BASELINE HUMAN HEALTH RISK ASSESSMENT

STANDARD CHLORINE CHEMICAL CO. INC. SITE
KEARNY, NEW JERSEY

Prepared for:

Performing Parties Group
(Beazer East, Inc., Cooper Industries, LLC, Tierra Solutions, Inc., on behalf of Occidental Chemical Corporation and Apogent Transition Corporation)

Prepared by:

Key Environmental, Inc.
200 Third Avenue
Carnegie, Pennsylvania 15106

DECEMBER 2014

333172

TABLE OF CONTENTS

1.0 INTRODUCTION 1-1
1.1 OVERVIEW OF THE BHHRA 1-1

2.0 SITE BACKGROUND AND SETTING 2-1
2.1 SITE DESCRIPTION 2-1
2.2 SITE HISTORY 2-2
2.2.1 Interim Remedial Measures (IRMs) 2-3
2.2.2 Interim Response Action (IRA) 2-4
2.2.3 Removal Action 2-5
2.2.4 Additional Response Actions 2-5
2.3 LAND AND WATER USE 2-6
2.4 CURRENT SITE OPERATIONS, MAINTENANCE AND MONITORING (OM&M) 2-7

3.0 CONCEPTUAL SITE MODEL 3-1
3.1 SOURCES OF CONTAMINATION 3-1
3.2 FATE AND TRANSPORT 3-2
3.3 MIGRATION PATHWAYS 3-3
3.4 EXPOSURE MEDIA 3-3
3.4.1 Current Site Conditions 3-4
3.4.2 Future Site Conditions 3-5
3.5 EXPOSURE UNITS 3-6
3.6 EXPOSURE PATHWAYS 3-6

4.0 SELECTION OF CHEMICALS OF POTENTIAL CONCERN 4-1
4.1 DATA EVALUATION 4-1
4.1.1 Western Portion of the Site 4-2
4.1.2 Eastern Portion of the Site 4-2
4.1.3 On-Site Groundwater 4-2
4.2 DATA USABILITY 4-2
4.3 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN (COPCS) 4-3
4.3.1 On-Site Surface Soils (0 to 2 Feet Deep) 4-5
4.3.2 On-Site Surface and Subsurface Soils (0 to 10 Feet Deep) 4-5
4.3.3 On-Site Groundwater 4-6

5.0 EXPOSURE ASSESSMENT 5-1
5.1 EXPOSURE PATHWAYS 5-1
5.2 CHARACTERIZATION OF POTENTIAL RECEPTORS 5-2
5.3 EXPOSURE POINT CONCENTRATIONS 5-4
5.4 ESTIMATION OF EXPOSURE AND INTAKE 5-5
5.5 ESTIMATION OF CHEMICAL ABSORPTION 5-6
5.5.1 Gastrointestinal Availability 5-6
5.5.2 Dermal Absorption of Chemicals from Soil 5-6

5.5.3 Dermal Absorption of Chemicals from Water 5-7
5.6 EXPOSURE ASSUMPTIONS 5-8
5.6.1 Assumptions Common to all Pathways and Receptors 5-8
5.6.2 Equations Used to Estimate Intakes/Doses 5-8
5.6.3 HCTS Operator Exposure Parameters (Current and Future) 5-12
5.6.4 On-Site Visitor 5-13
5.6.5 Construction Worker/Utility Worker 5-13
5.6.6 Outdoor Industrial Worker 5-15
5.6.7 Indoor Industrial or Commercial Worker 5-15
5.7 LEAD EXPOSURE 5-16

6.0 TOXICITY ASSESSMENT 6-1
6.1 EVALUATION OF POTENTIAL NON-CARCINOGENIC RESPONSE 6-1
6.1.1 Non-carcinogenic Toxicity Values 6-1
6.2 EVALUATION OF POTENTIAL CARCINOGENIC RESPONSES 6-2
6.2.1 Cancer Toxicity Values 6-2

7.0 RISK CHARACTERIZATION 7-1
7.1 ESTIMATING POTENTIAL NON-CARCINOGENIC RESPONSES 7-1
7.2 ESTIMATING POTENTIAL CARCINOGENIC RESPONSES 7-2
7.3 RESULTS 7-2
7.3.1 Western Surface Soil – Current/Future 7-3
7.3.2 Eastern Surface Soil – Current/Future 7-5
7.3.3 Western Surface/Subsurface Soil and Shallow Groundwater– Future 7-6
7.3.4 Eastern Surface/Subsurface Soils and Shallow Groundwater– Future 7-7
7.4 VAPOR INTRUSION 7-8
7.4.1 Vapor Intrusion from Soil 7-8
7.4.2 Vapor Intrusion from Groundwater 7-9

8.0 SUMMARY AND CONCLUSIONS 8-1
8.1 WESTERN AREA SURFACE SOIL 8-1
8.2 EASTERN AREA SURFACE SOILS 8-2
8.3 WESTERN AREA SURFACE/SUBSURFACE SOIL AND SHALLOW GROUNDWATER 8-3
8.4 EASTERN AREA SURFACE/SUBSURFACE SOIL AND SHALLOW GROUNDWATER 8-3
8.5 POTENTIAL USE OF GROUNDWATER FOR DRINKING WATER 8-4
8.6 VAPOR INTRUSION INTO STRUCTURES 8-4
8.7 SUMMARY AND CONCLUSIONS 8-4
8.8 UNCERTAINTY ANALYSIS 8-5

9.0 REFERENCES 9-1

TABLES	RAGS PART D TABLE NUMBER	
3-1	1	SELECTION OF EXPOSURE PATHWAYS
4-1	N/A	SOIL SAMPLE SUMMARY TABLE
4-2	2.1	OCCURRENCE, DISTRIBUTION AND SELECTION OF COPCS WESTERN AREA SURFACE SOILS
4-3	2.2	OCCURRENCE, DISTRIBUTION AND SELECTION OF COPCS – EASTERN AREA SURFACE SOILS
4-4	2.3	OCCURRENCE, DISTRIBUTION AND SELECTION OF COPCS – EASTERN AREA SUBSURFACE SOILS
4-5	2.4	OCCURRENCE, DISTRIBUTION AND SELECTION OF COPCS – EASTERN AREA SUBSURFACE SOILS
4-6	2.5	OCCURRENCE, DISTRIBUTION AND SELECTION OF COPCS WESTERN AREA SHALLOW GROUNDWATER
4-7	2.6	OCCURRENCE, DISTRIBUTION AND SELECETION OF COPCS – EASTERN AREA SHALLOW GROUNDWATER
4-8	2.7	OCCURRENCE, DISTRIBUTION AND SELECTION OF COPCS – VAPOR INTRUSION FROM SHALLOWGROUNDWATER
5-1	3.1.RME	WESTERN AREA SURFACE SOIL – EPC – RME
5-2	3.1.CT	WESTERN AREA SURFACE SOIL – EPC - CT
5-3	3.2.RME	EASTERN AREA SURFACE SOIL – EPC - RME
5-4	3.2.CT	EASTERN AREA SUBSURFACE SOIL – EPC – CT
5-5	3.3.RME	WESTERN AREA SUBSURFACE SOIL – EPC – RME
5-6	3.3.CT	WESTERN AREA SUBSURFACE SOIL – EPC - CT
5-7	3.4.RME	EASTERN AREA SUBSURFACE SOIL – EPC – RME
5-8	3.4.CT	EASTERN AREA SUBSURFACE SOIL – EPC – CT
5-9	3.5.RME	WESTERN AREA SHALLOW (FILL UNIT) GROUNDWATER – EPC FOR DIRECT CONTACT – RME
5-10	3.5.CT	WESTERN AREA SHALLOW (FILL UNIT) GROUNDWATER – EPC FOR DIRECT CONTACT – CT
5-11	3.5.RME	EASTERN AREA SHALLOW (FILL UNIT) GROUNDWATER – EPC FOR DIRECT CONTACT – RME AND CT
5-12	3.6.RME	EPC FOR VAPOR INTRUSION FROM SHALLOW GROUNDWATER - RME
5-13	3.6.CT	EPC FOR VAPOR INTRUSION FROM SHALLOW GROUNDWATER – CT
5-14	4.1.RME	CURRENT/FUTURE SURFACE SOIL EXPOSURE – VALUES USED FOR DAILY INTAKE CALCULATIONS – RME
5-15	4.1.CT	CURRENT/FUTURE SURFACE SOIL EXPOSURE – VALUES USED FOR DAILY INTAKE CALCULATIONS – CT
5-16	4.2.RME	FUTURE SURFACE AND SUBSURFACE SOIL EXPOSURE – VALUES USED FOR DAILY INTAKE CALCULATIONS – RME

5-17	**4.2.CT**	**FUTURE SURFACE AND SUBSURFACE SOIL EXPOSURE – VALUES USED FOR DAILY INTAKE CALCULATIONS – CT**
5-18	**4.3.RME**	**FUTURE GROUNDWATER EXPOSURE – VALUES USED FOR DAILY INTAKE – RME**
5-19	**4.3.CT**	**FUTURE GROUNDWATER EXPOSURE – VALUES USED FOR DAILYINTAKE CALCULATIONS – CT**
5-20	**4.4.RME**	**FUTURE INDOOR AIR EXPOSURE – VALUES USED FOR DAILYINTAKE CALCULATIONS – RME**
5-21	**4.4.CT**	**FUTURE INDOOR AIR EXPOSURE – VALUES USED FOR DAILY INTAKE CALCULATIONS – CT**
6-1	**5.1**	**NON-CANCER TOXICITY DATA – ORAL/DERMAL**
6-2	**5.2**	**NON-CANCERN TOXICITY DATA – INHALATION**
6-3	**6.1**	**CANCER TOXICITY DATA – ORAL/DERMAL**
6-4	**6.2**	**CANCER TOXICITY DATA – INHALATION**
7-1	**9.1.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS WESTERN AREA SURFACE SOIL – RME - VISITOR**
7-2	**9.1.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SURFACE SOIL – CT - VISITOR**
7-3	**9.2.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SURFACE SOIL – RME – HCTS OPERATOR**
7-4	**9.2.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SURFACE SOIL – CT– HCTS OPERATOR**
7-5	**9.3.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - WESTERN AREA SURFACE SOIL – RME – OUTDOOR WORKER**
7-6	**9.3.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SURFACE SOIL – CT – OUTDOOR WORKER**
7-7	**9.4.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS EASTERN AREA SURFACE SOIL – RME – VISITOR**
7-8	**9.4.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – EASTERN AREA SURFACE SOIL – CT – VISITOR**
7-9	**9.5.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – EASTERN AREA SURFACE SOIL – RME – HCTS OPERATOR**
7-10	**9.5.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – EASTERN AREA SURFACE SOIL – CT – HCTS OPERATOR**
7-11	**9.6.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – EASTERN AREA SURFACE SOIL – RME – OUTDOOR WORKER**
7-12	**9.6.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – EASTERN AREA SURFACE SOIL – CT – OUTDOOR WORKER**
7-13	**9.7.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - RME – CONSTRUCTION WORKER**

7-14	**9.7.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - CT – CONSTRUCTION WORKER**
7-15	**9.8.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - RME – UTILITY WORKER**
7-16	**9.8.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - CT – UTILITY WORKER**
7-17	**9.9.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - RME – CONSTRUCTION WORKER**
7-18	**9.9.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - CT – CONSTRUCTION WORKER**
7-19	**9.10.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - RME – UTILITY WORKER**
7-20	**9.10.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - CT – UTILTY WORKER**
7-21	**9.11.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - RME – INDOOR WORKER**
7-22	**9.11.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - CT – INDOOR WORKER**
7-23	**9.12.RME**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - RME – INDOOR WORKER**
7-24	**9.12.CT**	**SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCS - EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER - CT – INDOOR WORKER**
8-1	**10.1RME**	**RISK SUMMARY – WESTERN AREA SURFACE SOIL – RME – VISITOR**
8-2	**10.2.RME**	**RISK SUMMARY – WESTERN AREA SURFACE SOIL – RME – HCTS OPERATOR**
8-3	**10.2.CT**	**RISK SUMMARY – WESTERN AREA SURFACE SOIL – CT – HCTS OPERATOR**
8-4	**10.3.RME**	**RISK SUMMARY – WESTERN AREA SURFACE SOIL – RME – OUTDOOR WORKER**
8-5	**10.3.CT**	**RISK SUMMARY – WESTERN AREA SURFACE SOIL – CT – OUTDOOR WORKER**

8-6 10.4.RME RISK SUMMARY – EASTERN AREA SURFACE SOIL – RME – VISITOR
8-7 10.4.CT RISK SUMMARY – EASTERN AREA SURFACE SOIL – CT– VISITOR
8-8 10.5.RME RISK SUMMARY – EASTERN AREA SURFACE SOIL – RME – HCTS OPERATOR
8-9 10.5.CT RISK SUMMARY – EASTERN AREA SURFACE SOIL – CT – HCTS OPERATOR
8-10 10.6.RME RISK SUMMARY – EASTERN AREA SURFACE SOIL – RME – OUTDOOR WORKER
8-11 10.6.CT RISK SUMMARY – EASTERN AREA SURFACE SOIL – CT – OUTDOOR WORKER
8-12 10.7.RME RISK SUMMARY – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – RME- CONSTRUCTION WORKER
8-13 10.7.CT RISK SUMMARY – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – CT – CONSTRUCTION WORKER
8-14 10.8.RME RISK SUMMARY – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – RME - UTILITY WORKER
8-15 10.8.CT RISK SUMMARY – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – CT – UTILITY WORKER
8-16 10.9.RME RISK SUMMARY – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – RME- CONSTRUCTION WORKER
8-17 10.9.CT RISK SUMMARY – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – CT - CONSTRUCTION WORKER
8-18 10.10.RME RISK SUMMARY – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – RME- UTILITY WORKER
8-19 10.10.CT RISK SUMMARY – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – CT - UTILITY WORKER
8-20 10.11.RME RISK SUMMARY – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – RME – INDOOR WORKER
8-21 10.11.CT RISK SUMMARY – WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – CT – INDOOR WORKER
8-22 10.12.RME RISK SUMMARY – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – RME – INDOOR WORKER
8-23 10.12.CT RISK SUMMARY – EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER – CT – INDOORWORKER

FIGURES

2-1 SITE LOCATION MAP
2-2 2012 AERIAL PHOTOGRAPH
2-3 HISTORICAL SITE ARRANGEMENT SHOWING INTERIM MEASURES (2008)
2-4 CURRENT SITE CONDITIONS (2012)
3-1 CONCEPTUAL SITE MODEL
4-1 SAMPLE LOCATION MAP

APPENDICES

A CLASSIFICATION EXCEPTION AREA/WELL RESTRICTION AREA
B AIR MONITORING RESULTS
C COPC SCREENING FOR RESIDENTIAL LAND USE
D CHEMICAL-SPECIFIC INPUT PARAMETERS
E RISK CALCULATION SPREADSHEETS (RAGS PART D TABLE 7'S)
F STATISTICAL TESTS (GOODNESS OF FIT AND UCLS)
G LEAD RISK CALCULATIONS (ADULT LEAD MODEL)
H VAPOR INTRUSION CALCULATIONS (JOHNSON AND ETTINGER MODEL)

ABBREVIATIONS/ACRONYMNS

ABS	Dermal Absorption Fraction
ACO	Administrative Consent Order
ADD	Average Daily Dose
Agreement	Administrative Settlement Agreement and Order on Consent
Apogent	Apogent Transition Corporation
Beazer	Beazer East, Inc.
BHHRA	Baseline Human Health Risk Assessment
Cooper	Cooper Industries, LLC
COPC	Chemical of Potential Concern
CSF	Cancer Slope Factor
CSM	Conceptual Site Model
CT	Central Tendency
DNAPL	Dense Non-Aqueous Phase Liquid
EE/CA	Engineering Evaluation/Cost Analysis
EPC	Exposure Point Concentration
FFS	Focused Feasibility Study
Group	Performing Parties Group
HCTS	Hydraulic Control Treatment System
IRA	Interim Response Action
IRAW	Interim Response Action Workplan
IRM	Interim Remedial Measure
IUR	Inhalation Unit Risk
KEY	Key Environmental, Inc.
LADD	Lifetime Average Daily Dose
LOAEL	Lowest Observed Adverse Effect Level
MCL	Maximum Contaminant Level
MESA	Memorandum on Exposure Scenarios and Assumptions
mg/kg	milligrams per kilogram
NJDEP	New Jersey Department of Environmental Protection
NJPDES	New Jersey Pollutant Discharge Elimination System
NOAEL	No Observed Adverse Effect Level
NJPDES	New Jersey Pollutant Discharge Elimination System
NPL	National Priorities List
OCC	Occidental Chemical Corporation
OM&M	Operations, Maintenance and Monitoring
PAH	Polycyclic Aromatic Hydrocarbon
PAR	Pathway Analysis Report
PCBs	Polychlorinated biphenyls
PCDD/PCDF	Polychlorinated dibenzodioxin/Polychlorinated dibenzofuran
PDM	Processed Dredge Material
PRG	Peninsula Restoration Group

ABBREVIATIONS/ACRONYMNS (Continued)

RA	Removal Action
RfC	Reference Concentration
RfD	Reference Dose
RI	Remedial Investigation
RME	Reasonable Maximum Exposure
RSL	Regional Screening Level
SCCC	Standard Chlorine Chemical Co., Inc.
Site	Standard Chlorine Chemical Co., Inc. Site
SOW	Statement of Work
TCDD	2,3,7,8-Tetrachlorodibenzo-p-dioxin
TEF	Toxicity Equivalence Factor
Tierra	Tierra Solutions, Inc.
UCL	95% Upper Confidence Limit
USEPA	United States Environmental Protection Agency

1.0 INTRODUCTION

This Baseline Human Health Risk Assessment (BHHRA) for the Standard Chlorine Chemical Co. Inc. (SCCC) Site (Site) located in Kearny, New Jersey was prepared by Key Environmental, Inc., (KEY) on behalf of the Performing Parties Group (Group). The Group consists of Beazer East, Inc. (Beazer), Cooper Industries, LLC (Cooper), Tierra Solutions, Inc. (Tierra) on behalf of Occidental Chemical Corporation (OCC), and Apogent Transition Corporation (Apogent). This work is being conducted pursuant to the Statement of Work (SOW) issued by the United States Environmental Protection Agency (USEPA) as Appendix A of the Administrative Settlement Agreement and Order on Consent dated May 3, 2013 (Agreement). Task 7.4 of the SOW delineates the requirements for the BHHRA submittal. In accordance with the approved Final Remedial Investigation/Focused Feasibility Study Work Plan (RI/FFS Work Plan; KEY, September 2013), the Group has incorporated the information previously prepared for the Pathway Analysis Report (PAR; KEY, May 2014) to meet USEPA risk assessment requirements. The PAR also addressed the information requirements for the Memorandum on Exposure Scenarios and Assumptions (MESA) as specified in the SOW. This document incorporates the Group's response to comments received from the USEPA on the PAR.

1.1 OVERVIEW OF THE BHHRA

In order to define likely exposure scenarios and associated potential human health risks, KEY considered both current and reasonably foreseeable future use(s) of the Site, the remedial measures completed, and ongoing and established restrictions in land use. Hypothetical future exposures were identified to be consistent with planned remedial measures, land use restrictions (i.e., zoning) and reasonably expected future use of the Site for non-residential purposes based on a 2013 redevelopment plan (New Jersey Meadowlands Commission, February 2013).

The PAR addressed the exposure setting and receptor characteristics for the Site based on current and reasonably foreseeable future land use and exposure pathways by which potential receptors may be exposed in the absence of added remedial measures or land use restrictions. Exposure pathways were identified based on consideration of the sources and locations of contaminants, existing remedial measures and ongoing controls, the likely environmental fate of the contaminants, and the location and activities of the potentially exposed populations. The PAR identified potential exposure points and potential routes of exposure for each potential exposure pathway, as well as specific parameters that define the characteristics of the receptor groups. The PAR also identified specific chemicals of concern for each exposure medium/scenario combination and presented the results of statistical analysis of the analytical results to define potential exposure point concentrations. Finally, the PAR presented the toxicity information that is used in the BHHRA to quantify estimated theoretical human health risks to the various chemicals of concern in environmental media. In summary, the PAR presented all information required in Tables 1 through 6 of Part D: Standardized Planning, Reporting and Review of the USEPA's current risk assessment guidance (USEPA, December 2001a). Technical comments received from USEPA in June 2014 on the PAR were incorporated into this BHHRA, as requested in the transmittal letter (USEPA, June 17, 2014). In addition to the information presented in the PAR, the BHHRA incorporates information required in Tables 7 through 10 of the USEPA guidance, as per the SOW, excluding Table 8 which is for presenting radiation risks and is not applicable to the SCCC Site.

This BHHRA was developed in accordance with USEPA guidance set forth in the following documents:

- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part A* (USEPA, December 1989)
- *Risk Assessment Guidance for Superfund: Volume III-Part A, Process for Conducting Probabilistic Risk Assessment* (USEPA, December 2001b)
- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part D, Standardized Planning, Reporting and Review of Superfund Risk Assessments* (USEPA, December 2001a)
- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part E, Supplemental Guidance for Dermal Risk Assessment* (USEPA, July 2004)
- *Risk Assessment Guidance for Superfund: Volume I: Human Health Evaluation Manual, Part F, Supplemental Guidance for Inhalation Risk Assessment* (USEPA, January 2009)
- *Exposure Factors Handbook: 2011 Edition* (USEPA, September 2011)
- *Exposure Factors Handbook: Volumes I, II, and III* (USEPA, August 1997)
- *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites* (USEPA, December 2002)
- *Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway for Groundwater and Soils* (USEPA, November 2002)

Additional guidance documents were used as required for the evaluation of particular exposure scenarios. All such guidance documents are referenced in that specific text section as needed.

BHHRA consists of nine sections, as follows:

- Section 1 – Introduction
- Section 2 – Site Background and Setting
- Section 3 – Conceptual Site Model
- Section 4 – Selection of Chemicals of Potential Concern
- Section 5 – Exposure Assessment
- Section 6 – Toxicity Assessment
- Section 7 – Risk Characterization
- Section 8 – Summary and Conclusions
- Section 9 – References

In addition, several figures have been included in this document to help the reader identify the Site characteristics described herein. Appendices have been included as well to provide additional or background information to support this BHHRA.

2.0 SITE BACKGROUND AND SETTING

The SCCC Site is located at 1025-1035 Belleville Turnpike in Kearny, New Jersey. Figure 2-1 is a Site location map which shows the existing Site boundaries on a base map which consists of combined portions of two United States Geologic Survey 7.5 minute quadrangles (Jersey City and Weehawken, New Jersey). The Site is situated adjacent to the Hackensack River in Hudson County, New Jersey, and is located approximately 4,000 feet east of the intersection of I-95 and I-280. The Site is bounded to northeast by the Hackensack River, to the south by the adjacent Seaboard Site, to the north by the adjacent Diamond Site, and to the west by the Belleville Turnpike. Substantial remedial measures have been implemented at the Site as discussed in detail in Section 2.2. A recent aerial photograph taken in 2012 depicting current Site conditions is provided as Figure 2-2.

The Site, as the description is used in this BHHRA, refers to the definition of the "Site" in the Agreement and the RI/FFS SOW, with the following considerations regarding the riparian parcel (known as Lot 52R or 52.01): 1) there are no complete human or ecological exposure pathways to the sediments or surface waters historically affected by the Site; 2) historical discharges to surface waters have been eliminated via upgraded stormwater management systems, remedial activities that removed sediments and soft soils in the drainage ditches; 3) stormwater sampling and analysis has shown no loading to the river via runoff or groundwater intrusion in the storm sewer; 4) the groundwater is fully contained within the barrier wall system and does not discharge to the river; 5) the top three feet of near-shore river sediments were removed and restoration was completed, thereby eliminating potential exposures of both human and ecological receptors; and 6) given the existence of multiple other point and area sources in the watershed, the USEPA has determined that the Hackensack River surface waters are more appropriately assessed under a broader program; and as a result, discussions regarding the River are ongoing between the USEPA and the New Jersey Department of Environmental Protection (NJDEP). Further, while past remedial response actions on the SCCC Site have been integrated with areas of contiguous impact on the adjacent Diamond and Seaboard sites, those sites are adequately regulated under the State of New Jersey, Department of Environmental Protection (NJDEP) requirements and are excluded from consideration in the BHHRA. The one exception is consideration of potential exposure pathways associated with SCCC Site impacts that have not been addressed through past/ongoing remedial actions (e.g., consideration of DNAPL in soil and groundwater impacts located beyond the influence of barrier wall/containment system).

2.1 SITE DESCRIPTION

The BHHRA evaluates an area of approximately 25 acres, consisting of five upland parcels and one riparian parcel, referred to on the Tax Map of the Town of Kearny as Block 287, Lots 48, 49, 50, 51, 52 and 52R, respectively. These lots currently are owned by the Town of Kearny. The outer property boundaries encompass another parcel, Lot 32.01, which is a former railroad right-of-way currently owned by the Hudson County Improvement Authority. Figure 2-3 identifies the lot numbers for the various Site parcels. The Site is located along the tidal portion of the Hackensack River. The entire property lies within the 100-year floodplain of the Hackensack River (EDR, May 5, 2008).

The Site is located in a former meadow that was filled at the beginning of the 20th century. The filling occurred to support industrial development of the Site and surrounding properties in the early 20th century. Significant areas of meadowlands remain north and west of the Site.

Hudson County lies within the Piedmont Province of New Jersey. It is mainly underlain by slightly folded and faulted sedimentary rocks of Triassic and Jurassic age (240 to 140 million years old) and igneous rocks of Jurassic age. Geology at the Site consists of upper fill materials ranging in thickness from 2 to 10 feet, an underlying peat layer locally referred to as the Meadow Mat (typically 2 to 8 feet thick), a deeper sand unit approximately 10 feet thick, and below these units, a massive low permeability varved clay unit acting as an aquitard. The varved clay is continuous beneath the areal extent of the Site, is at least 40 feet thick, prevents downward vertical migration of Site constituents into the underlying glacial till and bedrock.

2.2 SITE HISTORY

Various forms of chemical manufacturing, blending/mixing, and/or processing have occurred on the different parcels that make up the Site since 1916. Activities included naphthalene refining and product formulation, dye-carrier production, dichlorobenzene refining and product formulation, and lead-acid battery manufacture. Additionally, it has been reported that former Site owners and/or operators placed fill materials on the Site. These activities were performed by multiple parties on different parcels of the Site. Figure 2-3 is a map that shows the historical Site arrangement just prior to initiation of an extensive Interim Response Action (IRA) completed from 2010 through 2011. The property lines and parcels, as well as the building numbers subsequently referenced, are identified on this figure.

In October 1989, the NJDEP and SCCC entered into an Administrative Consent Order (ACO). This ACO required SCCC to plan and implement the following:

- Intrim Remedial Measures (IRMs) to prevent potential contact with materials in the lagoon area and to secure damaged tanks and containers;
- A Remedial Investigation and Feasibility Study; and,
- Selected Remedial Alternative(s).

Subsequent to the ACO, a remedial investigation was conducted in a phased approach between 1990 and 1999. The SCCC Site has also been investigated and remediated for chromium-related impacts pursuant to the April 1990 ACO between NJDEP and Occidental Chemical Corporation[1]. In addition, various IRMs were completed, as described in Section 2.2.1.

In December 2001, NJDEP referred the Site to USEPA for proposed inclusion on the National Priorities List (NPL). On April 30, 2003, the USEPA proposed to add the Site to the NPL and the Site was subsequently listed on September 19, 2007. Work under the SCCC ACO continued through the period of Site Listing, and included the development of an NJDEP-approved Interim Response Action Workplan (IRAW). Upon Site listing, an Engineering Evaluation/Cost Analysis (EE/CA) corresponding to the

[1] Tierra is also a party to this ACO but only with respect to the adjacent Diamond Site and the 1990 ACO is now modified and superseded by the September 7, 2011 Consent Judgment.

response proposed in the NJDEP-approved IRAW was submitted to (and approved by) the USEPA. The USEPA designated NJDEP as the lead agency for implementation of the IRA as described in the IRAW and EE/CA, but the USEPA remains the lead agency for all other response activities undertaken at the Site.

Over the last twenty-five to thirty years numerous investigative and interim response activities have been undertaken at the Site. Most of these activities were completed on behalf of or by SCCC, the Peninsula Restoration Group (PRG) (a group that consisted of Beazer, Tierra on behalf of OCC, and SCCC), and most recently, by the Group. While the PRG and NJDEP were in the process of negotiating a scope of work for an IRA, activities such as multiple work plan submittals, an asbestos and lead paint survey, wetlands delineation, an aerial topographic survey, waste classification requests, off-site disposal of demolition debris, numerical groundwater model development, vault content sampling and analysis, and a request to use the USEPA's Area of Contamination Policy were completed proactively by the PRG. Environmental investigations, dating back to the early 1980s, have also been completed for the Site, as follows:

1983-1984	Hydrogeologic Investigation	Roy F. Weston, Inc.
1985	Phase II Dioxin Investigation	E.C. Jordan, Inc.
1987	Stage 1 Dioxin Investigation	Roy F. Weston, Inc.
1988	Stage 2 and 3 Dioxin Investigations	Roy F. Weston, Inc.
1991	Chromium Delineation	French & Parrello Associates
1990-1993	Remedial Investigation/Supplemental RI	Roy F. Weston, Inc.
1996-1997	Focused Remedial Investigation	ERM, Inc.
1997-1999	Supplemental Remedial Investigation	Key Environmental, Inc.
2000	Soil/Sediment Sampling and Analysis	Enviro-Sciences, Inc.
2000	Characterization of Containerized Materials	Enviro-Sciences, Inc.
2001	Remedial Investigation Site 116	Brown and Caldwell
2002	Surface Water and Sediment Sampling	USEPA TAT
2008-2009	IRA Pre-Design Investigation	Key Environmental, Inc.
2008-2009	Phase II Supplemental RI	Key Environmental, Inc.
2013	RI/Focused Feasibility Study Investigation	Key Environmental, Inc.

From 2002 through 2008, various project planning activities were undertaken with respect to pre-design, remedial investigation and interim response activities. Multiple response actions have been undertaken at the Site, consisting of IRMs, an IRA, a Removal Action, and other miscellaneous responses. Brief descriptions of these responses follow.

2.2.1 Interim Remedial Measures (IRMs)

Various IRMs have been implemented at the Site dating back to the early 1990s. These IRMs have been completed to preclude potential risks associated with exposure to chromium-impacted soils, to preclude access to impacted soils and the lagoon in the former process area, to control fugitive dust emissions, to provide protection of the lagoon area from flooding, and to control potential constituent migration via existing storm sewers. IRM activities were as follows:

- Installation of security fencing surrounding a former production area and lagoons to prevent unauthorized access (early 1990s) - Lots 49 and 52;

- Addition of soil to the lagoon berm to increase its height and freeboard to prevent potential overflows (early 1990s) - Lot 52;
- Placement of stabilizing geotextile and rip rap along the Hackensack River shoreline in the vicinity of the lagoons (early 1990s) - Lot 52;
- Removal of the contents of five above-ground storage tanks and repackaging of asbestos-containing material removed from the former distillation building (early 1990s) - Lot 49;
- Installation of an asphalt pavement overlay on traffic areas where existing deteriorated asphalt pavement was present (1991) - Lots 48, 49, and 51;
- Installation of geotextile fabric/aggregate/asphalt cover in all remaining traffic areas where total chromium concentrations exceeded the NJDEP criterion in effect at the time, 75 milligrams per kilogram (mg/kg) (1991) - Lots 49 and 52;
- Geotextile/geomembrane liner/aggregate cover construction in non-traffic areas west of a railroad right-of-way (1991) - Lot 51;
- Installation of a dust fence barrier along the railroad right-of-way and north fence line of the former northeast process area (1991) - Lots 49 and 52; and,
- Improvements to existing stormwater sewer located between the Site and the adjacent Diamond Site to the north (2008) - Lots 48 and 49.

Site conditions upon completion of the IRMs (2008) are presented in Figure 2-3.

2.2.2 Interim Response Action (IRA)

An IRA was completed in 2010 and 2011 and included significant construction components which have resulted in containment, control, and treatment of impacted media at the Site. The IRA was designed to address environmental conditions at both the Site and at the adjacent Diamond Site. The IRA was completed to eliminate the potential for subsurface discharge of constituents to the Hackensack River from the Site, to eliminate the potential for overland runoff of constituents to the Hackensack River from the Site, to remove Dense Non-Aqueous Phase Liquid (DNAPL) to the extent practicable as a source control measure, and to eliminate the potential for direct contact with constituents of interest at the Site. The IRA consisted of the following major components:

- Site preparation activities
- Physical barrier wall system installation to eliminate groundwater discharge to the River
- Hydraulic Control and Treatment System (HCTS) construction
- DNAPL recovery system installation
- Lagoon dewatering, backfilling, and surface cover installation
- Near-shore sediment management (excavation and disposal)
- South Ditch sediment management and stormwater management system construction
- Consolidation Area construction
- Wetland and shoreline mitigation
- Septic tank closure
- Transformer pad removal and remediation
- Site restoration
- Air monitoring activities

Compete details of the IRA are presented in the IRA Report (KEY, December 2011). In summary, implementation of the IRA was such that engineering controls effectively eliminate potential exposure pathways to human receptors both at the surface and in the subsurface, including:

- A slurry wall that is keyed into the varved clay unit that fully encloses the Site and the adjacent Diamond Site
- A steel sheet pile wall installed along the river bank, extending into the varved clay, that further separates the Site from the Hackensack River
- A partial cap that prevents direct contact and overland runoff
- A new and upgraded infiltration-resistant stormwater management system
- Multiple potential sources and impacted media have been removed or managed (i.e., polychlorinated biphenyls (PCB) impacted soil from the transformer area, wastewater treatment lagoons, septic tanks, ditch sediments, and near-shore river sediments)
- Reductions in toxicity, mobility, and volume of constituents in Site groundwater have been achieved and are ongoing via the operation of groundwater and DNAPL recovery wells
- Construction and operation of an effective, permitted groundwater treatment plant, the HCTS, with unit operations consisting of chromium reduction, metals precipitation, carbon adsorption, oil separation, and solids management (operating in compliance with effluent limits established under New Jersey Pollutant Discharge Elimination System (NJPDES) Permit No. NJ0155438)
- Inspection, maintenance and operation of the HCTS conducted in accordance with Appendix D of the USEPA-approved RI/FFS Workplan, with quarterly reports submitted to the agency

2.2.3 Removal Action

A Removal Action (RA) was completed at the Site in 2010 which consisted of sealing existing structures on Lot 49 that were perceived to be potential sources of wind-borne particulates. The RA was completed pursuant to an Administrative Settlement Agreement and Order on Consent for Removal Action entered into between the USEPA, SCCC, and Beazer dated June 7, 2010. An Administrative Order Notice of Completion was issued by the USEPA on January 20, 2011. The buildings that were sealed have since been demolished and removed from the Site.

2.2.4 Additional Response Actions

Several additional response actions have been completed at the Site and consisted of demolition of the majority of the Site structures and disposal of historical containerized materials associated with past abatement operations and Site investigations. Demolition of all structures except historical structures associated with former activities of Thomas A. Edison, Inc. at the Site (Buildings 1, 2, 3 and 4) has been completed. The demolition of the structures on Lots 48 and 49 was completed in three separate phases designated as Track 1, Track 2, and Track 3. Track 1 demolition was completed prior to IRA implementation to facilitate IRA construction activities. Track 2 and Track 3 building demolition was conducted as the IRA neared completion. NJDEP-approved work plans, which were also provided to USEPA for review, were prepared for each phase of the demolition work. Upon completion, each phase of demolition was summarized in a Demolition Remedial Action Report that was submitted to the NJDEP.

Various asbestos-abatement materials and investigation-derived waste had been previously containerized and stored at the Site in six SeaLand containers. These materials were appropriately characterized and managed on-site. A total of seven material shipments were made to an off-site disposal facility (Chemtron Corporation in Avon, Ohio). Current conditions on the Site, the adjacent Diamond Site and the northern portion of the Seaboard Site following IRA construction are shown in Figure 2-4.

2.3 LAND AND WATER USE

Land use in the general vicinity of the Site is limited to industrial and commercial use, and/or easements for transportation corridors. There are no nearby residential areas. The nearest residential area is in Jersey City, located more than one mile southeast of the Site and on the opposite side of the Hackensack River. Residential land uses are not planned as per the recently adopted redevelopment plan (New Jersey Meadowlands Commission, February 2013). Section 3 of the plan indicates that the area "is not an appropriate location to accommodate residential usage due to the industrial character of the area.

North of the Site is a former industrial property once operated by Diamond Shamrock and known as the Diamond Site, which is currently not in use, but contains two vacant structures. South of the Site is another former industrial property known as the Seaboard Site, which is currently used for the placement and spreading of processed dredge material (PDM). East of the Site is the Hackensack River. West of the Site is Belleville Turnpike and various outlying industrial properties.

Currently, the Site contains a few abandoned historic building structures, multiple foundations from buildings that were demolished during past response actions, the HCTS building, and a capped Consolidation Area. The New Jersey Meadowlands Commission (February 2013) has designated the Site and surrounding properties (a total of 74 properties on 367 acres) for redevelopment, with the goal of capitalizing on existing road, rail and marine transportation prospects in the area. In this plan, the Site was designated for Intermodal B land uses. Intermodal facilities are typically those where cargo is transferred from one mode of transportation to another. Recommended uses for the area consist of the following categories: 1) Industrial/storage/trucking uses; 2) Transport support services; 3) Neighborhood services (e.g., truck stops or retail to support working people); 4) Public or quasi/public uses (e.g., utilities); or 5) Water-dependent uses (boat sales and repair or port facilities). The goal is to return these properties to productive industrial or commercial uses. In addition, it should be noted that a groundwater classification exception area /well restriction area is in place for the Site and adjacent Sites (See Appendix A).

Historically, surface water runoff in portions of the Site was channeled into surface ditches and wetland areas that originated on the Site and flowed to the south into what was referred to as the South Ditch Surface water runoff from the South Ditch flowed toward the Hackensack River. In addition, an underground storm sewer with catchment basins located on the Diamond Site north of Lots 48 and 49 were upgraded in 2008, prior to the IRA.

As a major component of the IRA, a new infiltration-resistant storm water collection system was installed to manage the runoff previously discharged via the South Ditch. This system currently consists of underground high-density polyethylene conveyance pipes and a series of drop inlets. Since the former process areas, fill placement areas, and wastewater management units (lagoons) are covered or lie within

the limits of the capped Consolidation Area, erosion of surface soil is no longer occurring and no surface water or shallow groundwater discharges are present at the Site. Groundwater that collects within the slurry wall is pumped, treated and discharged under an NJPDES permit.

The Hackensack River adjacent to the Site is classified as SE2. This classification applies to saline estuarine water with the following designated uses:

- Maintenance, migration and propagation of the natural and established biota
- Migration of diadromous fish
- Maintenance of wildlife
- Secondary contact recreation
- Any other reasonable uses.

The Hackensack River in the Site vicinity is tidally influenced. A tidal range of approximately 5 to 6 feet occurs in this lower portion of the river. The Passaic River is approximately one mile west of the Site and discharges to Newark Bay which is located downstream of the Site, but no hydraulic connection exists between groundwater in the fill or sand unit aquifers at the Site and the Passaic River, or between the Site and the Hackensack River since the installation of the barrier wall in 2011. Furthermore, prior to the installation of the barrier wall, groundwater flow was toward the South. There are no known groundwater wells used as a source of private or public drinking water within one mile of the Site (KEY, May 2011). No drinking water intakes are located in the Hackensack River in this tidal reach due to the water being brackish. The Town of Kearny water is supplied by the Wanaque Reservoir in Bergen County, New Jersey. The entire Site lies within the 100-year floodplain of the Hackensack River (EDR, May 5, 2008).

2.4 CURRENT SITE OPERATIONS, MAINTENANCE AND MONITORING (OM&M)

The current Site OM&M activities consist of the following tasks:

- Visual inspection of the freshwater wetland mitigation areas
- Visual inspection of the various surface covers
- Visual inspection of the stormwater system
- Visual inspection of the barrier wall system and cathodic protection system
- Visual inspection of the consolidation area surface cover
- Visual inspection of Site security (fences)
- DNAPL recovery
- Operation of the hydraulic control groundwater extraction and treatment systems
- Waste management (i.e., spent carbon regeneration; DNAPL and filter cake characterization and off-site disposal)
- Measurement of potentiometric surface elevations and apparent DNAPL thicknesses
- Maintenance of the paved and vegetative surface covers
- Periodic maintenance of IRA and IRM components such as cathodic protection system
- Recordkeeping and regulatory reporting of the monitoring and maintenance activities

Operation and maintenance of the HCTS (including water discharge and air monitoring) is a primary component of OM&M activities for the Site. Certified personnel operate the HCTS in accordance with the requirements of an NJPDES/Discharge to Surface Water permit (Permit Number NJ0155438). The permit authorizes the off-site discharge of treated groundwater and lists the associated requirements such as effluent limits, influent and effluent monitoring, monthly and annual reporting, and recordkeeping. Inspection, maintenance and operation of the plant itself are conducted in accordance with the Operation, Maintenance and Monitoring Plan for the Standard Chlorine Chemical Company Site (KEY, July 2013). Reports on the OM&M are submitted to the USEPA on a quarterly basis as an appendix to the Monthly Progress Report.

The Site's shallow groundwater table within the barrier wall system is regulated by the hydraulic control wells connected to the HCTS. Monthly gauging of piezometers located inboard and outboard of the slurry wall as well as the hydraulic control and DNAPL recovery wells is conducted to evaluate the performance of the hydraulic control system. In addition, routine inspection and maintenance of various Site improvements, IRM and IRA features is completed as listed above. Operation and maintenance associated with these features is accomplished via the use of checklists and corrective action is initiated as required.

3.0 CONCEPTUAL SITE MODEL

A preliminary Conceptual Site Model (CSM) originally developed for the Site Characterization Summary Report (KEY, March 2013) was refined based on additional site sampling performed as part of the RI/FFS in late 2013 and the CSM developed for the Screening Level Ecological Risk Assessment (KEY, July 2014). This CSM is based on consideration of Site modifications resulting from implementation of the IRAs, including but not necessarily limited to, the existence of the fully-enclosing perimeter subsurface barrier wall system, the operation of the groundwater collection and treatment system (the HCTS), DNAPL gauging and passive recovery, the presence of historical and recent cover materials, the existence of the new infiltration-resistant stormwater management system, and on-site consolidation and capping of impacted materials (including South Ditch soft soils and near-shore river sediments), and source material removal and off-site disposal.

Under current Site conditions, the potential for Site-related exposures is considered to be minimal, as is the potential for off-site migration of any Site-related constituents. Figure 3-1 is a graphical representation of the CSM. This figure has been updated from the version originally presented in the Site Characterization Summary Report (KEY, March 2013) to incorporate information about groundwater quality in the area outside the slurry wall and the potential for direct contact with groundwater as well as recent stormwater sampling that confirm that under current conditions, no Site-related constituents are leaving the Site via either the new storm drains or via groundwater discharge to the storm drains.

3.1 SOURCES OF CONTAMINATION

Since the early 20th century, various forms of chemical manufacturing, processing or blending have occurred on the various parcels that make up the Site. These activities included naphthalene processing, dichlorobenzene and trichlorobenzene processing, battery manufacturing, and dye carrier blending operations. In addition, a variety of fill material has been emplaced at the Site. As a result, multiple classes of chemicals (volatile and semi-volatile organics (VOCs/SVOCs), PCBs, dioxins and furans, and metals have been detected in various environmental media over time.

Former source areas consisted of the following areas that have been remediated: chemical storage tanks and chemical processing operations, septic systems and tanks, an underground vault, wastewater treatment lagoons (dewatered, backfilled, solidified and capped) and wastewater discharges, a former PCB-transformer area (excavated), impacted surface materials and fill on the eastern and western portions of the property (removed and covered), soft soil formerly contained in the South Ditch, and DNAPL in the groundwater (contained within the barrier wall system).

The barrier wall system surrounds all of the former source areas and ensures that no off-site migration from former source areas occurs. Data collected in 2013 as part of the RI/FFS conducted pursuant to the Agreement indicated the presence of residual DNAPL in subsurface soil located within the sand unit at the top of the varved clay and corresponding dissolved phase impact to groundwater located outside the barrier wall near the southwest corner of the Site. Evaluation of the extent of impact outside the barrier wall is ongoing, and will be presented in a letter report that will include a risk assessment attachment and will constitute an addendum to this BHHRA.

3.2 FATE AND TRANSPORT

Chemicals may have been released to the environment via several mechanisms such as leaks and spills during former industrial manufacturing operations; wastewater discharges; overflows from the former wastewater lagoons; erosion of surficial materials and subsequent overland flow/discharge to drainage ditches; and the placement of fill material from both off-site and on-site sources.

This section presents a brief discussion of general fate and transport information for the major chemicals or classes of chemicals observed in various environmental media at the Site as well as general information indicative of chemical transport at the Site. Major classes of chemicals detected include chlorinated aromatic compounds (such as chlorobenzene, dichlorobenzene isomers and 1,2,4-trichlorobenzene); PCBs; polychlorinated dibenzodioxins/polychlorinated dibenzofurans (PCDDs/PCDFs); and polycyclic aromatic hydrocarbons (PAHs). In addition, various metals have been detected in Site media, including total and hexavalent chromium.

The following general statements can be made relative to fate and transport of the major classes of chemicals found at the Site:

- The chlorinated benzenes and naphthalene (a PAH) are the more water-soluble constituents observed in Site media. These compounds are considered to be more amenable to dissolution from DNAPL, leaching from the soils and reaching the groundwater where they could migrate in the dissolved phase (groundwater), than the PCBs, dioxins, and other PAHs. Further migration is also governed by chemical- and aquifer-specific characteristics (e.g., aqueous solubility, organic carbon partition coefficients, permeability or Henry's Law constants).
- Dioxins, PCBs, and most PAHs have high organic carbon partition coefficients, and are more likely to adsorb to soil materials and hence are considered less mobile. Sorption to the soil matrix inhibits migration.
- Chlorinated aromatics, PCBs and dioxins are generally considered to be resistant to natural biodegradation, while many lower molecular weight PAHs such as naphthalene are more amenable to these processes.
- Transport of many metals, which are generally not highly soluble, occurs primarily via particulate erosional mechanisms (e.g., runoff, wind erosion). Hexavalent chromium is a more soluble species, however it is readily reduced to the insoluble and immobile trivalent species in the presence of organic carbon (i.e., the Meadow Mat).

In general, Site conditions are favorable with respect to minimizing the transport of chemical constituents, especially with the presence of the underlying Meadow Mat and varved clay. The removal of source areas, construction of the Consolidation Area, upgrading of the storm sewers, and installation of the barrier wall also establish containment within contiguous areas of impact on the adjacent Diamond and Seaboard Sites.

3.3 MIGRATION PATHWAYS

The CSM indicates that the majority of potential migration pathways (and hence exposure scenarios) are incomplete under current Site conditions. Under existing Site conditions, potential migration pathways have been substantially addressed.

Installation of the slurry wall and steel sheet pile wall has effectively addressed the potential for discharge of constituents to adjacent properties (beyond the barrier wall) and the Hackensack River via subsurface routes. In addition, the slurry wall was also designed to encompass the potentially mobile DNAPL that extended onto the Seaboard Site to the south of the Site and this objective was also accomplished.

Reduction of toxicity, mobility, and volume of constituents in groundwater has been achieved to date and is ongoing via the operation of groundwater and DNAPL recovery wells and an effective, permitted groundwater treatment plant. The removal of soft soils from the South Ditch and near-shore sediments from the Hackensack River, in concert with construction of a water-tight stormwater management system, has also served to address potential overland transport pathways.

The construction of the SCCC Consolidation Area and the consolidation therein of various impacted materials under a multi-layer cap, coupled with the construction of the IRMs has served to address the potential for atmospheric transport of Site-related constituents. The IRMs and the Consolidation Area require ongoing maintenance and monitoring. The presence of cover materials (i.e., asphalt, gravel, the multi-layer cap on the Consolidation Area, etc.) eliminates the current wind or surface water runoff transport of surficial soil materials from beneath these covers, however, the covers require ongoing maintenance to ensure protection.

VOCs in shallow soils and groundwater (above the Meadow Mat) at the Site present a potential for vapor intrusion into future occupied structures. Upward migration of volatile emissions from the soil or groundwater can enter a structure through foundations, basements, slabs, etc. if their integrity is breached or the materials used are air-permeable.

Off-site migration of volatiles or particulates could occur during soil disturbance. However, air monitoring results from sampling conducted during various response activities indicated that neither volatiles nor particulates presented the potential for adverse effects to on-site workers during major soil disturbance activities (i.e., the installation of the barrier wall, piping for the HCTS, etc.).

3.4 EXPOSURE MEDIA

This section presents a summary of the exposure media of concern, as described in the CSM (Figure 3-1). Separate discussions of current and future potential Site conditions are included. Only those media to which exposures might reasonably be expected to occur under either current or future site conditions, are discussed. If a medium has been addressed under an IRM or IRA, that medium (e.g., soft soils in the South Ditch, lagoon sediments or transformer area soils) is not addressed further in this section. Potential exposures to surficial soils potentially eroded from the Site and transported via the enclosed stormwater system are not addressed because stormwater monitoring has shown that such releases are not occurring.

In addition, exposures to sediments and surface waters in the Hackensack River adjacent to the Site have been eliminated via interim response actions completed in 2010 and 2011 (i.e., the near-shore sediment removal, South Ditch excavation, and storm sewer culvert installation).

3.4.1 Current Site Conditions

Under current Site conditions, a limited number of media were considered as being potentially available for exposure based on the CSM presented as Figure 3-1. The following media were evaluated:

On-Site Groundwater – Retained for qualitative assessment. Groundwater is not currently used for potable purposes. Groundwater and associated DNAPL within the barrier wall is collected and treated by the HCTS, and all operations are conducted with appropriate health and safety considerations for potential occupational exposures. No use of shallow groundwater occurs in the vicinity of the Site. In addition, an institutional control prohibiting groundwater use is in effect for the Site, which includes a Classification Exception Area/Well Restriction Area (CEA-2240) established in 2003. A copy of the CEA is attached in Appendix A. Even though the CEA lists only chloride, chromium, hexavalent chromium and dissolved solids as contaminants of concern in Site groundwater, potable use of the on-Site groundwater is prohibited by the CEA/WRA. On-site groundwater will be evaluated qualitatively via a comparison to drinking water standards.

Off-Site Groundwater – Excluded from further consideration at this time. Groundwater impacts outside the barrier wall are not under the control of the current hydraulic containment system. Evaluation of the extent of this impact is ongoing; however areas that are currently impacted lie within the limits of the groundwater CEA, therefore potential current exposure is excluded from further consideration.

Particulate and Volatile Emissions (Off-Site Exposures) - Excluded from further consideration. Real-time personnel air monitoring as well as perimeter air monitoring conducted during the implementation of various IRAs indicated that even when soil disturbances occurred, potential exposures to volatile organics in air or particulates were negligible. Appendix B contains summary tables of the air monitoring results for both personnel and perimeter air monitoring that was conducted in 2011. No residential areas are located in the immediate vicinity nor are the immediately adjacent properties occupied on a regular basis, thereby eliminating these off-site residential or employee populations from further consideration.

Vapor Intrusion (On-Site Exposures) – Excluded from further consideration. The HCTS was constructed upon several feet of clean, imported fill material and a new cement slab with epoxy sealant, thereby eliminating upward migration of volatile emissions into the building.

Surface Soils – Retained for consideration under current land use conditions. Because there are personnel involved in intermittent inspection activities and operation of the HCTS, direct, infrequent exposures to surface materials may occur *if* the existing cover materials are disturbed. *Note that the entire surface is paved, covered with coarse gravel, or vegetated and actual exposures, if any, are considered to be minimal.*

Subsurface Soils – Excluded from further consideration under current land use conditions. Major remediation activities have been completed using proper health and safety techniques to minimize exposures to subsurface media. Current activities at the Site do not disturb the subsurface soil.

3.4.2 Future Site Conditions

Site media were also evaluated for exposure based on potential, reasonably expected future land use conditions. The rationale for inclusion or exclusion of various media follows:

On-Site Groundwater – Retained for quantitative assessment. Under future development scenarios, there is a limited potential for construction or utility workers to come into contact with shallow groundwater while involved in soil excavation. Best management practices would dictate that dewatering would be used given the shallow depth to groundwater absent the operation of the HCTS. In addition, the historic presence of volatile organics (chemicals most likely to permeate the skin during exposure) is limited in the shallow groundwater outside the limits of the Consolidation Area, and hence this potential exposure scenario is considered to be potentially insignificant under future land use conditions. Incidental, direct contact with shallow groundwater will be addressed quantitatively using conservative exposure assumptions.

Off-Site Groundwater – Retained for qualitative assessment. Evaluation of the extent of impact outside the barrier wall is ongoing; however no current or reasonably anticipated future use is anticipated since groundwater use is subject to a CEA and the adjacent land is occupied by major transportation corridors (Belleville Turnpike). Evaluation of off-Site groundwater will be addressed qualitatively in the risk assessment.

Particulate and/or Volatile Emissions – Onsite exposures retained for quantitative assessment. Off-site exposures excluded from further consideration. On-site air monitoring results are available for on-site workers during the implementation of the interim remedial actions and showed minimal exposures of workers during long-term soil disturbing activities. The use of standard industry dust control measures will reduce potential future exposures significantly. Because on-site impacts were negligible, off-site outdoor receptors' impacts would be even lower and hence will not be addressed quantitatively in the risk assessment.

Vapor Intrusion – Retained for quantitative assessment. Future potential exposure to volatiles via vapor intrusion into an occupied structure is considered to be an additional potential on-site exposure pathway for future indoor adult employees. Volatile emissions originating in the shallow groundwater and shallow soils are addressed quantitatively in the BHHRA.

Surface Soils – Retained for quantitative assessment. Under current Site conditions, the HCTS operators and site visitors may be exposed to surface soils on the Site as part of their job duties if the cover materials are disturbed for any reason. If the Site is redeveloped in some fashion, there is a potential for construction or utility workers to be exposed to surface media during certain discrete activities. In addition, redevelopment could also result in exposure of outdoor industrial workers such as landscapers on a more regular basis on the SCCC Site if cover materials are changed, removed, etc. On-site surface soils and fill material (beneath the current cover materials) are retained for a worst-case quantitative assessment.

Subsurface Soils – Retained for quantitative assessment. Again, redevelopment and its associated construction/utility work may bring workers into contact with subsurface soils at the SCCC Site. A depth of 10 feet was selected as the maximum likely depth of excavation given the presence of the Meadow Mat at a depth of about 10 feet on-site, and the fact that the depth to groundwater is artificially increased due to the operation of the HCTS. Therefore, subsurface soils are considered to represent a potential exposure medium. Excavations of greater depths are highly unlikely, given the locally high water table, the need for dewatering under such conditions, and typical construction practices for industrial facilities at and around the Site (slab-on-grade).

3.5 EXPOSURE UNITS

Given the extensive nature of the IRMs and Response Actions conducted to date, it is necessary to consider the nature of potential exposures based on the current Site configuration. The exposure units addressed for the SCCC Site consist of the Western Area (Lots 48, 50 and 51), located west of the railroad right-of way that parallels the River, and the Eastern Area (Lots 49 and 52), located between the right-of-way and the riverbank.

The Western Area surficial materials are primarily asphalt or coarse stone. There are a few existing historical structures, several foundations and slabs from buildings that have been removed (see Section 2.2.4), and the recently completed structure containing the HCTS. Small wetland areas exist on the western boundary of this area and near the HCTS. Stormwater is controlled with a man-made system of storm drains and catch basins that replaced the original open ditches.

The Eastern area consists primarily of the Consolidation Area which was constructed in the area formerly containing wastewater lagoons. It is a mounded area that received soil materials excavated from various portions of the property that were compacted and covered by geotextile fabric, 60-mil linear low-density polyethylene, drainage layer with an overlying geotextile fabric, 8 inches of structural fill, and 4 inches of topsoil. North of the Consolidation Area are several foundations/slabs, and the area is completely covered by coarse gravel.

3.6 EXPOSURE PATHWAYS

Complete or potentially complete exposure pathways consisting of the exposure media discussed in Section 3.2 and identified potential receptors and exposure routes that will be carried through the quantitative risk assessment are summarized in Table 3-1 (equivalent to Table 1 in RAGS Part D; USEPA 2001a). These complete or potentially complete exposure pathways are as follows:

Exposure Medium/Exposure Point	Current Land Use	Future Land Use
On-Site Surface Soil/Soil and Particulates	Site Visitors	Site Visitors
	HCTS Operator	HCTS Operator
		Outdoor Industrial Worker
		Construction Worker
On-Site Subsurface Soil/Soil and Particulates		Utility Worker
On-Site Groundwater and Soil/Indoor Air		Indoor Industrial Worker
		Construction Worker
On-Site Groundwater/Groundwater		Utility Worker
Off-Site Groundwater		Qualitative Evaluation

While other exposure scenarios have been considered, they were removed from quantitative evaluation for the reasons summarized below:

On-Site and Off-Site Groundwater/Potable Well – No domestic or industrial water supply wells are located on the property or in the immediate Site vicinity. The Town of Kearny uses surface water supplies from a reservoir located several miles from the Site. Future installation of a potable well either on-site or off-site is considered to be highly unlikely, Groundwater use is prohibited via a CEA (see Appendix A). Future potential use of groundwater both within the barrier wall and outside the barrier wall will be addressed qualitatively in the risk assessment.

Off-Site Surface Soil/Particulate and Volatile Emissions (originating on-site) – Extensive air monitoring conducted during various construction activities on the Site indicated that all exposures were either non-detected or within acceptable industrial exposure limits; therefore it can be concluded that exposures of off-site receptors would be lower. In addition, future off-site exposures to dust generated during construction scenarios would be low because the most heavily impacted materials have been excavated and emplaced in the Consolidation Area to which future intrusive activities will be prohibited. Elimination of this exposure is supported by air monitoring data contained in Appendix B.

4.0 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

This section presents a summary of the process used to select chemicals of potential concern (COPCs) for evaluation in the BHHRA, as originally described in the PAR. Existing analytical results for soil samples collected during previous investigations at the Site are included in the BHHRA. Historic samples collected from locations that have been remedied are not included. In addition, soil samples collected from within the confines of the Consolidation Area are not included. Samples of native or fill materials remaining in their original locations are used for risk / hazard evaluation purposes.

Recent data (e.g., from 2008 and later) are considered most representative of current Site conditions. In addition, all sample data from this period are complete with detection limits reported, which were not always available for historic data collection efforts from the early 1990s. All of these recent data were evaluated for data usability by KEY personnel familiar with laboratory procedures. The quantity and quality of data acquired from 2008 to the present is more than sufficient for estimation of baseline risks. Historical data reported only as "ND" (not detected) are not used in the risk assessment as detection limits are not specified and therefore cannot be evaluated in the statistical package. Historic data are used to supplement the more recent results if detection limits are available, if the samples were analyzed for specific constituents of interest (e.g., chlorobenzenes, dioxin or hexavalent chromium) that may not have been analyzed in the more recent data, and to provide additional confidence in the statistical summaries by evaluating larger sample sets. Table 4-1 presents a complete list of the soil samples used for the risk assessment, along with the locations in which the results were reported (i.e., in the Site Characterization Summary Report [KEY, March 2013] or the Site Characterization Summary Report Addendum [KEY, March 2014]), as well as the rationale for sample inclusion.

4.1 DATA EVALUATION

This section presents a brief summary of the samples used in the determination of COPCs for the exposure units discussed in Section 3.5. Surface soil samples (those collected from depths of less than 2 feet) were used for the non-invasive, current and future exposure assessments. Combined surface and subsurface soil samples (collected from depths of 0 to 10 feet) were used to evaluate future exposure routes involving construction and excavation activities. A limiting depth of 10 feet was used because that is slightly deeper than the deepest groundwater measurements occurring within the barrier wall system and the approximate depth of the Meadow Mat. Figure 4-1 presents the locations of the soil and groundwater sampling locations used in the risk assessment.

Table 4-1 presents a summary of the samples used to determine exposure concentrations in the risk assessment process. Specific samples included were first identified as to whether they were located on the eastern or western portions of the property, and then by sample depth (i.e., less than two feet deep or less than 10 feet deep for surface and subsurface samples, respectively). The table includes references to the data tables and reports in which the analytical results were presented.

4.1.1 Western Portion of the Site

A total of 52 surface soil samples (0 to 2 feet deep) and 49subsurface soil samples (2 to 10 feet deep) were collected from the western portion of the Site and used in the risk assessment. Any samples collected from areas prior to excavation were not addressed in this document. Analytical parameters varied over time, so the total number of samples analyzed for any particular analyte may not reflect the total number of samples used in the risk assessment. The most prevalent analytes in this area were dichlorobenzenes, PAHs, 2,3,7,8-TCDD and several metals including lead, chromium and hexavalent chromium.

4.1.2 Eastern Portion of the Site

Twenty-nine surface soil samples (0 to 2 feet deep) and seven subsurface soil samples (2 to 10 feet deep) were collected and analyzed in this portion of the Site. Samples collected from areas beneath the Consolidation Area and samples collected from areas prior to removal were not addressed in this document. Analytical parameters were not consistent through all samples, with PAHs and dioxin being the most commonly analyzed. Therefore, the total number of samples analyzed for any particular analyte does not necessarily reflect the total number of samples used in the risk assessment.

4.1.3 On-Site Groundwater

Fill unit groundwater samples collected from areas outside the Consolidation Area (five monitoring points) were used for the selection of groundwater COPCs for the vapor intrusion pathway. These five samples were collected in 2008. Multiple wells on the eastern portion of the property were abandoned prior to construction of the Consolidation Area. Shallow wells (such as SC-MW-11U and -14U) were previously located in areas where groundwater is actively being pumped and subsequently treated and are not addressed in the risk assessment. The HCTS has been in operation for 2 years thus far and groundwater conditions would be notably different from those described by the Site Characterization Summary Report (KEY, March 2013) and the Site Characterization Summary Report Addendum (KEY, March 2014). Groundwater collection wells and piping installed for maximum hydraulic control also intercept the areas of highest concentrations of COPCs.

The 2008 groundwater samples were analyzed for volatile and semi-volatile organic compounds, which are the primary constituents of interest in the assessment of the indoor air, vapor intrusion exposure scenario as well as the direct contact scenarios. Four of the groundwater sampling points are on the Western portion of the Site (SC_MW-15U, SC-PZ-1U, SC-PZ-2U, and SC-PZ-3U), and one is located on the Eastern portion of the Site (SC-PZ-4U).

4.2 DATA USABILITY

Determination of data usability is the process of assuring that the quality of the data generated meets the intended use. USEPA (USEPA, April 1992) provides guidance for data usability in risk assessments. The analytical data collected for the Site were evaluated with respect to data usability prior to inclusion in this risk assessment. The following data quality issues are addressed: detection limits; qualified data; and quality control samples.

Selecting the analytical method for optimal detection limits is critical for data usability assessment. If detection limits are consistently higher than risk-based comparison values, the confidence in the results of the risk assessment can be affected by the possibility that constituents are present (but not detected) at levels that could impact human health. The most recent sampling efforts provide the most reliable detection limits, however, should older data be used to supplement the recent data, or if samples required dilution in the laboratory, there is a potential for elevated detection limits to skew the estimates of average and representative concentrations.

Qualified data must also be used appropriately in a risk assessment. Validated, qualified data are considered usable for this risk assessment with the exception of unusable or rejected ("R" qualified) results. There were no rejected results in the data sets used in this risk assessment. Data with results that are estimated ("J" qualified) are included, and data that were noted to be present in associated blank samples ("B" qualified), and data with confirmation column qualifiers ("P" or "G" qualified) are considered as positive detections and are therefore included.

Quality control samples such as method blanks, trip blanks, and matrix spike samples are not included in the risk assessment. The analytical results for field duplicate samples are averaged.

4.3 IDENTIFICATION OF CHEMICALS OF POTENTIAL CONCERN (COPCS)

The purpose of this section is to identify the constituents that will be evaluated quantitatively in the human health risk assessment. The basis for this screening is discussed in greater detail for each medium, but the primary purpose of the screening is to eliminate from further evaluation any constituent that will clearly pose a negligible contribution to the overall health risk. This section presents a summary of all the analytical data used to identify constituents present at the Site, the frequency of detection, and the risk-based values to which the maximum detected concentrations were compared, resulting in a subset of the original list of analytes. COPCs are defined as those chemicals present in a medium that will constitute the significant portion of the quantified risks associated with human exposures, by virtue of being present in at least one sample at a concentration that exceeded the screening criterion. Note that the simple selection of a constituent as a COPC does not necessarily indicate that it poses a health risk. It merely indicates that there is a need to evaluate the risk potential quantitatively.

Based on chemical-analytical data generated as a result of sampling and analysis over approximately 30 years, major constituents have been identified for the Site. The major constituents, or classes of constituents, are as follows:

- Chlorinated benzenes
- PAHs (primarily naphthalene)
- Polychlorinated Biphenyls (PCBs)
- Dioxins/Furans (PCDDs/PCDFs)
- Metals

While other specific analytes have been detected in various Site media, the constituent classes listed above constitute the majority of the COPCs based on their historical use (or placement at the Site), their prevalence in environmental media, and the measured concentrations. However, all positive detections of analytes were screened as potential COPCs.

The maximum detected concentration of every analyte in each sample group was compared to the appropriate USEPA Regional Screening Levels (RSLs) (USEPA, November 2013). At this step, duplicate sample results were handled as discrete samples. In all cases, the RSLs corresponding to a target cancer risk of 1E-6 and a target Hazard Quotient of 0.1 were used for the screening. As per Appendix A, Section VIII of the Agreement, maximum detected concentrations were screened against the USEPA RSLs for "residential soil." In addition, "industrial soil" screening levels were also included because the Site and all surrounding areas are zoned for industrial uses. If a chemical has more than one criterion (i.e., exhibits both carcinogenic and non-carcinogenic health effects), then the lower of those two values was used for this initial comparison.

It should be noted that even though a surface soil sample (i.e., fill material) is evaluated in this BHHRA, the site is either paved or covered with gravel, and in some cases covered with an additional layer of geotextile fabric. However, the BHHRA assumes that these cover materials can degrade or erode over time and that exposures to surface soils or fill can potentially occur under current or future site conditions.

Analytes that exceeded only the residential RSLs are noted in the COPC selection tables, but will be eliminated from further quantitative analysis in the BHHRA for the following reasons:

- Those compounds that exceed only the more stringent residential RSL contribute only a very small portion of the total risks at the Site. A simple ratio of the maximum detected concentration to the RSL was calculated, and summed for all exceedances. The sums of the ratios for the residential exceedances were compared to the totals for all exceedances. Based on this approach, the input to the totals from chemicals that only exceeded the residential RSL and not the industrial RSL was found to be minimal (less than 5 percent of the total, and often less than one percent). Calculations for this procedure are presented in Appendix C. Therefore, when this information is considered in conjunction with the future land use, zoning and adjacent land uses, the total risks or the ultimate remedy for the Site would not be affected.

- The organic chemicals that exceeded only the residential RSLs are often not related to the major industrial processes conducted at the Site. These chemicals often included such analytes as phthalates, a limited number of volatile organics, phthalate esters, and dibenzofuran. Several additional PAHs exceeded only the residential RSLs (e.g. chrysene or indeno(1,2,3-cd)pyrene, but these were determined to contribute little additional risk via this comparison exercise (less than one percent).

- Metals such as chromium (total), aluminum, manganese, and iron were frequently noted at concentrations greater than the residential RSL (and not the industrial RSL) but typically contribute less than one percent of the summed ratio totals (see Appendix C).

The tables presented in this section contain a summary of all the detected analytes in a particular medium. The tables include the minimum and maximum detections (and the location of the maximum detected concentration), the frequency of detection, and a range of detection limits and correspond to the tables identified in RAGS Part D as Table 2. If the maximum detection exceeded the corresponding criterion, that chemical was selected as a COPC. Additional information on other criteria to be considered (e.g., Safe Drinking Water Act Maximum Contaminant Levels for public water supplies) are also included if available. The final column of these tables presents the rationale for either inclusion or exclusion as a COPC.

Chemicals that exceed only the residential RSL are indicated by "**BSL**". Chemicals that exceed the industrial RSL are shaded and indicated as "ASL", and are carried through the quantitative risk assessment.

4.3.1 On-Site Surface Soils (0 to 2 Feet Deep)

On-site surface soil samples are used to evaluate exposures of adults who may come into contact with surficial materials (which are currently covered) during a typical workday. Currently, these include persons such as the HCTS operators and occasional visitors who may be on the Site infrequently. For future scenarios, potential receptors would also include outdoor workers such as landscapers. On-site surface soils are divided into two areas – the Eastern portion of the property and the Western portion of the property.

Table 4-2 presents a summary of all the chemicals detected in the surface soil samples (0 to 2 foot depth) collected on the Western portion of the property. PAHs and chlorobenzenes were the most frequently detected organic analytes in these samples. In addition, 2,3,7,8-TCDD (toxicity equivalence factors, TEF) were noted in multiple samples. Aroclor-1260, while not detected as frequently as some other analytes, was measured at concentrations that exceeded the toxicity screening values and was therefore selected as a COPC. In addition, several metals were also selected, including arsenic, iron, lead and hexavalent chromium.

Table 4-3 presents a data summary for the surface soil samples collected on the Eastern portion of the property. The primary COPCs based on frequency of detection for this area are chlorobenzenes and PAHs. In addition, two aroclors (PCB-1254 and PCB-1260) and dioxin (expressed as 2,3,7,8-TCDD equivalents) were also selected based on their presence at concentrations that exceeded the screening values. A limited number of surface soil samples in this area were analyzed for chromium and hexavalent chromium. Hexavalent chromium was selected as a COPC.

4.3.2 On-Site Surface and Subsurface Soils (0 to 10 Feet Deep)

Surface soils and subsurface soils to a depth of approximately 10 feet (somewhat greater than the deepest depth to groundwater inside the barrier wall) are combined for the evaluation of certain future exposure scenarios that involve soil disturbance, such as construction and utility work. Again, these results were segregated for the Eastern and Western portions of the Site.

A large number of samples were collected and analyzed from subsurface soils in the Western portion of the property, as shown in Table 4-4. Benzene, toluene, ethylbenzene, xylenes, chlorobenzenes, PAHs, PCB-1260 and dioxins (2,3,7,8-TCDD equivalents) were the most frequently detected organic analytes and were

selected as COPCs. Metals selected as COPCs include antimony, arsenic, cobalt, iron, lead, thallium, vanadium, and hexavalent chromium.

In the Eastern portion of the property, a similar range of chemical groups was found, as shown on Table 4-5. Of the organic compounds detected, chlorobenzenes, PAHs, PCBs, and dioxin were selected as COPCs. The list of metals that exceeded screening criteria in the Eastern area and selected as COPCs was more limited, with arsenic, cobalt, thallium, vanadium and hexavalent chromium detected at concentrations higher than their respective screening levels.

The volatile and semi-volatile organic COPCs selected in Tables 4-4 and 4-5 were also used to assess potential future exposures to indoor air resulting from vapor intrusion. The concentrations of volatile and selected semi-volatile compounds in soils were used as input to the Johnson and Ettinger Model (Environmental Quality Management, Inc., June 2003).

4.3.3 On-Site Groundwater

Analytical results for samples collected from four piezometers and one monitoring well will be used for the qualitative evaluation of potential risks associated either direct or indirect exposure to groundwater.

Direct exposures to groundwater during construction activities will be addressed using these five groundwater sampling points. For the direct contact scenarios, all volatile and semi volatile organic compounds were considered as COPCs for direct contact if they were present at concentrations that exceed the corresponding screening levels for tap water. This selection process is documented in Tables 4-6 (Western Area) and 4-7 (Eastern Area).

For the potential future installation of an industrial or commercial building on the Site, the same five samples were used. All detected analytes present at concentrations greater than the groundwater screening levels that correspond to a 10^{-6} risk as per USEPA guidance Section IV.C (Table 2c; USEPA, November 2002) were selected as COPCs. In addition, because Table 2c is based on a Hazard Index of 1, the screening levels for non-carcinogens were reduced by a factor of 10 to correspond to a Hazard Index screening value of 0.1. The COPCs for vapor intrusion from groundwater are benzene and naphthalene. Table 4-8 presents a summary of the groundwater analytical results and the selection of COPCs for the vapor intrusion scenario. For this scenario, the maximum concentrations from all five wells were compared to the USEPA screening criteria (USEPA, November 2002) because only four COPCs were selected for this exposure pathway – benzene, chlorobenzene, 2-methylnaphthalene, and naphthalene.

5.0 EXPOSURE ASSESSMENT

Exposure assessment is the process of estimating the magnitude, frequency and duration of human exposure to a constituent in the environment. This section of this report discusses the mechanisms by which people might come into contact with constituents in certain media and the approximate magnitude, frequency, and duration of that contact. The quantitative assessment of exposure, based on chemical concentrations and the degree of absorption of that chemical, provides the basis for estimating chemical uptake (dose) and associated health risks. This exposure assessment follows the current USEPA recommendations on exposure parameters and assumptions.

5.1 EXPOSURE PATHWAYS

An exposure pathway describes the route that a chemical takes from its environmental source (e.g., soil) to a human receptor. An exposure pathway has the following elements: (1) a source or chemical release from a source; (2) an exposure medium; (3) a point of potential contact for the receptor with the exposure medium; and (4) an exposure route at the point of contact (e.g., ingestion). An exposure pathway is considered to be complete when all four of these components exist. When one of these components is missing, eliminated or controlled, the exposure pathway is considered incomplete.

Once chemicals are released into the environment, they may migrate from one medium to another. Complete exposure pathways involve contact with a medium that contains elevated levels of a constituent. Only complete, or potentially complete, exposure pathways are addressed in a risk assessment.

Table 3-1 presented a summary of all current and potential future exposure pathways addressed in this assessment. Quantitative assessment of the following exposure scenarios will be presented in the BHHRA:

- Potential contact with on-site surface and/or subsurface soils – COPCs were detected in on-site surface soils at concentrations that exceeded risk-based screening levels, as described in the preceding section. This pathway is currently insignificant because there are no current full-time outdoor employees at the Site and surface covers are in place. However, HCTS operators performing wellhead maintenance or an intermittent Site visitor such as an inspector could be exposed to surface soils under both current and future conditions. Under potential future Site conditions, perhaps where the Site is redeveloped, it is considered possible that construction or utility workers may experience a short-term exposure during such work. The scenario of a full-time, outdoor industrial worker such as groundskeepers is also addressed for future Site conditions.

- Potential direct contact with on-site groundwater during construction activities – The presence of volatile and semivolatile organic compounds in shallow (fill unit) groundwater may occur under future land use conditions. Exposures during construction would be limited to dermal contact and incidental ingestion.
- Potential inhalation of volatile and semivolatile organics from indoor air – This potential vapor intrusion scenario will be addressed for future, full-time adult employees in a commercial or industrial setting. Vapor intrusion through building floor slabs will be considered.

Under current Site conditions, there are no known complete exposure pathways. The completed IRMs and IRA have: 1) covered and/or capped all surficial materials; 2) removed significant structures with the exception of four structures associated with the operations of Thomas A. Edison, Inc., SCCC and Apogent; 3) encircled the Site and all or parts of adjacent properties with a subsurface barrier wall system; 4) excavated impacted soils for off-site disposal and placement into the Consolidation Area; 5) stabilized soft surficial materials in the former lagoons; and 6) removed sediments and impacted soils and placed them in an engineered Consolidation Area within the Site which also serves as a capping system for the former lagoons. An occasional Site visitor or the HCTS operators performing outdoor tasks are considered to conservatively estimate current potential exposures should they encounter unvegetated/uncovered soil materials beneath the extant surface covers. The HCTS building has a new, intact concrete slab which is sealed with an epoxy coating and is constructed upon several feet of clean imported fill, therefore potential indoor exposures under current Site conditions are not evaluated.

However, the absence of significant complete exposure pathways relies on the maintenance of these engineered controls and a continued prohibition against uncontrolled disturbance of the cover materials. Although development of groundwater as a drinking water source is considered infeasible in this area, the current CEA is considered to be an appropriate institutional control to mitigate the potential for future use of groundwater for drinking water. Access to the Site is restricted by a chain-link fence along Belleville Turnpike, and major roadways and access ramps as well as railroad tracks along the Seaboard Site south of the Site. Existing access controls greatly reduce the potential for trespassers to access the Site.

Under potential future use scenarios, the primary potential future exposure pathways are associated with disturbance of the soil located beneath the cover materials. Potential receptors involved in surface or subsurface soil disturbance are construction or utility workers or full-time outdoor employees. Potential exposure routes to these workers are inhalation of fugitive dust or dermal contact with and incidental ingestion of the soils located beneath the cover materials or exposures during or after Site redevelopment. Additional potential direct contact and incidental ingestion of shallow groundwater in the soil disturbance scenarios will also be addressed. However, these potential exposures can be effectively managed via administrative controls (i.e., the establishment of procedures to be followed during any future construction that potentially involves disturbance of the IRM/IRA covers), routine health and safety measures, dewatering, and industry-standard dust control measures. Such measures will also mitigate potential air and water erosion of particulates with subsequent off-site transport and exposure, as was demonstrated by air monitoring conducted during IRA activities.

Finally, potential indoor air exposures will be addressed to fully evaluate potential risks associated with the future development of the property. Both soil and groundwater sources of volatile and semivolatile organics will be evaluated.

5.2 CHARACTERIZATION OF POTENTIAL RECEPTORS

The potential populations of human receptors at the Site are characterized in order to evaluate potential exposure pathways. Potential receptors for the Site were identified based on current and assumed and reasonable potential future land use scenarios. Currently, the Site is undeveloped with the exception of the HCTS facility.

Current on-site receptors are limited to the intermittent exposure of personnel such as HCTS operators or inspection staff (visitors). In the future, it is possible that the Site will be redeveloped for heavy commercial or industrial uses (based on zoning), where outdoor exposures will be limited. Because of the potential for redevelopment, construction workers, utility workers, and outdoor industrial workers such as groundskeepers are evaluated.

In summary, the following potential receptors are considered in the quantitative BHHRA:

- Occasional visitors (current and future)
- HCTS operators (current and future)
- Outdoor industrial workers (future)
- Construction and utility workers (future)
- Indoor industrial or commercial workers (future)

In addition, adolescent trespassers will be considered qualitatively. In essence the trespasser exposure frequency would be similar to that of a site visitor, and the exposures could be estimated using the ratio between an adult body weight (80 kg) and an adolescent body weight (57 kg, or 71% of an adult body weight). Carcinogenic risks associated with mutagenic compounds (benzo(a)pyrene and dibenzo(ah)anthracene) will be addressed by a modification of the cancer slope factor for adolescents as outlined in the current USEPA guidance on early-life exposures (USEPA, March 2005a).

On-site exposures of adults to soils are addressed for both the Eastern and Western portions of the property. Reasonable future land use considerations were selected based on the Meadowlands Commission's Redevelopment Plan and the existence of deed restrictions limiting disturbance of the Consolidation Area.

Full-time HCTS operators are assumed to be adults who are on the Site every working day. Based on a typical work day, the operators are inside the building most of the day, but may be outdoors for a few hours to perform equipment inspections, maintenance, measurements and DNAPL removal. Exposures could occur via ingestion of and dermal contact with soils. Inhalation is also considered for the operators because of the presence of low concentrations of volatile organics in surface soils and the potential for some dust generation in areas that may not be well-vegetated. Indoor inhalation is not considered for reasons previously mentioned.

Occasional visitors are assumed to be adults who are intermittently on the Site. It is assumed that these visitors are exposed only to COPCs found in the surface soils, in this case, assumed to be found at a depth of less than 2 feet. Exposures are assumed to occur via incidental ingestion of and dermal contact with the surficial materials, should the cover materials be breached in any way. Inhalation is considered for on-site receptors because of the presence of low concentrations of volatile organics in surface soils and the potential for some dust generation in areas that may not be well-vegetated.

Future outdoor industrial workers are considered to be full-time adult employees working outdoors approximately 225 days/year. These personnel are assumed to be groundskeepers or others whose work

requires them to be outdoors all or most of a day. Ingestion, dermal contact, and inhalation of volatiles/fugitive dust are considered.

The construction worker (or utility worker) is an adult whose work brings them into contact with surface and subsurface soils on a limited basis. Exposures are assumed to occur over a short-term (e.g., 4 month) period while such digging or construction would occur. Ingestion, dermal contact and inhalation of volatile or fugitive dust emissions are addressed. In addition, incidental ingestion of and dermal contact with shallow (fill unit) groundwater are also addressed.

Finally, exposure via inhalation of indoor air (the vapor intrusion scenario) is considered for future land use conditions where the Site is redeveloped. The potential receptor is assumed to be an adult working full-time indoors (250 days/year) in an industrial or commercial facility.

It is important to note that residential, recreational, or other residential-like uses (schools, day care centers, etc.) are eliminated from consideration in the BHHRA as potential receptor populations based on current and/or anticipated future land use restrictions and institutional controls that are assumed to remain in place for the foreseeable future for Site and surrounding sites.

5.3 EXPOSURE POINT CONCENTRATIONS

Potential exposure to constituents in the environment is directly proportional to the concentrations of those constituents in environmental media, known as exposure point concentrations (EPCs). The analytical results for samples from a given area or medium are combined to derive a single EPC for each COPC that conservatively represents the concentration of that chemical to which potential receptors may be exposed.

For the Reasonable Maximum Exposure (RME) soil exposures, the EPCs were statistically determined from the sampling data using the USEPA's statistical program, ProUCL 5.0. Prior to input, duplicate sample results were averaged. Upper Confidence Limits (UCLs) were determined using the full data sets ("all data, with NDs"), including non-detected values for all distribution types. Statistical analyses were performed by the program for "all data, with NDs" for all distribution possibilities. Based on the results generated by the software, an appropriate UCL was selected for use in the quantitative risk assessment. If the calculated UCL exceeded the maximum detected concentration, the maximum detected concentration was selected as the EPC. If there was only a single detection, UCLs were not calculated, and the concentration of the single "hit" became the EPC.

For groundwater exposures (via direct contact or indirectly via vapor intrusion), the maximum detected concentrations in the fill unit samples collected outside the Consolidation Area are used as the EPCs.

A simple arithmetic mean, calculated using the detection limits and any positive detections, was determined and used in the estimation of risks associated with the Central Tendency exposure (CT) scenarios. Again, if the mean exceeded the maximum detection (as a result of elevated detection limits), the maximum detection was used as the EPC for the CT scenarios.

The EPCs for the RME and the CT scenarios are presented on a series of tables. Tables 5-1 and 5-2 present the EPC evaluation for the Western Area surface soils for the RME and CT scenarios, respectively. Eastern Area surface soils are addressed in Tables 5-3 (RME) and 5-4 (CT). Similarly Western Area subsurface soil EPCs are presented in Tables 5-5 (RME) and 5-6 (CT), while the Eastern Area subsurface soils are presented in Tables 5-7 (RME) and 5-8 (CT). Tables 5-9 and 5-10 present information for the RME and CT groundwater direct contact scenarios for the western portion of the Site, and Table 5-11 contains EPCs for the eastern portion of the Site. Tables 5-12 and 5-13 present the EPCs for the RME and CT vapor intrusion scenarios, respectively.

Each of these tables includes information on the mean, UCL and maximum detected concentrations, as well as the selection of the appropriate EPC and the statistics and rationale to support the selection of the exposure concentrations to be used in the quantitative risk assessment. While potential "sources", or locations with notably elevated concentrations of one or more analytes (outliers), are not eliminated from the data base, the BHHRA will include modifying discussions as needed. Such outliers may not be used to eliminate a COPC from further evaluation, but note of them may be made in the BHHRA or the FFS in support of remedial alternative selection and/or implementation.

5.4 ESTIMATION OF EXPOSURE AND INTAKE

In order to complete an exposure assessment, it is necessary to estimate the nature and magnitude of potential human exposures to Site-related chemicals of potential concern that were either measured or modeled in the affected media, considering both current and future potential land uses. To provide a range of potential exposures and risks, both the RME and a CT exposure will be evaluated (USEPA, December 2001b).

The RME represents an estimate of the high-end exposure of a particular population, and is based on a combination of both average and high-end exposure estimates (representing the 90th or 95th percentiles of a parameter), in combination with the UCL chemical concentrations. This combination represents the multiple upper-bound parameter values and as such is extremely conservative. The CT represents an estimate of an average, or typical, exposure of a population and is based on central estimates of exposure parameters and typically uses a mean concentration of a COPC. This section presents a summary of the exposure parameters used in the BHHRA.

An exposure occurs when a human receptor comes into contact with a chemical in the environment such as soil or groundwater. The chemical must first come into contact with the human body, and then pass through a boundary from outside to inside the body, which is defined as an intake. For most exposure routes, intake is evaluated in terms of how much of the carrier medium containing the chemical crosses the boundary (e.g., the amount of soil ingested). Dermal contact pathways are evaluated in terms of uptake, or the absorption of the chemical through the skin.

Two types of doses, applied and internal, are defined for evaluating chemical exposure. The applied dose is the amount of a chemical present at an absorption barrier such as the lung, skin, or gastrointestinal tract and available for absorption. The applied dose is estimated as the amount of chemical ingested, inhaled or contained in the material touching the skin. It is analogous to the administered dose in a dose-response

experiment. The internal dose is the amount of a chemical actually absorbed across the barrier and available for biological interactions. It is the portion of the internal dose that actually reaches cells or membranes where adverse effects can occur. Doses are generally presented as a mass per unit time on a per unit of body weight basis.

Non-carcinogenic health effects are evaluated by calculating the average intake of a chemical over the period of exposure. This value is the Average Daily Dose (ADD). Potential carcinogenic health effects are evaluated in terms of an individual's theoretical increased risk of developing cancer over a lifetime. Although the duration of exposure generally does not last for an entire lifetime, carcinogenic intakes are estimated as the average dose over a lifetime, because effects can occur long after the exposure period. This dose is the Lifetime Average Daily Dose (LADD).

The ADD and the LADD are quantified using assumptions about the duration, frequency and magnitude of exposure experienced by each potential receptor, as well as assumptions about the chemical properties that influence absorption. The equations used to estimate ADD and LADD for each receptor population presented in Section 5.6.2.

5.5 ESTIMATION OF CHEMICAL ABSORPTION

5.5.1 Gastrointestinal Availability

The amount of a chemical that actually penetrates the exchange boundaries of the body is the absorbed dose. Toxicity studies that provide the basis for the health effects criteria (reference doses and cancer slope factors) generally report health effects as a function of applied doses rather than absorbed doses. These criteria are therefore most correctly compared to calculations of potential applied doses. In addition, animal toxicity studies often provide chemicals in food or water which readily allows for absorption. The fraction of a chemical that is absorbed from soil is typically less that the fraction absorbed from food or water. Guidance therefore indicates that reference doses (RfDs) are usually based on or have been adjusted to reflect drinking water exposure (USEPA, December 1989). For COPCs in soil, the USEPA recommends using gastrointestinal absorption factors of 100%, which is a conservative approach to risk estimation.

5.5.2 Dermal Absorption of Chemicals from Soil

The administered dose in a dermal exposure pathway is the amount of a constituent in the volume of soil contacting the skin. Only a small fraction of this amount will actually penetrate the skin barrier and enter the body of a receptor. Dermal exposure calculations are therefore always calculated as an absorbed dose and require the inclusion of a dermal absorption fraction (ABS).

USEPA guidance (USEPA, July 2004) provides ABS for several constituents, as follows:

- PAHs – 0.13
- PCBs – 0.14
- Other semivolatile organics – 0.1
- Dioxins – 0.03

- Antimony – 0.15
- Arsenic – 0.03
- Barium – 0.07
- Beryllium – 0.007
- Cadmium – 0.025
- Chromium - 0.13
- Hexavalent Chromium – 0.025
- Thallium – 1.0
- Vanadium – 0.026

The guidance recommends the use of an absorption rate of 100 percent for all organics and inorganics not specifically indicated in the guidance.

In order to determine the appropriate reference dose for evaluation of dermal contact scenarios, it is necessary to adjust the oral toxicity factors as follows:

Absorbed RfD = Oral RfD (mg/kg-day) * ABS

Volatile organics are not evaluated via the dermal route of exposure – they are considered in the inhalation pathway because of their propensity to volatilize rapidly before absorption could occur. For other inorganics, the data are insufficient to extrapolate a reasonable default value because the speciation of a metal is critical to dermal absorption (USEPA, July 2004).

5.5.3 Dermal Absorption of Chemicals from Water

Pathways that involve dermal contact with water require the inclusion of a dermal permeability constant (K_p) in the exposure calculations. The dermal permeability factor accounts for the movement of the chemical from the water, across the skin to the stratum corneum and hence into the bloodstream. Because dermal permeability constants are based on equilibrium partitioning, they are likely to overestimate the amount of a chemical absorbed during short term exposure periods such as those considered for this risk assessment.

USEPA guidance (USEPA, July 2004) presents K_p values for several constituents. For organics, the K_p values were obtained from Exhibit B-2, and for inorganics, K_p values were obtained from Exhibit 3-1 of the USEPA July 2004 guidance.

5.6 EXPOSURE ASSUMPTIONS

The quantitative estimation of chemical intake involves the incorporation of numerical assumptions for a variety of exposure parameters. Where guidance was available, exposure assumptions used in the intake calculations are based on USEPA recommended values. However, because default assumptions are not available for every parameter, best professional judgment was used based on Site-specific characteristics. All exposure assumptions used in the risk assessment are discussed in this section and are presented on Tables 5-14 through 5-21.

5.6.1 Assumptions Common to all Pathways and Receptors

The following factors are used in all exposure pathways addressed for this Site:

Body Weight (BW)

According to recent USEPA guidance (USEPA, September 2011), adult body weights are set at 80 kg and children ages 0 to 6 years have body weights of 15 kg. The same values were used for both the CT and the RME scenarios.

Averaging Time (AT)

Because doses for non-carcinogenic health effects are averaged over the specific period of exposure, non-carcinogenic averaging times are calculated by multiplying the particular exposure duration by 365 days/year. Carcinogenic health effects are calculated for a lifetime, so the averaging time for carcinogenic effects is 28470 days, which represents a recommended lifetime of 78 years (USEPA, September 2011) multiplied by 365 days/year. These ATs are expressed in hours for inhalation routes of exposure (USEPA, January 2009).

Dermal Absorption Fraction (ABS)

Dermal absorption fractions were presented in Section 5.5.2. These values will be used in each scenario addressing dermal contact with soil.

5.6.2 Equations Used to Estimate Intakes/Doses

Standard equations are used to estimate chemical intake under various combinations of receptors and exposure media. This section presents the equations, which are also included in Tables 5-14 through 5-21 for each combination of timeframe, exposure medium and receptor. Section 5.6.3 presents receptor-specific variables used for the current and future HCTS Operators working on-site and Section 5.6.4 presents the variables used for Site visitors. Variables used for construction or utility workers are discussed in Section 5.6.5, and variables for the future outdoor industrial worker are presented in Section 5.6.6. Section 5.6.7 presents the variables used for future groundwater users.

Soil Ingestion

Intake via incidental ingestion of soil is estimated using the following equation:

$$Intake = CS \times SI \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$$

Where:

Intake = Average daily intake of a chemical via ingestion (mg/kg-day)
CS = Chemical concentration in soil (mg/kg)
SI = Soil ingestion rate (mg/day)
CF = Conversion factor (1E-6 kg/mg)
FI = Fraction of total soil intake derived from the site (unitless)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

Dermal Contact with Soil

The amount of a chemical absorbed from soil through the skin is estimated using the following equation:

$$DAD = Da_{event} \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$$

Where:

DAD = Dermally absorbed dose (mg/kg-day)
Da_{event} = Absorbed dose per event (mg/cm^2)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
SA = Skin surface area available for contact (cm^2)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

Da_{event} is calculated as follows:

$$Da_{event} = CS \times CF \times AF \times ABS$$

Where:

CS = Chemical concentration in soil (mg/kg)
CF = Conversion factor (1E-6 kg/mg)
AF = Adherence factor of soil to skin (mg/cm^2)
ABS = Dermal absorption fraction (unitless)

Inhalation of Volatile Emissions and Fugitive Dust

Current USEPA guidance for estimating risk via inhalation indicates that the concentration of a constituent in air should be used instead of an inhalation intake of a constituent in air based on inhalation rate and body weight. Exposure concentrations are estimated using the following equation:

$$\text{Exposure Concentration} = CA \times CF \times ET \times EF \times ED \; 1/AT$$

Where:

Exposure Concentration = Time-weighted air concentration based on activity (mg/m^3)
CA = Chemical concentration in air (mg/m^3)
ET = Exposure time (hour/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
AT = Averaging time = ED x 365 days/year x 24 hours/day – for noncarcinogens
AT = Lifetime x 365 days/year x 24 hours/day – for carcinogens

Air concentrations are estimated from the soil concentrations using the following equation:

$$CA = CS \times (1/VF + 1/PEF)$$

Where:
CA = Calculated chemical concentration in air(mg/m^3)
CS = Chemical concentration in soil (mg/kg)
VF = Chemical-specific volatilization factor (m^3/kg)
PEF = Default particulate emission factor (1.4E+9 m^3/kg)

Chemical-specific volatilization factors are presented in Appendix D. The USEPA default particulate emission factor was used for all soil disturbance scenarios.

Incidental Ingestion of Groundwater

Estimation of chemical intakes via incidental ingestion of groundwater in a construction/excavation scenario uses the following equation:

$$\text{Intake} = CW \times IR_w \times EF \times ED \times 1/BW \times 1/AT$$

Where:
Intake = Average daily intake of a chemical via water ingestion (mg/kg-day)
CW = Chemical concentration in water (mg/L)
IR_w = Water ingestion rate (L/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)

BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

Dermal Contact with Groundwater

The amount of a chemical absorbed through the skin from a film of water on the outer skin surface is estimated as follows:

$$DAD = Da_{event} \times SA \times EV \times EF \times ED \times 1/BW \times 1/AT$$

Where:

DAD = Dermally absorbed dose (mg/kg-day)
Da_{event} = Absorbed dose per event (mg/cm^2-event)
SA = Skin surface area (cm^2)
EV = Event frequency (1 event/day)
EF = Exposure frequency (days/year)
ED = Exposure duration (years)
BW = Receptor body weight (kg)
AT = Averaging time = ED x 365 days/year

The method to estimate the Da_{event} varies with the event duration. If the event duration is less than the time required for a chemical to reach steady-state, the following equation is used:

$$\text{If } t_{event} \leq t^*, \text{ then } Da_{event} = 2FA \times K_p \times CW \ SQRT(6\tau_{event} \times t_{event}/\pi)$$

Where:

t_{event} = Event duration (hour/event)
t* = Time to reach steady state (hour)
FA = Fraction absorbed from water (assumed to be 100%; unitless)
K_p = Chemical-specific dermal permeability coefficient (cm/hour)
CW = Chemical concentration in water (mg/L)
τ_{event} = Chemical-specific lag time per event (hour)

If the event duration is greater than the time required for a chemical to reach steady-state, the following equation is used:

$$\text{If } t_{event} > t^*, \text{ then } Da_{event} = FA \times K_p \times CW \left[t_{event}/(1+B)\ 2\tau_{event}\ ((1 + 3B + 3B^2)/(1 + B)^2)\right]$$

Where:

B = Chemical-specific ratio of permeability coefficient through stratum corneum to permeability coefficient through epidermis (unitless)

USEPA recommended values (USEPA, July 2004) for t*, K_p, τ_{event}, and B are presented in Appendix D.

Inhalation of Volatiles Resulting from Vapor Intrusion

Exposure via inhalation of volatile or semivolatile organic constituents in indoor air, which originate either from subsurface soils or shallow groundwater, will be estimated using the Johnson and Ettinger Model (Environmental Quality Management, Inc., June 2003). Spreadsheets developed for this model will be used to calculate exposures and risks associated with vapor intrusion. Both the soil (0 to 10 foot depth) and the shallow (fill unit) groundwater samples will be addressed as separate components of potential future inhalation exposures.

Air concentrations inside a future building are estimated in this model by using some State-recommended standard default assumptions (NJDEP, January 2013) regarding source size, air exchange rates, and soil characteristics (coarse-grained "sand" is assumed to correspond to the fill material as a worst-case scenario). It is assumed that the average soil and groundwater temperature is 13°C and an assumed average groundwater depth of 4.5 feet (140 cm). Soil type SL is used based on the fill material consisting of poorly graded sand and silty sand. Building dimensions were assumed to be 100 x 60 x 12 feet, and averaging times were based on 78 years for carcinogens and either 5 or 25 years for noncarcinogens, based on exposure durations for RME and CT industrial workers. Site-specific soil and groundwater analytical results were used as input. If a COPC was identified in both the groundwater and the soil for the vapor intrusion scenario, it will only be included in the matrix resulting in the higher risk.

5.6.3 HCTS Operator Exposure Parameters (Current and Future)

Under current and future land use scenarios, the full-time adult operators of the HCTS facility will be addressed using the following parameters to assess potential exposures to surface soils:

Parameter and Abbreviation		CT		RME	
IR_s	Soil Ingestion Rate (mg/day)	50	USEPA, September 2011	200	USEPA, September 2011
FI	Fraction Ingested from Site	0.5	Professional judgment	1	Region 2 guidance
EF	Exposure Frequency (days/yr)	225	USEPA, December 2002	225	USEPA, December 2002
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
AF	Soil Adherence Factor (mg/cm^2)	0.02	USEPA, July 2004	0.1	USEPA, July 2004
SA	Skin Surface Area (cm^2)	6840	USEPA, September 2011	6840	USEPA, September 2011
ET_{inh}	Exposure Time - inhalation (hr/day)	2	Professional judgment	4	Professional judgment

It is assumed that since this activity does not involve ground disturbance, only half of a person's daily intake of soil occurs at the Site. Exposure frequency is the commonly used value for full-time employees. The exposure duration of 5 years represents the average job tenure. The 25 year exposure duration is a conservative standard default assumption for job tenure. Soil adherence factors are based on the geometric mean and the 95th percentile for groundskeepers. Exposed skin surface area available for contact was assumed to be 6840 cm^2, equal to the head, hands and forearms. Time spent outdoors was set at 2 hours/day for the CTE, and 4 hours/day for the RME, based on typical and conservative workday patterns for current employees who may be exposed via inhalation of fugitive dust or volatile emissions.

Estimation of intakes via all exposure routes was performed using the equations presented in the previous section. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 5-14 (RME) and Table 5-15 (CT).

5.6.4 On-Site Visitor

Under current and future land use scenarios, the following assumptions were selected to evaluate exposures of occasional on-site visitors such as inspectors or maintenance personnel (e.g., fence repair, etc.) who may come into contact with surface soils:

	Parameter and Abbreviation	CT		RME	
IR_s	Soil Ingestion Rate (mg/day)	50	USEPA, September 2011	200	USEPA, September 2011
FI	Fraction Ingested from Site	0.5	Professional judgment	1	Region 2 guidance
EF	Exposure Frequency (days/yr)	50	Professional judgment	100	USEPA, December 2002
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
AF	Soil Adherence Factor (mg/cm^2)	0.02	USEPA, July 2004	0.1	USEPA, July 2004
SA	Skin Surface Area (cm^2)	6840	USEPA, September 2011	6840	USEPA, September 2011
ET_{inh}	Exposure Time - inhalation (hr/day)	8	Professional judgment	8	Professional judgment

It is assumed that since this sort of activity does not involve ground disturbance, only half of a person's daily intake of soil occurs at the Site for the CTE scenario, and 100% is used for the RME scenario. Exposure frequencies are based on one or two visits per week to the Site. The exposure duration of 5 years represents the average job tenure. The 25 year exposure duration is a conservative standard default assumption for job tenure. Soil adherence factors are based on the geometric mean and the 95th percentile for groundskeepers. Exposed skin surface area available for contact was assumed to be 6840 cm^2, equal to the head, hands and forearms.

Estimation of intakes via all exposure routes was performed using the equations presented in the previous section. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 5-14 (RME) and Table 5-15 (CT).

5.6.5 Construction Worker/Utility Worker

Should the Site be redeveloped, it is necessary to evaluate potential exposures of construction workers or utility workers who may be on-site for a one-time construction or installation event. It is assumed that these persons are adults who may be exposed to both surface and subsurface soils as well as shallow groundwater during earthmoving activities. The following table presents a summary of exposure parameters for the construction worker:

	Parameter and Abbreviation	CT		RME	
IR_s	Soil Ingestion Rate (mg/day)	100	USEPA, November 2013	330	USEPA, December 2002
FI	Fraction Ingested from Site	1	Professional judgment	1	Region 2 guidance
EF	Exposure Frequency (days/yr)	60	Professional judgment	130	Professional judgment
ED	Exposure Duration (yr)	1	Professional judgment	1	Professional judgment
AF	Soil Adherence Factor (mg/cm^2)	0.2	USEPA, July 2004	0.8	USEPA, July 2004
SA	Skin Surface Area (cm^2)	6840	USEPA, September 2011	6840	USEPA, September 2011
ET_{inh}	Exposure Time - inhalation (hr/day)	8	Professional judgment	8	Professional judgment
IR_w	Groundwater Ingestion Rate (L/day)	0.09	Professional judgment	0.27	Professional judgment
SA_w	Skin Surface Area (cm^2)	5300	USEPA, September 2011	5300	USEPA, September 2011

Utility worker exposure parameters are presented in the following table:

	Parameter and Abbreviation	CT		RME	
IR_s	Soil Ingestion Rate (mg/day)	100	USEPA, November 2013	330	USEPA, December 2002
FI	Fraction Ingested from Site	1	Professional judgment	1	Region 2 guidance
EF	Exposure Frequency (days/yr)	20	Professional judgment	40	Professional judgment
ED	Exposure Duration (yr)	1	Professional judgment	1	Professional judgment
AF	Soil Adherence Factor (mg/cm^2)	0.2	USEPA, July 2004	0.8	USEPA, July 2004
SA	Skin Surface Area (cm^2)	3300	USEPA, July 2004	3300	USEPA, July 2004
ET_{inh}	Exposure Time – inhalation (hr/day)	8	Professional judgment	8	Professional judgment
IR_w	Groundwater Ingestion Rate (L/day)	0.09	Professional judgment	0.27	Professional judgment
SA_w	Skin Surface Area (cm^2)	5300	USEPA, September 2011	5300	USEPA, September 2011

For jobs involving soil disturbance, greater ingestion rates were used, and it was assumed that essentially all of a person's incidental ingestion of soil occurred during this activity. An exposure frequency representing approximately 6 months and an exposure duration of 1 year were used for the central tendency, while a one year exposure frequency and duration were used for the RME scenario. Soil adherence factors are based on the geometric mean and the 95th percentiles for construction and utility workers. Exposed skin surface area for soil contact for the construction and utility worker is assumed to be the head, arms, and hands (6840 cm^2)

Exposures to groundwater are assumed to be minimal. Incidental water ingestion rates were set at 10 percent of the mean and 95th percentile tap water ingestion rates. It is considered to be highly unlikely that workers would be exposed to groundwater 8 hours/day given that this would be unacceptable to an employee and given the fact that the high water table would require dewatering for any major project. Therefore, an intermittent exposure of 2 hours/day was assumed. Exposed skin area is assumed to be hands and arms only (5300 cm^2). Best management practices would certainly minimize the exposure to groundwater in an excavation.

Estimation of intakes via all exposure routes was performed using the equations presented in Section 5.6.2. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 5-16 (RME) and Table 5-17 (CT) for soils, and Tables 5-18 (RME) and 5-19 (CT) for groundwater.

5.6.6 Outdoor Industrial Worker

Redevelopment of the Site and the resulting change in land use could result in the employment of full-time groundskeepers or similar employees who would work outdoors. The following exposure parameters were used to evaluate such adult personnel:

Parameter and Abbreviation		CT		RME	
IR_S	Soil Ingestion Rate (mg/day)	50	USEPA, September 2011	200	USEPA, November 2011
FI	Fraction Ingested from Site	0.75	Professional judgment	1	Region 2 Guidance
EF	Exposure Frequency (days/yr)	225	USEPA, December 2002	225	USEPA, December 2002
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
AF	Soil Adherence Factor (mg/cm^2)	0.02	USEPA, July 2004	0.1	USEPA, July 2004
SA	Skin Surface Area (cm^2)	3300	USEPA, July 2004	3300	USEPA, July 2004
ET_{inh}	Exposure Time – inhalation (hr/day)	8	Professional judgment	8	Professional judgment

The types of jobs that do not involve soil disturbance were evaluated using the central tendency and upper percentile soil ingestion rates. Under these circumstances, it was assumed that the majority (75%) of a person's daily intake of soil would occur during the working day. Full-time outdoor employees spend approximately 225 days/year outdoors, and exposure durations were 5 and 25 years as used previously. Soil adherence factors represent the geometric mean and the 95th percentiles for groundskeepers. Inhalation rates representing approximate mean and 95th percentile values for light intensity activities were used.

Estimation of intakes via all exposure routes was performed using the equations presented in Section 5.6.2. Additional details on input parameters and equations used to estimate the intakes for this receptor are contained in Tables 5-14 (RME) and Table 5-15 (CT).

5.6.7 Indoor Industrial or Commercial Worker

Potential redevelopment of the Site could also result in exposure of future indoor industrial workers. These receptors are assumed to be adults exposed during the working day. The following exposure parameters are used to evaluate this receptor:

Parameter and Abbreviation		CT		RME	
EF	Exposure Frequency (days/year)	250	USEPA, December 1989	250	USEPA, December 1989
ED	Exposure Duration (yr)	5	Bur. of Labor Statistics, 2012	25	USEPA, December 1989
ET	Exposure Time (hr/day)	8	Professional Judgment	8	Professional Judgment

Once indoor air concentrations are estimated using the Johnson and Ettinger Model (Environmental Quality Management, Inc., June 2003), the exposures will be estimated using a mean inhalation rate for adults performing light intensity activities (USEPA, September 2011). Full-time indoor employees are assumed to work 250 days/year. Exposure durations are set at 5 years for the CTE (Bureau of Labor Statistics, 2012) and 25 years for the RME (USEPA, December 1989). It is assumed that all workers are exposed for 8 hours/day while at work. Exposure assumptions are presented in Tables 5-20 (RME) and 5-21 (CT). One modification to the model was made – the Unit Risk for naphthalene, developed by California EPA was added to be consistent with the tables in Section 6.

5.7 LEAD EXPOSURE

Exposure to lead in soils is addressed via an initial comparison to recommended industrial screening levels to determine whether lead is addressed as a COPC. If the mean or UCL lead concentration exceeded 800 mg/kg, lead was retained as a COPC for that particular group of soil samples (e.g., Western Area Surface Soils). Soil lead intake will be related to blood lead levels in women of child-bearing age using the Adult Lead Model (USEPA, January 2003; June 2009).

Intake of lead in soil is estimated as follows:

$$\text{Absorbed Dose} = PbS \times IR \times EF \times AF / AT$$

Where:

PbS = Lead concentration in soil (mg/kg)
IR = Ingestion rate (mg/day)
EF = Exposure frequency (days/year)
AF = Gastrointestinal absorption of lead (0.12 default value)
AT = Averaging time (days)

Adult blood lead levels are evaluated using the default input parameters for baseline blood lead level (1 ug/dL) and geometric standard deviation parameter (1.8), as per the updated guidance. Target fetal blood lead level was 10 ug/dL, as per the model default values. Soil ingestion rates and exposure frequencies were those presented in the preceding tables in this section for each receptor. All relevant parameters were input to the Blood Lead Concentration Excel worksheets from the USEPA to estimate the probability that fetal blood lead concentrations would exceed the target level based on the defined potential exposure scenarios.

6.0 TOXICITY ASSESSMENT

The toxicity assessment, also known as a dose-response assessment, provides a description of the relationship between a dose, or intake, of a constituent and the anticipated incidence or an adverse health effect. The majority of knowledge about the dose-response relationship is based on data collected from laboratory studies of animals, studies of human occupational exposures, and theories about human responses to environmental doses.

The USEPA has developed dose-response assessment techniques to determine "acceptable" levels of human exposure to environmental constituents. These USEPA-derived values address chronic, and occasionally sub-chronic, non-carcinogenic health effects and potential carcinogenic risks.

6.1 EVALUATION OF POTENTIAL NON-CARCINOGENIC RESPONSE

This section discusses the mechanisms of non-carcinogenic response, the derivation of acceptable dose levels, the manner in which these levels are used in the risk assessment, and some of the limitations of these values. Limitations will be discussed in greater detail in the uncertainty analysis section of the risk assessment.

It is widely accepted that non-carcinogenic effects of chemicals occur only after a threshold dose is achieved. Typically, physiological mechanisms exist that will minimize the adverse effects through pharmacokinetic means such as adsorption, distribution, excretion or metabolism by the human body. Therefore there exists a range of exposures and doses that can be tolerated by a receptor without adverse effects. The threshold dose for a compound is usually estimated from the no observed adverse effect level (NOAEL) or the lowest observed adverse effect level (LOAEL), derived from laboratory animal studies or human exposure data. The NOAEL is the highest dose at which no adverse effects occur, and the LOAEL is the lowest dose at which adverse effects are noticeable.

6.1.1 Non-carcinogenic Toxicity Values

USEPA uses the NOAEL or the LOAEL estimates of threshold doses to establish reference doses (RfDs) and reference concentrations (RfCs) for human exposure. An RfD or RfC is an estimate of a daily exposure level that is unlikely to result in an appreciable risk of adverse effects during a period of exposure. USEPA has developed RfDs and RfCs for chronic (long-term) exposure, as well as sub-chronic exposures for some chemicals.

RfDs, which are used to estimate exposure via ingestion, are expressed in units of dose (mg/kg-day), while RfCs, which are used to estimate exposures via inhalation, are expressed in concentrations (mg/m^3). Both types of toxicity values incorporate uncertainty factors to account for limitations in the quality or quantity of available data. RfDs for dermal exposures are developed through route-to-route extrapolation, as described by the USEPA (USEPA, July 2004). An oral RfD is converted to an absorbed dose by multiplying the oral RfD by the fractional absorption efficiency factor, as shown in Exhibit 4-1 of that document. A fractional absorption efficiency factor or 1 (100%) is recommended for all the organic COPCs, while

several metals have varying recommended rates. For those chemicals not specifically identified with alternate absorption rates, a value of 1 is used.

Non-carcinogenic toxicity data (RfDs) for the oral and dermal routes of exposure are presented in Table 6-1. Both chronic (for long-term exposures) and sub-chronic (short-term exposures less than a seven years duration) are presented, if available. Target organs are presented as well, for eventual segregation of toxicity by health effect in the human health risk assessment, if appropriate. Table 6-2 presents inhalation non-carcinogenic toxicity data in both RfC and RfD format.

6.2 EVALUATION OF POTENTIAL CARCINOGENIC RESPONSES

This section discusses the assumed mechanisms of carcinogenic response, the derivation of carcinogenic toxicity values, the manner in which these values are used in risk assessment, and some of the limitations of these values. Limitations will be discussed in more detail in the uncertainty section of the risk assessment.

USEPA typically has required that potentially carcinogenic constituents be treated as if minimum threshold doses do not exist (USEPA, March 2005b). The regulatory dose-response curve used for carcinogens only allows for zero risk at zero dose. Thus for environmental exposures, some level of risk is always assumed upon exposure.

To estimate the theoretical response to environmental doses, various mathematical dose-response models are used. USEPA uses the linearized multi-stage model for low dose extrapolation. This model assumes that the effect of the carcinogenic agent on tumor formation seen at high doses in animal testing is basically the same at low doses (i.e., the slope can be extrapolated in a linear fashion).

USEPA evaluates all available scientific information using a weight-of-evidence approach to determine whether a chemical poses a carcinogenic risk in humans. USEPA groups chemicals according to their potential to result in carcinogenic effects as follows:

- Group A – Known human carcinogen
- Group B – Probable human carcinogen
- Group C – Possible human carcinogen
- Group D – Insufficient data to classify as a human carcinogen
- Group E – Not a human carcinogen

6.2.1 Cancer Toxicity Values

Cancer slope factors (CSFs) and inhalation unit risks (IURs) are the toxicity values used to quantitatively assess potential carcinogenic effects in humans from exposure. CSFs are defined as the plausible upper bound estimate of the increased cancer risk from a lifetime exposure to a given carcinogen. This estimate, usually expressed as the proportion of a population affected per mg/kg-day.

The CSF used to evaluate the oral route of exposure is expressed in units of reciprocal dose, or $(mg/kg\text{-}day)^{-1}$, while the IUR used to evaluate the inhalation route of exposure is expressed as a reciprocal concentration $(mg/m^3)^{-1}$. CSFs for the dermal route of exposure are developed through route-to-route extrapolation. The oral CSF is converted to an absorbed dermal CSF by dividing the oral CSF by the fractional absorption efficiency factor, as follows:

$$\text{Dermal CSF } (mg/kg\text{-}day)^{-1} = \text{Oral CSF } (mg/kg\text{-}day)^{-1} / \text{Oral Absorption Efficiency}$$

Cancer slope factors for the oral and dermal routes of exposure are presented in Table 6-3. Table 6-4 contains inhalation slope factors and unit risks. These values will be used to estimate lifetime incremental cancer risks for each receptor population in the human health risk assessment.

7.0 RISK CHARACTERIZATION

Risk characterization is the final step of the human health risk assessment process. It includes a description of the nature and magnitude of the potential for occurrence of adverse health effects under a specific set of conditions. In this step, the toxicity assessment and site-specific exposure assessment are integrated into quantitative and qualitative estimates of potential health risks. Potential estimated non-carcinogenic and carcinogenic health risks are calculated and summarized individually for each receptor and exposure medium. Estimated risks are combined across constituents and exposure pathways as appropriate to determine cumulative non-cancer hazard indices and theoretical excess lifetime cancer risks.

This section presents a discussion of the results of the carcinogenic and non-carcinogenic risk estimations using the methodologies and input parameters described in the preceding sections. Quantitative risk estimates are calculated according to current risk assessment guidance. Lifetime cancer risks are expressed in terms of dimensionless probabilities based on cancer slope factors and intake estimates. Non-carcinogenic risk estimates are presented in the form of Hazard Quotients (or Hazard Indices) that are determined through a comparison of intakes with published reference doses.

7.1 ESTIMATING POTENTIAL NON-CARCINOGENIC RESPONSES

The likelihood of the occurrence of adverse non-carcinogenic effects depends on the relationship between the RfD or RfC and the estimated exposure concentration received by a receptor. Doses less than the RfD, and exposure concentrations below the RfC, are not likely to be associated with any adverse health effects and are generally not of regulatory concern. Doses that exceed the RfD (and exposure concentrations greater than the RfC are considered to present a potential for adverse health effects.

Non-carcinogenic responses are evaluated numerically using a ratio known as the hazard quotient (HQ) and hazard index (HI). For oral and dermal exposure routes, the HQ is obtained by dividing the daily dose by the RfD, as follows:

$$\text{ADD (mg/kg-day)} / \text{RfD (mg/kg-day)} = \text{HQ}$$

The ADD (average daily dose) is the estimated daily dose of a chemical averaged over the specific period of exposure, which may be less than a lifetime. Equations used to calculate the ADD were presented in Section 6.

Similarly, for inhalation exposures, the HQ is calculated by dividing the exposure concentration by the RfC. The equation for calculating the exposure concentration for inhalation of volatiles and particulates was presented in Section 5.6.2. An inhalation HQ is calculated as follows:

$$\text{EC} / \text{RfC} = \text{HQ}$$

Each calculation with a specific combination of chemical, receptor, and exposure pathway, has a separate HQ. HQs associated with all COCs for a particular pathway are summed to yield the HI, as follows:

$$HI = HQ_1 + HQ_2 = \ldots HQ_n$$

If a receptor is exposed via more than one pathway (e.g., ingestion and dermal contact), the HIs for each pathway are summed. An HI of 1 or less indicates that an adverse effect would not be anticipated. HIs are most appropriately derived for constituents that act on the same target organ (e.g., liver or respiratory system) or have the same critical effect. Therefore, if the total HI for all COCs exceeds 1, it is appropriate to segregate the COCs by effect and mechanism of action and to derive separate HIs for each group (USEPA, December 1989).

7.2 ESTIMATING POTENTIAL CARCINOGENIC RESPONSES

For potentially carcinogenic chemicals, a risk assessment evaluates the degree to which a receptor may have an increased likelihood of developing cancer over a lifetime due to exposure to that chemical. At environmental dosage levels, the CSF is assumed to be constant and potential risk is directly proportional to intake. In order to estimate the theoretical excess lifetime cancer risk, the LADD of a chemical was multiplied by the CSF, as follows:

$$\text{LADD (mg/kg-day)} \times \text{CSF (mg/kg-day)}^{-1} = \text{Risk}$$

Equations for calculating the LADD were presented in Section 5.6.2 for the various exposure scenarios.

Similarly, for the inhalation exposure route, the potential cancer risk is calculated by multiplying the exposure concentration by the IUR, as follows:

$$\text{Exposure Concentration (mg/m}^3\text{)} \times \text{IUR (mg/m}^3\text{)}^{-1} = \text{Risk}$$

For each exposure pathway, these calculations are performed for each applicable COC, and the risks are summed to obtain the risk to a receptor via a particular pathway. Total risk via all pathways was calculated by summing the individual pathway risks.

7.3 RESULTS

This section presents the results of the risk calculations described in the preceding sections. Detailed spreadsheets enumerating the risks for each combination of exposure route, pathway and receptor are contained in Appendix E. These tables correspond to the various Table 7s required by RAGS Part D, and such table numbers are presented on each table.

In this section, result roll-up tables are presented, which correspond to the Table 9s required by RAGS Part D. Risk results tables have been prepared for each receptor/exposure medium combination for both the RME and CT scenarios, with Hazard Indices for each target organ included.

The RME risk calculations are based on the upper 95% confidence limit of the chemical analytical results for each analyte. This provides an upper-bound estimate of the risk associated with the exposure area. Risks and hazards for receptor populations may be over- or underestimated by using the 95% UCL due to

variability of concentrations across the exposure area. Most importantly, however, is the fact that under current Site conditions, exposures would be minimal given the extensive presence of cover materials (e.g., gravel, pavement, geotextile fabric, etc.).

The CT risk calculations may be more representative of a typical, yet conservative, exposure scenario. These risks are based on exposure to the mean concentration over the exposure unit, and less conservative inputs for parameters such as ingestion rates. However, even the CT estimates under current Site conditions would be an overestimate of risks due to the presence of cover materials over the Site.

Potential exposures to groundwater during excavation activities are considered to be highly conservative estimates based on typical construction practices and rather conservative estimates of the time that a receptor would spend in contact with the water during a working day.

The USEPA acceptable risk range and Hazard Index for industrial scenarios are typically 1E-4 for the incremental cancer risk, and 1 for the Hazard Index.

7.3.1 Western Surface Soil – Current/Future

All risk estimates presented in this section are predicated on the assumption that existing cover materials (e.g., asphalt, gravel, etc) are removed or degraded such that direct contact with the underlying fill material and soil could occur. This assumption results in a conservative estimate of potential risks associated with exposures under current land use conditions.

On-Site Visitors - Current and Future

Potential current or future exposures to surface soils on the western portion of the property via visitors under current land use conditions are presented in Tables 7-1 (RME) and 7-2 (CT). In the RME scenario, potential carcinogenic risks were estimated to be 2E-4. The RME represents a very conservative estimate of potential risks, predicated on the assumption that the current cover materials do not remain intact, and that visitors may come into direct contact with all surface soil materials on a regular basis. The estimated Hazard Index for all exposure routes is 6. Both these numbers slightly exceed the typical acceptable risk range and Hazard Index. When considering target organ effects, two compounds (benzene and hexavalent chromium) present a combined HI of 2 for the blood.

In the RME scenario, exposure to the UCL concentration of lead (48,400 mg/kg) results in blood lead levels greater than 10 ug/dL for 100% of potential receptors. However, this scenario is based on a highly conservative concentration. One biased soil sample collected from beneath an asphalt, clean fill, and fabric cover (location D-22), contained 57300 mg/kg lead, which drove the UCL concentration. This sample was reported to contain construction debris and brick fragments and hence is not representative of typical fill material at the Site. This particular sample result was omitted from a second set of calculations, using an RME concentration of 1300 mg/kg, and only 5.8% of potential receptors would experience an increase in blood lead levels above the target blood lead level of 10 ug/dL, with a 95th percentile value of 10.5 ug/dL and a geometric mean of 4.4 ug/dL. Blood lead level spreadsheets are presented in Appendix G, both with and without sample location D-22.

In the CT scenario (Table 7-2), risks are below the target blood lead level for industrial land use. These risks are based on exposure to an average concentration, with average exposure parameters. Blood lead levels for the visitor under the CT scenario are acceptable, with no probability of exceedance of the target blood lead level. Estimations were performed for the entire sample group (average lead concentration of 4880 mg/kg), as well as for a group that excluded sample location D-22 (average lead concentration of 511 mg/kg which is below the screening value for an industrial scenario).

HCTS Operator – Current and Future

Current and future potential exposures to surface soils by the HCTS Operator during routine inspection or maintenance activities are presented in Tables 7-3 (RME) and 7-4 (CT). In the RME scenario, cancer risks were estimated at 2E-4, and the Hazard Index was 6. Again, the assumption is made that the existing cover materials erode or degrade, thus exposing the fill and soil materials beneath. These risks slightly exceed the industrial scenario USEPA acceptable risk range and Hazard Index, but when target organ effects are considered no single organ or system would be expected to experience adverse effects from exposure.

Blood lead levels estimated using the UCL lead concentration would result in unacceptable blood lead levels for all potential receptors under the RME scenario (see the discussion for the site visitor above). Without the D-22 sample location results for lead, a geometric mean blood lead level is estimated to be 8.7 ug/dL, with about a 33% chance of exceeding the target blood lead level for this scenario. Blood lead level calculations are presented in Appendix G.

In the CT scenario, the cancer risk was estimated at 2E-6, and the Hazard Index was estimated to be 2. The cancer risk in this scenario is below the acceptable risk range of 1E-4 for an industrial receptor, and when target organs are considered for the Hazard Index, all target organ effects are at a level of 1 or below, which meets the acceptable Hazard Index value. For the Operator, there is a marginal chance for blood lead levels to exceed the target blood lead level (a 6.7% chance). Geometric mean blood lead levels for the operator would be in the acceptable range. When sample location D-22 is excluded, exposure to lead in soil does not present an unacceptable risk to the operator.

Outdoor Worker – Future

Future potential exposures of an outdoor worker such as a landscaper are presented in Table 7-5 (RME) and 7-6 (CT). Under the RME scenario, cancer risks were estimated at 4E-4 for routine exposures to exposed surface soil materials. The HI as estimated at 13. The HI is driven by reproductive, hematological, and thyroid effects resulting from potential exposure to dioxin, cobalt, and hexavalent chromium. Blood lead levels for a potential outdoor worker are unacceptable under the RME scenario as well (see Appendix G). Exclusion of the anomalous sample location D-22, results in a 33% chance that blood lead levels would exceed the target blood lead level in an outdoor worker.

In the CT scenario (Table 7-6), cancer risks were estimated at 5E-6 and the HI was estimated to be 2. These cancer risks fall below the USEPA acceptable risk range for industrial scenarios, and all target organ effects were less than 1. Consideration of blood lead levels in this receptor shown in Appendix G indicate that about an outdoor worker would have about an 18% chance of exceeding the target blood lead level upon routine exposure to surface materials. Again, with sample location D-22 excluded, the average soil

concentration is reduced to 511 mg/kg, which is below the RSL for lead in soil under an industrial scenario (800 mg/kg).

Trespasser – Future

Quantitative risk estimates were not calculated for a potential adolescent trespasser, however, this qualitative discussion is included based on USEPA comments received on the PAR. For this discussion, exposure parameters are assumed to be roughly similar to those for the outdoor worker, at the request of the USEPA. Receptor body weights would be somewhat less than those for an adult, perhaps 20 percent, and exposure durations would be on the order described for the worker under the CT scenario (approximately 5 years) therefore potential risks would be approximately 80% of those for the CT outdoor worker, or 4E-6. This risk would not be affected by the mutagenic properties of several of the COPCs (benzo(a)pyrene and dibenzo(a,h)anthracene) that require a 3-fold adjustment to the CSF. The risks associated with these compounds to the outdoor worker are in the 1E-9 range, and a 3-fold adjustment to the CSF for the trespasser receptor would not increase the cancer risk above the 4E-6 estimate.

7.3.2 Eastern Surface Soil – Current/Future

All risk estimates presented in this section are predicated on the assumption that existing cover materials (e.g., asphalt, gravel, geotextile fabric, etc) are removed or degraded such that direct contact with the underlying fill material and soil could occur. This assumption results in a conservative estimate of potential risks associated with exposures under current land use conditions.

Visitor – Current/Future

Potential risks to site visitors under current or future land use conditions are presented in Tables 7-7 (RME) and 7-8 (CT). Incremental cancer risks to a site visitor were estimated at 4E-3 in the RME scenario. This risk is driven primarily by the presence of 1,2,4-trichlorobenzene at very high concentrations in a duplicate pair of samples, which resulted in a high degree of uncertainty in the estimation of the UCL concentration, and therefore requiring that the maximum (average of the two duplicate results) be used as the UCL (see Table 5-3). Risks from other COPCs are two orders of magnitude lower. The HI is estimated to be 17, again driven by ingestion of and dermal contact with soil containing 1,2,4-trichlorobenzene at the maximum concentration. Exposures of this type would require that the visitor spend all of his/her time at the point of maximum concentration, and assume that the existing cover materials (gravel) are removed.

In the CT scenario, carcinogenic risk was estimated to be 2E-5 (below the 1E-4 acceptable risk range), and the HI to be 1 (acceptable). Risks to COPCs other than 1,2,4-trichlorobenzene at the average concentration of 31000 mg/kg (driven by the maximum concentration) are two or more orders of magnitude lower.

HCTS Operator – Current/Future

Potential risks estimated for the HCTS Operator for exposure to surface materials on the eastern portion of the property are presented in Tables 7-9 (RME) and 7-10 (CT). Under the RME scenario, potential carcinogenic risks are 1E-2, again due to exposure to the maximum concentration of 1,2,4-trichlorobenzene. This compound also drove the HI of 38 (for adrenal effects).

Under the CT scenario, the incremental cancer risk is estimated to be 8E-5 (below the 1E-4 acceptable risk range), and the HI is estimated to be 6. The presence of 1,2,4-trichlorobenzene drives the cancer risk, and hexachlorobenzene drives the HI. These levels are above the typical acceptable levels for industrial scenarios, and assume that the operator would spend the same amount of time on both portions of the property, even though the HCTS is physically located on the western portion of the Site, thereby potentially overestimating risks for this receptor.

Outdoor Worker – Future

Estimated potential risks to a future outdoor worker are presented in Tables 7-11 (RME) and 7-12 (CT). These risks were similar to those for the Operator, with RME carcinogenic risks of 1E-2 and an HI of 38 for the RME scenario, and a carcinogenic risk of 8E-5 and an HI of 6 for the CT scenario.

Trespasser – Future

Quantitative risk estimates were not calculated for a potential adolescent trespasser, however, this qualitative discussion is included based on USEPA comments received on the PAR. As discussed in Section 7.3.2, the potential risk to an adolescent trespasser on the eastern portion of the Site would be approximately 80 percent of that estimated for the outdoor worker, or a total of about 7E-5.

7.3.3 Western Surface/Subsurface Soil and Shallow Groundwater– Future

Construction Worker – Future

Potential carcinogenic and non-carcinogenic health risks were estimated for a construction worker under future conditions. Table 7-13 presents risks and HIs for the RME scenario, and Table 7-14 presents the results for CT conditions. Construction workers are assumed to be exposed to both soil and groundwater, as discussed in Section 5.6.

Table 7-13 shows that the potential incremental cancer risk under the RME scenario is 3E-4, with a soil risk of 4E-5 and a conservative groundwater contact risk of 3E-4 and Hazard Indices are estimated at 221, with 155 from the soil contact and 66 from contact with groundwater. Dioxin, 1,2,4,5-tetrachlorobenzene, vanadium and hexavalent chromium provide the majority of the risk to the liver, blood, reproductive system, thyroid, and kidney. Under RME conditions (i.e., exposure concentrations driven by the lead concentration in one sample location D-22 that is a statistical outlier), potentially unacceptable blood lead levels may result for a construction worker based on exposure to a UCL lead concentration of 15800 mg/kg. Without sample location D-22, the UCL lead concentration is 606 mg/kg, which is below the industrial screening level and therefore would not result in unacceptable blood lead levels. In addition, the concentration of lead in two of the 2008 groundwater samples (SC-PZ-4U and SC-MW-15U) exceeds the MCL for lead, and would therefore be considered unacceptable for potable use. Additional metals found at concentrations greater than MCLs or secondary MCLs in groundwater are arsenic (SC-PZ-3U), chromium (SC-PZ-1U, -2U, -3U and -4U), iron (SC-MW-15U, Sc-PZ-1U, -3U and -4U), manganese (SC-MW-15U, SC-PZ-1U and SC-PZ-4U) and zinc (SC-PZ-4U).

Table 7-14 shows that under the CT scenario, the incremental cancer risk is 3E-6 (below the USEPA acceptable risk range of 1E-4), and the HI is 2426. The presence of naphthalene in the groundwater at a

concentration up to 5 mg/L presents the majority of the potential for adverse health effects upon repeated dermal contact with this maximum concentration. Naphthalene presents adverse effects on body weight of a receptor. The average lead concentration in the subsurface/surface soils is 3440 mg/kg, which would result in only a 3% chance that blood lead levels would exceed the target blood lead level in a construction worker, with a 95th percentile lead concentration of 8.8 ug/dL. If sample location D-22 is eliminated from consideration, the average lead concentration of 606 mg/kg is below the screening value and lead would not pose a risk to a construction worker.

Utility Worker – Future

Tables 7-15 and 7-16 present the estimated carcinogenic and non-carcinogenic risks for a future utility worker under the RME and CT scenarios, respectively. The estimated lifetime incremental cancer risk for a utility worker on the western portion of the site is 1E-4, and the HI is 6524. Naphthalene in the groundwater at a maximum concentration of 5 mg/L and the presence of hexavalent chromium (UCL = 2280 mg/kg) and 1,4-dichlorobenzene (UCL = 730 mg/kg) in the soil present the majority of the risks. In addition, blood lead levels for the utility worker would have a 95% chance of exceeding the target blood lead level under RME conditions if all samples are considered, including location D-22.

Under the CT scenario, incremental cancer risks were estimated to be 1E-5. The CT HI was estimated at 811, primarily due to the presence of naphthalene in one groundwater sample at a high concentration, driving the average value upwards. Increased blood lead levels are not an issue for the utility worker if all samples are considered, with only a 0.1% chance of a receptor experiencing blood lead levels above the target blood lead level.

7.3.4 Eastern Surface/Subsurface Soils and Shallow Groundwater– Future

Construction Worker - Future

The estimated risks for the construction worker on the eastern portion of the site are presented in Table 7-17 for the RME scenario and Table 7-18 for the CT scenario. Table 7-17 indicates that the incremental cancer risk for the RME scenario is 2E-2, primarily driven by potential ingestion of hexavalent chromium in the shallow groundwater. The Hazard Index is 3152, with several target organs/systems having unacceptable HIs (blood, liver, kidneys, reproductive system, etc) due to the presence of multiple metals in the groundwater samples. The concentration of lead in the 2008 sample used to assess groundwater risks on the eastern portion of the property also exceeded the lead MCL, and therefore would not be considered acceptable for potable use.

Under the CT scenario, cancer risks are somewhat lower (1E-3), resulting from the presence of several PAHs in the low ppb concentration range in the groundwater samples. The total HI for the construction worker was estimated at 65, with naphthalene in the groundwater and hexachlorobenzene and 1,2,4-trichlorobenzene in the soil presenting the majority of the HI. Body weight, the reproductive system, and the kidneys are most likely to exhibit adverse effects under the CT construction worker scenario.

Utility Worker – Future

Table 7-19 presents a summary of the potential incremental cancer risks and HIs for the future utility worker receptor under the RME exposure scenario. Risks are estimated at 4E-4 for combined exposure to both soil and shallow groundwater on the eastern portion of the site. PAHs in the groundwater sample present the majority of that risk. The HI for the utility worker is estimated at 32, with body weight, the liver and the reproductive system being most likely to be adversely affected.

Table 7-20 presents a summary of the cancer risks and HIs for the CT utility worker exposure scenario. The incremental carcinogenic risk was estimated at 3E-4; again, the PAHs in the single sample drove the risk. The HI was estimated to be 21, with body weight and the liver being the most impacted.

7.4 VAPOR INTRUSION

This section presents a brief summary of the results of a vapor intrusion assessment for a future non-residential development on the property. Vapors resulting from both shallow groundwater (only naphthalene and benzene exceeded the screening levels, as indicated in Table 4-8) and the shallow soil (all volatile organics and naphthalene) are considered. Appendix H presents the detailed results of this assessment, and the salient points are summarized in this section.

7.4.1 Vapor Intrusion from Soil

Potential risks associated with both the RME scenario (25 year exposure duration and UCL soil concentrations) and the CT scenario (5 year exposure duration and average soil concentrations) were estimated using the Johnson and Ettinger Model.

For the western portion of the property, risks are summarized in Tables 7-21 (RME) and 7-22 (CT). Soil and groundwater sources of indoor volatiles are presented separately. The groundwater data used for this assessment were combined for both the eastern and western portions of the Site because of the limited number of samples used in this assessment.

These tables indicate that under both RME and CT scenarios, a routine exposure to volatile organic chemicals migrating through a building slab may result in unacceptable risks. However, it should be noted that these exposures assume a three foot thickness of soil containing either the UCL or average COPC concentrations, which may greatly overestimate risks unless the building were sited directly over the location of maximum concentrations, which differ from chemical to chemical, as well as from medium to medium.

Non-carcinogenic compounds in the shallow soils on the eastern portion of the site present unacceptable estimated HIs under both CT and RME future scenarios, as presented in Tables 7-23 (RME) and 7-24 (CT). The cancer risks resulting from volatilization from the soil source material are greater than those originating from the groundwater (see Section 7.4.2).

Note that in some cases, the CT HIs are greater than the RME HIs for an individual chemical. Source depletion is addressed by the model, and if the exposure time exceeds the time needed to deplete the finite source, risks may be higher for such chemicals when shorter exposure durations are considered. The central

tendency scenario evaluates only a 5-year exposure duration, which does not always allow for significant reductions in soil vapor concentrations and can therefore result in higher HIs for shorter exposure durations.

7.4.2 Vapor Intrusion from Groundwater

Evaluation of the maximum concentration of benzene (0.85 mg/L) and an RME exposure duration of 25 years, resulted in incremental cancer risks to a future potential indoor worker of 2E-6. Potential RME indoor inhalation risks from naphthalene originating in groundwater were estimated at 6E-5 for the 25 year exposure duration. Central tendency risks were also evaluated using the average concentrations of both benzene and naphthalene, with an ED of 5 years. These risks were estimated at 1E-7 and 2E-6, respectively. These risks are approximately 2 orders of magnitude below the risks resulting from soils (see Section 7.4.1).

Chlorobenzene and 2-methylnaphthalene were less significant contributors to risks. Under the RME scenario, chlorobenzene would present an HI of 0.03. An incremental cancer risk of 2E-7 is estimated for 2-methylnaphthalene under the RME scenario. Central tendency risks and HIs for these compounds were one to two orders of magnitude lower.

Assumptions regarding building construction were discussed in Section 5.6.2. The modeling input and results pages are presented in Appendix H. It should be noted that the Johnson and Ettinger model considers 2-methylnaphthalene as a carcinogen, which is not supported by the current literature (e.g., IRIS, the ORNL risk assessment information system or the provisional peer-reviewed toxicity values). No inhalation values were available for either carcinogenic or non-carcinogenic effects in the cited literature, and therefore the risks may be overstated for 2-methylnaphthalene by using the inhalation values in the model input.

8.0 SUMMARY AND CONCLUSIONS

This section provides a brief summary of the results of the BHHRA. The exposure scenarios were presented in Table 3-1. Multiple potential exposure scenarios were eliminated from quantitative assessment for reasons discussed in Section 3 and Table 3-1.

Under current and future site conditions, potential exposures of HCTS operators and site visitors to SCCC Site surface soils were evaluated. Potential exposure routes included dermal contact with soil, as well as incidental ingestion and inhalation of particulates or volatile emissions on an occasional basis. Currently, -the majority of the Site is paved or covered with gravel and/or geotextile fabric. Thus, the potential exposure scenarios involve the assumption that the existing covers are compromised, allowing direct exposure to occur.

Under future Site conditions, several additional potential receptors were evaluated. These include construction or utility workers whose work may bring them into contact with soils from the surface to a depth of approximately 10 feet as well as with shallow groundwater. Again, dermal contact, incidental ingestion and inhalation scenarios were evaluated. In addition, should the Site be redeveloped, full-time outdoor and full-time indoor employee scenarios (i.e., vapor intrusion) were also evaluated. A future adolescent trespasser was also discussed qualitatively in Section 7.

Evaluation of off-site impacts to soil and groundwater outside of the barrier wall is ongoing; however, no complete exposure pathways have been identified under current and future land uses. Evaluation of off-site groundwater is addressed qualitatively in this summary section of the risk assessment.

Exposure scenarios were developed based upon reasonably expected future land use (considering the Redevelopment Plan in place (New Jersey Meadowlands Commission, February 2013), the limitations for future groundwater use (CEA, Appendix A), and the ultimate implementation of a deed restriction prohibiting disturbance of the Consolidation Area. Future land use is restricted to industrial-type or support service uses in the Intermodal B zoning restriction.

The risk summary tables presented in this section are equivalent to the Table 10s of RAGS Part D. These tables include only those COPCs that drive the risks. Any individual COPC that contributes a cancer risk greater than 1E-6 or contributes to an HI of 1 or more is included in these tables. Often risks are driven by one or more discrete sample locations that contribute the vast majority of the risks in the RME scenarios. HIs presented in this section may vary slightly from those presented in Section 7 due to rounding to one significant figure and the inclusion of only target organs where HIs equaled or exceeded unity.

8.1 WESTERN AREA SURFACE SOIL

Potential risks associated with current exposures to surface soils (present beneath cover materials which eliminate exposures, including fill material, are summarized in Tables 8-1 through 8-5. For all current or future receptors (visitors, HCTS Operator, and a future outdoor worker), hexavalent chromium was the most significant contributor to the carcinogenic risks. Hexavalent chromium was detected in 25 of 35

surface soil samples, at concentrations ranging from 0.54 to 3390 mg/kg. Both the UCL concentration of 1270 mg/kg and the arithmetic mean concentration of 200 mg/kg exceeded the industrial RSL of 5.6 mg/kg. It is important to note that interim remedial measures, consisting of surface cover materials, were previously constructed and are currently in place and maintained; these measures eliminate direct contact exposure to the surface soils.

Carcinogenic risks ranged from 2E-4 to 4E-4 under the RME scenarios for the various receptors (Table 8-1, 8-2 and 8-4). For all three potential receptors exposed to surface soils, hexavalent chromium contributed the majority of the risks (50% or more), followed by dioxins. HIs for these receptors ranged from 4 to 6, with only the future outdoor worker who is assumed to be exposed to soils/fill on a routine basis (assuming the existing covers are compromised in some way) potentially experiencing adverse health effects as a result of exposure to hexavalent chromium and dioxin.

Potential exposure to lead, driven by a single sample that results in a UCL concentration significantly greater than the 800 mg/kg industrial screening level, could result in an unacceptable probability of blood lead levels being greater than the target blood lead level value of 10 ug/dL. If that single sample is excluded from consideration (e.g., removed/remediated), the UCL concentration would result in a 1 in 3 chance that blood lead levels would exceed the target value.

For the CT scenarios, the estimated potential risks are somewhat lower. For the on-site visitor, total carcinogenic risk was estimated at 4E-7 and the HI was less than 1. Therefore, no summary table for this receptor is included in this section. CT carcinogenic risk for the HCTS Operator was estimated at 1E-6 and 2E-6 for the outdoor worker, as shown in Tables 8-3 and 8-5, respectively. Both of these values are below the USEPA acceptable risk range of 1E-4 for industrial land use. In addition, all HIs are 1 or below. Blood lead levels are only slightly elevated when the maximum detected lead concentration is factored into the average, but without that sample, the average lead concentration is below the screening value of 800 mg/kg.

Under the CT scenario, risks are below acceptable risk range values for all receptors. Under the RME scenarios, cancer risks and HIs are driven by hexavalent chromium and dioxins present in surface soil below the current cover materials, thus *exposure could only occur if covers are compromised*.

8.2 EASTERN AREA SURFACE SOILS

Tables 8-6 through 8-11 present a summary of the potential risks associated with routine exposure to surface soils and fill material (beneath the current cover materials) on the eastern portion of the property. On the eastern portion of the property, carcinogenic risks are driven primarily by the presence of 1,2,4-trichlorobenzene in a pair of duplicate samples at an average concentration of 150,000 mg/kg in tank area surface soil samples collected in 1990. Trichlorobenzene contributes the vast majority of potential carcinogenic risks to all three surface soil receptors, ranging from 4E-3 for the visitors, to 9E-3 for the operator and outdoor worker, as shown in Tables 8-6, 8-8 and 8-10, respectively for the RME scenarios.

Hazard indices under the RME scenario ranged from 17 to 38, with the adrenal and reproductive systems most likely to be adversely impacted by exposure to 1,2,4-trichlorobenzene and dioxin, respectively. Hexavalent chromium was not a significant risk driver on the eastern portion of the property.

Under the CT scenario, incremental cancer risks ranged from 2E-5 for the visitor to 8E-5 for the future outdoor worker. All risks for the CT scenarios are below 1E-4. 1,2,4-Trichorobenzene in a pair of duplicate samples collected from the former tank area contributes virtually all of the potential carcinogenic risk, as shown on Tables 8-7, 8-9, and 8-11. Hazard Indices are generally less than 1, with the exception of dermal exposure to hexachlorobenzene in the soil and fill material, which could result in an HI up to 5.

8.3 WESTERN AREA SURFACE/SUBSURFACE SOIL AND SHALLOW GROUNDWATER

Construction workers' and utility workers' potential exposure to surface and shallow subsurface soils as well as shallow groundwater were evaluated under future land use conditions. Tables 8-12 through 8-15 present a summary of the risk assessment results.

Under the RME scenarios, risks for exposure to both media were 4E-4 for the construction worker and 2E-4 for the utility worker. Both these values exceed the USEPA acceptable risk range of 1E-4 for industrial land use. Benzene and hexavalent chromium present in the groundwater at maximum concentrations of 0.085 mg/L and 4.07 mg/L out of only a limited number of samples (four) were the COPCs that drove the potential cancer risks associated with groundwater dermal contact and incidental ingestion. In the soil, 1,4-dichlorobenzene and hexavalent chromium are the most significant contributors to the risks. For non-carcinogenic HIs, naphthalene presents essentially all of the potential hazards (body weight) via groundwater exposure . Dioxins (reproductive system), 1,2,4,5-tetrachlorobenzene (thyroid), vanadium (kidney) and hexavalent chromium (blood) pose the majority of the risks in the soils. Exposure to lead in the soils located beneath the cover materials could result in unacceptable blood lead levels in both receptors under the RME scenario as well.

Under the CT scenarios, risks and HIs are somewhat lower (see Table 8-13 and 8-15). The incremental cancer risk for the construction worker was estimated at 4E-5 for the construction worker and 2E-5 for the utility worker, which are below 1E-4. HIs are driven by the presence of naphthalene in the groundwater. Lead is not an issue for the CT scenarios, with only a 3 percent chance of blood lead levels exceeding the target blood lead level if all samples are considered, and less than 1 percent chance if the single sample containing high lead concentrations is eliminated from the calculation.

8.4 EASTERN AREA SURFACE/SUBSURFACE SOIL AND SHALLOW GROUNDWATER

For the eastern portion of the Site, risks and HIs are summarized in Tables 8-16 through 8-19. For the RME scenario, risks to the construction worker were estimated as 2E-2 (see Table 8-16), due primarily to the presence of hexavalent chromium in the groundwater at a maximum concentration of 0.453 mg/L. In addition, various PAHs found in the single groundwater sample from the eastern portion of the Site and 1,2,4-trichlorobenzene in the soil were major contributors to the risk. For the utility worker, risks were estimated at 4E-4. PAHs in the groundwater contributed the majority of that incremental cancer risk. Together, vanadium and hexavalent chromium in the single groundwater sample contributed the majority of the HI, followed by 1,2,4-trichlorobenzene and hexachlorobenzene in the soil.

Under the CT exposure scenarios, the risks to the construction worker and the utility worker were 1E-3 and 3E-4, respectively. PAHs in the groundwater sample were the primary contributors to the risks. HIs were

64 (construction worker) and 21 (utility worker), with the primary contributors being naphthalene in the groundwater and the chlorobenzenes in the soil.

8.5 POTENTIAL USE OF GROUNDWATER FOR DRINKING WATER

In addition to the current groundwater Classification Exception Area in effect (for a limited number of constituents) that prohibits groundwater extraction for potable use, the chemical analytical results for the shallow groundwater samples were compared to current maximum contaminant levels (MCLs) to provide additional support to the conclusion that potable use of groundwater at the site is not appropriate. Given the containment of groundwater within the barrier wall, the operation of a hydraulic control and groundwater treatment system, the collection and disposal of DNAPL from the subsurface matrix, potable use of groundwater should remain restricted. The concentrations of multiple analytes exceeded MCLs, as shown in Tables 4-6 and 4-7. These analytes are benzene, benzo(a)pyrene, arsenic, chromium, lead and thallium. Groundwater within the barrier wall is well contained, and reductions in toxicity, mobility and concentration are being achieved.

Groundwater outside the barrier wall is not being addressed by the HCTS. One sample, discussed in the SCSR Addendum (from location PZ-13L), located southwest of the barrier wall, contained a number of analytes at significant concentrations, indicative of the potential presence of DNAPL in this area. This issue is the subject of ongoing investigations and ultimately a remedy to address the groundwater currently outside the barrier wall. Analytical results for the PZ-13L groundwater sample are presented in Table 15 of the SCSR Addendum, and included various dichlorobenzenes at concentrations ranging from 15 to 24 mg/L, chlorobenzene at a concentration of 1.8 mg/L, benzene at a concentration of 0.19 mg/L. These reported concentrations exceed drinking water standards (MCLs). Results of the additional investigation underway will be incorporated into a letter report with a risk assessment attachment that will be considered an addendum to this document.

8.6 VAPOR INTRUSION INTO STRUCTURES

The risk assessment results presented in Section 7.4 indicated that, barring enhanced construction techniques such as the installation of vapor barriers or vapor mitigation systems in new construction, the potential risks associated with indoor inhalation of volatile emissions originating in either soil or shallow groundwater would be unacceptable to future indoor workers. This risk estimate was based on conservative assumptions, but the results nonetheless support the need for vapor mitigation in future construction that occurs on Site. Tables 8-20 through 8-24 present summaries of the risk results for the indoor inhalation pathways. The contribution from groundwater is minor when compared to the contributions from soil.

8.7 SUMMARY AND CONCLUSIONS

The preceding sections contained a description of the results of the risk characterization activities conducted in the BHHRA. This section contains a tabular summary of those results.

Receptor	Current Land Use with Interim Remedies [1]		Current Land Use with Interim Remedies Disturbed [2]		Future Land Use with Interim Remedies Disturbed [3]	
	RME Risk/HI	CT Risk/HI	RME Risk/HI	CT Risk/HI	RME Risk/HI	CT Risk/HI
Western Area						
On-Site Visitor	0 / 0	0 / 0	2E-4 / 4	4E-7 / 0	NA	NA
HCTS Operator	0 / 0	0 / 0	2E-4 / 4	1E-6 / 1	NA	NA
Outdoor Worker	0 / 0	0 / 0	4E-4 / 6	2E-6 / 1	NA	NA
Constr. Worker	0 / 0	0 / 0	NA	NA	4E-4 / 21189	4E-5 / 2433
Utility Worker	0 / 0	0 / 0	NA	NA	2E-4 / 6535	2E-5 / 811
Indoor Worker[4]	0 / 0	0 / 0	NA	NA	1E-3 / 187	1E-4 / 184
Eastern Area						
On-Site Visitor	0 / 0	0 / 0	4E-3 / 17	2E-5 / 1	NA	NA
HCTS Operator	0 / 0	0 / 0	1E-2 / 37	7E-5 / 6	NA	NA
Outdoor Worker	0 / 0	0 / 0	1E-2 / 38	8E-5 / 6	NA	NA
Constr. Worker	0 / 0	0 / 0	NA	NA	2E-2 / 3141	1E-3 / 64
Utility Worker	0 / 0	0 / 0	NA	NA	4E-4 / 31	3E-4 / 21
Indoor Worker[4]	0 / 0	0 / 0	NA	NA	1E-3 / 147	2E-4 / 142

1. With interim remedies in place (i.e., pavement, gravel, vapor barrier in HCTS building) and no groundwater use, both risks and HIs are zero. No current exposures.
2. Current risks are hypothetical. No complete exposure pathways at present due to the interim remedies in use. These risks assume that the cover materials are disturbed such that persons may be exposed to the underlying surficial soil/fill material.
3. Future scenarios involve disturbance of interim remedies and potential exposure to soils and shallow groundwater by construction and utility workers.
4. Future risks to indoor workers are associated with construction of a building at the Site with no vapor barriers, etc.

This table allows the reader to see that under current site conditions, with the cover materials intact, there are no risks for visitors, the HCTS Operator, and for outdoor workers. If the cover materials are disturbed under current land use conditions, risks and/or hazard indices exceed the acceptable ranges for most receptors under both RME and CT scenarios. Finally, disturbance of the cover materials, with subsequent exposures to subsurface/surface soils and shallow groundwater present risks to the future receptors (construction workers and utility workers) that exceed the acceptable risk range of 1E-4, with HIs greater than unity for one or more target organs. Often, these high risk estimates are driven by just one or two COPCs, present in limited locations at high concentrations.

8.8 UNCERTAINTY ANALYSIS

Uncertainties are inherent in a quantitative risk assessment. Inclusion of site-specific factors such as current and future land use considerations, decreases uncertainty. Assessment of uncertainty is a standard component of the risk assessment process. Uncertainty analysis provides a context for better understanding the conclusion by identifying uncertainties that have most significantly impacted the results.

The number of samples and the array of analyses conducted to date are adequate to assess baseline human health risks for the Site. Numerous soil/fill material samples were collected, including biased sample locations used to delineate source areas such as tank locations. Analytical parameters for various sample groups included both complete analysis for volatiles, semi-volatiles, dioxins, PCBs, and metals, as well as

focused sampling and analysis limited to particular analytes such as hexavalent chromium or dioxin. Recent (2008 and later) analytical results were subjected to an evaluation in accordance with the USEPA National Functional Guidelines for data validation. The use of older historical data, in this case samples analyzed more than twenty years ago, may introduce uncertainty into the risk estimates for several reasons. For example, organic constituent concentrations in environmental media on inactive sites such as the SCCC are expected to decrease over time. Thus, the use of the older sample data in the risk calculations will result in an overestimate of the risk.

One of the major contributors to the uncertainty of the current scenario risk results is associated with the use of exposure concentrations and scenarios that assume direct contact with surficial soil or fill material. In reality, these materials are covered with asphalt or geotextile/aggregate over the majority of the Site. Any current exposures to surface materials (e.g., by the HCTS Operator or Site Visitors) would be an overestimate of potential risks based on the presence of these cover materials.

The Construction Worker exposure scenario may also result in an overestimation of potential risks. The future development of the Site would require placement of clean fill material to bring the ground surface above the 100-year floodplain. This addition of clean material would reduce exposure concentrations, thereby reducing risks and HIs as well. Such effects may not be seen in the Utility Worker exposure scenarios, as utility work can occur at any time, prior to emplacement of the fill material.

Uncertainties discussed in the remainder of this section include uncertainties associated with the following:

- Analytical data and COPC selection process
- Exposure assessment
- Toxicity information
- Risk characterization

Uncertainties associated with the available analytical data and the COPC selection processes affect the hazard identification portion the BHHRA. These uncertainties are

- Sample Locations – Environmental sampling conducted at the Site was not random. Potential source areas were targeted for sampling and analysis. Because much of the sampling during the various investigation phases was biased toward areas where contamination was most likely to exist, data sets are biased toward higher concentrations, which can lead to an overestimation of potential risks.

- Identification of COPCs – Multiple uncertainties exist in the process of identifying COPCs for the Site. These include uncertainties associated with the selection of sampling locations and analytical parameters, the number of samples available for use, and the number of analyses for a particular analyte. For example, the more samples analyzed for a particular parameter, the better the chances are that the concentration term is truly representative of Site conditions. In addition, the screening values selected are typically the most conservative available (e.g., the RSLs are calculated for a highly exposed individual vs. a more typical exposure scenario). Individual chemicals are carried

through the quantitative assessment based solely on whether a screening criterion is exceeded. For several COPCs, the RSLs used for screening are based on the most conservative toxicity data available. For example, the USEPA does not consider naphthalene as a carcinogen in its Integrated Risk Information System data base, but the screening values are based on a carcinogenic unit risk factor from the California Environmental Protection Agency.

Uncertainties associated with the USEPA approach to exposure assessment generally involve the use of standard default exposure scenarios. Under this approach, if a constituent is identified as a COPC for a particular area and medium, it is assumed that exposure to that substance will occur at levels consistent with the default scenario. Default scenarios in the BHHRA evaluate current and potential future exposures under the RME scenario in addition to a more representative CT scenario. The RME scenario is defined as the highest exposure that is reasonably expected to occur at a site.

- Use of Default Exposure Factors – The use of standard default exposure factors leads to a degree of uncertainty in the estimated risks. For example, soil ingestion rates and the fraction ingested from the Site are probably significant overestimations of the amount of exposure that may occur. Exposures that might occur at this Site are likely to be intermittent, and most people consciously avoid hand-to-mouth behavior. In addition, the assumption of dermal contact with and ingestion of shallow groundwater is most likely overestimated as well; exposures are more likely to be intermittent and infrequent (if at all, considering the likelihood of wearing personal protective equipment, normal safety considerations, and/or the use of dewatering to facilitate construction). Assuming direct contact with groundwater for several hours at a time is extremely conservative.

- Vapor Intrusion Modeling – Because no occupied structures other than the HCTS exist at the site (and the HCTS was constructed over several feet of imported clean fill with an epoxy-sealed slab), conservative fate and transport modeling was used to estimate potential indoor air concentrations to which future workers could be exposed. Such models generally provide an overestimation of the actual air concentrations, especially since they assume a constant source of a defined dimension, as opposed to a continually degrading source. The model does not consider the effects of multiple contaminants. Other conservative assumptions in the Johnson & Ettinger model include a low air exchange rate that disregards typical ventilation in industrial buildings, and assumptions based on distance of the source from the building foundation, and are discussed in the User's Guide (Environmental Quality Management, Inc., June 2003).

Toxicity information introduces another uncertainty factor in the estimation of potential carcinogenic and non-carcinogenic risks. Toxicity information used in the quantitative risk assessment is seldom based on actual human data. Extrapolation of animal data to humans and the extrapolation of effects observed at high doses to the low doses typically encountered in environmental exposure scenarios introduce substantial uncertainty to the risk estimations. Uncertainties in toxicity information are routinely addressed by the USEPA via the use of 95th percentile estimates of cancer slope factors and through the use of uncertainty and modifying factors for Reference Doses. All USEPA toxicity values are designed to err on the conservative side.

- Toxicity Assessment for Non-carcinogens - Uncertainty factors are intended to account for factors such as animal-to-human extrapolation, individual variation in human populations, limitations in toxicity data quality, or incomplete studies. Often, absorption, distribution, metabolic fate and excretion parameters are unknown. Interspecies dose conversion may be limited by differences in lifespan, body size, breathing rates or the route of administration used in a study.

- Gastrointestinal Absorption - Extrapolation of oral toxicity values originally developed for food or water sources to soil as the source assumes that chemicals in soil are equally well absorbed via ingestion as those dissolved in water. This assumption is conservative, but based on current USEPA guidance.

- Dermal Absorption - Dermal toxicity values assume an absorption efficiency based on animal testing. This may substantially overestimate risks associated with exposures to chemicals for which no specific recommended absorption factor is available, thereby requiring the risk assessor to assume that 100% of a dermal dose is absorbed. This approach does not account for potential volatilization from the skin vs. absorption, and is conservative with regard to the potential for metals in soil to permeate the skin.

- Use of Chronic RfDs/RfCs to Evaluate Subchronic Exposures – In the absence of an oral RfD or inhalation RfC derived specifically for subchronic exposure durations, the chronic value is used for the risk assessment. Use of the chronic RfD or RfC to evaluate subchronic exposure duration may overestimate the potential for adverse effects to construction workers or others exposed for short time periods may overestimate HIs because in general, the subchronic values are up to an order of magnitude greater than the chronic values. In other words, subchronic durations of exposure generally require greater constituent concentrations before the adverse effect is observed.

- Upper-Bound CSFs and IURs – The USEPA CSFs and IURs are considered to be plausible upper bounds of risk at a 95% confidence level. Thus, there is a 95% probability that the true risks do not exceed these levels, and the risks are likely to be much lower. The Carcinogen Assessment Group (USEPA, March 2005b) states that the use of the linearized multistage model and upper bound risk estimates is appropriate, but that the lower limit of risk may be as low as zero. When biological factors are considered, the best estimate of the risk at very low levels is often zero.

The typical approach to risk characterization, and that used for this BHHRA, involves conservatively multiplying a combination of average and upper bound exposure parameters together to evaluate exposure. USEPA risk assessment guidance (USEPA, December 1989) specifies that numerous factors in the exposure equation should each be represented by the 95% UCL on the mean for that variable. These factors include the exposure point concentration, the contact rate with the environmental medium, and exposure frequency and duration. This approach is likely to overestimate actual risks. In addition, the specification that under the RME scenario, 100% of a person's daily intake of soil or dust occurs at the site location, discounting any exposure at home.

All of these assumptions discussed in this section will lead to an extremely conservative estimate of the potential for adverse health effects resulting from potential exposure to Site media under the defined exposure scenarios. All of the risk calculations were conducted under the assumption that receptors could come into contact with soils, as though the IRMs (i.e., covers) were not in place. This conservative estimate is by design, and helps provide a baseline to which particular remedies may be compared when estimating the benefit of specific actions undertaken at the Site during cleanup activities. In addition, this conservative assumption supports the need for institutional controls (e.g., deed restrictions) to prohibit or control future uses of the Site that could result in adverse exposures in the absence of such controls.

9.0 REFERENCES

Agency for Toxic Substances and Disease Registry (ATSDR), July 2013. Minimal Risk Levels (MRLs). <http://www.atsdr.cdc.gov/mrls/pdfs/atsdr_mrls_july_2013.pdf>

EDR, May 5, 2008. The EDR Radius Map with GeoCheck®. Milford, CT.

Environmental Quality Management, Inc., June 2003. User's Guide for Evaluating Subsurface Vapor Intrusion into Buildings. Durham, NC.

KEY, May 2011. Classification Exception Area/Well Restriction Area – Former Koppers Seaboard Site – Kearny, Hudson County, New Jersey – Exhibit F – Well Search Results. White House, NJ.

KEY, January 2012. Operation, Maintenance & Monitoring Manual – Hydraulic Control Treatment System – SCCC and Diamond Sites, 1015-1035 Belleville Turnpike, Kearny, New Jersey. Carnegie, PA.

KEY, March 2013. Site Characterization Summary Report – Standard Chlorine Chemical Co. Inc. Site – Kearny, New Jersey. Carnegie, PA.

KEY, July 2013. Remedial Investigation/Focused Feasibility Study Work Plan – Standard Chlorine Chemical Co. Inc. Site – Kearny, New Jersey. Carnegie, PA.

KEY, September 2013. Final Remedial Investigation/Focused Feasibility Study Work Plan – Standard Chlorine Chemical Co. Inc. Site – Kearny, New Jersey. Carnegie, PA.

KEY, March 2014. Site Characterization Summary Report Addendum – Standard Chlorine Chemical Co. Inc. Superfund Site – Kearny, New Jersey. Carnegie, PA.

KEY, April 2014. Pathway Analysis Report – Standard Chlorine Chemical Co. Inc. Site – Kearny, New Jersey. Carnegie, PA.

KEY, July 2014. Screening Level Ecological Risk Assessment – Standard Chlorine Chemical Co. Inc. Site – Kearny, New Jersey. Carnegie, PA.

NJDEP (New Jersey Department of Environmental Protection), January 2013. Instructions for New Jersey Johnson & Ettinger Spreadsheets NJ-GW-SCREEN and NJ-GW-ADV. http://www.nj.gov/dep/srp/guidance/vaporintrusion/njje.htm

New Jersey Meadowlands Commission, February 2013. Koppers Coke Peninsula Redevelopment Plan – Kearny, New Jersey. Lyndhurst, New Jersey.

Oak Ridge National Laboratory (ORNL), 2014. Risk Assessment Information System. <http://rais.ornl.gov/>

Town of Kearny, 2009. Kearny Zoning Map. E-Government Maps, Kearny, New Jersey.

US Bureau of Census, July 2010. Seasonality of Moves and the Duration and Tenure of Residence: 2004. Current Population Reports P70-122. <https://www.census.gov/prod/2010pubs/p70-122.pdf>

US Bureau of Labor Statistics, 2012. Employer Tenure Summary. Available online at the following URL: <http://www.bls.gov/news.release/tenure.nr0.htm>

USEPA, December 1989. Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (Part A, Human Health Evaluation Manual). EPA/540/1-89/002. Office of Emergency and Remedial Response.

USEPA, December 1991. Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (Part B, Development of Risk-Based Preliminary Remediation Goals). EPA/540/R-92/003. Office of Emergency and Remedial Response.

USEPA, April 1992. Guidance for Data Usability in Risk Assessment (Part A). PB92-963356. Office of Emergency and Remedial Response.

USEPA, August 1994. Memorandum: OSWER Directive: Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities. OSWER Directive 9355.4-12.

USEPA, July 1997. Health Effects Assessment Summary Tables – FY 1997 Update. EPA-540-R-97-036. Office of Solid Waste and Emergency Response.

USEPA, August 1997. Exposure Factors Handbook. National Center for Environmental Assessment, Office of Research and Development.

USEPA, December 2001a. Risk Assessment Guidance for Superfund - Volume I: - Human Health Evaluation Manual (Part D, Standardized Planning, Reporting and Review of Superfund Risk Assessments).

USEPA, December 2001b. Risk Assessment Guidance for Superfund: Volume III – Part A, Process for Conducting Probabilistic Risk Assessment. EPA 540-R-02-002.

USEPA, November 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (Subsurface Vapor Intrusion Guidance). EPA 530-D-02-004.

USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24.

USEPA, January 2003. Recommendations of the Technical Review Workgroup for Lead for an Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil. EPA-540-R-03-001. Technical Review Workgroup for Lead.

USEPA, July 2004. Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005. Office of Superfund Remediation and Technology Innovation.

USEPA, March 2005a. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. EPA/630/R-03/003F. Risk Assessment Forum.

USEPA, March 2005b. Guidelines for Carcinogen Risk Assessment. EPA/630/P-03/001F. Risk Assessment Forum.

USEPA, January 2009. Risk Assessment Guidance for Superfund – Volume I: Human Health Evaluation Manual (Part F, Supplemental Guidance for Inhalation Risk Assessment). EPA-540-R-070-002. Office of Superfund Remediation and Technology Innovation.

USEPA, June 2009. Update of the Adult Lead Methodology's Default Baseline Blood Lead Concentration and Geometric Standard Deviation Parameters. OSWER 9200.2-82. Prepared by the Lead Committee of the Technical Review Workgroup for Metals and Asbestos.

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F.

USEPA, November 2013. User's Guide– Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm.>

USEPA, 2014a. Integrated Risk Information System. <http://www.epa.gov/iris/>

USEPA, 2014b. Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV). http://hhpprtv.ornl.gov/quickview/pprtv_compare.php

USEPA, June 17, 2014. USEPA June 2014 Comments on April 2014 Pathway Analysis Report – Standard Chlorine Superfund Site. Letter from Alison A. Hess to James Zubrow.

TABLES

TABLE 3-1 (RAGS Part D Table 1)
SELECTION OF EXPOSURE PATHWAYS
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe	Medium	Exposure Medium	Exposure Point	Receptor Population	Receptor Age	Exposure Route	Type of Analysis	Rationale for Selection or Exclusion of Exposure Pathway
Current	Onsite Groundwater	COPCs in onsite groundwater may enter a potable water well and be available for exposure	Tap water from wells installed inside the barrier wall	Onsite Industrial User	Adult	Ingestion Inhalation Dermal Contact	Qual	**Excluded**. Groundwater is not used for potable purposes. Properties supplied with municipal water. Classification Exception Area is is in effect for the Site and surrounding area to eliminate this exposure (See Appendix A).
Current/Future	Onsite Surface Soil	COPCs in onsite surface soil may volatilize or be transferred to airborne particulates and carried offsite, becoming available for exposure	Wind may carry airborne COCs to offsite properties	Offsite Resident	Adult Child	Inhalation Inhalation	Qual	**Excluded**. Monitoring data collected for onsite workers during implementation of interim response actions showed no unacceptable levels of either volatile organics or particulates in air monitoring samples collected to date. It is assumed that offsite exposures would be lower. The site surface is either paved, covered with gravel or vegetated.
				Offsite Industrial Worker	Adult	Inhalation		
Current/Future	Onsite Surface Soil	COPCs in onsite surface soil are available for exposure	If soil cover is disturbed for any reason, direct exposure may occur to soil and to COCs transferred to airborne particulates	Visitor HCTS Operator	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Occasional visitors to the property may be exposed to surface soils during time spent on site, if the existing soil cover materials are disturbed. HCTS operators are onsite daily and perform some duties outdoors. Inhalation not addressed, based on air monitoring data collected during implementation of intgerim response actions
Current/Future	Offsite Surface Soil	COPCs in surface soil are available for exposure	Direct exposure may occur to offsite soil and to COCs transferred to airborne particulates	Offsite Visitor	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Visitors to the Seaboard Site may be exposed to surface soils that are not covered by asphalt, gravel or vegetation.
Future	Onsite and Offsite Surface and Subsurface Soil to Groudnwater	COPCs in soils may be transferred to groundwaters (within the slurry wall)	Exposure may occur during construction activities conducted below the water table	Construction Worker Utility Worker	Adult	Ingestion Inhalation Dermal Contact	Qual	**Included**. Construction workers could come into contact with shallow groundwater. However, best management practices in areas of shallow groundwater include dewatering of the excavations, thereby minimizing contact with waters. In addition, the most prevalent COPCs in soil (PAHs, PCBs and dioxins) are not found in the groundwater at significant concentrations, nor are these compounds readily soluble and able to pass through the skin during an intermittent exposure. Shallow groundwater at the Site does not contain high concentrations of organic chemicals outside the limits of the Consolidation Area.
Future	Offsite Surface and Subsurface Soil to Offsite Groundwater	COPCs in soils outside the barrier wall may be transferred to groundwater, enter a potable well, and be available for contact (outside the slurry wall)	Tap water from future potential wells installed outside the barrier wall	Offsite Industrial User	Adult	Ingestion Inhalation Dermal Contact	Qual	**Excluded.** No domestic or industrial water supply wells are located on the property or in the immediate Site vicinity. The Town of Kearny uses surface water supplies. Future installation of a potable well either on-site or off-site is considered to be highly unlikely, Groundwater use is prohibited via a Classification Exception Area (see Appendix A)/Well Restriction Area. Future potential use of groundwater both within the barrier wall and outside the barrier wall will be addressed qualitatively in the risk assessment.
Future	Onsite and Offsite Surface Soil	COPCs in surface soil are available for exposure	Exposure may occur to soil and to COCs transferred to airborne particulates	Outdoor Industrial Worker	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Under future site conditions, the property may be redeveloped for industrial use. Outdoor workers such as groundskeepers may be employed.
Future	Onsite and Offsite Surface and Subsurface Soil / Groundwater to Air	COPCs in surface and subsurface soil are available for exposure via vapor intrusion into a building	Exposure may occur via vapor intrusion through future building floors	Indoor Industrial Worker	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Under future site conditions, a building could be constructed on the Site. Indoor workers could be affected by volatile emissions from soils and groundwater beneath a structure.
Future	Onsite and Offsite Surface and Subsurface Soil to Air	COPCs in surface and subsurface soil are available for exposure in outdoor air	Exposure may occur to soil and to COCs transferred to airborne particulates	Construction Worker Utility Worker	Adult	Ingestion Inhalation Dermal Contact	Quan	**Included**. Construction/utility workers may come into direct contact with surface/subsurface soil during activities that result in soil disturbance.
Future	Onsite and Offsite Surface and Subsurface Soil to Surface Water	COPCs in surface and subsurface soil could be transported to surface waters via runoff during construction activities	Exposure may occur via ingestion of fish through bioaccumulation or via dermal contact/ingestion during recreation	Offsite Resident	Adult	Ingestion Dermal Contact	Qual	**Excluded**. Best management practices during construction, installation of cover materials and storm sewers, and prior removal of soft soils from the South Ditch preclude potential exposures to Site-related constituents in surface water or fish.
Future	Groundwater	COPCs in shallow (fill unit) groundwater are available for exposure	Exposure may occur during construction or excavation activities conducted below the water table	Construction Worker Utility Worker	Adult	Ingestion Dermal Contact	Quan	**Included**. Shallow (fill unit) groundwater may be contacted by construction or utility workers during excavation.

TABLE 4-1
SOIL SAMPLE SUMMARY TABLE
STANDARD CHLORINE CHEMICAL COMPANY INC. SITE
KEARNY, NEW JERSEY

Western Area Surface Soils (0-2 feet)				Western Area Subsurface Soils (2-10 feet)				Eastern Area Surface Soils (0-2 feet)				Eastern Area Subsurface Soils (2-10 feet)			
Location of Results [1]	**Sample Number**	**Sample Depth**	**Rationale**	**Location of Results [1]**	**Sample Number**	**Sample Depth**	**Rationale**	**Location of Results [1]**	**Sample Number**	**Sample Depth**	**Rationale**	**Location of Results [1]**	**Sample Depth**	**Sample Sets**	**Rationale**
SCSRA Tables 3 - 7	D-15	0-0.5	2013 samples collected as part	SCSRA Tables 3 - 7	D-16	9 - 9.5	2013 samples collected as part	SCSR Table B-3	10	0-0.5	1985 surface soil samples analyzed	SCSR Table B-3	12_8-85	1.5-2	1985-1987 Surface soil samples
	D-16	0-0.5	of the DNAPL delineation effort.		D-21	7 - 7.5	of the DNAPL delineation effort.		11	0-0.5	analyzed for dioxin. Detection		13_8-85	1.5-2	analyzed for 2,3,7,8-TCDD.
	D-17	0-0.5	Samples analyzed for VOCs,				Samples analyzed for VOCs, SVOCs,		12_5-85	0-0.5	limits available. Data used in				Detection limits available, and
	D-18	0-0.5	SVOCs, metals, PCBs and dioxins.				metals, PCBs and dioxins.		12_8-85	1.5-2	their entirety, based on location.				data used based on location.
	D-19	0-0.5	Data used in their entirety				Data used in their entirety		13_5-85	0-0.5		SCSR Table 4-4	BW-01	6.5-7.5	2008 soil samples collected for
	D-20	0-0.5	based on location.				based on location.		13_8-85	1.5-2			BW-02	9.0-9.75	barrier wall alignment study.
	D-22	0-0.5		SCSR Table B-5	SC-MW-16L	8-10	1999 suface soil samples		14	0-0.5			BW-03	6.0-6.25	Samples analyzed for VOCs, SVOCs,
	VC-1	0-0.5					collected from one monitoring	SCSR Table 4-1	SC-SS-01	0.0-0.5	2009 surface soil samples		BW-04	6.0-6.33	PCBs, dioxins and/or metal. All data
	VC-2	0-0.5					well boring location analyzed for		SC-SS-02	0.0-0.5	analyzed for dioxins, PCBs		BW-04	7.0-8.0	used based on location and depth
	VC-2 DUP	0-0.5					SVOCs, and limited VOCs and		SC-SS-03	0.0-0.5	and SVOCs. Data used in their				(<10 feet).
	VC-3	0-0.5					metals. All data used.		SC-SS-04	0.0-0.5	entirety based on location.				
	VC-4	0-0.5		SCSR Table B-6	SC-SB-15	8-10	1992-99 surface and subsurface soil		SC-SS-05	0.0-0.5					
	VC-5	0-0.5			SB-2A	Fill	samples collected and analyzed		SC-SS-06	0.0-0.5					
SCSR Table B-3	1	0-0.5	1985 surface soil samples analyzed		SB-3A	Fill	for chlorinated benzenes and		SC-SS-07	0.0-0.5					
	2	0-0.5	analyzed for dioxin. Detection		SB-4A	Fill	SVOCs. Data used based on known	SCSR Table B-2	TSS-1	0-0.5	1990 surface soil samples analyzed				
	3	0-0.5	limits available. Data used in				or presumed depth (<10 ft) and		TSS-2	0-0.5	for limited VOCs and SVOCs				
	4	0-0.5	their entirety, based on location.				location.		TSS-3	0-0.5	(including PAHs). Detection				
	5	0-0.5		SCSR Table 4-9	ST-1A-E		2011 Subsurface soil samples		TSS-4	0-0.5	limits available, and data used				
	6	0-0.5			ST-1A-N		collected around locations		TSS-5	0-0.5	in their entirety based on				
	7	0-0.5			ST-1A-W		(base) of former septic tanks		TSS-6	0-0.5	location.				
	8	0-0.5			ST-1B-E		to determine whether tanks leaked.		TSS-7	0-0.5	Location of Sample TSS-7 not				
SCSR Table B-4	TA-SS01	0-0.5	1998 surface soil samples		ST-1B-N		Samples analyzed for VOCs, SVOCs,		TSS-8	0-0.5	shown in Weston RI report;				
	TA-SS02	0-0.5	collected from the transformer		ST-1B-S		PCBs and metals. All data used		TSS-9	0-0.5	assumed to be in general vicinity of				
	TA-SS03	0-0.5	area and analyzed for PCBs.		ST-1B-W		based on location.		TSS-9D	0-0.5	other samples.				
			All soil data used; concrete chip		ST-1-E				TSS-10	0-0.5					
			results not used.		ST-1-N			SCSR Table B-1	031	0-0.5	1991 surface soil samples				
SCSR Table B-5	SC-MW-16L	0-2	1990 and 1999 suface soil samples		ST-1-S				035	0-0.5	analyzed for chromium and				
	SC-MW-17L	0-2	collected from three monitoring		ST-2-E				039	0-0.5	hexavalent chromium. Data used				
	SC-MW-2L	0-0.5	well boring locations analyzed for		ST-2-N				043	0-0.5	based on location.				
			SVOCs, and limited VOCs and		ST-2-S										
			metals. All data used.		ST-3-E										
SCSR Table B-6	SC-SB-15	0-2	1992 surface soil samples		ST-3-E DUP										
	SC-SB-16	0-2	collected near Building 2 and		ST-3-N										
			analyzed for chlorinated		ST-3-S										
			benzenes and PAHs. Data used		ST-3-W										
			based on depth (<2 ft) and location.		ST-4-E										
SCSR Table B-1	001	0-0.5	1991 surface soil samples		ST-4-N										
	002	0-0.5	analyzed for chromium and		ST-4-S										
	003	0-0.5	hexavalent chromium. Data used		ST-4-W										
	004	0-0.5	based on location.		ST-5-E										
	005	0-0.5			ST-5-S										
	006	0-0.5			ST-5-W										
	007	0-0.5			ST-6-E										
	008	0-0.5			ST-6-N										
	009	0-0.5			ST-6-S										
	010	0-0.5			ST-6-W										
	011	0-0.5			ST-7-E										
	012	0-0.5			ST-7-N										
	013	0-0.5			ST-7-N-DUP										
	014	0-0.5			ST-7-S										
	015	0-0.5			ST-7-W										
	016	0-0.5			ST-8-E										
	017	0-0.5			ST-8-N										
	018	0-0.5			ST-8-S										
	044	0-0.5			ST-8-W										
	045	0-0.5		SCSR Table 4-4	BW-16	0-115	2008 soil samples collected for								
	046	0-0.5			BW-16	0-115	barrier wall alignment study.								
	047	0-0.5			BW-18A	6.5-7.0	Samples analyzed for VOCs, SVOCs,								
	048	0-0.5			BW-18A	9.0-10.0	PCBs, dioxins and/or metal. All data								
							used based on location and depth								
							(<10 feet).								

Note - all samples from the SCSR and SCSRA that are not included on these tables have either been excavated or lie beneath the Consolidation Area
Sample locations are shown on Figure 4-1.
(1) SCSR - Site Characterization Summary Report - March 2013 (Key Environmental, Inc.)
SCSRA - Site Characterization Summary Report Addendum - March 2014 (Key Environmental, Inc.)

TABLE 4-2 (RAGS Part D Table 2.1)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
WESTERN AREA SURFACE SOILS (0 - 2 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Current/Future
Medium: Surface Soil (0-2 feet bgs)
Exposure Medium: Surface Soil (0-2 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency Detected	Detection Frequency Total	Range of Detection Limits Minimum	Range of Detection Limits Maximum	Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4] Industrial	Toxicity Screening Value[4] Residential	(N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
Onsite	87-61-6	1,2,3-Trichlorobenzene	0.29	J	210		mg/kg	D-19	2	13	0.00072	4.2	210	NA [6]	49	4.9	N	NA	NA	Y	ASL
Surface Soil	120-82-1	1,2,4-Trichlorobenzene	0.00079	J	480		mg/kg	D-19	3	15	0.00085	2.5	480	NA	27	6.2	N	NA	NA	Y	ASL
Particulates	95-50-1	1,2-Dichlorobenzene	0.0012	J	220		mg/kg	D-16	8	18	0.00077	0.47	220	NA	980	190	N	NA	NA	Y	**BSL**
Volatile Emissions	541-73-1	1,3-Dichlorobenzene*	0.00096	J	200		mg/kg	D-16	9	18	0.00063	0.47	200	NA	980	190	N	NA	NA	Y	**BSL**
	106-46-7	1,4-Dichlorobenzene	0.0015	J	360		mg/kg	D-16	8	18	0.00061	0.47	360	NA	12	2.4	C	NA	NA	Y	ASL
	71-43-2	Benzene	7.8	J	7.8	J	mg/kg	D-16	1	14	0.00058	2.5	7.8	NA	5.4	1.1	C	NA	NA	Y	ASL
	108-90-7	Chlorobenzene	5.1		45		mg/kg	D-15	3	14	0.00065	1.3	45	NA	140	29	N	NA	NA	Y	**BSL**
	67-66-3	Chloroform	0.00086	J	0.00086	J	mg/kg	D-20	1	13	0.00056	6.7	0.00086	NA	1.5	0.29	C	NA	NA	N	BSL
	75-09-2	Methylene Chloride	0.11	J	0.93	J	mg/kg	D-15	2	13	0.00074	7.3	0.93	NA	310	36	N	NA	NA	N	BSL
	92-52-4	1,1'-Biphenyl	0.063	J	14		mg/kg	D-19	6	13	0.049	0.11	14	NA	21	5.1	N	NA	NA	Y	**BSL**
	95-94-3	1,2,4,5-Tetrachlorobenzene*	0.097	J	4.2		mg/kg	D-19	6	13	0.05	0.065	4.2	NA	27	1.8	N	NA	NA	Y	**BSL**
	120-83-2	2,4-Dichlorophenol	0.047	J	0.34	J	mg/kg	D-16	2	13	0.03	0.12	0.34	NA	180	18	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.22		0.36		mg/kg	SC-SB-16	2	18	0.073	0.66	0.36	NA	1200	120	N	NA	NA	N	BSL
	91-57-6	2-Methylnaphthalene	0.03	J	0.54		mg/kg	VC-5	9	17	0.047	0.47	0.54	NA	220	23	N	NA	NA	N	BSL
	95-48-7	2-Methylphenol	0.23		0.23		mg/kg	SC-MW-17L	1	17	0.033	1.6	0.23	NA	3100	310	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.32		0.32		mg/kg	SC-SB-16	1	17	0.046	0.43	0.32	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.039	J	1.1		mg/kg	SC-MW-2L	7	18	0.054	0.47	1.1	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.034	J	0.13		mg/kg	SC-SB-15	3	17	0.034	0.47	0.13	NA	3300	340	N	NA	NA	N	BSL
	98-86-2	Acetophenone	0.12	J	0.29	J	mg/kg	VC-2DUP	2	13	0.039	0.13	0.29	NA	10000	780	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.058		1.1		mg/kg	VC-4	11	18	0.045	0.47	1.1	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.073		1.5		mg/kg	SC-SB-15	16	18	0.47	1.9	1.5	NA	2.1	0.15	C	NA	NA	Y	**BSL**
	50-32-8	Benzo(a)pyrene	0.03	J	1.6		mg/kg	D-22	15	18	0.12	0.61	1.6	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.068		2.2		mg/kg	VC-3	17	18	0.47	0.47	2.2	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.04	J	1.7		mg/kg	D-20	16	18	0.47	1	1.7	NA	-	-	-	NA	NA	N	BSL
	207-08-9	Benzo(k)fluoranthene	0.048		2.2		mg/kg	SC-SB-15	15	17	0.0034	0.47	2.2	NA	21	1.5	C	NA	NA	Y	**BSL**
	117-81-7	bis(2-Ethylhexyl)phthalate	0.075		120		mg/kg	SC-SB-15	8	18	0.12	0.47	120	NA	120	35	C	NA	NA	Y	BSL
	86-74-8	Carbazole*	0.039		0.36		mg/kg	SC-SB-15	5	17	0.0087	0.47	0.36	NA	-	-	-	NA	NA	N	BSL
	218-01-9	Chrysene	0.11	J	6.4		mg/kg	SC-SB-15	17	18	0.47	0.47	6.4	NA	210	15	C	NA	NA	N	BSL
	53-70-3	Dibenz(a,h)anthracene	0.01	J	0.45		mg/kg	SC-SB-15	14	17	0.12	0.47	0.45	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.12	J	1.2		mg/kg	VC-4	4	17	0.043	0.47	1.2	NA	100	7.8	N	NA	NA	N	BSL
	84-66-2	Diethylphthalate	0.06	J	0.06	J	mg/kg	D-18	1	17	0.044	0.47	0.06	NA	49000	4900	N	NA	NA	N	BSL
	131-11-3	Dimethylphthalate	0.29	J	0.62		mg/kg	SC-SB-16	2	17	0.044	0.16	0.62	NA	-	-	-	NA	NA	N	BSL
	84-72-2	Di-n-Butylphthalate	0.049	J	3.06		mg/kg	SC-MW-2L	4	18	0.046	0.47	3.06	NA	6200	610	N	NA	NA	N	BSL
	117-84-0	Di-n-Octylphthalate	190		190		mg/kg	SC-SB-15	1	17	0.023	0.47	190	NA	620	61	N	NA	NA	Y	**BSL**
	206-44-0	Fluoranthene	0.069	J	3.14		mg/kg	SC-MW-2L	17	18	0.47	0.47	3.14	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.053	J	1.36		mg/kg	SC-MW-2L	5	18	0.039	0.47	1.36	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.0098	J	0.095		mg/kg	D-19	7	17	0.0051	0.47	0.095	NA	1.1	0.3	C	NA	NA	N	BSL
	87-68-3	Hexachlorobutadiene	0.027	J	0.027	J	mg/kg	D-19	1	17	0.009	0.47	0.027	NA	22	6.1	C	NA	NA	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.032	J	1.9		mg/kg	D-22	15	18	0.13	0.9	1.9	NA	2.1	0.15	C	NA	NA	Y	**BSL**
	91-20-3	Naphthalene	0.04		3.22		mg/kg	SC-MW-2L	16	18	0.043	0.12	3.22	NA	18	3.6	C	NA	NA	N	BSL
	86-30-6	N-Nitrosodiphenylamine	0.15		0.15		mg/kg	SC-MW-17L	1	17	0.036	0.47	0.15	NA	350	99	C	NA	NA	N	BSL
	85-01-8	Phenanthrene*	0.058	J	6.8		mg/kg	VC-4	17	18	0.47	0.47	6.8	NA	17000	1700	N	NA	NA	N	BSL
	108-95-2	Phenol	0.5		0.5		mg/kg	SC-MW-17L	1	17	0.011	1.6	0.5	NA	18000	1800	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.14	J	6.9		mg/kg	SC-SB-15	17	18	0.47	0.47	6.9	NA	1700	170	N	NA	NA	N	BSL
	11097-69-1	PCB-1254	0.034		0.034		mg/kg	TA-SS02	1	16	0.021	0.11	0.034	NA	0.74	0.11	C	NA	NA	N	BSL

TABLE 4-2 (RAGS Part D Table 2.1)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
WESTERN AREA SURFACE SOILS (0 - 2 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Current/Future
Medium: Surface Soil (0-2 feet bgs)
Exposure Medium: Surface Soil (0-2 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
	11096-82-5	PCB-1260	0.022		4.2		mg/kg	D-18	5	16	0.021	0.028	4.2	NA	0.74	0.22	C	NA	NA	Y	ASL
	1746-01-6	2,3,7,8-TCDD	9.9174E-06		0.00114525		mg/kg	D-19	13	21	0.000037	0.00067	0.00114525	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	7429-90-5	Aluminum	2030		29500		mg/kg	VC-3	13	13	NA	NA	29500	NA	99000	7700	N	NA	NA	Y	**BSL**
	7440-36-0	Antimony	2.9		202		mg/kg	D-22	5	14	1.5	34.3	202	NA	41	3.1	N	NA	NA	Y	ASL
	7440-38-2	Arsenic	3.4		17.7		mg/kg	D-19	7	14	2.1	32.7	17.7	NA	2.4	0.61	C	NA	NA	Y	ASL
	7440-39-3	Barium	19.3	J	4210		mg/kg	D-19	13	13	NA	NA	4210	NA	19000	1500	N	NA	NA	Y	**BSL**
	7440-41-7	Beryllium	0.38	J	2.5		mg/kg	D-15	8	14	0.21	5	2.5	NA	200	16	N	NA	NA	N	BSL
	7440-43-9	Cadmium	0.93		5.1	J	mg/kg	D-19	4	14	0.15	5.1	5.1	NA	9300	7	N	NA	NA	N	BSL
	7440-70-2	Calcium	938		159000		mg/kg	D-20	13	13	NA	NA	159000	NA	-	-	-	NA	NA	N	BSL
	16065-83-1	Chromium	17.5	J	21400		mg/kg	VC-3	37	37	NA	NA	21400	NA	150000	12000	N	NA	NA	Y	**BSL**
	7440-48-4	Cobalt	2.2	J	221		mg/kg	VC-5	12	13	2.5	2.5	221	NA	30	2.3	N	NA	NA	Y	ASL
	7440-50-8	Copper	18.7	J	278		mg/kg	D-15	11	14	24	67.4	278	NA	4100	310	N	NA	NA	N	BSL
	7439-89-6	Iron	7060		198000		mg/kg	D-19	13	13	NA	NA	198000	NA	72000	5500	N	NA	NA	Y	ASL
	7439-92-1	Lead	18.5		57300		mg/kg	D-22	14	14	NA	NA	57300	NA	800 [7]	400 [8]	N	NA	NA	Y	ASL
	1284-72-6	Magnesium	208	J	89700		mg/kg	VC-5	13	13	NA	NA	89700	NA	-	-	-	NA	NA	N	BSL
	7439-96-5	Manganese	8.2		959		mg/kg	D-16	13	13	NA	NA	959	NA	2300	180	N	NA	NA	Y	**BSL**
	7439-97-6	Mercury	0.024		0.36		mg/kg	VC-2DUP	13	14	0.17	0.17	0.36	NA	4.3	1	N	NA	NA	N	BSL
	7440-02-0	Nickel	7.6	J	881		mg/kg	VC-5	14	14	NA	NA	881	NA	2000	150	N	NA	NA	Y	**BSL**
	7440-09-7	Potassium	177	J	1500	J	mg/kg	D-19	6	13	313	3720	1500	NA	-	-	-	NA	NA	N	BSL
	7782-49-2	Selenium	1.8	J	1.8	J	mg/kg	VC-2DUP	1	13	1.3	45.9	1.8	NA	510	39	N	NA	NA	N	BSL
	7440-22-4	Silver	1.3		1.3		mg/kg	D-22	1	14	0.2	7	1.3	NA	510	39	N	NA	NA	N	BSL
	7647-14-5	Sodium	188	J	1440		mg/kg	D-15	7	13	462	5490	1440	NA	-	-	-	NA	NA	N	BSL
	7440-62-2	Vanadium	12.9		1670		mg/kg	D-16	13	13	NA	NA	1670	NA	510	39	N	NA	NA	Y	ASL
	7440-66-6	Zinc	22.5		45300		mg/kg	D-19	14	14	NA	NA	45300	NA	31000	2300	N	NA	NA	Y	ASL
	18540-29-9	Chromium, hexavalent	0.54		3390		mg/kg	D-16	25	35	NA	NA	3390	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable
(7) http://www.epa.gov/superfund/lead/almfaq.htm
(8) USEPA, August 1994. OSWER Directive 9355.4-12.

TABLE 4-3 (RAGS Part D Table 2.2)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
EASTERN AREA SURFACE SOILS (0 - 2 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Current/Future
Medium: Surface Soil (0-2 feet bgs)
Exposure Medium: Surface Soil (0-2 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite	120-82-1	1,2,4-Trichlorobenzene	6.36		200000		mg/Kg	TSS-9D	11	11	NA [6]	NA	200000	NA	27	6.2	N	NA	NA	Y	ASL
Surface Soil	156-59-2	1,2-Dichloroethene	0.0205		0.0765		mg/kg	TSS-7	2	11	0.0024	10	0.0765	NA	920	70	N	NA	NA	N	BSL
Particulates	95-50-1	1,2-Dichlorobenzene	3.78		6470		mg/Kg	TSS-9D	10	11	2.9	2.9	6470	NA	980	190	N	NA	NA	Y	ASL
Volatile Emission	541-73-1	1,3-Dichlorobenzene	6.4		1550		mg/Kg	TSS-9D	10	11	2.9	2.9	1550	NA	980	190	N	NA	NA	Y	ASL
	106-46-7	1,4-Dichlorobenzene	15		4840		mg/Kg	TSS-2	9	11	6.6	7.4	4840	NA	12	2.4	C	NA	NA	Y	ASL
	108-90-7	Chlorobenzene	0.0891		99.6		mg/kg	TSS-1	6	11	0.0091	8.7	99.6	NA	140	29	N	NA	NA	Y	**BSL**
	75-09-2	Methylene Chloride	0.00657		7.02		mg/kg	TSS-9	6	11	0.0042	18	7.02	NA	310	36	N	NA	NA	N	BSL
	127-18-4	Tetrachloroethene	0.00991		2.31		mg/kg	TSS-5	3	11	0.0062	26	2.31	NA	41	8.6	N	NA	NA	N	BSL
	79-01-6	Trichloroethene	0.0292		0.866		mg/kg	TSS-5	2	11	0.0029	12	0.866	NA	2	0.44	N	NA	NA	Y	**BSL**
	92-52-4	1,1'-Biphenyl	0.058	J	0.4	J	mg/kg	SC-SS-02	4	7	0.021	0.097	0.4	NA	21	5.1	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.053	J	0.77	J	mg/kg	SC-SS-02	3	7	0.019	0.089	0.77	NA	1200	120	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.057	J	0.34		mg/kg	SC-SS-04	2	7	0.02	0.19	0.34	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.045	J	219		mg/kg	TSS-2	10	18	0.064	3.5	219	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.043	J	24.1		mg/kg	TSS-1	8	18	5.1	9	24.1	NA	3300	340	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.2	J	46.2		mg/kg	TSS-1	12	18	2.9	4.9	46.2	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.17		22		mg/kg	SC-SS-04	6	18	0.063	49	22	NA	2.1	0.15	C	NA	NA	Y	ASL
	50-32-8	Benzo(a)pyrene	0.17		37		mg/kg	SC-SS-04	12	18	3.7	16	37	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.42		65.8		mg/kg	TSS-3	13	18	6.9	30	65.8	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.21		34		mg/kg	SC-SS-04	13	18	5.9	26	34	NA	--	--	--	NA	NA	N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.26	J	44.5		mg/kg	TSS-7	6	18	0.068	63	44.5	NA	120	35	C	NA	NA	Y	**BSL**
	86-74-8	Carbazole	0.084	J	1.6		mg/kg	SC-SS-04	7	7	NA	NA	1.6	NA	--	--	--	NA	NA	N	BSL
	218-01-9	Chrysene	0.16		41.9		mg/kg	TSS-1	16	18	0.069	3.8	41.9	NA	210	15	C	NA	NA	Y	**BSL**
	53-70-3	Dibenz(a,h)anthracene	0.029	J	8.8		mg/kg	SC-SS-04	8	18	3.6	16	8.8	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.064	J	1.2		mg/kg	SC-SS-02	7	7	NA	NA	1.2	NA	100	7.8	N	NA	NA	N	BSL
	84-66-2	Diethylphthalate	0.077	J	0.077	J	mg/kg	SC-SS-07	1	7	0.026	0.24	0.077	NA	49000	4900	N	NA	NA	N	BSL
	206-44-0	Fluoranthene	0.36		121		mg/kg	TSS-1	16	18	3.3	3.7	121	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.041	J	213		mg/kg	TSS-1	9	18	0.06	4.9	213	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.95		359		mg/kg	TSS-5	11	18	0.017	3.1	359	NA	1.1	0.3	C	NA	NA	Y	ASL
	87-68-3	Hexachlorobutadiene	8.52		8.52		mg/kg	TSS-2	1	18	0.019	5.6	8.52	NA	22	6.1	C	NA	NA	Y	**BSL**
	193-39-5	Indeno(1,2,3-cd)pyrene	0.31		35.9		mg/kg	TSS-3	13	18	5.4	23	35.9	NA	2.1	0.15	C	NA	NA	Y	ASL
	91-20-3	Naphthalene	0.11		448		mg/kg	TSS-10	14	17	2.4	4.1	448	NA	18	3.6	C	NA	NA	Y	ASL
	85-01-8	Phenanthrene*	0.25		428		mg/kg	TSS-1	14	18	8.1	9.3	428	NA	17000	1700	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.29		70.5		mg/kg	TSS-1	16	18	2.9	3.2	70.5	NA	1700	170	N	NA	NA	N	BSL
	12672-29-6	PCB-1248	0.1		2.5		mg/kg	SC-SS-04	5	7	0.0019	0.0019	2.5	NA	0.74	0.22	C	NA	NA	Y	ASL
	11097-69-1	PCB-1254	0.042	PG	1		mg/kg	SC-SS-04	7	7	NA	NA	1	NA	0.74	0.11	C	NA	NA	Y	ASL
	11100-14-4	PCB-1268*	0.041	PG	0.46		mg/kg	SC-SS-06	4	7	0.0026	0.0029	0.46	NA	0.74	0.22	C	NA	NA	Y	**BSL**
	1746-01-6	2,3,7,8-TCDD	NA		0.00052		mg/kg	12	1	10	0.00013	0.0007	0.00052	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	16065-83-1	Chromium	8570		11500		mg/kg	039	4	4	NA	NA	11500	NA	150000	12000	N	NA	NA	N	BSL
	18540-29-9	Chromium, hexavalent	0.39		195		mg/kg	039	2	4	0.15	14	195	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
PG = Percent difference between columns >25%
(2) Maximum detected concentration used for screening
(3) No background soil samples collected
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening
(5) ASL = Above screening level ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations
BSL = Below screening level Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculation
(6) NA = Not applicable

TABLE 4-4 (RAGS Part D Table 2.3)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
WESTERN AREA SUBSURFACE SOILS (0 - 10 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Subsurface Soil (0-10 feet bgs)
Exposure Medium: Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite	71-55-6	1,1,1-Trichloroethane	0.36		0.5		mg/kg	SB-4A	2	61	0.00017	63	0.5	NA [6]	3800	870	N	NA	NA	N	BSL
Subsurface Soil	87-61-6	1,2,3-Trichlorobenzene	0.29	J	210		mg/kg	D-19	2	15	0.00072	38	210	NA	49	4.9	N	NA	NA	Y	ASL
Particulates	120-82-1	1,2,4-Trichlorobenzene	0.00079	J	1300		mg/kg	BW-18A	7	29	0.00085	23	1300	NA	27	6.2	N	NA	NA	Y	ASL
Volatile Emissions	95-50-1	1,2-Dichlorobenzene	0.0012	J	3300		mg/kg	D-16	16	29	0.00077	0.47	3300	NA	980	190	N	NA	NA	Y	ASL
	78-87-5	1,2-Dichloropropane	0.00094	J	0.00094		mg/Kg	ST-1-E	1	57	0.00028	78	0.00094	NA	4.7	0.94	C	NA	NA	N	BSL
	541-73-1	1,3-Dichlorobenzene*	0.00096	J	3300		mg/kg	D-16	17	29	0.00063	0.47	3300	NA	980	190	N	NA	NA	Y	ASL
	106-46-7	1,4-Dichlorobenzene	0.0015	J	5200		mg/kg	D-16	16	29	0.00061	0.47	5200	NA	12	2.4	C	NA	NA	Y	ASL
	78-93-3	2-Butanone	0.0029	J	0.56		mg/kg	SB-4A	10	60	0.00053	66	0.56	NA	20000	2800	N	NA	NA	N	BSL
	67-64-1	Acetone	0.0066	J	0.35		mg/kg	SB-4A	20	60	0.0042	300	0.35	NA	63000	6100	N	NA	NA	N	BSL
	71-43-2	Benzene	0.00071	J	110	J	mg/kg	D-16	29	61	0.00058	19	110	NA	5.4	1.1	C	NA	NA	Y	ASL
	75-15-0	Carbon Disulfide	0.00063	J	0.0059		mg/kg	ST-5-S	3	57	0.00041	65	0.0059	NA	370	82	N	NA	NA	N	BSL
	56-23-5	Carbon Tetrachloride	0.089		0.089		mg/kg	SB-4A	1	61	0.00009	66	0.089	NA	3	0.61	C	NA	NA	N	BSL
	108-90-7	Chlorobenzene	0.0012		630		mg/kg	ST-4W	43	61	0.00043	1.3	630	NA	140	29	N	NA	NA	Y	ASL
	67-66-3	Chloroform	0.00086	J	0.00086	J	mg/kg	D-20	1	57	0.00021	61	0.00086	NA	1.5	0.29	C	NA	NA	N	BSL
	74-87-3	Chloromethane	0.18		0.18		mg/kg	SB-4A	1	61	0.00056	85	0.18	NA	50	12	N	NA	NA	N	BSL
	156-59-2	cis-1,2-Dichloroethene	0.00058	J	0.0021		mg/kg	ST-8S	2	57	0.00021	40	0.0021	NA	200	16	N	NA	NA	N	BSL
	100-41-4	Ethylbenzene	0.00048	J	450		mg/kg	D-16	14	57	0.00017	21	450	NA	27	5.4	C	NA	NA	Y	ASL
	108-38-3 (m); 106-42-3 (p)	m,p-Xylenes	1700		1700		mg/kg	D-16	1	15	0.0013	16	1700	NA	250	59	N	NA	NA	Y	ASL
	108-87-2	Methylcyclohexane	48	J	48	J	mg/kg	D-16	1	19	0.00062	20	48	NA	--	--	--	NA	NA	N	BSL
	75-09-2	Methylene Chloride	0.0015	J	9.7	J	mg/kg	BW-18A	10	57	0.00042	66	9.7	NA	310	36	N	NA	NA	N	BSL
	95-47-6	o-Xylene	600		600		mg/kg	D-16	1	15	0.00067	9	600	NA	300	69	N	NA	NA	Y	ASL
	100-42-5	Styrene	0.12		4		mg/kg	ST-7N	3	60	0.00031	39	4	NA	3600	630	N	NA	NA	N	BSL
	127-18-4	Tetrachloroethene	0.003		7.9		mg/kg	ST-1B-E	6	61	0.00029	50	7.9	NA	41	8.6	N	NA	NA	N	BSL
	108-88-3	Toluene	0.00045	J	420		mg/kg	D-16	18	61	0.00027	14	420	NA	4500	500	N	NA	NA	N	BSL
	156-60-5	trans-1,2-Dichloroethene	0.00056	J	0.00056	J	mg/kg	ST-8S	1	57	0.00025	46	0.00056	NA	69	15	N	NA	NA	N	BSL
	75-01-4	Vinyl Chloride	0.00096	J	0.00096	J	mg/kg	ST-8S	1	57	0.00021	79	0.00096	NA	1.7	0.06	C	NA	NA	N	BSL
		Xylene (total)	0.0019	J	110		mg/Kg	ST-7N	14	45	0.0007	64	110	NA	270	63	N	NA	NA	Y	**BSL**
	92-52-4	1,1'-Biphenyl	0.063	J	22		mg/kg	D-16	9	19	0.022	1.4	22	NA	21	5.1	N	NA	NA	Y	ASL
	95-94-3	1,2,4,5-Tetrachlorobenzene*	0.097	J	210		mg/kg	D-21	8	15	0.05	0.065	210	NA	27	1.8	N	NA	NA	Y	ASL
	120-83-2	2,4-Dichlorophenol	0.047	J	4.3		mg/kg	D-21	5	19	0.012	3.1	4.3	NA	180	18	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.22		0.36		mg/kg	SC-SC-16	2	29	0.017	13	0.36	NA	1200	120	N	NA	NA	N	BSL
	91-57-6	2-Methylnaphthalene	0.03	J	140		mg/kg	D-16	12	28	0.022	12	140	NA	220	23	N	NA	NA	Y	**BSL**
	95-48-7	2-Methylphenol	0.029	J	0.23		mg/kg	SC-MW-17L	2	25	0.026	3.6	0.23	NA	3100	310	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.11	J	0.32		mg/kg	SC-SB-16	2	25	0.025	4.2	0.32	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.039	J	25		mg/kg	SB-2A	11	29	0.021	12	25	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.034	J	12	J	mg/kg	D-16	6	25	0.023	0.47	12	NA	3300	340	N	NA	NA	N	BSL
	98-86-2	Acetophenone	0.12	J	0.29	J	mg/kg	VC-2DUP	2	19	0.025	3.2	0.29	NA	10000	780	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.058		90		mg/kg	SB-2A	17	29	0.026	12	90	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.073		87		mg/kg	SB-2A	23	29	0.14	12	87	NA	2.1	0.15	C	NA	NA	Y	ASL
	50-32-8	Benzo(a)pyrene	0.03	J	82		mg/kg	SB-2A	22	29	0.12	12	82	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.041		58		mg/kg	SB-2A	25	29	0.47	12	58	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.04	J	53		mg/kg	SB-2A	22	29	0.14	12	53	NA	--	--	--	NA	NA	N	BSL
	207-08-9	Benzo(k)fluoranthene	0.048		11		mg/kg	D-16	16	25	0.0034	0.62	11	NA	21	1.5	C	NA	NA	Y	**BSL**
	117-81-7	bis(2-Ethylhexyl)phthalate	0.075		120		mg/kg	SC-SB-15	12	0.012	0.031	13	120	NA	120	35	C	NA	NA	Y	**BSL**
	85-68-7	Butyl benzyl phthalate	0.057	J	0.1	J	mg/kg	BW-16	2	25	0.034	2.1	0.1	NA	910	260	N	NA	NA	N	BSL
	86-74-8	Carbazole	0.039		10		mg/kg	SB-2A	8	28	0.0087	12	10	NA	--	--	--	NA	NA	N	BSL
	218-01-9	Chrysene	0.11	J	79		mg/kg	SB-2A	24	29	0.14	12	79	NA	210	15	C	NA	NA	Y	**BSL**
	53-70-3	Dibenz(a,h)anthracene	0.01	J	4.9		mg/kg	D-16	17	25	0.026	0.47	4.9	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.12	J	15		mg/kg	SB-2A	7	28	0.022	12	15	NA	100	7.8	N	NA	NA	Y	**BSL**

TABLE 4-4 (RAGS Part D Table 2.3)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
WESTERN AREA SUBSURFACE SOILS (0 - 10 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Subsurface Soil (0-10 feet bgs)
Exposure Medium: Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
	84-66-2	Diethylphthalate	0.06	J	0.084	J	mg/kg	BW-18A	2	25	0.036	2.5	0.084	NA	49000	4900	N	NA	NA	N	BSL
	131-11-3	Dimethylphthalate	0.29	J	0.62		mg/kg	SC-SB-16	2	25	0.023	2.5	0.62	NA	--	--	--	NA	NA	N	BSL
	84-72-2	Di-n-Butylphthalate	0.049	J	3.06		mg/kg	SC-MW-2L	4	29	0.046	13	3.06	NA	6200	610	N	NA	NA	N	BSL
	117-84-0	Di-n-Octylphthalate	190		190		mg/kg	SC-SB-15	1	25	0.023	1.6	190	NA	620	61	N	NA	NA	Y	**BSL**
	206-44-0	Fluoranthene	0.05		200		mg/kg	SB-2A	26	29	0.47	12	200	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.053	J	65		mg/kg	D-16	8	29	0.02	12	65	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.0098	J	0.095		mg/kg	D-19	7	25	0.0051	0.47	0.095	NA	1.1	0.3	C	NA	NA	N	BSL
	87-68-3	Hexachlorobutadiene	0.027	J	0.027	J	mg/kg	D-19	1	25	0.009	0.52	0.027	NA	22	6.1	C	NA	NA	N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	0.032	J	54		mg/kg	SB-2A	21	29	0.13	12	54	NA	2.1	0.15	C	NA	NA	Y	ASL
	91-20-3	Naphthalene	0.04		110		mg/kg	D-16	22	29	0.02	12	110	NA	18	3.6	C	NA	NA	Y	ASL
	86-30-6	N-Nitrosodiphenylamine	0.15		0.15		mg/kg	SC-MW-17L	1	25	0.022	2.1	0.15	NA	350	99	C	NA	NA	N	BSL
	85-01-8	Phenanthrene*	0.058	J	250		mg/kg	D-16	25	29	0.14	12	250	NA	17000	1700	N	NA	NA	N	BSL
	108-95-2	Phenol	0.13		0.5		mg/kg	SC-MW-17L	2	25	0.011	2.8	0.5	NA	18000	1800	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.044		190		mg/kg	SB-2A	26	29	0.47	12	190	NA	1700	170	N	NA	NA	Y	**BSL**
	11097-69-1	PCB-1254	0.034		0.82		mg/kg	BW-16	3	25	0.0029	1.3	0.034	NA	0.74	0.11	C	NA	NA	N	BSL
	11096-82-5	PCB-1260	0.022		4.2		mg/kg	D-18	6	25	0.0029	1.3	4.2	NA	0.74	0.22	C	NA	NA	Y	ASL
	1746-01-6	2,3,7,8-TCDD	2.0107E-06		4.150E-03		mg/kg	D-16	19	27	0.00023	0.00067	4.15E-03	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	7429-90-5	Aluminum	1600	J	29500		mg/kg	VC-3	18	18	NA	NA	29500	NA	99000	7700	N	NA	NA	Y	**BSL**
	7440-36-0	Antimony	2.9		202		mg/kg	D-22	9	22	0.23	34.3	202	NA	41	3.1	N	NA	NA	Y	ASL
	7440-38-2	Arsenic	2.53		54.9		mg/kg	BW-18A	15	22	2.1	32.7	54.9	NA	2.4	0.61	C	NA	NA	Y	ASL
	7440-39-3	Barium	19.3	J	4210		mg/kg	D-19	18	18	0	0	4210	NA	19000	1500	N	NA	NA	Y	**BSL**
	7440-41-7	Beryllium	0.38	J	2.5		mg/kg	D-15	12	22	0.14	5	2.5	NA	200	16	N	NA	NA	N	BSL
	7440-43-9	Cadmium	0.6	B	5.1	J	mg/kg	D-19	7	22	0.058	5.1	5.1	NA	9300	7	N	NA	NA	N	BSL
	7440-70-2	Calcium	938		159000		mg/kg	D-20	18	18	NA	NA	159000	NA	--	--	--	NA	NA	N	BSL
	16065-83-1	Chromium	11		37000		mg/kg	ST-6N	83	83	NA	NA	37000	NA	150000	12000	N	NA	NA	Y	**BSL**
	7440-48-4	Cobalt	1.2	B	221		mg/kg	VC-5	17	18	2.5	2.5	221	NA	30	2.3	N	NA	NA	Y	ASL
	7440-50-8	Copper	11.9		335		mg/kg	SB-4A	19	22	24	67.4	335	NA	4100	310	N	NA	NA	Y	**BSL**
	7439-89-6	Iron	7060		198000		mg/kg	D-19	18	18	NA	NA	198000	NA	72000	5500	N	NA	NA	Y	ASL
	7439-92-1	Lead	18.5		57300		mg/kg	D-22	22	22	NA	NA	57300	NA	800[7]	400[8]	N	NA	NA	Y	ASL
	1284-72-6	Magnesium	208	J	89700		mg/kg	VC-5	18	18	NA	NA	89700	NA	--	--	--	NA	NA	N	BSL
	7439-96-5	Manganese	8.2		959		mg/kg	D-16	18	18	NA	NA	959	NA	2300	180	N	NA	NA	Y	**BSL**
	7439-97-6	Mercury	0.024		0.87		mg/kg	BW-18A	19	22	0.17	0.32	0.87	NA	4.3	1	N	NA	NA	N	BSL
	7440-02-0	Nickel	4.6	B	881		mg/kg	VC-5	22	22	NA	NA	881	NA	2000	150	N	NA	NA	Y	**BSL**
	7440-09-7	Potassium	177	J	1500	J	mg/kg	D-19	11	18	313	3720	1500	NA	--	--	--	NA	NA	N	BSL
	7782-49-2	Selenium	0.69		5.1	J	mg/kg	D-21	6	21	1.3	45.9	5.1	NA	510	39	N	NA	NA	N	BSL
	7440-22-4	Silver	0.17	BJ	1.3		mg/kg	D-22	4	22	0.17	7	1.3	NA	510	39	N	NA	NA	N	BSL
	7647-14-5	Sodium	153	B	1540		mg/kg	BW-18A	12	18	462	5490	1540	NA	--	--	--	NA	NA	N	BSL
	7440-28-0	Thallium	0.87		1.7		mg/kg	BW-18A	3	21	1.1	39.3	1.7	NA	1	0.078	N	NA	NA	Y	ASL
	7440-62-2	Vanadium	10.3	B	1670		mg/kg	D-16	18	18	NA	NA	1670	NA	510	39	N	NA	NA	Y	ASL
	7440-66-6	Zinc	22.5		45300		mg/kg	D-19	22	22	NA	NA	45300	NA	31000	2300	N	NA	NA	Y	ASL
	18540-29-9	Chromium, hexavalent	0.54		11000		mg/kg	ST-7-W	58	75	0.13	2.8	11000	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable
(7) http://www.epa.gov/superfund/lead/almfaq.htm
(8) USEPA, August 1994. OSWER Directive 9355.4-12.

TABLE 4-5 (RAGS Part D Table 2.4)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
EASTERN AREA SUBSURFACE SOILS (0 - 10 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Subsurface Soil (0-10 feet bgs)
Exposure Medium: Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]			Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Industrial	Residential	(N/C)				
Onsite	120-82-1	1,2,4-Trichlorobenzene	0.007	J	200000	J	mg/kg	TSS-9D	13	16	0.001	5.3	200000	NA[6]	27	6.2	N	NA	NA	Y	ASL
Subsurface Soil	156-59-2	1,2-Dichloroethene	0.0205		0.0765		mg/kg	TSS-3	11	22	0.0024	10	0.0765	NA	920	70	N	NA	NA	N	BSL
Particulates	95-50-1	1,2-Dichlorobenzene	3.78		6470		mg/Kg	TSS-9D	10	11	2.9	2.9	6470	NA	980	190	N	NA	NA	Y	ASL
Volatile Emissions	541-73-1	1,3-Dichlorobenzene*	6.4		1550		mg/Kg	TSS-9D	10	11	2.9	2.9	1550	NA	980	190	N	NA	NA	Y	ASL
	106-46-7	1,4-Dichlorobenzene	0.55		4840		mg/kg	BW-04	10	16	0.00076	7.4	4840	NA	12	2.4	C	NA	NA	Y	ASL
	71-43-2	Benzene	0.0015	J	0.0035	J	mg/kg	BW-04	2	16	0.0031	27	0.0035	NA	5.4	1.1	C	NA	NA	N	BSL
	108-90-7	Chlorobenzene	0.0891		99.6		mg/kg	TSS-1	8	16	0.0009	8.7	99.6	NA	140	29	N	NA	NA	Y	**BSL**
	75-09-2	Methylene Chloride	0.00657		7.02		mg/kg	TSS-9	6	16	0.0008	18	7.02	NA	310	36	N	NA	NA	N	BSL
	127-18-4	Tetrachloroethene	0.00991		2.31		mg/kg	TSS-5	3	16	0.00081	26	2.31	NA	41	8.6	N	NA	NA	N	BSL
	79-01-6	Trichloroethene	0.0292		0.866		mg/kg	TSS-5	2	16	0.00078	12	0.866	NA	2	0.44	N	NA	NA	Y	**BSL**
	92-52-4	1,1'-Biphenyl	0.044	J	4.6	J	mg/kg	BW-3	7	12	0.021	0.097	4.6	NA	21	5.1	N	NA	NA	N	BSL
	105-67-9	2,4-Dimethylphenol	0.053	J	0.77	J	mg/kg	SC-SS-02	3	12	0.018	2.2	0.77	NA	1200	120	N	NA	NA	N	BSL
	91-57-6	2-Methylnaphthalene	0.047	J	35	J	mg/kg	BW-03	10	12	0.025	0.036	35	NA	220	23	N	NA	NA	Y	**BSL**
	95-48-7	2-Methylphenol	0.031	J	0.031	J	mg/kg	BW-02	1	12	0.017	3.1	0.031	NA	3100	310	N	NA	NA	N	BSL
	106-44-5	4-Methylphenol	0.057	J	8.8	J	mg/kg	BW-03	4	12	0.02	0.19	8.8	NA	6200	610	N	NA	NA	N	BSL
	83-32-9	Acenaphthene	0.045	J	219		mg/kg	TSS-2	13	23	0.023	3.5	219	NA	3300	340	N	NA	NA	N	BSL
	208-96-8	Acenaphthylene*	0.043	J	24.1		mg/kg	TSS-1	10	23	0.026	9	24.1	NA	3300	340	N	NA	NA	N	BSL
	120-12-7	Anthracene	0.046	J	46.2		mg/kg	TSS-1	16	23	0.037	4.9	46.2	NA	17000	1700	N	NA	NA	N	BSL
	56-55-3	Benzo(a)anthracene	0.14	J	22		mg/kg	SC-SS-04	9	23	0.026	49	22	NA	2.1	0.15	C	NA	NA	Y	ASL
	50-32-8	Benzo(a)pyrene	0.14	J	37		mg/kg	SC-SS-04	16	23	0.02	16	37	NA	0.21	0.015	C	NA	NA	Y	ASL
	205-99-2	Benzo(b)fluoranthene	0.22	J	65.8		mg/kg	TSS-3	17	23	0.025	30	65.8	NA	2.1	0.15	C	NA	NA	Y	ASL
	191-24-2	Benzo(g,h,i)perylene	0.11	J	34		mg/kg	SC-SS-04	16	23	0.022	26	34	NA	--	--	--	NA	NA	N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.16	J	44.5		mg/kg	TSS-7	7	23	0.032	63	44.5	NA	120	34	C	NA	NA	Y	**BSL**
	86-74-8	Carbazole	0.025	J	7	J	mg/kg	BW-03	11	12	0.027	0.027	7	NA	--	--	--	NA	NA	N	BSL
	218-01-9	Chrysene	0.14	J	41.9		mg/kg	TSS-1	19	23	0.026	3.8	41.9	NA	210	15	C	NA	NA	Y	**BSL**
	53-70-3	Dibenz(a,h)anthracene	0.029	J	8.8		mg/kg	SC-SS-04	10	23	0.027	16	8.8	NA	0.21	0.015	C	NA	NA	Y	ASL
	132-64-9	Dibenzofuran	0.064	J	14	J	mg/kg	BW-03	10	12	0.025	0.036	14	NA	100	7.8	N	NA	NA	Y	**BSL**
	84-66-2	Diethylphthalate	0.077	J	0.077	J	mg/kg	SC-SS-07	1	12	0.026	4.5	0.077	NA	49000	4900	N	NA	NA	N	BSL
	206-44-0	Fluoranthene	0.36		121		mg/kg	TSS-1	20	23	0.042	3.7	121	NA	2200	230	N	NA	NA	N	BSL
	86-73-7	Fluorene	0.041	J	213		mg/kg	TSS-1	12	23	0.022	4.9	213	NA	2200	230	N	NA	NA	N	BSL
	118-74-1	Hexachlorobenzene	0.95		359		mg/kg	TSS-5	11	23	0.017	3.1	359	NA	1.1	0.3	C	NA	NA	Y	ASL
	87-68-3	Hexachlorobutadiene	8.52		8.52		mg/kg	TSS-2	1	23	0.019	5.6	8.52	NA	22	6.1	C	NA	NA	Y	**BSL**
	193-39-5	Indeno(1,2,3-cd)pyrene	0.074	J	35.9		mg/kg	TSS-3	16	23	0.023	23	35.9	NA	2.1	0.15	C	NA	NA	Y	ASL
	91-20-3	Naphthalene	0.11		2000		mg/kg	BW-03	19	22	2.4	4.1	2000	NA	18	3.6	C	NA	NA	Y	ASL
	85-01-8	Phenanthrene	0.25		428		mg/kg	TSS-1	18	23	0.031	9.3	428	NA	17000	1700	N	NA	NA	N	BSL
	129-00-0	Pyrene	0.29		70.5		mg/kg	TSS-1	19	23	0.04	3.2	70.5	NA	1700	170	N	NA	NA	N	BSL
	12672-29-6	PCB-1248	0.052		2.5		mg/kg	SC-SS-04	6	12	0.0019	0.0031	2.5	NA	0.74	0.22	C	NA	NA	Y	ASL
	11097-69-1	PCB-1254	0.042	PG	1		mg/kg	SC-SS-04	7	12	0.003	0.0047	1	NA	0.74	0.11	C	NA	NA	Y	ASL
	11096-82-5	PCB-1260	0.022	JP	0.046		mg/kg	BW-04	2	12	0.0028	0.0047	0.046	NA	0.74	0.22	C	NA	NA	N	BSL
	11100-14-4	PCB-1268	0.041	PG	0.46		mg/kg	SC-SS-06	4	12	0.0026	0.0042	0.46	NA	0.74	0.22	C	NA	NA	Y	**BSL**
	1746-01-6	2,3,7,8-TCDD	1.788E-07		0.00052		mg/kg	12	6	15	0.00013	0.0007	0.00052	NA	0.000018	0.0000045	C	NA	NA	Y	ASL
	7429-90-5	Aluminum	10800		27600	J	mg/kg	BW-03	5	5	NA	NA	27600	NA	99000	7700	N	NA	NA	Y	**BSL**
	7440-38-2	Arsenic	6.5		9.8	B	mg/kg	BW-04	2	5	2.9	3.5	9.8	NA	2.4	0.61	C	NA	NA	Y	ASL
	7440-39-3	Barium	26.1	B	132		mg/kg	BW-03	5	5	NA	NA	132	NA	19000	1500	N	NA	NA	N	BSL
	7440-41-7	Beryllium	0.75	B	0.75	B	mg/kg	BW-04	1	5	0.039	0.099	0.75	NA	200	16	N	NA	NA	N	BSL
	7440-43-9	Cadmium	0.42	B	2.2		mg/kg	BW-04	5	5	NA	NA	2.2	NA	9300	7	N	NA	NA	N	BSL
	7440-70-2	Calcium	2050		239000		mg/kg	BW-03	5	5	NA	NA	239000	NA	--	--	--	NA	NA	N	BSL

TABLE 4-5 (RAGS Part D Table 2.4)
OCCURRENCE, DISTRIBUTION AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
EASTERN AREA SUBSURFACE SOILS (0 - 10 FEET)
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Subsurface Soil (0-10 feet bgs)
Exposure Medium: Subsurface Soil (0-10 feet bgs)

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency Detected	Detection Frequency Total	Range of Detection Limits Minimum	Range of Detection Limits Maximum	Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4] Industrial	Toxicity Screening Value[4] Residential	Toxicity Screening Value[4] (N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
	16065-83-1	Chromium	88.8	J	25200	J	mg/kg	BW-03	9	9	NA	NA	25200	NA	150000	12000	N	NA	NA	Y	**BSL**
	7440-48-4	Cobalt	8	B	126		mg/kg	BW-04	5	5	NA	NA	126	NA	30	2.3	N	NA	NA	Y	ASL
	7440-50-8	Copper	11.5		23.8		mg/kg	BW-04	5	5	NA	NA	23.8	NA	4100	310	N	NA	NA	N	BSL
	7439-89-6	Iron	22300		72100		mg/kg	BW-04	5	5	NA	NA	72100	NA	72000	5500	N	NA	NA	Y	ASL
	7439-92-1	Lead	10.5		110		mg/kg	BW-03	5	5	NA	NA	110	NA	800[7]	400[8]	N	NA	NA	N	BSL
	1284-72-6	Magnesium	4660		46800		mg/kg	BW-04	5	5	NA	NA	46800	NA	--	--	--	NA	NA	N	BSL
	7439-96-5	Manganese	209		933		mg/kg	BW-04	5	5	NA	NA	933	NA	2300	180	N	NA	NA	Y	**BSL**
	7439-97-6	Mercury	0.03	B	1.3		mg/kg	BW-03	5	5	NA	NA	1.3	NA	4.3	1	N	NA	NA	Y	**BSL**
	7440-02-0	Nickel	20.3	J	597	J	mg/kg	BW-04	5	5	NA	NA	597	NA	2000	150	N	NA	NA	Y	**BSL**
	7440-09-7	Potassium	292	B	2210		mg/kg	BW-04	5	5	NA	NA	2210	NA	--	--	--	NA	NA	N	BSL
	7782-49-2	Selenium	0.94	B	0.94	B	mg/kg	BW-04	1	5	0.36	0.46	0.94	NA	510	39	N	NA	NA	N	BSL
	7440-22-4	Silver	0.15	B	0.57	B	mg/kg	BW-04	5	5	NA	NA	0.57	NA	510	39	N	NA	NA	N	BSL
	7647-14-5	Sodium	882		2640		mg/kg	BW-04	5	5	NA	NA	2640	NA	--	--	--	NA	NA	N	BSL
	7440-28-0	Thallium	4.5		9.4		mg/kg	BW-03	4	5	0.64	0.64	9.4	NA	1	0.078	N	NA	NA	Y	ASL
	7440-62-2	Vanadium	38.6		1390		mg/kg	BW-04	5	5	NA	NA	1390	NA	510	39	N	NA	NA	Y	ASL
	7440-66-6	Zinc	49.2		223		mg/kg	BW-04	5	5	NA	NA	223	NA	31000	2300	N	NA	NA	N	BSL
	18540-29-9	Chromium, hexavalent	0.39		3820		mg/kg	BW-01	6	9	0.15	14	3820	NA	5.6	0.29	C	NA	NA	Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
PG = Pecent difference between columns >25%
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR = 1E-6; HQ = 0.1). Lower of cancer/noncancer industrial soil concentration used for screening.
(5) ASL = Above screening level — ASL indicates that screening concentration exceeds industrial criterion. COPC will be addressed in risk calculations.
BSL = Below screening level — Bolding indicates that screening concentration exceeds residential criterion, but is less than industrial criterion. COPC will not be addressed in risk calculations.
(6) NA = Not applicable
(7) http://www.epa.gov/superfund/lead/almfaq.htm
(8) USEPA, August 1994. OSWER Directive 9355.4-12.

TABLE 4-6 (RAGS Part D Table 2.5)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
WESTERN AREA SHALLOW GROUNDWATER
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Western Area Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening[2]	Background Value[3]	Toxicity Screening Value[4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
									Detected	Total	Minimum	Maximum			Groundwater	(N/C)				
Groundwater	120-82-1	1,2,4-Trichlorobenzene	NA		0.00089	J	mg/L	PZ-2U	2	4	NA	0.42	0.00089	NA [6]	0.00039	N			Y	ASL
	95-50-1	1,2-Dichlorobenzene	0.00065	J	0.01		mg/L	PZ-2U	3	4	NA	0.65	0.01	NA	0.0028	N	0.6	MCL	Y	ASL
	541-73-1	1,3-Dichlorobenzene*	0.0026	J	0.0034	J	mg/L	PZ-2U	2	4	NA	0.66	0.0034	NA	0.0028	N			Y	ASL
	106-46-7	1,4-Dichlorobenzene	0.001	J	0.0044	J	mg/L	MW-15U	3	4	NA	0.6	0.0044	NA	0.00042	C	0.075	MCL	Y	ASL
	67-64-1	Acetone	NA		0.017	J	mg/L	PZ-2U	1	4	NA	0.005	0.017	NA	1.2	N			N	BSL
	71-43-2	Benzene	0.0015	J	0.085		mg/L	MW-15U	3	4	NA	0.00081	0.085	NA	0.00039	C	0.005	MCL	Y	ASL
	108-90-7	Chlorobenzene	0.0024	J	0.32		mg/L	MW-15U	3	4	NA	0.00071	0.32	NA	0.0072	N			Y	ASL
	156-59-2	cis-1,2-Dichloroethene	NA		0.0024		mg/L	PZ-3U	1	4	NA	0.001	0.0024	NA	0.0028	N	0.07	MCL	N	BSL
	100-41-4	Ethylbenzene	NA		0.01		mg/L	PZ-3U	1	4	NA	0.00058	0.01	NA	0.0013	C	0.7	MCL	Y	ASL
	98-82-8	Isopropylbenzene	NA		0.0031	J	mg/L	PZ-3U	1	4	NA	0.00072	0.0031	NA	NA	N			N	BSL
		Xylene (total)	NA		0.039		mg/L	PZ-3U	1	4	NA	0.0024	0.039	NA	0.019	N	10	MCL	Y	ASL
	92-52-4	1,1'-Biphenyl	NA		0.028		mg/L	PZ-3U	1	4	0.00063	0.00075	0.028	NA	0.000083	N			Y	ASL
	105-67-9	2,4-Dimethylphenol	0.0033	J	0.012		mg/L	PZ-3U	3	4	NA	0.00065	0.012	NA	0.027	N			N	BSL
	91-57-6	2-Methylnaphthalene	0.0012	J	0.59		mg/L	PZ-3U	2	4	0.00049	0.00059	0.59	NA	0.0027	N			Y	ASL
	95-48-7	2-Methylphenol	0.0011	J	0.0076	J	mg/L	MW-15U	3	4	NA	0.00064	0.0076	NA	0.072	N			N	BSL
	106-44-5	4-Methylphenol	0.0033	J	0.031		mg/L	MW-15U	3	4	NA	0.00092	0.031	NA	0.14	N			N	BSL
	83-32-9	Acenaphthene	0.0012	J	0.061		mg/L	PZ-3U	3	4	NA	0.00065	0.061	NA	0.04	N			Y	ASL
	120-12-7	Anthracene	NA		0.0014	J	mg/L	PZ-3U	1	4	0.00053	0.00063	0.0014	NA	0.13	N			N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.0015	J	0.0026	J	mg/L	PZ-3U	3	4	NA	0.0013	0.0026	NA	0.0048	C	0.006	MCL	N	BSL
	105-60-2	Caprolactam	0.0032	J	0.005	J	mg/L	PZ-2U	3	4	NA	0.002	0.005	NA	0.77	N			N	BSL
	86-74-8	Carbazole	NA		0.0024	J	mg/L	PZ-3U	1	4	0.00055	0.00065	0.0024	NA	NA	--			N	BSL
	132-64-9	Dibenzofuran	NA		0.02	J	mg/L	PZ-3U	1	4	0.00056	0.00067	0.02	NA	NA	N			N	BSL
	206-44-0	Fluoranthene	NA		0.00071	J	mg/L	MW-15U	1	4	0.00052	0.00062	0.00071	NA	0.063	N			N	BSL
	86-73-7	Fluorene	0.0039	J	0.01	J	mg/L	PZ-3U	2	4	0.00057	0.00068	0.01	NA	0.022	N			N	BSL
	91-20-3	Naphthalene	0.0021	J	5		mg/L	PZ-3U	2	4	0.00045	0.00054	5	NA	0.000029	C			Y	ASL
	85-01-8	Phenanthrene*	0.00081	J	0.0052	J	mg/L	PZ-3U	3	4	NA	0.00069	0.0052	NA	0.13	N			N	BSL
	108-95-2	Phenol	0.0058	J	0.039		mg/L	MW-15U	3	4	NA	0.00028	0.039	NA	0.45	N			N	BSL
	7429-90-5	Aluminum	0.055	B	1.75		mg/L	PZ-2U	4	4	NA	NA	1.75	NA	1.6	N			Y	ASL
	7440-36-0	Antimony	NA		0.0044	B	mg/L	MW-15U	1	4	NA	0.0029	0.0044	NA	0.0006	N	0.006	MCL	Y	ASL
	7440-38-2	Arsenic	0.003		0.016		mg/L	PZ-3U	2	4	NA	0.0022	0.016	NA	0.000045	C	0.01	MCL	Y	ASL
	7440-39-3	Barium	NA		0.352	J	mg/L	MW-15U	4	4	NA	NA	0.352	NA	0.29	N	2	MCL	Y	ASL
	7440-43-9	Cadmium	NA		0.00067	B	mg/L	PZ-1U	1	4	NA	0.00023	0.00067	NA	0.00061	N	0.005	MCL	Y	ASL
	7440-70-2	Calcium	10.5	J	289	J	mg/L	PZ-2U	4	4	NA	NA	289	NA	NA	--			N	BSL
	16065-83-1	Chromium	0.0031	B	4.69		mg/L	PZ-2U	4	4	NA	NA	4.69	NA	1.6	N	0.1	MCL	Y	ASL
	7440-48-4	Cobalt	NA		0.0028	B	mg/L	PZ-1U	1	4	NA	0.0007	0.0028	NA	0.00047	N			Y	ASL
	7440-50-8	Copper	0.0012	B	0.0258	B	mg/L	PZ-1U	4	4	NA	NA	0.0258	NA	0.062	N	1.3	MCL	N	BSL
	7439-89-6	Iron	0.0334	B	46.1		mg/L	PZ-1U	4	4	NA	NA	46.1	NA	1.1	N			Y	ASL
	7439-92-1	Lead	0.0032		0.0377		mg/L	MW-15U	2	4	NA	0.0024	0.0377	NA	NA	N	0.015		Y	ASL
	1284-72-6	Magnesium	0.073	BJ	19.9	J	mg/L	MW-15U	4	4	NA	NA	19.9	NA	NA	--			N	BSL
	7439-96-5	Manganese	0.0242		0.701		mg/L	PZ-1U	3	4	NA	0.00032	0.701	NA	0.032	N			Y	ASL
	7439-97-6	Mercury	0.000076	B	0.00012	B	mg/L	PZ-3U	2	4	NA	NA	0.00012	NA	0.000063	N	0.002	MCL	Y	ASL
	7440-02-0	Nickel	0.0015	B	0.0177	B	mg/L	PZ-1U	4	4	NA	NA	0.0177	NA	0.03	N			N	BSL
	7440-09-7	Potassium	1.14	B	14.1		mg/L	PZ-3U	4	4	NA	NA	14.1	NA	NA	--			N	BSL
	7440-22-4	Silver	NA		0.00064	B	mg/L	PZ-2U	1	4	NA	NA	0.00064	NA	0.0071	N			N	BSL
	7647-14-5	Sodium	27		195		mg/L	PZ-1U	4	4	NA	NA	195	NA	NA	--			N	BSL
	7440-28-0	Thallium	NA		0.0036	BJ	mg/L	PZ-1U	1	4	NA	0.0031	0.0036	NA	0.000016	N	0.002	MCL	Y	ASL
	7440-62-2	Vanadium	0.0013	BJ	0.0487		mg/L	PZ-1U	3	4	NA	0.001	0.0487	NA	0.0063	N			Y	ASL
	7440-66-6	Zinc	0.107		1.94		mg/L	PZ-4U	3	4	NA	0.0013	1.94	NA	0.47	N			Y	ASL
	18540-29-9	Chromium, hexavalent	NA		4.07		mg/L	PZ-2U	1	4	0.01	0.25	4.07	NA	0.000031	C			Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR=1E-6; HQ=0.1). Lower of cancer/noncancer tapwater concentration used for screening
(5) ASL = Above screening level ASL indicates that screening concentration exceeds tapwater criterion. COPC will be addressed in risk calculations.
BSL = Below screening level
(6) NA = Not applicable

TABLE 4-7 (RAGS Part D Table 2.6)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF POTENTIAL CONCERN
EASTERN AREA SHALLOW GROUNDWATER
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Eastern Area Groundwater
Exposure Medium: Groundwater

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]	Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency		Range of Detection Limits		Concentration Used for Screening [2]	Background Value [3]	Toxicity Screening Value [4]		Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion [5]
								Detected	Total	Minimum	Maximum			Groundwater	(N/C)				
Groundwater	120-82-1	1,2,4-Trichlorobenzene	NA	0.0041	J	mg/L	PZ-4U	1	1	NA	NA	0.0041	NA [6]	0.00039	N			Y	ASL
	95-50-1	1,2-Dichlorobenzene	NA	0.0042	J	mg/L	PZ-4U	1	1	NA	NA	0.0042	NA	0.0028	N	0.6	MCL	Y	ASL
	541-73-1	1,3-Dichlorobenzene*	NA	0.0026	J	mg/L	PZ-4U	1	1	NA	NA	0.0026	NA	0.0028	N			N	BSL
	106-46-7	1,4-Dichlorobenzene	NA	0.0044	J	mg/L	PZ-4U	1	1	NA	NA	0.0044	NA	0.00042	C	0.075	MCL	Y	ASL
	108-90-7	Chlorobenzene	NA	0.017		mg/L	PZ-4U	1	1	NA	NA	0.017	NA	0.0072	N			Y	ASL
	127-18-4	Tetrachloroethene	NA	0.00067	J	mg/L	PZ-4U	1	1	NA	NA	0.00067	NA	0.0035	N	0.005	MCL	N	BSL
	105-67-9	2,4-Dimethylphenol	NA	0.0098	J	mg/L	PZ-4U	1	1	NA	NA	0.0098	NA	0.027	N			N	BSL
	91-57-6	2-Methylnaphthalene	NA	0.0014	J	mg/L	PZ-4U	1	1	NA	NA	0.0014	NA	0.0027	N			N	BSL
	95-48-7	2-Methylphenol	NA	0.011	J	mg/L	PZ-4U	1	1	NA	NA	0.011	NA	0.072	N			N	BSL
	106-44-5	4-Methylphenol	NA	0.023		mg/L	PZ-4U	1	1	NA	NA	0.023	NA	0.14	N			N	BSL
	83-32-9	Acenaphthene	NA	0.0056	J	mg/L	PZ-4U	1	1	NA	NA	0.0056	NA	0.04	N			N	BSL
	208-96-8	Acenaphthylene*	NA	0.00085	J	mg/L	PZ-4U	1	1	NA	NA	0.00085	NA	0.04	N			N	BSL
	120-12-7	Anthracene	NA	0.001	J	mg/L	PZ-4U	1	1	NA	NA	0.001	NA	0.13	N			N	BSL
	56-55-3	Benzo(a)anthracene	NA	0.0023	J	mg/L	PZ-4U	1	1	NA	NA	0.0023	NA	0.000029	C			Y	ASL
	50-32-8	Benzo(a)pyrene	NA	0.0022	J	mg/L	PZ-4U	1	1	NA	NA	0.0022	NA	0.0000029	C	0.0002	MCL	Y	ASL
	205-99-2	Benzo(b)fluoranthene	NA	0.0038	J	mg/L	PZ-4U	1	1	NA	NA	0.0038	NA	0.000029	C			Y	ASL
	191-24-2	Benzo(g,h,i)perylene	NA	0.0019	J	mg/L	PZ-4U	1	1	NA	NA	0.0019	NA	NA	--			N	BSL
	218-01-9	Chrysene	NA	0.0021	J	mg/L	PZ-4U	1	1	NA	NA	0.0021	NA	0.0029	C			N	BSL
	206-44-0	Fluoranthene	NA	0.0038	J	mg/L	PZ-4U	1	1	NA	NA	0.0038	NA	0.063	N			N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	NA	0.0017	J	mg/L	PZ-4U	1	1	NA	NA	0.0017	NA	0.000029	C			Y	ASL
	91-20-3	Naphthalene	NA	0.021		mg/L	PZ-4U	1	1	NA	NA	0.021	NA	0.000029	C			Y	ASL
	85-01-8	Phenanthrene*	NA	0.0014	J	mg/L	PZ-4U	1	1	NA	NA	0.0014	NA	0.13	N			N	BSL
	108-95-2	Phenol	NA	0.029		mg/L	PZ-4U	1	1	NA	NA	0.029	NA	0.45	N			N	BSL
	129-00-0	Pyrene	NA	0.00029	J	mg/L	PZ-4U	1	1	NA	NA	0.00029	NA	0.0087	N			N	BSL
	7429-90-5	Aluminum	NA	2.91	J	mg/L	PZ-4U	1	1	NA	NA	2.91	NA	1.6	N			Y	ASL
	7440-39-3	Barium	NA	0.0123	B	mg/L	PZ-4U	1	1	NA	NA	0.0123	NA	0.29	N	2	MCL	N	BSL
	7440-43-9	Cadmium	NA	0.002	B	mg/L	PZ-4U	1	1	NA	NA	0.002	NA	0.00061	N	0.005	MCL	Y	ASL
	7440-70-2	Calcium	NA	74.5	J	mg/L	PZ-4U	1	1	NA	NA	74.5	NA	NA	--			N	BSL
	16065-83-1	Chromium	NA	3.65		mg/L	PZ-4U	1	1	NA	NA	3.65	NA	1.6	N	0.1	MCL	Y	ASL
	7440-48-4	Cobalt	NA	0.0066	B	mg/L	PZ-4U	1	1	NA	NA	0.0066	NA	0.00047	N			Y	ASL
	7440-50-8	Copper	NA	0.0126	B	mg/L	PZ-4U	1	1	NA	NA	0.0126	NA	0.062	N	1.3	MCL	N	BSL
	7439-89-6	Iron	NA	6.55		mg/L	PZ-4U	1	1	NA	NA	6.55	NA	1.1	N			Y	ASL
	7439-92-1	Lead	NA	15.5		mg/L	PZ-4U	1	1	NA	NA	15.5	NA	NA	N	0.015		Y	ASL
	1284-72-6	Magnesium	NA	17.4	J	mg/L	PZ-4U	1	1	NA	NA	17.4	NA	NA	--			N	BSL
	7439-96-5	Manganese	NA	0.071		mg/L	PZ-4U	1	1	NA	NA	0.071	NA	0.032	N			Y	ASL
	7439-97-6	Mercury	NA	0.00011	B	mg/L	PZ-4U	1	1	NA	NA	0.00011	NA	0.000063	N	0.002	MCL	Y	ASL
	7440-02-0	Nickel	NA	0.0317	B	mg/L	PZ-4U	1	1	NA	NA	0.0024	NA	0.03	N			N	BSL
	7440-09-7	Potassium	NA	2.21	B	mg/L	PZ-4U	1	1	NA	NA	2.21	NA	NA	--			N	BSL
	7440-22-4	Silver	NA	0.00089	B	mg/L	PZ-4U	1	1	NA	NA	0.00089	NA	0.0071	N			N	BSL
	7647-14-5	Sodium	NA	8.78		mg/L	PZ-4U	1	1	NA	NA	8.78	NA	NA	--			N	BSL
	7440-62-2	Vanadium	NA	0.135		mg/L	PZ-4U	1	1	NA	NA	0.135	NA	0.0063	N			Y	ASL
	7440-66-6	Zinc	NA	5.35		mg/L	PZ-4U	1	1	NA	NA	5.35	NA	0.47	N			Y	ASL
	18540-29-9	Chromium, hexavalent	NA	0.453		mg/L	PZ-4U	1	1	NA	NA	0.453	NA	0.000031	C			Y	ASL

* = Screened using value for a similar compound
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limit
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2013. Regional Screening Level (RSL) Summary Table (TR=1E-6; HQ=0.1). Lower of cancer/noncancer tapwater concentration used for screening.
(5) ASL = Above screening level ASL indicates that screening concentration exceeds tapwater criterion. COPC will be addressed in risk calculations.
BSL = Below screening level
(6) NA = Not applicable

TABLE 4-8 (RAGS Part D Table 2.7)
OCCURRENCE, DISTRIBUTION, AND SELECTION OF CHEMICALS OF CONCERN
VAPOR INTRUSION FROM SHALLOW GROUNDWATER
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe: Future
Medium: Groundwater
Exposure Medium: Indoor Air

Exposure Point	CAS Number	Chemical	Minimum Concentration (Qualifier)[1]		Maximum Concentration (Qualifier)		Units	Location of Maximum Concentration	Detection Frequency Detected	Detection Frequency Total	Range of Detection Limits Minimum	Range of Detection Limits Maximum	Concentration Used for Screening[2]	Background Value[3]	Vapor Intrusion Screening Value[4] Groundwater	(N/C)	Potential ARAR/TBC Value	Potential ARAR/TBC Source	COPC Flag (Y/N)	Rationale for Selection or Deletion[5]
Indoor Air	120-82-1	1,2,4-Trichlorobenzene	0.00089	J	0.0041	J	mg/L	PZ-4U	2	5	NA	0.42	0.0041	NA[6]	0.34	N			N	BSL
	95-50-1	1,2-Dichlorobenzene	0.00084	J	0.01		mg/L	PZ-2U	4	5	NA	0.65	0.01	NA	0.26	N	0.6	MCL	N	BSL
	541-73-1	1,3-Dichlorobenzene	0.0026	J	0.0034	J	mg/L	PZ-2U	3	5	NA	0.66	0.0034	NA	0.083	N			N	BSL
	106-46-7	1,4-Dichlorobenzene	0.001	J	0.0044	J	mg/L	PZ-4U	4	5	NA	0.6	0.0044	NA	8.2	N	0.075	MCL	N	BSL
	67-64-1	Acetone	NA		0.017	J	mg/L	PZ-2U	1	5	NA	0.005	0.017	NA	22	N			N	BSL
	71-43-2	Benzene	0.0015	J	0.085		mg/L	MW-15U	3	5	NA	0.00081	0.085	NA	0.005	C	0.005	MCL	Y	ASL
	108-90-7	Chlorobenzene	0.0024	J	0.32		mg/L	MW-15U	4	5	NA	0.00071	0.32	NA	0.039	N			Y	ASL
	156-59-2	cis-1,2-Dichloroethene	NA		0.001		mg/L	PZ-4U	1	5	NA	0.001	0.001	NA	0.021	N	0.07	MCL	N	BSL
	100-41-4	Ethylbenzene	NA		0.01		mg/L	PZ-3U	1	5	NA	0.00058	0.01	NA	0.7	C	0.7	MCL	N	BSL
	98-82-8	Isopropylbenzene	NA		0.0031	J	mg/L	PZ-3U	1	5	NA	0.00072	0.0031	NA	NA	N			N	BSL
	127-18-4	Tetrachloroethene	NA		0.00067		mg/L	PZ-4U	1	5	NA	0.00057	0.00067	NA	0.011	C	0.005	MCL	N	BSL
		Xylene (total)	NA		0.039		mg/L	PZ-3U	1	5	NA	0.0024	0.039	NA	2.2	N	10	MCL	N	BSL
	92-52-4	1,1'-Biphenyl	NA		0.028		mg/L	PZ-3U	1	5	0.00063	0.00075	0.028	NA	NA	N			N	BSL
	105-67-9	2,4-Dimethylphenol	0.0033	J	0.012		mg/L	PZ-3U	4	5	NA	0.00065	0.012	NA	NA	N			N	BSL
	91-57-6	2-Methylnaphthalene	0.0012	J	0.59		mg/L	PZ-3U	3	5	0.00049	0.00059	0.59	NA	0.33	N			Y	ASL
	95-48-7	2-Methylphenol	0.0011	J	0.011	J	mg/L	PZ-4U	4	5	NA	0.00064	0.011	NA	NA	N			N	BSL
	106-44-5	4-Methylphenol	0.0033	J	0.031		mg/L	MW-15U	4	5	NA	0.00092	0.031	NA	NA	N			N	BSL
	83-32-9	Acenaphthene	0.0012	J	0.061		mg/L	PZ-3U	4	5	NA	0.00065	0.061	NA	NA	N			N	BSL
	208-96-8	Acenaphthylene*	NA		0.00085	J	mg/L	PZ-4U	1	5	0.00049	0.00058	0.00085	NA	NA	N			N	BSL
	120-12-7	Anthracene	0.001	J	0.0014	J	mg/L	PZ-3U	2	5	0.00053	0.00063	0.0014	NA	NA	N			N	BSL
	56-55-3	Benzo(a)anthracene	NA		0.0023	J	mg/L	PZ-4U	1	5	0.00043	0.00051	0.0023	NA	NA	C			N	BSL
	50-32-8	Benzo(a)pyrene	NA		0.0022	J	mg/L	PZ-4U	1	5	0.00046	0.00055	0.0022	NA	NA	C	0.0002	MCL	N	BSL
	205-99-2	Benzo(b)fluoranthene	NA		0.0038	J	mg/L	PZ-4U	1	5	0.00033	0.00039	0.0038	NA	NA	C			N	BSL
	191-24-2	Benzo(g,h,i)perylene	NA		0.0019	J	mg/L	PZ-4U	1	5	0.00029	0.00034	0.0019	NA	NA	--			N	BSL
	117-81-7	bis(2-Ethylhexyl)phthalate	0.0015	J	0.0026	J	mg/L	PZ-3U	3	5	0.0013	0.0014	0.0026	NA	NA	C	0.006	MCL	N	BSL
	105-60-2	Caprolactam	0.0032	J	0.005	J	mg/L	PZ-2U	3	5	0.002	0.0022	0.005	NA	NA	--			N	BSL
	86-74-8	Carbazole	NA		0.0024	J	mg/L	PZ-3U	1	5	0.00055	0.00065	0.0024	NA	NA	--			N	BSL
	218-01-9	Chrysene	NA		0.0021	J	mg/L	PZ-4U	1	5	0.00037	0.00044	0.0021	NA	NA	C			N	BSL
	132-64-9	Dibenzofuran	NA		0.02	J	mg/L	PZ-3U	1	5	0.00056	0.00061	0.02	NA	NA	N			N	BSL
	206-44-0	Fluoranthene	0.00071	J	0.0038	J	mg/L	PZ-4U	2	5	0.00052	0.00062	0.0038	NA	NA	N			N	BSL
	86-73-7	Fluorene	0.0039	J	0.01	J	mg/L	PZ-3U	2	5	0.00057	0.00062	0.01	NA	NA	N			N	BSL
	193-39-5	Indeno(1,2,3-cd)pyrene	NA		0.0017	J	mg/L	PZ-4U	1	5	0.0005	0.00059	0.0017	NA	NA	C			N	BSL
	91-20-3	Naphthalene	0.0021	J	5		mg/L	PZ-3U	3	5	0.00045	0.00054	5	NA	0.015	N			Y	ASL
	85-01-8	Phenanthrene*	0.00081	J	0.0052	J	mg/L	PZ-3U	4	5	NA	0.00069	0.0052	NA	N	BSL			N	BSL
	108-95-2	Phenol	0.0058	J	0.039		mg/L	MW-15U	4	5	NA	0.00028	0.039	NA	NA	N			N	BSL
	129-00-0	Pyrene	NA		0.00029	J	mg/L	PZ-4U	1	5	0.00059	0.00071	0.00029	NA	NA	N			N	BSL
	7429-90-5	Aluminum	0.055	B	2.91		mg/L	PZ-4U	5	5	NA	NA	2.91	NA	NA	N			N	BSL
	7440-36-0	Antimony	NA		0.0044	B	mg/L	MW-15U	1	5	NA	0.0029	0.0044	NA	NA	N	0.006	MCL	N	BSL
	7440-38-2	Arsenic	0.003		0.016		mg/L	PZ-3U	2	5	NA	0.0022	0.016	NA	NA	C	0.01	MCL	N	BSL
	7440-39-3	Barium	0.0123	B	0.352	J	mg/L	MW-15U	5	5	NA	NA	0.352	NA	NA	N	2	MCL	N	BSL
	7440-43-9	Cadmium	0.00067	B	0.002	B	mg/L	PZ-4U	2	5	NA	0.00023	0.002	NA	NA	N	0.005	MCL	N	BSL
	7440-70-2	Calcium	10.5	J	289	J	mg/L	PZ-2U	5	5	NA	NA	289	NA	NA	--			N	BSL
	16065-83-1	Chromium	0.0031	B	4.69		mg/L	PZ-2U	5	5	NA	NA	4.69	NA	NA	N	0.1	MCL	N	BSL
	7440-48-4	Cobalt	0.0028	B	0.0066	B	mg/L	PZ-4U	2	5	NA	0.0007	0.0066	NA	NA	N			N	BSL
	7440-50-8	Copper	0.0012	B	0.0258	B	mg/L	PZ-1U	5	5	NA	NA	0.0258	NA	NA	N	1.3	MCL	N	BSL
	7439-89-6	Iron	0.0334	B	46.1		mg/L	PZ-1U	5	5	NA	NA	46.1	NA	NA	N			N	BSL
	7439-92-1	Lead	0.0032		0.0377		mg/L	MW-15U	3	5	NA	0.0024	0.0377	NA	NA	N			N	BSL
	1284-72-6	Magnesium	0.073	BJ	19.9	J	mg/L	MW-15U	5	5	NA	NA	19.9	NA	NA	--			N	BSL
	7439-96-5	Manganese	0.0242		0.701		mg/L	PZ-1U	4	5	NA	0.00032	0.701	NA	NA	N			N	BSL
	7439-97-6	Mercury	0.000076	B	0.00012	B	mg/L	PZ-3U	3	5	NA	0.000055	0.00012	NA	NA	N	0.002	MCL	N	BSL
	7440-02-0	Nickel	0.0015	B	0.0317	B	mg/L	PZ-4U	5	5	NA	NA	0.0317	NA	NA	N			N	BSL
	7440-09-7	Potassium	1.14	B	14.4		mg/L	PZ-2U	5	5	NA	NA	14.4	NA	NA	--			N	BSL
	7440-22-4	Silver	0.00064	B	0.00089	B	mg/L	PZ-4U	2	5	NA	0.00059	0.00089	NA	NA	N			N	BSL
	7647-14-5	Sodium	8.78		195		mg/L	PZ-1U	5	5	NA	NA	195	NA	NA	--			N	BSL
	7440-28-0	Thallium	NA		0.0036	BJ	mg/L	PZ-1U	1	5	NA	0.0031	0.0036	NA	NA	N	0.002	MCL	N	BSL
	7440-62-2	Vanadium	0.0013	BJ	0.135		mg/L	PZ-4U	4	5	NA	0.001	0.135	NA	NA	N			N	BSL
	7440-66-6	Zinc	0.108		5.35		mg/L	PZ-4U	4	5	NA	0.0013	5.35	NA	NA	N			N	BSL
	18540-29-9	Chromium, hexavalent	0.453		4.07		mg/L	PZ-2U	2	5	0.01	0.25	4.07	NA	NA	C			N	BSL

* = Screened using value for a similar compounc
(1) J = Estimated value
B = Reported value is between Contract Required Detection Limit and Instrument Detection Limi
(2) Maximum detected concentration used for screening
(3) No background soil samples collected.
(4) USEPA, November 2002. OSWER Draft Guidance for Evaluating the Vapor Intrusion to Indoor Air Pathway from Groundwater and Soils (TR = 1E-6; Table 2c). Screening values for non-carcinogens were reduced by a factor of 10 to represent a concentration equivalent to an HI of 0.
(5) ASL = Above screening level ASL indicates that screening concentration exceeds vapor intrusion criterion. COPC will be addressed in risk calculations
BSL = Below screening level
(6) NA = Not applicable
(7) Lowest of the screening values for o-, m- and p-xylene used

TABLE 5-1 (RAGS Part D Table 3.1.RME)
WESTERN AREA SURFACE SOIL (0-2 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe: **Current/Future**
Medium: **Surface Soil (0-2 feet bgs)**
Exposure Medium: **Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL [1]		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
On-site	1,2,3-Trichlorobenzene	mg/kg	17.9	253	U	210		253	mg/kg	Maximum	UCL > Maximum
Surface Soil	1,2,4-Trichlorobenzene	mg/kg	34.6	106	U	480		106	mg/kg	KM (t)	ProUCL 5.0
Particulates	1,4-Dichlorobenzene	mg/kg	30.7	78.5	L	360		78.5	mg/kg	KM (t)	ProUCL 5.0
Volatile Emissions	Benzene	mg/kg	0.88	NA	NA	7.8	J	7.8	mg/kg	Maximum	Only one detection
	Benzo(a)pyrene	mg/kg	0.58	1.11	L	1.6		1.11	mg/kg	KM (Ch)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	0.97	1.78	L	2.2		1.78	mg/kg	KM (Ch)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	0.17	0.2	N	0.45		0.2	mg/kg	KM (t)	ProUCL 5.0
	PCB-1260	mg/kg	0.33	0.86	L	4.2		0.86	mg/kg	KM (t)	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	1.85E-04	3.08E-04	L	1.15E-03		3.08E-04	mg/kg	KM(BCA)	ProUCL 5.0
	Antimony	mg/kg	28.9	52.6	L	202		52.6	mg/kg	KM (t)	ProUCL 5.0
	Arsenic	mg/kg	10.2	8.32	N	17.7		8.32	mg/kg	KM (t)	ProUCL 5.0
	Cobalt	mg/kg	94.8	138	N	221		138	mg/kg	KM (t)	ProUCL 5.0
	Iron	mg/kg	76200	103000	U	198000		103000	mg/kg	Stud. t	ProUCL 5.0
	Lead	mg/kg	4880	48400	U	57300		48400	mg/kg	Cheb	ProUCL 5.0
	Vanadium	mg/kg	651	949	U	1670		949	mg/kg	Stud. t	ProUCL 5.0
	Zinc	mg/kg	3820	38200	U	45300		38200	mg/kg	Cheb	ProUCL 5.0
	Chromium, hexavalent	mg/kg	200	1270	L	3390		1270	mg/kg	KM (Ch)	ProUCL 5.0

(1) U = Undetermined distribution
L = Lognormal distribution
N = Normal distribution
NA = Not applicable. Too few detections to calculate.
(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value.
KM(Ch) = UCL based on Kaplan- Meier estimates using the Chebyshev inequality
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap method
Stud. t = UCL based on the Student's t test.
Cheb = UCL based on estimates using the Chebyshev inequality
(3) Rationale for selection of appropriate EPC:
UCL > Maximum = UCL concentration determined by ProUCL 5.0 exceeded the maximum detected concentration, therefore maximum concentration is used as the EPC.
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC.
Only one detection = One positive detection, therefore maximum detction is used.

TABLE 5-2 (RAGS Part D Table 3.1.CT)
WESTERN AREA SURFACE SOIL (0 TO 2 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
SCCC, INC. SITE, KEARNY, NJ

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL [1]		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
Onsite Surface Soil Particulates Volatile Emissions	1,2,3-Trichlorobenzene	mg/kg	17.9	253	U	210		17.9	mg/kg	Mean	CT
	1,2,4-Trichlorobenzene	mg/kg	34.6	106	U	480		34.6	mg/kg	Mean	CT
	1,4-Dichlorobenzene	mg/kg	30.7	78.5	L	360		30.7	mg/kg	Mean	CT
	Benzene	mg/kg	0.88	NA	NA	7.8	J	0.88	mg/kg	Mean	CT
	Benzo(a)pyrene	mg/kg	0.58	1.11	L	1.6		0.58	mg/kg	Mean	CT
	Benzo(b)fluoranthene	mg/kg	0.97	1.78	L	2.2		0.97	mg/kg	Mean	CT
	Dibenz(a,h)anthracene	mg/kg	0.17	0.2	N	0.45		0.17	mg/kg	Mean	CT
	PCB-1260	mg/kg	0.33	0.86	L	4.2		0.33	mg/kg	Mean	CT
	2,3,7,8-TCDD	mg/kg	1.85E-04	3.08E-04	L	1.15E-03		1.85E-04	mg/kg	Mean	CT
	Antimony	mg/kg	28.9	52.6	L	202		28.9	mg/kg	Mean	CT
	Arsenic	mg/kg	10.2	8.32	N	17.7		10.2	mg/kg	Mean	CT
	Cobalt	mg/kg	94.8	138	N	221		94.8	mg/kg	Mean	CT
	Iron	mg/kg	76200	103000	U	198000		76200	mg/kg	Mean	CT
	Lead	mg/kg	4880	48400	U	57300		4880	mg/kg	Mean	CT
	Vanadium	mg/kg	651	949	U	1670		651	mg/kg	Mean	CT
	Zinc	mg/kg	3820	38200	U	45300		3820	mg/kg	Mean	CT
	Chromium, hexavalent	mg/kg	200	1270	L	3390		200	mg/kg	Mean	CT

(1) U = Undetermined distribution
L = Lognormal distribution
N = Normal distribution
NA = Not applicable. Too few detections to calculate.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CT = Central tendency exposure represents an average exposure, based on typical or average exposure parameters.

TABLE 5-3 (RAGS Part D Table 3.2.RME)
EASTERN AREA SURFACE SOIL (0-2 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL [1]		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
On-site	1,2,4-Trichlorobenzene	mg/kg	31000	223000	U	150000 [4]		150000	mg/kg	Maximum	UCL>Maximum
Surface Soil	1,2-Dichlorobenzene	mg/kg	1450	4560	U	5405 [4]		4560	mg/kg	KM(Ch)	ProUCL 5.0
Particulates	1,3-Dichlorobenzene	mg/kg	386	1140	U	1410 [4]		1140	mg/kg	KM(Ch)	ProUCL 5.0
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	849	1681	U	4840		1681	mg/kg	KM(Ch)	ProUCL 5.0
	Benzo(a)anthracene	mg/kg	12.5	6.9	N	22		6.9	mg/kg	KM(t)	ProUCL 5.0
	Benzo(a)pyrene	mg/kg	9.4	20.4	L	37		20.4	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	16.9	22.4	L	65.8		22.4	mg/kg	KM(t)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	4.37	3.1	L	8.8		3.1	mg/kg	KM(t)	ProUCL 5.0
	Hexachlorobenzene	mg/kg	40.7	83.2	L	359		83.2	mg/kg	KM(BCA)	ProUCL 5.0
	Indeno(1,2,3-cd)pyrene	mg/kg	10.7	13	L	35.9		13	mg/kg	KM(t)	ProUCL 5.0
	Naphthalene	mg/kg	58.2	189	L	448		189	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1248	mg/kg	0.73	1.43	U	2.5		1.43	mg/kg	KM(t)	ProUCL 5.0
	PCB-1254	mg/kg	0.32	0.56	U	1		0.56	mg/kg	Stud.-t	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	0.00041	NA	NA	0.00052		0.00052	mg/kg	Maximum	Only 1 detection
	Chromium, hexavalent	mg/kg	52.4	642	L	195		195	mg/kg	Maximum	UCL>Maximum

(1) U = Undetermined distribution
N = Normal distribution
L = Lognormal distribution
NA = Not applicable. Too few detections to calculate.

(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value
KM(Ch) = UCL based on Kaplan- Meier estimates using the Chebyshev inequality
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap metho
Stud.-t = UCL based on the Student's t test.
Cheb = UCL based on estimates using the Chebyshev inequality

(3) Rationale for selection of appropriate EPC:
UCL > Maximum = UCL concentration determined by ProUCL 5.0 exceeded the maximum detected concentration, therefore maximum concentration is used as the EPC
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC.

(4) Maximum reported in Table 4-3 was in one of a duplicate pair of samples. The value reported reflects the average of the two duplicate results.

TABLE 5-4 (RAGS Part D Table 3.2.CT)
EASTERN AREA SURFACE SOIL (0-2 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Surface Soil (0-2 feet bgs)**
Exposure Medium:	**Surface Soil (0-2 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL [1]		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
On-site	1,2,4-Trichlorobenzene	mg/kg	31000	223000	U	150000 [4]		31000	mg/kg	Mean	CT
Subsurface Soil	1,2-Dichlorobenzene	mg/kg	1450	4560	U	5405 [4]		1450	mg/kg	Mean	CT
Particulates	1,3-Dichlorobenzene	mg/kg	386	1140	U	1410 [4]		386	mg/kg	Mean	CT
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	849	1681	U	4840		849	mg/kg	Mean	CT
	Benzo(a)anthracene	mg/kg	12.5	6.9	N	22		12.5	mg/kg	Mean	CT
	Benzo(a)pyrene	mg/kg	9.4	20.4	L	37		9.4	mg/kg	Mean	CT
	Benzo(b)fluoranthene	mg/kg	16.9	22.4	L	65.8		16.9	mg/kg	Mean	CT
	Dibenz(a,h)anthracene	mg/kg	4.37	3.1	L	8.8		4.37	mg/kg	Mean	CT
	Hexachlorobenzene	mg/kg	40.7	83.2	L	359		40.7	mg/kg	Mean	CT
	Indeno(1,2,3-cd)pyrene	mg/kg	10.7	13	L	35.9		10.7	mg/kg	Mean	CT
	Naphthalene	mg/kg	58.2	189	L	448		58.2	mg/kg	Mean	CT
	PCB-1248	mg/kg	0.73	1.43	U	2.5		0.73	mg/kg	Mean	CT
	PCB-1254	mg/kg	0.32	0.56	U	1		0.32	mg/kg	Mean	CT
	2,3,7,8-TCDD	mg/kg	0.00041	NA	NA	0.00052		0.00041	mg/kg	Mean	CT
	Chromium, hexavalent	mg/kg	52.4	642	N	195		52.4	mg/kg	Mean	CT

(1) U = Undetermined distribution
N = Normal distribution
L = Lognormal distriburion
NA = Not applicable. Too few detections to calculate.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CT = Central tendency exposure represents an average exposure, based on typical or average exposure parameters.

TABLE 5-5 (RAGS Part D Table 3.3.RME)
WESTERN AREA SUBSURFACE SOIL (0-10 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (1)		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Subsurface Soil Particulates Volatile Emissions	1,2,3-Trichlorobenzene	mg/kg	18.6	218	NA	210		210	mg/kg	Maximum	UCL>Maximum
	1,2,4-Trichlorobenzene	mg/kg	71.1	161	L	1300		161	mg/kg	KM(t)	ProUCL 5.0
	1,2-Dichlorobenzene	mg/kg	333	606	L	3300		606	mg/kg	KM(BCA)	ProUCL 5.0
	1,3-Dichlorobenzene	mg/kg	330	631	L	3300		631	mg/kg	KM(BCA)	ProUCL 5.0
	1,4-Dichlorobenzene	mg/kg	383	730	L	5200		730	mg/kg	KM(BCA)	ProUCL 5.0
	Benzene	mg/kg	4.24	25.3	U	110	J	25.3	mg/kg	KM(Ch)	ProUCL 5.0
	Chlorobenzene	mg/kg	41	189	L	630		189	mg/kg	KM(Ch)	ProUCL 5.0
	Ethylbenzene	mg/kg	9.6	95	U	450		95	mg/kg	KM(Ch)	ProUCL 5.0
	m,p-Xylenes	mg/kg	123	NA	NA	1700		1700	mg/kg	Maximum	Only one detection
	o-Xylene	mg/kg	44	NA	NA	600		600	mg/kg	Maximum	Only one detection
	1,1'-Biphenyl	mg/kg	1.31	17.4	U	22		17.4	mg/kg	KM(Ch)	ProUCL 5.0
	1,2,4,5-Tetrachlorobenzene	mg/kg	17.9	44.4	U	210		44.4	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(a)anthracene	mg/kg	6.26	40.2	L	87		40.2	mg/kg	KM(Ch)	ProUCL 5.0
	Benzo(a)pyrene	mg/kg	5.5	35.8	L	82		35.8	mg/kg	KM(Ch)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	5.06	27.5	L	58		27.5	mg/kg	KM(Ch)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	0.43	0.79	L	4.9		0.79	mg/kg	KM(BCA)	ProUCL 5.0
	Indeno(1,2,3-cd)pyrene	mg/kg	4.02	23.4	L	54		23.4	mg/kg	KM(Ch)	ProUCL 5.0
	Naphthalene	mg/kg	5.57	45.4	L	110		45.4	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1254	mg/kg	0.12	0.42	NA	0.63		0.42	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1260	mg/kg	0.29	0.55	U	4.2		0.55	mg/kg	KM(t)	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	4.96E-04	1.27E-03	L	4.15E-03		1.27E-03	mg/kg	KM(Ch)	ProUCL 5.0
	Antimony	mg/kg	25	37.4	L	202		37.4	mg/kg	KM(t)	ProUCL 5.0
	Arsenic	mg/kg	15	16.8	L	54.9		16.8	mg/kg	KM(BCA)	ProUCL 5.0
	Cobalt	mg/kg	72.3	162	L	221		162	mg/kg	KM(Ch)	ProUCL 5.0
	Iron	mg/kg	62600	84800	NA	198000		84800	mg/kg	Stud. t	ProUCL 5.0
	Lead	mg/kg	3440	15800	L	57300		15800	mg/kg	Cheb	ProUCL 5.0
	Thallium	mg/kg	7.34	1.39	NA	1.7		1.39	mg/kg	KM(t)	ProUCL 5.0
	Vanadium	mg/kg	495	1080	L	1670		1080	mg/kg	AG	ProUCL 5.0
	Zinc	mg/kg	2700	12500	U	45300		12500	mg/kg	Cheb	ProUCL 5.0
	Chromium, hexavalent	mg/kg	739	2280	U	11000		2280	mg/kg	KM(Ch)	ProUCL 5.0

(1) U = Undetermined distribution
L = Lognormal distribution
G = Gamma distribution
N = Normal distribution
NA = Not applicable. Too few detections to calculate.

(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(Ch) = UCL based on Kaplan-Meier estimates using the Chebyshev inequalit
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap metho
Stud. t = UCL based on the Student's t test.
Cheb = UCL based on estimates using the Chebyshev inequalit
AG = Adjusted gamma 95% UCL

(3) Rationale for selection of appropriate EPC:
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC.
Only one detection =One positive detection, therefore maximum detection is used

TABLE 5-6 (RAGS Part D Table 3.3.CT)
WESTERN AREA SUBSURFACE SOIL (0 TO 10 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (1)		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site	1,2,3-Trichlorobenzene	mg/kg	18.6	218	NA	210		18.6	mg/kg	Mean	CT
Surface Soil	1,2,4-Trichlorobenzene	mg/kg	71.1	161	L	1300		71.1	mg/kg	Mean	CT
Particulates	1,2-Dichlorobenzene	mg/kg	333	606	L	3300		333	mg/kg	Mean	CT
Volatile Emissions	1,3-Dichlorobenzene	mg/kg	330	631	L	3300		330	mg/kg	Mean	CT
	1,4-Dichlorobenzene	mg/kg	383	730	L	5200		383	mg/kg	Mean	CT
	Benzene	mg/kg	4.24	25.3	U	110	J	4.24	mg/kg	Mean	CT
	Chlorobenzene	mg/kg	41	189	L	630		41	mg/kg	Mean	CT
	Ethylbenzene	mg/kg	9.6	95	U	450		9.6	mg/kg	Mean	CT
	m,p-Xylenes	mg/kg	123	NA	NA	1700		123	mg/kg	Mean	CT
	o-Xylene	mg/kg	44	NA	NA	600		44	mg/kg	Mean	CT
	1,1'-Biphenyl	mg/kg	1.31	17.4	U	22		1.31	mg/kg	Mean	CT
	1,2,4,5-Tetrachlorobenzene	mg/kg	17.9	44.4	U	210		17.9	mg/kg	Mean	CT
	Benzo(a)anthracene	mg/kg	6.26	40.2	L	87		6.26	mg/kg	Mean	CT
	Benzo(a)pyrene	mg/kg	5.5	35.8	L	82		5.5	mg/kg	Mean	CT
	Benzo(b)fluoranthene	mg/kg	5.06	27.5	L	58		5.06	mg/kg	Mean	CT
	Dibenz(a,h)anthracene	mg/kg	0.43	0.79	L	4.9		0.43	mg/kg	Mean	CT
	Indeno(1,2,3-cd)pyrene	mg/kg	4.02	23.4	L	54		4.02	mg/kg	Mean	CT
	Naphthalene	mg/kg	5.57	45.4	L	110		5.57	mg/kg	Mean	CT
	PCB-1254	mg/kg	0.12	0.42	NA	0.63		0.12	mg/kg	Mean	CT
	PCB-1260	mg/kg	0.29	0.55	U	4.2		0.29	mg/kg	Mean	CT
	2,3,7,8-TCDD	mg/kg	4.96E-04	1.27E-03	L	4.15E-03		4.96E-04	mg/kg	Mean	CT
	Antimony	mg/kg	25	37.4	L	202		25	mg/kg	Mean	CT
	Arsenic	mg/kg	15	16.8	L	54.9		15	mg/kg	Mean	CT
	Cobalt	mg/kg	72.3	162	L	221		72.3	mg/kg	Mean	CT
	Iron	mg/kg	62600	84800	NA	198000		62600	mg/kg	Mean	CT
	Lead	mg/kg	3440	15800	L	57300		3440	mg/kg	Mean	CT
	Thallium	mg/kg	7.34	1.39	NA	1.7		7.34	mg/kg	Mean	CT
	Vanadium	mg/kg	495	1080	L	1670		495	mg/kg	Mean	CT
	Zinc	mg/kg	2700	12500	U	45300		2700	mg/kg	Mean	CT
	Chromium, hexavalent	mg/kg	739	2280	U	11000		739	mg/kg	Mean	CT

(1) U = Undetermined distribution
L = Lognormal distribution
G = Gamma distribution
N = Normal distribution
NA = Not applicable. Too few detections to calculate.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CT = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 5-7 (RAGS Part D Table 3.4.RME)
EASTERN AREA SUBSURFACE SOIL (0-10 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL [1]		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic [2]	Rationale [3]
On-site	1,2,4-Trichlorobenzene	mg/kg	20700	70200	L	150000 [4]	J	70200	mg/kg	KM(Ch)	ProUCL 5.0
Subsurface Soil	1,2-Dichlorobenzene	mg/kg	969	1860	L	5405 [4]		1860	mg/kg	KM(BCA)	ProUCL 5.0
Particulates	1,3-Dichlorobenzene	mg/kg	258	484	L	1410 [4]		484	mg/kg	KM(BCA)	ProUCL 5.0
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	554	1200	L	4840		1200	mg/kg	KM(BCA)	ProUCL 5.0
	Benzo(a)anthracene	mg/kg	9.8	4.9	U	22		4.9	mg/kg	KM(t)	ProUCL 5.0
	Benzo(a)pyrene	mg/kg	7.4	16.2	L	37		16.2	mg/kg	KM(Ch)	ProUCL 5.0
	Benzo(b)fluoranthene	mg/kg	13.3	27.1	G	65.8		27.1	mg/kg	KM(Ch)	ProUCL 5.0
	Dibenz(a,h)anthracene	mg/kg	3.5	2.3	U	8.8		2.3	mg/kg	KM(t)	ProUCL 5.0
	Hexachlorobenzene	mg/kg	31.5	61.2	L	359		61.2	mg/kg	KM(t)	ProUCL 5.0
	Indeno(1,2,3-cd)pyrene	mg/kg	8.4	10	G	35.9		10	mg/kg	KM(t)	ProUCL 5.0
	Naphthalene	mg/kg	149	1100	L	2000		1100	mg/kg	KM(Ch)	ProUCL 5.0
	PCB-1248	mg/kg	0.43	0.85	U	2.5		0.85	mg/kg	KM(t)	ProUCL 5.0
	PCB-1254	mg/kg	0.19	0.34	L	1		0.34	mg/kg	KM(t)	ProUCL 5.0
	2,3,7,8-TCDD	mg/kg	0.00028	1.58E-04	L	0.00052		1.58E-04	mg/kg	KM(t)	ProUCL 5.0
	Arsenic	mg/kg	5.2	NA	NA	9.8	B	9.8	mg/kg	Maximum	Only two detections
	Cobalt	mg/kg	72	120	N	126		120	mg/kg	Stud.-t	ProUCL 5.0
	Iron	mg/kg	47300	65200	N	72100		65200	mg/kg	Stud.-t	ProUCL 5.0
	Thallium	mg/kg	5.8	9.3	N	9.4		9.3	mg/kg	KM(t)	ProUCL 5.0
	Vanadium	mg/kg	503	1000	N	1390		1000	mg/kg	Stud.-t	ProUCL 5.0
	Chromium, hexavalent	mg/kg	1270	2250	N	3820		2250	mg/kg	KM(t)	ProUCL 5.0

(1) U = Undetermined distribution
L = Lognormal distribution
G = Gamma distribution
N = Normal distribution
NA = Not applicable. Too few detections to calculate

(2) Statistical tests used to determine UCL:
Maximum = maximum detected concentration
KM(t) = UCL based on Kaplan-Meier estimates using the Student's t-distribution cutoff value.
KM(Ch) = UCL based on Kaplan- Meier estimates using the Chebyshev inequality
KM(BCA) = UCL based on Kaplan-Meier estimates using the bias-corrected bootstrap method
Stud.-t = UCL based on the Student's t test

(3) Rationale for selection of appropriate EPC:
ProUCL 5.0 = The best fit, based on multiple goodness of fit tests performed by ProUCL 5.0, is selected as the EPC
Only two detections =Two positive detections, therefore maximum detection is used

(4) Maximum reported in Table 4-3 was in one of a duplicate pair of samples. The value reported reflects the average of the two duplicate result

TABLE 5-8 (RAGS Part D Table 3.4.CT)
EASTERN AREA SUBSURFACE SOIL (0 TO 10 FEET) - EXPOSURE POINT CONCENTRATION SUMMARY
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Subsurface Soil (0-10 feet bgs)**
Exposure Medium:	**Subsurface Soil (0-10 feet bgs)**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL (1)		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site	1,2,4-Trichlorobenzene	mg/kg	20700	70200	L	150000 (4)	J	20700	mg/kg	Mean	CT
Subsurface Soil	1,2-Dichlorobenzene	mg/kg	969	1860	L	5405 (4)		969	mg/kg	Mean	CT
Particulates	1,3-Dichlorobenzene	mg/kg	258	484	L	1410 (4)		258	mg/kg	Mean	CT
Volatile Emissions	1,4-Dichlorobenzene	mg/kg	554	1200	L	4840		554	mg/kg	Mean	CT
	Benzo(a)anthracene	mg/kg	9.8	4.9	U	22		9.8	mg/kg	Mean	CT
	Benzo(a)pyrene	mg/kg	7.4	16.2	L	37		7.4	mg/kg	Mean	CT
	Benzo(b)fluoranthene	mg/kg	13.3	27.1	G	65.8		13.3	mg/kg	Mean	CT
	Dibenz(a,h)anthracene	mg/kg	3.5	2.3	U	8.8		3.5	mg/kg	Mean	CT
	Hexachlorobenzene	mg/kg	31.5	61.2	L	359		31.5	mg/kg	Mean	CT
	Indeno(1,2,3-cd)pyrene	mg/kg	8.4	10	G	35.9		8.4	mg/kg	Mean	CT
	Naphthalene	mg/kg	149	1100	L	2000		149	mg/kg	Mean	CT
	PCB-1248	mg/kg	0.43	0.85	U	2.5		0.43	mg/kg	Mean	CT
	PCB-1254	mg/kg	0.19	0.34	L	1		0.19	mg/kg	Mean	CT
	2,3,7,8-TCDD	mg/kg	0.00028	1.58E-04	L	0.00052		0.00028	mg/kg	Mean	CT
	Arsenic	mg/kg	5.2	NA	NA	9.8	B	5.2	mg/kg	Mean	CT
	Cobalt	mg/kg	72	120	N	126		72	mg/kg	Mean	CT
	Iron	mg/kg	47300	65200	N	72100		47300	mg/kg	Mean	CT
	Thallium	mg/kg	5.8	9.3	N	9.4		5.8	mg/kg	Mean	CT
	Vanadium	mg/kg	503	1000	N	1390		503	mg/kg	Mean	CT
	Chromium, hexavalent	mg/kg	1270	2250	N	3820		1270	mg/kg	Mean	CT

(1) U = Undetermined distribution
L = Lognormal distribution
G = Gamma distribution
N = Normal distribution
NA = Not applicable. Too few detections to calculate.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CT = Central tendency exposure represents an average exposure, based on typical or average exposure parameters.
(4) Maximum reported in Table 4-3 was in one of a duplicate pair of samples. The value reported reflects the average of the two duplicate results.

TABLE 5-9 (RAGS Part D Table 3.5.RME)
WESTERN AREA SHALLOW (FILL UNIT) GROUNDWATER - EXPOSURE POINT CONCENTRATION SUMMARY FOR DIRECT CONTACT
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Western Groundwater**
Exposure Medium:	**Groundwater**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Groundwater	1,2,4-Trichlorobenzene	mg/L	0.00054	--	U	0.00089	J	0.00089	mg/L	Maximum	Only 4 samples
	1,2-Dichlorobenzene	mg/L	0.0004	--	U	0.01		0.01	mg/L	Maximum	Only 4 samples
	1,3-Dichlorobenzene	mg/L	0.00018	--	U	0.0034	J	0.0034	mg/L	Maximum	Only 4 samples
	1,4-Dichlorobenzene	mg/L	0.0023	--	U	0.0044	J	0.0044	mg/L	Maximum	Only 4 samples
	Benzene	mg/L	0.024	--	U	0.085		0.085	mg/L	Maximum	Only 4 samples
	Chlorobenzene	mg/L	0.083	--	U	0.32		0.32	mg/L	Maximum	Only 4 samples
	Ethylbenzene	mg/L	0.0029	--	U	0.01		0.01	mg/L	Maximum	Only 4 samples
	Xylene (total)	mg/L	0.012	--	U	0.039		0.039	mg/L	Maximum	Only 4 samples
	1,1'-Biphenyl	mg/L	0.0075	--	U	0.028		0.028	mg/L	Maximum	Only 4 samples
	2-Methylnaphthalene	mg/L	0.15	--	U	0.59		0.59	mg/L	Maximum	Only 4 samples
	Acenaphthene	mg/L	0.017	--	U	0.061		0.061	mg/L	Maximum	Only 4 samples
	Naphthalene	mg/L	1.25	--	U	5		5	mg/L	Maximum	Only 4 samples
	Aluminum	mg/L	0.78	--	U	1.75		1.75	mg/L	Maximum	Only 4 samples
	Antimony	mg/L	0.0033	--	U	0.0044	B	0.0044	mg/L	Maximum	Only 4 samples
	Arsenic	mg/L	0.0058	--	U	0.016		0.016	mg/L	Maximum	Only 4 samples
	Barium	mg/L	0.21	--	U	0.352	J	0.352	mg/L	Maximum	Only 4 samples
	Cadmium	mg/L	0.00034	--	U	0.00067	B	0.00067	mg/L	Maximum	Only 4 samples
	Chromium	mg/L	1.24	--	U	4.69		4.69	mg/L	Maximum	Only 4 samples
	Cobalt	mg/L	0.0012	--	U	0.0028	B	0.0028	mg/L	Maximum	Only 4 samples
	Iron	mg/L	14	--	U	46.1		46.1	mg/L	Maximum	Only 4 samples
	Lead	mg/L	0.011	--	U	0.0377		0.0377	mg/L	Maximum	Only 4 samples
	Manganese	mg/L	0.31	--	U	0.701		0.701	mg/L	Maximum	Only 4 samples
	Mercury	mg/L	0.000076	--	U	0.00012	B	0.00012	mg/L	Maximum	Only 4 samples
	Thallium	mg/L	0.0032	--	U	0.0036	BJ	0.0036	mg/L	Maximum	Only 4 samples
	Vanadium	mg/L	0.015	--	U	0.0487		0.0487	mg/L	Maximum	Only 4 samples
	Zinc	mg/L	0.54	--	U	1.94		1.94	mg/L	Maximum	Only 4 samples
	Chromium, hexavalent	mg/L	1.08	--	U	4.07		4.07	mg/L	Maximum	Only 4 samples

(1) U = Undetermined distribution - Only 4 data points. Distribution not determined.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
Only four samples. Distribution not estimated. Maximum used for EPC

TABLE 5-10 (RAGS Part D Table 3.5.CT)
WESTERN AREA SHALLOW (FILL UNIT) GROUNDWATER - EXPOSURE POINT CONCENTRATION SUMMARY FOR DIRECT CONTACT
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Western Groundwater**
Exposure Medium:	**Groundwater**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site Groundwater	1,2,4-Trichlorobenzene	mg/L	0.00054	--	U	0.00089	J	0.00054	mg/L	Mean	Only 4 samples
	1,2-Dichlorobenzene	mg/L	0.0004	--	U	0.01		0.0004	mg/L	Mean	Only 4 samples
	1,3-Dichlorobenzene	mg/L	0.00018	--	U	0.0034	J	0.00018	mg/L	Mean	Only 4 samples
	1,4-Dichlorobenzene	mg/L	0.0023	--	U	0.0044	J	0.0023	mg/L	Mean	Only 4 samples
	Benzene	mg/L	0.024	--	U	0.085		0.024	mg/L	Mean	Only 4 samples
	Chlorobenzene	mg/L	0.083	--	U	0.32		0.083	mg/L	Mean	Only 4 samples
	Ethylbenzene	mg/L	0.0029	--	U	0.01		0.0029	mg/L	Mean	Only 4 samples
	Xylene (total)	mg/L	0.012	--	U	0.039		0.012	mg/L	Mean	Only 4 samples
	1,1'-Biphenyl	mg/L	0.0075	--	U	0.028		0.0075	mg/L	Mean	Only 4 samples
	2-Methylnaphthalene	mg/L	0.15	--	U	0.59		0.15	mg/L	Mean	Only 4 samples
	Acenaphthene	mg/L	0.017	--	U	0.061		0.017	mg/L	Mean	Only 4 samples
	Naphthalene	mg/L	1.25	--	U	5		1.25	mg/L	Mean	Only 4 samples
	Aluminum	mg/L	0.78	--	U	1.75		0.78	mg/L	Mean	Only 4 samples
	Antimony	mg/L	0.0033	--	U	0.0044	B	0.0033	mg/L	Mean	Only 4 samples
	Arsenic	mg/L	0.0058	--	U	0.016		0.0058	mg/L	Mean	Only 4 samples
	Barium	mg/L	0.21	--	U	0.352	J	0.21	mg/L	Mean	Only 4 samples
	Cadmium	mg/L	0.00034	--	U	0.00067	B	0.00034	mg/L	Mean	Only 4 samples
	Chromium	mg/L	1.24	--	U	4.69		1.24	mg/L	Mean	Only 4 samples
	Cobalt	mg/L	0.0012	--	U	0.0028	B	0.0012	mg/L	Mean	Only 4 samples
	Iron	mg/L	14	--	U	46.1		14	mg/L	Mean	Only 4 samples
	Lead	mg/L	0.011	--	U	0.0377		0.011	mg/L	Mean	Only 4 samples
	Manganese	mg/L	0.31	--	U	0.701		0.31	mg/L	Mean	Only 4 samples
	Mercury	mg/L	0.000076	--	U	0.00012	B	0.000076	mg/L	Mean	Only 4 samples
	Thallium	mg/L	0.0032	--	U	0.0036	BJ	0.0032	mg/L	Mean	Only 4 samples
	Vanadium	mg/L	0.015	--	U	0.0487		0.015	mg/L	Mean	Only 4 samples
	Zinc	mg/L	0.54	--	U	1.94		0.54	mg/L	Mean	Only 4 samples
	Chromium, hexavalent	mg/L	1.08	--	U	4.07		1.08	mg/L	Mean	Only 4 samples

(1) U = Undetermined distribution - Only 4 data points. Distribution not determined.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
Only four samples. Distribution not estimated. Mean used for EPC

TABLE 5-11 (RAGS Part D Table 3.5.RME)
EASTERN AREA SHALLOW (FILL UNIT) GROUNDWATER - EXPOSURE POINT CONCENTRATION SUMMARY FOR DIRECT CONTACT
REASONABLE MAXIMUM EXPOSURE AND CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Eastern Groundwater**
Exposure Medium:	**Groundwater**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
On-site	1,2,4-Trichlorobenzene	mg/L	NA	--	U	0.0041	J	0.0041	mg/L	Maximum	Only 1 sample
Groundwater	1,2-Dichlorobenzene	mg/L	NA	--	U	0.0042	J	0.0042	mg/L	Maximum	Only 1 sample
	1,3-Dichlorobenzene*	mg/L	NA	--	U	0.0026	J	0.0026	mg/L	Maximum	Only 1 sample
	1,4-Dichlorobenzene	mg/L	NA	--	U	0.0044	J	0.0044	mg/L	Maximum	Only 1 sample
	Chlorobenzene	mg/L	NA	--	U	0.017		0.017	mg/L	Maximum	Only 1 sample
	Benzo(a)anthracene	mg/L	NA	--	U	0.0023	J	0.0023	mg/L	Maximum	Only 1 sample
	Benzo(a)pyrene	mg/L	NA	--	U	0.0022	J	0.0022	mg/L	Maximum	Only 1 sample
	Benzo(b)fluoranthene	mg/L	NA	--	U	0.0038	J	0.0038	mg/L	Maximum	Only 1 sample
	Indeno(1,2,3-cd)pyrene	mg/L	NA	--	U	0.0017		0.0017	mg/L	Maximum	Only 1 sample
	Naphthalene	mg/L	NA	--	U	0.021		0.021	mg/L	Maximum	Only 1 sample
	Aluminum	mg/L	NA	--	U	2.91	J	2.91	mg/L	Maximum	Only 1 sample
	Barium	mg/L	NA	--	U	0.0123	B	0.0123	mg/L	Maximum	Only 1 sample
	Cadmium	mg/L	NA	--	U	0.002	B	0.002	mg/L	Maximum	Only 1 sample
	Chromium	mg/L	NA	--	U	3.65		3.65	mg/L	Maximum	Only 1 sample
	Cobalt	mg/L	NA	--	U	0.0066	B	0.0066	mg/L	Maximum	Only 1 sample
	Iron	mg/L	NA	--	U	6.55		6.55	mg/L	Maximum	Only 1 sample
	Lead	mg/L	NA	--	U	0.0155		0.0155	mg/L	Maximum	Only 1 sample
	Manganese	mg/L	NA	--	U	0.071		0.071	mg/L	Maximum	Only 1 sample
	Mercury	mg/L	NA	--	U	0.00011	B	0.00011	mg/L	Maximum	Only 1 sample
	Nickel	mg/L	NA	--	U	0.0317	B	0.0317	mg/L	Maximum	Only 1 sample
	Vanadium	mg/L	NA	--	U	0.135		0.135	mg/L	Maximum	Only 1 sample
	Zinc	mg/L	NA	--	U	5.35		5.35	mg/L	Maximum	Only 1 sample
	Chromium, hexavalent	mg/L	NA	--	U	0.453		0.453	mg/L	Maximum	Only 1 sample

(1) U = Undetermined distribution - Only 4 data points. Distribution not determined.
(2) Statistical tests used to determine UCL:
NA - Only one sample. Maximum concentration used for both CT and RME exposures
(3) Rationale for selection of appropriate EPC:
Only four samples. Distribution not estimated. Maximum used for EPC

TABLE 5-12 (RAGS Part D Table 3.6.RME)
EXPOSURE POINT CONCENTRATION SUMMARY FOR VAPOR INTRUSION FROM SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Indoor Air**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
Indoor Air	Benzene	mg/L	0.02	--	U	0.085		0.085	mg/L	Maximum	Only 5 samples
	Chlorobenzene	mg/L	0.07	--	U	0.32		0.32	mg/L	Maximum	Only 5 samples
	2-Methylnaphthalene	mg/L	0.12	--	U	0.59		0.59	mg/L	Maximum	Only 5 samples
	Naphthalene	mg/L	1	--	U	5		5	mg/L	Maximum	Only 5 samples

(1) U = Undetermined distribution - Only 5 data points. Distribution not determined
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
Maximum used for EPC. Only 5 samples collected.

TABLE 5-13 (RAGS Part D Table 3.6.CT)
EXPOSURE POINT CONCENTRATION SUMMARY FOR VAPOR INTRUSION FROM SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Indoor Air**

Exposure Point	Chemical of Potential Concern	Units	Arithmetic Mean	95% UCL		Maximum Concentration		Exposure Point Concentration			
				Value	Distribution (1)	Value	Qualifier	Value	Units	Statistic (2)	Rationale (3)
Indoor Air	Benzene	mg/L	0.02	--	U	0.085		0.02	mg/L	Mean	CT
	Chlorobenzene	mg/L	0.07	--	U	0.32		0.07	mg/L	Mean	CT
	2-Methylnaphthalene	mg/L	0.12	--	U	0.59		0.12	mg/L	Mean	CT
	Naphthalene	mg/L	1	--	U	5		1	mg/L	Mean	CT

(1) U = Undetermined distribution - Only 5 data points. Distribution not determined.
(2) Statistical tests used to determine UCL:
Mean = arithmetic average concentration of hits and nondetects
(3) Rationale for selection of appropriate EPC:
CT = Central tendency exposure represents an average exposure, based on typical or average exposure parameters

TABLE 5-14 (RAGS Part D Table 4.1.RME)
CURRENT/FUTURE SURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	200	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	100	days/yr	Assume 2 days/week	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Dermal Contact	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.1	mg/cm^2	95th percentile for groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 5.5.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	100	days/yr	Assume 2 days/week	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Inhalation	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	100	days/yr	Assume 2 days/week	
				ED	Exposure Duration	25	yr	USEPA, December 1989	CA(mg/m^3) = CS x (1/VF + 1/PEF)
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	219000	hours	USEPA, January 2009	

TABLE 5-14 (RAGS Part D Table 4.1.RME)
CURRENT/FUTURE SURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	200	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Dermal Contact	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.1	mg/cm^2	95th percentile, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 5.5.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	3300	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA,December 1989	
Inhalation	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	CA(mg/m^3) = CS x (1/VF + 1/PEF)
				ET	Exposure Time	4	hr/day	Based on job duties	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	219000	hours	USEPA, January 2009	

TABLE 5-14 (RAGS Part D Table 4.1.RME)
CURRENT/FUTURE SURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [(1)]
Ingestion	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	NA	Intake (mg/kg/day) = $CS \times IR_s \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$
				IR_s	Soil Ingestion Rate	200	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Assumes 75% of soil ingestion during the day occurs during working hours	
				EF	Exposure Frequency	225	days/yr	Outdoor Worker, USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA, December 1989	
Dermal Contact	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	See Table 3.1	Dermally Absorbed Dose (DAD) (mg/kg/day) = $Da_{event} \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$ where $Da_{event} = CS \times CF \times AF \times ABS$
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.1	mg/cm^2	95th percentile, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 5.5.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	Outdoor Worker, USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	9125	days	USEPA, December 1989	
Inhalation	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-1 See Table 5-3	mg/kg	See Table 3.1	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	225	days/yr	Outdoor Worker, USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	$CA(mg/m^3) = CS \times (1/VF + 1/PEF)$
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	219000	hours	USEPA, January 2009	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA/540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 5-15 (RAGS Part D Table 4.1.CT)
CURRENT/FUTURE SURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [(1)]
Ingestion	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	50	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.5	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	50	days/yr	Assume 1 day/week	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2102	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	
Dermal Contact	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.02	mg/cm^2	Geometric Mean for Groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	50	days/yr	Assume 1 day/week	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	
Inhalation	Onsite Visitor	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	50	days/yr	Assume 1 day/week	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	CA(mg/m^3) = CS x (1/VF + 1/PEF)
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	43800	hours	USEPA, January 2009	

TABLE 5-15 (RAGS Part D Table 4.1.CT)
CURRENT/FUTURE SURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [(1)]
Ingestion	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	50	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.5	unitless	Assumes 50% of soil ingestion occurs on site during non-invasive activities	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	
Dermal Contact	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.02	mg/cm^2	Geometric Mean for Groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA,December 1989	
Inhalation	HCTS Operator	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	CA(mg/m^3) = CS x (1/VF + 1/PEF)
				ET	Exposure Time	2	hr/day	Conservative, based on job duties	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	43800	hours	USEPA, January 2009	

TABLE 5-15 (RAGS Part D Table 4.1.CT)
CURRENT/FUTURE SURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Medium:	**Surface Soil**
Exposure Medium:	**Surface Soil**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	50	mg soil/day	USEPA, September 2011	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	0.75	unitless	Assumes 75% of soil ingestion during the day occurs during working hours	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	
Dermal Contact	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.02	mg/cm^2	Geometric Mean for Groundskeepers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USPEA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USPEA, September 2011	
				AT-N	Averaging Time - Non-Cancer	1825	days	USEPA, December 1989	
Inhalation	Outdoor Industrial Worker	Adult	Onsite Surface Soil	CS	Chemical Concentration in Soil	See Table 5-2 See Table 5-4	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	225	days/yr	USEPA, December 2002	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	CA(mg/m^3) = CS x (1/VF + 1/PEF)
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	43800	hours	USEPA, January 2009	

Bureau of Labor Statistics, 2012. Employer Tenure Summary, http://www.bls.gov/news.release/tenure.nr0.htm
USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA 540/1-89/002
USEPA, January 2009. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part F). EPA-540-R-070-002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 5-16 (RAGS Part D Table 4.2.RME)
FUTURE SURFACE AND SUBSURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Construction Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 5-5 See Table 5-7	mg/kg	NA	Intake (mg/kg/day) = $CS \times IR_S \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$
				IR_S	Soil Ingestion Rate	330	mg soil/day	USEPA December 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal Contact	Construction Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 5-5 See Table 5-7	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = $Da_{event} \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$ where $Da_{event} = CS \times CF \times AF \times ABS$
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.8	mg/cm^2	95th percentile for construction and utility workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Inhalation	Construction Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 5-5 See Table 5-7	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	$CA(mg/m^3) = CS \times (1/VF + 1/PEF)$
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	8760	hours	USEPA, January 2009	

TABLE 5-16 (RAGS Part D Table 4.2.RME)
FUTURE SURFACE AND SUBSURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Utility Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 5-5 See Table 5-7	mg/kg	NA	Intake (mg/kg/day) = $CS \times IR_s \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$
				IR_s	Soil Ingestion Rate	330	mg soil/day	USEPA December 2002	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal Contact	Utility Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 5-5 See Table 5-7	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = $Da_{event} \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$ where $Da_{event} = CS \times CF \times AF \times ABS$
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.8	mg/cm^2	95th percentile for construction and utility workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Inhalation	Utility Worker	Adult	On-site Soil	CS	Chemical Concentration in Soil	See Table 5-5 See Table 5-7	mg/kg	NA	Exp. Conc. (mg/m^3) = $CA \times ET \times EF \times ED \times 1/AT$
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	$CA(mg/m^3) = CS \times (1/VF + 1/PEF)$
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	70080	hours	USEPA, January 2009	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA 540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 5-17 (RAGS Part D Table 4.2.CT)
FUTURE SURFACE AND SUBSURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference (1)	Intake Equation/ Model Name (1)
Ingestion	Construction Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 5-6 See Table 5-8	mg/kg	NA	Intake (mg/kg/day) = $CS \times IR_s \times CF \times FI \times EF \times ED \times 1/BW \times 1/AT$
				IR_s	Soil Ingestion Rate	100	mg soil/day	USEPA, November 2013	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal Contact	Construction Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 5-6 See Table 5-8	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = $CS \times CF \times AF \times ABS \times EF \times ED \times EV \times SA \times 1/BW \times 1/AT$
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.2	mg/cm^2	Geometric Mean for Construction and Utility Workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Inhalation	Construction Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 5-6 See Table 5-8	mg/kg	NA	Exp. Conc. (mg/m^3) = $CA \times ET \times EF \times ED \times 1/AT$
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	$CA(mg/m^3) = CS \times (1/VF + 1/PEF)$
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	8760	hours	USEPA, January 2009	

TABLE 5-17 (RAGS Part D Table 4.2.CT)
FUTURE SURFACE AND SUBSURFACE SOIL EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe: Future
Medium: Surface and Subsurface Soil
Exposure Medium: Surface and Subsurface Soil

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference (1)	Intake Equation/ Model Name (1)
Ingestion	Utility Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 5-6 See Table 5-8	mg/kg	NA	Intake (mg/kg/day) = CS x IR_s x CF x FI x EF x ED x 1/BW x 1/AT
				IR_s	Soil Ingestion Rate	100	mg soil/day	USEPA, November 2013	
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				FI	Fraction Ingested from Source	1	unitless	Conservative Assumption	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal Contact	Utility Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 5-6 See Table 5-8	mg/kg	NA	Dermally Absorbed Dose (DAD) (mg/kg/day) = CS x CF x AF x ABS x EF x ED x EV x SA x 1/BW x 1/AT
				CF	Conversion Factor	1.00E-06	kg/mg	NA	
				AF	Adherence Factor of Soil to Skin	0.2	mg/cm^2	Geometric Mean for Construction and Utility Workers, USEPA, July 2004	
				ABS	Dermal Absorption Fraction	Chemical-Specific See Section 6.2.2	unitless	USEPA, July 2004	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				EV	Event Frequency	1	event/day	USEPA, July 2004	
				SA	Skin Surface Area Available for Contact	6840	cm^2	Assumes head, hands, arms and legs; USEPA, September 2011	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Inhalation	Utility Worker	Adult	Onsite Soil	CS	Chemical Concentration in Soil	See Table 5-6 See Table 5-8	mg/kg	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				CA	Chemical Concentration in Air	Calculated	mg/m^3	USEPA, January 2009	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	CA(mg/m^3) = CS x (1/VF + 1/PEF)
				ET	Exposure Time	8	hr/day	Assumed	
				VF	Volatilization Factor	Chemical-specific	m^3/kg	USEPA, November 2013	
				PEF	Particulate Emission Factor	1.40E+09	m^3/kg	Default value;USEPA, November 2013	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	8760	hours	USEPA, January 2009	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/002
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-24
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA 540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F
USEPA, November 2013. User's Guide - Regional Screening Table. <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>

TABLE 5-18 (RAGS Part D Table 4.3.RME)
FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Construction Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 5-9 See Table 5-11	mg/L	NA	Intake (mg/kg/day) = CW x IR_w x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.27	L/day	Assume 10% of the 95th percentile ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Construction Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Water	See Table 5-9 See Table 5-11	mg/cm^3	NA	
				SA	Skin Surface Area	5300	cm^2	USEPA, September 2011; Assumes hands and arms	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	130	days/yr	Assumes 6 month construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then Da_{event} = 2FA x K_p x CW x SQRT(6τevent x tevent/π)
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	If $t_{event} > t^*$, then Da_{event} = FA x K_p x CW
				t_{event}	Event Duration	8	hours	Assume 8 hours/day	B)2)
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

TABLE 5-18 (RAGS Part D Table 4.3.RME)
FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Utility Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 5-9 See Table 5-11	mg/L	NA	Intake (mg/kg/day) = CW x IR_w x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.27	L/day	Assume 10% of the 95th percentile ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Utility Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Water	See Table 5-9 See Table 5-11	mg/cm^3	NA	
				SA	Skin Surface Area	5300	cm^2	USEPA, September 2011; Assumes hands and arms	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	40	days/yr	Assumes 8 week construction period	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then Da_{event} = 2FA x K_p x CW x SQRT(6τevent x tevent/π)
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	If $t_{event} > t^*$, then Da_{event} = FA x K_p x CW x [tevent/(1+B) 2τevent ((1 + 3B + 3B2)/(1 + B)2)
				t_{event}	Event Duration	2	hours	Professional judgment	
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA/540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 5-19 (RAGS Part D Table 4.3.CT)
FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Ingestion	Construction Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 5-10 See Table 5-11	mg/L	NA	Intake (mg/kg/day) = CW x IR x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.09	L/day	Assume 10% of the Mean water ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Construction Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Groundwater	See Table 5-10 See Table 5-11	mg/L	NA	
				SA	Skin Surface Area	5300	cm^2	USEPA, September 2011; Assumes hands and arms	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	60	days/yr	Assumes 12 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then $DA_{event} = 2FA \times K_p \times CW \times SQRT(6\tau event \times tevent/\pi)$
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				CW	Chemical Concentration in Water	Calculated	mg/cm^3	NA	If $t_{event} > t^*$, then $DA_{event} = FA \times K_p \times CW$ B)2)
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	
				t_{event}	Event Duration	8	hours	Assume 8 hours/day	
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

TABLE 5-19 (RAGS Part D Table 4.3.CT)
FUTURE GROUNDWATER EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Groundwater**
Exposure Medium:	**Groundwater**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Ingestion	Utility Worker	Adult	Groundwater	CW	Chemical Concentration in Groundwater	See Table 5-10 See Table 5-11	mg/L	NA	Intake (mg/kg/day) = CW x IR x EF x ED x 1/BW x 1/AT
				IR_w	Ingestion Rate	0.09	L/day	Assume 10% of the Mean water ingestion rate, USEPA, September 2011	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
Dermal	Utility Worker	Adult	Groundwater	Da_{event}	Absorbed Dose per Event	Calculated	mg/cm^2-event	USEPA, July 2004	Absorbed Dose (mg/kg/day) = Da_{event} x SA x EV x EF x ED x 1/BW x 1/AT
				CW	Chemical Concentration in Groundwater	See Table 5-10 See Table 5-11	mg/L	NA	
				SA	Skin Surface Area	5300	cm^2	USEPA, September 2011; Assumes hands and arms	
				EV	Event Frequency	1	events/day	USEPA, July 2004	
				EF	Exposure Frequency	20	days/yr	Assumes 4 week project duration	
				ED	Exposure Duration	1	yr	Assumes 1 year project duration	
				BW	Body Weight	80	kg	USEPA, September 2011	
				AT-C	Averaging Time - Cancer	28470	days	USEPA, September 2011	If $t_{event} \leq t^*$, then $DA_{event} = 2FA \times K_p \times CW \times SQRT(6\tau event \times tevent/\pi)$
				AT-N	Averaging Time - Non-Cancer	365	days	USEPA, December 1989	
				FA	Fraction Absorbed from Water	1	unitless	USEPA, July 2004	
				K_p	Dermal Permeability Coefficient	Chemical-Specific	cm/hr	USEPA, July 2004	
				CW	Chemical Concentration in Water	Calculated	mg/cm^3	NA	If $t_{event} > t^*$, then $DA_{event} = FA \times K_p \times CW \times [tevent/(1+B) 2\tau event ((1 + 3B + 3B2)/(1 + B)2)$
				τ_{event}	Lag time per event	Chemical-Specific	hours	USEPA, July 2004	
				t_{event}	Event Duration	2	hours	Professional judgment	
				t*	Time to Reach Steady-State	2.4 x τ_{event}	hours	USEPA, July 2004	
				B	Ratio of Permeability Coefficient through Stratum Corneum to Permeability Coefficient through Epidermis	Chemical-Specific	unitless	USEPA, July 2004	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA/540/1-89/002
USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part E). EPA/540/1-89/002
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 5-20 (RAGS Part D Table 4.4.RME)
FUTURE INDOOR AIR EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Indoor Air**
Exposure Medium:	**Indoor Air**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name (1)
Inhalation	Indoor Worker	Adult	Indoor Air	CA	Chemical Concentration in Air	Estimated using Johnson&Ettinger	mg/m^3	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				EF	Exposure Frequency	250	days/yr	USEPA, December 2002	
				ED	Exposure Duration	25	yr	USEPA, December 1989	
				ET	Exposure Time	8	hr/day	Assumed	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	219000	hours	USEPA, January 2009	

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/00
USEPA, December 2002. Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites. OSWER 9355.4-2
USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 5-21 (RAGS Part D Table 4.4.CT)
FUTURE INDOOR AIR EXPOSURE
VALUES USED FOR DAILY INTAKE CALCULATIONS
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Medium:	**Indoor Air**
Exposure Medium:	**Indoor Air**

Exposure Route	Receptor Population	Receptor Age	Exposure Point	Parameter Code	Parameter Definition	Value	Units	Rationale/ Reference	Intake Equation/ Model Name [1]
Inhalation	Indoor Worker	Adult	Indoor Air	CA	Chemical Concentration in Air	Estimated using Johnson&Ettinger	mg/m^3	NA	Exp. Conc. (mg/m^3) = CA x ET x EF x ED x 1/AT
				EF	Exposure Frequency	250	days/year	USEPA, December 1989	
				ED	Exposure Duration	5	yr	Average job tenure, Bureau of Labor Statistics, 2012	
				ET	Exposure Time	8	hr/day	Assumed	
				AT-C	Averaging Time - Cancer	683280	hours	USEPA, January 2009	
				AT-N	Averaging Time - Non-Cancer	43800	hours	USEPA, January 2009	

Bureau of Labor Statistics, 2012. Employer Tenure Summary, http://www.bls.gov/news.release/tenure.nr0.htı

USEPA, December 1989. Risk Assessment Guidance for Superfund - Volume I - Human Health Evaluation Manual (Part A). EPA 540/1-89/00

USEPA, September 2011. Exposure Factors Handbook: 2011 Edition. EPA/600/R-090/052F

TABLE 6-1 (RAGS Part D Table 5.1)
NON-CANCER TOXICITY DATA - ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic [1]	Oral RfD		Oral Absorption Efficiency for Dermal [2]	Absorbed RfD for Dermal [2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Volatile Organics										
1,2,4,5-Tetrachlorobenzene	C	3E-04	mg/kg/day	1	3E-04	mg/kg/day	kidney	1000	IRIS [3]	02/10/14
	SC	3E-05	mg/kg/day	1	3E-05	mg/kg/day	thyroid	300	PPRTV [4]	02/10/14
1,2,3-Trichlorobenzene	C	8E-04	mg/kg/day	1	8E-04	mg/kg/day	body weight	10	PPRTV	02/10/14
	SC	8E-03	mg/kg/day	1	8E-03	mg/kg/day	body weight/liver	1000	PPRTV	02/10/14
1,2,4-Trichlorobenzene	C	1E-02	mg/kg/day	1	1E-02	mg/kg/day	adrenal	1000	IRIS	02/10/14
	SC	9E-02	mg/kg/day	1	9E-02	mg/kg/day	liver	100	PPRTV	02/10/14
1,2-Dichlorobenzene	C	9E-02	mg/kg/day	1	9E-02	mg/kg/day	liver	1000	IRIS	02/10/14
	SC	6E-01	mg/kg/day	1	6E-01	mg/kg/day	liver	NA [5]	RAIS [6]	02/10/14
1,3-Dichlorobenzene [7]	C	9E-02	mg/kg/day	1	9E-02	mg/kg/day	liver	1000	IRIS	02/10/14
	SC	6E-01	mg/kg/day	1	6E-01	mg/kg/day	liver	NA	PPRTV	02/10/14
1,4-Dichlorobenzene	C	7E-02	mg/kg/day	1	7E-02	mg/kg/day	liver	NA	RSL [8]	11/01/13
1,2-Dichloropropane	C	9E-02	mg/kg/day	1	9E-02	mg/kg/day	CNS[9]/liver	NA	RSL	11/01/13
Benzene	C	4E-03	mg/kg/day	1	4E-03	mg/kg/day	blood	300	IRIS	02/10/14
	SC	1E-02	mg/kg/day	1	1E-02	mg/kg/day	blood	100	RAIS	02/10/14
Chlorobenzene	C	2E-02	mg/kg/day	1	2E-02	mg/kg/day	liver	1000	IRIS	02/10/14
	SC	7E-02	mg/kg/day	1	7E-02	mg/kg/day	liver	300	PPRTV	02/10/14
Ethylbenzene	C	1E-01	mg/kg/day	1	1E-01	mg/kg/day	liver/kidney	1000	IRIS	02/10/14
	SC	5E-02	mg/kg/day	1	5E-02	mg/kg/day	liver	1000	PPRTV	02/10/14
Xylenes	C	2E-01	mg/kg/day	1	2E-01	mg/kg/day	body weight	1000	IRIS	02/10/14
	SC	4E-01	mg/kg/day	1	4E-01	mg/kg/day	whole body	100	PPRTV	2/10/2014
Semivolatile Organics										
1,1'-Biphenyl	C	5E-01	mg/kg/day	1	5E-01	mg/kg/day	kidney	30	IRIS	02/10/14
	SC	1E-01	mg/kg/day	1	1E-01	mg/kg/day	fetus	100	PPRTV	02/10/14
2-Methylnaphthalene	C	4E-03	mg/kg/day	0.13	5E-04	mg/kg/day	lung	1000	IRIS	11/10/14
	SC	4E-03	mg/kg/day	0.13	5E-04	mg/kg/day	lung	1000	IRIS	11/10/14
Benzo(a)anthracene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	0.13	NA	NA	NA	NA	IRIS	02/26/14
Benzo(b)fluoranthene	NA	NA	NA	0.13	NA	NA	NA	NA	IRIS	02/26/14
Dibenz(a,h)anthracene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	C	8E-04	mg/kg/day	0.1	8E-05	mg/kg/day	liver	100	IRIS	02/26/14
	SC	1E-05	mg/kg/day	0.1	1E-06	mg/kg/day	reproductive	300	PPRTV	02/26/14
Indeno(1,2,3-cd)pyrene	NA	NA	NA	0.13	NA	NA	NA	NA	NA	NA
Naphthalene	C	2E-02	mg/kg/day	0.13	3E-03	mg/kg/day	body weight	3000	IRIS	02/26/14
PCBs										
Aroclor 1248	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-1 (RAGS Part D Table 5.1)
NON-CANCER TOXICITY DATA - ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic (1)	Oral RfD		Oral Absorption Efficiency for Dermal (2)	Absorbed RfD for Dermal (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfD:Target Organ(s)	
		Value	Units		Value	Units			Source(s)	Date(s)
Aroclor 1254	C	2E-05	mg/kg/day	0.14	3E-06	mg/kg/day	eyes/immune	300	IRIS	02/26/14
Aroclor 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dioxin										
TCDD	C	7E-10	mg/kg/day	0.03	2E-11	mg/kg/day	reproductive	30	IRIS	02/26/14
Metals										
Aluminum	C	1E+00	mg/kg/day	1.00	1E+00	mg/kg/day	CNS	1E+02	PPRTV	02/26/14
Antimony	C	4E-04	mg/kg/day	0.15	6E-05	mg/kg/day	lifespan/blood	1000	IRIS	02/26/14
	SC	4E-04	mg/kg/day	0.15	6E-05	mg/kg/day	whole body	1000	PPRTV	02/26/14
Arsenic	C	3E-04	mg/kg/day	0.03	9E-06	mg/kg/day	skin	3	IRIS	02/26/14
Barium	C	2E-01	mg/kg/day	0.07	1E-02	mg/kg/day	kidney	300	IRIS	02/26/14
Cadmium	C	1E-03	mg/kg/day	0.03	3E-05	mg/kg/day	kidney	10	IRIS	02/26/14
Chromium	C	1.5E+0	mg/kg/day	0.13	2E-01	mg/kg/day	blood	1000	IRIS	02/26/14
Chromium, hexavalent	C	3E-03	mg/kg/day	0.025	8E-05	mg/kg/day	blood	900	IRIS	02/26/14
Cobalt	C	3E-04	mg/kg/day	1	3E-04	mg/kg/day	thyroid	3000	PPRTV	02/26/14
	SC	3E-03	mg/kg/day	1	3E-03	mg/kg/day	thyroid	300	PPRTV	02/26/14
Iron	C	7E-01	mg/kg/day	1	7E-01	mg/kg/day	gastrointestinal	1.5	PPRTV	02/26/14
	SC	7E-01	mg/kg/day	1	7E-01	mg/kg/day	gastrointestinal	1.5	RAIS	02/26/14
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	C	1E-01	mg/kg/day	1	1E-01	mg/kg/day	central nervous	1	IRIS	02/26/14
Mercury	C	2E-04	mg/kg/day	1E+00	2E-04	mg/kg/day	GI/kidney	NA	RAIS	07/17/14
Nickel (11)	C	2E-02	mg/kg/day	1	2E-02	mg/kg/day	body weight	300	IRIS	02/26/14
Thallium (11)	C	1E-05	mg/kg/day	1	1E-05	mg/kg/day	hair,eyes	3000	IRIS	02/26/14
	SC	4E-05	mg/kg/day	1	4E-05	mg/kg/day	hair,eyes	1000	PPRTV	02/26/14
Vanadium	C	9E-03	mg/kg/day	0.03	2E-04	mg/kg/day	hair	100	PPRTV	02/26/14
	SC	7E-04	mg/kg/day	0.03	2E-05	mg/kg/day	kidney	300	RAIS	02/26/14
Zinc	C	3E-01	mg/kg/day	1	3E-01	mg/kg/day	low copper status	3	IRIS	02/26/14

(1) In the absence of subchronic toxicity values, the chronic value is used to be conservative.
(2) USEPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005 - chapter 4. See Section 6.2.2 of the text.
(3) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>
(4) Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) - USEPA, 2014. http://hhpprtv.ornl.gov/
(5) NA - Not available
(6) Risk Assessment Information System (RAIS) - Oak Ridge National Laboratory - 2014. <http://rais.ornl.gov>
(7) Toxicity values for 1,2-dichlorobenzene are used for 1.3-dichlorobenzene
(8) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(9) CNS - Central nervous system
(10) NOAEL - No Observed Adverse Effect Level
(11) Value presented for soluble salts

TABLE 6-2 (RAGS Part D Table 5.2)
NON-CANCER TOXICITY DATA - INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic [1]	Inhalation RfC		Extrapolated RfD [2]		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Volatile Organics									
1,2,4,5-Tetrachlorobenzene	NA [3]	NA	NA	NA	NA	NA	NA	NA	NA
1,2,3-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
1,2,4-Trichlorobenzene	C	2E-03	mg/m^3	5.71E-04	mg/kg-day	liver	100	PPRTV [4]	2/10/2014
	SC	2E-02	mg/m^3	5.71E-03	mg/kg-day	liver	300	PPRTV	2/10/2014
1,2-Dichlorobenzene	C	2E-01	mg/m^3	5.71E-02	mg/kg-day	liver	NA	RSL [5]	11/01/13
	SC	2E+00	mg/m^3	5.71E-01	mg/kg-day	liver	NA	RAIS [6]	2/10/2014
1,3-Dichlorobenzene [7]	C	2E-01	mg/m^3	5.71E-02	mg/kg-day	liver	NA	RSL	11/01/13
	SC	2E+00	mg/m^3	5.71E-01	mg/kg-day	liver	NA	RAIS	2/10/2014
1,4-Dichlorobenzene	C	8E-01	mg/m^3	2.29E-01	mg/kg-day	liver	100	IRIS [8]	2/10/2014
1,2-Dichloropropane	C	4E-03	mg/m^3	1.14E-03	mg/kg-day	respiratory	300	IRIS	2/10/2014
Benzene	C	3E-02	mg/m^3	8.57E-03	mg/kg-day	blood	300	IRIS	2/10/2014
	SC	8E-02	mg/m^3	2.29E-02	mg/kg-day	liver	100	RAIS	2/10/2014
Chlorobenzene	C	5E-02	mg/m^3	1.43E-02	mg/kg-day	liver	1000	IRIS	2/10/2014
	SC	5E-01	mg/m^3	1.43E-01	mg/kg-day	liver	100	PPRTV	2/10/2014
Ethylbenzene	C	1E+00	mg/m^3	2.86E-01	mg/kg-day	developmental	300	IRIS	2/10/2014
	SC	9E+00	mg/m^3	2.57E+00	mg/kg-day	ear	100	PPRTV	2/10/2014
Xylenes	C	1E-01	mg/m^3	2.86E-02	mg/kg-day	coordination	300	IRIS	2/10/2014
	SC	4E-01	mg/m^3	1.14E-01	mg/kg-day	whole body	100	PPRTV	2/10/2014
Semivolatile Organics									
1,1'-Biphenyl	C	4E-04	mg/m^3	1.14E-04	mg/kg-day	edema	NA	IRIS	2/10/2014
	SC	4E-03	mg/m^3	1.14E-03	mg/kg-day	edema	NA	PPRTV	2/10/2014
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(a)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzo(b)fluoranthene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Dibenz(a,h)anthracene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Hexachlorobenzene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Indeno(1,2,3-cd)pyrene	NA	NA	NA	NA	NA	NA	NA	NA	NA
Naphthalene	C	3E-03	mg/m^3	8.57E-04	mg/kg-day	respiratory	3000	IRIS	2/26/2014
PCBs									
Aroclor 1248	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1254	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1260	NA	NA	NA	NA	NA	NA	NA	NA	NA
Aroclor 1268 [6]	NA	NA	NA	NA	NA	NA	NA	NA	NA

TABLE 6-2 (RAGS Part D Table 5.2)
NON-CANCER TOXICITY DATA - INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Chronic/ Subchronic (1)	Inhalation RfC		Extrapolated RfD (2)		Primary Target Organ(s)	Combined Uncertainty/Modifying Factors	RfC : Target Organ(s)	
		Value	Units	Value	Units			Source(s)	Date(s)
Dioxin									
TCDD	C	4E-08	mg/m^3	1.14E-08	mg/kg-day	reproductive	NA	RSL	11/01/13
Metals									
Aluminum	C	5E-03	mg/m^3	1.43E-03	mg/kg-day	neuro	NA	PPRTV	2/26/2014
Antimony	NA	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	C	1.5E-05	mg/m^3	4.29E-06	mg/kg-day	respiratory	NA	RSL	11/01/13
Barium	C	5E-04	mg/m^3	1.43E-04	mg/kg-day	developmental	NA	RSL	11/01/13
Cadmium	C	1E-05	mg/m^3	2.86E-06	mg/kg-day	respiratory/kidney	NA	RSL	11/01/13
Chromium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chromium, hexavalent	C	1E-04	mg/m^3	2.86E-05	mg/kg-day	respiratory	300	IRIS	2/26/2014
Cobalt	C	6E-06	mg/m^3	1.71E-06	mg/kg-day	respiratory	300	PPRTV	2/26/2014
	SC	2E-05	mg/m^3	5.71E-06	mg/kg-day	respiratory	100	PPRTV	2/26/2014
Iron	NA	NA	NA	NA	NA	NA	NA	NA	NA
Lead	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	C	5E-05	mg/m^3	1.43E-05	mg/kg-day	central nervous	1000	IRIS	2/26/2014
Mercury	C	3E-04	mg/m^3	8.57E-05	mg/kg-day	central nervous	30	IRIS	2/26/2014
Nickel (5,6)	C	9E-05	mg/m^3	2.57E-05	mg/kg-day	respiratory	NA	IRIS	2/26/2014
Thallium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Vanadium	NA	NA	NA	NA	NA	NA	NA	NA	NA
Zinc	NA	NA	NA	NA	NA	NA	NA	NA	NA

(1) In the absence of subchronic toxicity values, the chronic value is used to be conservative.
(2) RfD (mg/kg-day) = RfC (mg/m^3) x 20 (m3/day) / 70 (kg)
(3) NA - Not available
(4) Provisional Peer Reviewed Toxicity Values for Superfund (PPRTV) - USEPA, 2014. http://hhpprtv.ornl.gov/
(5) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(6) Risk Assessment Information System (RAIS) - Oak Ridge National Laboratory - 2014. <http://rais.ornl.gov>
(7) Toxicity values for 1,2-dichlorobenzene are used for 1.3-dichlorobenzene
(8) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>

TABLE 6-3 (RAGS Part D Table 6.1)
CANCER TOXICITY DATA -- ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal [1]	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)
Volatile Organics								
1,2,4,5-Tetrachlorobenzene	NA [3]	NA	1	NA	NA	Inadequate Information	PPRTV[2]	02/10/14
1,2,3-Trichlorobenzene	NA	NA	1	NA	NA	Inadequate Information	PPRTV	02/10/14
1,2,4-Trichlorobenzene	2.9E-02	kg-day/mg	1	2.90E-02	kg-day/mg	D - Not Classifiable	PPRTV	02/10/14
1,2-Dichlorobenzene	NA	NA	1	NA	NA	D - Not Classifiable	IRIS[4]	02/10/14
1,3-Dichlorobenzene	NA	NA	1	NA	NA	NA	NA	NA
1,4-Dichlorobenzene [5]	5.4E-03	kg-day/mg	1	5.40E-03	kg-day/mg	C- Possible Human Carcinogen	RSL [6]	11/01/13
1,2-Dichloropropane [5]	3.6E-02	kg-day/mg	1	3.60E-02	kg-day/mg	NA	NA	NA
Benzene	5.5E-02	kg-day/mg	1	5.50E-02	kg-day/mg	A - Known Human Carcinogen	IRIS	02/10/14
Chlorobenzene	NA	NA	1	NA	NA	D - Not Classifiable	IRIS	02/10/14
Ethylbenzene [5]	1.0E-02	kg-day/mg	1	1.00E-02	kg-day/mg	D - Not Classifiable	IRIS	02/10/14
Xylenes	NA	NA	1	NA	NA	Inadequate Information	IRIS	02/10/14
Semivolatile Organics								
1,1'-Biphyenyl	8.0E-03	kg-day/mg	1	8.00E-03	kg-day/mg	Suggestive Evidence of Carcinogenicity	IRIS	02/10/14
2-Methylnaphthalene	NA	NA	0.13	NA	NA	Inadequate Information	IRIS	11/10/14
Benzo(a)anthracene	7.3E-01	kg-day/mg	0.13	9.49E-02	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Benzo(a)pyrene	7.3E+00	kg-day/mg	0.13	9.49E-01	kg-day/mg	B2 - Probable Human Carcinogen	IRIS	02/26/14
Benzo(b)fluoranthene	7.3E-01	kg-day/mg	0.13	9.49E-02	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Dibenz(a,h)anthracene	7.3E+00	kg-day/mg	0.13	9.49E-01	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Hexachlorobenzene	1.6E+00	kg-day/mg	0.1	1.60E-01	kg-day/mg	B2 - Probable Human Carcinogen	IRIS	02/26/14
Indeno(1,2,3-cd)pyrene	7.3E-01	kg-day/mg	0.13	9.49E-02	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Naphthalene	NA	NA	0.13	NA	NA	C - Possible Human Carcinogen	IRIS	02/26/14
PCBs								
Aroclor 1248 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	NA	RSL	11/01/13
Aroclor 1254 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1260 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1268 [5]	2.0E+00	kg-day/mg	0.14	2.80E-01	kg-day/mg	NA	RSL	11/01/13

TABLE 6-3 (RAGS Part D Table 6.1)
CANCER TOXICITY DATA -- ORAL/DERMAL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Oral Cancer Slope Factor		Oral Absorption Efficiency for Dermal [1]	Absorbed Cancer Slope Factor for Dermal		Weight of Evidence/ Cancer Guideline Description	Oral CSF	
	Value	Units		Value	Units		Source(s)	Date(s)
Dioxin								
TCDD [5]	1.5E+05	kg-day/mg	0.03	4.50E+03	kg-day/mg	Probable Human Carcinogen	HEAST [7]	07/01/97
Metals								
Aluminum	NA	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA	NA
Arsenic	1.5E+00	kg-day/mg	0.03	4.50E-02	kg-day/mg	A - Known Human Carcinogen	IRIS	02/26/14
Barium	NA	NA	NA	NA	NA	NA	NA	NA
Cadmium	NA	NA	NA	NA	NA	B1 - Probable Human Carcinogen	IRIS	02/26/14
Chromium	NA	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Chromium, hexavalent [5]	5.0E-01	kg-day/mg	0.025	1.25E-02	kg-day/mg	A - Known Human Carcinogen	RSL	11/01/13
Cobalt	NA	NA	NA	NA	NA	Likely to be Carcinogenic	PPRTV	02/26/14
Lead	NA	NA	NA	NA	NA	B2 - Probable Human Carcinogen	IRIS	02/26/14
Nickel	NA	NA	NA	NA	NA	NA	IRIS	02/26/14
Thallium	NA	NA	1	NA	NA	Inadequate Information	IRIS	02/26/14
Vanadium	NA	NA	1	NA	NA	Inadequate Information	PPRTV	02/26/14
Zinc	NA	NA	0.001	NA	NA	NA	IRIS	02/26/14

(1) USEPA, 2004. Risk Assessment Guidance for Superfund Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R/99/005 - chapter
(2) Provisional Peer Reviewed Toxicity Values (PPRTV) for Superfund - USEPA, 2014. http://hhpprtv.ornl.gov/
(3) NA - Not available
(4) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>
(5) USEPA has no toxicity value for this compound. Value presented is from the California EPA or other source and may not be supported by the literature.
(6) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(7) Health Effects Assessment Summary Tables - FY 1997 Update (HEAST) - USEPA July 1997

TABLE 6-4 (RAGS Part D Table 6.2)
CANCER TOXICITY DATA -- INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[1]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s)
Volatile Organics							
1,2,4,5-Tetrachlorobenzene	NA [2]	NA	NA	NA	Inadequate Information	IRIS [3]	02/10/14
1,2,3-Trichlorobenzene	NA	NA	NA	NA	Inadequate Information	PPRTV [4]	02/10/14
1,2,4-Trichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,2-Dichlorobenzene	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/10/14
1,3-Dichlorobenzene	NA	NA	NA	NA	NA	NA	NA
1,4-Dichlorobenzene	1.1E-02	m^3/mg	3.85E+01	mg/kg-day	C - Possible Human Carcinogen	RSL [5]	11/01/13
Benzene	7.8E-03	m^3/mg	2.73E+01	mg/kg-day	A - Known Human Carcinogen	IRIS	02/10/14
Chlorobenzene	NA	NA	NA	NA	NA	NA	NA
Ethylbenzene [6]	2.5E-03	m^3/mg	8.75E+00	mg/kg-day	D - Not Classifiable	RSL	11/01/13
Xylenes	NA	NA	NA	NA	Inadequate Information	IRIS	02/10/14
Semivolatile Organics							
1,1-Biphenyl	NA [2]	NA	NA	NA	NA	NA	NA
2-Methylnaphthalene	NA	NA	NA	NA	NA	NA	NA
Benzo(a)anthracene	1.1E-01	m^3/mg	3.85E+02	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Benzo(a)pyrene	1.1E+00	m^3/mg	3.85E+03	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Benzo(b)fluoranthene	1.1E-01	m^3/mg	3.85E+02	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Dibenz(a,h)anthracene	1.2E+00	m^3/mg	4.20E+03	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Di-n-Octylphthalate	NA	NA	NA	NA	Inadequate Information	PPRTV	02/10/14
Hexachlorobenzene	4.6E-01	m^3/mg	1.61E+03	mg/kg-day	B2 - Probable Human Carcinogen	IRIS	02/26/14
Indeno(1,2,3-cd)pyrene	1.1E-01	m^3/mg	3.85E+02	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Naphthalene	3.4E-02	m^3/mg	1.19E+02	mg/kg-day	C - Possible Human Carcinogen	RSL	11/01/13

TABLE 6-4 (RAGS Part D Table 6.2)
CANCER TOXICITY DATA -- INHALATION
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Chemical of Potential Concern	Unit Risk		Inhalation Cancer Slope Factor[(1)]		Weight of Evidence/ Cancer Guideline Description	Unit Risk : Inhalation CSF	
	Value	Units	Value	Units		Source(s)	Date(s)
PCBs							
Aroclor 1248 [(6)]	5.7E-01	m^3/mg	2.00E+03	mg/kg-day	NA	RSL	11/01/13
Aroclor 1254 [(6)]	5.7E-01	m^3/mg	2.00E+03	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Aroclor 1260 [(6)]	5.7E-01	m^3/mg	2.00E+03	mg/kg-day	B2 - Probable Human Carcinogen	RSL	11/01/13
Dioxin							
TCDD [(6)]	3.8E+04	m^3/mg	1.33E+08	mg/kg-day	NA	RSL	11/01/13
Metals							
Aluminum	NA	NA	NA	NA	NA	NA	NA
Antimony	NA	NA	NA	NA	NA	NA	NA
Arsenic	4.3E+00	m^3/mg	1.51E+04	mg/kg-day	A - Known Human Carcinogen	IRIS	02/26/14
Barium	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Cadmium	1.8E+00	m^3/mg	6.30E+03	mg/kg-day	B1 - Probable Human Carcinogen	IRIS	02/26/14
Chromium	NA	NA	NA	NA	D - Not Classifiable	IRIS	02/26/14
Chromium, hexavalent	1.2E-01	m^3/mg	4.20E+02	mg/kg-day	A - Known Human Carcinogen	IRIS	02/26/14
Cobalt	9.0E-02	m^3/mg	3.15E+02	mg/kg-day	Likely to be Carcinogenic	PPRTV	02/26/14
Iron	NA	NA	NA	NA	Inadequate Information	IRIS	02/26/14
Lead	NA	NA	NA	NA	B2 - Probable Human Carcinogen	IRIS	02/26/14
Nickel [(5,6)]	2.6E-01	m^3/mg	9.10E+02	mg/kg-day	NA	RSL	11/01/13
Thallium	NA	NA	NA	NA	Inadequate Information	IRIS	02/26/14
Vanadium	NA	NA	NA	NA	Inadequate Information	PPRTV	02/26/14
Zinc	NA	NA	NA	NA	NA	NA	NA

(1) Inhalation Cancer Slope Factor (kg-day/mg) = Inhalation Unit Risk (ug/m^3) x 70 (kg) x 1000 (ug/mg) / 20 (m^3/day)
(2) NA - Not available
(3) Integrated Risk Information System (IRIS) - USEPA, February 2014. <http://cfpub.epa.gov/ncea/iris/index.html>
(4) Provisional Peer Reviewed Toxicity Values (PPRTV) for Superfund - USEPA, 2014. http://hhpprtv.ornl.gov/
(5) Regional Screening Table (RSL) - USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(6) USEPA has no toxicity value for this compound. Value presented is from the California EPA or other source, or similar compound and may not be supported by the literature.

TABLE 7-1 (RAGS Part D Table 9.1.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight	--	0.22	--	0.07	0
			1,2,4-Trichlorobenzene	7E-07	--	2E-06	3E-06	adrenal	liver	0.01	0.00	0.00	0
			1,4-Dichlorobenzene	9E-08	2E-12	3E-07	4E-07	liver	liver	0.00	0.00	0.00	0
			Benzene	9E-08	1E-13	3E-07	4E-07	blood	blood	0.00	0.00	0.00	0
			Benzo(a)pyrene	2E-06	3E-12	1E-07	2E-06	--	--	--	--	--	--
			Benzo(b)fluoranthene	3E-07	4E-13	2E-08	3E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	3E-07	5E-13	2E-08	3E-07	--	--	--	--	--	--
			PCB-1260	4E-07	1E-12	3E-08	4E-07	--	--	--	--	--	--
			2,3,7,8-TCDD	1E-05	2E-11	3E-08	1E-05	reproductive	reproductive	0.30	0.00	1.08	1
			Antimony	--	--	--	--	lifespan & blood	--	0.09	--	0.31	0
			Arsenic	3E-06	7E-11	8E-09	3E-06	skin	--	0.02	0.00	0.06	0
			Cobalt	--	3E-11	--	3E-11	thyroid	respiratory	0.32	0.00	1.08	1
			Iron	--	--	--	--	gastrointestinal	--	0.10	--	0.34	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Vanadium	--	--	--	--	hair	--	0.07	--	0.29	0
			Zinc	--	--	--	--	low CU status	--	0.09	--	0.30	0
			Chromium, hexavalent	1E-04	3E-10	3E-07	1E-04	blood	respiratory	0.29	0.00	0.93	1
			Chemical Total	**2E-04**	**5E-10**	**3E-06**	**2E-04**			**2**	**0**	**4**	**6**
		Exposure Point Total					**2E-04**						**6**
	Exposure Medium Total						**2E-04**						**6**
Medium Total							**2E-04**						**6**
Receptor Total							**2E-04**					**Receptor HI Total**	**6**

Total Risk Across All Media **2E-04** **Total Hazard Across All Media** **6**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-1 for supporting calculations.

Total Adrenal system	0
Total Liver	0
Total Body weight	0
Total Reproductive system	1
Total Blood	2
Total Skin	0
Total Low copper status	0
Total Thyroid	1
Total Respiratory	0
Total Lifespan	0
Total Gastrointestinal	0
Total Hair	0

TABLE 7-2 (RAGS Part D Table 9.1.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.00	--	0.00	0
			1,2,4-Trichlorobenzene	3E-09	--	2E-08	2E-08	adrenal	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	5E-10	7E-13	2E-09	3E-09	liv	liver	0.00	0.00	0.00	0
			Benzene	1E-10	1E-14	7E-10	9E-10	blood	liver	0.00	0.00	0.00	0
			Benzo(a)pyrene	1E-08	1E-12	1E-09	1E-08	--	--	--	--	--	--
			Benzo(b)fluoranthene	2E-09	2E-13	2E-10	2E-09	--	--	--	--	--	--
			Dibenz(a,h)anthracene	3E-09	4E-13	3E-10	4E-09	--	--	--	--	--	--
			PCB-1260	2E-09	4E-13	1E-10	2E-09	--	--	--	--	--	--
			2,3,7,8-TCDD	8E-08	1E-11	1E-09	8E-08	reproductive	reproductive	0.01	0.00	0.07	0
			Antimony	--	--	--	--	whole body	--	0.00	--	0.02	0
			Arsenic	4E-08	9E-11	7E-10	4E-08	skin	respiratory	0.00	0.00	0.01	0
			Cobalt	--	2E-11	--	2E-11	thyroid	respiratory	0.00	0.00	0.01	0
			Iron	--	--	--	--	gastrointestinal	--	0.00	--	0.03	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Vanadium	--	--	--	--	kidney	--	0.04	--	0.20	0
			Zinc	--	--	--	--	low Cu status	--	0.00	--	0.00	0
			Chromium, hexavalent	3E-07	5E-11	4E-09	3E-07	blood	respiratory	0.00	0.00	0.01	0
			Chemical Total	**4E-07**	**2E-10**	**3E-08**	**4E-07**			**0**	**0**	**0**	**0**
		Exposure Point Total					**4E-07**						**0**
	Exposure Medium Total						**4E-07**						**0**
Medium Total							**4E-07**						**0**
Receptor Total							**4E-07**					**Receptor HI Total**	**0**

Total Risk Across All Media **4E-07** **Total Hazard Across All Media** **0**

Lead risks calculated using the Adult Lead Model (See AppendixG)
See Table E-2 for supporting calculations.

Total Adrenal system	0
Total Liver	0
Total Body weight	0
Total Reproductive system	0
Total Blood	0
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	0
Total Gastrointestinal	0

TABLE 7-3 (RAGS Part D Table 9.2.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight	--	0.22	--	0.08	0
			1,2,4-Trichlorobenzene	7E-07	--	3E-06	3E-06	adrenal	liver	0.01	0.00	0.00	0
			1,4-Dichlorobenzene	9E-08	2E-12	3E-07	4E-07	liver	liver	0.00	0.00	0.00	0
			Benzene	9E-08	1E-13	3E-07	4E-07	blood	blood	0.00	0.00	0.00	0
			Benzo(a)pyrene	2E-06	3E-12	1E-07	2E-06	--	--	--	--	--	--
			Benzo(b)fluoranthene	3E-07	4E-13	2E-08	3E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	3E-07	5E-13	2E-08	3E-07	--	--	--	--	--	--
			PCB-1260	4E-07	1E-12	3E-08	4E-07	--	--	--	--	--	--
			2,3,7,8-TCDD	1E-05	2E-11	3E-08	1E-05	reproductive	reproductive	0.30	0.00	1.17	1
			Antimony	--	--	--	--	lifespan/blood	--	0.09	--	0.33	0
			Arsenic	3E-06	7E-11	9E-09	3E-06	skin	--	0.02	0.00	0.07	0
			Cobalt	--	3E-11	--	3E-11	thyroid	respiratory	0.32	0.00	1.17	1
			Iron	--	--	--	--	gastrointestinal	--	0.10	--	0.37	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Vanadium	--	--	--	--	hair	--	0.07	--	0.31	0
			Zinc	--	--	--	--	low Cu status	--	0.09	--	0.32	0
			Chromium, hexavalent	1E-04	3E-10	3E-07	1E-04	blood	respiratory	0.29	0.00	1.01	1
			Chemical Total	**2E-04**	**5E-10**	**4E-06**	**2E-04**			**2**	**0**	**5**	**6**
		Exposure Point Total					**2E-04**						**6**
	Exposure Medium Total						**2E-04**						**6**
Medium Total							**2E-04**						**6**
Receptor Total							**2E-04**					**Receptor HI Total**	**6**

Total Risk Across All Media **2E-04** **Total Hazard Across All Media** **6**

Lead risks calculated using the Adult Lead Model (See Appendix G)

See Table E-3 for supporting calculations.

Total Adrenal system	0
Total Liver	0
Total Body weight	0
Total Reproductive system	1
Total Blood	1
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	1
Total Respiratory	0
Total Kidney	0
Total Gastrointestinal	0

TABLE 7-4 (RAGS Part D Table 9.2.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.00	--	0.00	0
			1,2,4-Trichlorobenzene	1E-08	--	7E-08	8E-08	adrenal	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	2E-09	8E-13	1E-08	1E-08	liver	liver	0.00	0.00	0.00	0
			Benzene	6E-10	2E-14	3E-09	4E-09	blood	liver	0.00	0.00	0.00	0
			Benzo(a)pyrene	5E-08	2E-12	5E-09	6E-08	--	--	--	--	--	--
			Benzo(b)fluoranthene	9E-09	3E-13	8E-10	1E-08	--	--	--	--	--	--
			Dibenz(a,h)anthracene	2E-08	5E-13	1E-09	2E-08	--	--	--	--	--	--
			PCB-1260	8E-09	4E-13	6E-10	9E-09	--	--	--	--	--	--
			2,3,7,8-TCDD	3E-07	2E-11	6E-09	3E-07	reproductive	reproductive	0.05	0.00	0.29	0
			Antimony	--	--	--	--	whole body	--	0.00	--	0.08	0
			Arsenic	2E-07	1E-10	3E-09	2E-07	skin	respiratory	0.01	0.00	0.04	0
			Cobalt	--	2E-11	--	2E-11	thyroid	respiratory	0.01	0.00	0.03	0
			Iron	--	--	--	--	gastrointestinal	--	0.02	--	0.11	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Vanadium	--	--	--	--	kidney	--	0.18	--	0.89	1
			Zinc	--	--	--	--	low Cu status	--	0.00	--	0.01	0
			Chromium, hexavalent	1E-06	6E-11	2E-08	1E-06	blood	respiratory	0.01	0.00	0.07	0
			Chemical Total	**2E-06**	**2E-10**	**1E-07**	**2E-06**			**0**	**0**	**2**	**2**
		Exposure Point Total					**2E-06**						**2**
	Exposure Medium Total						**2E-06**						**2**
Medium Total							**2E-06**						**2**
Receptor Total							**2E-06**					**Receptor HI Total**	**2**

Total Risk Across All Media **2E-06** **Total Hazard Across All Media** **2**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-4 for supporting calculations.

Total Adrenal system	0
Total Liver	0
Total Body weight	0
Total Reproductive system	0
Total Blood	0
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	1

TABLE 7-5 (RAGS Part D Table 9.3.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight	--	0.49	--	0.17	1
			1,2,4-Trichlorobenzene	2E-06	--	5E-06	7E-06	adrenal	liver	0.02	0.00	0.01	0
			1,4-Dichlorobenzene	2E-07	4E-11	7E-07	9E-07	liver	liver	0.00	0.00	0.00	0
			Benzene	2E-07	3E-12	7E-07	9E-07	blood	blood	0.00	0.00	0.01	0
			Benzo(a)pyrene	4E-06	6E-11	2E-07	4E-06	--	--	--	--	--	--
			Benzo(b)fluoranthene	6E-07	9E-12	4E-08	7E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	7E-07	1E-11	4E-08	8E-07	--	--	--	--	--	--
			PCB-1260	8E-07	2E-11	6E-08	9E-07	--	--	--	--	--	--
			2,3,7,8-TCDD	2E-05	6E-10	7E-08	2E-05	reproductive	reproductive	0.68	0.00	2.43	3
			Antimony	--	--	--	--	lifespan/blood	--	0.20	--	0.69	1
			Arsenic	6E-06	2E-09	2E-08	6E-06	skin	--	0.04	--	0.15	0
			Cobalt	--	6E-10	--	6E-10	thyroid	respiratory	0.71	0.00	2.42	3
			Iron	--	--	--	--	gastrointestinal	--	0.23	--	0.78	1
			Lead	--	--	--	--	blood	--	--	--	--	--
			Vanadium	--	--	--	--	hair	--	0.16	--	0.65	1
			Zinc	--	--	--	--	low CU status	--	0.20	--	0.67	1
			Chromium, hexavalent	3E-04	7E-09	7E-07	3E-04	blood	respiratory	0.65	0.00	2.09	3
			Chemical Total	**4E-04**	**1E-08**	**8E-06**	**4E-04**			**3**	**0**	**10**	**13**
		Exposure Point Total					**4E-04**						**13**
	Exposure Medium Total						**4E-04**						**13**
Medium Total							**4E-04**						**13**
Receptor Total							**4E-04**					**Receptor HI Total**	**13**

Total Risk Across All Media **4E-04** **Total Hazard Across All Media** **13**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-5 for supporting calculations.

Total Adrenal system	0
Total Liver	1
Total Body weight	1
Total Reproductive system	3
Total Blood	3
Total Whole body	1
Total Skin	0
Total Low copper status	1
Total Thyroid	3
Total Respiratory	0
Total Kidney	1
Total Gastrointestinal	1

TABLE 7-6 (RAGS Part D Table 9.3.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,3-Trichlorobenzene	--	--	--	2E-06	body weight/liver	--	0.00	--	0.00	0
			1,2,4-Trichlorobenzene	2E-08	--	7E-08	9E-08	adrenal	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	3E-09	3E-12	1E-08	1E-08	liver	liver	0.00	0.00	0.00	0
			Benzene	9E-10	6E-14	3E-09	4E-09	blood	liver	0.00	0.00	0.00	0
			Benzo(a)pyrene	8E-08	6E-12	5E-09	8E-08	--	--	--	--	--	--
			Benzo(b)fluoranthene	1E-08	1E-12	8E-10	1E-08	--	--	--	--	--	--
			Dibenz(a,h)anthracene	2E-08	2E-12	1E-09	2E-08	--	--	--	--	--	--
			PCB-1260	1E-08	2E-12	6E-10	1E-08	--	--	--	--	--	--
			2,3,7,8-TCDD	5E-07	7E-11	6E-09	5E-07	reprductive	reprductive	0.08	0.00	0.29	0
			Antimony	--	--	--	--	whole body	--	0.00	--	0.08	0
			Arsenic	3E-07	4E-10	3E-09	3E-07	skin	respiratory	0.01	0.00	0.04	0
			Cobalt	--	8E-11	--	8E-11	thyroid	respiratory	0.01	0.00	0.03	0
			Iron	--	--	--	--	gastrointestinal	--	0.03	--	0.11	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Vanadium	--	--	--	--	kidney	--	0.27	--	0.89	1
			Zinc	--	--	--	--	low Cu status	--	0.00	--	0.01	0
			Chromium, hexavalent	2E-06	2E-10	2E-08	2E-06	blood	respiratory	0.02	0.00	0.07	0
			Chemical Total	**3E-06**	**8E-10**	**1E-07**	**5E-06**			**0**	**0**	**2**	**2**
		Exposure Point Total					**5E-06**						**2**
	Exposure Medium Total						**5E-06**						**2**
Medium Total							**5E-06**						**2**
Receptor Total							**5E-06**					**Receptor HI Total**	**2**

Total Risk Across All Media **5E-06** **Total Hazard Across All Media** **2**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-6 for supporting calculations.

Total Adrenal system	0
Total Liver	0
Total Body weight	0
Total Reproductive system	0
Total Blood	0
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	1

TABLE 7-7 (RAGS Part D Table 9.4.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	1E-03	--	3E-03	4E-03	adrenal	liver	10	0.00	3.51	14
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.03	0.00	0.01	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.01	0.00	0.00	0
			1,4-Dichlorobenzene	2E-06	4E-11	7E-06	9E-06	liver	liver	0.02	0.00	0.01	0
			Benzo(a)anthracene	1E-06	2E-12	6E-08	1E-06	--	--	--	--	--	--
			Benzo(a)pyrene	3E-05	5E-11	2E-06	3E-05	--	--	--	--	--	--
			Benzo(b)fluoranthene	4E-06	5E-12	2E-07	4E-06	--	--	--	--	--	--
			Dibenz(a,h)anthracene	5E-06	8E-12	3E-07	5E-06	--	--	--	--	--	--
			Hexachlorobenzene	3E-05	8E-11	1E-06	3E-05	liver	--	0.07	--	0.24	0
			Indeno(1,2,3-cd)pyrene	2E-06	3E-12	1E-07	2E-06	--	--	--	--	--	--
			Naphthalene	--	1E-11	--	1E-11	body weight	respiratory	0.01	0.00	0.02	0
			PCB-1248	6E-07	2E-12	4E-08	7E-07	--	--	--	--	--	--
			PCB-1254	2E-07	7E-13	2E-08	3E-07	eyes/immune	--	0.02	--	0.06	0
			2,3,7,8-TCDD	2E-05	4E-11	5E-08	2E-05	reproductive	reproductive	0.51	0.00	1.83	2
			Chromium, hexavalent	2E-05	5E-09	5E-08	2E-05	blood	respiratory	0.04	0.00	0.14	0
			Chemical Total	**1E-03**	**5E-09**	**3E-03**	**4E-03**			**11**	**0**	**6**	**17**
		Exposure Point Total					**4E-03**						**17**
	Exposure Medium Total						**4E-03**						**17**
Medium Total							**4E-03**						**17**
Receptor Total							**4E-03**					**Receptor HI Total**	**17**

Total Risk Across All Media **4E-03** **Total Hazard Across All Media** **17**

See Table E-7 for supporting calculations.

Total Liver	0
Total Reproductive	3
Total Body Weight	0
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0
Total Adrenal	14

TABLE 7-8 (RAGS Part D Table 9.4.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-06	--	1E-05	2E-05	liver	liver	0.01	0.00	0.01	0
			1,2-Dichlorobenzene	--	--	--	0E+00	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	0E+00	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	1E-08	2E-11	7E-08	8E-08	liver	liver	0.00	0.00	0.00	0
			Benzo(a)anthracene	3E-08	3E-12	2E-09	3E-08			--	--	--	0
			Benzo(a)pyrene	2E-07	2E-11	2E-08	2E-07			--	--	--	0
			Benzo(b)fluoranthene	3E-08	4E-12	3E-09	4E-08			--	--	--	0
			Dibenz(a,h)anthracene	9E-08	1E-11	8E-09	1E-07			--	--	--	0
			Hexachlorobenzene	2E-07	4E-11	1E-08	2E-07	reproductive		0.17	--	0.95	1
			Indeno(1,2,3-cd)pyrene	2E-08	2E-12	2E-09	2E-08			--	--	--	0
			Naphthalene	--	4E-12	--	4E-12	body weight	respiratory	0.00	0.00	0.00	0
			PCB-1248	4E-09	9E-13	4E-10	4E-09			--	--	--	0
			PCB-1254	2E-09	4E-13	2E-10	2E-09	eyes/immune		0.00	--	0.00	0
			2,3,7,8-TCDD	2E-07	3E-11	8E-10	2E-07	reproductive	reproductive	0.03	0.00	0.14	0
			Chromium, hexavalent	7E-08	1E-09	2E-10	7E-08	blood	respiratory	0.00	0.00	0.00	0
			Chemical Total	**3E-06**	**1E-09**	**1E-05**	**2E-05**			**0**	**0**	**1**	**1**
		Exposure Point Total					**2E-05**						**1**
	Exposure Medium Total						**2E-05**						**1**
Medium Total							**2E-05**						**1**
Receptor Total							**2E-05**					**Receptor HI Total**	**1**

Total Risk Across All Media **2E-05** **Total Hazard Across All Media** **1**

See Table E-8 for supporting calculations.

Total Liver	0
Total Reproductive	1
Total Body Weight	0
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0

TABLE 7-9 (RAGS Part D Table 9.5.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-03	--	7E-03	9E-03	adrenal	liver	23	0.00	8	31
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.08	0.00	0.03	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.02	0.00	0.01	0
			1,4-Dichlorobenzene	4E-06	4E-10	2E-05	2E-05	liver	liver	0.04	0.00	0.01	0
			Benzo(a)anthracene	2E-06	2E-11	1E-07	3E-06	--	--	--	--	--	--
			Benzo(a)pyrene	7E-05	5E-10	4E-06	8E-05	--	--	--	--	--	--
			Benzo(b)fluoranthene	8E-06	6E-11	5E-07	9E-06	--	--	--	--	--	--
			Dibenz(a,h)anthracene	1E-05	9E-11	6E-07	1E-05	--	--	--	--	--	--
			Hexachlorobenzene	7E-05	9E-10	3E-06	7E-05	liver	--	0.16	--	0.55	1
			Indeno(1,2,3-cd)pyrene	5E-06	3E-11	3E-07	5E-06	--	--	--	--	--	--
			Naphthalene	--	2E-10	--	2E-10	body weight	respiratory	0.01	0.00	0.04	0
			PCB-1248	1E-06	2E-11	9E-08	2E-06	--	--	--	--	--	--
			PCB-1254	6E-07	8E-12	4E-08	6E-07	eyes/immune	--	0.04	--	0.14	0
			2,3,7,8-TCDD	4E-05	5E-10	1E-07	4E-05	reproductive	reproductive	1.14	0.00	4	5
			Chromium, hexavalent	5E-05	6E-08	1E-07	5E-05	blood	respiratory	0.10	0.00	0.32	0
			Chemical Total	**2E-03**	**6E-08**	**7E-03**	**1E-02**			**25**	**0**	**13**	**38**
		Exposure Point Total					**1E-02**						**38**
	Exposure Medium Total						**1E-02**						**38**
Medium Total							**1E-02**						**38**
Receptor Total							**1E-02**					**Receptor HI Total**	**38**

Total Risk Across All Media **1E-02** **Total Hazard Across All Media** **38**

See Table E-9 for supporting calculations.

Total Liver	0
Total Reproductive	6
Total Body Weight	0
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0
Total Adrenal	31

TABLE 7-10 (RAGS Part D Table 9.5.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	1E-05	--	6E-05	7E-05	liver	liver	0.07	0.00	0.04	0
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	6E-08	2E-11	3E-07	4E-07	liver	liver	0.00	0.00	0.00	0
			Benzo(a)anthracene	1E-07	3E-12	1E-08	1E-07	--	--	--	--	--	--
			Benzo(a)pyrene	8E-07	2E-11	8E-08	9E-07	--	--	--	--	--	--
			Benzo(b)fluoranthene	2E-07	4E-12	1E-08	2E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	4E-07	1E-11	4E-08	4E-07	--	--	--	--	--	--
			Hexachlorobenzene	8E-07	4E-11	4E-08	8E-07	reproductive	--	0.78	--	4.29	5
			Indeno(1,2,3-cd)pyrene	1E-07	3E-12	9E-09	1E-07	--	--	--	--	--	--
			Naphthalene	--	5E-12	--	5E-12	body weight	respiratory	0.00	0.00	0.00	0
			PCB-1248	2E-08	1E-12	2E-09	2E-08	--	--	--	--	--	--
			PCB-1254	8E-09	4E-13	8E-10	9E-09	eyes/immune	--	0.00	--	0.02	0
			2,3,7,8-TCDD	8E-07	4E-11	4E-09	8E-07	reproductive	reproductive	0.11	0.00	0.65	1
			Chromium, hexavalent	3E-07	1E-09	1E-09	3E-07	blood	respiratory	0.00	0.00	0.01	0
			Chemical Total	**1E-05**	**2E-09**	**6E-05**	**8E-05**			**1**	**0**	**5**	**6**
		Exposure Point Total					**8E-05**						**6**
	Exposure Medium Total						**8E-05**						**6**
Medium Total							**8E-05**						**6**
Receptor Total							**8E-05**					**Receptor HI Total**	**6**

Total Risk Across All Media **8E-05** **Total Hazard Across All Media** **6**

See Table E-10 for supporting calculations.

Total Liver	0
Total Reproductive	6
Total Body Weight	0
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0

TABLE 7-11 (RAGS Part D Table 9.6.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-03	--	7E-03	9E-03	adrenal	liver	23	0.00	8	31
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.08	0.00	0.03	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.02	0.00	0.01	0
			1,4-Dichlorobenzene	4E-06	9E-10	2E-05	2E-05	liver	liver	0.04	0.00	0.01	0
			Benzo(a)anthracene	2E-06	4E-11	1E-07	3E-06	--	--	--	--	--	--
			Benzo(a)pyrene	7E-05	1E-09	4E-06	8E-05	--	--	--	--	--	--
			Benzo(b)fluoranthene	8E-06	1E-10	5E-07	9E-06	--	--	--	--	--	--
			Dibenz(a,h)anthracene	1E-05	2E-10	6E-07	1E-05	--	--	--	--	--	--
			Hexachlorobenzene	7E-05	2E-09	3E-06	7E-05	liver	--	0.16	--	0.55	1
			Indeno(1,2,3-cd)pyrene	5E-06	7E-11	3E-07	5E-06	--	--	--	--	--	0
			Naphthalene	--	3E-10	--	3E-10	body weight	respiratory	0.01	0.00	0.04	0
			PCB-1248	1E-06	4E-11	9E-08	2E-06	--	--	--	--	--	--
			PCB-1254	6E-07	2E-11	4E-08	6E-07	eyes/immune	--	0.04	--	0.14	0
			2,3,7,8-TCDD	4E-05	9E-10	1E-07	4E-05	reproductive	reproductive	1.14	0.00	4.11	5
			Chromium, hexavalent	5E-05	1E-07	3E-09	5E-05	blood	respiratory	0.10	0.00	0.32	0
			Chemical Total	**2E-03**	**1E-07**	**7E-03**	**1E-02**			**25**	**0**	**13**	**38**
		Exposure Point Total					**1E-02**						**38**
	Exposure Medium Total						**1E-02**						**38**
Medium Total							**1E-02**						**38**
Receptor Total							**1E-02**					**Receptor HI Total**	**38**

Total Risk Across All Media **1E-02**

Total Hazard Across All Media **38**

See Table E-11 for supporting calculations.

Total Liver	0
Total Reproductive	6
Total Body Weight	0
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0
Total Adrenal	31

TABLE 7-12 (RAGS Part D Table 9.6.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-05	--	6E-05	8E-05	liver	liver	0.10	0.00	0.04	0
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	8E-08	9E-11	3E-07	4E-07	liver	liver	0.00	0.00	0.00	0
			Benzo(a)anthracene	2E-07	1E-11	1E-08	2E-07	--	--	--	--	--	--
			Benzo(a)pyrene	1E-06	1E-10	8E-08	1E-06	--	--	--	--	--	--
			Benzo(b)fluoranthene	2E-07	2E-11	1E-08	2E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	6E-07	5E-11	4E-08	6E-07	--	--	--	--	--	--
			Hexachlorobenzene	1E-06	2E-10	4E-08	1E-06	reproductive	--	1.18	--	4.29	5
			Indeno(1,2,3-cd)pyrene	1E-07	1E-11	9E-09	2E-07	--	--	--	--	--	--
			Naphthalene	--	2E-11	--	2E-11	body weight	respiratory	0.00	0.00	0.00	0
			PCB-1248	3E-08	4E-12	2E-09	3E-08	--	--	--	--	--	--
			PCB-1254	1E-08	2E-12	8E-10	1E-08	eyes/immune	--	0.00	--	0.02	0
			2,3,7,8-TCDD	1E-06	1E-10	4E-09	1E-06	reproductive	reproductive	0.17	0.00	0.65	1
			Chromium, hexavalent	5E-07	6E-09	1E-09	5E-07	blood	respiratory	0.01	0.00	0.01	0
			Chemical Total	**2E-05**	**7E-09**	**6E-05**	**8E-05**			**1**	**0**	**5**	**6**
		Exposure Point Total					**8E-05**						**6**
	Exposure Medium Total						**8E-05**						**6**
Medium Total							**8E-05**						**6**
Receptor Total							**8E-05**					**Receptor HI Total**	**6**

Total Risk Across All Media **8E-05** **Total Hazard Across All Media** **6**

See Table E-12 for supporting calculations.

Total Liver	0
Total Reproductive	6
Total Body Weight	0
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0

TABLE 7-13 (RAGS Part D Table 9.7.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	Surface and Subsurface Soil (0-10 feet bgs)	Western Area Surface and Subsurface Soil	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.039	--	0.639	1
			1,2,4-Trichlorobenzene	9E-08	--	1E-06	2E-06	liver	liver	0.003	0.000	0.044	0
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.001	0.000	0.025	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.002	0.000	0.026	0
			1,4-Dichlorobenzene	7E-08	9E-12	1E-06	1E-06	liver	liver	0.015	0.000	0.254	0
			Benzene	3E-08	2E-13	4E-07	5E-07	blood	liver	0.004	0.000	0.062	0
			Chlorobenzene	--	--	--	--	liver	liver	0.004	0.000	0.066	0
			Ethylbenzene	2E-08	3E-13	3E-07	3E-07	liver	ear	0.003	0.000	0.046	0
			m,p-Xylenes	--	--	--	--	whole body	whole body	0.006	0.000	0.104	0
			o-Xylene	--	--	--	--	whole body	whole body	0.002	0.000	0.037	0
			1,1'-Biphenyl	3E-09	--	4E-09	7E-09	fetus	edema	0.000	0.000	0.000	0
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	2.174	--	36.055	38
			Benzo(a)anthracene	6E-07	5E-12	2E-07	7E-07	--	--	--	--	--	0
			Benzo(a)pyrene	5E-06	4E-11	1E-06	6E-06	--	--	--	--	--	0
			Benzo(b)fluoranthene	4E-07	3E-12	1E-07	5E-07	--	--	--	--	--	0
			Dibenz(a,h)anthracene	1E-07	1E-12	3E-08	1E-07	--	--	--	--	--	0
			Indeno(1,2,3-cd)pyrene	3E-07	3E-12	9E-07	1E-06	--	--	--	--	--	0
			Naphthalene	--	2E-12	--	2E-12	body weight	respiratory	0.003	0.000	0.048	0
			PCB-1254	2E-08	3E-13	5E-09	2E-08	eyes/immune	--	0.031	--	0.477	1
			PCB-1260	2E-08	3E-13	7E-09	3E-08	--	--	--	--	--	0
			2,3,7,8-TCDD	4E-06	5E-11	5E-08	4E-06	reprod	reproductive	2.666	0.000	46.409	49
			Antimony	--	--	--	--	whole body	--	0.137	--	2.278	2
			Arsenic	5E-07	8E-11	7E-09	5E-07	skin	respiratory	0.082	0.000	1.364	1
			Cobalt	--	2E-07	--	2E-07	thyroid	respiratory	0.079	0.001	1.316	1
			Iron	--	--	--	--	gastrointestinal	--	0.178	--	2.951	3
			Lead	--	--	--	--	--	--	--	--	--	0
			Thallium	--	--	--	--	hair/eyes	--	0.051	--	0.847	1
			Vanadium	--	--	--	--	kidney	--	2.267	--	34.204	36
			Zinc	--	--	--	--	low Cu status	--	0.061	--	1.015	1
			Chromium, hexavalent	2E-05	3E-08	2E-07	2E-05	blood	respiratory	1.117	0.002	17.358	18
			Chemical Total	**3E-05**	**2E-07**	**6E-06**	**4E-05**			**9**	**0**	**146**	**155**
		Exposure Point Total					**4E-05**						**155**
	Exposure Medium Total						**4E-05**						**155**
Soil Total							**4E-05**						**155**

TABLE 7-13 (RAGS Part D Table 9.7.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Shallow Groundwater	Shallow Groundwater	Western Area Shallow Groundwater	1,2,4-Trichlorobenzene	4.0E-10	--	2.6E-05	3E-05	liver	Not evaluated	0.00	--	0.22	0
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.18	0
			1,3-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.10	0
			1,4-Dichlorobenzene	3.7E-10	--	3.5E-06	4E-06	liver	Not evaluated	0.00	--	0.73	1
			Benzene	7.2E-08	--	2.0E-04	2E-04	blood	Not evaluated	0.01	--	29	29
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.01	--	30	30
			Ethylbenzene	1.5E-09	--	1.6E-05	2E-05	liver	Not evaluated	0.00	--	2.54	3
			Xylene (total)	--	--	--	--	whole body	Not evaluated	0.00	--	1.34	1
			1,1'-Biphenyl	3.5E-09	--	--	3E-09	whole body	Not evaluated	0.00	--	--	0
			2-Methylnaphthalene	--	--	--	--	respiratory	Not evaluated	0.18	--	--	0
			Acenaphthene	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.30	--	20956	20956
			Aluminum	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Antimony	--	--	--	--	whole body	Not evaluated	0.01	--	--	0
			Arsenic	3.7E-07	--	--	4E-07	skin	Not evaluated	0.06	--	--	0
			Barium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	--	kdiney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0
			Cobalt	--	--	--	--	throid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.08	--	--	0
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	0
			Manganese	--	--	--	--	CNS	Not evaluated	0.01	--	--	0
			Mercury	--	--	--	--	GI/kidney	Not evaluated	0.00	--	--	0
			Thallium	--	--	--	--	hair/eyes	Not evaluated	0.11	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.08	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.01	--	--	0
			Chromium, hexavalent	3.1E-05	--	--	3E-05	blood	Not evaluated	1.63	--	--	2
			Chemical Total	**3E-05**	**0E+00**	**2E-04**	**3E-04**			**3**	**0**	**21020**	**21022**
		Exposure Point Total					**3E-04**						**21022**
	Exposure Medium Total						**3E-04**						**21022**
Groundwater Total							**3E-04**						**21022**
Receptor Total							**3E-04**					**Receptor HI Total**	**21177**
				Total Risk Across All Media			**3E-04**			**Total Hazard Across All Media**			**21177**

Inhalation of volatiles from water not evaluated for construction worker
Lead evaluated using the Adult Lead Model (see Appendix G).
See Table E-13 for supporting calculations.

Total Immune system	1
Total Liver	34
Total Body weight	20957
Total Reproductive system	49
Total Blood	49
Total Whole body	4
Total Skin	2
Total Low copper status	1
Total Thyroid	40
Total Respiratory	0
Total Kidney	37
Total Gastrointestinal	3
Total CNS	0
Total Eyes	2
Total Fetus	0
Total Immune system	1
Total Hair	1
Total Ear	0
Total Edema	0

TABLE 7-14 (RAGS Part D Table 9.7.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Western Area Surface and Subsurface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.00	--	0.01	0
			1,2,4-Trichlorobenzene	5E-09	--	7E-08	8E-08	liver	liver	0.00	0.00	0.00	0
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	5E-09	2E-12	7E-08	8E-08	liver	liver	0.00	0.00	0.02	0
			Benzene	6E-10	2E-14	8E-09	9E-09	blood	liver	0.00	0.00	0.00	0
			Chlorobenzene	0E+00	--	--	--	liver	liver	0.00	0.00	0.00	0
			Ethylbenzene	3E-10	1E-14	3E-09	4E-09	liver	ear	0.00	0.00	0.00	0
			m,p-Xylenes	--	--	--	--	whole body	whole body	0.00	0.00	0.00	0
			o-Xylene	--	--	--	--	whole body	whole body	0.00	0.00	0.00	0
			1,1'-Biphenyl	3E-11	--	4E-11	7E-11	fetus	edema	0.00	0.00	0.00	0
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	0.12	--	1.68	2
			Benzo(a)anthracene	1E-08	3E-13	3E-09	1E-08	--	--	--	--	--	--
			Benzo(a)pyrene	1E-07	3E-12	2E-08	1E-07	--	--	--	--	--	--
			Benzo(b)fluoranthene	1E-08	3E-13	2E-09	1E-08	--	--	--	--	--	--
			Dibenz(a,h)anthracene	8E-09	3E-13	2E-09	1E-08	--	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	8E-09	2E-13	2E-08	3E-08	--	--	--	--	--	--
			Naphthalene	--	1E-13	--	1E-13	body weight	respiratory	0.00	0.00	0.00	0
			PCB-1254	6E-10	3E-14	2E-10	8E-10	eyes/immune	--	0.00	--	0.02	0
			PCB-1260	2E-09	8E-14	4E-10	2E-09	--	--	--	--	--	--
			2,3,7,8-TCDD	2E-07	9E-12	2E-09	2E-07	reprod	reproductive	0.15	0.00	2.09	2
			Antimony	--	--	--	--	whole body	--	0.01	--	0.18	0
			Arsenic	6E-08	3E-11	7E-10	6E-08	skin	respiratory	0.01	0.00	0.14	0
			Cobalt	--	3E-08	--	3E-08	thyroid	respiratory	0.00	0.00	0.07	0
			Iron	--	--	--	--	gastrointestinal	--	0.02	--	0.25	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Thallium	--	--	--	--	hair/eyes	--	0.04	--	0.52	1
			Vanadium	--	--	--	--	kidney	--	0.15	--	1.81	2
			Zinc	--	--	--	--	low Cu status	--	0.00	--	0.03	0
			Chromium, hexavalent	1E-06	4E-09	8E-09	1E-06	blood	respiratory	0.05	0.00	0.65	1
			Chemical Total	**1E-06**	**4E-08**	**2E-07**	**2E-06**			**1**	**0**	**7**	**8**
		Exposure Point Total					**2E-06**						**8**
	Exposure Medium Total						**2E-06**						**8**
Soil Total							**2E-06**						**8**

TABLE 7-14 (RAGS Part D Table 9.7.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Shallow Groundwater	**Shallow Groundwater**	**Western Area Shallow Groundwater**	1,2,4-Trichlorobenzene	3.7E-11	--	2.1E-06	2E-06	liver	Not evaluated	0.00	--	0.06	0
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.00	0
			1,4-Dichlorobenzene	2.9E-11	--	8.5E-07	9E-07	liver	Not evaluated	0.00	--	0.00	0
			Benzene	3.1E-09	--	2.6E-05	3E-05	blood	Not evaluated	0.00	--	3.73	4
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	3.58	4
			Ethylbenzene	6.9E-11	--	2.2E-06	2E-06	liver	Not evaluated	0.00	--	0.34	0
			Xylene (total)	--	--	--	--	whole body	Not evaluated	0.00	--	0.19	0
			1,1'-Biphenyl	1.4E-10	--	--	1E-10	whole body	Not evaluated	0.00	--	--	0
			2-Methylnaphthalene	--	--	--	--	respiratory	Not evaluated	0.01	--	--	0
			Acenaphthene	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.01	--	2418	2418
			Aluminum	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Antimony	--	--	--	--	whole body	Not evaluated	0.00	--	--	0
			Arsenic	2.1E-08	--	--	2E-08	skin	Not evaluated	0.00	--	--	0
			Barium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	--	kdiney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0
			Cobalt	--	--	--	--	thyroid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.00	--	--	0
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Mercury	--	--	--	--	G/kidney	Not evaluated	0.00	--	--	0
			Thallium	--	--	--	--	hair/eyes	Not evaluated	0.01	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.00	--	--	0
			Chromium, hexavalent	1.3E-06	--	--	1E-06	blood	Not evaluated	0.07	--	--	0
			Chemical Total	**1E-06**	**0E+00**	**3E-05**	**3E-05**			**0**	**0**	**2426**	**2426**
		Exposure Point Total					**3E-05**						**2426**
	Exposure Medium Total						**3E-05**						**2426**
Groundwater Total							**3E-05**						**2426**
Receptor Total							**2E-06**					**Receptor HI Total**	**2426**
						Total Risk Across All Media	**3E-06**					**Total Hazard Across All Media**	**2434**

Inhalation of volatiles from water not evaluated for construction worker
Lead evaluated using the Adult Lead Model (see Appendix G).
See Table E-14 for supporting calculations.

Total Immune system	0
Total Liver	4
Total Body weight	2418
Total Reproductive system	2
Total Blood	5
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	2
Total Respiratory	0
Total Kidney	2
Total Gastrointestinal	0
Total CNS	0
Total Eyes	1
Total Fetus	0
Total Immune system	0
Total Hair	1
Total Ear	0
Total Edema	0

TABLE 7-15 (RAGS Part D Table 9.8.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
								Primary Target Organ(s)					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Western Area Surface and Subsurface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.04	--	0.20	0
			1,2,4-Trichlorobenzene	9E-08	--	4E-07	5E-07	liver	liver	0.00	0.00	0.01	0
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.01	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.01	0
			1,4-Dichlorobenzene	7E-08	9E-12	4E-07	5E-07	liver	liver	0.02	0.00	0.08	0
			Benzene	3E-08	2E-13	1E-07	2E-07	blood	liver	0.00	0.00	0.02	0
			Chlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.02	0
			Ethylbenzene	2E-08	3E-13	9E-08	1E-07	liver	ear	0.00	0.00	0.01	0
			m,p-Xylenes	--	--	--	--	whole body	whole body	0.01	0.00	0.03	0
			o-Xylene	--	--	--	--	whole body	whole body	0.00	0.00	0.01	0
			1,1'-Biphenyl	3E-09	--	1E-09	4E-09	fetus	edema	0.00	0.00	0.00	0
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	2.17	--	11.09	13
			Benzo(a)anthracene	6E-07	5E-12	5E-08	6E-07	--	--	--	--	--	0
			Benzo(a)pyrene	5E-06	4E-11	4E-07	5E-06	--	--	--	--	--	0
			Benzo(b)fluoranthene	4E-07	3E-12	3E-08	4E-07	--	--	--	--	--	0
			Dibenz(a,h)anthracene	1E-07	1E-12	9E-09	1E-07	--	--	--	--	--	0
			Indeno(1,2,3-cd)pyrene	3E-07	3E-12	3E-07	6E-07	--	--	--	--	--	0
			Naphthalene	--	2E-12	--	2E-12	body weight	respiratory	0.00	0.00	0.01	0
			PCB-1254	2E-08	3E-13	2E-09	2E-08	eyes/immune	--	0.03	--	0.15	0
			PCB-1260	2E-08	3E-13	2E-09	2E-08	--	--	--	--	--	0
			2,3,7,8-TCDD	4E-06	5E-11	2E-08	4E-06	reprod	reproductive	2.67	0.00	14.28	17
			Antimony	--	--	--	--	whole body	--	0.14	--	0.70	1
			Arsenic	5E-07	8E-11	2E-09	5E-07	skin	respiratory	0.08	0.00	0.42	1
			Cobalt	--	2E-07	--	2E-07	thyroid	respiratory	0.08	0.00	0.40	0
			Iron	--	--	--	--	gastrointestinal	--	0.18	--	0.91	1
			Lead	--	--	--	--	blood	--	--	--	--	0
			Thallium	--	--	--	--	hair/eyes	--	0.05	--	0.26	0
			Vanadium	--	--	--	--	kidney	--	2.27	--	10.52	13
			Zinc	--	--	--	--	low Cu status	--	0.06	--	0.31	0
			Chromium, hexavalent	2E-05	3E-08	7E-08	2E-05	blood	respiratory	1.12	0.00	5.34	6
			Chemical Total	**3E-05**	**2E-07**	**2E-06**	**3E-05**			**9**	**0**	**45**	**54**
		Exposure Point Total					**3E-05**						**54**
	Exposure Medium Total						**3E-05**						**54**
Soil Total							**3E-05**						**54**

TABLE 7-15 (RAGS Part D Table 9.8.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
								Primary Target Organ(s)					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Shallow Groundwater	**Shallow Groundwater**	**Western Area Shallow Groundwater**	1,2,4-Trichlorobenzene	4.0E-10	--	2.3E-06	2E-06	liver	Not evaluated	0.00	--	0.07	0
			1,2-Dichlorobenzene	--	--	--	0E+00	liver	Not evaluated	0.00	--	0.06	0
			1,3-Dichlorobenzene	--	--	--	0E+00	liver	Not evaluated	0.00	--	0.03	0
			1,4-Dichlorobenzene	3.7E-10	--	1.1E-06	1E-06	liver	Not evaluated	0.00	--	0.22	0
			Benzene	7.2E-08	--	6.2E-05	6E-05	blood	Not evaluated	0.01	--	8.82	9
			Chlorobenzene	--	--	--	0E+00	liver	Not evaluated	0.01	--	9.20	9
			Ethylbenzene	1.5E-09	--	5.0E-06	5E-06	liver	Not evaluated	0.00	--	0.78	1
			Xylene (total)	--	--	--	0E+00	whole body	Not evaluated	0.00	--	0.41	0
			1,1'-Biphenyl	3.5E-09	--	--	3E-09	whole body	Not evaluated	0.00	--	--	0
			2-Methylnaphthalene	--	--	--	0E+00	respiratory	Not evaluated	0.18	--	--	0
			Acenaphthene	--	--	--	0E+00	kidney	Not evaluated	0.00	--	--	0
			Naphthalene	--	--	--	0E+00	body weight	Not evaluated	0.30	--	6448	6448
			Aluminum	--	--	--	0E+00	CNS	Not evaluated	0.00	--	--	0
			Antimony	--	--	--	0E+00	whole body	Not evaluated	0.01	--	--	0
			Arsenic	3.7E-07	--	--	4E-07	skin	Not evaluated	0.06	--	--	0
			Barium	--	--	--	0E+00	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	0E+00	kdiney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	0E+00	blood	Not evaluated	0.00	--	--	0
			Cobalt	--	--	--	0E+00	throid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	0E+00	gastrointestinal	Not evaluated	0.08	--	--	0
			Lead	--	--	--	0E+00	blood	Not evaluated	--	--	--	0
			Manganese	--	--	--	0E+00	CNS	Not evaluated	0.01	--	--	0
			Mercury	--	--	--	0E+00	GI/kidney	Not evaluated	0.00	--	--	0
			Thallium	--	--	--	0E+00	hair/eyes	Not evaluated	0.11	--	--	0
			Vanadium	--	--	--	0E+00	kidney	Not evaluated	0.08	--	--	0
			Zinc	--	--	--	0E+00	low Cu status	Not evaluated	0.01	--	--	0
			Chromium, hexavalent	3.1E-05	--	--	3E-05	blood	Not evaluated	1.63	--	--	2
			Chemical Total	**3E-05**	**0E+00**	**7E-05**	**1E-04**			**3**	**0**	**6468**	**6470**
		Exposure Point Total					**1E-04**						**6470**
	Exposure Medium Total						**1E-04**						**6470**
Groundwater Total							**1E-04**						**6470**
Receptor Total							**1E-04**					**Receptor HI Total**	**6524**

Total Risk Across All Media **1E-04** **Total Hazard Across All Media** **6524**

Total Immune system	0
Total Liver	11
Total Body weight	6449
Total Reproductive system	17
Total Blood	17
Total Whole body	1
Total Skin	1
Total Low copper status	0
Total Thyroid	14
Total Respiratory	0
Total Kidney	13
Total Gastrointestinal	1
Total CNS	0
Total Eyes	1
Total Fetus	0
Total Immune system	0
Total Hair	0
Total Ear	0
Total Edema	0

Inhalation of volatiles from water not evaluated for construction worker
Lead evaluated using the Adult Lead Model (see Appendix G).
See Table E-15 for supporting calculations.

TABLE 7-16 (RAGS Part D Tale 9.8.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
								Primary Target Organ(s)					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Western Area Surface and Subsurface Soil**	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.00	--	0.00	0
			1,2,4-Trichlorobenzene	2E-09	--	2E-08	3E-08	liver	liver	0.00	0.00	0.00	0
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	2E-09	7E-13	2E-08	3E-08	liver	liver	0.00	0.00	0.01	0
			Benzene	2E-10	6E-15	3E-09	3E-09	blood	liver	0.00	0.00	0.00	0
			Chlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			Ethylbenzene	8E-11	4E-15	1E-09	1E-09	liver	ear	0.00	0.00	0.00	0
			m,p-Xylenes	--	--	--	--	whole body	whole body	0.00	0.00	0.00	0
			o-Xylene	--	--	--	--	whole body	whole body	0.00	0.00	0.00	0
			1,1'-Biphenyl	9E-12	0E+00	1E-11	2E-11	fetus	edema	0.00	0.00	0.00	0
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	0.04	--	0.56	1
			Benzo(a)anthracene	4E-09	1E-13	9E-10	5E-09	--	--	--	--	--	--
			Benzo(a)pyrene	4E-08	1E-12	8E-09	4E-08	--	--	--	--	--	--
			Benzo(b)fluoranthene	3E-09	9E-14	7E-10	4E-09	--	--	--	--	--	--
			Dibenz(a,h)anthracene	3E-09	9E-14	6E-10	3E-09	--	--	--	--	--	--
			Indeno(1,2,3-cd)pyrene	3E-09	7E-14	6E-09	9E-09	--	--	--	--	--	--
			Naphthalene	--	3E-14	--	3E-14	body weight	respiratory	0.00	0.00	0.00	0
			PCB-1254	2E-10	1E-14	6E-11	3E-10	eyes/immune	--	0.00	--	0.01	0
			PCB-1260	5E-10	3E-14	1E-10	6E-10	--	--	--	--	--	--
			2,3,7,8-TCDD	7E-08	3E-12	8E-10	7E-08	reprod	reproductive	0.05	0.00	0.70	1
			Antimony	--	--	--	--	whole body	--	0.00	--	0.06	0
			Arsenic	2E-08	1E-11	2E-10	2E-08	skin	respiratory	0.00	0.00	0.05	0
			Cobalt	--	1E-08	--	1E-08	thyroid	respiratory	0.00	0.00	0.02	0
			Iron	--	--	--	--	gastrointestinal	--	0.01	--	0.08	0
			Lead	--	--	--	--	blood	--	--	--	--	--
			Thallium	--	--	--	--	hair/eyes	--	0.01	--	0.17	0
			Vanadium	--	--	--	--	kidney	--	0.05	--	0.60	1
			Zinc	--	--	--	--	low Cu status	--	0.00	--	0.01	0
			Chromium, hexavalent	3E-07	1E-09	3E-09	3E-07	blood	respiratory	0.02	0.00	0.22	0
			Chemical Total	**5E-07**	**1E-08**	**7E-08**	**5E-07**			**0**	**0**	**2**	**3**
		Exposure Point Total					**5E-07**						**3**
	Exposure Medium Total						**5E-07**						**3**
Soil Total							**5E-07**						**3**

TABLE 7-16 (RAGS Part D Tale 9.8.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
								Primary Target Organ(s)					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Shallow Groundwater	Shallow Groundwater	Western Area Shallow Groundwater	1,2,4-Trichlorobenzene	3.7E-11	--	6.9E-07	7E-07	liver	Not evaluated	0.00	--	0.02	0
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.00	0
			1,4-Dichlorobenzene	2.9E-11	--	2.8E-07	3E-07	liver	Not evaluated	0.00	--	0.06	0
			Benzene	3.1E-09	--	8.8E-06	9E-06	blood	Not evaluated	0.00	--	1.24	1
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	1.19	1
			Ethylbenzene	6.9E-11	--	7.3E-07	7E-07	liver	Not evaluated	0.00	--	0.11	0
			Xylene (total)	--	--	--	--	whole body	Not evaluated	0.00	--	0.06	0
			1,1'-Biphenyl	1.4E-10	--	--	1E-10	whole body	Not evaluated	0.00	--	--	0
			2-Methylnaphthalene	--	--	--	--	respiratory	Not evaluated	0.01	--	--	0
			Acenaphthene	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.01	--	806	806
			Aluminum	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Antimony	--	--	--	--	whole body	Not evaluated	0.00	--	--	0
			Arsenic	2.1E-08	--	--	2E-08	skin	Not evaluated	0.00	--	--	0
			Barium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	--	kdiney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0
			Cobalt	--	--	--	--	thyroid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.00	--	--	0
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Mercury	--	--	--	--	G/kidney	Not evaluated	0.00	--	--	0
			Thallium	--	--	--	--	hair/eyes	Not evaluated	0.01	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.00	--	--	0
			Chromium, hexavalent	1.3E-06	--	--	1E-06	blood	Not evaluated	0.07	--	--	0
			Chemical Total	**1E-06**	**0E+00**	**1E-05**	**1E-05**			**0**	**0**	**809**	**809**
		Exposure Point Total					**1E-05**						**809**
	Exposure Medium Total						**1E-05**						**809**
Groundwater Total							**1E-05**						**809**
Receptor Total							**1E-05**					**Receptor HI Total**	**811**
				Total Risk Across All Media			**1E-05**			**Total Hazard Across All Media**			**811**

Inhalation of volatiles from water not evaluated for construction worker
Lead evaluated using the Adult Lead Model (see Appendix G).
See Table E-16 for supporting calculations.

Total	Immune system	0
Total	Liver	1
Total	Body weight	806
Total	Reproductive system	1
Total	Blood	2
Total	Whole body	0
Total	Skin	0
Total	Low copper status	0
Total	Thyroid	1
Total	Respiratory	0
Total	Kidney	1
Total	Gastrointestinal	0
Total	CNS	0
Total	Eyes	0
Total	Fetus	0
Total	Immune system	0
Total	Hair	0
Total	Ear	0
Total	Edema	0

TABLE 7-17 (RAGS Part D Table 9.9.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	4E-05	--	6E-04	7E-04	liver	liver	13	0.00	214	227
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.08	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.02	0
			1,4-Dichlorobenzene	1E-07	1E-11	2E-06	2E-06	liver	liver	0.03	0.00	0.42	0
			Benzo(a)anthracene	7E-08	6E-13	2E-08	9E-08	--	--	--	--	--	--
			Benzo(a)pyrene	2E-06	2E-11	6E-07	3E-06	--	--	--	--	--	--
			Benzo(b)fluoranthene	4E-07	3E-12	1E-07	5E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	3E-07	3E-12	9E-08	4E-07	--	--	--	--	--	--
			Hexachlorobenzene	2E-06	3E-11	3E-07	2E-06	reproductive	--	9	--	149	158
			Indeno(1,2,3-cd)pyrene	1E-07	1E-12	4E-08	2E-07	--	--	--	--	--	--
			Naphthalene	--	4E-11	--	4E-11	body weight	respiratory	0.08	0.00	1.16	1
			PCB-1248	3E-08	5E-13	1E-08	4E-08	--	--	--	--	--	--
			PCB-1254	1E-08	2E-13	4E-09	2E-08	eyes/immune	--	0.02	--	0.39	0
			2,3,7,8-TCDD	4E-07	7E-12	7E-09	5E-07	reproductive	--	0.33	--	6	6
			Arsenic	3E-07	5E-11	4E-09	3E-07	skin	--	0.05	--	0.80	1
			Cobalt	--	1E-07	--	1E-07	thyroid	--	0.06	--	0.97	1
			Iron	--	--	--	--	gastrointestinal	--	0.14	--	0.29	0
			Thallium	--	--	--	--	hair/eyes	--	0.34	--	0.74	1
			Vanadium	--	--	--	--	kidney	--	2.10	--	32	34
			Chromium, hexavalent	2E-05	3E-08	2E-07	2E-05	blood	respiratory	1.10	0.00	17	18
			Chemical Total	**7E-05**	**1E-07**	**6E-04**	**7E-04**			**26**	**0**	**422**	**448**
		Exposure Point Total					**7E-04**						**448**
	Exposure Medium Total						**7E-04**						**448**
Soil Total							**7E-04**						**448**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	1,2,4-Trichlorobenzene	1.0E-05	--	3.4E-05	4E-05	liver	Not evaluated	0.31	--	1.01	1
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.05	--	0.08	0
			1,3-Dichlorobenzene*	--	--	--	--	liver	Not evaluated	0.03	--	0.08	0
			1,4-Dichlorobenzene	2.1E-06	--	3.5E-06	6E-06	liver	Not evaluated	0.43	--	0.73	1
			Benzene	3.9E-06	--	1.9E-06	6E-06	blood	Not evaluated	0.55	--	0.27	1
			Chlorobenzene	--	--	--	--	liver	Not evaluated	1.65	--	1.59	3
			Benzo(a)anthracene	2.0E-06	--	3.6E-05	4E-05	--	Not evaluated	--	--	--	--
			Benzo(a)pyrene	--	--	3.7E-04	4E-04	--	Not evaluated	--	--	--	--
			Benzo(b)fluoranthene	2.6E-06	--	8.6E-04	9E-04	--	Not evaluated	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	--	9.0E-04	9E-04	--	Not evaluated	--	--	--	--
			Naphthalene	--	--	--	--	body wieght	Not evaluated	7.12	--	88	95
			Aluminum	--	--	--	--	CNS	Not evaluated	20	--	--	20
			Barium	--	--	--	--	kidney	Not evaluated	0.42	--	--	0
			Cadmium	--	--	--	--	kidney	Not evaluated	14	--	--	14
			Chromium	--	--	--	--	blood	Not evaluated	17	--	--	17
			Cobalt	--	--	--	--	thyroid	Not evaluated	15	--	--	15
			Iron	--	--	--	--	gastrointestinal	Not evaluated	63	--	--	63
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	4.81	--	--	5

TABLE 7-17 (RAGS Part D Table 9.9.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
			Mercury	--	--	--	--	GI /kidney	Not evaluated	4.66	--	--	5
			Nickel	--	--	--	--	body weight	Not evaluated	10.75	--	--	11
			Vanadium	--	--	--	--	kidney	Not evaluated	1308	--	--	1308
			Zinc	--	--	--	--	low Cu status	Not evaluated	121	--	--	121
			Chromium, hexavalent	2.0E-02	--	--	2E-02	blood	Not evaluated	1024	--	--	1024
			Chemical Total	**2E-02**	**3E-07**	**3E-03**	**2E-02**			**2611**	**0**	**92**	**2703**
		Exposure Point Total					**2E-02**						**2703**
	Exposure Medium Total						**2E-02**						**2703**
Groundwater Total							**2E-02**						**2703**
Receptor Total							**2E-02**					**Receptor HI Total**	**3152**

Total Risk Across All Media **2E-02**

Total Hazard Across All Media **3152**

Lead evaluated using the Adult Lead Model (See Appendix G).
See Table E-17 for supporting calculations.

Total Immune system	0
Total Liver	233
Total Body weight	107
Total Reproductive system	164
Total Blood	1059
Total Whole body	0
Total Skin	1
Total Low copper status	121
Total Thyroid	16
Total Respiratory	0
Total Kidney	1360
Total Gastrointestinal	69
Total CNS	25
Total Eyes	1
Total Hair	1

TABLE 7-18 (RAGS Part D Table 9.9.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Western Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	2E-06	--	2E-05	2E-05	liver	liver	0.53	0.00	7.27	8
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	8E-09	3E-12	1E-07	1E-07	liver	liver	0.00	0.00	0.02	0
			Benzo(a)anthracene	2E-08	5E-13	4E-09	2E-08	--	--	--	--	--	--
			Benzo(a)pyrene	1E-07	4E-12	3E-08	2E-07	--	--	--	--	--	--
			Benzo(b)fluoranthene	3E-08	7E-13	6E-09	3E-08	--	--	--	--	--	--
			Dibenz(a,h)anthracene	7E-08	2E-12	2E-08	8E-08	--	--	--	--	--	--
			Hexachlorobenzene	1E-07	7E-12	2E-08	2E-07	reproductive	--	0.65	--	8.85	10
			Indeno(1,2,3-cd)pyrene	2E-08	5E-13	4E-09	2E-08	--	--	--	--	--	--
			Naphthalene	--	3E-12	--	3E-12	body weight	respiratory	0.00	0.00	0.02	0
			PCB-1248	2E-09	1E-13	6E-10	3E-09	--	--	--	--	--	--
			PCB-1254	1E-09	5E-14	3E-10	1E-09	eyes/immune	--	0.00	--	0.02	0
			2,3,7,8-TCDD	1E-07	5E-12	1E-09	1E-07	reproductive	--	0.08	--	1.18	1
			Arsenic	2E-08	1E-11	3E-10	2E-08	skin	--	0.00	--	0.05	0
			Cobalt	--	3E-08	--	3E-08	thyroid	--	0.00	--	0.07	0
			Iron	--	--	--	--	gastrointestinal	--	0.01	--	0.02	0
			Thallium	--	--	--	--	hair/eyes	--	0.03	--	0.05	0
			Vanadium	--	--	--	--	kidney	--	0.15	--	1.84	2
			Chromium, hexavalent	2E-06	8E-09	1E-08	2E-06	blood	respiratory	0.09	0.00	1.12	1
			Chemical Total	**4E-06**	**4E-08**	**2E-05**	**3E-05**			**2**	**0**	**21**	**22**
		Exposure Point Total					**3E-05**						**22**
	Exposure Medium Total						**3E-05**						**22**
Soil Total							**3E-05**						**22**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	1,2,4-Trichlorobenzene	2.8E-10	--	1.6E-05	2E-05	liver	Not evaluated	0.00	--	0.47	0
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.04	0
			1,3-Dichlorobenzene*	--	--	--	--	liver	Not evaluated	0.00	--	0.04	0
			1,4-Dichlorobenzene	5.6E-11	--	1.6E-06	2E-06	liver	Not evaluated	0.00	--	0.34	0
			Benzene	1.1E-10	--	8.9E-07	9E-07	blood	Not evaluated	0.00	--	0.13	0
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.73	1
			Benzo(a)anthracene	5.5E-11	--	1.6E-05	2E-05	--	Not evaluated	--	--	--	--
			Benzo(a)pyrene	--	--	1.7E-04	2E-04	--	Not evaluated	--	--	--	--
			Benzo(b)fluoranthene	7.2E-11	--	4.0E-04	4E-04	--	Not evaluated	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	--	4.2E-04	4E-04	--	Not evaluated	--	--	--	--
			Naphthalene	--	--	--	--	body wieght	Not evaluated	0.00	--	41	41
			Aluminum	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Barium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0
			Cobalt	--	--	--	--	thyroid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.00	--	--	0
			Lead	--	--	--	--	--	Not evaluated	--	--	--	0
			Manganese	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Mercury	--	--	--	--	GI /kidney	Not evaluated	0.00	--	--	0

TABLE 7-18 (RAGS Part D Table 9.9.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
			Nickel	--	--	--	--	body weight	Not evaluated	0.00	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.04	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.00	--	--	0
			Chromium, hexavalent	5.4E-07	--	--	5E-07	blood	Not evaluated	0.03	--	--	0
			Chemical Total	**5E-07**	**0E+00**	**1E-03**	**1E-03**			**0**	**0**	**42**	**42**
		Exposure Point Total					**1E-03**						**42**
	Exposure Medium Total						**1E-03**						**42**
Groundwater Total							**1E-03**						**42**
Receptor Total							**1E-03**					**Receptor HI Total**	**65**
				Total Risk Across All Media			**1E-03**			**Total Hazard Across All Media**			**65**

Lead evaluated using the Adult Lead Model (See Appendix G).
See Table E-18 for supporting calculations.

Total Immune system	0
Total Liver	9
Total Body weight	41
Total Reproductive system	11
Total Blood	1
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	2
Total Gastrointestinal	0
Total CNS	0
Total Eyes	0
Total Hair	0

TABLE 7-19 (RAGS Part D Table 9.10.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	2E-06	--	2E-05	3E-05	liver	liver	0.60	0.00	8.22	9
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.00	0
			1,4-Dichlorobenzene	6E-09	2E-12	8E-08	8E-08	liver	liver	0.00	0.00	0.02	0
			Benzo(a)anthracene	3E-09	9E-14	7E-10	4E-09	--	--	--	--	--	--
			Benzo(a)pyrene	1E-07	3E-12	2E-08	1E-07	--	--	--	--	--	--
			Benzo(b)fluoranthene	2E-08	5E-13	4E-09	2E-08	--	--	--	--	--	--
			Dibenz(a,h)anthracene	1E-08	5E-13	3E-09	2E-08	--	--	--	--	--	--
			Hexachlorobenzene	9E-08	5E-12	1E-08	1E-07	reproductive	--	0.42	--	5.73	6
			Indeno(1,2,3-cd)pyrene	6E-09	2E-13	1E-09	8E-09	--	--	--	--	--	--
			Naphthalene	--	6E-12	--	6E-12	body weight	respiratory	0.00	0.00	0.04	0
			PCB-1248	1E-09	8E-14	4E-10	2E-09	--	--	--	--	--	--
			PCB-1254	6E-10	3E-14	2E-10	8E-10	eyes/immune	--	0.00	--	0.01	0
			2,3,7,8-TCDD	2E-08	1E-12	3E-10	2E-08	reproductive	--	0.02	--	0.22	0
			Arsenic	1E-08	7E-12	2E-10	1E-08	skin	--	0.00	--	0.03	0
			Cobalt	--	2E-08	--	2E-08	thyroid	--	0.00	--	0.04	0
			Iron	--	--	--	--	gastrointestinal	--	0.01	--	0.01	0
			Thallium	--	--	--	--	hair/eyes	--	0.02	--	0.03	0
			Vanadium	--	--	--	--	kidney	--	0.10	--	1.22	1
			Chromium, hexavalent	1E-06	5E-09	8E-09	1E-06	blood	respiratory	0.05	0.00	0.66	1
			Chemical Total	**3E-06**	**2E-08**	**2E-05**	**3E-05**			**1**	**0**	**16**	**17**
		Exposure Point Total					**3E-05**						**17**
	Exposure Medium Total						**3E-05**						**17**
Soil Total							**3E-05**						**17**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	1,2,4-Trichlorobenzene	9.4E-11	--	5.2E-06	5E-06	liver	Not evaluated	0.00	--	0.16	0
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.01	0
			1,3-Dichlorobenzene*	--	--	--	--	liver	Not evaluated	0.00	--	0.01	0
			1,4-Dichlorobenzene	1.9E-11	--	5.4E-07	5E-07	liver	Not evaluated	0.00	--	0.11	0
			Benzene	3.5E-11	--	3.0E-07	3E-07	blood	Not evaluated	0.00	--	0.04	0
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.24	0
			Benzo(a)anthracene	1.8E-11	--	5.5E-06	5E-06	--	Not evaluated	--	--	--	--
			Benzo(a)pyrene	--	--	5.7E-05	6E-05	--	Not evaluated	--	--	--	--
			Benzo(b)fluoranthene	2.4E-11	--	1.3E-04	1E-04	--	Not evaluated	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	--	1.4E-04	1E-04	--	Not evaluated	--	--	--	--
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.00	--	14	14
			Aluminum	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Barium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0

TABLE 7-19 (RAGS Part D Table 9.10.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
			Cobalt	--	--	--	--	thyroid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.00	--	--	0
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Mercury	--	--	--	--	GI /kidney	Not evaluated	0.00	--	--	0
			Nickel	--	--	--	--	body weight	Not evaluated	0.00	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.01	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.00	--	--	0
			Chromium, hexavalent	1.8E-07	--	--	2E-07	blood	Not evaluated	0.01	--	--	0
			Chemical Total	**2E-07**	**5E-08**	**4E-04**	**3E-04**			**0**	**0**	**14**	**14**
		Exposure Point Total					**3E-04**						**14**
	Exposure Medium Total						**3E-04**						**14**
Groundwater Total							**3E-04**						**14**
Receptor Total							**4E-04**					**Receptor HI Total**	**32**

Total Risk Across All Medi **4E-04** **Total Hazard Across All Media** **32**

Lead evaluated using the Adult Lead Model (See Appendix G).
See Table E-19 for supporting calculations.

Total Immune system	0
Total Liver	9
Total Body weight	14
Total Reproductive system	6
Total Blood	1
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	1
Total Gastrointestinal	0
Total CNS	0
Total Eyes	0
Total Hair	0

TABLE 7-20 (RAGS Part D Table 9.10.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	5E-07	--	7E-06	8E-06	liver	liver	0.177	0.000	2.424	3
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.000	0.000	0.002	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.000	0.000	0.000	0
			1,4-Dichlorobenzene	3E-09	1E-12	4E-08	4E-08	liver	liver	0.001	0.000	0.007	0
			Benzo(a)anthracene	6E-09	2E-13	1E-09	8E-09	--	--	--	--	--	--
			Benzo(a)pyrene	5E-08	1E-12	1E-08	6E-08	--	--	--	--	--	--
			Benzo(b)fluoranthene	9E-09	2E-13	2E-09	1E-08	--	--	--	--	--	--
			Dibenz(a,h)anthracene	2E-08	7E-13	5E-09	3E-08	--	--	--	--	--	--
			Hexachlorobenzene	4E-08	2E-12	6E-09	5E-08	reproductive	--	0.216	--	2.952	3
			Indeno(1,2,3-cd)pyrene	5E-09	2E-13	1E-09	7E-09	--	--	--	--	--	--
			Naphthalene	--	8E-13	--	8E-13	body weight	respiratory	0.001	0.000	0.006	0
			PCB-1248	8E-10	4E-14	2E-10	1E-09	--	--	--	--	--	--
			PCB-1254	3E-10	2E-14	9E-11	4E-10	eyes/immune	--	0.001	--	0.008	0
			2,3,7,8-TCDD	4E-08	2E-12	5E-10	4E-08	reproductive	--	0.027	--	0.394	0
			Arsenic	7E-09	4E-12	8E-11	7E-09	skin	--	0.001	--	0.016	0
			Cobalt	--	1E-08	--	1E-08	thyroid	--	0.002	--	0.022	0
			Iron	--	--	--	--	gastrointestinal	--	0.005	--	0.008	0
			Thallium	--	--	--	--	hair/eyes	--	0.010	--	0.018	0
			Vanadium	--	--	--	--	kidney	--	0.049	--	0.613	1
			Chromium, hexavalent	6E-07	3E-09	5E-09	6E-07	blood	respiratory	0.029	0.000	0.372	0
			Chemical Total	**1E-06**	**1E-08**	**7E-06**	**9E-06**			**1**	**0**	**7**	**7**
		Exposure Point Total					**9E-06**						**7**
	Exposure Medium Total						**9E-06**						**7**
Soil Total							**9E-06**						**7**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	1,2,4-Trichlorobenzene	9.4E-11	--	5.2E-06	5E-06	liver	Not evaluated	0.00	--	0.16	0
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.01	0
			1,3-Dichlorobenzene*	--	--	--	--	liver	Not evaluated	0.00	--	0.01	0
			1,4-Dichlorobenzene	1.9E-11	--	5.4E-07	5E-07	liver	Not evaluated	0.00	--	0.11	0
			Benzene	3.5E-11	--	3.0E-07	3E-07	blood	Not evaluated	0.00	--	0.04	0
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	0.24	0
			Benzo(a)anthracene	1.8E-11	--	5.5E-06	5E-06	--	Not evaluated	--	--	--	--
			Benzo(a)pyrene	--	--	5.7E-05	6E-05	--	Not evaluated	--	--	--	--
			Benzo(b)fluoranthene	2.4E-11	--	1.3E-04	1E-04	--	Not evaluated	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	--	1.4E-04	1E-04	--	Not evaluated	--	--	--	--
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.00	--	14	14
			Aluminum	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Barium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Cadmium	--	--	--	--	kidney	Not evaluated	0.00	--	--	0
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0
			Cobalt	--	--	--	--	thyroid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.00	--	--	0
			Lead	--	--	--	--	--	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	0.00	--	--	0

TABLE 7-20 (RAGS Part D Table 9.10.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
			Mercury	--	--	--	--	GI /kidney	Not evaluated	0.00	--	--	0
			Nickel	--	--	--	--	body weight	Not evaluated	0.00	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.01	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.00	--	--	0
			Chromium, hexavalent	1.8E-07	--	--	2E-07	blood	Not evaluated	0.01	--	--	**0**
			Chemical Total	**2E-10**	**0E+00**	**3E-04**	**3E-04**			**0**	**0**	**14**	**14**
		Exposure Point Total					**3E-04**						**14**
	Exposure Medium Total						**3E-04**						**14**
Groundwater Total							**3E-04**						**14**
Receptor Total							**3E-04**					**Receptor HI Total**	**21**

Total Risk Across All Medi **3E-04** **Total Hazard Across All Media** **21**

Lead evaluated using the Adult Lead Model (See Appendix G).
See Table E-20 for supporting calculations.

Total Immune system	0
Total Liver	3
Total Body weight	14
Total Reproductive system	4
Total Blood	0
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	1
Total Gastrointestinal	0
Total CNS	0
Total Eyes	0
Total Hair	0

TABLE 7-21 (RAGS Part D Table 9.11.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	75	--	75
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	9	--	9
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	25	--	25
			1.4-Dichlorobenzene	--	--	--	--	blood	blood	--	1	--	1
			Benzene	--	6E-04	--	6E-04	blood	blood	--	8	--	8
			Chlorobenzene	--	--	--	--	liver	liver	--	29	--	29
			Ethylbenzene	--	--	--	--	liver/kidney	developmental	--	0.9	--	1
			m-Xylene	--	--	--	--	body weight	coordination	--	13	--	13
			o-Xylene	--	--	--	--	body weight	coordination	--	13	--	13
			1,1-Biphenyl	--	--	--	--	kidney	edema	--	0.02	--	0
			Naphthalene	--	3E-04	--	3E-04	body weight	respiratory	--	11	--	11
			Chemical Total	**--**	**9E-04**	**--**	**9E-04**			**--**	**185**	**--**	**185**
		Exposure Point Total					**9E-04**						**185**
	Exposure Medium Total						**9E-04**						**185**
Medium Total							**9E-04**						**185**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Benzene	--	2E-06	--	2E-06	blood	blood	--	0.03	--	0
			Chlorobenzene	--	--	--	--	respiratory	respiratory	--	0.03	--	0
			2-Methylnaphthalene	--	2E-07	--	2E-07	respiratory	respiratory	--	--	--	--
			Naphthalene	--	6E-05	--	6E-05	body weight	respiratory	--	2	--	2
			Chemical Total	**--**	**6E-05**	**--**	**6E-05**			**--**	**2**	**--**	**2**
		Exposure Point Total					**6E-05**						**2**
	Exposure Medium Total						**6E-05**						**2**
Medium Total							**6E-05**						**2**
Receptor Total							**1E-03**					**Receptor HI Total**	**187**

Total Risk Across All Media **1E-03** **Total Hazard Across All Media** **187**

* See Appendix H for supporting calculations.

Total Liver	138
Total Developmental	1
Total Coordination	26
Total Blood	9
Total Edema	0
Total Respiratory	13

TABLE 7-22 (RAGS Part D Table 9.11.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	35	--	35
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	10	--	10
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	16	--	16
			1.4-Dichlorobenzene	--	--	--	--	liver	liver	--	10	--	10
			Benzene	--	1E-04	--	1E-04	blood	liver	--	6	--	6
			Chlorobenzene	--	--	--	--	liver	liver	--	31	--	31
			Ethylbenzene	--	--	--	--	liver	ear	--	0.4	--	0
			m-Xylene	--	--	--	--	whole body	whole body	--	56	--	56
			o-Xylene	--	--	--	--	whole body	whole body	--	19	--	19
			1,1-Biphenyl	--	--	--	--	fetus	edema	--	0.001	--	0
			Naphthalene	--	8E-06	--	8E-06	body weight	respiratory	--	1	--	1
			Chemical Total	**--**	**1E-04**	**--**	**1E-04**			**--**	**184**	**--**	**184**
		Exposure Point Total					**1E-04**						**184**
	Exposure Medium Total						**1E-04**						**184**
Medium Total							**1E-04**						**184**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Benzene	--	1E-07	--	1E-07	blood	liver	--	0.007	--	0
			Chlorobenzene	--	--	--	--	respiratory	respiratory	--	0.007	--	0
			2-Methylnaphthalene	--	8E-09	--	8E-09	respiratory	respiratory	--	--	--	--
			Naphthalene	--	2E-06	--	2E-06	body weight	respiratory	--	0.35	--	0
			Chemical Total	**--**	**2E-06**	**--**	**2E-06**			**--**	**0**	**--**	**0**
		Exposure Point Total					**2E-06**						**0**
	Exposure Medium Total						**2E-06**						**0**
Medium Total							**2E-06**						**0**
Receptor Total							**1E-04**					**Receptor HI Total**	**185**

Total Risk Across All Media **1E-04**

Total Hazard Across All Media **185**

Total Liver	108
Total Whole body	75
Total Respiratory	1
Total Edema	0
Total Ear	0

* See Appendix H for supporting calculations.

TABLE 7-23 (RAGS Part D Table 9.12.RME)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	83	--	83
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	9	--	9
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	23	--	23
			1.4-Dichlorobenzene	--	--	--	--	blood	blood	--	1	--	1
			Naphthalene	--	1E-03	--	1E-03	body weight	respiratory	--	29	--	29
			Chemical Total	**--**	**1E-03**	**--**	**1E-03**			**--**	**145**	**--**	**145**
		Exposure Point Total					**1E-03**						**145**
	Exposure Medium Total						**1E-03**						**145**
Medium Total							**1E-03**						**145**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Benzene	--	2E-06	--	2E-06	blood	blood	--	0.03	--	0
			Chlorobenzene	--	--	--	--	respiratory	respiratory	--	0.03	--	0
			2-Methylnaphthalene	--	2E-07	--	2E-07	respiratory	respiratory	--	--	--	--
			Naphthalene	--	6E-05	--	6E-05	body weight	respiratory	--	2	--	2
			Chemical Total	**--**	**6E-05**	**--**	**6E-05**			**--**	**2**	**--**	**2**
		Exposure Point Total					**6E-05**						**2**
	Exposure Medium Total						**6E-05**						**2**
Medium Total							**6E-05**						**2**
Receptor Total							**1E-03**					**Receptor HI Total**	**147**

Total Risk Across All Media **1E-03** **Total Hazard Across All Media** **147**

Total Liver	115
Total Blood	1
Total Respiratory	31

* See Appendix H for supporting calculations.

TABLE 7-24 (RAGS Part D Table 9.12.CT)
SUMMARY OF RECEPTOR RISKS AND HAZARDS FOR COPCs
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	87	--	87
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	10	--	10
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	13	--	13
			1.4-Dichlorobenzene	--	--	--	--	liver	liver	--	2	--	2
			Naphthalene	--	2E-04	--	2E-04	body weight	respiratory	--	30	--	30
			Chemical Total	**--**	**2E-04**	**--**	**2E-04**			**--**	**142**	**--**	**142**
		Exposure Point Total					**2E-04**						**142**
	Exposure Medium Total						**2E-04**						**142**
Medium Total							**2E-04**						**142**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Benzene	--	1E-07	--	1E-07	blood	liver	--	0.007	--	0
			Chlorobenzene	--	--	--	--	respiratory	respiratory	--	0.007	--	0
			2-Methylnaphthalene	--	8E-09	--	8E-09	respiratory	respiratory	--	--	--	--
			Naphthalene	--	2E-06	--	2E-06	body weight	respiratory	--	0.35	--	0
			Chemical Total	**--**	**2E-06**	**--**	**2E-06**			**--**	**0**	**--**	**0**
		Exposure Point Total					**2E-06**						**0**
	Exposure Medium Total						**2E-06**						**0**
Medium Total							**2E-06**						**0**
Receptor Total							**2E-04**					**Receptor HI Total**	**142**

Total Risk Across All Media **2E-04**

Total Hazard Across All Media **142**

Total Liver	112
Total Respiratory	30

* See Appendix H for supporting calculations.

TABLE 8-1 (RAGS Part D Table 10.1.RME)
RISK SUMMARY
WESTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,4-Trichlorobenzene	7E-07	--	2E-06	3E-06	adrenal	liver	0.01	0.00	0.00	0
			Benzo(a)pyrene	2E-06	3E-12	1E-07	2E-06	--	--	--	--	--	--
			2,3,7,8-TCDD	9E-06	2E-11	3E-08	9E-06	reproductive	reproductive	0.30	0.00	1.08	1
			Arsenic	3E-06	7E-11	8E-09	3E-06	skin	--	0.02	0.00	0.06	0
			Cobalt	--	3E-11	--	3E-10	thyroid	respiratory	0.32	0.00	1.08	1
			Lead	--	--	--	--	--	--	--	--	--	--
			Chromium, hexavalent	1E-04	3E-10	3E-07	1E-04	blood	respiratory	0.29	0.00	0.93	1
			Chemical Total	**2E-04**	**4E-10**	**3E-06**	**2E-04**			**1**	**0**	**3**	**4**
		Exposure Point Total					**2E-04**						**4**
	Exposure Medium Total						**2E-04**						**4**
Medium Total							**2E-04**						**4**
Receptor Total							**2E-04**					**Receptor HI Total**	**4**

Total Risk Across All Media **2E-04** **Total Hazard Across All Media** **4**

Total Reproductive system	1
Total Blood	2
Total Thyroid	1

TABLE 8-2 (RAGS Part D Table 10.2.RME)
RISK SUMMARY
WESTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,4-Trichlorobenzene	7E-07	--	3E-06	3E-06	adrenal	liver	0.01	0.00	0.00	0
			Benzo(a)pyrene	2E-06	3E-12	1E-07	2E-06	--	--	--	--	--	--
			2,3,7,8-TCDD	1E-05	2E-11	3E-08	1E-05	reproductive	reproductive	0.30	0.00	1.17	1
			Arsenic	3E-06	7E-11	9E-09	3E-06	skin	--	0.02	0.00	0.07	0
			Cobalt	--	3E-11	--	3E-10	thyroid	respiratory	0.32	0.00	1.17	1
			Lead	--	--	--	--	--	--	0.00	--	--	--
			Chromium, hexavalent	1E-04	3E-10	3E-07	1E-04	blood	respiratory	0.29	0.00	1.01	1
			Chemical Total	**2E-04**	**4E-10**	**3E-06**	**2E-04**			**1**	**0**	**3**	**4**
		Exposure Point Total					**2E-04**						**4**
	Exposure Medium Total						**2E-04**						**4**
Medium Total							**2E-04**						**4**
Receptor Total							**2E-04**					**Receptor HI Total**	**4**

Total Risk Across All Media **2E-04** **Total Hazard Across All Media** **4**

Total Adrenal system	0
Total Liver	0
Total Reproductive system	1
Total Blood	1
Total Skin	0
Total Thyroid	1
Total Respiratory	0

TABLE 8-3 (RAGS Part D Table 10.2.CT)
RISK SUMMARY
WESTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
								Primary Target Organ(s)					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	Vanadium	--	--	--	--	kidney	--	0.18	--	0.89	1
			Chromium, hexavalent	1E-06	6E-11	2E-08	1E-06	blood	respiratory	0.01	0.00	0.07	0
			Chemical Total	**1E-06**	**6E-11**	**2E-08**	**1E-06**			**0**	**0**	**1**	**1**
		Exposure Point Total					**1E-06**						**1**
	Exposure Medium Total						**1E-06**						**1**
Medium Total							**1E-06**						**1**
Receptor Total							**1E-06**					**Receptor HI Total**	**1**

Total Risk Across All Media **1E-06** **Total Hazard Across All Media** **1**

Total Blood	0.08
Total Respiratory	0.00
Total Kidney	1.07

TABLE 8-4 (RAGS Part D Table 10.3.RME)
RISK SUMMARY
WESTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	1,2,4-Trichlorobenzene	2E-06	--	5E-06	7E-06	adrenal	liver	0.02	0.00	0.01	0
			Benzo(a)pyrene	4E-06	6E-11	2E-07	4E-06	--	--	--	--	--	0
			2,3,7,8-TCDD	2E-05	6E-10	7E-08	2E-05	reproductive	reproductive	0.68	0.00	2.43	3
			Arsenic	6E-06	2E-09	2E-08	6E-06	skin	--	0.04	0.00	0.15	0
			Lead	--	--	--	--	--	--	0.00	--	0.00	0
			Chromium, hexavalent	3E-04	7E-09	7E-07	3E-04	blood	respiratory	0.65	0.00	2.09	3
			Chemical Total	**3E-04**	**9E-09**	**6E-06**	**4E-04**			**1**	**0**	**5**	**6**
		Exposure Point Total					**4E-04**						**6**
	Exposure Medium Total						**4E-04**						**6**
Medium Total							**4E-04**						**6**
Receptor Total							**4E-04**					**Receptor HI Total**	**6**

Total Risk Across All Media	**4E-04**	**Total Hazard Across All Media**	**6**

Total Adrenal system	0
Total Liver	1
Total Reproductive system	3
Total Blood	3
Total Skin	0
Total Respiratory	0

TABLE 8-5(RAGS Part D Table 10.3.CT)
RISK SUMMARY
WESTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area Surface Soil**	Vanadium	--	--	--	0E+00	kidney	--	0.27	--	0.89	1
			Chromium, hexavalent	2E-06	2E-10	2E-08	2E-06	blood	respiratory	0.02	0.00	0.07	0
			Chemical Total	**2E-06**	**2E-10**	**2E-08**	**2E-06**			**0**	**0**	**1**	**1**
		Exposure Point Total					**2E-06**						**1**
	Exposure Medium Total						**2E-06**						**1**
Medium Total							**2E-06**						**1**
Receptor Total							**2E-06**					**Receptor HI Total**	**1**

Total Risk Across All Media **2E-06**

Total Hazard Across All Media **1**

Total Blood	0
Total Respiratory	0
Total Kidney	1

TABLE 8-6 (RAGS Part D Table 10.4.RME)
RISK SUMMARY
EASTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	1E-03	--	3E-03	4E-03	adrenal	liver	10	0.00	3.51	14
			1,4-Dichlorobenzene	2E-06	4E-11	7E-06	9E-06	liver	liver	0.02	0.00	0.01	0
			Benzo(a)anthracene	1E-06	2E-12	6E-08	1E-06	--	--	--	--	--	--
			Benzo(a)pyrene	3E-05	5E-11	2E-06	3E-05	--	--	--	--	--	--
			Benzo(b)fluoranthene	4E-06	5E-12	2E-07	4E-06	--	--	--	--	--	--
			Dibenz(a,h)anthracene	5E-06	8E-12	3E-07	5E-06	--	--	--	--	--	--
			Hexachlorobenzene	3E-05	8E-11	1E-06	3E-05	liver	--	0.07	--	0.24	0
			Indeno(1,2,3-cd)pyrene	2E-06	3E-12	1E-07	2E-06	--	--	--	--	--	--
			2,3,7,8-TCDD	2E-05	4E-11	5E-08	2E-05	reproductive	reproductive	0.51	0.00	1.83	2
			Chromium, hexavalent	2E-05	5E-09	5E-08	2E-05	blood	respiratory	0.04	0.00	0.14	0
			Chemical Total	**1E-03**	**5E-09**	**3E-03**	**4E-03**			**11**	**0**	**6**	**17**
		Exposure Point Total					**4E-03**						**17**
	Exposure Medium Total						**4E-03**						**17**
Medium Total							**4E-03**						**17**
Receptor Total							**4E-03**					**Receptor HI Total**	**17**

Total Risk Across All Media **4E-03** **Total Hazard Across All Media** **17**

Total Liver	14
Total Reproductive	3
Total Respiratory	0
Total Blood	0
Total Adrenal	14

TABLE 8-7 (RAGS Part D Table 10.4.CT)
RISK SUMMARY
EASTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-06	--	1E-05	2E-05	liver	liver	0.01	0.00	0.01	0
			Hexachlorobenzene	2E-07	4E-11	1E-08	2E-07	reproductive	--	0.17	--	0.95	1
			Chemical Total	**3E-06**	**4E-11**	**1E-05**	**2E-05**			**0**	**0**	**1**	**1**
		Exposure Point Total					**2E-05**						**1**
	Exposure Medium Total						**2E-05**						**1**
Medium Total							**2E-05**						**1**
Receptor Total							**2E-05**					**Receptor HI Total**	**1**

Total Risk Across All Media **2E-05** **Total Hazard Across All Media** **1**

Total Liver	0
Total Reproductive	1

TABLE 8-8 (RAGS Part D Table 10.5.RME)
RISK SUMMARY
EASTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-03	--	7E-03	9E-03	adrenal	liver	23	0.00	7.91	31
			1,4-Dichlorobenzene	4E-06	4E-10	2E-05	2E-05	liver	liver	0.04	0.00	0.01	0
			Benzo(a)anthracene	2E-06	2E-11	1E-07	3E-06	--	--	--	--	--	--
			Benzo(a)pyrene	7E-05	5E-10	4E-06	8E-05	--	--	--	--	--	--
			Benzo(b)fluoranthene	8E-06	6E-11	5E-07	9E-06	--	--	--	--	--	--
			Dibenz(a,h)anthracene	1E-05	9E-11	6E-07	1E-05	--	--	--	--	--	--
			Hexachlorobenzene	7E-05	9E-10	3E-06	7E-05	liver	--	0.16	--	0.55	1
			Indeno(1,2,3-cd)pyrene	5E-06	3E-11	3E-07	5E-06	--	--	--	--	--	--
			PCB-1248	1E-06	2E-11	9E-08	2E-06	--	--	--	--	--	--
			2,3,7,8-TCDD	4E-05	5E-10	1E-07	4E-05	reproductive	reproductive	1.14	0.00	4.11	5
			Chromium, hexavalent	5E-05	6E-08	1E-07	5E-05	blood	respiratory	0.10	0.00	0.32	0
			Chemical Total	**2E-03**	**6E-08**	**7E-03**	**1E-02**			**25**	**0**	**13**	**37**
		Exposure Point Total					**1E-02**						**37**
	Exposure Medium Total						**1E-02**						**37**
Medium Total							**1E-02**						**37**
Receptor Total							**1E-02**					**Receptor HI Total**	**37**

Total Risk Across All Media **1E-02**

Total Hazard Across All Media **37**

Total Liver	0
Total Reproductive	6
Total Respiratory	0
Total Blood	0
Total Adrenal	31

TABLE 8-9 (RAGS Part D Table 10.4.CT)
RISK SUMMARY
EASTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	1E-05	--	6E-05	7E-05	liver	liver	0.07	0.00	0.04	0
			Hexachlorobenzene	8E-07	4E-11	4E-08	8E-07	reproductive	--	0.78	--	4.29	5
			2,3,7,8-TCDD	8E-07	4E-11	4E-09	8E-07	reproductive	reproductive	0.11	0.00	0.65	1
			Chemical Total	**1E-05**	**8E-11**	**6E-05**	**7E-05**			**1**	**0**	**5**	**6**
		Exposure Point Total					**7E-05**						**6**
	Exposure Medium Total						**7E-05**						**6**
Medium Total							**7E-05**						**6**
Receptor Total							**7E-05**					**Receptor HI Total**	**6**

Total Risk Across All Media **7E-05** **Total Hazard Across All Media** **6**

Total Liver	0
Total Reproductive	6

TABLE 8-10 (RAGS Part D Table 10.6.RME)
RISK SUMMARY
EASTERN AREA SURFACE SOIL
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-03	--	7E-03	9E-03	adrenal	liver	23.116	0.000	7.906	31
			1,4-Dichlorobenzene	4E-06	9E-10	2E-05	2E-05	liver	liver	0.037	0.000	0.013	0
			Benzo(a)anthracene	2E-06	4E-11	1E-07	3E-06			--	--	--	0
			Benzo(a)pyrene	7E-05	1E-09	4E-06	8E-05			--	--	--	0
			Benzo(b)fluoranthene	8E-06	1E-10	5E-07	9E-06			--	--	--	0
			Dibenz(a,h)anthracene	1E-05	2E-10	6E-07	1E-05			--	--	--	0
			Hexachlorobenzene	7E-05	2E-09	3E-06	7E-05	liver		0.160	--	0.548	1
			Indeno(1,2,3-cd)pyrene	5E-06	7E-11	3E-07	5E-06			--	--	--	0
			PCB-1248	1E-06	4E-11	9E-08	2E-06			--	--	--	0
			PCB-1254	6E-07	2E-11	4E-08	6E-07	eyes/immune		0.043	--	0.138	0
			2,3,7,8-TCDD	4E-05	9E-10	1E-07	4E-05	reproductive	reproductive	1.145	0.000	4.111	5
			Chromium, hexavalent	5E-05	1E-07	3E-09	5E-05	blood	respiratory	0.100	0.000	0.321	0
			Chemical Total	**2E-03**	**1E-07**	**7E-03**	**1E-02**			**25**	**0**	**13**	**38**
		Exposure Point Total					**1E-02**						**38**
	Exposure Medium Total						**1E-02**						**38**
Medium Total							**1E-02**						**38**
Receptor Total							**1E-02**					**Receptor HI Total**	**38**

Total Risk Across All Media **1E-02**

Total Hazard Across All Media **38**

Total Liver	0
Total Reproductive	6
Total Eyes	0
Total Immune	0
Total Respiratory	0
Total Blood	0
Total Adrenal	31

TABLE 8-11 (RAGS Part D Table 10.6.CT)
RISK SUMMARY
EASTERN AREA SURFACE SOIL
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area Surface Soil**	1,2,4-Trichlorobenzene	2E-05	--	6E-05	8E-05	liver	liver	0.10	0.00	0.04	0
			Benzo(a)pyrene	1E-06	2E-10	8E-08	1E-06	--	--	--	--	--	--
			Hexachlorobenzene	1E-06	2E-10	4E-08	1E-06	reproductive	--	1.18	--	4.29	5
			2,3,7,8-TCDD	1E-06	1E-10	4E-09	1E-06	reproductive	reproductive	0.17	0.00	0.65	1
			Chemical Total	**2E-05**	**5E-10**	**6E-05**	**8E-05**			**1**	**0**	**5**	**6**
		Exposure Point Total					**8E-05**						**6**
	Exposure Medium Total						**8E-05**						**6**
Medium Total							**8E-05**						**6**
Receptor Total							**8E-05**					**Receptor HI Total**	**6**

Total Risk Across All Media **8E-05** **Total Hazard Across All Media** **6**

Total Liver	0
Total Reproductive	6

TABLE 8-12 (RAGS Part D Table 10.7.RME)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	Surface and Subsurface Soil (0-10 feet bgs)	Western Area Surface and Subsurface Soil	1,2,3-Trichlorobenzene	--	--	--	--	body weight/liver	--	0.04	--	0.64	1
			1,2,4-Trichlorobenzene	9E-08	--	1E-06	2E-06	liver	liver	0.00	1.44	0.04	1
			1,4-Dichlorobenzene	7E-08	9E-12	1E-06	5E-05	liver	liver	0.02	0.44	0.25	1
			m,p-Xylenes	--	--	--	--	whole body	whole body	0.01	8.52	0.10	9
			o-Xylene	--	--	--	--	whole body	whole body	0.00	3.01	0.04	3
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	2.17	--	36.06	38
			Benzo(a)pyrene	5E-06	4E-11	1E-06	6E-06	--	--	--	--	--	0
			Indeno(1,2,3-cd)pyrene	3E-07	3E-12	9E-07	1E-06	--	--	--	--	--	0
			PCB-1254	2E-08	3E-13	5E-09	2E-08	eyes/immune	--	0.03	--	0.48	1
			2,3,7,8-TCDD	4E-06	5E-11	5E-08	4E-06	reproductive	reproductive	2.67	0.00	46.41	49
			Antimony	--	--	--	--	whole body	--	0.14	--	2.28	2
			Arsenic	5E-07	8E-11	7E-09	5E-07	skin	respiratory	0.08	0.00	1.36	1
			Cobalt	--	2E-07	--	2E-07	thyroid	respiratory	0.08	0.00	1.32	1
			Iron	--	--	--	--	gastrointestinal	--	0.18	--	2.95	3
			Lead	--	--	--	--	--	--	--	--	--	0
			Thallium	--	--	--	--	hair/eyes	--	0.05	--	0.85	1
			Vanadium	--	--	--	--	kidney	--	2.27	--	34	36
			Zinc	--	--	--	--	low Cu status	--	0.06	--	1.02	1
			Chromium, hexavalent	2E-05	3E-13	2E-07	2E-05	blood	respiratory	1.12	0.00	17	18
			Chemical Total	**3E-05**	**2E-07**	**5E-06**	**9E-05**			**9**	**13**	**145**	**168**
		Exposure Point Total					**9E-05**						**168**
	Exposure Medium Total						**9E-05**						**168**
Soil Total							**9E-05**						**168**

TABLE 8-12 (RAGS Part D Table 10.7.RME)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Shallow Groundwater	**Shallow Groundwater**	**Western Area**	1,2,4-Trichlorobenzene	4.0E-10	--	2.6E-05	3E-05	liver	Not evaluated	0.00	--	0.22	0
			1,4-Dichlorobenzene	3.7E-10	--	3.5E-06	4E-06	liver	Not evaluated	0.00	--	0.73	1
			Benzene	7.2E-08	--	2.0E-04	2E-04	blood	Not evaluated	0.01	--	29	29
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.01	--	30	30
			Ethylbenzene	1.5E-09	--	1.6E-05	2E-05	liver	Not evaluated	0.00	--	2.54	3
			Xylene (total)	--	--	--	--	whole body	Not evaluated	0.00	--	1.34	1
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.30	--	20956	20956
			Lead	--	--	--	--		Not evaluated	--	--	--	0
			Chromium, hexavalent	3.1E-05	--	--	3E-05	blood	Not evaluated	1.63	--	--	2
			Chemical Total	**3E-05**	**0E+00**	**2E-04**	**3E-04**			**2**	**0**	**21020**	**21021**
		Exposure Point Total					**3E-04**						**21021**
	Exposure Medium Total						**3E-04**						**21021**
Groundwater Total							**3E-04**						**21021**
Receptor Total							**4E-04**					**Receptor HI Total**	**21189**

Total Risk Across All Media **4E-04**

Total Hazard Across All Media **21189**

Total Immune system	1
Total Liver	37
Total Body weight	20957
Total Reproductive system	49
Total Blood	49
Total Whole body	15
Total Skin	2
Total Low copper status	1
Total Thyroid	40
Total Kidney	37
Total Gastrointestinal	3
Total Eyes	2
Total Immune system	1
Total Hair	1

TABLE 8-13 (RAGS Part D Table 10.7.CT)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	Surface and Subsurface Soil (0-10 feet bgs)	Western Area Surface and Subsurface Soil	1,4-Dichlorobenzene	5E-09	2E-12	7E-08	2E-05	liver	liver	0.00	0.16	0.02	0
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	0.12	--	1.68	2
			2,3,7,8-TCDD	2E-07	9E-12	2E-09	2E-07	reproductive	reproductive	0.15	0.00	2.09	2
			Lead	--	--	--	--	--	--	--	--	--	0
			Thallium	--	--	--	--	hair/eyes	--	0.04	--	0.52	1
			Vanadium	--	--	--	--	kidney	--	0.15	--	1.81	2
			Chromium, hexavalent	1E-06	4E-09	8E-09	1E-06	blood	respiratory	0.05	0.00	0.65	1
			Chemical Total	**1E-06**	**4E-09**	**9E-08**	**2E-05**			**1**	**0**	**7**	**7**
		Exposure Point Total					**2E-05**						**7**
	Exposure Medium Total						**2E-05**						**7**
Soil Total							**2E-05**						**7**
Shallow Groundwater	Shallow Groundwater	Western Area	1,2,4-Trichlorobenzene	3.7E-11	--	2.1E-06	2E-06	liver	Not evaluated	0.00	--	0.06	0
			Benzene	3.1E-09	--	2.6E-05	3E-05	blood	Not evaluated	0.00	--	3.73	4
			Chlorobenzene	--	--	--	0.0E+00	liver	Not evaluated	0.00	--	3.58	4
			Ethylbenzene	6.9E-11	--	2.2E-06	2E-06	liver	Not evaluated	0.00	--	0.34	0
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.01	--	2418	2418
			Lead	--	--	--	--		Not evaluated	--	--	--	0
			Chromium, hexavalent	1.3E-06	--	--	1E-06	blood	Not evaluated	0.07	--	--	0
			Chemical Total	**1E-06**	**0E+00**	**3E-05**	**3E-05**			**0**	**0**	**2426**	**2426**
		Exposure Point Total					**3E-05**						**2426**
	Exposure Medium Total						**3E-05**						**2426**
Groundwater Total							**3E-05**						**2426**
Receptor Total							**2E-05**					**Receptor HI Total**	**2426**

Total Risk Across All Media **4E-05** **Total Hazard Across All Media** **2433**

Total Liver	5
Total Body weight	2418
Total Reproductive system	2
Total Blood	5
Total Thyroid	2
Total Eyes	1
Total Hair	1

TABLE 8-14 (RAGS Part D Table10.8.RME)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	Surface and Subsurface Soil (0-10 feet bgs)	Western Area Surface and Subsurface Soil	1,2,4-Trichlorobenzene	9E-08	--	4E-07	5E-07	liver	liver	0.00	1.44	0.01	1
			1,4-Dichlorobenzene	7E-08	9E-12	4E-07	5E-05	liver	liver	0.02	0.44	0.08	1
			m,p-Xylenes	--	--	--	0E+00	whole body	whole body	0.01	8.52	0.03	9
			o-Xylene	--	--	--	0E+00	whole body	whole body	0.00	3.01	0.01	3
			1,2,4,5-Tetrachlorobenzene	--	--	--	0E+00	thyroid	--	2.17	--	11.09	13
			2,3,7,8-TCDD	4E-06	5E-11	2E-08	4E-06	reproductive	reproductive	2.67	0.00	14.28	17
			Antimony	--	--	--	0E+00	whole body	--	0.14	--	0.70	1
			Arsenic	5E-07	8E-11	2E-09	5E-07	skin	respiratory	0.08	0.00	0.42	1
			Iron	--	--	--	0E+00	gastrointestinal	--	0.18	--	0.91	1
			Lead	--	--	--	0E+00	--	--	--	--	--	0
			Vanadium	--	--	--	0E+00	kidney	--	2.27	--	10.52	13
			Chromium, hexavalent	2E-05	3E-08	7E-08	2E-05	blood	respiratory	1.12	0.00	5.34	6
			Chemical Total	**3E-05**	**3E-08**	**9E-07**	**8E-05**			**9**	**13**	**43**	**65**
		Exposure Point Total					**8E-05**						**65**
	Exposure Medium Total						**8E-05**						**65**
Soil Total							**8E-05**						**65**
Shallow	Shallow	Western	1,2,4-Trichlorobenzene	4.0E-10	--	2.3E-06	2E-06	liver	Not evaluated	0.00	--	0.07	0
			1,4-Dichlorobenzene	3.7E-10	--	1.1E-06	1E-06	liver	Not evaluated	0.00	--	0.22	0
			Benzene	7.2E-08	--	6.2E-05	6E-05	blood	Not evaluated	0.01	--	8.82	9
			Chlorobenzene	--	--	--	0E+00	liver	Not evaluated	0.01	--	9.20	9
			Ethylbenzene	1.5E-09	--	5.0E-06	5E-06	liver	Not evaluated	0.00	--	0.78	1
			Naphthalene	--	--	--	0E+00	body weight	Not evaluated	0.30	--	6448	6448
			Lead	--	--	--	0E+00		Not evaluated	--	--	--	0
			Chromium, hexavalent	3.1E-05	--	--	3E-05	blood	Not evaluated	1.63	--	--	2
			Chemical Total	**3E-05**	**0E+00**	**7E-05**	**1E-04**			**2**	**0**	**6467**	**6469**
		Exposure Point Total					**1E-04**						**6469**
	Exposure Medium Total						**1E-04**						**6469**
Groundwater Total							**1E-04**						**6469**
Receptor Total							**2E-04**					**Receptor HI Total**	**6535**

Total Risk Across All Media **2E-04**

Total Hazard Across All Media **6535**

Total Liver	13
Total Body weight	6449
Total Reproductive system	17
Total Blood	17
Total Whole body	13
Total Skin	1
Total Thyroid	14
Total Kidney	13
Total Gastrointestinal	1

TABLE 8-15 (RAGS Part D Table10.8.CT)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
								Primary Target Organ(s)					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	Surface and Subsurface Soil (0-10 feet bgs)	Western Area Surface and Subsurface Soil	1,4-Dichlorobenzene	2E-09	7E-13	2E-08	6E-06	liver	liver	0.00	0.05	0.01	0
			1,2,4,5-Tetrachlorobenzene	--	--	--	--	thyroid	--	0.04	--	0.56	1
			2,3,7,8-TCDD	7E-08	3E-12	8E-10	7E-08	reproductive	reproductive	0.05	0.00	0.70	1
			Lead	--	--	--	--	--	--	--	--	--	--
			Vanadium	--	--	--	--	kidney	--	0.05	--	0.60	1
			Chemical Total	**7E-08**	**3E-12**	**3E-08**	**6E-06**			**0**	**0**	**2**	**2**
		Exposure Point Total					**6E-06**						**2**
	Exposure Medium Total						**6E-06**						**2**
Soil Total							**6E-06**						**2**
Shallow Groundwater	Shallow Groundwater	Western Area	Benzene	3.1E-09	--	8.8E-06	9E-06	blood	Not evaluated	0.00	--	1.24	1
			Chlorobenzene	--	--	--	--	liver	Not evaluated	0.00	--	1.19	1
			Naphthalene	--	--	--	--	body weight	Not evaluated	0.01	--	806	806
			Lead	--	--	--	--		Not evaluated	--	--	--	--
			Chromium, hexavalent	1.3E-06	--	--	1E-06	blood	Not evaluated	0.07	--	--	0
			Chemical Total	**1E-06**	**0E+00**	**9E-06**	**1E-05**			**0**	**0**	**808**	**809**
		Exposure Point Total					**1E-05**						**809**
	Exposure Medium Total						**1E-05**						**809**
Groundwater Total							**1E-05**						**809**
Receptor Total							**2E-05**					**Receptor HI Total**	**811**

Total Risk Across All Media **2E-05** **Total Hazard Across All Media** **811**

Total Liver	2
Total Body weight	806
Total Reproductive system	1
Total Blood	2
Total Thyroid	1
Total Kidney	1

TABLE 8-16 (RAGS Part D Table 10.9.RME)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	4E-05	--	6E-04	7E-04	liver	liver	13	0.00	214	227
			1,2-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.08	0
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	0.00	0.00	0.02	0
			1,4-Dichlorobenzene	1E-07	1E-11	2E-06	2E-06	liver	liver	0.03	0.00	0.42	0
			Benzo(a)anthracene	7E-08	6E-13	2E-08	9E-08	--	--	--	--	--	--
			Benzo(a)pyrene	2E-06	2E-11	6E-07	3E-06	--	--	--	--	--	--
			Benzo(b)fluoranthene	4E-07	3E-12	1E-07	5E-07	--	--	--	--	--	--
			Dibenz(a,h)anthracene	3E-07	3E-12	9E-08	4E-07	--	--	--	--	--	--
			Hexachlorobenzene	2E-06	3E-11	3E-07	2E-06	reproductive	--	9	--	149	158
			Indeno(1,2,3-cd)pyrene	1E-07	1E-12	4E-08	2E-07	--	--	--	--	--	0
			Naphthalene	--	4E-11	--	4E-11	body weight	respiratory	0.08	0.00	1.16	1
			PCB-1248	3E-08	5E-13	1E-08	4E-08	--	--	--	--	--	--
			PCB-1254	1E-08	2E-13	4E-09	2E-08	eyes/immune	--	0.02	--	0.39	0
			2,3,7,8-TCDD	4E-07	6E-15	7E-09	5E-07	reproductive	--	0.33	--	6	6
			Arsenic	3E-07	5E-11	4E-09	3E-07	skin	--	0.05	--	0.80	1
			Cobalt	--	1E-07	--	1E-07	thyroid	--	0.06	--	0.97	1
			Iron	--	--	--	--	gastrointestinal	--	0.14	--	0.29	0
			Thallium	--	--	--	--	hair/eyes	--	0.34	--	0.74	1
			Vanadium	--	--	--	--	kidney	--	2.10	--	32	34
			Chromium, hexavalent	2E-05	3E-08	2E-07	2E-05	blood	respiratory	1.10	0.00	17	18
			Chemical Total	**7E-05**	**1E-07**	**6E-04**	**7E-04**			**26**	**0**	**422**	**448**
		Exposure Point Total					**7E-04**						**448**
	Exposure Medium Total						**7E-04**						**448**
Soil Total							**7E-04**						**448**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area**	1,2,4-Trichlorobenzene	1.0E-05	--	3.4E-05	4E-05	liver	Not evaluated	0.31	--	1.01	1
			1,2-Dichlorobenzene	--	--	--	--	liver	Not evaluated	0.05	--	0.08	0
			1,3-Dichlorobenzene*	--	--	--	--	liver	Not evaluated	0.03	--	0.08	0
			1,4-Dichlorobenzene	2.1E-06	--	3.5E-06	6E-06	liver	Not evaluated	0.43	--	0.73	1
			Benzene	3.9E-06	--	1.9E-06	6E-06	blood	Not evaluated	0.55	--	0.27	1
			Chlorobenzene	--	--	--	--	liver	Not evaluated	1.65	--	1.59	3
			Benzo(a)anthracene	2.0E-06	--	3.6E-05	4E-05	--	Not evaluated	--	--	--	--
			Benzo(a)pyrene	--	--	3.7E-04	4E-04	--	Not evaluated	--	--	--	--
			Benzo(b)fluoranthene	2.6E-06	--	8.6E-04	9E-04	--	Not evaluated	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	--	9.0E-04	9E-04	--	Not evaluated	--	--	--	--
			Naphthalene	--	--	--	--	body wieght	Not evaluated	7.12	--	88	95
			Aluminum	--	--	--	--	CNS	Not evaluated	20	--	--	20
			Barium	--	--	--	--	kidney	Not evaluated	0.42	--	--	0
			Cadmium	--	--	--	--	kidney	Not evaluated	14	--	--	14
			Chromium	--	--	--	--	blood	Not evaluated	17	--	--	17
			Cobalt	--	--	--	--	thyroid	Not evaluated	15	--	--	15
			Iron	--	--	--	--	gastrointestinal	Not evaluated	63	--	--	63
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	4.81	--	--	5

TABLE 8-16 (RAGS Part D Table 10.9.RME)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
			Mercury	--	--	--	--	GI /kidney	Not evaluated	4.66	--	--	5
			Vanadium	--	--	--	--	kidney	Not evaluated	1308	--	--	1308
			Zinc	--	--	--	--	low Cu status	Not evaluated	121	--	--	121
			Chromium, hexavalent	2.0E-02	--	--	2E-02	blood	Not evaluated	1024	--	--	1024
			Chemical Total	**2E-02**	**3E-07**	**3E-03**	**2E-02**			**2601**	**0**	**92**	**2693**
		Exposure Point Total					**2E-02**						**2693**
	Exposure Medium Total						**2E-02**						**2693**
Groundwater Total							**2E-02**						**2693**
Receptor Total							**2E-02**					**Receptor HI Total**	**3141**

Total Risk Across All Media **2E-02**

Total Hazard Across All Media **3141**

Total Immune system	0
Total Liver	233
Total Body weight	96
Total Reproductive system	164
Total Blood	1059
Total Whole body	0
Total Skin	1
Total Low copper status	121
Total Thyroid	16
Total Respiratory	0
Total Kidney	1360
Total Gastrointestinal	69
Total CNS	25
Total Eyes	1
Total Hair	1

TABLE 8-17 (RAGS Part D Table 10.9.CT)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
SCCC INC. SITE, KEARNY, NJ

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	2E-06	--	2E-05	2E-05	liver	liver	0.53	0.00	7.27	8
			Hexachlorobenzene	1E-07	7E-12	2E-08	2E-07	reproductive	--	0.65	--	8.85	10
			2,3,7,8-TCDD	1E-07	5E-12	1E-09	1E-07	reproductive	--	0.08	--	1.18	1
			Vanadium	--	--	--	--	kidney	--	0.15	--	1.84	2
			Chromium, hexavalent	2E-06	8E-09	1E-08	2E-06	blood	respiratory	0.09	0.00	1.12	1
			Chemical Total	**3E-06**	**8E-09**	**2E-05**	**3E-05**			**1**	**0**	**20**	**22**
		Exposure Point Total					**3E-05**						**22**
	Exposure Medium Total						**3E-05**						**22**
Soil Total							**3E-05**						**22**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area**	1,2,4-Trichlorobenzene	2.8E-10	--	1.6E-05	2E-05	liver	Not evaluated	0.00	--	0.47	0
			1,4-Dichlorobenzene	5.6E-11	--	1.6E-06	2E-06	liver	Not evaluated	0.00	--	0.34	0
			Chlorobenzene	--	--	--	0E+00	liver	Not evaluated	0.00	--	0.73	1
			Benzo(a)anthracene	5.5E-11	--	1.6E-05	2E-05	--	Not evaluated	--	--	--	--
			Benzo(a)pyrene	--	--	1.7E-04	2E-04	--	Not evaluated	--	--	--	--
			Benzo(b)fluoranthene	7.2E-11	--	4.0E-04	4E-04	--	Not evaluated	--	--	--	--
			Indeno(1,2,3-cd)pyrene	--	--	4.2E-04	4E-04	--	Not evaluated	--	--	--	--
			Naphthalene	--	--	--	--	body wieght	Not evaluated	0.00	--	41	41
			Chromium	--	--	--	--	blood	Not evaluated	0.00	--	--	0
			Cobalt	2.4E+01	--	--	--	thyroid	Not evaluated	0.00	--	--	0
			Iron	--	--	--	--	gastrointestinal	Not evaluated	0.00	--	--	0
			Lead	--	--	--	--	blood	Not evaluated	--	--	--	--
			Manganese	--	--	--	--	CNS	Not evaluated	0.00	--	--	0
			Mercury	--	--	--	--	GI /kidney	Not evaluated	0.00	--	--	0
			Vanadium	--	--	--	--	kidney	Not evaluated	0.04	--	--	0
			Zinc	--	--	--	--	low Cu status	Not evaluated	0.00	--	--	0
			Chromium, hexavalent	5.4E-07	--	--	5E-07	blood	Not evaluated	0.03	--	--	0
			Chemical Total	**2E+01**	**0E+00**	**1E-03**	**1E-03**			**0**	**0**	**42**	**42**
		Exposure Point Total					**1E-03**						**42**
	Exposure Medium Total						**1E-03**						**42**
Groundwater Total							**1E-03**						**42**
Receptor Total							**1E-03**					**Receptor HI Total**	**64**

Total Risk Across All Media **1E-03**

Total Hazard Across All Media **64**

Total Immune system	0
Total Liver	9
Total Body weight	41
Total Reproductive system	11
Total Blood	1
Total Whole body	0
Total Skin	0
Total Low copper status	0
Total Thyroid	0
Total Respiratory	0
Total Kidney	2
Total Gastrointestinal	0
Total CNS	0
Total Eyes	0
Total Hair	0

TABLE 8-18 (RAGS Part D Table 10.10.RME)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	2E-06	--	2E-05	3E-05	liver	liver	0.60	0.00	8.22	9
			Hexachlorobenzene	9E-08	5E-12	1E-08	1E-07	reproductive	--	0.42	--	5.73	6
			Vanadium	--	--	--	0E+00	kidney	--	0.10	--	1.22	1
			Chromium, hexavalent	1E-06	5E-09	8E-09	1E-06	blood	respiratory	0.05	0.00	0.66	1
			Chemical Total	**3E-06**	**5E-09**	**2E-05**	**3E-05**			**1**	**0**	**16**	**17**
		Exposure Point Total					**3E-05**						**17**
	Exposure Medium Total						**3E-05**						**17**
Soil Total							**3E-05**						**17**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area**	1,2,4-Trichlorobenzene	9.4E-11	--	5.2E-06	5E-06	liver	Not evaluated	0.00	--	0.16	0
			Benzo(a)anthracene	1.8E-11	--	5.5E-06	5E-06	--	Not evaluated	--	--	--	0
			Benzo(a)pyrene	--	--	5.7E-05	6E-05	--	Not evaluated	--	--	--	0
			Benzo(b)fluoranthene	2.4E-11	--	1.3E-04	1E-04	--	Not evaluated	--	--	--	0
			Indeno(1,2,3-cd)pyrene	--	--	1.4E-04	1E-04	--	Not evaluated	--	--	--	0
			Naphthalene	--	--	--	0E+00	body weight	Not evaluated	0.00	--	14	14
			Chromium, hexavalent	1.8E-07	--	--	2E-07	blood	Not evaluated	0.01	--	--	0
			Chemical Total	**2E-07**	**0E+00**	**3E-04**	**3E-04**			**0**	**0**	**14**	**14**
		Exposure Point Total					**3E-04**						**14**
	Exposure Medium Total						**3E-04**						**14**
Groundwater Total							**3E-04**						**14**
Receptor Total							**4E-04**					**Receptor HI Total**	**31**

Total Risk Across All Medi **4E-04**

Total Hazard Across All Media **31**

Total Liver	9
Total Body weight	14
Total Reproductive system	6
Total Blood	1
Total Respiratory	0
Total Kidney	1

TABLE 8-19 (RAGS Part D Table10.10.CT)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	1,2,4-Trichlorobenzene	5E-07	--	7E-06	8E-06	liver	liver	0.18	0.00	2.42	3
			Hexachlorobenzene	4E-08	2E-12	6E-09	5E-08	reproductive	--	0.22	--	2.95	3
			Vanadium	--	--	--	--	kidney	--	0.05	--	0.61	1
			Chromium, hexavalent	6E-07	3E-09	5E-09	6E-07	blood	respiratory	0.03	0.00	0.37	0
			Chemical Total	**1E-06**	**3E-09**	**7E-06**	**8E-06**			**0**	**0**	**6**	**7**
		Exposure Point Total					**8E-06**						**7**
	Exposure Medium Total						**8E-06**						**7**
Soil Total							**8E-06**						**7**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area**	1,2,4-Trichlorobenzene	9.4E-11	--	5.2E-06	5E-06	liver	Not evaluated	0.00	--	0.16	0
			Benzo(a)anthracene	1.8E-11	--	5.5E-06	5E-06	--	Not evaluated	--	--	--	0
			Benzo(a)pyrene	--	--	5.7E-05	6E-05	--	Not evaluated	--	--	--	0
			Benzo(b)fluoranthene	2.4E-11	--	1.3E-04	1E-04	--	Not evaluated	--	--	--	0
			Indeno(1,2,3-cd)pyrene	--	--	1.4E-04	1E-04	--	Not evaluated	--	--	--	0
			Naphthalene	--	--	--	0E+00	body weight	Not evaluated	0.00	--	14	14
			Chromium, hexavalent	1.8E-07	--	--	2E-07	blood	Not evaluated	0.01	--	--	0
			Chemical Total	**2E-07**	**0E+00**	**3E-04**	**3E-04**			**0**	**0**	**14**	**14**
		Exposure Point Total					**3E-04**						**14**
	Exposure Medium Total						**3E-04**						**14**
Groundwater Total							**3E-04**						**14**
Receptor Total							**3E-04**					**Receptor HI Total**	**21**

Total Risk Across All Media **3E-04**

Total Hazard Across All Media **21**

Total Liver	3
Total Body weight	14
Total Reproductive system	4
Total Blood	0
Total Respiratory	0
Total Kidney	1

TABLE 8-20 (RAGS Part D Table 10.11.RME)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	75	--	75
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	9	--	9
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	25	--	25
			1.4-Dichlorobenzene	--	--	--	--	blood	blood	--	1	--	1
			Benzene	--	6E-04	--	6E-04	blood	blood	--	8	--	8
			Chlorobenzene	--	--	--	--	liver	liver	--	29	--	29
			Ethylbenzene	--	--	--	--	liver/kidney	developmental	--	0.9	--	1
			m-Xylene	--	--	--	--	body weight	coordination	--	13	--	13
			o-Xylene	--	--	--	--	body weight	coordination	--	13	--	13
			Naphthalene	--	3E-04	--	3E-04	body weight	respiratory	--	11	--	11
			Chemical Total	**--**	**9E-04**	**--**	**9E-04**			**--**	**185**	**--**	**185**
		Exposure Point Total					**9E-04**						**185**
	Exposure Medium Total						**9E-04**						**185**
Medium Total							**9E-04**						**185**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Benzene	--	2E-06	--	2E-06	blood	blood	--	0.03	--	0
			Naphthalene	--	6E-05	--	6E-05	body weight	respiratory	--	2	--	2
			Chemical Total	**--**	**6E-05**	**--**	**6E-05**			**--**	**2**	**--**	**2**
		Exposure Point Total					**6E-05**						**2**
	Exposure Medium Total						**6E-05**						**2**
Medium Total							**6E-05**						**2**
Receptor Total							**1E-03**					**Receptor HI Total**	**187**

Total Risk Across All Media **1E-03**

Total Hazard Across All Media **187**

Total Liver	138
Total Developmental	1
Total Coordination	26
Total Blood	9
Total Respiratory	13

* See Appendix H for supporting calculations.

TABLE 8-21 (RAGS Part D Table 10.11.CT)
RISK SUMMARY
WESTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)					
								Oral/Dermal	Inhalation	Ingestion	Inhalation	Dermal	Exposure
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	35	--	35
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	10	--	10
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	16	--	16
			1.4-Dichlorobenzene	--	--	--	--	liver	liver	--	10	--	10
			Benzene	--	1E-04	--	1E-04	blood	liver	--	6	--	6
			Chlorobenzene	--	--	--	--	liver	liver	--	31	--	31
			m-Xylene	--	--	--	--	whole body	whole body	--	56	--	56
			o-Xylene	--	--	--	--	whole body	whole body	--	19	--	19
			Naphthalene	--	8E-06	--	8E-06	body weight	respiratory	--	1	--	1
			Chemical Total	**--**	**1E-04**	**--**	**1E-04**			**--**	**184**	**--**	**184**
		Exposure Point Total					**1E-04**						**184**
	Exposure Medium Total						**1E-04**						**184**
Medium Total							**1E-04**						**184**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Naphthalene	--	2E-06	--	2E-06	body weight	respiratory	--	0.35	--	0
			Chemical Total	**--**	**2E-06**	**--**	**2E-06**			**--**	**0**	**--**	**0**
		Exposure Point Total					**2E-06**						**0**
	Exposure Medium Total						**2E-06**						**0**
Medium Total							**2E-06**						**0**
Receptor Total							**1E-04**					**Receptor HI Total**	**184**

Total Risk Across All Media **1E-04**

Total Hazard Across All Media **184**

Total Liver	108
Total Whole body	75
Total Respiratory	1

* See Appendix H for supporting calculations.

TABLE 8-22 (RAGS Part D Table 10.12.RME)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
REASONABLE MAXIMUM EXPOSURE
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s)		Ingestion	Inhalation	Dermal	Exposure Routes Total
								Oral/Dermal	Inhalation				
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	83	--	83
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	9	--	9
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	23	--	23
			1.4-Dichlorobenzene	--	--	--	--	blood	blood	--	1	--	1
			Naphthalene	--	1E-03	--	1E-03	body weight	respiratory	--	29	--	29
			Chemical Total	**--**	**1E-03**	**--**	**1E-03**			**--**	**145**	**--**	**145**
		Exposure Point Total					**1E-03**						**145**
	Exposure Medium Total						**1E-03**						**145**
Medium Total							**1E-03**						**145**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Benzene	--	2E-06	--	2E-06	blood	blood	--	0.03	--	0
			Naphthalene	--	6E-05	--	6E-05	body weight	respiratory	--	2	--	2
			Chemical Total	**--**	**6E-05**	**--**	**6E-05**			**--**	**2**	**--**	**2**
		Exposure Point Total					**6E-05**						**2**
	Exposure Medium Total						**6E-05**						**2**
Medium Total							**6E-05**						**2**
Receptor Total							**1E-03**					**Receptor HI Total**	**147**

Total Risk Across All Media **1E-03** **Total Hazard Across All Media** **147**

Total Liver	115
Total Blood	1
Total Respiratory	31

* See Appendix H for supporting calculations.

TABLE 8-23 (RAGS Part D Table 10.12.CT)
RISK SUMMARY
EASTERN AREA SUBSURFACE SOIL AND SHALLOW GROUNDWATER
CENTRAL TENDENCY
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Indoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Chemical of Potential Concern	Carcinogenic Risk				Non-Carcinogenic Hazard Quotient					
				Ingestion	Inhalation	Dermal	Exposure Routes Total	Primary Target Organ(s) Oral/Dermal	Primary Target Organ(s) Inhalation	Ingestion	Inhalation	Dermal	Exposure Routes Total
Subsurface Soil (0-10 feet bgs)	**Indoor Air**	**Indoor Air**	1,2,4-Trichlorobenzene	--	--	--	--	adrenal	liver	--	87	--	87
			1,2-Dichlorobenzene	--	--	--	--	CNS/liver	liver	--	10	--	10
			1,3-Dichlorobenzene	--	--	--	--	liver	liver	--	13	--	13
			1.4-Dichlorobenzene	--	--	--	--	liver	liver	--	2	--	2
			Naphthalene	--	2E-04	--	2E-04	body weight	respiratory	--	30	--	30
			Chemical Total	**--**	**2E-04**	**--**	**2E-04**			**--**	**142**	**--**	**142**
		Exposure Point Total					**2E-04**						**142**
	Exposure Medium Total						**2E-04**						**142**
Medium Total							**2E-04**						**142**
Shallow Groundwater	**Indoor Air**	**Indoor Air***	Naphthalene	--	2E-06	--	2E-06	body weight	respiratory	--	0.35	--	0
			Chemical Total	**--**	**2E-06**	**--**	**2E-06**			**--**	**0**	**--**	**0**
		Exposure Point Total					**2E-06**						**0**
	Exposure Medium Total						**2E-06**						**0**
Medium Total							**2E-06**						**0**
Receptor Total							**2E-04**					**Receptor HI Total**	**142**

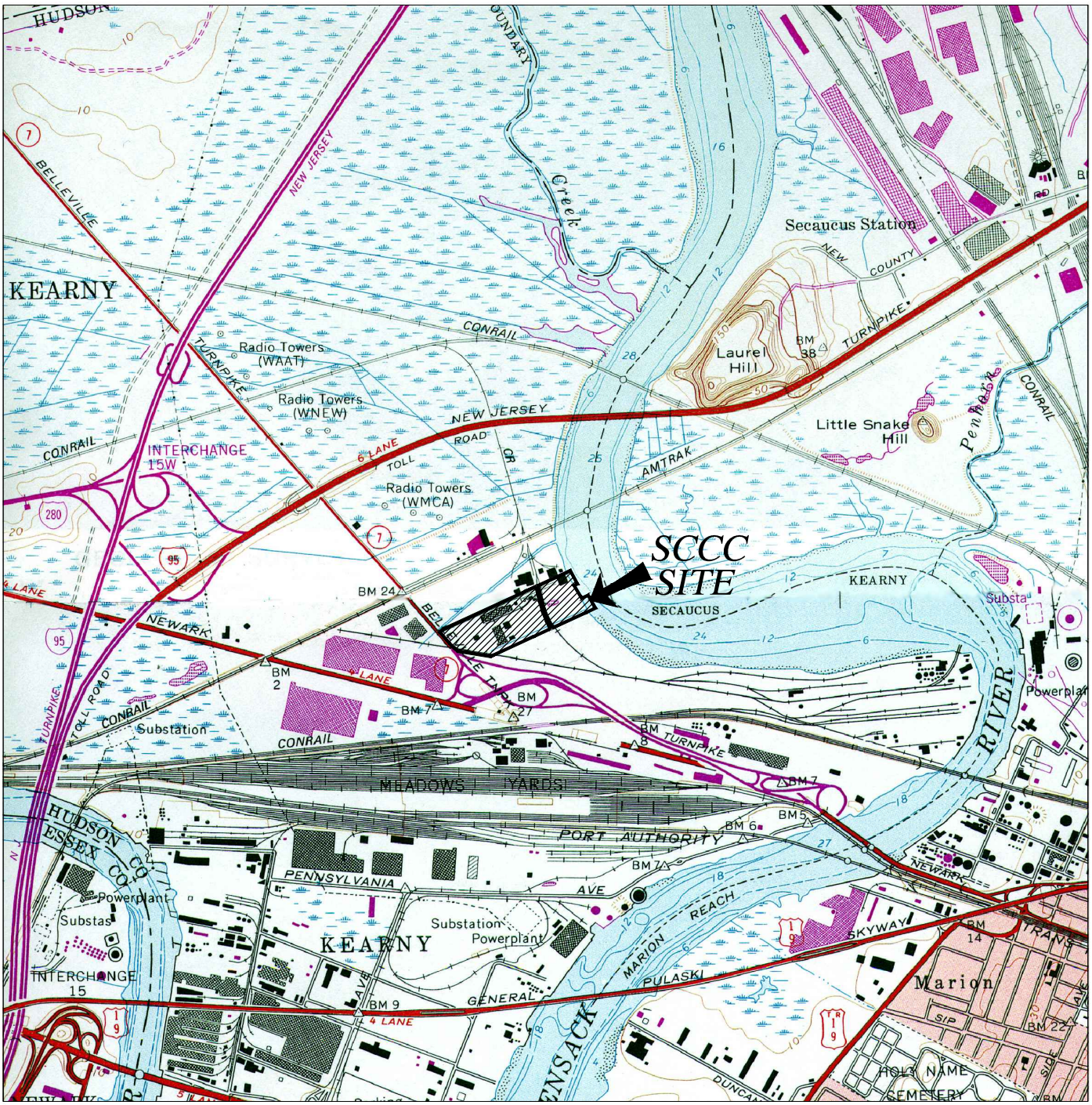
Total Risk Across All Media **2E-04**

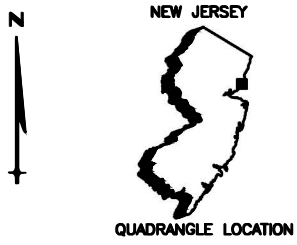
Total Hazard Across All Media **142**

Total Liver	112
Total Respiratory	30

* See Appendix H for supporting calculations.

FIGURES





REFERENCE: USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLES OF JERSEY CITY, AND WEEHAWKEN, NEW JERSEY

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 07/30/14
CHKD: RJH	DATE: 07/30/14
APPD: JSZ	DATE: 07/30/14
SCALE:	1"= 2000'

KEY ENVIRONMENTAL INCORPORATED

BASELINE HUMAN HEALTH RISK ASSESSMENT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY, NEW JERSEY

SITE LOCATION MAP

PROJECT NO: 201401-02
FIGURE 2-1

y:\00civil\kearny\baseline human health risk assessment\figure 2-1.dwg Last Saved By: Scomer 7/30/2014 3:39 PM Plotted By: Shelly Comer 8/8/2014 4:35 PM Scale: 1:1.016827

LEGEND

PROPERTY BOUNDARY

0 150 300 FEET

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 07/30/14	KEY ENVIRONMENTAL INCORPORATED	
CHKD: AH	DATE: 07/30/14		
APPD: JSZ	DATE: 07/30/14		
SCALE: AS SHOWN			

BASELINE HUMAN HEALTH RISK ASSESSMENT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY, NEW JERSEY

2012 AERIAL PHOTOGRAPH

PROJECT NO: 201401-02

FIGURE 2-2

REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

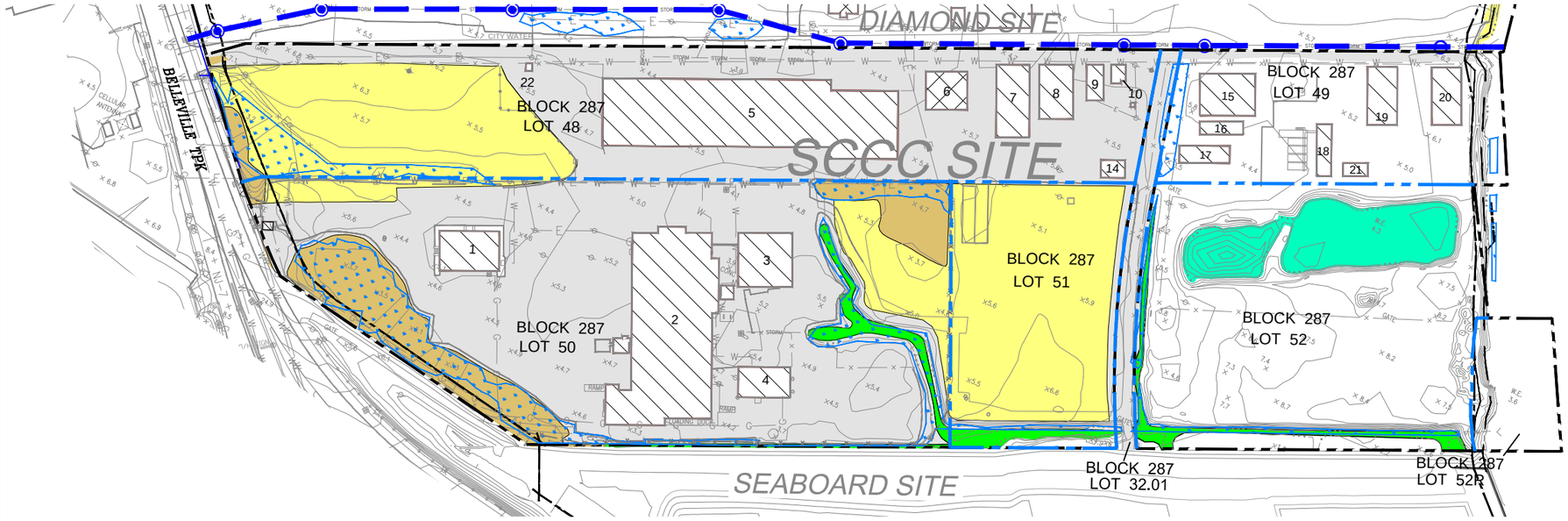
REFERENCE:

1. PROPERTY BOUNDARY SHOWN HEREON FROM SHEET 1 OF 1 TITLED "SURVEY OF PROPERTY, TAX LOTS 32.02, 46, 47 & 47R, BLOCK 267, TAX LOTS 48, 49, 50, 51, 52 AND 53R, BLOCK 267, TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY," DATED JULY 1, 2009 (REVISION 2: JULY 20, 2009), PREPARED BY DIMETRA ASSOCIATES, PC.
2. IMAGE PROVIDED BY GOOGLE EARTH DATED JUNE, 2012.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

J:\Docs\kearny\baseline human health risk assessment\Figure 2-2 2012 aerial photograph.dwg Last Saved By: Scanner 7/30/2014 1:38 PM Plotted By: Shelly Demer 8/5/2014 4:38 PM Scale: 1:1



LEGEND

- PROPERTY BOUNDARY
- EXISTING SURFACE COVER IRM COMPRISED OF ASPHALTIC CONCRETE
- EXISTING SURFACE COVER IRM COMPRISED OF SOIL
- EXISTING SURFACE COVER IRM COMPRISED OF GEOMEMBRANE OVERLAIN WITH AGGREGRATE
- EAST AND WEST LAGOONS
- SOUTH DITCH SOFT SOILS
- EXISTING WETLANDS
- EXISTING BUILDING
- FORMER BUILDING FOUNDATION
- EXISTING UTILITY POLES
- EXISTING LIGHT STANDARD
- EXISTING OVERHEAD POWER LINE
- EXISTING WATER LINES
- EXISTING GAS LINES
- EXISTING STORM DRAIN
- 8–FOOT HIGH SECURITY FENCE WITH DUST CONTROL
- EXISTING STORM DRAIN (48" PIPE)
- EXISTING DROP INLET
- LOT BOUNDARY

0 200 400 FEET

REV #	DATE	DESCRIPTION	APPD
3			
2			
1			

REFERENCE:

1. EXISTING GROUND SURFACE CONTOURS PER AIR SURVEY, DULLES, VIRGINIA, APRIL 14, 2001. HORIZONTAL REFERENCE: NEW JERSEY STATE PLANE COORDINATES (NAD 1927). VERTICAL REFERENCE:NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
2. PROPERTY BOUNDARY SHOWN HEREON FROM SHEET 1 OF 1 TITLED "SURVEY OF PROPERTY, TAX LOTS 32.02, 46, 47 & 47R, BLOCK 287, TAX LOTS 48, 49, 50, 51, 52 AND 52R, BLOCK 287, TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY," DATED JULY 1, 2009 (REVISION 2: JULY 29, 2009), PREPARED BY DYKSTRA ASSOCIATES, PC.
3. EXISTING WETLANDS PER WETLAND DELINEATION BY PRINCETON HYDRO, LLC FOR KEY ENVIRONMENTAL, INC. PERFORMED IN MARCH 2009.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

PERFORMING PARTIES GROUP

DRWN:	SCC	DATE:	07/30/14
CHKD:	AH	DATE:	07/30/14
APPD:	JSZ	DATE:	07/30/14
SCALE:	AS SHOWN		

KEY ENVIRONMENTAL INCORPORATED

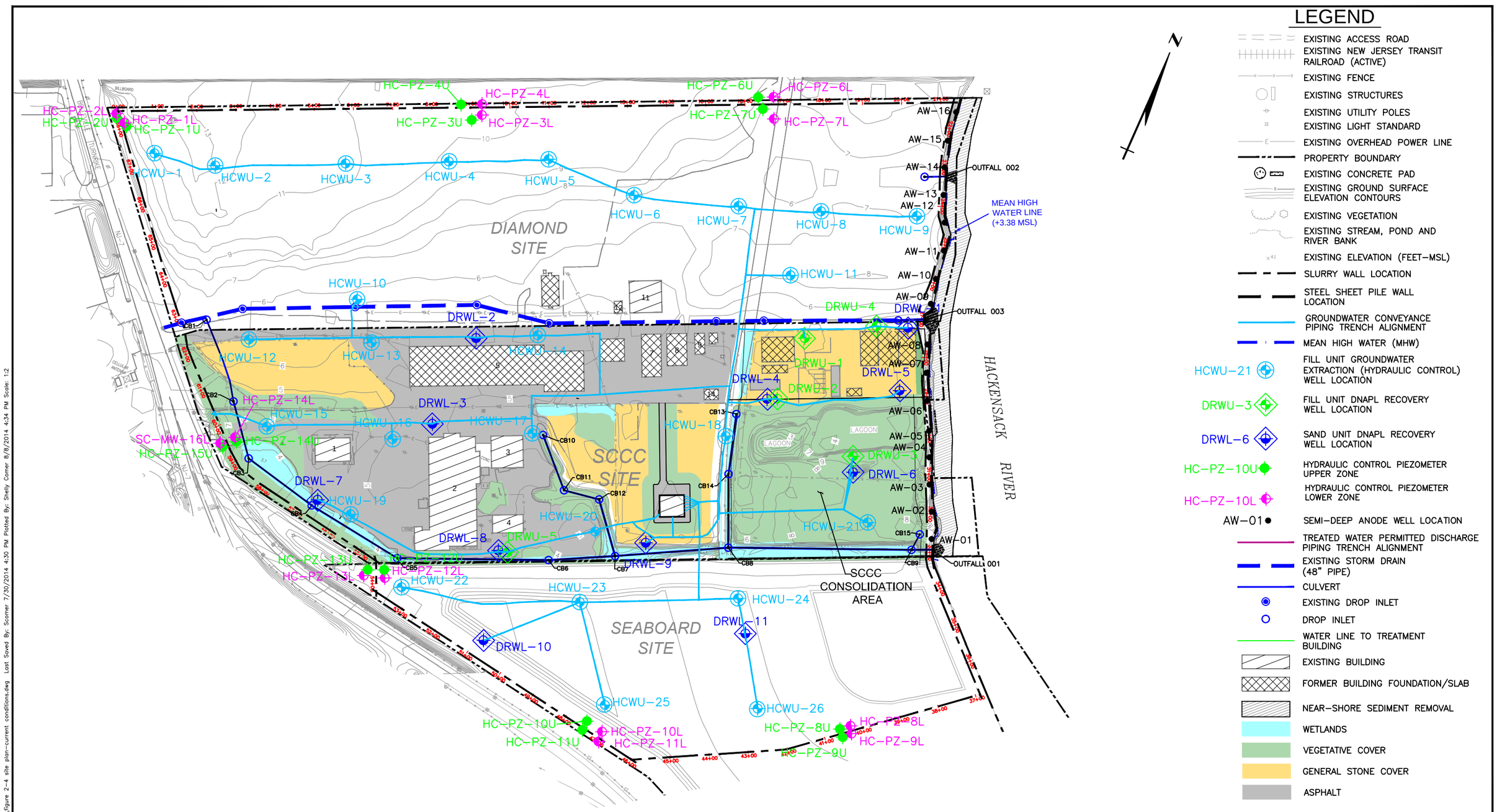
BASELINE HUMAN HEALTH RISK ASSESSMENT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY, NEW JERSEY

HISTORICAL SITE ARRANGEMENT SHOWING INTERIM MEASURES (2008)

PROJECT NO: 201401–02

FIGURE 2–3

y:\00civil\kearny\baseline human health risk assessment\figure 2-3 historical site conditions.dwg Last Saved By: Scomer 7/30/2014 1:44 PM Plotted By: Shelly Conner 8/8/2014 4:35 PM Scale: 1:1



LEGEND

- EXISTING ACCESS ROAD
- EXISTING NEW JERSEY TRANSIT RAILROAD (ACTIVE)
- EXISTING FENCE
- EXISTING STRUCTURES
- EXISTING UTILITY POLES
- EXISTING LIGHT STANDARD
- EXISTING OVERHEAD POWER LINE
- PROPERTY BOUNDARY
- EXISTING CONCRETE PAD
- EXISTING GROUND SURFACE ELEVATION CONTOURS
- EXISTING VEGETATION
- EXISTING STREAM, POND AND RIVER BANK
- EXISTING ELEVATION (FEET–MSL)
- SLURRY WALL LOCATION
- STEEL SHEET PILE WALL LOCATION
- GROUNDWATER CONVEYANCE PIPING TRENCH ALIGNMENT
- MEAN HIGH WATER (MHW)
- HCWU–21 — FILL UNIT GROUNDWATER EXTRACTION (HYDRAULIC CONTROL) WELL LOCATION
- DRWU–3 — FILL UNIT DNAPL RECOVERY WELL LOCATION
- DRWL–6 — SAND UNIT DNAPL RECOVERY WELL LOCATION
- HC–PZ–10U — HYDRAULIC CONTROL PIEZOMETER UPPER ZONE
- HC–PZ–10L — HYDRAULIC CONTROL PIEZOMETER LOWER ZONE
- AW–01 — SEMI–DEEP ANODE WELL LOCATION
- TREATED WATER PERMITTED DISCHARGE PIPING TRENCH ALIGNMENT
- EXISTING STORM DRAIN (48" PIPE)
- CULVERT
- EXISTING DROP INLET
- DROP INLET
- WATER LINE TO TREATMENT BUILDING
- EXISTING BUILDING
- FORMER BUILDING FOUNDATION/SLAB
- NEAR–SHORE SEDIMENT REMOVAL
- WETLANDS
- VEGETATIVE COVER
- GENERAL STONE COVER
- ASPHALT

0 120 240 FEET

REV #	DATE	DESCRIPTION	APPD
0			
1			
2			

REFERENCE:

1. EXISTING GROUND SURFACE CONTOURS PER AIR SURVEY, DULLES, VIRGINIA, APRIL 14, 2001. HORIZONTAL REFERENCE: NEW JERSEY STATE PLANE COORDINATES (NAD 1927). VERTICAL REFERENCE:NATIONAL GEODETIC VERTICAL DATUM (NGVD 1929).
2. PROPERTY BOUNDARY SHOWN HEREON FROM SHEET 1 OF 1 TITLED "SURVEY OF PROPERTY, TAX LOTS 32.02, 46, 47 & 47R, BLOCK 287, TAX LOTS 48, 49, 50, 51, 52 AND 52R, BLOCK 287, TOWN OF KEARNY, HUDSON COUNTY, NEW JERSEY," DATED JULY 1, 2009 (REVISION 2: JULY 29, 2009), PREPARED BY DYKSTRA ASSOCIATES, PC.
3. EXISTING WETLANDS PER WETLAND DELINEATION BY PRINCETON HYDRO, LLC FOR KEY ENVIRONMENTAL, INC. PERFORMED IN MARCH 2009.

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 07/30/14	KEY ENVIRONMENTAL INCORPORATED
CHKD: AH	DATE: 07/30/14	
APPD: JSZ	DATE: 07/30/14	
SCALE: AS SHOWN		

BASELINE HUMAN HEALTH RISK ASSESSMENT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, NEW JERSEY

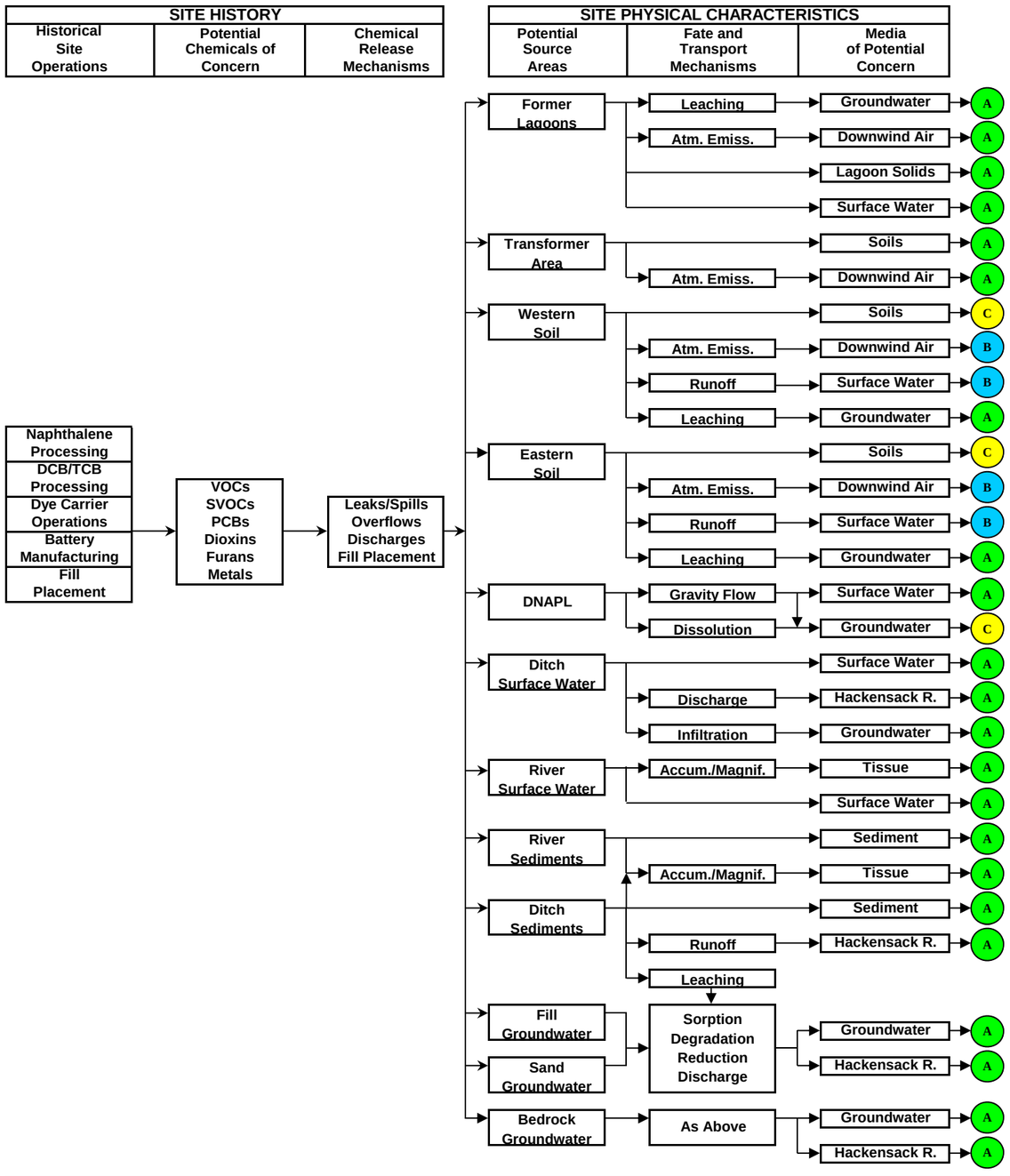
CURRENT SITE CONDITIONS

PROJECT NO: 201401–02
FIGURE 2–4

y:\00civil\kearny\baseline human health risk assessment\figure 2–4 site plan–current conditions.dwg Last Saved By: Scomer 7/30/2014 4:30 PM Plotted By: Shelly Comer 8/6/2014 4:34 PM Scale: 1:2

FIGURE 3-1

CONCEPTUAL SITE MODEL
SCCC SITE - KEARNY, NEW JERSEY



RECEPTORS

Potential Exposure Pathways	ONSITE/OFFSITE HUMAN				OFFSITE HUMAN				BIOTA			
	On-site Workers	Occasional Visitors	Construction Workers	Utility Workers	Residential Receptors	Industrial Worker	Recreational Users	Sport Fisherman	Benthic Community	Fish	Aquatic Birds	Feeding Mammals
Scenario A - Pathways are Incomplete (Current Conditions)												
Ingestion												
Dermal												
Inhalation												
Scenario B - Pathways are Potentially Complete but Insignificant (Current Conditions)												
Ingestion												
Dermal												
Inhalation												
Scenario C - Pathways are Potentially Complete and Potentially Significant (Future Conditions)												
Ingestion												
Dermal												
Inhalation												

Pathway is incomplete at present as a result of implementation of IRMs and IRA and is expected to remain so in the future.

All direct onsite groundwater exposure pathways (no groundwater use).
All potential exposure pathways associated with the lagoons (capped).
Discharge of DNAPL to the south ditch or Hackensack River (barrier walls in place).
Discharge of all groundwater to the Hackensack River (barrier walls in place).
Direct contact with transformer area soils eliminated via removal.
Atmospheric emission of dust from transformer area eliminated via removal.
Potential for direct contact with surface water in the South Ditch eliminated via removal and new stormwater management system.
Discharge of surface water from the South Ditch (will be noncontact surface water, sediments removed).
All potential nongroundwater exposures associated with the south ditch (impacted sediment removed).
Direct contact with eastern area soils by outdoor site workers and visitors (cover placed).
Direct contact with Hackensack River surface water (does not consider other sources).
Accumulation and magnification of Hackensack River constituents in surface water (does not consider other sources).
Human and ecological receptor direct contact with Hackensack River sediments (sediments removedl).
Accumulation and magnification of Hackensack River constituents in sediments (does not consider other sources - river sediments removed).

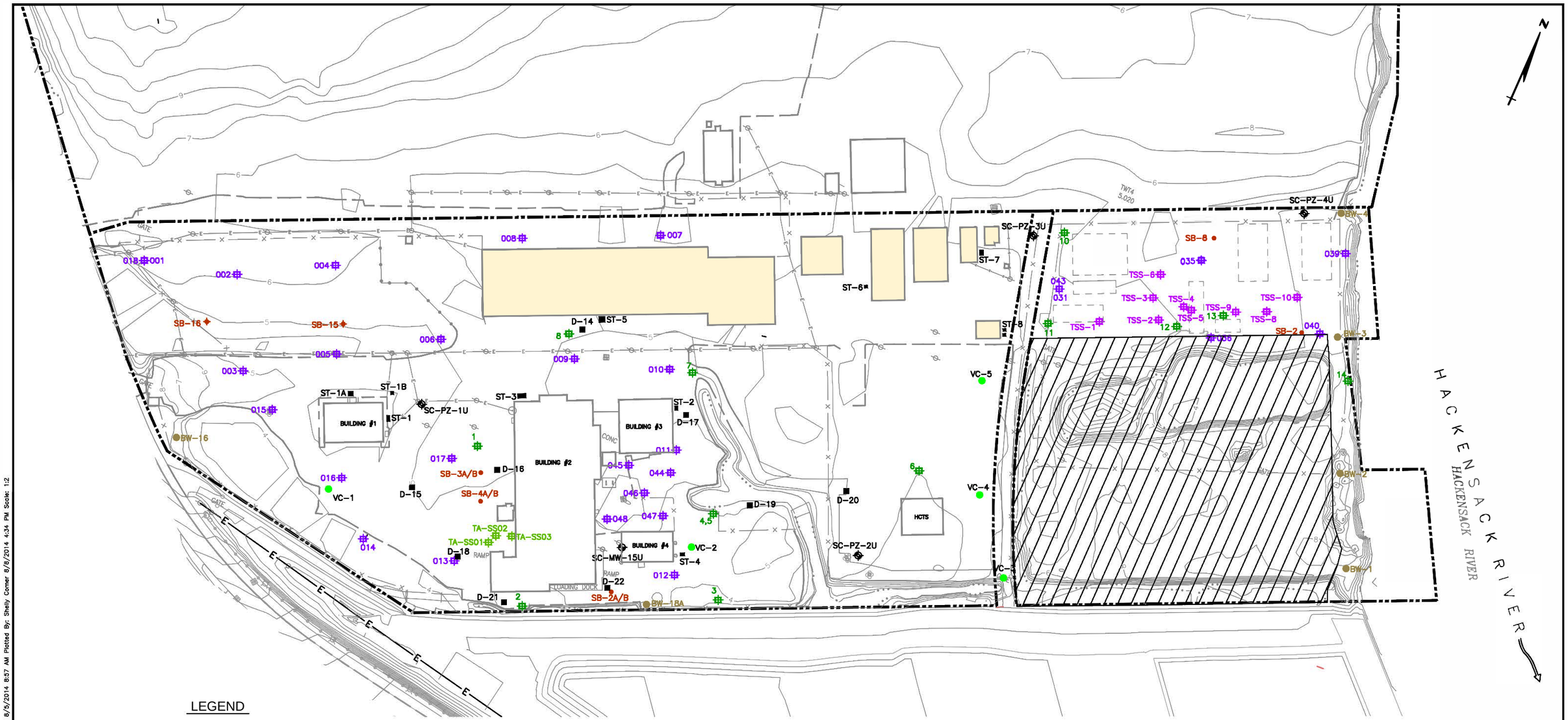
Pathway may be complete after IRA implementation but is expected to be insignificant.

Infrequent exposures to surface soils by visitors, workers, or terrestrial ecological receptors could occur if cover materials are not maintained.
Atmospheric emission of volatiles or fugitive dust from non-remediated areas (monitoring data during active remediation showed no risk).
Runoff of western area soil to receiving surface waters (western soils relatively unimpacted) and eastern area soil (stormwater management, capping and revegetation in place). Under a future disturbance scenario, residents, recreators, and fishermen could experience low risk as a result of erosion and runoff of particulates. Surface covers are in place to prevent such releases. Stormwater monitoring has shown that such releases are not occurring under current conditions. Institutional controls will be implemented to preclude such releases in the future.

Pathway is potentially complete after IRA implementation and may be significant for humans and ecological receptors.

Potential for direct contact with western area soils and groundwater by utility workers and construction workers exists under a future scenario.
Potential for direct contact with eastern area soils and groundwater by utility workers and construction workers exists under a future scenario.
Potential for direct contact with shallow groundwater by utility workers and construction workers exists under a future scenario.
Potential for exposure via vapor intrusion into future buildings

Notes: Potential exposures associated with the Hackensack River are being addressed in a broader context. Potential site releases to the Hackensack River from the SCCC Site have been mitigated and impacted sediments have been excavated from the river.



LEGEND

- SITE BOUNDARY
- FENCELINE
- EXISTING BUILDING/STRUCTURES
- CONCRETE SLAB
- FORMER BUILDING/STRUCTURES
- BUSH/TREELINE
- RIVER/CHANNEL/LAGOON
- EXISTING GROUND SURFACE ELEVATION
- UTILITY POLE
- GUARD RAIL
- STORM DRAIN
- RAILROAD LINE
- CONSOLIDATION AREA
- SEPTIC TANK LOCATION

- 8 SURFACE SOIL SAMPLE LOCATION (WESTON-1985)
- SS-1 SURFACE SOIL SAMPLE LOCATION (WESTON-1987)
- TSS-1 TANK AREA SURFACE SOIL SAMPLE LOCATION (WESTON-1990)
- TA-SS01 TRANSFORMER AREA SURFACE SOIL SAMPLE LOCATION (KEY-1998)
- 001 SURFACE SOIL SAMPLE LOCATION (FRENCH AND PARRELLO-1991)
- SB-1 SOIL BORING LOCATION (SAMPLE COLLECTED)(ERM-1996)
- SB-2 SOIL BORING LOCATION (VISUAL/FIELD SCREENING)(ERM-1996)
- SB-2A/B SOIL BORING LOCATION (WESTON-1992)
- SB-15 SOIL BORING LOCATION (KEY-1998)
- BW-3 BARRIER WALL ALIGNMENT BORING (KEY-20013)
- VC-1 VARVED CLAY SOIL BORING (KEY-2013)
- D-25 DNAPL DELINEATION BORING (KEY-2006)
- SC-PZ-2U SHALLOW WELL/PIEZOMETER

0 150 300 FEET

PERFORMING PARTIES GROUP

DRWN: SCC	DATE: 07/30/14
CHKD: RJH	DATE: 07/30/14
APPD: JSZ	DATE: 07/30/14
SCALE: AS SHOWN	

KEY ENVIRONMENTAL INCORPORATED

BASELINE HUMAN HEALTH RISK ASSESSMENT
STANDARD CHLORINE CHEMICAL CO., INC. SITE
KEARNY, HUDSON COUNTY NEW JERSEY

REV #	DATE	DESCRIPTION	APPD
1			
2			
3			

REFERENCE:

ISSUE DATE:

KEY ENVIRONMENTAL, INC.
200 THIRD AVENUE
CARNEGIE, PA 15106

SAMPLE LOCATION MAP

PROJECT NO: 201401-02

FIGURE 4-1

y:\00civil\kearny\baseline human health risk assessment\figure 4-1.dwg Last Saved By: Scomer 8/5/2014 8:57 AM Plotted By: Shelly Comer 8/8/2014 4:34 PM Scale: 1:2

APPENDIX A

CLASSIFICATION EXCEPTION AREA / WELL RESTRICTION AREA

njhome | my new jersey | people | business | government | departments
search
newjersey department of environmental protection
OPRA | New Jersey Open Public Records Act
opra home | contact opra | njdep home
site search | reports by category | reports search | help

Classification Exception Area/Well restriction Area

Case Information

CEA ID: CEA - 2240
Activity Number RPC040001
Subject Item ID: CEA1167113

Case ID 250063 RPC040001
Preferred Id 250063
Case HUDSON COUNTY CHROMATE - KEARNY
Address : VARIOUS LOCATIONS

County Hudson
City: Kearny Town

Lot and Block of the Case		
Block	Lot	
See Exhibit A [Site Location Map]		

Lot and Block of the CEA		
Block	Lot	
286	37a	
286	37c	
287	19	
287	20	
287	20R	
287	27	
287	27R	
287	31	
287	33	

287	**33R**	
287	**35**	
287	**36**	
287	**37**	
287	**38a**	
287	**38b**	
287	**39**	
287	40	
287	41	
287	41R	
287	46	
287	47	
287	48	
287	49R	
287	**50**	
287	**51**	
287	**52**	
287	**52R**	
287	54	

Contacts

DEP DOYLE, DAVID
(609) 292 - 2173

Department Oversight Document

CEA Information

Description: This CEA is for the following Chromium Sites located in Kearny Town: 48, 50, 51, 58, 103, 113, 116 and 131. This CEA supercedes and is inclusive of the CEAs previously established for these sites

GW

Aquifer	Vertical **Depth**
Fill	25

Contaminant				
This CEA /WRA applies to the contaminants listed in the table below. The ground water quality criteria / primary drinking water standards for these contaminants are listed in parts per billion (ppb). All constituents standards (N.J.A.C. 7:9:9-6) apply at the designated boundary.				
Contaminant	Concentration *1*		GWQS *2*	
Chloride	6,560.00	Micrograms Per Liter	0.10	Micrograms Per Liter

Chromium	87,100.00	Micrograms Per Liter	0.10	Micrograms Per Liter
Chromium (VI)	38,600.00	Micrograms Per Liter	0.10	Micrograms Per Liter
Total dissolved solids (TDS)	10,400.00	Micrograms Per Liter	0.10	Micrograms Per Liter

Site
Note:
1 Maximum concentration detected at the time of CEA estblishment
2 Ground Water Quality Standards

CEA Boundaries				
	horizontal	See **exhibit B (CEA/WRA Location Map)**		
	vertical	See **exhibit B (CEA/WRA Location Map)**		
		Included in affected aquifer above		

Projected Term of CEA	
Date Established	7/11/2003
Duration	999.00
Date Closed/Lifted	
Comments	
	Since groundwater quality data indicates excedance of contaminants above the Primary Drinking
Note	Water Standards, and the designated uses of Class II-A aquifer included potable use, the CEA
	established for this site is also a Well restriction Area. The extent of Well Restriction shall
	coincide with the boundaries of the CEA

Well Restrictions set within boundaries of the CEA	
Restrictions	**Well Restriction Boundries**
Double Case Wells	Double Case Wells: With the exception of monitoring wells installed into the first water bearing zone, any proposed well to be installed within the CEA/WRA boundary shall be double cased to an appropriate depth in order to prevent any vertical contaminant migration pathways. This depth is either into a confining layer or 50 feet below the vertical extent of the CEA.
Evaluate Production Wells	Evaluate Production Wells: Any proposed high capacity production wells in the immediate vicinity of the CEA/WRA should be pre-evaluated to determine if pumping from these wells would draw a portion of the contaminant plume into the cone of capture of the production wells or alter the configuration of the contaminant plume.
Sample Potable Wells	Sample Potable Wells: Any potable well to be installed within the footprint of the CEA/WRA shall be sampled annually for the parameters of concern. The first sample shall be collected prior to using the well. If contamination is detected, contact your local Health Department. If the contamination is above the Safe Drinking Water Standards, then the NJDEP Hot Line should be called. Treatment is required for any well that has contamination above the Safe Drinking Water Standards.

Site Specific Well Restrictions	
Restriction	
* None at this time	

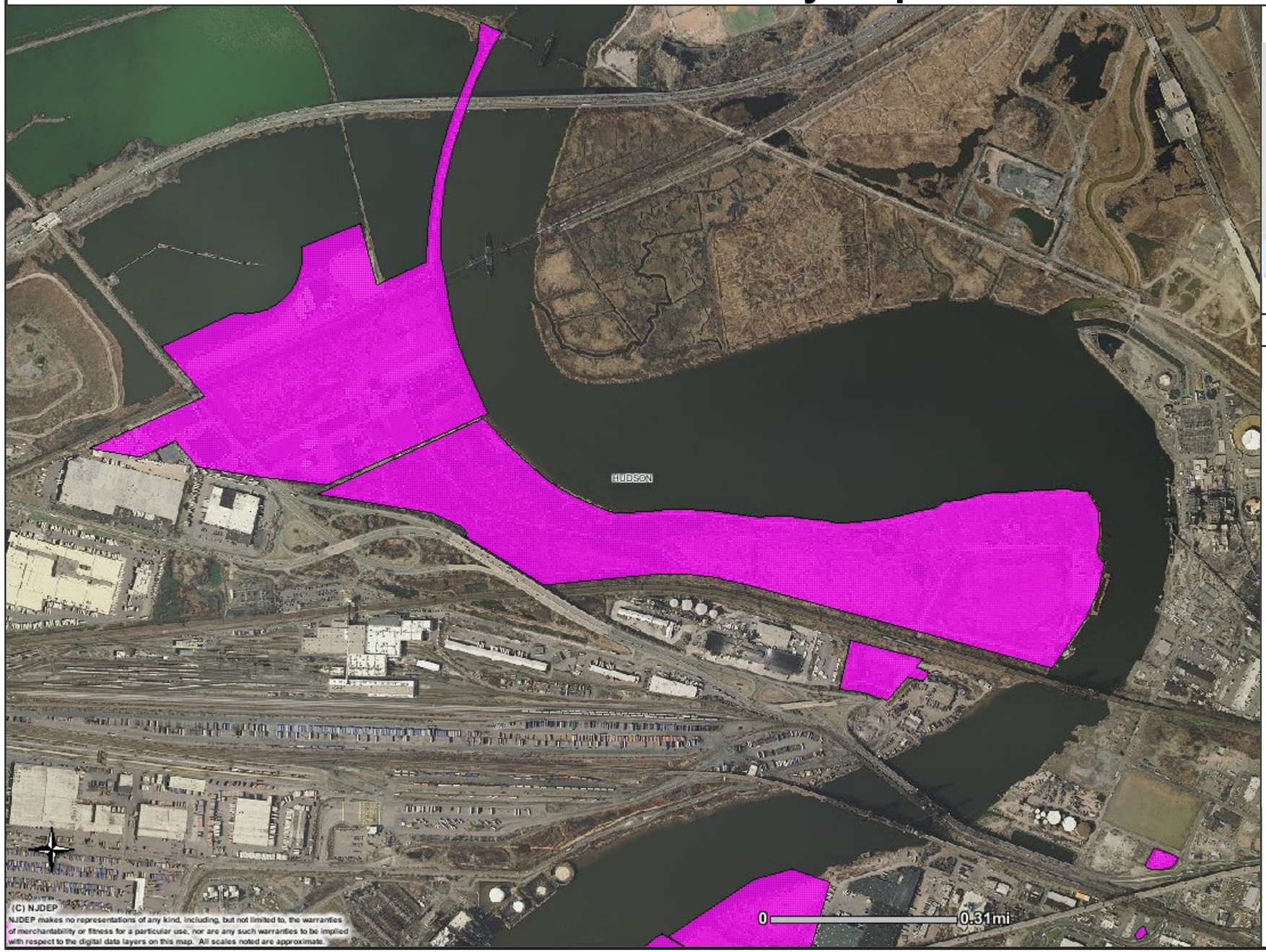
contact dep | privacy notice | legal statement | accessibility statement

department: njdep home | about dep | index by topic | programs/units | dep online
statewide: njhome | citizen | business | government | services A to Z | departments | search

Copyright © State of New Jersey, 1996-2004
Department of Environmental Protection
P. O. Box 402
Trenton, NJ 08625-0402

Last Updated: June 15, 2012

New Jersey Map



Scale 1:11501

- Counties
- Groundwater Contamination Areas (CEA)

Aerial Photos 2007

Mid-Atlantic States

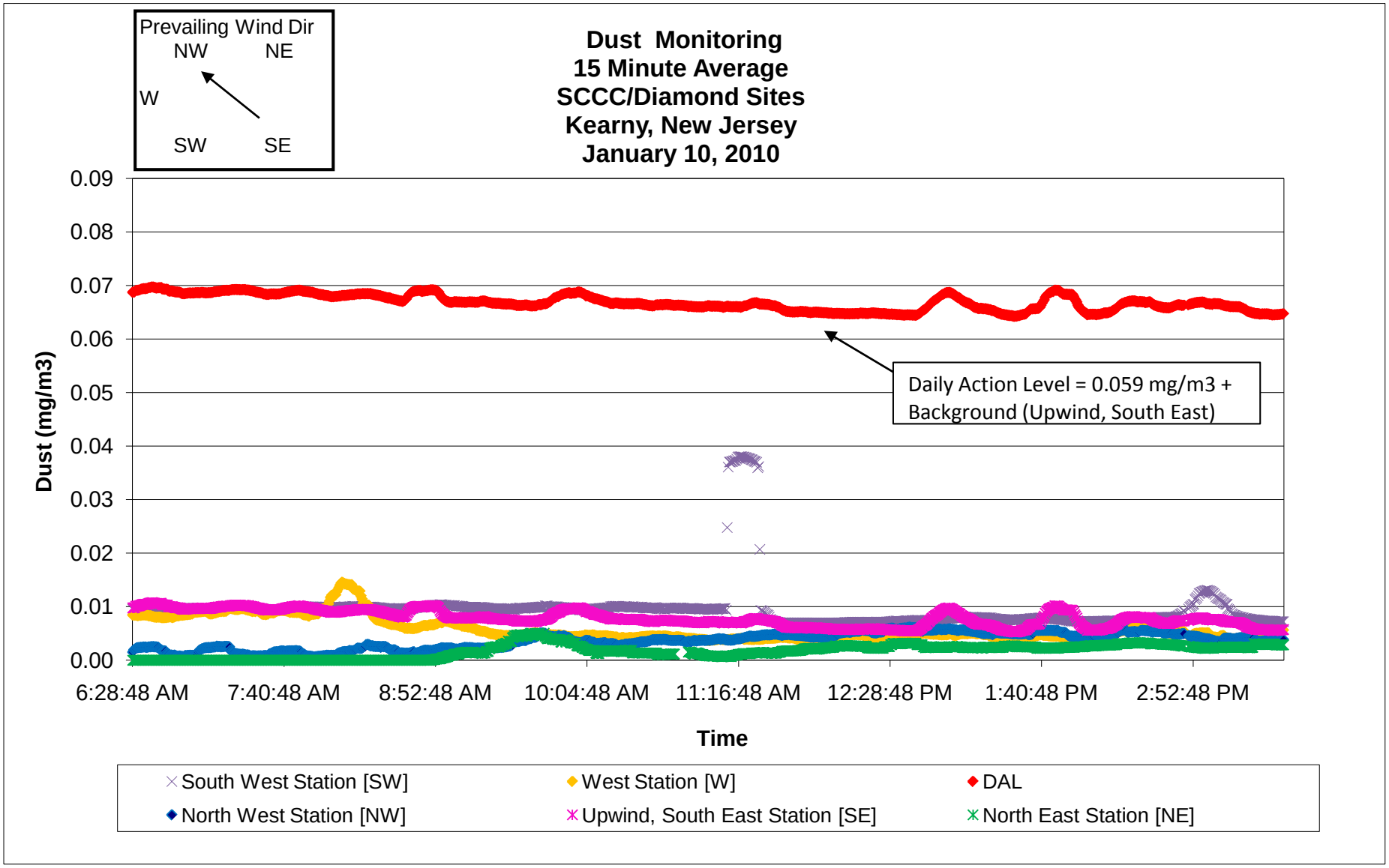
- New Jersey
- Other States

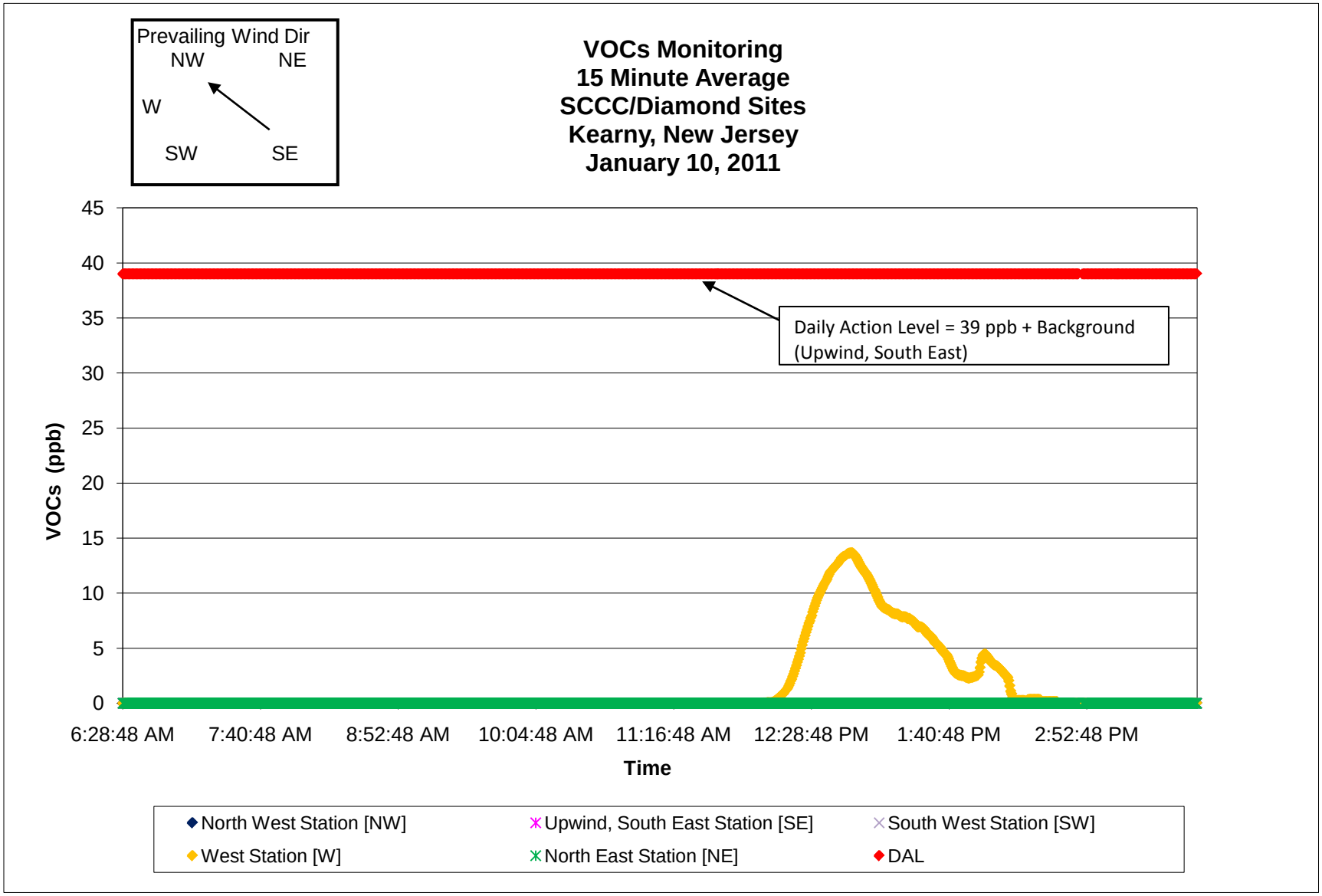
APPENDIX B

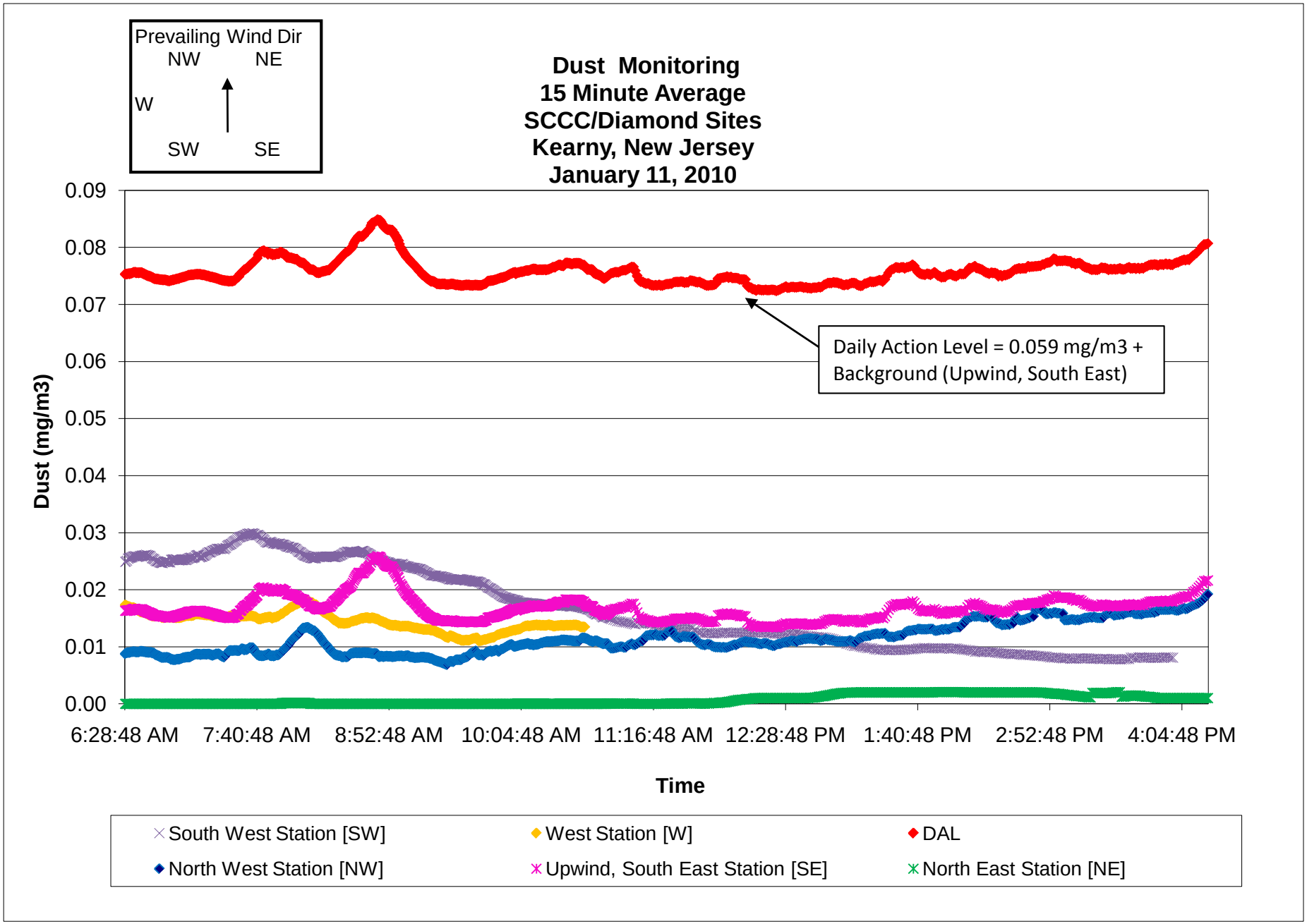
AIR MONITORING RESULTS

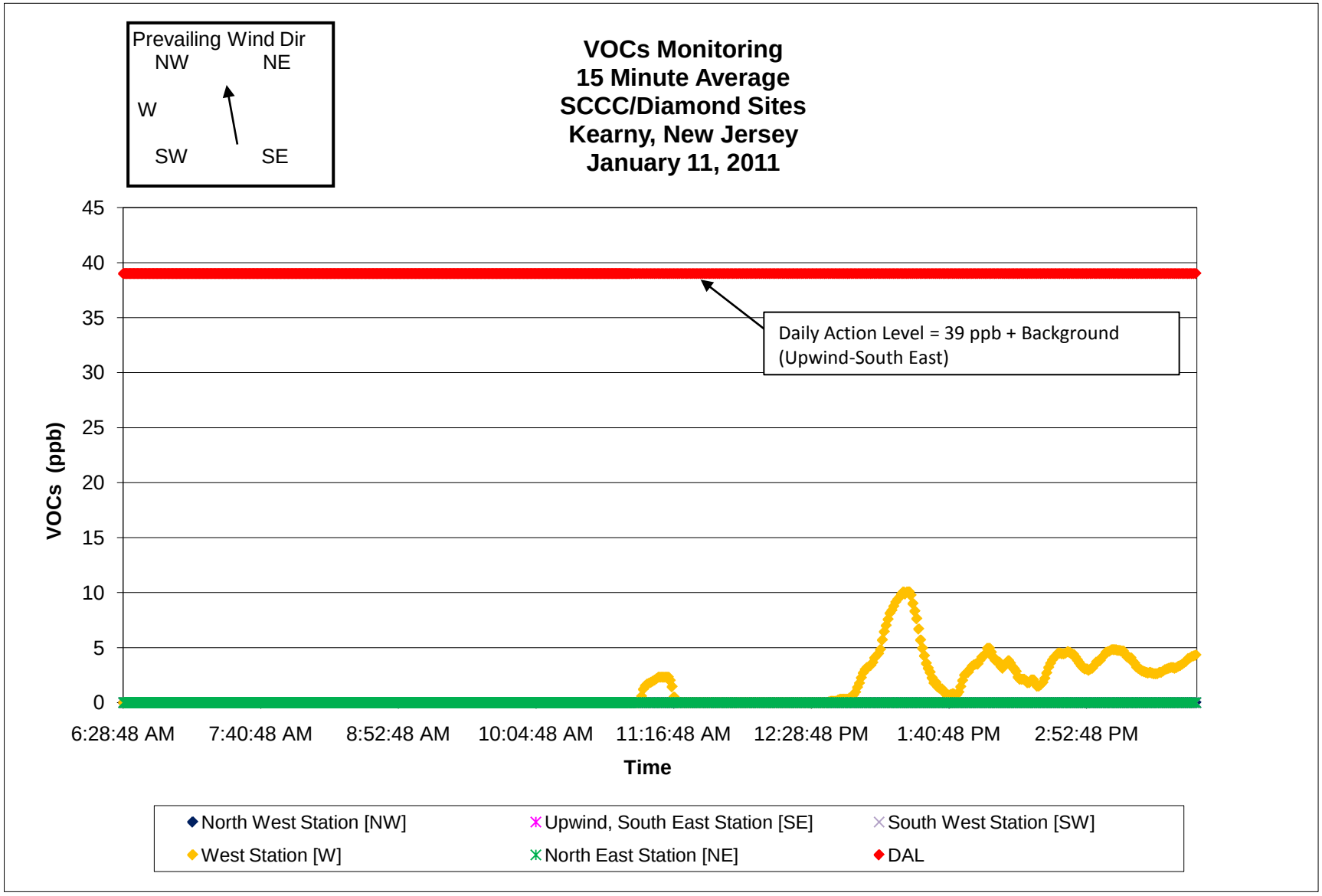
APPENDIX B.1

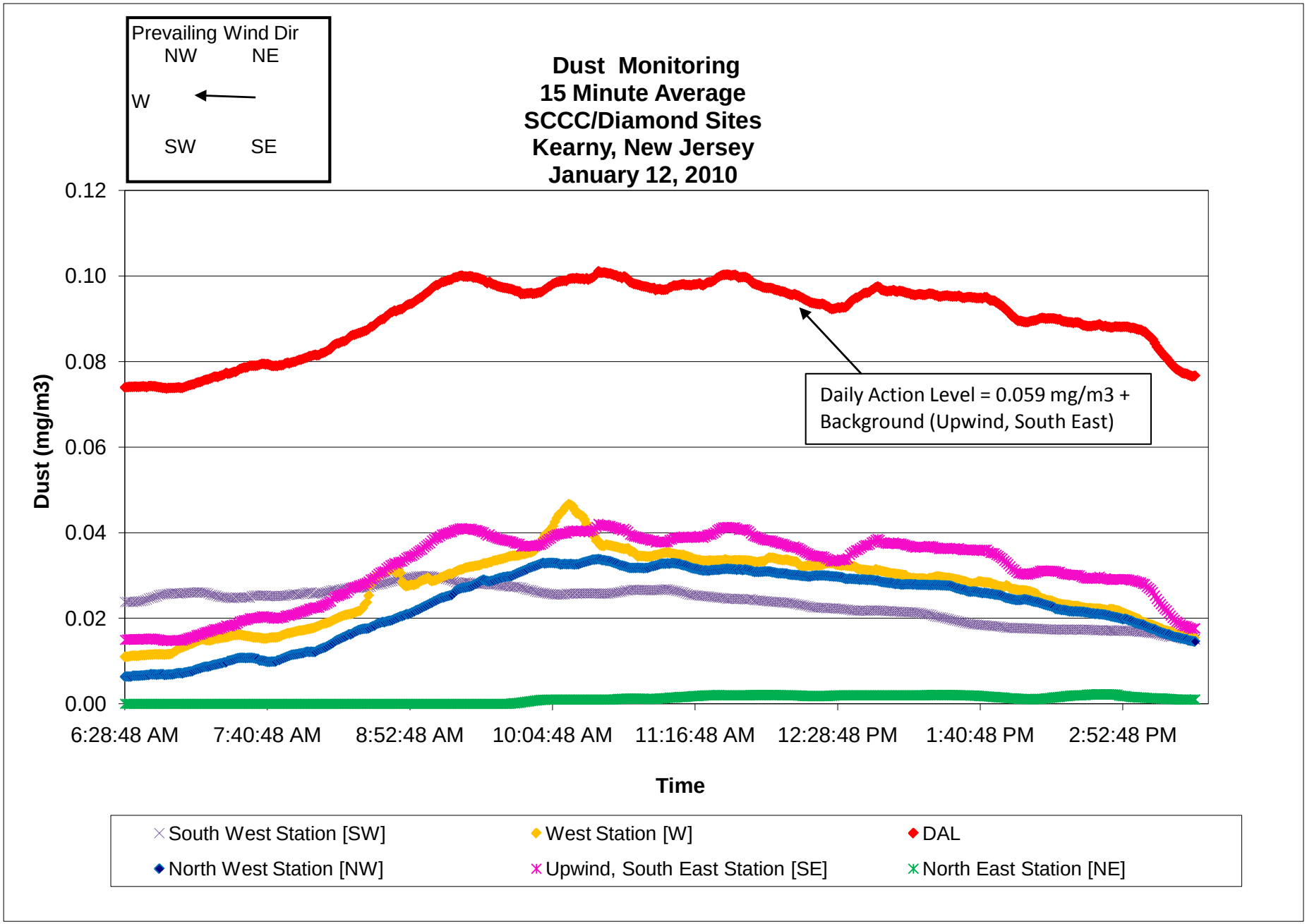
TYPICAL PERIMETER AIR MONITORING GRAPHS

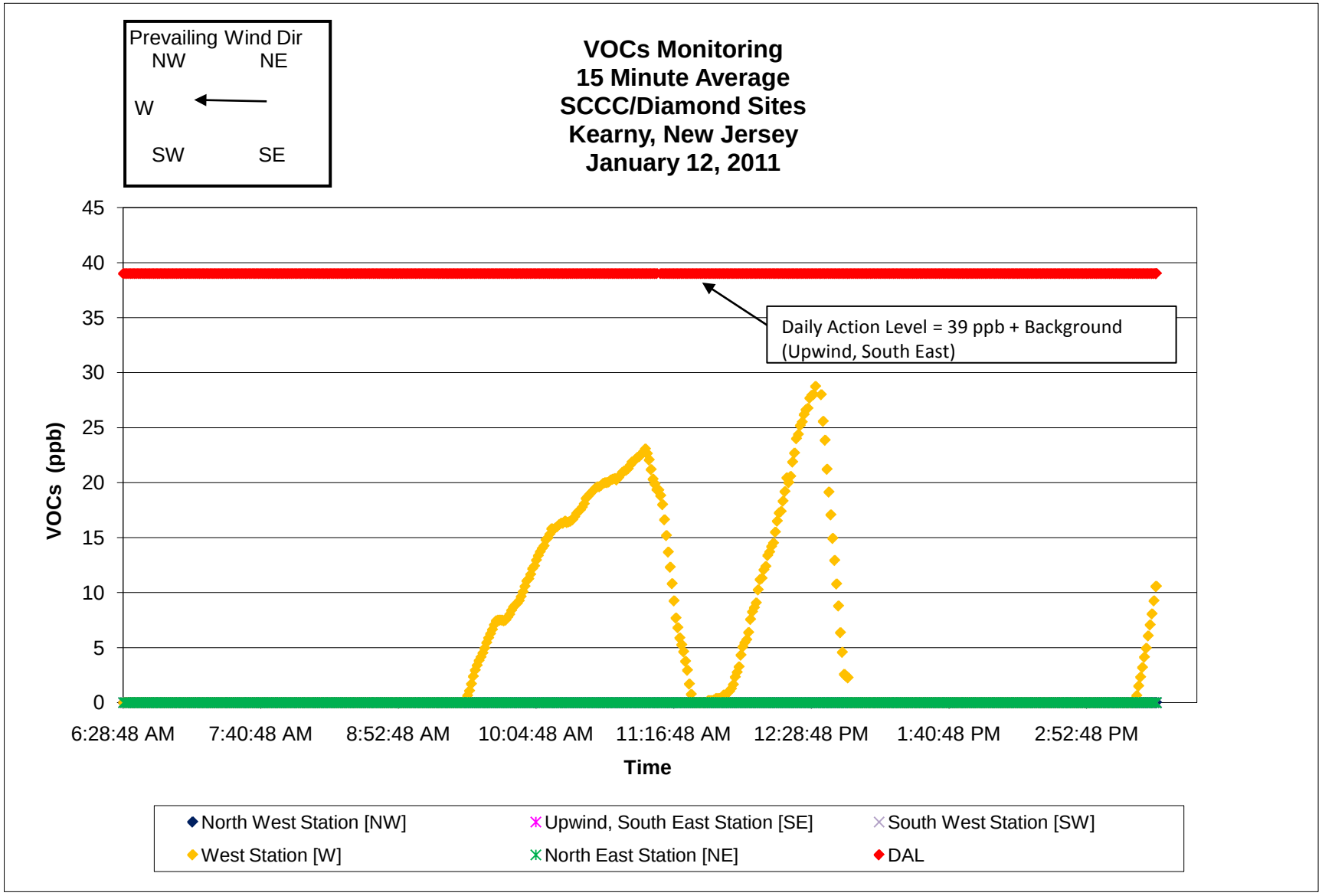

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 10, 2010
Dust (mg/m3)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

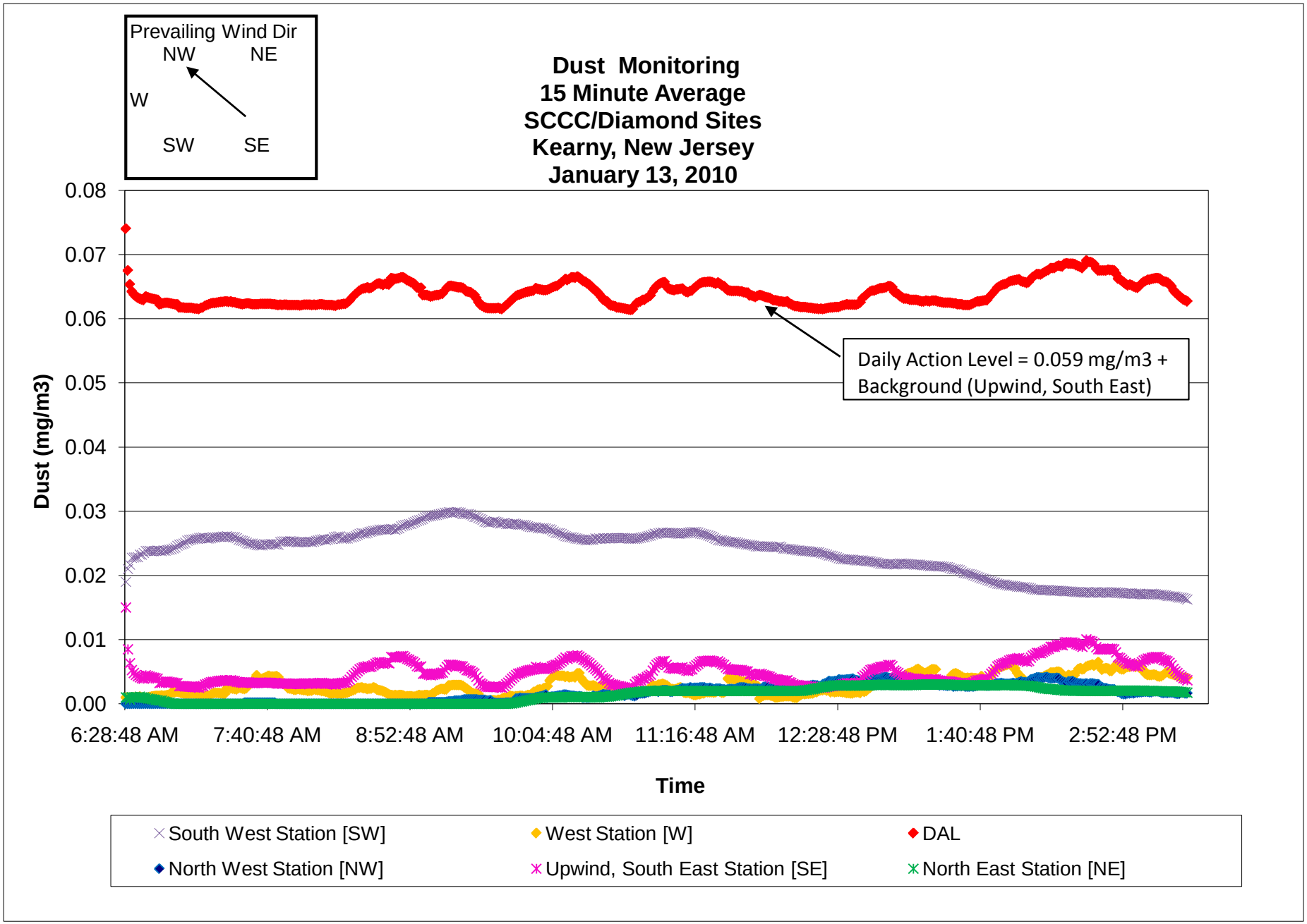

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 10, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

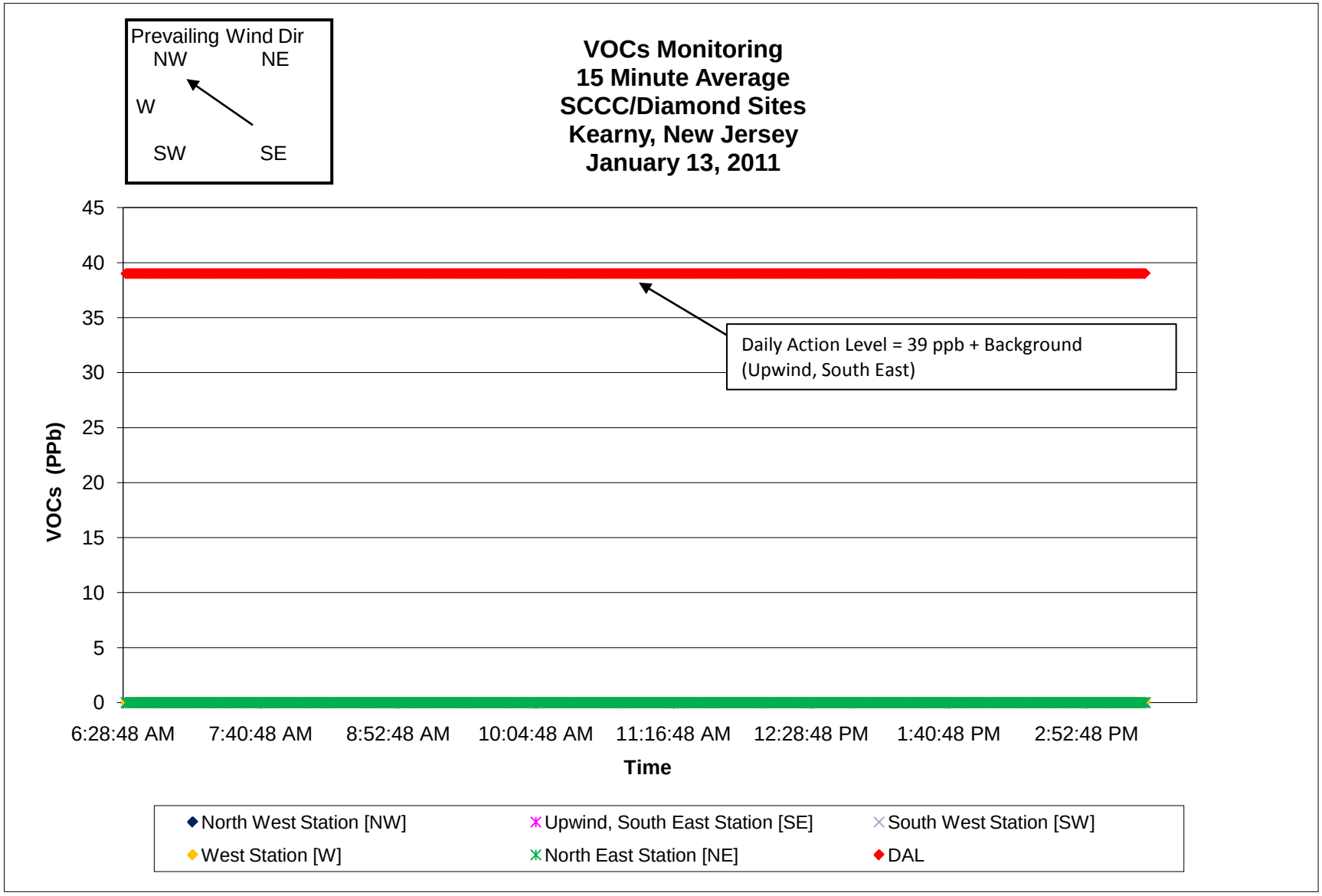

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 11, 2010
Dust (mg/m3)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 +
Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
4:04:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

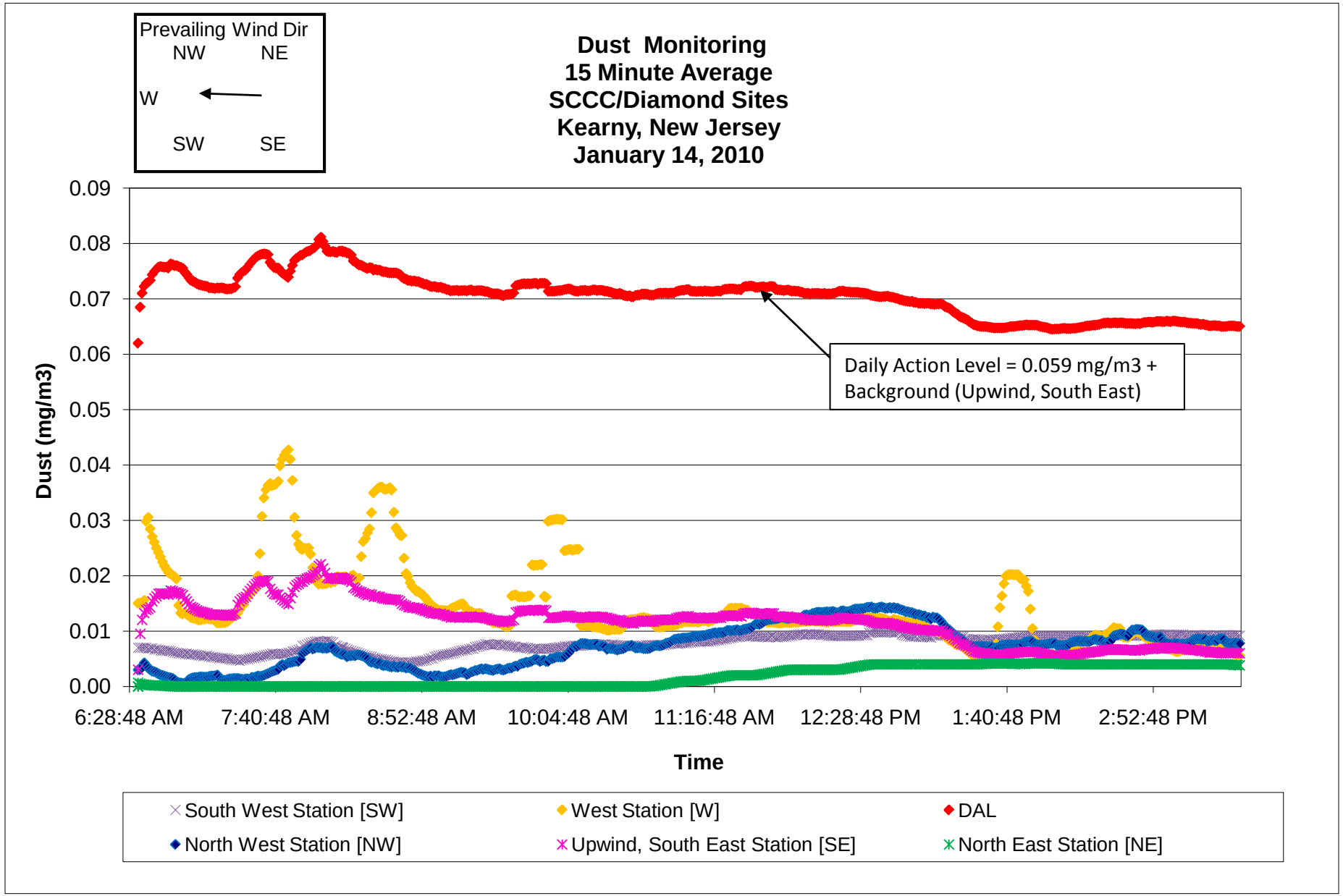

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 11, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind-South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

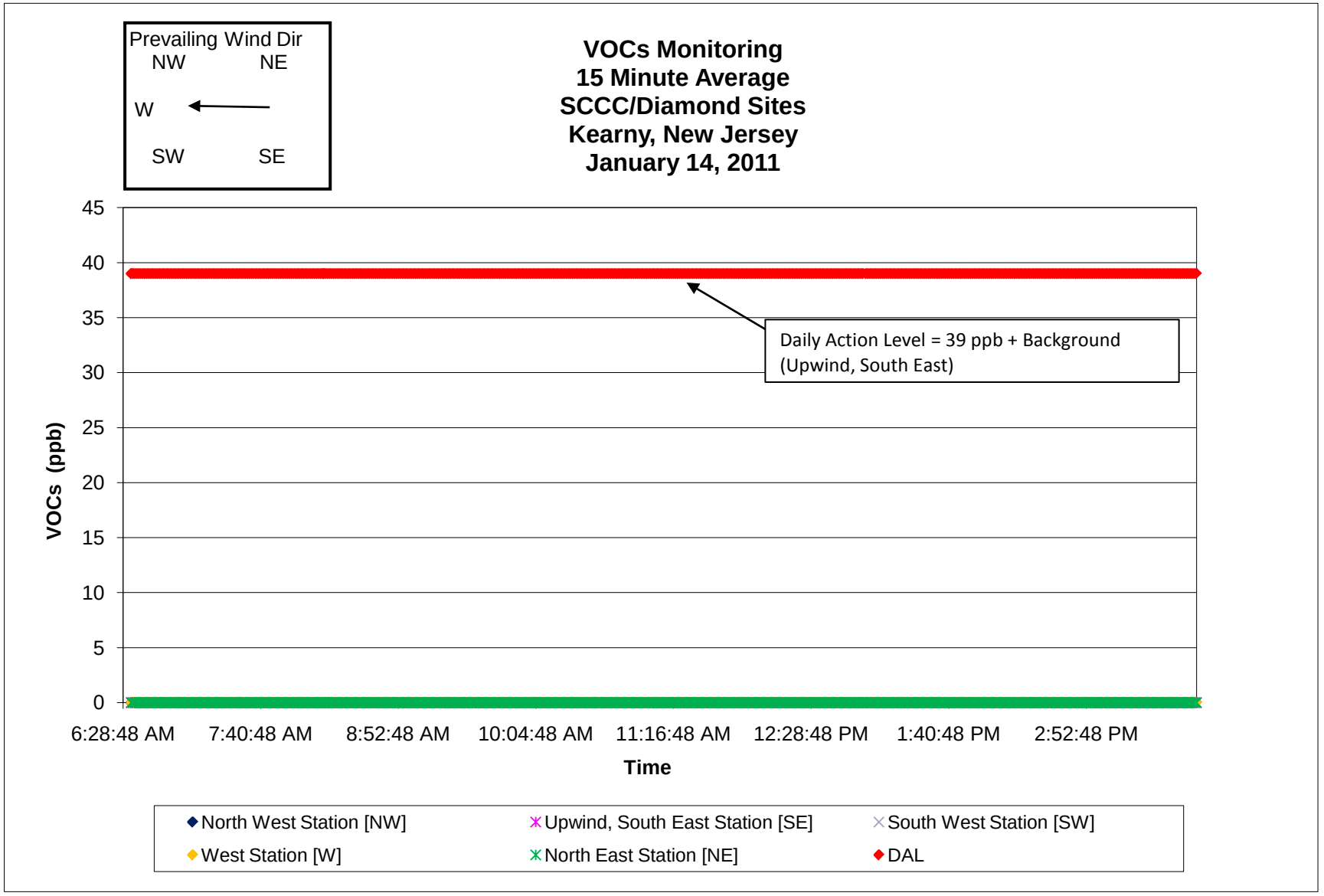

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 12, 2010
Dust (mg/m3)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

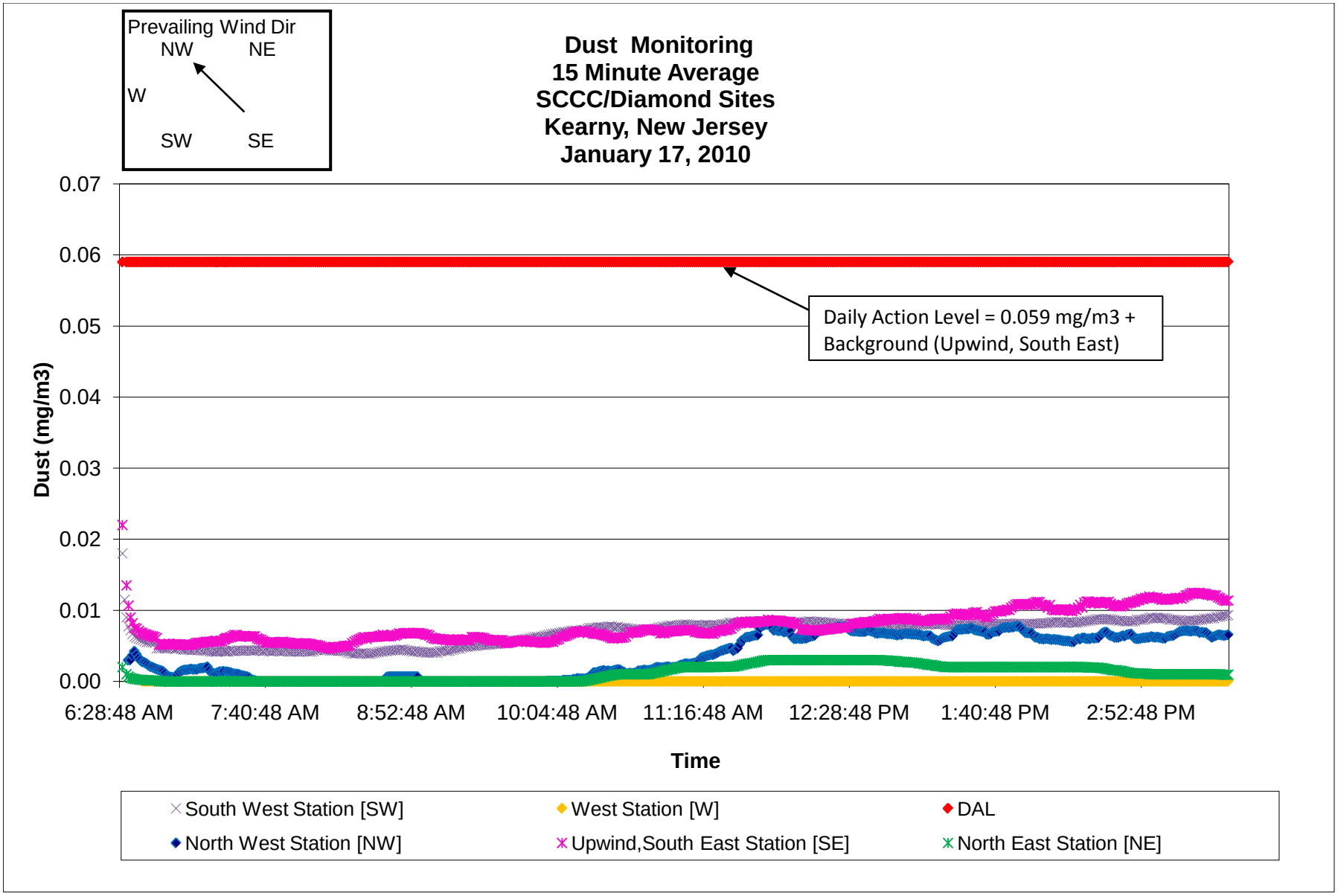

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 12, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

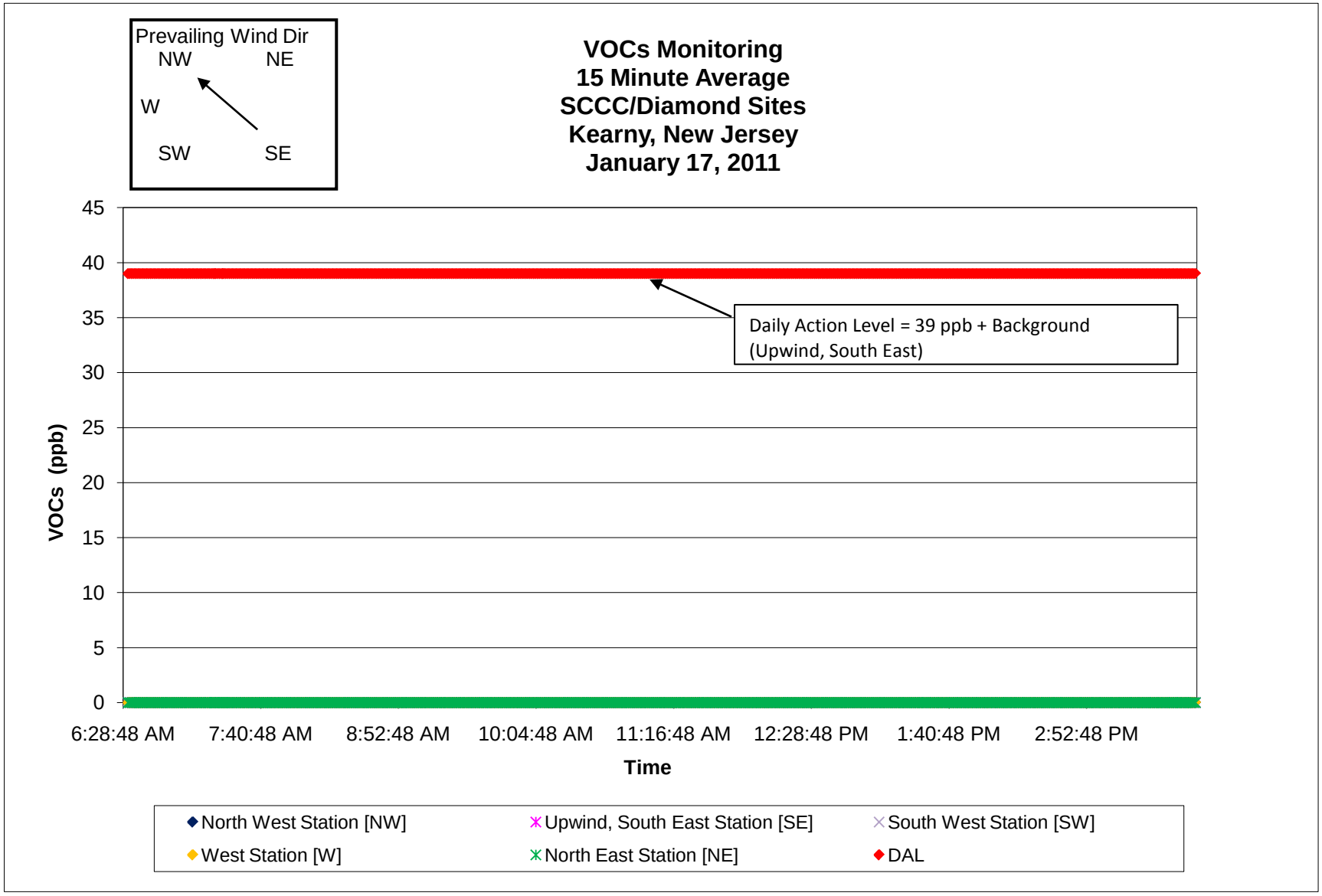

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 13, 2010
Dust (mg/m3)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 +
Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

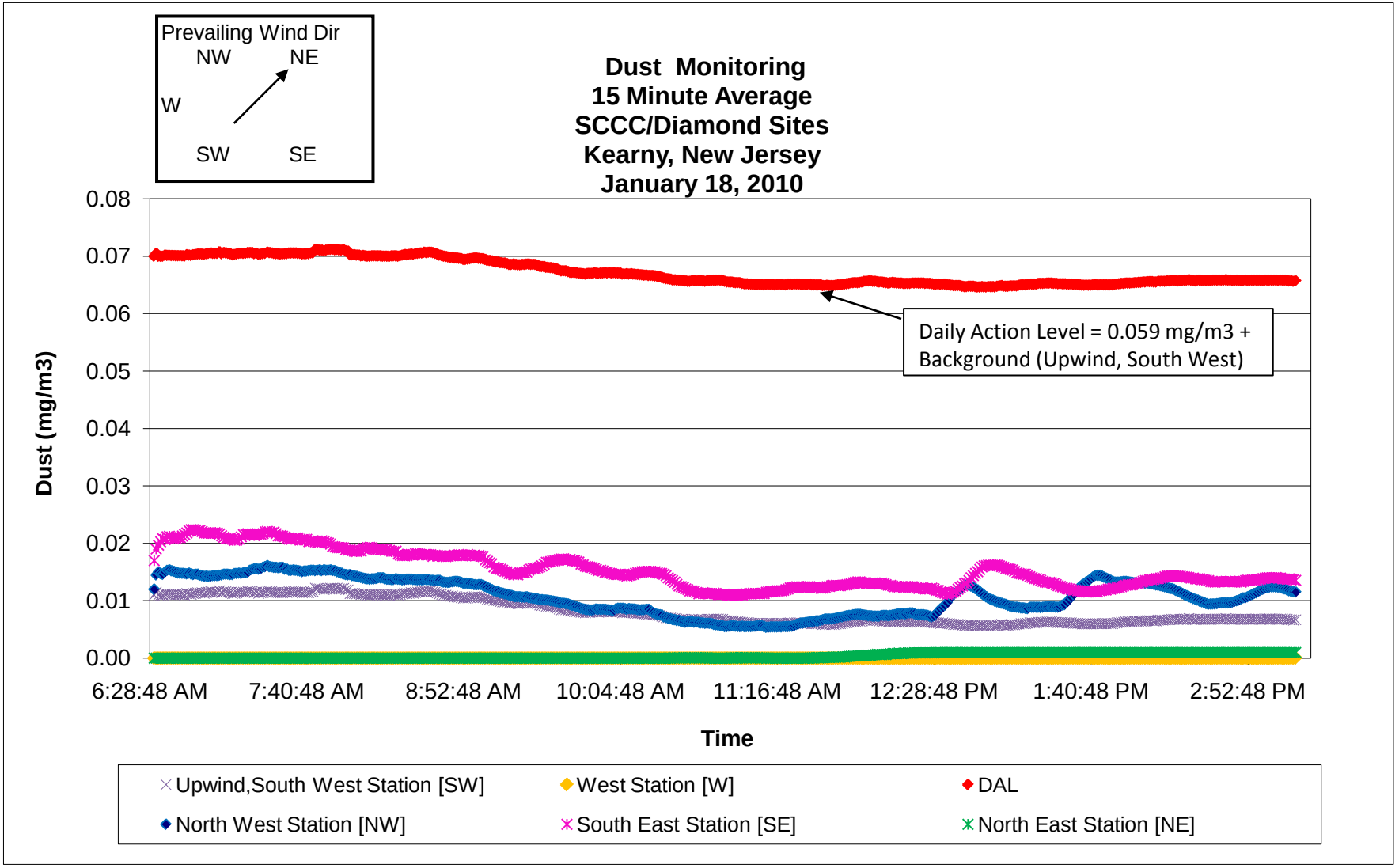

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 13, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (PPb)
Daily Action Level = 39 ppb + Background
(Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

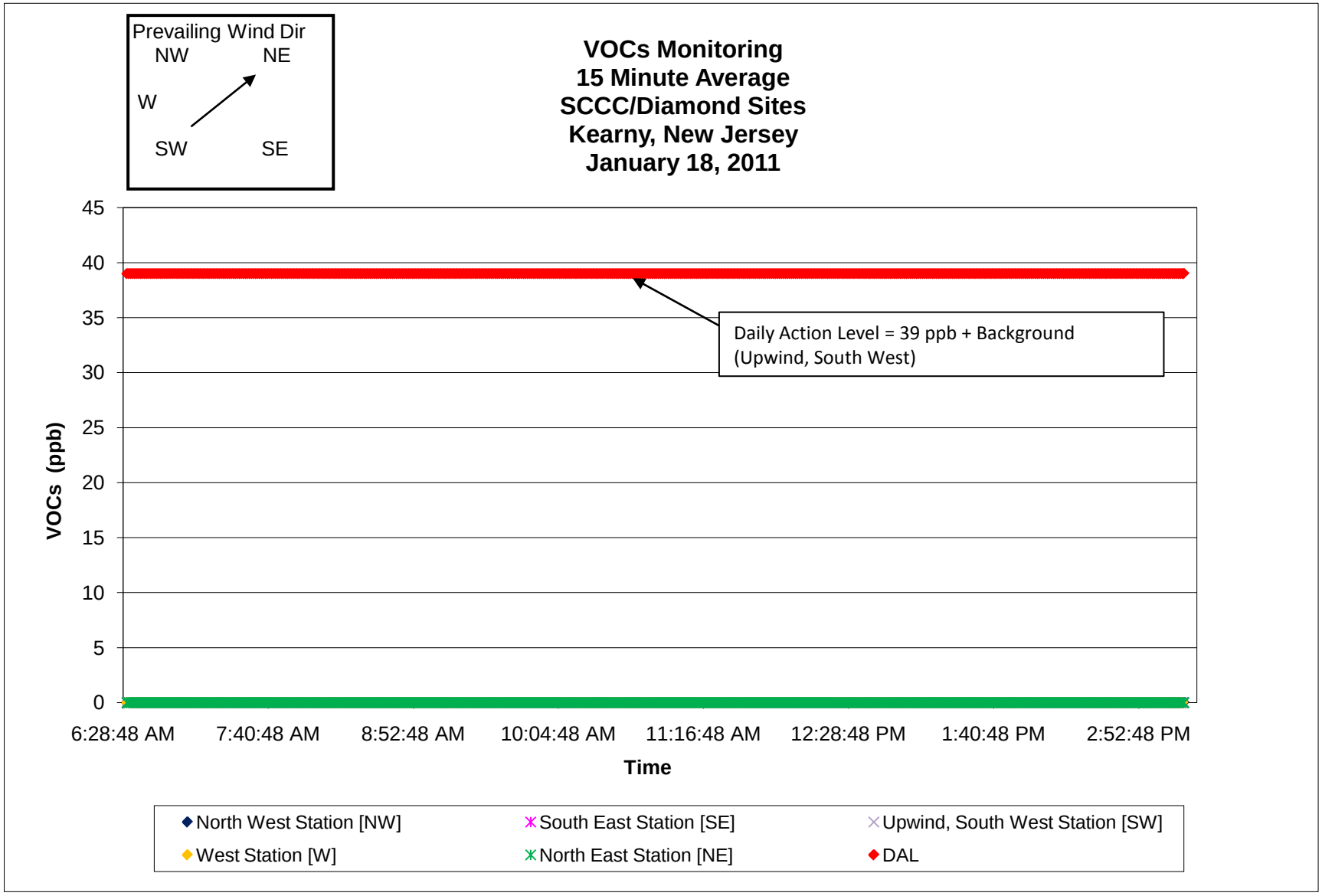

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 14, 2010
Dust (mg/m3)
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind, South East Station [SE]
North East Station [NE]

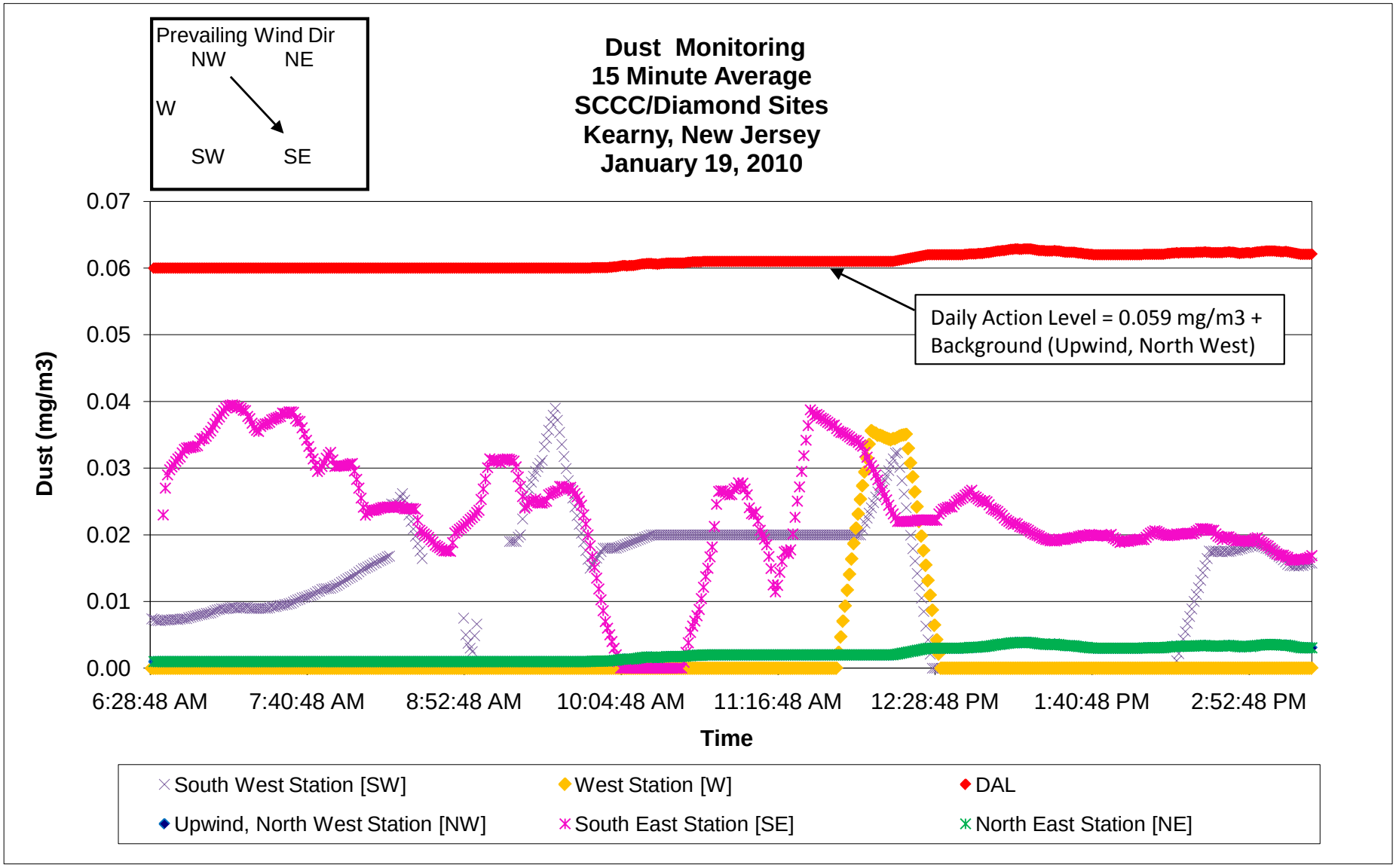

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 14, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

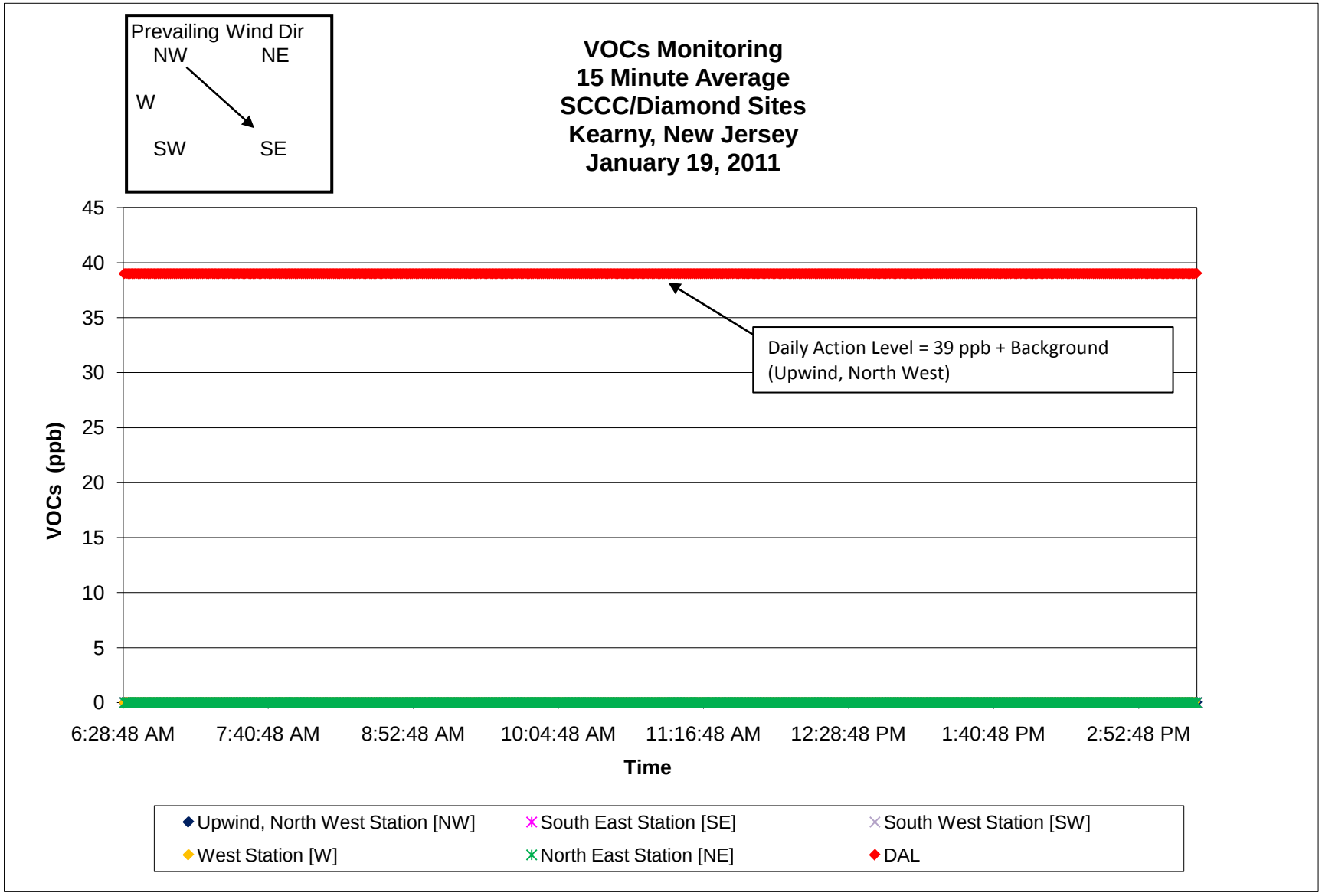

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 17, 2010
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South East)
Dust (mg/m3)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
North West Station [NW]
Upwind,South East Station [SE]
North East Station [NE]

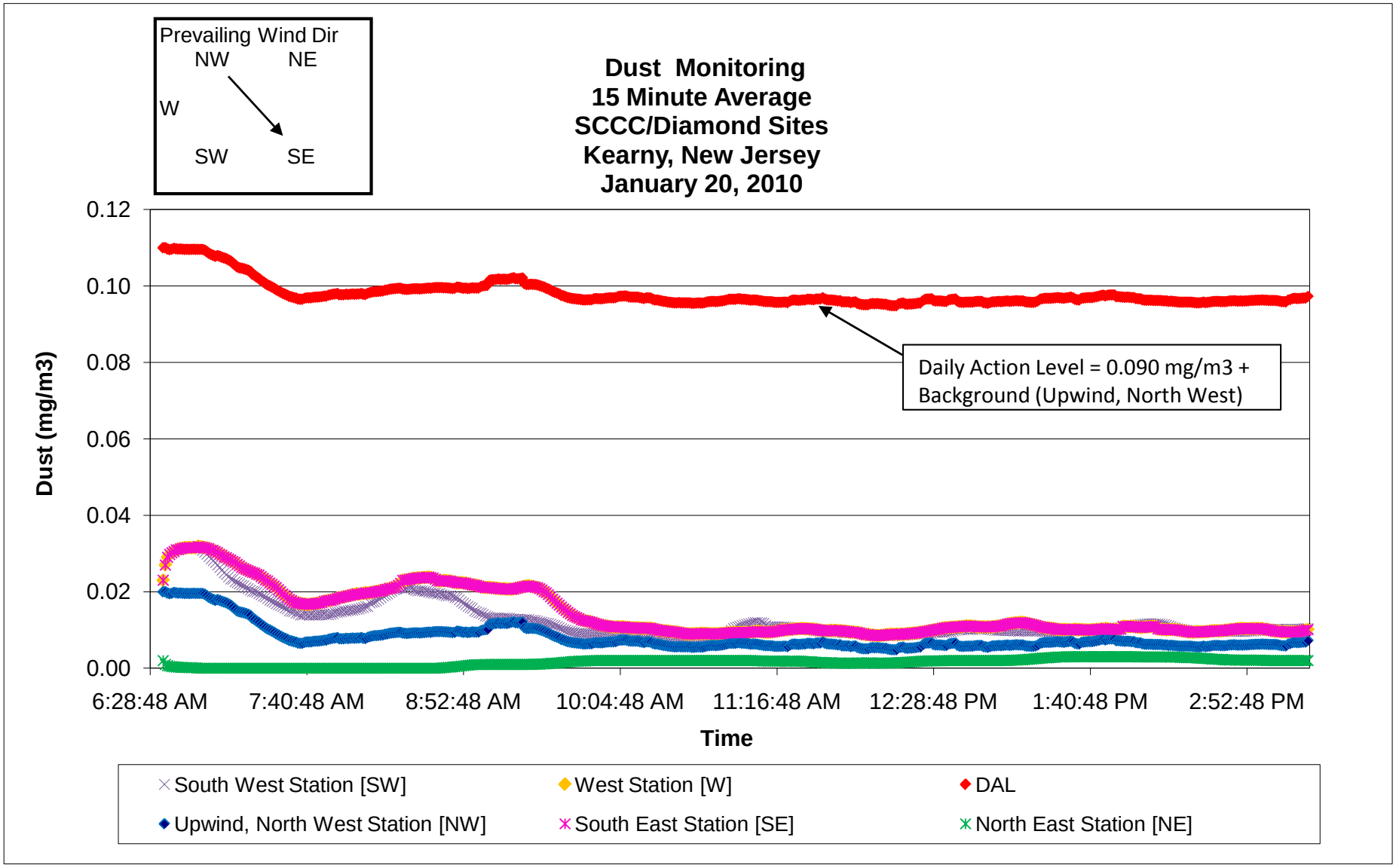

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 17, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind, South East)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
Upwind, South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

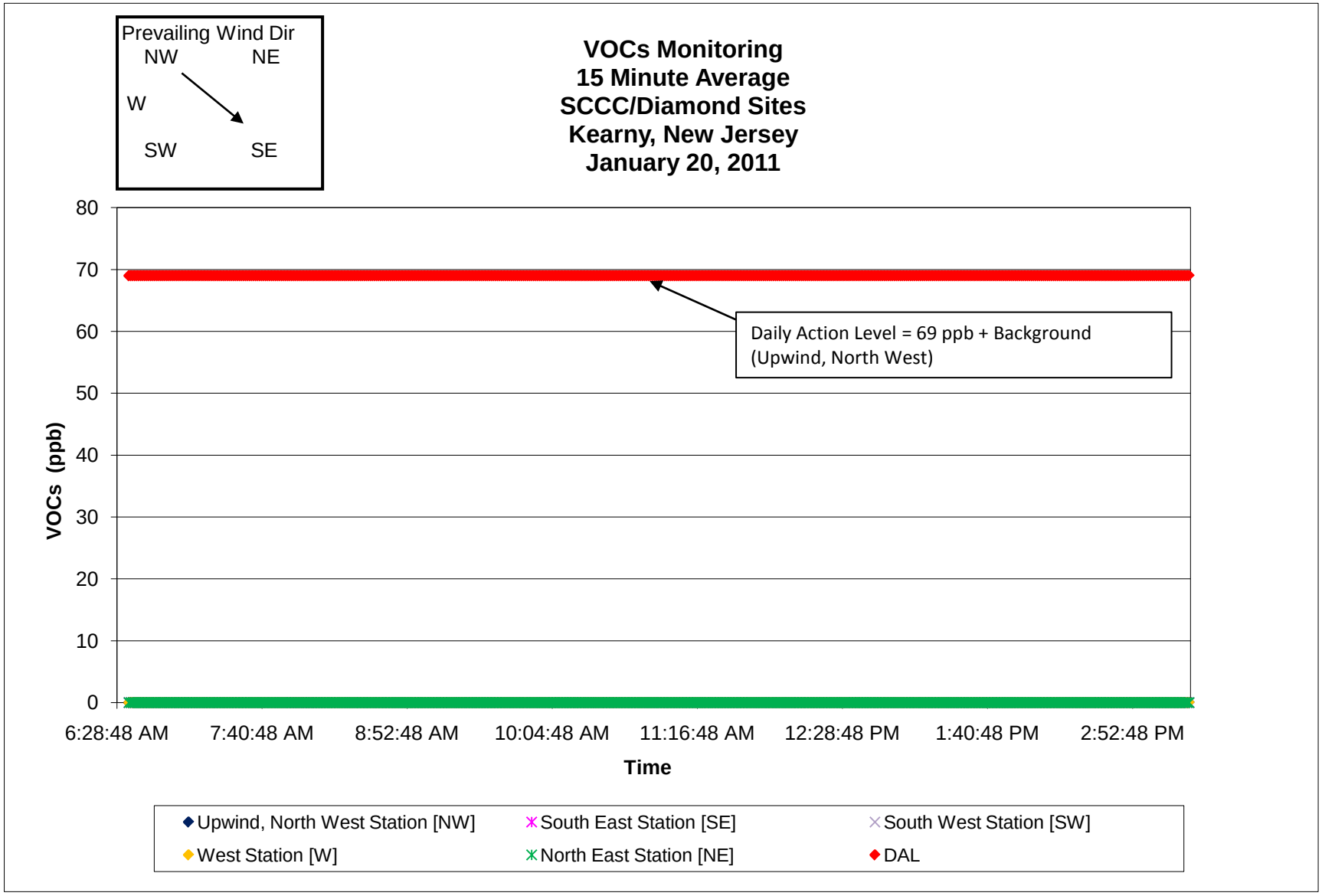

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 18, 2010
Dust (mg/m3)
0.08
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 + Background (Upwind, South West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind,South West Station [SW]
West Station [W]
DAL
North West Station [NW]
South East Station [SE]
North East Station [NE]

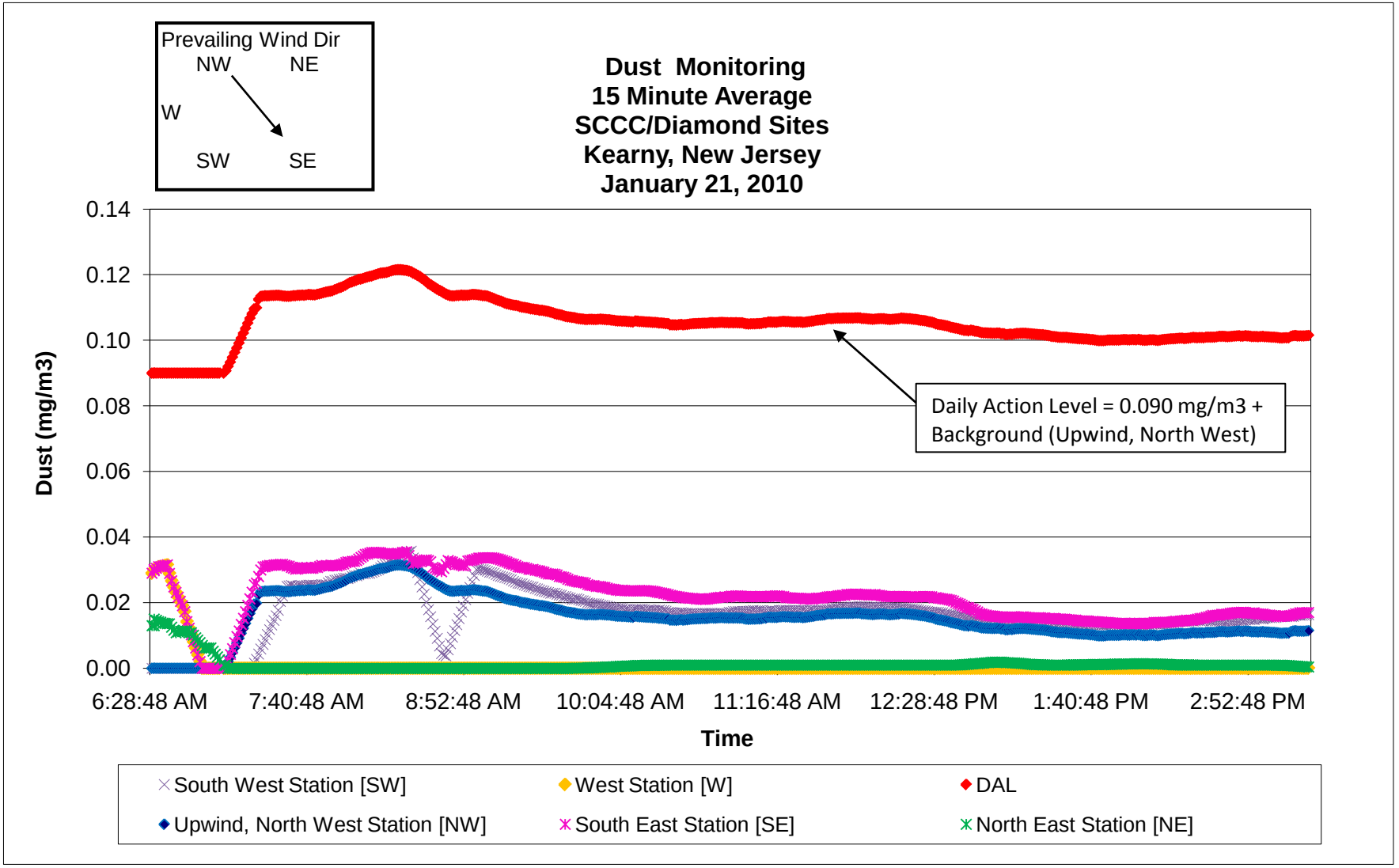

Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 18, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind, South West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
North West Station [NW]
South East Station [SE]
Upwind, South West Station [SW]
West Station [W]
North East Station [NE]
DAL

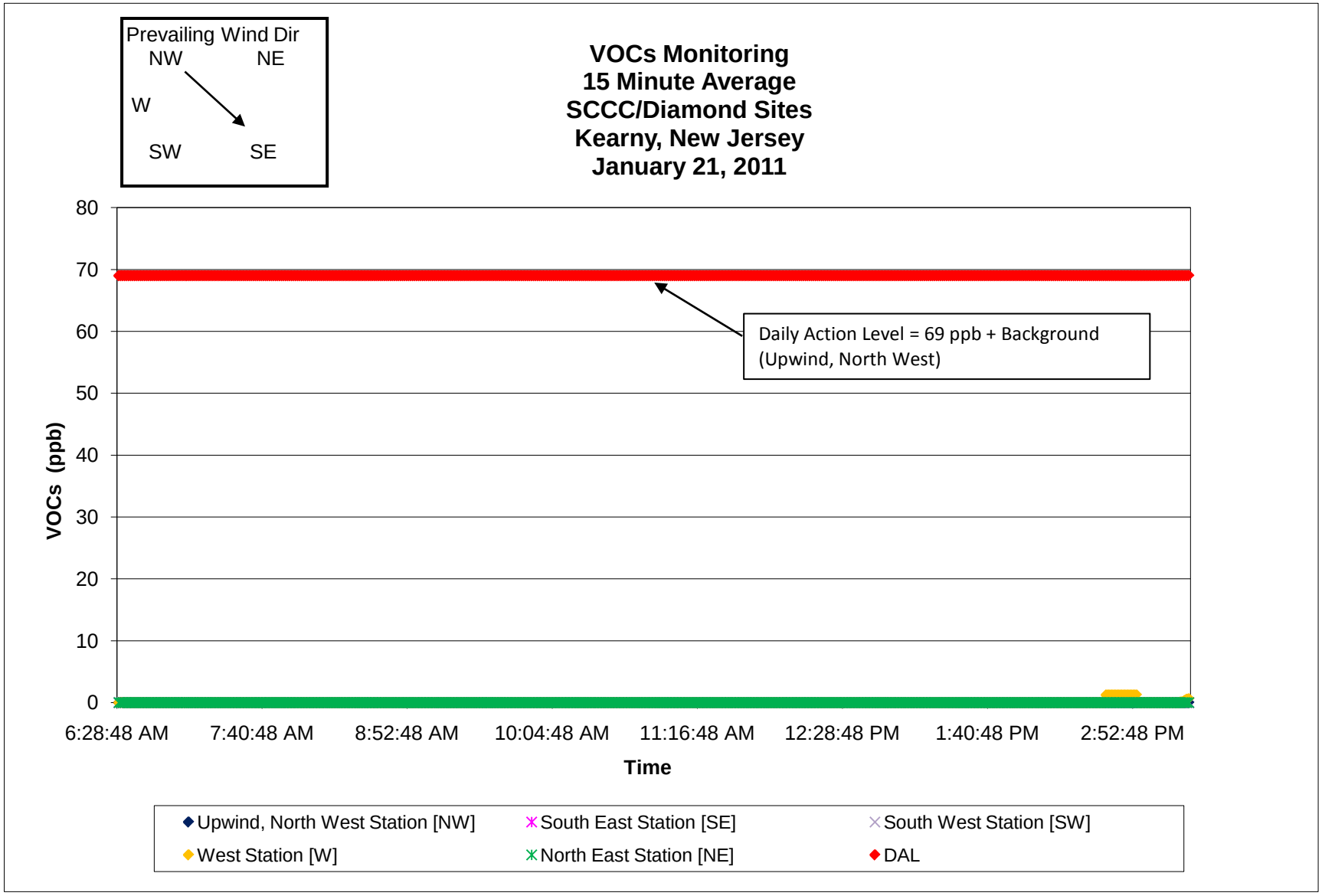

Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 19, 2010
Dust (mg/m3)
0.07
0.06
0.05
0.04
0.03
0.02
0.01
0.00
Daily Action Level = 0.059 mg/m3 +
Background (Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
Upwind, North West Station [NW]
South East Station [SE]
North East Station [NE]


Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 19, 2011
45
40
35
30
25
20
15
10
5
0
VOCs (ppb)
Daily Action Level = 39 ppb + Background
(Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind, North West Station [NW]
South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 20, 2010
Dust (mg/m3)
0.12
0.10
0.08
0.06
0.04
0.02
0.00
Daily Action Level = 0.090 mg/m3 + Background (Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
South West Station [SW]
West Station [W]
DAL
Upwind, North West Station [NW]
South East Station [SE]
North East Station [NE]


Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 20, 2011
80
70
60
50
40
30
20
10
0
VOCs (ppb)
Daily Action Level = 69 ppb + Background
(Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind, North West Station [NW]
South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL


Prevailing Wind Dir
NW
NE
W
SW
SE
Dust Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 21, 2010
Dust (mg/m3)
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Daily Action Level = 0.090 mg/m3 + Background (Upwind, North West)
South West Station [SW]
West Station [W]
DAL
Upwind, North West Station [NW]
South East Station [SE]
North East Station [NE]


Prevailing Wind Dir
NW
NE
W
SW
SE
VOCs Monitoring
15 Minute Average
SCCC/Diamond Sites
Kearny, New Jersey
January 21, 2011
80
70
60
50
40
30
20
10
0
VOCs (ppb)
Daily Action Level = 69 ppb + Background
(Upwind, North West)
6:28:48 AM
7:40:48 AM
8:52:48 AM
10:04:48 AM
11:16:48 AM
12:28:48 PM
1:40:48 PM
2:52:48 PM
Time
Upwind, North West Station [NW]
South East Station [SE]
South West Station [SW]
West Station [W]
North East Station [NE]
DAL

APPENDIX B.2

PERSONAL AIR MONITORING RESULTS

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 22, 2011

PARAMETER	Units	Staff Engineer - 1	Staff Engineer - 2	Staff Geologist	Sr. Hydrogeologist	Staff Scientist	Field Blank (Total ug)	OHSA PEL
PAHs								
1-Nitropyrene	mg/m^3	<0.0003	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Acenaphthene	mg/m^3	<0.0005	<0.0006	<0.0007	<0.0007	<0.0006	<0.3	NA
Acenaphthylene	mg/m^3	<0.0005	<0.0005	<0.0007	<0.0007	<0.0005	<0.3	NA
Anthracene	mg/m^3	<0.0005	<0.0005	<0.0007	<0.0006	<0.0005	<0.4	NA
Benzo (a) anthracene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0004	<0.4	NA
Benzo (a) pyrene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.5	0.2
Benzo (b) fluoranthene	mg/m^3	<0.0004	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Benzo (e) pyrene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0005	<0.4	NA
Benzo (g, h, i) perlene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.5	NA
Benzo (k) fluoranthene	mg/m^3	<0.0004	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Chrysene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0004	<0.4	0.2
Dibenzo (a, h) anthracene	mg/m^3	<0.0004	<0.0004	<0.0005	<0.0005	<0.0004	<0.4	NA
Fluoranthene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.4	NA
Fluorene	mg/m^3	<0.0005	<0.0005	<0.0007	<0.0007	<0.0005	<0.3	NA
Indeno (1,2,3-cd) pyrene	mg/m^3	<0.0004	<0.0004	<0.0006	<0.0006	<0.0004	<0.5	NA
Naphthalene	ppm	0.0011	<0.0006	0.00081	0.0002	0.00065	<0.3	10
Phenanthrene	mg/m^3	<0.0005	<0.0005	<0.0006	<0.0006	<0.0005	<0.3	NA
Pyrene	mg/m^3	<0.0004	<0.0005	<0.0006	<0.0006	<0.0005	<0.4	NA

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 22, 2011

PARAMETER	Units	Staff Engineer - 1	Staff Engineer - 2	Staff Geologist – 1	Sr. Hydrogeologist	Staff Scientist	Field Blank (Total ug)	OHSA PEL
VOCs								
Methyl chloroform	ppm	<0.08	<0.08	<0.09	<0.08	<0.09	<5	350
1,1,2-Trichloroethane	ppm	<0.08	<0.08	<0.09	<0.08	<0.09	<5	10
1,1-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0.1	<0.1	<5	50
Acetone	ppm	<0.2	<0.2	<0.2	<0.2	<0.2	<6	1,000
Benzene	ppm	<0.05	<0.05	<0.06	<0.05	<0.06	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	75
Chloroform	ppm	<0.09	<0.09	<0.1	<0. 09	<0.1	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Cumene	ppm	<0.09	<0.09	<0.1	<0. 09	<0.1	<5	50
Cyclohexane	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Cyclohexanone	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	50
Cyclohenene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	300
Ethyl Alcohol	ppm	1.4	<0.2	1.6	1.2	0.86	<5	1,000
Ethylbenzene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.2	<0.2	<0. 2	<0.2	<5	400
m-Dichlorobenzene	ppm	<0.08	<0.07	<0.08	<0. 08	<0.08	<5	NA
Methyl Ethyl Ketone	ppm	<0.1	<0.1	<0.2	<0. 1	<0.2	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	100
Methyl n-Propyl Ketone	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Methylene Chloride	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	25
n-Butyl Acetate	ppm	<0.1	<0.09	<0.1	<0. 1	<0.1	<5	150
n-Hexane	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	500
n-Propyl Acetate	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
o-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0. 08	<0.08	<5	50 (C)
p-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0. 08	<0.08	<5	75
Pentane	ppm	<0.1	<0.1	<0.2	<0. 1	<0.2	<5	1,000
Tetrachloroethylene	ppm	<0.07	<0.06	<0.07	<0. 07	<0.07	<5	100
Tetrahydrofuran	ppm	<0.1	<0.1	<0.2	<0. 2	<0.2	<5	200
Toluene	ppm	<0.1	<0.1	<0.1	<0. 1	<0.1	<5	200
Trichloroethylene	ppm	<0.08	<0.08	<0.09	<0. 08	<0.09	<5	100
Vinyl Chloride	ppm	<0.02	<0.02	<0.03	<0. 02	<0.03	<0.7	1
Xylene	ppm	<0.30	<0.29	<0.34	<0. 031	<0.33	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 23, 2011

PARAMETER	Units	Staff Geologist – 2	Staff Engineer - 2	Staff Scientist	Field Blank (Total ug)	OSHA PEL
VOCs						
Methyl chloroform	ppm	<0.09	<0.06	<0.07	<5	350
1,1,2-Trichloroethane	ppm	<0.09	<0.06	<0.07	<5	10
1,1-Dichloroethane	ppm	<0.1	<0.09	<0.1	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.08	<0.1	<5	50
Acetone	ppm	<0.2	<0.2	<0.2	<6	1,000
Benzene	ppm	<0.06	<0.04	<0.05	<2	1
Chlorobenzene	ppm	<0.1	<0.07	<0.09	<5	75
Chloroform	ppm	<0.1	<0.07	<0.08	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.08	<0.1	<5	200
Cumene	ppm	<0.1	<0.07	<0.08	<5	50
Cyclohexane	ppm	<0.1	<0.1	<0.1	<5	200
Cyclohexanone	ppm	<0.1	<0.09	<0.1	<5	50
Cyclohenene	ppm	<0.1	<0.1	<0.1	<5	300
Ethyl Alcohol	ppm	<0.3	<0.2	0.3	<5	1,000
Ethylbenzene	ppm	<0.1	<0.08	<0.09	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.1	<0.2	<5	400
m-Dichlorobenzene	ppm	<0.09	<0.06	<0.07	<5	NA
Methyl Ethyl Ketone	ppm	<0.1	<0.1	<0.1	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.08	<0.1	<5	100
Methyl n-Propyl Ketone	ppm	<0.1	<0.1	<0.1	<5	200
Methylene Chloride	ppm	<0.1	<0.09	<0.1	<5	25
n-Butyl Acetate	ppm	<0.1	<0.07	<0.09	<5	150
n-Hexane	ppm	<0.1	<0.1	<0.1	<5	500
n-Propyl Acetate	ppm	<0.1	<0.08	<0.1	<5	200
o-Dichlorobenzene	ppm	<0.09	<0.06	<0.07	<5	50 (C)
p-Dichlorobenzene	ppm	<0.09	<0.06	<0.07	<5	75
Pentane	ppm	<0.2	<0.1	<0.1	<5	1,000
Tetrachloroethylene	ppm	<0.07	<0.05	<0.06	<5	100
Tetrahydrofuran	ppm	<0.2	<0.1	<0.1	<5	200
Toluene	ppm	<0.1	<0.09	<0.1	<5	200
Trichloroethylene	ppm	<0.09	<0.06	<0.07	<5	100
Vinyl Chloride	ppm	<0.03	<0.02	<0.02	<0.7	1
Xylene	ppm	<0.34	<0.23	<0.27	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 30 & 31, 2011

Parameter	Units	Staff Geologist – 1	Staff Engineer - 1	Staff Scientist	Field Blank (Total ug)	OSHA PEL
PAHs		**3/30/11**	**3/30/11**	**3/30/11**	**3/30/11**	
1-Nitropyrene	mg/m^3	<0.0001	<0.00008	<0.0001	<0.4	NA
Acenaphthene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Acenaphthylene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Anthracene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.4	NA
Benzo (a) anthracene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Benzo (a) pyrene	mg/m^3	<0.0002	<0.00009	<0.0002	<0.5	0.2
Benzo (b) fluoranthene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Benzo (e) pyrene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Benzo (g, h, i) perlene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.5	NA
Benzo (k) fluoranthene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	NA
Chrysene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.4	0.2
Dibenzo (a, h) anthracene	mg/m^3	<0.0001	<0.00008	<0.0001	<0.4	NA
Fluoranthene	mg/m^3	<0.0002	<0.00009	<0.0002	<0.4	NA
Fluorene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Indeno (1,2,3-cd) pyrene	mg/m^3	<0.0001	<0.00009	<0.0001	<0.5	NA
Naphthalene	ppm	0.055	0.0010	0.0032	<0.3	10
Phenanthrene	mg/m^3	<0.0002	<0.0001	<0.0002	<0.3	NA
Pyrene	mg/m^3	<0.0002	<0.00009	<0.0002	<0.4	NA

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
March 30 & 31, 2011

Parameter	Units	Staff Scientist	Staff Engineer - 1	Staff Geologist – 1	Trailer	Field Blank (Total ug)	OSHA PEL
VOCs		**3/31/11**	**3/31/11**	**3/31/11**	**3/31/11**	**3/31/11**	
Methyl chloroform	ppm	<0.08	<0.09	<0.09	<0.08	<5	350
1,1,2-Trichloroethane	ppm	<0.09	<0.09	<0.09	<0.08	<5	10
1,1-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0.1	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.1	<0.1	<0.1	<5	50
Acetone	ppm	<0.2	<0.2	<0.2	<0.2	<6	1,000
Benzene	ppm	<0.06	<0.06	<0.06	<0.05	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<0.1	<0.09	<5	75
Chloroform	ppm	<0.1	<0.1	<0.1	<0.09	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Cumene	ppm	<0.1	<0.1	<0.1	<0.09	<5	50
Cyclohexane	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Cyclohexanone	ppm	<0.1	<0.1	<0.1	<0.1	<5	50
Cyclohenene	ppm	<0.1	<0.1	<0.1	<0.1	<5	300
Ethyl Alcohol	ppm	0.85	1.1	0.3	3.6	<5	1,000
Ethylbenzene	ppm	<0.1	<0.1	<0.1	<0.09	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.2	<0.2	0.2	<5	400
m-Dichlorobenzene	ppm	<0.08	<0.08	<0.08	<0.07	<5	NA
Methyl Ethyl Ketone	ppm	<0.2	<0.2	<0.2	<0.1	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.1	<0.1	<0.1	<5	100
Methyl n-Propyl Ketone	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Methylene Chloride	ppm	<0.1	<0.1	<0.1	<0.1	<5	25
n-Butyl Acetate	ppm	<0.1	<0.1	<0.1	<0.09	<5	150
n-Hexane	ppm	<0.1	<0.1	<0.1	<0.1	<5	500
n-Propyl Acetate	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
o-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0.07	<5	50 (C)
p-Dichlorobenzene	ppm	<0.08	<0.08	<0.09	<0.07	<5	75
Pentane	ppm	<0.2	<0.2	<0.2	<0.1	<5	1,000
Tetrachloroethylene	ppm	<0.07	<0.07	<0.07	<0.06	<5	100
Tetrahydrofuran	ppm	<0.2	<0.2	<0.2	<0.1	<5	200
Toluene	ppm	<0.1	<0.1	<0.1	<0.1	<5	200
Trichloroethylene	ppm	<0.09	<0.09	<0.09	<0.08	<5	100
Vinyl Chloride	ppm	<0.02	<0.02	<0.02	<0.02	<0.7	1
Xylene	ppm	<0.31	<0.32	<0.33	<0.28	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
April 7 & 8 2011

Parameter	Units	Staff Scientist Sample 1	Staff Scientist Sample 2	Field Blank (Total ug)	OSHA PEL
PAHs		**4/7/11**	**4/7/11**		
1-Nitropyrene	mg/m^3	<0.0003	<0.0003	<0.4	NA
Acenaphthene	mg/m^3	<0.0004	<0.0005	<0.3	NA
Acenaphthylene	mg/m^3	<0.0004	<0.0004	<0.3	NA
Anthracene	mg/m^3	<0.0004	<0.0004	<0.4	NA
Benzo (a) anthracene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Benzo (a) pyrene	mg/m^3	<0.0003	<0.0004	<0.5	0.2
Benzo (b) fluoranthene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Benzo (e) pyrene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Benzo (g, h, i) perlene	mg/m^3	<0.0003	<0.0004	<0.5	NA
Benzo (k) fluoranthene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Chrysene	mg/m^3	<0.0003	<0.0004	<0.4	0.2
Dibenzo (a, h) anthracene	mg/m^3	<0.0003	<0.0003	<0.4	NA
Fluoranthene	mg/m^3	<0.0003	<0.0004	<0.4	NA
Fluorene	mg/m^3	<0.0004	<0.0004	<0.3	NA
Indeno (1,2,3-cd) pyrene	mg/m^3	<0.0003	<0.0004	<0.5	NA
Naphthalene	ppm	0.001	0.031	<0.3	10
Phenanthrene	mg/m^3	<0.0004	<0.0004	<0.3	NA
Pyrene	mg/m^3	<0.0003	<0.0004	<0.4	NA

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
April 7 & 8 2011

Parameter	Units	Staff Scientist	Staff Engineer - 2	Field Blank (Total ug)	OSHA PEL
VOCs		**4/7/11**	**4/8/11**		
Methyl chloroform	ppm	<0.1	<0.1	<5	350
1,1,2-Trichloroethane	ppm	<0.1	<0.1	<5	10
1,1-Dichloroethane	ppm	<0.2	<0.2	<6	100
1,2-Dichloroethane	ppm	<0.1	<0.2	<5	50
Acetone	ppm	<0.3	<0.3	<6	1,000
Benzene	ppm	<0.07	<0.08	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<5	75
Chloroform	ppm	<0.1	<0.1	<5	50 (C)
Cis-1,2-Dichloroethylene	ppm	<0.1	<0.2	<5	200
Cumene	ppm	<0.1	<0.1	<5	50
Cyclohexane	ppm	<0.2	<0.2	<5	200
Cyclohexanone	ppm	<0.2	<0.2	<5	50
Cyclohenene	ppm	<0.2	<0.2	<5	300
Ethyl Alcohol	ppm	<0.4	<0.4	<5	1,000
Ethylbenzene	ppm	<0.1	<0.2	<5	100
Isopropyl Alcohol	ppm	<0.2	<0.3	<5	400
m-Dichlorobenzene	ppm	<0.1	<0.1	<5	NA
Methyl Ethyl Ketone	ppm	<0.2	<0.2	<5	200
Methyl Isobutyl Ketone	ppm	<0.1	<0.2	<5	100
Methyl n-Propyl Ketone	ppm	<0.2	<0.2	<5	200
Methylene Chloride	ppm	<0.2	<0.2	<5	25
n-Butyl Acetate	ppm	<0.1	<0.1	<5	150
n-Hexane	ppm	<0.2	<0.2	<5	500
n-Propyl Acetate	ppm	<0.1	<0.2	<5	200
o-Dichlorobenzene	ppm	<0.1	<0.1	<5	50 (C)
p-Dichlorobenzene	ppm	<0.1	<0.1	<5	75
Pentane	ppm	<0.2	<0.2	<5	1,000
Tetrachloroethylene	ppm	<0.09	<0.1	<5	100
Tetrahydrofuran	ppm	<0.2	<0.2	<5	200
Toluene	ppm	<0.2	<0.2	<5	200
Trichloroethylene	ppm	<0.1	<0.1	<5	100
Vinyl Chlroide	ppm	<0.03	<0.04	<0.7	1
Xylene	ppm	<0.39	<0.46	<15	100

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE
KEARNY, NEW JERSEY
April 8 & 9, 2011

Parameter	Units	Staff Scientist	Staff Scientist	Field Blank (Total ug)	OSHA PEL	OSHA Action Level
		4/8/11	**4/9/11**			
Hexavalent Chromium	ug/m^3	<0.031	0.038	<0.029	5	2.5

AIR SAMPLING RESULTS
SCCC/DIAMOND SITE – KEY ENVIRONMENTAL, INC.
KEARNY, NEW JERSEY
APRIL 26 & 27, 2011

PARAMETER	Units	Staff Scientist	Staff Scientist	Staff Engineer - 2	Field Blank (Total ug)	OHSA PEL
VOCs		**4/26/11**	**4/27/11**	**4/27/11**		
Benzene	ppm	<0.05	<0.05	<0.05	<2	1
Chlorobenzene	ppm	<0.1	<0.1	<0.1	<5	75
Cumene	ppm	<0.1	<0.1	<0.1	<5	50
Ethylbenzene	ppm	<0.1	<0.1	<0.1	<5	100
m-Dichlorobenzene	ppm	<0.09	<0.09	<0.09	<5	NE
o-Dichlorobenzene	ppm	<0.1	<0.1	<0.1	<6	50 (C)
p-Dichlorobenzene	ppm	<0.1	<0.1	<0.1	<5	75
Toluene	ppm	<0.1	<0.1	<0.1	<5	200
Vinyl Toluene	ppm	<0.28	<0.27	<0.26	<11	100
Xylene	ppm	<0.41	<0.39	<0.38	<15	100

EMPLOYEE	DATE	NAPHTHALENE (ppm) OSHA PEL = 10
Staff Scientist - 1	4/26/11	<0.21
Staff Scientist - 2	4/26/11	<0.21
Staff Scientist - 3	4/26/11	<0.21
Staff Scientist - 4	4/26/11	<0.21
Staff Scientist - 5	4/26/11	<0.22
Staff Scientist - 6	4/26/11	<0.21
Staff Scientist – 1 – 27	4/27/11	<0.20
Staff Scientist – 2 – 27	4/27/11	<0.22
Staff Scientist – 3 – 27	4/27/11	<0.24
Staff Scientist – 4 – 27	4/27/11	<0.21
Staff Scientist – 5 – 27	4/27/11	<0.20
Staff Scientist – 6 – 27	4/27/11	<0.21
Staff Scientist – 7 – 27	4/27/11	<0.21
Staff Engineer (2) – 1 – 27	4/27/11	<0.20
Staff Engineer (2) – 2 – 27	4/27/11	<0.21
Staff Engineer (2) – 3 – 27	4/27/11	<0.23
Staff Engineer (2) – 4 – 27	4/27/11	<0.21
Staff Engineer (2) – 5 – 27	4/27/11	<0.20
Staff Engineer (2) – 6 – 27	4/27/11	<0.20
Staff Engineer (2) – 7 – 27	4/27/11	<0.21
Field Blank	4/26/11	<11 ug

APPENDIX C

COPC SCREENING FOR RESIDENTIAL LAND USE

TABLE C.1 - WESTERN AREA SURFACE SOILS (0-2 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,2,3-Trichlorobenzene	210	49	4.9	N	Y	ASL	4.286	0
1,2,4-Trichlorobenzene	480	27	6.2	N	Y	ASL	17.778	0
1,2-Dichlorobenzene	220	980	190	N	Y	**BSL**	0.224	0
1,3-Dichlorobenzene*	200	980	190	N	Y	**BSL**	0.204	0
1,4-Dichlorobenzene	360	12	2.4	C	Y	ASL	0	30.000
Benzene	7.8	5.4	1.1	C	Y	ASL	0	1.444
Chlorobenzene	45	140	29	N	Y	**BSL**	0.321	0
Chloroform	0.00086	1.5	0.29	C	N	BSL	0	0
Methylene Chloride	0.93	310	36	N	N	BSL	0	0
1,1'-Biphenyl	14	21	5.1	N	Y	**BSL**	0.667	0
1,2,4,5-Tetrachlorobenzene*	4.2	27	1.8	N	Y	**BSL**	0.156	0
2,4-Dichlorophenol	0.34	180	18	N	N	BSL	0	0
2,4-Dimethylphenol	0.36	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	0.54	220	23	N	N	BSL	0	0
2-Methylphenol	0.23	3100	310	N	N	BSL	0	0
4-Methylphenol	0.32	6200	610	N	N	BSL	0	0
Acenaphthene	1.1	3300	340	N	N	BSL	0	0
Acenaphthylene*	0.13	3300	340	N	N	BSL	0	0
Acetophenone	0.29	10000	780	N	N	BSL	0	0
Anthracene	1.1	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	1.5	2.1	0.15	C	Y	**BSL**	0	0.714
Benzo(a)pyrene	1.6	0.21	0.015	C	Y	ASL	0	7.619
Benzo(b)fluoranthene	2.2	2.1	0.15	C	Y	ASL	0	1.048
Benzo(g,h,i)perylene	1.7	-	-	-	N	BSL	0	0
Benzo(k)fluoranthene	2.2	21	1.5	C	Y	**BSL**	0	0.105
bis(2-Ethylhexyl)phthalate	120	120	35	C	Y	BSL	0	1.000
Carbazole*	0.36	-	-	-	N	BSL	0	0
Chrysene	6.4	210	15	C	N	BSL	0	0
Dibenz(a,h)anthracene	0.45	0.21	0.015	C	Y	ASL	0	2.143
Dibenzofuran	1.2	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.06	49000	4900	N	N	BSL	0	0
Dimethylphthalate	0.62	-	-	-	N	BSL	0	0
Di-n-Butylphthalate	3.06	6200	610	N	N	BSL	0	0
Di-n-Octylphthalate	190	620	61	N	Y	**BSL**	0.306	0
Fluoranthene	3.14	2200	230	N	N	BSL	0	0
Fluorene	1.36	2200	230	N	N	BSL	0	0
Hexachlorobenzene	0.095	1.1	0.3	C	N	BSL	0	0
Hexachlorobutadiene	0.027	22	6.1	C	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	1.9	2.1	0.15	C	Y	**BSL**	0	0.905
Naphthalene	3.22	18	3.6	C	N	BSL	0	0
N-Nitrosodiphenylamine	0.15	350	99	C	N	BSL	0	0
Phenanthrene*	6.8	17000	1700	N	N	BSL	0	0
Phenol	0.5	18000	1800	N	N	BSL	0	0
Pyrene	6.9	1700	170	N	N	BSL	0	0
PCB-1254	0.034	0.74	0.11	C	N	BSL	0	0
PCB-1260	4.2	0.74	0.22	C	Y	ASL	0	5.676
2,3,7,8-TCDD	0.00114525	0.000018	0.0000045	C	Y	ASL	0	63.625
Aluminum	29500	99000	7700	N	Y	**BSL**	0.298	0
Antimony	202	41	3.1	N	Y	ASL	4.927	0
Arsenic	17.7	2.4	0.61	C	Y	ASL	0	7.375
Barium	4210	19000	1500	N	Y	**BSL**	0.222	0
Beryllium	2.5	200	16	N	N	BSL	0	0
Cadmium	5.1	9300	7	N	N	BSL	0	0
Calcium	159000	-	-	-	N	BSL	0	0
Chromium	21400	150000	12000	N	Y	**BSL**	0.143	0
Cobalt	221	30	2.3	N	Y	ASL	7.367	0
Copper	278	4100	310	N	N	BSL	0	0
Iron	198000	72000	5500	N	Y	ASL	2.750	0
Lead	57300	800 [7]	400 [8]	N	Y	ASL	71.625	0
Magnesium	89700	-	-	-	N	BSL	0	0
Manganese	959	2300	180	N	Y	**BSL**	0.417	0
Mercury	0.36	4.3	1	N	N	BSL	0	0
Nickel	881	2000	150	N	Y	**BSL**	0.441	0
Potassium	1500	-	-	-	N	BSL	0	0
Selenium	1.8	510	39	N	N	BSL	0	0
Silver	1.3	510	39	N	N	BSL	0	0
Sodium	1440	-	-	-	N	BSL	0	0
Vanadium	1670	510	39	N	Y	ASL	3.275	0
Zinc	45300	31000	2300	N	Y	ASL	1.461	0
Chromium, hexavalent	3390	5.6	0.29	C	Y	ASL	0	605.357

sum	116.866	727.011
sum of **BSL**	3.177	1.724
ratio of **BSL**/total	0.027	0.002

TABLE C.2 - EASTERN AREA SURFACE SOILS (0 TO 2 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,2,4-Trichlorobenzene	200000	27	6.2	N	Y	ASL	7407.407	0
1,2-Dichloroethene	0.0765	920	70	N	N	BSL	0	0
1,2-Dichlorobenzene	6470	980	190	N	Y	ASL	6.602	0
1,3-Dichlorobenzene	1550	980	190	N	Y	ASL	1.582	0
1,4-Dichlorobenzene	4840	12	2.4	C	Y	ASL	0	403.333
Chlorobenzene	99.6	140	29	N	Y	**BSL**	0.711	0
Methylene Chloride	7.02	310	36	N	N	BSL	0	0
Tetrachloroethene	2.31	41	8.6	N	N	BSL	0	0
Trichloroethene	0.866	2	0.44	N	Y	**BSL**	0.433	0
1,1'-Biphenyl	0.4	21	5.1	N	N	BSL	0	0
2,4-Dimethylphenol	0.77	1200	120	N	N	BSL	0	0
4-Methylphenol	0.34	6200	610	N	N	BSL	0	0
Acenaphthene	219	3300	340	N	N	BSL	0	0
Acenaphthylene*	24.1	3300	340	N	N	BSL	0	0
Anthracene	46.2	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	22	2.1	0.15	C	Y	ASL	0	10.476
Benzo(a)pyrene	37	0.21	0.015	C	Y	ASL	0	176.190
Benzo(b)fluoranthene	65.8	2.1	0.15	C	Y	ASL	0	31.333
Benzo(g,h,i)perylene	34	--	--	--	N	BSL	0	0
bis(2-Ethylhexyl)phthalate	44.5	120	35	C	Y	**BSL**	0	0.371
Carbazole	1.6	--	--	--	N	BSL	0	0
Chrysene	41.9	210	15	C	Y	**BSL**	0	0.200
Dibenz(a,h)anthracene	8.8	0.21	0.015	C	Y	ASL	0	41.905
Dibenzofuran	1.2	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.077	49000	4900	N	N	BSL	0	0
Fluoranthene	121	2200	230	N	N	BSL	0	0
Fluorene	213	2200	230	N	N	BSL	0	0
Hexachlorobenzene	359	1.1	0.3	C	Y	ASL	0	326.364
Hexachlorobutadiene	8.52	22	6.1	C	Y	**BSL**	0	0.387
Indeno(1,2,3-cd)pyrene	35.9	2.1	0.15	C	Y	ASL	0	17.095
Naphthalene	448	18	3.6	C	Y	ASL	0	24.889
Phenanthrene*	428	17000	1700	N	N	BSL	0	0
Pyrene	70.5	1700	170	N	N	BSL	0	0
PCB-1248	2.5	0.74	0.22	C	Y	ASL	0	3.378
PCB-1254	1	0.74	0.11	C	Y	ASL	0	1.351
PCB-1268*	0.46	0.74	0.22	C	Y	**BSL**	0	0.622
2,3,7,8-TCDD	0.0595	0.000018	0.0000045	C	Y	ASL	0	3305.556
						sum	7416.736	4343.450
						sum of **BSL**	1.144	1.579
						ratio of **BSL**/total	0.000	0.000

TABLE C.3 - WESTERN AREA SUBSURFACE SOILS (0-10 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,1,1-Trichloroethane	0.5	3800	870	N	N	BSL	0	0
1,2,3-Trichlorobenzene	210	49	4.9	N	Y	ASL	4.286	0
1,2,4-Trichlorobenzene	1300	27	6.2	N	Y	ASL	48.148	0
1,2-Dichlorobenzene	3300	980	190	N	Y	ASL	3.367	0
1,2-Dichloropropane	1.14	4.7	0.94	C	Y	**BSL**	0	0.243
1,3-Dichlorobenzene*	3300	980	190	N	Y	ASL	3.367	0
1,4-Dichlorobenzene	5200	12	2.4	C	Y	ASL	0	433.333
2-Butanone	0.56	20000	2800	N	N	BSL	0	0
Acetone	0.35	63000	6100	N	N	BSL	0	0
Benzene	110	5.4	1.1	C	Y	ASL	0	20.370
Carbon Disulfide	0.0059	370	82	N	N	BSL	0	0
Carbon Tetrachloride	0.089	3	0.61	C	N	BSL	0	0
Chlorobenzene	630	140	29	N	Y	ASL	4.500	0
Chloroform	0.00086	1.5	0.29	C	N	BSL	0	0
Chloromethane	0.18	50	12	N	N	BSL	0	0
cis-1,2-Dichloroethene	0.0021	200	16	N	N	BSL	0	0
Ethylbenzene	450	27	5.4	C	Y	ASL	0	16.667
m,p-Xylenes	1700	250	59	N	Y	ASL	6.800	0
Methylcyclohexane	48	--	--	--	N	BSL	0	0
Methylene Chloride	9.7	310	36	N	N	BSL	0	0
o-Xylene	600	300	69	N	Y	ASL	2.000	0
Styrene	4	3600	630	N	N	BSL	0	0
Tetrachloroethene	7.9	41	8.6	N	N	BSL	0	0
Toluene	420	4500	500	N	N	BSL	0	0
trans-1,2-Dichloroethene	0.00056	69	15	N	N	BSL	0	0
Vinyl Chloride	0.00096	1.7	0.06	C	N	BSL	0	0
Xylene (total)	110	270	63	N	Y	**BSL**	0.407	0
1,1'-Biphenyl	22	21	5.1	N	Y	ASL	1.048	0
1,2,4,5-Tetrachlorobenzene*	210	27	1.8	N	Y	ASL	7.778	0
2,4-Dichlorophenol	4.3	180	18	N	N	BSL	0	0
2,4-Dimethylphenol	0.36	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	140	220	23	N	Y	**BSL**	0.636	0
2-Methylphenol	0.23	3100	310	N	N	BSL	0	0
4-Methylphenol	0.32	6200	610	N	N	BSL	0	0
Acenaphthene	25	3300	340	N	N	BSL	0	0
Acenaphthylene*	12	3300	340	N	N	BSL	0	0
Acetophenone	0.29	10000	780	N	N	BSL	0	0
Anthracene	90	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	87	2.1	0.15	C	Y	ASL	0	41.429
Benzo(a)pyrene	82	0.21	0.015	C	Y	ASL	0	390.476
Benzo(b)fluoranthene	58	2.1	0.15	C	Y	ASL	0	27.619
Benzo(g,h,i)perylene	53	--	--	--	N	BSL	0	0
Benzo(k)fluoranthene	11	21	1.5	C	Y	**BSL**	0	0.524
bis(2-Ethylhexyl)phthalate	120	120	35	C	Y	**BSL**	0	1.000
Carbazole	10	--	--	--	N	BSL	0	0
Chrysene	79	210	15	C	Y	**BSL**	0	0.376
Dibenz(a,h)anthracene	4.9	0.21	0.015	C	Y	ASL	0	23.333
Dibenzofuran	15	100	7.8	N	Y	**BSL**	0.150	0
Diethylphthalate	0.084	49000	4900	N	N	BSL	0	0
Dimethylphthalate	0.62	--	--	--	N	BSL	0	0
Di-n-Butylphthalate	3.06	6200	610	N	N	BSL	0	0
Di-n-Octylphthalate	190	620	61	N	Y	**BSL**	0.306	0
Fluoranthene	200	2200	230	N	N	BSL	0	0
Fluorene	65	2200	230	N	N	BSL	0	0
Hexachlorobenzene	0.095	1.1	0.3	C	N	BSL	0	0
Hexachlorobutadiene	0.027	22	6.1	C	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	54	2.1	0.15	C	Y	ASL	0	25.714
Isophorone	0.36	1800	510	C	N	BSL	0	0
Naphthalene	110	18	3.6	C	Y	ASL	0	6.111
N-Nitrosodiphenylamine	0.15	350	99	C	N	BSL	0	0
Phenanthrene*	250	17000	1700	N	N	BSL	0	0
Phenol	0.5	18000	1800	N	N	BSL	0	0
Pyrene	190	1700	170	N	Y	**BSL**	0.112	0
PCB-1254	0.034	0.74	0.11	C	N	BSL	0	0
PCB-1260	4.2	0.74	0.22	C	Y	ASL	0	5.676
2,3,7,8-TCDD	0.004150167	0.000018	0.0000045	C	Y	ASL	0	230.565
Aluminum	29500	99000	7700	N	Y	**BSL**	0.298	0
Antimony	202	41	3.1	N	Y	ASL	4.927	0
Arsenic	54.9	2.4	0.61	C	Y	ASL	0	22.875
Barium	4210	19000	1500	N	Y	**BSL**	0.222	0
Beryllium	2.5	200	16	N	N	BSL	0	0
Cadmium	5.1	9300	7	N	N	BSL	0	0
Calcium	159000	--	--	--	N	BSL	0	0
Chromium	37000	150000	12000	N	Y	**BSL**	0.247	0
Cobalt	221	30	2.3	N	Y	ASL	7.367	0
Copper	335	4100	310	N	Y	**BSL**	0.082	0
Iron	198000	72000	5500	N	Y	ASL	2.750	0
Lead	57300	800 [7]	400 [8]	N	Y	ASL	71.625	0
Magnesium	89700	--	--	--	N	BSL	0	0
Manganese	959	2300	180	N	Y	**BSL**	0.417	0
Mercury	0.91	4.3	1	N	N	BSL	0	0
Nickel	881	2000	150	N	Y	**BSL**	0.441	0
Potassium	1500	--	--	--	N	BSL	0	0
Selenium	5.1	510	39	N	N	BSL	0	0
Silver	1.3	510	39	N	N	BSL	0	0
Sodium	1860	--	--	--	N	BSL	0	0
Thallium	5	1	0.078	N	Y	ASL	5.000	0
Vanadium	1670	510	39	N	Y	ASL	3.275	0
Zinc	45300	31000	2300	N	Y	ASL	1.461	0
Chromium, hexavalent	11000	5.6	0.29	C	Y	ASL	0	1964.286

sum	181.016	3210.597
sum of **BSL**	3.317	2.143
ratio of **BSL**/total	0.018	0.001

TABLE C.4 - EASTERN AREA SUBSURFACE SOILS (0 TO 10 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,2,4-Trichlorobenzene	200000	27	6.2	N	Y	ASL	7407.407	0
1,2-Dichloroethene	0.0765	920	70	N	N	BSL	0	0
1,2-Dichlorobenzene	6470	980	190	N	Y	ASL	6.602	0
1,3-Dichlorobenzene*	1550	980	190	N	Y	ASL	1.582	0
1,4-Dichlorobenzene	4840	12	2.4	C	Y	ASL	0	403.333
Benzene	0.0035	5.4	1.1	C	N	BSL	0	0
Chlorobenzene	99.6	140	29	N	Y	**BSL**	0.711	0
Methylene Chloride	7.02	310	36	N	N	BSL	0	0
Tetrachloroethene	2.31	41	8.6	N	N	BSL	0	0
Trichloroethene	0.866	2	0.44	N	Y	**BSL**	0.433	0
1,1'-Biphenyl	4.6	21	5.1	N	N	BSL	0	0
2,4-Dimethylphenol	0.77	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	35	220	23	N	Y	**BSL**	0.159	0
2-Methylphenol	0.031	3100	310	N	N	BSL	0	0
4-Methylphenol	8.8	6200	610	N	N	BSL	0	0
Acenaphthene	219	3300	340	N	N	BSL	0	0
Acenaphthylene*	24.1	3300	340	N	N	BSL	0	0
Anthracene	46.2	17000	1700	N	N	BSL	0	0
Benzo(a)anthracene	22	2.1	0.15	C	Y	ASL	0	10.476
Benzo(a)pyrene	37	0.21	0.015	C	Y	ASL	0	176.190
Benzo(b)fluoranthene	65.8	2.1	0.15	C	Y	ASL	0	31.333
Benzo(g,h,i)perylene	34	--	--	--	N	BSL	0	0
bis(2-Ethylhexyl)phthalate	44.5	120	34	C	Y	**BSL**	0	0.371
Carbazole	7	--	--	--	N	BSL	0	0
Chrysene	41.9	210	15	C	Y	**BSL**	0	0.200
Dibenz(a,h)anthracene	8.8	0.21	0.015	C	Y	ASL	0	41.905
Dibenzofuran	14	100	7.8	N	Y	**BSL**	0.140	0
Diethylphthalate	0.077	49000	4900	N	N	BSL	0	0
Fluoranthene	121	2200	230	N	N	BSL	0	0
Fluorene	213	2200	230	N	N	BSL	0	0
Hexachlorobenzene	359	1.1	0.3	C	Y	ASL	0	326.364
Hexachlorobutadiene	8.52	22	6.1	C	Y	**BSL**	0	0.387
Indeno(1,2,3-cd)pyrene	35.9	2.1	0.15	C	Y	ASL	0	17.095
Naphthalene	2000	18	3.6	C	Y	ASL	0	111.111
Phenanthrene	428	17000	1700	N	N	BSL	0	0
Pyrene	70.5	1700	170	N	N	BSL	0	0
PCB-1248	2.5	0.74	0.22	C	Y	ASL	0	3.378
PCB-1254	1	0.74	0.11	C	Y	ASL	0	1.351
PCB-1260	0.046	0.74	0.22	C	N	BSL	0	0
PCB-1268	0.46	0.74	0.22	C	Y	**BSL**	0	0.622
2,3,7,8-TCDD	0.0595	0.000018	0.0000045	C	Y	ASL	0	3305.556
Aluminum	27600	99000	7700	N	Y	**BSL**	0.279	0
Arsenic	9.8	2.4	0.61	C	Y	ASL	0	4.083
Barium	132	19000	1500	N	N	BSL	0	0
Beryllium	0.75	200	16	N	N	BSL	0	0
Cadmium	2.2	9300	7	N	N	BSL	0	0
Calcium	239000	--	--	--	N	BSL	0	0
Chromium	25200	150000	12000	N	Y	**BSL**	0.168	0
Cobalt	126	30	2.3	N	Y	ASL	4.200	0
Copper	23.8	4100	310	N	N	BSL	0	0
Iron	72100	72000	5500	N	Y	ASL	1.001	0
Lead	110	800 [7]	400 [8]	N	N	BSL	0	0
Magnesium	46800	--	--	--	N	BSL	0	0
Manganese	933	2300	180	N	Y	**BSL**	0.406	0
Mercury	1.3	4.3	1	N	Y	**BSL**	0.302	0
Nickel	597	2000	150	N	Y	**BSL**	0.299	0
Potassium	2210	--	--	--	N	BSL	0	0
Selenium	0.94	510	39	N	N	BSL	0	0
Silver	0.57	510	39	N	N	BSL	0	0
Sodium	2640	--	--	--	N	BSL	0	0
Thallium	9.4	1	0.078	N	Y	ASL	9.400	0
Vanadium	1390	510	39	N	Y	ASL	2.725	0
Zinc	223	31000	2300	N	N	BSL	0	0
Chromium, hexavalent	3820	5.6	0.29	C	Y	ASL	0	682.143

sum	7435.815	5115.899
sum of **BSL**	2.897	1.579
ratio of **BSL**/total	0.000	0.000

TABLE C.5 - FORMER SEABOARD KOPPERS SITE SURFACE SOILS (0-2 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,1'-Biphenyl	0.056	21	5.1	N	N	BSL	0	0
2,4-Dimethylphenol	0.51	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	0.17	220	310	N	N	BSL	0	0
2-Methylphenol	1.3	3100	3100	N	N	BSL	0	0
4-Chloroaniline	0.042	8.6	2.4	C	N	BSL	0	0
4-Methylphenol	1.7	6200	610	N	N	BSL	0	0
Acenaphthene	0.47	3300	340	N	N	BSL	0	0
Acenaphthylene*	0.47	3300	340	N	N	BSL	0	0
Acetophenone	0.026	10000	780	N	N	BSL	0	0
Anthracene	0.83	17000	1700	N	N	BSL	0	0
Benzaldehyde	0.68	10000	780	N	N	BSL	0	0
Benzo(a)anthracene	4.7	2.1	0.15	C	Y	ASL	0	2.238
Benzo(a)pyrene	7.5	0.21	0.015	C	Y	ASL	0	35.714
Benzo(b)fluoranthene	7.6	2.1	0.15	C	Y	ASL	0	3.619
Benzo(g,h,i)perylene	6.1	-	-	-	N	BSL	0	0
Benzo(k)fluoranthene	2.5	21	1.5	C	Y	**BSL**	0	0.119
bis(2-Ethylhexyl)phthalate	1	120	35	C	N	BSL	0	0
Butylbenzylphthalate	0.037	910	260	N	N	BSL	0	0
Carbazole	0.55	-	-	-	N	BSL	0	0
Chrysene	4.9	210	15	C	N	BSL	0	0
Dibenz(a,h)anthracene	1.5	0.21	0.015	C	Y	ASL	0	7.143
Dibenzofuran	0.24	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.026	49000	4900	N	N	BSL	0	0
Di-n-Butylphthalate	0.055	6200	610	N	N	BSL	0	0
Di-n-Octyl phthalate	0.017	620	61	N	N	BSL	0	0
Fluoranthene	6.4	2200	230	N	N	BSL	0	0
Fluorene	0.38	2200	230	N	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	4.9	2.1	0.15	C	Y	ASL	0	2.333
Naphthalene	0.67	18	3.6	C	N	BSL	0	0
Pentachlorophenol	0.81	2.7	0.89	C	N	BSL	0	0
Phenanthrene*	2.8	17000	1700	N	N	BSL	0	0
Phenol	8.6	18000	1800	N	N	BSL	0	0
Pyrene	5.3	1700	170	N	N	BSL	0	0
PCB-1242	0.28	0.74	0.22	C	Y	**BSL**	0	0.378
PCB-1254	0.3	0.74	0.11	C	Y	**BSL**	0	0.405
PCB-1260	0.2	0.74	0.22	C	N	BSL	0	0
2,3,7,8-TCDD	0.00014025	0.000018	0.0000045	C	Y	ASL	0	7.792
Chromium	5290	150000	12000	N	N	BSL	0	0
Chromium, hexavalent	121	5.6	0.29	C	Y	ASL	0	21.607
						sum	0.000	81.349
						sum of **BSL**	0.000	0.903
						ratio of **BSL**/total	0.000	0.011

TABLE C.6 - FORMER KOPPERS SEABOARD SITE SUBSURFACE SOIL (0-10 FEET)

Chemical	Concentration Used for Screening [2]	Toxicity Screening Value [4]			COPC Flag (Y/N)	Rationale for Selection or Deletion [5]	COPC noncancer Scr. Conc./Ind RSL	COPC cancer Scr. Conc./Ind RSL
		Industrial	Residential	(N/C)				
1,2,4-Trichlorobenzene	1300	27	6.2	N	Y	ASL	48.148	0
1,2-Dichlorobenzene	2700	980	190	N	Y	ASL	2.755	0
1,3-Dichlorobenzene*	2800	980	190	N	Y	ASL	2.857	0
1,4-Dichlorobenzene	1600	12	2.4	C	Y	ASL	0	133.333
Acetone	0.054	63000	6100	N	N	BSL	0	0
Carbon Disulfide	0.0023	370	82	N	N	BSL	0	0
Chlorobenzene	130	140	29	N	Y	**BSL**	0.929	0
Methylene Chloride	9.7	310	36	N	N	BSL	0	0
1,1'-Biphenyl	0.73	21	5.1	N	N	BSL	0	0
2,4-Dichlorophenol	0.59	180	18	N	N	BSL	0	0
2,4-Dimethylphenol	0.51	1200	120	N	N	BSL	0	0
2-Methylnaphthalene	0.63	220	23	N	N	BSL	0	0
2-Methylphenol	1.3	3100	310	N	N	BSL	0	0
4-Chloroaniline	0.042	8.6	2.4	C	N	BSL	0	0
4-Methylphenol	1.7	6200	610	N	N	BSL	0	0
Acenaphthene	1.1	3300	340	N	N	BSL	0	0
Acenaphthylene	0.84	3300	340	N	N	BSL	0	0
Acetophenone	0.026	10000	780	N	N	BSL	0	0
Anthracene	16	17000	1700	N	N	BSL	0	0
Benzaldehyde	0.68	10000	780	N	N	BSL	0	0
Benzo(a)anthracene	12	2.1	0.15	C	Y	ASL	0	5.714
Benzo(a)pyrene	15	0.21	0.015	C	Y	ASL	0	71.429
Benzo(b)fluoranthene	21	2.1	0.15	C	Y	ASL	0	10
Benzo(g,h,i)perylene	11	-	-	-	N	BSL	0	0
Benzo(k)fluoranthene	2.5	21	1.5	C	Y	**BSL**	0	0.119
bis(2-Ethylhexyl)phthalate	1	120	35	C	N	BSL	0	0
Butylbenzylphthalate	0.037	910	260	C	N	BSL	0	0
Carbazole	5.5	-	-	-	N	BSL	0	0
Chrysene	11	210	15	C	N	BSL	0	0
Dibenz(a,h)anthracene	2.6	0.21	0.015	C	Y	ASL	0	12.381
Dibenzofuran	1.1	100	7.8	N	N	BSL	0	0
Diethylphthalate	0.084	49000	4900	N	N	BSL	0	0
Di-n-Butylphthalate	0.055	6200	610	N	N	BSL	0	0
Di-n-Octylphthalate	0.017	620	61	N	N	BSL	0	0
Fluoranthene	23	2200	230	N	N	BSL	0	0
Fluorene	2.1	2200	230	N	N	BSL	0	0
Indeno(1,2,3-cd)pyrene	9.1	2.1	0.15	C	Y	ASL	0	4.333
Naphthalene	2	18	3.6	C	N	BSL	0	0
Pentachlorophenol	0.81	2.7	0.89	C	N	BSL	0	0
Phenanthrene*	12	17000	1700	N	N	BSL	0	0
Phenol	8.6	18000	1800	N	N	BSL	0	0
Pyrene	16	1700	170	N	N	BSL	0	0
PCB-1242	0.28	0.74	0.22	C	Y	**BSL**	0	0.378
PCB-1254	0.3	0.74	0.11	C	Y	**BSL**	0	0.405
PCB-1260	0.2	0.74	0.22	C	N	BSL	0	0
2,3,7,8-TCDD	0.00014025	0.000018	0.0000045	C	Y	ASL	0	7.792
Aluminum	13300	99000	7700	N	Y	**BSL**	0.134	0
Antimony	19.5	41	3.1	N	Y	**BSL**	0.476	0
Arsenic	54.9	2.4	0.61	C	Y	ASL	0	22.875
Barium	134	19000	1500	N	N	BSL	0	0
Beryllium	0.85	200	16	N	N	BSL	0	0
Cadmium	1.3	9300	7	N	N	BSL	0	0
Calcium	19900	-	-	-	N	BSL	0	0
Chromium	23200	150000	12000	N	Y	**BSL**	0.155	0
Cobalt	16.9	30	2.3	N	Y	**BSL**	0.563	0
Copper	195	4100	310	N	N	BSL	0	0
Iron	37300	72000	5500	N	Y	**BSL**	0.518	0
Lead	3730	800 [7]	400 [8]	N	Y	ASL	4.663	0
Magnesium	6720	-	-	-	N	BSL	0	0
Manganese	526	2300	180	N	Y	**BSL**	0.229	0
Mercury	0.87	4.3	1	N	N	BSL	0	0
Nickel	65.4	2000	150	N	N	BSL	0	0
Potassium	2260	-	-	-	N	BSL	0	0
Selenium	3.7	510	39	N	N	BSL	0	0
Silver	0.65	510	39	N	N	BSL	0	0
Sodium	1540	-	-	-	N	BSL	0	0
Thallium	1.7	1	0.078	N	Y	ASL	1.700	0
Vanadium	127	510	39	N	Y	**BSL**	0.249	0
Zinc	449	31000	2300	N	N	BSL	0	0
Chromium, hexavalent	495	5.6	0.29	C	Y	ASL	0	88.393
						sum	63.375	357.153
						sum of **BSL**	3.252	0.903
						ratio of **BSL**/total	0.051	0.003

APPENDIX D

CHEMICAL-SPECIFIC INPUT PARAMETERS

	Exposure-Specific Volatilization Factors										Chemical/Physical Properties of COCs						Dermal Absorption of Chemicals in Water			
Chemical	**VF Visitor CT (m^3/kg)**	**VF Visitor RME (m^3/kg)**	**VF Operator CT (m^3/kg)**	**VF Operator RME (m^3/kg)**	**VF Worker CT (m^3/kg)**	**VF Worker RME (m^3/kg)**	**VF Construct CT (m^3/kg)**	**VF Construct RME (m^3/kg)**	**VF Utility CT (m^3/kg)**	**VF Utility RME (m^3/kg)**	**Apparent Diffusivity (cm^2/sec)**	**H'**	**Diffusivity in Air (cm^2/sec)**	**Diffusivity in Water (cm^2/sec)**	**Particulate Emission Factor [1] (m^3/kg)**	**Koc -Organic Carbon Partition Coefficient [1] (L/kg)**	**Dermal Perm. Coeff. [2] (cm/hr)**	**B Ratio [2] (unitless)**	**τ - Lag Time per Event [2] (hour)**	**t* - Time to Reach Steady State [2] (hours)**
Benzene	1.25E+02	3.97E+02	1.33E+02	2.97E+02	2.66E+02	5.95E+02	6.14E+01	9.04E+01	3.55E+01	5.02E+01	3.07E-02	0.22690	0.08954	0.00001	1.40E+09	145.8	1.50E-02	0.1	0.29	0.7
Chlorobenzene	2.17E+02	6.85E+02	2.30E+02	5.14E+02	4.60E+02	1.03E+03	1.06E+02	1.56E+02	6.13E+01	8.67E+01	1.03E-02	0.12715	0.07213	0.00001	1.40E+09	233.9	2.80E-02	0.1	0.46	1.09
Ethylbenzene	1.82E+02	5.77E+02	1.93E+02	4.33E+02	3.87E+02	8.65E+02	8.94E+01	1.32E+02	5.16E+01	7.30E+01	1.45E-02	0.32216	0.06847	0.00001	1.40E+09	446.1	4.90E-02	0.2	0.42	1.01
Xylenes	1.89E+02	5.97E+02	2.00E+02	4.48E+02	4.00E+02	8.95E+02	9.25E+01	1.36E+02	5.34E+01	7.55E+01	1.36E-02	0.21177	0.08474	0.00001	1.40E+09	382.9	5.30E-02	0.2	0.42	1.01
1,2,4,5-Tetrachlorobenzene	1.54E+03	4.89E+03	1.64E+03	3.66E+03	3.28E+03	7.33E+03	7.57E+02	1.11E+03	4.37E+02	6.18E+02	2.02E-04	0.04088	0.03190	0.00001	1.40E+09	2220	NA	NA	NA	NA
1,2,3-Trichlorobenzene	9.90E+02	3.13E+03	1.05E+03	2.35E+03	2.10E+03	4.70E+03	4.85E+02	7.14E+02	2.80E+02	3.96E+02	4.93E-04	0.05110	0.03953	0.00001	1.40E+09	1383	6.60E-02	0.3	1.11	2.66
1,2,4-Trichlorobenzene	9.20E+02	2.91E+03	9.75E+02	2.18E+03	1.95E+03	4.36E+03	4.51E+02	6.63E+02	2.60E+02	3.68E+02	5.71E-04	0.05805	0.03960	0.00001	1.40E+09	1356	6.60E-02	0.3	1.11	2.66
1,2-Dichlorobenzene	3.78E+02	1.19E+03	4.00E+02	8.95E+02	8.01E+02	1.79E+03	1.85E+02	2.72E+02	1.07E+02	1.51E+02	3.39E-03	0.07850	0.05617	0.00001	1.40E+09	382.9	4.00E-02	0.2	0.71	1.71
1,3-Dichlorobenzene															1.40E+09	638 [1]	5.80E-02	0.3	0.71	1.71
1,4-Dichlorobenzene	3.38E+02	1.07E+03	3.59E+02	8.02E+02	7.17E+02	1.60E+03	1.66E+02	2.44E+02	9.56E+01	1.35E+02	4.23E-03	0.09853	0.05504	0.00001	1.40E+09	375.3	4.20E-02	0.2	0.71	1.71
Benzo(a)anthracene															1.40E+09	176900	4.70E-01	2.8	2.03	8.53
Benzo(a)pyrene															1.40E+09	587400	7.00E-01	4.3	2.69	11.67
Benzo(b)fluoranthene															1.40E+09	599400	7.00E-01	4.3	2.77	12.03
Bis(2-ethylhexyl)phthalate															1.40E+09	119600	NA	NA	NA	NA
Chrysene															1.40E+09	180500	4.70E-01	2.8	2.03	8.53
Dibenz(a,h)anthracene															1.40E+09	1912000	1.50E+00	9.7	3.88	17.57
Hexachlorobenzene															1.40E+09	1202264	1.30E-01	0.9	4.22	16.21
Indeno(1,2,3-cd)pyrene															1.40E+09	3470000	1.00E+00	6.7	3.78	16.83
Naphthalene	1.42E+03	4.49E+03	1.51E+03	3.37E+03	3.01E+03	6.74E+03	6.96E+02	1.02E+03	4.02E+02	5.68E+02	2.40E-04	0.01799	0.06050	0.00001	1.40E+09	1544	4.70E-02	0.2	0.56	1.34
Aluminum															1.40E+09	NA	NA	NA	NA	NA
Antimony															1.40E+09	NA	NA	NA	NA	NA
Arsenic															1.40E+09	NA	NA	NA	NA	NA
Barium															1.40E+09	NA	NA	NA	NA	NA
Cadmium															1.40E+09	NA	NA	NA	NA	NA
Chromium (Total)															1.40E+09	NA	NA	NA	NA	NA
Cobalt															1.40E+09	NA	NA	NA	NA	NA
Copper															1.40E+09	NA	NA	NA	NA	NA
Iron															1.40E+09	NA	NA	NA	NA	NA
Lead															1.40E+09	NA	NA	NA	NA	NA
Manganese															1.40E+09	NA	NA	NA	NA	NA
Mercury															1.40E+09	NA	NA	NA	NA	NA
Nickel															1.40E+09	NA	NA	NA	NA	NA
Silver															1.40E+09	NA	NA	NA	NA	NA
Thallium															1.40E+09	NA	NA	NA	NA	NA
Vanadium															1.40E+09	NA	NA	NA	NA	NA
Zinc															1.40E+09	NA	NA	NA	NA	NA
Aroclor 1248															1.40E+09	76530	NA	NA	NA	NA
Aroclor 1254															1.40E+09	130500	NA	NA	NA	NA
Aroclor 1260															1.40E+09	349700	NA	NA	NA	NA
Dioxins															1.40E+09	249100	8.10E-01	5.6	6.82	30.09

(1) USEPA, November 2013 <http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/index.htm>
(2) USEPA, July 2004. Risk Assessment Guidance for Superfund - Volume I: Human Health Evaluation Manual (Part E, Supplemental Guidance for Dermal Risk Assessment). EPA/540/R-99/005

APPENDIX E

RISK CALCULATION SPREADSHEETS
(RAGS PART D TABLE 7'S)

TABLE E-1 (RAGS Part D Table 7.1.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	Surface Soil (0-2 feet bgs)	Western Area Surface Soil	Incidental Ingestion	1,2,3-Trichlorobenzene	253	mg/kg	5.55E-05	mg/kg/day	--	--	--	1.7E-04	mg/kg/day	8E-04	mg/kg/day	0.217
				1,2,4-Trichlorobenzene	106	mg/kg	2.33E-05	mg/kg/day	2.9E-02	kg-day/mg	6.75E-07	7.3E-05	mg/kg/day	1E-02	mg/kg/day	0.007
				1,4-Dichlorobenzene	78.5	mg/kg	1.72E-05	mg/kg/day	5.4E-03	kg-day/mg	9.31E-08	5.4E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzene	7.8	mg/kg	1.71E-06	mg/kg/day	5.5E-02	kg-day/mg	9.42E-08	5.3E-06	mg/kg/day	4E-03	mg/kg/day	0.001
				Benzo(a)pyrene	1.11	mg/kg	2.44E-07	mg/kg/day	7.3E+00	kg-day/mg	1.78E-06	7.6E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	1.78	mg/kg	3.91E-07	mg/kg/day	7.3E-01	kg-day/mg	2.85E-07	1.2E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.2	mg/kg	4.39E-08	mg/kg/day	7.3E+00	kg-day/mg	3.21E-07	1.4E-07	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.86	mg/kg	1.89E-07	mg/kg/day	2.0E+00	kg-day/mg	3.78E-07	5.9E-07	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	3.08E-04	mg/kg	6.76E-11	mg/kg/day	1.5E+05	kg-day/mg	1.01E-05	2.1E-10	mg/kg/day	7E-10	mg/kg/day	0.301
				Antimony	52.6	mg/kg	1.15E-05	mg/kg/day	--	--	--	3.6E-05	mg/kg/day	4E-04	mg/kg/day	0.090
				Arsenic	8.32	mg/kg	1.83E-06	mg/kg/day	1.5E+00	kg-day/mg	2.74E-06	5.7E-06	mg/kg/day	3E-04	mg/kg/day	0.019
				Cobalt	138	mg/kg	3.03E-05	mg/kg/day	--	--	--	9.5E-05	mg/kg/day	3E-04	mg/kg/day	0.315
				Iron	103000	mg/kg	2.26E-02	mg/kg/day	--	--	--	7.1E-02	mg/kg/day	7E-01	mg/kg/day	0.101
				Lead	48400	mg/kg	--	--	--	--	--	--	--	--	--	--
				Vanadium	949	mg/kg	2.08E-04	mg/kg/day	--	--	--	6.5E-04	mg/kg/day	9E-03	mg/kg/day	0.072
				Zinc	38200	mg/kg	8.39E-03	mg/kg/day	--	--	--	2.6E-02	mg/kg/day	3E-01	mg/kg/day	0.087
				Chromium, hexavalent	1270	mg/kg	2.79E-04	mg/kg/day	5.0E-01	kg-day/mg	1.39E-04	8.7E-04	mg/kg/day	3E-03	mg/kg/day	0.290
			Exposure Route Total								**1.6E-04**					**1.5**
			Dermal Contact	1,2,3-Trichlorobenzene	253	mg/kg	1.90E-04	mg/kg/day	--	--	--	5.9E-05	mg/kg/day	8E-04	mg/kg/day	0.074
				1,2,4-Trichlorobenzene	106	mg/kg	7.96E-05	mg/kg/day	2.90E-02	kg-day/mg	2.31E-06	2.5E-05	mg/kg/day	1E-02	mg/kg/day	0.002
				1,4-Dichlorobenzene	78.5	mg/kg	5.89E-05	mg/kg/day	5.40E-03	kg-day/mg	3.18E-07	1.8E-05	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	7.8	mg/kg	5.86E-06	mg/kg/day	5.50E-02	kg-day/mg	3.22E-07	1.8E-05	mg/kg/day	4E-03	mg/kg/day	0.005
				Benzo(a)pyrene	1.11	mg/kg	1.08E-07	mg/kg/day	9.49E-01	kg-day/mg	1.03E-07	3.4E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	1.78	mg/kg	1.74E-07	mg/kg/day	9.49E-02	kg-day/mg	1.65E-08	5.4E-07	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.2	mg/kg	1.95E-08	mg/kg/day	9.49E-01	kg-day/mg	1.85E-08	6.1E-08	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.86	mg/kg	9.04E-08	mg/kg/day	2.80E-01	kg-day/mg	2.53E-08	2.8E-07	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	3.08E-04	mg/kg	6.94E-12	mg/kg/day	4.50E+03	kg-day/mg	3.12E-08	2.2E-11	mg/kg/day	2E-11	mg/kg/day	1.082
				Antimony	52.6	mg/kg	5.92E-06	mg/kg/day	--		--	1.8E-05	mg/kg/day	6E-05	mg/kg/day	0.308
				Arsenic	8.32	mg/kg	1.87E-07	mg/kg/day	4.50E-02	kg-day/mg	8.43E-09	5.8E-07	mg/kg/day	9E-06	mg/kg/day	0.065
				Cobalt	138	mg/kg	1.04E-04	mg/kg/day	--	--	--	3.2E-04	mg/kg/day	3E-04	mg/kg/day	1.078
				Iron	103000	mg/kg	7.73E-02	mg/kg/day	--	--	--	2.4E-01	mg/kg/day	7E-01	mg/kg/day	0.345
				Lead	48400	mg/kg	--	--	--	--	--	--	--	--	--	--
				Vanadium	949	mg/kg	1.85E-05	mg/kg/day	--	--	--	5.8E-05	mg/kg/day	2E-04	mg/kg/day	0.289
				Zinc	38200	mg/kg	2.87E-02	mg/kg/day	--	--	--	8.9E-02	mg/kg/day	3E-01	mg/kg/day	0.298
				Chromium, hexavalent	1270	mg/kg	2.38E-05	mg/kg/day	1.25E-02	kg-day/mg	2.98E-07	7.4E-05	mg/kg/day	8E-05	mg/kg/day	0.930
			Exposure Route Total								**3.4E-06**					**4.5**
			Inhalation	1,2,3-Trichlorobenzene	1.81E-07	mg/m^3	5.3E-10	mg/m^3	--	--	--	8.3E-09	mg/m^3	--	--	--
				1,2,4-Trichlorobenzene	7.57E-08	mg/m^3	2.2E-10	mg/m^3	--	--	--	3.5E-09	mg/m^3	2E-03	m3/mg	0.000
				1,4-Dichlorobenzene	5.61E-08	mg/m^3	1.6E-10	mg/m^3	1.1E-02	m^3/mg	1.8E-12	2.6E-09	mg/m^3	8E-01	m3/mg	0.000
				Benzene	5.57E-09	mg/m^3	1.6E-11	mg/m^3	7.8E-03	m^3/mg	1.3E-13	2.5E-10	mg/m^3	3E-02	m3/mg	0.000
				Benzo(a)pyrene	7.93E-10	mg/m^3	2.3E-12	mg/m^3	1.1E+00	m^3/mg	2.6E-12	3.6E-11	mg/m^3	--	--	--
				Benzo(b)fluoranthene	1.27E-09	mg/m^3	3.7E-12	mg/m^3	1.1E-01	m^3/mg	4.1E-13	5.8E-11	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	1.43E-10	mg/m^3	4.2E-13	mg/m^3	1.2E+00	m^3/mg	5.0E-13	6.5E-12	mg/m^3	--	--	--
				PCB-1260	6.14E-10	mg/m^3	1.8E-12	mg/m^3	5.7E-01	m^3/mg	1.0E-12	2.8E-11	mg/m^3	--	--	--

TABLE E-1 (RAGS Part D Table 7.1.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				2,3,7,8-TCDD	2.20E-13	mg/m^3	6.4E-16	mg/m^3	3.8E+04	m^3/mg	2.4E-11	1.0E-14	mg/m^3	4E-08	m3/mg	0.000
				Antimony	3.76E-08	mg/m^3	1.1E-10	mg/m^3	--	--	--	1.7E-09	mg/m^3	--	--	--
				Arsenic	5.94E-09	mg/m^3	1.7E-11	mg/m^3	4.3E+00	m^3/mg	7.5E-11	2.7E-10	mg/m^3	1.5E-05	m3/mg	0.000
				Cobalt	9.86E-08	mg/m^3	2.9E-10	mg/m^3	9.0E-02	m^3/mg	2.6E-11	4.5E-09	mg/m^3	6E-06	m3/mg	0.001
				Iron	7.36E-05	mg/m^3	2.2E-07	mg/m^3	--	--	--	3.4E-06	mg/m^3	--	--	--
				Lead	3.46E-05	mg/m^3	--	--	--	--	--	--	--	--	--	--
				Vanadium	6.78E-07	mg/m^3	2.0E-09	mg/m^3	--	--	--	3.1E-08	mg/m^3	--	--	--
				Zinc	2.73E-05	mg/m^3	8.0E-08	mg/m^3	--	--	--	1.2E-06	mg/m^3	--	--	--
				Chromium, hexavalent	9.07E-07	mg/m^3	2.7E-09	mg/m^3	1.2E-01	m^3/mg	3.2E-10	4.1E-08	mg/m^3	1E-04	m3/mg	0.000
			Exposure Route Total								**4.5E-10**					**0.0**
		Exposure Point Total									**1.6E-04**					**6.0**
	Exposure Medium Total										**1.6E-04**					**6.0**
Surface Soil Total											**1.6E-04**					**6.0**
							Total of Receptor Risks Across All Media				**1.6E-04**	**Total of Receptor Hazards Across All Media**				**6.0**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-2 (RAGS Part D Table 7.1.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		Hazard
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Quotient
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	17.9	mg/kg	4.9E-08	mg/kg/day	--	--	--	7.7E-07	mg/kg/day	8.0E-03	mg/kg/day	0.000
				1,2,4-Trichlorobenzene	34.6	mg/kg	9.5E-08	mg/kg/day	2.9E-02	kg-day/mg	2.8E-09	1.5E-06	mg/kg/day	9.0E-02	mg/kg/day	0.000
				1,4-Dichlorobenzene	30.7	mg/kg	8.4E-08	mg/kg/day	5.4E-03	kg-day/mg	4.5E-10	1.3E-06	mg/kg/day	7.0E-02	mg/kg/day	0.000
				Benzene	0.88	mg/kg	2.4E-09	mg/kg/day	5.5E-02	kg-day/mg	1.3E-10	3.8E-08	mg/kg/day	1.0E-02	mg/kg/day	0.000
				Benzo(a)pyrene	0.58	mg/kg	1.6E-09	mg/kg/day	7.3E+00	kg-day/mg	1.2E-08	2.5E-08	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	0.97	mg/kg	2.7E-09	mg/kg/day	7.3E-01	kg-day/mg	1.9E-09	4.2E-08	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.17	mg/kg	4.7E-10	mg/kg/day	7.3E+00	kg-day/mg	3.4E-09	7.3E-09	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.33	mg/kg	9.1E-10	mg/kg/day	2.0E+00	kg-day/mg	1.8E-09	1.4E-08	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	1.85E-04	mg/kg	5.1E-13	mg/kg/day	1.5E+05	kg-day/mg	7.6E-08	7.9E-12	mg/kg/day	7.0E-10	mg/kg/day	0.011
				Antimony	28.9	mg/kg	7.9E-08	mg/kg/day	--	--	--	1.2E-06	mg/kg/day	1.0E+00	mg/kg/day	0.000
				Arsenic	10.2	mg/kg	2.8E-08	mg/kg/day	1.5E+00	kg-day/mg	4.2E-08	4.4E-07	mg/kg/day	3.0E-04	mg/kg/day	0.001
				Cobalt	94.8	mg/kg	2.6E-07	mg/kg/day	--	--	--	4.1E-06	mg/kg/day	3.0E-03	mg/kg/day	0.001
				Iron	76200	mg/kg	2.1E-04	mg/kg/day	--	--	--	3.3E-03	mg/kg/day	7.0E-01	mg/kg/day	0.005
				Lead	4880	mg/kg	--	--	--	--	--	--	--	--	--	--
				Vanadium	651	mg/kg	1.8E-06	mg/kg/day	--	--	--	2.8E-05	mg/kg/day	7.0E-04	mg/kg/day	0.040
				Zinc	3820	mg/kg	1.0E-05	mg/kg/day	--	--	--	1.6E-04	mg/kg/day	3.0E-01	mg/kg/day	0.001
				Chromium, hexavalent	200	mg/kg	5.5E-07	mg/kg/day	5.0E-01	kg-day/mg	2.7E-07	8.6E-06	mg/kg/day	3.0E-03	mg/kg/day	0.003
			Exposure Route								**4.1E-07**					**0.1**
			Dermal Contact	1,2,3-Trichlorobenzene	17.9	mg/kg	2.69E-07	mg/kg/day	--	--	--	4.2E-07	mg/kg/day	8E-03	mg/kg/day	0.000
				1,2,4-Trichlorobenzene	34.6	mg/kg	5.20E-07	mg/kg/day	2.90E-02	kg-day/mg	1.51E-08	8.1E-07	mg/kg/day	9E-02	mg/kg/day	0.000
				1,4-Dichlorobenzene	30.7	mg/kg	4.61E-07	mg/kg/day	5.40E-03	kg-day/mg	2.49E-09	7.2E-07	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.88	mg/kg	1.32E-08	mg/kg/day	5.50E-02	kg-day/mg	7.27E-10	2.1E-07	mg/kg/day	1E-02	mg/kg/day	0.000
				Benzo(a)pyrene	0.58	mg/kg	1.13E-09	mg/kg/day	9.49E-01	kg-day/mg	1.07E-09	1.8E-08	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.97	mg/kg	1.89E-09	mg/kg/day	9.49E-02	kg-day/mg	1.80E-10	3.0E-08	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.17	mg/kg	3.32E-10	mg/kg/day	9.49E-01	kg-day/mg	3.15E-10	5.2E-09	mg/kg/day	--	--	--
				PCB-1260	0.33	mg/kg	4.96E-10	mg/kg/day	2.80E-01	kg-day/mg	1.39E-10	1.1E-08	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.85E-04	mg/kg	2.78E-13	mg/kg/day	4.50E+03	kg-day/mg	1.25E-09	1.3E-12	mg/kg/day	2E-11	mg/kg/day	0.065
				Antimony	28.9	mg/kg	4.34E-08	mg/kg/day	--		--	1.0E-06	mg/kg/day	6E-05	mg/kg/day	0.017
				Arsenic	10.2	mg/kg	1.53E-08	mg/kg/day	4.50E-02	kg-day/mg	6.89E-10	7.2E-08	mg/kg/day	9E-06	mg/kg/day	0.008
				Cobalt	94.8	mg/kg	1.42E-07	mg/kg/day	--	--	--	2.2E-05	mg/kg/day	3E-03	mg/kg/day	0.007
				Iron	76200	mg/kg	1.14E-04	mg/kg/day	--	--	--	1.8E-02	mg/kg/day	7E-01	mg/kg/day	0.025
				Lead	4880	mg/kg	--	--	--	--	--	--	--	--	--	--
				Vanadium	651	mg/kg	9.78E-07	mg/kg/day	--	--	--	4.0E-06	mg/kg/day	2E-05	mg/kg/day	0.198
				Zinc	3820	mg/kg	5.74E-06	mg/kg/day	--	--	--	8.9E-04	mg/kg/day	3E-01	mg/kg/day	0.003
				Chromium, hexavalent	200	mg/kg	3.00E-07	mg/kg/day	1.25E-02	kg-day/mg	3.75E-09	1.2E-06	mg/kg/day	8E-05	mg/kg/day	0.015
			Exposure Route								**2.6E-08**					**0.3**
			Inhalation	1,2,3-Trichlorobenzene	1.28E-08	mg/m^3	3.7E-11	mg/m^3	--	--	--	5.8E-10	mg/m^3	--	--	--
				1,2,4-Trichlorobenzene	2.47E-08	mg/m^3	7.2E-11	mg/m^3	--	--	--	1.1E-09	mg/m^3	2.0E-02	mg/m^3	0.000
				1,4-Dichlorobenzene	2.19E-08	mg/m^3	6.4E-11	mg/m^3	1.1E-02	m3/mg	7.1E-13	1.0E-09	mg/m^3	8.0E-01	mg/m^3	0.000
				Benzene	6.29E-10	mg/m^3	1.8E-12	mg/m^3	7.8E-03	m3/mg	1.4E-14	2.9E-11	mg/m^3	8.0E-02	mg/m^3	0.000
				Benzo(a)pyrene	4.14E-10	mg/m^3	1.2E-12	mg/m^3	1.1E+00	m3/mg	1.3E-12	1.9E-11	mg/m^3	--	--	--
				Benzo(b)fluoranthene	6.93E-10	mg/m^3	2.0E-12	mg/m^3	1.1E-01	m3/mg	2.2E-13	3.2E-11	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	1.21E-10	mg/m^3	3.6E-13	mg/m^3	1.2E+00	m3/mg	4.3E-13	5.5E-12	mg/m^3	--	--	--
				PCB-1260	2.36E-10	mg/m^3	6.9E-13	mg/m^3	5.7E-01	m3/mg	3.9E-13	1.1E-11	mg/m^3	--	--	--
				2,3,7,8-TCDD	1.32E-13	mg/m^3	3.9E-16	mg/m^3	3.8E+04	m3/mg	1.5E-11	6.0E-15	mg/m^3	4.0E-08	mg/m^3	0.000
				Antimony	2.06E-08	mg/m^3	6.0E-11	mg/m^3	--	--	--	9.4E-10	mg/m^3	--	--	--

TABLE E-2 (RAGS Part D Table 7.1.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Arsenic	7.29E-09	mg/m^3	2.1E-11	mg/m^3	4.3E+00	m3/mg	9.2E-11	3.3E-10	mg/m^3	1.5E-05	mg/m^3	0.000
				Cobalt	6.77E-08	mg/m^3	2.0E-10	mg/m^3	9.0E-02	m3/mg	1.8E-11	3.1E-09	mg/m^3	2.0E-05	mg/m^3	0.000
				Iron	5.44E-05	mg/m^3	1.6E-07	mg/m^3	--	--	--	2.5E-06	mg/m^3	--	--	--
				Lead	3.49E-06	mg/m^3	--	--	--	--	--	--	--	--	--	--
				Vanadium	4.65E-07	mg/m^3	1.4E-09	mg/m^3	--	--	--	2.1E-08	mg/m^3	--	--	--
				Zinc	2.73E-06	mg/m^3	8.0E-09	mg/m^3	--	--	--	1.2E-07	mg/m^3	--	--	--
				Chromium, hexavalent	1.43E-07	mg/m^3	4.2E-10	mg/m^3	1.2E-01	m3/mg	5.0E-11	6.5E-09	mg/m^3	1.0E-04	mg/m^3	0.000
			Exposure Route								**1.8E-10**					**0.0**
		Exposure Point Total									**4.4E-07**					**0.4**
	Exposure Medium Total										**4.4E-07**					**0.4**
Surface Soil Total											**4.4E-07**					**0.4**
							Total of Receptor Risks Across All Media				**4.4E-07**	**Total of Receptor Hazards Across All Media**				**0.4**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-3 (RAGS Part D Table 7.2.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	253	mg/kg	5.55E-05	mg/kg/day	--	--	--	1.7E-04	mg/kg/day	8E-04	mg/kg/day	0.217
				1,2,4-Trichlorobenzene	106	mg/kg	2.33E-05	mg/kg/day	2.9E-02	kg-day/mg	6.75E-07	7.3E-05	mg/kg/day	1E-02	mg/kg/day	0.007
				1,4-Dichlorobenzene	78.5	mg/kg	1.72E-05	mg/kg/day	5.4E-03	kg-day/mg	9.31E-08	5.4E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzene	7.8	mg/kg	1.71E-06	mg/kg/day	5.5E-02	kg-day/mg	9.42E-08	5.3E-06	mg/kg/day	4E-03	mg/kg/day	0.001
				Benzo(a)pyrene	1.11	mg/kg	2.44E-07	mg/kg/day	7.3E+00	kg-day/mg	1.78E-06	7.6E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	1.78	mg/kg	3.91E-07	mg/kg/day	7.3E-01	kg-day/mg	2.85E-07	1.2E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.2	mg/kg	4.39E-08	mg/kg/day	7.3E+00	kg-day/mg	3.21E-07	1.4E-07	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.86	mg/kg	1.89E-07	mg/kg/day	2.0E+00	kg-day/mg	3.78E-07	5.9E-07	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	3.08E-04	mg/kg	6.76E-11	mg/kg/day	1.5E+05	kg-day/mg	1.01E-05	2.1E-10	mg/kg/day	7E-10	mg/kg/day	0.301
				Antimony	52.6	mg/kg	1.15E-05	mg/kg/day	--	--	--	3.6E-05	mg/kg/day	4E-04	mg/kg/day	0.090
				Arsenic	8.32	mg/kg	1.83E-06	mg/kg/day	1.5E+00	kg-day/mg	2.74E-06	5.7E-06	mg/kg/day	3E-04	mg/kg/day	0.019
				Cobalt	138	mg/kg	3.03E-05	mg/kg/day	--	--	--	9.5E-05	mg/kg/day	3E-04	mg/kg/day	0.315
				Iron	103000	mg/kg	2.26E-02	mg/kg/day	--	--	--	7.1E-02	mg/kg/day	7E-01	mg/kg/day	0.101
				Lead	48400	mg/kg	--	--	--	--	--	--	--	--	--	--
				Vanadium	949	mg/kg	2.08E-04	mg/kg/day	--	--	--	6.5E-04	mg/kg/day	9E-03	mg/kg/day	0.072
				Zinc	38200	mg/kg	8.39E-03	mg/kg/day	--	--	--	2.6E-02	mg/kg/day	3E-01	mg/kg/day	0.087
				Chromium, hexavalent	1270	mg/kg	2.79E-04	mg/kg/day	5.0E-01	kg-day/mg	1.39E-04	8.7E-04	mg/kg/day	3E-03	mg/kg/day	0.290
			Exposure Route Total								**1.6E-04**					**1.5**
			Dermal Contact	1,2,3-Trichlorobenzene	253	mg/kg	2.06E-04	mg/kg/day	--	--	--	6.4E-05	mg/kg/day	8E-04	mg/kg/day	0.080
				1,2,4-Trichlorobenzene	106	mg/kg	8.64E-05	mg/kg/day	2.90E-02	kg-day/mg	2.51E-06	2.7E-05	mg/kg/day	1E-02	mg/kg/day	0.003
				1,4-Dichlorobenzene	78.5	mg/kg	6.40E-05	mg/kg/day	5.40E-03	kg-day/mg	3.45E-07	2.0E-05	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	7.8	mg/kg	6.36E-06	mg/kg/day	5.50E-02	kg-day/mg	3.50E-07	2.0E-05	mg/kg/day	4E-03	mg/kg/day	0.005
				Benzo(a)pyrene	1.11	mg/kg	1.18E-07	mg/kg/day	9.49E-01	kg-day/mg	1.12E-07	3.7E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	1.78	mg/kg	1.89E-07	mg/kg/day	9.49E-02	kg-day/mg	1.79E-08	5.9E-07	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.2	mg/kg	2.12E-08	mg/kg/day	9.49E-01	kg-day/mg	2.01E-08	6.6E-08	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.86	mg/kg	9.81E-08	mg/kg/day	2.80E-01	kg-day/mg	2.75E-08	3.1E-07	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	3.08E-04	mg/kg	7.53E-12	mg/kg/day	4.50E+03	kg-day/mg	3.39E-08	2.3E-11	mg/kg/day	2E-11	mg/kg/day	1.175
				Antimony	52.6	mg/kg	6.43E-06	mg/kg/day	--		--	2.0E-05	mg/kg/day	6E-05	mg/kg/day	0.334
				Arsenic	8.32	mg/kg	2.03E-07	mg/kg/day	4.50E-02	kg-day/mg	9.15E-09	6.3E-07	mg/kg/day	9E-06	mg/kg/day	0.071
				Cobalt	138	mg/kg	1.12E-04	mg/kg/day	--	--	--	3.5E-04	mg/kg/day	3E-04	mg/kg/day	1.170
				Iron	103000	mg/kg	8.39E-02	mg/kg/day	--	--	--	2.6E-01	mg/kg/day	7E-01	mg/kg/day	0.374
				Lead	48400	mg/kg	--	--	--	--	--	--	--	--	--	--
				Vanadium	949	mg/kg	2.01E-05	mg/kg/day	--	--	--	6.3E-05	mg/kg/day	2E-04	mg/kg/day	0.314
				Zinc	38200	mg/kg	3.11E-02	mg/kg/day	--	--	--	9.7E-02	mg/kg/day	3E-01	mg/kg/day	0.324
				Chromium, hexavalent	1270	mg/kg	2.59E-05	mg/kg/day	1.25E-02	kg-day/mg	3.23E-07	8.1E-05	mg/kg/day	8E-05	mg/kg/day	1.009
			Exposure Route Total								**3.7E-06**					**4.9**
			Inhalation	1,2,3-Trichlorobenzene	1.81E-07	mg/m^3	5.3E-10	mg/m^3	--	--	--	8.3E-09	mg/m^3	--	--	--
				1,2,4-Trichlorobenzene	7.57E-08	mg/m^3	2.2E-10	mg/m^3	--	--	--	3.5E-09	mg/m^3	2E-03	mg/m^3	0.000
				1,4-Dichlorobenzene	5.61E-08	mg/m^3	1.6E-10	mg/m^3	1.1E-02	m^3/mg	1.8E-12	2.6E-09	mg/m^3	8E-01	mg/m^3	0.000
				Benzene	5.57E-09	mg/m^3	1.6E-11	mg/m^3	7.8E-03	m^3/mg	1.3E-13	2.5E-10	mg/m^3	3E-02	mg/m^3	0.000
				Benzo(a)pyrene	7.93E-10	mg/m^3	2.3E-12	mg/m^3	1.1E+00	m^3/mg	2.6E-12	3.6E-11	mg/m^3	--	--	--
				Benzo(b)fluoranthene	1.27E-09	mg/m^3	3.7E-12	mg/m^3	1.1E-01	m^3/mg	4.1E-13	5.8E-11	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	1.43E-10	mg/m^3	4.2E-13	mg/m^3	1.2E+00	m^3/mg	5.0E-13	6.5E-12	mg/m^3	--	--	--
				PCB-1260	6.14E-10	mg/m^3	1.8E-12	mg/m^3	5.7E-01	m^3/mg	1.0E-12	2.8E-11	mg/m^3	--	--	--
				2,3,7,8-TCDD	2.20E-13	mg/m^3	6.4E-16	mg/m^3	3.8E+04	m^3/mg	2.4E-11	1.0E-14	mg/m^3	4E-08	mg/m^3	0.000
				Antimony	3.76E-08	mg/m^3	1.1E-10	mg/m^3	--	--	--	1.7E-09	mg/m^3	--	--	--
				Arsenic	5.94E-09	mg/m^3	1.7E-11	mg/m^3	4.3E+00	m3/mg	7.5E-11	2.7E-10	mg/m^3	1.5E-05	mg/m^3	
				Cobalt	9.86E-08	mg/m^3	2.9E-10	mg/m^3	9.0E-02	m^3/mg	2.6E-11	4.5E-09	mg/m^3	6E-06	mg/m^3	0.001
				Iron	7.36E-05	mg/m^3	2.2E-07	mg/m^3	--	--	--	3.4E-06	mg/m^3	--	--	--

TABLE E-3 (RAGS Part D Table 7.2.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Lead	3.46E-05	mg/m^3	--	--	--	--	--	--	--	--	--	--
				Vanadium	6.78E-07	mg/m^3	2.0E-09	mg/m^3	--	--	--	3.1E-08	mg/m^3	--	--	--
				Zinc	2.73E-05	mg/m^3	8.0E-08	mg/m^3	--	--	--	1.2E-06	mg/m^3	--	--	--
				Chromium, hexavalent	9.07E-07	mg/m^3	2.7E-09	mg/m^3	1.2E-01	m^3/mg	3.2E-10	4.1E-08	mg/m^3	1E-04	mg/m^3	0.000
			Exposure Route Total								**4.5E-10**					**0.0**
		Exposure Point Total									**1.6E-04**					**6.4**
	Exposure Medium Total										**1.6E-04**					**6.4**
Surface Soil Total											**1.6E-04**					**6.4**
							Total of Receptor Risks Across All Media				**1.6E-04**	**Total of Receptor Hazards Across All Media**				**6.4**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-4 (RAGS Part D Table 7.2.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	17.9	mg/kg	2.2E-07	mg/kg/day	--	--	--	3.4E-06	mg/kg/day	8.0E-03	mg/kg/day	0.000
				1,2,4-Trichlorobenzene	34.6	mg/kg	4.3E-07	mg/kg/day	2.9E-02	kg-day/mg	1.2E-08	6.7E-06	mg/kg/day	9.0E-02	mg/kg/day	0.000
				1,4-Dichlorobenzene	30.7	mg/kg	3.8E-07	mg/kg/day	5.4E-03	kg-day/mg	2.0E-09	5.9E-06	mg/kg/day	7.0E-02	mg/kg/day	0.000
				Benzene	0.88	mg/kg	1.1E-08	mg/kg/day	5.5E-02	kg-day/mg	6.0E-10	1.7E-07	mg/kg/day	1.0E-02	mg/kg/day	0.000
				Benzo(a)pyrene	0.58	mg/kg	7.2E-09	mg/kg/day	7.3E+00	kg-day/mg	5.2E-08	1.1E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	0.97	mg/kg	1.2E-08	mg/kg/day	7.3E-01	kg-day/mg	8.7E-09	1.9E-07	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.17	mg/kg	2.1E-09	mg/kg/day	7.3E+00	kg-day/mg	1.5E-08	3.3E-08	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.33	mg/kg	4.1E-09	mg/kg/day	2.0E+00	kg-day/mg	8.2E-09	6.4E-08	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	1.85E-04	mg/kg	2.3E-12	mg/kg/day	1.5E+05	kg-day/mg	3.4E-07	3.6E-11	mg/kg/day	7.0E-10	mg/kg/day	0.051
				Antimony	28.9	mg/kg	3.6E-07	mg/kg/day	--	--	--	5.6E-06	mg/kg/day	1.0E+00	mg/kg/day	0.000
				Arsenic	10.2	mg/kg	1.3E-07	mg/kg/day	1.5E+00	kg-day/mg	1.9E-07	2.0E-06	mg/kg/day	3.0E-04	mg/kg/day	0.007
				Cobalt	94.8	mg/kg	1.2E-06	mg/kg/day	--	--	--	1.8E-05	mg/kg/day	3.0E-03	mg/kg/day	0.006
				Iron	76200	mg/kg	9.4E-04	mg/kg/day	--	--	--	1.5E-02	mg/kg/day	7.0E-01	mg/kg/day	0.021
				Lead	4880	mg/kg		mg/kg/day	--	--	--		mg/kg/day	--	mg/kg/day	--
				Vanadium	651	mg/kg	8.0E-06	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	7.0E-04	mg/kg/day	0.179
				Zinc	3820	mg/kg	4.7E-05	mg/kg/day	--	--	--	7.4E-04	mg/kg/day	3.0E-01	mg/kg/day	0.002
				Chromium, hexavalent	200	mg/kg	2.5E-06	mg/kg/day	5.0E-01	kg-day/mg	1.2E-06	3.9E-05	mg/kg/day	3.0E-03	mg/kg/day	0.013
			Exposure Route Total								**1.9E-06**					**0.3**
			Dermal Contact	1,2,3-Trichlorobenzene	17.9	mg/kg	1.21E-06	mg/kg/day	--	--	--	1.9E-06	mg/kg/day	8E-03	mg/kg/day	0.000
				1,2,4-Trichlorobenzene	34.6	mg/kg	2.34E-06	mg/kg/day	2.90E-02	kg-day/mg	6.78E-08	3.6E-06	mg/kg/day	9E-02	mg/kg/day	0.000
				1,4-Dichlorobenzene	30.7	mg/kg	2.07E-06	mg/kg/day	5.40E-03	kg-day/mg	1.12E-08	3.2E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.88	mg/kg	5.95E-08	mg/kg/day	5.50E-02	kg-day/mg	3.27E-09	9.3E-07	mg/kg/day	1E-02	mg/kg/day	0.000
				Benzo(a)pyrene	0.58	mg/kg	5.09E-09	mg/kg/day	9.49E-01	kg-day/mg	4.84E-09	7.9E-08	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.97	mg/kg	8.52E-09	mg/kg/day	9.49E-02	kg-day/mg	8.09E-10	1.3E-07	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.17	mg/kg	1.49E-09	mg/kg/day	9.49E-01	kg-day/mg	1.42E-09	2.3E-08	mg/kg/day	--	--	--
				PCB-1260	0.33	mg/kg	2.23E-09	mg/kg/day	2.80E-01	kg-day/mg	6.24E-10	4.9E-08	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.85E-04	mg/kg	1.25E-12	mg/kg/day	4.50E+03	kg-day/mg	5.63E-09	5.9E-12	mg/kg/day	2E-11	mg/kg/day	0.293
				Antimony	28.9	mg/kg	1.95E-07	mg/kg/day	--		--	4.6E-06	mg/kg/day	6E-05	mg/kg/day	0.076
				Arsenic	10.2	mg/kg	6.89E-08	mg/kg/day	4.50E-02	kg-day/mg	3.10E-09	3.2E-07	mg/kg/day	9E-06	mg/kg/day	0.036
				Cobalt	94.8	mg/kg	6.41E-07	mg/kg/day	--	--	--	1.0E-04	mg/kg/day	3E-03	mg/kg/day	0.033
				Iron	76200	mg/kg	5.15E-04	mg/kg/day	--	--	--	8.0E-02	mg/kg/day	7E-01	mg/kg/day	0.115
				Lead	4880	mg/kg		mg/kg/day	--	--	--	--	mg/kg/day	--	--	--
				Vanadium	651	mg/kg	4.40E-06	mg/kg/day	--	--	--	1.8E-05	mg/kg/day	2E-05	mg/kg/day	0.892
				Zinc	3820	mg/kg	2.58E-05	mg/kg/day	--	--	--	4.0E-03	mg/kg/day	3E-01	mg/kg/day	0.013
				Chromium, hexavalent	200	mg/kg	1.35E-06	mg/kg/day	1.25E-02	kg-day/mg	1.69E-08	5.3E-06	mg/kg/day	8E-05	mg/kg/day	0.066
			Exposure Route Total								**1.2E-07**					**1.5**
			Inhalation	1,2,3-Trichlorobenzene	1.28E-08	mg/m^3	4.2E-11	mg/m^3	--	--	--	6.6E-10	mg/m^3	--	--	--
				1,2,4-Trichlorobenzene	2.47E-08	mg/kg	8.1E-11	mg/m^3	--	--	--	1.3E-09	mg/m^3	2.0E-02	m3/mg	0.000
				1,4-Dichlorobenzene	2.19E-08	mg/kg	7.2E-11	mg/m^3	1.1E-02	m^3/mg	7.9E-13	1.1E-09	mg/m^3	8.0E-01	m3/mg	0.000
				Benzene	6.29E-10	mg/kg	2.1E-12	mg/m^3	7.8E-03	m^3/mg	1.6E-14	3.2E-11	mg/m^3	8.0E-02	m3/mg	0.000
				Benzo(a)pyrene	4.14E-10	mg/kg	1.4E-12	mg/m^3	1.1E+00	m^3/mg	1.5E-12	2.1E-11	mg/m^3	--	--	--
				Benzo(b)fluoranthene	6.93E-10	mg/kg	2.3E-12	mg/m^3	1.1E-01	m^3/mg	2.5E-13	3.6E-11	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	1.21E-10	mg/kg	4.0E-13	mg/m^3	1.2E+00	m^3/mg	4.8E-13	6.2E-12	mg/m^3	--	--	--
				PCB-1260	2.36E-10	mg/kg	7.8E-13	mg/m^3	5.7E-01	m^3/mg	4.4E-13	1.2E-11	mg/m^3	--	--	--
				2,3,7,8-TCDD	1.32E-13	mg/kg	4.4E-16	mg/m^3	3.8E+04	m^3/mg	1.7E-11	6.8E-15	mg/m^3	4.0E-08	m3/mg	0.000
				Antimony	2.06E-08	mg/kg	6.8E-11	mg/m^3	--	--	--	1.1E-09	mg/m^3	--	--	--
				Arsenic	7.29E-09	mg/kg	2.4E-11	mg/m^3	4.3E+00	m^3/mg	1.0E-10	3.7E-10	mg/m^3	1.5E-05	m3/mg	0.000
				Cobalt	6.77E-08	mg/kg	2.2E-10	mg/m^3	9.0E-02	m^3/mg	2.0E-11	3.5E-09	mg/m^3	2.0E-05	m3/mg	0.000
				Iron	5.44E-05	mg/kg	1.8E-07	mg/m^3	--	--	--	2.8E-06	mg/m^3	--	--	--
				Lead	3.49E-06	mg/kg	1.1E-08	mg/m^3	--	--	--	1.8E-07	mg/m^3	--	--	--

TABLE E-4 (RAGS Part D Table 7.2.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Vanadium	4.65E-07	mg/kg	1.5E-09	mg/m^3	--	--	--	2.4E-08	mg/m^3	--	--	--
				Zinc	2.73E-06	mg/kg	9.0E-09	mg/m^3	--	--	--	1.4E-07	mg/m^3	--	--	--
				Chromium, hexavalent	1.43E-07	mg/kg	4.7E-10	mg/m^3	1.2E-01	m^3/mg	5.6E-11	7.3E-09	mg/m^3	1.0E-04	m3/mg	0.000
			Exposure Route Total								**2.0E-10**					**0.0**
		Exposure Point Total									**2.0E-06**					**1.8**
	Exposure Medium Total										**2.0E-06**					**1.8**
Surface Soil Total											**2.0E-06**					**1.8**
							Total of Receptor Risks Across All Media				**2.0E-06**	**Total of Receptor Hazards Across All Media**				**1.8**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-5 (RAGS Part D Table 7.3.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	253	mg/kg	1.25E-04	mg/kg/day	--	--	--	3.9E-04	mg/kg/day	8E-04	mg/kg/day	0.487
				1,2,4-Trichlorobenzene	106	mg/kg	5.24E-05	mg/kg/day	2.9E-02	kg-day/mg	1.52E-06	1.6E-04	mg/kg/day	1E-02	mg/kg/day	0.016
				1,4-Dichlorobenzene	78.5	mg/kg	3.88E-05	mg/kg/day	5.4E-03	kg-day/mg	2.09E-07	1.2E-04	mg/kg/day	7E-02	mg/kg/day	0.002
				Benzene	7.8	mg/kg	3.85E-06	mg/kg/day	5.5E-02	kg-day/mg	2.12E-07	1.2E-05	mg/kg/day	4E-03	mg/kg/day	0.003
				Benzo(a)pyrene	1.11	mg/kg	5.48E-07	mg/kg/day	7.3E+00	kg-day/mg	4.00E-06	1.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	1.78	mg/kg	8.79E-07	mg/kg/day	7.3E-01	kg-day/mg	6.42E-07	2.7E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.2	mg/kg	9.88E-08	mg/kg/day	7.3E+00	kg-day/mg	7.21E-07	3.1E-07	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.86	mg/kg	4.25E-07	mg/kg/day	2.0E+00	kg-day/mg	8.50E-07	1.3E-06	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	3.08E-04	mg/kg	1.52E-10	mg/kg/day	1.5E+05	kg-day/mg	2.28E-05	4.7E-10	mg/kg/day	7E-10	mg/kg/day	0.678
				Antimony	52.6	mg/kg	2.60E-05	mg/kg/day	--	--	--	8.1E-05	mg/kg/day	4E-04	mg/kg/day	0.203
				Arsenic	8.32	mg/kg	4.11E-06	mg/kg/day	1.5E+00	kg-day/mg	6.16E-06	1.3E-05	mg/kg/day	3E-04	mg/kg/day	0.043
				Cobalt	138	mg/kg	6.82E-05	mg/kg/day	--	--	--	2.1E-04	mg/kg/day	3E-04	mg/kg/day	0.709
				Iron	103000	mg/kg	5.09E-02	mg/kg/day	--	--	--	1.6E-01	mg/kg/day	7E-01	mg/kg/day	0.227
				Lead	48400	mg/kg	2.39E-02	mg/kg/day	--	--	--	7.5E-02	mg/kg/day	--	mg/kg/day	--
				Vanadium	949	mg/kg	4.69E-04	mg/kg/day	--	--	--	1.5E-03	mg/kg/day	9E-03	mg/kg/day	0.163
				Zinc	38200	mg/kg	1.89E-02	mg/kg/day	--	--	--	5.9E-02	mg/kg/day	3E-01	mg/kg/day	0.196
				Chromium, hexavalent	1270	mg/kg	6.27E-04	mg/kg/day	5.0E-01	kg-day/mg	3.14E-04	2.0E-03	mg/kg/day	3E-03	mg/kg/day	0.652
			Exposure Route Total								**3.5E-04**					**3.4**
			Dermal Contact	1,2,3-Trichlorobenzene	253	mg/kg	4.27E-04	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	8E-04	mg/kg/day	0.167
				1,2,4-Trichlorobenzene	106	mg/kg	1.79E-04	mg/kg/day	2.90E-02	kg-day/mg	5.19E-06	5.6E-05	mg/kg/day	1E-02	mg/kg/day	0.006
				1,4-Dichlorobenzene	78.5	mg/kg	1.33E-04	mg/kg/day	5.40E-03	kg-day/mg	7.16E-07	4.1E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzene	7.8	mg/kg	1.32E-05	mg/kg/day	5.50E-02	kg-day/mg	7.25E-07	4.1E-05	mg/kg/day	4E-03	mg/kg/day	0.010
				Benzo(a)pyrene	1.11	mg/kg	2.44E-07	mg/kg/day	9.49E-01	kg-day/mg	2.31E-07	7.6E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	1.78	mg/kg	3.91E-07	mg/kg/day	9.49E-02	kg-day/mg	3.71E-08	1.2E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.2	mg/kg	4.39E-08	mg/kg/day	9.49E-01	kg-day/mg	4.17E-08	1.4E-07	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.86	mg/kg	2.03E-07	mg/kg/day	2.80E-01	kg-day/mg	5.69E-08	6.3E-07	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	3.08E-04	mg/kg	1.56E-11	mg/kg/day	4.50E+03	kg-day/mg	7.02E-08	4.9E-11	mg/kg/day	2E-11	mg/kg/day	2.435
				Antimony	52.6	mg/kg	1.33E-05	mg/kg/day	--		--	4.2E-05	mg/kg/day	6E-05	mg/kg/day	0.693
				Arsenic	8.32	mg/kg	4.22E-07	mg/kg/day	4.50E-02	kg-day/mg	1.90E-08	1.3E-06	mg/kg/day	9E-06	mg/kg/day	0.146
				Cobalt	138	mg/kg	2.33E-04	mg/kg/day	--	--	--	7.3E-04	mg/kg/day	3E-04	mg/kg/day	2.424
				Iron	103000	mg/kg	1.74E-01	mg/kg/day	--	--	--	5.4E-01	mg/kg/day	7E-01	mg/kg/day	0.776
				Lead	48400	mg/kg	2.55E-01	mg/kg/day	--	--	--	2.6E-01	mg/kg/day		mg/kg/day	--
				Vanadium	949	mg/kg	4.17E-05	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	2E-04	mg/kg/day	0.650
				Zinc	38200	mg/kg	6.45E-02	mg/kg/day	--	--	--	2.0E-01	mg/kg/day	3E-01	mg/kg/day	0.671
				Chromium, hexavalent	1270	mg/kg	5.36E-05	mg/kg/day	1.25E-02	kg-day/mg	6.70E-07	1.7E-04	mg/kg/day	8E-05	mg/kg/day	2.092
			Exposure Route Total								**7.8E-06**					**10.1**
			Inhalation	1,2,3-Trichlorobenzene	1.81E-07	mg/m^3	1.2E-08	mg/m^3	--	--	--	3.7E-08	mg/m^3	--	--	--
				1,2,4-Trichlorobenzene	7.57E-08	mg/m^3	5.0E-09	mg/m^3	--	--	--	1.6E-08	mg/m^3	2E-03	mg/m^3	0.000
				1,4-Dichlorobenzene	5.61E-08	mg/m^3	3.7E-09	mg/m^3	1.1E-02	m^3/mg	4.1E-11	1.2E-08	mg/m^3	8E-01	mg/m^3	0.000
				Benzene	5.57E-09	mg/m^3	3.7E-10	mg/m^3	7.8E-03	m^3/mg	2.9E-12	1.1E-09	mg/m^3	3E-02	mg/m^3	0.000
				Benzo(a)pyrene	7.93E-10	mg/m^3	5.2E-11	mg/m^3	1.1E+00	m^3/mg	5.7E-11	1.6E-10	mg/m^3	--	--	--
				Benzo(b)fluoranthene	1.27E-09	mg/m^3	8.4E-11	mg/m^3	1.1E-01	m^3/mg	9.2E-12	2.6E-10	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	1.43E-10	mg/m^3	9.4E-12	mg/m^3	1.2E+00	m^3/mg	1.1E-11	2.9E-11	mg/m^3	--	--	--
				PCB-1260	6.14E-10	mg/m^3	4.0E-11	mg/m^3	5.7E-01	m^3/mg	2.3E-11	1.3E-10	mg/m^3	--	--	--
				2,3,7,8-TCDD	2.20E-13	mg/m^3	1.4E-14	mg/m^3	3.8E+04	m^3/mg	5.5E-10	4.5E-14	mg/m^3	4E-08	mg/m^3	0.000
				Antimony	3.76E-08	mg/m^3	2.5E-09	mg/m^3	--	--	--	7.7E-09	mg/m^3	--	--	--
				Arsenic	5.94E-09	mg/m^3	3.9E-10	mg/m^3	4.3E+00	m3/mg	1.7E-09	1.2E-09	mg/m^3	1.5E-05	mg/m^3	--

TABLE E-5 (RAGS Part D Table 7.3.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
				Cobalt	9.86E-08	mg/m^3	6.5E-09	mg/m^3	9.0E-02	m^3/mg	5.8E-10	2.0E-08	mg/m^3	6E-06	mg/m^3	0.003
				Iron	7.36E-05	mg/m^3	4.8E-06	mg/m^3	--	--	--	1.5E-05	mg/m^3	--	--	--
				Lead	3.46E-05	mg/m^3	2.3E-06	mg/m^3	--	--	--	7.1E-06	mg/m^3	--	--	--
				Vanadium	6.78E-07	mg/m^3	4.5E-08	mg/m^3	--	--	--	1.4E-07	mg/m^3	--	--	--
				Zinc	2.73E-05	mg/m^3	1.8E-06	mg/m^3	--	--	--	5.6E-06	mg/m^3	--	--	--
				Chromium, hexavalent	9.07E-07	mg/m^3	6.0E-08	mg/m^3	1.2E-01	m^3/mg	7.2E-09	1.9E-07	mg/m^3	1E-04	mg/m^3	0.002
			Exposure Route Total								**1.0E-08**					**0.0**
		Exposure Point Total									**3.6E-04**					**13.5**
	Exposure Medium Total										**3.6E-04**					**13.5**
Surface Soil Total											**3.6E-04**					**13.5**
							Total of Receptor Risks Across All Media				**3.6E-04**	**Total of Receptor Hazards Across All Media**				**13.5**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-6 (RAGS Part D Table 7.3.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Western Area**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	17.9	mg/kg	3.3E-07	mg/kg/day	--	--	--	5.2E-06	mg/kg/day	8.0E-03	mg/kg/day	0.001
				1,2,4-Trichlorobenzene	34.6	mg/kg	6.4E-07	mg/kg/day	2.9E-02	kg-day/mg	1.9E-08	1.0E-05	mg/kg/day	9.0E-02	mg/kg/day	0.000
				1,4-Dichlorobenzene	30.7	mg/kg	5.7E-07	mg/kg/day	5.4E-03	kg-day/mg	3.1E-09	8.9E-06	mg/kg/day	7.0E-02	mg/kg/day	0.000
				Benzene	0.88	mg/kg	1.6E-08	mg/kg/day	5.5E-02	kg-day/mg	9.0E-10	2.5E-07	mg/kg/day	1.0E-02	mg/kg/day	0.000
				Benzo(a)pyrene	0.58	mg/kg	1.1E-08	mg/kg/day	7.3E+00	kg-day/mg	7.8E-08	1.7E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	0.97	mg/kg	1.8E-08	mg/kg/day	7.3E-01	kg-day/mg	1.3E-08	2.8E-07	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	0.17	mg/kg	3.1E-09	mg/kg/day	7.3E+00	kg-day/mg	2.3E-08	4.9E-08	mg/kg/day	--	mg/kg/day	--
				PCB-1260	0.33	mg/kg	6.1E-09	mg/kg/day	2.0E+00	kg-day/mg	1.2E-08	9.5E-08	mg/kg/day	--	mg/kg/day	--
				2,3,7,8-TCDD	1.85E-04	mg/kg	3.4E-12	mg/kg/day	1.5E+05	kg-day/mg	5.1E-07	5.3E-11	mg/kg/day	7.0E-10	mg/kg/day	0.076
				Antimony	28.9	mg/kg	5.4E-07	mg/kg/day	--	--	--	8.4E-06	mg/kg/day	1.0E+00	mg/kg/day	0.000
				Arsenic	10.2	mg/kg	1.9E-07	mg/kg/day	1.5E+00	kg-day/mg	2.8E-07	2.9E-06	mg/kg/day	3.0E-04	mg/kg/day	0.010
				Cobalt	94.8	mg/kg	1.8E-06	mg/kg/day	--	--	--	2.7E-05	mg/kg/day	3.0E-03	mg/kg/day	0.009
				Iron	76200	mg/kg	1.4E-03	mg/kg/day	--	--	--	2.2E-02	mg/kg/day	7.0E-01	mg/kg/day	0.031
				Lead	4880	mg/kg	9.0E-05	mg/kg/day	--	--	--		mg/kg/day	--	mg/kg/day	--
				Vanadium	651	mg/kg	1.2E-05	mg/kg/day	--	--	--	1.9E-04	mg/kg/day	7.0E-04	mg/kg/day	0.269
				Zinc	3820	mg/kg	7.1E-05	mg/kg/day	--	--	--	1.1E-03	mg/kg/day	3.0E-01	mg/kg/day	0.004
				Chromium, hexavalent	200	mg/kg	3.7E-06	mg/kg/day	5.0E-01	kg-day/mg	1.9E-06	5.8E-05	mg/kg/day	3.0E-03	mg/kg/day	0.019
			Exposure Route Total								**2.8E-06**					**0.4**
			Dermal Contact	1,2,3-Trichlorobenzene	17.9	mg/kg	1.21E-06	mg/kg/day	--	--	--	1.9E-06	mg/kg/day	8E-03	mg/kg/day	0.000
				1,2,4-Trichlorobenzene	34.6	mg/kg	2.34E-06	mg/kg/day	2.90E-02	kg-day/mg	6.78E-08	3.6E-06	mg/kg/day	9E-02	mg/kg/day	0.000
				1,4-Dichlorobenzene	30.7	mg/kg	2.07E-06	mg/kg/day	5.40E-03	kg-day/mg	1.12E-08	3.2E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.88	mg/kg	5.95E-08	mg/kg/day	5.50E-02	kg-day/mg	3.27E-09	9.3E-07	mg/kg/day	1E-02	mg/kg/day	0.000
				Benzo(a)pyrene	0.58	mg/kg	5.09E-09	mg/kg/day	9.49E-01	kg-day/mg	4.84E-09	7.9E-08	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.97	mg/kg	8.52E-09	mg/kg/day	9.49E-02	kg-day/mg	8.09E-10	1.3E-07	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.17	mg/kg	1.49E-09	mg/kg/day	9.49E-01	kg-day/mg	1.42E-09	2.3E-08	mg/kg/day	--	--	--
				PCB-1260	0.33	mg/kg	2.23E-09	mg/kg/day	2.80E-01	kg-day/mg	6.24E-10	4.9E-08	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.85E-04	mg/kg	1.25E-12	mg/kg/day	4.50E+03	kg-day/mg	5.63E-09	5.9E-12	mg/kg/day	2E-11	mg/kg/day	0.293
				Antimony	28.9	mg/kg	1.95E-07	mg/kg/day	--		--	4.6E-06	mg/kg/day	6E-05	mg/kg/day	0.076
				Arsenic	10.2	mg/kg	6.89E-08	mg/kg/day	4.50E-02	kg-day/mg	3.10E-09	3.2E-07	mg/kg/day	9E-06	mg/kg/day	0.036
				Cobalt	94.8	mg/kg	6.41E-07	mg/kg/day	--	--	--	1.0E-04	mg/kg/day	3E-03	mg/kg/day	0.033
				Iron	76200	mg/kg	5.15E-04	mg/kg/day	--	--	--	8.0E-02	mg/kg/day	7E-01	mg/kg/day	0.115
				Lead	4880	mg/kg	5.14E-04	mg/kg/day	--	--	--	--	mg/kg/day	--	--	--
				Vanadium	651	mg/kg	4.40E-06	mg/kg/day	--	--	--	1.8E-05	mg/kg/day	2E-05	mg/kg/day	0.892
				Zinc	3820	mg/kg	2.58E-05	mg/kg/day	--	--	--	4.0E-03	mg/kg/day	3E-01	mg/kg/day	0.013
				Chromium, hexavalent	200	mg/kg	1.35E-06	mg/kg/day	1.25E-02	kg-day/mg	1.69E-08	5.3E-06	mg/kg/day	8E-05	mg/kg/day	0.066
			Exposure Route Total								**1.2E-07**					**1.5**
			Inhalation	1,2,3-Trichlorobenzene	1.28E-08	mg/m^3	1.7E-10	mg/m^3	--	--	--	5.4E-23	mg/kg/day	--	--	--
				1,2,4-Trichlorobenzene	2.47E-08	mg/m^3	3.3E-10	mg/m^3	--	--	--	1.1E-22	mg/kg/day	2.0E-02	m3/mg	0.000
				1,4-Dichlorobenzene	2.19E-08	mg/m^3	2.9E-10	mg/m^3	1.1E-02	m^3/mg	3.2E-12	2.9E-22	mg/kg/day	8.0E-01	m3/mg	0.000
				Benzene	6.29E-10	mg/m^3	8.3E-12	mg/m^3	7.8E-03	m^3/mg	6.5E-14	2.4E-23	mg/kg/day	8.0E-02	m3/mg	0.000
				Benzo(a)pyrene	4.14E-10	mg/m^3	5.5E-12	mg/m^3	1.1E+00	m^3/mg	6.0E-12	6.1E-20	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	6.93E-10	mg/m^3	9.1E-12	mg/m^3	1.1E-01	m^3/mg	1.0E-12	1.0E-19	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	1.21E-10	mg/m^3	1.6E-12	mg/m^3	1.2E+00	m^3/mg	1.9E-12	1.8E-20	mg/kg/day	--	--	--
				PCB-1260	2.36E-10	mg/m^3	3.1E-12	mg/m^3	5.7E-01	m^3/mg	1.8E-12	3.5E-20	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.32E-13	mg/m^3	1.7E-15	mg/m^3	3.8E+04	m^3/mg	6.6E-11	1.9E-23	mg/kg/day	4.0E-08	m3/mg	0.000
				Antimony	2.06E-08	mg/m^3	2.7E-10	mg/m^3	--	--	--	3.0E-18	mg/kg/day	--	--	--
				Arsenic	7.29E-09	mg/m^3	9.6E-11	mg/m^3	4.3E+00	m^3/mg	4.1E-10	1.1E-18	mg/kg/day	1.5E-05	m3/mg	0.000
				Cobalt	6.77E-08	mg/m^3	8.9E-10	mg/m^3	9.0E-02	m^3/mg	8.0E-11	9.9E-18	mg/kg/day	2.0E-05	m3/mg	0.000
				Iron	5.44E-05	mg/m^3	7.2E-07	mg/m^3	--	--	--	8.0E-15	mg/kg/day	--	--	--
				Lead	3.49E-06	mg/m^3	4.6E-08	mg/m^3	--	--	--	5.1E-16	mg/kg/day	--	--	--

TABLE E-6 (RAGS Part D Table 7.3.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Vanadium	4.65E-07	mg/m^3	6.1E-09	mg/m^3	--	--	--	6.8E-17	mg/kg/day	--	--	--
				Zinc	2.73E-06	mg/m^3	3.6E-08	mg/m^3	--	--	--	4.0E-16	mg/kg/day	--	--	--
				Chromium, hexavalent	1.43E-07	mg/m^3	1.9E-09	mg/m^3	1.2E-01	m^3/mg	2.3E-10	2.1E-17	mg/kg/day	1.0E-04	m3/mg	0.000
			Exposure Route Total								**8.0E-10**					**0.0**
		Exposure Point Total									**2.9E-06**					**1.9**
	Exposure Medium Total										**2.9E-06**					**1.9**
Surface Soil Total											**2.9E-06**					**1.9**
							Total of Receptor Risks Across All Media				**2.9E-06**	**Total of Receptor Hazards Across All Media**				**1.9**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-7 (RAGS Part D Table 7.4.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN AREA - SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	150000	mg/kg	3.29E-02	mg/kg/day	2.90E-02	kg-day/mg	9.55E-04	1.0E-01	mg/kg/day	1E-02	mg/kg/day	10.274
				1,2-Dichlorobenzene	4560	mg/kg	1.00E-03	mg/kg/day	--	--	--	3.1E-03	mg/kg/day	9E-02	mg/kg/day	0.035
				1,3-Dichlorobenzene	1140	mg/kg	2.50E-04	mg/kg/day	--	--	--	7.8E-04	mg/kg/day	9E-02	mg/kg/day	0.009
				1,4-Dichlorobenzene	1681	mg/kg	3.69E-04	mg/kg/day	5.40E-03	kg-day/mg	1.99E-06	1.2E-03	mg/kg/day	7E-02	mg/kg/day	0.016
				Benzo(a)anthracene	6.9	mg/kg	1.51E-06	mg/kg/day	7.30E-01	kg-day/mg	1.11E-06	4.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	20.4	mg/kg	4.48E-06	mg/kg/day	7.30E+00	kg-day/mg	3.27E-05	1.4E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	22.4	mg/kg	4.92E-06	mg/kg/day	7.30E-01	kg-day/mg	3.59E-06	1.5E-05	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	3.1	mg/kg	6.81E-07	mg/kg/day	7.30E+00	kg-day/mg	4.97E-06	2.1E-06	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	83.2	mg/kg	1.83E-05	mg/kg/day	1.60E+00	kg-day/mg	2.92E-05	5.7E-05	mg/kg/day	8E-04	mg/kg/day	0.071
				Indeno(1,2,3-cd)pyrene	13	mg/kg	2.85E-06	mg/kg/day	7.30E-01	kg-day/mg	2.08E-06	8.9E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	189	mg/kg	4.15E-05	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	2E-02	mg/kg/day	0.006
				PCB-1248	1.43	mg/kg	3.14E-07	mg/kg/day	2.00E+00	kg-day/mg	6.28E-07	9.8E-07	mg/kg/day	--	mg/kg/day	--
				PCB-1254	0.56	mg/kg	1.23E-07	mg/kg/day	2.00E+00	kg-day/mg	2.46E-07	3.8E-07	mg/kg/day	2E-05	mg/kg/day	0.019
				2,3,7,8-TCDD	0.00052	mg/kg	1.14E-10	mg/kg/day	1.50E+05	kg-day/mg	1.71E-05	3.6E-10	mg/kg/day	7E-10	mg/kg/day	0.509
				Chromium, hexavalent	195	mg/kg	4.28E-05	mg/kg/day	5.00E-01	kg-day/mg	2.14E-05	1.3E-04	mg/kg/day	3E-03	mg/kg/day	0.045
			Exposure Route Total								**1.1E-03**					**10.9**
			Dermal Contact	1,2,4-Trichlorobenzene	150000	mg/kg	1.13E-01	mg/kg/day	2.90E-02	kg-day/mg	3.27E-03	3.5E-02	mg/kg/day	1E-02	mg/kg/day	3.514
				1,2-Dichlorobenzene	4560	mg/kg	3.42E-03	mg/kg/day	--	--	--	1.1E-03	mg/kg/day	9E-02	mg/kg/day	0.012
				1,3-Dichlorobenzene	1140	mg/kg	8.56E-04	mg/kg/day	--	--	--	2.7E-04	mg/kg/day	9E-02	mg/kg/day	0.003
				1,4-Dichlorobenzene	1681	mg/kg	1.26E-03	mg/kg/day	5.40E-03	kg-day/mg	6.82E-06	3.9E-04	mg/kg/day	7E-02	mg/kg/day	0.006
				Benzo(a)anthracene	6.9	mg/kg	6.73E-07	mg/kg/day	9.49E-02	kg-day/mg	6.39E-08	2.1E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	20.4	mg/kg	1.99E-06	mg/kg/day	9.49E-01	kg-day/mg	1.89E-06	6.2E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	22.4	mg/kg	2.19E-06	mg/kg/day	9.49E-02	kg-day/mg	2.07E-07	6.8E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	3.1	mg/kg	3.03E-07	mg/kg/day	9.49E-01	kg-day/mg	2.87E-07	9.4E-07	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	83.2	mg/kg	8.12E-06	mg/kg/day	1.60E-01	kg-day/mg	1.30E-06	1.9E-05	mg/kg/day	8E-05	mg/kg/day	0.244
				Indeno(1,2,3-cd)pyrene	13	mg/kg	1.27E-06	mg/kg/day	9.49E-02	kg-day/mg	1.20E-07	4.0E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	189	mg/kg	1.84E-05	mg/kg/day	--	--	--	5.8E-05	mg/kg/day	3E-03	mg/kg/day	0.019
				PCB-1248	1.43	mg/kg	1.50E-07	mg/kg/day	2.80E-01	kg-day/mg	4.21E-08	4.7E-07	mg/kg/day	--	mg/kg/day	--
				PCB-1254	0.56	mg/kg	5.89E-08	mg/kg/day	2.80E-01	kg-day/mg	1.65E-08	1.8E-07	mg/kg/day	3E-06	mg/kg/day	0.061
				2,3,7,8-TCDD	0.00052	mg/kg	1.17E-11	mg/kg/day	4.50E+03	kg-day/mg	5.27E-08	3.7E-11	mg/kg/day	2E-11	mg/kg/day	1.827
				Chromium, hexavalent	195	mg/kg	3.66E-06	mg/kg/day	1.25E-02	kg-day/mg	4.58E-08	1.1E-05	mg/kg/day	8E-05	mg/kg/day	0.143
			Exposure Route Total								**3.3E-03**					**5.8**
			Inhalation of Dust and Particulates	1,2,4-Trichlorobenzene	1.07E-04	mg/m³	3.14E-07	mg/m³	--	--	--	4.9E-06	mg/m³	2E-03	mg/m³	0.000
				1,2-Dichlorobenzene	3.26E-06	mg/m³	9.53E-09	mg/m³	--	--	--	1.5E-07	mg/m³	2E-01	mg/m³	0.000
				1,3-Dichlorobenzene	8.14E-07	mg/m³	2.38E-09	mg/m³	--	--	--	3.7E-08	mg/m³	2E-01	mg/m³	0.000
				1,4-Dichlorobenzene	1.20E-06	mg/m³	3.51E-09	mg/m³	1.1E-02	m³/mg	3.87E-11	5.5E-08	mg/m³	8E-01	mg/m³	0.000
				Benzo(a)anthracene	4.93E-09	mg/m³	1.44E-11	mg/m³	1.1E-01	m³/mg	1.59E-12	2.3E-10	mg/m³	--	mg/m³	--
				Benzo(a)pyrene	1.46E-08	mg/m³	4.27E-11	mg/m³	1.1E+00	m³/mg	4.69E-11	6.7E-10	mg/m³	--	mg/m³	--
				Benzo(b)fluoranthene	1.60E-08	mg/m³	4.68E-11	mg/m³	1.1E-01	m³/mg	5.15E-12	7.3E-10	mg/m³	--	mg/m³	--
				Dibenz(a,h)anthracene	2.21E-09	mg/m³	6.48E-12	mg/m³	1.2E+00	m³/mg	7.78E-12	1.0E-10	mg/m³	--	mg/m³	--
				Hexachlorobenzene	5.94E-08	mg/m³	1.74E-10	mg/m³	4.6E-01	m³/mg	8.00E-11	2.7E-09	mg/m³	--	mg/m³	--
				Indeno(1,2,3-cd)pyrene	9.29E-09	mg/m³	2.72E-11	mg/m³	1.1E-01	m³/mg	2.99E-12	4.2E-10	mg/m³	--	mg/m³	--
				Naphthalene	1.35E-07	mg/m³	3.95E-10	mg/m³	3.4E-02	m³/mg	1.34E-11	6.2E-09	mg/m³	3E-03	mg/m³	0.000
				PCB-1248	1.02E-09	mg/m³	2.99E-12	mg/m³	5.7E-01	m³/mg	1.70E-12	4.7E-11	mg/m³	--	mg/m³	--
				PCB-1254	4.00E-10	mg/m³	1.17E-12	mg/m³	5.7E-01	m³/mg	6.67E-13	1.8E-11	mg/m³	--	mg/m³	--
				2,3,7,8-TCDD	3.71E-13	mg/m³	1.09E-15	mg/m³	3.8E+04	m³/mg	4.13E-11	1.7E-14	mg/m³	4E-08	mg/m³	0.000
				Chromium, hexavalent	1.39E-07	mg/m³	4.08E-10	mg/m³	1.2E+01	m³/mg	4.89E-09	6.4E-09	mg/m³	1E-04	mg/m³	0.000
			Exposure Route Total								**5.1E-09**					**0.0**
		Exposure Point Total									**4.3E-03**					**16.8**
	Exposure Medium Total										**4.3E-03**					**16.8**
Surface Soil Total											**4.3E-03**					**16.8**
							Total of Receptor Risks Across All Media				**4.3E-03**	**Total of Receptor Hazards Across All Media**				**16.8**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-6 for supporting calculations.

TABLE E-8 (RAGS Part D Table 7.4.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN AREA - SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**On-Site Visitor**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	31000	mg/kg	8.5E-05	mg/kg/day	2.90E-02	kg-day/mg	2.5E-06	1.3E-03	mg/kg/day	9E-02	mg/kg/day	0.015
				1,2-Dichlorobenzene	1450	mg/kg	4.0E-06	mg/kg/day	--	--	--	6.2E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	386	mg/kg	1.1E-06	mg/kg/day	--	--	--	1.7E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	849	mg/kg	2.3E-06	mg/kg/day	5.40E-03	kg-day/mg	1.3E-08	3.6E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzo(a)anthracene	12.5	mg/kg	3.4E-08	mg/kg/day	7.30E-01	kg-day/mg	2.5E-08	5.4E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	9.4	mg/kg	2.6E-08	mg/kg/day	7.30E+00	kg-day/mg	1.9E-07	4.0E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	16.9	mg/kg	4.6E-08	mg/kg/day	7.30E-01	kg-day/mg	3.4E-08	7.2E-07	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	4.37	mg/kg	1.2E-08	mg/kg/day	7.30E+00	kg-day/mg	8.8E-08	1.9E-07	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	40.7	mg/kg	1.1E-07	mg/kg/day	1.60E+00	kg-day/mg	1.8E-07	1.7E-06	mg/kg/day	1E-05	mg/kg/day	0.174
				Indeno(1,2,3-cd)pyrene	10.7	mg/kg	2.9E-08	mg/kg/day	7.30E-01	kg-day/mg	2.1E-08	4.6E-07	mg/kg/day	--	mg/kg/day	--
				Naphthalene	58.2	mg/kg	1.6E-07	mg/kg/day	--	--	--	2.5E-06	mg/kg/day	2E-02	mg/kg/day	0.000
				PCB-1248	0.73	mg/kg	2.0E-09	mg/kg/day	2.00E+00	kg-day/mg	4.0E-09	3.1E-08	mg/kg/day		mg/kg/day	--
				PCB-1254	0.32	mg/kg	8.8E-10	mg/kg/day	2.00E+00	kg-day/mg	1.8E-09	1.4E-08	mg/kg/day	2E-05	mg/kg/day	0.001
				2,3,7,8-TCDD	0.00041	mg/kg	1.1E-12	mg/kg/day	1.50E+05	kg-day/mg	1.7E-07	1.8E-11	mg/kg/day	7E-10	mg/kg/day	0.025
				Chromium, hexavalent	52.4	mg/kg	1.4E-07	mg/kg/day	5.00E-01	kg-day/mg	7.2E-08	2.2E-06	mg/kg/day	3E-03	mg/kg/day	0.001
			Exposure Route Total								**3.3E-06**					**0.2**
			Dermal Contact	1,2,4-Trichlorobenzene	31000	mg/kg	4.65E-04	mg/kg/day	2.90E-02	kg-day/mg	1.35E-05	7.3E-04	mg/kg/day	9E-02	mg/kg/day	0.008
				1,2-Dichlorobenzene	1450	mg/kg	2.18E-05	mg/kg/day	--	--	--	3.4E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	386	mg/kg	5.80E-06	mg/kg/day	--	--	--	9.0E-06	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	849	mg/kg	1.27E-05	mg/kg/day	5.40E-03	kg-day/mg	6.88E-08	2.0E-05	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzo(a)anthracene	12.5	mg/kg	2.44E-08	mg/kg/day	9.49E-02	kg-day/mg	2.32E-09	3.8E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	9.4	mg/kg	1.83E-08	mg/kg/day	9.49E-01	kg-day/mg	1.74E-08	2.9E-07	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	16.9	mg/kg	3.30E-08	mg/kg/day	9.49E-02	kg-day/mg	3.13E-09	5.1E-07	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	4.37	mg/kg	8.53E-09	mg/kg/day	9.49E-01	kg-day/mg	8.10E-09	1.3E-07	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	40.7	mg/kg	6.11E-08	mg/kg/day	1.60E-01	kg-day/mg	9.78E-09	9.5E-07	mg/kg/day	1E-06	mg/kg/day	0.953
				Indeno(1,2,3-cd)pyrene	10.7	mg/kg	2.09E-08	mg/kg/day	9.49E-02	kg-day/mg	1.98E-09	3.3E-07	mg/kg/day	--	mg/kg/day	--
				Naphthalene	58.2	mg/kg	1.14E-07	mg/kg/day	--	--	--	1.8E-06	mg/kg/day	3E-03	mg/kg/day	0.001
				PCB-1248	0.73	mg/kg	1.53E-09	mg/kg/day	2.80E-01	kg-day/mg	4.30E-10	2.4E-08	mg/kg/day		mg/kg/day	--
				PCB-1254	0.32	mg/kg	6.73E-10	mg/kg/day	2.80E-01	kg-day/mg	1.88E-10	1.0E-08	mg/kg/day	3E-06	mg/kg/day	0.003
				2,3,7,8-TCDD	0.00041	mg/kg	1.85E-13	mg/kg/day	4.50E+03	kg-day/mg	8.31E-10	2.9E-12	mg/kg/day	2E-11	mg/kg/day	0.144
				Chromium, hexavalent	52.4	mg/kg	1.97E-08	mg/kg/day	1.25E-02	kg-day/mg	2.46E-10	3.1E-07	mg/kg/day	8E-05	mg/kg/day	0.004
			Exposure Route Total								**1.4E-05**					**1.1**
			Inhalation of Dust and Particulates	1,2,4-Trichlorobenzene	2.21E-05	mg/m^3	6.5E-08	mg/m^3	--	m^3/mg	--	1.0E-06	mg/m^3	2E-02	mg/m^3	0.001
				1,2-Dichlorobenzene	1.04E-06	mg/m^3	3.0E-09	mg/m^3	--	m^3/mg	--	4.7E-08	mg/m^3	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	2.76E-07	mg/m^3	8.1E-10	mg/m^3	--	m^3/mg	--	1.3E-08	mg/m^3	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	6.06E-07	mg/m^3	1.8E-09	mg/m^3	1.1E-02	m^3/mg	2.0E-11	2.8E-08	mg/m^3	8E-01	mg/m^3	0.000
				Benzo(a)anthracene	8.93E-09	mg/m^3	2.6E-11	mg/m^3	1.1E-01	m^3/mg	2.9E-12	4.1E-10	mg/m^3	--	mg/m^3	--
				Benzo(a)pyrene	6.71E-09	mg/m^3	2.0E-11	mg/m^3	1.1E+00	m^3/mg	2.2E-11	3.1E-10	mg/m^3	--	mg/m^3	--
				Benzo(b)fluoranthene	1.21E-08	mg/m^3	3.5E-11	mg/m^3	1.1E-01	m^3/mg	3.9E-12	5.5E-10	mg/m^3	--	mg/m^3	--
				Dibenz(a,h)anthracene	3.12E-09	mg/m^3	9.1E-12	mg/m^3	1.2E+00	m^3/mg	1.1E-11	1.4E-10	mg/m^3	--	mg/m^3	--
				Hexachlorobenzene	2.91E-08	mg/m^3	8.5E-11	mg/m^3	4.6E-01	m^3/mg	3.9E-11	1.3E-09	mg/m^3	--	mg/m^3	--
				Indeno(1,2,3-cd)pyrene	7.64E-09	mg/m^3	2.2E-11	mg/m^3	1.1E-01	m^3/mg	2.5E-12	3.5E-10	mg/m^3	--	mg/m^3	--
				Naphthalene	4.16E-08	mg/m^3	1.2E-10	mg/m^3	3.4E-02	m^3/mg	4.1E-12	1.9E-09	mg/m^3	3E-03	mg/m^3	0.000
				PCB-1248	5.21E-10	mg/m^3	1.5E-12	mg/m^3	5.7E-01	m^3/mg	8.7E-13	2.4E-11	mg/m^3	--	mg/m^3	--
				PCB-1254	2.29E-10	mg/m^3	6.7E-13	mg/m^3	5.7E-01	m^3/mg	3.8E-13	1.0E-11	mg/m^3	--	mg/m^3	--
				2,3,7,8-TCDD	2.93E-13	mg/m^3	8.6E-16	mg/m^3	3.8E+04	m^3/mg	3.3E-11	1.3E-14	mg/m^3	4E-08	mg/m^3	0.000
				Chromium, hexavalent	3.74E-08	mg/m^3	1.1E-10	mg/m^3	1.2E+01	m^3/mg	1.3E-09	1.7E-09	mg/m^3	1E-04	mg/m^3	0.000
			Exposure Route Total								**1.5E-09**					**0.0**
		Exposure Point Total									**1.7E-05**					**1.3**
	Exposure Medium Total										**1.7E-05**					**1.3**
Surface Soil Total											**1.7E-05**					**1.3**
							Total of Receptor Risks Across All Media				**1.7E-05**	**Total of Receptor Hazards Across All Media**				**1.3**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-6 for supporting calculations.

TABLE E-9 (RAGS Part D Table 7.5.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN AREA - SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	150000	mg/kg	7.41E-02	mg/kg/day	2.90E-02	kg-day/mg	2.15E-03	2.3E-01	mg/kg/day	1E-02	mg/kg/day	23.116
				1,2-Dichlorobenzene	4560	mg/kg	2.25E-03	mg/kg/day	--	--	--	7.0E-03	mg/kg/day	9E-02	mg/kg/day	0.078
				1,3-Dichlorobenzene	1140	mg/kg	5.63E-04	mg/kg/day	--	--	--	1.8E-03	mg/kg/day	9E-02	mg/kg/day	0.020
				1,4-Dichlorobenzene	1681	mg/kg	8.30E-04	mg/kg/day	5.40E-03	kg-day/mg	4.48E-06	2.6E-03	mg/kg/day	7E-02	mg/kg/day	0.037
				Benzo(a)anthracene	6.9	mg/kg	3.41E-06	mg/kg/day	7.30E-01	kg-day/mg	2.49E-06	1.1E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	20.4	mg/kg	1.01E-05	mg/kg/day	7.30E+00	kg-day/mg	7.36E-05	3.1E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	22.4	mg/kg	1.11E-05	mg/kg/day	7.30E-01	kg-day/mg	8.08E-06	3.5E-05	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	3.1	mg/kg	1.53E-06	mg/kg/day	7.30E+00	kg-day/mg	1.12E-05	4.8E-06	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	83.2	mg/kg	4.11E-05	mg/kg/day	1.60E+00	kg-day/mg	6.58E-05	1.3E-04	mg/kg/day	8E-04	mg/kg/day	0.160
				Indeno(1,2,3-cd)pyrene	13	mg/kg	6.42E-06	mg/kg/day	7.30E-01	kg-day/mg	4.69E-06	2.0E-05	mg/kg/day	--	mg/kg/day	--
				Naphthalene	189	mg/kg	9.34E-05	mg/kg/day	--	--	--	2.9E-04	mg/kg/day	2E-02	mg/kg/day	0.015
				PCB-1248	1.43	mg/kg	7.06E-07	mg/kg/day	2.00E+00	kg-day/mg	1.41E-06	2.2E-06	mg/kg/day	--	mg/kg/day	--
				PCB-1254	0.56	mg/kg	2.77E-07	mg/kg/day	2.00E+00	kg-day/mg	5.53E-07	8.6E-07	mg/kg/day	2E-05	mg/kg/day	0.043
				2,3,7,8-TCDD	0.00052	mg/kg	2.57E-10	mg/kg/day	1.50E+05	kg-day/mg	3.85E-05	8.0E-10	mg/kg/day	7E-10	mg/kg/day	1.145
				Chromium, hexavalent	195	mg/kg	9.63E-05	mg/kg/day	5.00E-01	kg-day/mg	4.82E-05	3.0E-04	mg/kg/day	3E-03	mg/kg/day	0.100
			Exposure Route Total								**2.4E-03**					**25**
			Dermal Contact	1,2,4-Trichlorobenzene	150000	mg/kg	2.53E-01	mg/kg/day	2.90E-02	kg-day/mg	7.35E-03	7.9E-02	mg/kg/day	1E-02	mg/kg/day	7.906
				1,2-Dichlorobenzene	4560	mg/kg	7.70E-03	mg/kg/day	--	--	--	2.4E-03	mg/kg/day	9E-02	mg/kg/day	0.027
				1,3-Dichlorobenzene	1140	mg/kg	1.93E-03	mg/kg/day	--	--	--	6.0E-04	mg/kg/day	9E-02	mg/kg/day	0.007
				1,4-Dichlorobenzene	1681	mg/kg	2.84E-03	mg/kg/day	5.40E-03	kg-day/mg	1.53E-05	8.9E-04	mg/kg/day	7E-02	mg/kg/day	0.013
				Benzo(a)anthracene	6.9	mg/kg	1.52E-06	mg/kg/day	9.49E-02	kg-day/mg	1.44E-07	4.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	20.4	mg/kg	4.48E-06	mg/kg/day	9.49E-01	kg-day/mg	4.25E-06	1.4E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	22.4	mg/kg	4.92E-06	mg/kg/day	9.49E-02	kg-day/mg	4.67E-07	1.5E-05	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	3.1	mg/kg	6.81E-07	mg/kg/day	9.49E-01	kg-day/mg	6.46E-07	2.1E-06	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	83.2	mg/kg	1.83E-05	mg/kg/day	1.60E-01	kg-day/mg	2.92E-06	4.4E-05	mg/kg/day	8E-05	mg/kg/day	0.548
				Indeno(1,2,3-cd)pyrene	13	mg/kg	2.85E-06	mg/kg/day	9.49E-02	kg-day/mg	2.71E-07	8.9E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	189	mg/kg	4.15E-05	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	3E-03	mg/kg/day	0.043
				PCB-1248	1.43	mg/kg	3.38E-07	mg/kg/day	2.80E-01	kg-day/mg	9.47E-08	1.1E-06	mg/kg/day	--	mg/kg/day	--
				PCB-1254	0.56	mg/kg	1.32E-07	mg/kg/day	2.80E-01	kg-day/mg	3.71E-08	4.1E-07	mg/kg/day	3E-06	mg/kg/day	0.138
				2,3,7,8-TCDD	0.00052	mg/kg	2.64E-11	mg/kg/day	4.50E+03	kg-day/mg	1.19E-07	8.2E-11	mg/kg/day	2E-11	mg/kg/day	4.111
				Chromium, hexavalent	195	mg/kg	8.24E-06	mg/kg/day	1.25E-02	kg-day/mg	1.03E-07	2.6E-05	mg/kg/day	8E-05	mg/kg/day	0.321
			Exposure Route Total								**7.4E-03**					**13**
			Inhalation of Dust and Particulates	1,2,4-Trichlorobenzene	1.07E-04	mg/m³	3.53E-06	mg/m³	--	m³/mg	--	1.1E-05	mg/m³	2E-03	mg/m³	0.002
				1,2-Dichlorobenzene	3.26E-06	mg/m³	1.07E-07	mg/m³	--	m³/mg	--	3.3E-07	mg/m³	2E-01	mg/m³	0.000
				1,3-Dichlorobenzene	8.14E-07	mg/m³	2.68E-08	mg/m³	--	m³/mg	--	8.4E-08	mg/m³	2E-01	mg/m³	0.000
				1,4-Dichlorobenzene	1.20E-06	mg/m³	3.95E-08	mg/m³	1.1E-02	m³/mg	4.35E-10	1.2E-07	mg/m³	8E-01	mg/m³	0.000
				Benzo(a)anthracene	4.93E-09	mg/m³	1.62E-10	mg/m³	1.1E-01	m³/mg	1.79E-11	5.1E-10	mg/m³	--	mg/m³	--
				Benzo(a)pyrene	1.46E-08	mg/m³	4.80E-10	mg/m³	1.1E+00	m³/mg	5.28E-10	1.5E-09	mg/m³	--	mg/m³	--
				Benzo(b)fluoranthene	1.60E-08	mg/m³	5.27E-10	mg/m³	1.1E-01	m³/mg	5.80E-11	1.6E-09	mg/m³	--	mg/m³	--
				Dibenz(a,h)anthracene	2.21E-09	mg/m³	7.29E-11	mg/m³	1.2E+00	m³/mg	8.75E-11	2.3E-10	mg/m³	--	mg/m³	--
				Hexachlorobenzene	5.94E-08	mg/m³	1.96E-09	mg/m³	4.6E-01	m³/mg	9.00E-10	6.1E-09	mg/m³	--	mg/m³	--
				Indeno(1,2,3-cd)pyrene	9.29E-09	mg/m³	3.06E-10	mg/m³	1.1E-01	m³/mg	3.36E-11	9.5E-10	mg/m³	--	mg/m³	--
				Naphthalene	1.35E-07	mg/m³	4.45E-09	mg/m³	3.4E-02	m³/mg	1.51E-10	1.4E-08	mg/m³	3E-03	mg/m³	0.000
				PCB-1248	1.02E-09	mg/m³	3.36E-11	mg/m³	5.7E-01	m³/mg	1.92E-11	1.0E-10	mg/m³	--	mg/m³	--
				PCB-1254	4.00E-10	mg/m³	1.32E-11	mg/m³	5.7E-01	m³/mg	7.51E-12	4.1E-11	mg/m³	--	mg/m³	--
				2,3,7,8-TCDD	3.71E-13	mg/m³	1.22E-14	mg/m³	3.8E+04	m³/mg	4.65E-10	3.8E-14	mg/m³	4E-08	mg/m³	0.000
				Chromium, hexavalent	1.39E-07	mg/m³	4.59E-09	mg/m³	1.2E+01	mg/m³	5.50E-08	1.4E-08	mg/m³	1E-04	mg/m³	0.000
			Exposure Route Total								**5.8E-08**					**0.0**
		Exposure Point Total									**9.8E-03**					**37.7**
	Exposure Medium Total										**9.8E-03**					**37.7**
Surface Soil Total											**9.8E-03**					**37.7**
							Total of Receptor Risks Across All Media				**9.8E-03**	**Total of Receptor Hazards Across All Media**				**37.7**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-6 for supporting calculations.

TABLE E-10 (RAGS Part D Table 7.5.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN AREA - SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**HCTS Operator**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	31000	mg/kg	3.8E-04	mg/kg/day	2.90E-02	kg-day/mg	1.1E-05	6.0E-03	mg/kg/day	9E-02	mg/kg/day	0.066
				1,2-Dichlorobenzene	1450	mg/kg	1.8E-05	mg/kg/day	--	--	--	2.8E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	386	mg/kg	4.8E-06	mg/kg/day	--	--	--	7.4E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	849	mg/kg	1.0E-05	mg/kg/day	5.40E-03	kg-day/mg	5.7E-08	1.6E-04	mg/kg/day	7E-02	mg/kg/day	0.002
				Benzo(a)anthracene	12.5	mg/kg	1.5E-07	mg/kg/day	7.30E-01	kg-day/mg	1.1E-07	2.4E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	9.4	mg/kg	1.2E-07	mg/kg/day	7.30E+00	kg-day/mg	8.5E-07	1.8E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	16.9	mg/kg	2.1E-07	mg/kg/day	7.30E-01	kg-day/mg	1.5E-07	3.3E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	4.37	mg/kg	5.4E-08	mg/kg/day	7.30E+00	kg-day/mg	3.9E-07	8.4E-07	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	40.7	mg/kg	5.0E-07	mg/kg/day	1.60E+00	kg-day/mg	8.0E-07	7.8E-06	mg/kg/day	1E-05	mg/kg/day	0.784
				Indeno(1,2,3-cd)pyrene	10.7	mg/kg	1.3E-07	mg/kg/day	7.30E-01	kg-day/mg	9.6E-08	2.1E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	58.2	mg/kg	7.2E-07	mg/kg/day	--	--	--	1.1E-05	mg/kg/day	2E-02	mg/kg/day	0.001
				PCB-1248	0.73	mg/kg	9.0E-09	mg/kg/day	2.00E+00	kg-day/mg	1.8E-08	1.4E-07	mg/kg/day		mg/kg/day	--
				PCB-1254	0.32	mg/kg	4.0E-09	mg/kg/day	2.00E+00	kg-day/mg	7.9E-09	6.2E-08	mg/kg/day	2E-05	mg/kg/day	0.003
				2,3,7,8-TCDD	0.00041	mg/kg	5.1E-12	mg/kg/day	1.50E+05	kg-day/mg	7.6E-07	7.9E-11	mg/kg/day	7E-10	mg/kg/day	0.113
				Chromium, hexavalent	52.4	mg/kg	6.5E-07	mg/kg/day	5.00E-01	kg-day/mg	3.2E-07	1.0E-05	mg/kg/day	3E-03	mg/kg/day	0.003
			Exposure Route Total								**1.5E-05**					**1.0**
			Dermal Contact	1,2,4-Trichlorobenzene	31000	mg/kg	2.09E-03	mg/kg/day	2.90E-02	kg-day/mg	6.07E-05	3.3E-03	mg/kg/day	9E-02	mg/kg/day	0.036
				1,2-Dichlorobenzene	1450	mg/kg	9.80E-05	mg/kg/day	--	--	--	1.5E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	386	mg/kg	2.61E-05	mg/kg/day	--	--	--	4.1E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	849	mg/kg	5.74E-05	mg/kg/day	5.40E-03	kg-day/mg	3.10E-07	8.9E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzo(a)anthracene	12.5	mg/kg	1.10E-07	mg/kg/day	9.49E-02	kg-day/mg	1.04E-08	1.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	9.4	mg/kg	8.26E-08	mg/kg/day	9.49E-01	kg-day/mg	7.84E-08	1.3E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	16.9	mg/kg	1.48E-07	mg/kg/day	9.49E-02	kg-day/mg	1.41E-08	2.3E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	4.37	mg/kg	3.84E-08	mg/kg/day	9.49E-01	kg-day/mg	3.64E-08	6.0E-07	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	40.7	mg/kg	2.75E-07	mg/kg/day	1.60E-01	kg-day/mg	4.40E-08	4.3E-06	mg/kg/day	1E-06	mg/kg/day	4.290
				Indeno(1,2,3-cd)pyrene	10.7	mg/kg	9.40E-08	mg/kg/day	9.49E-02	kg-day/mg	8.92E-09	1.5E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	58.2	mg/kg	5.11E-07	mg/kg/day	--	--	--	8.0E-06	mg/kg/day	3E-03	mg/kg/day	0.003
				PCB-1248	0.73	mg/kg	6.91E-09	mg/kg/day	2.80E-01	kg-day/mg	1.93E-09	1.1E-07	mg/kg/day		mg/kg/day	--
				PCB-1254	0.32	mg/kg	3.03E-09	mg/kg/day	2.80E-01	kg-day/mg	8.48E-10	4.7E-08	mg/kg/day	3E-06	mg/kg/day	0.016
				2,3,7,8-TCDD	0.00041	mg/kg	8.31E-13	mg/kg/day	4.50E+03	kg-day/mg	3.74E-09	1.3E-11	mg/kg/day	2E-11	mg/kg/day	0.648
				Chromium, hexavalent	52.4	mg/kg	8.85E-08	mg/kg/day	1.25E-02	kg-day/mg	1.11E-09	1.4E-06	mg/kg/day	1E-04	mg/kg/day	0.014
			Exposure Route Total								**6.1E-05**					**5.0**
			Inhalation of Dust and Particulates	1,2,4-Trichlorobenzene	2.21E-05	mg/m^3	7.3E-08	mg/m^3	--	m^3/mg	--	1.1E-06	mg/m^3	2E-02	mg/m^3	0.001
				1,2-Dichlorobenzene	1.04E-06	mg/m^3	3.4E-09	mg/m^3	--	m^3/mg	--	5.3E-08	mg/m^3	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	2.76E-07	mg/m^3	9.1E-10	mg/m^3	--	m^3/mg	--	1.4E-08	mg/m^3	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	6.06E-07	mg/m^3	2.0E-09	mg/m^3	1.1E-02	m^3/mg	2.2E-11	3.1E-08	mg/m^3	8E-01	mg/m^3	0.000
				Benzo(a)anthracene	8.93E-09	mg/m^3	2.9E-11	mg/m^3	1.1E-01	m^3/mg	3.2E-12	4.6E-10	mg/m^3	--	mg/m^3	--
				Benzo(a)pyrene	6.71E-09	mg/m^3	2.2E-11	mg/m^3	1.1E+00	m^3/mg	2.4E-11	3.4E-10	mg/m^3	--	mg/m^3	--
				Benzo(b)fluoranthene	1.21E-08	mg/m^3	4.0E-11	mg/m^3	1.1E-01	m^3/mg	4.4E-12	6.2E-10	mg/m^3	--	mg/m^3	--
				Dibenz(a,h)anthracene	3.12E-09	mg/m^3	1.0E-11	mg/m^3	1.2E+00	m^3/mg	1.2E-11	1.6E-10	mg/m^3	--	mg/m^3	--
				Hexachlorobenzene	2.91E-08	mg/m^3	9.6E-11	mg/m^3	4.6E-01	m^3/mg	4.4E-11	1.5E-09	mg/m^3	--	mg/m^3	--
				Indeno(1,2,3-cd)pyrene	7.64E-09	mg/m^3	2.5E-11	mg/m^3	1.1E-01	m^3/mg	2.8E-12	3.9E-10	mg/m^3	--	mg/m^3	--
				Naphthalene	4.16E-08	mg/m^3	1.4E-10	mg/m^3	3.4E-02	m^3/mg	4.7E-12	2.1E-09	mg/m^3	3E-03	mg/m^3	0.000
				PCB-1248	5.21E-10	mg/m^3	1.7E-12	mg/m^3	5.7E-01	m^3/mg	9.8E-13	2.7E-11	mg/m^3	--	mg/m^3	--
				PCB-1254	2.29E-10	mg/m^3	7.5E-13	mg/m^3	5.7E-01	m^3/mg	4.3E-13	1.2E-11	mg/m^3	--	mg/m^3	--
				2,3,7,8-TCDD	2.93E-13	mg/m^3	9.6E-16	mg/m^3	3.8E+04	m^3/mg	3.7E-11	1.5E-14	mg/m^3	4E-08	mg/m^3	0.000
				Chromium, hexavalent	3.74E-08	mg/m^3	1.2E-10	m^3/mg	1.2E+01	m^3/mg	1.5E-09	1.9E-09	mg/m^3	1E-04	mg/m^3	0.000
			Exposure Route Total								**1.6E-09**					**0**
		Exposure Point Total									**7.6E-05**					**6**
	Exposure Medium Total										**7.6E-05**					**6**
Surface Soil Total											**7.6E-05**					**6**
							Total of Receptor Risks Across All Media				**7.6E-05**	**Total of Receptor Hazards Across All Media**				**6**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-6 for supporting calculations.

TABLE E-11 (RAGS Part D Table 7.6.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN AREA - SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations				Cancer Risk	Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk			Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	150000	mg/kg	7.41E-02	mg/kg/day	2.90E-02	kg-day/mg	2.15E-03	2.3E-01	mg/kg/day	1E-02	mg/kg/day	23.116
				1,2-Dichlorobenzene	4560	mg/kg	2.25E-03	mg/kg/day	--	--	--	7.0E-03	mg/kg/day	9E-02	mg/kg/day	0.078
				1,3-Dichlorobenzene	1140	mg/kg	5.63E-04	mg/kg/day	--	--	--	1.8E-03	mg/kg/day	9E-02	mg/kg/day	0.020
				1,4-Dichlorobenzene	1681	mg/kg	8.30E-04	mg/kg/day	5.40E-03	kg-day/mg	4.48E-06	2.6E-03	mg/kg/day	7E-02	mg/kg/day	0.037
				Benzo(a)anthracene	6.9	mg/kg	3.41E-06	mg/kg/day	7.30E-01	kg-day/mg	2.49E-06	1.1E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	20.4	mg/kg	1.01E-05	mg/kg/day	7.30E+00	kg-day/mg	7.36E-05	3.1E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	22.4	mg/kg	1.11E-05	mg/kg/day	7.30E-01	kg-day/mg	8.08E-06	3.5E-05	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	3.1	mg/kg	1.53E-06	mg/kg/day	7.30E+00	kg-day/mg	1.12E-05	4.8E-06	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	83.2	mg/kg	4.11E-05	mg/kg/day	1.60E+00	kg-day/mg	6.58E-05	1.3E-04	mg/kg/day	8E-04	mg/kg/day	0.160
				Indeno(1,2,3-cd)pyrene	13	mg/kg	6.42E-06	mg/kg/day	7.30E-01	kg-day/mg	4.69E-06	2.0E-05	mg/kg/day	--	mg/kg/day	--
				Naphthalene	189	mg/kg	9.34E-05	mg/kg/day	--	--	--	2.9E-04	mg/kg/day	2E-02	mg/kg/day	0.015
				PCB-1248	1.43	mg/kg	7.06E-07	mg/kg/day	2.00E+00	kg-day/mg	1.41E-06	2.2E-06	mg/kg/day	--	mg/kg/day	--
				PCB-1254	0.56	mg/kg	2.77E-07	mg/kg/day	2.00E+00	kg-day/mg	5.53E-07	8.6E-07	mg/kg/day	2E-05	mg/kg/day	0.043
				2,3,7,8-TCDD	0.00052	mg/kg	2.57E-10	mg/kg/day	1.50E+05	kg-day/mg	3.85E-05	8.0E-10	mg/kg/day	7E-10	mg/kg/day	1.145
				Chromium, hexavalent	195	mg/kg	9.63E-05	mg/kg/day	5.00E-01	kg-day/mg	4.82E-05	3.0E-04	mg/kg/day	3E-03	mg/kg/day	0.100
			Exposure Route Total								**2.4E-03**					**25**
			Dermal Contact	1,2,4-Trichlorobenzene	150000	mg/kg	2.53E-01	mg/kg/day	2.90E-02	kg-day/mg	7.35E-03	7.9E-02	mg/kg/day	1E-02	mg/kg/day	7.906
				1,2-Dichlorobenzene	4560	mg/kg	7.70E-03	mg/kg/day	--	--	--	2.4E-03	mg/kg/day	9E-02	mg/kg/day	0.027
				1,3-Dichlorobenzene	1140	mg/kg	1.93E-03	mg/kg/day	--	--	--	6.0E-04	mg/kg/day	9E-02	mg/kg/day	0.007
				1,4-Dichlorobenzene	1681	mg/kg	2.84E-03	mg/kg/day	5.40E-03	kg-day/mg	1.53E-05	8.9E-04	mg/kg/day	7E-02	mg/kg/day	0.013
				Benzo(a)anthracene	6.9	mg/kg	1.52E-06	mg/kg/day	9.49E-02	kg-day/mg	1.44E-07	4.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	20.4	mg/kg	4.48E-06	mg/kg/day	9.49E-01	kg-day/mg	4.25E-06	1.4E-05	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	22.4	mg/kg	4.92E-06	mg/kg/day	9.49E-02	kg-day/mg	4.67E-07	1.5E-05	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	3.1	mg/kg	6.81E-07	mg/kg/day	9.49E-01	kg-day/mg	6.46E-07	2.1E-06	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	83.2	mg/kg	1.83E-05	mg/kg/day	1.60E-01	kg-day/mg	2.92E-06	4.4E-05	mg/kg/day	8E-05	mg/kg/day	0.548
				Indeno(1,2,3-cd)pyrene	13	mg/kg	2.85E-06	mg/kg/day	9.49E-02	kg-day/mg	2.71E-07	8.9E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	189	mg/kg	4.15E-05	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	3E-03	mg/kg/day	0.043
				PCB-1248	1.43	mg/kg	3.38E-07	mg/kg/day	2.80E-01	kg-day/mg	9.47E-08	1.1E-06	mg/kg/day	--	mg/kg/day	--
				PCB-1254	0.56	mg/kg	1.32E-07	mg/kg/day	2.80E-01	kg-day/mg	3.71E-08	4.1E-07	mg/kg/day	3E-06	mg/kg/day	0.138
				2,3,7,8-TCDD	0.00052	mg/kg	2.64E-11	mg/kg/day	4.50E+03	kg-day/mg	1.19E-07	8.2E-11	mg/kg/day	2E-11	mg/kg/day	4.111
				Chromium, hexavalent	195	mg/kg	8.24E-06	mg/kg/day	1.25E-02	kg-day/mg	2.57E-09	2.6E-05	mg/kg/day	8E-05	mg/kg/day	0.321
			Exposure Route Total								**7.4E-03**					**13**
			Inhalation of Dust and Particulates	1,2,4-Trichlorobenzene	1.07E-04	mg/m³	7.06E-06	mg/m³	--	m³/mg	--	2.2E-05	mg/m³	2E-03	mg/m³	0.004
				1,2-Dichlorobenzene	3.26E-06	mg/m³	2.15E-07	mg/m³	--	m³/mg	--	6.7E-07	mg/m³	2E-01	mg/m³	0.000
				1,3-Dichlorobenzene	8.14E-07	mg/m³	5.36E-08	mg/m³	--	m³/mg	--	1.7E-07	mg/m³	2E-01	mg/m³	0.000
				1,4-Dichlorobenzene	1.20E-06	mg/m³	7.91E-08	mg/m³	1.1E-02	m³/mg	8.70E-10	2.5E-07	mg/m³	8E-01	mg/m³	0.000
				Benzo(a)anthracene	4.93E-09	mg/m³	3.25E-10	mg/m³	1.1E-01	m³/mg	3.57E-11	1.0E-09	mg/m³	--	mg/m³	--
				Benzo(a)pyrene	1.46E-08	mg/m³	9.60E-10	mg/m³	1.1E+00	m³/mg	1.06E-09	3.0E-09	mg/m³	--	mg/m³	--
				Benzo(b)fluoranthene	1.60E-08	mg/m³	1.05E-09	mg/m³	1.1E-01	m³/mg	1.16E-10	3.3E-09	mg/m³	--	mg/m³	--
				Dibenz(a,h)anthracene	2.21E-09	mg/m³	1.46E-10	mg/m³	1.2E+00	m³/mg	1.75E-10	4.5E-10	mg/m³	--	mg/m³	--
				Hexachlorobenzene	5.94E-08	mg/m³	3.91E-09	mg/m³	4.6E-01	m³/mg	1.80E-09	1.2E-08	mg/m³	--	mg/m³	--
				Indeno(1,2,3-cd)pyrene	9.29E-09	mg/m³	6.12E-10	mg/m³	1.1E-01	m³/mg	6.73E-11	1.9E-09	mg/m³	--	mg/m³	--
				Naphthalene	1.35E-07	mg/m³	8.89E-09	mg/m³	3.4E-02	m³/mg	3.02E-10	2.8E-08	mg/m³	3E-03	mg/m³	0.000
				PCB-1248	1.02E-09	mg/m³	6.73E-11	mg/m³	5.7E-01	m³/mg	3.83E-11	2.1E-10	mg/m³	--	mg/m³	--
				PCB-1254	4.00E-10	mg/m³	2.63E-11	mg/m³	5.7E-01	m³/mg	1.50E-11	8.2E-11	mg/m³	--	mg/m³	--
				2,3,7,8-TCDD	3.71E-13	mg/m³	2.45E-14	mg/m³	3.8E+04	m³/mg	9.30E-10	7.6E-14	mg/m³	4E-08	mg/m³	0.000
				Chromium, hexavalent	1.39E-07	mg/m³	9.17E-09	mg/m³	1.2E+01	m³/mg	1.10E-07	2.9E-08	mg/m³	1E-04	mg/m³	0.000
			Exposure Route Total								**1.2E-07**					**0.0**
		Exposure Point Total									**9.8E-03**					**37.4**
	Exposure Medium Total										**9.8E-03**					**37.4**
Surface Soil Total											**9.8E-03**					**37.4**
							Total of Receptor Risks Across All Media				**9.8E-03**	**Total of Receptor Hazards Across All Media**				**37.4**

TABLE E-12 (RAGS Part D Table 7.6.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN AREA - SURFACE SOIL
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Outdoor Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure Concentration		CSF/Unit Risk		Cancer Risk	Intake/Exposure Concentration		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface Soil (0-2 feet bgs)	**Surface Soil (0-2 feet bgs)**	**Eastern Area**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	31000	mg/kg	5.7E-04	mg/kg/day	2.90E-02	kg-day/mg	1.7E-05	9.0E-03	mg/kg/day	9E-02	mg/kg/day	0.100
				1,2-Dichlorobenzene	1450	mg/kg	2.7E-05	mg/kg/day	--	--	--	4.2E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,3-Dichlorobenzene	386	mg/kg	7.1E-06	mg/kg/day	--	--	--	1.1E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	849	mg/kg	1.6E-05	mg/kg/day	5.40E-03	kg-day/mg	8.5E-08	2.5E-04	mg/kg/day	7E-02	mg/kg/day	0.004
				Benzo(a)anthracene	12.5	mg/kg	2.3E-07	mg/kg/day	7.30E-01	kg-day/mg	1.7E-07	3.6E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	9.4	mg/kg	1.7E-07	mg/kg/day	7.30E+00	kg-day/mg	1.3E-06	2.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	16.9	mg/kg	3.1E-07	mg/kg/day	7.30E-01	kg-day/mg	2.3E-07	4.9E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	4.37	mg/kg	8.1E-08	mg/kg/day	7.30E+00	kg-day/mg	5.9E-07	1.3E-06	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	40.7	mg/kg	7.5E-07	mg/kg/day	1.60E+00	kg-day/mg	1.2E-06	1.2E-05	mg/kg/day	1E-05	mg/kg/day	1.176
				Indeno(1,2,3-cd)pyrene	10.7	mg/kg	2.0E-07	mg/kg/day	7.30E-01	kg-day/mg	1.4E-07	3.1E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	58.2	mg/kg	1.1E-06	mg/kg/day	--	--	--	1.7E-05	mg/kg/day	2E-02	mg/kg/day	0.001
				PCB-1248	0.73	mg/kg	1.4E-08	mg/kg/day	2.00E+00	kg-day/mg	2.7E-08	2.1E-07	mg/kg/day		mg/kg/day	--
				PCB-1254	0.32	mg/kg	5.9E-09	mg/kg/day	2.00E+00	kg-day/mg	1.2E-08	9.2E-08	mg/kg/day	2E-05	mg/kg/day	0.005
				2,3,7,8-TCDD	0.00041	mg/kg	7.6E-12	mg/kg/day	1.50E+05	kg-day/mg	1.1E-06	1.2E-10	mg/kg/day	7E-10	mg/kg/day	0.169
				Chromium, hexavalent	52.4	mg/kg	9.7E-07	mg/kg/day	5.00E-01	kg-day/mg	4.9E-07	1.5E-05	mg/kg/day	3E-03	mg/kg/day	0.005
			Exposure Route Total								**2.2E-05**					**1.5**
			Dermal Contact	1,2,4-Trichlorobenzene	31000	mg/kg	2.09E-03	mg/kg/day	2.90E-02	kg-day/mg	6.07E-05	3.3E-03	mg/kg/day	9E-02	mg/kg/day	0.036
				1,2-Dichlorobenzene	1450	mg/kg	9.80E-05	mg/kg/day	--	--	--	1.5E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	386	mg/kg	2.61E-05	mg/kg/day	--	--	--	4.1E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	849	mg/kg	5.74E-05	mg/kg/day	5.40E-03	kg-day/mg	3.10E-07	8.9E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzo(a)anthracene	12.5	mg/kg	1.10E-07	mg/kg/day	9.49E-02	kg-day/mg	1.04E-08	1.7E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(a)pyrene	9.4	mg/kg	8.26E-08	mg/kg/day	9.49E-01	kg-day/mg	7.84E-08	1.3E-06	mg/kg/day	--	mg/kg/day	--
				Benzo(b)fluoranthene	16.9	mg/kg	1.48E-07	mg/kg/day	9.49E-02	kg-day/mg	1.41E-08	2.3E-06	mg/kg/day	--	mg/kg/day	--
				Dibenz(a,h)anthracene	4.37	mg/kg	3.84E-08	mg/kg/day	9.49E-01	kg-day/mg	3.64E-08	6.0E-07	mg/kg/day	--	mg/kg/day	--
				Hexachlorobenzene	40.7	mg/kg	2.75E-07	mg/kg/day	1.60E-01	kg-day/mg	4.40E-08	4.3E-06	mg/kg/day	1E-06	mg/kg/day	4.290
				Indeno(1,2,3-cd)pyrene	10.7	mg/kg	9.40E-08	mg/kg/day	9.49E-02	kg-day/mg	8.92E-09	1.5E-06	mg/kg/day	--	mg/kg/day	--
				Naphthalene	58.2	mg/kg	5.11E-07	mg/kg/day	--	--	--	8.0E-06	mg/kg/day	3E-03	mg/kg/day	0.003
				PCB-1248	0.73	mg/kg	6.91E-09	mg/kg/day	2.80E-01	kg-day/mg	1.93E-09	1.1E-07	mg/kg/day		mg/kg/day	--
				PCB-1254	0.32	mg/kg	3.03E-09	mg/kg/day	2.80E-01	kg-day/mg	8.48E-10	4.7E-08	mg/kg/day	3E-06	mg/kg/day	0.016
				2,3,7,8-TCDD	0.00041	mg/kg	8.31E-13	mg/kg/day	4.50E+03	kg-day/mg	3.74E-09	1.3E-11	mg/kg/day	2E-11	mg/kg/day	0.648
				Chromium, hexavalent	52.4	mg/kg	8.85E-08	mg/kg/day	1.25E-02	kg-day/mg	1.11E-09	1.4E-06	mg/kg/day	1E-04	mg/kg/day	0.014
			Exposure Route Total								**6.1E-05**					**5.0**
			Inhalation of Dust and Particulates	1,2,4-Trichlorobenzene	2.21E-05	mg/m^3	2.9E-07	mg/m^3	--	m^3/mg	--	4.5E-06	mg/m^3	2E-02	mg/m^3	0.001
				1,2-Dichlorobenzene	1.04E-06	mg/m^3	1.4E-08	mg/m^3	--	m^3/mg	--	2.1E-07	mg/m^3	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	2.76E-07	mg/m^3	3.6E-09	mg/m^3	--	m^3/mg	--	5.7E-08	mg/m^3	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	6.06E-07	mg/m^3	8.0E-09	mg/m^3	1.1E-02	m^3/mg	8.8E-11	1.2E-07	mg/m^3	8E-01	mg/m^3	0.000
				Benzo(a)anthracene	8.93E-09	mg/m^3	1.2E-10	mg/m^3	1.1E-01	m^3/mg	1.3E-11	1.8E-09	mg/m^3	--	mg/m^3	--
				Benzo(a)pyrene	6.71E-09	mg/m^3	8.8E-11	mg/m^3	1.1E+00	m^3/mg	9.7E-11	1.4E-09	mg/m^3	--	mg/m^3	--
				Benzo(b)fluoranthene	1.21E-08	mg/m^3	1.6E-10	mg/m^3	1.1E-01	m^3/mg	1.7E-11	2.5E-09	mg/m^3	--	mg/m^3	--
				Dibenz(a,h)anthracene	3.12E-09	mg/m^3	4.1E-11	mg/m^3	1.2E+00	m^3/mg	4.9E-11	6.4E-10	mg/m^3	--	mg/m^3	--
				Hexachlorobenzene	2.91E-08	mg/m^3	3.8E-10	mg/m^3	4.6E-01	m^3/mg	1.8E-10	6.0E-09	mg/m^3	--	mg/m^3	--
				Indeno(1,2,3-cd)pyrene	7.64E-09	mg/m^3	1.0E-10	mg/m^3	1.1E-01	m^3/mg	1.1E-11	1.6E-09	mg/m^3	--	mg/m^3	--
				Naphthalene	4.16E-08	mg/m^3	5.5E-10	mg/m^3	3.4E-02	m^3/mg	1.9E-11	8.5E-09	mg/m^3	3E-03	mg/m^3	0.000
				PCB-1248	5.21E-10	mg/m^3	6.9E-12	mg/m^3	5.7E-01	m^3/mg	3.9E-12	1.1E-10	mg/m^3	--	mg/m^3	--
				PCB-1254	2.29E-10	mg/m^3	3.0E-12	mg/m^3	5.7E-01	m^3/mg	1.7E-12	4.7E-11	mg/m^3	--	mg/m^3	--
				2,3,7,8-TCDD	2.93E-13	mg/m^3	3.9E-15	mg/m^3	3.8E+04	m^3/mg	1.5E-10	6.0E-14	mg/m^3	4E-08	mg/m^3	0.000
				Chromium, hexavalent	3.74E-08	mg/m^3	4.9E-10	mg/m^3	1.2E+01	m^3/mg	5.9E-09	7.7E-09	mg/m^3	1E-04	mg/m^3	0.000
			Exposure Route Total								**6.5E-09**					**0.002**
		Exposure Point Total									**8.3E-05**					**6.5**
	Exposure Medium Total										**8.3E-05**					**6.5**
Surface Soil Total											**8.3E-05**					**6.5**
							Total of Receptor Risks Across All Media				**8.3E-05**	**Total of Receptor Hazards Across All Media**				**6.5**

Lead risks calculated using the Adult Lead Model (See Appendix G)
See Table E-6 for supporting calculations.

TABLE E-13 (RAGS Part D Table 7.7.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface and Subsurface Soil (0-2 feet bgs)	**Surface and Subsurface Soil (0-2 feet bgs)**	**Western Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	210	mg/kg	4.0E-06	mg/kg/day	--	--	--	3.1E-04	mg/kg/day	8.0E-03	mg/kg/day	0.039
				1,2,4-Trichlorobenzene	161	mg/kg	3.0E-06	mg/kg/day	2.9E-02	kg-day/mg	8.8E-08	2.4E-04	mg/kg/day	9.0E-02	mg/kg/day	0.003
				1,2-Dichlorobenzene	606	mg/kg	1.1E-05	mg/kg/day	--	--	--	8.9E-04	mg/kg/day	6.0E-01	mg/kg/day	0.001
				1,3-Dichlorobenzene	631	mg/kg	1.2E-05	mg/kg/day	--	--	--	9.3E-04	mg/kg/day	6.0E-01	mg/kg/day	0.002
				1,4-Dichlorobenzene	730	mg/kg	1.4E-05	mg/kg/day	5.4E-03	kg-day/mg	7.4E-08	1.1E-03	mg/kg/day	7.0E-02	mg/kg/day	0.015
				Benzene	25.3	mg/kg	4.8E-07	mg/kg/day	5.5E-02	kg-day/mg	2.6E-08	3.7E-05	mg/kg/day	1.0E-02	mg/kg/day	0.004
				Chlorobenzene	189	mg/kg	3.6E-06	mg/kg/day	--	--		2.8E-04	mg/kg/day	7.0E-02	mg/kg/day	0.004
				Ethylbenzene	95	mg/kg	1.8E-06	mg/kg/day	1.0E-02	kg-day/mg	1.8E-08	1.4E-04	mg/kg/day	5.0E-02	mg/kg/day	0.003
				m,p-Xylenes	1700	mg/kg	3.2E-05	mg/kg/day	--	--	--	2.5E-03	mg/kg/day	4.0E-01	mg/kg/day	0.006
				o-Xylene	600	mg/kg	1.1E-05	mg/kg/day	--	--	--	8.8E-04	mg/kg/day	4.0E-01	mg/kg/day	0.002
				1,1'-Biphenyl	17.4	mg/kg	3.3E-07	mg/kg/day	8.0E-03	kg-day/mg	2.6E-09	2.6E-05	mg/kg/day	1.0E-01	mg/kg/day	0.000
				1,2,4,5-Tetrachlorobenzene	44.4	mg/kg	8.4E-07	mg/kg/day	--	--	--	6.5E-05	mg/kg/day	3.0E-05	mg/kg/day	2.174
				Benzo(a)anthracene	40.2	mg/kg	7.6E-07	mg/kg/day	7.3E-01	kg-day/mg	5.5E-07	5.9E-05	mg/kg/day	--	--	--
				Benzo(a)pyrene	35.8	mg/kg	6.7E-07	mg/kg/day	7.3E+00	kg-day/mg	4.9E-06	5.3E-05	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.5	mg/kg	5.2E-07	mg/kg/day	7.3E-01	kg-day/mg	3.8E-07	4.0E-05	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.79	mg/kg	1.5E-08	mg/kg/day	7.3E+00	kg-day/mg	1.1E-07	1.2E-06	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	23.4	mg/kg	4.4E-07	mg/kg/day	7.3E-01	kg-day/mg	3.2E-07	3.4E-05	mg/kg/day	--	--	--
				Naphthalene	45.4	mg/kg	8.6E-07	mg/kg/day	--	--	--	6.7E-05	mg/kg/day	2.0E-02	mg/kg/day	0.003
				PCB-1254	0.42	mg/kg	7.9E-09	mg/kg/day	2.0E+00	kg-day/mg	1.6E-08	6.2E-07	mg/kg/day	2.0E-05	mg/kg/day	0.031
				PCB-1260	0.55	mg/kg	1.0E-08	mg/kg/day	2.0E+00	kg-day/mg	2.1E-08	8.1E-07	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.27E-03	mg/kg	2.4E-11	mg/kg/day	1.5E+05	kg-day/mg	3.6E-06	1.9E-09	mg/kg/day	7.0E-10	mg/kg/day	2.666
				Antimony	37.4	mg/kg	7.0E-07	mg/kg/day	--	--	--	5.5E-05	mg/kg/day	4.0E-04	mg/kg/day	0.137
				Arsenic	16.8	mg/kg	3.2E-07	mg/kg/day	1.5E+00	kg-day/mg	4.7E-07	2.5E-05	mg/kg/day	3.0E-04	mg/kg/day	0.082
				Cobalt	162	mg/kg	3.1E-06	mg/kg/day	--	--	--	2.4E-04	mg/kg/day	3.0E-03	mg/kg/day	0.079
				Iron	84800	mg/kg	1.6E-03	mg/kg/day	--	--	--	1.2E-01	mg/kg/day	7.0E-01	mg/kg/day	0.178
				Lead	15800	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	1.39	mg/kg	2.6E-08	mg/kg/day	--	--	--	2.0E-06	mg/kg/day	4.0E-05	mg/kg/day	0.051
				Vanadium	1080	mg/kg	2.0E-05	mg/kg/day	--	--	--	1.6E-03	mg/kg/day	7.0E-04	mg/kg/day	2.267
				Zinc	12500	mg/kg	2.4E-04	mg/kg/day	--	--	--	1.8E-02	mg/kg/day	3.0E-01	mg/kg/day	0.061
				Chromium, hexavalent	2280	mg/kg	4.3E-05	mg/kg/day	5.0E-01	kg-day/mg	2.1E-05	3.3E-03	mg/kg/day	3.0E-03	mg/kg/day	1.117
			Exposure Route Total								**3.2E-05**					**8.9**
			Dermal Contact	1,2,3-Trichlorobenzene	210	mg/kg	6.56E-05	mg/kg/day	--	--	--	5.1E-03	mg/kg/day	8E-03	mg/kg/day	0.639
				1,2,4-Trichlorobenzene	161	mg/kg	5.03E-05	mg/kg/day	2.90E-02	kg-day/mg	1.46E-06	3.9E-03	mg/kg/day	9E-02	mg/kg/day	0.044
				1,2-Dichlorobenzene	606	mg/kg	1.89E-04	mg/kg/day	--	--	--	1.5E-02	mg/kg/day	6E-01	mg/kg/day	0.025
				1,3-Dichlorobenzene	631	mg/kg	1.97E-04	mg/kg/day	--	--	--	1.5E-02	mg/kg/day	6E-01	mg/kg/day	0.026
				1,4-Dichlorobenzene	730	mg/kg	2.28E-04	mg/kg/day	5.40E-03	kg-day/mg	1.23E-06	1.8E-02	mg/kg/day	7E-02	mg/kg/day	0.254
				Benzene	25.3	mg/kg	7.90E-06	mg/kg/day	5.50E-02	kg-day/mg	4.35E-07	6.2E-04	mg/kg/day	1E-02	mg/kg/day	0.062
				Chlorobenzene	189	mg/kg	5.90E-05	mg/kg/day	--	--	--	4.6E-03	mg/kg/day	7E-02	mg/kg/day	0.066
				Ethylbenzene	95	mg/kg	2.97E-05	mg/kg/day	1.00E-02	kg-day/mg	2.97E-07	2.3E-03	mg/kg/day	5E-02	mg/kg/day	0.046
				m,p-Xylenes	1700	mg/kg	5.31E-04	mg/kg/day	--	--	--	4.1E-02	mg/kg/day	4E-01	mg/kg/day	0.104
				o-Xylene	600	mg/kg	1.87E-04	mg/kg/day	--	--	--	1.5E-02	mg/kg/day	4E-01	mg/kg/day	0.037
				1,1'-Biphenyl	17.4	mg/kg	5.43E-07	mg/kg/day	8.00E-03	kg-day/mg	4.35E-09	4.2E-05	mg/kg/day	1E-01	mg/kg/day	0.000
				1,2,4,5-Tetrachlorobenzene	44.4	mg/kg	1.39E-05	mg/kg/day	--	--	--	1.1E-03	mg/kg/day	3E-05	mg/kg/day	36.055
				Benzo(a)anthracene	40.2	mg/kg	1.63E-06	mg/kg/day	9.49E-02	kg-day/mg	1.55E-07	1.3E-04	mg/kg/day	--	--	--
				Benzo(a)pyrene	35.8	mg/kg	1.45E-06	mg/kg/day	9.49E-01	kg-day/mg	1.38E-06	1.1E-04	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.5	mg/kg	1.12E-06	mg/kg/day	9.49E-02	kg-day/mg	1.06E-07	8.7E-05	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.79	mg/kg	3.21E-08	mg/kg/day	9.49E-01	kg-day/mg	3.04E-08	2.5E-06	mg/kg/day	--	--	--

TABLE E-13 (RAGS Part D Table 7.7.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Indeno(1,2,3-cd)pyrene	23.4	mg/kg	9.50E-07	mg/kg/day	9.49E-01	kg-day/mg	9.02E-07	7.4E-05	mg/kg/day	--	--	--
				Naphthalene	45.4	mg/kg	1.84E-06	mg/kg/day	--	--	--	1.4E-04	mg/kg/day	3E-03	mg/kg/day	0.048
				PCB-1254	0.42	mg/kg	1.84E-08	mg/kg/day	2.80E-01	kg-day/mg	5.14E-09	1.4E-06	mg/kg/day	3E-06	mg/kg/day	0.477
				PCB-1260	0.55	mg/kg	2.40E-08	mg/kg/day	2.80E-01	kg-day/mg	6.73E-09	1.9E-06	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.27E-03	mg/kg	1.19E-11	mg/kg/day	4.50E+03	kg-day/mg	5.35E-08	9.3E-10	mg/kg/day	2E-11	mg/kg/day	46.409
				Antimony	37.4	mg/kg	1.75E-06	mg/kg/day	--	--	--	1.4E-04	mg/kg/day	6E-05	mg/kg/day	2.278
				Arsenic	16.8	mg/kg	1.57E-07	mg/kg/day	4.50E-02	kg-day/mg	7.08E-09	1.2E-05	mg/kg/day	9E-06	mg/kg/day	1.364
				Cobalt	162	mg/kg	5.06E-05	mg/kg/day	--	--	--	3.9E-03	mg/kg/day	3E-03	mg/kg/day	1.316
				Iron	84800	mg/kg	2.65E-02	mg/kg/day	--	--	--	2.1E+00	mg/kg/day	7E-01	mg/kg/day	2.951
				Lead	15800	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	1.39	mg/kg	4.34E-07	mg/kg/day	--	--	--	3.4E-05	mg/kg/day	4E-05	mg/kg/day	0.847
				Vanadium	1080	mg/kg	8.77E-06	mg/kg/day	--	--	--	6.8E-04	mg/kg/day	2E-05	mg/kg/day	34.204
				Zinc	12500	mg/kg	3.90E-03	mg/kg/day	--	--	--	3.0E-01	mg/kg/day	3E-01	mg/kg/day	1.015
				Chromium, hexavalent	2280	mg/kg	1.78E-05	mg/kg/day	1.3E-02	kg-day/mg	2.2E-07	1.4E-03	mg/kg/day	8E-05	mg/kg/day	17.358
			Exposure Route Total								**6.3E-06**					**145.6**
			Inhalation	1,2,3-Trichlorobenzene	1.50E-07	mg/m3	2.28E-10	mg/m3	--	--	--	1.78E-08	mg/kg/day	--	--	--
				1,2,4-Trichlorobenzene	1.15E-07	mg/m3	1.75E-10	mg/m3	--	--	--	1.37E-08	mg/kg/day	2E-02	mg/m^3	0.000
				1,2-Dichlorobenzene	4.33E-07	mg/m3	6.59E-10	mg/m3	--	--	--	5.14E-08	mg/kg/day	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	4.51E-07	mg/m3	6.86E-10	mg/m3	--	--	--	5.35E-08	mg/kg/day	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	5.21E-07	mg/m3	7.94E-10	mg/m3	1.10E-02	m^3/mg	8.7E-12	6.19E-08	mg/kg/day	8E-01	mg/m^3	0.000
				Benzene	1.81E-08	mg/m3	2.75E-11	mg/m3	7.80E-03	m^3/mg	2.1E-13	2.15E-09	mg/kg/day	8E-02	mg/m^3	0.000
				Chlorobenzene	1.35E-07	mg/m3	2.05E-10	mg/m3	--	--	--	1.60E-08	mg/kg/day	5E-01	mg/m^3	0.000
				Ethylbenzene	6.79E-08	mg/m3	1.03E-10	mg/m3	2.50E-03	m^3/mg	2.6E-13	8.06E-09	mg/kg/day	9E+00	mg/m^3	0.000
				m,p-Xylenes	1.21E-06	mg/m3	1.85E-09	mg/m3	--	--	--	1.44E-07	mg/kg/day	4E-01	mg/m^3	0.000
				o-Xylene	4.29E-07	mg/m3	6.52E-10	mg/m3	--	--	--	5.09E-08	mg/kg/day	4E-01	mg/m^3	0.000
				1,1'-Biphenyl	1.24E-08	mg/m3	1.89E-11	mg/m3	--	--	--	1.48E-09	mg/kg/day	4E-03	mg/m^3	0.000
				1,2,4,5-Tetrachlorobenzene	3.17E-08	mg/m3	4.83E-11	mg/m3	--	--	--	3.77E-09	mg/kg/day	--	--	--
				Benzo(a)anthracene	2.87E-08	mg/m3	4.37E-11	mg/m3	1.10E-01	m^3/mg	4.8E-12	3.41E-09	mg/kg/day	--	--	--
				Benzo(a)pyrene	2.56E-08	mg/m3	3.89E-11	mg/m3	1.10E+00	m^3/mg	4.3E-11	3.04E-09	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	1.96E-08	mg/m3	2.99E-11	mg/m3	1.10E-01	m^3/mg	3.3E-12	2.33E-09	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	5.64E-10	mg/m3	8.59E-13	mg/m3	1.20E+00	m^3/mg	1.0E-12	6.70E-11	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	1.67E-08	mg/m3	2.54E-11	mg/m3	1.10E-01	m^3/mg	2.8E-12	1.98E-09	mg/kg/day	--	--	--
				Naphthalene	3.24E-08	mg/m3	4.94E-11	mg/m3	3.40E-02	m^3/mg	1.7E-12	3.85E-09	mg/kg/day	3E-03	mg/m^3	0.000
				PCB-1254	3.00E-10	mg/m3	4.57E-13	mg/m3	5.7E-01	m^3/mg	2.6E-13	3.56E-11	mg/kg/day	--	--	--
				PCB-1260	3.93E-10	mg/m3	5.98E-13	mg/m3	5.7E-01	m^3/mg	3.4E-13	4.66E-11	mg/kg/day	--	--	--
				2,3,7,8-TCDD	9.07E-13	mg/m3	1.38E-15	mg/m3	3.8E+04	m^3/mg	5.2E-11	1.08E-13	mg/kg/day	4E-08	mg/m^3	0.000
				Antimony	2.67E-08	mg/m3	4.07E-11	mg/m3	--	--	--	3.17E-09	mg/kg/day	--	--	--
				Arsenic	1.20E-08	mg/m3	1.83E-11	mg/m3	4.3E+00	m^3/mg	7.9E-11	1.42E-09	mg/kg/day	1.5E-05	mg/m^3	0.000
				Cobalt	1.16E-07	mg/m3	1.76E-10	mg/m3	9.0E+02	m^3/mg	1.6E-07	1.37E-08	mg/kg/day	2E-05	mg/m^3	0.001
				Iron	6.06E-05	mg/m3	9.22E-08	mg/m3	--	--	--	7.19E-06	mg/kg/day	--	--	--
				Lead	1.13E-05	mg/m3	--	--	--	--	--	--	--	--	--	--
				Thallium	9.93E-10	mg/m3	1.51E-12	mg/m3	--	--	--	1.18E-10	mg/kg/day	--	--	--
				Vanadium	7.71E-07	mg/m3	1.17E-09	mg/m3	--	--	--	9.16E-08	mg/kg/day	--	--	--
				Zinc	8.93E-06	mg/m3	1.36E-08	mg/m3	--	--	--	1.06E-06	mg/kg/day	--	--	--
				Chromium, hexavalent	1.63E-06	mg/m3	2.48E-09	mg/m3	1.20E+01	m^3/mg	3.0E-08	1.93E-07	mg/kg/day	1E-04	mg/m^3	0.002
			Exposure Route Total								**1.9E-07**					**0.0**
		Exposure Point Total									**3.9E-05**					**155**

TABLE E-13 (RAGS Part D Table 7.7.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
	Exposure Medium Total										**3.9E-05**					**155**
Soil Total											**3.9E-05**					**155**
Shallow Groundwater	**Western Area Shallow Groundwater**	**Western Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.00089	mg/L	8.9E-04	mg/kg/day	2.90E-02	kg-day/mg	2.6E-05	2.0E-02	mg/kg/day	9E-02	mg/kg/day	0.220
				1,2-Dichlorobenzene	0.01	mg/L	1.4E-03	mg/kg/day	--	--	--	1.1E-01	mg/kg/day	6E-01	mg/kg/day	0.184
				1,3-Dichlorobenzene	0.0034	mg/L	7.9E-04	mg/kg/day	--	--	--	6.2E-02	mg/kg/day	6E-01	mg/kg/day	0.103
				1,4-Dichlorobenzene	0.0044	mg/L	6.5E-04	mg/kg/day	5.40E-03	kg-day/mg	3.5E-06	5.1E-02	mg/kg/day	7E-02	mg/kg/day	0.729
				Benzene	0.085	mg/L	3.7E-03	mg/kg/day	5.50E-02	kg-day/mg	2.0E-04	2.9E-01	mg/kg/day	1E-02	mg/kg/day	29
				Chlorobenzene	0.32	mg/L	2.7E-02	mg/kg/day	--	--	--	2.1E+00	mg/kg/day	7E-02	mg/kg/day	30
				Ethylbenzene	0.01	mg/L	1.6E-03	mg/kg/day	1.00E-02	kg-day/mg	1.6E-05	1.3E-01	mg/kg/day	5E-02	mg/kg/day	2.544
				Xylene (total)	0.039	mg/L	6.9E-03	mg/kg/day	--	--	--	5.4E-01	mg/kg/day	4E-01	mg/kg/day	1.342
				1,1'-Biphenyl	0.028	mg/L	--	--	8.00E-03	kg-day/mg	--	--	--	--	--	--
				2-Methylnaphthalene	0.59	mg/L	--	--	--	--	--	--	--	--	--	--
				Acenaphthene	0.061	mg/L	--	--	--	--	--	--	--	--	--	--
				Naphthalene	5	mg/L	8.1E-01	mg/kg/day	--	--	--	6.3E+01	mg/kg/day	3E-03	mg/kg/day	20956
				Aluminum	1.75	mg/L	--	--	--	--	--	--	--	--	--	--
				Antimony	0.0044	mg/L	--	--	--	--	--	--	--	--	--	--
				Arsenic	0.016	mg/L	--	--	4.50E-02	kg-day/mg	--	--	--	--	--	--
				Barium	0.352	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.00067	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium	4.69	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0028	mg/L	--	--	--	--	--	--	--	--	--	--
				Iron	46.1	mg/L	--	--	--	--	--	--	--	--	--	--
				Lead	0.0377	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.701	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.00012	mg/L	--	--	--	--	--	--	--	--	--	--
				Thallium	0.0036	mg/L	--	--	--	--	--	--	--	--	--	--
				Vanadium	0.0487	mg/L	--	--	--	--	--	--	--	--	--	--
				Zinc	1.94	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium, hexavalent	4.07	mg/L	--	--	1.25E-02	kg-day/mg	--	--	--	--	--	--
			Exposure Route Total								**3.6E-04**					**21483**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.00089	mg/L	1.37E-08	mg/kg/day	2.9E-02	kg-day/mg	4.0E-10	1.1E-06	mg/kg/day	9E-02	mg/kg/day	0.000
				1,2-Dichlorobenzene	0.01	mg/L	1.54E-07	mg/kg/day	--	--	--	1.2E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	0.0034	mg/L	5.24E-08	mg/kg/day	--	--	--	4.1E-06	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	0.0044	mg/L	6.78E-08	mg/kg/day	5.4E-03	kg-day/mg	3.7E-10	5.3E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.085	mg/L	1.31E-06	mg/kg/day	5.5E-02	kg-day/mg	7.2E-08	1.0E-04	mg/kg/day	1E-02	mg/kg/day	0.010
				Chlorobenzene	0.32	mg/L	4.93E-06	mg/kg/day	--	--	--	3.8E-04	mg/kg/day	7E-02	mg/kg/day	0.005
				Ethylbenzene	0.01	mg/L	1.54E-07	mg/kg/day	1.0E-02	kg-day/mg	1.5E-09	1.2E-05	mg/kg/day	5E-02	mg/kg/day	0.000
				Xylene (total)	0.039	mg/L	6.01E-07	mg/kg/day	--	--	--	4.7E-05	mg/kg/day	4E-01	mg/kg/day	0.000
				1,1'-Biphenyl	0.028	mg/L	4.32E-07	mg/kg/day	8.0E-03	kg-day/mg	3.5E-09	3.4E-05	mg/kg/day	1E-01	mg/kg/day	0.000
				2-Methylnaphthalene	0.59	mg/L	9.09E-06	mg/kg/day	--	--	--	7.1E-04	mg/kg/day	4E-03	mg/kg/day	0.177
				Acenaphthene	0.061	mg/L	9.40E-07	mg/kg/day	--	--	--	7.3E-05	mg/kg/day	2E-01	mg/kg/day	0.000
				Naphthalene	5	mg/L	7.71E-05	mg/kg/day	--	--	--	6.0E-03	mg/kg/day	2E-02	mg/kg/day	0.301
				Aluminum	1.75	mg/L	2.70E-05	mg/kg/day	--	--	--	2.1E-03	mg/kg/day	1E+00	mg/kg/day	0.002
				Antimony	0.0044	mg/L	6.78E-08	mg/kg/day	--	--	--	5.3E-06	mg/kg/day	4E-04	mg/kg/day	0.013
				Arsenic	0.016	mg/L	2.47E-07	mg/kg/day	1.5E+00	kg-day/mg	3.7E-07	1.9E-05	mg/kg/day	3E-04	mg/kg/day	0.064
				Barium	0.352	mg/L	5.42E-06	mg/kg/day	--	--	--	4.2E-04	mg/kg/day	2E-01	mg/kg/day	0.002
				Cadmium	0.00067	mg/L	1.03E-08	mg/kg/day	--	--	--	8.1E-07	mg/kg/day	1E-03	mg/kg/day	0.001

TABLE E-13 (RAGS Part D Table 7.7.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Chromium	4.69	mg/L	7.23E-05	mg/kg/day	--	--	--	5.6E-03	mg/kg/day	1.5E+00	mg/kg/day	0.004
				Cobalt	0.0028	mg/L	4.32E-08	mg/kg/day	--	--	--	3.4E-06	mg/kg/day	3E-03	mg/kg/day	0.001
				Iron	46.1	mg/L	7.10E-04	mg/kg/day	--	--	--	5.5E-02	mg/kg/day	7E-01	mg/kg/day	0.079
				Lead	0.0377	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.701	mg/L	1.08E-05	mg/kg/day	--	--	--	8.4E-04	mg/kg/day	1E-01	mg/kg/day	0.008
				Mercury	0.00012	mg/L	1.85E-09	mg/kg/day	--	--	--	1.4E-07	mg/kg/day	2E-04	mg/kg/day	0.001
				Thallium	0.0036	mg/L	5.55E-08	mg/kg/day	--	--	--	4.3E-06	mg/kg/day	4E-05	mg/kg/day	0.108
				Vanadium	0.0487	mg/L	7.51E-07	mg/kg/day	--	--	--	5.9E-05	mg/kg/day	7E-04	mg/kg/day	0.084
				Zinc	1.94	mg/L	2.99E-05	mg/kg/day	--	--	--	2.3E-03	mg/kg/day	3E-01	mg/kg/day	0.008
				Chromium, hexavalent	4.07	mg/L	6.27E-05	mg/kg/day	5.0E-01	kg-day/mg	3.1E-05	4.9E-03	mg/kg/day	3E-03	mg/kg/day	1.631
			Exposure Route Total								**4.0E-04**					**2.5**
		Exposure Point Total									**7.6E-04**					**21486**
	Exposure Medium Total										**7.6E-04**					**21486**
Groundwater Total											**7.6E-04**					**21486**
							Total of Receptor Risks Across All Media				**8.0E-04**	**Total of Receptor Hazards Across All Media**				**21641**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-14 (RAGS Part D Table 7.7.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Western Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	18.6	mg/kg	4.9E-08	mg/kg/day	--	--	--	3.8E-06	mg/kg/day	8.0E-03	mg/kg/day	0.00
				1,2,4-Trichlorobenzene	71.1	mg/kg	1.9E-07	mg/kg/day	2.9E-02	kg-day/mg	5.4E-09	1.5E-05	mg/kg/day	9.0E-02	mg/kg/day	0.00
				1,2-Dichlorobenzene	333	mg/kg	8.8E-07	mg/kg/day	--	--	--	6.8E-05	mg/kg/day	6.0E-01	mg/kg/day	0.00
				1,3-Dichlorobenzene	330	mg/kg	8.7E-07	mg/kg/day	--	--	--	6.8E-05	mg/kg/day	6.0E-01	mg/kg/day	0.00
				1,4-Dichlorobenzene	383	mg/kg	1.0E-06	mg/kg/day	5.4E-03	kg-day/mg	5.4E-09	7.9E-05	mg/kg/day	7.0E-02	mg/kg/day	0.00
				Benzene	4.24	mg/kg	1.1E-08	mg/kg/day	5.5E-02	kg-day/mg	6.1E-10	8.7E-07	mg/kg/day	1.0E-02	mg/kg/day	0.00
				Chlorobenzene	41	mg/kg	1.1E-07	mg/kg/day	--	--		8.4E-06	mg/kg/day	7.0E-02	mg/kg/day	0.00
				Ethylbenzene	9.6	mg/kg	2.5E-08	mg/kg/day	1.0E-02	kg-day/mg	2.5E-10	2.0E-06	mg/kg/day	5.0E-02	mg/kg/day	0.00
				m,p-Xylenes	123	mg/kg	3.2E-07	mg/kg/day	--	--	--	2.5E-05	mg/kg/day	4.0E-01	mg/kg/day	0.00
				o-Xylene	44	mg/kg	1.2E-07	mg/kg/day	--	--	--	9.0E-06	mg/kg/day	4.0E-01	mg/kg/day	0.00
				1,1'-Biphenyl	1.31	mg/kg	3.5E-09	mg/kg/day	8.0E-03	kg-day/mg	2.8E-11	2.7E-07	mg/kg/day	1.0E-01	mg/kg/day	0.00
				1,2,4,5-Tetrachlorobenzene	17.9	mg/kg	4.7E-08	mg/kg/day	--	--	--	3.7E-06	mg/kg/day	3.0E-05	mg/kg/day	0.12
				Benzo(a)anthracene	6.26	mg/kg	1.6E-08	mg/kg/day	7.3E-01	kg-day/mg	1.2E-08	1.3E-06	mg/kg/day	--	--	--
				Benzo(a)pyrene	5.5	mg/kg	1.4E-08	mg/kg/day	7.3E+00	kg-day/mg	1.1E-07	1.1E-06	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	5.06	mg/kg	1.3E-08	mg/kg/day	7.3E-01	kg-day/mg	9.7E-09	1.0E-06	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.43	mg/kg	1.1E-09	mg/kg/day	7.3E+00	kg-day/mg	8.3E-09	8.8E-08	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	4.02	mg/kg	1.1E-08	mg/kg/day	7.3E-01	kg-day/mg	7.7E-09	8.3E-07	mg/kg/day	--	--	--
				Naphthalene	5.57	mg/kg	1.5E-08	mg/kg/day	--	--	--	1.1E-06	mg/kg/day	2.0E-02	mg/kg/day	0.00
				PCB-1254	0.12	mg/kg	3.2E-10	mg/kg/day	2.0E+00	kg-day/mg	6.3E-10	2.5E-08	mg/kg/day	2.0E-05	mg/kg/day	0.00
				PCB-1260	0.29	mg/kg	7.6E-10	mg/kg/day	2.0E+00	kg-day/mg	1.5E-09	6.0E-08	mg/kg/day	--	--	--
				2,3,7,8-TCDD	4.96E-04	mg/kg	1.3E-12	mg/kg/day	1.5E+05	kg-day/mg	2.0E-07	1.0E-10	mg/kg/day	7.0E-10	mg/kg/day	0.15
				Antimony	25	mg/kg	6.6E-08	mg/kg/day	--	--	--	5.1E-06	mg/kg/day	4.0E-04	mg/kg/day	0.01
				Arsenic	15	mg/kg	4.0E-08	mg/kg/day	1.5E+00	kg-day/mg	5.9E-08	3.1E-06	mg/kg/day	3.0E-04	mg/kg/day	0.01
				Cobalt	72.3	mg/kg	1.9E-07	mg/kg/day	--	--	--	1.5E-05	mg/kg/day	3.0E-03	mg/kg/day	0.00
				Iron	62600	mg/kg	1.6E-04	mg/kg/day	--	--	--	1.3E-02	mg/kg/day	7.0E-01	mg/kg/day	0.02
				Lead	3440	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	7.34	mg/kg	1.9E-08	mg/kg/day	--	--	--	1.5E-06	mg/kg/day	4.0E-05	mg/kg/day	0.04
				Vanadium	495	mg/kg	1.3E-06	mg/kg/day	--	--	--	1.0E-04	mg/kg/day	7.0E-04	mg/kg/day	0.15
				Zinc	2700	mg/kg	7.1E-06	mg/kg/day	--	--	--	5.5E-04	mg/kg/day	3.0E-01	mg/kg/day	0.00
				Chromium, hexavalent	739	mg/kg	1.9E-06	mg/kg/day	5.0E-01	kg-day/mg	9.73E-07	1.5E-04	mg/kg/day	3.0E-03	mg/kg/day	0.05
			Exposure Route Total								**1.4E-06**					**0.6**
			Dermal Contact	1,2,3-Trichlorobenzene	18.6	mg/kg	6.70E-07	mg/kg/day	--	--	--	5.2E-05	mg/kg/day	8E-03	mg/kg/day	0.01
				1,2,4-Trichlorobenzene	71.1	mg/kg	2.56E-06	mg/kg/day	2.90E-02	kg-day/mg	7.43E-08	2.0E-04	mg/kg/day	9E-02	mg/kg/day	0.00
				1,2-Dichlorobenzene	333	mg/kg	1.20E-05	mg/kg/day	--	--	--	9.4E-04	mg/kg/day	6E-01	mg/kg/day	0.00
				1,3-Dichlorobenzene	330	mg/kg	1.19E-05	mg/kg/day	--	--	--	9.3E-04	mg/kg/day	6E-01	mg/kg/day	0.00
				1,4-Dichlorobenzene	383	mg/kg	1.38E-05	mg/kg/day	5.40E-03	kg-day/mg	7.45E-08	1.1E-03	mg/kg/day	7E-02	mg/kg/day	0.02
				Benzene	4.24	mg/kg	1.53E-07	mg/kg/day	5.50E-02	kg-day/mg	8.40E-09	1.2E-05	mg/kg/day	1E-02	mg/kg/day	0.00
				Chlorobenzene	41	mg/kg	1.48E-06	mg/kg/day	--	--	--	1.2E-04	mg/kg/day	7E-02	mg/kg/day	0.00
				Ethylbenzene	9.6	mg/kg	3.46E-07	mg/kg/day	1.00E-02	kg-day/mg	3.46E-09	2.7E-05	mg/kg/day	5E-02	mg/kg/day	0.00
				m,p-Xylenes	123	mg/kg	4.43E-06	mg/kg/day	--	--	--	3.5E-04	mg/kg/day	4E-01	mg/kg/day	0.00
				o-Xylene	44	mg/kg	1.59E-06	mg/kg/day	--	--	--	1.2E-04	mg/kg/day	4E-01	mg/kg/day	0.00
				1,1'-Biphenyl	1.31	mg/kg	4.72E-09	mg/kg/day	8.00E-03	kg-day/mg	3.78E-11	3.7E-07	mg/kg/day	1E-01	mg/kg/day	0.00
				1,2,4,5-Tetrachlorobenzene	17.9	mg/kg	6.45E-07	mg/kg/day	--	--	--	5.0E-05	mg/kg/day	3E-05	mg/kg/day	1.68
				Benzo(a)anthracene	6.26	mg/kg	2.93E-08	mg/kg/day	9.49E-02	kg-day/mg	2.78E-09	2.3E-06	mg/kg/day	--	--	--
				Benzo(a)pyrene	5.5	mg/kg	2.58E-08	mg/kg/day	9.49E-01	kg-day/mg	2.45E-08	2.0E-06	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	5.06	mg/kg	2.37E-08	mg/kg/day	9.49E-02	kg-day/mg	2.25E-09	1.8E-06	mg/kg/day	--	--	--

TABLE E-14 (RAGS Part D Table 7.7.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
				Dibenz(a,h)anthracene	0.43	mg/kg	2.01E-09	mg/kg/day	9.49E-01	kg-day/mg	1.91E-09	1.6E-07	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	4.02	mg/kg	1.88E-08	mg/kg/day	9.49E-01	kg-day/mg	1.79E-08	1.5E-06	mg/kg/day	--	--	--
				Naphthalene	5.57	mg/kg	2.61E-08	mg/kg/day	--	--	--	2.0E-06	mg/kg/day	3E-03	mg/kg/day	0.00
				PCB-1254	0.12	mg/kg	6.05E-10	mg/kg/day	2.80E-01	kg-day/mg	1.70E-10	4.7E-08	mg/kg/day	3E-06	mg/kg/day	0.02
				PCB-1260	0.29	mg/kg	1.46E-09	mg/kg/day	2.80E-01	kg-day/mg	4.10E-10	1.1E-07	mg/kg/day	--	--	--
				2,3,7,8-TCDD	4.96E-04	mg/kg	5.36E-13	mg/kg/day	4.50E+03	kg-day/mg	2.41E-09	4.2E-11	mg/kg/day	2E-11	mg/kg/day	2.09
				Antimony	25	mg/kg	1.35E-07	mg/kg/day	--	--	--	1.1E-05	mg/kg/day	6E-05	mg/kg/day	0.18
				Arsenic	15	mg/kg	1.62E-08	mg/kg/day	4.50E-02	kg-day/mg	7.30E-10	1.3E-06	mg/kg/day	9E-06	mg/kg/day	0.14
				Cobalt	72.3	mg/kg	2.61E-06	mg/kg/day	--	--	--	2.0E-04	mg/kg/day	3E-03	mg/kg/day	0.07
				Iron	62600	mg/kg	2.26E-03	mg/kg/day	--	--	--	1.8E-01	mg/kg/day	7E-01	mg/kg/day	0.25
				Lead	3440	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	7.34	mg/kg	2.65E-07	mg/kg/day	--	--	--	2.1E-05	mg/kg/day	4E-05	mg/kg/day	0.52
				Vanadium	495	mg/kg	4.64E-07	mg/kg/day	--	--	--	3.6E-05	mg/kg/day	2E-05	mg/kg/day	1.81
				Zinc	2700	mg/kg	9.73E-05	mg/kg/day	--	--	--	7.6E-03	mg/kg/day	3E-01	mg/kg/day	0.03
				Chromium, hexavalent	739	mg/kg	6.66E-07	mg/kg/day	1.3E-02	kg-day/mg	8.32E-09	5.2E-05	mg/kg/day	8E-05	mg/kg/day	0.65
			Exposure Route Total								**2.2E-07**					**7.5**
			Inhalation	1,2,3-Trichlorobenzene	1.33E-08	mg/m^3	9.33E-12	mg/m^3	--	--	--	7.3E-10	mg/m^3	--	--	--
				1,2,4-Trichlorobenzene	5.08E-08	mg/m^3	3.57E-11	mg/m^3	--	--	--	2.8E-09	mg/m^3	2E-02	mg/m^3	0.00
				1,2-Dichlorobenzene	2.38E-07	mg/m^3	1.67E-10	mg/m^3	--	--	--	1.3E-08	mg/m^3	2E+00	mg/m^3	0.00
				1,3-Dichlorobenzene	2.36E-07	mg/m^3	1.66E-10	mg/m^3	--	--	--	1.3E-08	mg/m^3	2E+00	mg/m^3	0.00
				1,4-Dichlorobenzene	2.74E-07	mg/m^3	1.92E-10	mg/m^3	1.10E-02	m^3/mg	2.1E-12	1.5E-08	mg/m^3	8E-01	mg/m^3	0.00
				Benzene	3.03E-09	mg/m^3	2.13E-12	mg/m^3	7.80E-03	m^3/mg	1.7E-14	1.7E-10	mg/m^3	8E-02	mg/m^3	0.00
				Chlorobenzene	2.93E-08	mg/m^3	2.06E-11	mg/m^3	--	--	--	1.6E-09	mg/m^3	5E-01	mg/m^3	0.00
				Ethylbenzene	6.86E-09	mg/m^3	4.82E-12	mg/m^3	2.50E-03	m^3/mg	1.2E-14	3.8E-10	mg/m^3	9E+00	mg/m^3	0.00
				m,p-Xylenes	8.79E-08	mg/m^3	6.17E-11	mg/m^3		m^3/mg	0.0E+00	4.8E-09	mg/m^3	4E-01	mg/m^3	0.00
				o-Xylene	3.14E-08	mg/m^3	2.21E-11	mg/m^3		m^3/mg	0.0E+00	1.7E-09	mg/m^3	4E-01	mg/m^3	0.00
				1,1'-Biphenyl	9.36E-10	mg/m^3	6.57E-13	mg/m^3		m^3/mg	0.0E+00	5.1E-11	mg/m^3	4E-03	mg/m^3	0.00
				1,2,4,5-Tetrachlorobenzene	1.28E-08	mg/m^3	8.98E-12	mg/m^3	--	--	--	7.0E-10	mg/m^3	--	--	--
				Benzo(a)anthracene	4.47E-09	mg/m^3	3.14E-12	mg/m^3	1.10E-01	m^3/mg	3.5E-13	2.5E-10	mg/m^3	--	--	--
				Benzo(a)pyrene	3.93E-09	mg/m^3	2.76E-12	mg/m^3	1.10E+00	m^3/mg	3.0E-12	2.2E-10	mg/m^3	--	--	--
				Benzo(b)fluoranthene	3.61E-09	mg/m^3	2.54E-12	mg/m^3	1.10E-01	m^3/mg	2.8E-13	2.0E-10	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	3.07E-10	mg/m^3	2.16E-13	mg/m^3	1.20E+00	m^3/mg	2.6E-13	1.7E-11	mg/m^3	--	--	--
				Indeno(1,2,3-cd)pyrene	2.87E-09	mg/m^3	2.02E-12	mg/m^3	1.10E-01	m^3/mg	2.2E-13	1.6E-10	mg/m^3	--	--	--
				Naphthalene	3.98E-09	mg/m^3	2.79E-12	mg/m^3	3.40E-02	m^3/mg	9.5E-14	2.2E-10	mg/m^3	3E-03	mg/m^3	0.00
				PCB-1254	8.57E-11	mg/m^3	6.02E-14	mg/m^3	5.7E-01	m^3/mg	3.4E-14	4.7E-12	mg/m^3	--	--	--
				PCB-1260	2.07E-10	mg/m^3	1.46E-13	mg/m^3	5.7E-01	m^3/mg	8.3E-14	1.1E-11	mg/m^3	--	--	--
				2,3,7,8-TCDD	3.54E-13	mg/m^3	2.49E-16	mg/m^3	3.8E+04	m^3/mg	9.5E-12	1.9E-14	mg/m^3	4E-08	mg/m^3	0.00
				Antimony	1.79E-08	mg/m^3	1.25E-11	mg/m^3	--	--	--	9.8E-10	mg/m^3	--	--	--
				Arsenic	1.07E-08	mg/m^3	7.53E-12	mg/m^3	4.3E+00	m^3/mg	3.2E-11	5.9E-10	mg/m^3	1.5E-05	mg/m^3	0.00
				Cobalt	5.16E-08	mg/m^3	3.63E-11	mg/m^3	9.0E+02	m^3/mg	3.3E-08	2.8E-09	mg/m^3	2E-05	mg/m^3	0.00
				Iron	4.47E-05	mg/m^3	3.14E-08	mg/m^3	--	--	--	2.5E-06	mg/m^3	--	--	--
				Lead	2.46E-06	mg/m^3	--	--	--	--	--	--	--	--	--	--
				Thallium	5.24E-09	mg/m^3	3.68E-12	mg/m^3	--	--	--	2.9E-10	mg/m^3	--	--	--
				Vanadium	3.54E-07	mg/m^3	2.48E-10	mg/m^3	--	--	--	1.9E-08	mg/m^3	--	--	--
				Zinc	1.93E-06	mg/m^3	1.35E-09	mg/m^3	--	--	--	1.1E-07	mg/m^3	--	--	--
				Chromium, hexavalent	5.28E-07	mg/m^3	3.71E-10	mg/m^3	1.20E+01	m^3/mg	4.4E-09	2.9E-08	mg/m^3	1E-04	mg/m^3	0.00

TABLE E-14 (RAGS Part D Table 7.7.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
			Exposure Route Total								**3.7E-08**					**0.0**
		Exposure Point Total									**1.6E-06**					**8.0**
	Exposure Medium Total										**1.6E-06**					**8.0**
Soil Total											**1.6E-06**					**8.0**
Shallow Groundwater	**Shallow Groundwater**	**Western Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.00054	mg/L	7.1E-05	mg/kg/day	2.90E-02	kg-day/mg	2.1E-06	5.5E-03	mg/kg/day	9E-02	mg/kg/day	0.06
				1,2-Dichlorobenzene	0.0004	mg/L	2.6E-05	mg/kg/day	--	--	--	2.0E-03	mg/kg/day	6E-01	mg/kg/day	0.00
				1,3-Dichlorobenzene	0.00018	mg/L	1.9E-05	mg/kg/day	--	--	--	1.5E-03	mg/kg/day	6E-01	mg/kg/day	0.00
				1,4-Dichlorobenzene	0.0023	mg/L	1.6E-04	mg/kg/day	5.40E-03	kg-day/mg	8.5E-07	0.0E+00	mg/kg/day	7E-02	mg/kg/day	0.00
				Benzene	0.024	mg/L	4.8E-04	mg/kg/day	5.50E-02	kg-day/mg	2.6E-05	3.7E-02	mg/kg/day	1E-02	mg/kg/day	3.73
				Chlorobenzene	0.083	mg/L	3.2E-03	mg/kg/day	--	--	--	2.5E-01	mg/kg/day	7E-02	mg/kg/day	3.58
				Ethylbenzene	0.0029	mg/L	2.2E-04	mg/kg/day	1.00E-02	kg-day/mg	2.2E-06	1.7E-02	mg/kg/day	5E-02	mg/kg/day	0.34
				Xylene (total)	0.012	mg/L	9.8E-04	mg/kg/day	--	--	--	7.6E-02	mg/kg/day	4E-01	mg/kg/day	0.19
				1,1'-Biphenyl	0.0075	mg/L	--	--	8.00E-03	kg-day/mg	--	--	--	--	--	--
				2-Methylnaphthalene	0.15	mg/L	--	--	--	--	--	--	--	--	--	--
				Acenaphthene	0.017	mg/L	--	--	--	--	--	--	--	--	--	--
				Naphthalene	1.25	mg/L	9.3E-02	mg/kg/day	--	--	--	7.3E+00	mg/kg/day	3E-03	mg/kg/day	2418.01
				Aluminum	0.78	mg/L	--	--	--	--	--	--	--	--	--	--
				Antimony	0.0033	mg/L	--	--	--	--	--	--	--	--	--	--
				Arsenic	0.0058	mg/L	--	--	4.50E-02	kg-day/mg	--	--	--	--	--	--
				Barium	0.21	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.00034	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium	1.24	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0012	mg/L	--	--	--	--	--	--	--	--	--	--
				Iron	14	mg/L	--	--	--	--	--	--	--	--	--	--
				Lead	0.011	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.31	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.000076	mg/L	--	--	--	--	--	--	--	--	--	--
				Thallium	0.0032	mg/L	--	--	--	--	--	--	--	--	--	--
				Vanadium	0.015	mg/L	--	--	--	--	--	--	--	--	--	--
				Zinc	0.54	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium, hexavalent	1.08	mg/L	--	--	1.25E-02	kg-day/mg	--	--	--	--	--	--
			Exposure Route Total								**2.9E-05**					**2426**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.00054	mg/L	1.28E-09	mg/kg/day	2.9E-02	kg-day/mg	3.7E-11	1.0E-07	mg/kg/day	9E-02	mg/kg/day	0.00
				1,2-Dichlorobenzene	0.0004	mg/L	9.48E-10	mg/kg/day	--	--	--	7.4E-08	mg/kg/day	6E-01	mg/kg/day	0.00
				1,3-Dichlorobenzene	0.00018	mg/L	4.27E-10	mg/kg/day	--	--	--	3.3E-08	mg/kg/day	6E-01	mg/kg/day	0.00
				1,4-Dichlorobenzene	0.0023	mg/L	5.45E-09	mg/kg/day	5.4E-03	kg-day/mg	2.9E-11	4.3E-07	mg/kg/day	7E-02	mg/kg/day	0.00
				Benzene	0.024	mg/L	5.69E-08	mg/kg/day	5.5E-02	kg-day/mg	3.1E-09	4.4E-06	mg/kg/day	1E-02	mg/kg/day	0.00
				Chlorobenzene	0.083	mg/L	1.97E-07	mg/kg/day	--	--	--	1.5E-05	mg/kg/day	7E-02	mg/kg/day	0.00
				Ethylbenzene	0.0029	mg/L	6.88E-09	mg/kg/day	1.0E-02	kg-day/mg	6.9E-11	5.4E-07	mg/kg/day	5E-02	mg/kg/day	0.00
				Xylene (total)	0.012	mg/L	2.85E-08	mg/kg/day	--	--	--	2.2E-06	mg/kg/day	4E-01	mg/kg/day	0.00
				1,1'-Biphenyl	0.0075	mg/L	1.78E-08	mg/kg/day	8.0E-03	kg-day/mg	1.4E-10	1.4E-06	mg/kg/day	1E-01	mg/kg/day	0.00
				2-Methylnaphthalene	0.15	mg/L	3.56E-07	mg/kg/day	--	--	--	2.8E-05	mg/kg/day	4E-03	mg/kg/day	0.01
				Acenaphthene	0.017	mg/L	4.03E-08	mg/kg/day	--	--	--	3.1E-06	mg/kg/day	2E-01	mg/kg/day	0.00
				Naphthalene	1.25	mg/L	2.96E-06	mg/kg/day	--	--	--	2.3E-04	mg/kg/day	2E-02	mg/kg/day	0.01
				Aluminum	0.78	mg/L	1.85E-06	mg/kg/day	--	--	--	1.4E-04	mg/kg/day	1E+00	mg/kg/day	0.00
				Antimony	0.0033	mg/L	7.82E-09	mg/kg/day	--	--	--	6.1E-07	mg/kg/day	4E-04	mg/kg/day	0.00

TABLE E-14 (RAGS Part D Table 7.7.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Arsenic	0.0058	mg/L	1.38E-08	mg/kg/day	1.5E+00	kg-day/mg	2.1E-08	1.1E-06	mg/kg/day	3E-04	mg/kg/day	0.00
				Barium	0.21	mg/L	4.98E-07	mg/kg/day	--	--	--	3.9E-05	mg/kg/day	2E-01	mg/kg/day	0.00
				Cadmium	0.00034	mg/L	8.06E-10	mg/kg/day	--	--	--	6.3E-08	mg/kg/day	1E-03	mg/kg/day	0.00
				Chromium	1.24	mg/L	2.94E-06	mg/kg/day	--	--	--	2.3E-04	mg/kg/day	1.5E+00	mg/kg/day	0.00
				Cobalt	0.0012	mg/L	2.85E-09	mg/kg/day	--	--	--	2.2E-07	mg/kg/day	3E-03	mg/kg/day	0.00
				Iron	14	mg/L	3.32E-05	mg/kg/day	--	--	--	2.6E-03	mg/kg/day	7E-01	mg/kg/day	0.00
				Lead	0.011	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.31	mg/L	7.35E-07	mg/kg/day	--	--	--	5.7E-05	mg/kg/day	1E-01	mg/kg/day	0.00
				Mercury	0.000076	mg/L	1.80E-10	mg/kg/day	--	--	--	1.4E-08	mg/kg/day	2E-04	mg/kg/day	0.00
				Thallium	0.0032	mg/L	7.59E-09	mg/kg/day	--	--	--	5.9E-07	mg/kg/day	4E-05	mg/kg/day	0.01
				Vanadium	0.015	mg/L	3.56E-08	mg/kg/day	--	--	--	2.8E-06	mg/kg/day	7E-04	mg/kg/day	0.00
				Zinc	0.54	mg/L	1.28E-06	mg/kg/day	--	--	--	1.0E-04	mg/kg/day	3E-01	mg/kg/day	0.00
				Chromium, hexavalent	1.08	mg/L	2.56E-06	mg/kg/day	5.0E-01	kg-day/mg	1.3E-06	2.0E-04	mg/kg/day	3E-03	mg/kg/day	0.07
			Exposure Route Total								**1.3E-06**					**0.1**
		Exposure Point Total									**3.1E-05**					**2426**
	Exposure Medium Total										**3.1E-05**					**2426**
Groundwater Total											**3.1E-05**					**2426**
							Total of Receptor Risks Across All Media				**3.2E-05**	**Total of Receptor Hazards Across All Media**				**2434**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-15 (RAGS Part D Table 7.8.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface and Subsurface Soil (0-2 feet bgs)	**Surface and Subsurface Soil (0-2 feet bgs)**	**Western Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	210	mg/kg	4.0E-06	mg/kg/day	--	--	--	3.1E-04	mg/kg/day	8.0E-03	mg/kg/day	0.039
				1,2,4-Trichlorobenzene	161	mg/kg	3.0E-06	mg/kg/day	2.9E-02	kg-day/mg	8.8E-08	2.4E-04	mg/kg/day	9.0E-02	mg/kg/day	0.003
				1,2-Dichlorobenzene	606	mg/kg	1.1E-05	mg/kg/day	--	--	--	8.9E-04	mg/kg/day	6.0E-01	mg/kg/day	0.001
				1,3-Dichlorobenzene	631	mg/kg	1.2E-05	mg/kg/day	--	--	--	9.3E-04	mg/kg/day	6.0E-01	mg/kg/day	0.002
				1,4-Dichlorobenzene	730	mg/kg	1.4E-05	mg/kg/day	5.4E-03	kg-day/mg	7.4E-08	1.1E-03	mg/kg/day	7.0E-02	mg/kg/day	0.015
				Benzene	25.3	mg/kg	4.8E-07	mg/kg/day	5.5E-02	kg-day/mg	2.6E-08	3.7E-05	mg/kg/day	1.0E-02	mg/kg/day	0.004
				Chlorobenzene	189	mg/kg	3.6E-06	mg/kg/day	--	--		2.8E-04	mg/kg/day	7.0E-02	mg/kg/day	0.004
				Ethylbenzene	95	mg/kg	1.8E-06	mg/kg/day	1.0E-02	kg-day/mg	1.8E-08	1.4E-04	mg/kg/day	5.0E-02	mg/kg/day	0.003
				m,p-Xylenes	1700	mg/kg	3.2E-05	mg/kg/day	--	--	--	2.5E-03	mg/kg/day	4.0E-01	mg/kg/day	0.006
				o-Xylene	600	mg/kg	1.1E-05	mg/kg/day	--	--	--	8.8E-04	mg/kg/day	4.0E-01	mg/kg/day	0.002
				1,1'-Biphenyl	17.4	mg/kg	3.3E-07	mg/kg/day	8.0E-03	kg-day/mg	2.6E-09	2.6E-05	mg/kg/day	1.0E-01	mg/kg/day	0.000
				1,2,4,5-Tetrachlorobenzene	44.4	mg/kg	8.4E-07	mg/kg/day	--	--	--	6.5E-05	mg/kg/day	3.0E-05	mg/kg/day	2.174
				Benzo(a)anthracene	40.2	mg/kg	7.6E-07	mg/kg/day	7.3E-01	kg-day/mg	5.5E-07	5.9E-05	mg/kg/day	--	--	--
				Benzo(a)pyrene	35.8	mg/kg	6.7E-07	mg/kg/day	7.3E+00	kg-day/mg	4.9E-06	5.3E-05	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.5	mg/kg	5.2E-07	mg/kg/day	7.3E-01	kg-day/mg	3.8E-07	4.0E-05	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.79	mg/kg	1.5E-08	mg/kg/day	7.3E+00	kg-day/mg	1.1E-07	1.2E-06	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	23.4	mg/kg	4.4E-07	mg/kg/day	7.3E-01	kg-day/mg	3.2E-07	3.4E-05	mg/kg/day	--	--	--
				Naphthalene	45.4	mg/kg	8.6E-07	mg/kg/day	--	--	--	6.7E-05	mg/kg/day	2.0E-02	mg/kg/day	0.003
				PCB-1254	0.42	mg/kg	7.9E-09	mg/kg/day	2.0E+00	kg-day/mg	1.6E-08	6.2E-07	mg/kg/day	2.0E-05	mg/kg/day	0.031
				PCB-1260	0.55	mg/kg	1.0E-08	mg/kg/day	2.0E+00	kg-day/mg	2.1E-08	8.1E-07	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.27E-03	mg/kg	2.4E-11	mg/kg/day	1.5E+05	kg-day/mg	3.6E-06	1.9E-09	mg/kg/day	7.0E-10	mg/kg/day	2.666
				Antimony	37.4	mg/kg	7.0E-07	mg/kg/day	--	--	--	5.5E-05	mg/kg/day	4.0E-04	mg/kg/day	0.137
				Arsenic	16.8	mg/kg	3.2E-07	mg/kg/day	1.5E+00	kg-day/mg	4.7E-07	2.5E-05	mg/kg/day	3.0E-04	mg/kg/day	0.082
				Cobalt	162	mg/kg	3.1E-06	mg/kg/day	--	--	--	2.4E-04	mg/kg/day	3.0E-03	mg/kg/day	0.079
				Iron	84800	mg/kg	1.6E-03	mg/kg/day	--	--	--	1.2E-01	mg/kg/day	7.0E-01	mg/kg/day	0.178
				Lead	15800	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	1.39	mg/kg	2.6E-08	mg/kg/day	--	--	--	2.0E-06	mg/kg/day	4.0E-05	mg/kg/day	0.051
				Vanadium	1080	mg/kg	2.0E-05	mg/kg/day	--	--	--	1.6E-03	mg/kg/day	7.0E-04	mg/kg/day	2.267
				Zinc	12500	mg/kg	2.4E-04	mg/kg/day	--	--	--	1.8E-02	mg/kg/day	3.0E-01	mg/kg/day	0.061
				Chromium, hexavalent	2280	mg/kg	4.3E-05	mg/kg/day	5.0E-01	kg-day/mg	2.1E-05	3.3E-03	mg/kg/day	3.0E-03	mg/kg/day	1.117
			Exposure Route Total								**3.2E-05**					**8.9**
			Dermal Contact	1,2,3-Trichlorobenzene	210	mg/kg	2.02E-05	mg/kg/day	--	--	--	1.6E-03	mg/kg/day	8E-03	mg/kg/day	0.197
				1,2,4-Trichlorobenzene	161	mg/kg	1.55E-05	mg/kg/day	2.90E-02	kg-day/mg	4.49E-07	1.2E-03	mg/kg/day	9E-02	mg/kg/day	0.013
				1,2-Dichlorobenzene	606	mg/kg	5.82E-05	mg/kg/day	--	--	--	4.5E-03	mg/kg/day	6E-01	mg/kg/day	0.008
				1,3-Dichlorobenzene	631	mg/kg	6.06E-05	mg/kg/day	--	--	--	4.7E-03	mg/kg/day	6E-01	mg/kg/day	0.008
				1,4-Dichlorobenzene	730	mg/kg	7.02E-05	mg/kg/day	5.40E-03	kg-day/mg	3.79E-07	5.5E-03	mg/kg/day	7E-02	mg/kg/day	0.078
				Benzene	25.3	mg/kg	2.43E-06	mg/kg/day	5.50E-02	kg-day/mg	1.34E-07	1.9E-04	mg/kg/day	1E-02	mg/kg/day	0.019
				Chlorobenzene	189	mg/kg	1.82E-05	mg/kg/day	--	--	--	1.4E-03	mg/kg/day	7E-02	mg/kg/day	0.020
				Ethylbenzene	95	mg/kg	9.13E-06	mg/kg/day	1.00E-02	kg-day/mg	9.13E-08	7.1E-04	mg/kg/day	5E-02	mg/kg/day	0.014
				m,p-Xylenes	1700	mg/kg	1.63E-04	mg/kg/day	--	--	--	1.3E-02	mg/kg/day	4E-01	mg/kg/day	0.032
				o-Xylene	600	mg/kg	5.77E-05	mg/kg/day	--	--	--	4.5E-03	mg/kg/day	4E-01	mg/kg/day	0.011
				1,1'-Biphenyl	17.4	mg/kg	1.67E-07	mg/kg/day	8.00E-03	kg-day/mg	1.34E-09	1.3E-05	mg/kg/day	1E-01	mg/kg/day	0.000
				1,2,4,5-Tetrachlorobenzene	44.4	mg/kg	4.27E-06	mg/kg/day	--	--	--	3.3E-04	mg/kg/day	3E-05	mg/kg/day	11.094
				Benzo(a)anthracene	40.2	mg/kg	5.02E-07	mg/kg/day	9.49E-02	kg-day/mg	4.77E-08	3.9E-05	mg/kg/day	--	--	--
				Benzo(a)pyrene	35.8	mg/kg	4.47E-07	mg/kg/day	9.49E-01	kg-day/mg	4.24E-07	3.5E-05	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.5	mg/kg	3.44E-07	mg/kg/day	9.49E-02	kg-day/mg	3.26E-08	2.7E-05	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.79	mg/kg	9.87E-09	mg/kg/day	9.49E-01	kg-day/mg	9.37E-09	7.7E-07	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	23.4	mg/kg	2.92E-07	mg/kg/day	9.49E-01	kg-day/mg	2.77E-07	2.3E-05	mg/kg/day	--	--	--

TABLE E-15 (RAGS Part D Table 7.8.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Naphthalene	45.4	mg/kg	5.67E-07	mg/kg/day	--	--	--	4.4E-05	mg/kg/day	3E-03	mg/kg/day	0.015
				PCB-1254	0.42	mg/kg	5.65E-09	mg/kg/day	2.80E-01	kg-day/mg	1.58E-09	4.4E-07	mg/kg/day	3E-06	mg/kg/day	0.147
				PCB-1260	0.55	mg/kg	7.40E-09	mg/kg/day	2.80E-01	kg-day/mg	2.07E-09	5.8E-07	mg/kg/day	--	--	--
				2,3,7,8-TCDD	1.27E-03	mg/kg	3.66E-12	mg/kg/day	4.50E+03	kg-day/mg	1.65E-08	2.9E-10	mg/kg/day	2E-11	mg/kg/day	14.280
				Antimony	37.4	mg/kg	5.39E-07	mg/kg/day	--	--	--	4.2E-05	mg/kg/day	6E-05	mg/kg/day	0.701
				Arsenic	16.8	mg/kg	4.84E-08	mg/kg/day	4.50E-02	kg-day/mg	2.18E-09	3.8E-06	mg/kg/day	9E-06	mg/kg/day	0.420
				Cobalt	162	mg/kg	1.56E-05	mg/kg/day	--	--	--	1.2E-03	mg/kg/day	3E-03	mg/kg/day	0.405
				Iron	84800	mg/kg	8.15E-03	mg/kg/day	--	--	--	6.4E-01	mg/kg/day	7E-01	mg/kg/day	0.908
				Lead	15800	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	1.39	mg/kg	1.34E-07	mg/kg/day	--	--	--	1.0E-05	mg/kg/day	4E-05	mg/kg/day	0.260
				Vanadium	1080	mg/kg	2.70E-06	mg/kg/day	--	--	--	2.1E-04	mg/kg/day	2E-05	mg/kg/day	10.524
				Zinc	12500	mg/kg	1.20E-03	mg/kg/day	--	--	--	9.4E-02	mg/kg/day	3E-01	mg/kg/day	0.312
				Chromium, hexavalent	2280	mg/kg	5.48E-06	mg/kg/day	1.3E-02	kg-day/mg	6.85E-08	4.3E-04	mg/kg/day	8E-05	mg/kg/day	5.341
			Exposure Route Total								**1.9E-06**					**44.8**
			Inhalation	1,2,3-Trichlorobenzene	1.50E-07	mg/m^3	2.28E-10	mg/m^3	--	--	--	1.78E-08	mg/m3	--	--	--
				1,2,4-Trichlorobenzene	1.15E-07	mg/m^3	1.75E-10	mg/m^3	--	--	--	1.37E-08	mg/m3	2E-02	mg/m^3	0.000
				1,2-Dichlorobenzene	4.33E-07	mg/m^3	6.59E-10	mg/m^3	--	--	--	5.14E-08	mg/m3	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	4.51E-07	mg/m^3	6.86E-10	mg/m^3	--	--	--	5.35E-08	mg/m3	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	5.21E-07	mg/m^3	7.94E-10	mg/m^3	1.10E-02	m^3/mg	8.7E-12	6.19E-08	mg/m3	8E-01	mg/m^3	0.000
				Benzene	1.81E-08	mg/m^3	2.75E-11	mg/m^3	7.80E-03	m^3/mg	2.1E-13	2.15E-09	mg/m3	8E-02	mg/m^3	0.000
				Chlorobenzene	1.35E-07	mg/m^3	2.05E-10	mg/m^3	--	--	--	1.60E-08	mg/m3	5E-01	mg/m^3	0.000
				Ethylbenzene	6.79E-08	mg/m^3	1.03E-10	mg/m^3	2.50E-03	m^3/mg	2.6E-13	8.06E-09	mg/m3	9E+00	mg/m^3	0.000
				m,p-Xylenes	1.21E-06	mg/m^3	1.85E-09	mg/m^3	--	--	--	1.44E-07	mg/m3	4E-01	mg/m^3	0.000
				o-Xylene	4.29E-07	mg/m^3	6.52E-10	mg/m^3	--	--	--	5.09E-08	mg/m3	4E-01	mg/m^3	0.000
				1,1'-Biphenyl	1.24E-08	mg/m^3	1.89E-11	mg/m^3	--	--	--	1.48E-09	mg/m3	4E-03	mg/m^3	0.000
				1,2,4,5-Tetrachlorobenzene	3.17E-08	mg/m^3	4.83E-11	mg/m^3	--	--	--	3.77E-09	mg/m3	--	--	--
				Benzo(a)anthracene	2.87E-08	mg/m^3	4.37E-11	mg/m^3	1.10E-01	m^3/mg	4.8E-12	3.41E-09	mg/m3	--	--	--
				Benzo(a)pyrene	2.56E-08	mg/m^3	3.89E-11	mg/m^3	1.10E+00	m^3/mg	4.3E-11	3.04E-09	mg/m3	--	--	--
				Benzo(b)fluoranthene	1.96E-08	mg/m^3	2.99E-11	mg/m^3	1.10E-01	m^3/mg	3.3E-12	2.33E-09	mg/m3	--	--	--
				Dibenz(a,h)anthracene	5.64E-10	mg/m^3	8.59E-13	mg/m^3	1.20E+00	m^3/mg	1.0E-12	6.70E-11	mg/m3	--	--	--
				Indeno(1,2,3-cd)pyrene	1.67E-08	mg/m^3	2.54E-11	mg/m^3	1.10E-01	m^3/mg	2.8E-12	1.98E-09	mg/m3	--	--	--
				Naphthalene	3.24E-08	mg/m^3	4.94E-11	mg/m^3	3.40E-02	m^3/mg	1.7E-12	3.85E-09	mg/m3	3E-03	mg/m^3	0.000
				PCB-1254	3.00E-10	mg/m^3	4.57E-13	mg/m^3	5.7E-01	m^3/mg	2.6E-13	3.56E-11	mg/m3	--	--	--
				PCB-1260	3.93E-10	mg/m^3	5.98E-13	mg/m^3	5.7E-01	m^3/mg	3.4E-13	4.66E-11	mg/m3	--	--	--
				2,3,7,8-TCDD	9.07E-13	mg/m^3	1.38E-15	mg/m^3	3.8E+04	m^3/mg	5.2E-11	1.08E-13	mg/m3	4E-08	mg/m^3	0.000
				Antimony	2.67E-08	mg/m^3	4.07E-11	mg/m^3	--	--	--	3.17E-09	mg/m3	--	--	--
				Arsenic	1.20E-08	mg/m^3	1.83E-11	mg/m^3	4.3E+00	m^3/mg	7.9E-11	1.42E-09	mg/m3	1.5E-05	mg/m^3	0.000
				Cobalt	1.16E-07	mg/m^3	1.76E-10	mg/m^3	9.0E+02	m^3/mg	1.6E-07	1.37E-08	mg/m3	2E-05	mg/m^3	0.001
				Iron	6.06E-05	mg/m^3	9.22E-08	mg/m^3	--	--	--	7.19E-06	mg/m3	--	--	--
				Lead	1.13E-05	mg/m^3	--	--	--	--	--	--	--	--	--	--
				Thallium	9.93E-10	mg/m^3	1.51E-12	mg/m^3	--	--	--	1.18E-10	mg/m3	--	--	--
				Vanadium	7.71E-07	mg/m^3	1.17E-09	mg/m^3	--	--	--	9.16E-08	mg/m3	--	--	--
				Zinc	8.93E-06	mg/m^3	1.36E-08	mg/m^3	--	--	--	1.06E-06	mg/m3	--	--	--
				Chromium, hexavalent	1.63E-06	mg/m^3	2.48E-09	mg/m^3	1.20E+01	m^3/mg	3.0E-08	1.93E-07	mg/m3	1E-04	mg/m^3	0.002
			Exposure Route Total								**1.9E-07**					**0.0**
		Exposure Point Total									**3.4E-05**					**53.7**
	Exposure Medium Total										**3.4E-05**					**53.7**

TABLE E-15 (RAGS Part D Table 7.8.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Soil Total											**3.4E-05**					**53.7**
Shallow Groundwater	**Western Area**	**Western Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.00089	mg/L	7.8E-05	mg/kg/day	2.90E-02	kg-day/mg	2.3E-06	6.1E-03	mg/kg/day	9E-02	mg/kg/day	0.068
				1,2-Dichlorobenzene	0.01	mg/L	4.4E-04	mg/kg/day	--	--	--	3.4E-02	mg/kg/day	6E-01	mg/kg/day	0.057
				1,3-Dichlorobenzene	0.0034	mg/L	2.4E-04	mg/kg/day	--	--	--	1.9E-02	mg/kg/day	6E-01	mg/kg/day	0.032
				1,4-Dichlorobenzene	0.0044	mg/L	2.0E-04	mg/kg/day	5.40E-03	kg-day/mg	1.1E-06	1.6E-02	mg/kg/day	7E-02	mg/kg/day	0.224
				Benzene	0.085	mg/L	1.1E-03	mg/kg/day	5.50E-02	kg-day/mg	6.2E-05	8.8E-02	mg/kg/day	1E-02	mg/kg/day	8.818
				Chlorobenzene	0.32	mg/L	8.3E-03	mg/kg/day	--	--	--	6.4E-01	mg/kg/day	7E-02	mg/kg/day	9.200
				Ethylbenzene	0.01	mg/L	5.0E-04	mg/kg/day	1.00E-02	kg-day/mg	5.0E-06	3.9E-02	mg/kg/day	5E-02	mg/kg/day	0.783
				Xylene (total)	0.039	mg/L	2.1E-03	mg/kg/day	--	--	--	1.7E-01	mg/kg/day	4E-01	mg/kg/day	0.413
				1,1'-Biphenyl	0.028	mg/L	--	--	8.00E-03	kg-day/mg	--	--	--	--	--	--
				2-Methylnaphthalene	0.59	mg/L	--	--	--	--	--	--	--	--	--	--
				Acenaphthene	0.061	mg/L	--	--	--	--	--	--	--	--	--	--
				Naphthalene	5	mg/L	2.5E-01	mg/kg/day	--	--	--	1.9E+01	mg/kg/day	3E-03	mg/kg/day	6448
				Aluminum	1.75	mg/L	--	--	--	--	--	--	--	--	--	--
				Antimony	0.0044	mg/L	--	--	--	--	--	--	--	--	--	--
				Arsenic	0.016	mg/L	--	--	4.50E-02	kg-day/mg	--	--	--	--	--	--
				Barium	0.352	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.00067	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium	4.69	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0028	mg/L	--	--	--	--	--	--	--	--	--	--
				Iron	46.1	mg/L	--	--	--	--	--	--	--	--	--	--
				Lead	0.0377	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.701	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.00012	mg/L	--	--	--	--	--	--	--	--	--	--
				Thallium	0.0036	mg/L	--	--	--	--	--	--	--	--	--	--
				Vanadium	0.0487	mg/L	--	--	--	--	--	--	--	--	--	--
				Zinc	1.94	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium, hexavalent	4.07	mg/L	--	--	1.25E-02	kg-day/mg	--	--	--	--	--	--
			Exposure Route Total								**1.7E-04**					**6629**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.00089	mg/L	1.37E-08	mg/kg/day	2.9E-02	kg-day/mg	4.0E-10	1.1E-06	mg/kg/day	9E-02	mg/kg/day	0.000
				1,2-Dichlorobenzene	0.01	mg/L	1.54E-07	mg/kg/day	--	--	--	1.2E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	0.0034	mg/L	5.24E-08	mg/kg/day	--	--	--	4.1E-06	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	0.0044	mg/L	6.78E-08	mg/kg/day	5.4E-03	kg-day/mg	3.7E-10	5.3E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.085	mg/L	1.31E-06	mg/kg/day	5.5E-02	kg-day/mg	7.2E-08	1.0E-04	mg/kg/day	1E-02	mg/kg/day	0.010
				Chlorobenzene	0.32	mg/L	4.93E-06	mg/kg/day	--	--	--	3.8E-04	mg/kg/day	7E-02	mg/kg/day	0.005
				Ethylbenzene	0.01	mg/L	1.54E-07	mg/kg/day	1.0E-02	kg-day/mg	1.5E-09	1.2E-05	mg/kg/day	5E-02	mg/kg/day	0.000
				Xylene (total)	0.039	mg/L	6.01E-07	mg/kg/day	--	--	--	4.7E-05	mg/kg/day	4E-01	mg/kg/day	0.000
				1,1'-Biphenyl	0.028	mg/L	4.32E-07	mg/kg/day	8.0E-03	kg-day/mg	3.5E-09	3.4E-05	mg/kg/day	1E-01	mg/kg/day	0.000
				2-Methylnaphthalene	0.59	mg/L	9.09E-06	mg/kg/day	--	--	--	7.1E-04	mg/kg/day	4E-03	mg/kg/day	0.177
				Acenaphthene	0.061	mg/L	9.40E-07	mg/kg/day	--	--	--	7.3E-05	mg/kg/day	2E-01	mg/kg/day	0.000
				Naphthalene	5	mg/L	7.71E-05	mg/kg/day	--	--	--	6.0E-03	mg/kg/day	2E-02	mg/kg/day	0.301
				Aluminum	1.75	mg/L	2.70E-05	mg/kg/day	--	--	--	2.1E-03	mg/kg/day	1E+00	mg/kg/day	0.002
				Antimony	0.0044	mg/L	6.78E-08	mg/kg/day	--	--	--	5.3E-06	mg/kg/day	4E-04	mg/kg/day	0.013
				Arsenic	0.016	mg/L	2.47E-07	mg/kg/day	1.5E+00	kg-day/mg	3.7E-07	1.9E-05	mg/kg/day	3E-04	mg/kg/day	0.064
				Barium	0.352	mg/L	5.42E-06	mg/kg/day	--	--	--	4.2E-04	mg/kg/day	2E-01	mg/kg/day	0.002
				Cadmium	0.00067	mg/L	1.03E-08	mg/kg/day	--	--	--	8.1E-07	mg/kg/day	1E-03	mg/kg/day	0.001
				Chromium	4.69	mg/L	7.23E-05	mg/kg/day	--	--	--	5.6E-03	mg/kg/day	1.5E+00	mg/kg/day	0.004
				Cobalt	0.0028	mg/L	4.32E-08	mg/kg/day	--	--	--	3.4E-06	mg/kg/day	3E-03	mg/kg/day	0.001

TABLE E-15 (RAGS Part D Table 7.8.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Iron	46.1	mg/L	7.10E-04	mg/kg/day	--	--	--	5.5E-02	mg/kg/day	7E-01	mg/kg/day	0.079
				Lead	0.0377	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.701	mg/L	1.08E-05	mg/kg/day	--	--	--	8.4E-04	mg/kg/day	1E-01	mg/kg/day	0.008
				Mercury	0.00012	mg/L	1.85E-09	mg/kg/day	--	--	--	1.4E-07	mg/kg/day	2E-04	mg/kg/day	0.001
				Thallium	0.0036	mg/L	5.55E-08	mg/kg/day	--	--	--	4.3E-06	mg/kg/day	4E-05	mg/kg/day	0.108
				Vanadium	0.0487	mg/L	7.51E-07	mg/kg/day	--	--	--	5.9E-05	mg/kg/day	7E-04	mg/kg/day	0.084
				Zinc	1.94	mg/L	2.99E-05	mg/kg/day	--	--	--	2.3E-03	mg/kg/day	3E-01	mg/kg/day	0.008
				Chromium, hexavalent	4.07	mg/L	6.27E-05	mg/kg/day	5.0E-01	kg-day/mg	3.1E-05	4.9E-03	mg/kg/day	3E-03	mg/kg/day	1.631
			Exposure Route Total								**2.0E-04**					**2.5**
		Exposure Point Total									**3.8E-04**					**6631**
	Exposure Medium Total										**3.8E-04**					**6631**
Groundwater Total											**3.8E-04**					**6631**
							Total of Receptor Risks Across All Media				**4.1E-04**	**Total of Receptor Hazards Across All Media**				**6685**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-16 (RAGS Part D Table 7.8.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Western Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,3-Trichlorobenzene	18.6	mg/kg	1.6E-08	mg/kg/day	--	--	--	1.3E-06	mg/kg/day	8.0E-03	mg/kg/day	0.000
				1,2,4-Trichlorobenzene	71.1	mg/kg	6.2E-08	mg/kg/day	2.9E-02	kg-day/mg	1.8E-09	4.9E-06	mg/kg/day	9.0E-02	mg/kg/day	0.000
				1,2-Dichlorobenzene	333	mg/kg	2.9E-07	mg/kg/day	--	--	--	2.3E-05	mg/kg/day	6.0E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	330	mg/kg	2.9E-07	mg/kg/day	--	--	--	2.3E-05	mg/kg/day	6.0E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	383	mg/kg	3.4E-07	mg/kg/day	5.4E-03	kg-day/mg	1.8E-09	2.6E-05	mg/kg/day	7.0E-02	mg/kg/day	0.000
				Benzene	4.24	mg/kg	3.7E-09	mg/kg/day	5.5E-02	kg-day/mg	2.0E-10	2.9E-07	mg/kg/day	1.0E-02	mg/kg/day	0.000
				Chlorobenzene	41	mg/kg	3.6E-08	mg/kg/day	--	--		2.8E-06	mg/kg/day	7.0E-02	mg/kg/day	0.000
				Ethylbenzene	9.6	mg/kg	8.4E-09	mg/kg/day	1.0E-02	kg-day/mg	8.4E-11	6.6E-07	mg/kg/day	5.0E-02	mg/kg/day	0.000
				m,p-Xylenes	123	mg/kg	1.1E-07	mg/kg/day	--	--	--	8.4E-06	mg/kg/day	4.0E-01	mg/kg/day	0.000
				o-Xylene	44	mg/kg	3.9E-08	mg/kg/day	--	--	--	3.0E-06	mg/kg/day	4.0E-01	mg/kg/day	0.000
				1,1'-Biphenyl	1.31	mg/kg	1.2E-09	mg/kg/day	8.0E-03	kg-day/mg	9.2E-12	9.0E-08	mg/kg/day	1.0E-01	mg/kg/day	0.000
				1,2,4,5-Tetrachlorobenzene	17.9	mg/kg	1.6E-08	mg/kg/day	--	--	--	1.2E-06	mg/kg/day	3.0E-05	mg/kg/day	0.041
				Benzo(a)anthracene	6.26	mg/kg	5.5E-09	mg/kg/day	7.3E-01	kg-day/mg	4.0E-09	4.3E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	5.5	mg/kg	4.8E-09	mg/kg/day	7.3E+00	kg-day/mg	3.5E-08	3.8E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	5.06	mg/kg	4.4E-09	mg/kg/day	7.3E-01	kg-day/mg	3.2E-09	3.5E-07	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.43	mg/kg	3.8E-10	mg/kg/day	7.3E+00	kg-day/mg	2.8E-09	2.9E-08	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	4.02	mg/kg	3.5E-09	mg/kg/day	7.3E-01	kg-day/mg	2.6E-09	2.8E-07	mg/kg/day	--	--	--
				Naphthalene	5.57	mg/kg	4.9E-09	mg/kg/day	--	--	--	3.8E-07	mg/kg/day	2.0E-02	mg/kg/day	0.000
				PCB-1254	0.12	mg/kg	1.1E-10	mg/kg/day	2.0E+00	kg-day/mg	2.1E-10	8.2E-09	mg/kg/day	2.0E-05	mg/kg/day	0.000
				PCB-1260	0.29	mg/kg	2.5E-10	mg/kg/day	2.0E+00	kg-day/mg	5.1E-10	2.0E-08	mg/kg/day	--	--	--
				2,3,7,8-TCDD	4.96E-04	mg/kg	4.4E-13	mg/kg/day	1.5E+05	kg-day/mg	6.5E-08	3.4E-11	mg/kg/day	7.0E-10	mg/kg/day	0.049
				Antimony	25	mg/kg	2.2E-08	mg/kg/day	--	--	--	1.7E-06	mg/kg/day	4.0E-04	mg/kg/day	0.004
				Arsenic	15	mg/kg	1.3E-08	mg/kg/day	1.5E+00	kg-day/mg	2.0E-08	1.0E-06	mg/kg/day	3.0E-04	mg/kg/day	0.003
				Cobalt	72.3	mg/kg	6.3E-08	mg/kg/day	--	--	--	5.0E-06	mg/kg/day	3.0E-03	mg/kg/day	0.002
				Iron	62600	mg/kg	5.5E-05	mg/kg/day	--	--	--	4.3E-03	mg/kg/day	7.0E-01	mg/kg/day	0.006
				Lead	3440	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	7.34	mg/kg	6.4E-09	mg/kg/day	--	--	--	5.0E-07	mg/kg/day	4.0E-05	mg/kg/day	0.013
				Vanadium	495	mg/kg	4.3E-07	mg/kg/day	--	--	--	3.4E-05	mg/kg/day	7.0E-04	mg/kg/day	0.048
				Zinc	2700	mg/kg	2.4E-06	mg/kg/day	--	--	--	1.8E-04	mg/kg/day	3.0E-01	mg/kg/day	0.001
				Chromium, hexavalent	739	mg/kg	6.5E-07	mg/kg/day	5.0E-01	kg-day/mg	3.2E-07	5.1E-05	mg/kg/day	3.0E-03	mg/kg/day	0.017
			Exposure Route Total								**4.6E-07**					**0.2**
			Dermal Contact	1,2,3-Trichlorobenzene	18.6	mg/kg	2.23E-07	mg/kg/day	--	--	--	1.7E-05	mg/kg/day	8E-03	mg/kg/day	0.002
				1,2,4-Trichlorobenzene	71.1	mg/kg	8.54E-07	mg/kg/day	2.90E-02	kg-day/mg	2.48E-08	6.7E-05	mg/kg/day	9E-02	mg/kg/day	0.001
				1,2-Dichlorobenzene	333	mg/kg	4.00E-06	mg/kg/day	--	--	--	3.1E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,3-Dichlorobenzene	330	mg/kg	3.96E-06	mg/kg/day	--	--	--	3.1E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,4-Dichlorobenzene	383	mg/kg	4.60E-06	mg/kg/day	5.40E-03	kg-day/mg	2.48E-08	3.6E-04	mg/kg/day	7E-02	mg/kg/day	0.005
				Benzene	4.24	mg/kg	5.09E-08	mg/kg/day	5.50E-02	kg-day/mg	2.80E-09	4.0E-06	mg/kg/day	1E-02	mg/kg/day	0.000
				Chlorobenzene	41	mg/kg	4.93E-07	mg/kg/day	--	--	--	3.8E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Ethylbenzene	9.6	mg/kg	1.15E-07	mg/kg/day	1.00E-02	kg-day/mg	1.15E-09	9.0E-06	mg/kg/day	5E-02	mg/kg/day	0.000
				m,p-Xylenes	123	mg/kg	1.48E-06	mg/kg/day	--	--	--	1.2E-04	mg/kg/day	4E-01	mg/kg/day	0.000
				o-Xylene	44	mg/kg	5.29E-07	mg/kg/day	--	--	--	4.1E-05	mg/kg/day	4E-01	mg/kg/day	0.000
				1,1'-Biphenyl	1.31	mg/kg	1.57E-09	mg/kg/day	8.00E-03	kg-day/mg	1.26E-11	1.2E-07	mg/kg/day	1E-01	mg/kg/day	0.000
				1,2,4,5-Tetrachlorobenzene	17.9	mg/kg	2.15E-07	mg/kg/day	--	--	--	1.7E-05	mg/kg/day	3E-05	mg/kg/day	0.559
				Benzo(a)anthracene	6.26	mg/kg	9.78E-09	mg/kg/day	9.49E-02	kg-day/mg	9.28E-10	7.6E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	5.5	mg/kg	8.59E-09	mg/kg/day	9.49E-01	kg-day/mg	8.15E-09	6.7E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	5.06	mg/kg	7.90E-09	mg/kg/day	9.49E-02	kg-day/mg	7.50E-10	6.2E-07	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	0.43	mg/kg	6.72E-10	mg/kg/day	9.49E-01	kg-day/mg	6.37E-10	5.2E-08	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	4.02	mg/kg	6.28E-09	mg/kg/day	9.49E-01	kg-day/mg	5.96E-09	4.9E-07	mg/kg/day	--	--	--

TABLE E-16 (RAGS Part D Table 7.8.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Naphthalene	5.57	mg/kg	8.70E-09	mg/kg/day	--	--	--	6.8E-07	mg/kg/day	3E-03	mg/kg/day	0.000
				PCB-1254	0.12	mg/kg	2.02E-10	mg/kg/day	2.80E-01	kg-day/mg	5.65E-11	1.6E-08	mg/kg/day	3E-06	mg/kg/day	0.005
				PCB-1260	0.29	mg/kg	4.88E-10	mg/kg/day	2.80E-01	kg-day/mg	1.37E-10	3.8E-08	mg/kg/day	--	--	--
				2,3,7,8-TCDD	4.96E-04	mg/kg	1.79E-13	mg/kg/day	4.50E+03	kg-day/mg	8.04E-10	1.4E-11	mg/kg/day	2E-11	mg/kg/day	0.697
				Antimony	25	mg/kg	4.50E-08	mg/kg/day	--	--	--	3.5E-06	mg/kg/day	6E-05	mg/kg/day	0.059
				Arsenic	15	mg/kg	5.41E-09	mg/kg/day	4.50E-02	kg-day/mg	2.43E-10	4.2E-07	mg/kg/day	9E-06	mg/kg/day	0.047
				Cobalt	72.3	mg/kg	8.69E-07	mg/kg/day	--	--	--	6.8E-05	mg/kg/day	3E-03	mg/kg/day	0.023
				Iron	62600	mg/kg	7.52E-04	mg/kg/day	--	--	--	5.9E-02	mg/kg/day	7E-01	mg/kg/day	0.084
				Lead	3440	mg/kg	--	--	--	--	--	--	--	--	--	--
				Thallium	7.34	mg/kg	8.82E-08	mg/kg/day	--	--	--	6.9E-06	mg/kg/day	4E-05	mg/kg/day	0.172
				Vanadium	495	mg/kg	1.55E-07	mg/kg/day	--	--	--	1.2E-05	mg/kg/day	2E-05	mg/kg/day	0.603
				Zinc	2700	mg/kg	3.24E-05	mg/kg/day	--	--	--	2.5E-03	mg/kg/day	3E-01	mg/kg/day	0.008
				Chromium, hexavalent	739	mg/kg	2.22E-07	mg/kg/day	1.3E-02	kg-day/mg	2.77E-09	1.7E-05	mg/kg/day	8E-05	mg/kg/day	0.216
			Exposure Route Total								**7.4E-08**					**2.5**
			Inhalation	1,2,3-Trichlorobenzene	1.33E-08	mg/m3	3.1E-12	mg/m3	--	--	--	5.0E-13	mg/m3	--	--	--
				1,2,4-Trichlorobenzene	5.08E-08	mg/m3	1.2E-11	mg/m3	--	--	--	2.1E-12	mg/m3	2E-02	mg/m^3	0.000
				1,2-Dichlorobenzene	2.38E-07	mg/m3	5.6E-11	mg/m3	--	--	--	2.3E-11	mg/m3	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	2.36E-07	mg/m3	5.5E-11	mg/m3	--	--	--	3.1E-18	mg/m3	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	2.74E-07	mg/m3	6.4E-11	mg/m3	1.10E-02	m^3/mg	7.0E-13	3.0E-11	mg/m3	8E-01	mg/m^3	0.000
				Benzene	3.03E-09	mg/m3	7.1E-13	mg/m3	7.80E-03	m^3/mg	5.5E-15	9.0E-13	mg/m3	8E-02	mg/m^3	0.000
				Chlorobenzene	2.93E-08	mg/m3	6.9E-12	mg/m3	--	--	--	5.0E-12	mg/m3	5E-01	mg/m^3	0.000
				Ethylbenzene	6.86E-09	mg/m3	1.6E-12	mg/m3	2.50E-03	m^3/mg	4.0E-15	3.3E-12	mg/m3	9E+00	mg/m^3	0.000
				m,p-Xylenes	8.79E-08	mg/m3	2.1E-11	mg/m3		m^3/mg	0.0E+00	4.0E-11	mg/m3	4E-01	mg/m^3	0.000
				o-Xylene	3.14E-08	mg/m3	7.4E-12	mg/m3		m^3/mg	0.0E+00	1.4E-11	mg/m3	4E-01	mg/m^3	0.000
				1,1'-Biphenyl	9.36E-10	mg/m3	2.2E-13	mg/m3		m^3/mg	0.0E+00	1.22E-20	mg/m3	4E-03	mg/m^3	0.000
				1,2,4,5-Tetrachlorobenzene	1.28E-08	mg/m3	3.0E-12	mg/m3	--	--	--	1.7E-19	mg/m3	--	--	--
				Benzo(a)anthracene	4.47E-09	mg/m3	1.0E-12	mg/m3	1.10E-01	m^3/mg	1.2E-13	5.8E-20	mg/m3	--	--	--
				Benzo(a)pyrene	3.93E-09	mg/m3	9.2E-13	mg/m3	1.10E+00	m^3/mg	1.0E-12	5.1E-20	mg/m3	--	--	--
				Benzo(b)fluoranthene	3.61E-09	mg/m3	8.5E-13	mg/m3	1.10E-01	m^3/mg	9.3E-14	4.7E-20	mg/m3	--	--	--
				Dibenz(a,h)anthracene	3.07E-10	mg/m3	7.2E-14	mg/m3	1.20E+00	m^3/mg	8.6E-14	4.0E-21	mg/m3	--	--	--
				Indeno(1,2,3-cd)pyrene	2.87E-09	mg/m3	6.7E-13	mg/m3	1.10E-01	m^3/mg	7.4E-14	3.7E-20	mg/m3	--	--	--
				Naphthalene	3.98E-09	mg/m3	9.3E-13	mg/m3	3.40E-02	m^3/mg	3.2E-14	1.0E-13	mg/m3	3E-03	mg/m^3	0.000
				PCB-1254	8.57E-11	mg/m3	2.0E-14	mg/m3	5.7E-01	m^3/mg	1.1E-14	1.1E-21	mg/m3	--	--	--
				PCB-1260	2.07E-10	mg/m3	4.9E-14	mg/m3	5.7E-01	m^3/mg	2.8E-14	2.7E-21	mg/m3	--	--	--
				2,3,7,8-TCDD	3.54E-13	mg/m3	8.3E-17	mg/m3	3.8E+04	m^3/mg	3.2E-12	4.6E-24	mg/m3	4E-08	mg/m^3	0.000
				Antimony	1.79E-08	mg/m3	4.2E-12	mg/m3	--	--	--	2.3E-19	mg/m3	--	--	--
				Arsenic	1.07E-08	mg/m3	2.5E-12	mg/m3	4.3E+00	m^3/mg	1.1E-11	1.4E-19	mg/m3	1.5E-05	mg/m^3	0.000
				Cobalt	5.16E-08	mg/m3	1.2E-11	mg/m3	9.0E+02	m^3/mg	1.1E-08	6.7E-19	mg/m3	2E-05	mg/m^3	0.000
				Iron	4.47E-05	mg/m3	1.0E-08	mg/m3	--	--	--	5.8E-16	mg/m3	--	--	--
				Lead	2.46E-06	mg/m3	--	--	--	--	--	--	--	--	--	--
				Thallium	5.24E-09	mg/m3	1.2E-12	mg/m3	--	--	--	6.8E-20	mg/m3	--	--	--
				Vanadium	3.54E-07	mg/m3	8.3E-11	mg/m3	--	--	--	4.6E-18	mg/m3	--	--	--
				Zinc	1.93E-06	mg/m3	4.5E-10	mg/m3	--	--	--	2.5E-17	mg/m3	--	--	--
				Chromium, hexavalent	5.28E-07	mg/m3	1.2E-10	mg/m3	1.20E+01	m^3/mg	1.5E-09	6.9E-18	mg/m3	1E-04	mg/m^3	0.000
			Exposure Route Total								**1.2E-08**					**0.0**
		Exposure Point Total									**5.5E-07**					**2.7**
	Exposure Medium Total										**5.5E-07**					**2.7**
Soil Total											**5.5E-07**					**2.7**

TABLE E-16 (RAGS Part D Table 7.8.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Shallow Groundwater	**Shallow Groundwater**	**Western Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.00054	mg/L	2.4E-05	mg/kg/day	2.90E-02	kg-day/mg	6.9E-07	1.8E-03	mg/kg/day	9E-02	mg/kg/day	0.021
				1,2-Dichlorobenzene	0.0004	mg/L	8.7E-06	mg/kg/day	--	--	--	6.8E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,3-Dichlorobenzene	0.00018	mg/L	6.4E-06	mg/kg/day	--	--	--	5.0E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,4-Dichlorobenzene	0.0023	mg/L	5.3E-05	mg/kg/day	5.40E-03	kg-day/mg	2.8E-07	4.1E-03	mg/kg/day	7E-02	mg/kg/day	0.059
				Benzene	0.024	mg/L	1.6E-04	mg/kg/day	5.50E-02	kg-day/mg	8.8E-06	1.2E-02	mg/kg/day	1E-02	mg/kg/day	1.245
				Chlorobenzene	0.083	mg/L	1.1E-03	mg/kg/day	--	--	--	8.4E-02	mg/kg/day	7E-02	mg/kg/day	1.193
				Ethylbenzene	0.0029	mg/L	7.3E-05	mg/kg/day	1.00E-02	kg-day/mg	7.3E-07	5.7E-03	mg/kg/day	5E-02	mg/kg/day	0.114
				Xylene (total)	0.012	mg/L	3.3E-04	mg/kg/day	--	--	--	2.5E-02	mg/kg/day	4E-01	mg/kg/day	0.064
				1,1'-Biphenyl	0.0075	mg/L	--	--	8.00E-03	kg-day/mg	--	--	--	--	--	--
				2-Methylnaphthalene	0.15	mg/L	--	--	--	--	--	--	--	--	--	--
				Acenaphthene	0.017	mg/L	--	--	--	--	--	--	--	--	--	--
				Naphthalene	1.25	mg/L	3.1E-02	mg/kg/day	--	--	--	2.4E+00	mg/kg/day	3E-03	mg/kg/day	806.005
				Aluminum	0.78	mg/L	--	--	--	--	--	--	--	--	--	--
				Antimony	0.0033	mg/L	--	--	--	--	--	--	--	--	--	--
				Arsenic	0.0058	mg/L	--	--	4.50E-02	kg-day/mg	--	--	--	--	--	--
				Barium	0.21	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.00034	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium	1.24	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0012	mg/L	--	--	--	--	--	--	--	--	--	--
				Iron	14	mg/L	--	--	--	--	--	--	--	--	--	--
				Lead	0.011	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.31	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.000076	mg/L	--	--	--	--	--	--	--	--	--	--
				Thallium	0.0032	mg/L	--	--	--	--	--	--	--	--	--	--
				Vanadium	0.015	mg/L	--	--	--	--	--	--	--	--	--	--
				Zinc	0.54	mg/L	--	--	--	--	--	--	--	--	--	--
				Chromium, hexavalent	1.08	mg/L	--	--	1.25E-02	kg-day/mg	--	--	--	--	--	--
			Exposure Route Total								**9.8E-06**					**809**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.00054	mg/L	1.28E-09	mg/kg/day	2.9E-02	kg-day/mg	3.7E-11	1.0E-07	mg/kg/day	9E-02	mg/kg/day	1.1E-06
				1,2-Dichlorobenzene	0.0004	mg/L	9.48E-10	mg/kg/day	--	--	--	7.4E-08	mg/kg/day	6E-01	mg/kg/day	1.2E-07
				1,3-Dichlorobenzene	0.00018	mg/L	4.27E-10	mg/kg/day	--	--	--	3.3E-08	mg/kg/day	6E-01	mg/kg/day	5.5E-08
				1,4-Dichlorobenzene	0.0023	mg/L	5.45E-09	mg/kg/day	5.4E-03	kg-day/mg	2.9E-11	4.3E-07	mg/kg/day	7E-02	mg/kg/day	6.1E-06
				Benzene	0.024	mg/L	5.69E-08	mg/kg/day	5.5E-02	kg-day/mg	3.1E-09	4.4E-06	mg/kg/day	1E-02	mg/kg/day	4.4E-04
				Chlorobenzene	0.083	mg/L	1.97E-07	mg/kg/day	--	--	--	1.5E-05	mg/kg/day	7E-02	mg/kg/day	2.2E-04
				Ethylbenzene	0.0029	mg/L	6.88E-09	mg/kg/day	1.0E-02	kg-day/mg	6.9E-11	5.4E-07	mg/kg/day	5E-02	mg/kg/day	1.1E-05
				Xylene (total)	0.012	mg/L	2.85E-08	mg/kg/day	--	--	--	2.2E-06	mg/kg/day	4E-01	mg/kg/day	5.5E-06
				1,1'-Biphenyl	0.0075	mg/L	1.78E-08	mg/kg/day	8.0E-03	kg-day/mg	1.4E-10	1.4E-06	mg/kg/day	1E-01	mg/kg/day	1.4E-05
				2-Methylnaphthalene	0.15	mg/L	3.56E-07	mg/kg/day	--	--	--	2.8E-05	mg/kg/day	4E-03	mg/kg/day	6.9E-03
				Acenaphthene	0.017	mg/L	4.03E-08	mg/kg/day	--	--	--	3.1E-06	mg/kg/day	2E-01	mg/kg/day	1.6E-05
				Naphthalene	1.25	mg/L	2.96E-06	mg/kg/day	--	--	--	2.3E-04	mg/kg/day	2E-02	mg/kg/day	1.2E-02
				Aluminum	0.78	mg/L	1.85E-06	mg/kg/day	--	--	--	1.4E-04	mg/kg/day	1E+00	mg/kg/day	1.4E-04
				Antimony	0.0033	mg/L	7.82E-09	mg/kg/day	--	--	--	6.1E-07	mg/kg/day	4E-04	mg/kg/day	1.5E-03
				Arsenic	0.0058	mg/L	1.38E-08	mg/kg/day	1.5E+00	kg-day/mg	2.1E-08	1.1E-06	mg/kg/day	3E-04	mg/kg/day	3.6E-03
				Barium	0.21	mg/L	4.98E-07	mg/kg/day	--	--	--	3.9E-05	mg/kg/day	2E-01	mg/kg/day	1.9E-04
				Cadmium	0.00034	mg/L	8.06E-10	mg/kg/day	--	--	--	6.3E-08	mg/kg/day	1E-03	mg/kg/day	6.3E-05
				Chromium	1.24	mg/L	2.94E-06	mg/kg/day	--	--	--	2.3E-04	mg/kg/day	1.5E+00	mg/kg/day	1.5E-04
				Cobalt	0.0012	mg/L	2.85E-09	mg/kg/day	--	--	--	2.2E-07	mg/kg/day	3E-03	mg/kg/day	7.4E-05
				Iron	14	mg/L	3.32E-05	mg/kg/day	--	--	--	2.6E-03	mg/kg/day	7E-01	mg/kg/day	3.7E-03

TABLE E-16 (RAGS Part D Table 7.8.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
WESTERN SURFACE AND SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Lead	--	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.31	mg/L	7.35E-07	mg/kg/day	--	--	--	5.7E-05	mg/kg/day	1E-01	mg/kg/day	5.7E-04
				Mercury	0.000076	mg/L	1.80E-10	mg/kg/day	--	--	--	1.4E-08	mg/kg/day	2E-04	mg/kg/day	8.8E-05
				Thallium	0.0032	mg/L	7.59E-09	mg/kg/day	--	--	--	5.9E-07	mg/kg/day	4E-05	mg/kg/day	1.5E-02
				Vanadium	0.015	mg/L	3.56E-08	mg/kg/day	--	--	--	2.8E-06	mg/kg/day	7E-04	mg/kg/day	4.0E-03
				Zinc	0.54	mg/L	1.28E-06	mg/kg/day	--	--	--	1.0E-04	mg/kg/day	3E-01	mg/kg/day	3.3E-04
				Chromium, hexavalent	1.08	mg/L	2.56E-06	mg/kg/day	5.0E-01	kg-day/mg	1.3E-06	2.0E-04	mg/kg/day	3E-03	mg/kg/day	6.7E-02
			Exposure Route Total								**1.3E-06**					**0.1**
		Exposure Point Total									**1.1E-05**					**809**
	Exposure Medium Total										**1.1E-05**					**809**
Groundwater Total											**1.1E-05**					**809**
							Total of Receptor Risks Across All Media				**1.2E-05**	**Total of Receptor Hazards Across All Media**				**811**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-17 (RAGS Part D Table 7.9.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
					Value	Units	Value	Units	Value	Units		Value	Units	Value	Units	
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	70200	mg/kg	1.3E-03	mg/kg/day	2.9E-02	kg-day/mg	3.8E-05	1.0E-01	mg/kg/day	8E-03	mg/kg/day	13
				1,2-Dichlorobenzene	1860	mg/kg	3.5E-05	mg/kg/day	--	--	--	2.7E-03	mg/kg/day	6E-01	mg/kg/day	0
				1,3-Dichlorobenzene	484	mg/kg	9.1E-06	mg/kg/day	--	--	--	7.1E-04	mg/kg/day	6E-01	mg/kg/day	0
				1,4-Dichlorobenzene	1200	mg/kg	2.3E-05	mg/kg/day	5.4E-03	kg-day/mg	1.2E-07	1.8E-03	mg/kg/day	7E-02	mg/kg/day	0
				Benzo(a)anthracene	4.9	mg/kg	9.2E-08	mg/kg/day	7.3E-01	kg-day/mg	6.7E-08	7.2E-06	mg/kg/day	--	--	--
				Benzo(a)pyrene	16.2	mg/kg	3.1E-07	mg/kg/day	7.3E+00	kg-day/mg	2.2E-06	2.4E-05	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.1	mg/kg	5.1E-07	mg/kg/day	7.3E-01	kg-day/mg	3.7E-07	4.0E-05	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	2.3	mg/kg	4.3E-08	mg/kg/day	7.3E+00	kg-day/mg	3.2E-07	3.4E-06	mg/kg/day	--	--	--
				Hexachlorobenzene	61.2	mg/kg	1.2E-06	mg/kg/day	1.6E+00	kg-day/mg	1.8E-06	9.0E-05	mg/kg/day	1E-05	mg/kg/day	9
				Indeno(1,2,3-cd)pyrene	10	mg/kg	1.9E-07	mg/kg/day	7.3E-01	kg-day/mg	1.4E-07	1.5E-05	mg/kg/day	--	--	--
				Naphthalene	1100	mg/kg	2.1E-05	mg/kg/day	--	--	--	1.6E-03	mg/kg/day	2E-02	mg/kg/day	0
				PCB-1248	0.85	mg/kg	1.6E-08	mg/kg/day	2.0E+00	kg-day/mg	3.2E-08	1.2E-06	mg/kg/day	--	--	--
				PCB-1254	0.34	mg/kg	6.4E-09	mg/kg/day	2.0E+00	kg-day/mg	1.3E-08	5.0E-07	mg/kg/day	2E-05	mg/kg/day	0
				2,3,7,8-TCDD	1.58E-04	mg/kg	3.0E-12	mg/kg/day	1.5E+05	kg-day/mg	4.5E-07	2.3E-10	mg/kg/day	7E-10	mg/kg/day	0
				Arsenic	9.8	mg/kg	1.8E-07	mg/kg/day	1.5E+00	kg-day/mg	2.8E-07	1.4E-05	mg/kg/day	3E-04	mg/kg/day	0
				Cobalt	120	mg/kg	2.3E-06	mg/kg/day	--	--	--	1.8E-04	mg/kg/day	3E-03	mg/kg/day	0
				Iron	65200	mg/kg	1.2E-03	mg/kg/day	--	--	--	9.6E-02	mg/kg/day	7E-01	mg/kg/day	0
				Thallium	9.3	mg/kg	1.8E-07	mg/kg/day	--	--	--	1.4E-05	mg/kg/day	4E-05	mg/kg/day	0
				Vanadium	1000	mg/kg	1.9E-05	mg/kg/day	--	--	--	1.5E-03	mg/kg/day	7E-04	mg/kg/day	2
				Chromium, hexavalent	2250	mg/kg	4.2E-05	mg/kg/day	5.0E-01	kg-day/mg	2.1E-05	3.3E-03	mg/kg/day	3E-03	mg/kg/day	1
			Exposure Route Total								**6.5E-05**					**26**
			Dermal Contact	1,2,4-Trichlorobenzene	70200	mg/kg	2.19E-02	mg/kg/day	2.9E-02	kg-day/mg	6.36E-04	1.7E+00	mg/kg/day	8E-03	mg/kg/day	214
				1,2-Dichlorobenzene	1860	mg/kg	5.81E-04	mg/kg/day	--	--	--	4.5E-02	mg/kg/day	6E-01	mg/kg/day	0
				1,3-Dichlorobenzene	484	mg/kg	1.51E-04	mg/kg/day	--	--	--	1.2E-02	mg/kg/day	6E-01	mg/kg/day	0
				1,4-Dichlorobenzene	1200	mg/kg	3.75E-04	mg/kg/day	5.4E-03	kg-day/mg	2.02E-06	2.9E-02	mg/kg/day	7E-02	mg/kg/day	0
				Benzo(a)anthracene	4.9	mg/kg	1.99E-07	mg/kg/day	9.49E-02	kg-day/mg	1.89E-08	1.6E-05	mg/kg/day	--	--	--
				Benzo(a)pyrene	16.2	mg/kg	6.58E-07	mg/kg/day	9.49E-01	kg-day/mg	6.24E-07	5.1E-05	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.1	mg/kg	1.10E-06	mg/kg/day	9.5E-02	kg-day/mg	1.04E-07	8.6E-05	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	2.3	mg/kg	9.34E-08	mg/kg/day	9.49E-01	kg-day/mg	8.86E-08	7.3E-06	mg/kg/day	--	--	--
				Hexachlorobenzene	61.2	mg/kg	1.91E-06	mg/kg/day	1.6E-01	kg-day/mg	3.06E-07	1.5E-04	mg/kg/day	1E-06	mg/kg/day	149
				Indeno(1,2,3-cd)pyrene	10	mg/kg	4.06E-07	mg/kg/day	9.5E-02	kg-day/mg	3.85E-08	3.2E-05	mg/kg/day	--	--	--
				Naphthalene	1100	mg/kg	4.47E-05	mg/kg/day	--	--	--	3.5E-03	mg/kg/day	3E-03	mg/kg/day	1
				PCB-1248	0.85	mg/kg	3.72E-08	mg/kg/day	2.8E-01	kg-day/mg	1.04E-08	2.9E-06	mg/kg/day	--	--	--
				PCB-1254	0.34	mg/kg	1.49E-08	mg/kg/day	2.80E-01	kg-day/mg	4.16E-09	1.2E-06	mg/kg/day	3E-06	mg/kg/day	0
				2,3,7,8-TCDD	1.58E-04	mg/kg	1.48E-12	mg/kg/day	4.50E+03	kg-day/mg	6.66E-09	1.2E-10	mg/kg/day	2E-11	mg/kg/day	6
				Arsenic	9.8	mg/kg	9.18E-08	mg/kg/day	4.50E-02	kg-day/mg	4.13E-09	7.2E-06	mg/kg/day	9E-06	mg/kg/day	1
				Cobalt	120	mg/kg	3.75E-05	mg/kg/day	--	--	--	2.9E-03	mg/kg/day	3E-03	mg/kg/day	1
				Iron	65200	mg/kg	2.65E-03	mg/kg/day	--	--	--	2.1E-01	mg/kg/day	7E-01	mg/kg/day	0
				Thallium	9.3	mg/kg	3.78E-07	mg/kg/day	--	--	--	2.9E-05	mg/kg/day	4E-05	mg/kg/day	1
				Vanadium	1000	mg/kg	8.12E-06	mg/kg/day	--	--	--	6.3E-04	mg/kg/day	2E-05	mg/kg/day	32
				Chromium, hexavalent	2250	mg/kg	1.76E-05	mg/kg/day	1.25E-02	kg-day/mg	2.20E-07	1.4E-03	mg/kg/day	8E-05	mg/kg/day	17
			Exposure Route Total								**6.4E-04**					**422**
			Inhalation	1,2,4-Trichlorobenzene	5.01E-05	mg/m³	1.2E-10	mg/m³	--	--	--	6.0E-06	mg/m³	2E-02	mg/m³	0
				1,2-Dichlorobenzene	1.33E-06	mg/m³	2.0E-09	mg/m³	--	--	--	1.6E-07	mg/m³	2E+00	mg/m³	0
				1,3-Dichlorobenzene	3.46E-07	mg/m³	5.3E-10	mg/m³	--	--	--	4.1E-08	mg/m³	2E+00	mg/m³	0
				1,4-Dichlorobenzene	8.57E-07	mg/m³	1.3E-09	mg/m³	1.1E-02	m³/mg	1.4E-11	1.0E-07	mg/m³	8E-01	mg/m³	0
				Benzo(a)anthracene	3.50E-09	mg/m³	5.3E-12	mg/m³	1.1E-01	m³/mg	5.9E-13	4.2E-10	mg/m³	--	--	--
				Benzo(a)pyrene	1.16E-08	mg/m³	1.8E-11	mg/m³	1.1E+00	m³/mg	1.9E-11	1.4E-09	mg/m³	--	--	--

TABLE E-17 (RAGS Part D Table 7.9.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
				Benzo(b)fluoranthene	1.94E-08	mg/m^3	2.9E-11	mg/m^3	1.1E-01	m^3/mg	3.2E-12	2.3E-09	mg/m^3	--	--	--
				Dibenz(a,h)anthracene	1.64E-09	mg/m^3	2.5E-12	mg/m^3	1.2E+00	m^3/mg	3.0E-12	2.0E-10	mg/m^3	--	--	--
				Hexachlorobenzene	4.37E-08	mg/m^3	6.7E-11	mg/m^3	4.6E-01	m^3/mg	3.1E-11	5.2E-09	mg/m^3	--	--	--
				Indeno(1,2,3-cd)pyrene	7.14E-09	mg/m^3	1.1E-11	mg/m^3	1.1E-01	m^3/mg	1.2E-12	8.5E-10	mg/m^3	--	--	--
				Naphthalene	7.86E-07	mg/m^3	1.2E-09	mg/m^3	3.4E-02	m^3/mg	4.1E-11	9.3E-08	mg/m^3	4E-03	mg/m^3	0
				PCB-1248	6.07E-10	mg/m^3	9.2E-13	mg/m^3	5.7E-01	m^3/mg	5.3E-13	7.2E-11	mg/m^3	--	--	--
				PCB-1254	2.43E-10	mg/m^3	3.7E-13	mg/m^3	5.7E-01	m^3/mg	2.1E-13	2.9E-11	mg/m^3	--	--	--
				2,3,7,8-TCDD	1.13E-13	mg/m^3	1.7E-16	mg/m^3	3.8E+04	m^3/mg	6.5E-12	1.3E-14	mg/m^3	--	--	--
				Arsenic	7.00E-09	mg/m^3	1.1E-11	mg/m^3	4.3E+00	m^3/mg	4.6E-11	8.3E-10	mg/m^3	--	--	--
				Cobalt	8.57E-08	mg/m^3	1.3E-10	mg/m^3	9.0E+02	m^3/mg	1.2E-07	1.0E-08	mg/m^3	--	--	--
				Iron	4.66E-05	mg/m^3	7.1E-08	mg/m^3	--	--	--	5.5E-06	mg/m^3	--	--	--
				Thallium	6.64E-09	mg/m^3	1.0E-11	mg/m^3	--	--	--	7.9E-10	mg/m^3	--	--	--
				Vanadium	7.14E-07	mg/m^3	1.1E-09	mg/m^3	--	--	--	8.5E-08	mg/m^3	--	--	--
				Chromium, hexavalent	1.61E-06	mg/m^3	2.4E-09	mg/m^3	1.2E+01	m^3/mg	2.9E-08	1.9E-07	mg/m^3	1.0E-01	mg/m^3	0.000
			Exposure Route Total								**1.5E-07**					**0.0**
		Exposure Point Total									**7.0E-04**					**448**
	Exposure Medium Total										**7.0E-04**					**448**
Surface Soil Total											**7.0E-04**					**448**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.0041	mg/L	1.2E-03	mg/kg/day	2.9E-02	kg-day/mg	3.4E-05	9.1E-02	mg/kg/day	9E-02	mg/kg/day	1
				1,2-Dichlorobenzene	0.0042	mg/L	5.9E-04	mg/kg/day	--	--	--	4.6E-02	mg/kg/day	6E-01	mg/kg/day	0
				1,3-Dichlorobenzene*	0.0026	mg/L	6.0E-04	mg/kg/day	--	--	--	4.7E-02	mg/kg/day	6E-01	mg/kg/day	0
				1,4-Dichlorobenzene	0.0044	mg/L	6.5E-04	mg/kg/day	5.4E-03	kg-day/mg	3.5E-06	5.1E-02	mg/kg/day	7E-02	mg/kg/day	1
				Benzene	0.00081	mg/L	3.5E-05	mg/kg/day	5.50E-02	kg-day/mg	1.9E-06	2.7E-03	mg/kg/day	1E-02	mg/kg/day	0
				Chlorobenzene	0.017	mg/L	1.4E-03	mg/kg/day	--	--	--	1.1E-01	mg/kg/day	7E-02	mg/kg/day	2
				Benzo(a)anthracene	0.0023	mg/L	3.8E-04	mg/kg/day	9.49E-02	kg-day/mg	3.6E-05	1.2E-01	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	3.9E-04	mg/kg/day	9.49E-01	kg-day/mg	3.7E-04	3.9E-01	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	9.1E-03	mg/kg/day	9.5E-02	kg-day/mg	8.6E-04	7.1E-01	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	9.5E-03	mg/kg/day	9.5E-02	kg-day/mg	9.0E-04	7.4E-01	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	3.4E-03	mg/kg/day	--	--	--	2.6E-01	mg/kg/day	3E-03	mg/kg/day	88
				Aluminum	2.91	mg/L	--	--	--	--	--	--	--	--	--	--
				Barium	0.0123	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.002	mg/L	--	--	--		--	--	--	1E+00	mg/kg/day	--
				Chromium	3.65	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0066	mg/L	--	--	--	--	--	--	--	2E+00	mg/kg/day	--
				Iron	6.55	mg/L	--	--	--	--	--	--	--	7E-01	mg/kg/day	--
				Lead	0.0155	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.071	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.00011	mg/L	--	--	--	--	--	--	--	1E-01	mg/kg/day	--
				Nickel	0.0317	mg/L	--	--	--	--	--	--	--	2E-02	mg/kg/day	--
				Vanadium	0.135	mg/L	--	--	--	--	--	--	--	2E-05	mg/kg/day	--
				Zinc	5.35	mg/L	--	--	--	--	--	--	--	3E-01	mg/kg/day	--
				Chromium, hexavalent	0.453	mg/L	--	--	1.3E-02	kg-day/mg	--	--	--	2E-01	mg/kg/day	--
			Exposure Route Total								**2.2E-03**					**91**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.0041	mg/L	3.56E-04	mg/kg/day	2.9E-02	kg-day/mg	1.0E-05	2.8E-02	mg/kg/day	9E-02	mg/kg/day	0
				1,2-Dichlorobenzene	0.0042	mg/L	3.65E-04	mg/kg/day	--	--	--	2.8E-02	mg/kg/day	6E-01	mg/kg/day	0
				1,3-Dichlorobenzene*	0.0026	mg/L	2.26E-04	mg/kg/day	--	--	--	1.8E-02	mg/kg/day	6E-01	mg/kg/day	0
				1,4-Dichlorobenzene	0.0044	mg/L	3.83E-04	mg/kg/day	5.4E-03	kg-day/mg	2.1E-06	3.0E-02	mg/kg/day	7E-02	mg/kg/day	0
				Benzene	0.00081	mg/L	7.04E-05	mg/kg/day	5.5E-02	kg-day/mg	3.9E-06	5.5E-03	mg/kg/day	1E-02	mg/kg/day	1

TABLE E-17 (RAGS Part D Table 7.9.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
				Chlorobenzene	0.017	mg/L	1.48E-03	mg/kg/day	--	--	--	1.2E-01	mg/kg/day	7E-02	mg/kg/day	2
				Benzo(a)anthracene	0.0023	mg/L	2.00E-04	mg/kg/day	1.0E-02	kg-day/mg	2.0E-06	1.6E-02	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	1.91E-04	mg/kg/day	--	--	--	1.5E-02	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	3.30E-04	mg/kg/day	8.0E-03	kg-day/mg	2.6E-06	2.6E-02	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	1.48E-04	mg/kg/day	--	--	--	1.2E-02	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	1.83E-03	mg/kg/day	--	--	--	1.4E-01	mg/kg/day	2E-02	mg/kg/day	7
				Aluminum	2.91	mg/L	2.53E-01	mg/kg/day	--	--	--	2.0E+01	mg/kg/day	1E+00	mg/kg/day	20
				Barium	0.0123	mg/L	1.07E-03	mg/kg/day	--	--	--	8.3E-02	mg/kg/day	2E-01	mg/kg/day	0
				Cadmium	0.002	mg/L	1.74E-04	mg/kg/day	--	--	--	1.4E-02	mg/kg/day	1E-03	mg/kg/day	14
				Chromium	3.65	mg/L	3.17E-01	mg/kg/day	--	--	--	2.5E+01	mg/kg/day	1.5E+00	mg/kg/day	17
				Cobalt	0.0066	mg/L	5.74E-04	mg/kg/day	--	--	--	4.5E-02	mg/kg/day	3E-03	mg/kg/day	15
				Iron	6.55	mg/L	5.69E-01	mg/kg/day	--	--	--	4.4E+01	mg/kg/day	7E-01	mg/kg/day	63
				Lead	0.0155	mg/L	1.35E-03	mg/kg/day	--	--	--	1.1E-01	mg/kg/day	--	--	--
				Manganese	0.071	mg/L	6.17E-03	mg/kg/day	--	--	--	4.8E-01	mg/kg/day	1E-01	mg/kg/day	5
				Mercury	0.00011	mg/L	9.56E-06	mg/kg/day	--	--	--	7.5E-04	mg/kg/day	1.6E-04	mg/kg/day	5
				Nickel	0.0317	mg/L	2.76E-03	mg/kg/day	--	--	--	2.1E-01	mg/kg/day	2E-02	mg/kg/day	11
				Vanadium	0.135	mg/L	1.17E-02	mg/kg/day	--	--	--	9.2E-01	mg/kg/day	7E-04	mg/kg/day	1308
				Zinc	5.35	mg/L	4.65E-01	mg/kg/day	--	--	--	3.6E+01	mg/kg/day	3E-01	mg/kg/day	121
				Chromium, hexavalent	0.453	mg/L	3.94E-02	mg/kg/day	5.0E-01	kg-day/mg	2.0E-02	3.1E+00	mg/kg/day	3E-03	mg/kg/day	1024
			Exposure Route Total								**2.0E-02**					**2611**
		Exposure Point Total									**2.2E-02**					**2702**
	Exposure Medium Total										**2.2E-02**					**2702**
Groundwater Total											**2.2E-02**					**2702**
							Total of Receptor Risks Across All Media				**2.3E-02**	**Total of Receptor Hazards Across All Media**				**3150**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-18 (RAGS Part D Table 7.9.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		Hazard
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Quotient
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	20700	mg/kg	5.5E-05	mg/kg/day	2.9E-02	kg-day/mg	1.6E-06	4.3E-03	mg/kg/day	8E-03	mg/kg/day	0.532
				1,2-Dichlorobenzene	969	mg/kg	2.6E-06	mg/kg/day	--	--	--	2.0E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	258	mg/kg	6.8E-07	mg/kg/day	--	--	--	5.3E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	554	mg/kg	1.5E-06	mg/kg/day	5.4E-03	kg-day/mg	7.9E-09	1.1E-04	mg/kg/day	7E-02	mg/kg/day	0.002
				Benzo(a)anthracene	9.8	mg/kg	2.6E-08	mg/kg/day	7.3E-01	kg-day/mg	1.9E-08	2.0E-06	mg/kg/day	--	--	--
				Benzo(a)pyrene	7.4	mg/kg	1.9E-08	mg/kg/day	7.3E+00	kg-day/mg	1.4E-07	1.5E-06	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	13.3	mg/kg	3.5E-08	mg/kg/day	7.3E-01	kg-day/mg	2.6E-08	2.7E-06	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	3.5	mg/kg	9.2E-09	mg/kg/day	7.3E+00	kg-day/mg	6.7E-08	7.2E-07	mg/kg/day	--	--	--
				Hexachlorobenzene	31.5	mg/kg	8.3E-08	mg/kg/day	1.6E+00	kg-day/mg	1.3E-07	6.5E-06	mg/kg/day	1E-05	mg/kg/day	0.647
				Indeno(1,2,3-cd)pyrene	8.4	mg/kg	2.2E-08	mg/kg/day	7.3E-01	kg-day/mg	1.6E-08	1.7E-06	mg/kg/day	--	--	--
				Naphthalene	149	mg/kg	3.9E-07	mg/kg/day	--	--	--	3.1E-05	mg/kg/day	2E-02	mg/kg/day	0.002
				PCB-1248	0.43	mg/kg	1.1E-09	mg/kg/day	2.0E+00	kg-day/mg	2.3E-09	8.8E-08	mg/kg/day	--	--	--
				PCB-1254	0.19	mg/kg	5.0E-10	mg/kg/day	2.0E+00	kg-day/mg	1.0E-09	3.9E-08	mg/kg/day	2E-05	mg/kg/day	0.002
				2,3,7,8-TCDD	0.00028	mg/kg	7.4E-13	mg/kg/day	1.5E+05	kg-day/mg	1.1E-07	5.8E-11	mg/kg/day	7E-10	mg/kg/day	0.082
				Arsenic	5.2	mg/kg	1.4E-08	mg/kg/day	1.5E+00	kg-day/mg	2.1E-08	1.1E-06	mg/kg/day	3E-04	mg/kg/day	0.004
				Cobalt	72	mg/kg	1.9E-07	mg/kg/day	--	--	--	1.5E-05	mg/kg/day	3E-03	mg/kg/day	0.005
				Iron	47300	mg/kg	1.2E-04	mg/kg/day	--	--	--	9.7E-03	mg/kg/day	7E-01	mg/kg/day	0.014
				Thallium	5.8	mg/kg	1.5E-08	mg/kg/day	--	--	--	1.2E-06	mg/kg/day	4E-05	mg/kg/day	0.030
				Vanadium	503	mg/kg	1.3E-06	mg/kg/day	--	--	--	1.0E-04	mg/kg/day	7E-04	mg/kg/day	0.148
				Chromium, hexavalent	1270	mg/kg	3.3E-06	mg/kg/day	5.0E-01	kg-day/mg	1.7E-06	2.6E-04	mg/kg/day	3E-03	mg/kg/day	0.087
			Exposure Route Total								**3.8E-06**					**1.6**
			Dermal Contact	1,2,4-Trichlorobenzene	20700	mg/kg	7.46E-04	mg/kg/day	2.9E-02	kg-day/mg	2.16E-05	5.8E-02	mg/kg/day	8E-03	mg/kg/day	7.273
				1,2-Dichlorobenzene	969	mg/kg	3.49E-05	mg/kg/day	--	--	--	2.7E-03	mg/kg/day	6E-01	mg/kg/day	0.005
				1,3-Dichlorobenzene	258	mg/kg	9.30E-06	mg/kg/day	--	--	--	7.3E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,4-Dichlorobenzene	554	mg/kg	2.00E-05	mg/kg/day	5.4E-03	kg-day/mg	1.08E-07	1.6E-03	mg/kg/day	7E-02	mg/kg/day	0.022
				Benzo(a)anthracene	9.8	mg/kg	4.59E-08	mg/kg/day	9.49E-02	kg-day/mg	4.36E-09	3.6E-06	mg/kg/day	--	--	--
				Benzo(a)pyrene	7.4	mg/kg	3.47E-08	mg/kg/day	9.49E-01	kg-day/mg	3.29E-08	2.7E-06	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	13.3	mg/kg	6.23E-08	mg/kg/day	9.5E-02	kg-day/mg	5.91E-09	4.9E-06	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	3.5	mg/kg	1.64E-08	mg/kg/day	9.49E-01	kg-day/mg	1.56E-08	1.3E-06	mg/kg/day	--	--	--
				Hexachlorobenzene	31.5	mg/kg	1.14E-07	mg/kg/day	1.6E-01	kg-day/mg	1.82E-08	8.9E-06	mg/kg/day	1E-06	mg/kg/day	8.855
				Indeno(1,2,3-cd)pyrene	8.4	mg/kg	3.94E-08	mg/kg/day	9.5E-02	kg-day/mg	3.73E-09	3.1E-06	mg/kg/day	--	--	--
				Naphthalene	149	mg/kg	6.98E-07	mg/kg/day	--	--	--	5.4E-05	mg/kg/day	3E-03	mg/kg/day	0.018
				PCB-1248	0.43	mg/kg	2.17E-09	mg/kg/day	2.8E-01	kg-day/mg	6.07E-10	1.7E-07	mg/kg/day	--	--	--
				PCB-1254	0.19	mg/kg	9.59E-10	mg/kg/day	2.80E-01	kg-day/mg	2.68E-10	7.5E-08	mg/kg/day	3E-06	mg/kg/day	0.025
				2,3,7,8-TCDD	0.00028	mg/kg	3.03E-13	mg/kg/day	4.50E+03	kg-day/mg	1.36E-09	2.4E-11	mg/kg/day	2E-11	mg/kg/day	1.181
				Arsenic	5.2	mg/kg	5.62E-09	mg/kg/day	4.50E-02	kg-day/mg	2.53E-10	4.4E-07	mg/kg/day	9E-06	mg/kg/day	0.049
				Cobalt	72	mg/kg	2.59E-06	mg/kg/day	--	--	--	2.0E-04	mg/kg/day	3E-03	mg/kg/day	0.067
				Iron	47300	mg/kg	2.22E-04	mg/kg/day	--	--	--	1.7E-02	mg/kg/day	7E-01	mg/kg/day	0.025
				Thallium	5.8	mg/kg	2.72E-08	mg/kg/day	--	--	--	2.1E-06	mg/kg/day	4E-05	mg/kg/day	0.053
				Vanadium	503	mg/kg	4.71E-07	mg/kg/day	--	--	--	3.7E-05	mg/kg/day	2E-05	mg/kg/day	1.838
				Chromium, hexavalent	1270	mg/kg	1.14E-06	mg/kg/day	1.25E-02	kg-day/mg	1.43E-08	8.9E-05	mg/kg/day	8E-05	mg/kg/day	1.116
			Exposure Route Total								**2.2E-05**					**20.5**
			Inhalation	1,2,4-Trichlorobenzene	1.48E-05	mg/m^3	2.3E-11	mg/m^3	--	--	--	8.1E-07	mg/kg/day	2E-02	mg/m^3	0.000
				1,2-Dichlorobenzene	6.92E-07	mg/m^3	4.9E-10	mg/m^3	--	--	--	3.8E-08	mg/kg/day	2E+00	mg/m^3	0.000
				1,3-Dichlorobenzene	1.84E-07	mg/m^3	1.3E-10	mg/m^3	--	--	--	1.0E-08	mg/kg/day	2E+00	mg/m^3	0.000
				1,4-Dichlorobenzene	3.96E-07	mg/m^3	2.8E-10	mg/m^3	1.1E-02	m^3/mg	3.1E-12	2.2E-08	mg/kg/day	8E-01	mg/m^3	0.000
				Benzo(a)anthracene	7.00E-09	mg/m^3	4.9E-12	mg/m^3	1.1E-01	m^3/mg	5.4E-13	3.8E-10	mg/kg/day	--	--	--
				Benzo(a)pyrene	5.29E-09	mg/m^3	3.7E-12	mg/m^3	1.1E+00	m^3/mg	4.1E-12	2.9E-10	mg/kg/day	--	--	--

TABLE E-18 (RAGS Part D Table 7.9.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		Hazard
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Quotient
				Benzo(b)fluoranthene	9.50E-09	mg/m^3	6.7E-12	mg/m^3	1.1E-01	m^3/mg	7.3E-13	5.2E-10	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	2.50E-09	mg/m^3	1.8E-12	mg/m^3	1.2E+00	m^3/mg	2.1E-12	1.4E-10	mg/kg/day	--	--	--
				Hexachlorobenzene	2.25E-08	mg/m^3	1.6E-11	mg/m^3	4.6E-01	m^3/mg	7.3E-12	1.2E-09	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	6.00E-09	mg/m^3	4.2E-12	mg/m^3	1.1E-01	m^3/mg	4.6E-13	3.3E-10	mg/kg/day	--	--	--
				Naphthalene	1.06E-07	mg/m^3	7.5E-11	mg/m^3	3.4E-02	m^3/mg	2.5E-12	5.8E-09	mg/kg/day	4E-03	mg/m^3	0.000
				PCB-1248	3.07E-10	mg/m^3	2.2E-13	mg/m^3	5.7E-01	m^3/mg	1.2E-13	1.7E-11	mg/kg/day	--	--	--
				PCB-1254	1.36E-10	mg/m^3	9.5E-14	mg/m^3	5.7E-01	m^3/mg	5.4E-14	7.4E-12	mg/kg/day	--	--	--
				2,3,7,8-TCDD	2.00E-13	mg/m^3	1.4E-16	mg/m^3	3.8E+04	m^3/mg	5.3E-12	1.1E-14	mg/kg/day	--	--	--
				Arsenic	3.71E-09	mg/m^3	2.6E-12	mg/m^3	4.3E+00	m^3/mg	1.1E-11	2.0E-10	mg/kg/day	--	--	--
				Cobalt	5.14E-08	mg/m^3	3.6E-11	mg/m^3	9.0E+02	m^3/mg	3.3E-08	2.8E-09	mg/kg/day	--	--	--
				Iron	3.38E-05	mg/m^3	2.4E-08	mg/m^3	--	--	--	1.9E-06	mg/kg/day	--	--	--
				Thallium	4.14E-09	mg/m^3	2.9E-12	mg/m^3	--	--	--	2.3E-10	mg/kg/day	--	--	--
				Vanadium	3.59E-07	mg/m^3	2.5E-10	mg/m^3	--	--	--	2.0E-08	mg/kg/day	--	--	--
				Chromium, hexavalent	9.07E-07	mg/m^3	6.4E-10	mg/m^3	1.2E+01	m^3/mg	7.6E-09	5.0E-08	mg/kg/day	1.0E-01	mg/m^3	0.000
			Exposure Route Total								**4.0E-08**					**0.0**
		Exposure Point Total									**2.6E-05**					**22.1**
	Exposure Medium Total										**2.6E-05**					**22.1**
Surface Soil Total											**2.6E-05**					**22.1**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.0041	mg/L	5.4E-04	mg/kg/day	2.9E-02	kg-day/mg	1.6E-05	4.2E-02	mg/kg/day	9E-02	mg/kg/day	0.468
				1,2-Dichlorobenzene	0.0042	mg/L	2.7E-04	mg/kg/day	--	--	--	2.1E-02	mg/kg/day	6E-01	mg/kg/day	0.036
				1,3-Dichlorobenzene*	0.0026	mg/L	2.8E-04	mg/kg/day	--	--	--	2.2E-02	mg/kg/day	6E-01	mg/kg/day	0.036
				1,4-Dichlorobenzene	0.0044	mg/L	3.0E-04	mg/kg/day	5.4E-03	kg-day/mg	1.6E-06	2.4E-02	mg/kg/day	7E-02	mg/kg/day	0.336
				Benzene	0.00081	mg/L	1.6E-05	mg/kg/day	5.50E-02	kg-day/mg	8.9E-07	1.3E-03	mg/kg/day	1E-02	mg/kg/day	0.126
				Chlorobenzene	0.017	mg/L	6.6E-04	mg/kg/day	--	--	--	5.1E-02	mg/kg/day	7E-02	mg/kg/day	0.733
				Benzo(a)anthracene	0.0023	mg/L	1.7E-04	mg/kg/day	9.49E-02	kg-day/mg	1.6E-05	5.7E-02	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	1.8E-04	mg/kg/day	9.49E-01	kg-day/mg	1.7E-04	1.8E-01	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	4.2E-03	mg/kg/day	9.5E-02	kg-day/mg	4.0E-04	3.3E-01	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	4.4E-03	mg/kg/day	9.5E-02	kg-day/mg	4.2E-04	3.4E-01	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	1.6E-03	mg/kg/day	--	--	--	1.2E-01	mg/kg/day	3E-03	mg/kg/day	41
				Aluminum	2.91	mg/L	--	--	--	--	--	--	--	--	--	--
				Barium	0.0123	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.002	mg/L	--	--	--		--	--	--	1E+00	mg/kg/day	--
				Chromium	3.65	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0066	mg/L	--	--	--	--	--	--	--	2E+00	mg/kg/day	--
				Iron	6.55	mg/L	--	--	--	--	--	--	--	7E-01	mg/kg/day	--
				Lead	0.0155	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.071	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.00011	mg/L	--	--	--	--	--	--	--	1E-01	mg/kg/day	--
				Nickel	0.0317	mg/L	--	--	--	--	--	--	--	2E-02	mg/kg/day	--
				Vanadium	0.135	mg/L	--	--	--	--	--	--	--	2E-05	mg/kg/day	--
				Zinc	5.35	mg/L	--	--	--	--	--	--	--	3E-01	mg/kg/day	--
				Chromium, hexavalent	0.453	mg/L	--	--	1.3E-02	kg-day/mg	--	--	--	2E-01	mg/kg/day	--
			Exposure Route Total								**1.0E-03**					**41.9**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.0041	mg/L	9.72E-09	mg/kg/day	2.9E-02	kg-day/mg	2.8E-10	7.6E-07	mg/kg/day	9E-02	mg/kg/day	0.000
				1,2-Dichlorobenzene	0.0042	mg/L	9.96E-09	mg/kg/day	--	--	--	7.8E-07	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene*	0.0026	mg/L	6.16E-09	mg/kg/day	--	--	--	4.8E-07	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	0.0044	mg/L	1.04E-08	mg/kg/day	5.4E-03	kg-day/mg	5.6E-11	8.1E-07	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.00081	mg/L	1.92E-09	mg/kg/day	5.5E-02	kg-day/mg	1.1E-10	1.5E-07	mg/kg/day	1E-02	mg/kg/day	0.000

TABLE E-18 (RAGS Part D Table 7.9.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Construction Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		Hazard
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Quotient
				Chlorobenzene	0.017	mg/L	4.03E-08	mg/kg/day	--	--	--	3.1E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzo(a)anthracene	0.0023	mg/L	5.45E-09	mg/kg/day	1.0E-02	kg-day/mg	5.5E-11	4.3E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	5.22E-09	mg/kg/day	--	--	--	4.1E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	9.01E-09	mg/kg/day	8.0E-03	kg-day/mg	7.2E-11	7.0E-07	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	4.03E-09	mg/kg/day	--	--	--	3.1E-07	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	4.98E-08	mg/kg/day	--	--	--	3.9E-06	mg/kg/day	2E-02	mg/kg/day	0.000
				Aluminum	2.91	mg/L	6.90E-06	mg/kg/day	--	--	--	5.4E-04	mg/kg/day	1E+00	mg/kg/day	0.001
				Barium	0.0123	mg/L	2.92E-08	mg/kg/day	--	--	--	2.3E-06	mg/kg/day	2E-01	mg/kg/day	0.000
				Cadmium	0.002	mg/L	4.74E-09	mg/kg/day	--	--	--	3.7E-07	mg/kg/day	1E-03	mg/kg/day	0.000
				Chromium	3.65	mg/L	8.65E-06	mg/kg/day	--	--	--	6.8E-04	mg/kg/day	1.5E+00	mg/kg/day	0.000
				Cobalt	0.0066	mg/L	1.56E-08	mg/kg/day	--	--	--	1.2E-06	mg/kg/day	3E-03	mg/kg/day	0.000
				Iron	6.55	mg/L	1.55E-05	mg/kg/day	--	--	--	1.2E-03	mg/kg/day	7E-01	mg/kg/day	0.002
				Lead	0.0155	mg/L	3.67E-08	mg/kg/day	--	--	--	2.9E-06	mg/kg/day	--	--	--
				Manganese	0.071	mg/L	1.68E-07	mg/kg/day	--	--	--	1.3E-05	mg/kg/day	1E-01	mg/kg/day	0.000
				Mercury	0.00011	mg/L	2.61E-10	mg/kg/day	--	--	--	2.0E-08	mg/kg/day	1.6E-04	mg/kg/day	0.000
				Nickel	0.0317	mg/L	7.52E-08	mg/kg/day	--	--	--	5.9E-06	mg/kg/day	2E-02	mg/kg/day	0.000
				Vanadium	0.135	mg/L	3.20E-07	mg/kg/day	--	--	--	2.5E-05	mg/kg/day	7E-04	mg/kg/day	0.036
				Zinc	5.35	mg/L	1.27E-05	mg/kg/day	--	--	--	9.9E-04	mg/kg/day	3E-01	mg/kg/day	0.003
				Chromium, hexavalent	0.453	mg/L	1.07E-06	mg/kg/day	5.0E-01	kg-day/mg	5.4E-07	8.4E-05	mg/kg/day	3E-03	mg/kg/day	0.028
			Exposure Route Total								**5.4E-07**					**0.1**
		Exposure Point Total									**1.0E-03**					**42**
	Exposure Medium Total										**1.0E-03**					**42**
Groundwater Total											**1.0E-03**					**42**
							Total of Receptor Risks Across All Media				**1.0E-03**	**Total of Receptor Hazards Across All Media**				**64**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-19 (RAGS Part D Table 7.10.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	70200	mg/kg	6.2E-05	mg/kg/day	2.9E-02	kg-day/mg	1.8E-06	4.8E-03	mg/kg/day	8E-03	mg/kg/day	0.601
				1,2-Dichlorobenzene	1860	mg/kg	1.6E-06	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	484	mg/kg	4.3E-07	mg/kg/day	--	--	--	3.3E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	1200	mg/kg	1.1E-06	mg/kg/day	5.4E-03	kg-day/mg	5.7E-09	8.2E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzo(a)anthracene	4.9	mg/kg	4.3E-09	mg/kg/day	7.3E-01	kg-day/mg	3.1E-09	3.4E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	16.2	mg/kg	1.4E-08	mg/kg/day	7.3E+00	kg-day/mg	1.0E-07	1.1E-06	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.1	mg/kg	2.4E-08	mg/kg/day	7.3E-01	kg-day/mg	1.7E-08	1.9E-06	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	2.3	mg/kg	2.0E-09	mg/kg/day	7.3E+00	kg-day/mg	1.5E-08	1.6E-07	mg/kg/day	--	--	--
				Hexachlorobenzene	61.2	mg/kg	5.4E-08	mg/kg/day	1.6E+00	kg-day/mg	8.6E-08	4.2E-06	mg/kg/day	1E-05	mg/kg/day	0.419
				Indeno(1,2,3-cd)pyrene	10	mg/kg	8.8E-09	mg/kg/day	7.3E-01	kg-day/mg	6.4E-09	6.8E-07	mg/kg/day	--	--	--
				Naphthalene	1100	mg/kg	9.7E-07	mg/kg/day	--	--	--	7.5E-05	mg/kg/day	2E-02	mg/kg/day	0.004
				PCB-1248	0.85	mg/kg	7.5E-10	mg/kg/day	2.0E+00	kg-day/mg	1.5E-09	5.8E-08	mg/kg/day	--	--	--
				PCB-1254	0.34	mg/kg	3.0E-10	mg/kg/day	2.0E+00	kg-day/mg	6.0E-10	2.3E-08	mg/kg/day	2E-05	mg/kg/day	0.001
				2,3,7,8-TCDD	1.58E-04	mg/kg	1.4E-13	mg/kg/day	1.5E+05	kg-day/mg	2.1E-08	1.1E-11	mg/kg/day	7E-10	mg/kg/day	0.015
				Arsenic	9.8	mg/kg	8.6E-09	mg/kg/day	1.5E+00	kg-day/mg	1.3E-08	6.7E-07	mg/kg/day	3E-04	mg/kg/day	0.002
				Cobalt	120	mg/kg	1.1E-07	mg/kg/day	--	--	--	8.2E-06	mg/kg/day	3E-03	mg/kg/day	0.003
				Iron	65200	mg/kg	5.7E-05	mg/kg/day	--	--	--	4.5E-03	mg/kg/day	7E-01	mg/kg/day	0.006
				Thallium	9.3	mg/kg	8.2E-09	mg/kg/day	--	--	--	6.4E-07	mg/kg/day	4E-05	mg/kg/day	0.016
				Vanadium	1000	mg/kg	8.8E-07	mg/kg/day	--	--	--	6.8E-05	mg/kg/day	7E-04	mg/kg/day	0.098
				Chromium, hexavalent	2250	mg/kg	2.0E-06	mg/kg/day	5.0E-01	kg-day/mg	9.9E-07	1.5E-04	mg/kg/day	3E-03	mg/kg/day	0.051
			Exposure Route Total								**3.0E-06**					**1.2**
			Dermal Contact	1,2,4-Trichlorobenzene	70200	mg/kg	8.43E-04	mg/kg/day	2.9E-02	kg-day/mg	2.45E-05	6.6E-02	mg/kg/day	8E-03	mg/kg/day	8.222
				1,2-Dichlorobenzene	1860	mg/kg	2.23E-05	mg/kg/day	--	--	--	1.7E-03	mg/kg/day	6E-01	mg/kg/day	0.003
				1,3-Dichlorobenzene	484	mg/kg	5.81E-06	mg/kg/day	--	--	--	4.5E-04	mg/kg/day	6E-01	mg/kg/day	0.001
				1,4-Dichlorobenzene	1200	mg/kg	1.44E-05	mg/kg/day	5.4E-03	kg-day/mg	7.78E-08	1.1E-03	mg/kg/day	7E-02	mg/kg/day	0.016
				Benzo(a)anthracene	4.9	mg/kg	7.65E-09	mg/kg/day	9.49E-02	kg-day/mg	7.26E-10	6.0E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	16.2	mg/kg	2.53E-08	mg/kg/day	9.49E-01	kg-day/mg	2.40E-08	2.0E-06	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	27.1	mg/kg	4.23E-08	mg/kg/day	9.5E-02	kg-day/mg	4.02E-09	3.3E-06	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	2.3	mg/kg	3.59E-09	mg/kg/day	9.49E-01	kg-day/mg	3.41E-09	2.8E-07	mg/kg/day	--	--	--
				Hexachlorobenzene	61.2	mg/kg	7.35E-08	mg/kg/day	1.6E-01	kg-day/mg	1.18E-08	5.7E-06	mg/kg/day	1E-06	mg/kg/day	5.734
				Indeno(1,2,3-cd)pyrene	10	mg/kg	1.56E-08	mg/kg/day	9.5E-02	kg-day/mg	1.48E-09	1.2E-06	mg/kg/day	--	--	--
				Naphthalene	1100	mg/kg	1.72E-06	mg/kg/day	--	--	--	1.3E-04	mg/kg/day	3E-03	mg/kg/day	0.045
				PCB-1248	0.85	mg/kg	1.43E-09	mg/kg/day	2.8E-01	kg-day/mg	4.00E-10	1.1E-07	mg/kg/day	--	--	--
				PCB-1254	0.34	mg/kg	5.72E-10	mg/kg/day	2.80E-01	kg-day/mg	1.60E-10	4.5E-08	mg/kg/day	3E-06	mg/kg/day	0.015
				2,3,7,8-TCDD	1.58E-04	mg/kg	5.69E-14	mg/kg/day	4.50E+03	kg-day/mg	2.56E-10	4.4E-12	mg/kg/day	2E-11	mg/kg/day	0.222
				Arsenic	9.8	mg/kg	3.53E-09	mg/kg/day	4.50E-02	kg-day/mg	1.59E-10	2.8E-07	mg/kg/day	9E-06	mg/kg/day	0.031
				Cobalt	120	mg/kg	1.44E-06	mg/kg/day	--	--	--	1.1E-04	mg/kg/day	3E-03	mg/kg/day	0.037
				Iron	65200	mg/kg	1.02E-04	mg/kg/day	--	--	--	7.9E-03	mg/kg/day	7E-01	mg/kg/day	0.011
				Thallium	9.3	mg/kg	1.45E-08	mg/kg/day	--	--	--	1.1E-06	mg/kg/day	4E-05	mg/kg/day	0.028
				Vanadium	1000	mg/kg	3.12E-07	mg/kg/day	--	--	--	2.4E-05	mg/kg/day	2E-05	mg/kg/day	1.218
				Chromium, hexavalent	2250	mg/kg	6.76E-07	mg/kg/day	1.25E-02	kg-day/mg	8.45E-09	5.3E-05	mg/kg/day	8E-05	mg/kg/day	0.659
			Exposure Route Total								**2.5E-05**					**16.2**
			Inhalation	1,2,4-Trichlorobenzene	5.01E-05	mg/m³	1.2E-08	mg/m³	--	--	--	9.2E-07	mg/m³	2E-02	mg/m³	0.000
				1,2-Dichlorobenzene	1.33E-06	mg/m³	3.1E-10	mg/m³	--	--	--	2.4E-08	mg/m³	2E+00	mg/m³	0.000
				1,3-Dichlorobenzene	3.46E-07	mg/m³	8.1E-11	mg/m³	--	--	--	6.3E-09	mg/m³	2E+00	mg/m³	0.000
				1,4-Dichlorobenzene	8.57E-07	mg/m³	2.0E-10	mg/m³	1.1E-02	m³/mg	2.2E-12	1.6E-08	mg/m³	8E-01	mg/m³	0.000
				Benzo(a)anthracene	3.50E-09	mg/m³	8.2E-13	mg/m³	1.1E-01	m³/mg	9.0E-14	6.4E-11	mg/m³	--	--	--
				Benzo(a)pyrene	1.16E-08	mg/m³	2.7E-12	mg/m³	1.1E+00	m³/mg	3.0E-12	2.1E-10	mg/m³	--	--	--
				Benzo(b)fluoranthene	1.94E-08	mg/m³	4.5E-12	mg/m³	1.1E-01	m³/mg	5.0E-13	3.5E-10	mg/m³	--	--	--
				Dibenz(a,h)anthracene	1.64E-09	mg/m³	3.8E-13	mg/m³	1.2E+00	m³/mg	4.6E-13	3.0E-11	mg/m³	--	--	--
				Hexachlorobenzene	4.37E-08	mg/m³	1.0E-11	mg/m³	4.6E-01	m³/mg	4.7E-12	8.0E-10	mg/m³	--	--	--

TABLE E-19 (RAGS Part D Table 7.10.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
				Indeno(1,2,3-cd)pyrene	7.14E-09	mg/m^3	1.7E-12	mg/m^3	1.1E-01	m^3/mg	1.8E-13	1.3E-10	mg/m^3	--	--	--
				Naphthalene	7.86E-07	mg/m^3	1.8E-10	mg/m^3	3.4E-02	m^3/mg	6.3E-12	1.4E-08	mg/m^3	4E-03	mg/m^3	0.000
				PCB-1248	6.07E-10	mg/m^3	1.4E-13	mg/m^3	5.7E-01	m^3/mg	8.1E-14	1.1E-11	mg/m^3	--	--	--
				PCB-1254	2.43E-10	mg/m^3	5.7E-14	mg/m^3	5.7E-01	m^3/mg	3.2E-14	4.4E-12	mg/m^3	--	--	--
				2,3,7,8-TCDD	1.13E-13	mg/m^3	2.6E-17	mg/m^3	3.8E+04	m^3/mg	1.0E-12	2.1E-15	mg/m^3	--	--	--
				Arsenic	7.00E-09	mg/m^3	1.6E-12	mg/m^3	4.3E+00	m^3/mg	7.0E-12	1.3E-10	mg/m^3	--	--	--
				Cobalt	8.57E-08	mg/m^3	2.0E-11	mg/m^3	9.0E+02	m^3/mg	1.8E-08	1.6E-09	mg/m^3	--	--	--
				Iron	4.66E-05	mg/m^3	1.1E-08	mg/m^3	--	--	--	8.5E-07	mg/m^3	--	--	--
				Thallium	6.64E-09	mg/m^3	1.6E-12	mg/m^3	--	--	--	1.2E-10	mg/m^3	--	--	--
				Vanadium	7.14E-07	mg/m^3	1.7E-10	mg/m^3	--	--	--	1.3E-08	mg/m^3	--	--	--
				Chromium, hexavalent	1.61E-06	mg/m^3	3.8E-10	mg/m^3	1.2E+01	m^3/mg	4.5E-09	2.9E-08	mg/m^3	1.0E-01	mg/m^3	0.000
			Exposure Route Total								**2.3E-08**					**0.0**
		Exposure Point Total									**2.8E-05**					**17**
	Exposure Medium Total										**2.8E-05**					**17**
Surface Soil Total											**2.8E-05**					**17**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.0041	mg/L	1.8E-04	mg/kg/day	2.9E-02	kg-day/mg	5.2E-06	1.4E-02	mg/kg/day	9E-02	mg/kg/day	0.156
				1,2-Dichlorobenzene	0.0042	mg/L	9.1E-05	mg/kg/day	--	--	--	7.1E-03	mg/kg/day	6E-01	mg/kg/day	0.012
				1,3-Dichlorobenzene*	0.0026	mg/L	9.3E-05	mg/kg/day	--	--	--	7.3E-03	mg/kg/day	6E-01	mg/kg/day	0.012
				1,4-Dichlorobenzene	0.0044	mg/L	1.0E-04	mg/kg/day	5.4E-03	kg-day/mg	5.4E-07	7.8E-03	mg/kg/day	7E-02	mg/kg/day	0.112
				Benzene	0.00081	mg/L	5.4E-06	mg/kg/day	5.50E-02	kg-day/mg	3.0E-07	4.2E-04	mg/kg/day	1E-02	mg/kg/day	0.042
				Chlorobenzene	0.017	mg/L	2.2E-04	mg/kg/day	--	--	--	1.7E-02	mg/kg/day	7E-02	mg/kg/day	0.244
				Benzo(a)anthracene	0.0023	mg/L	5.8E-05	mg/kg/day	9.49E-02	kg-day/mg	5.5E-06	1.9E-02	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	6.0E-05	mg/kg/day	9.49E-01	kg-day/mg	5.7E-05	6.1E-02	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	1.4E-03	mg/kg/day	9.5E-02	kg-day/mg	1.3E-04	1.1E-01	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	1.5E-03	mg/kg/day	9.5E-02	kg-day/mg	1.4E-04	1.1E-01	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	5.2E-04	mg/kg/day	--	--	--	4.1E-02	mg/kg/day	3E-03	mg/kg/day	13.541
				Aluminum	2.91	mg/L	--	--	--	--	--	--	--	--	--	--
				Barium	0.0123	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.002	mg/L	--	--	--		--	--	--	1E+00	mg/kg/day	--
				Chromium	3.65	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0066	mg/L	--	--	--	--	--	--	--	2E+00	mg/kg/day	--
				Iron	6.55	mg/L	--	--	--	--	--	--	--	7E-01	mg/kg/day	--
				Lead	0.0155	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.071	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.00011	mg/L	--	--	--	--	--	--	--	1E-01	mg/kg/day	--
				Nickel	0.0317	mg/L	--	--	--	--	--	--	--	2E-02	mg/kg/day	--
				Vanadium	0.135	mg/L	--	--	--	--	--	--	--	2E-05	mg/kg/day	--
				Zinc	5.35	mg/L	--	--	--	--	--	--	--	3E-01	mg/kg/day	--
				Chromium, hexavalent	0.453	mg/L	--	--	1.3E-02	kg-day/mg	--	--	--	2E-01	mg/kg/day	--
			Exposure Route Total								**3.3E-04**					**14.0**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.0041	mg/L	3.24E-09	mg/kg/day	2.9E-02	kg-day/mg	9.4E-11	2.5E-07	mg/kg/day	9E-02	mg/kg/day	0.000
				1,2-Dichlorobenzene	0.0042	mg/L	3.32E-09	mg/kg/day	--	--	--	2.6E-07	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene*	0.0026	mg/L	2.05E-09	mg/kg/day	--	--	--	1.6E-07	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	0.0044	mg/L	3.48E-09	mg/kg/day	5.4E-03	kg-day/mg	1.9E-11	2.7E-07	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.00081	mg/L	6.40E-10	mg/kg/day	5.5E-02	kg-day/mg	3.5E-11	5.0E-08	mg/kg/day	1E-02	mg/kg/day	0.000
				Chlorobenzene	0.017	mg/L	1.34E-08	mg/kg/day	--	--	--	1.0E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzo(a)anthracene	0.0023	mg/L	1.82E-09	mg/kg/day	1.0E-02	kg-day/mg	1.8E-11	1.4E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	1.74E-09	mg/kg/day	--	--	--	1.4E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	3.00E-09	mg/kg/day	8.0E-03	kg-day/mg	2.4E-11	2.3E-07	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	1.34E-09	mg/kg/day	--	--	--	1.0E-07	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	1.66E-08	mg/kg/day	--	--	--	1.3E-06	mg/kg/day	2E-02	mg/kg/day	0.000

TABLE E-19 (RAGS Part D Table 7.10.RME)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
REASONABLE MAXIMUM EXPOSURE
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
				Aluminum	2.91	mg/L	2.30E-06	mg/kg/day	--	--	--	1.8E-04	mg/kg/day	1E+00	mg/kg/day	0.000
				Barium	0.0123	mg/L	9.72E-09	mg/kg/day	--	--	--	7.6E-07	mg/kg/day	2E-01	mg/kg/day	0.000
				Cadmium	0.002	mg/L	1.58E-09	mg/kg/day	--	--	--	1.2E-07	mg/kg/day	1E-03	mg/kg/day	0.000
				Chromium	3.65	mg/L	2.88E-06	mg/kg/day	--	--	--	2.3E-04	mg/kg/day	1.5E+00	mg/kg/day	0.000
				Cobalt	0.0066	mg/L	5.22E-09	mg/kg/day	--	--	--	4.1E-07	mg/kg/day	3E-03	mg/kg/day	0.000
				Iron	6.55	mg/L	5.18E-06	mg/kg/day	--	--	--	4.0E-04	mg/kg/day	7E-01	mg/kg/day	0.001
				Lead	0.0155	mg/L	1.22E-08	mg/kg/day	--	--	--	9.6E-07	mg/kg/day	--	--	--
				Manganese	0.071	mg/L	5.61E-08	mg/kg/day	--	--	--	4.4E-06	mg/kg/day	1E-01	mg/kg/day	0.000
				Mercury	0.00011	mg/L	8.69E-11	mg/kg/day	--	--	--	6.8E-09	mg/kg/day	1.6E-04	mg/kg/day	0.000
				Nickel	0.0317	mg/L	2.51E-08	mg/kg/day	--	--	--	2.0E-06	mg/kg/day	2E-02	mg/kg/day	0.000
				Vanadium	0.135	mg/L	1.07E-07	mg/kg/day	--	--	--	8.3E-06	mg/kg/day	7E-04	mg/kg/day	0.012
				Zinc	5.35	mg/L	4.23E-06	mg/kg/day	--	--	--	3.3E-04	mg/kg/day	3E-01	mg/kg/day	0.001
				Chromium, hexavalent	0.453	mg/L	3.58E-07	mg/kg/day	5.0E-01	kg-day/mg	1.8E-07	2.8E-05	mg/kg/day	3E-03	mg/kg/day	0.009
			Exposure Route Total								**1.8E-07**					**0.0**
		Exposure Point Total									**3.3E-04**					**14**
	Exposure Medium Total										**3.3E-04**					**14**
Groundwater Total											**3.3E-04**					**14**
							Total of Receptor Risks Across All Media				**3.6E-04**	**Total of Receptor Hazards Across All Media**				**31**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

TABLE E-20 (RAGS Part D Table 7.10.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
					Value	Units	Intake/Exposure		CSF/Unit Risk		Cancer Risk	Intake/Exposure		RfD/RfC		Hazard Quotient
							Value	Units	Value	Units		Value	Units	Value	Units	
Surface and Subsurface Soil (0-10 feet bgs)	**Surface and Subsurface Soil (0-10 feet bgs)**	**Eastern Area Surface and Subsurface Soil**	**Incidental Ingestion**	1,2,4-Trichlorobenzene	20700	mg/kg	1.8E-05	mg/kg/day	2.9E-02	kg-day/mg	5.3E-07	1.4E-03	mg/kg/day	8E-03	mg/kg/day	0.177
				1,2-Dichlorobenzene	969	mg/kg	8.5E-07	mg/kg/day	--	--	--	6.6E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene	258	mg/kg	2.3E-07	mg/kg/day	--	--	--	1.8E-05	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	554	mg/kg	4.9E-07	mg/kg/day	5.4E-03	kg-day/mg	2.6E-09	3.8E-05	mg/kg/day	7E-02	mg/kg/day	0.001
				Benzo(a)anthracene	9.8	mg/kg	8.6E-09	mg/kg/day	7.3E-01	kg-day/mg	6.3E-09	6.7E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	7.4	mg/kg	6.5E-09	mg/kg/day	7.3E+00	kg-day/mg	4.7E-08	5.1E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	13.3	mg/kg	1.2E-08	mg/kg/day	7.3E-01	kg-day/mg	8.5E-09	9.1E-07	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	3.5	mg/kg	3.1E-09	mg/kg/day	7.3E+00	kg-day/mg	2.2E-08	2.4E-07	mg/kg/day	--	--	--
				Hexachlorobenzene	31.5	mg/kg	2.8E-08	mg/kg/day	1.6E+00	kg-day/mg	4.4E-08	2.2E-06	mg/kg/day	1E-05	mg/kg/day	0.216
				Indeno(1,2,3-cd)pyrene	8.4	mg/kg	7.4E-09	mg/kg/day	7.3E-01	kg-day/mg	5.4E-09	5.8E-07	mg/kg/day	--	--	--
				Naphthalene	149	mg/kg	1.3E-07	mg/kg/day	--	--	--	1.0E-05	mg/kg/day	2E-02	mg/kg/day	0.001
				PCB-1248	0.43	mg/kg	3.8E-10	mg/kg/day	2.0E+00	kg-day/mg	7.6E-10	2.9E-08	mg/kg/day	--	--	--
				PCB-1254	0.19	mg/kg	1.7E-10	mg/kg/day	2.0E+00	kg-day/mg	3.3E-10	1.3E-08	mg/kg/day	2E-05	mg/kg/day	0.001
				2,3,7,8-TCDD	0.00028	mg/kg	2.5E-13	mg/kg/day	1.5E+05	kg-day/mg	3.7E-08	1.9E-11	mg/kg/day	7E-10	mg/kg/day	0.027
				Arsenic	5.2	mg/kg	4.6E-09	mg/kg/day	1.5E+00	kg-day/mg	6.8E-09	3.6E-07	mg/kg/day	3E-04	mg/kg/day	0.001
				Cobalt	72	mg/kg	6.3E-08	mg/kg/day	--	--	--	4.9E-06	mg/kg/day	3E-03	mg/kg/day	0.002
				Iron	47300	mg/kg	4.2E-05	mg/kg/day	--	--	--	3.2E-03	mg/kg/day	7E-01	mg/kg/day	0.005
				Thallium	5.8	mg/kg	5.1E-09	mg/kg/day	--	--	--	4.0E-07	mg/kg/day	4E-05	mg/kg/day	0.010
				Vanadium	503	mg/kg	4.4E-07	mg/kg/day	--	--	--	3.4E-05	mg/kg/day	7E-04	mg/kg/day	0.049
				Chromium, hexavalent	1270	mg/kg	1.1E-06	mg/kg/day	5.0E-01	kg-day/mg	5.6E-07	8.7E-05	mg/kg/day	3E-03	mg/kg/day	0.029
			Exposure Route Total								**1.3E-06**					**0.5**
			Dermal Contact	1,2,4-Trichlorobenzene	20700	mg/kg	2.49E-04	mg/kg/day	2.9E-02	kg-day/mg	7.21E-06	1.9E-02	mg/kg/day	8E-03	mg/kg/day	2.424
				1,2-Dichlorobenzene	969	mg/kg	1.16E-05	mg/kg/day	--	--	--	9.1E-04	mg/kg/day	6E-01	mg/kg/day	0.002
				1,3-Dichlorobenzene	258	mg/kg	3.10E-06	mg/kg/day	--	--	--	2.4E-04	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	554	mg/kg	6.66E-06	mg/kg/day	5.4E-03	kg-day/mg	3.59E-08	5.2E-04	mg/kg/day	7E-02	mg/kg/day	0.007
				Benzo(a)anthracene	9.8	mg/kg	1.53E-08	mg/kg/day	9.49E-02	kg-day/mg	1.45E-09	1.2E-06	mg/kg/day	--	--	--
				Benzo(a)pyrene	7.4	mg/kg	1.16E-08	mg/kg/day	9.49E-01	kg-day/mg	1.10E-08	9.0E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	13.3	mg/kg	2.08E-08	mg/kg/day	9.5E-02	kg-day/mg	1.97E-09	1.6E-06	mg/kg/day	--	--	--
				Dibenz(a,h)anthracene	3.5	mg/kg	5.47E-09	mg/kg/day	9.49E-01	kg-day/mg	5.19E-09	4.3E-07	mg/kg/day	--	--	--
				Hexachlorobenzene	31.5	mg/kg	3.78E-08	mg/kg/day	1.6E-01	kg-day/mg	6.05E-09	3.0E-06	mg/kg/day	1E-06	mg/kg/day	2.952
				Indeno(1,2,3-cd)pyrene	8.4	mg/kg	1.31E-08	mg/kg/day	9.5E-02	kg-day/mg	1.24E-09	1.0E-06	mg/kg/day	--	--	--
				Naphthalene	149	mg/kg	2.33E-07	mg/kg/day	--	--	--	1.8E-05	mg/kg/day	3E-03	mg/kg/day	0.006
				PCB-1248	0.43	mg/kg	7.23E-10	mg/kg/day	2.8E-01	kg-day/mg	2.02E-10	5.6E-08	mg/kg/day	--	--	--
				PCB-1254	0.19	mg/kg	3.20E-10	mg/kg/day	2.80E-01	kg-day/mg	8.95E-11	2.5E-08	mg/kg/day	3E-06	mg/kg/day	0.008
				2,3,7,8-TCDD	0.00028	mg/kg	1.01E-13	mg/kg/day	4.50E+03	kg-day/mg	4.54E-10	7.9E-12	mg/kg/day	2E-11	mg/kg/day	0.394
				Arsenic	5.2	mg/kg	1.87E-09	mg/kg/day	4.50E-02	kg-day/mg	8.43E-11	1.5E-07	mg/kg/day	9E-06	mg/kg/day	0.016
				Cobalt	72	mg/kg	8.65E-07	mg/kg/day	--	--	--	6.7E-05	mg/kg/day	3E-03	mg/kg/day	0.022
				Iron	47300	mg/kg	7.39E-05	mg/kg/day	--	--	--	5.8E-03	mg/kg/day	7E-01	mg/kg/day	0.008
				Thallium	5.8	mg/kg	9.06E-09	mg/kg/day	--	--	--	7.1E-07	mg/kg/day	4E-05	mg/kg/day	0.018
				Vanadium	503	mg/kg	1.57E-07	mg/kg/day	--	--	--	1.2E-05	mg/kg/day	2E-05	mg/kg/day	0.613
				Chromium, hexavalent	1270	mg/kg	3.81E-07	mg/kg/day	1.25E-02	kg-day/mg	4.77E-09	3.0E-05	mg/kg/day	8E-05	mg/kg/day	0.372
			Exposure Route Total								**7.3E-06**					**6.8**
			Inhalation	1,2,4-Trichlorobenzene	1.48E-05	mg/m³	3.5E-09	mg/m³	--	--	--	2.7E-07	mg/m³	2E-02	mg/m³	0.000
				1,2-Dichlorobenzene	6.92E-07	mg/m³	1.6E-10	mg/m³	--	--	--	1.3E-08	mg/m³	2E+00	mg/m³	0.000
				1,3-Dichlorobenzene	1.84E-07	mg/m³	4.3E-11	mg/m³	--	--	--	3.4E-09	mg/m³	2E+00	mg/m³	0.000
				1,4-Dichlorobenzene	3.96E-07	mg/m³	9.3E-11	mg/m³	1.1E-02	m³/mg	1.0E-12	7.2E-09	mg/m³	8E-01	mg/m³	0.000
				Benzo(a)anthracene	7.00E-09	mg/m³	1.6E-12	mg/m³	1.1E-01	m³/mg	1.8E-13	1.3E-10	mg/m³	--	--	--
				Benzo(a)pyrene	5.29E-09	mg/m³	1.2E-12	mg/m³	1.1E+00	m³/mg	1.4E-12	9.7E-11	mg/m³	--	--	--
				Benzo(b)fluoranthene	9.50E-09	mg/m³	2.2E-12	mg/m³	1.1E-01	m³/mg	2.4E-13	1.7E-10	mg/m³	--	--	--
				Dibenz(a,h)anthracene	2.50E-09	mg/m³	5.9E-13	mg/m³	1.2E+00	m³/mg	7.0E-13	4.6E-11	mg/m³	--	--	--
				Hexachlorobenzene	2.25E-08	mg/m³	5.3E-12	mg/m³	4.6E-01	m³/mg	2.4E-12	4.1E-10	mg/m³	--	--	--

TABLE E-20 (RAGS Part D Table 7.10.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
				Indeno(1,2,3-cd)pyrene	6.00E-09	mg/m^3	1.4E-12	mg/m^3	1.1E-01	m^3/mg	1.5E-13	1.1E-10	mg/m^3	--	--	--
				Naphthalene	1.06E-07	mg/m^3	2.5E-11	mg/m^3	3.4E-02	m^3/mg	8.5E-13	1.9E-09	mg/m^3	4E-03	mg/m^3	0.000
				PCB-1248	3.07E-10	mg/m^3	7.2E-14	mg/m^3	5.7E-01	m^3/mg	4.1E-14	5.6E-12	mg/m^3	--	--	--
				PCB-1254	1.36E-10	mg/m^3	3.2E-14	mg/m^3	5.7E-01	m^3/mg	1.8E-14	2.5E-12	mg/m^3	--	--	--
				2,3,7,8-TCDD	2.00E-13	mg/m^3	4.7E-17	mg/m^3	3.8E+04	m^3/mg	1.8E-12	3.7E-15	mg/m^3	--	--	--
				Arsenic	3.71E-09	mg/m^3	8.7E-13	mg/m^3	4.3E+00	m^3/mg	3.7E-12	6.8E-11	mg/m^3	--	--	--
				Cobalt	5.14E-08	mg/m^3	1.2E-11	mg/m^3	9.0E+02	m^3/mg	1.1E-08	9.4E-10	mg/m^3	--	--	--
				Iron	3.38E-05	mg/m^3	7.9E-09	mg/m^3	--	--	--	6.2E-07	mg/m^3	--	--	--
				Thallium	4.14E-09	mg/m^3	9.7E-13	mg/m^3	--	--	--	7.6E-11	mg/m^3	--	--	--
				Vanadium	3.59E-07	mg/m^3	8.4E-11	mg/m^3	--	--	--	6.6E-09	mg/m^3	--	--	--
				Chromium, hexavalent	9.07E-07	mg/m^3	2.1E-10	mg/m^3	1.2E+01	m^3/mg	2.5E-09	1.7E-08	mg/m^3	1.0E-01	mg/m^3	0.000
			Exposure Route Total								**1.3E-08**					**0.0**
		Exposure Point Total									**8.6E-06**					**7.4**
	Exposure Medium Total										**8.6E-06**					**7.4**
Surface Soil Total											**8.6E-06**					**7.4**
Shallow Groundwater	**Shallow Groundwater**	**Eastern Area Shallow Groundwater**	**Dermal Contact**	1,2,4-Trichlorobenzene	0.0041	mg/L	1.8E-04	mg/kg/day	2.9E-02	kg-day/mg	5.2E-06	1.4E-02	mg/kg/day	9E-02	mg/kg/day	0.156
				1,2-Dichlorobenzene	0.0042	mg/L	9.1E-05	mg/kg/day	--	--	--	7.1E-03	mg/kg/day	6E-01	mg/kg/day	0.012
				1,3-Dichlorobenzene*	0.0026	mg/L	9.3E-05	mg/kg/day	--	--	--	7.3E-03	mg/kg/day	6E-01	mg/kg/day	0.012
				1,4-Dichlorobenzene	0.0044	mg/L	1.0E-04	mg/kg/day	5.4E-03	kg-day/mg	5.4E-07	7.8E-03	mg/kg/day	7E-02	mg/kg/day	0.112
				Benzene	0.00081	mg/L	5.4E-06	mg/kg/day	5.50E-02	kg-day/mg	3.0E-07	4.2E-04	mg/kg/day	1E-02	mg/kg/day	0.042
				Chlorobenzene	0.017	mg/L	2.2E-04	mg/kg/day	--	--	--	1.7E-02	mg/kg/day	7E-02	mg/kg/day	0.244
				Benzo(a)anthracene	0.0023	mg/L	5.8E-05	mg/kg/day	9.49E-02	kg-day/mg	5.5E-06	1.9E-02	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	6.0E-05	mg/kg/day	9.49E-01	kg-day/mg	5.7E-05	6.1E-02	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	1.4E-03	mg/kg/day	9.5E-02	kg-day/mg	1.3E-04	1.1E-01	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	1.5E-03	mg/kg/day	9.5E-02	kg-day/mg	1.4E-04	1.1E-01	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	5.2E-04	mg/kg/day	--	--	--	4.1E-02	mg/kg/day	3E-03	mg/kg/day	13.541
				Aluminum	2.91	mg/L	--	--	--	--	--	--	--	--	--	--
				Barium	0.0123	mg/L	--	--	--	--	--	--	--	--	--	--
				Cadmium	0.002	mg/L	--	--	--		--	--	--	1E+00	mg/kg/day	--
				Chromium	3.65	mg/L	--	--	--	--	--	--	--	--	--	--
				Cobalt	0.0066	mg/L	--	--	--	--	--	--	--	2E+00	mg/kg/day	--
				Iron	6.55	mg/L	--	--	--	--	--	--	--	7E-01	mg/kg/day	--
				Lead	0.0155	mg/L	--	--	--	--	--	--	--	--	--	--
				Manganese	0.071	mg/L	--	--	--	--	--	--	--	--	--	--
				Mercury	0.00011	mg/L	--	--	--	--	--	--	--	1E-01	mg/kg/day	--
				Nickel	0.0317	mg/L	--	--	--	--	--	--	--	2E-02	mg/kg/day	--
				Vanadium	0.135	mg/L	--	--	--	--	--	--	--	2E-05	mg/kg/day	--
				Zinc	5.35	mg/L	--	--	--	--	--	--	--	3E-01	mg/kg/day	--
				Chromium, hexavalent	0.453	mg/L	--	--	1.3E-02	kg-day/mg	--	--	--	2E-01	mg/kg/day	--
			Exposure Route Total								**3.3E-04**					**14.0**
			Incidental Ingestion	1,2,4-Trichlorobenzene	0.0041	mg/L	3.24E-09	mg/kg/day	2.9E-02	kg-day/mg	9.4E-11	2.5E-07	mg/kg/day	9E-02	mg/kg/day	0.000
				1,2-Dichlorobenzene	0.0042	mg/L	3.32E-09	mg/kg/day	--	--	--	2.6E-07	mg/kg/day	6E-01	mg/kg/day	0.000
				1,3-Dichlorobenzene*	0.0026	mg/L	2.05E-09	mg/kg/day	--	--	--	1.6E-07	mg/kg/day	6E-01	mg/kg/day	0.000
				1,4-Dichlorobenzene	0.0044	mg/L	3.48E-09	mg/kg/day	5.4E-03	kg-day/mg	1.9E-11	2.7E-07	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzene	0.00081	mg/L	6.40E-10	mg/kg/day	5.5E-02	kg-day/mg	3.5E-11	5.0E-08	mg/kg/day	1E-02	mg/kg/day	0.000
				Chlorobenzene	0.017	mg/L	1.34E-08	mg/kg/day	--	--	--	1.0E-06	mg/kg/day	7E-02	mg/kg/day	0.000
				Benzo(a)anthracene	0.0023	mg/L	1.82E-09	mg/kg/day	1.0E-02	kg-day/mg	1.8E-11	1.4E-07	mg/kg/day	--	--	--
				Benzo(a)pyrene	0.0022	mg/L	1.74E-09	mg/kg/day	--	--	--	1.4E-07	mg/kg/day	--	--	--
				Benzo(b)fluoranthene	0.0038	mg/L	3.00E-09	mg/kg/day	8.0E-03	kg-day/mg	2.4E-11	2.3E-07	mg/kg/day	--	--	--
				Indeno(1,2,3-cd)pyrene	0.0017	mg/L	1.34E-09	mg/kg/day	--	--	--	1.0E-07	mg/kg/day	--	--	--
				Naphthalene	0.021	mg/L	1.66E-08	mg/kg/day	--	--	--	1.3E-06	mg/kg/day	2E-02	mg/kg/day	0.000

TABLE E-20 (RAGS Part D Table 7.10.CT)
CALCULATION OF CHEMICAL CANCER RISKS AND NON-CANCER HAZARDS
CENTRAL TENDENCY
EASTERN SUBSURFACE SOIL AND SHALLOW GROUNDWATER
STANDARD CHLORINE CHEMICAL COMPANY, INC. SITE
KEARNY, NEW JERSEY

Scenario Timeframe:	**Current/Future**
Receptor Population:	**Utility Worker**
Receptor Age:	**Adult**

Medium	Exposure Medium	Exposure Point	Exposure Route	Chemical of Potential Concern	EPC		Cancer Risk Calculations					Non-Cancer Hazard Calculations				
							Intake/Exposure		CSF/Unit Risk			Intake/Exposure		RfD/RfC		
					Value	Units	Value	Units	Value	Units	Cancer Risk	Value	Units	Value	Units	Hazard Quotient
				Aluminum	2.91	mg/L	2.30E-06	mg/kg/day	--	--	--	1.8E-04	mg/kg/day	1E+00	mg/kg/day	0.000
				Barium	0.0123	mg/L	9.72E-09	mg/kg/day	--	--	--	7.6E-07	mg/kg/day	2E-01	mg/kg/day	0.000
				Cadmium	0.002	mg/L	1.58E-09	mg/kg/day	--	--	--	1.2E-07	mg/kg/day	1E-03	mg/kg/day	0.000
				Chromium	3.65	mg/L	2.88E-06	mg/kg/day	--	--	--	2.3E-04	mg/kg/day	1.5E+00	mg/kg/day	0.000
				Cobalt	0.0066	mg/L	5.22E-09	mg/kg/day	--	--	--	4.1E-07	mg/kg/day	3E-03	mg/kg/day	0.000
				Iron	6.55	mg/L	5.18E-06	mg/kg/day	--	--	--	4.0E-04	mg/kg/day	7E-01	mg/kg/day	0.001
				Lead	0.0155	mg/L	1.22E-08	mg/kg/day	--	--	--	9.6E-07	mg/kg/day	--	--	--
				Manganese	0.071	mg/L	5.61E-08	mg/kg/day	--	--	--	4.4E-06	mg/kg/day	1E-01	mg/kg/day	0.000
				Mercury	0.00011	mg/L	8.69E-11	mg/kg/day	--	--	--	6.8E-09	mg/kg/day	1.6E-04	mg/kg/day	0.000
				Nickel	0.0317	mg/L	2.51E-08	mg/kg/day	--	--	--	2.0E-06	mg/kg/day	2E-02	mg/kg/day	0.000
				Vanadium	0.135	mg/L	1.07E-07	mg/kg/day	--	--	--	8.3E-06	mg/kg/day	7E-04	mg/kg/day	0.012
				Zinc	5.35	mg/L	4.23E-06	mg/kg/day	--	--	--	3.3E-04	mg/kg/day	3E-01	mg/kg/day	0.001
				Chromium, hexavalent	0.453	mg/L	3.58E-07	mg/kg/day	5.0E-01	kg-day/mg	1.8E-07	2.8E-05	mg/kg/day	3E-03	mg/kg/day	0.009
			Exposure Route Total								**1.8E-07**					**0.0**
		Exposure Point Total									**3.3E-04**					**14**
	Exposure Medium Total										**3.3E-04**					**14**
Groundwater Total											**3.3E-04**					**14**
							Total of Receptor Risks Across All Media				**3.4E-04**	**Total of Receptor Hazards Across All Media**				**21**

Lead risks calculated using the Adult Lead Model (See Appendix G).
UCL concentrations calculated using ProUCL v. 5.0. Spreadsheets presented in Appendix F.

APPENDIX F

STATISTICAL CALCULATIONS
(GOODNESS OF FIT, UCLS)

APPENDIX F

STATISTICAL CALCULATIONS
(GOODNESS OF FIT, UCLS)

APPENDIX F.1A

WESTERN AREA SURFACE SOILS
GOODNESS OF FIT TESTING

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options
Date/Time of Computation 7/3/2014 14:02
From File WorkSheet_b.xls
Full Precision OFF
Confidence Coefficient 0.95

123TCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	12	0	12	2	10	83.33%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	12	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	12	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Imputed Data)	12	N/A	N/A	N/A	N/A	N/A

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

124TCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	14	0	14	3	11	78.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	8.50E-04	2.5	0.304	0.0013	0.742
Statistics (Detects Only)	3	7.90E-04	480	160.1	0.39	277
Statistics (All: NDs treated as DL value)	14	7.90E-04	480	34.55	0.0402	128.2

Statistics (All: NDs treated as DL/2 value)	14	4.25E-04	480	34.43	0.0201	128.2
Statistics (Normal ROS Imputed Data)	14	-138.7	480	-12.86	-63.38	146.5
Statistics (Gamma ROS Imputed Data)	14	7.90E-04	480	34.32	0.01	128.3
Statistics (Lognormal ROS Imputed Data)	14	3.99E-05	480	34.31	4.37E-04	128.3

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	N/A	N/A	N/A	N/A	N/A	N/A
Statistics (NDs = DL)	0.113	0.136	305.5	-3.525	4.059	-1.151
Statistics (NDs = DL/2)	0.106	0.131	325	-4.07	4.182	-1.027
Statistics (Gamma ROS Estimates)	0.11	0.134	311.9	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-6.132	4.072	-0.664

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.866	0.519	0.517	0.656

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.751	0.767	Data Not Normal
Lilliefors (Detects Only)	0.385	0.512	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.3	0.874	Data Not Normal
Lilliefors (NDs = DL)	0.527	0.237	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.298	0.874	Data Not Normal
Lilliefors (NDs = DL/2)	0.531	0.237	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.516	0.874	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.376	0.237	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	0.924	0.927	0.924

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	2.364	0.957	
Kolmogorov-Smirnov (NDs = DL)	0.349	0.26	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.474	0.963	
Kolmogorov-Smirnov (NDs = DL/2)	0.344	0.261	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	4.315	0.959	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.519	0.261	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.999	0.91	0.909	0.772

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilk (NDs = DL)	0.826	0.874	Data Not Lognormal
Lilliefors (NDs = DL)	0.279	0.237	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.825	0.874	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.269	0.237	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.625	0.874	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.377	0.237	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	14	0	14	6	8	57.14%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	7.70E-04	0.47	0.0745	0.00101	0.165
Statistics (Detects Only)	6	0.0012	220	46.98	11.8	85.91
Statistics (All: NDs treated as DL value)	14	7.70E-04	220	20.17	0.0606	58.47
Statistics (All: NDs treated as DL/2 value)	14	3.85E-04	220	20.15	0.0306	58.48
Statistics (Normal ROS Imputed Data)	14	-158.6	220	-66.8	-132.6	115.7
Statistics (Gamma ROS Imputed Data)	14	0.0012	220	20.14	0.01	58.48
Statistics (Lognormal ROS Imputed Data)	14	1.76E-05	220	20.13	8.77E-05	58.49

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.247	0.234	190.5	0.963	4.379	4.546
Statistics (NDs = DL)	0.135	0.154	149.5	-2.777	4.719	-1.7
Statistics (NDs = DL/2)	0.127	0.148	158.2	-3.173	4.979	-1.569
Statistics (Gamma ROS Estimates)	0.148	0.164	136.5	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-5.627	6.538	-1.162

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.782	0.609	0.609	0.608

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.631	0.788	Data Not Normal
Lilliefors (Detects Only)	0.375	0.362	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.401	0.874	Data Not Normal
Lilliefors (NDs = DL)	0.392	0.237	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.4	0.874	Data Not Normal
Lilliefors (NDs = DL/2)	0.392	0.237	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.781	0.874	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.264	0.237	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.992	0.97	0.972	0.967

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.188	0.785	
Kolmogorov-Smirnov (Detects Only)	0.176	0.361	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.27	0.937	
Kolmogorov-Smirnov (NDs = DL)	0.281	0.258	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.253	0.944	
Kolmogorov-Smirnov (NDs = DL/2)	0.263	0.259	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.938	0.926	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.38	0.257	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.941	0.918	0.922	0.889

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.893	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.274	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.821	0.874	Data Not Lognormal
Lilliefors (NDs = DL)	0.299	0.237	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.829	0.874	Data Not Lognormal

Lilliefors (NDs = DL/2)	0.262	0.237	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.768	0.874	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.268	0.237	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

14DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	14	0	14	6	8	57.14%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	6.10E-04	0.47	0.0743	8.10E-04	0.165
Statistics (Detects Only)	6	0.0015	360	71.65	12.35	142.2
Statistics (All: NDs treated as DL value)	14	6.10E-04	360	30.75	0.0608	95.56
Statistics (All: NDs treated as DL/2 value)	14	3.05E-04	360	30.73	0.0308	95.57
Statistics (Normal ROS Imputed Data)	14	-257.4	360	-110.4	-215.7	186.5
Statistics (Gamma ROS Imputed Data)	14	0.0015	360	30.71	0.01	95.57
Statistics (Lognormal ROS Imputed Data)	14	1.32E-05	360	30.71	6.99E-05	95.57

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.227	0.225	315.7	1.094	4.457	4.076
Statistics (NDs = DL)	0.126	0.147	243.7	-2.815	4.886	-1.735
Statistics (NDs = DL/2)	0.12	0.142	257	-3.211	5.148	-1.603
Statistics (Gamma ROS Estimates)	0.139	0.157	220.9	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-5.728	6.748	-1.178

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.754	0.582	0.582	0.582

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.591	0.788	Data Not Normal
Lilliefors (Detects Only)	0.408	0.362	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.37	0.874	Data Not Normal
Lilliefors (NDs = DL)	0.423	0.237	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.37	0.874	Data Not Normal
Lilliefors (NDs = DL/2)	0.423	0.237	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.772	0.874	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.262	0.237	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.988	0.959	0.962	0.955

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.199	0.792	
Kolmogorov-Smirnov (Detects Only)	0.162	0.362	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.305	0.945	
Kolmogorov-Smirnov (NDs = DL)	0.266	0.259	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.287	0.951	
Kolmogorov-Smirnov (NDs = DL/2)	0.255	0.26	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	2.04	0.934	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.377	0.258	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.953	0.923	0.927	0.892

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.913	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.271	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.832	0.874	Data Not Lognormal
Lilliefors (NDs = DL)	0.275	0.237	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.838	0.874	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.239	0.237	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.774	0.874	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.269	0.237	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BEN

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	13	0	13	1	12	92.31%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BEN was not processed!

BAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	14	3	17.65%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.12	0.61	0.4	0.47	0.252
Statistics (Detects Only)	14	0.03	1.6	0.624	0.37	0.545
Statistics (All: NDs treated as DL value)	17	0.03	1.6	0.584	0.38	0.507
Statistics (All: NDs treated as DL/2 value)	17	0.03	1.6	0.549	0.33	0.521
Statistics (Normal ROS Imputed Data)	17	-0.182	1.6	0.534	0.33	0.538
Statistics (Gamma ROS Imputed Data)	17	0.0112	1.6	0.538	0.33	0.529
Statistics (Lognormal ROS Imputed Data)	17	0.03	1.6	0.536	0.33	0.529

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.138	0.942	0.548	-0.972	1.201	-1.235
Statistics (NDs = DL)	1.224	1.047	0.477	-0.999	1.127	-1.128
Statistics (NDs = DL/2)	1.096	0.942	0.501	-1.121	1.174	-1.047
Statistics (Gamma ROS Estimates)	0.92	0.797	0.584	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.179	1.195	-1.013

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.941	0.939	0.917	0.962

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.868	0.874	Data Not Normal
Lilliefors (Detects Only)	0.244	0.237	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.87	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.186	0.215	Data Appear Normal
Shapiro-Wilk (NDs = DL/2)	0.829	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.274	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.872	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.26	0.215	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.954	0.97	0.962	0.959

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.253	0.757	
Kolmogorov-Smirnov (Detects Only)	0.136	0.234	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.166	0.761	
Kolmogorov-Smirnov (NDs = DL)	0.0976	0.214	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.338	0.764	
Kolmogorov-Smirnov (NDs = DL/2)	0.16	0.215	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.273	0.769	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.129	0.216	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.966	0.975	0.975	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.927	0.874	Data Appear Lognormal
Lilliefors (Detects Only)	0.118	0.237	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.946	0.892	Data Appear Lognormal
Lilliefors (NDs = DL)	0.11	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.941	0.892	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.141	0.215	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.952	0.892	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.116	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BBF

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	16	1	5.88%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	16	0.068	2.2	1.006	0.64	0.777
Statistics (All: NDs treated as DL value)	17	0.068	2.2	0.974	0.5	0.763
Statistics (All: NDs treated as DL/2 value)	17	0.068	2.2	0.96	0.5	0.775
Statistics (Normal ROS Imputed Data)	17	0.068	2.2	0.964	0.5	0.772
Statistics (Gamma ROS Imputed Data)	17	0.068	2.2	0.965	0.5	0.771
Statistics (Lognormal ROS Imputed Data)	17	0.068	2.2	0.961	0.5	0.775

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.332	1.124	0.755	-0.415	1.094	-2.638
Statistics (NDs = DL)	1.367	1.165	0.713	-0.435	1.062	-2.444
Statistics (NDs = DL/2)	1.291	1.102	0.744	-0.475	1.088	-2.289
Statistics (Gamma ROS Estimates)	1.326	1.132	0.728	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.474	1.087	-2.293

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.946	0.939	0.94	0.954

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.872	0.887	Data Not Normal
Lilliefors (Detects Only)	0.242	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.861	0.892	Data Not Normal

Lilliefors (NDs = DL)	0.262	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.862	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.253	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.86	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.255	0.215	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.922	0.929	0.927	0.928

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.555	0.758	
Kolmogorov-Smirnov (Detects Only)	0.192	0.22	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.609	0.758	
Kolmogorov-Smirnov (NDs = DL)	0.185	0.214	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.53	0.76	
Kolmogorov-Smirnov (NDs = DL/2)	0.184	0.214	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.578	0.759	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.182	0.214	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.946	0.947	0.959	0.958

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.885	0.887	Data Not Lognormal
Lilliefors (Detects Only)	0.191	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.889	0.892	Data Not Lognormal
Lilliefors (NDs = DL)	0.178	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.906	0.892	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.184	0.215	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.906	0.892	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.184	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

DAHA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	13	3	18.75%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.12	0.47	0.24	0.13	0.199
Statistics (Detects Only)	13	0.01	0.45	0.154	0.097	0.14
Statistics (All: NDs treated as DL value)	16	0.01	0.47	0.17	0.12	0.149
Statistics (All: NDs treated as DL/2 value)	16	0.01	0.45	0.148	0.092	0.131
Statistics (Normal ROS Imputed Data)	16	0.01	0.45	0.143	0.092	0.129
Statistics (Gamma ROS Imputed Data)	16	0.01	0.45	0.138	0.092	0.131
Statistics (Lognormal ROS Imputed Data)	16	0.01	0.45	0.136	0.0832	0.132

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.068	0.873	0.144	-2.406	1.232	-0.512
Statistics (NDs = DL)	1.155	0.98	0.148	-2.262	1.179	-0.521
Statistics (NDs = DL/2)	1.18	1.001	0.125	-2.392	1.138	-0.476
Statistics (Gamma ROS Estimates)	1.159	0.983	0.119	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.509	1.133	-0.451

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.948	0.944	0.941	0.867

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.889	0.866	Data Appear Normal
Lilliefors (Detects Only)	0.212	0.246	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.878	0.887	Data Not Normal
Lilliefors (NDs = DL)	0.231	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.879	0.887	Data Not Normal
Lilliefors (NDs = DL/2)	0.213	0.222	Data Appear Normal
Shapiro-Wilk (Normal ROS Estimates)	0.868	0.887	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.202	0.222	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.98	0.972	0.984	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.217	0.756	
Kolmogorov-Smirnov (Detects Only)	0.125	0.243	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.221	0.761	
Kolmogorov-Smirnov (NDs = DL)	0.108	0.22	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.28	0.76	
Kolmogorov-Smirnov (NDs = DL/2)	0.115	0.22	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.245	0.761	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.12	0.22	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.973	0.969	0.973	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.933	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.129	0.246	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.927	0.887	Data Appear Lognormal
Lilliefors (NDs = DL)	0.127	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.938	0.887	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.157	0.222	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.963	0.887	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0975	0.222	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1260

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	5	10	66.67%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.021	0.028	0.0244	0.0245	0.00214
Statistics (Detects Only)	5	0.022	4.2	0.949	0.15	1.82
Statistics (All: NDs treated as DL value)	15	0.021	4.2	0.333	0.025	1.072
Statistics (All: NDs treated as DL/2 value)	15	0.0105	4.2	0.325	0.0125	1.075
Statistics (Normal ROS Imputed Data)	15	-4.152	4.2	-1.583	-2.634	2.181
Statistics (Gamma ROS Imputed Data)	15	0.01	4.2	0.323	0.01	1.075
Statistics (Lognormal ROS Imputed Data)	15	1.69E-04	4.2	0.318	0.00139	1.077

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.422	0.302	2.25	-1.599	1.944	-1.216

Statistics (NDs = DL)	0.352	0.326	0.946	-3.012	1.468	-0.487
Statistics (NDs = DL/2)	0.294	0.28	1.102	-3.474	1.723	-0.496
Statistics (Gamma ROS Estimates)	0.282	0.27	1.147	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-5.116	2.903	-0.567

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.763	0.542	0.544	0.557

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.603	0.762	Data Not Normal
Lilliefors (Detects Only)	0.441	0.396	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.324	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.449	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.327	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.446	0.229	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.843	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.285	0.229	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.974	0.862	0.878	0.882

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.554	0.722	
Kolmogorov-Smirnov (Detects Only)	0.342	0.375	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	3.483	0.825	
Kolmogorov-Smirnov (NDs = DL)	0.41	0.238	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.19	0.838	
Kolmogorov-Smirnov (NDs = DL/2)	0.383	0.24	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.235	0.844	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.375	0.241	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.968	0.779	0.811	0.94

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.95	0.762	Data Appear Lognormal
Lilliefors (Detects Only)	0.226	0.396	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.624	0.881	Data Not Lognormal
Lilliefors (NDs = DL)	0.383	0.229	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.669	0.881	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.344	0.229	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.883	0.881	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.292	0.229	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

TCDD

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	19	0	19	12	7	36.84%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	3.70E-08	6.70E-07	4.07E-07	5.40E-07	2.59E-07
Statistics (Detects Only)	12	9.92E-06	0.00115	2.93E-04	1.85E-04	3.21E-04
Statistics (All: NDs treated as DL value)	19	3.70E-08	0.00115	1.85E-04	4.49E-05	2.90E-04

Statistics (All: NDs treated as DL/2 value)	19	1.85E-08	0.00115	1.85E-04	4.49E-05	2.90E-04
Statistics (Normal ROS Imputed Data)	19	-4.51E-04	0.00115	1.89E-05	4.49E-05	4.46E-04
Statistics (Gamma ROS Imputed Data)	19	9.92E-06	0.01	0.00387	3.36E-04	0.00482
Statistics (Lognormal ROS Imputed Data)	19	7.89E-06	0.00115	1.88E-04	4.49E-05	2.88E-04

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.98	0.791	2.99E-04	-8.725	1.296	-0.148
Statistics (NDs = DL)	0.283	0.273	6.56E-04	-11.06	3.354	-0.303
Statistics (NDs = DL/2)	0.26	0.254	7.13E-04	-11.31	3.677	-0.325
Statistics (Gamma ROS Estimates)	0.398	0.371	0.00971	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-9.84	1.809	-0.184

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.87	0.817	0.818	0.799

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.773	0.859	Data Not Normal
Lilliefors (Detects Only)	0.28	0.256	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.682	0.901	Data Not Normal
Lilliefors (NDs = DL)	0.261	0.203	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.683	0.901	Data Not Normal
Lilliefors (NDs = DL/2)	0.262	0.203	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.866	0.901	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.222	0.203	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.983	0.991	0.989	0.732

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.246	0.757	
Kolmogorov-Smirnov (Detects Only)	0.15	0.253	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.67	0.851	
Kolmogorov-Smirnov (NDs = DL)	0.21	0.216	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.759	0.862	
Kolmogorov-Smirnov (NDs = DL/2)	0.217	0.217	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	1.641	0.823	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.254	0.213	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.967	0.945	0.937	0.929

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.944	0.859	Data Appear Lognormal
Lilliefors (Detects Only)	0.217	0.256	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.878	0.901	Data Not Lognormal
Lilliefors (NDs = DL)	0.22	0.203	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.861	0.901	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.224	0.203	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.842	0.901	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.245	0.203	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Sb

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	13	0	13	5	8	61.54%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	3.1	34.3	12.58	10.7	10.24
Statistics (Detects Only)	5	2.2	202	55.02	13.8	84.78
Statistics (All: NDs treated as DL value)	13	2.2	202	28.9	13	54.03
Statistics (All: NDs treated as DL/2 value)	13	1.55	202	25.03	6.5	54.95
Statistics (Normal ROS Imputed Data)	13	-38.86	202	8.225	-10.08	62.94
Statistics (Gamma ROS Imputed Data)	13	0.01	202	21.17	0.01	56.32
Statistics (Lognormal ROS Imputed Data)	13	1.161	202	22.4	2.61	55.83

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.519	0.341	106	2.791	1.881	0.674
Statistics (NDs = DL)	0.667	0.565	43.3	2.452	1.292	0.527
Statistics (NDs = DL/2)	0.527	0.457	47.45	2.026	1.41	0.696
Statistics (Gamma ROS Estimates)	0.158	0.173	133.6	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.474	1.555	1.055

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.849	0.701	0.666	0.646

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.73	0.762	Data Not Normal
Lilliefors (Detects Only)	0.307	0.396	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.52	0.866	Data Not Normal
Lilliefors (NDs = DL)	0.356	0.246	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.473	0.866	Data Not Normal
Lilliefors (NDs = DL/2)	0.403	0.246	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.64	0.866	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.311	0.246	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.998	0.923	0.922	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.324	0.71	
Kolmogorov-Smirnov (Detects Only)	0.225	0.371	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.873	0.777	
Kolmogorov-Smirnov (NDs = DL)	0.259	0.247	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.272	0.788	
Kolmogorov-Smirnov (NDs = DL/2)	0.264	0.249	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.701	0.911	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.377	0.265	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.969	0.953	0.858

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.947	0.762	Data Appear Lognormal
Lilliefors (Detects Only)	0.193	0.396	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.939	0.866	Data Appear Lognormal
Lilliefors (NDs = DL)	0.153	0.246	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.908	0.866	Data Appear Lognormal

Lilliefors (NDs = DL/2)	0.16	0.246	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.744	0.866	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.326	0.246	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

As

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	13	0	13	6	7	53.85%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	2.1	32.7	12.46	5.2	12.05
Statistics (Detects Only)	6	3.4	17.7	7.508	4.7	5.606
Statistics (All: NDs treated as DL value)	13	2.1	32.7	10.17	5.1	9.606
Statistics (All: NDs treated as DL/2 value)	13	1.05	17.7	6.819	4.3	5.629
Statistics (Normal ROS Imputed Data)	13	-3.969	17.7	4.665	4.1	5.057
Statistics (Gamma ROS Imputed Data)	13	0.01	17.7	4.956	4.1	4.525
Statistics (Lognormal ROS Imputed Data)	13	1.552	17.7	5.327	4.1	4.25

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	2.757	1.489	2.724	1.824	0.645	0.353
Statistics (NDs = DL)	1.594	1.277	6.382	1.974	0.833	0.422
Statistics (NDs = DL/2)	1.717	1.372	3.971	1.601	0.848	0.53
Statistics (Gamma ROS Estimates)	0.941	0.775	5.269	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.481	0.595	0.402

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.879	0.873	0.918	0.881

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.777	0.788	Data Not Normal
Lilliefors (Detects Only)	0.333	0.362	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.764	0.866	Data Not Normal
Lilliefors (NDs = DL)	0.313	0.246	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.831	0.866	Data Not Normal
Lilliefors (NDs = DL/2)	0.264	0.246	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.825	0.866	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.312	0.246	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.967	0.972	0.968	0.95

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.588	0.702	
Kolmogorov-Smirnov (Detects Only)	0.32	0.335	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.837	0.749	
Kolmogorov-Smirnov (NDs = DL)	0.301	0.241	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.465	0.747	
Kolmogorov-Smirnov (NDs = DL/2)	0.171	0.24	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.211	0.76	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.305	0.244	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.932	0.959	0.98	0.919

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.863	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.285	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.914	0.866	Data Appear Lognormal
Lilliefors (NDs = DL)	0.267	0.246	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.952	0.866	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.119	0.246	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.87	0.866	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.283	0.246	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Co

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	12	0	12	11	1	8.33%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	11	2.45	221	103.2	120	81.66
Statistics (All: NDs treated as DL value)	12	2.45	221	94.85	85.8	83.11
Statistics (All: NDs treated as DL/2 value)	12	1.25	221	94.74	85.8	83.24
Statistics (Normal ROS Imputed Data)	12	-39.79	221	91.32	85.8	88.13
Statistics (Gamma ROS Imputed Data)	12	2.45	221	95.8	85.8	82.01
Statistics (Lognormal ROS Imputed Data)	12	2.45	221	95.02	85.8	82.9

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.965	0.762	107	4.036	1.455	0.36
Statistics (NDs = DL)	0.769	0.632	123.4	3.776	1.654	0.438
Statistics (NDs = DL/2)	0.723	0.597	131.1	3.718	1.771	0.476
Statistics (Gamma ROS Estimates)	0.909	0.737	105.4	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.827	1.566	0.409

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.961	0.951	0.952	0.953

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.898	0.85	Data Appear Normal
Lilliefors (Detects Only)	0.191	0.267	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.878	0.859	Data Appear Normal
Lilliefors (NDs = DL)	0.199	0.256	Data Appear Normal
Shapiro-Wilk (NDs = DL/2)	0.88	0.859	Data Appear Normal
Lilliefors (NDs = DL/2)	0.198	0.256	Data Appear Normal
Shapiro-Wilk (Normal ROS Estimates)	0.927	0.859	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.174	0.256	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.885	0.882	0.877	0.896

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.536	0.753	
Kolmogorov-Smirnov (Detects Only)	0.234	0.263	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.579	0.765	
Kolmogorov-Smirnov (NDs = DL)	0.223	0.255	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.549	0.768	
Kolmogorov-Smirnov (NDs = DL/2)	0.226	0.255	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.569	0.76	

Kolmogorov-Smirnov (Gamma ROS Est.)	0.216	0.253	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.928	0.932	0.931	0.943

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.856	0.85	Data Appear Lognormal
Lilliefors (Detects Only)	0.243	0.267	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.849	0.859	Data Not Lognormal
Lilliefors (NDs = DL)	0.23	0.256	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.854	0.859	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.227	0.256	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.873	0.859	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.23	0.256	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options	
Date/Time of Computation	7/3/2014 14:03
From File	WorkSheet_b.xls
Full Precision	OFF
Confidence Coefficient	0.95

Fe

Raw Statistics	
Number of Valid Observations	12
Number of Distinct Observations	12
Minimum	7060
Maximum	198000
Mean of Raw Data	76164
Standard Deviation of Raw Data	51488
Khat	1.765
Theta hat	43158
Kstar	1.379
Theta star	55226
Mean of Log Transformed Data	10.93
Standard Deviation of Log Transformed Data	0.973

Normal GOF Test Results

Correlation Coefficient R	0.95
Shapiro Wilk Test Statistic	0.914
Shapiro Wilk Critical (0.05) Value	0.859
Approximate Shapiro Wilk P Value	0.191
Lilliefors Test Statistic	0.166
Lilliefors Critical (0.05) Value	0.256

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.967
A-D Test Statistic	0.531
A-D Critical (0.05) Value	0.743
K-S Test Statistic	0.217
K-S Critical(0.05) Value	0.249

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.916
Shapiro Wilk Test Statistic	0.846
Shapiro Wilk Critical (0.05) Value	0.859
Approximate Shapiro Wilk P Value	0.0271
Lilliefors Test Statistic	0.275
Lilliefors Critical (0.05) Value	0.256

Data not Lognormal at (0.05) Significance Level

Pb

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	13
Minimum	18.5
Maximum	57300
Mean of Raw Data	4879
Standard Deviation of Raw Data	15770
Khat	0.253
Theta hat	19276
Kstar	0.246
Theta star	19835
Mean of Log Transformed Data	5.692
Standard Deviation of Log Transformed Data	2.126

Normal GOF Test Results

Correlation Coefficient R	0.559
Shapiro Wilk Test Statistic	0.344
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	7.62E-08
Lilliefors Test Statistic	0.472
Lilliefors Critical (0.05) Value	0.246

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.897
A-D Test Statistic	1.884
A-D Critical (0.05) Value	0.85
K-S Test Statistic	0.323
K-S Critical(0.05) Value	0.259

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.949
Shapiro Wilk Test Statistic	0.912
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	0.162
Lilliefors Test Statistic	0.16
Lilliefors Critical (0.05) Value	0.246

Data appear Lognormal at (0.05) Significance Level

V

Raw Statistics

Number of Valid Observations	12

Number of Distinct Observations	12
Minimum	13.35
Maximum	1670
Mean of Raw Data	650.8
Standard Deviation of Raw Data	575.1
Khat	0.781
Theta hat	833.5
Kstar	0.641
Theta star	1015
Mean of Log Transformed Data	5.716
Standard Deviation of Log Transformed Data	1.681

Normal GOF Test Results

Correlation Coefficient R	0.966
Shapiro Wilk Test Statistic	0.913
Shapiro Wilk Critical (0.05) Value	0.859
Approximate Shapiro Wilk P Value	0.315
Lilliefors Test Statistic	0.144
Lilliefors Critical (0.05) Value	0.256

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.935
A-D Test Statistic	0.388
A-D Critical (0.05) Value	0.765
K-S Test Statistic	0.162
K-S Critical(0.05) Value	0.255

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.932
Shapiro Wilk Test Statistic	0.855
Shapiro Wilk Critical (0.05) Value	0.859
Approximate Shapiro Wilk P Value	0.052
Lilliefors Test Statistic	0.209
Lilliefors Critical (0.05) Value	0.256

Data appear Approximate_Lognormal at (0.05) Significance Level

---

Zn

Raw Statistics

Number of Valid Observations	13
Number of Distinct Observations	13
Minimum	29.25
Maximum	45300
Mean of Raw Data	3816
Standard Deviation of Raw Data	12473
Khat	0.28
Theta hat	13626
Kstar	0.267
Theta star	14308
Mean of Log Transformed Data	5.757
Standard Deviation of Log Transformed Data	1.81

Normal GOF Test Results

Correlation Coefficient R	0.551

Shapiro Wilk Test Statistic	0.335
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	6.32E-08
Lilliefors Test Statistic	0.485
Lilliefors Critical (0.05) Value	0.246
Data not Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.883
A-D Test Statistic	2.5
A-D Critical (0.05) Value	0.838
K-S Test Statistic	0.43
K-S Critical(0.05) Value	0.257
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.899
Shapiro Wilk Test Statistic	0.834
Shapiro Wilk Critical (0.05) Value	0.866
Approximate Shapiro Wilk P Value	0.0113
Lilliefors Test Statistic	0.284
Lilliefors Critical (0.05) Value	0.246
Data not Lognormal at (0.05) Significance Level	

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	7/22/2014 10:36
From File	WorkSheet_b.xls
Full Precision	OFF
Confidence Coefficient	0.95

Cr6

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	35	0	35	25	10	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	0.13	30	4.325	1.49	9.137
Statistics (Detects Only)	25	0.54	3390	278.4	13.1	740.2
Statistics (All: NDs treated as DL value)	35	0.13	3390	200.1	11.9	634.5
Statistics (All: NDs treated as DL/2 value)	35	0.065	3390	199.5	11.9	634.6
Statistics (Normal ROS Imputed Data)	35	-1055	3390	-23.83	8.6	796.2
Statistics (Gamma ROS Imputed Data)	35	0.01	3390	198.9	8.6	634.8
Statistics (Lognormal ROS Imputed Data)	35	0.0994	3390	199	8.6	634.8

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.306	0.296	908.6	3.386	2.166	0.64
Statistics (NDs = DL)	0.246	0.244	814.7	2.398	2.6	1.084
Statistics (NDs = DL/2)	0.232	0.231	859.1	2.2	2.805	1.275
Statistics (Gamma ROS Estimates)	0.179	0.182	1113	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.096	2.796	1.334

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.63	0.572	0.571	0.572

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.422	0.918	Data Not Normal
Lilliefors (Detects Only)	0.354	0.177	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.358	0.934	Data Not Normal
Lilliefors (NDs = DL)	0.376	0.15	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.358	0.934	Data Not Normal
Lilliefors (NDs = DL/2)	0.377	0.15	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.713	0.934	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.253	0.15	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.945	0.93	0.935	0.952

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.008	0.85	
Kolmogorov-Smirnov (Detects Only)	0.278	0.189	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.554	0.884	
Kolmogorov-Smirnov (NDs = DL)	0.268	0.163	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.289	0.891	
Kolmogorov-Smirnov (NDs = DL/2)	0.28	0.164	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.542	0.927	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.208	0.166	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.973	0.984	0.987	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.945	0.918	Data Appear Lognormal
Lilliefors (Detects Only)	0.212	0.177	Data Not Lognormal
Shapiro-Wilk (NDs = DL)	0.958	0.934	Data Appear Lognormal
Lilliefors (NDs = DL)	0.128	0.15	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.962	0.934	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.133	0.15	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.952	0.934	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.119	0.15	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

APPENDIX F.1B

WESTERN AREA SURFACE SOILS
UCL CALCULATION

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	7/3/2014 13:57
From File	WorkSheet_b.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

123TCB

General Statistics

Total Number of Observations	12	Number of Distinct Observations	11
Number of Detects	2	Number of Non-Detects	10
Number of Distinct Detects	2	Number of Distinct Non-Detects	9
Minimum Detect	0.29	Minimum Non-Detect	7.20E-04
Maximum Detect	210	Maximum Non-Detect	4.2
Variance Detects	21989	Percent Non-Detects	83.33%
Mean Detects	105.1	SD Detects	148.3
Median Detects	105.1	CV Detects	1.41
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.055	SD of Logged Detects	4.656

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	17.53	Standard Error of Mean	23.69
SD	58.03	95% KM (BCA) UCL	N/A
95% KM (t) UCL	60.07	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	56.5	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	88.6	95% KM Chebyshev UCL	120.8
97.5% KM Chebyshev UCL	165.5	99% KM Chebyshev UCL	253.3

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.27	k star (bias corrected MLE)	N/A
Theta hat (MLE)	389.8	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.079	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0912	nu hat (KM)	2.189
		Adjusted Level of Significance (β)	0.029
Approximate Chi Square Value (2.19, α)	0.179	Adjusted Chi Square Value (2.19, β)	0.135
95% Gamma Approximate KM-UCL (use when n>=50)	214	95% Gamma Adjusted KM-UCL (use when n<50)	284.2

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	17.52	Mean in Log Scale	-12.94
SD in Original Scale	60.61	SD in Log Scale	7.351
95% t UCL (assumes normality of ROS data)	48.95	95% Percentile Bootstrap UCL	52.5
95% BCA Bootstrap UCL	70.02	95% Bootstrap t UCL	7.81E+08
95% H-UCL (Log ROS)	4.74E+22		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	17.72	Mean in Log Scale	-4.442
SD in Original Scale	60.56	SD in Log Scale	4.407
95% t UCL (Assumes normality)	49.11	95% H-Stat UCL	1.96E+08

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
99% KM (Chebyshev) UCL 253.3
Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

124TCB

General Statistics

Total Number of Observations	14	Number of Distinct Observations	13
Number of Detects	3	Number of Non-Detects	11
Number of Distinct Detects	3	Number of Distinct Non-Detects	10
Minimum Detect	7.90E-04	Minimum Non-Detect	8.50E-04
Maximum Detect	480	Maximum Non-Detect	2.5
Variance Detects	76738	Percent Non-Detects	78.57%
Mean Detects	160.1	SD Detects	277
Median Detects	0.39	CV Detects	1.73
Skewness Detects	1.732	Kurtosis Detects	N/A
Mean of Logged Detects	-0.637	SD of Logged Detects	6.664

Warning: Data set has only 3 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.751	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.767	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.385	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.512	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	34.32	Standard Error of Mean	40.46
SD	123.6	95% KM (BCA) UCL	N/A
95% KM (t) UCL	106	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	100.9	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	155.7	95% KM Chebyshev UCL	210.7
97.5% KM Chebyshev UCL	287	99% KM Chebyshev UCL	436.9

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.136	k star (bias corrected MLE)	N/A
Theta hat (MLE)	1174	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	0.818	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0771	nu hat (KM)	2.158
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (2.16, α)	0.174	Adjusted Chi Square Value (2.16, β)	0.137
95% Gamma Approximate KM-UCL (use when n>=50)	425.3	95% Gamma Adjusted KM-UCL (use when n<50)	542.4

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.998	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.767	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.185	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.512	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	34.31	Mean in Log Scale	-6.132
SD in Original Scale	128.3	SD in Log Scale	4.072
95% t UCL (assumes normality of ROS data)	95.03	95% Percentile Bootstrap UCL	102.9
95% BCA Bootstrap UCL	137.2	95% Bootstrap t UCL	4611435
95% H-UCL (Log ROS)	228468		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-5.669	95% H-UCL (KM -Log)	15844
KM SD (logged)	3.707	95% Critical H Value (KM-Log)	8.238
KM Standard Error of Mean (logged)	1.237		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	34.43	Mean in Log Scale	-4.07
SD in Original Scale	128.2	SD in Log Scale	4.182
95% t UCL (Assumes normality)	95.13	95% H-Stat UCL	4900451

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	106	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

12DCB

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	6	Number of Distinct Non-Detects	8
Minimum Detect	0.0012	Minimum Non-Detect	7.70E-04
Maximum Detect	220	Maximum Non-Detect	0.47
Variance Detects	7381	Percent Non-Detects	57.14%
Mean Detects	46.98	SD Detects	85.91
Median Detects	11.8	CV Detects	1.829
Skewness Detects	2.311	Kurtosis Detects	5.432
Mean of Logged Detects	0.963	SD of Logged Detects	4.379

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.631	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.375	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	20.13	Standard Error of Mean	16.5
SD	56.36	95% KM (BCA) UCL	48.39
95% KM (t) UCL	49.36	95% KM (Percentile Bootstrap) UCL	49.29

95% KM (z) UCL	47.27	95% KM Bootstrap t UCL	233.3
90% KM Chebyshev UCL	69.63	95% KM Chebyshev UCL	92.06
97.5% KM Chebyshev UCL	123.2	99% KM Chebyshev UCL	184.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.188	Anderson-Darling GOF Test	
5% A-D Critical Value	0.785	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.176	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.361	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.247	k star (bias corrected MLE)	0.234
Theta hat (MLE)	190.5	Theta star (bias corrected MLE)	200.4
nu hat (MLE)	2.959	nu star (bias corrected)	2.813
MLE Mean (bias corrected)	46.98	MLE Sd (bias corrected)	97.02

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.128	nu hat (KM)	3.574
Approximate Chi Square Value (3.57, α)	0.561	Adjusted Chi Square Value (3.57, β)	0.429
95% Gamma Approximate KM-UCL (use when n>=50)	128.3	95% Gamma Adjusted KM-UCL (use when n<50)	167.6

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	20.14
Maximum	220	Median	0.01
SD	58.48	CV	2.904
k hat (MLE)	0.148	k star (bias corrected MLE)	0.164
Theta hat (MLE)	136.5	Theta star (bias corrected MLE)	123.1
nu hat (MLE)	4.131	nu star (bias corrected)	4.579
MLE Mean (bias corrected)	20.14	MLE Sd (bias corrected)	49.8
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (4.58, α)	0.963	Adjusted Chi Square Value (4.58, β)	0.766
95% Gamma Approximate UCL (use when n>=50)	95.75	95% Gamma Adjusted UCL (use when n<50)	120.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.893	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.274	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	20.13	Mean in Log Scale	-5.627
SD in Original Scale	58.49	SD in Log Scale	6.538
95% t UCL (assumes normality of ROS data)	47.81	95% Percentile Bootstrap UCL	48.88
95% BCA Bootstrap UCL	68.35	95% Bootstrap t UCL	261.9
95% H-UCL (Log ROS)	1.31E+18		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.629	95% H-UCL (KM -Log)	3.10E+09
KM SD (logged)	4.789	95% Critical H Value (KM-Log)	10.55
KM Standard Error of Mean (logged)	1.41		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	20.15	Mean in Log Scale	-3.173
SD in Original Scale	58.48	SD in Log Scale	4.979
95% t UCL (Assumes normality)	47.83	95% H-Stat UCL	3.82E+10

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	49.36	95% GROS Adjusted Gamma UCL	120.4
95% Adjusted Gamma KM-UCL	167.6		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

14DCB

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	6	Number of Non-Detects	8
Number of Distinct Detects	6	Number of Distinct Non-Detects	8
Minimum Detect	0.0015	Minimum Non-Detect	6.10E-04
Maximum Detect	360	Maximum Non-Detect	0.47
Variance Detects	20228	Percent Non-Detects	57.14%
Mean Detects	71.65	SD Detects	142.2
Median Detects	12.35	CV Detects	1.985
Skewness Detects	2.378	Kurtosis Detects	5.71
Mean of Logged Detects	1.094	SD of Logged Detects	4.457

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.591	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.408	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	30.71	Standard Error of Mean	26.96
SD	92.1	95% KM (BCA) UCL	81.06
95% KM (t) UCL	78.46	95% KM (Percentile Bootstrap) UCL	81.05
95% KM (z) UCL	75.06	95% KM Bootstrap t UCL	569.3
90% KM Chebyshev UCL	111.6	95% KM Chebyshev UCL	148.2
97.5% KM Chebyshev UCL	199.1	99% KM Chebyshev UCL	299

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.199	Anderson-Darling GOF Test	
5% A-D Critical Value	0.792	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.162	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.227	k star (bias corrected MLE)	0.225
Theta hat (MLE)	315.7	Theta star (bias corrected MLE)	319
nu hat (MLE)	2.724	nu star (bias corrected)	2.695
MLE Mean (bias corrected)	71.65	MLE Sd (bias corrected)	151.2

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.111	nu hat (KM)	3.113
Approximate Chi Square Value (3.11, α)	0.407	Adjusted Chi Square Value (3.11, β)	0.306
95% Gamma Approximate KM-UCL (use when n>=50)	235	95% Gamma Adjusted KM-UCL (use when n<50)	312.3

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0015	Mean	30.71
Maximum	360	Median	0.01

SD	95.57	CV	3.112
k hat (MLE)	0.139	k star (bias corrected MLE)	0.157
Theta hat (MLE)	220.9	Theta star (bias corrected MLE)	195.8
nu hat (MLE)	3.894	nu star (bias corrected)	4.393
MLE Mean (bias corrected)	30.71	MLE Sd (bias corrected)	77.54
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (4.39, α)	0.883	Adjusted Chi Square Value (4.39, β)	0.698
95% Gamma Approximate UCL (use when n>=50)	152.8	95% Gamma Adjusted UCL (use when n<50)	193.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.913	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.271	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	30.71	Mean in Log Scale	-5.728
SD in Original Scale	95.57	SD in Log Scale	6.748
95% t UCL (assumes normality of ROS data)	75.94	95% Percentile Bootstrap UCL	78.95
95% BCA Bootstrap UCL	104.2	95% Bootstrap t UCL	694
95% H-UCL (Log ROS)	2.57E+19		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.698	95% H-UCL (KM -Log)	1.80E+10
KM SD (logged)	4.959	95% Critical H Value (KM-Log)	10.92
KM Standard Error of Mean (logged)	1.46		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	30.73	Mean in Log Scale	-3.211
SD in Original Scale	95.57	SD in Log Scale	5.148
95% t UCL (Assumes normality)	75.96	95% H-Stat UCL	2.41E+11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	78.46	95% GROS Adjusted Gamma UCL	193.4
95% Adjusted Gamma KM-UCL	312.3		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BEN

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Number of Detects	1	Number of Non-Detects	12
Number of Distinct Detects	1	Number of Distinct Non-Detects	12

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable BEN was not processed!

BAP

General Statistics

Total Number of Observations	17	Number of Distinct Observations	17
Number of Detects	14	Number of Non-Detects	3

Number of Distinct Detects	14	Number of Distinct Non-Detects	3
Minimum Detect	0.03	Minimum Non-Detect	0.12
Maximum Detect	1.6	Maximum Non-Detect	0.61
Variance Detects	0.297	Percent Non-Detects	17.65%
Mean Detects	0.624	SD Detects	0.545
Median Detects	0.37	CV Detects	0.875
Skewness Detects	0.813	Kurtosis Detects	-0.782
Mean of Logged Detects	-0.972	SD of Logged Detects	1.201

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.868	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.244	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.237	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.54	Standard Error of Mean	0.13
SD	0.513	95% KM (BCA) UCL	0.749
95% KM (t) UCL	0.767	95% KM (Percentile Bootstrap) UCL	0.749
95% KM (z) UCL	0.754	95% KM Bootstrap t UCL	0.827
90% KM Chebyshev UCL	0.929	95% KM Chebyshev UCL	1.106
97.5% KM Chebyshev UCL	1.35	99% KM Chebyshev UCL	1.831

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.253	Anderson-Darling GOF Test	
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.136	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.234	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.138	k star (bias corrected MLE)	0.942
Theta hat (MLE)	0.548	Theta star (bias corrected MLE)	0.662
nu hat (MLE)	31.86	nu star (bias corrected)	26.36
MLE Mean (bias corrected)	0.624	MLE Sd (bias corrected)	0.643

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.11	nu hat (KM)	37.75
Approximate Chi Square Value (37.75, α)	24.68	Adjusted Chi Square Value (37.75, β)	23.58
95% Gamma Approximate KM-UCL (use when n>=50)	0.826	95% Gamma Adjusted KM-UCL (use when n<50)	0.865

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0112	Mean	0.538
Maximum	1.6	Median	0.33
SD	0.529	CV	0.984
k hat (MLE)	0.92	k star (bias corrected MLE)	0.797
Theta hat (MLE)	0.584	Theta star (bias corrected MLE)	0.675
nu hat (MLE)	31.28	nu star (bias corrected)	27.09
MLE Mean (bias corrected)	0.538	MLE Sd (bias corrected)	0.602
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (27.09, α)	16.22	Adjusted Chi Square Value (27.09, β)	15.35
95% Gamma Approximate UCL (use when n>=50)	0.898	95% Gamma Adjusted UCL (use when n<50)	0.949

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.927	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.118	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.237	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.536	Mean in Log Scale	-1.179
SD in Original Scale	0.529	SD in Log Scale	1.195
95% t UCL (assumes normality of ROS data)	0.76	95% Percentile Bootstrap UCL	0.759
95% BCA Bootstrap UCL	0.769	95% Bootstrap t UCL	0.83
95% H-UCL (Log ROS)	1.527		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.216	95% H-UCL (KM -Log)	1.678
KM SD (logged)	1.248	95% Critical H Value (KM-Log)	3.059
KM Standard Error of Mean (logged)	0.328		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.549	Mean in Log Scale	-1.121
SD in Original Scale	0.521	SD in Log Scale	1.174
95% t UCL (Assumes normality)	0.769	95% H-Stat UCL	1.536

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1.106	95% GROS Adjusted Gamma UCL	0.949
95% Adjusted Gamma KM-UCL	0.865		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BBF

General Statistics

Total Number of Observations	17	Number of Distinct Observations	15
Number of Detects	16	Number of Non-Detects	1
Number of Distinct Detects	14	Number of Distinct Non-Detects	1
Minimum Detect	0.068	Minimum Non-Detect	0.47
Maximum Detect	2.2	Maximum Non-Detect	0.47
Variance Detects	0.604	Percent Non-Detects	5.88%
Mean Detects	1.006	SD Detects	0.777
Median Detects	0.64	CV Detects	0.773
Skewness Detects	0.428	Kurtosis Detects	-1.456
Mean of Logged Detects	-0.415	SD of Logged Detects	1.094

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.872	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.242	Lilliefors GOF Test
5% Lilliefors Critical Value	0.222	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.963	Standard Error of Mean	0.188
SD	0.75	95% KM (BCA) UCL	1.281
95% KM (t) UCL	1.292	95% KM (Percentile Bootstrap) UCL	1.277
95% KM (z) UCL	1.273	95% KM Bootstrap t UCL	1.32
90% KM Chebyshev UCL	1.528	95% KM Chebyshev UCL	1.784
97.5% KM Chebyshev UCL	2.138	99% KM Chebyshev UCL	2.836

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.555	Anderson-Darling GOF Test
5% A-D Critical Value	0.758	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.192	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.22	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.332	k star (bias corrected MLE)	1.124
Theta hat (MLE)	0.755	Theta star (bias corrected MLE)	0.895
nu hat (MLE)	42.62	nu star (bias corrected)	35.96
MLE Mean (bias corrected)	1.006	MLE Sd (bias corrected)	0.949

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.65	nu hat (KM)	56.1
Approximate Chi Square Value (56.10, α)	39.88	Adjusted Chi Square Value (56.10, β)	38.45
95% Gamma Approximate KM-UCL (use when n>=50)	1.355	95% Gamma Adjusted KM-UCL (use when n<50)	1.406

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.068	Mean	0.965
Maximum	2.2	Median	0.5
SD	0.771	CV	0.798
k hat (MLE)	1.326	k star (bias corrected MLE)	1.132
Theta hat (MLE)	0.728	Theta star (bias corrected MLE)	0.853
nu hat (MLE)	45.1	nu star (bias corrected)	38.47
MLE Mean (bias corrected)	0.965	MLE Sd (bias corrected)	0.907
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (38.47, α)	25.27	Adjusted Chi Square Value (38.47, β)	24.15
95% Gamma Approximate UCL (use when n>=50)	1.47	95% Gamma Adjusted UCL (use when n<50)	1.538

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.885	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.191	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.961	Mean in Log Scale	-0.474
SD in Original Scale	0.775	SD in Log Scale	1.087
95% t UCL (assumes normality of ROS data)	1.289	95% Percentile Bootstrap UCL	1.25
95% BCA Bootstrap UCL	1.273	95% Bootstrap t UCL	1.373
95% H-UCL (Log ROS)	2.406		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.478	95% H-UCL (KM -Log)	2.336
KM SD (logged)	1.075	95% Critical H Value (KM-Log)	2.783
KM Standard Error of Mean (logged)	0.274		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.96	Mean in Log Scale	-0.475
SD in Original Scale	0.775	SD in Log Scale	1.088
95% t UCL (Assumes normality)	1.289	95% H-Stat UCL	2.41

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1.784	95% GROS Adjusted Gamma UCL	1.538
95% Adjusted Gamma KM-UCL	1.406		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).

However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

DAHA

General Statistics

Total Number of Observations	16	Number of Distinct Observations	15
Number of Detects	13	Number of Non-Detects	3
Number of Distinct Detects	13	Number of Distinct Non-Detects	3
Minimum Detect	0.01	Minimum Non-Detect	0.12
Maximum Detect	0.45	Maximum Non-Detect	0.47
Variance Detects	0.0197	Percent Non-Detects	18.75%
Mean Detects	0.154	SD Detects	0.14
Median Detects	0.097	CV Detects	0.91
Skewness Detects	0.922	Kurtosis Detects	-0.165
Mean of Logged Detects	-2.406	SD of Logged Detects	1.232

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.889	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.212	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.141	Standard Error of Mean	0.0353
SD	0.131	95% KM (BCA) UCL	0.195
95% KM (t) UCL	0.203	95% KM (Percentile Bootstrap) UCL	0.199
95% KM (z) UCL	0.199	95% KM Bootstrap t UCL	0.219
90% KM Chebyshev UCL	0.247	95% KM Chebyshev UCL	0.295
97.5% KM Chebyshev UCL	0.362	99% KM Chebyshev UCL	0.493

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.217	Anderson-Darling GOF Test	
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.125	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.068	k star (bias corrected MLE)	0.873
Theta hat (MLE)	0.144	Theta star (bias corrected MLE)	0.177
nu hat (MLE)	27.76	nu star (bias corrected)	22.69
MLE Mean (bias corrected)	0.154	MLE Sd (bias corrected)	0.165

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.163	nu hat (KM)	37.2
Approximate Chi Square Value (37.20, α)	24.24	Adjusted Chi Square Value (37.20, β)	23.05
95% Gamma Approximate KM-UCL (use when n>=50)	0.216	95% Gamma Adjusted KM-UCL (use when n<50)	0.227

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.138
Maximum	0.45	Median	0.092
SD	0.131	CV	0.947
k hat (MLE)	1.159	k star (bias corrected MLE)	0.983
Theta hat (MLE)	0.119	Theta star (bias corrected MLE)	0.14
nu hat (MLE)	37.07	nu star (bias corrected)	31.45
MLE Mean (bias corrected)	0.138	MLE Sd (bias corrected)	0.139
		Adjusted Level of Significance (β)	0.0335
Approximate Chi Square Value (31.45, α)	19.64	Adjusted Chi Square Value (31.45, β)	18.58
95% Gamma Approximate UCL (use when n>=50)	0.221	95% Gamma Adjusted UCL (use when n<50)	0.234

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.933	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.129	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.136	Mean in Log Scale	-2.509
SD in Original Scale	0.132	SD in Log Scale	1.133
95% t UCL (assumes normality of ROS data)	0.193	95% Percentile Bootstrap UCL	0.19
95% BCA Bootstrap UCL	0.202	95% Bootstrap t UCL	0.209
95% H-UCL (Log ROS)	0.362		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.515	95% H-UCL (KM -Log)	0.406
KM SD (logged)	1.182	95% Critical H Value (KM-Log)	2.995
KM Standard Error of Mean (logged)	0.332		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.148	Mean in Log Scale	-2.392
SD in Original Scale	0.131	SD in Log Scale	1.138
95% t UCL (Assumes normality)	0.205	95% H-Stat UCL	0.412

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.203	95% KM (Percentile Bootstrap) UCL	0.199

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1260

General Statistics

Total Number of Observations	15	Number of Distinct Observations	12
Number of Detects	5	Number of Non-Detects	10
Number of Distinct Detects	5	Number of Distinct Non-Detects	8
Minimum Detect	0.022	Minimum Non-Detect	0.021
Maximum Detect	4.2	Maximum Non-Detect	0.028
Variance Detects	3.312	Percent Non-Detects	66.67%
Mean Detects	0.949	SD Detects	1.82
Median Detects	0.15	CV Detects	1.917
Skewness Detects	2.22	Kurtosis Detects	4.94
Mean of Logged Detects	-1.599	SD of Logged Detects	1.944

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.603	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.441	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.331	Standard Error of Mean	0.299
SD	1.037	95% KM (BCA) UCL	0.875
95% KM (t) UCL	0.858	95% KM (Percentile Bootstrap) UCL	0.876
95% KM (z) UCL	0.823	95% KM Bootstrap t UCL	6.051
90% KM Chebyshev UCL	1.228	95% KM Chebyshev UCL	1.635
97.5% KM Chebyshev UCL	2.199	99% KM Chebyshev UCL	3.308

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.554	Anderson-Darling GOF Test	
5% A-D Critical Value	0.722	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.342	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.375	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.422	k star (bias corrected MLE)	0.302
Theta hat (MLE)	2.25	Theta star (bias corrected MLE)	3.142
nu hat (MLE)	4.219	nu star (bias corrected)	3.021
MLE Mean (bias corrected)	0.949	MLE Sd (bias corrected)	1.727

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.102	nu hat (KM)	3.051
Approximate Chi Square Value (3.05, α)	0.388	Adjusted Chi Square Value (3.05, β)	0.297
95% Gamma Approximate KM-UCL (use when n>=50)	2.602	95% Gamma Adjusted KM-UCL (use when n<50)	3.392

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.323
Maximum	4.2	Median	0.01
SD	1.075	CV	3.329
k hat (MLE)	0.282	k star (bias corrected MLE)	0.27
Theta hat (MLE)	1.147	Theta star (bias corrected MLE)	1.197
nu hat (MLE)	8.451	nu star (bias corrected)	8.094
MLE Mean (bias corrected)	0.323	MLE Sd (bias corrected)	0.622
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (8.09, α)	2.79	Adjusted Chi Square Value (8.09, β)	2.42
95% Gamma Approximate UCL (use when n>=50)	0.937	95% Gamma Adjusted UCL (use when n<50)	1.08

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.95	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.226	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.318	Mean in Log Scale	-5.116
SD in Original Scale	1.077	SD in Log Scale	2.903
95% t UCL (assumes normality of ROS data)	0.807	95% Percentile Bootstrap UCL	0.868
95% BCA Bootstrap UCL	1.16	95% Bootstrap t UCL	7.976
95% H-UCL (Log ROS)	56.99		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.1	95% H-UCL (KM -Log)	0.522
KM SD (logged)	1.461	95% Critical H Value (KM-Log)	3.54
KM Standard Error of Mean (logged)	0.422		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.325	Mean in Log Scale	-3.474
SD in Original Scale	1.075	SD in Log Scale	1.723
95% t UCL (Assumes normality)	0.813	95% H-Stat UCL	0.874

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.858	95% GROS Adjusted Gamma UCL	1.08
95% Adjusted Gamma KM-UCL	3.392		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

TCDD

General Statistics

Total Number of Observations	19	Number of Distinct Observations	19
Number of Detects	12	Number of Non-Detects	7
Number of Distinct Detects	12	Number of Distinct Non-Detects	7
Minimum Detect	9.92E-06	Minimum Non-Detect	3.70E-08
Maximum Detect	0.00115	Maximum Non-Detect	6.70E-07
Variance Detects	1.03E-07	Percent Non-Detects	36.84%
Mean Detects	2.93E-04	SD Detects	3.21E-04
Median Detects	1.85E-04	CV Detects	1.096
Skewness Detects	2.016	Kurtosis Detects	4.412
Mean of Logged Detects	-8.725	SD of Logged Detects	1.296

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.773	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.28	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.85E-04	Standard Error of Mean	6.77E-05
SD	2.82E-04	95% KM (BCA) UCL	3.08E-04
95% KM (t) UCL	3.02E-04	95% KM (Percentile Bootstrap) UCL	2.91E-04
95% KM (z) UCL	2.96E-04	95% KM Bootstrap t UCL	4.14E-04
90% KM Chebyshev UCL	3.88E-04	95% KM Chebyshev UCL	4.80E-04
97.5% KM Chebyshev UCL	6.08E-04	99% KM Chebyshev UCL	8.58E-04

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.246	Anderson-Darling GOF Test	
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.15	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.253	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.98	k star (bias corrected MLE)	0.791
Theta hat (MLE)	2.99E-04	Theta star (bias corrected MLE)	3.71E-04
nu hat (MLE)	23.52	nu star (bias corrected)	18.97
MLE Mean (bias corrected)	2.93E-04	MLE Sd (bias corrected)	3.30E-04

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.43	nu hat (KM)	16.34
Approximate Chi Square Value (16.34, α)	8.2	Adjusted Chi Square Value (16.34, β)	7.699
95% Gamma Approximate KM-UCL (use when n>=50)	3.69E-04	95% Gamma Adjusted KM-UCL (use when n<50)	3.93E-04

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.92E-06	Mean	0.00387
Maximum	0.01	Median	3.36E-04
SD	0.00482	CV	1.245
k hat (MLE)	0.398	k star (bias corrected MLE)	0.371
Theta hat (MLE)	0.00971	Theta star (bias corrected MLE)	0.0104

nu hat (MLE)	15.14	nu star (bias corrected)	14.08
MLE Mean (bias corrected)	0.00387	MLE Sd (bias corrected)	0.00636
		Adjusted Level of Significance (β)	0.0369
Approximate Chi Square Value (14.08, α)	6.628	Adjusted Chi Square Value (14.08, β)	6.184
95% Gamma Approximate UCL (use when n>=50)	0.00822	95% Gamma Adjusted UCL (use when n<50)	0.00881

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.944	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.217	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.88E-04	Mean in Log Scale	-9.84
SD in Original Scale	2.88E-04	SD in Log Scale	1.809
95% t UCL (assumes normality of ROS data)	3.03E-04	95% Percentile Bootstrap UCL	3.11E-04
95% BCA Bootstrap UCL	3.49E-04	95% Bootstrap t UCL	4.22E-04
95% H-UCL (Log ROS)	0.00145		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-11.82	95% H-UCL (KM -Log)	114.4
KM SD (logged)	4.164	95% Critical H Value (KM-Log)	8.034
KM Standard Error of Mean (logged)	0.998		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.85E-04	Mean in Log Scale	-11.31
SD in Original Scale	2.90E-04	SD in Log Scale	3.677
95% t UCL (Assumes normality)	3.01E-04	95% H-Stat UCL	5.825

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	3.08E-04	95% GROS Adjusted Gamma UCL	0.00881
95% Adjusted Gamma KM-UCL	3.93E-04		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Sb

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
Number of Detects	5	Number of Non-Detects	8
Number of Distinct Detects	5	Number of Distinct Non-Detects	8
Minimum Detect	2.2	Minimum Non-Detect	3.1
Maximum Detect	202	Maximum Non-Detect	34.3
Variance Detects	7187	Percent Non-Detects	61.54%
Mean Detects	55.02	SD Detects	84.78
Median Detects	13.8	CV Detects	1.541
Skewness Detects	1.929	Kurtosis Detects	3.722
Mean of Logged Detects	2.791	SD of Logged Detects	1.881

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.73	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.307	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	22.99	Standard Error of Mean	16.59
SD	53.44	95% KM (BCA) UCL	53.46
95% KM (t) UCL	52.55	95% KM (Percentile Bootstrap) UCL	52.26
95% KM (z) UCL	50.27	95% KM Bootstrap t UCL	206.4
90% KM Chebyshev UCL	72.75	95% KM Chebyshev UCL	95.29
97.5% KM Chebyshev UCL	126.6	99% KM Chebyshev UCL	188

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.324	Anderson-Darling GOF Test	
5% A-D Critical Value	0.71	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.225	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.371	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	0.519	k star (bias corrected MLE)	0.341
Theta hat (MLE)	106	Theta star (bias corrected MLE)	161.4
nu hat (MLE)	5.191	nu star (bias corrected)	3.41
MLE Mean (bias corrected)	55.02	MLE Sd (bias corrected)	94.22

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.185	nu hat (KM)	4.811
Approximate Chi Square Value (4.81, α)	1.066	Adjusted Chi Square Value (4.81, β)	0.84
95% Gamma Approximate KM-UCL (use when n>=50)	103.8	95% Gamma Adjusted KM-UCL (use when n<50)	131.6

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	21.17
Maximum	202	Median	0.01
SD	56.32	CV	2.661
k hat (MLE)	0.158	k star (bias corrected MLE)	0.173
Theta hat (MLE)	133.6	Theta star (bias corrected MLE)	122.3
nu hat (MLE)	4.119	nu star (bias corrected)	4.502
MLE Mean (bias corrected)	21.17	MLE Sd (bias corrected)	50.87
		Adjusted Level of Significance (β)	0.0301
Approximate Chi Square Value (4.50, α)	0.929	Adjusted Chi Square Value (4.50, β)	0.724
95% Gamma Approximate UCL (use when n>=50)	102.5	95% Gamma Adjusted UCL (use when n<50)	131.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.947	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.193	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	22.4	Mean in Log Scale	1.474
SD in Original Scale	55.83	SD in Log Scale	1.555
95% t UCL (assumes normality of ROS data)	49.99	95% Percentile Bootstrap UCL	51.84
95% BCA Bootstrap UCL	68.49	95% Bootstrap t UCL	350.8
95% H-UCL (Log ROS)	83.86		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.662	95% H-UCL (KM -Log)	61.88
KM SD (logged)	1.41	95% Critical H Value (KM-Log)	3.607
KM Standard Error of Mean (logged)	0.453		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	25.03	Mean in Log Scale	2.026

SD in Original Scale	54.95	SD in Log Scale	1.41
95% t UCL (Assumes normality)	52.2	95% H-Stat UCL	88.86

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	52.55	95% KM (Percentile Bootstrap) UCL	52.26

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

As

General Statistics

Total Number of Observations	13	Number of Distinct Observations	12
Number of Detects	6	Number of Non-Detects	7
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	3.4	Minimum Non-Detect	2.1
Maximum Detect	17.7	Maximum Non-Detect	32.7
Variance Detects	31.42	Percent Non-Detects	53.85%
Mean Detects	7.508	SD Detects	5.606
Median Detects	4.7	CV Detects	0.747
Skewness Detects	1.581	Kurtosis Detects	1.849
Mean of Logged Detects	1.824	SD of Logged Detects	0.645

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.777	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.333	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	5.66	Standard Error of Mean	1.49
SD	4.399	95% KM (BCA) UCL	8.401
95% KM (t) UCL	8.315	95% KM (Percentile Bootstrap) UCL	8.102
95% KM (z) UCL	8.111	95% KM Bootstrap t UCL	13.46
90% KM Chebyshev UCL	10.13	95% KM Chebyshev UCL	12.15
97.5% KM Chebyshev UCL	14.96	99% KM Chebyshev UCL	20.48

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.588	Anderson-Darling GOF Test	
5% A-D Critical Value	0.702	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.32	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.335	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	2.757	k star (bias corrected MLE)	1.489
Theta hat (MLE)	2.724	Theta star (bias corrected MLE)	5.041
nu hat (MLE)	33.08	nu star (bias corrected)	17.87
MLE Mean (bias corrected)	7.508	MLE Sd (bias corrected)	6.152

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.656	nu hat (KM)	43.04
Approximate Chi Square Value (43.04, α)	29	Adjusted Chi Square Value (43.04, β)	27.37
95% Gamma Approximate KM-UCL (use when n>=50)	8.401	95% Gamma Adjusted KM-UCL (use when n<50)	8.903

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.956
Maximum	17.7	Median	4.1
SD	4.525	CV	0.913
k hat (MLE)	0.941	k star (bias corrected MLE)	0.775
Theta hat (MLE)	5.269	Theta star (bias corrected MLE)	6.396
nu hat (MLE)	24.46	nu star (bias corrected)	20.15
MLE Mean (bias corrected)	4.956	MLE Sd (bias corrected)	5.63
		Adjusted Level of Significance (β)	0.0301
Approximate Chi Square Value (20.15, α)	10.96	Adjusted Chi Square Value (20.15, β)	10.01
95% Gamma Approximate UCL (use when n>=50)	9.11	95% Gamma Adjusted UCL (use when n<50)	9.979

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.863	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.285	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.327	Mean in Log Scale	1.481
SD in Original Scale	4.25	SD in Log Scale	0.595
95% t UCL (assumes normality of ROS data)	7.427	95% Percentile Bootstrap UCL	7.19
95% BCA Bootstrap UCL	8.151	95% Bootstrap t UCL	12.63
95% H-UCL (Log ROS)	7.702		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.524	95% H-UCL (KM -Log)	8.088
KM SD (logged)	0.6	95% Critical H Value (KM-Log)	2.235
KM Standard Error of Mean (logged)	0.216		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.819	Mean in Log Scale	1.601
SD in Original Scale	5.629	SD in Log Scale	0.848
95% t UCL (Assumes normality)	9.602	95% H-Stat UCL	13.41

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	8.315	95% KM (Percentile Bootstrap) UCL	8.102

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Co

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
Number of Detects	11	Number of Non-Detects	1
Number of Distinct Detects	11	Number of Distinct Non-Detects	1
Minimum Detect	2.45	Minimum Non-Detect	2.5
Maximum Detect	221	Maximum Non-Detect	2.5
Variance Detects	6668	Percent Non-Detects	8.33%
Mean Detects	103.2	SD Detects	81.66
Median Detects	120	CV Detects	0.791
Skewness Detects	0.0795	Kurtosis Detects	-1.778
Mean of Logged Detects	4.036	SD of Logged Detects	1.455

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.898	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.191	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.267	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	94.84	Standard Error of Mean	24.09
SD	79.58	95% KM (BCA) UCL	132.5
95% KM (t) UCL	138.1	95% KM (Percentile Bootstrap) UCL	134.2
95% KM (z) UCL	134.5	95% KM Bootstrap t UCL	141.8
90% KM Chebyshev UCL	167.1	95% KM Chebyshev UCL	199.9
97.5% KM Chebyshev UCL	245.3	99% KM Chebyshev UCL	334.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.536	Anderson-Darling GOF Test	
5% A-D Critical Value	0.753	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.234	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.263	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	0.965	k star (bias corrected MLE)	0.762
Theta hat (MLE)	107	Theta star (bias corrected MLE)	135.5
nu hat (MLE)	21.22	nu star (bias corrected)	16.77
MLE Mean (bias corrected)	103.2	MLE Sd (bias corrected)	118.3

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	1.42	nu hat (KM)	34.09
Approximate Chi Square Value (34.09, α)	21.74	Adjusted Chi Square Value (34.09, β)	20.24
95% Gamma Approximate KM-UCL (use when n>=50)	148.7	95% Gamma Adjusted KM-UCL (use when n<50)	159.7

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.45	Mean	95.8
Maximum	221	Median	85.8
SD	82.01	CV	0.856
k hat (MLE)	0.909	k star (bias corrected MLE)	0.737
Theta hat (MLE)	105.4	Theta star (bias corrected MLE)	130
nu hat (MLE)	21.81	nu star (bias corrected)	17.69
MLE Mean (bias corrected)	95.8	MLE Sd (bias corrected)	111.6
		Adjusted Level of Significance (β)	0.029
Approximate Chi Square Value (17.69, α)	9.167	Adjusted Chi Square Value (17.69, β)	8.246
95% Gamma Approximate UCL (use when n>=50)	184.9	95% Gamma Adjusted UCL (use when n<50)	205.5

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.856	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.85	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.243	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.267	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	95.02	Mean in Log Scale	3.827
SD in Original Scale	82.9	SD in Log Scale	1.566
95% t UCL (assumes normality of ROS data)	138	95% Percentile Bootstrap UCL	134.8
95% BCA Bootstrap UCL	134.7	95% Bootstrap t UCL	138.9
95% H-UCL (Log ROS)	1049		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	3.774	95% H-UCL (KM -Log)	1078
KM SD (logged)	1.587	95% Critical H Value (KM-Log)	4.076

KM Standard Error of Mean (logged)	0.48		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	94.74	Mean in Log Scale	3.718
SD in Original Scale	83.24	SD in Log Scale	1.771
95% t UCL (Assumes normality)	137.9	95% H-Stat UCL	2145

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	138.1	95% KM (Percentile Bootstrap) UCL	134.2

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fe

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	7060	Mean	76164
Maximum	198000	Median	64800
SD	51488	Std. Error of Mean	14863
Coefficient of Variation	0.676	Skewness	0.983

Normal GOF Test

Shapiro Wilk Test Statistic	0.914	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.166	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	102857	95% Adjusted-CLT UCL (Chen-1995)	105121
		95% Modified-t UCL (Johnson-1978)	103560

Gamma GOF Test

A-D Test Statistic	0.531	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.743	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.217	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.249	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.765	k star (bias corrected MLE)	1.379
Theta hat (MLE)	43158	Theta star (bias corrected MLE)	55226
nu hat (MLE)	42.35	nu star (bias corrected)	33.1
MLE Mean (bias corrected)	76164	MLE Sd (bias corrected)	64855
		Approximate Chi Square Value (0.05)	20.95
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	19.48

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	120358	95% Adjusted Gamma UCL (use when n<50)	129405

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.846	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.275	Lilliefors Lognormal GOF Test	

5% Lilliefors Critical Value	0.256	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	8.862	Mean of logged Data	10.93
Maximum of Logged Data	12.2	SD of logged Data	0.973

Assuming Lognormal Distribution			
95% H-UCL	207862	90% Chebyshev (MVUE) UCL	161563
95% Chebyshev (MVUE) UCL	196204	97.5% Chebyshev (MVUE) UCL	244284
99% Chebyshev (MVUE) UCL	338728		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			

Nonparametric Distribution Free UCLs			
95% CLT UCL	100612	95% Jackknife UCL	102857
95% Standard Bootstrap UCL	99267	95% Bootstrap-t UCL	107464
95% Hall's Bootstrap UCL	119035	95% Percentile Bootstrap UCL	100234
95% BCA Bootstrap UCL	103868		
90% Chebyshev(Mean, Sd) UCL	120754	95% Chebyshev(Mean, Sd) UCL	140952
97.5% Chebyshev(Mean, Sd) UCL	168986	99% Chebyshev(Mean, Sd) UCL	224052

Suggested UCL to Use	
95% Student's-t UCL	102857

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Pb

General Statistics			
Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	18.5	Mean	4879
Maximum	57300	Median	226
SD	15770	Std. Error of Mean	4374
Coefficient of Variation	3.232	Skewness	3.59

Normal GOF Test			
Shapiro Wilk Test Statistic	0.344	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.472	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	12675	95% Adjusted-CLT UCL (Chen-1995)	16727
		95% Modified-t UCL (Johnson-1978)	13401

Gamma GOF Test			
A-D Test Statistic	1.884	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.85	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.323	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.259	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	0.253	k star (bias corrected MLE)	0.246
Theta hat (MLE)	19276	Theta star (bias corrected MLE)	19835
nu hat (MLE)	6.581	nu star (bias corrected)	6.396

MLE Mean (bias corrected)	4879	MLE Sd (bias corrected)	9838
		Approximate Chi Square Value (0.05)	1.845
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	1.519

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	16911	95% Adjusted Gamma UCL (use when n<50)	20544

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.912	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.866	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.16	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.246	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.918	Mean of logged Data	5.692
Maximum of Logged Data	10.96	SD of logged Data	2.126

Assuming Lognormal Distribution

95% H-UCL	64404	90% Chebyshev (MVUE) UCL	5561
95% Chebyshev (MVUE) UCL	7225	97.5% Chebyshev (MVUE) UCL	9534
99% Chebyshev (MVUE) UCL	14070		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	12074	95% Jackknife UCL	12675
95% Standard Bootstrap UCL	11772	95% Bootstrap-t UCL	231803
95% Hall's Bootstrap UCL	135255	95% Percentile Bootstrap UCL	13594
95% BCA Bootstrap UCL	18072		
90% Chebyshev(Mean, Sd) UCL	18001	95% Chebyshev(Mean, Sd) UCL	23945
97.5% Chebyshev(Mean, Sd) UCL	32194	99% Chebyshev(Mean, Sd) UCL	48399

Suggested UCL to Use

99% Chebyshev (Mean, Sd) UCL	48399

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

V

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	13.35	Mean	650.8
Maximum	1670	Median	550.5
SD	575.1	Std. Error of Mean	166
Coefficient of Variation	0.884	Skewness	0.529

Normal GOF Test

Shapiro Wilk Test Statistic	0.913	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.144	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	948.9	95% Adjusted-CLT UCL (Chen-1995)	951
		95% Modified-t UCL (Johnson-1978)	953.2

Gamma GOF Test

A-D Test Statistic	0.388	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.765	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.162	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.255	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.781	k star (bias corrected MLE)	0.641
Theta hat (MLE)	833.5	Theta star (bias corrected MLE)	1015
nu hat (MLE)	18.74	nu star (bias corrected)	15.39
MLE Mean (bias corrected)	650.8	MLE Sd (bias corrected)	812.7
		Approximate Chi Square Value (0.05)	7.532
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	6.71

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1329	95% Adjusted Gamma UCL (use when n<50)	1492

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.855	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.859	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.209	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level	

Data appear Approximate Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.592	Mean of logged Data	5.716
Maximum of Logged Data	7.421	SD of logged Data	1.681

Assuming Lognormal Distribution

95% H-UCL	10864	90% Chebyshev (MVUE) UCL	2585
95% Chebyshev (MVUE) UCL	3304	97.5% Chebyshev (MVUE) UCL	4303
99% Chebyshev (MVUE) UCL	6265		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	923.8	95% Jackknife UCL	948.9
95% Standard Bootstrap UCL	915	95% Bootstrap-t UCL	968.1
95% Hall's Bootstrap UCL	932.1	95% Percentile Bootstrap UCL	910.4
95% BCA Bootstrap UCL	930.1		
90% Chebyshev(Mean, Sd) UCL	1149	95% Chebyshev(Mean, Sd) UCL	1374
97.5% Chebyshev(Mean, Sd) UCL	1688	99% Chebyshev(Mean, Sd) UCL	2303

Suggested UCL to Use

95% Student's-t UCL	948.9

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Zn

General Statistics

Total Number of Observations	13	Number of Distinct Observations	13
		Number of Missing Observations	0
Minimum	29.25	Mean	3816
Maximum	45300	Median	251
SD	12473	Std. Error of Mean	3459
Coefficient of Variation	3.268	Skewness	3.597

Normal GOF Test

Shapiro Wilk Test Statistic	0.335	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.485	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	9982	95% Adjusted-CLT UCL (Chen-1995)	13194
		95% Modified-t UCL (Johnson-1978)	10557

Gamma GOF Test			
A-D Test Statistic	2.5	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.838	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.43	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.257	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	0.28	k star (bias corrected MLE)	0.267
Theta hat (MLE)	13626	Theta star (bias corrected MLE)	14308
nu hat (MLE)	7.282	nu star (bias corrected)	6.935
MLE Mean (bias corrected)	3816	MLE Sd (bias corrected)	7389
		Approximate Chi Square Value (0.05)	2.135
Adjusted Level of Significance	0.0301	Adjusted Chi Square Value	1.776

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	12397	95% Adjusted Gamma UCL (use when n<50)	14898

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.834	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.866	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.284	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.246	Data Not Lognormal at 5% Significance Level	
Data Not Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	3.376	Mean of logged Data	5.757
Maximum of Logged Data	10.72	SD of logged Data	1.81

Assuming Lognormal Distribution			
95% H-UCL	15855	90% Chebyshev (MVUE) UCL	3369
95% Chebyshev (MVUE) UCL	4326	97.5% Chebyshev (MVUE) UCL	5653
99% Chebyshev (MVUE) UCL	8260		

Nonparametric Distribution Free UCL Statistics			
Data do not follow a Discernible Distribution (0.05)			

Nonparametric Distribution Free UCLs			
95% CLT UCL	9507	95% Jackknife UCL	9982
95% Standard Bootstrap UCL	9311	95% Bootstrap-t UCL	369892
95% Hall's Bootstrap UCL	103307	95% Percentile Bootstrap UCL	10699
95% BCA Bootstrap UCL	14219		
90% Chebyshev(Mean, Sd) UCL	14195	95% Chebyshev(Mean, Sd) UCL	18896
97.5% Chebyshev(Mean, Sd) UCL	25421	99% Chebyshev(Mean, Sd) UCL	38237

Suggested UCL to Use	
99% Chebyshev (Mean, Sd) UCL	38237

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Cr6

General Statistics			
Total Number of Observations	35	Number of Distinct Observations	31
Number of Detects	25	Number of Non-Detects	10
Number of Distinct Detects	24	Number of Distinct Non-Detects	8
Minimum Detect	0.54	Minimum Non-Detect	0.13
Maximum Detect	3390	Maximum Non-Detect	30
Variance Detects	547863	Percent Non-Detects	28.57%
Mean Detects	278.4	SD Detects	740.2
Median Detects	13.1	CV Detects	2.659
Skewness Detects	3.692	Kurtosis Detects	14.18
Mean of Logged Detects	3.386	SD of Logged Detects	2.166

Normal GOF Test on Detects Only			
Shapiro Wilk Test Statistic	0.422	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.918	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.354	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.177	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs			
Mean	199.1	Standard Error of Mean	107.9
SD	625.6	95% KM (BCA) UCL	407.1
95% KM (t) UCL	381.6	95% KM (Percentile Bootstrap) UCL	391.5
95% KM (z) UCL	376.6	95% KM Bootstrap t UCL	1113
90% KM Chebyshev UCL	522.9	95% KM Chebyshev UCL	669.5
97.5% KM Chebyshev UCL	873.1	99% KM Chebyshev UCL	1273

Gamma GOF Tests on Detected Observations Only			
A-D Test Statistic	2.008	Anderson-Darling GOF Test	
5% A-D Critical Value	0.85	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.278	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.189	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.306	k star (bias corrected MLE)	0.296
Theta hat (MLE)	908.6	Theta star (bias corrected MLE)	939.6
nu hat (MLE)	15.32	nu star (bias corrected)	14.82
MLE Mean (bias corrected)	278.4	MLE Sd (bias corrected)	511.4

Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.101	nu hat (KM)	7.089
Approximate Chi Square Value (7.09, α)	2.22	Adjusted Chi Square Value (7.09, β)	2.093
95% Gamma Approximate KM-UCL (use when n>=50)	635.9	95% Gamma Adjusted KM-UCL (use when n<50)	674.5

Gamma ROS Statistics using Imputed Non-Detects			
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs			
GROS may not be used when kstar of detected data is small such as < 0.1			
For such situations, GROS method tends to yield inflated values of UCLs and BTVs			
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates			
Minimum	0.01	Mean	198.9
Maximum	3390	Median	8.6
SD	634.8	CV	3.192
k hat (MLE)	0.179	k star (bias corrected MLE)	0.182
Theta hat (MLE)	1113	Theta star (bias corrected MLE)	1090
nu hat (MLE)	12.51	nu star (bias corrected)	12.77
MLE Mean (bias corrected)	198.9	MLE Sd (bias corrected)	465.5
		Adjusted Level of Significance (β)	0.0425
Approximate Chi Square Value (12.77, α)	5.74	Adjusted Chi Square Value (12.77, β)	5.516
95% Gamma Approximate UCL (use when n>=50)	442.5	95% Gamma Adjusted UCL (use when n<50)	460.4

Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.945	Shapiro Wilk GOF Test	

5% Shapiro Wilk Critical Value	0.918	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.212	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.177	Detected Data Not Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	199	Mean in Log Scale	2.096
SD in Original Scale	634.8	SD in Log Scale	2.796
95% t UCL (assumes normality of ROS data)	380.4	95% Percentile Bootstrap UCL	396.3
95% BCA Bootstrap UCL	496.2	95% Bootstrap t UCL	1173
95% H-UCL (Log ROS)	4841		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.979	95% H-UCL (KM -Log)	7877
KM SD (logged)	2.928	95% Critical H Value (KM-Log)	5.391
KM Standard Error of Mean (logged)	0.514		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	199.5	Mean in Log Scale	2.2
SD in Original Scale	634.6	SD in Log Scale	2.805
95% t UCL (Assumes normality)	380.9	95% H-Stat UCL	5598

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	1273

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options		Without Sample Location D-22
Date/Time of Computation	7/18/2014 13:55	
From File	WorkSheet_a.xls	
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

Pb

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
		Number of Missing Observations	0
Minimum	18.5	Mean	510.9
Maximum	2930	Median	173
SD	827.3	Std. Error of Mean	238.8
Coefficient of Variation	1.619	Skewness	2.647

Normal GOF Test

Shapiro Wilk Test Statistic	0.628	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.859	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.298	Lilliefors GOF Test
5% Lilliefors Critical Value	0.256	Data Not Normal at 5% Significance Level
Data Not Normal at 5% Significance Level		

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	939.8	95% Adjusted-CLT UCL (Chen-1995)	1099
		95% Modified-t UCL (Johnson-1978)	970.2

Gamma GOF Test

A-D Test Statistic	0.523	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.775	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.208	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.257	Detected data appear Gamma Distributed at 5% Significance Level
Detected data appear Gamma Distributed at 5% Significance Level		

Gamma Statistics

k hat (MLE)	0.625	k star (bias corrected MLE)	0.524
Theta hat (MLE)	817.2	Theta star (bias corrected MLE)	974.2
nu hat (MLE)	15	nu star (bias corrected)	12.59
MLE Mean (bias corrected)	510.9	MLE Sd (bias corrected)	705.5
		Approximate Chi Square Value (0.05)	5.615
Adjusted Level of Significance	0.029	Adjusted Chi Square Value	4.923

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	1145	95% Adjusted Gamma UCL (use when n<50)	1306

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.972	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.859	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.125	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.256	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics

Minimum of Logged Data	2.918	Mean of logged Data	5.254
Maximum of Logged Data	7.983	SD of logged Data	1.484

Assuming Lognormal Distribution

95% H-UCL	3240	90% Chebyshev (MVUE) UCL	1182
95% Chebyshev (MVUE) UCL	1495	97.5% Chebyshev (MVUE) UCL	1929
99% Chebyshev (MVUE) UCL	2782		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	903.7	95% Jackknife UCL	939.8
95% Standard Bootstrap UCL	889.2	95% Bootstrap-t UCL	1677
95% Hall's Bootstrap UCL	2344	95% Percentile Bootstrap UCL	939.9
95% BCA Bootstrap UCL	1131		
90% Chebyshev(Mean, Sd) UCL	1227	95% Chebyshev(Mean, Sd) UCL	1552
97.5% Chebyshev(Mean, Sd) UCL	2002	99% Chebyshev(Mean, Sd) UCL	2887

Suggested UCL to Use

95% Adjusted Gamma UCL	1306

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

APPENDIX F.2A

EASTERN AREA SURFACE SOILS
GOODNESS OF FIT TESTING

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options	
Date/Time of Computation	7/3/2014 12:56
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

124TCB

Raw Statistics	
Number of Valid Observations	10
Number of Distinct Observations	10
Minimum	6.36
Maximum	150000
Mean of Raw Data	31049
Standard Deviation of Raw Data	50929
Khat	0.206
Theta hat	150924
Kstar	0.211
Theta star	147379
Mean of Log Transformed Data	6.782
Standard Deviation of Log Transformed Data	3.963
Normal GOF Test Results	
Correlation Coefficient R	0.829
Shapiro Wilk Test Statistic	0.693
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	8.36E-04
Lilliefors Test Statistic	0.33
Lilliefors Critical (0.05) Value	0.28
Data not Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.964
A-D Test Statistic	0.706
A-D Critical (0.05) Value	0.853
K-S Test Statistic	0.28
K-S Critical(0.05) Value	0.294
Data not Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.938
Shapiro Wilk Test Statistic	0.853
Shapiro Wilk Critical (0.05) Value	0.842
Approximate Shapiro Wilk P Value	0.104
Lilliefors Test Statistic	0.247
Lilliefors Critical (0.05) Value	0.28
Data appear Lognormal at (0.05) Significance Level	

1254

Raw Statistics	
Number of Valid Observations	7
Number of Distinct Observations	7
Minimum	0.042
Maximum	1
Mean of Raw Data	0.317
Standard Deviation of Raw Data	0.333
Khat	1.189
Theta hat	0.267
Kstar	0.774

Theta star	0.409
Mean of Log Transformed Data	-1.625
Standard Deviation of Log Transformed Data	1.097

Normal GOF Test Results

Correlation Coefficient R	0.898
Shapiro Wilk Test Statistic	0.817
Shapiro Wilk Critical (0.05) Value	0.803
Approximate Shapiro Wilk P Value	0.0487
Lilliefors Test Statistic	0.213
Lilliefors Critical (0.05) Value	0.335

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.993
A-D Test Statistic	0.186
A-D Critical (0.05) Value	0.725
K-S Test Statistic	0.129
K-S Critical(0.05) Value	0.319

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.996
Shapiro Wilk Test Statistic	0.985
Shapiro Wilk Critical (0.05) Value	0.803
Approximate Shapiro Wilk P Value	0.993
Lilliefors Test Statistic	0.119
Lilliefors Critical (0.05) Value	0.335

Data appear Lognormal at (0.05) Significance Level

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	7/3/2014 12:57
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

12DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	10	0	10	9	1	10.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	9	3.78	5405	1614	34.4	2312
Statistics (All: NDs treated as DL value)	10	2.9	5405	1453	23.25	2239
Statistics (All: NDs treated as DL/2 value)	10	1.45	5405	1453	23.25	2239
Statistics (Normal ROS Imputed Data)	10	-3488	5405	1104	23.25	2712
Statistics (Gamma ROS Imputed Data)	10	3.78	5405	1462	64.76	2232
Statistics (Lognormal ROS Imputed Data)	10	0.084	5405	1452	23.25	2239

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.271	0.255	5959	4.797	3.065	0.639
Statistics (NDs = DL)	0.249	0.241	5839	4.424	3.122	0.706
Statistics (NDs = DL/2)	0.244	0.237	5960	4.355	3.211	0.737
Statistics (Gamma ROS Estimates)	0.278	0.261	5264	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	4.07	3.694	0.908

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.853	0.831	0.831	0.831

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.708	0.829	Data Not Normal
Lilliefors (Detects Only)	0.348	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.677	0.842	Data Not Normal
Lilliefors (NDs = DL)	0.361	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.677	0.842	Data Not Normal
Lilliefors (NDs = DL/2)	0.361	0.28	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.856	0.842	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.285	0.28	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.863	0.875	0.873	0.882

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.822	0.819	
Kolmogorov-Smirnov (Detects Only)	0.282	0.303	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.962	0.835	
Kolmogorov-Smirnov (NDs = DL)	0.293	0.291	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.89	0.837	
Kolmogorov-Smirnov (NDs = DL/2)	0.287	0.292	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	0.801	0.823	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.237	0.289	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.931	0.929	0.942	0.96

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.836	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.218	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.833	0.842	Data Not Lognormal
Lilliefors (NDs = DL)	0.232	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.862	0.842	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.219	0.28	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.912	0.842	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.171	0.28	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

13DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	10	0	10	9	1	10.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	9	6.4	1410	428.7	66.2	559.3
Statistics (All: NDs treated as DL value)	10	2.9	1410	386.1	40.35	544.3
Statistics (All: NDs treated as DL/2 value)	10	1.45	1410	386	40.35	544.4
Statistics (Normal ROS Imputed Data)	10	-859.7	1410	299.8	40.35	666.4
Statistics (Gamma ROS Imputed Data)	10	0.01	1410	385.8	40.35	544.5
Statistics (Lognormal ROS Imputed Data)	10	0.381	1410	385.9	40.35	544.5

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.41	0.348	1045	4.463	2.275	0.51
Statistics (NDs = DL)	0.364	0.322	1060	4.123	2.399	0.582
Statistics (NDs = DL/2)	0.353	0.314	1093	4.054	2.505	0.618
Statistics (Gamma ROS Estimates)	0.289	0.269	1334	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.92	2.747	0.701

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS

Correlation Coefficient R	0.892	0.87	0.871	0.871

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.778	0.829	Data Not Normal
Lilliefors (Detects Only)	0.297	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.744	0.842	Data Not Normal
Lilliefors (NDs = DL)	0.322	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.745	0.842	Data Not Normal
Lilliefors (NDs = DL/2)	0.322	0.28	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.907	0.842	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.237	0.28	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.928	0.933	0.932	0.921

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.645	0.787	
Kolmogorov-Smirnov (Detects Only)	0.25	0.297	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.708	0.802	
Kolmogorov-Smirnov (NDs = DL)	0.266	0.286	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.633	0.804	
Kolmogorov-Smirnov (NDs = DL/2)	0.257	0.286	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.42	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.2	0.289	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.937	0.948	0.959	0.963

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.846	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.229	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.873	0.842	Data Appear Lognormal
Lilliefors (NDs = DL)	0.227	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.898	0.842	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.209	0.28	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.916	0.842	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.175	0.28	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

14DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	10	0	10	8	2	20.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	6.6	7.4	7	7	0.566
Statistics (Detects Only)	8	15	4840	1036	53.4	1728
Statistics (All: NDs treated as DL value)	10	6.6	4840	830.1	46.95	1584
Statistics (All: NDs treated as DL/2 value)	10	3.3	4840	829.4	46.95	1585
Statistics (Normal ROS Imputed Data)	10	-2663	4840	296	46.95	2181
Statistics (Gamma ROS Imputed Data)	10	0.01	4840	828.7	46.95	1585
Statistics (Lognormal ROS Imputed Data)	10	0.654	4840	828.9	46.95	1585

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.352	0.303	2941	5.036	2.307	0.458
Statistics (NDs = DL)	0.299	0.276	2773	4.418	2.417	0.547
Statistics (NDs = DL/2)	0.285	0.266	2912	4.279	2.586	0.604
Statistics (Gamma ROS Estimates)	0.203	0.209	4078	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.944	3.073	0.779

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.824	0.775	0.775	0.775

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.689	0.818	Data Not Normal
Lilliefors (Detects Only)	0.34	0.313	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.616	0.842	Data Not Normal
Lilliefors (NDs = DL)	0.388	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.616	0.842	Data Not Normal
Lilliefors (NDs = DL/2)	0.388	0.28	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.881	0.842	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.249	0.28	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.995	0.993	0.994	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.74	0.788	
Kolmogorov-Smirnov (Detects Only)	0.351	0.315	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.994	0.814	
Kolmogorov-Smirnov (NDs = DL)	0.358	0.288	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.848	0.82	
Kolmogorov-Smirnov (NDs = DL/2)	0.343	0.289	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.417	0.854	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.247	0.294	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.934	0.938	0.957	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.85	0.818	Data Appear Lognormal
Lilliefors (Detects Only)	0.298	0.313	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.863	0.842	Data Appear Lognormal
Lilliefors (NDs = DL)	0.269	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.9	0.842	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.243	0.28	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.924	0.842	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.193	0.28	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BAA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	6	11	64.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	0.063	49	15.28	13	12.09
Statistics (Detects Only)	6	0.17	22	7.503	3.95	8.66
Statistics (All: NDs treated as DL value)	17	0.063	49	12.53	12	11.38
Statistics (All: NDs treated as DL/2 value)	17	0.0315	24.5	7.591	6	6.803
Statistics (Normal ROS Imputed Data)	17	-10.71	22	2.41	1.389	7.506
Statistics (Gamma ROS Imputed Data)	17	0.01	22	3.564	1.25	5.844
Statistics (Lognormal ROS Imputed Data)	17	0.0751	22	3.257	0.95	5.858

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.669	0.445	11.22	1.106	1.794	1.622
Statistics (NDs = DL)	0.829	0.722	15.12	1.816	1.763	0.971
Statistics (NDs = DL/2)	0.888	0.77	8.551	1.367	1.69	1.236
Statistics (Gamma ROS Estimates)	0.407	0.375	8.751	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	0.0726	1.536	21.14

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.923	0.867	0.894	0.592

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.845	0.788	Data Appear Normal
Lilliefors (Detects Only)	0.302	0.362	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.773	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.272	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.804	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.328	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.919	0.892	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.155	0.215	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.977	0.938	0.961	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.195	0.726	
Kolmogorov-Smirnov (Detects Only)	0.165	0.345	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.257	0.773	
Kolmogorov-Smirnov (NDs = DL)	0.307	0.217	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.028	0.771	
Kolmogorov-Smirnov (NDs = DL/2)	0.237	0.216	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.333	0.818	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.137	0.224	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.976	0.865	0.861	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.949	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.193	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.759	0.892	Data Not Lognormal
Lilliefors (NDs = DL)	0.335	0.215	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.757	0.892	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.297	0.215	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.972	0.892	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.134	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	12	5	29.41%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	3.8	16	6.85	4.15	5.225
Statistics (Detects Only)	12	0.17	37	10.46	4.975	13.02
Statistics (All: NDs treated as DL value)	17	0.17	37	9.398	4.95	11.23
Statistics (All: NDs treated as DL/2 value)	17	0.17	37	8.39	4.91	11.36
Statistics (Normal ROS Imputed Data)	17	-3.354	37	7.483	4.389	11.91
Statistics (Gamma ROS Imputed Data)	17	0.01	37	7.529	3.84	11.77
Statistics (Lognormal ROS Imputed Data)	17	0.17	37	7.726	3.84	11.64

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.704	0.584	14.86	1.49	1.577	1.059
Statistics (NDs = DL)	0.871	0.756	10.8	1.566	1.348	0.861
Statistics (NDs = DL/2)	0.779	0.681	10.77	1.362	1.358	0.997

Statistics (Gamma ROS Estimates)	0.378	0.35	19.94	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.071	1.488	1.39

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.852	0.839	0.812	0.819

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.72	0.859	Data Not Normal
Lilliefors (Detects Only)	0.367	0.256	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.706	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.364	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.662	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.337	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.71	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.354	0.215	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.946	0.958	0.95	0.952

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.547	0.769	
Kolmogorov-Smirnov (Detects Only)	0.229	0.256	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.808	0.771	
Kolmogorov-Smirnov (NDs = DL)	0.242	0.216	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.699	0.775	
Kolmogorov-Smirnov (NDs = DL/2)	0.205	0.217	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.431	0.825	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.144	0.224	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.959	0.947	0.975	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.921	0.859	Data Appear Lognormal
Lilliefors (Detects Only)	0.214	0.256	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.907	0.892	Data Appear Lognormal
Lilliefors (NDs = DL)	0.255	0.215	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.956	0.892	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.122	0.215	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.951	0.892	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.127	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BBF

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	13	4	23.53%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	6.9	30	12.9	7.35	11.4
Statistics (Detects Only)	13	0.42	65.8	18.13	11.6	18.85
Statistics (All: NDs treated as DL value)	17	0.42	65.8	16.9	10	17.21
Statistics (All: NDs treated as DL/2 value)	17	0.42	65.8	15.38	10	17.28
Statistics (Normal ROS Imputed Data)	17	-3.667	65.8	13.83	10	18.43
Statistics (Gamma ROS Imputed Data)	17	0.01	65.8	14.26	8.7	17.9
Statistics (Lognormal ROS Imputed Data)	17	0.42	65.8	14.56	8.7	17.64

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.014	0.831	17.88	2.329	1.304	0.56

Statistics (NDs = DL)	1.142	0.98	14.8	2.33	1.171	0.503
Statistics (NDs = DL/2)	1.016	0.876	15.13	2.166	1.21	0.558
Statistics (Gamma ROS Estimates)	0.415	0.381	34.38	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.008	1.298	0.647

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.892	0.882	0.861	0.484

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.803	0.866	Data Not Normal
Lilliefors (Detects Only)	0.228	0.246	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.788	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.214	0.215	Data Appear Normal
Shapiro-Wilk (NDs = DL/2)	0.753	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.234	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.811	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.203	0.215	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.99	0.99	0.984	0.99

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.179	0.757	
Kolmogorov-Smirnov (Detects Only)	0.109	0.243	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.299	0.763	
Kolmogorov-Smirnov (NDs = DL)	0.131	0.214	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.302	0.766	
Kolmogorov-Smirnov (NDs = DL/2)	0.128	0.215	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.665	0.817	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.189	0.223	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.959	0.956	0.972	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.932	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.178	0.246	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.93	0.892	Data Appear Lognormal
Lilliefors (NDs = DL)	0.19	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.955	0.892	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.115	0.215	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.977	0.892	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.0976	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

DAHA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	8	9	52.94%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	9	3.6	16	5.572	4.15	3.999
Statistics (Detects Only)	8	0.029	8.8	3.009	1.25	3.473
Statistics (All: NDs treated as DL value)	17	0.029	16	4.366	3.9	3.874
Statistics (All: NDs treated as DL/2 value)	17	0.029	8.8	2.891	1.95	2.7
Statistics (Normal ROS Imputed Data)	17	-0.0944	8.8	2.064	1.117	2.515
Statistics (Gamma ROS Imputed Data)	17	0.029	8.8	1.736	0.516	2.618
Statistics (Lognormal ROS Imputed Data)	17	0.029	8.8	1.625	0.37	2.663

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.589	0.452	5.106	0.0501	1.937	38.69
Statistics (NDs = DL)	0.95	0.821	4.597	0.862	1.542	1.789
Statistics (NDs = DL/2)	1.017	0.877	2.842	0.495	1.394	2.814
Statistics (Gamma ROS Estimates)	0.681	0.6	2.548	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.498	1.412	-2.836

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.913	0.905	0.901	0.955

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.816	0.818	Data Not Normal
Lilliefors (Detects Only)	0.314	0.313	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.835	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.22	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.807	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.314	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.71	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.31	0.215	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.938	0.971	0.959	0.952

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.282	0.756	
Kolmogorov-Smirnov (Detects Only)	0.168	0.307	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.746	0.768	
Kolmogorov-Smirnov (NDs = DL)	0.273	0.216	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.574	0.766	
Kolmogorov-Smirnov (NDs = DL/2)	0.183	0.215	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.072	0.782	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.249	0.218	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.964	0.895	0.911	0.938

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.925	0.818	Data Appear Lognormal
Lilliefors (Detects Only)	0.158	0.313	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.816	0.892	Data Not Lognormal
Lilliefors (NDs = DL)	0.313	0.215	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.845	0.892	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.235	0.215	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.891	0.892	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.196	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

HCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	10	7	41.18%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.017	3.1	1.327	0.16	1.567
Statistics (Detects Only)	10	0.95	359	68.2	29.85	109.9
Statistics (All: NDs treated as DL value)	17	0.017	359	40.66	3	89.11
Statistics (All: NDs treated as DL/2 value)	17	0.0085	359	40.39	1.5	89.24
Statistics (Normal ROS Imputed Data)	17	-162.5	359	-15.8	0.96	133.8
Statistics (Gamma ROS Imputed Data)	17	0.01	359	40.12	0.96	89.36

Statistics (Lognormal ROS Imputed Data)	17	0.0998	359	40.21	0.96	89.32

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.475	0.399	143.7	2.874	2.096	0.729
Statistics (NDs = DL)	0.277	0.267	146.9	1.182	2.965	2.508
Statistics (NDs = DL/2)	0.253	0.248	159.7	0.896	3.222	3.594
Statistics (Gamma ROS Estimates)	0.19	0.196	210.9	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	0.988	2.842	2.877

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.791	0.699	0.699	0.699

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.647	0.842	Data Not Normal
Lilliefors (Detects Only)	0.341	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.514	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.324	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.513	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.325	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.862	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.176	0.215	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.983	0.977	0.981	0.989

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.386	0.782	
Kolmogorov-Smirnov (Detects Only)	0.175	0.282	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.446	0.852	
Kolmogorov-Smirnov (NDs = DL)	0.209	0.228	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.562	0.863	
Kolmogorov-Smirnov (NDs = DL/2)	0.247	0.229	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	0.994	0.895	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.248	0.233	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.95	0.984	0.975	0.951

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.888	0.842	Data Appear Lognormal
Lilliefors (Detects Only)	0.233	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.957	0.892	Data Appear Lognormal
Lilliefors (NDs = DL)	0.147	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.939	0.892	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.16	0.215	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.885	0.892	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.179	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

ICDP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	12	5	29.41%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	5.4	23	9.86	5.8	7.538
Statistics (Detects Only)	12	0.31	35.9	11.11	9.725	10.68
Statistics (All: NDs treated as DL value)	17	0.31	35.9	10.74	9.35	9.642
Statistics (All: NDs treated as DL/2 value)	17	0.31	35.9	9.289	6.6	9.507

Statistics (Normal ROS Imputed Data)	17	0.31	35.9	8.531	6.544	9.845
Statistics (Gamma ROS Imputed Data)	17	0.31	35.9	8.403	4.351	9.877
Statistics (Lognormal ROS Imputed Data)	17	0.31	35.9	8.438	3.9	9.834

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1	0.806	11.1	1.83	1.344	0.734
Statistics (NDs = DL)	1.224	1.047	8.772	1.913	1.164	0.609
Statistics (NDs = DL/2)	1.098	0.944	8.456	1.709	1.173	0.686
Statistics (Gamma ROS Estimates)	0.844	0.734	9.958	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.487	1.254	0.843

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.919	0.918	0.887	0.528

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.848	0.859	Data Not Normal
Lilliefors (Detects Only)	0.243	0.256	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.846	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.242	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.794	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.232	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.783	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.213	0.215	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.985	0.989	0.984	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.228	0.757	
Kolmogorov-Smirnov (Detects Only)	0.152	0.252	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.243	0.761	
Kolmogorov-Smirnov (NDs = DL)	0.124	0.214	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.251	0.764	
Kolmogorov-Smirnov (NDs = DL/2)	0.115	0.215	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.361	0.772	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.151	0.216	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.958	0.954	0.975	0.978

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.923	0.859	Data Appear Lognormal
Lilliefors (Detects Only)	0.202	0.256	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.92	0.892	Data Appear Lognormal
Lilliefors (NDs = DL)	0.188	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.958	0.892	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.144	0.215	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.956	0.892	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.137	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

NAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	14	2	12.50%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	2.7	4.1	3.4	3.4	0.99
Statistics (Detects Only)	14	0.11	448	66.08	8.655	126.3

Statistics (All: NDs treated as DL value)	16	0.11	448	58.25	6.805	119.5
Statistics (All: NDs treated as DL/2 value)	16	0.11	448	58.03	6.805	119.6
Statistics (Normal ROS Imputed Data)	16	-58.66	448	51.48	6.805	124.2
Statistics (Gamma ROS Imputed Data)	16	0.01	448	57.82	6.805	119.7
Statistics (Lognormal ROS Imputed Data)	16	0.11	448	57.9	6.805	119.7

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.367	0.336	180.1	2.372	2.24	0.944
Statistics (NDs = DL)	0.363	0.337	160.3	2.226	2.125	0.955
Statistics (NDs = DL/2)	0.35	0.326	165.9	2.139	2.182	1.02
Statistics (Gamma ROS Estimates)	0.274	0.264	211.3	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.019	2.299	1.139

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.756	0.729	0.729	0.731

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.59	0.874	Data Not Normal
Lilliefors (Detects Only)	0.366	0.237	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.551	0.887	Data Not Normal
Lilliefors (NDs = DL)	0.386	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.552	0.887	Data Not Normal
Lilliefors (NDs = DL/2)	0.385	0.222	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.653	0.887	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.36	0.222	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.984	0.978	0.98	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.68	0.819	
Kolmogorov-Smirnov (Detects Only)	0.256	0.246	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	1.026	0.825	
Kolmogorov-Smirnov (NDs = DL)	0.269	0.231	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.972	0.827	
Kolmogorov-Smirnov (NDs = DL/2)	0.26	0.232	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.446	0.85	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.206	0.234	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.98	0.984	0.991

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.973	0.874	Data Appear Lognormal
Lilliefors (Detects Only)	0.136	0.237	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.966	0.887	Data Appear Lognormal
Lilliefors (NDs = DL)	0.141	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.969	0.887	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.128	0.222	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.978	0.887	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.114	0.222	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1248

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	7	0	7	5	2	28.57%

	Number	Minimum	Maximum	Mean	Median	SD

Statistics (Non-Detects Only)	2	0.0019	0.0019	0.0019	0.0019	0
Statistics (Detects Only)	5	0.1	2.5	1.022	1.1	0.943
Statistics (All: NDs treated as DL value)	7	0.0019	2.5	0.731	0.31	0.917
Statistics (All: NDs treated as DL/2 value)	7	9.50E-04	2.5	0.73	0.31	0.917
Statistics (Normal ROS Imputed Data)	7	-1.787	2.5	0.32	0.31	1.439
Statistics (Gamma ROS Imputed Data)	7	0.01	2.5	0.733	0.31	0.914
Statistics (Lognormal ROS Imputed Data)	7	0.0152	2.5	0.738	0.31	0.91

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.148	0.592	0.89	-0.473	1.266	-2.674
Statistics (NDs = DL)	0.368	0.305	1.987	-2.128	3.01	-1.414
Statistics (NDs = DL/2)	0.336	0.287	2.171	-2.326	3.329	-1.431
Statistics (Gamma ROS Estimates)	0.476	0.368	1.538	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.401	1.91	-1.364

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.945	0.904	0.904	0.896

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.897	0.762	Data Appear Normal
Lilliefors (Detects Only)	0.267	0.396	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.818	0.803	Data Appear Normal
Lilliefors (NDs = DL)	0.248	0.335	Data Appear Normal
Shapiro-Wilk (NDs = DL/2)	0.818	0.803	Data Appear Normal
Lilliefors (NDs = DL/2)	0.248	0.335	Data Appear Normal
Shapiro-Wilk (Normal ROS Estimates)	0.971	0.803	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.154	0.335	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.969	0.964	0.961	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.28	0.69	
Kolmogorov-Smirnov (Detects Only)	0.253	0.364	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.375	0.773	
Kolmogorov-Smirnov (NDs = DL)	0.218	0.332	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.407	0.778	
Kolmogorov-Smirnov (NDs = DL/2)	0.221	0.334	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.334	0.755	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.209	0.328	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.966	0.927	0.918	0.977

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.932	0.762	Data Appear Lognormal
Lilliefors (Detects Only)	0.273	0.396	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.836	0.803	Data Appear Lognormal
Lilliefors (NDs = DL)	0.201	0.335	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.82	0.803	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.217	0.335	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.937	0.803	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.212	0.335	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

TCDD

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	10	0	10	1	9	90.00%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable TCDD was not processed!

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options	
Date/Time of Computation	7/22/2014 9:51
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

Cr

Raw Statistics	
Number of Valid Observations	4
Number of Distinct Observations	4
Minimum	8570
Maximum	11500
Mean of Raw Data	10243
Standard Deviation of Raw Data	1300
Khat	79.73
Theta hat	128.5
Kstar	20.1
Theta star	509.6
Mean of Log Transformed Data	9.228
Standard Deviation of Log Transformed Data	0.131
Normal GOF Test Results	
Correlation Coefficient R	0.98
Shapiro Wilk Test Statistic	0.953
Shapiro Wilk Critical (0.05) Value	0.748
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.22
Lilliefors Critical (0.05) Value	0.443
Data appear Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.968
A-D Test Statistic	0.282
A-D Critical (0.05) Value	0.656
K-S Test Statistic	0.252
K-S Critical(0.05) Value	0.394
Data appear Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.973
Shapiro Wilk Test Statistic	0.942
Shapiro Wilk Critical (0.05) Value	0.748
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.224
Lilliefors Critical (0.05) Value	0.443
Data appear Lognormal at (0.05) Significance Level	

Cr6

Raw Statistics	
Number of Valid Observations	4
Number of Distinct Observations	4
Minimum	0.15
Maximum	195
Mean of Raw Data	52.39
Standard Deviation of Raw Data	95.3
Khat	0.262
Theta hat	199.9

Kstar	0.232
Theta star	225.6
Mean of Log Transformed Data	1.268
Standard Deviation of Log Transformed Data	3.308

Normal GOF Test Results

Correlation Coefficient R	0.819
Shapiro Wilk Test Statistic	0.681
Shapiro Wilk Critical (0.05) Value	0.748
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.406
Lilliefors Critical (0.05) Value	0.443

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.996
A-D Test Statistic	0.357
A-D Critical (0.05) Value	0.715
K-S Test Statistic	0.284
K-S Critical(0.05) Value	0.421

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.972
Shapiro Wilk Test Statistic	0.931
Shapiro Wilk Critical (0.05) Value	0.748
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.248
Lilliefors Critical (0.05) Value	0.443

Data appear Lognormal at (0.05) Significance Level

APPENDIX F.2B

EASTERN AREA SURFACE SOILS
UCL CALCULATION

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	7/3/2014 12:44
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

124TCB

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
		Number of Missing Observations	0
Minimum	6.36	Mean	31049
Maximum	150000	Median	1551
SD	50929	Std. Error of Mean	16105
Coefficient of Variation	1.64	Skewness	1.728

Normal GOF Test

Shapiro Wilk Test Statistic	0.693	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.842	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.33	Lilliefors GOF Test
5% Lilliefors Critical Value	0.28	Data Not Normal at 5% Significance Level

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	60572	95% Adjusted-CLT UCL (Chen-1995)	66941
		95% Modified-t UCL (Johnson-1978)	62038

Gamma GOF Test

A-D Test Statistic	0.706	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.853	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.28	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.294	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.206	k star (bias corrected MLE)	0.211
Theta hat (MLE)	150924	Theta star (bias corrected MLE)	147379
nu hat (MLE)	4.115	nu star (bias corrected)	4.214
MLE Mean (bias corrected)	31049	MLE Sd (bias corrected)	67646
		Approximate Chi Square Value (0.05)	0.808
Adjusted Level of Significance	0.0267	Adjusted Chi Square Value	0.587

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	161949	95% Adjusted Gamma UCL (use when n<50)	222980

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.853	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.842	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.247	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.28	Data appear Lognormal at 5% Significance Level

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	1.85	Mean of logged Data	6.782
Maximum of Logged Data	11.92	SD of logged Data	3.963

Assuming Lognormal Distribution

95% H-UCL	1.81E+12	90% Chebyshev (MVUE) UCL	500123
95% Chebyshev (MVUE) UCL	667617	97.5% Chebyshev (MVUE) UCL	900092
99% Chebyshev (MVUE) UCL	1356745		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	57540	95% Jackknife UCL	60572
95% Standard Bootstrap UCL	55650	95% Bootstrap-t UCL	84552
95% Hall's Bootstrap UCL	58405	95% Percentile Bootstrap UCL	59329
95% BCA Bootstrap UCL	66832		
90% Chebyshev(Mean, Sd) UCL	79365	95% Chebyshev(Mean, Sd) UCL	101250
97.5% Chebyshev(Mean, Sd) UCL	131626	99% Chebyshev(Mean, Sd) UCL	191293

Suggested UCL to Use

95% Adjusted Gamma UCL	222980

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

12DCB

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1
Minimum Detect	3.78	Minimum Non-Detect	2.9
Maximum Detect	5405	Maximum Non-Detect	2.9
Variance Detects	5346554	Percent Non-Detects	10%
Mean Detects	1614	SD Detects	2312
Median Detects	34.4	CV Detects	1.433
Skewness Detects	0.945	Kurtosis Detects	-1.253
Mean of Logged Detects	4.797	SD of Logged Detects	3.065

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.708	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.348	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1453	Standard Error of Mean	712.4
SD	2124	95% KM (BCA) UCL	2769
95% KM (t) UCL	2759	95% KM (Percentile Bootstrap) UCL	2626
95% KM (z) UCL	2624	95% KM Bootstrap t UCL	3368
90% KM Chebyshev UCL	3590	95% KM Chebyshev UCL	4558
97.5% KM Chebyshev UCL	5901	99% KM Chebyshev UCL	8541

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.822	Anderson-Darling GOF Test	
5% A-D Critical Value	0.819	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.282	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.271	k star (bias corrected MLE)	0.255
Theta hat (MLE)	5959	Theta star (bias corrected MLE)	6338
nu hat (MLE)	4.875	nu star (bias corrected)	4.583
MLE Mean (bias corrected)	1614	MLE Sd (bias corrected)	3198

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.468	nu hat (KM)	9.357
Approximate Chi Square Value (9.36, α)	3.544	Adjusted Chi Square Value (9.36, β)	2.95
95% Gamma Approximate KM-UCL (use when n>=50)	3835	95% Gamma Adjusted KM-UCL (use when n<50)	4608

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	3.78	Mean	1462
Maximum	5405	Median	64.76
SD	2232	CV	1.527
k hat (MLE)	0.278	k star (bias corrected MLE)	0.261
Theta hat (MLE)	5264	Theta star (bias corrected MLE)	5600
nu hat (MLE)	5.554	nu star (bias corrected)	5.221
MLE Mean (bias corrected)	1462	MLE Sd (bias corrected)	2861
		Adjusted Level of Significance (β)	0.0267
Approximate Chi Square Value (5.22, α)	1.256	Adjusted Chi Square Value (5.22, β)	0.953
95% Gamma Approximate UCL (use when n>=50)	6078	95% Gamma Adjusted UCL (use when n<50)	8012

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.836	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.218	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1452	Mean in Log Scale	4.07
SD in Original Scale	2239	SD in Log Scale	3.694
95% t UCL (assumes normality of ROS data)	2750	95% Percentile Bootstrap UCL	2597
95% BCA Bootstrap UCL	2861	95% Bootstrap t UCL	3240
95% H-UCL (Log ROS)	7.35E+09		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	4.424	95% H-UCL (KM -Log)	14317997
KM SD (logged)	2.961	95% Critical H Value (KM-Log)	7.768
KM Standard Error of Mean (logged)	0.993		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1453	Mean in Log Scale	4.355
SD in Original Scale	2239	SD in Log Scale	3.211
95% t UCL (Assumes normality)	2750	95% H-Stat UCL	1.07E+08

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	4558	95% GROS Adjusted Gamma UCL	8012
95% Adjusted Gamma KM-UCL	4608		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

13DCB

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	9	Number of Non-Detects	1
Number of Distinct Detects	9	Number of Distinct Non-Detects	1

Minimum Detect	6.4	Minimum Non-Detect	2.9
Maximum Detect	1410	Maximum Non-Detect	2.9
Variance Detects	312867	Percent Non-Detects	10%
Mean Detects	428.7	SD Detects	559.3
Median Detects	66.2	CV Detects	1.305
Skewness Detects	1.02	Kurtosis Detects	-0.605
Mean of Logged Detects	4.463	SD of Logged Detects	2.275

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.778	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.297	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	386.1	Standard Error of Mean	173.2
SD	516.3	95% KM (BCA) UCL	655.4
95% KM (t) UCL	703.6	95% KM (Percentile Bootstrap) UCL	665.6
95% KM (z) UCL	671	95% KM Bootstrap t UCL	864.4
90% KM Chebyshev UCL	905.7	95% KM Chebyshev UCL	1141
97.5% KM Chebyshev UCL	1468	99% KM Chebyshev UCL	2109

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.645	Anderson-Darling GOF Test	
5% A-D Critical Value	0.787	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.25	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.41	k star (bias corrected MLE)	0.348
Theta hat (MLE)	1045	Theta star (bias corrected MLE)	1234
nu hat (MLE)	7.383	nu star (bias corrected)	6.255
MLE Mean (bias corrected)	428.7	MLE Sd (bias corrected)	727.2

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.559	nu hat (KM)	11.18
Approximate Chi Square Value (11.18, α)	4.694	Adjusted Chi Square Value (11.18, β)	3.989
95% Gamma Approximate KM-UCL (use when n>=50)	919.9	95% Gamma Adjusted KM-UCL (use when n<50)	1082

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	385.8
Maximum	1410	Median	40.35
SD	544.5	CV	1.411
k hat (MLE)	0.289	k star (bias corrected MLE)	0.269
Theta hat (MLE)	1334	Theta star (bias corrected MLE)	1434
nu hat (MLE)	5.783	nu star (bias corrected)	5.381
MLE Mean (bias corrected)	385.8	MLE Sd (bias corrected)	743.8
		Adjusted Level of Significance (β)	0.0267
Approximate Chi Square Value (5.38, α)	1.332	Adjusted Chi Square Value (5.38, β)	1.017
95% Gamma Approximate UCL (use when n>=50)	1558	95% Gamma Adjusted UCL (use when n<50)	2042

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.846	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.229	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	385.9	Mean in Log Scale	3.92
SD in Original Scale	544.5	SD in Log Scale	2.747
95% t UCL (assumes normality of ROS data)	701.5	95% Percentile Bootstrap UCL	666.3
95% BCA Bootstrap UCL	712.9	95% Bootstrap t UCL	966.5
95% H-UCL (Log ROS)	1647635		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	4.123	95% H-UCL (KM -Log)	82140
KM SD (logged)	2.276	95% Critical H Value (KM-Log)	6.068
KM Standard Error of Mean (logged)	0.763		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	386	Mean in Log Scale	4.054
SD in Original Scale	544.4	SD in Log Scale	2.505
95% t UCL (Assumes normality)	701.5	95% H-Stat UCL	337368

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	1141	95% GROS Adjusted Gamma UCL	2042
95% Adjusted Gamma KM-UCL	1082		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

14DCB

General Statistics

Total Number of Observations	10	Number of Distinct Observations	10
Number of Detects	8	Number of Non-Detects	2
Number of Distinct Detects	8	Number of Distinct Non-Detects	2
Minimum Detect	15	Minimum Non-Detect	6.6
Maximum Detect	4840	Maximum Non-Detect	7.4
Variance Detects	2985593	Percent Non-Detects	20%
Mean Detects	1036	SD Detects	1728
Median Detects	53.4	CV Detects	1.668
Skewness Detects	1.911	Kurtosis Detects	3.426
Mean of Logged Detects	5.036	SD of Logged Detects	2.307

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.689	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.34	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.313	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	830	Standard Error of Mean	508.2
SD	1503	95% KM (BCA) UCL	1684
95% KM (t) UCL	1762	95% KM (Percentile Bootstrap) UCL	1690
95% KM (z) UCL	1666	95% KM Bootstrap t UCL	4296
90% KM Chebyshev UCL	2355	95% KM Chebyshev UCL	3045
97.5% KM Chebyshev UCL	4003	99% KM Chebyshev UCL	5886

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.74	Anderson-Darling GOF Test	
5% A-D Critical Value	0.788	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.351	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.315	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.352	k star (bias corrected MLE)	0.303
Theta hat (MLE)	2941	Theta star (bias corrected MLE)	3414
nu hat (MLE)	5.636	nu star (bias corrected)	4.856
MLE Mean (bias corrected)	1036	MLE Sd (bias corrected)	1880

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.305	nu hat (KM)	6.099
Approximate Chi Square Value (6.10, α)	1.69	Adjusted Chi Square Value (6.10, β)	1.32
95% Gamma Approximate KM-UCL (use when n>=50)	2995	95% Gamma Adjusted KM-UCL (use when n<50)	3835

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	828.7
Maximum	4840	Median	46.95
SD	1585	CV	1.913
k hat (MLE)	0.203	k star (bias corrected MLE)	0.209
Theta hat (MLE)	4078	Theta star (bias corrected MLE)	3967
nu hat (MLE)	4.064	nu star (bias corrected)	4.178
MLE Mean (bias corrected)	828.7	MLE Sd (bias corrected)	1813
		Adjusted Level of Significance (β)	0.0267
Approximate Chi Square Value (4.18, α)	0.793	Adjusted Chi Square Value (4.18, β)	0.575
95% Gamma Approximate UCL (use when n>=50)	4364	95% Gamma Adjusted UCL (use when n<50)	6019

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.85	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.298	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.313	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	828.9	Mean in Log Scale	3.944
SD in Original Scale	1585	SD in Log Scale	3.073
95% t UCL (assumes normality of ROS data)	1748	95% Percentile Bootstrap UCL	1688
95% BCA Bootstrap UCL	2169	95% Bootstrap t UCL	4299
95% H-UCL (Log ROS)	21940884		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	4.406	95% H-UCL (KM -Log)	130501
KM SD (logged)	2.305	95% Critical H Value (KM-Log)	6.139
KM Standard Error of Mean (logged)	0.779		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	829.4	Mean in Log Scale	4.279
SD in Original Scale	1585	SD in Log Scale	2.586
95% t UCL (Assumes normality)	1748	95% H-Stat UCL	738999

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	3045	95% GROS Adjusted Gamma UCL	6019
95% Adjusted Gamma KM-UCL	3835		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BAA

General Statistics

Total Number of Observations	17	Number of Distinct Observations	12
Number of Detects	6	Number of Non-Detects	11
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	0.17	Minimum Non-Detect	0.063
Maximum Detect	22	Maximum Non-Detect	49
Variance Detects	74.99	Percent Non-Detects	64.71%
Mean Detects	7.503	SD Detects	8.66
Median Detects	3.95	CV Detects	1.154
Skewness Detects	1.177	Kurtosis Detects	0.105
Mean of Logged Detects	1.106	SD of Logged Detects	1.794

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.845	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.302	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Normal at 5% Significance Level	
Detected Data appear Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	3.894	Standard Error of Mean	1.724
SD	5.824	95% KM (BCA) UCL	6.918
95% KM (t) UCL	6.904	95% KM (Percentile Bootstrap) UCL	6.836
95% KM (z) UCL	6.729	95% KM Bootstrap t UCL	8.44
90% KM Chebyshev UCL	9.066	95% KM Chebyshev UCL	11.41
97.5% KM Chebyshev UCL	14.66	99% KM Chebyshev UCL	21.05

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.195	Anderson-Darling GOF Test	
5% A-D Critical Value	0.726	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.165	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.345	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	0.669	k star (bias corrected MLE)	0.445
Theta hat (MLE)	11.22	Theta star (bias corrected MLE)	16.84
nu hat (MLE)	8.025	nu star (bias corrected)	5.346
MLE Mean (bias corrected)	7.503	MLE Sd (bias corrected)	11.24

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.447	nu hat (KM)	15.2
Approximate Chi Square Value (15.20, α)	7.402	Adjusted Chi Square Value (15.20, β)	6.837
95% Gamma Approximate KM-UCL (use when n>=50)	7.997	95% Gamma Adjusted KM-UCL (use when n<50)	8.657

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.564
Maximum	22	Median	1.25
SD	5.844	CV	1.64
k hat (MLE)	0.407	k star (bias corrected MLE)	0.375
Theta hat (MLE)	8.751	Theta star (bias corrected MLE)	9.514
nu hat (MLE)	13.85	nu star (bias corrected)	12.74
MLE Mean (bias corrected)	3.564	MLE Sd (bias corrected)	5.823
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (12.74, α)	5.715	Adjusted Chi Square Value (12.74, β)	5.229
95% Gamma Approximate UCL (use when n>=50)	7.941	95% Gamma Adjusted UCL (use when n<50)	8.679

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.949	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.193	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.257	Mean in Log Scale	0.0726
SD in Original Scale	5.858	SD in Log Scale	1.536
95% t UCL (assumes normality of ROS data)	5.737	95% Percentile Bootstrap UCL	5.781
95% BCA Bootstrap UCL	6.913	95% Bootstrap t UCL	13.25
95% H-UCL (Log ROS)	13.65		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.0461	95% H-UCL (KM -Log)	46.1
KM SD (logged)	1.896	95% Critical H Value (KM-Log)	4.194
KM Standard Error of Mean (logged)	0.772		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.591	Mean in Log Scale	1.367
SD in Original Scale	6.803	SD in Log Scale	1.69
95% t UCL (Assumes normality)	10.47	95% H-Stat UCL	82.13

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	6.904	95% KM (Percentile Bootstrap) UCL	6.836

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BAP

General Statistics

Total Number of Observations	17	Number of Distinct Observations	17
Number of Detects	12	Number of Non-Detects	5
Number of Distinct Detects	12	Number of Distinct Non-Detects	5
Minimum Detect	0.17	Minimum Non-Detect	3.8
Maximum Detect	37	Maximum Non-Detect	16
Variance Detects	169.4	Percent Non-Detects	29.41%
Mean Detects	10.46	SD Detects	13.02
Median Detects	4.975	CV Detects	1.244
Skewness Detects	1.465	Kurtosis Detects	0.689
Mean of Logged Detects	1.49	SD of Logged Detects	1.577

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.72	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.367	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	7.9	Standard Error of Mean	2.859
SD	11.24	95% KM (BCA) UCL	12.44
95% KM (t) UCL	12.89	95% KM (Percentile Bootstrap) UCL	12.74
95% KM (z) UCL	12.6	95% KM Bootstrap t UCL	17.4
90% KM Chebyshev UCL	16.48	95% KM Chebyshev UCL	20.36

97.5% KM Chebyshev UCL	25.75	99% KM Chebyshev UCL	36.35

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.547	Anderson-Darling GOF Test	
5% A-D Critical Value	0.769	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.229	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.256	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.704	k star (bias corrected MLE)	0.584
Theta hat (MLE)	14.86	Theta star (bias corrected MLE)	17.92
nu hat (MLE)	16.89	nu star (bias corrected)	14
MLE Mean (bias corrected)	10.46	MLE Sd (bias corrected)	13.69

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.494	nu hat (KM)	16.8
Approximate Chi Square Value (16.80, α)	8.529	Adjusted Chi Square Value (16.80, β)	7.916
95% Gamma Approximate KM-UCL (use when n>=50)	15.56	95% Gamma Adjusted KM-UCL (use when n<50)	16.76

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	7.529
Maximum	37	Median	3.84
SD	11.77	CV	1.563
k hat (MLE)	0.378	k star (bias corrected MLE)	0.35
Theta hat (MLE)	19.94	Theta star (bias corrected MLE)	21.5
nu hat (MLE)	12.84	nu star (bias corrected)	11.9
MLE Mean (bias corrected)	7.529	MLE Sd (bias corrected)	12.72
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (11.90, α)	5.164	Adjusted Chi Square Value (11.90, β)	4.706
95% Gamma Approximate UCL (use when n>=50)	17.36	95% Gamma Adjusted UCL (use when n<50)	19.05

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.921	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.214	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	7.726	Mean in Log Scale	1.071
SD in Original Scale	11.64	SD in Log Scale	1.488
95% t UCL (assumes normality of ROS data)	12.66	95% Percentile Bootstrap UCL	12.53
95% BCA Bootstrap UCL	13.52	95% Bootstrap t UCL	18.14
95% H-UCL (Log ROS)	32.02		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.035	95% H-UCL (KM -Log)	42.07
KM SD (logged)	1.588	95% Critical H Value (KM-Log)	3.638
KM Standard Error of Mean (logged)	0.448		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	8.39	Mean in Log Scale	1.362
SD in Original Scale	11.36	SD in Log Scale	1.358
95% t UCL (Assumes normality)	13.2	95% H-Stat UCL	29.53

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	20.36	95% GROS Adjusted Gamma UCL	19.05
95% Adjusted Gamma KM-UCL	16.76		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BBF

General Statistics

Total Number of Observations	17	Number of Distinct Observations	17
Number of Detects	13	Number of Non-Detects	4
Number of Distinct Detects	13	Number of Distinct Non-Detects	4
Minimum Detect	0.42	Minimum Non-Detect	6.9
Maximum Detect	65.8	Maximum Non-Detect	30
Variance Detects	355.4	Percent Non-Detects	23.53%
Mean Detects	18.13	SD Detects	18.85
Median Detects	11.6	CV Detects	1.04
Skewness Detects	1.738	Kurtosis Detects	2.715
Mean of Logged Detects	2.329	SD of Logged Detects	1.304

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.803	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.228	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	14.84	Standard Error of Mean	4.348
SD	17.09	95% KM (BCA) UCL	22.74
95% KM (t) UCL	22.43	95% KM (Percentile Bootstrap) UCL	22.34
95% KM (z) UCL	21.99	95% KM Bootstrap t UCL	28.01
90% KM Chebyshev UCL	27.88	95% KM Chebyshev UCL	33.79
97.5% KM Chebyshev UCL	41.99	99% KM Chebyshev UCL	58.09

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.179	Anderson-Darling GOF Test	
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.109	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.014	k star (bias corrected MLE)	0.831
Theta hat (MLE)	17.88	Theta star (bias corrected MLE)	21.81
nu hat (MLE)	26.36	nu star (bias corrected)	21.61
MLE Mean (bias corrected)	18.13	MLE Sd (bias corrected)	19.89

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.754	nu hat (KM)	25.63
Approximate Chi Square Value (25.63, α)	15.1	Adjusted Chi Square Value (25.63, β)	14.25
95% Gamma Approximate KM-UCL (use when n>=50)	25.19	95% Gamma Adjusted KM-UCL (use when n<50)	26.68

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	14.26
Maximum	65.8	Median	8.7
SD	17.9	CV	1.255
k hat (MLE)	0.415	k star (bias corrected MLE)	0.381

Theta hat (MLE)	34.38	Theta star (bias corrected MLE)	37.45
nu hat (MLE)	14.1	nu star (bias corrected)	12.95
MLE Mean (bias corrected)	14.26	MLE Sd (bias corrected)	23.11
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (12.95, α)	5.858	Adjusted Chi Square Value (12.95, β)	5.365
95% Gamma Approximate UCL (use when n>=50)	31.53	95% Gamma Adjusted UCL (use when n<50)	34.42

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.178	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	14.56	Mean in Log Scale	2.008
SD in Original Scale	17.64	SD in Log Scale	1.298
95% t UCL (assumes normality of ROS data)	22.03	95% Percentile Bootstrap UCL	22.2
95% BCA Bootstrap UCL	23.41	95% Bootstrap t UCL	29.32
95% H-UCL (Log ROS)	47.94		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.972	95% H-UCL (KM -Log)	59.91
KM SD (logged)	1.393	95% Critical H Value (KM-Log)	3.301
KM Standard Error of Mean (logged)	0.394		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	15.38	Mean in Log Scale	2.166
SD in Original Scale	17.28	SD in Log Scale	1.21
95% t UCL (Assumes normality)	22.7	95% H-Stat UCL	44.88

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	22.43	95% KM (Percentile Bootstrap) UCL	22.34

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

DAHA

General Statistics

Total Number of Observations	17	Number of Distinct Observations	16
Number of Detects	8	Number of Non-Detects	9
Number of Distinct Detects	8	Number of Distinct Non-Detects	8
Minimum Detect	0.029	Minimum Non-Detect	3.6
Maximum Detect	8.8	Maximum Non-Detect	16
Variance Detects	12.06	Percent Non-Detects	52.94%
Mean Detects	3.009	SD Detects	3.473
Median Detects	1.25	CV Detects	1.154
Skewness Detects	0.919	Kurtosis Detects	-0.965
Mean of Logged Detects	0.0501	SD of Logged Detects	1.937

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.816	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.314	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.313	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.843	Standard Error of Mean	0.72
SD	2.617	95% KM (BCA) UCL	3.069
95% KM (t) UCL	3.101	95% KM (Percentile Bootstrap) UCL	3.035
95% KM (z) UCL	3.028	95% KM Bootstrap t UCL	3.881
90% KM Chebyshev UCL	4.005	95% KM Chebyshev UCL	4.984
97.5% KM Chebyshev UCL	6.343	99% KM Chebyshev UCL	9.012

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.282	Anderson-Darling GOF Test	
5% A-D Critical Value	0.756	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.168	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.307	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.589	k star (bias corrected MLE)	0.452
Theta hat (MLE)	5.106	Theta star (bias corrected MLE)	6.662
nu hat (MLE)	9.428	nu star (bias corrected)	7.226
MLE Mean (bias corrected)	3.009	MLE Sd (bias corrected)	4.477

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.496	nu hat (KM)	16.87
Approximate Chi Square Value (16.87, α)	8.58	Adjusted Chi Square Value (16.87, β)	7.965
95% Gamma Approximate KM-UCL (use when n>=50)	3.624	95% Gamma Adjusted KM-UCL (use when n<50)	3.904

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.029	Mean	1.736
Maximum	8.8	Median	0.516
SD	2.618	CV	1.508
k hat (MLE)	0.681	k star (bias corrected MLE)	0.6
Theta hat (MLE)	2.548	Theta star (bias corrected MLE)	2.892
nu hat (MLE)	23.16	nu star (bias corrected)	20.41
MLE Mean (bias corrected)	1.736	MLE Sd (bias corrected)	2.24
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (20.41, α)	11.15	Adjusted Chi Square Value (20.41, β)	10.44
95% Gamma Approximate UCL (use when n>=50)	3.176	95% Gamma Adjusted UCL (use when n<50)	3.393

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.925	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.158	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.313	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.625	Mean in Log Scale	-0.498
SD in Original Scale	2.663	SD in Log Scale	1.412
95% t UCL (assumes normality of ROS data)	2.753	95% Percentile Bootstrap UCL	2.746
95% BCA Bootstrap UCL	3.031	95% Bootstrap t UCL	3.963
95% H-UCL (Log ROS)	5.347		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.495	95% H-UCL (KM -Log)	13.5
KM SD (logged)	1.706	95% Critical H Value (KM-Log)	3.85
KM Standard Error of Mean (logged)	0.619		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.891	Mean in Log Scale	0.495
SD in Original Scale	2.7	SD in Log Scale	1.394

95% t UCL (Assumes normality)	4.034	95% H-Stat UCL	13.69

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	3.101	95% GROS Adjusted Gamma UCL	3.393
95% Adjusted Gamma KM-UCL	3.904		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

HCB

General Statistics

Total Number of Observations	17	Number of Distinct Observations	17
Number of Detects	10	Number of Non-Detects	7
Number of Distinct Detects	10	Number of Distinct Non-Detects	7
Minimum Detect	0.95	Minimum Non-Detect	0.017
Maximum Detect	359	Maximum Non-Detect	3.1
Variance Detects	12070	Percent Non-Detects	41.18%
Mean Detects	68.2	SD Detects	109.9
Median Detects	29.85	CV Detects	1.611
Skewness Detects	2.491	Kurtosis Detects	6.513
Mean of Logged Detects	2.874	SD of Logged Detects	2.096

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.647	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.341	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	40.21	Standard Error of Mean	22.15
SD	86.66	95% KM (BCA) UCL	83.29
95% KM (t) UCL	78.89	95% KM (Percentile Bootstrap) UCL	79.3
95% KM (z) UCL	76.65	95% KM Bootstrap t UCL	179.5
90% KM Chebyshev UCL	106.7	95% KM Chebyshev UCL	136.8
97.5% KM Chebyshev UCL	178.6	99% KM Chebyshev UCL	260.6

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.386	Anderson-Darling GOF Test	
5% A-D Critical Value	0.782	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.175	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.475	k star (bias corrected MLE)	0.399
Theta hat (MLE)	143.7	Theta star (bias corrected MLE)	170.9
nu hat (MLE)	9.495	nu star (bias corrected)	7.98
MLE Mean (bias corrected)	68.2	MLE Sd (bias corrected)	108

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.215	nu hat (KM)	7.319
Approximate Chi Square Value (7.32, α)	2.347	Adjusted Chi Square Value (7.32, β)	2.063
95% Gamma Approximate KM-UCL (use when n>=50)	125.4	95% Gamma Adjusted KM-UCL (use when n<50)	142.6

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	40.12
Maximum	359	Median	0.96
SD	89.36	CV	2.227
k hat (MLE)	0.19	k star (bias corrected MLE)	0.196
Theta hat (MLE)	210.9	Theta star (bias corrected MLE)	204.8
nu hat (MLE)	6.469	nu star (bias corrected)	6.661
MLE Mean (bias corrected)	40.12	MLE Sd (bias corrected)	90.65
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (6.66, α)	1.986	Adjusted Chi Square Value (6.66, β)	1.731
95% Gamma Approximate UCL (use when n>=50)	134.5	95% Gamma Adjusted UCL (use when n<50)	154.4

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.888	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.233	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	40.21	Mean in Log Scale	0.988
SD in Original Scale	89.32	SD in Log Scale	2.842
95% t UCL (assumes normality of ROS data)	78.04	95% Percentile Bootstrap UCL	78.17
95% BCA Bootstrap UCL	100.8	95% Bootstrap t UCL	177.1
95% H-UCL (Log ROS)	10726		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.327	95% H-UCL (KM -Log)	553828
KM SD (logged)	3.558	95% Critical H Value (KM-Log)	7.383
KM Standard Error of Mean (logged)	0.947		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	40.39	Mean in Log Scale	0.896
SD in Original Scale	89.24	SD in Log Scale	3.222
95% t UCL (Assumes normality)	78.18	95% H-Stat UCL	98903

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	83.29	95% GROS Adjusted Gamma UCL	154.4
95% Adjusted Gamma KM-UCL	142.6		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ICDP

General Statistics

Total Number of Observations	17	Number of Distinct Observations	17
Number of Detects	12	Number of Non-Detects	5
Number of Distinct Detects	12	Number of Distinct Non-Detects	5
Minimum Detect	0.31	Minimum Non-Detect	5.4
Maximum Detect	35.9	Maximum Non-Detect	23
Variance Detects	114.1	Percent Non-Detects	29.41%
Mean Detects	11.11	SD Detects	10.68
Median Detects	9.725	CV Detects	0.962
Skewness Detects	1.423	Kurtosis Detects	1.716
Mean of Logged Detects	1.83	SD of Logged Detects	1.344

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.848	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.243	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	8.693	Standard Error of Mean	2.445
SD	9.511	95% KM (BCA) UCL	12.79
95% KM (t) UCL	12.96	95% KM (Percentile Bootstrap) UCL	12.92
95% KM (z) UCL	12.72	95% KM Bootstrap t UCL	15.21
90% KM Chebyshev UCL	16.03	95% KM Chebyshev UCL	19.35
97.5% KM Chebyshev UCL	23.96	99% KM Chebyshev UCL	33.02

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.228	Anderson-Darling GOF Test	
5% A-D Critical Value	0.757	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.152	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.252	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1	k star (bias corrected MLE)	0.806
Theta hat (MLE)	11.1	Theta star (bias corrected MLE)	13.78
nu hat (MLE)	24.01	nu star (bias corrected)	19.34
MLE Mean (bias corrected)	11.11	MLE Sd (bias corrected)	12.37

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.835	nu hat (KM)	28.4
Approximate Chi Square Value (28.40, α)	17.24	Adjusted Chi Square Value (28.40, β)	16.33
95% Gamma Approximate KM-UCL (use when n>=50)	14.32	95% Gamma Adjusted KM-UCL (use when n<50)	15.12

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.31	Mean	8.403
Maximum	35.9	Median	4.351
SD	9.877	CV	1.175
k hat (MLE)	0.844	k star (bias corrected MLE)	0.734
Theta hat (MLE)	9.958	Theta star (bias corrected MLE)	11.45
nu hat (MLE)	28.69	nu star (bias corrected)	24.96
MLE Mean (bias corrected)	8.403	MLE Sd (bias corrected)	9.808
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (24.96, α)	14.58	Adjusted Chi Square Value (24.96, β)	13.75
95% Gamma Approximate UCL (use when n>=50)	14.38	95% Gamma Adjusted UCL (use when n<50)	15.25

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.923	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.202	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	8.438	Mean in Log Scale	1.487
SD in Original Scale	9.834	SD in Log Scale	1.254
95% t UCL (assumes normality of ROS data)	12.6	95% Percentile Bootstrap UCL	12.36
95% BCA Bootstrap UCL	13.63	95% Bootstrap t UCL	15.97
95% H-UCL (Log ROS)	25.4		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.454	95% H-UCL (KM -Log)	32.75

KM SD (logged)	1.363	95% Critical H Value (KM-Log)	3.249
KM Standard Error of Mean (logged)	0.394		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	9.289	Mean in Log Scale	1.709
SD in Original Scale	9.507	SD in Log Scale	1.173
95% t UCL (Assumes normality)	13.31	95% H-Stat UCL	25.99

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	12.96	95% KM (Percentile Bootstrap) UCL	12.92

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

NAP

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	14	Number of Non-Detects	2
Number of Distinct Detects	14	Number of Distinct Non-Detects	2
Minimum Detect	0.11	Minimum Non-Detect	2.7
Maximum Detect	448	Maximum Non-Detect	4.1
Variance Detects	15953	Percent Non-Detects	12.50%
Mean Detects	66.08	SD Detects	126.3
Median Detects	8.655	CV Detects	1.911
Skewness Detects	2.518	Kurtosis Detects	6.619
Mean of Logged Detects	2.372	SD of Logged Detects	2.24

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.59	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.366	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.237	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	57.96	Standard Error of Mean	30.06
SD	115.9	95% KM (BCA) UCL	117.8
95% KM (t) UCL	110.7	95% KM (Percentile Bootstrap) UCL	109.9
95% KM (z) UCL	107.4	95% KM Bootstrap t UCL	184.3
90% KM Chebyshev UCL	148.1	95% KM Chebyshev UCL	189
97.5% KM Chebyshev UCL	245.7	99% KM Chebyshev UCL	357

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.68	Anderson-Darling GOF Test	
5% A-D Critical Value	0.819	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.256	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.246	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.367	k star (bias corrected MLE)	0.336
Theta hat (MLE)	180.1	Theta star (bias corrected MLE)	196.8
nu hat (MLE)	10.27	nu star (bias corrected)	9.404
MLE Mean (bias corrected)	66.08	MLE Sd (bias corrected)	114

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.25	nu hat (KM)	8.009

Approximate Chi Square Value (8.01, α)	2.74	Adjusted Chi Square Value (8.01, β)	2.401
95% Gamma Approximate KM-UCL (use when n>=50)	169.4	95% Gamma Adjusted KM-UCL (use when n<50)	193.3

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	57.82
Maximum	448	Median	6.805
SD	119.7	CV	2.071
k hat (MLE)	0.274	k star (bias corrected MLE)	0.264
Theta hat (MLE)	211.3	Theta star (bias corrected MLE)	219
nu hat (MLE)	8.757	nu star (bias corrected)	8.449
MLE Mean (bias corrected)	57.82	MLE Sd (bias corrected)	112.5
		Adjusted Level of Significance (β)	0.0335
Approximate Chi Square Value (8.45, α)	2.997	Adjusted Chi Square Value (8.45, β)	2.639
95% Gamma Approximate UCL (use when n>=50)	163	95% Gamma Adjusted UCL (use when n<50)	185.1

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.973	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.874	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.136	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.237	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	57.9	Mean in Log Scale	2.019
SD in Original Scale	119.7	SD in Log Scale	2.299
95% t UCL (assumes normality of ROS data)	110.4	95% Percentile Bootstrap UCL	109.2
95% BCA Bootstrap UCL	128.1	95% Bootstrap t UCL	173.5
95% H-UCL (Log ROS)	2107		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	2.024	95% H-UCL (KM -Log)	1768
KM SD (logged)	2.26	95% Critical H Value (KM-Log)	4.968
KM Standard Error of Mean (logged)	0.602		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	58.03	Mean in Log Scale	2.139
SD in Original Scale	119.6	SD in Log Scale	2.182
95% t UCL (Assumes normality)	110.5	95% H-Stat UCL	1383

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	189	95% GROS Adjusted Gamma UCL	185.1
95% Adjusted Gamma KM-UCL	193.3		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1248

General Statistics

Total Number of Observations	7	Number of Distinct Observations	5
Number of Detects	5	Number of Non-Detects	2
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	0.1	Minimum Non-Detect	0.0019
Maximum Detect	2.5	Maximum Non-Detect	0.0019

Variance Detects	0.888	Percent Non-Detects	28.57%
Mean Detects	1.022	SD Detects	0.943
Median Detects	1.1	CV Detects	0.922
Skewness Detects	1.037	Kurtosis Detects	1.109
Mean of Logged Detects	-0.473	SD of Logged Detects	1.266

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.897	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.267	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.731	Standard Error of Mean	0.359
SD	0.849	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.427	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.32	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.806	95% KM Chebyshev UCL	2.294
97.5% KM Chebyshev UCL	2.97	99% KM Chebyshev UCL	4.298

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.28	Anderson-Darling GOF Test	
5% A-D Critical Value	0.69	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.253	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.364	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.148	k star (bias corrected MLE)	0.592
Theta hat (MLE)	0.89	Theta star (bias corrected MLE)	1.725
nu hat (MLE)	11.48	nu star (bias corrected)	5.925
MLE Mean (bias corrected)	1.022	MLE Sd (bias corrected)	1.328

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.741	nu hat (KM)	10.38
Approximate Chi Square Value (10.38, α)	4.179	Adjusted Chi Square Value (10.38, β)	3.078
95% Gamma Approximate KM-UCL (use when n>=50)	1.814	95% Gamma Adjusted KM-UCL (use when n<50)	2.463

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.733
Maximum	2.5	Median	0.31
SD	0.914	CV	1.248
k hat (MLE)	0.476	k star (bias corrected MLE)	0.368
Theta hat (MLE)	1.538	Theta star (bias corrected MLE)	1.994
nu hat (MLE)	6.671	nu star (bias corrected)	5.145
MLE Mean (bias corrected)	0.733	MLE Sd (bias corrected)	1.209
		Adjusted Level of Significance (β)	0.0158
Approximate Chi Square Value (5.15, α)	1.22	Adjusted Chi Square Value (5.15, β)	0.739
95% Gamma Approximate UCL (use when n>=50)	3.091	95% Gamma Adjusted UCL (use when n<50)	5.102

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.273	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.738	Mean in Log Scale	-1.401
SD in Original Scale	0.91	SD in Log Scale	1.91
95% t UCL (assumes normality of ROS data)	1.406	95% Percentile Bootstrap UCL	1.284
95% BCA Bootstrap UCL	1.444	95% Bootstrap t UCL	1.897
95% H-UCL (Log ROS)	235.9		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.128	95% H-UCL (KM -Log)	216014
KM SD (logged)	2.786	95% Critical H Value (KM-Log)	9.257
KM Standard Error of Mean (logged)	1.177		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.73	Mean in Log Scale	-2.326
SD in Original Scale	0.917	SD in Log Scale	3.329
95% t UCL (Assumes normality)	1.404	95% H-Stat UCL	78304612

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.427	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1254

General Statistics

Total Number of Observations	7	Number of Distinct Observations	7
		Number of Missing Observations	0
Minimum	0.042	Mean	0.317
Maximum	1	Median	0.22
SD	0.333	Std. Error of Mean	0.126
Coefficient of Variation	1.049	Skewness	1.754

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.817	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.803	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.213	Lilliefors GOF Test
5% Lilliefors Critical Value	0.335	Data appear Normal at 5% Significance Level

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	0.561	95% Adjusted-CLT UCL (Chen-1995)	0.613
		95% Modified-t UCL (Johnson-1978)	0.575

Gamma GOF Test

A-D Test Statistic	0.186	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.129	Kolmogrov-Smirnoff Gamma GOF Test

5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	1.189	k star (bias corrected MLE)	0.774
Theta hat (MLE)	0.267	Theta star (bias corrected MLE)	0.409
nu hat (MLE)	16.64	nu star (bias corrected)	10.84
MLE Mean (bias corrected)	0.317	MLE Sd (bias corrected)	0.36
		Approximate Chi Square Value (0.05)	4.475
Adjusted Level of Significance	0.0158	Adjusted Chi Square Value	3.326

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	0.768	95% Adjusted Gamma UCL (use when n<50)	1.034

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.985	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.803	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.119	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.335	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	-3.17	Mean of logged Data	-1.625
Maximum of Logged Data	0	SD of logged Data	1.097

Assuming Lognormal Distribution			
95% H-UCL	2.135	90% Chebyshev (MVUE) UCL	0.72
95% Chebyshev (MVUE) UCL	0.9	97.5% Chebyshev (MVUE) UCL	1.151
99% Chebyshev (MVUE) UCL	1.644		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs			
95% CLT UCL	0.524	95% Jackknife UCL	0.561
95% Standard Bootstrap UCL	0.506	95% Bootstrap-t UCL	0.813
95% Hall's Bootstrap UCL	1.448	95% Percentile Bootstrap UCL	0.551
95% BCA Bootstrap UCL	0.583		
90% Chebyshev(Mean, Sd) UCL	0.694	95% Chebyshev(Mean, Sd) UCL	0.865
97.5% Chebyshev(Mean, Sd) UCL	1.102	99% Chebyshev(Mean, Sd) UCL	1.568

Suggested UCL to Use	
95% Student's-t UCL	0.561

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

TCDD

General Statistics			
Total Number of Observations	10	Number of Distinct Observations	7
Number of Detects	1	Number of Non-Detects	9
Number of Distinct Detects	1	Number of Distinct Non-Detects	6

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable TCDD was not processed!

Cr

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
		Number of Missing Observations	0
Minimum	8570	Mean	10243
Maximum	11500	Median	10450
SD	1300	Std. Error of Mean	650
Coefficient of Variation	0.127	Skewness	-0.697

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.953	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.22	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.443	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	11772	95% Adjusted-CLT UCL (Chen-1995)	11070
		95% Modified-t UCL (Johnson-1978)	11734

Gamma GOF Test

A-D Test Statistic	0.282	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.656	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.252	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.394	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	79.73	k star (bias corrected MLE)	20.1
Theta hat (MLE)	128.5	Theta star (bias corrected MLE)	509.6
nu hat (MLE)	637.8	nu star (bias corrected)	160.8
MLE Mean (bias corrected)	10243	MLE Sd (bias corrected)	2285
		Approximate Chi Square Value (0.05)	132.5
Adjusted Level of Significance	N/A	Adjusted Chi Square Value	N/A

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	12432	95% Adjusted Gamma UCL (use when n<50)	N/A

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.942	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.748	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.224	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.443	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	9.056	Mean of logged Data	9.228
Maximum of Logged Data	9.35	SD of logged Data	0.131

Assuming Lognormal Distribution

95% H-UCL	12201	90% Chebyshev (MVUE) UCL	12250
95% Chebyshev (MVUE) UCL	13159	97.5% Chebyshev (MVUE) UCL	14420
99% Chebyshev (MVUE) UCL	16898		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	11312	95% Jackknife UCL	11772
95% Standard Bootstrap UCL	N/A	95% Bootstrap-t UCL	N/A
95% Hall's Bootstrap UCL	N/A	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A		
90% Chebyshev(Mean, Sd) UCL	12192	95% Chebyshev(Mean, Sd) UCL	13076
97.5% Chebyshev(Mean, Sd) UCL	14302	99% Chebyshev(Mean, Sd) UCL	16710

Suggested UCL to Use

95% Student's-t UCL	11772

Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Note: For highly negatively-skewed data, confidence limits (e.g., Chen, Johnson, Lognormal, and Gamma) may not be
reliable. Chen's and Johnson's methods provide adjustments for positvely skewed data sets.

Cr6

General Statistics

Total Number of Observations	4	Number of Distinct Observations	4
Number of Detects	2	Number of Non-Detects	2
Number of Distinct Detects	2	Number of Distinct Non-Detects	2
Minimum Detect	0.39	Minimum Non-Detect	0.15
Maximum Detect	195	Maximum Non-Detect	14
Variance Detects	18937	Percent Non-Detects	50%
Mean Detects	97.7	SD Detects	137.6
Median Detects	97.7	CV Detects	1.409
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.166	SD of Logged Detects	4.394

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	48.95	Standard Error of Mean	59.62
SD	84.32	95% KM (BCA) UCL	N/A
95% KM (t) UCL	189.3	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	147	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	227.8	95% KM Chebyshev UCL	308.8
97.5% KM Chebyshev UCL	421.3	99% KM Chebyshev UCL	642.2

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.287	k star (bias corrected MLE)	N/A
Theta hat (MLE)	339.9	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.15	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.337	nu hat (KM)	2.696
		Adjusted Level of Significance (β)	0.00498
Approximate Chi Square Value (2.70, α)	0.288	Adjusted Chi Square Value (2.70, β)	0.0778
95% Gamma Approximate KM-UCL (use when n>=50)	457.6	95% Gamma Adjusted KM-UCL (use when n<50)	1697

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	48.85	Mean in Log Scale	-1.767
SD in Original Scale	97.43	SD in Log Scale	5.4
95% t UCL (assumes normality of ROS data)	163.5	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	1.86E+53		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	50.62	Mean in Log Scale	0.922
SD in Original Scale	96.31	SD in Log Scale	3.454
95% t UCL (Assumes normality)	163.9	95% H-Stat UCL	3.31E+22

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	642.2

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX F.3A

WESTERN AREA SURFACE AND SUBSURFACE SOILS GOODNESS OF FIT TESTING

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	7/7/2014 16:14
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

123TCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	14	0	14	2	12	85.71%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	14	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	14	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Imputed Data)	14	N/A	N/A	N/A	N/A	N/A

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

124TCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	7	20	74.07%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	20	8.50E-04	23	2.21	0.125	5.636
Statistics (Detects Only)	7	7.90E-04	1300	267.9	34	486.9
Statistics (All: NDs treated as DL value)	27	7.90E-04	1300	71.1	0.17	262.3
Statistics (All: NDs treated as DL/2 value)	27	4.25E-04	1300	70.28	0.085	262.5
Statistics (Normal ROS Imputed Data)	27	-502.8	1300	-175.4	-311.6	358
Statistics (Gamma ROS Imputed Data)	27	7.90E-04	1300	69.47	0.01	262.7
Statistics (Lognormal ROS Imputed Data)	27	5.93E-05	1300	69.46	0.00111	262.7

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV

Statistics (Detects Only)	0.208	0.214	1285	2.083	4.878	2.341
Statistics (NDs = DL)	0.136	0.146	521.8	-1.456	4.293	-2.95
Statistics (NDs = DL/2)	0.127	0.137	555.3	-1.969	4.455	-2.263
Statistics (Gamma ROS Estimates)	0.112	0.125	617.6	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-4.713	4.772	-1.012

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.798	0.528	0.525	0.522

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.651	0.803	Data Not Normal
Lilliefors (Detects Only)	0.383	0.335	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.307	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.45	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.304	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.449	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.597	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.328	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.996	0.946	0.95	0.957

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.157	0.819	
Kolmogorov-Smirnov (Detects Only)	0.152	0.342	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	2.185	0.963	
Kolmogorov-Smirnov (NDs = DL)	0.256	0.191	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.396	0.972	
Kolmogorov-Smirnov (NDs = DL/2)	0.243	0.191	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	6.316	0.985	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.472	0.192	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.951	0.97	0.971	0.815

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.909	0.803	Data Appear Lognormal
Lilliefors (Detects Only)	0.19	0.335	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.925	0.923	Data Appear Lognormal
Lilliefors (NDs = DL)	0.155	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.927	0.923	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.156	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.666	0.923	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.382	0.171	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

12DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	16	11	40.74%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	11	7.70E-04	0.47	0.103	0.0011	0.172
Statistics (Detects Only)	16	0.0012	3300	561.8	26.5	1026
Statistics (All: NDs treated as DL value)	27	7.70E-04	3300	332.9	0.4	828.5
Statistics (All: NDs treated as DL/2 value)	27	3.85E-04	3300	332.9	0.235	828.5
Statistics (Normal ROS Imputed Data)	27	-1650	3300	-277.3	0.19	1298
Statistics (Gamma ROS Imputed Data)	27	0.0012	3300	332.9	0.19	828.5
Statistics (Lognormal ROS Imputed Data)	27	4.91E-04	3300	332.9	0.19	828.5

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.205	0.208	2737	2.76	4.286	1.553
Statistics (NDs = DL)	0.129	0.139	2589	-0.3	5.254	-17.53
Statistics (NDs = DL/2)	0.124	0.135	2693	-0.582	5.508	-9.461
Statistics (Gamma ROS Estimates)	0.13	0.14	2566	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.177	5.86	-4.978

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.786	0.676	0.676	0.676

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.624	0.887	Data Not Normal
Lilliefors (Detects Only)	0.318	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.472	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.389	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.472	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.389	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.846	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.177	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.964	0.972	0.971	0.972

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.264	0.881	
Kolmogorov-Smirnov (Detects Only)	0.126	0.238	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.362	0.97	
Kolmogorov-Smirnov (NDs = DL)	0.204	0.191	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.31	0.975	
Kolmogorov-Smirnov (NDs = DL/2)	0.219	0.191	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.179	0.969	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.235	0.191	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.975	0.966	0.966	0.941

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.943	0.887	Data Appear Lognormal
Lilliefors (Detects Only)	0.109	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.91	0.923	Data Not Lognormal
Lilliefors (NDs = DL)	0.149	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.91	0.923	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.127	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.861	0.923	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.208	0.171	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

13DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	17	10	37.04%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	6.30E-04	0.47	0.0998	8.88E-04	0.181
Statistics (Detects Only)	17	9.60E-04	3300	524.4	14	1015
Statistics (All: NDs treated as DL value)	27	6.30E-04	3300	330.2	0.47	836.8
Statistics (All: NDs treated as DL/2 value)	27	3.15E-04	3300	330.2	0.235	836.9
Statistics (Normal ROS Imputed Data)	27	-1547	3300	-190.7	0.14	1245
Statistics (Gamma ROS Imputed Data)	27	9.60E-04	3300	330.2	0.14	836.9
Statistics (Lognormal ROS Imputed Data)	27	2.89E-04	3300	330.2	0.14	836.9

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.188	0.194	2789	2.31	4.374	1.893
Statistics (NDs = DL)	0.125	0.136	2634	-0.49	5.324	-10.87
Statistics (NDs = DL/2)	0.121	0.132	2729	-0.747	5.568	-7.457
Statistics (Gamma ROS Estimates)	0.13	0.14	2546	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.301	5.928	-4.558

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.765	0.668	0.668	0.668

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.592	0.892	Data Not Normal
Lilliefors (Detects Only)	0.331	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.461	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.407	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.461	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.407	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.834	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.2	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.959	0.966	0.965	0.967

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.412	0.897	
Kolmogorov-Smirnov (Detects Only)	0.168	0.233	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.423	0.973	
Kolmogorov-Smirnov (NDs = DL)	0.206	0.191	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.35	0.977	
Kolmogorov-Smirnov (NDs = DL/2)	0.194	0.192	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.18	0.969	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.22	0.191	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.981	0.965	0.966	0.952

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.953	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.106	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.909	0.923	Data Not Lognormal
Lilliefors (NDs = DL)	0.147	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.91	0.923	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.144	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.88	0.923	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.187	0.171	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

14DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	17	10	37.04%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	6.10E-04	0.47	0.111	8.65E-04	0.178
Statistics (Detects Only)	17	0.0015	5200	607.9	9.7	1325
Statistics (All: NDs treated as DL value)	27	6.10E-04	5200	382.8	0.47	1081
Statistics (All: NDs treated as DL/2 value)	27	3.05E-04	5200	382.8	0.235	1081
Statistics (Normal ROS Imputed Data)	27	-2068	5200	-273.6	0.2	1576
Statistics (Gamma ROS Imputed Data)	27	0.0015	5200	382.7	0.2	1081

Statistics (Lognormal ROS Imputed Data)	27	1.51E-04	5200	382.7	0.2	1081

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.183	0.19	3317	2.34	4.418	1.888
Statistics (NDs = DL)	0.125	0.136	3054	-0.342	5.271	-15.41
Statistics (NDs = DL/2)	0.121	0.132	3163	-0.599	5.507	-9.196
Statistics (Gamma ROS Estimates)	0.127	0.138	3007	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.329	6.029	-4.535

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.718	0.626	0.626	0.626

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.537	0.892	Data Not Normal
Lilliefors (Detects Only)	0.323	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.418	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.4	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.418	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.4	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.817	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.199	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.995	0.991	0.992	0.991

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.417	0.902	
Kolmogorov-Smirnov (Detects Only)	0.186	0.233	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	1.416	0.973	
Kolmogorov-Smirnov (NDs = DL)	0.196	0.191	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.332	0.977	
Kolmogorov-Smirnov (NDs = DL/2)	0.186	0.192	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	2.214	0.971	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.231	0.191	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.97	0.972	0.955

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.955	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.142	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.919	0.923	Data Not Lognormal
Lilliefors (NDs = DL)	0.138	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.922	0.923	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.123	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.889	0.923	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.171	0.171	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BEN

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	57	0	57	29	28	49.12%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	28	5.80E-04	19	1.557	0.0013	4.345
Statistics (Detects Only)	29	7.10E-04	110	6.832	0.094	22.69
Statistics (All: NDs treated as DL value)	57	5.80E-04	110	4.241	0.054	16.54
Statistics (All: NDs treated as DL/2 value)	57	2.90E-04	110	3.858	0.048	16.4
Statistics (Normal ROS Imputed Data)	57	-30.93	110	-6.279	7.10E-04	21.63

Statistics (Gamma ROS Imputed Data)	57	7.10E-04	110	3.481	0.01	16.41
Statistics (Lognormal ROS Imputed Data)	57	2.61E-05	110	3.477	0.0026	16.41

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.177	0.182	38.64	-2.32	3.199	-1.379
Statistics (NDs = DL)	0.161	0.165	26.27	-3.265	3.5	-1.072
Statistics (NDs = DL/2)	0.154	0.158	24.99	-3.606	3.613	-1.002
Statistics (Gamma ROS Estimates)	0.162	0.165	21.48	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-5.179	3.889	-0.751

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.566	0.509	0.48	0.452

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.347	0.926	Data Not Normal
Lilliefors (Detects Only)	0.43	0.165	Data Not Normal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.421	0.117	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.423	0.117	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	0.281	0.117	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.951	0.931	0.911	0.889

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.791	0.925	
Kolmogorov-Smirnov (Detects Only)	0.296	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	5.042	0.95	
Kolmogorov-Smirnov (NDs = DL)	0.245	0.133	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	5.022	0.957	
Kolmogorov-Smirnov (NDs = DL/2)	0.263	0.133	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	11.59	0.95	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.344	0.133	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.982	0.957	0.964	0.971

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.954	0.926	Data Appear Lognormal
Lilliefors (Detects Only)	0.115	0.165	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.156	0.117	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.138	0.117	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	N/A	N/A	
Lilliefors (Lognormal ROS Estimates)	0.142	0.117	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

CB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	57	0	57	42	15	26.32%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	15	4.30E-04	1.3	0.134	8.80E-04	0.362
Statistics (Detects Only)	42	0.0012	630	55.59	4.425	127.7
Statistics (All: NDs treated as DL value)	57	4.30E-04	630	41	0.15	112
Statistics (All: NDs treated as DL/2 value)	57	2.15E-04	630	40.98	0.15	112

Statistics (Normal ROS Imputed Data)	57	-164.6	630	2.365	0.08	142.4
Statistics (Gamma ROS Imputed Data)	57	0.0012	630	40.96	0.08	112
Statistics (Lognormal ROS Imputed Data)	57	3.69E-04	630	40.96	0.08	112

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.201	0.202	277.1	0.351	3.737	10.64
Statistics (NDs = DL)	0.154	0.158	266.3	-1.261	4.401	-3.492
Statistics (NDs = DL/2)	0.149	0.153	274.7	-1.443	4.598	-3.187
Statistics (Gamma ROS Estimates)	0.163	0.166	251.7	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.644	4.684	-2.849

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.702	0.642	0.642	0.642

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.51	0.942	Data Not Normal
Lilliefors (Detects Only)	0.407	0.137	Data Not Normal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.43	0.117	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.43	0.117	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	0.304	0.117	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.989	0.988	0.988	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.339	0.91	
Kolmogorov-Smirnov (Detects Only)	0.177	0.151	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.495	0.958	
Kolmogorov-Smirnov (NDs = DL)	0.17	0.133	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.283	0.962	
Kolmogorov-Smirnov (NDs = DL/2)	0.159	0.133	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	4.303	0.949	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.222	0.133	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.976	0.971	0.974	0.964

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.882	0.942	Data Not Lognormal
Lilliefors (Detects Only)	0.137	0.137	Data Not Lognormal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.115	0.117	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.12	0.117	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	N/A	N/A	
Lilliefors (Lognormal ROS Estimates)	0.131	0.117	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

EB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	53	0	53	17	36	67.92%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	36	1.70E-04	21	1.273	8.73E-04	3.952
Statistics (Detects Only)	17	3.70E-04	450	27.23	0.03	109
Statistics (All: NDs treated as DL value)	53	1.70E-04	450	9.597	0.004	61.76

Statistics (All: NDs treated as DL/2 value)	53	8.50E-05	450	9.165	0.004	61.75
Statistics (Normal ROS Imputed Data)	53	-171.8	450	-68.43	-85.01	93.07
Statistics (Gamma ROS Imputed Data)	53	3.70E-04	450	8.739	0.01	61.79
Statistics (Lognormal ROS Imputed Data)	53	1.75E-07	450	8.733	3.56E-05	61.79

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.119	0.137	228.9	-3.372	3.934	-1.167
Statistics (NDs = DL)	0.119	0.125	80.76	-4.42	3.845	-0.87
Statistics (NDs = DL/2)	0.113	0.119	81.43	-4.891	3.92	-0.801
Statistics (Gamma ROS Estimates)	0.124	0.129	70.58	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-9.227	4.851	-0.526

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.493	0.352	0.341	0.33

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.272	0.892	Data Not Normal
Lilliefors (Detects Only)	0.506	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.463	0.122	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.473	0.122	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	0.186	0.122	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.91	0.798	0.79	0.77

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.479	0.962	
Kolmogorov-Smirnov (Detects Only)	0.329	0.239	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	7.227	0.99	
Kolmogorov-Smirnov (NDs = DL)	0.28	0.139	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	7.549	0.996	
Kolmogorov-Smirnov (NDs = DL/2)	0.279	0.139	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	16.06	0.986	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.457	0.139	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.959	0.948	0.954	0.944

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.917	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.132	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.201	0.122	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.18	0.122	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	N/A	N/A	
Lilliefors (Lognormal ROS Estimates)	0.185	0.122	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

MPXYL

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	14	0	14	1	13	92.86%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable MPXYL was not processed!

OXYL

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	14	0	14	1	13	92.86%

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable OXYL was not processed!

11BP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	17	0	17	9	8	47.06%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.049	1.4	0.231	0.059	0.473
Statistics (Detects Only)	9	0.0225	22	4.202	0.24	8.077
Statistics (All: NDs treated as DL value)	17	0.0225	22	2.333	0.071	6.074
Statistics (All: NDs treated as DL/2 value)	17	0.0225	22	2.279	0.063	6.088
Statistics (Normal ROS Imputed Data)	17	-9.391	22	-0.629	0.0225	7.9
Statistics (Gamma ROS Imputed Data)	17	0.01	22	2.229	0.0225	6.105
Statistics (Lognormal ROS Imputed Data)	17	0.00311	22	2.231	0.0415	6.105

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.304	0.277	13.83	-0.829	2.352	-2.837
Statistics (NDs = DL)	0.287	0.276	8.115	-1.568	1.996	-1.273
Statistics (NDs = DL/2)	0.26	0.253	8.774	-1.894	2.165	-1.143
Statistics (Gamma ROS Estimates)	0.214	0.215	10.43	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.586	2.59	-1.001

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.765	0.645	0.638	0.634

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.594	0.829	Data Not Normal
Lilliefors (Detects Only)	0.444	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.437	0.892	Data Not Normal
Lilliefors (NDs = DL)	0.443	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.427	0.892	Data Not Normal
Lilliefors (NDs = DL/2)	0.483	0.215	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.778	0.892	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.314	0.215	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.962	0.944	0.943	0.949

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.942	0.807	
Kolmogorov-Smirnov (Detects Only)	0.327	0.301	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.598	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.304	0.227	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.527	0.86	
Kolmogorov-Smirnov (NDs = DL/2)	0.312	0.229	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.551	0.88	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.278	0.231	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.957	0.904	0.905	0.946

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.906	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.191	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.817	0.892	Data Not Lognormal
Lilliefors (NDs = DL)	0.235	0.215	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.812	0.892	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.224	0.215	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.889	0.892	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.156	0.215	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1245TCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	8	7	46.67%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.05	0.065	0.0561	0.056	0.00515
Statistics (Detects Only)	8	0.097	210	30.7	0.555	73.17
Statistics (All: NDs treated as DL value)	15	0.05	210	16.4	0.097	54.11
Statistics (All: NDs treated as DL/2 value)	15	0.025	210	16.39	0.097	54.11
Statistics (Normal ROS Imputed Data)	15	-125.3	210	-42.1	0.097	95.74
Statistics (Gamma ROS Imputed Data)	15	0.01	210	16.38	0.097	54.11
Statistics (Lognormal ROS Imputed Data)	15	3.86E-04	210	16.38	0.097	54.11

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.223	0.223	137.6	0.183	2.95	16.14
Statistics (NDs = DL)	0.184	0.192	89.03	-1.248	2.62	-2.099
Statistics (NDs = DL/2)	0.172	0.182	95.08	-1.572	2.85	-1.814
Statistics (Gamma ROS Estimates)	0.157	0.17	104.1	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-3.571	4.648	-1.302

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.689	0.563	0.563	0.563

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.503	0.818	Data Not Normal
Lilliefors (Detects Only)	0.391	0.313	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.347	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.456	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.347	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.456	0.229	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.766	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.274	0.229	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.976	0.933	0.937	0.943

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.886	0.827	
Kolmogorov-Smirnov (Detects Only)	0.268	0.322	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	2.954	0.897	
Kolmogorov-Smirnov (NDs = DL)	0.408	0.246	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.64	0.908	
Kolmogorov-Smirnov (NDs = DL/2)	0.387	0.248	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.307	0.921	

Kolmogorov-Smirnov (Gamma ROS Est.)	0.358	0.249	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.926	0.838	0.873	0.921

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.84	0.818	Data Appear Lognormal
Lilliefors (Detects Only)	0.274	0.313	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.704	0.881	Data Not Lognormal
Lilliefors (NDs = DL)	0.352	0.229	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.76	0.881	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.299	0.229	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.831	0.881	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.289	0.229	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BAA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	21	6	22.22%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.14	12	4.482	1.185	5.856
Statistics (Detects Only)	21	0.073	87	6.773	0.5	20.39
Statistics (All: NDs treated as DL value)	27	0.073	87	6.264	0.5	18.09
Statistics (All: NDs treated as DL/2 value)	27	0.07	87	5.766	0.5	18.03
Statistics (Normal ROS Imputed Data)	27	-11.65	87	4.979	0.28	18.45
Statistics (Gamma ROS Imputed Data)	27	0.01	87	5.285	0.25	18.11
Statistics (Lognormal ROS Imputed Data)	27	0.0479	87	5.335	0.28	18.09

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.297	0.286	22.83	-0.415	1.835	-4.421
Statistics (NDs = DL)	0.326	0.315	19.21	-0.252	1.833	-7.287
Statistics (NDs = DL/2)	0.317	0.306	18.2	-0.406	1.807	-4.454
Statistics (Gamma ROS Estimates)	0.248	0.245	21.35	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.671	1.733	-2.584

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.588	0.6	0.569	0.421

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.368	0.908	Data Not Normal
Lilliefors (Detects Only)	0.459	0.193	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.387	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.41	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.352	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.421	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.431	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.399	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.921	0.928	0.905	0.908

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.238	0.847	
Kolmogorov-Smirnov (Detects Only)	0.368	0.206	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.135	0.847	
Kolmogorov-Smirnov (NDs = DL)	0.301	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.409	0.849	
Kolmogorov-Smirnov (NDs = DL/2)	0.318	0.182	Data Not Gamma Distributed

Anderson-Darling (Gamma ROS Estimates)	3.158	0.879	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.325	0.185	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.926	0.952	0.947	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.86	0.908	Data Not Lognormal
Lilliefors (Detects Only)	0.185	0.193	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.902	0.923	Data Not Lognormal
Lilliefors (NDs = DL)	0.147	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.895	0.923	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.166	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.859	0.923	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.163	0.171	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	20	7	25.93%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.12	12	3.663	0.47	5.698
Statistics (Detects Only)	20	0.03	82	6.129	0.505	18.69
Statistics (All: NDs treated as DL value)	27	0.03	82	5.49	0.47	16.24
Statistics (All: NDs treated as DL/2 value)	27	0.03	82	5.015	0.36	16.15
Statistics (Normal ROS Imputed Data)	27	-12.52	82	3.269	0.33	17.01
Statistics (Gamma ROS Imputed Data)	27	0.01	82	4.543	0.28	16.21
Statistics (Lognormal ROS Imputed Data)	27	0.03	82	4.591	0.33	16.19

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.316	0.302	19.41	-0.352	1.869	-5.307
Statistics (NDs = DL)	0.335	0.322	16.39	-0.319	1.851	-5.802
Statistics (NDs = DL/2)	0.323	0.312	15.54	-0.499	1.867	-3.744
Statistics (Gamma ROS Estimates)	0.241	0.239	18.87	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.827	1.87	-2.26

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.577	0.584	0.553	0.458

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.361	0.905	Data Not Normal
Lilliefors (Detects Only)	0.446	0.198	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.371	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.409	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.336	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.402	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.474	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.391	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.908	0.91	0.888	0.897

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.504	0.841	
Kolmogorov-Smirnov (Detects Only)	0.352	0.21	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.813	0.845	
Kolmogorov-Smirnov (NDs = DL)	0.313	0.182	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.788	0.848	

Kolmogorov-Smirnov (NDs = DL/2)	0.291	0.182	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.532	0.882	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.291	0.185	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.959	0.967	0.971	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.929	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.18	0.198	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.938	0.923	Data Appear Lognormal
Lilliefors (NDs = DL)	0.15	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.945	0.923	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.155	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.926	0.923	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.133	0.171	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BBF

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	23	4	14.81%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	4	0.47	12	6.238	6.24	6.654
Statistics (Detects Only)	23	0.041	58	4.862	0.78	13.02
Statistics (All: NDs treated as DL value)	27	0.041	58	5.066	0.78	12.2
Statistics (All: NDs treated as DL/2 value)	27	0.041	58	4.604	0.78	12.05
Statistics (Normal ROS Imputed Data)	27	-3.154	58	4.14	0.5	12.21
Statistics (Gamma ROS Imputed Data)	27	0.01	58	4.21	0.5	12.09
Statistics (Lognormal ROS Imputed Data)	27	0.041	58	4.214	0.5	12.08

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.395	0.372	12.32	-0.0894	1.707	-19.1
Statistics (NDs = DL)	0.417	0.395	12.16	0.0528	1.728	32.74
Statistics (NDs = DL/2)	0.415	0.393	11.1	-0.0499	1.696	-33.99
Statistics (Gamma ROS Estimates)	0.338	0.325	12.47	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.238	1.643	-6.904

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.609	0.651	0.613	0.454

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.395	0.914	Data Not Normal
Lilliefors (Detects Only)	0.451	0.185	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.449	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.408	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.403	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.394	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.432	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.415	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.911	0.939	0.909	0.906

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	2.294	0.828	
Kolmogorov-Smirnov (Detects Only)	0.326	0.195	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	2.124	0.826	
Kolmogorov-Smirnov (NDs = DL)	0.289	0.18	Data Not Gamma Distributed

Anderson-Darling (NDs = DL/2)	2.064	0.827	
Kolmogorov-Smirnov (NDs = DL/2)	0.27	0.18	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.889	0.844	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.292	0.182	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.967	0.975	0.981	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.941	0.914	Data Appear Lognormal
Lilliefors (Detects Only)	0.173	0.185	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.951	0.923	Data Appear Lognormal
Lilliefors (NDs = DL)	0.15	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.964	0.923	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.129	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.944	0.923	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.155	0.171	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

DAHA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	23	0	23	16	7	30.43%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.12	0.47	0.284	0.34	0.149
Statistics (Detects Only)	16	0.01	4.9	0.495	0.109	1.199
Statistics (All: NDs treated as DL value)	23	0.01	4.9	0.431	0.14	0.998
Statistics (All: NDs treated as DL/2 value)	23	0.01	4.9	0.387	0.12	1.004
Statistics (Normal ROS Imputed Data)	23	-0.0443	4.9	0.384	0.12	1.006
Statistics (Gamma ROS Imputed Data)	23	0.01	4.9	0.347	0.058	1.016
Statistics (Lognormal ROS Imputed Data)	23	0.01	4.9	0.363	0.0806	1.011

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.477	0.429	1.036	-2.045	1.596	-0.781
Statistics (NDs = DL)	0.612	0.561	0.703	-1.849	1.389	-0.751
Statistics (NDs = DL/2)	0.561	0.517	0.69	-2.06	1.356	-0.658
Statistics (Gamma ROS Estimates)	0.376	0.356	0.922	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.283	1.376	-0.603

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.623	0.595	0.571	0.768

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.419	0.887	Data Not Normal
Lilliefors (Detects Only)	0.39	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.383	0.914	Data Not Normal
Lilliefors (NDs = DL)	0.397	0.185	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.355	0.914	Data Not Normal
Lilliefors (NDs = DL/2)	0.388	0.185	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.368	0.914	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.387	0.185	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.892	0.837	0.834	0.874

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.035	0.801	
Kolmogorov-Smirnov (Detects Only)	0.213	0.228	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	1.161	0.795	

Kolmogorov-Smirnov (NDs = DL)	0.222	0.19	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.702	0.799	
Kolmogorov-Smirnov (NDs = DL/2)	0.23	0.191	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.91	0.832	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.204	0.195	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.985	0.979	0.975	0.963

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.975	0.887	Data Appear Lognormal
Lilliefors (Detects Only)	0.0925	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.966	0.914	Data Appear Lognormal
Lilliefors (NDs = DL)	0.128	0.185	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.961	0.914	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.107	0.185	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.938	0.914	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.167	0.185	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

ICDP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	19	8	29.63%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	8	0.13	12	3.294	0.435	5.379
Statistics (Detects Only)	19	0.032	54	4.304	0.57	12.44
Statistics (All: NDs treated as DL value)	27	0.032	54	4.004	0.47	10.73
Statistics (All: NDs treated as DL/2 value)	27	0.032	54	3.516	0.39	10.52
Statistics (Normal ROS Imputed Data)	27	-6.502	54	2.309	0.38	10.97
Statistics (Gamma ROS Imputed Data)	27	0.01	54	3.038	0.22	10.54
Statistics (Lognormal ROS Imputed Data)	27	0.032	54	3.081	0.38	10.53

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.355	0.334	12.13	-0.432	1.823	-4.221
Statistics (NDs = DL)	0.377	0.359	10.63	-0.377	1.783	-4.725
Statistics (NDs = DL/2)	0.363	0.348	9.681	-0.583	1.797	-3.083
Statistics (Gamma ROS Estimates)	0.264	0.259	11.53	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.928	1.764	-1.901

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.587	0.611	0.57	0.59

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.373	0.901	Data Not Normal
Lilliefors (Detects Only)	0.419	0.203	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.403	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.393	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.356	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.376	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.458	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.367	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.901	0.913	0.886	0.887

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.822	0.832	
Kolmogorov-Smirnov (Detects Only)	0.283	0.214	Data Not Gamma Distributed

Anderson-Darling (NDs = DL)	2.337	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.265	0.181	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	2.182	0.839	
Kolmogorov-Smirnov (NDs = DL/2)	0.236	0.181	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.086	0.871	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.223	0.184	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.978	0.977	0.982	0.967

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.962	0.901	Data Appear Lognormal
Lilliefors (Detects Only)	0.12	0.203	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.954	0.923	Data Appear Lognormal
Lilliefors (NDs = DL)	0.136	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.963	0.923	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.103	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.937	0.923	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.112	0.171	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

NAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	27	0	27	20	7	25.93%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.043	12	3.572	0.3	5.759
Statistics (Detects Only)	20	0.034	110	6.273	0.275	24.45
Statistics (All: NDs treated as DL value)	27	0.034	110	5.573	0.28	21.12
Statistics (All: NDs treated as DL/2 value)	27	0.0215	110	5.11	0.24	21.04
Statistics (Normal ROS Imputed Data)	27	-15.49	110	3.118	0.21	21.92
Statistics (Gamma ROS Imputed Data)	27	0.01	110	4.649	0.2	21.09
Statistics (Lognormal ROS Imputed Data)	27	0.0196	110	4.682	0.21	21.08

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.264	0.258	23.78	-0.833	1.885	-2.263
Statistics (NDs = DL)	0.279	0.273	19.95	-0.779	1.94	-2.49
Statistics (NDs = DL/2)	0.271	0.265	18.87	-0.959	1.95	-2.034
Statistics (Gamma ROS Estimates)	0.217	0.218	21.42	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.282	1.866	-1.456

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.49	0.498	0.468	0.425

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.268	0.905	Data Not Normal
Lilliefors (Detects Only)	0.466	0.198	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.279	0.923	Data Not Normal
Lilliefors (NDs = DL)	0.397	0.171	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.249	0.923	Data Not Normal
Lilliefors (NDs = DL/2)	0.446	0.171	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.375	0.923	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.387	0.171	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.842	0.847	0.817	0.822

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	3.146	0.862	

Kolmogorov-Smirnov (Detects Only)	0.342	0.212	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	3.413	0.863	
Kolmogorov-Smirnov (NDs = DL)	0.304	0.184	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.422	0.867	
Kolmogorov-Smirnov (NDs = DL/2)	0.285	0.184	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	3.51	0.894	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.3	0.186	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.946	0.956	0.964	0.952

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.906	0.905	Data Appear Lognormal
Lilliefors (Detects Only)	0.143	0.198	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.916	0.923	Data Not Lognormal
Lilliefors (NDs = DL)	0.158	0.171	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.933	0.923	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.157	0.171	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.916	0.923	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.128	0.171	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1254

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	23	0	23	2	21	91.30%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	21	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	23	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	23	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Imputed Data)	23	N/A	N/A	N/A	N/A	N/A

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

1260

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	23	0	23	6	17	73.91%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	17	0.0029	1.3	0.104	0.025	0.309
Statistics (Detects Only)	6	0.022	4.2	0.801	0.117	1.668
Statistics (All: NDs treated as DL value)	23	0.0029	4.2	0.286	0.025	0.894
Statistics (All: NDs treated as DL/2 value)	23	0.00145	4.2	0.248	0.0135	0.873
Statistics (Normal ROS Imputed Data)	23	-4.611	4.2	-2.143	-3.09	2.018
Statistics (Gamma ROS Imputed Data)	23	0.01	4.2	0.216	0.01	0.871
Statistics (Lognormal ROS Imputed Data)	23	1.47E-04	4.2	0.21	0.00106	0.872

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.415	0.319	1.931	-1.798	1.806	-1.004
Statistics (NDs = DL)	0.356	0.338	0.804	-3.135	1.645	-0.525
Statistics (NDs = DL/2)	0.305	0.294	0.811	-3.648	1.819	-0.499
Statistics (Gamma ROS Estimates)	0.295	0.286	0.733	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-5.621	2.558	-0.455

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.722	0.56	0.521	0.483

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.547	0.788	Data Not Normal
Lilliefors (Detects Only)	0.454	0.362	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.34	0.914	Data Not Normal
Lilliefors (NDs = DL)	0.43	0.185	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.299	0.914	Data Not Normal
Lilliefors (NDs = DL/2)	0.414	0.185	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.775	0.914	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.289	0.185	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.958	0.887	0.862	0.823

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.76	0.749	
Kolmogorov-Smirnov (Detects Only)	0.341	0.352	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	3.381	0.837	
Kolmogorov-Smirnov (NDs = DL)	0.299	0.195	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	3.245	0.848	
Kolmogorov-Smirnov (NDs = DL/2)	0.296	0.197	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	5.825	0.851	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.427	0.197	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.949	0.928	0.939	0.893

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.916	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.211	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.872	0.914	Data Not Lognormal
Lilliefors (NDs = DL)	0.214	0.185	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.891	0.914	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.199	0.185	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.804	0.914	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.293	0.185	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

TCDD

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	21	0	21	15	6	28.57%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	3.70E-05	6.70E-04	4.53E-04	5.80E-04	2.58E-04
Statistics (Detects Only)	15	1.47E-06	0.00415	5.14E-04	1.77E-04	0.00105
Statistics (All: NDs treated as DL value)	21	1.47E-06	0.00415	4.96E-04	2.30E-04	8.88E-04
Statistics (All: NDs treated as DL/2 value)	21	1.47E-06	0.00415	4.31E-04	1.93E-04	8.91E-04
Statistics (Normal ROS Imputed Data)	21	-5.92E-04	0.00415	3.86E-04	1.77E-04	9.22E-04
Statistics (Gamma ROS Imputed Data)	21	1.47E-06	0.01	0.00322	3.32E-04	0.00448
Statistics (Lognormal ROS Imputed Data)	21	1.47E-06	0.00415	3.83E-04	1.29E-04	9.04E-04

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.476	0.425	0.00108	-8.919	1.938	-0.217
Statistics (NDs = DL)	0.587	0.535	8.46E-04	-8.665	1.766	-0.204
Statistics (NDs = DL/2)	0.56	0.512	7.71E-04	-8.863	1.72	-0.194
Statistics (Gamma ROS Estimates)	0.346	0.328	0.00933	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-9.256	1.782	-0.192

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.685	0.694	0.645	0.766

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.498	0.881	Data Not Normal
Lilliefors (Detects Only)	0.367	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.508	0.908	Data Not Normal
Lilliefors (NDs = DL)	0.327	0.193	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.442	0.908	Data Not Normal
Lilliefors (NDs = DL/2)	0.4	0.193	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.529	0.908	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.331	0.193	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.933	0.907	0.886	0.786

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.523	0.798	
Kolmogorov-Smirnov (Detects Only)	0.211	0.235	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.432	0.797	
Kolmogorov-Smirnov (NDs = DL)	0.155	0.199	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.808	0.8	
Kolmogorov-Smirnov (NDs = DL/2)	0.248	0.2	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.23	0.837	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.219	0.204	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.971	0.96	0.958	0.985

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.957	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.184	0.229	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.932	0.908	Data Appear Lognormal
Lilliefors (NDs = DL)	0.176	0.193	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.932	0.908	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.173	0.193	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.98	0.908	Data Appear Lognormal

Lilliefors (Lognormal ROS Estimates)	0.118	0.193	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Sb

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	20	0	20	10	10	50.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	10	3.1	34.3	14.86	14.15	10.23
Statistics (Detects Only)	10	1.25	202	35.22	9.3	61.61
Statistics (All: NDs treated as DL value)	20	1.25	202	25.04	13.4	44.23
Statistics (All: NDs treated as DL/2 value)	20	1.25	202	21.32	7.075	44.87
Statistics (Normal ROS Imputed Data)	20	-26.7	202	14.63	2.794	48.35
Statistics (Gamma ROS Imputed Data)	20	0.01	202	17.7	1.511	46.05
Statistics (Lognormal ROS Imputed Data)	20	1.142	202	18.98	3.214	45.57

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.539	0.444	65.34	2.396	1.628	0.679
Statistics (NDs = DL)	0.742	0.664	33.75	2.412	1.26	0.523
Statistics (NDs = DL/2)	0.619	0.559	34.46	2.066	1.305	0.632
Statistics (Gamma ROS Estimates)	0.198	0.202	89.32	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.644	1.406	0.855

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.763	0.697	0.656	0.456

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.605	0.842	Data Not Normal
Lilliefors (Detects Only)	0.301	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.513	0.905	Data Not Normal
Lilliefors (NDs = DL)	0.309	0.198	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.458	0.905	Data Not Normal
Lilliefors (NDs = DL/2)	0.366	0.198	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.597	0.905	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.303	0.198	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.967	0.904	0.899	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.546	0.774	
Kolmogorov-Smirnov (Detects Only)	0.231	0.28	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.707	0.78	
Kolmogorov-Smirnov (NDs = DL)	0.161	0.201	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.294	0.792	
Kolmogorov-Smirnov (NDs = DL/2)	0.209	0.203	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.299	0.894	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.271	0.215	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.98	0.988	0.976	0.923

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.952	0.842	Data Appear Lognormal
Lilliefors (Detects Only)	0.195	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.977	0.905	Data Appear Lognormal
Lilliefors (NDs = DL)	0.0984	0.198	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.952	0.905	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.0983	0.198	Data Appear Lognormal

Shapiro-Wilk (Lognormal ROS Estimates)	0.852	0.905	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.223	0.198	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

As

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	20	0	20	13	7	35.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	2.1	32.7	12.46	5.2	12.05
Statistics (Detects Only)	13	2.53	54.9	15.29	6	17.05
Statistics (All: NDs treated as DL value)	20	2.1	54.9	14.3	5.6	15.21
Statistics (All: NDs treated as DL/2 value)	20	1.05	54.9	12.12	5.45	14.65
Statistics (Normal ROS Imputed Data)	20	-20.88	54.9	9.463	4.737	16.72
Statistics (Gamma ROS Imputed Data)	20	0.01	54.9	10.49	4.155	15.15
Statistics (Lognormal ROS Imputed Data)	20	0.823	54.9	11.15	4.619	14.76

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.109	0.905	13.78	2.213	1.026	0.463
Statistics (NDs = DL)	1.168	1.026	12.24	2.175	0.992	0.456
Statistics (NDs = DL/2)	1.023	0.903	11.85	1.932	1.065	0.551
Statistics (Gamma ROS Estimates)	0.464	0.428	22.58	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.825	1.044	0.572

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.867	0.875	0.842	0.72

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.75	0.866	Data Not Normal
Lilliefors (Detects Only)	0.28	0.246	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.765	0.905	Data Not Normal
Lilliefors (NDs = DL)	0.27	0.198	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.715	0.905	Data Not Normal
Lilliefors (NDs = DL/2)	0.262	0.198	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.818	0.905	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.282	0.198	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.977	0.98	0.978	0.981

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.816	0.756	
Kolmogorov-Smirnov (Detects Only)	0.235	0.243	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	1.086	0.765	
Kolmogorov-Smirnov (NDs = DL)	0.239	0.199	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.837	0.767	
Kolmogorov-Smirnov (NDs = DL/2)	0.214	0.199	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.788	0.81	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.194	0.206	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.959	0.964	0.981	0.954

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.903	0.866	Data Appear Lognormal
Lilliefors (Detects Only)	0.198	0.246	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.917	0.905	Data Appear Lognormal
Lilliefors (NDs = DL)	0.202	0.198	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.957	0.905	Data Appear Lognormal

Lilliefors (NDs = DL/2)	0.152	0.198	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.916	0.905	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.224	0.198	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Co

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	16	0	16	15	1	6.25%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	15	1.2	221	76.93	39	82.49
Statistics (All: NDs treated as DL value)	16	1.2	221	72.28	26.45	81.84
Statistics (All: NDs treated as DL/2 value)	16	1.2	221	72.2	26.45	81.91
Statistics (Normal ROS Imputed Data)	16	-44.9	221	69.31	26.45	85.31
Statistics (Gamma ROS Imputed Data)	16	1.2	221	72.36	26.45	81.75
Statistics (Lognormal ROS Imputed Data)	16	1.2	221	72.22	26.45	81.88

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.6	0.524	128.3	3.312	1.787	0.539
Statistics (NDs = DL)	0.559	0.496	129.4	3.163	1.827	0.578
Statistics (NDs = DL/2)	0.541	0.481	133.5	3.119	1.891	0.606
Statistics (Gamma ROS Estimates)	0.571	0.505	126.8	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.137	1.863	0.594

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.917	0.906	0.907	0.908

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.82	0.881	Data Not Normal
Lilliefors (Detects Only)	0.244	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.801	0.887	Data Not Normal
Lilliefors (NDs = DL)	0.262	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.802	0.887	Data Not Normal
Lilliefors (NDs = DL/2)	0.262	0.222	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.866	0.887	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.242	0.222	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.9	0.904	0.902	0.905

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.624	0.786	
Kolmogorov-Smirnov (Detects Only)	0.186	0.232	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.715	0.791	
Kolmogorov-Smirnov (NDs = DL)	0.189	0.226	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.667	0.793	
Kolmogorov-Smirnov (NDs = DL/2)	0.181	0.227	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.731	0.79	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.194	0.226	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.962	0.96	0.961	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.904	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.195	0.229	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.9	0.887	Data Appear Lognormal
Lilliefors (NDs = DL)	0.188	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.898	0.887	Data Appear Lognormal

Lilliefors (NDs = DL/2)	0.186	0.222	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.9	0.887	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.187	0.222	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Tl

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	19	0	19	2	17	89.47%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	17	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	19	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	19	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Imputed Data)	19	N/A	N/A	N/A	N/A	N/A

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Cr6

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	75	0	75	48	27	36.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	27	0.13	30	2.648	1.8	5.542
Statistics (Detects Only)	48	0.54	11000	1153	13.05	2587
Statistics (All: NDs treated as DL value)	75	0.13	11000	738.9	5.1	2135
Statistics (All: NDs treated as DL/2 value)	75	0.065	11000	738.5	5.1	2135
Statistics (Normal ROS Imputed Data)	75	-5638	11000	-519.8	4	3098
Statistics (Gamma ROS Imputed Data)	75	0.01	11000	738	4	2135
Statistics (Lognormal ROS Imputed Data)	75	0.00501	11000	738	4	2135

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.217	0.217	5321	3.697	2.794	0.756
Statistics (NDs = DL)	0.18	0.182	4097	2.46	2.864	1.164
Statistics (NDs = DL/2)	0.171	0.174	4307	2.21	3.071	1.389

Statistics (Gamma ROS Estimates)	0.133	0.136	5563	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.482	3.787	2.556

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.714	0.625	0.625	0.625

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.52	0.947	Data Not Normal
Lilliefors (Detects Only)	0.421	0.128	Data Not Normal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.44	0.102	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.44	0.102	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	0.258	0.102	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.96	0.96	0.961	0.961

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	5.133	0.903	
Kolmogorov-Smirnov (Detects Only)	0.293	0.142	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	10.4	0.934	
Kolmogorov-Smirnov (NDs = DL)	0.335	0.115	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	9.428	0.943	
Kolmogorov-Smirnov (NDs = DL/2)	0.333	0.116	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	5.998	0.982	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.257	0.117	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.942	0.943	0.957	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.87	0.947	Data Not Lognormal
Lilliefors (Detects Only)	0.234	0.128	Data Not Lognormal
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	0.19	0.102	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	0.174	0.102	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	N/A	N/A	
Lilliefors (Lognormal ROS Estimates)	0.113	0.102	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options	
Date/Time of Computation	7/7/2014 16:16
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	0.95

Fe

Raw Statistics	
Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	7060
Maximum	198000
Mean of Raw Data	62617

Standard Deviation of Raw Data	50561
Khat	1.497
Theta hat	41821
Kstar	1.258
Theta star	49768
Mean of Log Transformed Data	10.68
Standard Deviation of Log Transformed Data	0.975

Normal GOF Test Results

Correlation Coefficient R	0.939
Shapiro Wilk Test Statistic	0.886
Shapiro Wilk Critical (0.05) Value	0.887
Approximate Shapiro Wilk P Value	0.0475
Lilliefors Test Statistic	0.152
Lilliefors Critical (0.05) Value	0.222

Data appear Approximate Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.982
A-D Test Statistic	0.297
A-D Critical (0.05) Value	0.755
K-S Test Statistic	0.13
K-S Critical(0.05) Value	0.219

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.974
Shapiro Wilk Test Statistic	0.94
Shapiro Wilk Critical (0.05) Value	0.887
Approximate Shapiro Wilk P Value	0.386
Lilliefors Test Statistic	0.172
Lilliefors Critical (0.05) Value	0.222

Data appear Lognormal at (0.05) Significance Level

Pb

Raw Statistics

Number of Valid Observations	20
Number of Distinct Observations	20
Minimum	18.5
Maximum	57300
Mean of Raw Data	3441
Standard Deviation of Raw Data	12715
Khat	0.286
Theta hat	12036
Kstar	0.276
Theta star	12452
Mean of Log Transformed Data	5.712
Standard Deviation of Log Transformed Data	1.854

Normal GOF Test Results

Correlation Coefficient R	0.505
Shapiro Wilk Test Statistic	0.283
Shapiro Wilk Critical (0.05) Value	0.905
Approximate Shapiro Wilk P Value	5.44E-11
Lilliefors Test Statistic	0.441
Lilliefors Critical (0.05) Value	0.198

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.847

A-D Test Statistic	2.791
A-D Critical (0.05) Value	0.851
K-S Test Statistic	0.323
K-S Critical(0.05) Value	0.211
Data not Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.956
Shapiro Wilk Test Statistic	0.924
Shapiro Wilk Critical (0.05) Value	0.905
Approximate Shapiro Wilk P Value	0.12
Lilliefors Test Statistic	0.14
Lilliefors Critical (0.05) Value	0.198
Data appear Lognormal at (0.05) Significance Level	

V

Raw Statistics

Number of Valid Observations	16
Number of Distinct Observations	16
Minimum	10.3
Maximum	1670
Mean of Raw Data	495.3
Standard Deviation of Raw Data	565.6
Khat	0.561
Theta hat	882.5
Kstar	0.498
Theta star	995.2
Mean of Log Transformed Data	5.093
Standard Deviation of Log Transformed Data	1.843

Normal GOF Test Results

Correlation Coefficient R	0.917
Shapiro Wilk Test Statistic	0.826
Shapiro Wilk Critical (0.05) Value	0.887
Approximate Shapiro Wilk P Value	0.00679
Lilliefors Test Statistic	0.232
Lilliefors Critical (0.05) Value	0.222
Data not Normal at (0.05) Significance Level	

Gamma GOF Test Results

Correlation Coefficient R	0.945
A-D Test Statistic	0.553
A-D Critical (0.05) Value	0.791
K-S Test Statistic	0.169
K-S Critical(0.05) Value	0.226
Data appear Gamma Distributed at (0.05) Significance Level	

Lognormal GOF Test Results

Correlation Coefficient R	0.961
Shapiro Wilk Test Statistic	0.898
Shapiro Wilk Critical (0.05) Value	0.887
Approximate Shapiro Wilk P Value	0.109
Lilliefors Test Statistic	0.173
Lilliefors Critical (0.05) Value	0.222
Data appear Lognormal at (0.05) Significance Level	

Zn

Raw Statistics

Number of Valid Observations	20
Number of Distinct Observations	20

Minimum	29.25
Maximum	45300
Mean of Raw Data	2701
Standard Deviation of Raw Data	10064
Khat	0.293
Theta hat	9209
Kstar	0.283
Theta star	9557
Mean of Log Transformed Data	5.541
Standard Deviation of Log Transformed Data	1.679

Normal GOF Test Results

Correlation Coefficient R	0.503
Shapiro Wilk Test Statistic	0.281
Shapiro Wilk Critical (0.05) Value	0.905
Approximate Shapiro Wilk P Value	5.18E-11
Lilliefors Test Statistic	0.44
Lilliefors Critical (0.05) Value	0.198

Data not Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.846
A-D Test Statistic	3.583
A-D Critical (0.05) Value	0.848
K-S Test Statistic	0.405
K-S Critical(0.05) Value	0.21

Data not Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.91
Shapiro Wilk Test Statistic	0.843
Shapiro Wilk Critical (0.05) Value	0.905
Approximate Shapiro Wilk P Value	0.00307
Lilliefors Test Statistic	0.233
Lilliefors Critical (0.05) Value	0.198

Data not Lognormal at (0.05) Significance Level

APPENDIX F.3B

WESTERN AREA SURFACE AND SUBSURFACE SOILS
UCL CALCULATION

UCL Statistics for Data Sets with Non-Detects

User Selected Options

Date/Time of Computation	7/7/2014 16:03
From File	WorkSheet.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

123TCB

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	2	Number of Non-Detects	12
Number of Distinct Detects	2	Number of Distinct Non-Detects	12
Minimum Detect	0.29	Minimum Non-Detect	7.20E-04
Maximum Detect	210	Maximum Non-Detect	38
Variance Detects	21989	Percent Non-Detects	85.71%
Mean Detects	105.1	SD Detects	148.3
Median Detects	105.1	CV Detects	1.41
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.055	SD of Logged Detects	4.656

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	15.03	Standard Error of Mean	20.44
SD	54.08	95% KM (BCA) UCL	N/A
95% KM (t) UCL	51.22	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	48.65	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	76.34	95% KM Chebyshev UCL	104.1
97.5% KM Chebyshev UCL	142.7	99% KM Chebyshev UCL	218.4

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.27	k star (bias corrected MLE)	N/A
Theta hat (MLE)	389.8	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	1.079	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0772	nu hat (KM)	2.162
		Adjusted Level of Significance (β)	0.0312
Approximate Chi Square Value (2.16, α)	0.175	Adjusted Chi Square Value (2.16, β)	0.137
95% Gamma Approximate KM-UCL (use when n>=50)	185.9	95% Gamma Adjusted KM-UCL (use when n<50)	237.2

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	15.02	Mean in Log Scale	-13.24
SD in Original Scale	56.12	SD in Log Scale	6.629
95% t UCL (assumes normality of ROS data)	41.58	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	2.42E+15		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	16.82	Mean in Log Scale	-3.479
SD in Original Scale	55.83	SD in Log Scale	4.698
95% t UCL (Assumes normality)	43.24	95% H-Stat UCL	1.39E+09

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use
99% KM (Chebyshev) UCL 218.4
Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

124TCB

General Statistics

Total Number of Observations	27	Number of Distinct Observations	26
Number of Detects	7	Number of Non-Detects	20
Number of Distinct Detects	7	Number of Distinct Non-Detects	19
Minimum Detect	7.90E-04	Minimum Non-Detect	8.50E-04
Maximum Detect	1300	Maximum Non-Detect	23
Variance Detects	237029	Percent Non-Detects	74.07%
Mean Detects	267.9	SD Detects	486.9
Median Detects	34	CV Detects	1.817
Skewness Detects	2.083	Kurtosis Detects	4.208
Mean of Logged Detects	2.083	SD of Logged Detects	4.878

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.651	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.383	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.335	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	69.49	Standard Error of Mean	53.59
SD	257.8	95% KM (BCA) UCL	162.5
95% KM (t) UCL	160.9	95% KM (Percentile Bootstrap) UCL	162.5
95% KM (z) UCL	157.6	95% KM Bootstrap t UCL	1440
90% KM Chebyshev UCL	230.2	95% KM Chebyshev UCL	303.1
97.5% KM Chebyshev UCL	404.1	99% KM Chebyshev UCL	602.7

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.157	Anderson-Darling GOF Test	
5% A-D Critical Value	0.819	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.152	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.342	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.208	k star (bias corrected MLE)	0.214
Theta hat (MLE)	1285	Theta star (bias corrected MLE)	1250
nu hat (MLE)	2.919	nu star (bias corrected)	3.001
MLE Mean (bias corrected)	267.9	MLE Sd (bias corrected)	578.7

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0727	nu hat (KM)	3.924
Approximate Chi Square Value (3.92, α)	0.692	Adjusted Chi Square Value (3.92, β)	0.613
95% Gamma Approximate KM-UCL (use when n>=50)	394.1	95% Gamma Adjusted KM-UCL (use when n<50)	444.4

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.90E-04	Mean	69.47
Maximum	1300	Median	0.01
SD	262.7	CV	3.782
k hat (MLE)	0.112	k star (bias corrected MLE)	0.125
Theta hat (MLE)	617.6	Theta star (bias corrected MLE)	557.2
nu hat (MLE)	6.074	nu star (bias corrected)	6.732
MLE Mean (bias corrected)	69.47	MLE Sd (bias corrected)	196.7
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (6.73, α)	2.025	Adjusted Chi Square Value (6.73, β)	1.864
95% Gamma Approximate UCL (use when n>=50)	231	95% Gamma Adjusted UCL (use when n<50)	250.9

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.909	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.19	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	69.46	Mean in Log Scale	-4.713
SD in Original Scale	262.7	SD in Log Scale	4.772
95% t UCL (assumes normality of ROS data)	155.7	95% Percentile Bootstrap UCL	164.3
95% BCA Bootstrap UCL	216	95% Bootstrap t UCL	1727
95% H-UCL (Log ROS)	3243127		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-4.614	95% H-UCL (KM -Log)	1698838
KM SD (logged)	4.68	95% Critical H Value (KM-Log)	8.728
KM Standard Error of Mean (logged)	0.998		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	70.28	Mean in Log Scale	-1.969
SD in Original Scale	262.5	SD in Log Scale	4.455
95% t UCL (Assumes normality)	156.4	95% H-Stat UCL	4106242

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	160.9	95% GROS Adjusted Gamma UCL	250.9
95% Adjusted Gamma KM-UCL	444.4		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

12DCB

General Statistics

Total Number of Observations	27	Number of Distinct Observations	27
Number of Detects	16	Number of Non-Detects	11
Number of Distinct Detects	16	Number of Distinct Non-Detects	11
Minimum Detect	0.0012	Minimum Non-Detect	7.70E-04
Maximum Detect	3300	Maximum Non-Detect	0.47
Variance Detects	1052715	Percent Non-Detects	40.74%
Mean Detects	561.8	SD Detects	1026

Median Detects	26.5	CV Detects	1.826
Skewness Detects	2.044	Kurtosis Detects	3.325
Mean of Logged Detects	2.76	SD of Logged Detects	4.286

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.624	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.318	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	332.9	Standard Error of Mean	161.6
SD	813	95% KM (BCA) UCL	605.7
95% KM (t) UCL	608.5	95% KM (Percentile Bootstrap) UCL	613.3
95% KM (z) UCL	598.7	95% KM Bootstrap t UCL	986
90% KM Chebyshev UCL	817.7	95% KM Chebyshev UCL	1037
97.5% KM Chebyshev UCL	1342	99% KM Chebyshev UCL	1941

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.264	Anderson-Darling GOF Test	
5% A-D Critical Value	0.881	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.126	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.238	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.205	k star (bias corrected MLE)	0.208
Theta hat (MLE)	2737	Theta star (bias corrected MLE)	2695
nu hat (MLE)	6.569	nu star (bias corrected)	6.67
MLE Mean (bias corrected)	561.8	MLE Sd (bias corrected)	1230

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.168	nu hat (KM)	9.053
Approximate Chi Square Value (9.05, α)	3.359	Adjusted Chi Square Value (9.05, β)	3.14
95% Gamma Approximate KM-UCL (use when n>=50)	897.2	95% Gamma Adjusted KM-UCL (use when n<50)	959.8

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	332.9
Maximum	3300	Median	0.19
SD	828.5	CV	2.489
k hat (MLE)	0.13	k star (bias corrected MLE)	0.14
Theta hat (MLE)	2566	Theta star (bias corrected MLE)	2378
nu hat (MLE)	7.005	nu star (bias corrected)	7.56
MLE Mean (bias corrected)	332.9	MLE Sd (bias corrected)	889.7
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (7.56, α)	2.483	Adjusted Chi Square Value (7.56, β)	2.301
95% Gamma Approximate UCL (use when n>=50)	1014	95% Gamma Adjusted UCL (use when n<50)	1094

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.943	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.109	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	332.9	Mean in Log Scale	-1.177
SD in Original Scale	828.5	SD in Log Scale	5.86
95% t UCL (assumes normality of ROS data)	604.9	95% Percentile Bootstrap UCL	609.6
95% BCA Bootstrap UCL	746.9	95% Bootstrap t UCL	1022

95% H-UCL (Log ROS)	2.32E+12		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.141	95% H-UCL (KM -Log)	7.46E+11
KM SD (logged)	5.743	95% Critical H Value (KM-Log)	10.64
KM Standard Error of Mean (logged)	1.153		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	332.9	Mean in Log Scale	-0.582
SD in Original Scale	828.5	SD in Log Scale	5.508
95% t UCL (Assumes normality)	604.9	95% H-Stat UCL	1.34E+11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	605.7	95% GROS Adjusted Gamma UCL	1094
95% Adjusted Gamma KM-UCL	959.8		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

13DCB

General Statistics

Total Number of Observations	27	Number of Distinct Observations	27
Number of Detects	17	Number of Non-Detects	10
Number of Distinct Detects	17	Number of Distinct Non-Detects	10
Minimum Detect	9.60E-04	Minimum Non-Detect	6.30E-04
Maximum Detect	3300	Maximum Non-Detect	0.47
Variance Detects	1029848	Percent Non-Detects	37.04%
Mean Detects	524.4	SD Detects	1015
Median Detects	14	CV Detects	1.935
Skewness Detects	2.164	Kurtosis Detects	3.824
Mean of Logged Detects	2.31	SD of Logged Detects	4.374

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.592	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.331	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	330.2	Standard Error of Mean	162.9
SD	821.2	95% KM (BCA) UCL	630.8
95% KM (t) UCL	608	95% KM (Percentile Bootstrap) UCL	610.6
95% KM (z) UCL	598.1	95% KM Bootstrap t UCL	1007
90% KM Chebyshev UCL	818.9	95% KM Chebyshev UCL	1040
97.5% KM Chebyshev UCL	1348	99% KM Chebyshev UCL	1951

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.412	Anderson-Darling GOF Test	
5% A-D Critical Value	0.897	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.168	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.233	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.188	k star (bias corrected MLE)	0.194
Theta hat (MLE)	2789	Theta star (bias corrected MLE)	2702

nu hat (MLE)	6.393	nu star (bias corrected)	6.598
MLE Mean (bias corrected)	524.4	MLE Sd (bias corrected)	1190

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.162	nu hat (KM)	8.728
Approximate Chi Square Value (8.73, α)	3.164	Adjusted Chi Square Value (8.73, β)	2.952
95% Gamma Approximate KM-UCL (use when n>=50)	910.9	95% Gamma Adjusted KM-UCL (use when n<50)	976

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	9.60E-04	Mean	330.2
Maximum	3300	Median	0.14
SD	836.9	CV	2.535
k hat (MLE)	0.13	k star (bias corrected MLE)	0.14
Theta hat (MLE)	2546	Theta star (bias corrected MLE)	2359
nu hat (MLE)	7.003	nu star (bias corrected)	7.558
MLE Mean (bias corrected)	330.2	MLE Sd (bias corrected)	882.5
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (7.56, α)	2.482	Adjusted Chi Square Value (7.56, β)	2.3
95% Gamma Approximate UCL (use when n>=50)	1005	95% Gamma Adjusted UCL (use when n<50)	1085

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.953	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.106	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	330.2	Mean in Log Scale	-1.301
SD in Original Scale	836.9	SD in Log Scale	5.928
95% t UCL (assumes normality of ROS data)	604.9	95% Percentile Bootstrap UCL	607.2
95% BCA Bootstrap UCL	719.7	95% Bootstrap t UCL	1049
95% H-UCL (Log ROS)	4.08E+12		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.138	95% H-UCL (KM -Log)	3.58E+11
KM SD (logged)	5.668	95% Critical H Value (KM-Log)	10.51
KM Standard Error of Mean (logged)	1.134		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	330.2	Mean in Log Scale	-0.747
SD in Original Scale	836.9	SD in Log Scale	5.568
95% t UCL (Assumes normality)	604.9	95% H-Stat UCL	2.01E+11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	630.8	95% GROS Adjusted Gamma UCL	1085
95% Adjusted Gamma KM-UCL	976		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

14DCB

General Statistics

Total Number of Observations	27	Number of Distinct Observations	26
Number of Detects	17	Number of Non-Detects	10
Number of Distinct Detects	17	Number of Distinct Non-Detects	9
Minimum Detect	1.50E-03	Minimum Non-Detect	6.10E-04
Maximum Detect	5200	Maximum Non-Detect	0.47
Variance Detects	1754437	Percent Non-Detects	37.04%
Mean Detects	607.9	SD Detects	1325
Median Detects	9.7	CV Detects	2.179
Skewness Detects	2.99	Kurtosis Detects	9.682
Mean of Logged Detects	2.34	SD of Logged Detects	4.418

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.537	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.323	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	382.7	Standard Error of Mean	210.5
SD	1061	95% KM (BCA) UCL	729.5
95% KM (t) UCL	741.7	95% KM (Percentile Bootstrap) UCL	765.4
95% KM (z) UCL	728.9	95% KM Bootstrap t UCL	1566
90% KM Chebyshev UCL	1014	95% KM Chebyshev UCL	1300
97.5% KM Chebyshev UCL	1697	99% KM Chebyshev UCL	2477

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.417	Anderson-Darling GOF Test	
5% A-D Critical Value	0.902	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.186	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.233	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.183	k star (bias corrected MLE)	0.19
Theta hat (MLE)	3317	Theta star (bias corrected MLE)	3197
nu hat (MLE)	6.231	nu star (bias corrected)	6.465
MLE Mean (bias corrected)	607.9	MLE Sd (bias corrected)	1394

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.13	nu hat (KM)	7.026
Approximate Chi Square Value (7.03, α)	2.185	Adjusted Chi Square Value (7.03, β)	2.016
95% Gamma Approximate KM-UCL (use when n>=50)	1231	95% Gamma Adjusted KM-UCL (use when n<50)	1334

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0015	Mean	382.7
Maximum	5.20E+03	Median	0.2
SD	1081	CV	2.825
k hat (MLE)	0.127	k star (bias corrected MLE)	0.138
Theta hat (MLE)	3007	Theta star (bias corrected MLE)	2777
nu hat (MLE)	6.874	nu star (bias corrected)	7.444
MLE Mean (bias corrected)	382.7	MLE Sd (bias corrected)	1031
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (7.44, α)	2.417	Adjusted Chi Square Value (7.44, β)	2.238
95% Gamma Approximate UCL (use when n>=50)	1179	95% Gamma Adjusted UCL (use when n<50)	1273

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.955	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.142	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	382.7	Mean in Log Scale	-1.329
SD in Original Scale	1081	SD in Log Scale	6.029
95% t UCL (assumes normality of ROS data)	737.7	95% Percentile Bootstrap UCL	749.5
95% BCA Bootstrap UCL	890	95% Bootstrap t UCL	1372
95% H-UCL (Log ROS)	1.11E+13		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.143	95% H-UCL (KM -Log)	5.55E+11
KM SD (logged)	5.713	95% Critical H Value (KM-Log)	10.59
KM Standard Error of Mean (logged)	1.141		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	382.8	Mean in Log Scale	-0.599
SD in Original Scale	1081	SD in Log Scale	5.507
95% t UCL (Assumes normality)	737.7	95% H-Stat UCL	1.31E+11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	729.5	95% GROS Adjusted Gamma UCL	1273
95% Adjusted Gamma KM-UCL	1334		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BEN

General Statistics

Total Number of Observations	57	Number of Distinct Observations	51
Number of Detects	29	Number of Non-Detects	28
Number of Distinct Detects	28	Number of Distinct Non-Detects	26
Minimum Detect	7.10E-04	Minimum Non-Detect	5.80E-04
Maximum Detect	110	Maximum Non-Detect	19
Variance Detects	514.8	Percent Non-Detects	49.12%
Mean Detects	6.832	SD Detects	22.69
Median Detects	0.094	CV Detects	3.321
Skewness Detects	4.036	Kurtosis Detects	16.77
Mean of Logged Detects	-2.32	SD of Logged Detects	3.199

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.347	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.926	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.43	Lilliefors GOF Test
5% Lilliefors Critical Value	0.165	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	3.503	Standard Error of Mean	2.193
SD	16.26	95% KM (BCA) UCL	7.912
95% KM (t) UCL	7.171	95% KM (Percentile Bootstrap) UCL	7.274
95% KM (z) UCL	7.11	95% KM Bootstrap t UCL	31.43
90% KM Chebyshev UCL	10.08	95% KM Chebyshev UCL	13.06
97.5% KM Chebyshev UCL	17.2	99% KM Chebyshev UCL	25.32

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.791	Anderson-Darling GOF Test
5% A-D Critical Value	0.925	Detected Data Not Gamma Distributed at 5% Significance Level

K-S Test Statistic	0.296	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.182	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only			
k hat (MLE)	0.177	k star (bias corrected MLE)	0.182
Theta hat (MLE)	38.64	Theta star (bias corrected MLE)	37.64
nu hat (MLE)	10.26	nu star (bias corrected)	10.53
MLE Mean (bias corrected)	6.832	MLE Sd (bias corrected)	16.04

Gamma Kaplan-Meier (KM) Statistics			
k hat (KM)	0.0464	nu hat (KM)	5.29
Approximate Chi Square Value (5.29, α)	1.289	Adjusted Chi Square Value (5.29, β)	1.239
95% Gamma Approximate KM-UCL (use when n>=50)	14.38	95% Gamma Adjusted KM-UCL (use when n<50)	14.96
Gamma (KM) may not be used when k hat (KM) is < 0.1			

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	7.10E-04	Mean	3.481
Maximum	110	Median	0.01
SD	16.41	CV	4.714
k hat (MLE)	0.162	k star (bias corrected MLE)	0.165
Theta hat (MLE)	21.48	Theta star (bias corrected MLE)	21.07
nu hat (MLE)	18.47	nu star (bias corrected)	18.83
MLE Mean (bias corrected)	3.481	MLE Sd (bias corrected)	8.565
		Adjusted Level of Significance (β)	0.0458
Approximate Chi Square Value (18.83, α)	9.995	Adjusted Chi Square Value (18.83, β)	9.828
95% Gamma Approximate UCL (use when n>=50)	6.559	95% Gamma Adjusted UCL (use when n<50)	6.671

Lognormal GOF Test on Detected Observations Only			
Shapiro Wilk Test Statistic	0.954	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.926	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.115	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.165	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects			
Mean in Original Scale	3.477	Mean in Log Scale	-5.179
SD in Original Scale	16.41	SD in Log Scale	3.889
95% t UCL (assumes normality of ROS data)	7.112	95% Percentile Bootstrap UCL	7.488
95% BCA Bootstrap UCL	9.949	95% Bootstrap t UCL	30.65
95% H-UCL (Log ROS)	368.8		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed			
KM Mean (logged)	-4.422	95% H-UCL (KM -Log)	45.11
KM SD (logged)	3.34	95% Critical H Value (KM-Log)	5.949
KM Standard Error of Mean (logged)	0.476		

DL/2 Statistics			
DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.858	Mean in Log Scale	-3.606
SD in Original Scale	16.4	SD in Log Scale	3.613
95% t UCL (Assumes normality)	7.492	95% H-Stat UCL	400.7
DL/2 is not a recommended method, provided for comparisons and historical reasons			

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	25.32

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.

Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

CB

General Statistics

Total Number of Observations	57	Number of Distinct Observations	52
Number of Detects	42	Number of Non-Detects	15
Number of Distinct Detects	38	Number of Distinct Non-Detects	15
Minimum Detect	0.0012	Minimum Non-Detect	4.30E-04
Maximum Detect	630	Maximum Non-Detect	1.3
Variance Detects	16313	Percent Non-Detects	26.32%
Mean Detects	55.59	SD Detects	127.7
Median Detects	4.425	CV Detects	2.298
Skewness Detects	3.03	Kurtosis Detects	10.07
Mean of Logged Detects	0.351	SD of Logged Detects	3.737

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.51	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.942	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.407	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.137	Detected Data Not Normal at 5% Significance Level	
Detected Data Not Normal at 5% Significance Level			

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	40.96	Standard Error of Mean	14.89
SD	111.1	95% KM (BCA) UCL	68.26
95% KM (t) UCL	65.86	95% KM (Percentile Bootstrap) UCL	65.89
95% KM (z) UCL	65.45	95% KM Bootstrap t UCL	83.49
90% KM Chebyshev UCL	85.63	95% KM Chebyshev UCL	105.9
97.5% KM Chebyshev UCL	133.9	99% KM Chebyshev UCL	189.1

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.339	Anderson-Darling GOF Test	
5% A-D Critical Value	0.91	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.177	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.151	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	0.201	k star (bias corrected MLE)	0.202
Theta hat (MLE)	277.1	Theta star (bias corrected MLE)	275
nu hat (MLE)	16.85	nu star (bias corrected)	16.98
MLE Mean (bias corrected)	55.59	MLE Sd (bias corrected)	123.6

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.136	nu hat (KM)	15.51
Approximate Chi Square Value (15.51, α)	7.618	Adjusted Chi Square Value (15.51, β)	7.474
95% Gamma Approximate KM-UCL (use when n>=50)	83.4	95% Gamma Adjusted KM-UCL (use when n<50)	85.01

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.0012	Mean	40.96
Maximum	630	Median	0.08
SD	112	CV	2.735
k hat (MLE)	0.163	k star (bias corrected MLE)	0.166
Theta hat (MLE)	251.7	Theta star (bias corrected MLE)	246.9
nu hat (MLE)	18.55	nu star (bias corrected)	18.91
MLE Mean (bias corrected)	40.96	MLE Sd (bias corrected)	100.6
		Adjusted Level of Significance (β)	0.0458
Approximate Chi Square Value (18.91, α)	10.05	Adjusted Chi Square Value (18.91, β)	9.884

95% Gamma Approximate UCL (use when n>=50)	77.06	95% Gamma Adjusted UCL (use when n<50)	78.37

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.882	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.942	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.137	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.137	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	40.96	Mean in Log Scale	-1.644
SD in Original Scale	112	SD in Log Scale	4.684
95% t UCL (assumes normality of ROS data)	65.78	95% Percentile Bootstrap UCL	67.09
95% BCA Bootstrap UCL	75.92	95% Bootstrap t UCL	85.9
95% H-UCL (Log ROS)	1687749		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	40.98	Mean in Log Scale	-1.443
SD in Original Scale	112	SD in Log Scale	4.598
95% t UCL (Assumes normality)	65.8	95% H-Stat UCL	1161027

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	189.1

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

EB

General Statistics

Total Number of Observations	53	Number of Distinct Observations	45
Number of Detects	17	Number of Non-Detects	36
Number of Distinct Detects	17	Number of Distinct Non-Detects	31
Minimum Detect	3.70E-04	Minimum Non-Detect	1.70E-04
Maximum Detect	450	Maximum Non-Detect	21
Variance Detects	11875	Percent Non-Detects	67.92%
Mean Detects	27.23	SD Detects	109
Median Detects	0.03	CV Detects	4.003
Skewness Detects	4.12	Kurtosis Detects	16.98
Mean of Logged Detects	-3.372	SD of Logged Detects	3.934

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.272	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.506	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	8.743	Standard Error of Mean	8.666
SD	61.21	95% KM (BCA) UCL	25.68
95% KM (t) UCL	23.26	95% KM (Percentile Bootstrap) UCL	25.68
95% KM (z) UCL	23	95% KM Bootstrap t UCL	1547
90% KM Chebyshev UCL	34.74	95% KM Chebyshev UCL	46.52
97.5% KM Chebyshev UCL	62.86	99% KM Chebyshev UCL	94.97

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.479	Anderson-Darling GOF Test	

5% A-D Critical Value	0.962	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.329	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.239	Detected Data Not Gamma Distributed at 5% Significance Level	
Detected Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	0.119	k star (bias corrected MLE)	0.137
Theta hat (MLE)	228.9	Theta star (bias corrected MLE)	198.5
nu hat (MLE)	4.043	nu star (bias corrected)	4.663
MLE Mean (bias corrected)	27.23	MLE Sd (bias corrected)	73.51

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0204	nu hat (KM)	2.163
Approximate Chi Square Value (2.16, α)	0.175	Adjusted Chi Square Value (2.16, β)	0.166
95% Gamma Approximate KM-UCL (use when n>=50)	108.1	95% Gamma Adjusted KM-UCL (use when n<50)	114.1
Gamma (KM) may not be used when k hat (KM) is < 0.1			

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	3.70E-04	Mean	8.739
Maximum	450	Median	0.01
SD	61.79	CV	7.07
k hat (MLE)	0.124	k star (bias corrected MLE)	0.129
Theta hat (MLE)	70.58	Theta star (bias corrected MLE)	67.54
nu hat (MLE)	13.12	nu star (bias corrected)	13.72
MLE Mean (bias corrected)	8.739	MLE Sd (bias corrected)	24.3
		Adjusted Level of Significance (β)	0.0455
Approximate Chi Square Value (13.72, α)	6.377	Adjusted Chi Square Value (13.72, β)	6.237
95% Gamma Approximate UCL (use when n>=50)	18.8	95% Gamma Adjusted UCL (use when n<50)	19.22

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.917	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.132	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	8.733	Mean in Log Scale	-9.227
SD in Original Scale	61.79	SD in Log Scale	4.851
95% t UCL (assumes normality of ROS data)	22.95	95% Percentile Bootstrap UCL	25.68
95% BCA Bootstrap UCL	34.39	95% Bootstrap t UCL	1636
95% H-UCL (Log ROS)	2548		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-6.603	95% H-UCL (KM -Log)	4.264
KM SD (logged)	3.314	95% Critical H Value (KM-Log)	5.574
KM Standard Error of Mean (logged)	0.5		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	9.165	Mean in Log Scale	-4.891
SD in Original Scale	61.75	SD in Log Scale	3.92
95% t UCL (Assumes normality)	23.37	95% H-Stat UCL	552.3

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	94.97

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

MPXYL

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	13

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable MPXYL was not processed!

OXYL

General Statistics

Total Number of Observations	14	Number of Distinct Observations	14
Number of Detects	1	Number of Non-Detects	13
Number of Distinct Detects	1	Number of Distinct Non-Detects	13

Warning: Only one distinct data value was detected! ProUCL (or any other software) should not be used on such a data set!
It is suggested to use alternative site specific values determined by the Project Team to estimate environmental parameters (e.g., EPC, BTV).

The data set for variable OXYL was not processed!

11BP

General Statistics

Total Number of Observations	17	Number of Distinct Observations	16
Number of Detects	9	Number of Non-Detects	8
Number of Distinct Detects	9	Number of Distinct Non-Detects	7
Minimum Detect	0.0225	Minimum Non-Detect	0.049
Maximum Detect	22	Maximum Non-Detect	140.00%
Variance Detects	65.25	Percent Non-Detects	47.06%
Mean Detects	4.202	SD Detects	8.077
Median Detects	0.24	CV Detects	1.922
Skewness Detects	1.874	Kurtosis Detects	2.431
Mean of Logged Detects	-0.829	SD of Logged Detects	2.352

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.594	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.444	Lilliefors GOF Test
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	2.243	Standard Error of Mean	1.522
SD	5.918	95% KM (BCA) UCL	5.148
95% KM (t) UCL	4.901	95% KM (Percentile Bootstrap) UCL	4.804
95% KM (z) UCL	4.747	95% KM Bootstrap t UCL	65.66
90% KM Chebyshev UCL	6.81	95% KM Chebyshev UCL	8.879
97.5% KM Chebyshev UCL	11.75	99% KM Chebyshev UCL	17.39

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.942	Anderson-Darling GOF Test
5% A-D Critical Value	0.807	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.327	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.301	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.304	k star (bias corrected MLE)	0.277
Theta hat (MLE)	13.83	Theta star (bias corrected MLE)	15.19
nu hat (MLE)	5.469	nu star (bias corrected)	4.98
MLE Mean (bias corrected)	4.202	MLE Sd (bias corrected)	7.989

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.144	nu hat (KM)	4.884
Approximate Chi Square Value (4.88, α)	1.099	Adjusted Chi Square Value (4.88, β)	0.926
95% Gamma Approximate KM-UCL (use when n>=50)	9.968	95% Gamma Adjusted KM-UCL (use when n<50)	11.83

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.229
Maximum	22	Median	0.0225
SD	6.105	CV	2.739
k hat (MLE)	0.214	k star (bias corrected MLE)	0.215
Theta hat (MLE)	10.43	Theta star (bias corrected MLE)	10.36
nu hat (MLE)	7.266	nu star (bias corrected)	7.317
MLE Mean (bias corrected)	2.229	MLE Sd (bias corrected)	4.805
		Adjusted Level of Significance (β)	0.0346
Approximate Chi Square Value (7.32, α)	2.346	Adjusted Chi Square Value (7.32, β)	2.062
95% Gamma Approximate UCL (use when n>=50)	6.952	95% Gamma Adjusted UCL (use when n<50)	7.91

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.906	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.191	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.231	Mean in Log Scale	-2.586
SD in Original Scale	6.105	SD in Log Scale	2.59
95% t UCL (assumes normality of ROS data)	4.816	95% Percentile Bootstrap UCL	4.822
95% BCA Bootstrap UCL	5.972	95% Bootstrap t UCL	72.62
95% H-UCL (Log ROS)	7.57E+01		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.143	95% H-UCL (KM -Log)	15.77
KM SD (logged)	2.169	95% Critical H Value (KM-Log)	4.701
KM Standard Error of Mean (logged)	0.565		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.279	Mean in Log Scale	-1.894
SD in Original Scale	6.088	SD in Log Scale	2.165
95% t UCL (Assumes normality)	4.857	95% H-Stat UCL	19.86

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	17.39

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1245TCB

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Number of Detects	8	Number of Non-Detects	7
Number of Distinct Detects	8	Number of Distinct Non-Detects	7
Minimum Detect	0.097	Minimum Non-Detect	0.05
Maximum Detect	210	Maximum Non-Detect	0.065
Variance Detects	5354	Percent Non-Detects	46.67%
Mean Detects	30.7	SD Detects	7317.00%
Median Detects	0.555	CV Detects	2.383
Skewness Detects	2.725	Kurtosis Detects	7.519
Mean of Logged Detects	0.183	SD of Logged Detects	2.95

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.503	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.818	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.391	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.313	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	16.4	Standard Error of Mean	14.43
SD	52.27	95% KM (BCA) UCL	44.4
95% KM (t) UCL	41.81	95% KM (Percentile Bootstrap) UCL	42.61
95% KM (z) UCL	40.13	95% KM Bootstrap t UCL	822.4
90% KM Chebyshev UCL	59.68	95% KM Chebyshev UCL	79.29
97.5% KM Chebyshev UCL	106.5	99% KM Chebyshev UCL	160

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.886	Anderson-Darling GOF Test	
5% A-D Critical Value	0.827	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.268	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.322	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.223	k star (bias corrected MLE)	0.223
Theta hat (MLE)	137.6	Theta star (bias corrected MLE)	137.8
nu hat (MLE)	3.57	nu star (bias corrected)	3.565
MLE Mean (bias corrected)	30.7	MLE Sd (bias corrected)	65.05

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0984	nu hat (KM)	2.953
Approximate Chi Square Value (2.95, α)	0.359	Adjusted Chi Square Value (2.95, β)	0.274
95% Gamma Approximate KM-UCL (use when n>=50)	135	95% Gamma Adjusted KM-UCL (use when n<50)	176.5

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	16.38
Maximum	210	Median	0.097
SD	54.11	CV	3.303
k hat (MLE)	0.157	k star (bias corrected MLE)	0.17
Theta hat (MLE)	104.1	Theta star (bias corrected MLE)	96.14
nu hat (MLE)	4.723	nu star (bias corrected)	5.112
MLE Mean (bias corrected)	16.38	MLE Sd (bias corrected)	39.68
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (5.11, α)	1.204	Adjusted Chi Square Value (5.11, β)	0.99
95% Gamma Approximate UCL (use when n>=50)	69.54	95% Gamma Adjusted UCL (use when n<50)	84.61

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.84	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.818	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.274	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.313	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	16.38	Mean in Log Scale	-3.571
SD in Original Scale	54.11	SD in Log Scale	4.648
95% t UCL (assumes normality of ROS data)	40.99	95% Percentile Bootstrap UCL	43.13
95% BCA Bootstrap UCL	70.09	95% Bootstrap t UCL	822.3
95% H-UCL (Log ROS)	3.34E+08		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.301	95% H-UCL (KM -Log)	359.6
KM SD (logged)	2.564	95% Critical H Value (KM-Log)	5.686
KM Standard Error of Mean (logged)	0.708		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	16.39	Mean in Log Scale	-1.572
SD in Original Scale	54.11	SD in Log Scale	2.85
95% t UCL (Assumes normality)	41	95% H-Stat UCL	1426

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	44.4	95% GROS Adjusted Gamma UCL	84.61
95% Adjusted Gamma KM-UCL	176.5		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BAA

General Statistics

Total Number of Observations	27	Number of Distinct Observations	21
Number of Detects	21	Number of Non-Detects	6
Number of Distinct Detects	16	Number of Distinct Non-Detects	5
Minimum Detect	0.073	Minimum Non-Detect	0.14
Maximum Detect	87	Maximum Non-Detect	12
Variance Detects	415.8	Percent Non-Detects	22.22%
Mean Detects	6.773	SD Detects	20.39
Median Detects	0.5	CV Detects	3.011
Skewness Detects	3.598	Kurtosis Detects	13.22
Mean of Logged Detects	-0.415	SD of Logged Detects	1.835

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.368	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.459	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.193	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	5.351	Standard Error of Mean	3.501
SD	17.75	95% KM (BCA) UCL	11.72
95% KM (t) UCL	11.32	95% KM (Percentile Bootstrap) UCL	11.52
95% KM (z) UCL	11.11	95% KM Bootstrap t UCL	101.7
90% KM Chebyshev UCL	15.86	95% KM Chebyshev UCL	20.61

97.5% KM Chebyshev UCL	27.22	99% KM Chebyshev UCL	40.19

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.238	Anderson-Darling GOF Test	
5% A-D Critical Value	0.847	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.368	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.206	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.297	k star (bias corrected MLE)	0.286
Theta hat (MLE)	22.83	Theta star (bias corrected MLE)	23.67
nu hat (MLE)	12.46	nu star (bias corrected)	12.02
MLE Mean (bias corrected)	6.773	MLE Sd (bias corrected)	12.66

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0909	nu hat (KM)	4.907
Approximate Chi Square Value (4.91, α)	1.109	Adjusted Chi Square Value (4.91, β)	1
95% Gamma Approximate KM-UCL (use when n>=50)	23.67	95% Gamma Adjusted KM-UCL (use when n<50)	26.25

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	5.285
Maximum	87	Median	0.25
SD	18.11	CV	3.426
k hat (MLE)	0.248	k star (bias corrected MLE)	0.245
Theta hat (MLE)	21.35	Theta star (bias corrected MLE)	21.59
nu hat (MLE)	13.37	nu star (bias corrected)	13.22
MLE Mean (bias corrected)	5.285	MLE Sd (bias corrected)	10.68
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (13.22, α)	6.039	Adjusted Chi Square Value (13.22, β)	5.73
95% Gamma Approximate UCL (use when n>=50)	11.57	95% Gamma Adjusted UCL (use when n<50)	12.19

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.86	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.908	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.185	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.193	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Approximate Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.335	Mean in Log Scale	-0.671
SD in Original Scale	18.09	SD in Log Scale	1.733
95% t UCL (assumes normality of ROS data)	11.27	95% Percentile Bootstrap UCL	11.76
95% BCA Bootstrap UCL	16.24	95% Bootstrap t UCL	104.8
95% H-UCL (Log ROS)	7.818		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.671	95% H-UCL (KM -Log)	7.311
KM SD (logged)	1.711	95% Critical H Value (KM-Log)	3.568
KM Standard Error of Mean (logged)	0.347		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.766	Mean in Log Scale	-0.406
SD in Original Scale	18.03	SD in Log Scale	1.807
95% t UCL (Assumes normality)	11.69	95% H-Stat UCL	12.74

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
99% KM (Chebyshev) UCL 40.19

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BAP

General Statistics

Total Number of Observations	27	Number of Distinct Observations	26
Number of Detects	20	Number of Non-Detects	7
Number of Distinct Detects	20	Number of Distinct Non-Detects	6
Minimum Detect	0.03	Minimum Non-Detect	0.12
Maximum Detect	82	Maximum Non-Detect	12
Variance Detects	349.2	Percent Non-Detects	25.93%
Mean Detects	6.129	SD Detects	18.69
Median Detects	0.505	CV Detects	3.049
Skewness Detects	3.948	Kurtosis Detects	16.18
Mean of Logged Detects	-0.352	SD of Logged Detects	1.869

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.361	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.446	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.198	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	4.615	Standard Error of Mean	3.137
SD	15.89	95% KM (BCA) UCL	10.77
95% KM (t) UCL	9.966	95% KM (Percentile Bootstrap) UCL	10.41
95% KM (z) UCL	9.776	95% KM Bootstrap t UCL	66.54
90% KM Chebyshev UCL	14.03	95% KM Chebyshev UCL	18.29
97.5% KM Chebyshev UCL	24.21	99% KM Chebyshev UCL	35.83

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.504	Anderson-Darling GOF Test	
5% A-D Critical Value	0.841	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.352	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.21	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.316	k star (bias corrected MLE)	0.302
Theta hat (MLE)	19.41	Theta star (bias corrected MLE)	20.31
nu hat (MLE)	12.63	nu star (bias corrected)	12.07
MLE Mean (bias corrected)	6.129	MLE Sd (bias corrected)	11.16

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0844	nu hat (KM)	4.557
Approximate Chi Square Value (4.56, α)	0.953	Adjusted Chi Square Value (4.56, β)	0.855
95% Gamma Approximate KM-UCL (use when n>=50)	22.06	95% Gamma Adjusted KM-UCL (use when n<50)	24.59

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.543
Maximum	82	Median	0.28
SD	16.21	CV	3.567

k hat (MLE)	0.241	k star (bias corrected MLE)	0.239
Theta hat (MLE)	18.87	Theta star (bias corrected MLE)	19.03
nu hat (MLE)	13	nu star (bias corrected)	12.89
MLE Mean (bias corrected)	4.543	MLE Sd (bias corrected)	9.299
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (12.89, α)	5.818	Adjusted Chi Square Value (12.89, β)	5.516
95% Gamma Approximate UCL (use when n>=50)	10.06	95% Gamma Adjusted UCL (use when n<50)	10.62

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.929	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.905	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.18	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.198	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.591	Mean in Log Scale	-0.827
SD in Original Scale	16.19	SD in Log Scale	1.87
95% t UCL (assumes normality of ROS data)	9.906	95% Percentile Bootstrap UCL	10.42
95% BCA Bootstrap UCL	13.66	95% Bootstrap t UCL	69.24
95% H-UCL (Log ROS)	10.21		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.818	95% H-UCL (KM -Log)	10.07
KM SD (logged)	1.863	95% Critical H Value (KM-Log)	3.812
KM Standard Error of Mean (logged)	0.384		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.015	Mean in Log Scale	-0.499
SD in Original Scale	16.15	SD in Log Scale	1.867
95% t UCL (Assumes normality)	10.32	95% H-Stat UCL	14.06

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	35.83

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BBF

General Statistics

Total Number of Observations	27	Number of Distinct Observations	22
Number of Detects	23	Number of Non-Detects	4
Number of Distinct Detects	20	Number of Distinct Non-Detects	3
Minimum Detect	0.041	Minimum Non-Detect	0.47
Maximum Detect	58	Maximum Non-Detect	1200.00%
Variance Detects	169.6	Percent Non-Detects	14.81%
Mean Detects	4.862	SD Detects	13.02
Median Detects	0.78	CV Detects	2.678
Skewness Detects	3.67	Kurtosis Detects	13.83
Mean of Logged Detects	-0.0894	SD of Logged Detects	1.707

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.395	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.914	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.451	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.185	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	4.242	Standard Error of Mean	2.334
SD	11.85	95% KM (BCA) UCL	8.714
95% KM (t) UCL	8.223	95% KM (Percentile Bootstrap) UCL	8.154
95% KM (z) UCL	8.081	95% KM Bootstrap t UCL	34.72
90% KM Chebyshev UCL	11.24	95% KM Chebyshev UCL	14.42
97.5% KM Chebyshev UCL	18.82	99% KM Chebyshev UCL	27.46

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	2.294	Anderson-Darling GOF Test	
5% A-D Critical Value	0.828	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.326	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.195	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.395	k star (bias corrected MLE)	0.372
Theta hat (MLE)	12.32	Theta star (bias corrected MLE)	13.06
nu hat (MLE)	18.16	nu star (bias corrected)	17.12
MLE Mean (bias corrected)	4.862	MLE Sd (bias corrected)	7.969

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.128	nu hat (KM)	6.916
Approximate Chi Square Value (6.92, α)	2.125	Adjusted Chi Square Value (6.92, β)	1.959
95% Gamma Approximate KM-UCL (use when n>=50)	13.81	95% Gamma Adjusted KM-UCL (use when n<50)	14.98

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.21
Maximum	58	Median	0.5
SD	12.09	CV	2.871
k hat (MLE)	0.338	k star (bias corrected MLE)	0.325
Theta hat (MLE)	12.47	Theta star (bias corrected MLE)	12.96
nu hat (MLE)	18.23	nu star (bias corrected)	17.54
MLE Mean (bias corrected)	4.21	MLE Sd (bias corrected)	7.387
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (17.54, α)	9.06	Adjusted Chi Square Value (17.54, β)	8.671
95% Gamma Approximate UCL (use when n>=50)	8.151	95% Gamma Adjusted UCL (use when n<50)	8.517

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.941	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.914	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.173	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.185	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.214	Mean in Log Scale	-0.238
SD in Original Scale	12.08	SD in Log Scale	1.643
95% t UCL (assumes normality of ROS data)	8.18	95% Percentile Bootstrap UCL	8.511
95% BCA Bootstrap UCL	11.2	95% Bootstrap t UCL	36.58
95% H-UCL (Log ROS)	9.275		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.241	95% H-UCL (KM -Log)	9.488
KM SD (logged)	1.652	95% Critical H Value (KM-Log)	3.475
KM Standard Error of Mean (logged)	0.338		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.604	Mean in Log Scale	-0.0499

SD in Original Scale	12.05	SD in Log Scale	1.696
95% t UCL (Assumes normality)	8.558	95% H-Stat UCL	13.03

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
99% KM (Chebyshev) UCL 27.46

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

DAHA

General Statistics

Total Number of Observations	23	Number of Distinct Observations	21
Number of Detects	16	Number of Non-Detects	7
Number of Distinct Detects	16	Number of Distinct Non-Detects	7
Minimum Detect	0.01	Minimum Non-Detect	0.12
Maximum Detect	4.9	Maximum Non-Detect	0.47
Variance Detects	1.437	Percent Non-Detects	30.43%
Mean Detects	0.495	SD Detects	1.199
Median Detects	0.109	CV Detects	2.424
Skewness Detects	3.751	Kurtosis Detects	14.49
Mean of Logged Detects	-2.045	SD of Logged Detects	1.596

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.419	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.39	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.371	Standard Error of Mean	0.213
SD	0.987	95% KM (BCA) UCL	0.791
95% KM (t) UCL	0.736	95% KM (Percentile Bootstrap) UCL	0.786
95% KM (z) UCL	0.721	95% KM Bootstrap t UCL	2.321
90% KM Chebyshev UCL	1.009	95% KM Chebyshev UCL	1.298
97.5% KM Chebyshev UCL	1.7	99% KM Chebyshev UCL	2.488

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.035	Anderson-Darling GOF Test	
5% A-D Critical Value	0.801	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.213	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.228	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.477	k star (bias corrected MLE)	0.429
Theta hat (MLE)	1.036	Theta star (bias corrected MLE)	1.152
nu hat (MLE)	15.27	nu star (bias corrected)	13.74
MLE Mean (bias corrected)	0.495	MLE Sd (bias corrected)	0.755

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.141	nu hat (KM)	6.488
Approximate Chi Square Value (6.49, α)	1.894	Adjusted Chi Square Value (6.49, β)	1.72
95% Gamma Approximate KM-UCL (use when n>=50)	1.27	95% Gamma Adjusted KM-UCL (use when n<50)	1.398

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.347
Maximum	4.9	Median	0.058
SD	1.016	CV	2.926
k hat (MLE)	0.376	k star (bias corrected MLE)	0.356
Theta hat (MLE)	0.922	Theta star (bias corrected MLE)	0.974
nu hat (MLE)	17.31	nu star (bias corrected)	16.39
MLE Mean (bias corrected)	0.347	MLE Sd (bias corrected)	0.582
		Adjusted Level of Significance (β)	0.0389
Approximate Chi Square Value (16.39, α)	8.237	Adjusted Chi Square Value (16.39, β)	7.819
95% Gamma Approximate UCL (use when n>=50)	0.691	95% Gamma Adjusted UCL (use when n<50)	0.727

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.975	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.0925	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.363	Mean in Log Scale	-2.283
SD in Original Scale	1.011	SD in Log Scale	1.376
95% t UCL (assumes normality of ROS data)	0.724	95% Percentile Bootstrap UCL	0.758
95% BCA Bootstrap UCL	1.022	95% Bootstrap t UCL	2.693
95% H-UCL (Log ROS)	0.645		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-2.305	95% H-UCL (KM -Log)	0.783
KM SD (logged)	1.461	95% Critical H Value (KM-Log)	3.188
KM Standard Error of Mean (logged)	0.346		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.387	Mean in Log Scale	-2.06
SD in Original Scale	1.004	SD in Log Scale	1.356
95% t UCL (Assumes normality)	0.747	95% H-Stat UCL	0.766

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	0.791	95% GROS Adjusted Gamma UCL	0.727
95% Adjusted Gamma KM-UCL	1.398		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ICDP

General Statistics

Total Number of Observations	27	Number of Distinct Observations	24
Number of Detects	19	Number of Non-Detects	8
Number of Distinct Detects	17	Number of Distinct Non-Detects	7
Minimum Detect	0.032	Minimum Non-Detect	0.13
Maximum Detect	54	Maximum Non-Detect	12
Variance Detects	154.8	Percent Non-Detects	29.63%
Mean Detects	4.304	SD Detects	12.44
Median Detects	0.57	CV Detects	2.891
Skewness Detects	3.96	Kurtosis Detects	16.23
Mean of Logged Detects	-0.432	SD of Logged Detects	1.823

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.373	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.419	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.203	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	3.108	Standard Error of Mean	2.043
SD	10.33	95% KM (BCA) UCL	7.158
95% KM (t) UCL	6.591	95% KM (Percentile Bootstrap) UCL	7.13
95% KM (z) UCL	6.467	95% KM Bootstrap t UCL	34.26
90% KM Chebyshev UCL	9.235	95% KM Chebyshev UCL	12.01
97.5% KM Chebyshev UCL	15.86	99% KM Chebyshev UCL	23.43

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.822	Anderson-Darling GOF Test	
5% A-D Critical Value	0.832	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.283	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.214	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.355	k star (bias corrected MLE)	0.334
Theta hat (MLE)	12.13	Theta star (bias corrected MLE)	12.89
nu hat (MLE)	13.48	nu star (bias corrected)	12.69
MLE Mean (bias corrected)	4.304	MLE Sd (bias corrected)	7.449

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0906	nu hat (KM)	4.89
Approximate Chi Square Value (4.89, α)	1.102	Adjusted Chi Square Value (4.89, β)	0.993
95% Gamma Approximate KM-UCL (use when n>=50)	13.79	95% Gamma Adjusted KM-UCL (use when n<50)	15.3

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	3.038
Maximum	54	Median	0.22
SD	10.54	CV	3.47
k hat (MLE)	0.264	k star (bias corrected MLE)	0.259
Theta hat (MLE)	11.53	Theta star (bias corrected MLE)	11.73
nu hat (MLE)	14.23	nu star (bias corrected)	13.98
MLE Mean (bias corrected)	3.038	MLE Sd (bias corrected)	5.97
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (13.98, α)	6.56	Adjusted Chi Square Value (13.98, β)	6.236
95% Gamma Approximate UCL (use when n>=50)	6.475	95% Gamma Adjusted UCL (use when n<50)	6.812

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.962	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.12	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.203	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.081	Mean in Log Scale	-0.928
SD in Original Scale	10.53	SD in Log Scale	1.764
95% t UCL (assumes normality of ROS data)	6.537	95% Percentile Bootstrap UCL	6.898
95% BCA Bootstrap UCL	9.453	95% Bootstrap t UCL	38.56
95% H-UCL (Log ROS)	6.627		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.929	95% H-UCL (KM -Log)	7.118
KM SD (logged)	1.787	95% Critical H Value (KM-Log)	3.691
KM Standard Error of Mean (logged)	0.375		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.516	Mean in Log Scale	-0.583
SD in Original Scale	10.52	SD in Log Scale	1.797
95% t UCL (Assumes normality)	6.969	95% H-Stat UCL	10.35

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	23.43

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

NAP

General Statistics

Total Number of Observations	27	Number of Distinct Observations	25
Number of Detects	20	Number of Non-Detects	7
Number of Distinct Detects	20	Number of Distinct Non-Detects	6
Minimum Detect	0.034	Minimum Non-Detect	0.043
Maximum Detect	110	Maximum Non-Detect	12
Variance Detects	597.7	Percent Non-Detects	25.93%
Mean Detects	6.273	SD Detects	24.45
Median Detects	0.275	CV Detects	3.897
Skewness Detects	4.452	Kurtosis Detects	19.87
Mean of Logged Detects	-0.833	SD of Logged Detects	1.885

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.268	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.905	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.466	Lilliefors GOF Test
5% Lilliefors Critical Value	0.198	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	4.711	Standard Error of Mean	4.084
SD	20.68	95% KM (BCA) UCL	12.79
95% KM (t) UCL	11.68	95% KM (Percentile Bootstrap) UCL	12.76
95% KM (z) UCL	11.43	95% KM Bootstrap t UCL	136.1
90% KM Chebyshev UCL	16.96	95% KM Chebyshev UCL	22.51
97.5% KM Chebyshev UCL	30.22	99% KM Chebyshev UCL	45.35

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	3.146	Anderson-Darling GOF Test
5% A-D Critical Value	0.862	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.342	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.212	Detected Data Not Gamma Distributed at 5% Significance Level

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.264	k star (bias corrected MLE)	0.258
Theta hat (MLE)	23.78	Theta star (bias corrected MLE)	24.35
nu hat (MLE)	10.55	nu star (bias corrected)	10.3
MLE Mean (bias corrected)	6.273	MLE Sd (bias corrected)	12.36

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0519	nu hat (KM)	2.803
Approximate Chi Square Value (2.80, α)	0.316	Adjusted Chi Square Value (2.80, β)	0.275
95% Gamma Approximate KM-UCL (use when n>=50)	41.73	95% Gamma Adjusted KM-UCL (use when n<50)	47.98

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	4.649
Maximum	110	Median	0.2
SD	21.09	CV	4.535
k hat (MLE)	0.217	k star (bias corrected MLE)	0.218
Theta hat (MLE)	21.42	Theta star (bias corrected MLE)	21.37
nu hat (MLE)	11.72	nu star (bias corrected)	11.75
MLE Mean (bias corrected)	4.649	MLE Sd (bias corrected)	9.967
		Adjusted Level of Significance (β)	0.0401
Approximate Chi Square Value (11.75, α)	5.063	Adjusted Chi Square Value (11.75, β)	4.784
95% Gamma Approximate UCL (use when n>=50)	10.79	95% Gamma Adjusted UCL (use when n<50)	11.42

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.906	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.905	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.143	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.198	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.682	Mean in Log Scale	-1.282
SD in Original Scale	21.08	SD in Log Scale	1.866
95% t UCL (assumes normality of ROS data)	11.6	95% Percentile Bootstrap UCL	12.77
95% BCA Bootstrap UCL	16.97	95% Bootstrap t UCL	188.3
95% H-UCL (Log ROS)	6.398		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.245	95% H-UCL (KM -Log)	5.838
KM SD (logged)	1.825	95% Critical H Value (KM-Log)	3.752
KM Standard Error of Mean (logged)	0.374		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.11	Mean in Log Scale	-0.959
SD in Original Scale	21.04	SD in Log Scale	1.95
95% t UCL (Assumes normality)	12.02	95% H-Stat UCL	11.64

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use
99% KM (Chebyshev) UCL 45.35

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1254

General Statistics

Total Number of Observations	23	Number of Distinct Observations	19
Number of Detects	2	Number of Non-Detects	21
Number of Distinct Detects	2	Number of Distinct Non-Detects	18
Minimum Detect	0.034	Minimum Non-Detect	0.003

Maximum Detect	0.63	Maximum Non-Detect	1.3
Variance Detects	0.178	Percent Non-Detects	91.30%
Mean Detects	0.332	SD Detects	0.421
Median Detects	0.332	CV Detects	1.269
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	-1.922	SD of Logged Detects	2.064

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.0335	Standard Error of Mean	0.0393
SD	0.13	95% KM (BCA) UCL	N/A
95% KM (t) UCL	0.101	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	0.0982	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	0.151	95% KM Chebyshev UCL	0.205
97.5% KM Chebyshev UCL	0.279	99% KM Chebyshev UCL	0.425

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	0.733	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.453	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	2.932	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0659	nu hat (KM)	3.031
		Adjusted Level of Significance (β)	0.0389
Approximate Chi Square Value (3.03, α)	0.382	Adjusted Chi Square Value (3.03, β)	0.327
95% Gamma Approximate KM-UCL (use when n>=50)	0.266	95% Gamma Adjusted KM-UCL (use when n<50)	0.311

Gamma (KM) may not be used when k hat (KM) is < 0.1

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.0289	Mean in Log Scale	-10.35
SD in Original Scale	0.131	SD in Log Scale	2.915
95% t UCL (assumes normality of ROS data)	0.0759	95% Percentile Bootstrap UCL	0.0837
95% BCA Bootstrap UCL	0.111	95% Bootstrap t UCL	83.34
95% H-UCL (Log ROS)	0.0736		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.0727	Mean in Log Scale	-3.907
SD in Original Scale	0.18	SD in Log Scale	1.315
95% t UCL (Assumes normality)	0.137	95% H-Stat UCL	0.11

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	0.425

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1260

General Statistics

Total Number of Observations	23	Number of Distinct Observations	20
Number of Detects	6	Number of Non-Detects	17
Number of Distinct Detects	6	Number of Distinct Non-Detects	15
Minimum Detect	0.022	Minimum Non-Detect	0.0029
Maximum Detect	4.20E+00	Maximum Non-Detect	1.30E+00
Variance Detects	2.781	Percent Non-Detects	73.91%
Mean Detects	8.01E-01	SD Detects	166.80%
Median Detects	1.17E-01	CV Detects	2.082
Skewness Detects	2.43E+00	Kurtosis Detects	5.933
Mean of Logged Detects	-1.798	SD of Logged Detects	1.806

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.547	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.454	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.214	Standard Error of Mean	0.195
SD	8.52E-01	95% KM (BCA) UCL	5.80E-01
95% KM (t) UCL	5.49E-01	95% KM (Percentile Bootstrap) UCL	5.75E-01
95% KM (z) UCL	5.35E-01	95% KM Bootstrap t UCL	4.18E+00
90% KM Chebyshev UCL	7.98E-01	95% KM Chebyshev UCL	1.063
97.5% KM Chebyshev UCL	1.43E+00	99% KM Chebyshev UCL	2.152

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.76	Anderson-Darling GOF Test	
5% A-D Critical Value	0.749	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.341	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.352	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.415	k star (bias corrected MLE)	0.319
Theta hat (MLE)	1.931	Theta star (bias corrected MLE)	2.515
nu hat (MLE)	4.979	nu star (bias corrected)	3.823
MLE Mean (bias corrected)	0.801	MLE Sd (bias corrected)	1.419

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.0632	nu hat (KM)	2.908
Approximate Chi Square Value (2.91, α)	0.346	Adjusted Chi Square Value (2.91, β)	0.295
95% Gamma Approximate KM-UCL (use when n>=50)	1.803	95% Gamma Adjusted KM-UCL (use when n<50)	2.11

Gamma (KM) may not be used when k hat (KM) is < 0.1

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.00E-02	Mean	0.216
Maximum	4.2	Median	1.00E-02
SD	0.871	CV	4.024
k hat (MLE)	0.295	k star (bias corrected MLE)	0.286
Theta hat (MLE)	0.733	Theta star (bias corrected MLE)	0.758
nu hat (MLE)	13.58	nu star (bias corrected)	13.14
MLE Mean (bias corrected)	0.216	MLE Sd (bias corrected)	0.405
		Adjusted Level of Significance (β)	0.0389
Approximate Chi Square Value (13.14, α)	5.987	Adjusted Chi Square Value (13.14, β)	5.639
95% Gamma Approximate UCL (use when n>=50)	0.475	95% Gamma Adjusted UCL (use when n<50)	0.504

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.916	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.211	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.10E-01	Mean in Log Scale	-5.621
SD in Original Scale	8.72E-01	SD in Log Scale	2.558
95% t UCL (assumes normality of ROS data)	5.22E-01	95% Percentile Bootstrap UCL	5.69E-01
95% BCA Bootstrap UCL	0.772	95% Bootstrap t UCL	5.186
95% H-UCL (Log ROS)	1.458		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-4.569	95% H-UCL (KM -Log)	0.385
KM SD (logged)	1.968	95% Critical H Value (KM-Log)	3.999
KM Standard Error of Mean (logged)	0.503		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.48E-01	Mean in Log Scale	-3.648
SD in Original Scale	8.73E-01	SD in Log Scale	1.819
95% t UCL (Assumes normality)	5.60E-01	95% H-Stat UCL	0.585

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.549	95% GROS Adjusted Gamma UCL	0.504
95% Adjusted Gamma KM-UCL	2.11		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

TCDD

General Statistics

Total Number of Observations	21	Number of Distinct Observations	20
Number of Detects	15	Number of Non-Detects	6
Number of Distinct Detects	15	Number of Distinct Non-Detects	5
Minimum Detect	1.47E-06	Minimum Non-Detect	3.70E-05
Maximum Detect	0.00415	Maximum Non-Detect	6.70E-04
Variance Detects	1.10E-06	Percent Non-Detects	28.57%
Mean Detects	5.14E-04	SD Detects	0%
Median Detects	1.77E-04	CV Detects	2.044
Skewness Detects	3.391	Kurtosis Detects	12.11
Mean of Logged Detects	-8.919	SD of Logged Detects	1.938

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.498	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.367	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	3.97E-04	Standard Error of Mean	1.99E-04
SD	8.79E-04	95% KM (BCA) UCL	8.02E-04
95% KM (t) UCL	7.41E-04	95% KM (Percentile Bootstrap) UCL	7.47E-04
95% KM (z) UCL	7.25E-04	95% KM Bootstrap t UCL	0.00183
90% KM Chebyshev UCL	9.95E-04	95% KM Chebyshev UCL	0.00127

97.5% KM Chebyshev UCL	0.00164	99% KM Chebyshev UCL	0.00238

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.523	Anderson-Darling GOF Test	
5% A-D Critical Value	0.798	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.211	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.235	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.476	k star (bias corrected MLE)	0.425
Theta hat (MLE)	0.00108	Theta star (bias corrected MLE)	0.00121
nu hat (MLE)	14.28	nu star (bias corrected)	12.76
MLE Mean (bias corrected)	5.14E-04	MLE Sd (bias corrected)	7.87E-04

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.204	nu hat (KM)	8.586
Approximate Chi Square Value (8.59, α)	3.079	Adjusted Chi Square Value (8.59, β)	2.831
95% Gamma Approximate KM-UCL (use when n>=50)	0.00111	95% Gamma Adjusted KM-UCL (use when n<50)	0.00121

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.47E-06	Mean	0.00322
Maximum	0.01	Median	3.32E-04
SD	0.00448	CV	1.389
k hat (MLE)	0.346	k star (bias corrected MLE)	0.328
Theta hat (MLE)	0.00933	Theta star (bias corrected MLE)	0.00983
nu hat (MLE)	14.52	nu star (bias corrected)	13.78
MLE Mean (bias corrected)	0.00322	MLE Sd (bias corrected)	0.00563
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (13.78, α)	6.42	Adjusted Chi Square Value (13.78, β)	6.037
95% Gamma Approximate UCL (use when n>=50)	0.00692	95% Gamma Adjusted UCL (use when n<50)	0.00736

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.957	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.184	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	3.83E-04	Mean in Log Scale	-9.256
SD in Original Scale	9.04E-04	SD in Log Scale	1.782
95% t UCL (assumes normality of ROS data)	7.23E-04	95% Percentile Bootstrap UCL	7.42E-04
95% BCA Bootstrap UCL	9.64E-04	95% Bootstrap t UCL	0.00186
95% H-UCL (Log ROS)	0.0021		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-9.309	95% H-UCL (KM -Log)	0.00393
KM SD (logged)	1.978	95% Critical H Value (KM-Log)	4.103
KM Standard Error of Mean (logged)	0.505		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.31E-04	Mean in Log Scale	-8.863
SD in Original Scale	8.91E-04	SD in Log Scale	1.72
95% t UCL (Assumes normality)	7.67E-04	95% H-Stat UCL	0.00255

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	0.00127	95% GROS Adjusted Gamma UCL	0.00736
95% Adjusted Gamma KM-UCL	0.00121		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Sb

General Statistics

Total Number of Observations	20	Number of Distinct Observations	19
Number of Detects	10	Number of Non-Detects	10
Number of Distinct Detects	10	Number of Distinct Non-Detects	9
Minimum Detect	1.25	Minimum Non-Detect	3.1
Maximum Detect	202	Maximum Non-Detect	34.3
Variance Detects	3796	Percent Non-Detects	50%
Mean Detects	35.22	SD Detects	61.61
Median Detects	9.3	CV Detects	1.75
Skewness Detects	2.654	Kurtosis Detects	7.47
Mean of Logged Detects	2.396	SD of Logged Detects	1.628

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.605	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.301	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	19.3	Standard Error of Mean	10.48
SD	44.36	95% KM (BCA) UCL	37.88
95% KM (t) UCL	37.41	95% KM (Percentile Bootstrap) UCL	37.27
95% KM (z) UCL	36.53	95% KM Bootstrap t UCL	72.8
90% KM Chebyshev UCL	50.73	95% KM Chebyshev UCL	64.96
97.5% KM Chebyshev UCL	84.72	99% KM Chebyshev UCL	123.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.546	Anderson-Darling GOF Test	
5% A-D Critical Value	0.774	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.231	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.28	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.539	k star (bias corrected MLE)	0.444
Theta hat (MLE)	65.34	Theta star (bias corrected MLE)	79.32
nu hat (MLE)	10.78	nu star (bias corrected)	8.879
MLE Mean (bias corrected)	35.22	MLE Sd (bias corrected)	52.85

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.189	nu hat (KM)	7.57
Approximate Chi Square Value (7.57, α)	2.489	Adjusted Chi Square Value (7.57, β)	2.264
95% Gamma Approximate KM-UCL (use when n>=50)	58.7	95% Gamma Adjusted KM-UCL (use when n<50)	64.51

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	17.7
Maximum	202	Median	1.511
SD	46.05	CV	2.602

k hat (MLE)	0.198	k star (bias corrected MLE)	0.202
Theta hat (MLE)	89.32	Theta star (bias corrected MLE)	87.73
nu hat (MLE)	7.927	nu star (bias corrected)	8.071
MLE Mean (bias corrected)	17.7	MLE Sd (bias corrected)	39.41
		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (8.07, α)	2.776	Adjusted Chi Square Value (8.07, β)	2.536
95% Gamma Approximate UCL (use when n>=50)	51.46	95% Gamma Adjusted UCL (use when n<50)	56.33

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.952	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.195	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	18.98	Mean in Log Scale	1.644
SD in Original Scale	45.57	SD in Log Scale	1.406
95% t UCL (assumes normality of ROS data)	36.6	95% Percentile Bootstrap UCL	37.93
95% BCA Bootstrap UCL	48.92	95% Bootstrap t UCL	78.07
95% H-UCL (Log ROS)	39.89		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.665	95% H-UCL (KM -Log)	39.81
KM SD (logged)	1.397	95% Critical H Value (KM-Log)	3.253
KM Standard Error of Mean (logged)	0.36		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	21.32	Mean in Log Scale	2.066
SD in Original Scale	44.87	SD in Log Scale	1.305
95% t UCL (Assumes normality)	38.67	95% H-Stat UCL	46.83

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	37.41	95% GROS Adjusted Gamma UCL	56.33
95% Adjusted Gamma KM-UCL	64.51		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

As

General Statistics

Total Number of Observations	20	Number of Distinct Observations	18
Number of Detects	13	Number of Non-Detects	7
Number of Distinct Detects	13	Number of Distinct Non-Detects	6
Minimum Detect	2.53	Minimum Non-Detect	2.1
Maximum Detect	54.9	Maximum Non-Detect	32.7
Variance Detects	290.6	Percent Non-Detects	35.00%
Mean Detects	15.29	SD Detects	17.05
Median Detects	6	CV Detects	1.115
Skewness Detects	1.519	Kurtosis Detects	1.242
Mean of Logged Detects	2.213	SD of Logged Detects	1.026

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.75	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.866	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.28	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.246	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	11.4	Standard Error of Mean	3.358
SD	14.33	95% KM (BCA) UCL	16.8
95% KM (t) UCL	17.2	95% KM (Percentile Bootstrap) UCL	16.99
95% KM (z) UCL	16.92	95% KM Bootstrap t UCL	21.4
90% KM Chebyshev UCL	21.47	95% KM Chebyshev UCL	26.03
97.5% KM Chebyshev UCL	32.36	99% KM Chebyshev UCL	44.8

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.816	Anderson-Darling GOF Test
5% A-D Critical Value	0.756	Detected Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.235	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.243	Detected data appear Gamma Distributed at 5% Significance Level

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.109	k star (bias corrected MLE)	0.905
Theta hat (MLE)	13.78	Theta star (bias corrected MLE)	16.9
nu hat (MLE)	28.85	nu star (bias corrected)	23.52
MLE Mean (bias corrected)	15.29	MLE Sd (bias corrected)	16.08

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.632	nu hat (KM)	25.29
Approximate Chi Square Value (25.29, α)	14.84	Adjusted Chi Square Value (25.29, β)	14.21
95% Gamma Approximate KM-UCL (use when n>=50)	19.43	95% Gamma Adjusted KM-UCL (use when n<50)	20.29

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	10.49
Maximum	54.9	Median	4.155
SD	15.15	CV	1.444
k hat (MLE)	0.464	k star (bias corrected MLE)	0.428
Theta hat (MLE)	22.58	Theta star (bias corrected MLE)	24.49
nu hat (MLE)	18.58	nu star (bias corrected)	17.13
MLE Mean (bias corrected)	10.49	MLE Sd (bias corrected)	16.03
		Adjusted Level of Significance (β)	0.038
Approximate Chi Square Value (17.13, α)	8.762	Adjusted Chi Square Value (17.13, β)	8.291
95% Gamma Approximate UCL (use when n>=50)	20.5	95% Gamma Adjusted UCL (use when n<50)	21.66

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.903	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.866	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.198	Lilliefors GOF Test
5% Lilliefors Critical Value	0.246	Detected Data appear Lognormal at 5% Significance Level

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	11.15	Mean in Log Scale	1.825
SD in Original Scale	14.76	SD in Log Scale	1.044
95% t UCL (assumes normality of ROS data)	16.86	95% Percentile Bootstrap UCL	17.1
95% BCA Bootstrap UCL	18.42	95% Bootstrap t UCL	20.94
95% H-UCL (Log ROS)	20.43		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.887	95% H-UCL (KM -Log)	18.29
KM SD (logged)	0.955	95% Critical H Value (KM-Log)	2.569
KM Standard Error of Mean (logged)	0.232		

DL/2 Statistics

DL/2 Normal	DL/2 Log-Transformed

Mean in Original Scale	12.12	Mean in Log Scale	1.932
SD in Original Scale	14.65	SD in Log Scale	1.065
95% t UCL (Assumes normality)	17.78	95% H-Stat UCL	23.73

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	16.8	95% GROS Adjusted Gamma UCL	21.66
95% Adjusted Gamma KM-UCL	20.29		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Co

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
Number of Detects	15	Number of Non-Detects	1
Number of Distinct Detects	15	Number of Distinct Non-Detects	1
Minimum Detect	1.2	Minimum Non-Detect	2.5
Maximum Detect	221	Maximum Non-Detect	2.5
Variance Detects	6804	Percent Non-Detects	6.25%
Mean Detects	76.93	SD Detects	82.49
Median Detects	39	CV Detects	1.072
Skewness Detects	0.631	Kurtosis Detects	-1.374
Mean of Logged Detects	3.312	SD of Logged Detects	1.787

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.82	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.244	Lilliefors GOF Test
5% Lilliefors Critical Value	0.229	Detected Data Not Normal at 5% Significance Level

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	72.23	Standard Error of Mean	20.51
SD	79.27	95% KM (BCA) UCL	105.5
95% KM (t) UCL	108.2	95% KM (Percentile Bootstrap) UCL	104.9
95% KM (z) UCL	106	95% KM Bootstrap t UCL	111.9
90% KM Chebyshev UCL	133.8	95% KM Chebyshev UCL	161.7
97.5% KM Chebyshev UCL	200.3	99% KM Chebyshev UCL	276.3

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.624	Anderson-Darling GOF Test
5% A-D Critical Value	0.786	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.186	Kolmogrov-Smirnoff GOF
5% K-S Critical Value	0.232	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.6	k star (bias corrected MLE)	0.524
Theta hat (MLE)	128.3	Theta star (bias corrected MLE)	146.8
nu hat (MLE)	17.99	nu star (bias corrected)	15.73
MLE Mean (bias corrected)	76.93	MLE Sd (bias corrected)	106.3

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.83	nu hat (KM)	26.57
Approximate Chi Square Value (26.57, α)	15.82	Adjusted Chi Square Value (26.57, β)	14.88
95% Gamma Approximate KM-UCL (use when n>=50)	121.3	95% Gamma Adjusted KM-UCL (use when n<50)	129

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.2	Mean	72.36
Maximum	221	Median	26.45
SD	81.75	CV	1.13
k hat (MLE)	0.571	k star (bias corrected MLE)	0.505
Theta hat (MLE)	126.8	Theta star (bias corrected MLE)	143.2
nu hat (MLE)	18.26	nu star (bias corrected)	16.17
MLE Mean (bias corrected)	72.36	MLE Sd (bias corrected)	101.8
		Adjusted Level of Significance (β)	0.0335
Approximate Chi Square Value (16.17, α)	8.083	Adjusted Chi Square Value (16.17, β)	7.439
95% Gamma Approximate UCL (use when n>=50)	144.8	95% Gamma Adjusted UCL (use when n<50)	157.3

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.904	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.195	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	72.22	Mean in Log Scale	3.137
SD in Original Scale	81.88	SD in Log Scale	1.863
95% t UCL (assumes normality of ROS data)	108.1	95% Percentile Bootstrap UCL	106.2
95% BCA Bootstrap UCL	109.9	95% Bootstrap t UCL	112.4
95% H-UCL (Log ROS)	991.4		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	3.139	95% H-UCL (KM -Log)	791.9
KM SD (logged)	1.804	95% Critical H Value (KM-Log)	4.099
KM Standard Error of Mean (logged)	0.468		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	72.2	Mean in Log Scale	3.119
SD in Original Scale	81.91	SD in Log Scale	1.891
95% t UCL (Assumes normality)	108.1	95% H-Stat UCL	1086

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	161.7	95% GROS Adjusted Gamma UCL	157.3
95% Adjusted Gamma KM-UCL	129		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Fe

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	7060	Mean	62617
Maximum	198000	Median	53500
SD	50561	Std. Error of Mean	12640
Coefficient of Variation	0.807	Skewness	1.258

Normal GOF Test

Shapiro Wilk Test Statistic	0.886	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.152	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Data appear Normal at 5% Significance Level	
Data appear Approximate Normal at 5% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	84776	95% Adjusted-CLT UCL (Chen-1995)	87655
		95% Modified-t UCL (Johnson-1978)	85438

Gamma GOF Test			
A-D Test Statistic	0.297	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.755	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.13	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.219	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	1.497	k star (bias corrected MLE)	1.258
Theta hat (MLE)	41821	Theta star (bias corrected MLE)	49768
nu hat (MLE)	47.91	nu star (bias corrected)	40.26
MLE Mean (bias corrected)	62617	MLE Sd (bias corrected)	55824
		Approximate Chi Square Value (0.05)	26.72
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	25.47

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	94341	95% Adjusted Gamma UCL (use when n<50)	98980

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.94	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.172	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.222	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	8.862	Mean of logged Data	10.68
Maximum of Logged Data	12.2	SD of logged Data	0.975

Assuming Lognormal Distribution			
95% H-UCL	136176	90% Chebyshev (MVUE) UCL	120356
95% Chebyshev (MVUE) UCL	144606	97.5% Chebyshev (MVUE) UCL	178263
99% Chebyshev (MVUE) UCL	244377		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			

Nonparametric Distribution Free UCLs			
95% CLT UCL	83408	95% Jackknife UCL	84776
95% Standard Bootstrap UCL	82371	95% Bootstrap-t UCL	90520
95% Hall's Bootstrap UCL	95397	95% Percentile Bootstrap UCL	82379
95% BCA Bootstrap UCL	87100		
90% Chebyshev(Mean, Sd) UCL	100538	95% Chebyshev(Mean, Sd) UCL	117714
97.5% Chebyshev(Mean, Sd) UCL	141555	99% Chebyshev(Mean, Sd) UCL	188386

Suggested UCL to Use	
95% Student's-t UCL	84776

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Pb

General Statistics

Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	18.5	Mean	3441
Maximum	57300	Median	230
SD	12715	Std. Error of Mean	2843
Coefficient of Variation	3.696	Skewness	4.429

Normal GOF Test

Shapiro Wilk Test Statistic	0.283	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.441	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.198	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	8357	95% Adjusted-CLT UCL (Chen-1995)	11126
		95% Modified-t UCL (Johnson-1978)	8826

Gamma GOF Test

A-D Test Statistic	2.791	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.851	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.323	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.211	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics

k hat (MLE)	0.286	k star (bias corrected MLE)	0.276
Theta hat (MLE)	12036	Theta star (bias corrected MLE)	12452
nu hat (MLE)	11.43	nu star (bias corrected)	11.05
MLE Mean (bias corrected)	3441	MLE Sd (bias corrected)	6545
		Approximate Chi Square Value (0.05)	4.61
Adjusted Level of Significance	0.038	Adjusted Chi Square Value	4.285

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	8249	95% Adjusted Gamma UCL (use when n<50)	8875

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.924	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.905	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.14	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.198	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			

Lognormal Statistics

Minimum of Logged Data	2.918	Mean of logged Data	5.712
Maximum of Logged Data	10.96	SD of logged Data	1.854

Assuming Lognormal Distribution

95% H-UCL	9404	90% Chebyshev (MVUE) UCL	3510
95% Chebyshev (MVUE) UCL	4470	97.5% Chebyshev (MVUE) UCL	5804
99% Chebyshev (MVUE) UCL	8422		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	8117	95% Jackknife UCL	8357
95% Standard Bootstrap UCL	7929	95% Bootstrap-t UCL	113368
95% Hall's Bootstrap UCL	50209	95% Percentile Bootstrap UCL	9089
95% BCA Bootstrap UCL	12605		
90% Chebyshev(Mean, Sd) UCL	11970	95% Chebyshev(Mean, Sd) UCL	15834

97.5% Chebyshev(Mean, Sd) UCL	21196	99% Chebyshev(Mean, Sd) UCL	31730

Suggested UCL to Use
95% Chebyshev (Mean, Sd) UCL 15834

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Tl

General Statistics

Total Number of Observations	19	Number of Distinct Observations	16
Number of Detects	2	Number of Non-Detects	17
Number of Distinct Detects	2	Number of Distinct Non-Detects	14
Minimum Detect	1.035	Minimum Non-Detect	1.1
Maximum Detect	1.7	Maximum Non-Detect	39.3
Variance Detects	0.221	Percent Non-Detects	89.47%
Mean Detects	1.368	SD Detects	0.47
Median Detects	1.368	CV Detects	0.344
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	0.283	SD of Logged Detects	0.351

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.146	Standard Error of Mean	0.143
SD	0.248	95% KM (BCA) UCL	N/A
95% KM (t) UCL	1.394	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	1.381	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	1.575	95% KM Chebyshev UCL	1.77
97.5% KM Chebyshev UCL	2.039	99% KM Chebyshev UCL	2.57

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	16.57	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.0825	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	66.3	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	21.38	nu hat (KM)	812.3
		Adjusted Level of Significance (β)	0.0369
Approximate Chi Square Value (812.30, α)	747.2	Adjusted Chi Square Value (812.30, β)	741.7
95% Gamma Approximate KM-UCL (use when n>=50)	1.246	95% Gamma Adjusted KM-UCL (use when n<50)	1.255

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.122	Mean in Log Scale	0.105
SD in Original Scale	0.171	SD in Log Scale	0.136
95% t UCL (assumes normality of ROS data)	1.19	95% Percentile Bootstrap UCL	1.189
95% BCA Bootstrap UCL	1.213	95% Bootstrap t UCL	1.251
95% H-UCL (Log ROS)	1.186		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	3.744	Mean in Log Scale	0.765
SD in Original Scale	5.158	SD in Log Scale	0.993
95% t UCL (Assumes normality)	5.796	95% H-Stat UCL	6.47

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.394	95% KM (% Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

V

General Statistics

Total Number of Observations	16	Number of Distinct Observations	16
		Number of Missing Observations	0
Minimum	10.3	Mean	495.3
Maximum	1670	Median	237.5
SD	565.6	Std. Error of Mean	141.4
Coefficient of Variation	1.142	Skewness	0.951

Normal GOF Test

Shapiro Wilk Test Statistic	0.826	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.232	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Data Not Normal at 5% Significance Level	

Data Not Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	743.2	95% Adjusted-CLT UCL (Chen-1995)	763.8
		95% Modified-t UCL (Johnson-1978)	748.8

Gamma GOF Test

A-D Test Statistic	0.553	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.791	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.169	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.226	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	0.561	k star (bias corrected MLE)	0.498
Theta hat (MLE)	882.5	Theta star (bias corrected MLE)	995.2
nu hat (MLE)	17.96	nu star (bias corrected)	15.93
MLE Mean (bias corrected)	495.3	MLE Sd (bias corrected)	702.1
		Approximate Chi Square Value (0.05)	7.911
Adjusted Level of Significance	0.0335	Adjusted Chi Square Value	7.275

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50)	997.3	95% Adjusted Gamma UCL (use when n<50)	1084

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.898	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.887	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.173	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.222	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.332	Mean of logged Data	5.093
Maximum of Logged Data	7.421	SD of logged Data	1.843

Assuming Lognormal Distribution

95% H-UCL	6487	90% Chebyshev (MVUE) UCL	1852
95% Chebyshev (MVUE) UCL	2370	97.5% Chebyshev (MVUE) UCL	3090
99% Chebyshev (MVUE) UCL	4502		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	727.9	95% Jackknife UCL	743.2
95% Standard Bootstrap UCL	717.5	95% Bootstrap-t UCL	802.2
95% Hall's Bootstrap UCL	736.3	95% Percentile Bootstrap UCL	728
95% BCA Bootstrap UCL	757.9		
90% Chebyshev(Mean, Sd) UCL	919.5	95% Chebyshev(Mean, Sd) UCL	1112
97.5% Chebyshev(Mean, Sd) UCL	1378	99% Chebyshev(Mean, Sd) UCL	1902

Suggested UCL to Use
95% Adjusted Gamma UCL 1084

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Zn

General Statistics

Total Number of Observations	20	Number of Distinct Observations	20
		Number of Missing Observations	0
Minimum	29.25	Mean	2701
Maximum	45300	Median	212
SD	10064	Std. Error of Mean	2250
Coefficient of Variation	3.726	Skewness	4.42

Normal GOF Test

Shapiro Wilk Test Statistic	0.281	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.905	Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.44	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.198	Data Not Normal at 5% Significance Level	
Data Not Normal at 5% Significance Level			

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	6592	95% Adjusted-CLT UCL (Chen-1995)	8779
		95% Modified-t UCL (Johnson-1978)	6963

Gamma GOF Test

A-D Test Statistic	3.583	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.848	Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.405	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.21	Data Not Gamma Distributed at 5% Significance Level	
Data Not Gamma Distributed at 5% Significance Level			

Gamma Statistics

k hat (MLE)	0.293	k star (bias corrected MLE)	0.283
Theta hat (MLE)	9209	Theta star (bias corrected MLE)	9557
nu hat (MLE)	11.73	nu star (bias corrected)	11.3
MLE Mean (bias corrected)	2701	MLE Sd (bias corrected)	5081
		Approximate Chi Square Value (0.05)	4.773

Adjusted Level of Significance	0.038	Adjusted Chi Square Value	4.441

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	6398	95% Adjusted Gamma UCL (use when n<50)	6876

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.843	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.905	Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.233	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.198	Data Not Lognormal at 5% Significance Level	

Data Not Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.376	Mean of logged Data	5.541
Maximum of Logged Data	10.72	SD of logged Data	1.679

Assuming Lognormal Distribution

95% H-UCL	4395	90% Chebyshev (MVUE) UCL	2138
95% Chebyshev (MVUE) UCL	2698	97.5% Chebyshev (MVUE) UCL	3474
99% Chebyshev (MVUE) UCL	4999		

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution (0.05)

Nonparametric Distribution Free UCLs

95% CLT UCL	6402	95% Jackknife UCL	6592
95% Standard Bootstrap UCL	6225	95% Bootstrap-t UCL	64794
95% Hall's Bootstrap UCL	55532	95% Percentile Bootstrap UCL	7143
95% BCA Bootstrap UCL	9644		
90% Chebyshev(Mean, Sd) UCL	9452	95% Chebyshev(Mean, Sd) UCL	12510
97.5% Chebyshev(Mean, Sd) UCL	16754	99% Chebyshev(Mean, Sd) UCL	25091

Suggested UCL to Use

95% Chebyshev (Mean, Sd) UCL	12510

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Cr6

General Statistics

Total Number of Observations	75	Number of Distinct Observations	58
Number of Detects	48	Number of Non-Detects	27
Number of Distinct Detects	44	Number of Distinct Non-Detects	15
Minimum Detect	0.54	Minimum Non-Detect	0.13
Maximum Detect	11000	Maximum Non-Detect	30
Variance Detects	6690306	Percent Non-Detects	36%
Mean Detects	1153	SD Detects	2587
Median Detects	13.05	CV Detects	2.243
Skewness Detects	2.397	Kurtosis Detects	5.065
Mean of Logged Detects	3.697	SD of Logged Detects	2.794

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.52	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.421	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.128	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	738.1	Standard Error of Mean	247.5
SD	2121	95% KM (BCA) UCL	1174
95% KM (t) UCL	1150	95% KM (Percentile Bootstrap) UCL	1171

95% KM (z) UCL	1145	95% KM Bootstrap t UCL	1349
90% KM Chebyshev UCL	1481	95% KM Chebyshev UCL	1817
97.5% KM Chebyshev UCL	2284	99% KM Chebyshev UCL	3201

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	5.133	Anderson-Darling GOF Test	
5% A-D Critical Value	0.903	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.293	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.142	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.217	k star (bias corrected MLE)	0.217
Theta hat (MLE)	5321	Theta star (bias corrected MLE)	5312
nu hat (MLE)	20.81	nu star (bias corrected)	20.84
MLE Mean (bias corrected)	1153	MLE Sd (bias corrected)	2475

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.121	nu hat (KM)	18.17
Approximate Chi Square Value (18.17, α)	9.512	Adjusted Chi Square Value (18.17, β)	9.389
95% Gamma Approximate KM-UCL (use when n>=50)	1410	95% Gamma Adjusted KM-UCL (use when n<50)	1428

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	738
Maximum	11000	Median	4
SD	2135	CV	2.893
k hat (MLE)	0.133	k star (bias corrected MLE)	0.136
Theta hat (MLE)	5563	Theta star (bias corrected MLE)	5416
nu hat (MLE)	19.9	nu star (bias corrected)	20.44
MLE Mean (bias corrected)	738	MLE Sd (bias corrected)	1999
		Adjusted Level of Significance (β)	0.0468
Approximate Chi Square Value (20.44, α)	11.17	Adjusted Chi Square Value (20.44, β)	11.04
95% Gamma Approximate UCL (use when n>=50)	1350	95% Gamma Adjusted UCL (use when n<50)	1366

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.87	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.947	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.234	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.128	Detected Data Not Lognormal at 5% Significance Level	

Detected Data Not Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	738	Mean in Log Scale	1.482
SD in Original Scale	2135	SD in Log Scale	3.787
95% t UCL (assumes normality of ROS data)	1149	95% Percentile Bootstrap UCL	1166
95% BCA Bootstrap UCL	1334	95% Bootstrap t UCL	1338
95% H-UCL (Log ROS)	75943		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	738.5	Mean in Log Scale	2.21
SD in Original Scale	2135	SD in Log Scale	3.071
95% t UCL (Assumes normality)	1149	95% H-Stat UCL	5781

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

97.5% KM (Chebyshev) UCL	2284

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

UCL Statistics for Data Sets with Non-Detects

User Selected Options		
Date/Time of Computation	7/18/2014 13:48	
From File	WorkSheet.xls	Without Location D-22
Full Precision	OFF	
Confidence Coefficient	95%	
Number of Bootstrap Operations	2000	

Pb

General Statistics			
Total Number of Observations	19	Number of Distinct Observations	19
		Number of Missing Observations	0
Minimum	18.5	Mean	605.9
Maximum	3730	Median	226
SD	1008	Std. Error of Mean	231.2
Coefficient of Variation	1.663	Skewness	2.529

Normal GOF Test		
Shapiro Wilk Test Statistic	0.593	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.901	Data Not Normal at 5% Significance Level
Lilliefors Test Statistic	0.325	Lilliefors GOF Test
5% Lilliefors Critical Value	0.203	Data Not Normal at 5% Significance Level
Data Not Normal at 5% Significance Level		

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	1007	95% Adjusted-CLT UCL (Chen-1995)	1129
		95% Modified-t UCL (Johnson-1978)	1029

Gamma GOF Test		
A-D Test Statistic	0.851	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.79	Data Not Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.181	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.208	Detected data appear Gamma Distributed at 5% Significance Level
Detected data follow Appr. Gamma Distribution at 5% Significance Level		

Gamma Statistics			
k hat (MLE)	0.632	k star (bias corrected MLE)	0.567
Theta hat (MLE)	959.2	Theta star (bias corrected MLE)	1069
nu hat (MLE)	24.01	nu star (bias corrected)	21.55
MLE Mean (bias corrected)	605.9	MLE Sd (bias corrected)	804.7
		Approximate Chi Square Value (0.05)	12
Adjusted Level of Significance	0.0369	Adjusted Chi Square Value	11.38

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50)	1088	95% Adjusted Gamma UCL (use when n<50)	1147

Lognormal GOF Test		
Shapiro Wilk Test Statistic	0.973	Shapiro Wilk Lognormal GOF Test
5% Shapiro Wilk Critical Value	0.901	Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.097	Lilliefors Lognormal GOF Test
5% Lilliefors Critical Value	0.203	Data appear Lognormal at 5% Significance Level
Data appear Lognormal at 5% Significance Level		

Lognormal Statistics			
Minimum of Logged Data	2.918	Mean of logged Data	5.436
Maximum of Logged Data	8.224	SD of logged Data	1.421

Assuming Lognormal Distribution			
95% H-UCL	1874	90% Chebyshev (MVUE) UCL	1233
95% Chebyshev (MVUE) UCL	1532	97.5% Chebyshev (MVUE) UCL	1946
99% Chebyshev (MVUE) UCL	2761		

Nonparametric Distribution Free UCL Statistics
Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	986.2	95% Jackknife UCL	1007
95% Standard Bootstrap UCL	975.1	95% Bootstrap-t UCL	1886
95% Hall's Bootstrap UCL	2837	95% Percentile Bootstrap UCL	1009
95% BCA Bootstrap UCL	1164		
90% Chebyshev(Mean, Sd) UCL	1299	95% Chebyshev(Mean, Sd) UCL	1614
97.5% Chebyshev(Mean, Sd) UCL	2050	99% Chebyshev(Mean, Sd) UCL	2906

Suggested UCL to Use

95% Adjusted Gamma UCL	1147

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

APPENDIX F.4A

EASTERN AREA SURFACE AND SUBSURFACE SOILS GOODNESS OF FIT TESTING

Goodness-of-Fit Test Statistics for Data Sets with Non-Detects

User Selected Options
Date/Time of Computation 7/3/2014 13:43
From File WorkSheet_a.xls
Full Precision OFF
Confidence Coefficient 0.95

124TCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	12	3	20.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.001	5.3	1.768	0.0019	3.059
Statistics (Detects Only)	12	0.007	150000	25874	46.45	47626
Statistics (All: NDs treated as DL value)	15	0.001	150000	20700	28.3	43554
Statistics (All: NDs treated as DL/2 value)	15	5.00E-04	150000	20700	28.3	43554
Statistics (Normal ROS Imputed Data)	15	-67549	150000	8722	28.3	55392
Statistics (Gamma ROS Imputed Data)	15	0.007	150000	20700	28.3	43554
Statistics (Lognormal ROS Imputed Data)	15	4.56E-04	150000	20700	28.3	43554

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.15	0.168	172714	5.03	5.466	1.087
Statistics (NDs = DL)	0.119	0.14	174169	3.257	6.341	1.947
Statistics (NDs = DL/2)	0.117	0.138	177350	3.118	6.511	2.088
Statistics (Gamma ROS Estimates)	0.116	0.138	177700	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.694	6.879	2.554

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.788	0.739	0.739	0.739

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.632	0.859	Data Not Normal
Lilliefors (Detects Only)	0.351	0.256	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.562	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.391	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.562	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.391	0.229	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.844	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.274	0.229	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.965	0.97	0.969	0.969

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.541	0.916	
Kolmogorov-Smirnov (Detects Only)	0.256	0.276	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.673	0.955	
Kolmogorov-Smirnov (NDs = DL)	0.254	0.252	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.627	0.957	
Kolmogorov-Smirnov (NDs = DL/2)	0.248	0.253	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.808	0.957	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.247	0.253	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.968	0.972	0.975	0.97

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.926	0.859	Data Appear Lognormal

Lilliefors (Detects Only)	0.148	0.256	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.926	0.881	Data Appear Lognormal
Lilliefors (NDs = DL)	0.134	0.229	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.931	0.881	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.108	0.229	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.917	0.881	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.131	0.229	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

12DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	9	6	40.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	9.50E-04	5.6	1.432	0.0459	2.344
Statistics (Detects Only)	9	3.78	5405	1614	34.4	2312
Statistics (All: NDs treated as DL value)	15	9.50E-04	5405	968.9	6.53	1930
Statistics (All: NDs treated as DL/2 value)	15	4.75E-04	5405	968.6	6.53	1930
Statistics (Normal ROS Imputed Data)	15	-3814	5405	-524.1	6.53	3227
Statistics (Gamma ROS Imputed Data)	15	0.01	5405	968.3	6.53	1930
Statistics (Lognormal ROS Imputed Data)	15	0.0623	5405	968.3	6.53	1930

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.271	0.255	5959	4.797	3.065	0.639
Statistics (NDs = DL)	0.147	0.162	6571	1.651	5.14	3.114
Statistics (NDs = DL/2)	0.141	0.157	6872	1.373	5.417	3.944
Statistics (Gamma ROS Estimates)	0.134	0.151	7237	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.814	4.438	2.446

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.853	0.747	0.747	0.747

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.708	0.829	Data Not Normal
Lilliefors (Detects Only)	0.348	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.558	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.419	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.558	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.419	0.229	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.844	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.207	0.229	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.863	0.893	0.89	0.887

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.822	0.819	
Kolmogorov-Smirnov (Detects Only)	0.282	0.303	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.8	0.93	
Kolmogorov-Smirnov (NDs = DL)	0.244	0.25	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.726	0.936	
Kolmogorov-Smirnov (NDs = DL/2)	0.23	0.25	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.106	0.942	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.225	0.251	Detected Data appear Approximate Gamma Distribution

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.931	0.966	0.968	0.937

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)

Shapiro-Wilk (Detects Only)	0.836	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.218	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.917	0.881	Data Appear Lognormal
Lilliefors (NDs = DL)	0.188	0.229	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.92	0.881	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.16	0.229	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.851	0.881	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.21	0.229	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

13DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	9	6	40.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	7.80E-04	5.4	1.398	0.0435	2.274
Statistics (Detects Only)	9	6.4	1410	428.7	66.2	559.3
Statistics (All: NDs treated as DL value)	15	7.80E-04	1410	257.8	9.5	475.1
Statistics (All: NDs treated as DL/2 value)	15	3.90E-04	1410	257.5	9.5	475.3
Statistics (Normal ROS Imputed Data)	15	-970.1	1410	-130.8	9.5	825.8
Statistics (Gamma ROS Imputed Data)	15	0.01	1410	257.2	9.5	475.4
Statistics (Lognormal ROS Imputed Data)	15	0.288	1410	257.3	9.5	475.4

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.41	0.348	1045	4.463	2.275	0.51
Statistics (NDs = DL)	0.181	0.189	1427	1.414	4.818	3.408
Statistics (NDs = DL/2)	0.171	0.181	1508	1.137	5.104	4.491
Statistics (Gamma ROS Estimates)	0.161	0.173	1595	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.18	3.366	1.544

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.892	0.783	0.783	0.783

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.778	0.829	Data Not Normal
Lilliefors (Detects Only)	0.297	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.615	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.39	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.615	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.39	0.229	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.854	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.245	0.229	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.928	0.936	0.933	0.93

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.645	0.787	
Kolmogorov-Smirnov (Detects Only)	0.25	0.297	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.468	0.9	
Kolmogorov-Smirnov (NDs = DL)	0.195	0.247	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.412	0.909	
Kolmogorov-Smirnov (NDs = DL/2)	0.179	0.248	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.894	0.918	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.244	0.249	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.937	0.954	0.957	0.931

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.846	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.229	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.895	0.881	Data Appear Lognormal
Lilliefors (NDs = DL)	0.204	0.229	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.898	0.881	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.174	0.229	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.84	0.881	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.245	0.229	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

14DCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	9	6	40.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	7.60E-04	7.4	3.284	2.851	3.636
Statistics (Detects Only)	9	0.55	4840	920.9	52.2	1653
Statistics (All: NDs treated as DL value)	15	7.60E-04	4840	553.8	15	1333
Statistics (All: NDs treated as DL/2 value)	15	3.80E-04	4840	553.2	15	1333
Statistics (Normal ROS Imputed Data)	15	-2847	4840	-484.2	15	2182
Statistics (Gamma ROS Imputed Data)	15	0.01	4840	552.5	15	1334
Statistics (Lognormal ROS Imputed Data)	15	0.0476	4840	552.6	15	1334

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.287	0.266	3203	4.41	2.861	0.649
Statistics (NDs = DL)	0.165	0.177	3347	1.739	4.856	2.793
Statistics (NDs = DL/2)	0.157	0.17	3518	1.461	5.107	3.495
Statistics (Gamma ROS Estimates)	0.141	0.157	3925	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.63	4.148	2.545

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.799	0.687	0.687	0.687

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.651	0.829	Data Not Normal
Lilliefors (Detects Only)	0.367	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.495	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.446	0.229	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.495	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.446	0.229	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.864	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.202	0.229	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.995	0.992	0.992	0.993

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.59	0.812	
Kolmogorov-Smirnov (Detects Only)	0.323	0.302	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL)	0.634	0.914	
Kolmogorov-Smirnov (NDs = DL)	0.256	0.248	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (NDs = DL/2)	0.567	0.921	
Kolmogorov-Smirnov (NDs = DL/2)	0.243	0.249	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.962	0.936	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.226	0.25	Detected Data appear Approximate Gamma Distribution

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.967	0.953	0.956	0.951

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.935	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.224	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.898	0.881	Data Appear Lognormal
Lilliefors (NDs = DL)	0.233	0.229	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.904	0.881	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.201	0.229	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.883	0.881	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.212	0.229	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BAA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	9	13	59.09%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	13	0.026	49	13.08	12	12.28
Statistics (Detects Only)	9	0.14	22	5.138	0.95	7.714
Statistics (All: NDs treated as DL value)	22	0.026	49	9.833	11.5	11.17
Statistics (All: NDs treated as DL/2 value)	22	0.013	24.5	5.967	5.75	6.686
Statistics (Normal ROS Imputed Data)	22	-9.655	22	1.04	0.241	6.959
Statistics (Gamma ROS Imputed Data)	22	0.01	22	2.402	0.155	5.365
Statistics (Lognormal ROS Imputed Data)	22	0.0259	22	2.344	0.35	5.334

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.485	0.398	10.59	0.321	1.908	5.94
Statistics (NDs = DL)	0.53	0.488	18.54	1.099	2.178	1.983
Statistics (NDs = DL/2)	0.568	0.521	10.51	0.689	2.099	3.046
Statistics (Gamma ROS Estimates)	0.265	0.259	9.062	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.78	1.802	-2.31

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.843	0.864	0.884	0.578

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.715	0.829	Data Not Normal
Lilliefors (Detects Only)	0.311	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.76	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.218	0.189	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.782	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.286	0.189	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.866	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.193	0.189	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.985	0.949	0.966	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.439	0.773	
Kolmogorov-Smirnov (Detects Only)	0.215	0.295	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.999	0.802	
Kolmogorov-Smirnov (NDs = DL)	0.252	0.195	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.749	0.798	
Kolmogorov-Smirnov (NDs = DL/2)	0.197	0.195	Detected Data appear Approximate Gamma Distribution
Anderson-Darling (Gamma ROS Estimates)	1.382	0.865	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.227	0.203	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS

Correlation Coefficient R	0.969	0.929	0.93	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.914	0.829	Data Appear Lognormal
Lilliefors (Detects Only)	0.184	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.856	0.911	Data Not Lognormal
Lilliefors (NDs = DL)	0.27	0.189	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.861	0.911	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.242	0.189	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.964	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.106	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	16	6	27.27%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.02	16	5.712	4.025	5.442
Statistics (Detects Only)	16	0.14	37	8.006	4.375	11.98
Statistics (All: NDs treated as DL value)	22	0.02	37	7.38	4.025	10.52
Statistics (All: NDs treated as DL/2 value)	22	0.01	37	6.602	2.638	10.48
Statistics (Normal ROS Imputed Data)	22	-15.91	37	5.166	1.869	11.68
Statistics (Gamma ROS Imputed Data)	22	0.01	37	5.851	0.88	10.75
Statistics (Lognormal ROS Imputed Data)	22	0.0358	37	5.976	0.976	10.68

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.532	0.474	15.04	0.899	1.788	1.989
Statistics (NDs = DL)	0.555	0.51	13.29	0.873	1.905	2.18
Statistics (NDs = DL/2)	0.524	0.483	12.59	0.684	1.937	2.831
Statistics (Gamma ROS Estimates)	0.326	0.312	17.93	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	0.396	1.828	4.611

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.812	0.816	0.781	0.823

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.66	0.887	Data Not Normal
Lilliefors (Detects Only)	0.36	0.222	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.668	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.349	0.189	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.615	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.326	0.189	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.736	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.317	0.189	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.953	0.965	0.956	0.957

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.574	0.794	
Kolmogorov-Smirnov (Detects Only)	0.184	0.227	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.509	0.8	
Kolmogorov-Smirnov (NDs = DL)	0.174	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.476	0.802	
Kolmogorov-Smirnov (NDs = DL/2)	0.153	0.196	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.543	0.842	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.123	0.2	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.975	0.961	0.964	0.986

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.934	0.887	Data Appear Lognormal
Lilliefors (Detects Only)	0.161	0.222	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.924	0.911	Data Appear Lognormal
Lilliefors (NDs = DL)	0.232	0.189	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.935	0.911	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.129	0.189	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.968	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.131	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

BBF

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	17	5	22.73%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	0.025	30	10.33	7.2	11.43
Statistics (Detects Only)	17	0.22	65.8	14.12	8.7	17.95
Statistics (All: NDs treated as DL value)	22	0.025	65.8	13.26	7.55	16.53
Statistics (All: NDs treated as DL/2 value)	22	0.0125	65.8	12.08	5.8	16.33
Statistics (Normal ROS Imputed Data)	22	-24.78	65.8	9.801	5.668	18.41
Statistics (Gamma ROS Imputed Data)	22	0.01	65.8	11.07	3.766	16.71
Statistics (Lognormal ROS Imputed Data)	22	0.0944	65.8	11.17	3.4	16.63

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.643	0.569	21.96	1.696	1.706	1.006
Statistics (NDs = DL)	0.606	0.554	21.87	1.567	1.931	1.233
Statistics (NDs = DL/2)	0.574	0.526	21.04	1.409	1.991	1.413
Statistics (Gamma ROS Estimates)	0.358	0.339	30.97	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.246	1.798	1.443

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.864	0.865	0.838	0.478

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.755	0.892	Data Not Normal
Lilliefors (Detects Only)	0.219	0.215	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.755	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.222	0.189	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.713	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.23	0.189	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.833	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.21	0.189	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.993	0.996	0.991	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.172	0.786	
Kolmogorov-Smirnov (Detects Only)	0.0897	0.219	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.19	0.795	
Kolmogorov-Smirnov (NDs = DL)	0.132	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.171	0.798	
Kolmogorov-Smirnov (NDs = DL/2)	0.0957	0.195	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.316	0.835	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.118	0.2	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.975	0.95	0.948	0.991

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.94	0.892	Data Appear Lognormal
Lilliefors (Detects Only)	0.165	0.215	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.906	0.911	Data Not Lognormal
Lilliefors (NDs = DL)	0.211	0.189	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.907	0.911	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.159	0.189	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.974	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.123	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

DAHA

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	10	12	54.55%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	0.027	16	4.452	3.85	4.043
Statistics (Detects Only)	10	0.029	8.8	2.429	0.785	3.298
Statistics (All: NDs treated as DL value)	22	0.027	16	3.532	3.7	3.78
Statistics (All: NDs treated as DL/2 value)	22	0.0135	8.8	2.318	1.85	2.61
Statistics (Normal ROS Imputed Data)	22	-4.451	8.8	0.908	0.171	2.826
Statistics (Gamma ROS Imputed Data)	22	0.01	8.8	1.146	0.0379	2.472
Statistics (Lognormal ROS Imputed Data)	22	0.00574	8.8	1.175	0.145	2.457

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.474	0.398	5.123	-0.464	2.058	-4.437
Statistics (NDs = DL)	0.576	0.527	6.136	0.182	2.052	11.28
Statistics (NDs = DL/2)	0.596	0.545	3.887	-0.196	1.977	-10.07
Statistics (Gamma ROS Estimates)	0.282	0.274	4.065	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-1.502	1.834	-1.221

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.871	0.895	0.885	0.835

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.749	0.842	Data Not Normal
Lilliefors (Detects Only)	0.334	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.811	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.192	0.189	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.779	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.298	0.189	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.773	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.296	0.189	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.95	0.97	0.96	0.963

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.37	0.782	
Kolmogorov-Smirnov (Detects Only)	0.183	0.282	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.967	0.798	
Kolmogorov-Smirnov (NDs = DL)	0.236	0.195	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.675	0.796	
Kolmogorov-Smirnov (NDs = DL/2)	0.179	0.195	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.885	0.856	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.245	0.202	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.977	0.921	0.931	0.965

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.932	0.842	Data Appear Lognormal
Lilliefors (Detects Only)	0.138	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.837	0.911	Data Not Lognormal
Lilliefors (NDs = DL)	0.275	0.189	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.858	0.911	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.258	0.189	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.932	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.164	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

HCB

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	10	12	54.55%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	12	0.017	3.1	1.034	0.0595	1.453
Statistics (Detects Only)	10	0.95	359	68.2	29.85	109.9
Statistics (All: NDs treated as DL value)	22	0.017	359	31.56	2.15	79.66
Statistics (All: NDs treated as DL/2 value)	22	0.0085	359	31.28	1.425	79.77
Statistics (Normal ROS Imputed Data)	22	-202.1	359	-64.72	-118.1	145.4
Statistics (Gamma ROS Imputed Data)	22	0.01	359	31.01	0.01	79.88
Statistics (Lognormal ROS Imputed Data)	22	0.0489	359	31.07	0.353	79.85

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.475	0.399	143.7	2.874	2.096	0.729
Statistics (NDs = DL)	0.23	0.229	137	0.327	3.179	9.709
Statistics (NDs = DL/2)	0.209	0.211	149.6	-0.0506	3.452	-68.17
Statistics (Gamma ROS Estimates)	0.164	0.172	189.6	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-0.0242	3.078	-127.1

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.791	0.652	0.651	0.65

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.647	0.842	Data Not Normal
Lilliefors (Detects Only)	0.341	0.28	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.449	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.346	0.189	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.447	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.348	0.189	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.823	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.216	0.189	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.983	0.971	0.975	0.984

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.386	0.782	
Kolmogorov-Smirnov (Detects Only)	0.175	0.282	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.941	0.882	
Kolmogorov-Smirnov (NDs = DL)	0.225	0.204	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.089	0.892	
Kolmogorov-Smirnov (NDs = DL/2)	0.263	0.206	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.24	0.931	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.33	0.208	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.95	0.969	0.962	0.918

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.888	0.842	Data Appear Lognormal
Lilliefors (Detects Only)	0.233	0.28	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.924	0.911	Data Appear Lognormal
Lilliefors (NDs = DL)	0.142	0.189	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.91	0.911	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.143	0.189	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.827	0.911	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.223	0.189	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

ICDP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	22	0	22	15	7	31.82%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	7	0.023	23	7.303	5.6	7.564
Statistics (Detects Only)	15	0.074	35.9	8.932	6.6	10.48
Statistics (All: NDs treated as DL value)	22	0.023	35.9	8.414	5.7	9.497
Statistics (All: NDs treated as DL/2 value)	22	0.0115	35.9	7.252	3.4	9.147
Statistics (Normal ROS Imputed Data)	22	-14.33	35.9	5.487	1.65	10.47
Statistics (Gamma ROS Imputed Data)	22	0.01	35.9	6.243	1.65	9.467
Statistics (Lognormal ROS Imputed Data)	22	0.0303	35.9	6.25	1.256	9.457

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.572	0.502	15.61	1.102	1.962	1.779
Statistics (NDs = DL)	0.593	0.543	14.18	1.087	2.006	1.846
Statistics (NDs = DL/2)	0.56	0.514	12.95	0.866	2.037	2.352
Statistics (Gamma ROS Estimates)	0.389	0.366	16.06	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	0.421	1.997	4.741

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.897	0.9	0.866	0.829

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.806	0.881	Data Not Normal
Lilliefors (Detects Only)	0.211	0.229	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.811	0.911	Data Not Normal
Lilliefors (NDs = DL)	0.199	0.189	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.756	0.911	Data Not Normal
Lilliefors (NDs = DL/2)	0.214	0.189	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.849	0.911	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.197	0.189	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.983	0.987	0.988	0.988

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.29	0.788	
Kolmogorov-Smirnov (Detects Only)	0.151	0.233	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.32	0.796	
Kolmogorov-Smirnov (NDs = DL)	0.143	0.195	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.168	0.799	
Kolmogorov-Smirnov (NDs = DL/2)	0.103	0.195	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.397	0.828	

Kolmogorov-Smirnov (Gamma ROS Est.)	0.122	0.199	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.96	0.945	0.956	0.982

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.91	0.881	Data Appear Lognormal
Lilliefors (Detects Only)	0.189	0.229	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.889	0.911	Data Not Lognormal
Lilliefors (NDs = DL)	0.208	0.189	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.914	0.911	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.161	0.189	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.956	0.911	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.136	0.189	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

NAP

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	21	0	21	19	2	9.52%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	2	2.7	4.1	3.4	3.4	0.99
Statistics (Detects Only)	19	0.11	2000	164	10	458.7
Statistics (All: NDs treated as DL value)	21	0.11	2000	148.7	7.31	437.8
Statistics (All: NDs treated as DL/2 value)	21	0.11	2000	148.5	7.31	437.9
Statistics (Normal ROS Imputed Data)	21	-194.9	2000	132.9	7.31	446.2
Statistics (Gamma ROS Imputed Data)	21	0.01	2000	148.4	7.31	437.9
Statistics (Lognormal ROS Imputed Data)	21	0.11	2000	148.4	7.31	437.9

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.281	0.272	582.7	2.623	2.433	0.928
Statistics (NDs = DL)	0.278	0.27	535.3	2.488	2.349	0.944
Statistics (NDs = DL/2)	0.272	0.265	546.5	2.422	2.395	0.989
Statistics (Gamma ROS Estimates)	0.234	0.232	633.4	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	2.343	2.474	1.056

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.606	0.588	0.589	0.589

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.396	0.901	Data Not Normal
Lilliefors (Detects Only)	0.371	0.203	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.372	0.908	Data Not Normal
Lilliefors (NDs = DL)	0.367	0.193	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.372	0.908	Data Not Normal
Lilliefors (NDs = DL/2)	0.367	0.193	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.442	0.908	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.353	0.193	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.927	0.919	0.92	0.931

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	1.259	0.852	
Kolmogorov-Smirnov (Detects Only)	0.278	0.216	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	1.672	0.857	
Kolmogorov-Smirnov (NDs = DL)	0.294	0.206	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	1.616	0.86	
Kolmogorov-Smirnov (NDs = DL/2)	0.287	0.207	Data Not Gamma Distributed

Anderson-Darling (Gamma ROS Estimates)	0.951	0.879	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.248	0.208	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.987	0.981	0.982	0.987

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.977	0.901	Data Appear Lognormal
Lilliefors (Detects Only)	0.153	0.203	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.967	0.908	Data Appear Lognormal
Lilliefors (NDs = DL)	0.159	0.193	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.967	0.908	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.149	0.193	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.973	0.908	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.139	0.193	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1248

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	12	0	12	6	6	50.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	6	0.0019	0.0031	0.00225	0.00205	4.72E-04
Statistics (Detects Only)	6	0.052	2.5	0.86	0.705	0.931
Statistics (All: NDs treated as DL value)	12	0.0019	2.5	0.431	0.0276	0.771
Statistics (All: NDs treated as DL/2 value)	12	9.50E-04	2.5	0.431	0.0268	0.772
Statistics (Normal ROS Imputed Data)	12	-2.361	2.5	-0.481	-0.648	1.551
Statistics (Gamma ROS Imputed Data)	12	0.01	2.5	0.435	0.031	0.769
Statistics (Lognormal ROS Imputed Data)	12	0.00225	2.5	0.433	0.0318	0.77

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.805	0.514	1.069	-0.887	1.52	-1.713
Statistics (NDs = DL)	0.265	0.254	1.63	-3.5	2.918	-0.834
Statistics (NDs = DL/2)	0.238	0.234	1.808	-3.847	3.259	-0.847
Statistics (Gamma ROS Estimates)	0.351	0.319	1.239	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-3.058	2.513	-0.822

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.924	0.793	0.793	0.797

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.853	0.788	Data Appear Normal
Lilliefors (Detects Only)	0.232	0.362	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.642	0.859	Data Not Normal
Lilliefors (NDs = DL)	0.333	0.256	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.642	0.859	Data Not Normal
Lilliefors (NDs = DL/2)	0.333	0.256	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.894	0.859	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.22	0.256	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.974	0.982	0.981	0.983

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.298	0.72	
Kolmogorov-Smirnov (Detects Only)	0.226	0.343	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.959	0.841	
Kolmogorov-Smirnov (NDs = DL)	0.289	0.268	Data Not Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.948	0.853	

Kolmogorov-Smirnov (NDs = DL/2)	0.295	0.269	Data Not Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	1.182	0.814	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.294	0.264	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.972	0.919	0.914	0.947

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.928	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.241	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.817	0.859	Data Not Lognormal
Lilliefors (NDs = DL)	0.282	0.256	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.807	0.859	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.289	0.256	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.876	0.859	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.22	0.256	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

1254

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	12	0	12	7	5	41.67%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	5	0.003	0.0047	0.00366	0.0036	6.62E-04
Statistics (Detects Only)	7	0.042	1	0.317	0.22	0.333
Statistics (All: NDs treated as DL value)	12	0.003	1	0.187	0.055	0.294
Statistics (All: NDs treated as DL/2 value)	12	0.0015	1	0.186	0.055	0.294
Statistics (Normal ROS Imputed Data)	12	-0.542	1	-0.0407	0.055	0.506
Statistics (Gamma ROS Imputed Data)	12	0.01	1	0.189	0.055	0.292
Statistics (Lognormal ROS Imputed Data)	12	0.0101	1	0.189	0.055	0.292

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	1.189	0.774	0.267	-1.625	1.097	-0.675
Statistics (NDs = DL)	0.407	0.361	0.458	-3.291	2.215	-0.673
Statistics (NDs = DL/2)	0.354	0.321	0.525	-3.579	2.55	-0.712
Statistics (Gamma ROS Estimates)	0.525	0.449	0.36	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-2.864	1.733	-0.605

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.898	0.824	0.825	0.952

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.817	0.803	Data Appear Normal
Lilliefors (Detects Only)	0.213	0.335	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.694	0.859	Data Not Normal
Lilliefors (NDs = DL)	0.266	0.256	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.695	0.859	Data Not Normal
Lilliefors (NDs = DL/2)	0.266	0.256	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.86	0.859	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.256	0.256	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.993	0.997	0.997	0.994

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.186	0.725	
Kolmogorov-Smirnov (Detects Only)	0.129	0.319	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.57	0.803	
Kolmogorov-Smirnov (NDs = DL)	0.242	0.262	Data Appear Gamma Distributed

Anderson-Darling (NDs = DL/2)	0.593	0.813	
Kolmogorov-Smirnov (NDs = DL/2)	0.251	0.264	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.695	0.783	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.247	0.258	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.996	0.944	0.935	0.94

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.985	0.803	Data Appear Lognormal
Lilliefors (Detects Only)	0.119	0.335	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.866	0.859	Data Appear Lognormal
Lilliefors (NDs = DL)	0.242	0.256	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.847	0.859	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.251	0.256	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.859	0.859	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.258	0.256	Data Not Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

TCDD

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	15	0	15	6	9	60.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	9	1.30E-04	7.00E-04	3.98E-04	2.90E-04	2.55E-04
Statistics (Detects Only)	6	1.79E-07	5.20E-04	1.09E-04	2.05E-05	2.04E-04
Statistics (All: NDs treated as DL value)	15	1.79E-07	7.00E-04	2.82E-04	1.60E-04	2.71E-04
Statistics (All: NDs treated as DL/2 value)	15	1.79E-07	5.20E-04	1.63E-04	8.91E-05	1.62E-04
Statistics (Normal ROS Imputed Data)	15	-1.57E-05	5.20E-04	8.34E-05	5.76E-05	1.34E-04
Statistics (Gamma ROS Imputed Data)	15	1.79E-07	0.01	0.00604	0.01	0.00502
Statistics (Lognormal ROS Imputed Data)	15	1.79E-07	5.20E-04	5.02E-05	6.09E-06	1.32E-04

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.327	0.275	3.33E-04	-11.21	2.818	-0.251
Statistics (NDs = DL)	0.549	0.484	5.14E-04	-9.314	2.389	-0.256
Statistics (NDs = DL/2)	0.612	0.534	2.66E-04	-9.73	2.169	-0.223
Statistics (Gamma ROS Estimates)	0.319	0.3	0.0189	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	-11.6	1.891	-0.163

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.776	0.93	0.93	0.81

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.622	0.788	Data Not Normal
Lilliefors (Detects Only)	0.372	0.362	Data Not Normal
Shapiro-Wilk (NDs = DL)	0.84	0.881	Data Not Normal
Lilliefors (NDs = DL)	0.207	0.229	Data Appear Normal
Shapiro-Wilk (NDs = DL/2)	0.857	0.881	Data Not Normal
Lilliefors (NDs = DL/2)	0.216	0.229	Data Appear Normal
Shapiro-Wilk (Normal ROS Estimates)	0.663	0.881	Data Not Normal
Lilliefors (Normal ROS Estimates)	0.243	0.229	Data Not Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.988	0.867	0.941	0.5

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.219	0.763	
Kolmogorov-Smirnov (Detects Only)	0.182	0.356	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.511	0.789	

Kolmogorov-Smirnov (NDs = DL)	0.159	0.233	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.397	0.785	
Kolmogorov-Smirnov (NDs = DL/2)	0.168	0.232	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	2.27	0.831	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.411	0.239	Data Not Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.992	0.901	0.904	0.975

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.985	0.788	Data Appear Lognormal
Lilliefors (Detects Only)	0.167	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.814	0.881	Data Not Lognormal
Lilliefors (NDs = DL)	0.231	0.229	Data Not Lognormal
Shapiro-Wilk (NDs = DL/2)	0.826	0.881	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.25	0.229	Data Not Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.966	0.881	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.14	0.229	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

As

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	5	0	5	2	3	60.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	N/A	N/A	N/A	N/A	N/A
Statistics (Detects Only)	2	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL value)	5	N/A	N/A	N/A	N/A	N/A
Statistics (All: NDs treated as DL/2 value)	5	N/A	N/A	N/A	N/A	N/A
Statistics (Normal ROS Imputed Data)	5	N/A	N/A	N/A	N/A	N/A

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	N/A	N/A	
Lilliefors (Detects Only)	N/A	N/A	
Shapiro-Wilk (NDs = DL)	N/A	N/A	
Lilliefors (NDs = DL)	N/A	N/A	
Shapiro-Wilk (NDs = DL/2)	N/A	N/A	
Lilliefors (NDs = DL/2)	N/A	N/A	
Shapiro-Wilk (Normal ROS Estimates)	N/A	N/A	
Lilliefors (Normal ROS Estimates)	N/A	N/A	

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	N/A	N/A	N/A	N/A

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	N/A	N/A	
Kolmogorov-Smirnov (Detects Only)	N/A	N/A	
Anderson-Darling (NDs = DL)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL)	N/A	N/A	
Anderson-Darling (NDs = DL/2)	N/A	N/A	
Kolmogorov-Smirnov (NDs = DL/2)	N/A	N/A	
Anderson-Darling (Gamma ROS Estimates)	N/A	N/A	
Kolmogorov-Smirnov (Gamma ROS Est.)	N/A	N/A	

Note: Substitution methods such as DL or DL/2 are not recommended.

Tl

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	5	0	5	4	1	20.00%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Detects Only)	4	4.5	9.4	7.15	7.35	2.258
Statistics (All: NDs treated as DL value)	5	0.64	9.4	5.848	6.1	3.507
Statistics (All: NDs treated as DL/2 value)	5	0.32	9.4	5.784	6.1	3.627
Statistics (Normal ROS Imputed Data)	5	1.198	9.4	5.96	6.1	3.303
Statistics (Gamma ROS Imputed Data)	5	2.026	9.4	6.125	6.1	3.012
Statistics (Lognormal ROS Imputed Data)	5	2.847	9.4	6.289	6.1	2.743

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	12.39	3.264	0.577	1.926	0.338	0.175
Statistics (NDs = DL)	1.738	0.829	3.364	1.452	1.101	0.758
Statistics (NDs = DL/2)	1.272	0.642	4.547	1.313	1.402	1.068
Statistics (Gamma ROS Estimates)	3.998	1.733	1.532	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	1.75	0.49	0.28

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.976	0.974	0.971	0.979

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.938	0.748	Data Appear Normal
Lilliefors (Detects Only)	0.24	0.443	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.943	0.762	Data Appear Normal
Lilliefors (NDs = DL)	0.184	0.396	Data Appear Normal
Shapiro-Wilk (NDs = DL/2)	0.938	0.762	Data Appear Normal
Lilliefors (NDs = DL/2)	0.181	0.396	Data Appear Normal
Shapiro-Wilk (Normal ROS Estimates)	0.951	0.762	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.188	0.396	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.951	0.857	0.823	0.934

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.309	0.657	
Kolmogorov-Smirnov (Detects Only)	0.278	0.395	Detected Data Appear Gamma Distributed
Anderson-Darling (NDs = DL)	0.502	0.685	
Kolmogorov-Smirnov (NDs = DL)	0.272	0.361	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.604	0.689	
Kolmogorov-Smirnov (NDs = DL/2)	0.313	0.363	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.29	0.681	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.211	0.358	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.971	0.876	0.849	0.975

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.93	0.748	Data Appear Lognormal
Lilliefors (Detects Only)	0.248	0.443	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.778	0.762	Data Appear Lognormal
Lilliefors (NDs = DL)	0.319	0.396	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.734	0.762	Data Not Lognormal
Lilliefors (NDs = DL/2)	0.354	0.396	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.939	0.762	Data Appear Lognormal
Lilliefors (Lognormal ROS Estimates)	0.194	0.396	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

	Num Obs	Num Miss	Num Valid	Detects	NDs	% NDs
Raw Statistics	9	0	9	6	3	33.33%

	Number	Minimum	Maximum	Mean	Median	SD
Statistics (Non-Detects Only)	3	0.15	14	4.85	0.4	7.925
Statistics (Detects Only)	6	0.39	3820	1909	2305	1515
Statistics (All: NDs treated as DL value)	9	0.15	3820	1274	195	1530
Statistics (All: NDs treated as DL/2 value)	9	0.075	3820	1274	195	1531
Statistics (Normal ROS Imputed Data)	9	-2033	3820	831.7	195	2035
Statistics (Gamma ROS Imputed Data)	9	0.39	3820	1395	385.5	1425
Statistics (Lognormal ROS Imputed Data)	9	0.107	3820	1273	195	1531

	K hat	K Star	Theta hat	Log Mean	Log Stdv	Log CV
Statistics (Detects Only)	0.42	0.321	4543	6.001	3.567	0.594
Statistics (NDs = DL)	0.228	0.226	5601	3.981	4.308	1.082
Statistics (NDs = DL/2)	0.214	0.217	5947	3.75	4.558	1.215
Statistics (Gamma ROS Estimates)	0.499	0.407	2794	--	--	--
Statistics (Lognormal ROS Estimates)	--	--	--	3.75	4.446	1.185

Normal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Normal ROS
Correlation Coefficient R	0.962	0.904	0.903	0.903

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.91	0.788	Data Appear Normal
Lilliefors (Detects Only)	0.217	0.362	Data Appear Normal
Shapiro-Wilk (NDs = DL)	0.796	0.829	Data Not Normal
Lilliefors (NDs = DL)	0.315	0.295	Data Not Normal
Shapiro-Wilk (NDs = DL/2)	0.795	0.829	Data Not Normal
Lilliefors (NDs = DL/2)	0.315	0.295	Data Not Normal
Shapiro-Wilk (Normal ROS Estimates)	0.935	0.829	Data Appear Normal
Lilliefors (Normal ROS Estimates)	0.178	0.295	Data Appear Normal

Gamma GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Gamma ROS
Correlation Coefficient R	0.789	0.833	0.828	0.904

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Anderson-Darling (Detects Only)	0.82	0.748	
Kolmogorov-Smirnov (Detects Only)	0.384	0.352	Data Not Gamma Distributed
Anderson-Darling (NDs = DL)	0.726	0.836	
Kolmogorov-Smirnov (NDs = DL)	0.267	0.306	Data Appear Gamma Distributed
Anderson-Darling (NDs = DL/2)	0.733	0.842	
Kolmogorov-Smirnov (NDs = DL/2)	0.27	0.307	Data Appear Gamma Distributed
Anderson-Darling (Gamma ROS Estimates)	0.553	0.771	
Kolmogorov-Smirnov (Gamma ROS Est.)	0.225	0.294	Data Appear Gamma Distributed

Lognormal GOF Test Results

	No NDs	NDs = DL	NDs = DL/2	Log ROS
Correlation Coefficient R	0.828	0.925	0.928	0.917

	Test value	Crit. (0.05)	Conclusion with Alpha(0.05)
Shapiro-Wilk (Detects Only)	0.7	0.788	Data Not Lognormal
Lilliefors (Detects Only)	0.345	0.362	Data Appear Lognormal
Shapiro-Wilk (NDs = DL)	0.824	0.829	Data Not Lognormal
Lilliefors (NDs = DL)	0.247	0.295	Data Appear Lognormal
Shapiro-Wilk (NDs = DL/2)	0.831	0.829	Data Appear Lognormal
Lilliefors (NDs = DL/2)	0.248	0.295	Data Appear Lognormal
Shapiro-Wilk (Lognormal ROS Estimates)	0.812	0.829	Data Not Lognormal
Lilliefors (Lognormal ROS Estimates)	0.254	0.295	Data Appear Lognormal

Note: Substitution methods such as DL or DL/2 are not recommended.

Goodness-of-Fit Test Statistics for Uncensored Full Data Sets without Non-Detects

User Selected Options	
Date/Time of Computation	7/3/2014 13:45
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	0.95

Co

Raw Statistics	
Number of Valid Observations	5
Number of Distinct Observations	5
Minimum	8
Maximum	126
Mean of Raw Data	72.02
Standard Deviation of Raw Data	50.84
Khat	1.561
Theta hat	46.13
Kstar	0.758
Theta star	95.03
Mean of Log Transformed Data	3.924
Standard Deviation of Log Transformed Data	1.12
Normal GOF Test Results	
Correlation Coefficient R	0.956
Shapiro Wilk Test Statistic	0.896
Shapiro Wilk Critical (0.05) Value	0.762
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.237
Lilliefors Critical (0.05) Value	0.396
Data appear Normal at (0.05) Significance Level	
Gamma GOF Test Results	
Correlation Coefficient R	0.876
A-D Test Statistic	0.394
A-D Critical (0.05) Value	0.686
K-S Test Statistic	0.236
K-S Critical(0.05) Value	0.362
Data appear Gamma Distributed at (0.05) Significance Level	
Lognormal GOF Test Results	
Correlation Coefficient R	0.915
Shapiro Wilk Test Statistic	0.842
Shapiro Wilk Critical (0.05) Value	0.762
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.283
Lilliefors Critical (0.05) Value	0.396
Data appear Lognormal at (0.05) Significance Level	

Fe

Raw Statistics	
Number of Valid Observations	5
Number of Distinct Observations	5
Minimum	22300
Maximum	72100
Mean of Raw Data	47280
Standard Deviation of Raw Data	18744
Khat	7.063
Theta hat	6694
Kstar	2.958
Theta star	15981

Mean of Log Transformed Data	10.69
Standard Deviation of Log Transformed Data	0.444

Normal GOF Test Results

Correlation Coefficient R	0.997
Shapiro Wilk Test Statistic	0.996
Shapiro Wilk Critical (0.05) Value	0.762
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.138
Lilliefors Critical (0.05) Value	0.396

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.985
A-D Test Statistic	0.199
A-D Critical (0.05) Value	0.68
K-S Test Statistic	0.164
K-S Critical(0.05) Value	0.358

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.977
Shapiro Wilk Test Statistic	0.961
Shapiro Wilk Critical (0.05) Value	0.762
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.2
Lilliefors Critical (0.05) Value	0.396

Data appear Lognormal at (0.05) Significance Level

V

Raw Statistics

Number of Valid Observations	5
Number of Distinct Observations	5
Minimum	38.6
Maximum	1390
Mean of Raw Data	503.3
Standard Deviation of Raw Data	523.3
Khat	1.078
Theta hat	466.8
Kstar	0.565
Theta star	891.5
Mean of Log Transformed Data	5.69
Standard Deviation of Log Transformed Data	1.308

Normal GOF Test Results

Correlation Coefficient R	0.902
Shapiro Wilk Test Statistic	0.831
Shapiro Wilk Critical (0.05) Value	0.762
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.293
Lilliefors Critical (0.05) Value	0.396

Data appear Normal at (0.05) Significance Level

Gamma GOF Test Results

Correlation Coefficient R	0.987
A-D Test Statistic	0.269
A-D Critical (0.05) Value	0.691
K-S Test Statistic	0.214
K-S Critical(0.05) Value	0.364

Data appear Gamma Distributed at (0.05) Significance Level

Lognormal GOF Test Results

Correlation Coefficient R	0.956
Shapiro Wilk Test Statistic	0.933
Shapiro Wilk Critical (0.05) Value	0.762
Approximate Shapiro Wilk P Value	N/A
Lilliefors Test Statistic	0.283
Lilliefors Critical (0.05) Value	0.396

Data appear Lognormal at (0.05) Significance Level

APPENDIX F.4B

EASTERN AREA SURFACE AND SUBSURFACE SOILS
UCL CALCULATION

UCL Statistics for Data Sets with Non-Detects

User Selected Options	
Date/Time of Computation	7/3/2014 13:41
From File	WorkSheet_a.xls
Full Precision	OFF
Confidence Coefficient	95%
Number of Bootstrap Operations	2000

124TCB

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Number of Detects	12	Number of Non-Detects	3
Number of Distinct Detects	12	Number of Distinct Non-Detects	3
Minimum Detect	0.007	Minimum Non-Detect	0.001
Maximum Detect	150000	Maximum Non-Detect	5.3
Variance Detects	2.27E+09	Percent Non-Detects	20%
Mean Detects	25874	SD Detects	47626
Median Detects	46.45	CV Detects	1.841
Skewness Detects	1.992	Kurtosis Detects	3.618
Mean of Logged Detects	5.03	SD of Logged Detects	5.466

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.632	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.351	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	20700	Standard Error of Mean	11347
SD	42077	95% KM (BCA) UCL	40535
95% KM (t) UCL	40686	95% KM (Percentile Bootstrap) UCL	40616
95% KM (z) UCL	39364	95% KM Bootstrap t UCL	57709
90% KM Chebyshev UCL	54742	95% KM Chebyshev UCL	70161
97.5% KM Chebyshev UCL	91564	99% KM Chebyshev UCL	133604

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.541	Anderson-Darling GOF Test	
5% A-D Critical Value	0.916	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.256	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.276	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.15	k star (bias corrected MLE)	0.168
Theta hat (MLE)	172714	Theta star (bias corrected MLE)	154094
nu hat (MLE)	3.595	nu star (bias corrected)	4.03
MLE Mean (bias corrected)	25874	MLE Sd (bias corrected)	63143

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.242	nu hat (KM)	7.26
Approximate Chi Square Value (7.26, α)	2.314	Adjusted Chi Square Value (7.26, β)	1.986
95% Gamma Approximate KM-UCL (use when n>=50)	64932	95% Gamma Adjusted KM-UCL (use when n<50)	75676

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.007	Mean	20700
Maximum	150000	Median	28.3
SD	43554	CV	2.104

k hat (MLE)	0.116	k star (bias corrected MLE)	0.138
Theta hat (MLE)	177700	Theta star (bias corrected MLE)	150397
nu hat (MLE)	3.495	nu star (bias corrected)	4.129
MLE Mean (bias corrected)	20700	MLE Sd (bias corrected)	55796
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (4.13, α)	0.773	Adjusted Chi Square Value (4.13, β)	0.616
95% Gamma Approximate UCL (use when n>=50)	110522	95% Gamma Adjusted UCL (use when n<50)	138671

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.926	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.859	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.148	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.256	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	20700	Mean in Log Scale	2.694
SD in Original Scale	43554	SD in Log Scale	6.879
95% t UCL (assumes normality of ROS data)	40506	95% Percentile Bootstrap UCL	40493
95% BCA Bootstrap UCL	49584	95% Bootstrap t UCL	59389
95% H-UCL (Log ROS)	1.39E+23		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	2.748	95% H-UCL (KM -Log)	1.57E+21
KM SD (logged)	6.562	95% Critical H Value (KM-Log)	13.99
KM Standard Error of Mean (logged)	1.775		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	20700	Mean in Log Scale	3.118
SD in Original Scale	43554	SD in Log Scale	6.511
95% t UCL (Assumes normality)	40507	95% H-Stat UCL	1.12E+21

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	70161	95% GROS Adjusted Gamma UCL	138671
95% Adjusted Gamma KM-UCL	75676		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

12DCB

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Number of Detects	9	Number of Non-Detects	6
Number of Distinct Detects	9	Number of Distinct Non-Detects	6
Minimum Detect	3.78	Minimum Non-Detect	9.50E-04
Maximum Detect	5405	Maximum Non-Detect	5.6
Variance Detects	5346554	Percent Non-Detects	40%
Mean Detects	1614	SD Detects	2312
Median Detects	34.4	CV Detects	1.433
Skewness Detects	0.945	Kurtosis Detects	-1.253
Mean of Logged Detects	4.797	SD of Logged Detects	3.065

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.708	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.348	Lilliefors GOF Test	

5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	968.3	Standard Error of Mean	510.6
SD	1865	95% KM (BCA) UCL	1860
95% KM (t) UCL	1868	95% KM (Percentile Bootstrap) UCL	1778
95% KM (z) UCL	1808	95% KM Bootstrap t UCL	2271
90% KM Chebyshev UCL	2500	95% KM Chebyshev UCL	3194
97.5% KM Chebyshev UCL	4157	99% KM Chebyshev UCL	6049

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.822	Anderson-Darling GOF Test	
5% A-D Critical Value	0.819	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.282	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.303	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.271	k star (bias corrected MLE)	0.255
Theta hat (MLE)	5959	Theta star (bias corrected MLE)	6338
nu hat (MLE)	4.875	nu star (bias corrected)	4.583
MLE Mean (bias corrected)	1614	MLE Sd (bias corrected)	3198

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.27	nu hat (KM)	8.092
Approximate Chi Square Value (8.09, α)	2.788	Adjusted Chi Square Value (8.09, β)	2.419
95% Gamma Approximate KM-UCL (use when n>=50)	2810	95% Gamma Adjusted KM-UCL (use when n<50)	3239

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	968.3
Maximum	5405	Median	6.53
SD	1930	CV	1.993
k hat (MLE)	0.134	k star (bias corrected MLE)	0.151
Theta hat (MLE)	7237	Theta star (bias corrected MLE)	6392
nu hat (MLE)	4.014	nu star (bias corrected)	4.544
MLE Mean (bias corrected)	968.3	MLE Sd (bias corrected)	2488
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (4.54, α)	0.948	Adjusted Chi Square Value (4.54, β)	0.766
95% Gamma Approximate UCL (use when n>=50)	4643	95% Gamma Adjusted UCL (use when n<50)	5744

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.836	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.218	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	968.3	Mean in Log Scale	1.814
SD in Original Scale	1930	SD in Log Scale	4.438
95% t UCL (assumes normality of ROS data)	1846	95% Percentile Bootstrap UCL	1812
95% BCA Bootstrap UCL	1977	95% Bootstrap t UCL	2277
95% H-UCL (Log ROS)	9.57E+09		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.187	95% H-UCL (KM -Log)	3.78E+17
KM SD (logged)	6.135	95% Critical H Value (KM-Log)	13.09
KM Standard Error of Mean (logged)	1.697		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	968.6	Mean in Log Scale	1.373
SD in Original Scale	1930	SD in Log Scale	5.417
95% t UCL (Assumes normality)	1846	95% H-Stat UCL	1.79E+14

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	1860	95% GROS Adjusted Gamma UCL	5744
95% Adjusted Gamma KM-UCL	3239		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

13DCB

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Number of Detects	9	Number of Non-Detects	6
Number of Distinct Detects	9	Number of Distinct Non-Detects	6
Minimum Detect	6.4	Minimum Non-Detect	7.80E-04
Maximum Detect	1410	Maximum Non-Detect	5.4
Variance Detects	312867	Percent Non-Detects	40%
Mean Detects	428.7	SD Detects	559.3
Median Detects	66.2	CV Detects	1.305
Skewness Detects	1.02	Kurtosis Detects	-0.605
Mean of Logged Detects	4.463	SD of Logged Detects	2.275

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.778	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.297	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	257.2	Standard Error of Mean	125.8
SD	459.3	95% KM (BCA) UCL	483.6
95% KM (t) UCL	478.8	95% KM (Percentile Bootstrap) UCL	477.7
95% KM (z) UCL	464.1	95% KM Bootstrap t UCL	737.3
90% KM Chebyshev UCL	634.6	95% KM Chebyshev UCL	805.5
97.5% KM Chebyshev UCL	1043	99% KM Chebyshev UCL	1509

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.645	Anderson-Darling GOF Test	
5% A-D Critical Value	0.787	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.25	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.297	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.41	k star (bias corrected MLE)	0.348
Theta hat (MLE)	1045	Theta star (bias corrected MLE)	1234
nu hat (MLE)	7.383	nu star (bias corrected)	6.255
MLE Mean (bias corrected)	428.7	MLE Sd (bias corrected)	727.2

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.314	nu hat (KM)	9.408

Approximate Chi Square Value (9.41, α)	3.575	Adjusted Chi Square Value (9.41, β)	3.145
95% Gamma Approximate KM-UCL (use when n>=50)	676.8	95% Gamma Adjusted KM-UCL (use when n<50)	769.3

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	257.2
Maximum	1410	Median	9.5
SD	475.4	CV	1.848
k hat (MLE)	0.161	k star (bias corrected MLE)	0.173
Theta hat (MLE)	1595	Theta star (bias corrected MLE)	1483
nu hat (MLE)	4.839	nu star (bias corrected)	5.205
MLE Mean (bias corrected)	257.2	MLE Sd (bias corrected)	617.5
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (5.20, α)	1.248	Adjusted Chi Square Value (5.20, β)	1.028
95% Gamma Approximate UCL (use when n>=50)	1073	95% Gamma Adjusted UCL (use when n<50)	1302

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.846	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.229	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	257.3	Mean in Log Scale	2.18
SD in Original Scale	475.4	SD in Log Scale	3.366
95% t UCL (assumes normality of ROS data)	473.5	95% Percentile Bootstrap UCL	454.2
95% BCA Bootstrap UCL	529.1	95% Bootstrap t UCL	666.1
95% H-UCL (Log ROS)	1820940		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.185	95% H-UCL (KM -Log)	1.86E+16
KM SD (logged)	5.93	95% Critical H Value (KM-Log)	12.66
KM Standard Error of Mean (logged)	1.624		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	257.5	Mean in Log Scale	1.137
SD in Original Scale	475.3	SD in Log Scale	5.104
95% t UCL (Assumes normality)	473.6	95% H-Stat UCL	4.23E+12

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	483.6	95% GROS Adjusted Gamma UCL	1302
95% Adjusted Gamma KM-UCL	769.3		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

14DCB

General Statistics

Total Number of Observations	15	Number of Distinct Observations	15
Number of Detects	9	Number of Non-Detects	6
Number of Distinct Detects	9	Number of Distinct Non-Detects	6
Minimum Detect	0.55	Minimum Non-Detect	7.60E-04

Maximum Detect	4840	Maximum Non-Detect	7.4
Variance Detects	2731499	Percent Non-Detects	40%
Mean Detects	920.9	SD Detects	1653
Median Detects	52.2	CV Detects	1.795
Skewness Detects	2.072	Kurtosis Detects	4.14
Mean of Logged Detects	4.41	SD of Logged Detects	2.861

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.651	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.367	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	552.5	Standard Error of Mean	352.9
SD	1289	95% KM (BCA) UCL	1198
95% KM (t) UCL	1174	95% KM (Percentile Bootstrap) UCL	1127
95% KM (z) UCL	1133	95% KM Bootstrap t UCL	2922
90% KM Chebyshev UCL	1611	95% KM Chebyshev UCL	2091
97.5% KM Chebyshev UCL	2756	99% KM Chebyshev UCL	4064

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.59	Anderson-Darling GOF Test	
5% A-D Critical Value	0.812	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.323	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.302	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected data follow Appr. Gamma Distribution at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.287	k star (bias corrected MLE)	0.266
Theta hat (MLE)	3203	Theta star (bias corrected MLE)	3465
nu hat (MLE)	5.175	nu star (bias corrected)	4.783
MLE Mean (bias corrected)	920.9	MLE Sd (bias corrected)	1786

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.184	nu hat (KM)	5.517
Approximate Chi Square Value (5.52, α)	1.398	Adjusted Chi Square Value (5.52, β)	1.161
95% Gamma Approximate KM-UCL (use when n>=50)	2180	95% Gamma Adjusted KM-UCL (use when n<50)	2626

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	552.5
Maximum	4840	Median	15
SD	1334	CV	2.414
k hat (MLE)	0.141	k star (bias corrected MLE)	0.157
Theta hat (MLE)	3925	Theta star (bias corrected MLE)	3518
nu hat (MLE)	4.223	nu star (bias corrected)	4.711
MLE Mean (bias corrected)	552.5	MLE Sd (bias corrected)	1394
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (4.71, α)	1.021	Adjusted Chi Square Value (4.71, β)	0.83
95% Gamma Approximate UCL (use when n>=50)	2549	95% Gamma Adjusted UCL (use when n<50)	3137

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.935	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.224	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	552.6	Mean in Log Scale	1.63
SD in Original Scale	1334	SD in Log Scale	4.148
95% t UCL (assumes normality of ROS data)	1159	95% Percentile Bootstrap UCL	1128
95% BCA Bootstrap UCL	1507	95% Bootstrap t UCL	2921
95% H-UCL (Log ROS)	5.60E+08		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.102	95% H-UCL (KM -Log)	7.94E+15
KM SD (logged)	5.839	95% Critical H Value (KM-Log)	12.47
KM Standard Error of Mean (logged)	1.664		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	553.2	Mean in Log Scale	1.461
SD in Original Scale	1333	SD in Log Scale	5.107
95% t UCL (Assumes normality)	1160	95% H-Stat UCL	6.02E+12

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Approximate Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (BCA) UCL	1198	95% GROS Adjusted Gamma UCL	3137
95% Adjusted Gamma KM-UCL	2626		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BAA

General Statistics

Total Number of Observations	22	Number of Distinct Observations	17
Number of Detects	9	Number of Non-Detects	13
Number of Distinct Detects	9	Number of Distinct Non-Detects	8
Minimum Detect	0.14	Minimum Non-Detect	0.026
Maximum Detect	22	Maximum Non-Detect	49
Variance Detects	59.5	Percent Non-Detects	59.09%
Mean Detects	5.138	SD Detects	7.714
Median Detects	0.95	CV Detects	1.501
Skewness Detects	1.739	Kurtosis Detects	2.199
Mean of Logged Detects	0.321	SD of Logged Detects	1.908

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.715	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.311	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	2.709	Standard Error of Mean	1.286
SD	5.347	95% KM (BCA) UCL	4.906
95% KM (t) UCL	4.921	95% KM (Percentile Bootstrap) UCL	4.906
95% KM (z) UCL	4.823	95% KM Bootstrap t UCL	7.437
90% KM Chebyshev UCL	6.566	95% KM Chebyshev UCL	8.313
97.5% KM Chebyshev UCL	10.74	99% KM Chebyshev UCL	15.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.439	Anderson-Darling GOF Test	
5% A-D Critical Value	0.773	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.215	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.295	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.485	k star (bias corrected MLE)	0.398
Theta hat (MLE)	10.59	Theta star (bias corrected MLE)	12.92
nu hat (MLE)	8.733	nu star (bias corrected)	7.155
MLE Mean (bias corrected)	5.138	MLE Sd (bias corrected)	8.149

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.257	nu hat (KM)	11.29
Approximate Chi Square Value (11.29, α)	4.765	Adjusted Chi Square Value (11.29, β)	4.452
95% Gamma Approximate KM-UCL (use when n>=50)	6.42	95% Gamma Adjusted KM-UCL (use when n<50)	6.872

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	2.402
Maximum	22	Median	0.155
SD	5.365	CV	2.234
k hat (MLE)	0.265	k star (bias corrected MLE)	0.259
Theta hat (MLE)	9.062	Theta star (bias corrected MLE)	9.266
nu hat (MLE)	11.66	nu star (bias corrected)	11.4
MLE Mean (bias corrected)	2.402	MLE Sd (bias corrected)	4.718
		Adjusted Level of Significance (β)	0.0386
Approximate Chi Square Value (11.40, α)	4.838	Adjusted Chi Square Value (11.40, β)	4.521
95% Gamma Approximate UCL (use when n>=50)	5.662	95% Gamma Adjusted UCL (use when n<50)	6.058

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.914	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.829	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.184	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.295	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	2.344	Mean in Log Scale	-0.78
SD in Original Scale	5.334	SD in Log Scale	1.802
95% t UCL (assumes normality of ROS data)	4.301	95% Percentile Bootstrap UCL	4.35
95% BCA Bootstrap UCL	5.244	95% Bootstrap t UCL	11.31
95% H-UCL (Log ROS)	10.56		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.801	95% H-UCL (KM -Log)	26.09
KM SD (logged)	2.063	95% Critical H Value (KM-Log)	4.295
KM Standard Error of Mean (logged)	0.619		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.967	Mean in Log Scale	0.689
SD in Original Scale	6.686	SD in Log Scale	2.099
95% t UCL (Assumes normality)	8.42	95% H-Stat UCL	132.6

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	4.921	95% GROS Adjusted Gamma UCL	6.058
95% Adjusted Gamma KM-UCL	6.872		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BAP

General Statistics

Total Number of Observations	22	Number of Distinct Observations	22
Number of Detects	16	Number of Non-Detects	6
Number of Distinct Detects	16	Number of Distinct Non-Detects	6
Minimum Detect	0.14	Minimum Non-Detect	0.02
Maximum Detect	37	Maximum Non-Detect	16
Variance Detects	143.6	Percent Non-Detects	27.27%
Mean Detects	8.006	SD Detects	11.98
Median Detects	4.375	CV Detects	1.497
Skewness Detects	1.855	Kurtosis Detects	2.239
Mean of Logged Detects	0.899	SD of Logged Detects	1.788

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.66	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.36	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	6.118	Standard Error of Mean	2.296
SD	10.4	95% KM (BCA) UCL	10.37
95% KM (t) UCL	10.07	95% KM (Percentile Bootstrap) UCL	9.992
95% KM (z) UCL	9.894	95% KM Bootstrap t UCL	12.85
90% KM Chebyshev UCL	13.01	95% KM Chebyshev UCL	16.13
97.5% KM Chebyshev UCL	20.46	99% KM Chebyshev UCL	28.96

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.574	Anderson-Darling GOF Test	
5% A-D Critical Value	0.794	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.184	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.227	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.532	k star (bias corrected MLE)	0.474
Theta hat (MLE)	15.04	Theta star (bias corrected MLE)	16.88
nu hat (MLE)	17.04	nu star (bias corrected)	15.18
MLE Mean (bias corrected)	8.006	MLE Sd (bias corrected)	11.63

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.346	nu hat (KM)	15.24
Approximate Chi Square Value (15.24, α)	7.426	Adjusted Chi Square Value (15.24, β)	7.021
95% Gamma Approximate KM-UCL (use when n>=50)	12.55	95% Gamma Adjusted KM-UCL (use when n<50)	13.28

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	5.851
Maximum	37	Median	0.88
SD	10.75	CV	1.837
k hat (MLE)	0.326	k star (bias corrected MLE)	0.312
Theta hat (MLE)	17.93	Theta star (bias corrected MLE)	18.75
nu hat (MLE)	14.36	nu star (bias corrected)	13.73
MLE Mean (bias corrected)	5.851	MLE Sd (bias corrected)	10.47
		Adjusted Level of Significance (β)	0.0386
Approximate Chi Square Value (13.73, α)	6.389	Adjusted Chi Square Value (13.73, β)	6.017

95% Gamma Approximate UCL (use when n>=50)	12.58	95% Gamma Adjusted UCL (use when n<50)	13.35

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.934	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.887	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.161	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.222	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.976	Mean in Log Scale	0.396
SD in Original Scale	10.68	SD in Log Scale	1.828
95% t UCL (assumes normality of ROS data)	9.894	95% Percentile Bootstrap UCL	9.976
95% BCA Bootstrap UCL	11.06	95% Bootstrap t UCL	13.49
95% H-UCL (Log ROS)	37.26		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.317	95% H-UCL (KM -Log)	65.91
KM SD (logged)	2.012	95% Critical H Value (KM-Log)	4.207
KM Standard Error of Mean (logged)	0.483		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	6.602	Mean in Log Scale	0.684
SD in Original Scale	10.48	SD in Log Scale	1.937
95% t UCL (Assumes normality)	10.45	95% H-Stat UCL	72.6

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	16.13	95% GROS Adjusted Gamma UCL	13.35
95% Adjusted Gamma KM-UCL	13.28		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

BBF

General Statistics

Total Number of Observations	22	Number of Distinct Observations	22
Number of Detects	17	Number of Non-Detects	5
Number of Distinct Detects	17	Number of Distinct Non-Detects	5
Minimum Detect	0.22	Minimum Non-Detect	0.025
Maximum Detect	65.8	Maximum Non-Detect	30
Variance Detects	322.3	Percent Non-Detects	22.73%
Mean Detects	14.12	SD Detects	17.95
Median Detects	8.7	CV Detects	1.271
Skewness Detects	1.976	Kurtosis Detects	3.808
Mean of Logged Detects	1.696	SD of Logged Detects	1.706

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.755	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.219	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	11.42	Standard Error of Mean	3.588
SD	16.23	95% KM (BCA) UCL	17.71

95% KM (t) UCL	17.6	95% KM (Percentile Bootstrap) UCL	17.05
95% KM (z) UCL	17.33	95% KM Bootstrap t UCL	22.26
90% KM Chebyshev UCL	22.19	95% KM Chebyshev UCL	27.06
97.5% KM Chebyshev UCL	33.83	99% KM Chebyshev UCL	47.12

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.172	Anderson-Darling GOF Test	
5% A-D Critical Value	0.786	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.0897	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.219	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.643	k star (bias corrected MLE)	0.569
Theta hat (MLE)	21.96	Theta star (bias corrected MLE)	24.83
nu hat (MLE)	21.86	nu star (bias corrected)	19.33
MLE Mean (bias corrected)	14.12	MLE Sd (bias corrected)	18.73

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.496	nu hat (KM)	21.81
Approximate Chi Square Value (21.81, α)	12.2	Adjusted Chi Square Value (21.81, β)	11.66
95% Gamma Approximate KM-UCL (use when n>=50)	20.43	95% Gamma Adjusted KM-UCL (use when n<50)	21.37

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	11.07
Maximum	65.8	Median	3.766
SD	16.71	CV	1.509
k hat (MLE)	0.358	k star (bias corrected MLE)	0.339
Theta hat (MLE)	30.97	Theta star (bias corrected MLE)	32.65
nu hat (MLE)	15.73	nu star (bias corrected)	14.92
MLE Mean (bias corrected)	11.07	MLE Sd (bias corrected)	19.02
		Adjusted Level of Significance (β)	0.0386
Approximate Chi Square Value (14.92, α)	7.207	Adjusted Chi Square Value (14.92, β)	6.809
95% Gamma Approximate UCL (use when n>=50)	22.93	95% Gamma Adjusted UCL (use when n<50)	24.27

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.94	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.892	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.165	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.215	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	11.17	Mean in Log Scale	1.246
SD in Original Scale	16.63	SD in Log Scale	1.798
95% t UCL (assumes normality of ROS data)	17.27	95% Percentile Bootstrap UCL	17.61
95% BCA Bootstrap UCL	19.47	95% Bootstrap t UCL	22.54
95% H-UCL (Log ROS)	78.86		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.12	95% H-UCL (KM -Log)	181.9
KM SD (logged)	2.069	95% Critical H Value (KM-Log)	4.305
KM Standard Error of Mean (logged)	0.491		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	12.08	Mean in Log Scale	1.409
SD in Original Scale	16.33	SD in Log Scale	1.991
95% t UCL (Assumes normality)	18.07	95% H-Stat UCL	181.8

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (Chebyshev) UCL	27.06	95% GROS Adjusted Gamma UCL	24.27
95% Adjusted Gamma KM-UCL	21.37		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

DAHA

General Statistics

Total Number of Observations	22	Number of Distinct Observations	21
Number of Detects	10	Number of Non-Detects	12
Number of Distinct Detects	10	Number of Distinct Non-Detects	11
Minimum Detect	0.029	Minimum Non-Detect	0.027
Maximum Detect	8.8	Maximum Non-Detect	16
Variance Detects	10.88	Percent Non-Detects	54.55%
Mean Detects	2.429	SD Detects	3.298
Median Detects	0.785	CV Detects	1.358
Skewness Detects	1.26	Kurtosis Detects	0.0294
Mean of Logged Detects	-0.464	SD of Logged Detects	2.058

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.749	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.334	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1.336	Standard Error of Mean	0.571
SD	2.43	95% KM (BCA) UCL	2.214
95% KM (t) UCL	2.317	95% KM (Percentile Bootstrap) UCL	2.289
95% KM (z) UCL	2.274	95% KM Bootstrap t UCL	3.1
90% KM Chebyshev UCL	3.047	95% KM Chebyshev UCL	3.823
97.5% KM Chebyshev UCL	4.899	99% KM Chebyshev UCL	7.013

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.37	Anderson-Darling GOF Test	
5% A-D Critical Value	0.782	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.183	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.474	k star (bias corrected MLE)	0.398
Theta hat (MLE)	5.123	Theta star (bias corrected MLE)	6.094
nu hat (MLE)	9.481	nu star (bias corrected)	7.97
MLE Mean (bias corrected)	2.429	MLE Sd (bias corrected)	3.847

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.302	nu hat (KM)	13.29
Approximate Chi Square Value (13.29, α)	6.089	Adjusted Chi Square Value (13.29, β)	5.727
95% Gamma Approximate KM-UCL (use when n>=50)	2.916	95% Gamma Adjusted KM-UCL (use when n<50)	3.1

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	1.146
Maximum	8.8	Median	0.0379
SD	2.472	CV	2.156
k hat (MLE)	0.282	k star (bias corrected MLE)	0.274
Theta hat (MLE)	4.065	Theta star (bias corrected MLE)	4.186
nu hat (MLE)	12.41	nu star (bias corrected)	12.05
MLE Mean (bias corrected)	1.146	MLE Sd (bias corrected)	2.191
		Adjusted Level of Significance (β)	0.0386
Approximate Chi Square Value (12.05, α)	5.26	Adjusted Chi Square Value (12.05, β)	4.928
95% Gamma Approximate UCL (use when n>=50)	2.626	95% Gamma Adjusted UCL (use when n<50)	2.803

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.932	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.138	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1.175	Mean in Log Scale	-1.502
SD in Original Scale	2.457	SD in Log Scale	1.834
95% t UCL (assumes normality of ROS data)	2.076	95% Percentile Bootstrap UCL	2.074
95% BCA Bootstrap UCL	2.379	95% Bootstrap t UCL	3.016
95% H-UCL (Log ROS)	5.706		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-1.382	95% H-UCL (KM -Log)	9.529
KM SD (logged)	1.947	95% Critical H Value (KM-Log)	4.094
KM Standard Error of Mean (logged)	0.552		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	2.318	Mean in Log Scale	-0.196
SD in Original Scale	2.61	SD in Log Scale	1.977
95% t UCL (Assumes normality)	3.275	95% H-Stat UCL	34.68

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2.317	95% GROS Adjusted Gamma UCL	2.803
95% Adjusted Gamma KM-UCL	3.1		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

HCB

General Statistics

Total Number of Observations	22	Number of Distinct Observations	21
Number of Detects	10	Number of Non-Detects	12
Number of Distinct Detects	10	Number of Distinct Non-Detects	11
Minimum Detect	0.95	Minimum Non-Detect	0.017
Maximum Detect	359	Maximum Non-Detect	3.1
Variance Detects	12070	Percent Non-Detects	54.55%
Mean Detects	68.2	SD Detects	109.9
Median Detects	29.85	CV Detects	1.611
Skewness Detects	2.491	Kurtosis Detects	6.513
Mean of Logged Detects	2.874	SD of Logged Detects	2.096

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.647	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.341	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	31.06	Standard Error of Mean	17.53
SD	78.02	95% KM (BCA) UCL	61.14
95% KM (t) UCL	61.23	95% KM (Percentile Bootstrap) UCL	60.87
95% KM (z) UCL	59.9	95% KM Bootstrap t UCL	141.8
90% KM Chebyshev UCL	83.66	95% KM Chebyshev UCL	107.5
97.5% KM Chebyshev UCL	140.6	99% KM Chebyshev UCL	205.5

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.386	Anderson-Darling GOF Test	
5% A-D Critical Value	0.782	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.175	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.282	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.475	k star (bias corrected MLE)	0.399
Theta hat (MLE)	143.7	Theta star (bias corrected MLE)	170.9
nu hat (MLE)	9.495	nu star (bias corrected)	7.98
MLE Mean (bias corrected)	68.2	MLE Sd (bias corrected)	108

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.159	nu hat (KM)	6.975
Approximate Chi Square Value (6.97, α)	2.157	Adjusted Chi Square Value (6.97, β)	1.963
95% Gamma Approximate KM-UCL (use when n>=50)	100.5	95% Gamma Adjusted KM-UCL (use when n<50)	110.4

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	31.01
Maximum	359	Median	0.01
SD	79.88	CV	2.576
k hat (MLE)	0.164	k star (bias corrected MLE)	0.172
Theta hat (MLE)	189.6	Theta star (bias corrected MLE)	180.7
nu hat (MLE)	7.196	nu star (bias corrected)	7.548
MLE Mean (bias corrected)	31.01	MLE Sd (bias corrected)	74.86
		Adjusted Level of Significance (β)	0.0386
Approximate Chi Square Value (7.55, α)	2.476	Adjusted Chi Square Value (7.55, β)	2.265
95% Gamma Approximate UCL (use when n>=50)	94.51	95% Gamma Adjusted UCL (use when n<50)	103.3

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.888	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.842	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.233	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.28	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	31.07	Mean in Log Scale	-0.0242
SD in Original Scale	79.85	SD in Log Scale	3.078
95% t UCL (assumes normality of ROS data)	60.36	95% Percentile Bootstrap UCL	62.07
95% BCA Bootstrap UCL	77.46	95% Bootstrap t UCL	143.9
95% H-UCL (Log ROS)	6785		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-0.71	95% H-UCL (KM -Log)	112252
KM SD (logged)	3.644	95% Critical H Value (KM-Log)	7.165
KM Standard Error of Mean (logged)	0.845		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	31.28	Mean in Log Scale	-0.0506
SD in Original Scale	79.77	SD in Log Scale	3.452
95% t UCL (Assumes normality)	60.55	95% H-Stat UCL	61926

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	61.23	95% GROS Adjusted Gamma UCL	103.3
95% Adjusted Gamma KM-UCL	110.4		

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

ICDP

General Statistics

Total Number of Observations	22	Number of Distinct Observations	22
Number of Detects	15	Number of Non-Detects	7
Number of Distinct Detects	15	Number of Distinct Non-Detects	7
Minimum Detect	0.074	Minimum Non-Detect	0.023
Maximum Detect	35.9	Maximum Non-Detect	23
Variance Detects	109.9	Percent Non-Detects	31.82%
Mean Detects	8.932	SD Detects	10.48
Median Detects	6.6	CV Detects	1.173
Skewness Detects	1.59	Kurtosis Detects	2.293
Mean of Logged Detects	1.102	SD of Logged Detects	1.962

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.806	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.211	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Approximate Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	6.513	Standard Error of Mean	2.051
SD	9.193	95% KM (BCA) UCL	10.42
95% KM (t) UCL	10.04	95% KM (Percentile Bootstrap) UCL	9.943
95% KM (z) UCL	9.887	95% KM Bootstrap t UCL	12.44
90% KM Chebyshev UCL	12.67	95% KM Chebyshev UCL	15.45
97.5% KM Chebyshev UCL	19.32	99% KM Chebyshev UCL	26.92

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.29	Anderson-Darling GOF Test	
5% A-D Critical Value	0.788	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.151	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.233	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.572	k star (bias corrected MLE)	0.502
Theta hat (MLE)	15.61	Theta star (bias corrected MLE)	17.78
nu hat (MLE)	17.17	nu star (bias corrected)	15.07
MLE Mean (bias corrected)	8.932	MLE Sd (bias corrected)	12.6

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.502	nu hat (KM)	22.08
Approximate Chi Square Value (22.08, α)	12.4	Adjusted Chi Square Value (22.08, β)	11.86
95% Gamma Approximate KM-UCL (use when n>=50)	11.6	95% Gamma Adjusted KM-UCL (use when n<50)	12.13

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	6.243
Maximum	35.9	Median	1.65
SD	9.467	CV	1.516
k hat (MLE)	0.389	k star (bias corrected MLE)	0.366
Theta hat (MLE)	16.06	Theta star (bias corrected MLE)	17.06
nu hat (MLE)	17.1	nu star (bias corrected)	16.1
MLE Mean (bias corrected)	6.243	MLE Sd (bias corrected)	10.32
		Adjusted Level of Significance (β)	0.0386
Approximate Chi Square Value (16.10, α)	8.036	Adjusted Chi Square Value (16.10, β)	7.612
95% Gamma Approximate UCL (use when n>=50)	12.51	95% Gamma Adjusted UCL (use when n<50)	13.21

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.91	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.881	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.189	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.229	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.25	Mean in Log Scale	0.421
SD in Original Scale	9.457	SD in Log Scale	1.997
95% t UCL (assumes normality of ROS data)	9.719	95% Percentile Bootstrap UCL	9.846
95% BCA Bootstrap UCL	10.3	95% Bootstrap t UCL	12.32
95% H-UCL (Log ROS)	69.2		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	0.329	95% H-UCL (KM -Log)	149.3
KM SD (logged)	2.22	95% Critical H Value (KM-Log)	4.57
KM Standard Error of Mean (logged)	0.548		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	7.252	Mean in Log Scale	0.866
SD in Original Scale	9.147	SD in Log Scale	2.037
95% t UCL (Assumes normality)	10.61	95% H-Stat UCL	125.2

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Approximate Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	10.04	95% KM (Percentile Bootstrap) UCL	9.943

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

NAP

General Statistics

Total Number of Observations	21	Number of Distinct Observations	19
Number of Detects	19	Number of Non-Detects	2

Number of Distinct Detects	17	Number of Distinct Non-Detects	2
Minimum Detect	0.11	Minimum Non-Detect	2.7
Maximum Detect	2000	Maximum Non-Detect	4.1
Variance Detects	210381	Percent Non-Detects	9.52%
Mean Detects	164	SD Detects	458.7
Median Detects	10	CV Detects	2.797
Skewness Detects	3.964	Kurtosis Detects	16.38
Mean of Logged Detects	2.623	SD of Logged Detects	2.433

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.396	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.901	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.371	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.203	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	148.5	Standard Error of Mean	95.81
SD	427.3	95% KM (BCA) UCL	334
95% KM (t) UCL	313.7	95% KM (Percentile Bootstrap) UCL	333.6
95% KM (z) UCL	306.1	95% KM Bootstrap t UCL	1002
90% KM Chebyshev UCL	435.9	95% KM Chebyshev UCL	566.1
97.5% KM Chebyshev UCL	746.8	99% KM Chebyshev UCL	1102

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	1.259	Anderson-Darling GOF Test	
5% A-D Critical Value	0.852	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.278	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.216	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.281	k star (bias corrected MLE)	0.272
Theta hat (MLE)	582.7	Theta star (bias corrected MLE)	602.7
nu hat (MLE)	10.69	nu star (bias corrected)	10.34
MLE Mean (bias corrected)	164	MLE Sd (bias corrected)	314.4

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.121	nu hat (KM)	5.07
Approximate Chi Square Value (5.07, α)	1.185	Adjusted Chi Square Value (5.07, β)	1.049
95% Gamma Approximate KM-UCL (use when n>=50)	635.4	95% Gamma Adjusted KM-UCL (use when n<50)	717.6

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	148.4
Maximum	2000	Median	7.31
SD	437.9	CV	2.952
k hat (MLE)	0.234	k star (bias corrected MLE)	0.232
Theta hat (MLE)	633.4	Theta star (bias corrected MLE)	638.1
nu hat (MLE)	9.837	nu star (bias corrected)	9.765
MLE Mean (bias corrected)	148.4	MLE Sd (bias corrected)	307.7
		Adjusted Level of Significance (β)	0.0383
Approximate Chi Square Value (9.76, α)	3.795	Adjusted Chi Square Value (9.76, β)	3.513
95% Gamma Approximate UCL (use when n>=50)	381.7	95% Gamma Adjusted UCL (use when n<50)	412.3

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.977	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.901	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.153	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.203	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	148.4	Mean in Log Scale	2.343
SD in Original Scale	437.9	SD in Log Scale	2.474
95% t UCL (assumes normality of ROS data)	313.2	95% Percentile Bootstrap UCL	329.6
95% BCA Bootstrap UCL	422.1	95% Bootstrap t UCL	1008
95% H-UCL (Log ROS)	3473		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	2.352	95% H-UCL (KM -Log)	2833
KM SD (logged)	2.427	95% Critical H Value (KM-Log)	4.884
KM Standard Error of Mean (logged)	0.551		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	148.5	Mean in Log Scale	2.422
SD in Original Scale	437.9	SD in Log Scale	2.395
95% t UCL (Assumes normality)	313.3	95% H-Stat UCL	2634

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Lognormal Distributed at 5% Significance Level

Suggested UCL to Use

99% KM (Chebyshev) UCL	1102

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1248

General Statistics

Total Number of Observations	12	Number of Distinct Observations	10
Number of Detects	6	Number of Non-Detects	6
Number of Distinct Detects	5	Number of Distinct Non-Detects	5
Minimum Detect	0.052	Minimum Non-Detect	0.0019
Maximum Detect	2.5	Maximum Non-Detect	0.0031
Variance Detects	0.868	Percent Non-Detects	50%
Mean Detects	0.86	SD Detects	0.931
Median Detects	0.705	CV Detects	1.083
Skewness Detects	1.226	Kurtosis Detects	1.272
Mean of Logged Detects	-0.887	SD of Logged Detects	1.52

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.853	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.232	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.431	Standard Error of Mean	0.234
SD	0.739	95% KM (BCA) UCL	0.844
95% KM (t) UCL	0.851	95% KM (Percentile Bootstrap) UCL	0.81
95% KM (z) UCL	0.815	95% KM Bootstrap t UCL	1.121
90% KM Chebyshev UCL	1.132	95% KM Chebyshev UCL	1.449
97.5% KM Chebyshev UCL	1.89	99% KM Chebyshev UCL	2.755

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.298	Anderson-Darling GOF Test	
5% A-D Critical Value	0.72	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.226	Kolmogrov-Smirnoff GOF	

5% K-S Critical Value	0.343	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics on Detected Data Only

k hat (MLE)	0.805	k star (bias corrected MLE)	0.514
Theta hat (MLE)	1.069	Theta star (bias corrected MLE)	1.675
nu hat (MLE)	9.658	nu star (bias corrected)	6.163
MLE Mean (bias corrected)	0.86	MLE Sd (bias corrected)	1.201

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.341	nu hat (KM)	8.174
Approximate Chi Square Value (8.17, α)	2.836	Adjusted Chi Square Value (8.17, β)	2.379
95% Gamma Approximate KM-UCL (use when n>=50)	1.242	95% Gamma Adjusted KM-UCL (use when n<50)	1.481

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.435
Maximum	2.5	Median	0.031
SD	0.769	CV	1.767
k hat (MLE)	0.351	k star (bias corrected MLE)	0.319
Theta hat (MLE)	1.239	Theta star (bias corrected MLE)	1.365
nu hat (MLE)	8.427	nu star (bias corrected)	7.653
MLE Mean (bias corrected)	0.435	MLE Sd (bias corrected)	0.771
		Adjusted Level of Significance (β)	0.029
Approximate Chi Square Value (7.65, α)	2.536	Adjusted Chi Square Value (7.65, β)	2.109
95% Gamma Approximate UCL (use when n>=50)	1.313	95% Gamma Adjusted UCL (use when n<50)	1.579

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.928	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level
Lilliefors Test Statistic	0.241	Lilliefors GOF Test
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level
Detected Data appear Lognormal at 5% Significance Level		

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.433	Mean in Log Scale	-3.058
SD in Original Scale	0.77	SD in Log Scale	2.513
95% t UCL (assumes normality of ROS data)	0.833	95% Percentile Bootstrap UCL	0.819
95% BCA Bootstrap UCL	0.932	95% Bootstrap t UCL	1.207
95% H-UCL (Log ROS)	111.7		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.577	95% H-UCL (KM -Log)	638.8
KM SD (logged)	2.863	95% Critical H Value (KM-Log)	6.88
KM Standard Error of Mean (logged)	0.905		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.431	Mean in Log Scale	-3.847
SD in Original Scale	0.772	SD in Log Scale	3.259
95% t UCL (Assumes normality)	0.831	95% H-Stat UCL	9028

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.851	95% KM (Percentile Bootstrap) UCL	0.81

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.

These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

1254

General Statistics

Total Number of Observations	12	Number of Distinct Observations	12
Number of Detects	7	Number of Non-Detects	5
Number of Distinct Detects	7	Number of Distinct Non-Detects	5
Minimum Detect	0.042	Minimum Non-Detect	0.003
Maximum Detect	1	Maximum Non-Detect	0.0047
Variance Detects	0.111	Percent Non-Detects	41.67%
Mean Detects	0.317	SD Detects	0.333
Median Detects	0.22	CV Detects	1.049
Skewness Detects	1.754	Kurtosis Detects	3.319
Mean of Logged Detects	-1.625	SD of Logged Detects	1.097

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.817	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.213	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.335	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	0.186	Standard Error of Mean	0.0878
SD	0.282	95% KM (BCA) UCL	0.344
95% KM (t) UCL	0.344	95% KM (Percentile Bootstrap) UCL	0.327
95% KM (z) UCL	0.331	95% KM Bootstrap t UCL	0.504
90% KM Chebyshev UCL	0.45	95% KM Chebyshev UCL	0.569
97.5% KM Chebyshev UCL	0.735	99% KM Chebyshev UCL	1.06

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.186	Anderson-Darling GOF Test	
5% A-D Critical Value	0.725	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.129	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.319	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	1.189	k star (bias corrected MLE)	0.774
Theta hat (MLE)	0.267	Theta star (bias corrected MLE)	0.409
nu hat (MLE)	16.64	nu star (bias corrected)	10.84
MLE Mean (bias corrected)	0.317	MLE Sd (bias corrected)	0.36

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.438	nu hat (KM)	10.5
Approximate Chi Square Value (10.50, α)	4.257	Adjusted Chi Square Value (10.50, β)	3.67
95% Gamma Approximate KM-UCL (use when n>=50)	0.459	95% Gamma Adjusted KM-UCL (use when n<50)	0.533

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.01	Mean	0.189
Maximum	1	Median	0.055
SD	0.292	CV	1.544
k hat (MLE)	0.525	k star (bias corrected MLE)	0.449
Theta hat (MLE)	0.36	Theta star (bias corrected MLE)	0.421
nu hat (MLE)	12.59	nu star (bias corrected)	10.78
MLE Mean (bias corrected)	0.189	MLE Sd (bias corrected)	0.282
		Adjusted Level of Significance (β)	0.029
Approximate Chi Square Value (10.78, α)	4.434	Adjusted Chi Square Value (10.78, β)	3.833

95% Gamma Approximate UCL (use when n>=50)	0.46	95% Gamma Adjusted UCL (use when n<50)	0.532

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.985	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.803	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.119	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.335	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	0.189	Mean in Log Scale	-2.864
SD in Original Scale	0.292	SD in Log Scale	1.733
95% t UCL (assumes normality of ROS data)	0.341	95% Percentile Bootstrap UCL	0.328
95% BCA Bootstrap UCL	0.394	95% Bootstrap t UCL	0.539
95% H-UCL (Log ROS)	2.534		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-3.368	95% H-UCL (KM -Log)	14.23
KM SD (logged)	2.204	95% Critical H Value (KM-Log)	5.409
KM Standard Error of Mean (logged)	0.687		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	0.186	Mean in Log Scale	-3.579
SD in Original Scale	0.294	SD in Log Scale	2.55
95% t UCL (Assumes normality)	0.338	95% H-Stat UCL	83.33

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	0.344	95% KM (Percentile Bootstrap) UCL	0.327

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

TCDD

General Statistics

Total Number of Observations	15	Number of Distinct Observations	12
Number of Detects	6	Number of Non-Detects	9
Number of Distinct Detects	6	Number of Distinct Non-Detects	6
Minimum Detect	1.79E-07	Minimum Non-Detect	1.30E-04
Maximum Detect	5.20E-04	Maximum Non-Detect	7.00E-04
Variance Detects	4.17E-08	Percent Non-Detects	60%
Mean Detects	1.09E-04	SD Detects	2.04E-04
Median Detects	2.05E-05	CV Detects	1.878
Skewness Detects	2.316	Kurtosis Detects	5.442
Mean of Logged Detects	-11.21	SD of Logged Detects	2.818

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.622	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Normal at 5% Significance Level	
Lilliefors Test Statistic	0.372	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data Not Normal at 5% Significance Level	

Detected Data Not Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	7.13E-05	Standard Error of Mean	4.91E-05
SD	1.45E-04	95% KM (BCA) UCL	1.52E-04
95% KM (t) UCL	1.58E-04	95% KM (Percentile Bootstrap) UCL	1.59E-04

95% KM (z) UCL	1.52E-04	95% KM Bootstrap t UCL	6.78E-04
90% KM Chebyshev UCL	2.19E-04	95% KM Chebyshev UCL	2.85E-04
97.5% KM Chebyshev UCL	3.78E-04	99% KM Chebyshev UCL	5.60E-04

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.219	Anderson-Darling GOF Test	
5% A-D Critical Value	0.763	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.182	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.356	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.327	k star (bias corrected MLE)	0.275
Theta hat (MLE)	3.33E-04	Theta star (bias corrected MLE)	3.96E-04
nu hat (MLE)	3.922	nu star (bias corrected)	3.294
MLE Mean (bias corrected)	1.09E-04	MLE Sd (bias corrected)	2.08E-04

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.241	nu hat (KM)	7.231
Approximate Chi Square Value (7.23, α)	2.298	Adjusted Chi Square Value (7.23, β)	1.971
95% Gamma Approximate KM-UCL (use when n>=50)	2.24E-04	95% Gamma Adjusted KM-UCL (use when n<50)	2.62E-04

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs

GROS may not be used when kstar of detected data is small such as < 0.1

For such situations, GROS method tends to yield inflated values of UCLs and BTVs

For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	1.79E-07	Mean	0.00604
Maximum	0.01	Median	0.01
SD	0.00502	CV	0.83
k hat (MLE)	0.319	k star (bias corrected MLE)	0.3
Theta hat (MLE)	0.0189	Theta star (bias corrected MLE)	0.0201
nu hat (MLE)	9.581	nu star (bias corrected)	8.998
MLE Mean (bias corrected)	0.00604	MLE Sd (bias corrected)	0.011
		Adjusted Level of Significance (β)	0.0324
Approximate Chi Square Value (9.00, α)	3.326	Adjusted Chi Square Value (9.00, β)	2.914
95% Gamma Approximate UCL (use when n>=50)	0.0164	95% Gamma Adjusted UCL (use when n<50)	0.0187

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.985	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.167	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	5.02E-05	Mean in Log Scale	-11.6
SD in Original Scale	1.32E-04	SD in Log Scale	1.891
95% t UCL (assumes normality of ROS data)	1.10E-04	95% Percentile Bootstrap UCL	1.16E-04
95% BCA Bootstrap UCL	1.54E-04	95% Bootstrap t UCL	5.53E-04
95% H-UCL (Log ROS)	4.92E-04		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	-11.54	95% H-UCL (KM -Log)	0.00625
KM SD (logged)	2.429	95% Critical H Value (KM-Log)	5.413
KM Standard Error of Mean (logged)	1.056		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1.63E-04	Mean in Log Scale	-9.73
SD in Original Scale	1.62E-04	SD in Log Scale	2.169
95% t UCL (Assumes normality)	2.37E-04	95% H-Stat UCL	0.0107

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Detected Data appear Gamma Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	1.58E-04	95% GROS Adjusted Gamma UCL	0.0187
95% Adjusted Gamma KM-UCL	2.62E-04		

Warning: Recommended UCL exceeds the maximum observation

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

As

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
Number of Detects	2	Number of Non-Detects	3
Number of Distinct Detects	2	Number of Distinct Non-Detects	3
Minimum Detect	6.5	Minimum Non-Detect	2.9
Maximum Detect	9.8	Maximum Non-Detect	3.5
Variance Detects	5.445	Percent Non-Detects	60%
Mean Detects	8.15	SD Detects	2.333
Median Detects	8.15	CV Detects	0.286
Skewness Detects	N/A	Kurtosis Detects	N/A
Mean of Logged Detects	2.077	SD of Logged Detects	0.29

Warning: Data set has only 2 Detected Values.
This is not enough to compute meaningful or reliable statistics and estimates.

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test on Detects Only
Not Enough Data to Perform GOF Test

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	5	Standard Error of Mean	1.755
SD	2.776	95% KM (BCA) UCL	N/A
95% KM (t) UCL	8.742	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	7.887	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	10.27	95% KM Chebyshev UCL	12.65
97.5% KM Chebyshev UCL	15.96	99% KM Chebyshev UCL	22.47

Gamma GOF Tests on Detected Observations Only
Not Enough Data to Perform GOF Test

Gamma Statistics on Detected Data Only

k hat (MLE)	24.06	k star (bias corrected MLE)	N/A
Theta hat (MLE)	0.339	Theta star (bias corrected MLE)	N/A
nu hat (MLE)	96.24	nu star (bias corrected)	N/A
MLE Mean (bias corrected)	N/A	MLE Sd (bias corrected)	N/A

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	3.245	nu hat (KM)	32.45
		Adjusted Level of Significance (β)	0.0086
Approximate Chi Square Value (32.45, α)	20.43	Adjusted Chi Square Value (32.45, β)	16.4
95% Gamma Approximate KM-UCL (use when n>=50)	7.942	95% Gamma Adjusted KM-UCL (use when n<50)	9.895

Lognormal GOF Test on Detected Observations Only
Not Enough Data to Perform GOF Test

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	4.745	Mean in Log Scale	1.375
SD in Original Scale	3.32	SD in Log Scale	0.658
95% t UCL (assumes normality of ROS data)	7.91	95% Percentile Bootstrap UCL	N/A
95% BCA Bootstrap UCL	N/A	95% Bootstrap t UCL	N/A
95% H-UCL (Log ROS)	15.5		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	4.21	Mean in Log Scale	1.105
SD in Original Scale	3.783	SD in Log Scale	0.902
95% t UCL (Assumes normality)	7.816	95% H-Stat UCL	34.29

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics
Data do not follow a Discernible Distribution at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	8.742	95% KM (% Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

Co

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	8	Mean	72.02
Maximum	126	Median	55.9
SD	50.84	Std. Error of Mean	22.74
Coefficient of Variation	0.706	Skewness	0.00649

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.896	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.237	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	120.5	95% Adjusted-CLT UCL (Chen-1995)	109.5
		95% Modified-t UCL (Johnson-1978)	120.5

Gamma GOF Test

A-D Test Statistic	0.394	Anderson-Darling Gamma GOF Test
5% A-D Critical Value	0.686	Detected data appear Gamma Distributed at 5% Significance Level
K-S Test Statistic	0.236	Kolmogrov-Smirnoff Gamma GOF Test
5% K-S Critical Value	0.362	Detected data appear Gamma Distributed at 5% Significance Level

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.561	k star (bias corrected MLE)	0.758

Theta hat (MLE)	46.13	Theta star (bias corrected MLE)	95.03
nu hat (MLE)	15.61	nu star (bias corrected)	7.579
MLE Mean (bias corrected)	72.02	MLE Sd (bias corrected)	82.73
		Approximate Chi Square Value (0.05)	2.494
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	1.411

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	218.9	95% Adjusted Gamma UCL (use when n<50)	387

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.842	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.283	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.396	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	2.079	Mean of logged Data	3.924
Maximum of Logged Data	4.836	SD of logged Data	1.12

Assuming Lognormal Distribution

95% H-UCL	1983	90% Chebyshev (MVUE) UCL	195.4
95% Chebyshev (MVUE) UCL	247.3	97.5% Chebyshev (MVUE) UCL	319.5
99% Chebyshev (MVUE) UCL	461.2		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	109.4	95% Jackknife UCL	120.5
95% Standard Bootstrap UCL	105.8	95% Bootstrap-t UCL	146.8
95% Hall's Bootstrap UCL	169.7	95% Percentile Bootstrap UCL	108.8
95% BCA Bootstrap UCL	108.8		
90% Chebyshev(Mean, Sd) UCL	140.2	95% Chebyshev(Mean, Sd) UCL	171.1
97.5% Chebyshev(Mean, Sd) UCL	214	99% Chebyshev(Mean, Sd) UCL	298.2

Suggested UCL to Use

95% Student's-t UCL	120.5

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Fe

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	22300	Mean	47280
Maximum	72100	Median	45500
SD	18744	Std. Error of Mean	8382
Coefficient of Variation	0.396	Skewness	0.0104

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.996	Shapiro Wilk GOF Test
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level
Lilliefors Test Statistic	0.138	Lilliefors GOF Test

5% Lilliefors Critical Value	0.396	Data appear Normal at 5% Significance Level	
Data appear Normal at 5% Significance Level			

Assuming Normal Distribution			
95% Normal UCL		95% UCLs (Adjusted for Skewness)	
95% Student's-t UCL	65150	95% Adjusted-CLT UCL (Chen-1995)	61110
		95% Modified-t UCL (Johnson-1978)	65156

Gamma GOF Test			
A-D Test Statistic	0.199	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.68	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.164	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.358	Detected data appear Gamma Distributed at 5% Significance Level	
Detected data appear Gamma Distributed at 5% Significance Level			

Gamma Statistics			
k hat (MLE)	7.063	k star (bias corrected MLE)	2.958
Theta hat (MLE)	6694	Theta star (bias corrected MLE)	15981
nu hat (MLE)	70.63	nu star (bias corrected)	29.58
MLE Mean (bias corrected)	47280	MLE Sd (bias corrected)	27488
		Approximate Chi Square Value (0.05)	18.17
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	14.4

Assuming Gamma Distribution			
95% Approximate Gamma UCL (use when n>=50))	76997	95% Adjusted Gamma UCL (use when n<50)	97145

Lognormal GOF Test			
Shapiro Wilk Test Statistic	0.961	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.2	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.396	Data appear Lognormal at 5% Significance Level	
Data appear Lognormal at 5% Significance Level			

Lognormal Statistics			
Minimum of Logged Data	10.01	Mean of logged Data	10.69
Maximum of Logged Data	11.19	SD of logged Data	0.444

Assuming Lognormal Distribution			
95% H-UCL	89864	90% Chebyshev (MVUE) UCL	75651
95% Chebyshev (MVUE) UCL	88387	97.5% Chebyshev (MVUE) UCL	106063
99% Chebyshev (MVUE) UCL	140785		

Nonparametric Distribution Free UCL Statistics			
Data appear to follow a Discernible Distribution at 5% Significance Level			

Nonparametric Distribution Free UCLs			
95% CLT UCL	61068	95% Jackknife UCL	65150
95% Standard Bootstrap UCL	59563	95% Bootstrap-t UCL	66737
95% Hall's Bootstrap UCL	70050	95% Percentile Bootstrap UCL	59580
95% BCA Bootstrap UCL	59160		
90% Chebyshev(Mean, Sd) UCL	72427	95% Chebyshev(Mean, Sd) UCL	83818
97.5% Chebyshev(Mean, Sd) UCL	99628	99% Chebyshev(Mean, Sd) UCL	130684

Suggested UCL to Use	
95% Student's-t UCL	65150

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

Tl

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
Number of Detects	4	Number of Non-Detects	1
Number of Distinct Detects	4	Number of Distinct Non-Detects	1
Minimum Detect	4.5	Minimum Non-Detect	0.64
Maximum Detect	9.4	Maximum Non-Detect	0.64
Variance Detects	5.097	Percent Non-Detects	20%
Mean Detects	7.15	SD Detects	2.258
Median Detects	7.35	CV Detects	0.316
Skewness Detects	-0.309	Kurtosis Detects	-3.16
Mean of Logged Detects	1.926	SD of Logged Detects	0.338

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.938	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.24	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.443	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	5.848	Standard Error of Mean	1.62
SD	3.137	95% KM (BCA) UCL	N/A
95% KM (t) UCL	9.301	95% KM (Percentile Bootstrap) UCL	N/A
95% KM (z) UCL	8.512	95% KM Bootstrap t UCL	N/A
90% KM Chebyshev UCL	10.71	95% KM Chebyshev UCL	12.91
97.5% KM Chebyshev UCL	15.96	99% KM Chebyshev UCL	21.96

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.309	Anderson-Darling GOF Test	
5% A-D Critical Value	0.657	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.278	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.395	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	12.39	k star (bias corrected MLE)	3.264
Theta hat (MLE)	0.577	Theta star (bias corrected MLE)	2.191
nu hat (MLE)	99.11	nu star (bias corrected)	26.11
MLE Mean (bias corrected)	7.15	MLE Sd (bias corrected)	3.958

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	3.476	nu hat (KM)	34.76
Approximate Chi Square Value (34.76, α)	22.27	Adjusted Chi Square Value (34.76, β)	18.04
95% Gamma Approximate KM-UCL (use when n>=50)	9.127	95% Gamma Adjusted KM-UCL (use when n<50)	11.27

Gamma ROS Statistics using Imputed Non-Detects

GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	2.026	Mean	6.125
Maximum	9.4	Median	6.1
SD	3.012	CV	0.492
k hat (MLE)	3.998	k star (bias corrected MLE)	1.733
Theta hat (MLE)	1.532	Theta star (bias corrected MLE)	3.535
nu hat (MLE)	39.98	nu star (bias corrected)	17.33
MLE Mean (bias corrected)	6.125	MLE Sd (bias corrected)	4.653
		Adjusted Level of Significance (β)	0.0086
Approximate Chi Square Value (17.33, α)	8.906	Adjusted Chi Square Value (17.33, β)	6.438
95% Gamma Approximate UCL (use when n>=50)	11.92	95% Gamma Adjusted UCL (use when n<50)	N/A

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.93	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.748	Detected Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.248	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.443	Detected Data appear Lognormal at 5% Significance Level	

Detected Data appear Lognormal at 5% Significance Level

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	6.289	Mean in Log Scale	1.75
SD in Original Scale	2.743	SD in Log Scale	0.49
95% t UCL (assumes normality of ROS data)	8.905	95% Percentile Bootstrap UCL	8.1
95% BCA Bootstrap UCL	8.08	95% Bootstrap t UCL	9.586
95% H-UCL (Log ROS)	13.26		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	1.452	95% H-UCL (KM -Log)	74.97
KM SD (logged)	0.984	95% Critical H Value (KM-Log)	4.838
KM Standard Error of Mean (logged)	0.508		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	5.784	Mean in Log Scale	1.313
SD in Original Scale	3.627	SD in Log Scale	1.402
95% t UCL (Assumes normality)	9.242	95% H-Stat UCL	1071

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	9.301	95% KM (Percentile Bootstrap) UCL	N/A

Warning: One or more Recommended UCL(s) not available!

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

V

General Statistics

Total Number of Observations	5	Number of Distinct Observations	5
		Number of Missing Observations	0
Minimum	38.6	Mean	503.3
Maximum	1390	Median	295
SD	523.3	Std. Error of Mean	234
Coefficient of Variation	1.04	Skewness	1.676

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test

Shapiro Wilk Test Statistic	0.831	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.762	Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.293	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.396	Data appear Normal at 5% Significance Level	

Data appear Normal at 5% Significance Level

Assuming Normal Distribution

95% Normal UCL	95% UCLs (Adjusted for Skewness)

95% Student's-t UCL	1002	95% Adjusted-CLT UCL (Chen-1995)	1076
		95% Modified-t UCL (Johnson-1978)	1032

Gamma GOF Test

A-D Test Statistic	0.269	Anderson-Darling Gamma GOF Test	
5% A-D Critical Value	0.691	Detected data appear Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.214	Kolmogrov-Smirnoff Gamma GOF Test	
5% K-S Critical Value	0.364	Detected data appear Gamma Distributed at 5% Significance Level	

Detected data appear Gamma Distributed at 5% Significance Level

Gamma Statistics

k hat (MLE)	1.078	k star (bias corrected MLE)	0.565
Theta hat (MLE)	466.8	Theta star (bias corrected MLE)	891.5
nu hat (MLE)	10.78	nu star (bias corrected)	5.646
MLE Mean (bias corrected)	503.3	MLE Sd (bias corrected)	669.8
		Approximate Chi Square Value (0.05)	1.462
Adjusted Level of Significance	0.0086	Adjusted Chi Square Value	0.723

Assuming Gamma Distribution

95% Approximate Gamma UCL (use when n>=50))	1944	95% Adjusted Gamma UCL (use when n<50)	3932

Lognormal GOF Test

Shapiro Wilk Test Statistic	0.933	Shapiro Wilk Lognormal GOF Test	
5% Shapiro Wilk Critical Value	0.762	Data appear Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.283	Lilliefors Lognormal GOF Test	
5% Lilliefors Critical Value	0.396	Data appear Lognormal at 5% Significance Level	

Data appear Lognormal at 5% Significance Level

Lognormal Statistics

Minimum of Logged Data	3.653	Mean of logged Data	5.69
Maximum of Logged Data	7.237	SD of logged Data	1.308

Assuming Lognormal Distribution

95% H-UCL	41852	90% Chebyshev (MVUE) UCL	1445
95% Chebyshev (MVUE) UCL	1850	97.5% Chebyshev (MVUE) UCL	2413
99% Chebyshev (MVUE) UCL	3518		

Nonparametric Distribution Free UCL Statistics

Data appear to follow a Discernible Distribution at 5% Significance Level

Nonparametric Distribution Free UCLs

95% CLT UCL	888.3	95% Jackknife UCL	1002
95% Standard Bootstrap UCL	849.7	95% Bootstrap-t UCL	1749
95% Hall's Bootstrap UCL	3062	95% Percentile Bootstrap UCL	897.7
95% BCA Bootstrap UCL	944.3		
90% Chebyshev(Mean, Sd) UCL	1205	95% Chebyshev(Mean, Sd) UCL	1523
97.5% Chebyshev(Mean, Sd) UCL	1965	99% Chebyshev(Mean, Sd) UCL	2832

Suggested UCL to Use

95% Student's-t UCL	1002

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
These recommendations are based upon the results of the simulation studies summarized in Singh, Singh, and Iaci (2002)
and Singh and Singh (2003). However, simulations results will not cover all Real World data sets.
For additional insight the user may want to consult a statistician.

CR6

General Statistics

Total Number of Observations	9	Number of Distinct Observations	9
Number of Detects	6	Number of Non-Detects	3
Number of Distinct Detects	6	Number of Distinct Non-Detects	3
Minimum Detect	0.39	Minimum Non-Detect	0.15
Maximum Detect	3820	Maximum Non-Detect	14

Variance Detects	2295686	Percent Non-Detects	33%
Mean Detects	1909	SD Detects	1515
Median Detects	2305	CV Detects	0.794
Skewness Detects	-0.346	Kurtosis Detects	-1.456
Mean of Logged Detects	6.001	SD of Logged Detects	3.567

Note: Sample size is small (e.g., <10), if data are collected using ISM approach, you should use
guidance provided in ITRC Tech Reg Guide on ISM (ITRC, 2012) to compute statistics of interest.
For example, you may want to use Chebyshev UCL to estimate EPC (ITRC, 2012).
Chebyshev UCL can be computed using the Nonparametric and All UCL Options of ProUCL 5.0

Normal GOF Test on Detects Only

Shapiro Wilk Test Statistic	0.91	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data appear Normal at 5% Significance Level	
Lilliefors Test Statistic	0.217	Lilliefors GOF Test	
5% Lilliefors Critical Value	0.362	Detected Data appear Normal at 5% Significance Level	

Detected Data appear Normal at 5% Significance Level

Kaplan-Meier (KM) Statistics using Normal Critical Values and other Nonparametric UCLs

Mean	1273	Standard Error of Mean	527.3
SD	1444	95% KM (BCA) UCL	2116
95% KM (t) UCL	2253	95% KM (Percentile Bootstrap) UCL	2071
95% KM (z) UCL	2140	95% KM Bootstrap t UCL	2239
90% KM Chebyshev UCL	2855	95% KM Chebyshev UCL	3571
97.5% KM Chebyshev UCL	4566	99% KM Chebyshev UCL	6519

Gamma GOF Tests on Detected Observations Only

A-D Test Statistic	0.82	Anderson-Darling GOF Test	
5% A-D Critical Value	0.748	Detected Data Not Gamma Distributed at 5% Significance Level	
K-S Test Statistic	0.384	Kolmogrov-Smirnoff GOF	
5% K-S Critical Value	0.352	Detected Data Not Gamma Distributed at 5% Significance Level	

Detected Data Not Gamma Distributed at 5% Significance Level

Gamma Statistics on Detected Data Only

k hat (MLE)	0.42	k star (bias corrected MLE)	0.321
Theta hat (MLE)	4543	Theta star (bias corrected MLE)	5944
nu hat (MLE)	5.043	nu star (bias corrected)	3.855
MLE Mean (bias corrected)	1909	MLE Sd (bias corrected)	3369

Gamma Kaplan-Meier (KM) Statistics

k hat (KM)	0.777	nu hat (KM)	13.99
Approximate Chi Square Value (13.99, α)	6.562	Adjusted Chi Square Value (13.99, β)	5.526
95% Gamma Approximate KM-UCL (use when n>=50)	2713	95% Gamma Adjusted KM-UCL (use when n<50)	3222

Gamma ROS Statistics using Imputed Non-Detects
GROS may not be used when data set has > 50% NDs with many tied observations at multiple DLs
GROS may not be used when kstar of detected data is small such as < 0.1
For such situations, GROS method tends to yield inflated values of UCLs and BTVs
For gamma distributed detected data, BTVs and UCLs may be computed using gamma distribution on KM estimates

Minimum	0.39	Mean	1395
Maximum	3820	Median	385.5
SD	1425	CV	1.021
k hat (MLE)	0.499	k star (bias corrected MLE)	0.407
Theta hat (MLE)	2794	Theta star (bias corrected MLE)	3429
nu hat (MLE)	8.987	nu star (bias corrected)	7.325
MLE Mean (bias corrected)	1395	MLE Sd (bias corrected)	2187
		Adjusted Level of Significance (β)	0.0231
Approximate Chi Square Value (7.32, α)	2.351	Adjusted Chi Square Value (7.32, β)	1.801
95% Gamma Approximate UCL (use when n>=50)	4348	95% Gamma Adjusted UCL (use when n<50)	5673

Lognormal GOF Test on Detected Observations Only

Shapiro Wilk Test Statistic	0.7	Shapiro Wilk GOF Test	
5% Shapiro Wilk Critical Value	0.788	Detected Data Not Lognormal at 5% Significance Level	
Lilliefors Test Statistic	0.345	Lilliefors GOF Test	

5% Lilliefors Critical Value	0.362	Detected Data appear Lognormal at 5% Significance Level	
Detected Data appear Approximate Lognormal at 5% Significance Level			

Lognormal ROS Statistics Using Imputed Non-Detects

Mean in Original Scale	1273	Mean in Log Scale	3.75
SD in Original Scale	1531	SD in Log Scale	4.446
95% t UCL (assumes normality of ROS data)	2222	95% Percentile Bootstrap UCL	2100
95% BCA Bootstrap UCL	2136	95% Bootstrap t UCL	2272
95% H-UCL (Log ROS)	1.87E+14		

UCLs using Lognormal Distribution and KM Estimates when Detected data are Lognormally Distributed

KM Mean (logged)	3.474	95% H-UCL (KM -Log)	1.74E+14
KM SD (logged)	4.461	95% Critical H Value (KM-Log)	12.28
KM Standard Error of Mean (logged)	1.633		

DL/2 Statistics

DL/2 Normal		DL/2 Log-Transformed	
Mean in Original Scale	1274	Mean in Log Scale	3.75
SD in Original Scale	1531	SD in Log Scale	4.558
95% t UCL (Assumes normality)	2223	95% H-Stat UCL	8.20E+14

DL/2 is not a recommended method, provided for comparisons and historical reasons

Nonparametric Distribution Free UCL Statistics

Detected Data appear Normal Distributed at 5% Significance Level

Suggested UCL to Use

95% KM (t) UCL	2253	95% KM (Percentile Bootstrap) UCL	2071

Note: Suggestions regarding the selection of a 95% UCL are provided to help the user to select the most appropriate 95% UCL.
Recommendations are based upon data size, data distribution, and skewness.
These recommendations are based upon the results of the simulation studies summarized in Singh, Maichle, and Lee (2006).
However, simulations results will not cover all Real World data sets; for additional insight the user may want to consult a statistician.

APPENDIX G

LEAD RISK CALCULATIONS
(ADULT LEAD MODEL)

APPENDIX G.1

WESTERN AREA SURFACE SOILS

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Surface Soils - RME

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Visitor

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	48400
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.200
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	100
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**128.3**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	303.7
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**100.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Surface Soils - RME
HCTS Operator &
Outdoor Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	48400
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.200
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	225
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**287.4**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	680.3
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**100.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Surface Soils - CT

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Visitor

Version date 6/21/09

EDIT RED CELLS

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	4880
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.025
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	50
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.8**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	4.3
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.1%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Surface Soils - CT

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

HCTS Operator

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	4880
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.025
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	225
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**4.6**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	10.9
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**6.7%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Surface Soils - CT

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Outdoor Worker

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	4880
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.038
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	225
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**6.4**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	15.2
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**17.5%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

APPENDIX G.2

WESTERN AREA SURFACE SOILS
WITHOUT LOCATION D-22

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Surface Soils - RME
Without D22
Visitor

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	1300
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.200
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	100
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**4.4**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	10.5
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**5.8%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Surface Soils - RME Without D22 HCTS Operator & Outdoor Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	1300
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.200
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	225
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**8.7**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	20.6
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**33.8%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Surface Soils - CT
Without D22
Visitor

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	511
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.025
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	50
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.1**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	2.6
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Surface Soils - CT
Without D22
HCTS Operator

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	511
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.025
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	225
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.4**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	3.3
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Surface Soils - CT
Without D22
Outdoor Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	511
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.038
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	225
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.6**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	3.7
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

APPENDIX G.3

WESTERN AREA SUBSURFACE SOILS

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Subsurface Soils -RME

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Construction Worker

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	15800
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	130
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**90.1**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	213.3
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**100.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Subsurface Soils -RME

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Utility Worker

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	15800
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	40
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**28.4**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	67.3
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**94.5%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Subsurface Soils - CT

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Construction Worker

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	3440
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	60
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**3.7**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	8.8
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**3.1%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

West - Subsurface Soils - CT

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Utility Worker

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	3440
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	20
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.9**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	4.5
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.1%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

APPENDIX G.4

WESTERN AREA SUBSURFACE SOILS WITHOUT LOCATIONS D-22

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Subsurface Soils - RME
Without D-22
Construction Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	1150
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	130
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**7.5**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	17.7
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**25.1%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Subsurface Soils - RME
Without D-22
Utility Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	1150
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.330
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	40
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**3.0**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	7.1
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**1.3%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Subsurface Soils - CT
Without D-22
Construction Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	606
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	60
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.5**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	3.5
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

Calculations of Preliminary Remediation Goals (PRGs)

Calculations of Blood Lead Concentrations (PbBs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

West - Subsurface Soils - CT
Without D-22
Utility Worker

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004
PbS	Soil lead concentration	ug/g or ppm	606
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4
GSD_i	Geometric standard deviation PbB	--	1.8
PbB_0	Baseline PbB	ug/dL	1.0
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.100
IR_{S+D}	Total ingestion rate of outdoor soil and indoor dust	g/day	--
W_S	Weighting factor; fraction of IR_{S+D} ingested as outdoor soil	--	--
K_{SD}	Mass fraction of soil in dust	--	--
$AF_{S, D}$	Absorption fraction (same for soil and dust)	--	0.12
$EF_{S, D}$	Exposure frequency (same for soil and dust)	days/yr	20
$AT_{S, D}$	Averaging time (same for soil and dust)	days/yr	365
PbB_{adult}	**PbB of adult worker, geometric mean**	**ug/dL**	**1.2**
$PbB_{fetal, 0.95}$	95th percentile PbB among fetuses of adult workers	ug/dL	2.7
PbB_t	Target PbB level of concern (e.g., 10 ug/dL)	ug/dL	**10.0**
$P(PbB_{fetal} > PbB_t)$	**Probability that fetal PbB > PbB_t, assuming lognormal distribution**	**%**	**0.0%**

Source: U.S. EPA (1996). Recommendations of the Technical Review Workgroup for Lead for an Interim Approach to Assessing Risks Associated with Adult Exposures to Lead in Soil

Calculations of Preliminary Remediation Goals (PRGs)

U.S. EPA Technical Review Workgroup for Lead, Adult Lead Committee

Version date 6/21/09 **EDIT RED CELLS**

Variable	Description of Variable	Units	GSDi and PbBo from Analysis of NHANES 1999-2004	GSDi and PbBo from Analysis of NHANES III (Phases 1&2)
$PbB_{fetal,\ 0.95}$	95th percentile PbB in fetus	ug/dL	10	10
$R_{fetal/maternal}$	Fetal/maternal PbB ratio	--	0.9	0.9
BKSF	Biokinetic Slope Factor	ug/dL per ug/day	0.4	0.4
GSD_i	Geometric standard deviation PbB	--	1.8	2.1
PbB_0	Baseline PbB	ug/dL	1.0	1.5
IR_S	Soil ingestion rate (including soil-derived indoor dust)	g/day	0.050	0.050
$AF_{S,\ D}$	Absorption fraction (same for soil and dust)	--	0.12	0.12
$EF_{S,\ D}$	Exposure frequency (same for soil and dust)	days/yr	219	219
$AT_{S,\ D}$	Averaging time (same for soil and dust)	days/yr	365	365
PRG		**ppm**	**2,240**	**1,235**

APPENDIX H

VAPOR INTRUSION CALCULATIONS
(JOHNSON & ETTINGER MODEL)

APPENDIX H.1

WESTERN AREA – RME SCENARIO

DATA ENTRY SHEET

RME

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (letter "X" in "YES" box and initial soil conc. below)

YES: x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
120821	1.61E+05	1,2,4-Trichlorobenzene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is negative) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space ceiling height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.77E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	7.5E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RME

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
95501	6.06E+05	1,2-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_2 (cell G28): Thickness of soil stratum A, H_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) H_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) H_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

End

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.7E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RME

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (ug/kg)	Chemical
541731	6.31E+05	1,3-Dichlorobenzene

MORE

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	5.40E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.5E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

RME

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
106467	7.30E+05	1,4-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, dP (g/cm-s^2)	ENTER Enclosed space floor height, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
10	40	1800	3000	366	0.1	0.25

ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)

5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RMB

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
71432	2.53E+04	Benzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_T (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.189	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	3.66E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.8E-04	7.7E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

RMO

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{si} (µg/kg)	Chemical
108907	1.89E+05	Chlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_T (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.43E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.9E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RME

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (ug/kg)	Chemical
100414	9.50E+04	Ethylbenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_f (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, L_2 (cm)	ENTER Totals must add up to value of L_s (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, h_B (cm)	ENTER Thickness of soil stratum C, h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.38E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.6E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RMG

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{is} (µg/kg)	Chemical
108383	1.70E+06	m-Xylene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_s (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_s (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.46E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

RMB

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{vs} (µg/kg)	Chemical
95476	6.00E+05	o-Xylene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE

ENTER Enclosed space floor thickness, L_{floor} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.44E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RME

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: X

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_0 (µg/kg)	Chemical
92524	1.74E+04	Biphenyl

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, L_2 (cm)	ENTER Totals must add up to value of L_T (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, h_B (Enter value or 0) (cm)	ENTER Thickness of soil stratum C, h_C (Enter value or 0) (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	6.57E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.7E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT!)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

RME

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
91203	4.54E+04	Naphthalene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, h_B (Enter value or 0) (cm)	ENTER Thickness of soil stratum C, h_C (Enter value or 0) (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil air-filled porosity, θ_a^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
10	40	1800	3000	366	0.1	0.25

ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.26E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
3.1E-04	1.1E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

APPENDIX H.2

WESTERN AREA – CT SCENARIO

CT

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
120821	7.10E+04	1,2,4-Trichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm²)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm³/cm³)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm³/cm³)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm³/cm³)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.169	0.002										

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil/bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.77E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.5E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{si} (µg/kg)	Chemical
95501	3.33E+05	1,2-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_f (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum B, h_B (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum C, h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.6E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

CT

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
541731	3.30E+05	1,3-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{floor} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, ATc (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	5.40E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.6E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

CT

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
106467	3.83E+05	1,4-Dichlorobenzene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_T (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.6E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

CT

SL-ADV Version 3.1: 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{si} (µg/kg)	Chemical
71432	4.24E+03	Benzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_B (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE ↓

ENTER Enclosed space floor Thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	3.66E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.6E-05	6.4E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
108907	4.10E+04	Chlorobenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, H_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) H_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) H_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.43E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.1E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
100414	9.60E+03	Ethylbenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, h_B (cm)	Thickness of soil stratum C, h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.38E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	4.4E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS no. (numbers only, no dashes)	ENTER Initial soil conc., C_w (ug/kg)	Chemical
108383	1.23E+05	m-Xylene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.46E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	5.6E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_R (µg/kg)	Chemical
95476	4.40E+04	o-Xylene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_B (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G26) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air-exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.44E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.9E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{si} (µg/kg)	Chemical
92524	1.31E+03	Biphenyl

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{cr} (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air-exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. BR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	6.57E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

PT

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (ug/kg)	Chemical
91203	5.57E+03	Naphthalene

MORE

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall vapor crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.26E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
7.6E-06	1.3E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

APPENDIX H.3

EASTERN AREA – RME SCENARIO

RMB

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
120821	7.02E+07	1,2,4-Trichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_T (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil-vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

INCREMENTAL RISK CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)	Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	NA	NA	1.77E+05	NA	NA	8.3E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RMB

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
95501	1.88E+06	1,2-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{cz} (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)
10	40	1800	3000	366	0.1	0.25

ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.7E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RMF

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [x]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
541731	4.84E+05	1,3-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G26) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	5.40E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	2.3E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

RME

DATA ENTRY SHEET

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (ug/kg)	Chemical
106467	1.20E+06	1,4-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{cr} (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G25) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

*Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.2E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

RME

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_s (µg/kg)	Chemical
91203	1.10E+06	Naphthalene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_B (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm\text{-}s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.26E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
9.6E-04	2.9E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

APPENDIX H.4

EASTERN AREA – CT SCENARIO

CT

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{ai} (µg/kg)	Chemical
120821	2.07E+07	1,2,4-Trichlorobenzene

MORE

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_b (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.77E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	8.7E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{is} (µg/kg)	Chemical
95501	9.69E+05	1,2-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil Stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	2.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	9.6E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

CT

DATA ENTRY SHEET

SL-ADV Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{si} (µg/kg)	Chemical
541731	2.58E+05	1,3-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_B (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002											

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1000	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	5.40E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.3E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

MESSAGE: Risk/HQ or risk-based soil concentration is based on a route-to-route extrapolation.

SCROLL DOWN TO "END"

END

CT

DATA ENTRY SHEET

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES [X]

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{is} (µg/kg)	Chemical
106467	5.54E+05	1,4-Dichlorobenzene

MORE ↓

ENTER Average soil temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_t (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_b (cm)	ENTER Totals must add up to value of L_t (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER (User-defined) stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE ↓

ENTER Stratum A SCS soil type (enter SCS or Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (enter SCS or Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (enter SCS or Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based soil concentration.

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.03E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	1.6E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

DATA ENTRY SHEET

CT

SL-ADV
Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED SOIL CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL SOIL CONCENTRATION (enter "X" in "YES" box and initial soil conc. below)

YES: x

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial soil conc., C_{si} (µg/kg)	Chemical
91203	1.49E+05	Naphthalene

MORE

ENTER Average soil temperature, T_s (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_{ef} (cm)	ENTER Depth below grade to top of contamination, L_1 (cm)	ENTER Depth below grade to bottom of contamination, (enter value of 0 if value is unknown) L_2 (cm)	ENTER Totals must add up to value of L_1 (cell G26): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	90	250	90			SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum A soil organic carbon fraction, f_{oc}^A (unitless)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum B soil organic carbon fraction, f_{oc}^B (unitless)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)	ENTER Stratum C soil organic carbon fraction, f_{oc}^C (unitless)
SL	1.62	0.387	0.103	0.002										

MORE

ENTER Enclosed space floor thickness, L_{ecrack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based soil concentration.	

END

RESULTS SHEET

RISK-BASED SOIL CONCENTRATION CALCULATIONS:

Indoor exposure soil conc., carcinogen (µg/kg)	Indoor exposure soil conc., noncarcinogen (µg/kg)	Risk-based indoor exposure soil conc., (µg/kg)	Soil saturation conc., C_{sat} (µg/kg)	Final indoor exposure soil conc., (µg/kg)
NA	NA	NA	1.26E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.9E-04	3.0E+01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

APPENDIX H.5

GROUNDWATER SOURCE - RME AND CT SCENARIOS

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_{gw} (µg/L)	Chemical
71432	8.50E+01	Benzene

MORE

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm³)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm³)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm³)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s²)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.7[illegible]E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.1E-06	2.8E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
71432	2.00E+01	Benzene

MORE ↓

ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	1.79E+06	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
1.0E-07	6.7E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_{wi} (µg/L)	Chemical
108907	3.20E+02	Chlorobenzene

MORE ↓

ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	4.98E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	3.0E-02

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES X

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_{wi} (µg/L)	Chemical
108907	7.00E+01	Chlorobenzene

MORE ↓

ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	4.98E+05	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
NA	6.6E-03

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_{GW} (µg/L)	Chemical
91576	5.90E+02	2-Methylnaphthalene

MORE ↓

ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1
				Used to calculate risk-based groundwater concentration.	

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.46E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.0E-07	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_{gw} (µg/L)	Chemical
91576	1.20E+02	2-Methylnaphthalene

MORE ↓

ENTER Average soil/ groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_B (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	2.46E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
8.0E-09	NA

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_{wi} (µg/L)	Chemical
91203	5.00E+03	Naphthalene

MORE ↓

ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28): Thickness of soil stratum A, h_A (cm)	Thickness of soil stratum B, (Enter value or 0) h_B (cm)	Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{crack} (cm)	ENTER Soil-bldg. pressure differential, ΔP (g/cm-s^2)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	25	25	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.10E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
5.7E-05	1.8E+00

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.

DATA ENTRY SHEET

NJ-GW-ADV-JAN2013
USEPA Version 3.1; 02/04

Reset to Defaults

CALCULATE RISK-BASED GROUNDWATER CONCENTRATION (enter "X" in "YES" box)

YES [ ]

OR

CALCULATE INCREMENTAL RISKS FROM ACTUAL GROUNDWATER CONCENTRATION (enter "X" in "YES" box and initial groundwater conc. below)

YES [X]

NOTE: SEE SPECIAL INSTRUCTIONS FOR METHYLENE CHLORIDE, TRICHLOROETHENE, AND VINYL CHLORIDE ON RESULTS PAGE

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Initial groundwater conc., C_w (µg/L)	Chemical
91203	1.00E+03	Naphthalene

MORE ↓

ENTER Average soil/groundwater temperature, T_S (°C)	ENTER Depth below grade to bottom of enclosed space floor, L_F (cm)	ENTER Depth below grade to water table, L_{WT} (cm)	ENTER Totals must add up to value of L_{WT} (cell G28) Thickness of soil stratum A, h_A (cm)	ENTER Thickness of soil stratum B, (Enter value or 0) h_B (cm)	ENTER Thickness of soil stratum C, (Enter value or 0) h_C (cm)	ENTER Soil stratum directly above water table, (Enter A, B, or C)	ENTER SCS soil type directly above water table	ENTER Soil stratum A SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined stratum A soil vapor permeability, k_v (cm^2)
13	15	140	140	0	0	A	SL	SL		

MORE ↓

ENTER Stratum A SCS soil type (Lookup Soil Parameters)	ENTER Stratum A soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Stratum A soil total porosity, n^A (unitless)	ENTER Stratum A soil water-filled porosity, θ_w^A (cm^3/cm^3)	ENTER Stratum B SCS soil type (Lookup Soil Parameters)	ENTER Stratum B soil dry bulk density, ρ_b^B (g/cm^3)	ENTER Stratum B soil total porosity, n^B (unitless)	ENTER Stratum B soil water-filled porosity, θ_w^B (cm^3/cm^3)	ENTER Stratum C SCS soil type (Lookup Soil Parameters)	ENTER Stratum C soil dry bulk density, ρ_b^C (g/cm^3)	ENTER Stratum C soil total porosity, n^C (unitless)	ENTER Stratum C soil water-filled porosity, θ_w^C (cm^3/cm^3)
SL	1.62	0.387	0.103		1.66	0.375	0.054		1.66	0.375	0.054

MORE ↓

ENTER Enclosed space floor thickness, L_{slab} (cm)	ENTER Soil/bldg. pressure differential, ΔP ($g/cm-s^2$)	ENTER Enclosed space floor length, L_B (cm)	ENTER Enclosed space floor width, W_B (cm)	ENTER Enclosed space height, H_B (cm)	ENTER Floor-wall seam crack width, w (cm)	ENTER Indoor air exchange rate, ER (1/h)	ENTER Average vapor flow rate into bldg. OR Leave blank to calculate Q_{soil} (L/m)
10	40	1800	3000	366	0.1	0.25	5

MORE ↓

ENTER Averaging time for carcinogens, AT_C (yrs)	ENTER Averaging time for noncarcinogens, AT_{NC} (yrs)	ENTER Exposure duration, ED (yrs)	ENTER Exposure frequency, EF (days/yr)	ENTER Target risk for carcinogens, TR (unitless)	ENTER Target hazard quotient for noncarcinogens, THQ (unitless)
78	5	5	250	1.0E-06	1

Used to calculate risk-based groundwater concentration.

END

RESULTS SHEET

RISK-BASED GROUNDWATER CONCENTRATION CALCULATIONS:

Indoor exposure groundwater conc., carcinogen (µg/L)	Indoor exposure groundwater conc., noncarcinogen (µg/L)	Risk-based indoor exposure groundwater conc., (µg/L)	Pure component water solubility, S (µg/L)	Final indoor exposure groundwater conc., (µg/L)
NA	NA	NA	3.10E+04	NA

INCREMENTAL RISK CALCULATIONS:

Incremental risk from vapor intrusion to indoor air, carcinogen (unitless)	Hazard quotient from vapor intrusion to indoor air, noncarcinogen (unitless)
2.3E-06	3.5E-01

MESSAGE AND ERROR SUMMARY BELOW: (DO NOT USE RESULTS IF ERRORS ARE PRESENT)

SCROLL DOWN TO "END"

END

NOTE: methylene chloride, trichloroethene, and vinyl chloride must have an adjustment factor applied because they are considered mutagens and USEPA applies different calculations to these three chemicals. The factors are: methylene chloride, 0.40; trichloroethene, 0.72; vinyl chloride, 0.29. For these three chemicals, the J&E result is multiplied by the chemical specific factor.