SECOND
FIVE-YEAR REVIEW REPORT FOR
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

Prepared by

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AC ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirement
BGS	Below Ground Surface
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
COC	Contaminant of Concern
CRQL	Contract Required Quantification Limit
CSF	Cancer Slope Factor
DNAPL	Dense Non-Aqueous Phase Liquid
DPVOC	Daughter Product Volatile Organic Compound
EBSR	East Branch of the Sebasticook River
EE/CA	Engineering Evaluation and Cost Analysis
EPA	United States Environmental Protection Agency
EPCs	Exposure Point Concentrations
EWM	Eastland Woolen Mill
FS	Feasibility Study
FYR	Five-Year Review
GAC	Granular Activated Carbon
GCL	Groundwater Cleanup Level
HHRA	Human Health Risk Assessment
ICs	Institutional Controls
ICP	Iron-Catalyzed Persulfate
ICZ	Institutional Control Zone
IRIS	Integrated Risk Information System
ISCO	In-Situ Chemical Oxidation
JE	Johnson & Ettinger
LTM	Long-Term Monitoring
LTMP	Long-Term Monitoring Plan
LTRA	Long-Term Response Action
MEDEP	Maine Department of Environmental Protection
MCL	Maximum Contaminant Level
MCLG	Maximum Contaminant Level Goal
MEG	Maximum Exposure Guidelines
µg/L	Micrograms per Liter

MSL	Mean Sea Level
NCP	National Contingency Plan
NPL	National Priorities List
NTCRA	Non-Time Critical Removal Action
O&M	Operation and Maintenance
OSWER	Office of Solid Waste and Emergency Response
OU	Operable Unit
PALs	Project Action Limits
PPRTV	Provisional Peer Reviewed Toxicity Value
RA	Remedial Action
RAGs	Remedial Action Guidelines
RAO	Remedial Action Objectives
RBA	Relative Bioavailability
RD	Remedial Design
RfD	Reference Dose
ROD	Record of Decision
RSLs	Regional Screening Levels
SF/CSF	Surfactant/Cosolvent Flushing
TBCs	To Be Considered
UCL	Upper Confidence Limit
URFs	Unit Risk Factors
UST	Underground Storage Tank
VISL	Vapor Intrusion Screening Level
VOC	Volatile Organic Compound
WWTP	Waste Water Treatment Plant
1,2-DCB	1,2-Dichlorobenzene
1,3-DCB	1,3-Dichlorobenzene
1,4-DCB	1,4-Dichlorobenzene
1,2,4-TCB	1,2,4-Trichlorobenzene

ES EXECUTIVE SUMMARY

This is the second Five-Year Review (FYR) for the Eastland Woolen Mill Superfund (Site) located in Corinna, Penobscot County, Maine. The purpose of this FYR is to review information to determine if the remedy is and will continue to be protective of human health and the environment. The triggering action for this statutory FYR was the signing of the previous FYR on 9/21/2010.

The remedy for the Eastland Woolen Mill Superfund Site in Corinna, Maine included the demolition of the former Eastland Woolen Mill, excavation and treatment of contaminated soils, in-situ chemical oxidation of contamination in deep soil and bedrock, and land-use restrictions.

The Site achieved construction completion with the signing of the Preliminary Close-Out Report on September 28, 2006. The Site achieved Remedial Action completion on September 22, 2008, which began the ten year period for the Long-Term Response Action (LTRA).

The assessment of this FYR review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD) issued in 2002 and amended in 2006. The LTRA remedy is functioning as designed. As a result of the response actions at the Site, there is no current exposure to contaminants at the Site. A water line provides clean water to nearby residents and institutional controls (ICs) will prevent future use of potentially contaminated groundwater. The remedy at the Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed; there is no current human exposure to contamination; the groundwater contamination is not migrating; clean water is available to all locations within the extent of the groundwater contamination; and the United States Environmental Protection Agency (EPA) is actively monitoring the groundwater as part of the ongoing LTRA. In addition, ICs are in place for 30 of the 32 properties identified where some type of land use restriction was identified as necessary in the ROD and Remedial Design. Two properties do not have final ICs in place required by the ROD to ensure long term protectiveness at the Site. In order for the remedy to be protective in the long-term, the ICs for these remaining two properties must be finalized to ensure long-term protectiveness. EPA will continue to coordinate with the state to develop and implement a strategy for final IC implementation on the two outstanding properties.

This FYR also documents that the vapor intrusion evaluation completed since the 2010 FYR resolves that there is not a vapor intrusion threat at the Site.

The remedy at the Eastland Woolen Mill Superfund Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed, there is no current human exposure to contamination, the groundwater contamination is not migrating, clean water is available to all locations within the extent of the groundwater contamination, and EPA is actively monitoring the groundwater as part of the on-going LTRA. However, in order for the remedy to be protective in the long-term, institutional controls to prevent future groundwater use need to be put in place at the two remaining properties to ensure long-term protectiveness.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Eastland Woolen Mill		
EPA ID: MED980915474		
Region: 1	**State:** ME	**City/County:** Corinna/Penobscot
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	**Has the site achieved construction completion?** Yes	
REVIEW STATUS		
Lead agency: EPA ***[If "Other Federal Agency", enter Agency name]*:** Click here to enter text.		
Author name (Federal or State Project Manager): Edward Hathaway		
Author affiliation: U.S. Environmental Protection Agency, Region 1		
Review period: 9/21/2010 - 9/9/2015		
Date of site inspection: 6/16/2015		
Type of review: Statutory		
Review number: 2		
Triggering action date: 9/21/2010		
Due date *(five years after triggering action date)*: 9/21/2015		

Five-Year Review Summary Form (continued)

Issues/Recommendations

Issues and Recommendations Identified in the Five-Year Review:

OU(s): *OU1*	**Issue Category: Institutional Controls**			
	Issue: *Two properties do not have final ICs in place required by the ROD to ensure long term protectiveness at the Site.*			
	Recommendation: *EPA will continue to coordinate with the state to develop and implement a strategy for final IC implementation on the two outstanding properties.*			
Affect Current Protectiveness	**Affect Future Protectiveness**	**Party Responsible**	**Oversight Party**	**Milestone Date**
No	Yes	EPA	EPA	9/28/2018

Protectiveness Statement(s)

Operable Unit: OU1	*Protectiveness Determination:* Short-term Protective	*Addendum Due Date (if applicable):* N/A

Protectiveness Statement:
The remedy at the Eastland Woolen Mill Superfund Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed, there is no current human exposure to contamination, the groundwater contamination is not migrating, clean water is available to all locations within the extent of the groundwater contamination, and EPA is actively monitoring the groundwater as part of the on-going LTRA. However, in order for the remedy to be protective in the long-term, institutional controls to prevent future groundwater use at the two remaining properties need to be in place to ensure long-term protectiveness.

Sitewide Protectiveness Statement

Protectiveness Determination: Short-term Protective *Addendum Due Date: N/A*

Protectiveness Statement:

Because the response actions at the Site are protective of human health and the environment in the short-term, the Site is currently protective of human health and the environment. The remedy at the Eastland Woolen Mill Superfund Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed, there is no current human exposure to contamination, the groundwater contamination is not migrating, clean water is available to all locations within the extent of the groundwater contamination, and EPA is actively monitoring the groundwater as part of the on-going LTRA. However, in order for the remedy to be protective in the long-term, institutional controls to prevent future groundwater use need to be in place at the two remaining properties to ensure long-term protectiveness.

I INTRODUCTION

The purpose of a FYR is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in five-year review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

EPA prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 121 and the National Contingency Plan (NCP). CERCLA 121 states:

> "*If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews."*

EPA interpreted this requirement further in the NCP; 40 Code of Federal Regulations (CFR) Section 300.430(f)(4)(ii), which states:

"*If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action*."

EPA conducted a FYR on the remedy implemented at the Eastland Woolen Mill Superfund Site in Corinna, Penobscot County, Maine. EPA is the lead agency for developing and implementing the remedy for the Site. The Maine Department of Environmental Protection (MEDEP), as the support agency representing the State of Maine, has reviewed all supporting documentation and provided input to EPA during the FYR process.

The Site has two Operable Units (Figure 1) and was subject to a Non-Time-Critical Removal Action (NTCRA). The former mill complex and associated soil/sediment contamination were subject to the

NTCRA from July 1999 to May 2006. The groundwater contamination associated with the former mill complex and the residual soil contamination left after the NTCRA are the focus of the Operable Unit 1 (OU1) Remedial Action which began in August 2005. The downstream areas within the East Branch of the Sebasticook River (EBSR) and the associated Old Dump were the focus of Operable Unit 2 (OU2). The 2004 ROD for OU 2 documented that no further remedial action was necessary for the OU 2 area of the Site. Previous response actions implemented as part of a NTCRA and the OU 1 remedial action will adequately control the principal and low-level threats at the Site. The NTCRA removed all of the surface and near surface contamination in the soil, sediment, and floodplain areas in downtown Corinna and for the first several hundred yards of the EBSR. This included the section of the EBSR where DNAPL was observed in the river bed. The OU 1 remedial action will address the remaining principal threat wastes in the deep overburden and bedrock groundwater. As this is a decision for No Action, the statutory requirements of CERCLA Section 121 for remedial actions are not applicable. Therefore, EPA does not intend to perform 5-year reviews of the OU 2 decision. EPA will, however, be performing five year reviews for the OU 1 portions of the Site pursuant to the September 2002 ROD for OU 1.

This is the second FYR for the Eastland Woolen Mill Superfund Site addressing the status of the NTCRA and the Remedial Action for OU1. The triggering action for this statutory review is the completion date of the previous FYR. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II PROGRESS SINCE THE LAST REVIEW

The first FYR, signed on September 21, 2010, determined that the remedy was considered protective of human health and the environment. Long-term protectiveness will continue to be achieved through the public water supply along with institutional controls. These measures will prevent exposure to contaminants until groundwater cleanup standards are achieved. Tables 1 and 2 below provide the protectiveness statement and recommendations from the 2010 FYR. Table 3 provides an update of the planned and implemented institutional controls.

Table 1: Protectiveness Determinations/Statements from the 2010 FYR

OU #	Protectiveness Determination	Protectiveness Statement
1	Short-term Protective	The remedy at the Eastland Woolen Mill Superfund Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed, there is no current human exposure to contamination, the groundwater contamination is not migrating, clean water is available to all locations within the extent of the groundwater contamination, and EPA is actively treating and monitoring the groundwater as part of the on-going Long-Term Response Action. However, in order for the remedy to be protective in the long-term, the institutional controls to prevent future groundwater use need to be in place to ensure long-term protectiveness. A preliminary assessment of the potential for vapor intrusion to present a threat at the Site was performed as part of this five-year review. There are no structures above areas of the plume that exceed vapor intrusion screening criteria so the pathway is not complete.

Table 2: Status of Recommendations from the 2010 FYR

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Party	Original Milestone Date	Current Status	Completion Date (if applicable)
1	VI	Perform a VI Study	EPA	EPA/State	9/21/2015	complete	N/A
1	ICs	Complete ICs	EPA	EPA/State	9/21/2015	incomplete	N/A

Remedy Implementation Activities

Table 3: Summary of Planned and/or Implemented ICs

Media, engineered controls, and areas that do not support UU/UE based on current conditions	ICs Needed	ICs Called for in the Decision Documents	Impacted Parcel(s)	IC Objective	Title of IC Instrument Implemented and Date (or planned)
Groundwater – Institutional Control Zone	Yes	Yes	Map 18, Lots 37,38,39,40, 42,43, 52,53, 54,55,56, 57,61, 62,63,64,93, 118, and 149 Subdivision lots 1,2,3,4,5,6,8,9 and 10. Map 20 Lot 4, Map 15- Lot 10, and Maine DOT Route 7	Groundwater use prohibited to prevent the consumption and withdrawal of groundwater until cleanup standards are achieved.	Restrictive covenants filed with the Registry of Deeds – various dates
Groundwater	Yes	Yes	Map 18, Lot 44	Prohibit the installation of new wells in different locations or depths to maintain plume stability.	

Since the 2010 FYR, institutional controls have been put in place for all but two of the properties identified as requiring institutional controls by the 2002 ROD and 2006 ROD Amendment. One of the two remaining property owners where an institutional control is necessary is working with EPA and MEDEP to finalize the restriction. The other remaining property where an IC is needed is a location where the current well is not contaminated and does not appear to be impacting the groundwater contaminant migration; however, the groundwater modeling suggested that a modification to the existing well to increase yield or the installation of a new well at locations on the property closer to the Site could have an adverse impact on the groundwater contamination by inducing migration of the groundwater contamination. The restrictions on this property would prohibit installation of future groundwater wells in locations or at depths that differ from existing water supply wells located on these properties. This property will be allowed to continue to use their private water well within this zone for domestic or other uses. This property owner has not been willing to comply with the request for an institutional control on the property.

Compliance with the environmental covenants and restrictions will be monitored and enforced to ensure that the institutional controls are effective. Over time, EPA will also evaluate whether the land use restrictions can be removed or modified because acceptable levels have been met at the Site. All existing bedrock and overburden water supply wells for properties connected to the water line were formally decommissioned in 2011, with the exception of the wells converted to monitoring wells for use in the long-term remedial action.

Long-term monitoring of groundwater and surface water has continued during the period covered by this review (September 2010 to July 2015).

Other LTRA activities have included the various site activities summarized below:

- The wastewater treatment plant building and decontamination pad were removed/disassembled and disposed of in July 2011;
- sampling of sediment in EBSR and Sebasticook Lake occurred in August 2011;
- riverbank restoration occurred along the EBSR in 2011;
- 52 wells and three piezometers in OU1 and OU2 were decommissioned following MEDEP well abandonment procedures in 2011;
- a soil vapor intrusion pathway study was performed in 2012;
- a partial deletion of the Site from the National Priorities List occurred in 2012;
- a water line was installed to the property at Map 18, Lot 93 in December 2013; and
- a bench scale test of in-situ bioremediation treatability was completed in 2014.

System Operation/Operation and Maintenance Activities

Operation and maintenance (O&M), as part of the Long-Term Response Action at the Site, ensures the ongoing protectiveness of the Remedial Action. Periodic site inspections, monitoring, and the ongoing implementation of the in-situ groundwater treatment are part of the LTRA.

III FIVE-YEAR REVIEW PROCESS

Administrative Components

The public was notified of the initiation of the five-year review on 1/5/2015. EPA, the lead agency for this FYR, notified MEDEP that it was conducting a five-year review with a report to be completed by September 2015. The Eastland Woolen Mill Superfund Site Five-Year Review was led by Edward

Hathaway the Remedial Project Manager for the Site and Pamela Harting-Barrett, the Community Involvement Coordinator (CIC). Rebecca Hewett, of the MEDEP, assisted in the review as the representative for the support agency.

The review, which began on 3/23/2015, consisted of the following components:

- Community Notification and Involvement;
- Document Review;
- Data Review;
- Site Inspection;
- Interviews; and
- Five-Year Review Report Development and Review.

Community Notification and Involvement

Activities to involve the community in the five-year review process were initiated with a discussion in March 2015 between the Remedial Project Manager and Community Involvement Coordinator for the Site. Per Region 1 policy, a region-wide press release announcing all upcoming five-year reviews in New England was sent to all regional newspapers, including the Portland Press Herald, on January 5, 2015, stating that there was a five-year review and inviting the public to submit any comments to the EPA. The press release is attached in Appendix C. The results of the review and the report will be made available at the Site information repository located at:

- Stewart Free Library, 8 Levi Stewart Drive, Corinna, Maine 04928, and
- EPA Record Center, U.S. Environmental Protection Agency, 5 Post Office Square, Suite 100, Boston, Massachusetts 02109-3912

Document Review

This FYR review consisted of a review of relevant documents including monitoring data to develop the Site history, which is included in Appendix A. Applicable groundwater and surface water cleanup standards, as listed in the September 2002 ROD, were also reviewed, as discussed in the Technical Assessment (Section IV) below. A complete list of documents reviewed for this FYR can be found in Appendix B.

Data Review

Monitoring data and remedial assessment data have been collected as part of the remedial action and LTRA. A summary of the reviewed data is presented below, with reference to the most recent data and evaluation of trends. For long-term monitoring data, reference is made to the most recent monitoring report, the 2014 Area-Wide Groundwater Monitoring Report (Nobis, 2015b). Contaminant levels in groundwater are compared to the Site Specific Groundwater Cleanup Levels (GCLs) listed in Table 4 below.

Table 4

Site Specific Groundwater Cleanup Levels

Contaminant of Concern	Site Specific Groundwater Cleanup Level (µg/l)	Basis
Arsenic	10*	MCL
Manganese	200	MEG
Benzene	5	MCL
Chlorobenzene	47	1992 MEG
1,2 Dichlorobenzene	85	1992 MEG
1,3 Dichlorobenzene	85	1992 MEG
1,4 Dichlorobenzene	27	1992 MEG
1,2,4 Trichlorobenzene	70	MCL

Soil Sample Data

Results obtained from the most recent soil boring and sampling program performed in 2009 indicate residual soil contamination exists at the Site. Based on laboratory results for soil samples collected for the draft 2009 ISCO Performance Assessment Report (Nobis, 2009), overburden soil and shallow weathered bedrock beneath Area 1 contain residual concentrations of contaminants exceeding soil removal criteria. Additionally, subsurface soil and groundwater data indicate that residual contamination may reside in the form of dense non-aqueous phase liquid (DNAPL) in bedrock fractures beneath the Site. Additional soil sampling has not been performed at the Site since the previous FYR prepared in 2010.

Overburden Groundwater – Area 1

The major area of remaining overburden groundwater contamination is located in the area designated as Area 1 (see Figure 6) which is a small area at the front of the Site extending beneath Route 7. Results from groundwater monitoring performed in August 2014 are consistent with past monitoring results and confirm the presence of an overburden groundwater plume characterized by the following contaminants of concern (COC): 1,2,4-trichlorobenzene (1,2,4-TCB), 1,2-dichlorobenzene (1,2-DCB), 1,3-dichlorobenzene (1,3-DCB), 1,4-dichlorobenzene (1,4-DCB), benzene, and chlorobenzene. The maximum detected concentration of the COC VOCs range between six times Site specific GCL (1,3-DCB detected in IM-04-04) to 66 times Site specific GCL (chlorobenzene detected in IM-04-04).

In addition to the COCs identified in the ROD, other VOCs, including 1,2,3-trichlorobenzene (1,2,3-TCB) 1,1,2-trichloroethane, 1,2-dichloroethane (1,2 DCA), bromomethane, and chloromethane were detected in the groundwater. With the exception of 1,2,3 TCB, the non COC VOCs are believed to be associated with the degradation of chlorinated VOCs during in-situ chemical oxidation (ISCO) reactions (ISCO daughter product VOCs or DPVOCs). The concentration data collected to date suggests that most of the overburden VOC plume mass is located on-site within the boundaries of Area 1. Figure 6 depicts the current estimated extent of the Area 1 overburden VOC plume. Table 5 contains the data for the bedrock sampling performed in 2014 and Table 6 contains a historic summary of the Site specific COCs in bedrock groundwater at the Site.

Manganese was detected excess of the Site specific GCL in seven of the eight samples collected from Area 1 overburden wells sampled in 2014. Arsenic was detected in six of the eight overburden groundwater samples collected from monitoring wells in Area 1 with two of the results in exceedance of groundwater quality criteria for arsenic. Previous work conducted at the Site has established that risks associated with arsenic and manganese in the overburden plume are consistent with risks associated with arsenic and the other inorganics in background locations and thus is not believed to be related to Site activities.

Overburden Groundwater – UST Area/Building 14

The ongoing monitoring program also confirmed the continued presence of a small area of VOC contamination located in the vicinity of the former Building 14 Area northeast of the EBSR. This plume is characterized by the presence of 1,2-DCB and 1,4-DCB at concentrations in excess of their respective Site specific GCL in OM-01-50. Additional VOCs were detected at concentrations below contract required quantification limits (CRQL) in overburden wells OM-01-51 and OM-11-76. Concentrations in all

other overburden wells located east of the EBSR are non-detect, indicating that the site-related overburden VOC plume is confined to the area of OM-01-50, OM-01-51, and OM-11-76. Comparison of 1,2-DCB and 1,4- DCB data since completion of the prior FYR indicates a 66% and 69% reduction, respectively, in these compounds in OM-01-50, suggesting the overburden plume is attenuating with time in this area. Figure 6 depicts the current estimated extent of the UST/Building 14 Area overburden VOC plume. Table 5 contains the data for the bedrock sampling performed in 2014 and Table 6 contains a historic summary of the Site specific COCs in bedrock groundwater at the Site.

Overburden groundwater monitoring wells OM-11-76 and OM-11-77 were installed in 2012 in the vicinity of the UST/Building 14 Area to monitor the groundwater plume near site structures to evaluate the potential for vapor intrusion into these structures. No VOCs have been detected in the groundwater samples collected from these wells.

Manganese was detected in excess of the Site specific GCL in most samples collected from the Building 14/UST Area overburden wells sampled in 2014. The exceptions were samples collected from OM-11-76 and OM-11-77. Arsenic was detected in three of the four overburden groundwater samples from the Building 14/UST Area. One arsenic-bearing sample exceeded groundwater quality criteria. Previous work conducted at the Site has established that risks associated with arsenic and manganese in the overburden plume are consistent with risks associated with arsenic and manganese in background locations and not associated with impacts related to the Site.

Bedrock Groundwater

The ongoing bedrock monitoring program confirmed the continued presence of a VOC plume that extends to the northeast and east-southeast of the source area (Area 1). This VOC plume is predominantly characterized by the presence of site COCs (chlorobenzene, 1,2-DCB, 1,3-DCB, 1,4-DCB, and 1,2,4-TCB) at concentrations exceeding Site specific GCL. The maximum detected VOC COC concentrations range between 15 times Site specific GCL (1,3-DCB detected in BM-04-44) to 255 times Site specific GCL (CB detected in BM-04-44). Non-COC VOCs that were detected in bedrock include, 1,2-dichloroethane, bromoform, chloromethane, methylene chloride, and vinyl chloride. The results of the bedrock groundwater sampling indicate that most of the bedrock VOC plume mass is located within the boundaries of Area 1 and the East Side Source Area, as described in previous Area-Wide Groundwater Monitoring Reports (Nobis, 2008 et al) and the 2007 East Side Characterization (ESC) Report (Nobis, 2008b). Table 7 contains the data for the bedrock sampling performed in 2014 and Table 8 contains a historic summary of the Site specific COCs in bedrock groundwater at the Site.

Figures 7 and 8 depict the estimated limits of the current bedrock VOC plume based on results from the 2014 LTM sampling. In previous reports, the bedrock plume geometry was described as expanding along a bedrock strike to the northeast, as indicated by significant chlorinated benzene concentrations observed east of the EBSR. The 2014 data confirms the continued presence of the VOC plume in this area. In samples collected from BM-07-49, total COCs have decreased 87% to 97% in the three packer intervals (which are discrete sample intervals collected using a packer to isolate the location) sampled since sampling at this location commenced in 2007. In samples collected from BM-07-50, total COCs have decreased 61% to 85% in the four packer intervals sampled. Although COC concentrations have increased in some East Side Source Area wells recently (BM-07-48 and specific packer intervals in BM-07-50), these concentrations still generally remain below those observed in 2007. The plume does not appear to be migrating away from the East Side Source Area. This is supported by either non-detections or detections below groundwater quality criteria in BM-99-10 (Zones B, C, and D), BM-04-40, BM—06-43, and in water supply wells on the Map 18 Lot 62 and 64 properties.

The December 2010 sampling demonstrated a low-level exceedance of benzene in BM-06-43, extending the VOC plume boundary to a small area east of Route 7 and resulting in a “boot” shaped plume geometry. Subsequent sample results from BM-06-43, including data from the 2014 sampling event, did not report the presence of benzene or any VOCs exceeding groundwater quality criteria.

The packer intervals sampled from BM-04-32, BM-04-36, and RB-04-01 during the 2014 monitoring round were co-located with the intervals sampled in the same wells during 2004, 2012, and 2013. The depths sampled from BM-07-49 and BM-07-50 were co-located with the intervals sampled in the same wells during 2007, 2012, and 2013. Sample results from 2014 indicated a decrease in COCs at each of the packer intervals sampled in BM-04-36, BM-07-49, BM-07-50, and RB-04-01, when compared to the 2004 or 2007 results, as applicable. Table 8 includes a summary of the COCs in the packer intervals during each of these sampling rounds. With the exception of the deepest packer interval (168-178 feet below ground surface [bgs]), the total COC concentrations in the packer samples collected from BM-04-32 show a reduction of 5% to 73% compared to the total COC concentrations reported in 2004. While the 168-178 feet bgs interval indicates a 179% increase in comparison to 2004 results, the total COCs reported in 2014 are notably reduced. The 2012 total COC results in BM-04-32 intervals show an increase in concentrations compared to 2004 results. The 2012 increase may be attributed to several factors, including contamination rebound, migration of dissolved contaminants from nearby sources or along preferential fracture planes, or mobilization of DNAPL caused by previous pumping stress alterations and ISCO injections. In addition, a change in the hydrogeologic regime may have occurred. However, the recent decline in total COCs indicates a return to longer-term downward trends may be occurring.

Manganese was detected in 2014 at concentrations in excess of groundwater quality criteria in samples collected from six bedrock monitoring wells/boreholes, two active and one inactive bedrock drinking water well samples, and one inactive drinking water well (two FLUTe™ zones- FLUTeTM wells are flexible liners that are inserted in an open-borehole that allow for sampling at specific intervals or zones). Arsenic was detected in samples from one inactive drinking water well (two FLUTe™ zones) at concentrations in excess of groundwater quality criteria. Previous work conducted at the Site has established that risks associated with arsenic and manganese in the bedrock plume are consistent with risks associated with arsenic and manganese in background locations and not associated with impacts related to the Site.

Active Water Supply Sampling

VOCs were not detected above the CRQLs in the active water supply wells sampled in 2014. Manganese was reported in the samples collected from the active water supply wells on the Map 18 Lot 117 and Map 18 Lot 94 properties at concentrations above the federal secondary maximum contaminant level but below the current federal safe drinking water act health advisory of 300 ug/l for manganese. The concentrations are consistent with background concentrations of manganese and are not believed to be related to Site activities. Table 9 contains the data for the active water supply sampling in 2014.

Surface Water Sampling

No VOCs were detected in 2014 above surface water quality criteria at any of the three surface water sample locations at the site. These results suggest that neither the bedrock plume nor the overburden plumes from Area 1 and the UST/Building 14 area pose a current risk to ecological receptors in the EBSR. Additional monitoring of surface water locations will be continued per the long-term monitoring (LTM) program.

Arsenic was detected in 2014 in one of the three surface water sample locations at the site and at a concentration significantly below the surface water quality criterion. Arsenic was detected in one duplicate surface water sample at a concentration significantly below the surface water quality criterion, but was not detected in the parent sample which had a laboratory detection limit above the concentration detected in the duplicate sample. Table 10 contains the data for the surface water sampling in 2014.

Soil Gas Sampling

A soil gas sampling program was completed in 2012 in support of assessment of potential vapor intrusion issues identified in the previous FYR. Five soil gas sampling probes were installed in the vicinity of the former Building 14 Area where the possibility of human exposure to subsurface vapors is most likely to occur due to observed groundwater contamination concentrations and proximity to inhabited structures. The soil gas probes were constructed as standard soil gas probes and installed at depths ranging from 2.4 to 3.8 feet bgs, approximately 1.5 feet above the observed groundwater elevation in the respective locations. Soil gas samples were collected from each of the probes for VOC analysis. The results of laboratory analysis indicated the presence of VOCs in each sample.

Due to the presence of VOCs in multiple samples, a risk evaluation was completed using EPA's Vapor Intrusion Screening Level (VISL) Calculator (Version 2.0, May 2012) followed by risk modeling using the Johnson and Ettinger (JE) Model (Version 3.1, February 2004).

JE Modeling was conducted with the assumption of a hypothetical slab on grade structure construction as a potential vapor intrusion pathway. Based on the JE Model output results, the assessment concluded that risk related to the observed contaminants was negligible and that further investigation is not warranted. The risk evaluation was documented in the Technical Memorandum in the 2012 Area-Wide Groundwater Monitoring Report, Appendix D, which also includes the soil gas data and JE Modeling results (Nobis, 2012). Appendix D is also included as Appendix F to this five year review.

Sediment Sampling

The section of the EBSR downstream of the former Eastland Woolen Mill extending into Sebasticook Lake was within the study area of Operable Unit 2. EPA signed a No Action ROD for OU2 in 2004. The ROD stated that FYRs would not be necessary for the OU2 area of the Site. The Selectboard and residents in Newport, ME requested that EPA update the data for the former OU2 area to confirm that the sediments are not a threat to public health. In August 2011, EPA collected 29 samples from the EBSR and Sebasticook Lake. The samples were analyzed for VOCs, pesticides, PCBs, and metals. One sample (SED 10) contained the VOC chlorobenzene and another sample (SED 2) contained the pesticides Aldrin and Dieldrin. Twenty-seven of the samples contained 4,4-DDD and 4,4-DDE. The chlorobenzene, Aldrin, Dieldrin, 4,4-DDD, and 4,4-DDE were all found at concentrations below the screening level identified for park visitors, which assumes 90 days a year of exposure, in the State of Maine Remedial Action Guidelines (RAGs). For metals, only arsenic was detected at a concentration above the State of Maine RAGs. 28 of 29 samples contained arsenic above the screening level for park

visitors as listed in the Maine RAGs. Arsenic is naturally occurring and is often found above the screening levels. Maine developed a background assessment that indicates that concentrations of arsenic up to 16 mg/kg could be associated with natural sources. A background study for the OU2 Remedial Investigation indicated that the background concentration for the EBSR was 15 mg/kg. Only one sample (SED 5) contained arsenic above the State of Maine or site specific background level. The overall average arsenic concentration for the 29 samples was 10.8 mg/kg. Based on the data collected, there does not appear to be any concern with respect to human exposure to sediments in the EBSR and Sebasticook Lake for the locations sampled. The sediment data, a location map, and a comparison of the sediment data Maine Remedial Action Guidelines can be found in Appendix G.

Site Inspection

The initial FYR inspection of the Site was conducted on 6/16/2015. In attendance were Tim Andrews, Nobis; David Gorhan, Nobis; Rebecca Hewett, Maine DEP; Jason Langley, Maine DEP; and Chris Swain, Maine DEP. The purpose of the inspection was to assess the overall site conditions to support the evaluation of the protectiveness of the remedy. A second FYR inspection was performed on 8/18/2015. In attendance were Edward Hathaway, EPA and Rebecca Hewett, Maine DEP.

The two FYR inspections identified the following issues with the Site:

- The wooden fence surrounding the construction trailer and conex box at the Site remains in good condition with the exception of three broken slats that have been temporarily repaired with plywood. The gates on either end of the fenced in area remain locked.
- Most monitoring wells appeared to be in good condition; however, several monitoring well covers were missing one or more bolts used to secure the covers. Decommissioned wells located on private properties have been restored so there is no indication of their previous existence on those properties. These wells were decommissioned in accordance with Maine DEP guidance in 2011 and 2014.
- One monitoring well has a damaged casing and possible damage to Flute liner.
- The electrical service panel mount located in Area 1 is loose and should be secured or removed, as applicable.
- The geotextile fabric underlying rip-rap along the toe of the east and west banks of the EBSR is exposed in several areas. The exposed fabric does not appear to be a result of ongoing erosion, nor is it believed to be of particular concern.

Interviews

During the FYR process, interviews were conducted with the Maine DEP, Town of Corinna, and several residents involved in Site activities or aware of the Site. The purpose of the interviews was to document any perceived problems or successes with the remedy that has been implemented to date. Interviews were conducted via email during June and July 2015. The interviews indicated that the only concern with respect to the Site is the completion of the institutional controls. In general, the State regulatory agency (ME DEP), Town of Corinna, and local residents were satisfied with the cleanup activities to date, did not identify any issues with the Site conditions, and felt generally well informed regarding the Site activities. Complete interviews are included in Appendix B.

IV TECHNICAL ASSESSMENT

Question A: Is the remedy functioning as intended by the decision documents?

Remedial Action Performance

Yes, the remedy is functioning as intended by the decision documents.

Based on the installation of the water line to local residents, implementation of ICs on 30 properties, and long-term monitoring of groundwater and residential wells, the remedy is successful in preventing ingestion of groundwater contamination. None of the currently used drinking water supplies exceed cleanup levels. Surface water monitoring supports the conclusion that the ecological receptors are protected.

An evaluation of current data for the contaminant plumes in the overburden and bedrock aquifers indicates the current extent of groundwater contamination is stable. The removal of local water supply pumping stresses has allowed for plume retraction over time.

Assessment of remedial performance of ISCO injections between 2006 and 2009 (Nobis, 2009) concluded that COCs in impacted soils have been reduced an estimated 68%, and COCs in groundwater have been reduced an estimated 70% compared to baseline mass estimates.

System Operations/O&M

Operation and maintenance as part of the Long-Term Response Action at the Site, continues to be effective. Issues identified during the routine Site visits by Nobis Engineering, Inc. on behalf of the EPA, are regularly addressed or continue to be monitored as recommended. The monitoring well network

appears to be adequate to define the current extent of the groundwater plume and monitor the progress of the cleanup.

Opportunities for Optimization

The FYR did not identify any changes in operating procedures that would further optimize the cleanup actions.

Early Indicators of Potential Issues

There have not been any indicators of potential issues since the last FYR.

Implementation of Institutional Controls

There are 32 properties that have been identified as requiring some form of institutional control relating to the Site. To date, 30 of the properties have recorded institutional controls. Two remaining properties need ICs recorded to ensure long-term protectiveness of the remedy. The owner of one property in need of final land use controls has been cooperating with EPA and MEDEP to complete the institutional control, but it has not been finalized and recorded as of this FYR. The owner of the second property in need of land use controls has refused to participate in the implementation of the institutional controls. Although the current water supply well on this property has not been impacted by site activities, an institutional control is required on the property to prevent the installation of a new well in a location closer to the former maximum extent of the groundwater contamination. EPA and MEDEP continue to work with both owners in order to secure protective ICs on the impacted properties.

Question B: Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy section still valid?

The exposure assumptions and RAOs used at the time of the remedy selection are still valid. While some toxicity values used in the estimations of cancer risk and non-cancer health hazards have changed, the ARARs that define the cleanup levels for the ROD have not changed. In addition, the 2002 ROD requires that once cleanup levels have been achieved, a risk assessment be performed to ensure that the site no longer poses an unacceptable risk to human health and the environment. All updates to exposure assumptions, toxicity values, and risk assessment guidance will be incorporated into the risk assessment performed at that time.

Changes in Standards and To Be Considered (TBCs)

As part of the second five-year review, the Applicable, Relevant, and Appropriate Regulations (ARARs) and To Be Considered (TBCs) were reviewed for changes that might affect the protectiveness of the remedy.

NTCRA source control remedy ARARs related to the construction of the components of the source control remedy (soil and sediment removal and demolition of the mill complex) were met prior to the September 2006 ROD Amendment and remain unchanged. The 2002 ROD presented ARARs related to the OU1 groundwater response action selected to control the migration of the contamination in groundwater and restore the aquifer to drinking water standards. OU1 also addresses soil contamination remaining after the NTCRA. The 2004 ROD documented that a no further action decision for OU2 and presented no additional ARARs. The 2006 ROD Amendment reviewed and updated the ARARs identified in the 2002 ROD. Appendix A presents the table summarizing the ARARs and TBCs that were presented in the ROD Amendment. Tables 10 through 12 in the 2006 ROD Amendment contained the location-specific, chemical-specific, and action-specific ARARs and TBCs. Both the 2002 ROD and the 2006 ROD Amendment list federal MCLs, non-zero maximum contaminant level goals (MCLGs), and State MEGs as chemical specific ARARs. These ARARs were used in establishing the OU1 groundwater cleanup levels. The following discussions address these chemical-specific ARARs and other applicable TBCs for the contaminants of concern (COCs) identified in the ROD. These COCs include: benzene, 1,2,4-TCB, 1,2-DCB, 1,3-DCB, 1,4-DCB, chlorobenzene, arsenic, and manganese.

<u>Federal Maximum Contaminant Levels (MCLs)</u>

There have been no changes to the MCLs for COCs since either the 2006 ROD Amendment or the 2010 FYR.

<u>Federal Maximum Contaminant Level Goals (MCLGs)</u>

There have been no changes to the MCLGs for COCs since the 2010 FYR.

<u>Maine Maximum Exposure Guidelines (MEGs)</u>

- The Maine MEGs were updated in 2012 (ME CDC, 2012) and include revisions to the MEG for several of the COCs, as discussed below. Although the MEGs were updated in 2008, 2010, and 2012, the new levels were not promulgated and, therefore, do not constitute ARARs for the Site. The 2002 OU 1 ROD and 2006 OU1 ROD Amendment only considered the 1992 MEGs as ARARs. As a result, there are no changes to regulatory standards since these RODs.

- The MEG for benzene was revised to a 2012 MEG of 4 micrograms per liter (µg/L) more stringent than the Federal MCL selected as the groundwater cleanup level.
- The MEG for chlorobenzene was revised from the value of 47 µg/L cited in the ROD Amendment to a less stringent 2012 MEG of 100 µg/L.
- The MEG for 1,2-DCB was revised from the value of 85 µg/L cited in the ROD Amendment to a less stringent 2012 MEG of 200 µg/L.
- The MEG for 1,3-DCB was revised from the value of 85 µg/L cited in the ROD Amendment to a more stringent 2012 MEG of 1 µg/L.
- The MEG for 1,4-DCB was revised from the value of 27 µg/L cited in the ROD Amendment to a less stringent 2012 MEG of 70 µg/L.
- The MEG for manganese was revised from the value of 200 µg/L cited in the ROD Amendment to a less stringent 2012 MEG of 500 µg/L.

Maine Remedial Action Guidelines (RAGs)

The Maine Draft RAGs for indoor air were used to develop Project Action Limits (PALs) for the vapor intrusion evaluation of soil gas sampling results collected in 2012 (Nobis, 2013). The Maine RAGs were updated in 2013 (Maine DEP's *Guidance for Human Health Risk Assessment for Hazardous Substance Sites in Maine*) and include revisions to the indoor air RAGs for several of the COCs:

- 1,2-DCB values added.
- 1,4-DCB values increased (less stringent).
- 1,1-DCA values increased (less stringent).
- trichlorofluoromethane values added.

Because no soil gas concentrations exceeded either the current or former values, these changes have no impact on the protectiveness of the remedy.

Changes in Exposure Pathways

While the implementation of institutional controls and the availability of the water line should prevent the future use of contaminated groundwater as a water supply, the ingestion of contaminated groundwater remains a valid potential exposure pathway as long as the groundwater concentrations remain above site specific cleanup levels. The HHRA did not evaluate a vapor intrusion pathway. However, a vapor intrusion evaluation of soil gas sampling results collected in 2012 (Nobis, 2012) was conducted. This evaluation concluded that contamination present in the groundwater is not likely to present a hazard to individuals in indoor air in structures near the Site.

No additional exposure pathways for human or environmental receptors have been identified.

As documented in the 2010 FYR, the ISCO treatment of the groundwater resulted in the presence of additional VOCs that are formed by the degradation of chlorinated VOCs during ISCO reactions (DPVOCs). DPVOCs include 1,1,2-trichloroethane, 1,2-dichloroethane, bromomethane, and chloromethane. During the last five years, both 1,2-dichloroethane and bromomethane have been detected at concentrations exceeding MCLs and/or MEGs. Because no groundwater from impacted areas is used as drinking water, the presence of these additional contaminants does not impact the short-term protectiveness of the remedy; however, consideration of these contaminants is needed to assure the long-term protectiveness of the remedy. After the concentration of the contaminants of concern reach site specific cleanup levels, a risk assessment will be performed to determine if any of the remaining constituents present an unacceptable risk to human health or the environment. This issues will also be addressed in future five-year reviews.

Since the baseline HHRA and the 2010 FYR, EPA has issued new guidance regarding human health exposure assumptions used in the evaluations of human health risk.

- 2014 Office of Solid Waste and Emergency Response (OSWER) Directive on the Update of Standard Default Exposure Factors
  In 2014, EPA finalized a Directive to update standard default exposure factors and frequently asked questions associated with these updates.
  http://www.epa.gov/oswer/riskassessment/superfund_hh_exposure.htm (items # 22 and #23 of this web link). Many of these exposure factors differ from those used in the risk assessment supporting the ROD(s). These changes in general would result in a slight decrease of the risk estimates for most chemicals. (USEPA, 2014a)

These changes do not impact the remedy.

As noted above, no significant risks from soil, sediment, and surface water pathways were identified. Since the changes in exposure assumptions would lower risk, no revision to the soil, sediment, and surface water pathways risk assessment is necessary at this time. No revision to the groundwater risk assessment is necessary at this time. A waterline has been installed serving residents within the potentially impacted area, and the majority of residential supply wells have been decommissioned, effectively preventing exposures to groundwater at the majority of potentially impacted properties. Remaining inactive water supply wells have not been decommissioned because they are now part of the long term monitoring program. Decommissioning of these wells is needed at the time it is determined they are no longer needed for monitoring purposes to assure long-term protectiveness. Between 2005 and 2015, institutional controls restricting groundwater use have been placed on the majority of potentially

impacted properties. Two properties remain in need of land use controls. Of the two properties, one property owner is cooperating with EPA and state efforts to place controls on the property and EPA reasonably anticipates recorded controls before the next FYR. In contrast, the owner of the second property where controls are necessary has refused an environmental covenant. In order for the remedy to remain protective in the long-term, the institutional controls to prevent future groundwater use need to be in place at both of these remaining properties to ensure long-term protectiveness.

Changes in Toxicity and Other Contaminant Characteristics

As part of the five-year review, the toxicity values used to estimate risks from the identified COCs were reviewed for changes that might affect the conclusions of the risk assessment or affect the protectiveness of the remedy. The 2010 FYR noted changes in the RfDs for benzene and 1,4-DCB and the CSF for 1,4-DCB, and a newly available PPRTV CSF for 1,2,4-TCB since the completion date of the baseline HHRA. No additional changes in toxicity values or other contaminant characteristics for the selected COCs in the OU1 Baseline HHRA contained within the OU1 RI Report (Harding ESE, 2002) have occurred since the 2010 Five Year Review. No changes have occurred in the toxicity values used in the vapor intrusion evaluation of soil gas sampling results collected in 2012 (Nobis, 2014).

<u>Environmental Protection Agency Reference Doses (RfDs) and Cancer Slope Factors (CSFs)</u>

EPA toxicity values including RfDs and CSFs are routinely re-evaluated and updated. RfCs and inhalation unit risk factors (URFs) are also available for evaluation of risks via the inhalation pathway. Currently, the primary source of toxicity values is the Integrated Risk Information System (IRIS) database. These toxicity values are used in the calculations of risk in the HHRA and can be used in the development of site-specific and more generic risk-based clean-up goals. The 2010 Five Year Review noted changes in the RfDs for benzene and 1,4-DCB and the CSF for 1,4-DCB, and a newly available Peer Reviewed Toxicity Value (PPRTV) CSF for 1,2,4-TCB since the timing of the baseline HHRA. No additional changes in toxicity values for the selected COCs in the OU1 Baseline HHRA contained within the OU1 RI Report (Harding ESE, 2002) have occurred since the 2010 Five Year Review. No changes have occurred in the toxicity values used in the vapor intrusion evaluation of soil gas sampling results collected in 2012 (Nobis, 2014).

Changes in Risk Assessment Methods

Since 2010, EPA has introduced the following new risk assessment methods applicable to the site evaluations:

- 2012 OSWER Directive on Recommendations for Default Value for Relative Bioavailability (RBA) of Arsenic in Soil

  Based on a compilation and review of data on relative bioavailability of arsenic in soil in 2012, arsenic was found to be less bioavailable via soil ingestion relative to other analytes. A default value of RBA of 60% is now applied during soil/sediment ingestion calculations of risk/cleanup levels. This default RBA value reduces arsenic contribution to risk and/or increases arsenic cleanup levels (USEPA, 2012). Because soil exposure pathways evaluated in the HHRA are no longer complete, changes in the method for evaluating arsenic in soil do not impact the protectiveness of the remedy.

- 2014 OSWER Directive Determining Groundwater Exposure Point Concentrations (EPCs), Supplemental Guidance

  In 2014, EPA finalized a Directive to determine groundwater EPCs http://www.epa.gov/oswer/riskassessment/pdf/superfund-hh-exposure/OSWER-Directive-9283-1-42-GWEPC-2014.pdf. This Directive provides recommendations to develop groundwater EPCs. The recommendations to calculate the 95% upper confidence limit (UCL) of the arithmetic mean concentration for each contaminant from wells within the core/center of the plume, using the statistical software ProUCL, could result in lower groundwater EPCs than the maximum concentrations routinely used for EPCs as past practice in risk assessment, leading to changes in groundwater risk screening and evaluation. In general this approach could result in slightly lower risk or higher screening levels (EPA, 2014b). Because no one is currently using the groundwater as potable water and the long-term remedy relies on MCLs and MEGs as cleanup goals, this change does not impact the remedy.

Expected Progress Towards Meeting RAOs

The RAOs for the OU1 ROD and 2006 ROD Amendment are as follows:

- Prevent the ingestion of groundwater containing contaminants that exceed Federal or State MCLs, Federal Non-zero MCLGs and more stringent State MEGs, or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1.

- Prevent, to the extent practicable, the off-site migration of groundwater containing contaminants at a concentration above Site cleanup levels.
- Prevent, to the extent practicable, the discharge to the EBSR of groundwater containing contaminants at a concentration above levels that could impact ecological receptors.
- Restore groundwater to meet federal or state MCLs, federal non-zero MCLGs or State MEGs (whichever is more stringent), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1.
- Perform long-term monitoring of surface water, sediments and groundwater to verify that the cleanup actions at the Site are protective of human health and the environment.

The remedy is progressing as expected. Remedial actions to date have met the first three RAOs through the following activities:

- Connected currently occupied properties within the institutional controls zone to the existing public water supply system;
- Installed water lines serving area properties;
- Decommissioned wells and piezometers in OU1 and OU2 following MEDEP well abandonment procedures;
- Implemented institutional controls to prevent future use of the contaminated groundwater and prevent disturbance of the remedy; and
- Reduced contaminant source mass through soil and sediment excavation and removal, on-site ex-situ thermal soil treatment, and in-situ chemical oxidation treatment of deep saturated soil, shallow weathered bedrock, and deep fractured bedrock.

In order to meet the RAOs, institutional controls to prevent future groundwater use still need to be implemented at two remaining properties, and decommissioning of remaining inactive water supply wells that are now part of the long term monitoring program will be needed after they are no longer needed for monitoring purposes. Long-term monitoring of groundwater and surface water has continued during the period covered by this review (Fall 2010 to Fall 2015). Groundwater COC concentrations do not yet meet the long-term goal of groundwater restoration; however, groundwater COC concentrations are decreasing, and the plume is shrinking in size. Additional non-COC VOCs, as well as ISCO DPVOCs, continue to be detected in groundwater at low levels. During the last five years, DPVOCs 1,1,2-trichloroethane, 1,2-dichloroethane, chloromethane, and bromomethane, as well as a few other VOCs, have been detected at concentrations exceeding MCLs and/or MEGs. Consideration of the DPVOCs is needed to assure the long-term protectiveness of the remedy. Surface water monitoring supports the conclusion that the ecological receptors are protected.

Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

No.

The Site land use scenarios have not changed. Review of the data collected and information obtained through the site inspection and interviews revealed no new information that calls into question the effectiveness and protectiveness of the remedy selected in the RODs. No new human or ecological receptors have been identified at this time. The water line provides clean water to those locations impacted by the contamination, and residential wells in use in the Site vicinity do not contain contamination above cleanup levels or drinking water standards. There is no pathway for vapor intrusion at the Site. When the groundwater cleanup is completed, an assessment of any residual contamination, including any breakdown products created by the in-situ chemical oxidation, will need to be performed.

Technical Assessment Summary

According to the data reviewed, the site inspection, and the interviews, the remedy is functioning as intended by the ROD. There have been no changes in the physical conditions of the site that would affect the protectiveness of the remedy. There have been no changes to the overall exposure assumptions used in evaluating human health and ecological risk. ARARs have not changed in any way that would call into question the protectiveness of the cleanup. Some changes to toxicity values and risk assessment methods and guidance have been noted; these changes will be incorporated into a risk assessment performed after cleanup levels have been achieved. In summary, there is no other information that calls into question the protectiveness of the remedy.

V ISSUES/RECOMMENDATIONS AND FOLLOW-UP ACTIONS

There are no major issues which affect the protectiveness of the remedy. The public water supply and absence of dwellings over the contaminated groundwater provide for current protectiveness with respect to contaminated groundwater. The completion of the institutional controls will be necessary to achieve future long-term protectiveness. EPA will continue to coordinate with the state to develop and implement a strategy for final IC implementation on the two outstanding properties.

Table 11: Issues and Recommendations/Follow-up Actions

OU #	Issue	Recommendations/ Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Y/N)	
						Current	Future
1	*Two properties do not have final ICs in place required by the ROD to ensure long term protectiveness at the Site.*	*EPA will continue to coordinate with the state to develop and implement a strategy for final IC implementation on the two outstanding properties.*	EPA	EPA	9/28/2018	No	Yes

VI PROTECTIVENESS STATEMENT

Protectiveness Statement(s)		
Operable Unit: OU1	*Protectiveness Determination:* Short-term Protective	*Addendum Due Date (if applicable):* NA
Protectiveness Statement: The remedy at the Eastland Woolen Mill Superfund Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed, there is no current human exposure to contamination, the groundwater contamination is not migrating, clean water is available to all locations within the extent of the groundwater contamination, and EPA is actively monitoring the groundwater as part of the on-going LTRA. However, in order for the remedy to be protective in the long-term, institutional controls to prevent future groundwater use at the two remaining properties need to be in place to ensure long-term protectiveness.		

Sitewide Protectiveness Statement	
Protectiveness Determination: Short-term Protective	*Addendum Due Date (if applicable):* *NA*
Protectiveness Statement: Because the response actions at the Site are protective of human health and the environment in the short-term, the Site is currently protective of human health and the environment. The remedy at the Eastland Woolen Mill Superfund Site currently protects human health and the environment because the contamination accessible to ecological receptors has been removed, there is no current human exposure to contamination, the groundwater contamination is not migrating, clean water is available to all locations within the extent of the groundwater contamination, and EPA is actively monitoring the groundwater as part of the on-going LTRA. However, in order for the remedy to be protective in the long-term, institutional controls to prevent future groundwater use at the two remaining properties need to be in place to ensure long-term protectiveness.	

VII NEXT REVIEW

The next FYR report for the Eastland Woolen Mill Superfund Site will be completed by September 2020, five years from the completion date of this review.

TABLES

Table 5
2014 Overburden Groundwater Sampling Results
Eastland Woolen Mill Superfund Site
Corinna, Maine

				Organinc Sample Name:	A4CN0	A4CN1	A4CN2	A4CP2	A4CX3	A4CP1	A4CX2	A4CN5	A4CP6	A4CR9	A4CS8	A4CT6	A4D14	A4D05	A4CR4	A4CQ5	A4CT2	A4CT7	A4CQ6	A4CW1
				Inorganic Sample Name:	MA4CN0	MA4CN1	MA4CN2	MA4CP2		MA4CP1		MA4CN5	MA4CP6	MA4CR9	MA4CS8	MA4CT6	MA4D14	MA4D05	MA4CR4	MA4CQ5	MA4CT2	MA4CT7	MA4CQ6	MA4CW1
				Sample Location:	IM-04-04	IM-04-04	IM-04-07	OM-00-46	OM-00-46	OM-01-50	OM-01-50	OM-01-51	OM-06-66	OM-06-67	OM-06-68	OM-06-69	OM-06-70	OM-06-71	OM-06-72	OM-06-73	OM-06-74	OM-06-75	OM-11-76	OM-11-77
				Station ID:	IM-04-04A-081914AX	IM-04-04A-081918AD	IM-04-07A-082014AX	OM-00-46X-082014AX	OM-00-46X-082614AX	OM-01-50X-082014AX	OM-01-50X-082614AX	OM-01-51A-082014AX	OM-06-66X-082014AX	OM-06-67X-082214AX	OM-06-68X-082214AX	OM-06-69X-082514AX	OM-06-70X-082914AX	OM-06-71X-082814AX	OM-06-72X-082114AX	OM-06-73X-082114AX	OM-06-74X-082514AX	OM-06-75X-082514AX	OM-11-76X-082114AX	OM-11-77X-082614AX
				Sample Date:	8/19/2014	8/19/2014	8/20/2014	8/20/2014	8/26/2014	8/20/2014	8/26/2014	8/20/2014	8/20/2014	8/22/2014	8/22/2014	8/25/2014	8/29/2014	8/28/2014	8/21/2014	8/21/2014	8/25/2014	8/25/2014	8/21/2014	8/26/2014
Chemical	**Groundwater Quality Criteria**																							
	CRQL	**GCL**	**MEG**	**MCL**																				
Contaminants of Concern (COC) VOCs																								
1,2,4-Trichlorobenzene	5	70	70	70	**930 J**	**440 J**	**76**	**140**	NA	8.0	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.8 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	5	85	200	600	**930 J**	**450 J**	74	**270**	NA	**430**	NA	5.0 U	3.1 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5	85	1	NS	**490 J**	**240 J**	**60**	**330**	NA	**5.7**	NA	5.0 U	**2.2 J**	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	5	27	70	75	**780 J**	**370 J**	**61**	**250**	NA	**92**	NA	5.0 U	6.4	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	5	5	4	5	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5	47	100	100	**3,100 J**	**1,500 J**	**50**	**580**	NA	41	NA	5.0 U	2.8 J	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Daughter Product VOCs (DPVOCs)																								
1,1,2-Trichloroethane	5	NS	6	5	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5	NS	4	5	**40**	**20 J**	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	5	NS	10	NS	6.5 J	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	5	NS	20	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Other VOCs																								
1,1,1-Trichloroethane	5	NS	10,000	200	25 U	25 U	5 U	10.0 U	NA	6.9	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	6.5	5.0 U
1,1,2,2-Tetrachloroethane	5	NS	2	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5	NS	60	NS	25 U	25 U	5 U	10.0 U	NA	11	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	2.1 J	5.0 U
1,1-Dichloroethene	5	NS	40	7	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	5	NS	NS	NS	130 J	60 J	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromo-3-chloropropane	5	NS	0.40	0.20	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane	5	NS	0.20	0.05	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	NS	10	5	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dioxane	100	NS	4	NS	0.1 U	0.1 U	0.1 U	NA	0.1 U	NA	0.42 J	0.18 J	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	1.5 J	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
2-Butanone	10	NS	4,000	NS	50 U	50 U	10 U	20 U	NA	10.0 U	NA	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
2-Hexanone	10	NS	NS	NS	50 U	50 U	10 U	20 U	NA	10.0 U	NA	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
4-Methyl-2-pentanone	10	NS	500	NS	50 U	50 U	10 U	20 U	NA	10.0 U	NA	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Acetone	10	NS	6,000	NS	50 U	50 U	10 U	20 U	NA	10.0 U	NA	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U
Bromochloromethane	5	NS	100	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5	NS	6	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	5	NS	40	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	5	NS	600	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	5	NS	5	5	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	5	NS	7	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	5	NS	70	80	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5	NS	10	70	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	5	NS	4	80	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	5	NS	1,000	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5	NS	30	700	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylene	5	NS	NS	10,000	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl acetate	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methyl tert-butyl ether	5	NS	35	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	16	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Methylene chloride	5	NS	40	5	**7.7 J**	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	5	NS	NS	10,000	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	5	NS	100	100	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5	NS	40	5	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	5	NS	600	1,000	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	5	NS	100	100	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	5	NS	NS	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	5	NS	4	5	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	5	NS	2,000	NS	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	5	NS	0.2	2	25 U	25 U	5 U	10.0 U	NA	5.0 U	NA	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U	5.0 U
Inorganics																								
Arsenic	10	10	10	10	4.2 J	4.1 J	10.0 U	32 J		1.4 J		8.5 J	8.7 J	3.1 J	4.5 J	30	10.0 U	25	12	10	2.0 J	10.0 U	10.0 U	10.0 U
Manganese	15	200	500	NS	42,400	44,600	119	5,620		19,600		304	1,890	1,120	922	2,840	9,010	193	299	675	270	621	61	15 U

Notes:

Results and criteria are reported in micrograms per liter (µg/L)

U = below detection limit, J = quantitation approximate, R = results rejected

CRQL = Contract Required Quantitation Limit,

GCL = Provisional Groundwater Cleanup Level, Table 9: Record of Decision Amendment, Eastland Woolen Mill Operable Unit I, September 2006.

MEG = Maine Center for Disease Control Maximum Exposure Guideline, Updated October 19, 2012.

MCL = Maximum Contaminant Level: EPA's National Primary Drinking Water Regualtions, Updated April 2012.

Bold and shaded indicates exceedance of GCL/MEG/MCL

On August 26, 2014, Nobis was notified that the FedEx shipment containing 1,4-dioxane samples collected on August 20, 2014 was lost during shipment.

The cooler containing the samples was eventually located and shipped to the laboratory, but the sample temperature was above an acceptable level.

On August 26, 2014, overburden monitoring wells OM-46 and OM-50 were resampled for 1,4-dioxane only.

Table 6
Historic Groundwater COC Concentrattions in Overburden Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
IM-04-04	7/12/2004	IM-04-04X037BX	**12,000**	**13,000**	**560**	**8,800**	**30**	**22,000**
	11/2/2004	IM-04-04X037CX	**1,000**	**250**	19	**200**	10 U	**140**
	12/13/2004	IM-04-04X037DX	**7,400**	**3,100**	**130**	**2,100**	100 U	**2,000**
	1/11/2005	IM-04-04X037EX	**5,400**	**1,100**	53	**810**	10 U	**770**
	8/29/2005	IM-04-04X037FX	**1,800**	**380**	**200**	**330**	10 U	**310**
	11/2/2005	IM-04-04X037LX	**2,400**	**940**	51	**740**	10 U	**1,100**
	8/14/2006	IM-04-04X037MX	**680**	**340**	16	**240**	10 U	**270**
	1/3/2007	IM-04-04X037NX	**2,800**	**2,000**	64	**1,700**	10 U	**1,500**
	9/11/2007	IM-04-04X037OX	***570***	***103***	*20 U*	***86.5***	*10 U*	***51***
	9/26/2007	IM-04-04X037PX	**1,000**	**680**	24	**580**	1.2	**600**
	11/15/2007	IM-04-04X037QX	**150**	**120**	20 U	**81**	10 U	**120**
	2/24/2009	IM-04-04X-022409AX	**410**	47	2.2	**38**	5 U	33
	9/22/2009	IM-04-04X-092209AX	**380 D**	77	3.7 J	**59**	3.8 J	**59**
	6/3/2010	IM-04-04X-060310AX	**180 J**	47 J	2.5 J	**39 J**	5 U	**70 J**
	12/15/2010	IM-04-04X-121510AX	***250 D***	***135***	*3.6 J*	***90.5***	*3.05 J*	***195 D***
	5/24/2011	IM-04-04X-052411AX	***670 D***	***165***	*7.9*	***130***	*5 U*	***515 D***
	6/19/2012	IM-04-04X-061912AX	***465***	***190***	*10*	***150***	*2.55 J*	***590***
	8/21/2013	IM-04-04X-082113AX	***580***	***420***	***85.5***	***330***	*50 U*	***1,450***
	8/19/2014	IM-04-04A-081914AX	***685 J***	***690 J***	***365 J***	***575 J***	*25 U*	***2,300 J***
IM-04-07	11/3/2005	IM-04-07X035AX	**4,300**	**2,300**	**93**	**1,800**	10 U	**2,700**
	8/15/2006	IM-04-07X035BX	**5,400**	**4,600**	**180**	**3,500**	10 U	**6,300**
	1/5/2007	IM-04-07X035CX	**2,400**	**1,800**	57	**1,500**	10 U	**2,000**
	9/7/2007	IM-04-07X035DX	**11,000**	**7,700**	**300**	**5,800**	100 U	**7,900**
	9/26/2007	IM-04-07X035EX	**93**	**93**	20 U	**90**	10 U	**100**
	11/15/2007	IM-04-07X035FX	**540**	**350**	11	**350**	10 U	**250**
	2/18/2009	IM-04-07X-021809AX			**120**	**2,600**	250 U	**3,000**
	9/22/2009	IM-04-07X-092209AX	**1,300 D**	**1,200 D**	50	**820 D**	5 U	**760 D**
	6/3/2010	IM-04-07X-060310AX	**840 D**	**690 D**	**120**	**600 D**	0.92 J	**410 D**
	12/15/2010	IM-04-07X-121510AX	5 U	23	9	**28**	5 U	**69**
	5/24/2011	IM-04-07X-052411AX	63 B	38	11	**32**	5 U	26
	6/19/2012	IM-04-07X-061912AX	36	41	22	**28**	5 U	23
	8/20/2013	IM-04-07X-082013AX	62	**91**	56	**73**	5 U	**58**
	8/20/2014	IM-04-07A-082014AX	**76**	74	**60**	**61**	5 U	**50**
OM-00-46	12/8/2004	OM-00-46X031AX	*38.5*	*34.5*	*7.85*	***29***	*0.77*	***63.5***
	11/3/2005	OM-00-46X031BX	**720**	**1,400**	**140**	**1,600**	10 U	**2,700**
	11/28/2005	OM-00-46X031CX	**970**	**1,900**	**170**	**2,300**	10 U	**3,100**
	8/17/2006	OM-00-46X031DX	**2,300**	**2,500**	**160**	**2,600**	10 U	**3,700**
	1/3/2007	OM-00-46X031EX	**1,600**	**1,200**	85	**1,200**	10 U	**1,500**
	9/11/2007	OM-00-46X031FX	**8,900**	**3,700**	**260**	**4,700**	100 U	**4,400**
	9/26/2007	OM-00-46X031HA	**3,500**	**2,100**	**120**	**2,100**	100 U	**2,000**
	11/14/2007	OM-00-46X031KX	**1,900**	**1,700**	**91**	**1,600**	100 U	**2,000**
	2/18/2009	OM-01-46X-021809AX			85	**1,500**	71 U	**1,900**
	9/22/2009	OM-00-46X-092209AX	**3,300 D**	**2,400 D**	**100**	**1,700 D**	25 U	**2,200 D**
	6/3/2010	OM-01-46X-060310AX	**4,200 J**	**2,400 J**	**180**	**2,000 J**	3.4 J	**2,300 J**
	12/15/2010	OM-00-46X-121510AX	**3,300 D**	**2,400 D**	**150**	**1,700 D**	2.5 J	**2,100 D**
	5/25/2011	OM-00-46X-052511AX	**4,300 D**	**2,300 D**	**230 D**	**2,000 D**	3.7 J	**2,300 D**
	6/25/2012	OM-00-46X-062512AX	**1,900**	**1,100**	**480**	**930**	50 U	**1,300**
	8/21/2013	OM-00-46X-082113AX	**510**	**680**	**770**	**610**	50 U	**990 J**
	8/20/2014	OM-00-46X-082014AX	**140**	**270**	**330**	**250**	10 U	**580**
OM-01-50	12/9/2004	OM-00-50X011AX	20	**1,900**	17	**440**	1 U	8.5
	7/6/2005	OM-01-50X011AX	30	**5,500**	45	**1,500**	10 U	**88**
	9/9/2005	OM-01-50X013FX	40	**2,600**	27	**850**	10 U	29
	10/18/2005	OM-01-50X013GX	28	**2,400**	20	**700**	10 U	21
	12/5/2005	OM-01-50X013QX	16	**1,200**	14	**390**	1.2	31
	9/8/2006	OM-01-50X012AX	30	**1,700**	15	**450**	10 U	18
	9/27/2007	OM-01-50X012BX	13	**630**	6.2	**160**	1 U	3.7
	9/16/2009	OM-01-50X-091609AX	14 J	**1,300 D**	25 U	**300**	25 U	19 J
	12/14/2010	OM-01-50X-121410AX	5 U	**340 D**	5 U	**55**	5 U	3.8 U
	6/2/2011	OM-01-50X-060211AX	6.2 U	**480 D**	6.7	**140**	5 U	18
	6/20/2012	OM-01-50X-062012AX	8.4	**600**	5.5	**130**	5 U	24
	8/22/2013	OM-01-50X-082213AX	16 J	**510**	25 U	**120**	25 U	39 J
	8/20/2014	OM-01-50X-082014AX	8	**430**	5.7	**92**	5 U	41

Table 6
Historic Groundwater COC Concentrattions in Overburden Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
OM-01-51	12/8/2005	OM-01-51X036AX	*2 U*	*2.65*	*2 U*	*0.54*	*1 U*	*2 U*
	9/7/2006	OM-01-51X036BX	*2 U*	*2.5*	*2 U*	*2 U*	*1 U*	*2 U*
	9/28/2007	OM-01-51X036CX	*2 U*	*1.85*	*2 U*	*2 U*	*1 U*	*2 U*
	9/16/2009	OM-01-51X-091609AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/14/2010	OM-01-51X-121410AX	5 U	2.6 U	5 U	5 U	5 U	5 U
	6/2/2011	OM-01-51X-060211AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/20/2012	OM-01-51X-061912AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2013	OM-01-51X-082213AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/20/2014	OM-01-51A-082014AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-66	9/21/2006	OM-06-66X030AX	3.8	6.3	2	8.4	1 U	12
	9/27/2007	OM-06-66X030BX	35	33	6.5	**40**	0.77	34
	9/24/2009	OM-06-66X-092409AX	14 J	19 J	7.1 J	19 J	5 U	22 J
	12/15/2010	OM-06-66X-121510AX	5 U	10 U	6	27	5 U	8.3 U
	5/25/2011	OM-06-66X-052511AX	5 U	4.5 J	6.3	16	5 U	5.1
	6/19/2012	OM-06-66X-061912AX	5 U	2.7 J	3.2 J	9.4	5 U	3.1 J
	8/20/2013	OM-06-66X-082013AX	5 U	2.1 J	2.2 J	6.7	5 U	2.8 J
	8/20/2014	OM-06-66X-082014AX	5 U	3.1 J	2.2 J	6.4	5 U	2.8 J
OM-06-67	9/21/2006	OM-06-67X025AX	2 U	2 U	2 U	2 U	1 U	2 U
	9/26/2007	OM-06-67X025BX	0.7	2 U	2 U	0.55	1 U	2 U
	9/23/2009	OM-06-67X-092309AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/16/2010	OM-06-67X-121610AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/25/2011	OM-06-67X-052511AX	67 B	12	1.5 J	10	5 U	2.5 J
	6/19/2012	OM-06-67X-061912AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/20/2013	OM-06-67X-082013AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2014	OM-06-67X-082214AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-68	9/12/2006	OM-06-68X030AX	2 U	2 U	2 U	2 U	1 U	2.5
	9/27/2007	OM-06-68X030BX	3	15	2.3	16	1 U	38
	9/17/2009	OM-06-68X-091709AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/15/2010	OM-06-68X-121510AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/24/2011	OM-06-68X-052411AX	5 U	3.9 J	1.1 J	5.2	5 U	6.5
	6/19/2012	OM-06-68X-061912AX	7 J	1.1 J	5 U	1.3 J	5 U	0.79 J
	8/21/2013	OM-06-68X-082113AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2014	OM-06-68X-082214AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-69	9/7/2006	OM-06-69X022AX	2 U	3.8	2 U	2 U	1 U	1.1
	9/26/2007	OM-06-69X022BX	2 U	3.8	2 U	2 U	1 U	0.88
	9/23/2009	OM-06-69X-092309AX	5 U	12	2.9 J	12	5 U	24
	12/16/2010	OM-06-69X-121610AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/25/2011	OM-06-69X-052511AX	5 U	2.8 J	5 U	5 U	5 U	5 U
	6/22/2012	OM-06-69X-062212AX	0.41 J	1.3 J	5 U	0.45 J	5 U	0.75 J
	8/22/2013	OM-06-69X-082213AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/25/2014	OM-06-69X-082514AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-71	11/17/2006	OM-06-71X022AX	2 U	2 U	2 U	2 U	**12**	2 U
	10/3/2007	OM-06-71X022BX	2 U	2 U	2 U	0.71	**7.6**	2 U
	9/23/2009	OM-06-71X-092309AX	5 U	5 U	5 U	2.6 J	5 U	5 U
	12/14/2010	OM-06-71X-121410AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/27/2011	OM-06-71X-052711AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/20/2012	OM-06-71X-062012AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2013	OM-06-71X-082213AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/28/2014	OM-06-71X-082814AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-72	9/18/2006	OM-06-72X020AX	2 U	2 U	2 U	2 U	1 U	2 U
	10/1/2007	OM-06-72X020BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/17/2009	OM-06-72X-091709AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/16/2010	OM-06-72X-121610AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/27/2011	OM-06-72X-052711AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/25/2012	OM-06-72X-062512AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2013	OM-06-72X-082213AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/21/2014	OM-06-72X-082114AX	5 U	5 U	5 U	5 U	5 U	5 U

Table 6
Historic Groundwater COC Concentrattions in Overburden Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
OM-06-73	9/19/2006	OM-06-73X020AX	2 U	2 U	2 U	2 U	1 U	2 U
	10/1/2007	OM-06-73X020BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/16/2009	OM-06-73X-091609AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/20/2010	OM-06-73X-122010AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/27/2011	OM-06-73X-052711AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/25/2012	OM-06-73X-062512AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/20/2013	OM-06-73X-082013AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/21/2014	OM-06-73X-082114AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-74	9/19/2006	OM-06-74X010AX	*4.4*	*7.55*	*4.35*	*6.5*	*1 U*	*2.9*
	9/27/2007	OM-06-74X010BX	*2.3*	*5*	*2.95*	*4.3*	*1 U*	*2*
	9/18/2009	OM-06-74X-091809AX	3.5 U	10	4 J	18	5 U	9.1 U
	12/14/2010	OM-06-74X-121410	5 U	5 U	5 U	5 U	5 U	5 U
	5/24/2011	OM-06-74X-052411AX	20 U	5.2	1 J	4.5 J	5 U	1.1 J
	6/21/2012	OM-06-74X-062112AX	2.2 J	0.42 J	5 U	1 J	5 U	5 U
	8/20/2013	OM-06-74X-082013AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/25/2014	OM-06-74X-082514AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-06-75	9/15/2006	OM-06-75X010AX	2 U	2 U	2 U	2 U	1 U	2 U
	10/3/2007	OM-06-75X010DX	2 U	2 U	2 U	2 U	1 U	2 U
	9/24/2009	OM-06-75X-092409AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/14/2010	OM-06-75X-121410AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/26/2011	OM-06-75X-052611	5 U	5 U	5 U	5 U	5 U	5 U
	6/19/2012	OM-06-75X-061912AX	2.2 J	5 U	5 U	5 U	5 U	5 U
	8/21/2013	OM-06-75-082113AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/25/2014	OM-06-75X-082514AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-11-76	6/27/2012	OM-11-76X-062712AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/21/2013	OM-11-76X-08213AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/21/2014	OM-11-76X-082114AX	5 U	5 U	5 U	5 U	5 U	5 U
OM-11-77	6/27/2012	OM-11-77X-062712AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/21/2013	OM-11-77X-082113AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/26/2014	OM-11-77X-082614AX	5 U	5 U	5 U	5 U	5 U	5 U

Notes:
1. Concentrations and criteria are reported in micrograms per liter (µg/L).
2. U = below detection limit, J = quantitation approximate, D = sample diluted
3. GCL = Provisional Groundwater Cleanup Level, Table 9: Record of Decision Amendment, Eastland Woolen Mill Operable Unit I, September 2006.
4. A blank field indicates that the parameter was not analyzed during the specified monitoring round.
5. Results shown in **bold** indicate an exceedance of the OU1 Groundwater Cleanup Level (GCL). "NS" indicates no standard.
6. Results shown in *italic and underlined* indicate that the value is an average of a field sample and field duplicate results.

Table 7
2014 Bedrock Groundwater Sampling Results
Eastland Woolen Mill Superfund Site
Corinna, Maine

				Organic Sample Name:	A4CS0	A4CQ7	A4CQ8	A4CQ9	A4CR1	A4CR0	A4CZ5	A4CT8	A4CT9	A4CW2	A4CS9	A4CY1	A4CT3	A4CY6	A4CY4	A4CW9	A4CZ2	A4CY5	A4CR2	A4CR3	A4D13
				Inorganic Sample Name:	MA4CS0	MA4CQ7	MA4CQ8	MA4CQ9	MA4CR1	MA4CR0	MA4CZ5	MA4CT8	MA4CT9	MA4CW2	MA4CS9	MA4CY1	MA4CT3	MA4CY6	MA4CY4	MA4CW9	MA4CZ2	MA4CY5	MA4CR2	MA4CR3	MA4D13
				Sample Location:	BM-99-09	BM-99-10F	BM-99-10F	BM-99-10F	BM-99-10F	BM-99-10F	BM-04-37BPF1	BM-04-34BPF2	BM-04-34BPF2	BM-04-34BPF4	BM-04-40	BM-04-42	BM-04-43	BM-04-44	BM-04-45	BM-07-47	BM-07-48	BM-07-51	M18LT62F	M18LT62F	RB-04-07
				Station ID:	BM-99-09X-082214AX	BM-99-10FA-082114AX	BM-99-10FB-082114AX	BM-99-10FC-082114AX	BM-99-10FD-082114AD	BM-99-10FD-082114AX	BM-04-37BPF1X-082714AX	BM-04-34BPF2X-082614AX	BM-04-34BPF2X-082614AD	BM-04-34BPF4X-082614AX	BM-04-40X-082214AX	BM-06-42X-082714AX	BM-06-43X-082514AX	BM-06-44X-082714AX	BM-06-45X-082714AX	BM-07-47X-082614AX	BM-07-48X-082714AX	BM-07-51X-082714AX	M18-LOT-62FA-082114AX	M18-LOT-62FB-082114AX	RB-04-07AX-082914AX
				Sample Date:	8/22/2014	8/21/2014	8/21/2014	8/21/2014	8/21/2014	8/21/2014	8/27/2014	8/26/2014	8/26/2014	8/26/2014	8/22/2014	8/27/2014	8/25/2014	8/27/2014	8/27/2014	8/26/2014	8/27/2014	8/27/2014	8/21/2014	8/21/2014	8/29/2014
				Bedrock Well Type/Sample Interval (ft bgs):	BR-OB	BR-FW	BR-FW	BR-FW	BR-FW	BR-FW	BR-MW	BR-MW	BR-MW	BR-MW	BR-OB	BR-MW	BR-MW	BR-MW	BR-MW	BR-MW	BR-MW	BR-MW	BR-FW	BR-FW	BR-MW
Chemical	**Groundwater Quality Criteria**																								
	CRQL	**GCL**	**MEG**	**MCL**																					
Contaminants of Concern (COC) VOCs																									
1,2,4-Trichlorobenzene	5	70	70	70	5 U	5 U	5 U	5 U	5 U	5 UJ	**390**	**1,700**	**2,000**	5.0 U	5 U	5 U	5 U	**140 J**	5 U	5 U	5 UJ	**420**	5.0 U	5.0 U	170
1,2-Dichlorobenzene	5	85	200	600	5 U	6.5	5 U	5 U	5 U	5 UJ	**700**	**270 J**	**380 J**	15	5 U	5 U	5 U	**2,800**	5 U	27	42 J	**700**	5.0 U	2.8 J	180
1,3-Dichlorobenzene	5	85	1	NS	5 U	**4.6 J**	5 U	5 U	5 U	5 UJ	**210**	**26**	**29 J**	**4.9 J**	5 U	5 U	5 U	**1,300**	5 U	**1.8 J**	**27 J**	**54**	5.0 U	5.0 U	13
1,4-Dichlorobenzene	5	27	70	75	5 U	11	2.6 J	2.8 J	4.5 J	2.5 J	**710**	**220 J**	**310 J**	27	5 U	5 U	5 U	**4,000**	5 U	21	**59 J**	**550**	5.0 U	1.9 J	130
Benzene	5	5	4	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5	47	100	100	5 U	28	8.2	9.6	13	7.9 J	**1,000**	**100 J**	**170 J**	**54**	5 U	5 U	5 U	**12,000**	5 U	**270**	**190**	**840**	2.9 J	9.2	310
Daughter Product VOCs (DPVOCs)																									
1,1,2-Trichloroethane	5	NS	6	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5	NS	4	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Bromomethane	5	NS	10	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	3.7 J	5.0 U	5.0 U	5.0 U
Chloromethane	5	NS	20	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Other VOCs																									
1,1,1-Trichloroethane	5	NS	10,000	200	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5	NS	2	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5	NS	60	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5	NS	40	7	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 UJ	20 U	320	400 J	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 UJ	87	5.0 U	5.0 U	65
1,2-Dibromo-3-chloropropane	5	NS	0.40	0.20	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane	5	NS	0.20	0.05	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	NS	10	5	5 U	5 U	5 U	5 U	5 U	5 UJ	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
1,4-Dioxane	100	NS	4	NS	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.10 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.1 U	0.10 U	0.10 U	0.10 U
2-Butanone	10	NS	4,000	NS	10 U	10 U	10 U	10 U	10 U	10 U	40 U	50 U	100 UJ	10.0 U	10 U	10 U	10 U	500 U	10 U	10 U	10 U	20 U	10.0 U	10.0 U	10.0 U
2-Hexanone	10	NS	NS	NS	10 U	10 U	10 U	10 U	10 U	10 U	40 U	50 U	100 UJ	10.0 U	10 U	10 U	10 U	500 U	10 U	10 U	10 U	20 U	10.0 U	10.0 U	10.0 U
4-Methyl-2-pentanone	10	NS	500	NS	10 U	10 U	10 U	10 U	10 U	10 U	40 U	50 U	100 UJ	10.0 U	10 U	10 U	10 U	500 U	10 U	10 U	10 U	20 U	10.0 U	10.0 U	10.0 U
Acetone	10	NS	6,000	NS	10 U	10 U	10 U	10 U	10 U	10 U	40 U	50 U	100 UJ	10.0 U	10 U	10 U	10 U	500 U	10 U	10 U	10 U	20 U	10.0 U	10.0 U	6.9 J
Bromochloromethane	5	NS	100	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5	NS	6	NS	5 U	5 U	5 U	5 U	5 U	5 UJ	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Bromoform	5	NS	40	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	5	NS	600	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	5	NS	5	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Chloroethane	5	NS	7	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Chloroform	5	NS	70	80	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5	NS	10	70	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Cyclohexane	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 UJ	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	5	NS	4	80	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	5	NS	1,000	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5	NS	30	700	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
m,p-Xylene	5	NS	NS	10,000	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Methyl acetate	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Methyl tert-butyl ether	5	NS	35	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 UJ	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Methylene chloride	5	NS	40	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
o-Xylene	5	NS	NS	10,000	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Styrene	5	NS	100	100	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5	NS	40	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Toluene	5	NS	600	1,000	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	5	NS	100	100	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	5	NS	NS	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Trichloroethene	5	NS	4	5	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	5	NS	2,000	NS	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	5	NS	0.2	2	5 U	5 U	5 U	5 U	5 U	5 U	20 U	25 U	50 UJ	5.0 U	5 U	5 U	5 U	250 U	5 U	5 U	5 U	10 U	5.0 U	5.0 U	5.0 U
Inorganics																									
Arsenic	10	10	10	10	2.2 J	2.1 J	10.0 U	10.0 U	2.2 J	2.0 J	1.7 J	1.2 J	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	10.0 U	31	56	10.0 U
Manganese	15	200	500	NS	32	48	24	15 U	15 U	15 U	231	228	243	267	255	15 U	167	67	58	190	119	894	256	216	668
Iron (Total)	100	NS	5,000	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron (Dissolved)	100	NS	5,000	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:
Results and criteria are reported in micrograms per liter (µg/L)
U = below detection limit, J = quantitation approximate, R = results rejected
CRQL = Contract Required Quantitation Limit,
GCL = Provisional Groundwater Cleanup Level, Table 9: Record of Decision Amendment, Eastland Woolen Mill Operable Unit I, September 2006.
MEG = Maine Center for Disease Control Maximum Exposure Guideline, Updated October 19, 2012.
MCL = Maximum Contaminant Level: EPA's National Primary Drinking Water Regualtions, Updated April 2012.
BR-MW = bedrock monitoring well
BR-OB = bedrock open borehole
BR-FW = bedrock FLUTe well
NA = Not Analyzed
Bold and shaded indicates exceedance of GCL/MEG/MCL

Table 7
2014 Bedrock Groundwater Sampling Results
Eastland Woolen Mill Superfund Site
Corinna, Maine

				Organic Sample Name:	A4CQ3	A4CP7	A4D15	A4CN7	A4CN3	A4CM8	A4D11	A4CT4	A4CT0	A4CS3	A4CS1	A4CR5	A4CX0	A4CW7	A4CW3	A4CW5	A4CZ3	A4CY9	A4CY7	A4CY2	A4D02	A4D00
				Inorganic Sample Name:	MA4CQ3	MA4CP7		MA4CN7	MA4CN3	MA4CM8	MA4D11	MA4CT4	MA4CT0	MA4CS3	MA4CS1	MA4CR5	MA4CX0	MA4CW7	MA4CW3	MA4CW5	MA4CZ3	MA4CY9	MA4CY7	MA4CY2	MA4D00	MA4D02
				Sample Location:	BM-04-32						BM-04-35	BM-04-36						BM-07-49				BM-07-50			RB-04-01	
				Station ID:	BM-04-32E-082114AX	BM-04-32D-082014AX	BM-04-32C-082914AX	BM-04-32C-082014AX	BM-04-32B-082014AX	BM-04-32A-081914AX	BM-04-35A-082814AX	BM-04-36E-082514AX	BM-04-36D-082514AX	BM-04-36C-082214AX	BM-04-36B-082214AX	BM-04-36A-082114AX	BM-07-49C-082614AX	BM-07-49B-082614AX	BM-07-49A-082614AX	BM-07-49A-082614AD	BM-07-50D-082714AX	BM-07-50C-082714AX	BM-07-50B-082714AX	BM-07-50A-082714AX	RB-04-01A-082814AD	RB-04-01A-082814AX
				Sample Date:	8/20/2014	8/20/2014	8/29/2014	8/20/2014	8/20/2014	8/19/2014	8/28/2014	8/25/2014	8/25/2014	8/22/2014	8/22/2014	8/21/2014	8/26/2014	8/26/2014	8/26/2014	8/26/2014	8/27/2014	8/27/2014	8/27/2014	8/27/2014	8/28/2014	8/28/2014
				Bedrock Well Type/Sample Interval (ft bgs):	58-68	68-78	93-103	93-103	110-120	168-178	77-87	70-80	85-95	105-115	127-137	155-165	74-84	92-102	125-135	125-135	50-60	72-82	91-101	127-137	60-70	60-70
Chemical	**Groundwater Quality Criteria**																									
	CRQL	**GCL**	**MEG**	**MCL**																						
Contaminants of Concern (COC) VOCs																										
1,2,4-Trichlorobenzene	5	70	70	70	**650**	**710**	NA	**1,500**	**850**	**620**	**3,600**	**3,900**	**4,400**	**2,000**	**2,600**	**2,900**	5.0 U	5.0 U	10 U	10 U	41	59	44	**600**	**500**	**460 J**
1,2-Dichlorobenzene	5	85	200	600	**750**	**880**	NA	**1,400**	**970**	**730**	**2,000**	**4,000**	**3,300**	**1,900**	**2,400**	**2,500**	47	41	**130**	**110**	**230**	**430**	**490**	**1,600**	**640 J**	**570 J**
1,3-Dichlorobenzene	5	85	1	NS	**290**	**300**	NA	**260**	**220**	**230**	**140**	**250**	**180**	**170**	**250**	**180**	**8.5**	**7.1**	**23**	**21**	**87**	**140**	**150**	**330**	**22 J**	**78 J**
1,4-Dichlorobenzene	5	27	70	75	**730**	**790**	NA	**1,200**	**820**	**760**	**1,600**	**3,100**	**2,500**	**1,600**	**2,000**	**2,200**	**44**	**36**	**110**	**100**	**240**	**450**	**480**	**1,500**	**620 J**	**670 J**
Benzene	5	5	4	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Chlorobenzene	5	47	100	100	**1,200**	**1,300**	NA	**1,700**	**1,500**	**1,200**	**2,500**	**4,100**	**4,300**	**2,200**	**3,000**	**3,300**	**700**	**250**	**660**	**650**	**970**	**1,600**	**1,300**	**3,700**	**1,100 J**	**2,000 J**
Daughter Product VOCs (DPVOCs)																										
1,1,2-Trichloroethane	5	NS	6	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,2-Dichloroethane	5	NS	4	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Bromomethane	5	NS	10	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 UJ	20 U	20 U	50 U	5.0 U	25 U
Chloromethane	5	NS	20	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Other VOCs																										
1,1,1-Trichloroethane	5	NS	10,000	200	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,1,2,2-Tetrachloroethane	5	NS	2	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,1,2-Trichloro-1,2,2-	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,1-Dichloroethane	5	NS	60	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,1-Dichloroethene	5	NS	40	7	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,2,3-Trichlorobenzene	5	NS	NS	NS	53	63	NA	320	140	84	920	960	1,000	470	770	560	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	86	36 J	70 J
1,2-Dibromo-3-chloropropane	5	NS	0.40	0.20	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,2-Dibromoethane	5	NS	0.20	0.05	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,2-Dichloropropane	5	NS	10	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
1,4-Dioxane	100	NS	4	NS	0.10 U	0.10 U	0.10 U	NA	0.40 J	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 R	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U	0.10 U
2-Butanone	10	NS	4,000	NS	40 U	40 U	NA	50 U	50 U	50 U	100 U	200 U	200 U	100 U	100 U	50 U	10 U	10 U	20 U	20 U	20 U	40 U	40 U	100 U	10 U	50 U
2-Hexanone	10	NS	NS	NS	40 U	40 U	NA	50 U	50 U	50 U	100 U	200 U	200 U	100 U	100 U	50 U	10 U	10 U	20 U	20 U	20 U	40 U	40 U	100 U	10 U	50 U
4-Methyl-2-pentanone	10	NS	500	NS	40 U	40 U	NA	50 U	50 U	50 U	100 U	200 U	200 U	100 U	100 U	50 U	10 U	10 U	20 U	20 U	20 U	40 U	40 U	100 U	10 U	50 U
Acetone	10	NS	6,000	NS	40 U	40 U	NA	50 U	50 U	50 U	100 U	200 U	52 J	100 U	180	580	10 U	10 U	20 U	20 U	20 U	40 U	40 U	100 U	10 U	50 U
Bromochloromethane	5	NS	100	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Bromodichloromethane	5	NS	6	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Bromoform	5	NS	40	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Carbon disulfide	5	NS	600	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Carbon tetrachloride	5	NS	5	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Chloroethane	5	NS	7	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Chloroform	5	NS	70	80	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
cis-1,2-Dichloroethene	5	NS	10	70	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
cis-1,3-Dichloropropene	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Cyclohexane	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Dibromochloromethane	5	NS	4	80	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Dichlorodifluoromethane	5	NS	1,000	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Ethylbenzene	5	NS	30	700	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
isopropylbenzene	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
m,p-Xylene	5	NS	NS	10,000	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Methyl acetate	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Methyl tert-butyl ether	5	NS	35	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Methylcyclohexane	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Methylene chloride	5	NS	40	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	**14 J**	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
o-Xylene	5	NS	NS	10,000	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Styrene	5	NS	100	100	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Tetrachloroethene	5	NS	40	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Toluene	5	NS	600	1,000	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
trans-1,2-Dichloroethene	5	NS	100	100	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
trans-1,3-Dichloropropene	5	NS	NS	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Trichloroethene	5	NS	4	5	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Trichlorofluoromethane	5	NS	2,000	NS	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Vinyl chloride	5	NS	0.2	2	20 U	20 U	NA	25 U	25 U	25 U	50 U	100 U	100 U	50 U	50 U	25 U	5.0 U	5.0 U	10 U	10 U	10 U	20 U	20 U	50 U	5.0 U	25 U
Inorganics																										
Arsenic	10	10	10	10	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Manganese	15	200	500	NS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Iron (Total)	100	NS	5,000	NS	5,760	6,330		4,520	1,790	7,030	13,100 J	58,900	76,900	90,200	177,000	550,000	1,370	5,990	5,210	5,140	5,180	3,500	10,700	10,200	8,370 J	7,080 J
Iron (Dissolved)	100	NS	5,000	NS	448	462		996	645	3,950	2,600	47,700	69,800	77,000	178,000	889,000	367	307	291	351	410	228	625	296	215	325

Notes:
Results and criteria are reported in micrograms per liter (µg/L)
U = below detection limit, J = quantitation approximate, R = results rejected
CRQL = Contract Required Quantitation Limit,
GCL = Provisional Groundwater Cleanup Level, Table 9: Record of Decision Amendment, Eastla
MEG = Maine Center for Disease Control Maximum Exposure Guideline, Updated October 19, 2(
MCL = Maximum Contaminant Level: EPA's National Primary Drinking Water Regualtions, Upda
BR-MW = bedrock monitoring well
BR-OB = bedrock open borehole
BR-FW = bedrock FLUTe well
NA = Not Analyzed
Bold and shaded indicates exceedance of GCL/MEG/MCL

Table 8
Historic Groundwater COC Concentrations in Bedrock Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
BM-99-09	12/9/2004	BM-99-09X130AX	2 U	2 U	2 U	2 U	1 U	2 U
	12/2/2005	BM-99-09X130BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/7/2006	BM-99-09X130CX	2 U	2 U	2 U	2 U	1 U	2 U
	9/27/2007	BM-99-09X130DX	2 U	2 U	2 U	2 U	1 U	2 U
	9/15/2009	BM-99-09X-091509AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/14/2010	BM-99-09X-121410AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/24/2011	BM-99-09X-052411AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/28/2012	BM-99-09X-062812AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/27/2013	BM-99-09X-082713AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2014	BM-99-09X-082214AX	5 U	5 U	5 U	5 U	5 U	5 U
BM-99-10FA	9/16/2009	BM-99-10FA-091609AX	5 U	5 U	5 U	6.2	5 U	13 U
	6/2/2010	BM-99-10FA-060210AX	5 U	4.2 J	2 J	6.5	5 U	20
	12/21/2010	BM-99-10FA-122110AX	5 U	5 U	5 U	5 U	5 U	8.9 U
	5/25/2011	BM-99-10FA-052511AX	5 U	2.4 J	1.4 J	5.2	5 U	12
	6/26/2012	BM-99-10FA-062612AX	5 U	5 U	5 U	4.4 J	5 U	11
	8/20/2013	BM-99-10FA-082013AX	5 U	6.5	3.4 J	11	5 U	26
	8/21/2014	BM-99-10FA-082114AX	5 U	6.5	4.6 J	11	5 U	28
BM-99-10FB	9/16/2009	BM-99-10FB-091609AX	5 U	5 U	5 U	4.1 J	5 U	10 U
	6/2/2010	BM-99-10FB-060210AX	5 U	2 J	0.94 J	3.9 J	5 U	13
	12/21/2010	BM-99-10FB-122110AX	5 U	5 U	5 U	5 U	5 U	6.9 U
	5/25/2011	BM-99-10FB-052511AX	5 U	2.4 J	1.2 J	4.6 J	5 U	15
	6/26/2012	BM-99-10FB-062612AX	5 U	5 U	5 U	4.1 J	5 U	10
	8/20/2013	BM-99-10FB-082013AX	5 U	2.7 J	5 U	5.2	5 U	16
	8/21/2014	BM-99-10FB-082114AX	5 U	5 U	5 U	2.6 J	5 U	8.2
BM-99-10FC	9/16/2009	BM-99-10FC-091609AX	5 U	5 U	5 U	5 U	5 U	6.7 U
	12/21/2010	BM-99-10FC-122110AX	5 U	5 U	5 U	5 U	5 U	7.1 U
	5/25/2011	BM-99-10FC-052511AX	5 U	1.4 J	5 U	3.1 J	5 U	11
	6/26/2012	BM-99-10FC-062612AX	5 U	1.7 J	5 U	3.5 J	5 U	11
	8/20/2013	BM-99-10FC-082013AX	5 U	2.7 J	5 U	5.3	5 U	15
	8/21/2014	BM-99-10FC-082114AX	5 U	5 U	5 U	2.8 J	5 U	9.6
BM-99-10FD	9/16/2009	BM-99-10FD-091609AX	5 U	5 U	5 U	2.7 J	5 U	7.6 U
	12/21/2010	BM-99-10FD-122110AX	*5 U*	*5 U*	*5 U*	*5 U*		*6.4 U*
	5/25/2011	BM-99-10FD-052511AX	5 U	1.8 J	0.98 J	3.5 J	5 U	10
	6/26/2012	BM-99-10FD-062612AX	5 U	5 U	5 U	5 U	5 U	11
	8/20/2013	BM-99-10FD-082013AX	5 U	2.4 J	5 U	5.5	5 U	17
	8/21/2014	BM-99-10FD-082114AX	*5 U*	*5 U*	*5 U*	*3.5 J*	*5 U*	*10.5*
BM-04-32 (58-68 ft)	8/24/2004	BM-04-32X058AX	**1,500**	**2,300**	69	**1,800**	100 U	**4,700**
	6/27/2012	BM-04-32E-062712AX	**3,900**	**3,300**	**550**	**2,600**	200 U	**4,000**
	8/27/2013	BM-04-32E-082713AX	**2,000**	**2,100**	**500**	**1,800**	20 U	**2,800**
	8/20/2014	BM-04-32E-082114AX	**650**	**750**	**290**	**730**	20 U	**1,200**
BM-04-32 (68-78 ft)	8/23/2004	BM-04-32X068AX	**1,100**	**1,600**	200 U	**1,200**	100 U	**3,400**
	6/26/2012	BM-04-32D-062612AX	**4,500**	**3,700**	**500**	**3,000**	200 U	**4,400**
	8/27/2013	BM-04-32D-082713AX	***2,200***	***2,300***	***475***	***1,700***	*50 U*	***2,950***
	8/20/2014	BM-04-32D-082014AX	**710**	**880**	**300**	**790**	20 U	**1,300**
BM-04-32 (93-103 ft)	8/23/2004	BM-04-32X093AX	**880**	**1,400**	200 U	**1,000**	100 U	**3,100**
	6/26/2012	BM-04-32C-062612AX	***5,600***	***4,450***	***435***	***3,500***	*200 U*	***4,900***
	8/27/2013	BM-04-32C-082713AX	**6,300**	**4,500**	**370**	**3,300**	50 U	**4,400**
	8/20/2014	BM-04-32C-082014AX	**1,500**	**1,400**	**260**	**1,200**	25 U	**1,700**
BM-04-32 (110-120 ft)	8/20/2004	BM-04-32X110BX	**2,100**	**3,400**	**100**	**2,600**	100 U	**7,800**
	9/7/2006	BM-04-32X110CX	**1,600**	**1,400**	68	**1,300**	10 U	**2,200**
	9/26/2007	BM-04-32X110DX	**4,000**	**4,900**	**220**	**4,600**	100 U	**6,300**
	6/26/2012	BM-04-32B-062612AX	**9,400**	**7,900**	**370 J**	**5,900**	500 U	**8,400**
	8/26/2013	BM-04-32B-082613AX	**4,100 J**	**4,300 J**	**260**	**2,900 J**	50 U	**4,900 J**
	8/20/2014	BM-04-32B-082014AX	**850**	**970**	**220**	**820**	25 U	**1,500**
BM-04-32 (168-178 ft)	8/20/2004	BM-04-32X168AX	**140**	**240**	8.5	**200**	10 U	**880**
	6/25/2012	BM-04-32A-062512AX	**3,100**	**3,600**	**620**	**3,300**	100 U	**4,000**
	8/26/2013	BM-04-32A-082613AX	**780**	**880**	**200**	**890**	40 U	**2,300**
	8/19/2014	BM-04-32A-081914AX	**620**	**730**	**230**	**760**	25 U	**1,200**
BM-04-32	6/8/2010	BM-04-32X-060810AX	**1,700 D**	**1,600 D**	**290**	**1,400 D**	2.4 J	**2,100 J**

Table 8
Historic Groundwater COC Concentrations in Bedrock Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
BM-04-34	8/10/2004	BM-04-34X136AX	**2,500**	**3,700**	**130**	**3,300**	13	**12,000**
		BM-04-34X189AX	**2,200**	**3,900**	**120**	**3,400**	18	**14,000**
	8/11/2004	BM-04-34X074AX	**5,300**	**5,500**	**190**	**4,600**	12	**12,000**
		BM-04-34X092AX	**4,500**	**4,900**	**170**	**4,300**	9.6	**11,000**
		BM-04-34X124AX	**3,800**	**3,500**	**130**	**3,100**	9.3	**8,200**
	8/12/2004	BM-04-34X054AX	**14,000**	**9,700**	**390**	**7,700**	12	**14,000**
	8/29/2006	BM-04-34X054BX	**1,900**	**2,900**	80	**1,900**	12	**11,000**
		BM-04-34X074BX	**990**	**2,200**	66	**1,600**	10 U	**9,300**
		BM-04-34X092BX	**1,300**	**3,000**	92	**2,300**	10	**11,000**
	11/10/2006	BM-04-34X074CX	***4,750***	***4,250***	***135***	***3,850***	***5.85***	***8,600***
	8/10/2007	BM-04-34X080AX	**13,000**	**10,000**	**410**	**8,500**	100 U	**14,000**
	8/23/2007	BM-34-13350823	**4,000**	**2,200**	**86**	**2,100**	100 U	**2,000**
		BM-34-16050823	**2,900**	**2,200**	**86**	**2,000**	100 U	**3,100**
		BM-34-18370823	**2,400**	**2,200**	**86**	**2,000**	100 U	**3,700**
		BM-34-21290823	**1,600**	**2,100**	84	**1,900**	100 U	**3,900**
	8/24/2007	BM-34-00300824	**1,500**	**2,100**	73	**1,900**	100 U	**4,200**
		BM-34-03400824	**2,000**	**2,800**	**110**	**2,500**	100 U	**5,400**
		BM-34-06250824	**2,100**	**2,800**	**100**	**2,500**	100 U	**5,800**
		BM-34-09100824	**2,100**	**2,800**	**110**	**2,600**	100 U	**5,400**
		BM-34-12450824	**2,800**	**3,600**	**140**	**3,200**	100 U	**7,100**
	8/27/2007	BM-34-14300827	**4,600**	**4,100**	**160**	**4,000**	100 U	**6,300**
	9/25/2007	BM-04-34X074IX	**8,100**	**7,800**	**320**	**7,500**	100 U	**12,000**
	9/26/2007	BM-04-34X054CX	**10,000**	**8,000**	**320**	**7,300**	100 U	**12,000**
	10/15/2007	BM-04-34X074JX	**9,100**	**7,500**	**320**	**6,800**	100 U	**11,000**
	2/18/2009	BM-04-34X-021809AX	**370**	**260**	16	**300**	5 U	**370**
	9/22/2009	BM-04-34X-092209AX	5 U	6.2	5 U	3.7 J	4.7 J	8.9
	6/4/2010	BM-04-34X-060410AX	**3,000 D**	**1,200 D**	63	**1,100 D**	5 U	**440 D**
	12/16/2010	BM-04-34X-121610AX	***4,750 D***	***2,400 D***	*66.5*	***1,800 D***	*5 U*	***1,150 D***
	5/26/2011	BM-04-34X-052611AX	***1,900 D***	***615 D***	*41.5*	***665 D***	*5 U*	***240 D***
	6/26/2012	BM-04-34BPF2X-062612AX	***300***	*22*	*6.45*	***27.5***	*5 U*	*8.25*
		BM-04-34BPF4X-062612AX	5 U	5 U	5 U	5 U	5 U	5 U
BM-04-34BPF2	8/21/2013	BM-04-34BPF2X-082113AX	***630***	***185***		***160***	*50 U*	*21.5 J*
	8/26/2014	BM-04-34BPF2X-082614AX	***1,850***	***325***	*27.5*	***265***	*25 U*	***135 J***
BM-04-34BPF4	8/21/2013	BM-04-34BPF4X-082113AX	**610**	**650**	**110**	**650**	50 U	**1,100**
	8/26/2014	BM-04-34BPF4X-082614AX	5 U	15	4.9 J	27	5 U	**54**
BM-04-36 (70-80 ft)	8/19/2004	BM-04-36X070AX	**4,000**	**3,500**	**160**	**3,000**	100 U	**5,500**
	6/20/2012	BM-04-36F-062012AX	**620**	**620**	**180**	**570**	25 U	**980**
	8/21/2013	BM-04-36F-082113AX	**3,900**	**3,100**	**380**	**2,800**	200 U	**3,500 J**
	8/25/2014	BM-04-36E-082514AX	**3,900**	**4,000**	**250**	**3,100**	100 U	**4,100**
BM-04-36 (85-95 ft)	8/19/2004	BM-04-36X085AX	**5,000**	**4,400**	**200**	**3,600**	100 U	**6,600**
	6/20/2012	BM-04-36D-062012AX	***895***	***1,040***	***525***	***960***	*3.4 J*	***1,750***
	8/21/2013	BM-04-36D-082113AX	**14,000**	**8,900**	**550**	**7,200**	500 U	**10,000 J**
	8/25/2014	BM-04-36D-082514AX	**4,400**	**3,300**	**180**	**2,500**	100 U	**4,300**
BM-04-36 (105-115 ft)	8/19/2004	BM-04-36X105AX	**4,300**	**4,000**	**190**	**3,300**	100 U	**6,200**
	6/20/2012	BM-04-36C-062012AX	**710**	**970**	100 U	**900**	100 U	**1,500 J**
	8/21/2013	BM-04-36C-082113AX	***9,150***	***6,350***	***500***	***5,300***	*250 U*	***7,250 J***
	8/22/2014	BM-04-36C-082214AX	**2,000**	**1,900**	**170**	**1,600**	50 U	**2,200**
BM-04-36 (127-137 ft)	8/18/2004	BM-04-36X127AX	**3,300**	**2,900**	**140**	**2,500**	100 U	**4,800**
	6/19/2012	BM-04-36B-061912AX	**370**	**360**	70 J	**340**	250 U	**380**
	8/20/2013	BM-04-36B-082013AX	**5,600**	**3,600**	**430**	**3,700**	100 U	**4,500**
	8/22/2014	BM-04-36B-082214AX	**2,600**	**2,400**	**250**	**2,000**	50 U	**3,000**
BM-04-36 (155-165 ft)	8/18/2004	BM-04-36X155AX	**3,100**	**2,800**	**120**	**2,500**	100 U	**4,800**
	6/19/2012	BM-04-36A-061912AX	**590**	**860**	**410**	**830**	100 U	**1,400**
	8/20/2013	BM-04-36A-082013AX	**3,400**	**2,800**	**280**	**2,500**	3.6 J	**3,100**
	8/21/2014	BM-04-36A-082114AX	**2,900**	**2,500**	**180**	**2,200**	25 U	**3,300**
BM-04-36	6/30/2004	BM-04-36X059AX	***960***	***565***	*25*	***460***	*25 U*	***780***
	6/30/2004	BM-04-36X075AX	**740**	**840**	44	**660**	25 U	**1,500**
	6/30/2004	BM-04-36X092AX	**580**	**320**	50 U	**240**	25 U	**490**
	6/8/2010	BM-04-36X-060810AX	**160**	**130**	100 U	**140**	**11 J**	**150**

Table 8
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Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
BM-04-37	7/30/2004	BM-04-37X054AX	**4,300**	**4,400**	**200**	**3,700**	**6.3**	**6,500**
	8/2/2004	BM-04-37X081AX	**6,900**	**5,800**	**250**	**4,800**	**7.8**	**8,300**
		BM-04-37X127AX	**6,300**	**6,200**	**330**	**5,300**	**11**	**9,500**
	8/3/2004	BM-04-37X154AX	**6,100**	**10,000**	**320**	**8,300**	**18**	**23,000**
		BM-04-37X202BX	**5,900**	**11,000**	**330**	**8,900**	**20**	**27,000**
	8/4/2004	BM-04-37X237AX	**900**	**2,200**	62	**1,600**	**16**	**11,000**
	12/8/2005	BM-04-37X230AX	**3,500**	**7,400**	**240**	**6,100**	**12**	**18,000**
	8/25/2006	BM-04-37X081BX	**1,100**	**3,200**	**87.5**	**2,000**	**8.35**	**11,000**
		BM-04-37X154BX	**2,100**	**4,300**	**120**	**2,900**	**12**	**15,000**
	11/10/2006	BM-04-37X154CX	**3,100**	**5,500**	**170**	**4,400**	**6.3**	**12,000**
	8/21/2007	BM-04-37X085BX	**3,600**	**2,850**	**135**	**3,050**	100 U	**3,450**
	8/31/2007	BM-37-07000831	**240**	**220**	14	**480**	10 U	**260**
		BM-37-09000831	**430**	**370**	20	**740**	10 U	**420**
		BM-37-11000831	**1,400**	**870**	51	**1,800**	10 U	**890**
		BM-37-15000831	**1,600**	**920**	54	**1,600**	10 U	**1,000**
		BM-37-19000831	**1,800**	**940**	57	**1,600**	10 U	**1,000**
		BM-37-20000831	**1,600**	**790**	50	**1,400**	10 U	**870**
		BM-37-22000831	**2,200**	**1,200**	70	**2,000**	10 U	**1,300**
	9/1/2007	BM-37-02000901	**2,300**	**1,300**	81	**2,100**	10 U	**1,600**
		BM-37-04000901	**2,700**	**1,500**	**92**	**2,400**	10 U	**1,800**
	9/25/2007	BM-04-37X085EX	**2,900**	**1,850**	**105**	**2,450**	100 U	**2,500**
	9/26/2007	BM-04-37X154DX	**3,000**	**1,900**	**120**	**2,400**	3	**2,600**
	10/15/2007	BM-04-37X080CX	**1,800**	**1,500**	71	**1,500**	10 U	**1,900**
BM-04-37	10/17/2007	BM-07-51X080GX	**10,000**	**4,800**	**200**	**4,500**	10 U	**4,400**
	2/18/2009	BM-04-37X-021809AX	4.7	2.7	5 U	2.9	5 U	2.8
	9/23/2009	BM-04-37X-092309AX	5.7 U	12	2.6 J	11	5 U	22
	6/4/2010	BM-04-37X-060410AX	**2,250 D**	**1,850 D**	**345 D**	**1,950 D**	3.9 J	**2,500 D**
	12/16/2010	BM-04-37X-121610AX	**99**	**86**	11	**85**	5 U	**110**
	5/25/2011	BM-04-37X-052511AX	**1,600 D**	**1,800 D**	**240 D**	**1,800 D**	3.4 J	**2,600 D**
	6/26/2012	BM-04-37BPF1X-062612AX	5 U	5 U	5 U	1.2 J	5 U	5 U
BM-04-37BPF1	8/26/2013	BM-04-37BPF1X-082613AX	**300**	**610**	**350**	**750**	50 U	**930**
	8/27/2014	BM-04-37BPF1X-082714AX	**390**	**700**	**210**	**710**	20 U	**1,000**
BM-04-40	12/6/2005	BM-04-40X150AX	2 U	0.84	2 U	2 U	1 U	2 U
	9/7/2006	BM-04-40X140AX	2 U	2 U	2 U	2 U	1 U	2 U
	9/27/2007	BM-04-40X140BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/15/2009	BM-07-40X-091509AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/15/2010	BM-04-40X-121510AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/24/2011	BM-04-40X-052411AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/28/2012	BM-04-40X-062812AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/27/2013	BM-04-40X-082713AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2014	BM-04-40X-082214AX	5 U	5 U	5 U	5 U	5 U	5 U
BM-06-42	9/14/2006	BM-06-42X022AX	2 U	2 U	2 U	2 U	1 U	2 U
	10/3/2007	BM-06-42X022BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/15/2009	BM-06-42X-091809AX	8.7 U	6.1 J	5 U	5 J	5 U	6.1 U
	3/3/2010	BM-06-42X-030310AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/15/2010	BM-06-42X-121510AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/2/2011	BM-06-42X-060211AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/26/2012	BM-06-42X-062612AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/22/2013	BM-06-42X-082213AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/27/2014	BM-06-42X-082714AX	5 U	5 U	5 U	5 U	5 U	5 U
BM-06-43	9/14/2006	BM-06-43X190AX	9.8	35	0.66	20	1 U	**59**
	10/2/2007	BM-06-43X190BX	5.2	25	2 U	11	1 U	35
	9/17/2009	BM-06-43X-091709AX	**5,200 D**	**2,800 D**	84 J	**2,400 D**	5 U	**1,000 D**
	3/2/2010	BM-06-43X-030210AX	*1.75 J*	*9.1*	*5 U*	*3.15 J*	***5.95***	*14.5*
	6/9/2010	BM-06-43X-060910AX	5 U	8.8 U	5 U	5 U	4.5 J	13
	12/15/2010	BM-06-43X-121510AX	5 U	7.1	5 U	2.8 J	4.7 J	9.5
	5/26/2011	BM-06-43X-052611AX	5 U	2.3 J	5 U	1.7 J	5 U	3.1 J
	6/21/2012	BM-06-43X-062112AX	5 U	2.3 J	5 U	1.6 J	1.7 J	3.5 J
	8/21/2013	BM-06-43X-082113AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/25/2014	BM-06-43X-082514AX	5 U	5 U	5 U	5 U	5 U	5 U

Table 8
Historic Groundwater COC Concentrations in Bedrock Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
BM-06-44	9/20/2006	BM-06-44X140AX	**3,000**	**4,200**	**130**	**2,900**	**6.6**	**7,100**
	2/20/2007	BM-06-44X140BX	29	74	20 U	**60**	10 U	**230**
	2/26/2007	BM-06-44X140CX	**2,200**	**4,300**	**170**	**4,000**	**13**	**15,000**
	9/28/2007	BM-06-44X140BA	**860**	**3,800**	**660**	**3,300**	**28**	**19,000**
	9/15/2009	BM-07-44X-091509AX	50	**170**	55	**160**	10 U	**930 D**
	12/16/2010	BM-06-44X-121610AX	**200 D**	**1,800 D**	**790 D**	**2,200 D**	**9.6**	**6,800 D**
	6/1/2011	BM-06-44X-060111AX	**200 J**	**2,600 D**	**1,000 D**	**2,900 D**	**22**	**9,500 D**
	6/22/2012	BM-06-44X-062212AX	**86 J**	**2,300**	**1,200**	**3,100**	**14 J**	**13,000 J**
	8/21/2013	BM-06-44X-082113AX	500 U	**1,700**	**1,400**	**4,200**	500 U	**17,000 J**
	8/27/2014	BM-06-44X-082714AX	**140 J**	**2,800**	**1,300**	**4,000**	250 U	**12,000**
BM-07-45	9/13/2006	BM-06-45X190AX	2 U	2 U	2 U	2 U	1 U	2 U
	9/28/2007	BM-06-45X190BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/17/2009	BM-07-45X-091709AX	5 U	5 U	5 U	5 U	5 U	5 U
	12/14/2010	BM-06-45X-121410AX	5 U	5 U	5 U	5 U	5 U	5 U
	5/26/2011	BM-06-45X-052611AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/21/2012	BM-06-45X-062112AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/20/2013	BM-06-45X-082013AX	5 U	5 U	5 U	5 U	5 U	5 U
	8/27/2014	BM-06-45X-082714AX	5 U	5 U	5 U	5 U	5 U	5 U
BM-07-47	8/7/2007	BM-07-47X155AX	20 U	**86**	5.6	**72**	10 U	**760**
	8/8/2007	BM-07-47X120AX	12	72	20 U	**59**	10 U	**620**
	8/9/2007	BM-07-47X069AX	17	69	20 U	**56**	10 U	**530**
		BM-07-47X097AX	23	75	20 U	**62**	10 U	**600**
	10/4/2007	BM-07-47X155BX	20 U	74	20 U	**68**	10 U	**780**
	9/17/2009	BM-07-47X-091709AX	5 U	37	5 U	**30**	5 U	**230 D**
	6/9/2010	BM-07-47X-060910AX	6.1	63	5.7	**53**	1.8 J	**690 D**
	12/14/2010	BM-07-47X-121410AX	25 U	66	25 U	**44**	25 U	**690**
	5/31/2011	BM-07-47X-053111AX	5 U	34	2.9 J	**29**	5 U	**270 D**
	6/26/2012	BM-07-47X-062612AX	5 U	13	5 U	10	0.64 J	**94**
	8/22/2013	BM-07-47X-082213AX	12 J	79	25 U	**64**	25 U	**840 J**
	8/26/2014	BM-07-47X-082614AX	5 U	27	1.8 J	21	5 U	**270**
BM-07-48	8/15/2007	BM-07-48X093AX	**170**	**290**	46	**250**	10 U	**580**
		BM-07-48X129AX	***165***	***265***	*47*	***235***	*10 U*	***535***
	8/16/2007	BM-07-48X063AX	**200**	**430**	63	**400**	10 U	**920**
		BM-07-48X080AX	**210**	**350**	46	**290**	10 U	**650**
	8/22/2007	BM-07-48X063BX	**180**	**300**	36	**250**	10 U	**590**
		BM-07-48X063CX	**160**	**260**	31	**220**	10 U	**490**
		BM-07-48X063DX	**150**	**250**	30	**200**	10 U	**470**
		BM-07-48X063EX	**200**	**310**	40	**260**	10 U	**610**
	10/4/2007	BM-07-48X063FX	**190**	**260**	58	**230**	1 U	**540**
	9/15/2009	BM-07-48X-091509AX	28	**120**	50	**120**	3.6 J	**270 D**
	6/9/2010	BM-07-48X-060910AX	**120**	**200**	62	**180**	0.68 J	**510 D**
	12/14/2010	BM-07-48X-121410AX	69	**240**	47	**180**	13 U	**460**
	6/1/2011	BM-07-48X-060111AX	57 B	**170**	65	**160**	5 U	
	6/22/2012	BM-07-48X-062212AX	8.5	**90**	53	**100**	0.46 J	**390**
	8/20/2013	BM-07-48X-082013AX	35	**120**	51	**110**	10 U	**380**
	8/27/2014	BM-07-48X-082714AX	5 U	42 J	27 J	**59 J**	5 U	**190**
BM-07-49 (74-84 ft)	8/14/2007	BM-07-49X074AX	**1,200**	**2,100**	71	**1,500**	100 U	**3,600**
	6/21/2012	BM-07-49C-062112AX	21	**95**	19	**110**	10 U	**360**
	8/23/2013	BM-07-49C-082313AX	13 J	**240 J**	43 J	**220 J**	25 U	**1,200 J**
	8/26/2014	BM-07-49C-082614AX	5 U	**47**	8.5	**44**	5 U	**700**
BM-07-49 (92-102 ft)	8/13/2007	BM-07-49X092AX	**1,300**	**2,400**	82	**1,700**	100 U	**4,100**
	6/21/2012	BM-07-49B-062112AX	17 J	**200**	39 J	**210**	50 U	**1,100**
	8/22/2013	BM-07-49B-082213AX	14	**230**	45	**220**	5 U	**1,300**
	8/26/2014	BM-07-49B-082614AX	5 U	41	7.1	**36**	5 U	**250**
BM-07-49 (125-135 ft)	8/10/2007	BM-07-49X125AX	**2,100**	**3,300**	**120**	**2,500**	100 U	**5,000**
	10/4/2007	BM-07-49X125BX	**700**	**1,300**	65	**970**	2.6	**2,800**
	6/21/2012	BM-07-49A-062112AX	58 J	**240 J**	48 J	**230 J**	50 U	**1,200 J**
	8/22/2013	BM-07-49A-082213AX	50 U	**200**	40 J	**190**	50 U	**1,200 J**
	8/26/2014	BM-07-49A-082614AX	*10 U*	***120***	*22*	***105***	*10 U*	***655***

Table 8
Historic Groundwater COC Concentrations in Bedrock Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
BM-07-49	8/14/2007	BM-07-49X048AX	**1,100**	**2,000**	70	**1,500**	100 U	**3,800**
	9/15/2009	BM-07-49X-091509AX	4.8 J	**160**	23	**160**	5 U	**930 D**
	6/9/2010	BM-07-49X-060910AX	44	**350 J**	61	**340 J**	2.8 J	**1,300 J**
	12/15/2010	BM-07-49X-121510AX	24	**350 D**	45	**280 D**	5 U	**1,600 D**
	6/1/2011	BM-07-49X-060111AX	24 B	58 D	64	**57 D**	2.2 J	**300 D**
BM-07-50 (50-60 ft)	8/21/2007	BM-07-50X050AX	**940**	**1,900**	**98**	**1,800**	100 U	**5,700**
	8/22/2007	BM-07-50X050BX	**490**	**1,200**	66	**1,000**	100 U	**4,100**
	8/22/2007	BM-07-50X050CX	**380**	**980**	200 U	**860**	100 U	**3,400**
	8/22/2007	BM-07-50X050DX	**550**	**1,200**	55	**1,000**	100 U	**3,700**
	6/28/2012	BM-07-50D-062812AX	17	29	4.6 J	**34**	5 U	41
	8/29/2013	BM-07-50D-082913AX	9	47	12	**69**	5 U	**120**
	8/27/2014	BM-07-50D-082714AX	41	**230**	**87**	**240**	10 U	**970**
BM-07-50 (72-82 ft)	8/20/2007	BM-07-50X072AX	***585***	***1,200***	*59*	***1,050***	*100 U*	***3,850***
	6/28/2012	BM-07-50C-062812AX	14	34	5.1	**45**	5 U	**62**
	8/28/2013	BM-07-50C-082813AX	7.1	84	22	**110**	5 U	**290**
	8/27/2014	BM-07-50C-082714AX	59	**430**	**140**	**450**	20 U	**1,600**
BM-07-50 (91-101 ft)	8/20/2007	BM-07-50X091AX	**610**	**1,400**	82	**1,300**	100 U	**4,500**
	6/28/2012	BM-07-50B-062812AX	12	31	6.4	**48**	5 U	**60**
	8/28/2013	BM-07-50B-082813AX	9.3	**95**	26	**140**	5 U	**210**
	8/27/2014	BM-07-50B-082714AX	44	**490**	**150**	**480**	20 U	**1,300**
BM-07-50 (127-137 ft)	8/17/2007	BM-07-50X127AX	**3,000**	**5,900**	**250**	**5,700**	100 U	**16,000**
	10/4/2007	BM-07-50X127BD	**2,100**	**4,000**	**220**	**3,900**	**5.6**	**11,000**
	10/4/2007	BM-07-50X127CX	**2,500**	**4,200**	**210**	**4,000**	**5.4**	**11,000**
	6/27/2012	BM-07-50A-062712AX	**360**	**650**	**97**	**790**	50 U	**1,300**
	8/28/2013	BM-07-50A-082813AX	**670**	**2,400**	**530**	**2,400**	250 U	**7,400**
	8/27/2014	BM-07-50A-082714AX	**600**	**1,600**	**330**	**1,500**	50 U	**3,700**
BM-07-50	9/15/2009	BM-07-50X-091509AX	5 U	**190**	59	**320 D**	5 U	**810 D**
	6/9/2010	BM-07-50X-060910AX	5 U	16	5.3	**30**	5 U	18
	12/16/2010	BM-07-50X-121610AX	5 U	28	6.4	**55**	5 U	35
	6/1/2011	BM-07-50X-060111AX	*5 U*	*9.5 U*	*3.3 J*	*17.5*	*5 U*	*9.1 U*
BM-07-51	8/21/2007	BM-07-51X085AX	**13,000**	**7,100**	**270**	**6,000**	100 U	**7,000**
	8/28/2007	BM-51-13450828	**160**	**190**	20 U	**510**	10 U	**110**
		BM-51-16000828	**240**	**220**	20 U	**520**	10 U	**91**
		BM-51-18000828	**2,600**	**1,500**	200 U	**1,800**	100 U	**850**
		BM-51-19000828	**3,600**	**2,100**	79	**2,200**	100 U	**1,500**
		BM-51-20000828	**4,400**	**2,500**	**93**	**2,500**	100 U	**1,700**
BM-07-51	8/29/2007	BM-51-02170829	**4,500**	**2,000**	79	**2,100**	100 U	**1,500**
		BM-51-06000829	**5,100**	**2,800**	**120**	**3,000**	100 U	**2,000**
		BM-51-10000829	**5,300**	**2,700**	**120**	**2,900**	100 U	**2,000**
		BM-51-12100829	**3,700**	**2,200**	83	**2,200**	100 U	**1,600**
	9/25/2007	BM-07-51X085CX	**6,200**	**2,500**	**94**	**2,700**	100 U	**1,600**
	2/17/2009	BM-04-51X-021709AX	**3,700**	**2,100**	**110**	**2,000**	2.2	**1,900**
	6/4/2010	BM-07-51X-060410AX	**4,100 D**	**3,000 D**	**170**	**2,500 D**	20 U	**3,200 D**
	6/28/2012	BM-07-51X-062812AX	**420**	**230**	12 J	**190**	20 U	**190**
	8/26/2013	BM-07-51X-082613AX	***445***	***820***	*46.5*	***625***	*25 U*	***1,350***
	8/27/2014	BM-07-51X-082714AX	**420**	**700**	54	**550**	10 U	**840**
M18LT62F	12/7/2004	M18LT062F045AX	0.52	0.83	2 U	0.76	1 U	2
		M18LT062F085AX	0.6	1.1	2 U	0.86	1 U	3.3
		M18LT062F122AX	2 U	2 U	2 U	2 U	1 U	2 U
	12/7/2005	M18LT062F045BX	0.57	0.54	2 U	0.66	1 U	1.2
		M18LT062F085BX		*1.5*	*2 U*	*0.99*	*1 U*	*4.85*
		M18LT062F122BX	2 U	2 U	2 U	2 U	1 U	2 U
	9/8/2006	M18LT062F045CX	2 U	0.65	2 U	0.68	1 U	1.4
		M18LT062F085CX	2 U	2 U	2 U	2 U	1 U	1.2
		M18LT062F122CX	2 U	2 U	2 U	2 U	1 U	2 U
	10/3/2007	M18LT062F045DX	1.5	2 U	2 U	0.6	1 U	1.3
		M18LT062F085DX	2 U	2 U	2 U	2 U	1 U	1.4
		M18LT062F122DX	2 U	2 U	2 U	2 U	1 U	2 U
	9/16/2009	M18LT62FA-091609AX	5 U	5 U	5 U	5 U	5 U	5 U
		M18LT62FB-091609AX	5 U	5 U	5 U	5 U	5 U	5 U
		M18LT62FC-091609AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/2/2010	M18L62FA-060210AX	5 U	0.79 J	5 U	0.82 J	5 U	3.7 J
	12/17/2010	MAP18-LOT-62FA-	5 U	5 U	5 U	5 U	5 U	5 U
		MAP18-LOT-62FB-	5 U	5 U	5 U	5 U	5 U	5 U
		MAP18-LOT-62FC-	5 U	5 U	5 U	5 U	5 U	5 U

Table 8
Historic Groundwater COC Concentrations in Bedrock Groundwater
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Contaminants of Concern (COC) VOCs					
Sample Location	**Sample Date**	**Sample ID**	1,2,4-Trichlorobenzene	1,2-Dichlorobenzene	1,3-Dichlorobenzene	1,4-Dichlorobenzene	Benzene	Chlorobenzene
		GCL	70	85	85	27	5	47
M18LT62F	5/25/2011	M18-LOT-62FA-052511AX	6.2 U	2.1 J	5 U	1.8 J	5 U	3.5 J
		M18-LOT-62FB-052511AX	5 U	2.5 J	5 U	2 J	5 U	8.3
		M18-LOT-62FC-052511AX	5 U	5 U	5 U	5 U	5 U	5 U
	6/22/2012	M18-LOT-62FA-062212AX	5 U	1 J	5 U	1 J	5 U	1.8 J
		M18-LOT-62FB-062212AX	0.6 J	1.3 J	0.4 J	1.1 J	5 U	5.4
	8/20/2013	M18-LOT-62FA-082013AX	5 U	5 U	5 U	5 U	5 U	5 U
		M18-LOT-62FB-082013AX	5 U	5 U	5 U	5 U	5 U	5.8
	8/21/2014	M18-LOT-62FA-082114AX	5 U	5 U	5 U	5 U	5 U	2.9 J
		M18-LOT-62FB-082114AX	5 U	2.8 J	5 U	1.9 J	5 U	9.2
RB-04-01	8/24/2004	RB-04-01X045AX	**2,200**	**2,000**	73	**1,700**	100 U	**3,500**
		RB-04-01X060AX	**5,600**	**6,600**	**220**	**5,500**	100 U	**12,000**
	6/8/2010	RB-04-01X-060810AX	5 U	6.5 U	3.8 J	18	5 U	8.3
	6/22/2012	RB-04-01A-062212AX	**410**	**290**	81	**300**	0.84 J	**460**
	8/28/2014	RB-04-01A-082814AX	***480***	***605 J***	*50 J*	***645 J***	*15 J*	***460***

Notes:
1. Concentrations and criteria are reported in micrograms per liter (µg/L).
2. U = below detection limit, J = quantitation approximate, D = sample diluted
3. GCL = Provisional Groundwater Cleanup Level, Table 9: Record of Decision Amendment, Eastland Woolen Mill Operable Unit I, September 2006.
4. A blank field indicates that the parameter was not analyzed during the specified monitoring round.
5. Results shown in **bold** indicate an exceedance of the OU1 Groundwater Cleanup Level (GCL). "NS" indicates no standard.
6. Results shown in *italic and underlined* indicate that the value is an average of a field sample and field duplicate results.

Table 9
2014 Residential Well Sampling Results
Eastland Woolen Mill Superfund Site
Corinna, Maine

				Organinc Sample Name:	A4D06	A4D07	A4CN9	A4CX4	A4CP0	A4CX5	A4D04	A4CM7
				Inorganic Sample Name:	MA4D06	MA4D07	MA4CN9		MA4CP0	MA4CX5	MA4D04	MA4CM7
				Sample Location:	M18LT44	M18LT44	M18LT92	M18LT92	M18LT94	M18LT117	M18LT37-1	M18LT64
				Station ID:	M18-LOT-44X-082814AX	M18-LOT-44X-082814AD	M18-LOT-92X-082014AX	M18-LOT-92X-082614AX	M18-LOT-94X-082014AX	M18-LOT-117X-082614AX	M18-LOT-37-1X-082814AX	M18-LOT-64X-081914AX
				Sample Date:	8/28/2014	8/28/2014	8/20/2014	8/26/2014	8/20/2014	8/26/2014	8/28/2014	8/19/2014
				Well Status:	Active	Active	Active	Active	Active	Active	Inactive	Inactive
Chemical	**Groundwater Quality Criteria**											
	CRQL	**GCL**	**MEG**	**MCL**								
Contaminants of Concern (COC) VOCs												
1,2,4-Trichlorobenzene	5	70	70	70	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	15	5 U
1,2-Dichlorobenzene	5	85	200	600	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,3-Dichlorobenzene	5	85	1	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,4-Dichlorobenzene	5	27	70	75	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	2.3 J	5 U
Benzene	5	5	4	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Chlorobenzene	5	47	100	100	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Daughter Product VOCs (DPVOCs)												
1,1,2-Trichloroethane	5	NS	6	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,2-Dibromoethane	5	NS	0.20	0.05	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Bromomethane	5	NS	10	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Chloromethane	5	NS	20	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Other VOCs												
1,1,1-Trichloroethane	5	NS	10,000	200	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,1,2,2-Tetrachloroethane	5	NS	2	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,1-Dichloroethane	5	NS	60	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,1-Dichloroethene	5	NS	40	7	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,2,3-Trichlorobenzene	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.2	5 U
1,2-Dibromo-3-Chloropropane	5	NS	0.40	0.20	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,2-Dichloroethane	5	NS	4	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,2-Dichloropropane	5	NS	10	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
1,4-Dioxane	100	NS	4	NS	0.1 U	0.1 U	NA	0.1 U	0.10 U	0.1 U	0.1 U	0.1 U
2-Butanone	10	NS	4,000	NS	5.0 U	5 U	5 U	NA	5.0 U	5 U	10.0 U	10 U
2-Hexanone	10	NS	NS	NS	5.0 U	5 U	5 U	NA	5.0 U	5 U	10.0 U	10 U
4-Methyl-2-Pentanone	10	NS	500	NS	5.0 U	5 U	5 U	NA	5.0 U	5 U	10.0 U	10 U
Acetone	10	NS	6,000	NS	5.0 U	5 U	5 U	NA	5.0 U	5 U	10.0 U	10 U
Bromochloromethane	5	NS	100	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Bromodichloromethane	5	NS	6	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Bromoform	5	NS	40	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Carbon Disulfide	5	NS	600	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Carbon Tetrachloride	5	NS	5	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Chloroethane	5	NS	7	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Chloroform	5	NS	70	80	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
cis-1,2-Dichloroethene	5	NS	10	70	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
cis-1,3-Dichloropropene	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Cyclohexane	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Dibromochloromethane	5	NS	4	80	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Dichlorodifluoromethane	5	NS	1,000	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Ethylbenzene	5	NS	30	700	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Isopropylbenzene	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
m,p-Xylene	5	NS	NS	10,000	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Methyl Acetate	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Methyl Tert-Butyl Ether	5	NS	35	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Methylcyclohexane	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Methylene Chloride	5	NS	40	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	2.3 J	5 U
o-Xylene	5	NS	NS	10,000	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Styrene	5	NS	100	100	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Tetrachloroethene	5	NS	40	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Toluene	5	NS	600	1,000	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
trans-1,2-Dichloroethene	5	NS	100	100	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
trans-1,3-Dichloropropene	5	NS	NS	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Trichloroethene	5	NS	4	5	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Trichlorofluoromethane	5	NS	2,000	NS	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Vinyl Chloride	5	NS	0.2	2	0.50 U	0.5 U	0.5 U	NA	0.50 U	0.5 U	5.0 U	5 U
Inoganics												
Arsenic	10	10	10	10	10.0 U	10.0 U	2.4 J	NA	10.0 U	10.0 U	10.0 U	10.0 U
Manganese	15	200	500	NS	15 U	15 U	179	NA	225	255	627	27

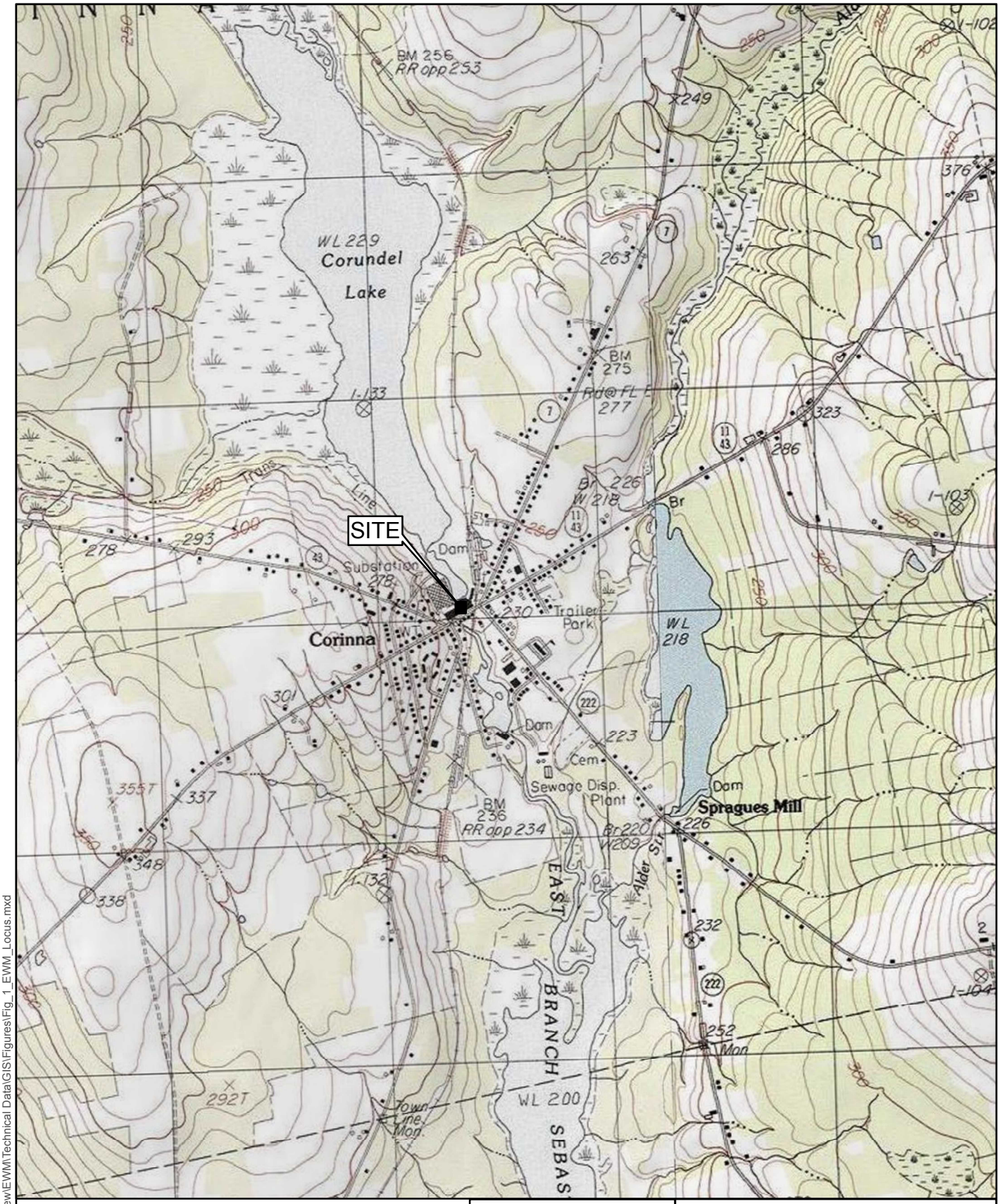
Notes:
Results and criteria are reported in micrograms per liter (µg/L)
U = below detection limit, J = quantitation approximate, R = results rejected
CRQL = Contract Required Quantitation Limit,
GCL = Provisional Groundwater Cleanup Level, Table 9: Record of Decision Amendment, Eastland Woolen Mill Operable Unit I, September 2006.
MEG = Maine Center for Disease Control Maximum Exposure Guideline, Updated October 19, 2012.
MCL = Maximum Contaminant Level: EPA's National Primary Drinking Water Regualtions, Updated April 2012.
Bold and shaded indicates exceedance of GCL/MEG/MCL
On August 26, 2014, Nobis was notified that the FedEx shipment containing 1,4-dioxane samples collected on August 20, 2014 was lost during shipment. The cooler containing the samples was eventually located and shipped to the laboratory, but the sample temperature was above an acceptable level. On August 26, 2014, the active drinking water supply well located at Map 18 Lot 92 was resampled for 1,4-dioxane only.

Table 10
2014 Surface Water Sampling Results
Eastland Woolen Mill Superfund Site
Corinna, Maine

			Organic Sample Name:	**A4CP3**	**A4CM1**	**A4CM2**	**A4CM3**
			Inorganic Sample Name:	**MA4CM1**	**MA4CP3**	**MA4CM2**	**MA4CM3**
			Sample Location:	**SW-1**	**SW-1**	**SW-2**	**SW-3**
			Sample ID:	SW-07-01X-082014AD	SW-07-01X-082014AX	SW-07-02X-081914AX	SW-07-03X-081914AX
			Sample Date:	8/20/2014	8/20/2014	8/19/2014	8/19/2014
Chemical	**Surface Water Quality Criteria**						
	CRQL	**EPA RWQC (HHCWO)**	**EPA RWQC (HHCOO)**				
Contaminants of Concern (COC) VOCs							
1,2,4-Trichlorobenzene	5	35	70	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichlorobenzene	5	420	1300	5.0 U	5.0 U	5.0 U	5.0 U
1,3-Dichlorobenzene	5	320	960	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dichlorobenzene	5	63	190	5.0 U	5.0 U	5.0 U	5.0 U
Benzene	5	2.2	51	5.0 U	5.0 U	5.0 U	5.0 U
Chlorobenzene	5	130	1600	5.0 U	5.0 U	5.0 U	5.0 U
Daughter Product VOCc (DPVOCs)							
1,1,2-Trichloroethane	5	0.59	16	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloroethane	5	0.38	37	5.0 U	5.0 U	5.0 U	5.0 U
Bromomethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Chloromethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Other VOCs							
1,1,1-Trichloroethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2,2-Tetrachloroethane	5	0.17	4	5.0 U	5.0 U	5.0 U	5.0 U
1,1,2-Trichloro-1,2,2-trifluoroethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
1,1-Dichloroethene	5	330	7100	5.0 U	5.0 U	5.0 U	5.0 U
1,2,3-Trichlorobenzene	5	NS	NS	5.0 U	5.0 U	2.9 J	5.0 U
1,2-Dibromo-3-chloropropane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dibromoethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
1,2-Dichloropropane	5	0.5	15	5.0 U	5.0 U	5.0 U	5.0 U
1,4-Dioxane	100	NS	NS	0.1 U	0.1 U	0.1 U	0.1 U
2-Butanone	10	NS	NS	10 U	10 U	10 U	10 U
2-Hexanone	10	NS	NS	10 U	10 U	10 U	10 U
4-Methyl-2-pentanone	10	NS	NS	10 U	10 U	10 U	10 U
Acetone	10	NS	NS	10 U	10 U	10 U	10 U
Bromochloromethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Bromodichloromethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Bromoform	5	4.3	140	5.0 U	5.0 U	5.0 U	5.0 U
Carbon disulfide	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Carbon tetrachloride	5	0.23	1.6	5.0 U	5.0 U	5.0 U	5.0 U
Chloroethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Chloroform	5	5.7	470	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,2-Dichloroethene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
cis-1,3-Dichloropropene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Cyclohexane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Dibromochloromethane	5	0.55	17	5.0 U	5.0 U	5.0 U	5.0 U
Dichlorodifluoromethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Ethylbenzene	5	530	2100	5.0 U	5.0 U	5.0 U	5.0 U
Isopropylbenzene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
m,p-Xylene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Methyl acetate	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Methyl tert-butyl ether	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Methylcyclohexane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Methylene chloride	5	4.6	590	5.0 U	5.0 U	5.0 U	5.0 U
o-Xylene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Styrene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Tetrachloroethene	5	0.96	3.3	5.0 U	5.0 U	5.0 U	5.0 U
Toluene	5	1300	15000	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,2-Dichloroethene	5	140	10000	5.0 U	5.0 U	5.0 U	5.0 U
trans-1,3-Dichloropropene	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Trichloroethene	5	2.5	30	5.0 U	5.0 U	5.0 U	5.0 U
Trichlorofluoromethane	5	NS	NS	5.0 U	5.0 U	5.0 U	5.0 U
Vinyl chloride	5	0.025	2.4	5.0 U	5.0 U	5.0 U	5.0 U
Inorganics							
Arsenic	10	0.018	0.14	10 U	**1.3 J**	**2.2 J**	10 U
Manganese	200	50	100	15 U	15 U	20.8	23.5

Notes:
Results and criteria are reported in micrograms per liter (µg/L)
U=below detection limit, J=quantitation approximate, R=results rejected
CRQL=Contract Required Quantitation Limit;E PA RWQC= EPA's National Recommended Water Quality Critera
pursuant to 304(a) of the Clean Water Act; p ursuant to 304(a) of the Clean Water Act;
HHCWO indicates the Human Health standard for Consumption of Water and Organisms;
HHCOO indicates the Human Health standard for Consumption of Organisms Only.
Bold and shaded indicates exceedance of HHCWO/HHCOO

FIGURES



QUADRANGLE LOCATION

USGS Topographic Map
Corinna and Stetson, Maine
Revised 1982

0 500 1,000 2,000
Feet

1 inch = 2,000 feet

N

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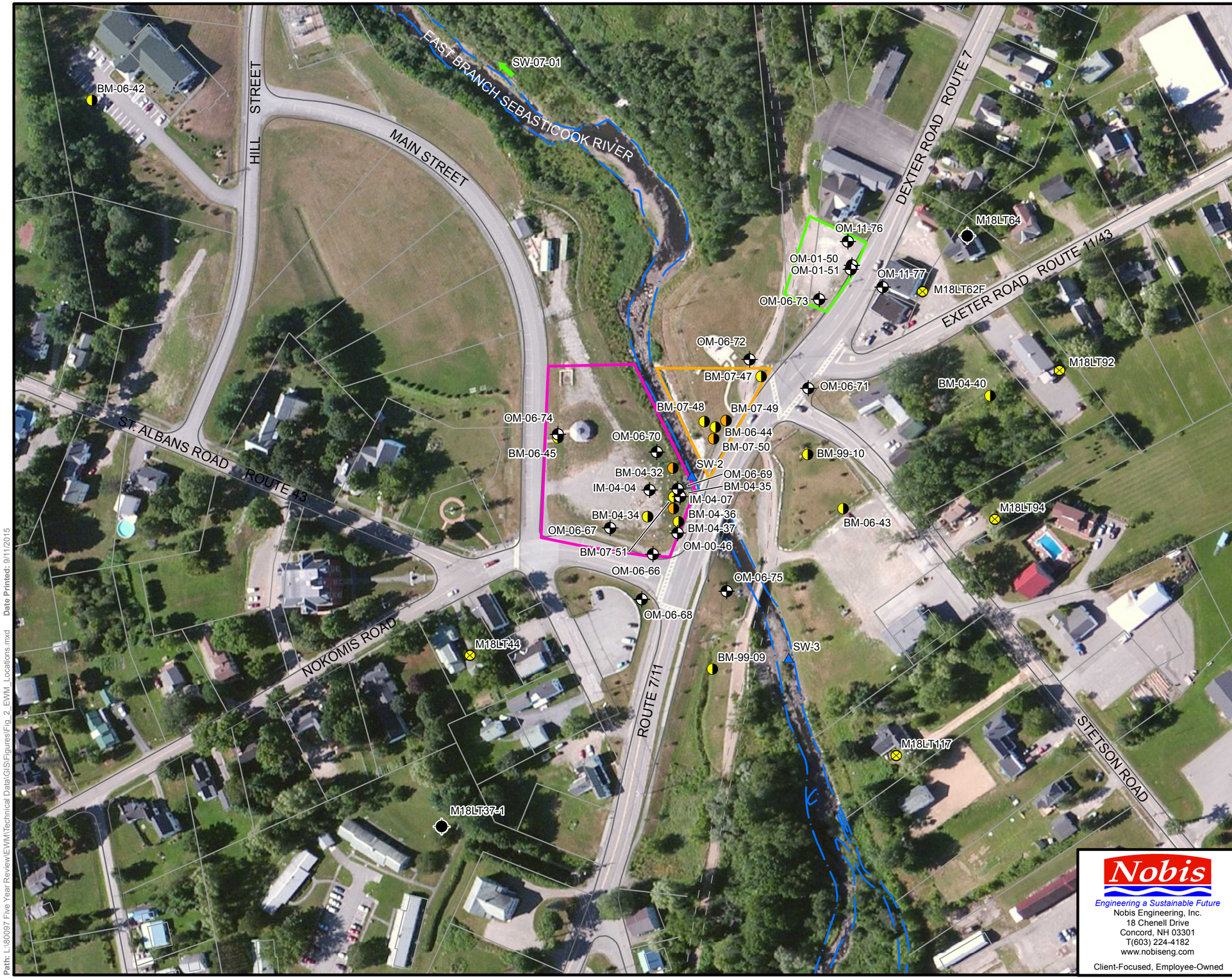
FIGURE 1

LOCUS PLAN
EASTLAND WOOLEN MILL
SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

Path: L:\80097 Five Year Review\EWM\Technical Data\GIS\Figures\Fig_1_EWM_Locus.mxd



Notes:

1. Only locations sampled for the 2014 sampling round are shown.

2. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

Legend

- Overburden Well
- Bedrock Well
- Bedrock Well Sampled with Packers
- Active Water Supply Well
- Inactive Water Supply Well
- Surface Water Sample Location
- Area 1
- Building 14 and UST Area
- East Side Source Area

0 75 150 300
Feet
1 inch = 150 feet

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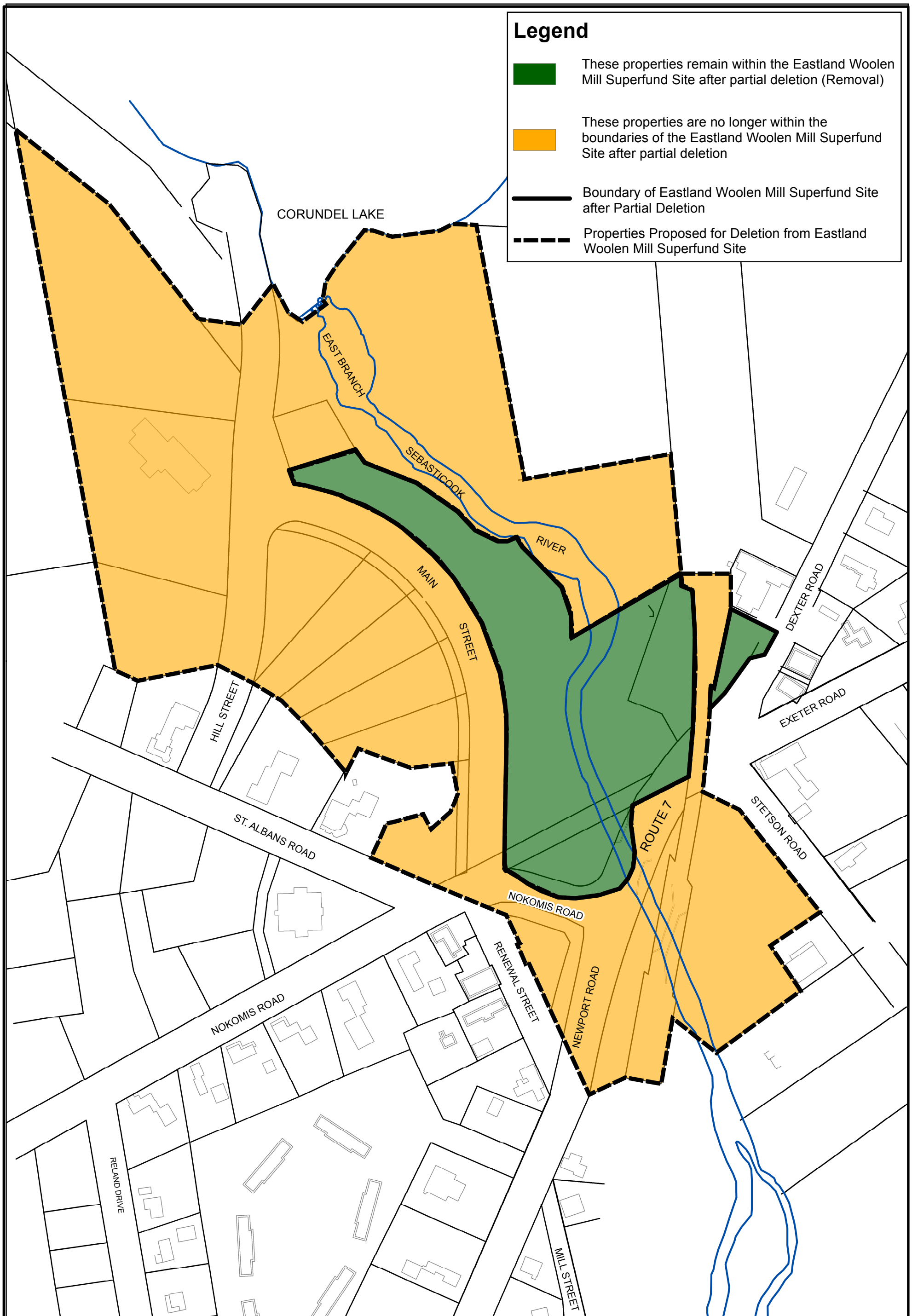
FIGURE 2

AREA-WIDE SITE PLAN
SAMPLE LOCATION LAYOUT
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

Path: L:\80097 Five Year Review\EWM\Technical Data\GIS\Figures\Fig_2_EWM_Locations.mxd Date Printed: 9/11/2015



0 80 160 320
Feet
1 inch = 160 feet

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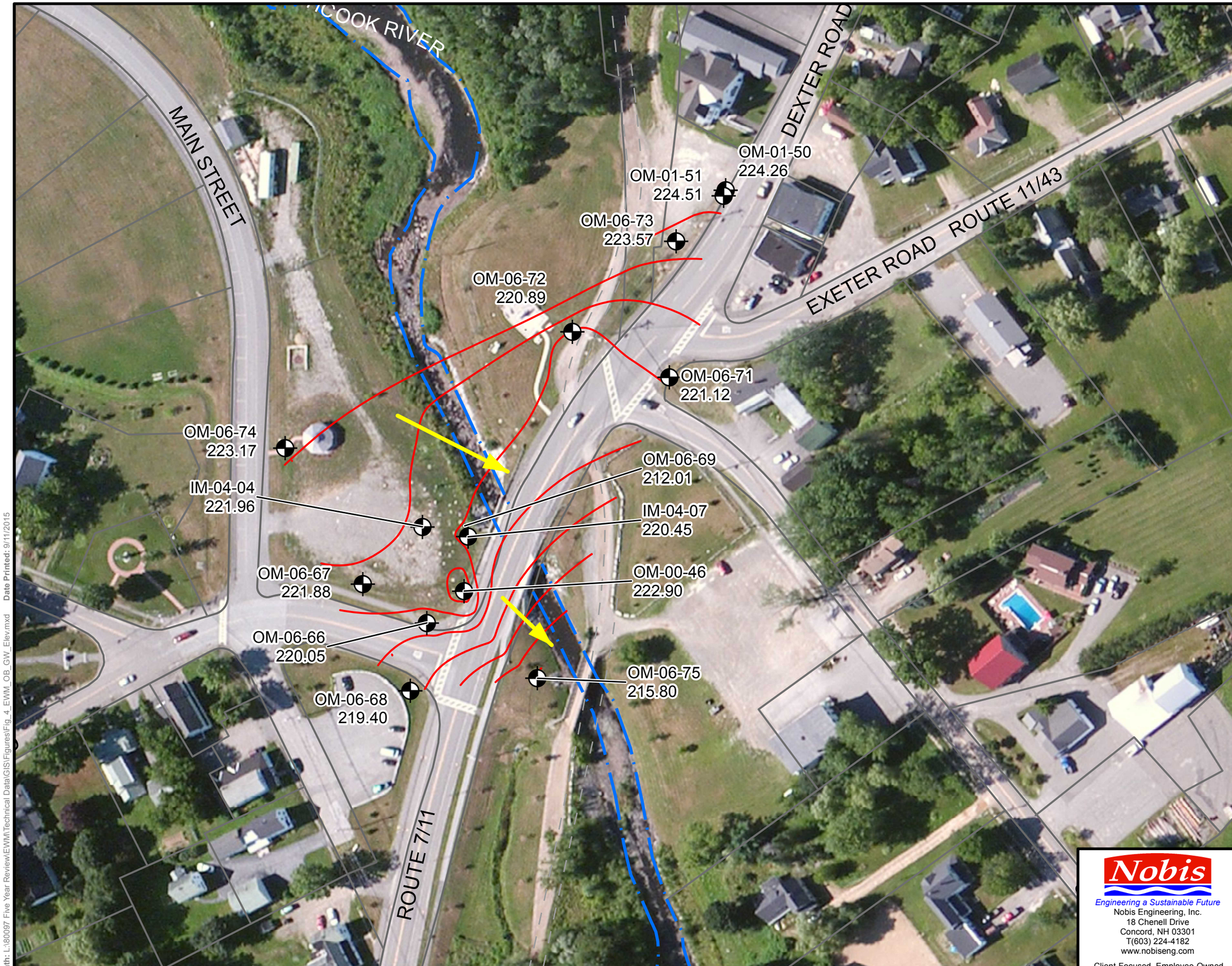
FIGURE 3

SITE PROPERTY BOUNDARY WITH 2012 PARTIAL DELISTING BOUNDARY
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: NZ	CHECKED BY: TA
PROJECT NO. 80097.05	DATE: SEPTEMBER 2015



Legend

224.26 Overburden Monitoring Well with Groundwater Elevation

2014 Overburden Groundwater Elevation Contour

2014 Inferred Groundwater Flow Direction

N

0 50 100 200

Feet

1 inch = 100 feet

Notes:

1. OM-06-69 is an angled boring; elevation data from this location was not used. OM-11-76 and OM-11-77 do not have reference elevations and, therefore, groundwater elevations at these locations could not be calcuated.

2. Aerial photogrpah provided by ESRI.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

4. Groundwater contours are based on groundwater elevation data obtained on August 18, 19, 21, and 28, 2014 and were contoured using the natural neighbor interpolation method. This is one interpretation of the data; other interpretations are possible.

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FIGURE 4

OVERBURDEN GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE CONTOURS
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

Path: L:\80097 Five Year Review\EWM\Technical Data\GIS\Figures\Fig_4_EWM_OB_GW_Elev.mxd Date Printed: 9/11/2015

Legend

- Bedrock Monitoring Well with Groundwater Elevation (221.77)
- 2014 Bedrock Groundwater Elevation Contour
- 2014 Inferred Groundwater Flow Direction

N

0 100 200 400
Feet
1 inch = 200 feet

Notes:

1. Aerial phograph provided by ESRI.

2. Locations of site features depicted hereon are approximate and given for illustrative purposes only.

3. Groundwater contours are based on groundwater elevation data obtained on August 18, 19, 21, and 28, 2014 and were contoured using the natural neighbor interpolation method. This is one interpretation of the data; other interpretations are possible.

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FIGURE 5

BEDROCK GROUNDWATER ELEVATIONS AND POTENTIOMETRIC SURFACE CONTOURS
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

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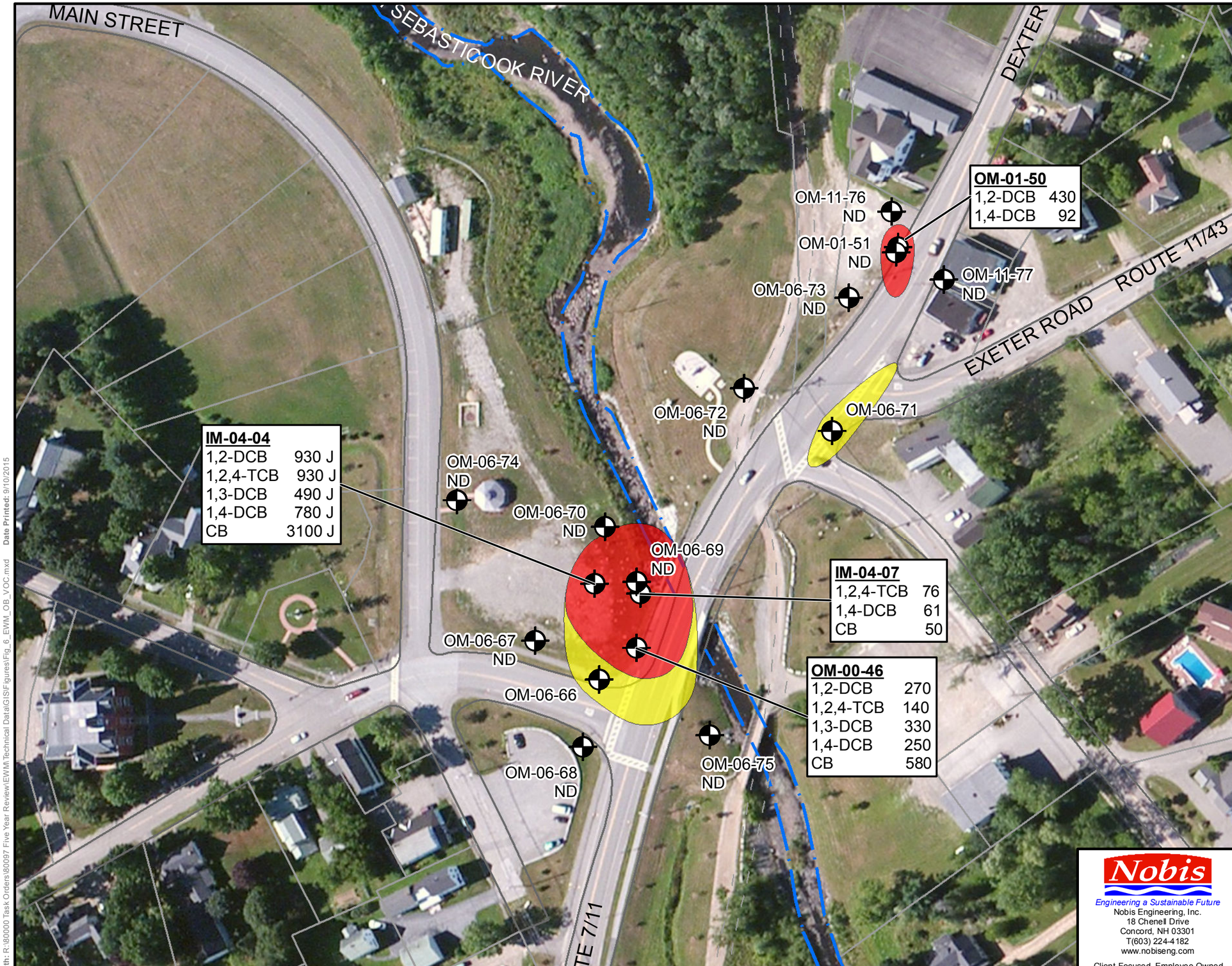

Legend

- Overburden Monitoring Well
- Estimated Extent of Overburden VOCs in Exceedance of GCLs
- Estimated Extent of Overburden VOC Detections

N

0 50 100 200
Feet

1 inch = 100 feet

ROD Selected CoCs		
Key	Chemical	GCL
1,2-DCB	1,2-Dichlorobenzene	85
1,2,4-TCB	1,2,4-Trichlorobenzene	70
1,3-DCB	1,3-Dichlorobenzene	85
1,4-DCB	1,4-Dichlorobenzene	27
BEN	Benzene	5
CB	Chlorobenzene	47

Notes:

1. Only concentrations exceeding the Site specific groundwater cleanup level (GCL) criteria are displayed. All concentrations for contaminants exceeding criteria as indicated are presented in micrograms per liter (µg/L). J = Result is estimated. ND = VOCs were not detected above the reporting limit.

2. Aerial photograph provided by ESRI.

3. Locations of site features depicted hereon are approximate and given for illustrative purposes only. Additional notes and features are displayed on Figure 2-1.

4. The extent of VOC exceedances is inferred from groundwater analytical data obtained during the sampling program conducted in August 2014. This is one interpretation of the data; other interpretations are possible.

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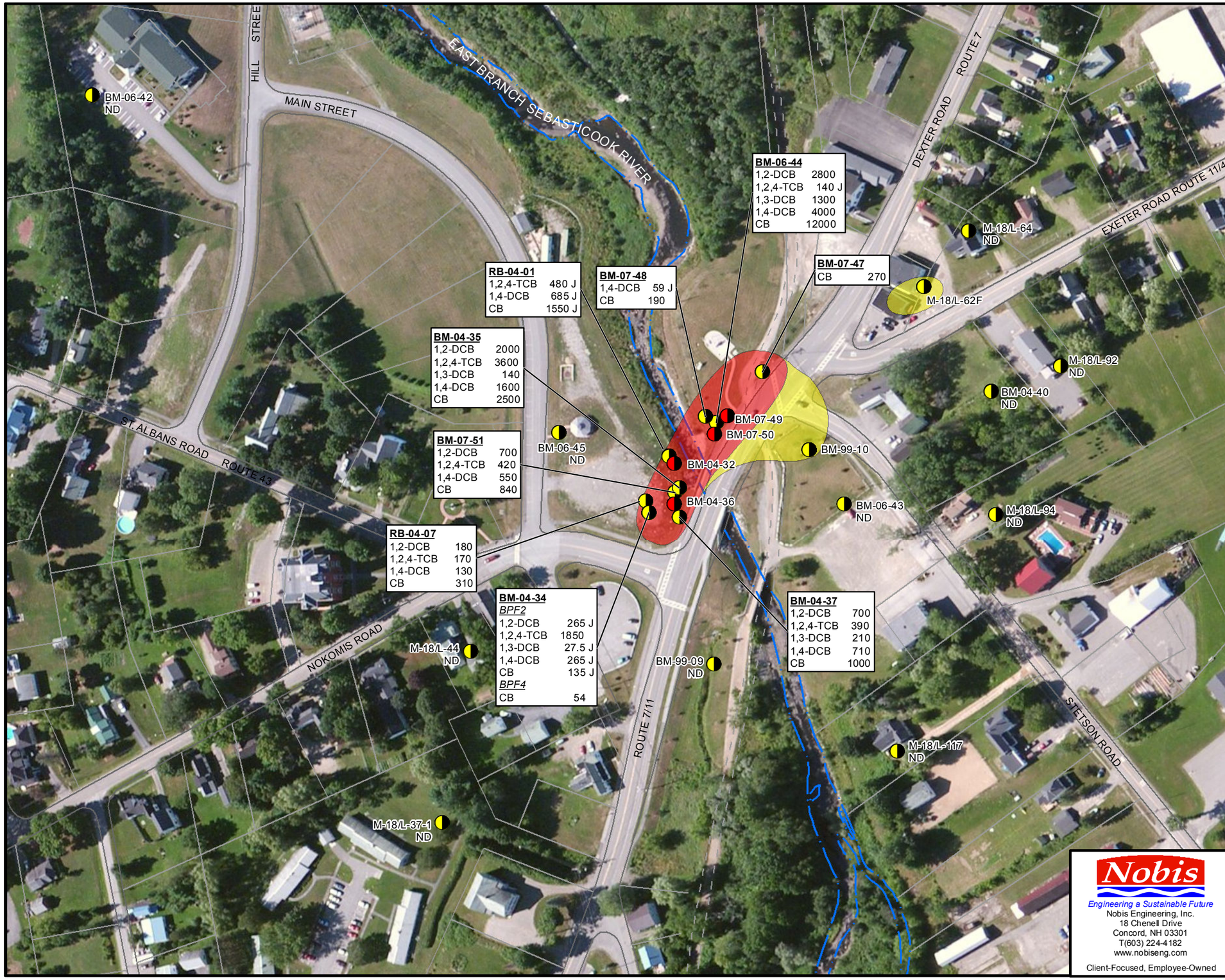
FIGURE 6

ESTIMATED EXTENT OF VOC CONTAMINANTS IN OVERBURDEN GROUNDWATER, AUGUST 2014
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

Path: R:\80000 Task Orders\80097 Five Year Review\EWM Technical Data\GIS\Figures\Fig_6_EWM_OB_VOC.mxd Date Printed: 9/10/2015



Legend

- Bedrock Monitoring Well
- Packer Sample Location (See Fig. 3-3)
- Estimated Extent of Bedrock VOCs in Exceedance of GCLs
- Estimated Extent of Bedrock VOC Detections

N

0 75 150 300
Feet

1 inch = 150 feet

ROD Selected CoCs		
Key	**Chemical**	**GCL**
1,2-DCB	1,2-Dichlorobenzene	85
1,2,4-TCB	1,2,4-Trichlorobenzene	70
1,3-DCB	1,3-Dichlorobenzene	85
1,4-DCB	1,4-Dichlorobenzene	27
BEN	Benzene	5
CB	Chlorobenzene	47

Notes:

1. Only concentrations exceeding the Site specific groundwater cleanup level (GCL) criteria are displayed. All concentrations for contaminants exceeding criteria as indicated are presented in micrograms per liter (µg/L). J = Result is estimated. ND = VOCs were not detected above the reporting limit.

2. Field duplicate and parent sample results were averaged for display purposes. Field duplicates were collected at BM-04-34-BPF2, BM-99-10, RB-04-01 and M-18/L-44.

3. Aerial photograpy provided by ESRI.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only. Additional notes and features are displayed on Figure 2-1.

5. The extent of VOC exceedances is inferred from groundwater analytical data obtained during the sampling program conducted in August 2014. This is one interpretation of the data; other interpretations are possible.

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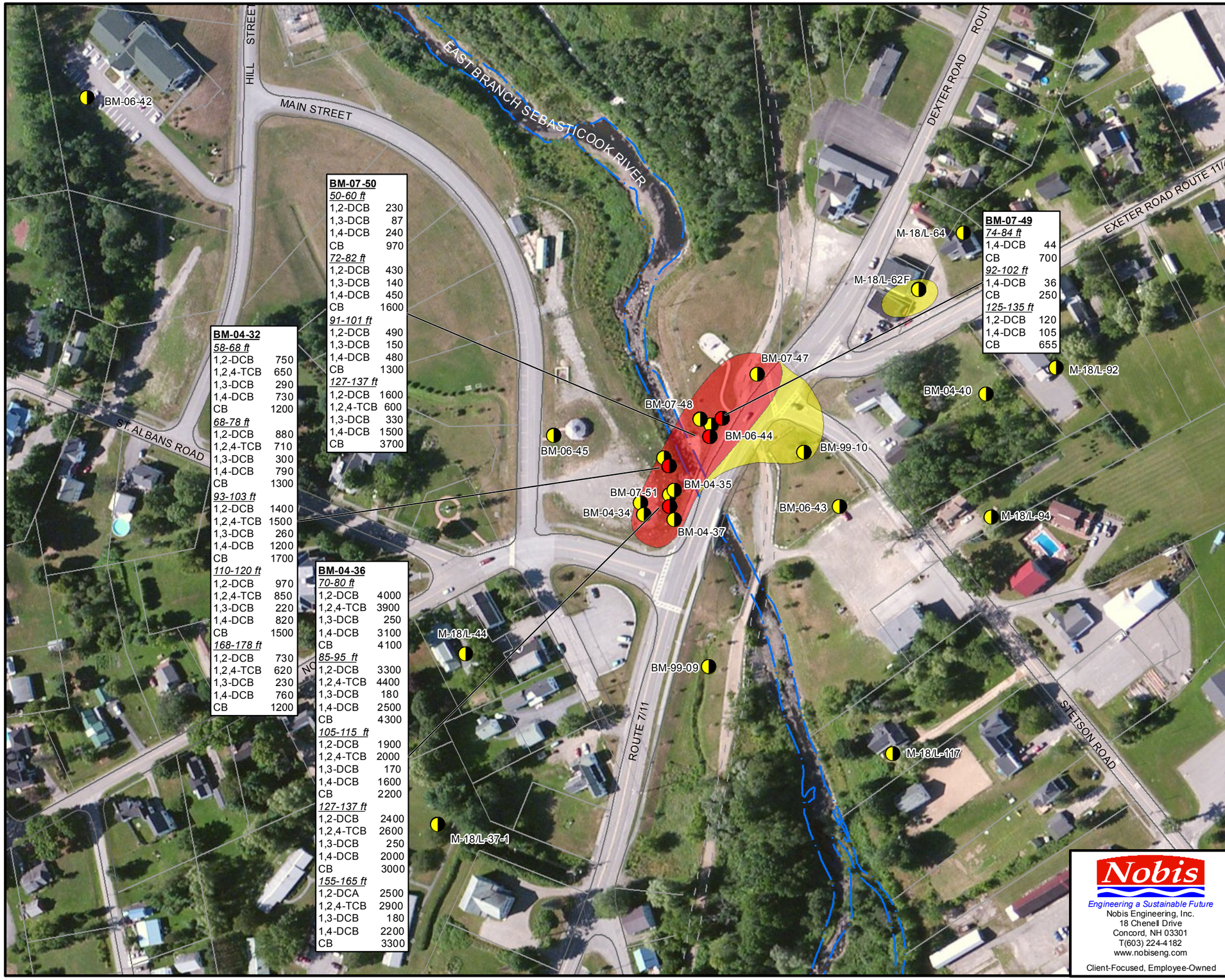
FIGURE 7

ESTIMATED EXTENT OF VOC CONTAMINANTS IN BEDROCK GROUNDWATER, AUGUST 2014
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

Path: R:\80000 Task Orders\80097 Five Year Review\EWM\Technical Data\GIS\Figures\Fig_7_EWM_BR_VOC.mxd Date Printed: 9/10/2015



Legend

- Bedrock Packer Monitoring Well
- Bedrock Monitoring Well (See Fig. 3-2)
- Estimated Extent of Bedrock VOCs in Exceedance of GCLs
- Estimated Extent of Bedrock VOC Detections

N

0 75 150 300
Feet

1 inch = 150 feet

ROD Selected CoCs		
Key	Chemical	GCL
1,2-DCB	1,2-Dichlorobenzene	85
1,2,4-TCB	1,2,4-Trichlorobenzene	70
1,3-DCB	1,3-Dichlorobenzene	85
1,4-DCB	1,4-Dichlorobenzene	27
BEN	Benzene	5
CB	Chlorobenzene	47

Notes:

1. Only concentrations exceeding the Site specific groundwater cleanup level (GCL) criteria are displayed. All concentrations for contaminants exceeding criteria as indicated are presented in micrograms per liter (µg/L). J = Result is estimated. ND = VOCs were not detected above the reporting limit.

2. Field duplicate and parent sample results were averaged for display purposes. Field duplicates were collected at BM-07-49.

3. Aerial photograph provided by ESRI.

4. Locations of site features depicted hereon are approximate and given for illustrative purposes only. Additional notes and features are displayed on Figure 2-1.

5. The extent of VOC exceedances is inferred from groundwater analytical data obtained during the sampling program conducted in August 2014. This is one interpretation of the data; other interpretations are possible.

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FIGURE 8

ESTIMATED EXTENT OF VOC CONTAMINANTS IN BEDROCK PACKER GROUNDWATER, AUGUST 2014
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80097	DATE: SEPTEMBER 2015

Path: R:\80000 Task Orders\80097 Five Year Review\EWM\Technical Data\GIS\Figures\Fig_8_EWM_BR_VOC_Packer.mxd Date Printed: 9/10/2015

APPENDIX A

Appendix A

Existing Site Information

A. SITE CHRONOLOGY

Table A-1: Chronology of Site Events

Event	Date
July 1999	Eastland Woolen Mill placed on National Priorities List (NPL)
July 1999	EPA signed Action Memorandum to initiate NTCRA
July 1999 – September 2002	Remedial Investigation and Feasibility Study for Operable Unit I (OU1)
November 19, 1999 – December 2002	NTCRA: Demolition of former Eastland Woolen Mill, Excavation and processing of contaminated soil.
September 19, 2002	EPA signs ROD for OU1
May 2002 through October 2003	NTCRA: Low-temperature thermal desorption of contaminated soil
January 8, 2003 – August 11, 2005	Remedial design for OU1
March 2004 – May 2006	NTCRA: In-situ chemical oxidation of remaining contamination
September 2002 – September 2004	Remedial Investigation and Feasibility Study for Operable Unit II (OU2).
September 30, 2004	EPA signed ROD for OU2
August 11, 2005	OU1 Remedial design completed.
September 2005	OU1 Remedial Action start: Initiation of Remedial Action with installation of water line to three locations.
June 2006 –September 2008	OU1 Remedial Action continues with in-situ Chemical Oxidation and assessment.
March 2006	Focused Feasibility Study for OU1 submitted to EPA
May 10, 2006	NTCRA Complete
September 28, 2006	Operable Unit 1 construction complete
September 30, 2006	EPA signs Record of Decision Amendment for OU1
September 22, 2008	Remedial Action completion for OU1
October 2008	Initiation of LTRA in-situ chemical oxidation and monitoring
December 17, 2009 – September 2010	Five-Year review for OU1
December 2010	Area-Wide Groundwater Monitoring
May-June 2011	Area-Wide Groundwater Monitoring
July 5 – 6, 2011	Nobis oversaw decommissioning of six wells within the OU2 area at the Former Moosehead Mill location.
August 30, 2011 – September 21, 2011	Nobis oversaw decommissioning of fifty-two wells and three piezometers within OU1 and OU2 areas.
Fall 2011	Riverbank restoration of the EBSR in OU1 area
Fall 2011	Wastewater Treatment Plant removal/disassembly
June 2012	Area-Wide Groundwater Monitoring
Fall 2012	Partial deletion of the Site from the National Priorities List
October 2012	Five soil gas sampling probes were installed and sampled in the vicinity of the former Building 14 Area for assessment of potential vapor intrusion issues.
November 25, 2013 & December 2, 2013	Nobis oversaw installation of a water line by a subcontractor at the Gould Property/Traditions Antique Shop.
August 2013	Area-Wide Groundwater Monitoring
August 2014	Area-Wide Groundwater Monitoring
January 2015	ISB Bench Test Technical Memorandum submitted to EPA
March 2015	In-Situ Bioremediation Pilot Test Implementation Plan submitted to EPA

B. BACKGROUND

Eastland Woolen Mill Superfund Site
Corinna, Penobscot County, Maine
MED980915474
Site ID No. 0101043
EPA Lead
Operable Unit 1

The Eastland Woolen Mill Superfund Site is located in the Town of Corinna, Penobscot County, Maine, approximately 6 miles north of Newport and 25 miles northwest of Bangor, Maine. Approximately 800 people live within one mile of the Site, and 2,500 people live within four miles.

Physical Characteristics

The Town of Corinna is located within the EBSR watershed, which drains to Sebasticook Lake approximately three miles south of the Town. Topography within the watershed is typified by gently rolling hills to steeply sloping ridges, varying from narrow valleys to fairly expansive low-lying floodplains. Elevations within the immediate vicinity of Corinna range from 200 to 320 feet above mean sea level (msl). The former Eastland Woolen Mill (EWM) straddled the EBSR and the southern portion of the former Mill Pond.

Hydrology

<u>Overburden Geology/Hydrogeology</u>

Overburden materials in Area 1 consist of anthropogenic fill materials (treated and reworked site soil) overlying glacial drift. The fill extends from ground surface to a maximum depth of 36 feet. Underlying the fill is a native sequence of glacial drift up to 26 feet thick, consisting of a layer of meltout till overlying basal till. Weathered bedrock ranging in thickness from less than one foot to approximately ten feet resides immediately below the till. Native soils thin to the north and west, consistent with the NTCRA excavation limits. Weathered bedrock surface data indicates that bedrock surface slopes generally to the east, towards the EBSR.

During the 2014 long-term monitoring plan (LTMP) monitoring event, groundwater elevations in the overburden aquifer varied from 212.01 to 224.51 feet above msl. Groundwater flow within the Site overburden material has fluctuated during the course of Site studies due to changes in subsurface conditions and pumping stresses applied. The current ambient condition indicates overburden groundwater generally flows toward the East Branch of the Sebasticook River with

local variations present. Figure 4 depicts the overburden groundwater elevations and the inferred potentiometric surface contours.

Bedrock Geology/Hydrogeology

The bedrock underlying the Site consists of essentially three distinct zones. These include a thin zone of highly-weathered bedrock immediately below the basal till, which overlies a thicker zone of moderately competent fractured bedrock. The weathered bedrock consists of rock flour and pulverized and strongly weathered rock fragments and is predominantly a porous media. This zone is believed to average approximately 1 foot in thickness and extends, on average, to an elevation of 187.1 feet above msl. The zone of moderately competent bedrock is approximately 10 feet in thickness and grades downward into competent fractured bedrock. The moderately competent and competent bedrock are discretely fractured media and are expected to have low matrix porosities where fresh. In the fractured bedrock, weathering adjacent to fractures has produced an oxidized zone up to several inches in thickness with greatly enhanced porosity.

Groundwater elevations in the bedrock aquifer calculated during the 2014 LTMP monitoring event were observed to vary from 218.88 to 250.38 feet above msl. Variation in bedrock groundwater elevations sometimes occurs near active water supply wells as a result of bedrock aquifer drawdown from well use. The bedrock groundwater generally flows in an inferred south to southeast direction, roughly parallel to the EBSR. Figure 5 depicts the bedrock groundwater elevation and the inferred potentiometric contours.

Land and Resource Use

The Site was formerly utilized by EWM for the manufacture and finishing of wool and associated fabrics. Currently, the Site is vacant of permanent structures, with the exception of a fenced-in staging area with storage and a job trailer to support LTM activities. The Future land use assumptions for the 25-acre Site and surrounding areas are based on the Reuse Plan developed by the Town of Corinna. A large portion of the Site in the center of town has been targeted for a mix of commercial, residential and mixed-use development. The water supply system has been expanded by the local water district to support future growth. The majority of the Site is available for re-use since the current cleanup program only occupies about three of the 25 acres covered by the Site. The available 22 acres are presently being marketed by the Town of Corinna. The back portion abutting the Site (part of the Site until completion of the partial delisting) has already been brought into productive reuse. A 20 unit senior housing facility, Corundel Commons, opened on this portion of the Site in February 2006.

The Town has erected a bandstand on the main portion of the Site and a war memorial on the eastern portion of the Site on Map 18, Lot 55.

History of Contamination

The Site was formerly dominated by the EWM building complex which, before its demolition in 2000, comprised a large manufacturing building and several ancillary structures, with a total area of 250,000 square feet. The buildings stood on both sides of and over the EBSR, a State-designated Class C water, which flows north to south through the center of Corinna.

Prior to closing in 1996, EWM was a manufacturer and finisher of wool and blended woven fabric. Fabric finishing included dyeing of the fabric to meet product or customer requirements.

This dyeing operation took place in dye kettles and utilized various chemicals, including dyes and dye-aids that reportedly contained biphenyl and chlorinated benzene compounds, including 1,2-DCB, 1,3-DCB, 1,4-DCB, and 1,2,4-TCB. Until construction of the Town of Corinna Wastewater Treatment Plant (WWTP) in 1969, liquid wastes from the EWM were discharged to the ground surface beneath mill buildings, to Mill Pond Dam tailrace and ultimately the EBSR. It was not until 1977 that all liquid waste streams were finally directed to the WWTP.

As a result of these discharges, overburden soil and bedrock underlying mill buildings and river sediment and underlying soil extending several hundred feet downgradient were contaminated with chlorinated benzene compounds. Groundwater was contaminated at concentrations well above federal drinking water MCLs and State of Maine drinking water MEGs. Routine pumping of nearby residential bedrock wells spread the contamination laterally along bedrock bedding-plane fractures. Groundwater contamination was first documented in Corinna in 1983, when a MEDEP employee noticed a strange odor and taste in drinking water at the Gallison Restaurant located across the street from the Mill. Several water samples collected from the restaurant showed the presence of monochlorobenzene, dichlorobenzenes and trichlorobenzenes. Later in 1983, granular activated carbon (GAC) filters were installed on five water supply wells (residential and business) near the Mill to mitigate exposures to chlorinated benzene compounds.

Initial Response

EWM initiated formal environmental investigations in 1984 by performing a preliminary hydrogeologic investigation of the downtown area. The work included the completion of soil borings, installation of monitoring wells and piezometers, sampling and analysis of soil and groundwater, and a preliminary fracture-trace analysis. The investigation concluded that additional work was needed to identify a contaminant source area. By 1988, EWM had completed a study of residences and businesses at risk from the groundwater contamination and had investigated potential locations for installation of a public water supply system. It was concluded that contamination had likely spread via bedrock fractures and faults. Five additional private water supply wells were fitted with granular activated carbon filters based on results of water supply well sampling performed between 1983 and 1988.

In 1993, EWM completed Phase I of a chlorinated benzene contamination investigation in the downtown area. The report identified the tailrace beneath the EWM and the UST area where dye-aid had been stored adjacent to Building 13 as possible source locations.

EWM removed three underground storage tanks (USTs) from the UST Area adjacent to Building 13 in 1994. Chlorinated benzene compounds were detected in soil samples collected from the bottom of the excavation. Because free product was reported in the excavation and soil staining was observed, an overburden groundwater recovery well (R-l), consisting of a 30-inch diameter corrugated metal pipe with slits in the bottom five feet and surrounded by crushed stone, was installed at the Site after removal of the USTs. In addition, a drum containing a dark oil-like substance was unearthed in the UST excavation. Recovery Well R-l was pumped to collect chlorinated benzene-contaminated groundwater and flush contaminants from the "smear" zone between August 1994 and sometime in 1995. In conjunction with the pumping of groundwater from Well R-l, EWM instituted pumping of groundwater from the bedrock well on Lot 122, south of Main Street, now referenced as Recovery Well R-2.

In the fall of 1995, during the installation of water supply lines to serve residences affected by contamination, a DNAPL was reportedly observed within the till material beneath the gravel riverbed just downstream of the Main Street bridge. A consultant for EWM, Acheron, Inc., performed additional sampling of the sediments in the riverbed downstream of the EWM and found chlorinated benzene compounds and petroleum hydrocarbons both within the silty till layer beneath the rocky gravel riverbed and in a floodplain on the west side of the river.

After closure of the EWM in 1996, MEDEP sampled soils around the former USTs adjacent to Building 13 to evaluate whether residual soil contamination was present and acting as a source of groundwater contamination. This effort was supplemented in 1998 with additional analytical parameters and sampling of a background location. In 1997, MEDEP performed sediment sampling with field chemical screening to gain information on the magnitude of river bottom contamination documented by Acheron, Inc. in 1995. Additional sediment and surface water samples were collected from the river in 1998 for analysis. These investigations confirmed that high concentrations of chlorinated benzenes were present in the riverbed over 1,000 feet downstream of the EWM complex. These data were used to prepare the Hazard Ranking System scoring package that was submitted to EPA for placement of the Site on the NPL.

In 1997, MEDEP performed an emergency response action to remove 54,673 pounds of various hazardous substances from process pipes, containers, and vessels located within the Mill.

In addition, in January 1999, following the evaluation of data collected during an expanded site inspection, EPA signed an Approval Memorandum authorizing the preparation of an Engineering Evaluation and Cost Analysis (EE/CA) to evaluate potential response alternatives for a NTCRA at the Site. The EE/CA recommended demolishing the mill complex buildings to allow for the excavation and treatment of the contaminated soils on the Site.

The Site was proposed for inclusion on the NPL on April 23, 1999 (64 Fed. Reg. 19968). It was listed for final inclusion on the NPL on July 22, 1999 (64 Fed. Reg. 39878-39885). In July 1999, EPA signed an Action Memorandum to initiate the NTCRA.

EPA performed a remedial investigation and feasibility study from 1999 through 2002 for OU1. The remedial investigation and feasibility study for OU2 extended to September 2004. The remedial design (RD) for OU1 began in 2003 and was completed in 2005. The description of remedial activities at the site is included in Section C.

Basis for Taking Action

The OU1 ROD included an assessment of the potential threats to human health in the OU1 study area. Based on the HHRA prepared as part of the RI and the OU1 ROD, the only pathways that exceeded EPA's acceptable cancer risk range and/or a hazard quotient of concern are ingestion of groundwater in the overburden and bedrock plumes by a future resident. The lifetime cancer risk estimate for a combined child and adult exposure to the bedrock plume groundwater is 6×10^{-6}. Seventy-five percent of this cancer risk is due to arsenic, with twenty-five percent

attributable to the 1,4-DCB. EPA's hazard index of concern for non-carcinogenic risk is exceeded for children and adults for several target organs. The major contributors to these exceedances are chlorobenzene, 1,2-DCB, 1,3-DCB, 1,4-DCB, 1,2,4-TCB, and arsenic. These COCs also were detected at concentrations above federal and state MCLs and more stringent state MEGs.

The lifetime cancer risk estimate for the overburden plume groundwater was 2×10^{-3}. Sixty-seven percent of this risk is attributable to 1,4-DCB, with arsenic contributing to the remainder of the cancer risk. EPA's hazard index of concern for non-carcinogenic risk is exceeded for children and adults for several target organs. The major contributors to these exceedances are chlorobenzene, 1,2-DCB, 1,3-DCB, 1,4-DCB, 1,2,4-TCB and arsenic. These COCs also were detected at concentrations above federal and state MCLs and more stringent state MEGs. The Baseline HHRA concluded that the estimated risk for the soils, surface water, or sediments within the OU1 area do not represent an unacceptable threat to human health. Even though only groundwater represents a threat to human health, soil contamination that is causing groundwater contamination is also relevant to the cleanup action.

The groundwater beneath and surrounding the Site still remains a drinking water aquifer. Although data gathered since the OU1 ROD was issued demonstrates that the groundwater plume has receded and contaminant mass is reduced, contaminant levels still exceed drinking water standards, and ingestion of groundwater continues to pose a risk to human health consistent with the risks summarized above.

The OU1 ROD determined that contaminant levels in surface waters, surface soils and sediments within the OU1 area of the EBSR were not sufficiently elevated to pose a substantial risk to invertebrates, fish and wildlife through direct contact and dietary exposure to the Site-related COCs. Exposure to the contaminated water at the groundwater/surface water interface, however, was identified as an unacceptable risk to those organisms dwelling in this zone. Data gathered since the OU1 ROD, however, demonstrate that the concentration of contaminants in the groundwater do not exceed the levels that pose an unacceptable risk to organisms dwelling in the groundwater/surface water interface. The data collected as part of the remedial action (RA) and LTRA confirms that the groundwater contamination has been reduced to levels that no longer present a threat to the ecological receptors in the EBSR.

C. REMEDIAL ACTIONS

Remedy Selection

The proposed cleanup plan to address OU1 residual source area soil and groundwater contamination was presented in the ROD dated September 19, 2002. OU1 was created to address both contaminated groundwater and post-NTCRA excavation soil and bedrock contamination. The OU1 cleanup plan was developed to meet the following Remedial Action Objectives:

- Prevent the ingestion of groundwater containing contaminants that exceed Federal or State MCLs, Federal Non-zero MCLGs and more stringent State MEGs, or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1.
- Prevent, to the extent practicable, the off-site migration of groundwater containing contaminants at a concentration above Site cleanup levels.
- Prevent, to the extent practicable, the discharge to the EBSR of groundwater containing contaminants at a concentration above levels that could impact ecological receptors.
- Restore groundwater to meet federal or state MCLs, federal non-zero MCLGs or State MEGs (whichever is more stringent), or in their absence, an excess cancer risk of 1×10^{-6} or a hazard quotient of 1.
- Perform long-term monitoring of surface water, sediments and groundwater to verify that the cleanup actions at the Site are protective of human health and the environment.

The following table summarizes the Site target groundwater contaminants of concern and the established Interim Groundwater Cleanup Levels as identified in the ROD.

Table A-2

Site Specific Groundwater Cleanup Levels

Contaminant of Concern	Site Specific Groundwater Cleanup Level (µg/l)	Basis
Arsenic	10*	MCL
Manganese	200	MEG
Benzene	5	MCL
Chlorobenzene	47	1992 MEG
1,2 Dichlorobenzene	85	1992 MEG
1,3 Dichlorobenzene	85	1992 MEG
1,4 Dichlorobenzene	27	1992 MEG
1,2,4 Trichlorobenzene	70	MCL

*Arsenic occurs naturally at levels exceeding MCLs

The 2002 ROD-selected remedy includes the following components:

- Implementation of institutional controls and extension of the existing public water supply system to prevent human exposure to contaminated groundwater and mitigate lateral plume migration toward local private water supply wells.
- Extraction and treatment of contaminated bedrock and overburden groundwater to hydraulically contain the Eastland Source Area plume and the UST/Building 14 plumes and to capture treatment reagents and tracers that may be introduced during remedial treatments at the Site. It is noted that, although long-term groundwater extraction and treatment was contemplated in the ROD, it is likely that any groundwater extraction and treatment will be temporary in nature and limited to periods of time concurrent with NTCRA and bedrock investigation activities.
- Implementation of remedial components to maximize reduction of residual contaminant sources as a strategy to reduce dissolved concentrations in groundwater. The four contaminant source areas identified for active treatment include: UST/Building 14 Area saturated soil, Area 1 deep saturated soil, Area 1 weathered bedrock surface, and Area 1 deep fractured bedrock. Up to three distinct remedial technologies may be implemented to achieve mass reduction in the residual source areas. These technologies include:

1. ISCO of soil at the UST/Building 14 Area and Area 1.

2. Surfactant/cosolvent flushing (SF/CSF) of fractured bedrock in Area 1 under the Eastland Woolen Mill Source Area.

3. Bio-stimulant “polishing” injection into the bedrock aquifer to reestablish and accelerate the biological degradation of remaining contaminant mass.

- Development of an environmental monitoring program to assess contaminant migration and long-term progress toward attaining remediation goals.

An OU1 ROD Amendment was issued in 2006 which specified the implementation of ISCO as the preferred in-situ remedial action followed by application of biostimulants.

Following completion of the Remedial Investigation and Supplemental Remedial Investigation for OU2, EPA issued a ROD in 2004 with the determination that no remedial action was necessary to protect human health or the environmental.

Operable Unit 1

Implementation of the NTCRA was initiated in 1999. The NTCRA has included the removal of the EWM buildings (performed during the winter of 1999-2000) and contaminated soils from four areas (performed from 2000-2001). During 2000 and 2001 approximately 75,000 cubic yards of soil contaminated with chlorinated benzene compounds were excavated and stockpiled at the Site in lined containment structures. Additional contaminated soil removal was performed at the Building 14 Area in 2005.

In 2001, pilot testing of an on-site thermal soil treatment system indicated that the system could meet the treatment goals established for the NTCRA. Full-scale treatment of contaminated soil using an on-site ex-situ low temperature thermal system began in October 2002 and was completed in October 2003. Quality control testing of the soil after treatment documented that all of the soil that was used for on-site backfill contained residual levels of contamination below residential cleanup standards and met the NTCRA groundwater leaching criteria that were developed during the NTCRA. Table 2 contains a summary of the data collected as part of the ex-situ treatment program.

Table 2

NTCRA Soil Cleanup Summary

Summary Statistics for Soil Excavated and Subject to Treatment

Contaminant	95% UCL Concentration in Soil prior to treatment (µg/kg) – based on 100 soil samples	95% UCL Concentration in Soil used as backfill after treatment (µg/kg) based on 4,200 soil samples	Soil concentration that allows for residential use direct contact with soil (µg/kg)	Soil concentration that was determined to be protective of groundwater (µg/kg) (dependent upon soil organic carbon content)
1,2,4-Trichlorobenzene	92,070	4,451	540,000	3,900-8,000
1,2,3-Trichlorobenzene	25,955	1,408		
1,2-Dichlorobenzene	17,091	610	370,000	4,700-4,900
1,3-Dichlorobenzene	1,427	285	16,000	4,300-4,800
1,4-Dichlorobenzene	12,279	563	3,400	3,400-3,800
Chlorobenzene	3,938	169	150,000	3,300-3,600

To support the NTCRA excavation and thermal treatment activities, a temporary groundwater extraction and treatment system was constructed to aid in control of groundwater infiltration during excavation activities. One bedrock well and four overburden wells were connected to a temporary treatment system. The system remained operational until November 2004 to provide hydraulic control over the groundwater plume during the initial phase of the NTCRA. From 2004 until 2011, the groundwater treatment system was operated as necessary to support the NTCRA in-situ oxidation program. The system was decommissioned and demolished in 2011 when it was no longer necessary for support of LTRA activities.

Three areas of contaminated soil were not accessible to the NTCRA excavations. One area was located within Area I and the other two were within the UST Area and Building 14 Area. These remaining soils are located in the saturated zone between depths of 6 feet to 40 feet below

ground surface (bgs). The final phase of the NTCRA targeted the reduction of contamination in these source areas using ISCO. The NTCRA ISCO Program consisted of two work areas: Phase I, which included the contaminated soil associated with the former UST Area and Building 14 Area; and Phase II, which included the contaminated soil associated with Area 1.

Phase I Activities

Following demolition of Building 14 by the Town of Corinna in 2004, a limited excavation was undertaken adjacent to the former loading dock to remove a small quantity of contaminated soil present in the vadose zone adjacent to the loading dock. The excavation did not extend below the water table. Analytical results for confirmation soil samples collected from the base of the excavation indicated contaminated soil remained in-place at depths below the water table (approximately 6 feet bgs).

ISCO treatment of the Phase 1 area consisted of two full-scale injections of iron-catalyzed persulfate (ICP), followed by confirmatory soil borings and groundwater sampling. These injections were performed in July and October/November 2005. A total of 13,319 gallons of persulfate solution (22,120 pounds of oxidant) and 13,514 gallons of chelated iron solution were delivered to the UST Area and Building 14 Area. Confirmatory soil borings and groundwater sampling indicated an approximate 90% reduction of dissolved phase contamination and an approximate 71% reduction in sorbed phase soil contamination following the Phase I ICP applications.

Phase II Activities

In August 2005, one full-scale round of Phase II ISCO treatment was conducted in Area 1. ICP was delivered to the subsurface via 11 ISCO injector wells. Approximately 19,256 gallons of persulfate (31,947 pounds of oxidant) and 19,423 gallons of chelated iron solution (2,429 pounds) were delivered to the Phase II treatment area. Confirmatory groundwater sampling performed after full-scale ISCO application indicated a reduction of dissolved phase contamination by approximately 63%. Soil sampling performed after the ISCO Pilot study indicated a 38% reduction in residual DNAPL contamination. The “Phase II Task Plan and Phase II Full Scale ISCO Injection Plan - Application #1” describes the activities that were performed to further the completion of NTCRA source reduction in this area. The "2005 Phase I and Phase II ISCO Remedial Performance Assessment Eastland Woolen Mill Superfund Site, Non-Time Critical Removal Action, Corinna, Maine, May 2006" documents that the ISCO has been successful in reducing the mass of contamination in the Phase II Area. The NTCRA ISCO

program was determined to be complete in May 2006, and the remaining ISCO activities are being implemented as a component of the Remedial Action.

Remedy Implementation

The majority of the source control activities occurred during the NTCRA, which was undertaken from 1999 through 2006. The NTCRA also included the initial phase of the in-situ chemical oxidation program.

The OUI Remedial Action was initiated in September 2005 with the installation of the three water line connections. Additional injection wells and monitoring wells were also installed from 2006-2007. Two major in-situ oxidation programs were implemented in 2006 and 2007. In September 2008, all construction activities for the OUI Remedial Action were completed as documented in the Preliminary Close Out Report for the Eastland Woolen Mill Site. The LTRA began in October 2008. From October 2008 through 2015, the focus of the LTRA activities has been monitoring and assessment of the in-situ oxidation program to determine whether additional injection programs will be necessary to meet the 85% contaminant mass reduction target established in the Feasibility Study (FS) for OUI.

As of 2015, all planned institutional controls, with the exception of two properties, have been established. The property identified as Map 18, Lot 44 is currently not restricted by institutional controls for water use restrictions due to refusal by the owner to participate. The property is not currently impacted by the Site, and site related contaminants have not been detected in the existing water supply well. The purpose of the institutional control was to prevent the installation of a new water supply well in a location on the property that is closer to the historic extent of the site related contamination. The second property is a property where the landowner is working with EPA/MEDEP to finalize the institutional controls but the finalization has been delayed due to subordination issues.

An in-situ bioremediation bench scale test was performed in 2014 (Nobis, 2015a) to assess the viability of bioremediation as a method of further reducing Site COCs and to evaluate potential implementation scenarios at the Site. The bench testing concluded that aerobic in-situ bioremediation was successful in reducing chlorobenzene compounds in Site groundwater to concentrations below detectable limits. Currently, a pilot-scale field application is planned for implementation at the Site in Fall 2015.

System Operation/Operation and Maintenance

The Site LTRA has not yet been completed. As a result, O&M activities have not begun. The LTRA activities ensure the ongoing protectiveness of the Remedial Action. Periodic Site inspections, monitoring, and the ongoing implementation of the in-situ chemical oxidation are part of the LTRA.

OU2 Record of Decision

In September 2004, EPA signed a no-action ROD for OU 2. OU 2 includes the surface water, sediment, and floodplain along the East Branch of the Sebasticook River extending from the end of the NTCRA/OU 1 area to Sebasticook Lake. Based upon the results of the OU 2 Remedial Investigation, including the Baseline Human Health Risk Assessment and revised Baseline Ecological Risk Assessment, EPA determined that no CERCLA remedial action was necessary to protect public health or welfare or the environment for the areas within OU 2. The September 2004 OU 2 ROD specifically stated that EPA has determined that no further remedial action is necessary at this Site. The 2002 ROD further stated that previous response actions implemented as part of a NTCRA and the OU 1 remedial action will adequately control the principal and low-level threats at the Site. The NTCRA removed all of the surface and near surface contamination in the soil, sediment, and floodplain areas in downtown Corinna and for the first several hundred yards of the East Branch of the Sebasticook River. This included the section of the East Branch where DNAPL was observed in the river bed. The OU 1 remedial action will address the remaining principal threat wastes in the deep overburden and bedrock groundwater. As this is a decision for No Action, the statutory requirements of CERCLA Section 121 for remedial actions are not applicable. Therefore, EPA does not intend to perform 5-year reviews of the OU 2 decision. EPA will, however, be performing five year reviews for the OU 1 portions of the Site pursuant to the September 2002 ROD for OU 1.

APPENDIX B

Appendix B

Documents Reviewed/References

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Nobis, 2008a. 2007 Area-Wide Groundwater Monitoring Report, Eastland Woolen Mill Superfund Site, Operable Unit 1 Remedial Action, Corinna, Maine. Nobis Engineering, Inc. May 2008.

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Nobis, 2014a. 2012 Area-Wide Groundwater Monitoring Report, Eastland Woolen Mill Superfund Site, Corinna, Maine. Nobis Engineering, Inc. March 2014.

Nobis, 2014b. 2013 (Draft) Area-Wide Groundwater Monitoring Report, Eastland Woolen Mill Superfund Site, Corinna, Maine. Nobis Engineering, Inc. June 2014.

Nobis, 2015a. 2014 In-Situ Bioremediation Bench Test Technical Memorandum, Eastland Woolen Mill Superfund Site, Corinna, Maine. Nobis Engineering, Inc. January 2015.

Nobis, 2015b. 2014 (Draft) Area-Wide Groundwater Monitoring Report, Eastland Woolen Mill Superfund Site, Corinna, Maine. Nobis Engineering, Inc. May 2015.

Weston, 2004. Non-Time Critical Removal Action, Eastland Woolen Mill Superfund Site, Corinna, Maine, Preliminary Draft Overall Completion Report. Weston Solutions, Inc., April 2004.

APPENDIX C

Newsroom

News Releases from Region 1

EPA Will Review 24 Hazardous Site Cleanups during 2015

Release Date: 01/05/2015
Contact Information: Emily Bender, 617-918-1037

EPA will review site clean ups and remedies at 20 Superfund Sites and oversee reviews at 4 Federal Facilities across New England this year by doing scheduled Five-Year Reviews at each site.

EPA conducts evaluations every five years on previously-completed clean up and remediation work performed at Superfund sites and Federal Facilities listed on the "National Priorities List" (aka Superfund sites) to determine whether the implemented remedies at the sites continue to be protective of human health and the environment. Further, five year review evaluations identify any deficiencies to the previous work and, if called for, recommend action(s) necessary to address them.

The Superfund Sites where EPA will begin Five Year Reviews in FY' 2015 (October 1, 2014 through September 30, 2015) are below. Please note, the Web link provided after each site provides detailed information on the site status and past assessment and cleanup activity. The web link also provides contact information for the EPA Project Manager and Community Involvement Coordinator at each site. Community members and local officials are invited to contact EPA with any comments or current concerns about a Superfund Site or about the conclusions of the previous Five Year Review.

The Superfund Sites at which EPA is performing Five Year Reviews over the following several months include the following sites.

Connecticut
Durham Meadows, Durham
http://www.epa.gov/region1/superfund/sites/durham

Old Southington Landfill, Southington
http://www.epa.gov/region1/superfund/sites/oldsouthington

Raymark Industries, Stratford
http://www.epa.gov/region1/superfund/sites/raymark

Solvents Recovery Services of New England, Southington
http://www.epa.gov/region1/superfund/sites/srs

Maine

Brunswick Naval Air Station (Federal Facility), Brunswick
http://www.epa.gov/region1/superfund/sites/brunswick

Callahan Mining Corp., Brooksville
http://www.epa.gov/region1/superfund/sites/callahan

Eastland Woolen Mill, Corinna
http://www.epa.gov/region1/superfund/sites/eastland

Loring Air Force Base (Federal Facility), Limestone
http://www.epa.gov/region1/superfund/sites/loring

Pinette's Salvage Yard, Washburn
http://www.epa.gov/region1/superfund/sites/pinette

Saco Municipal Landfill, Saco
http://www.epa.gov/region1/superfund/sites/sacolandfill

Massachusetts

Atlas Tack Corp., Fairhaven
http://www.epa.gov/region1/superfund/sites/atlas

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View selected historical press releases from 1970 to 1998 in the EPA History website.

Recent additions

03/31/2015 Three Massachusetts Students Selected for EPA Fellowships to Support Next Generation of Environmental Scientists
03/31/2015 UNH Student Selected for EPA Fellowships to Support Next Generation of Environmental Scientists
03/31/2015 Univ. of New Haven Student Selected for EPA Fellowships to Support Next Generation of Environmental Scientists
03/27/2015 EPA Awards Funding for Brownfield Cleanup Planning in Lawrence and New Bedford, Mass. and Portland, Maine
03/27/2015 EPA Action Ensures that Runoff Doesn't Harm Nearby Streams at North Reading, Mass. Construction Site

Cannon Engineering Corp., Bridgewater
http://www.epa.gov/region1/superfund/sites/cannon

Charles-George Reclamation Trust Landfill, Tyngsborough
http://www.epa.gov/region1/superfund/sites/charlesgeorge

Fort Devens (Federal Facility), Ayer, Harvard, Lancaster & Shirley
http://www.epa.gov/region1/superfund/sites/devens

Groveland Wells No. 1 & 2 Site, Groveland
http://www.epa.gov/region1/superfund/sites/groveland

Materials Technology Laboratory (US ARMY, Federal Facility), Watertown
http://www.epa.gov/region1/superfund/sites/amtl

New Bedford Harbor, New Bedford
www.epa.gov/nbh

PSC Resources, Palmer
http://www.epa.gov/region1/superfund/sites/psc

New Hampshire

Somersworth Sanitary Landfill, Somersworth
http://www.epa.gov/region1/superfund/sites/somersworth

South Municipal Water Supply Well (Five Year Review Addendum), Peterborough
http://www.epa.gov/region1/superfund/sites/southmuni

Troy Mills Landfill, Troy
http://www.epa.gov/region1/superfund/sites/troymills

Rhode Island

Stamina Mills Inc., North Smithfield
http://www.epa.gov/region1/superfund/sites/stamina

West Kingston Town Dump/URI Disposal Area, South Kingstown
http://www.epa.gov/region1/superfund/sites/wkingston

Vermont

Burgess Brothers Landfill, Woodford and Bennington
http://www.epa.gov/region1/superfund/sites/burgess

Last updated on 4/1/2015

APPENDIX D

Eastland Woolen Mill Superfund Site

Five Year Review Appendix D

State and Local Authority Interview Responses:

Maine Department of Environmental Protection response
By Rebecca Hewett, State Project Manager on July 17, 2015

Background: The U.S. Environmental Protection Agency (EPA) conducts regular checkups, called five-year reviews, on certain Superfund sites to make sure the cleanup continues to protect people and the environment. At any site where protection of the community and environment is dependent upon maintenance of engineering controls, EPA will inspect the site to make sure these engineering controls (cover systems, surface water diversion channels) are not damaged and are working properly. EPA will review completed, planned, and activity still in progress.

During the review, EPA studies information on the site, including the cleanup and the laws that apply, and inspects the site to make sure it continues to be protective.

1. Do you have any concerns about the contamination at the Eastland Woolen Mill site that are not being addressed by the current or planned cleanup actions?

   Response: No.

2. Do you know of any Eastland Woolen Mill site conditions that may impact the protectiveness of the completed and planned cleanup activities?

Response: Currently, institutional controls, groundwater use limitations in the form of environmental covenants (EC), have not been placed on 2 parcels located within the groundwater institutional controls zone (ICZ). Based on current site information, groundwater ICZ, groundwater use and status of the institutional controls (in the form of environmental covenants) protectiveness could be impacted by changes to the current pumping conditions at 2 parcels (Lots 44 and 64) located within the ICZ.

Current private well at Lot 44 is in use and to date not impacted by the groundwater contaminant plume. The parcel was included in the ICZ based on the potential for changes in pumping rate and current well depth or a new well on the parcel might be end up with groundwater contamination from the EWM site groundwater contaminant plume.

Lot 64 well is no longer used as a residential well but is currently used as a monitoring well for the EWM site. The residence on Lot 64 is connected to the public water line. Groundwater contaminants have historically been detected at low levels in a well located about 100 feet away on an adjacent parcel (Lot 63). Use of the existing well or new well(s) on the Lot 64 parcel has the potential to draw groundwater contaminants to them and expand the contaminant plume. The owner of Lot 44 has declined Maine DEP's request to place groundwater use limitations on their parcel. Currently, Maine DEP is waiting to hear from the Lot 64 owners as to whether or not they will place groundwater use limitations on their parcel.

3. Now that the majority of the Eastland Woolen Mill cleanup actions have been complete for several years, do you feel well informed about the site activities? If not, what would be the best way to keep you informed?

   Response: Yes.

4. Has EPA adequately addresses any concerns identified by your office (state or local government)?

   Response: Yes.

5. Are there any issues other that have not been addressed to your satisfaction? If so, please clarify?

   Response: No.

6. Do you have any other comments to offer regarding the cleanup actions at the Eastland Woolen Mill Superfund site?

   Response: No.

Response from Town of Corinna (Town Manager) and Selectboard

Received July 24, 2015

1. Do you have any concerns about the contamination at the Eastland Woolen Mill site that are not being addressed by the current or planned cleanup actions? There is always a concern when a major cleanup like the Eastland Woolen Mill takes place but we are confident in the set-up and testing that has been in ongoing and at this time have no specific concerns.

2. Do you know of any Eastland Woolen Mill site conditions that may impact the protectiveness of the completed and planned cleanup activities? None at this time.

3. Now that the majority of the Eastland Woolen Mill cleanup actions have been complete for several years, do you feel well informed about the site activities? We feel very confident in the process that has been enacted. We have good contact information and would know where to turn if there ever did come a time when we had a concern or wanted questions answered. If not, what would be the best way to keep you informed? N/A

4. Has EPA adequately addressed any concerns identified by your office (state or local government)? EPA personnel have always been very informative and quick with any responses that we have needed.

5. Are there any issues that have not been addressed to your satisfaction? If so, please clarify? None at this present time.

6. Do you have any other comments to offer regarding the cleanup actions at the Eastland Woolen Mill Superfund site? It was a very thorough job that we have been steadfastly keeping an eye on as has the EPA. We appreciate the periodic reporting that is in place.

Eastland Woolen Mill Superfund Site
Five Year Review
Community Interview Questions

July 28, 2015

Respondent: Kenneth Dow, PO Box 2, Corinna, ME 04928

1. Do you have any concerns about the contamination at the Eastland Woolen Mill site that are not being addressed by the current or planned cleanup actions?

No, I do not have any concerns. It is my understanding that the remaining contamination is contained and monitored for movement underground. Restrictions on the installation or use of bedrock wells on the site or near the area are in place to reduce the movement of the contamination plume through the bedrock that such wells might cause.

2. Do you know of any Eastland Woolen Mill site conditions that may impact the protectiveness of the completed and planned cleanup activities?

No.

3. Now that the majority of the Eastland Woolen Mill cleanup actions have been completed for several years, do you feel well informed about the site activities? If not, what would be the best way to keep you informed.

Occasionally, we see workers at the site using small equipment near the well heads. I assume this is monitoring activity. The site is highly visible. People driving by have no way of knowing for sure what the workers are doing or why they are at the site. Perhaps a one-page poster could be provided to the Corinna Town Office, to be posted at the office, informing residents of what the workers are doing.

While it may not be applicable in this case, another effective way to communicate with residents in Corinna and the surrounding area is to place articles in the local free weekly papers; "The Rolling Thunder Express", published in Newport, and "The Eastern Gazette", published in Dexter.

4. Do you have any other comments to offer regarding the cleanup actions at the Eastland Woolen Mill Superfund site?

The Town of Corinna was dramatically changed by the cleanup, changes primarily of a physical nature. The structures and enterprises that made up the village of the town are gone. What remains is aesthetically pleasing, open green space and the stream, but it is not economically productive. It is important to note that the lose of productivity was not caused by the cleanup. The cleanup was the end point of a general decline resulting from changes in economic conditions in the area. Corinna may never be the hub of economic activity it once was.

The cleanup provided the town with a "clean slate". So far the town has not found a way to move forward putting the clean slate to productive use.

APPENDIX E

Area 1 looking south/southeast towards the EBSR and Route 7/11.

Northern portion of Area 1 looking northwest toward Main Street and the job trailer.

Looking west across the EBSR toward the job trailer.

EBSR looking southeast toward Building 14 and the UST Area.

EBSR and southern portion of Area 1 looking north.

SITE PHOTOGRAPHS WERE TAKEN BY NOBIS ENGINEERING, INC. ON JUNE 16, 2015.

Nobis
Engineering a Sustainable Future
Nobis Engineering, Inc.
18 Chenell Drive
Concord, NH 03301
T(603) 224-4182
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APPENDIX E

SITE INSPECTION PHOTOGRAPHS
EASTLAND WOOLEN MILL SUPERFUND SITE
CORINNA, MAINE

DRAWN BY:	NZ	CHECKED BY:	TA
PROJECT NO.	80097.05	DATE:	SEPTEMBER 2015

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APPENDIX F

Vapor Intrusion Screening Level (VISL) Calculator

Data Sheets

(USEPA Version 2.0, May 2012)

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
			Csg	Cia	CR	HQ	IUR		RfC		
			(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
	83-32-9	Acenaphthene	NA	--	--	--					
	75-07-0	Acetaldehyde	NA	--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone	NA	--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin	NA	--	--	--			6.00E-02	P	
	75-05-8	Acetonitrile	NA	--	--	--			6.00E-02	I	
	98-86-2	Acetophenone	NA	--	--	--					
	107-02-8	Acrolein	NA	--	--	--			2.00E-05	I	
	107-13-1	Acrylonitrile	NA	--	--	--	6.80E-05	I	2.00E-03	I	
	107-05-1	Allyl Chloride	NA	--	--	--	6.00E-06	CA	1.00E-03	I	
	120-12-7	Anthracene	NA	--	--	--					
	11104-28-2	Aroclor 1221	NA	--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232	NA	--	--	--	5.70E-04	S			
	103-33-3	Azobenzene	NA	--	--	--	3.10E-05	I			
	100-52-7	Benzaldehyde	NA	--	--	--					
x	71-43-2	Benzene	4.5E-01	4.52E-02	1.4E-07	1.4E-03	7.80E-06	I	3.00E-02	I	
	108-98-5	Benzenethiol	NA	--	--	--					
	98-07-7	Benzotrichloride	NA	--	--	--					
	100-44-7	Benzyl Chloride	NA	--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-	NA	--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether	NA	--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether	NA	--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether	NA	--	--	--	6.20E-02	I			
	107-04-0	Bromo-2-chloroethane, 1-	NA	--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene	NA	--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane	NA	--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane	NA	--	--	--	3.70E-05	CA			
	74-83-9	Bromomethane	NA	--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-	NA	--	--	--	3.00E-05	I	2.00E-03	I	
	104-51-8	Butylbenzene, n-	NA	--	--	--					
x	75-15-0	Carbon Disulfide	NA	--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride	4.7E+00	4.74E-01	**1.2E-06**	4.5E-03	6.00E-06	I	1.00E-01	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-	NA	--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-	NA	--	--	--	3.00E-04	I	2.00E-02	I	
	107-20-0	Chloroacetaldehyde, 2-	NA	--	--	--					
	108-90-7	Chlorobenzene	NA	--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-	NA	--	--	--			3.00E-01	P	
	109-69-3	Chlorobutane, 1-	NA	--	--	--					
	75-45-6	Chlorodifluoromethane	NA	--	--	--			5.00E+01	I	
	67-66-3	Chloroform	2.9E+00	2.92E-01	**2.8E-06**	2.9E-03	2.30E-05	I	9.80E-02	A	
x	74-87-3	Chloromethane	4.8E-01	4.80E-02	No IUR	5.1E-04			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether	NA	--	--	--	6.90E-04	CA			
	91-58-7	Chloronaphthalene, Beta-	NA	--	--	--					
	95-57-8	Chlorophenol, 2-	NA	--	--	--					
	76-06-2	Chloropicrin	NA	--	--	--			4.00E-04	CA	
	95-49-8	Chlorotoluene, o-	NA	--	--	--					
	106-43-4	Chlorotoluene, p-	NA	--	--	--					
	123-73-9	Crotonaldehyde, trans-	NA	--	--	--					
	98-82-8	Cumene	NA	--	--	--			4.00E-01	I	
	57-12-5	Cyanide (CN-)	NA	--	--	--					
	460-19-5	Cyanogen	NA	--	--	--					

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	506-68-3	Cyanogen Bromide	NA	--	--	--					
	506-77-4	Cyanogen Chloride	NA	--	--	--					
	110-82-7	Cyclohexane	NA	--	--	--			6.00E+00	I	
	132-64-9	Dibenzofuran	NA	--	--	--					
	96-12-8	Dibromo-3-chloropropane, 1,2-	NA	--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane	NA	--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-	NA	--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)	NA	--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-	NA	--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-	NA	--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-	NA	--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-	NA	--	--	--			2.00E-01	H	
x	106-46-7	Dichlorobenzene, 1,4-	NA	--	--	--	1.10E-05	CA	8.00E-01	I	
x	75-71-8	Dichlorodifluoromethane	3.7E-01	3.75E-02	No IUR	3.6E-04			1.00E-01	X	
x	75-34-3	Dichloroethane, 1,1-	4.1E-01	4.10E-02	2.7E-08	No RfC	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-	NA	--	--	--	2.60E-05	I	7.00E-03	P	
x	75-35-4	Dichloroethylene, 1,1-	NA	--	--	--			2.00E-01	I	
x	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	NA	--	--	--					
	156-59-2	Dichloroethylene, 1,2-cis-	NA	--	--	--					
	156-60-5	Dichloroethylene, 1,2-trans-	NA	--	--	--			6.00E-02	P	
	78-87-5	Dichloropropane, 1,2-	NA	--	--	--	1.00E-05	CA	4.00E-03	I	
	142-28-9	Dichloropropane, 1,3-	NA	--	--	--					
	542-75-6	Dichloropropene, 1,3-	NA	--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene	NA	--	--	--			7.00E-03	P	
	75-37-6	Difluoroethane, 1,1-	NA	--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole	NA	--	--	--					
	108-20-3	Diisopropyl Ether	NA	--	--	--			7.00E-01	P	
	1445-75-6	Diisopropyl Methylphosphonate	NA	--	--	--					
	121-69-7	Dimethylaniline, N,N-	NA	--	--	--					
	120-61-6	Dimethylterephthalate	NA	--	--	--					
	513-37-1	Dimethylvinylchloride	NA	--	--	--					
	505-29-3	Dithiane, 1,4-	NA	--	--	--					
	106-89-8	Epichlorohydrin	NA	--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-	NA	--	--	--			2.00E-02	I	
	759-94-4	EPTC	NA	--	--	--					
	141-78-6	Ethyl Acetate	NA	--	--	--					
x	140-88-5	Ethyl Acrylate	NA	--	--	--					
	75-00-3	Ethyl Chloride	NA	--	--	--			1.00E+01	I	
	60-29-7	Ethyl Ether	NA	--	--	--					
	97-63-2	Ethyl Methacrylate	NA	--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene	NA	--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide	NA	--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine	NA	--	--	--					
	86-73-7	Fluorene	NA	--	--	--					
	110-00-9	Furan	NA	--	--	--					
	822-06-0	Hexamethylene Diisocyanate, 1,6-	NA	--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-	4.9E-01	4.90E-02	No IUR	6.7E-05			7.00E-01	I	
	591-78-6	Hexanone, 2-	NA	--	--	--			3.00E-02	I	
	74-90-8	Hydrogen Cyanide	NA	--	--	--			8.00E-04	I	
	NA (JP-7)	JP-7	NA	--	--	--			3.00E-01	A	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	7439-97-6	Mercury (elemental)	NA	--	--	--			3.00E-04	I	
	126-98-7	Methacrylonitrile	NA	--	--	--			7.00E-04	H	
	79-20-9	Methyl Acetate	NA	--	--	--					
	96-33-3	Methyl Acrylate	NA	--	--	--					
	78-93-3	Methyl Ethyl Ketone (2-Butanone)	1.9E+00	1.94E-01	No IUR	3.7E-05			5.00E+00	I	
	108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentan	NA	--	--	--			3.00E+00	I	
	624-83-9	Methyl Isocyanate	NA	--	--	--					
	80-62-6	Methyl Methacrylate	NA	--	--	--			7.00E-01	I	
	25013-15-4	Methyl Styrene (Mixed Isomers)	NA	--	--	--			4.00E-02	H	
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	NA	--	--	--	2.60E-07	CA	3.00E+00	I	
	75-09-2	Methylene Chloride	NA	--	--	--	1.00E-08	I	6.00E-01	I	Mut
	90-12-0	Methylnaphthalene, 1-	NA	--	--	--					
	91-57-6	Methylnaphthalene, 2-	NA	--	--	--					
	98-83-9	Methylstyrene, Alpha-	NA	--	--	--					
	8012-95-1	Mineral oils	NA	--	--	--					
	64724-95-6	Naphtha, High Flash Aromatic (HFAN)	NA	--	--	--			1.00E-01	P	
	91-20-3	Naphthalene	NA	--	--	--	3.40E-05	CA	3.00E-03	I	
	98-95-3	Nitrobenzene	NA	--	--	--	4.00E-05	I	9.00E-03	I	
	75-52-5	Nitromethane	NA	--	--	--	9.00E-06	P	2.00E-02	P	
	79-46-9	Nitropropane, 2-	NA	--	--	--	2.70E-03	H	2.00E-02	I	
	924-16-3	Nitroso-di-N-butylamine, N-	NA	--	--	--	1.60E-03	I			
	88-72-2	Nitrotoluene, o-	NA	--	--	--					
	111-84-2	Nonane, n-	NA	--	--	--			2.00E-01	P	
	109-66-0	Pentane, n-	NA	--	--	--			1.00E+00	P	
	75-44-5	Phosgene	NA	--	--	--			3.00E-04	I	
	123-38-6	Propionaldehyde	NA	--	--	--			8.00E-03	I	
	103-65-1	Propyl benzene	NA	--	--	--			1.00E+00	X	
	115-07-1	Propylene	NA	--	--	--					
	75-56-9	Propylene Oxide	NA	--	--	--	3.70E-06	I	3.00E-02	I	
	129-00-0	Pyrene	NA	--	--	--					
	110-86-1	Pyridine	NA	--	--	--					
	100-42-5	Styrene	NA	--	--	--			1.00E+00	I	
	630-20-6	Tetrachloroethane, 1,1,1,2-	NA	--	--	--	7.40E-06	I			
x	79-34-5	Tetrachloroethane, 1,1,2,2-	NA	--	--	--	5.80E-05	CA			
x	127-18-4	Tetrachloroethylene	1.2E+00	1.20E-01	1.3E-08	2.9E-03	2.60E-07	I	4.00E-02	I	
	811-97-2	Tetrafluoroethane, 1,1,1,2-	NA	--	--	--			8.00E+01	I	
	109-99-9	Tetrahydrofuran	NA	--	--	--					
	463-56-9	Thiocyanate	NA	--	--	--					
x	108-88-3	Toluene	4.5E-01	4.50E-02	No IUR	8.6E-06			5.00E+00	I	
	76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	NA	--	--	--			3.00E+01	H	
	87-61-6	Trichlorobenzene, 1,2,3-	NA	--	--	--					
	120-82-1	Trichlorobenzene, 1,2,4-	NA	--	--	--			2.00E-03	P	
x	71-55-6	Trichloroethane, 1,1,1-	2.0E+00	2.00E-01	No IUR	3.8E-05			5.00E+00	I	
x	79-00-5	Trichloroethane, 1,1,2-	NA	--	--	--	1.60E-05	I	2.00E-04	X	
x	79-01-6	Trichloroethylene	NA	--	--	--	see note	I	2.00E-03	I	TCE
	75-69-4	Trichlorofluoromethane	9.6E-01	9.60E-02	No IUR	1.3E-04			7.00E-01	H	
	598-77-6	Trichloropropane, 1,1,2-	NA	--	--	--					
	96-18-4	Trichloropropane, 1,2,3-	NA	--	--	--			3.00E-04	I	Mut
	96-19-5	Trichloropropene, 1,2,3-	NA	--	--	--			3.00E-04	P	
	121-44-8	Triethylamine	NA	--	--	--			7.00E-03	I	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	526-73-8	Trimethylbenzene, 1,2,3-	NA	--	--	--			5.00E-03	P	
	95-63-6	Trimethylbenzene, 1,2,4-	NA	--	--	--			7.00E-03	P	
	108-67-8	Trimethylbenzene, 1,3,5-	NA	--	--	--					
	108-05-4	Vinyl Acetate	NA	--	--	--			2.00E-01	I	
	593-60-2	Vinyl Bromide	NA	--	--	--	3.20E-05	H	3.00E-03	I	
x	75-01-4	Vinyl Chloride	NA	--	--	--	4.40E-06	I	1.00E-01	I	VC
	108-38-3	Xylene, m-	NA	--	--	--			1.00E-01	S	
x	95-47-6	Xylene, o-	NA	--	--	--			1.00E-01	S	
x	106-42-3	Xylene, P-	NA	--	--	--			1.00E-01	S	
x	1330-20-7	Xylenes	NA	--	--	--			1.00E-01	I	

x

x **Notes:**

x

x (1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	ATc_SG	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	30	ATnc_C_SG	25	ATnc_SG	30
Exposure duration	(yrs)	ED_R_SG	30	ED_C_SG	25	ED_SG	30
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	EF_SG	350
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	ET_SG	24

x

x (2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	(-)	AFgw_R_SG	0.001	AFgw_C_SG	0.001	AFgw_SG	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.1	AFss_C_SG	0.1	AFss_SG	0.1

x

x (3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

x

x (4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

x

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 30 years	14	1

Mutagenic-mode-of-action (MMOA) adjustment factor 76 This factor is used in the equations for mutagenic chemicals.

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
x										
x	Vinyl Chloride	See the Navigation Guide equation for Cia,c for vinyl chloride.								
x										

x **Notation:**

x I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

x P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

x A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

x CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

x H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

x S = See RSL User Guide, Section 5

x X = PPRTV Appendix

x Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

x VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

x TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

x Yellow highlighting indicates site-specific parameters that may be edited by the user.

x Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be change

x Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
			Csg	Cia	CR	HQ	IUR		RfC		
			(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
	83-32-9	Acenaphthene	NA	--	--	--					
	75-07-0	Acetaldehyde	NA	--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone	NA	--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin	NA	--	--	--			6.00E-02	P	
	75-05-8	Acetonitrile	NA	--	--	--			6.00E-02	I	
	98-86-2	Acetophenone	NA	--	--	--					
	107-02-8	Acrolein	NA	--	--	--			2.00E-05	I	
	107-13-1	Acrylonitrile	NA	--	--	--	6.80E-05	I	2.00E-03	I	
	107-05-1	Allyl Chloride	NA	--	--	--	6.00E-06	CA	1.00E-03	I	
	120-12-7	Anthracene	NA	--	--	--					
	11104-28-2	Aroclor 1221	NA	--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232	NA	--	--	--	5.70E-04	S			
	103-33-3	Azobenzene	NA	--	--	--	3.10E-05	I			
	100-52-7	Benzaldehyde	NA	--	--	--					
x	71-43-2	Benzene	NA	--	--	--	7.80E-06	I	3.00E-02	I	
	108-98-5	Benzenethiol	NA	--	--	--					
	98-07-7	Benzotrichloride	NA	--	--	--					
	100-44-7	Benzyl Chloride	NA	--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-	NA	--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether	NA	--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether	NA	--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether	NA	--	--	--	6.20E-02	I			
	107-04-0	Bromo-2-chloroethane, 1-	NA	--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene	NA	--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane	NA	--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane	NA	--	--	--	3.70E-05	CA			
	74-83-9	Bromomethane	NA	--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-	NA	--	--	--	3.00E-05	I	2.00E-03	I	
	104-51-8	Butylbenzene, n-	NA	--	--	--					
x	75-15-0	Carbon Disulfide	NA	--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride	NA	--	--	--	6.00E-06	I	1.00E-01	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-	NA	--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-	NA	--	--	--	3.00E-04	I	2.00E-02	I	
	107-20-0	Chloroacetaldehyde, 2-	NA	--	--	--					
	108-90-7	Chlorobenzene	NA	--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-	NA	--	--	--			3.00E-01	P	
	109-69-3	Chlorobutane, 1-	NA	--	--	--					
	75-45-6	Chlorodifluoromethane	NA	--	--	--			5.00E+01	I	
	67-66-3	Chloroform	6.5E+00	6.50E-01	**6.1E-06**	6.4E-03	2.30E-05	I	9.80E-02	A	
x	74-87-3	Chloromethane	NA	--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether	NA	--	--	--	6.90E-04	CA			
	91-58-7	Chloronaphthalene, Beta-	NA	--	--	--					
	95-57-8	Chlorophenol, 2-	NA	--	--	--					
	76-06-2	Chloropicrin	NA	--	--	--			4.00E-04	CA	
	95-49-8	Chlorotoluene, o-	NA	--	--	--					
	106-43-4	Chlorotoluene, p-	NA	--	--	--					
	123-73-9	Crotonaldehyde, trans-	NA	--	--	--					
	98-82-8	Cumene	NA	--	--	--			4.00E-01	I	
	57-12-5	Cyanide (CN-)	NA	--	--	--					
	460-19-5	Cyanogen	NA	--	--	--					

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
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Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	506-68-3	Cyanogen Bromide	NA	--	--	--					
	506-77-4	Cyanogen Chloride	NA	--	--	--					
	110-82-7	Cyclohexane	NA	--	--	--			6.00E+00	I	
	132-64-9	Dibenzofuran	NA	--	--	--					
	96-12-8	Dibromo-3-chloropropane, 1,2-	NA	--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane	NA	--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-	NA	--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)	NA	--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-	NA	--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-	NA	--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-	NA	--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-	NA	--	--	--			2.00E-01	H	
x	106-46-7	Dichlorobenzene, 1,4-	NA	--	--	--	1.10E-05	CA	8.00E-01	I	
x	75-71-8	Dichlorodifluoromethane	NA	--	--	--			1.00E-01	X	
x	75-34-3	Dichloroethane, 1,1-	NA	--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-	NA	--	--	--	2.60E-05	I	7.00E-03	P	
x	75-35-4	Dichloroethylene, 1,1-	NA	--	--	--			2.00E-01	I	
x	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	NA	--	--	--					
	156-59-2	Dichloroethylene, 1,2-cis-	NA	--	--	--					
	156-60-5	Dichloroethylene, 1,2-trans-	NA	--	--	--			6.00E-02	P	
	78-87-5	Dichloropropane, 1,2-	NA	--	--	--	1.00E-05	CA	4.00E-03	I	
	142-28-9	Dichloropropane, 1,3-	NA	--	--	--					
	542-75-6	Dichloropropene, 1,3-	NA	--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene	NA	--	--	--			7.00E-03	P	
	75-37-6	Difluoroethane, 1,1-	NA	--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole	NA	--	--	--					
	108-20-3	Diisopropyl Ether	NA	--	--	--			7.00E-01	P	
	1445-75-6	Diisopropyl Methylphosphonate	NA	--	--	--					
	121-69-7	Dimethylaniline, N,N-	NA	--	--	--					
	120-61-6	Dimethylterephthalate	NA	--	--	--					
	513-37-1	Dimethylvinylchloride	NA	--	--	--					
	505-29-3	Dithiane, 1,4-	NA	--	--	--					
	106-89-8	Epichlorohydrin	NA	--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-	NA	--	--	--			2.00E-02	I	
	759-94-4	EPTC	NA	--	--	--					
	141-78-6	Ethyl Acetate	NA	--	--	--					
x	140-88-5	Ethyl Acrylate	NA	--	--	--					
	75-00-3	Ethyl Chloride	NA	--	--	--			1.00E+01	I	
	60-29-7	Ethyl Ether	NA	--	--	--					
	97-63-2	Ethyl Methacrylate	NA	--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene	NA	--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide	NA	--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine	NA	--	--	--					
	86-73-7	Fluorene	NA	--	--	--					
	110-00-9	Furan	NA	--	--	--					
	822-06-0	Hexamethylene Diisocyanate, 1,6-	NA	--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-	4.9E-01	4.90E-02	No IUR	6.7E-05			7.00E-01	I	
	591-78-6	Hexanone, 2-	NA	--	--	--			3.00E-02	I	
	74-90-8	Hydrogen Cyanide	NA	--	--	--			8.00E-04	I	
	NA (JP-7)	JP-7	NA	--	--	--			3.00E-01	A	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	7439-97-6	Mercury (elemental)	NA	--	--	--			3.00E-04	I	
	126-98-7	Methacrylonitrile	NA	--	--	--			7.00E-04	H	
	79-20-9	Methyl Acetate	NA	--	--	--					
	96-33-3	Methyl Acrylate	NA	--	--	--					
	78-93-3	Methyl Ethyl Ketone (2-Butanone)	6.8E-01	6.80E-02	No IUR	1.3E-05			5.00E+00	I	
	108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentan	7.4E-01	7.45E-02	No IUR	2.4E-05			3.00E+00	I	
	624-83-9	Methyl Isocyanate	NA	--	--	--					
	80-62-6	Methyl Methacrylate	NA	--	--	--			7.00E-01	I	
	25013-15-4	Methyl Styrene (Mixed Isomers)	NA	--	--	--			4.00E-02	H	
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	NA	--	--	--	2.60E-07	CA	3.00E+00	I	
	75-09-2	Methylene Chloride	NA	--	--	--	1.00E-08	I	6.00E-01	I	Mut
	90-12-0	Methylnaphthalene, 1-	NA	--	--	--					
	91-57-6	Methylnaphthalene, 2-	NA	--	--	--					
	98-83-9	Methylstyrene, Alpha-	NA	--	--	--					
	8012-95-1	Mineral oils	NA	--	--	--					
	64724-95-6	Naphtha, High Flash Aromatic (HFAN)	NA	--	--	--			1.00E-01	P	
	91-20-3	Naphthalene	NA	--	--	--	3.40E-05	CA	3.00E-03	I	
	98-95-3	Nitrobenzene	NA	--	--	--	4.00E-05	I	9.00E-03	I	
	75-52-5	Nitromethane	NA	--	--	--	9.00E-06	P	2.00E-02	P	
	79-46-9	Nitropropane, 2-	NA	--	--	--	2.70E-03	H	2.00E-02	I	
	924-16-3	Nitroso-di-N-butylamine, N-	NA	--	--	--	1.60E-03	I			
	88-72-2	Nitrotoluene, o-	NA	--	--	--					
	111-84-2	Nonane, n-	NA	--	--	--			2.00E-01	P	
	109-66-0	Pentane, n-	NA	--	--	--			1.00E+00	P	
	75-44-5	Phosgene	NA	--	--	--			3.00E-04	I	
	123-38-6	Propionaldehyde	NA	--	--	--			8.00E-03	I	
	103-65-1	Propyl benzene	NA	--	--	--			1.00E+00	X	
	115-07-1	Propylene	NA	--	--	--					
	75-56-9	Propylene Oxide	NA	--	--	--	3.70E-06	I	3.00E-02	I	
	129-00-0	Pyrene	NA	--	--	--					
	110-86-1	Pyridine	NA	--	--	--					
	100-42-5	Styrene	NA	--	--	--			1.00E+00	I	
	630-20-6	Tetrachloroethane, 1,1,1,2-	NA	--	--	--	7.40E-06	I			
x	79-34-5	Tetrachloroethane, 1,1,2,2-	NA	--	--	--	5.80E-05	CA			
x	127-18-4	Tetrachloroethylene	NA	--	--	--	2.60E-07	I	4.00E-02	I	
	811-97-2	Tetrafluoroethane, 1,1,1,2-	NA	--	--	--			8.00E+01	I	
	109-99-9	Tetrahydrofuran	NA	--	--	--					
	463-56-9	Thiocyanate	NA	--	--	--					
x	108-88-3	Toluene	3.2E+00	3.20E-01	No IUR	6.1E-05			5.00E+00	I	
	76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	NA	--	--	--			3.00E+01	H	
	87-61-6	Trichlorobenzene, 1,2,3-	NA	--	--	--					
	120-82-1	Trichlorobenzene, 1,2,4-	NA	--	--	--			2.00E-03	P	
x	71-55-6	Trichloroethane, 1,1,1-	1.2E+01	1.22E+00	No IUR	2.3E-04			5.00E+00	I	
x	79-00-5	Trichloroethane, 1,1,2-	NA	--	--	--	1.60E-05	I	2.00E-04	X	
x	79-01-6	Trichloroethylene	NA	--	--	--	see note	I	2.00E-03	I	TCE
	75-69-4	Trichlorofluoromethane	7.9E-01	7.95E-02	No IUR	1.1E-04			7.00E-01	H	
	598-77-6	Trichloropropane, 1,1,2-	NA	--	--	--					
	96-18-4	Trichloropropane, 1,2,3-	NA	--	--	--			3.00E-04	I	Mut
	96-19-5	Trichloropropene, 1,2,3-	NA	--	--	--			3.00E-04	P	
	121-44-8	Triethylamine	NA	--	--	--			7.00E-03	I	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	526-73-8	Trimethylbenzene, 1,2,3-	NA	--	--	--			5.00E-03	P	
	95-63-6	Trimethylbenzene, 1,2,4-	NA	--	--	--			7.00E-03	P	
	108-67-8	Trimethylbenzene, 1,3,5-	NA	--	--	--					
	108-05-4	Vinyl Acetate	NA	--	--	--			2.00E-01	I	
	593-60-2	Vinyl Bromide	NA	--	--	--	3.20E-05	H	3.00E-03	I	
x	75-01-4	Vinyl Chloride	NA	--	--	--	4.40E-06	I	1.00E-01	I	VC
	108-38-3	Xylene, m-	NA	--	--	--			1.00E-01	S	
x	95-47-6	Xylene, o-	NA	--	--	--			1.00E-01	S	
x	106-42-3	Xylene, P-	NA	--	--	--			1.00E-01	S	
x	1330-20-7	Xylenes	NA	--	--	--			1.00E-01	I	

x

x **Notes:**

x

x (1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	ATc_SG	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	30	ATnc_C_SG	25	ATnc_SG	30
Exposure duration	(yrs)	ED_R_SG	30	ED_C_SG	25	ED_SG	30
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	EF_SG	350
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	ET_SG	24

x

x (2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	(-)	AFgw_R_SG	0.001	AFgw_C_SG	0.001	AFgw_SG	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.1	AFss_C_SG	0.1	AFss_SG	0.1

x

x (3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

x

x (4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

x

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 30 years	14	1

Mutagenic-mode-of-action (MMOA) adjustment factor 76 This factor is used in the equations for mutagenic chemicals.

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
x										
x	Vinyl Chloride	See the Navigation Guide equation for Cia,c for vinyl chloride.								
x										

x **Notation:**

x I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

x P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

x A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

x CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

x H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

x S = See RSL User Guide, Section 5

x X = PPRTV Appendix

x Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

x VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

x TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

x Yellow highlighting indicates site-specific parameters that may be edited by the user.

x Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be change

x Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
			Csg	Cia	CR	HQ	IUR		RfC		
			(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
	83-32-9	Acenaphthene	NA	--	--	--					
	75-07-0	Acetaldehyde	NA	--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone	NA	--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin	NA	--	--	--			6.00E-02	P	
	75-05-8	Acetonitrile	NA	--	--	--			6.00E-02	I	
	98-86-2	Acetophenone	NA	--	--	--					
	107-02-8	Acrolein	NA	--	--	--			2.00E-05	I	
	107-13-1	Acrylonitrile	NA	--	--	--	6.80E-05	I	2.00E-03	I	
	107-05-1	Allyl Chloride	NA	--	--	--	6.00E-06	CA	1.00E-03	I	
	120-12-7	Anthracene	NA	--	--	--					
	11104-28-2	Aroclor 1221	NA	--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232	NA	--	--	--	5.70E-04	S			
	103-33-3	Azobenzene	NA	--	--	--	3.10E-05	I			
	100-52-7	Benzaldehyde	NA	--	--	--					
x	71-43-2	Benzene	NA	--	--	--	7.80E-06	I	3.00E-02	I	
	108-98-5	Benzenethiol	NA	--	--	--					
	98-07-7	Benzotrichloride	NA	--	--	--					
	100-44-7	Benzyl Chloride	NA	--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-	NA	--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether	NA	--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether	NA	--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether	NA	--	--	--	6.20E-02	I			
	107-04-0	Bromo-2-chloroethane, 1-	NA	--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene	NA	--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane	NA	--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane	NA	--	--	--	3.70E-05	CA			
	74-83-9	Bromomethane	NA	--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-	NA	--	--	--	3.00E-05	I	2.00E-03	I	
	104-51-8	Butylbenzene, n-	NA	--	--	--					
x	75-15-0	Carbon Disulfide	NA	--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride	NA	--	--	--	6.00E-06	I	1.00E-01	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-	NA	--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-	NA	--	--	--	3.00E-04	I	2.00E-02	I	
	107-20-0	Chloroacetaldehyde, 2-	NA	--	--	--					
	108-90-7	Chlorobenzene	NA	--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-	NA	--	--	--			3.00E-01	P	
	109-69-3	Chlorobutane, 1-	NA	--	--	--					
	75-45-6	Chlorodifluoromethane	NA	--	--	--			5.00E+01	I	
	67-66-3	Chloroform	6.4E-01	6.41E-02	6.1E-07	6.3E-04	2.30E-05	I	9.80E-02	A	
x	74-87-3	Chloromethane	3.1E-01	3.13E-02	No IUR	3.3E-04			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether	NA	--	--	--	6.90E-04	CA			
	91-58-7	Chloronaphthalene, Beta-	NA	--	--	--					
	95-57-8	Chlorophenol, 2-	NA	--	--	--					
	76-06-2	Chloropicrin	NA	--	--	--			4.00E-04	CA	
	95-49-8	Chlorotoluene, o-	NA	--	--	--					
	106-43-4	Chlorotoluene, p-	NA	--	--	--					
	123-73-9	Crotonaldehyde, trans-	NA	--	--	--					
	98-82-8	Cumene	NA	--	--	--			4.00E-01	I	
	57-12-5	Cyanide (CN-)	NA	--	--	--					
	460-19-5	Cyanogen	NA	--	--	--					

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
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Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	506-68-3	Cyanogen Bromide	NA	--	--	--					
	506-77-4	Cyanogen Chloride	NA	--	--	--					
	110-82-7	Cyclohexane	NA	--	--	--			6.00E+00	I	
	132-64-9	Dibenzofuran	NA	--	--	--					
	96-12-8	Dibromo-3-chloropropane, 1,2-	NA	--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane	NA	--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-	NA	--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)	NA	--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-	NA	--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-	NA	--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-	NA	--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-	NA	--	--	--			2.00E-01	H	
x	106-46-7	Dichlorobenzene, 1,4-	NA	--	--	--	1.10E-05	CA	8.00E-01	I	
x	75-71-8	Dichlorodifluoromethane	7.9E-01	7.90E-02	No IUR	7.6E-04			1.00E-01	X	
x	75-34-3	Dichloroethane, 1,1-	NA	--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-	NA	--	--	--	2.60E-05	I	7.00E-03	P	
x	75-35-4	Dichloroethylene, 1,1-	NA	--	--	--			2.00E-01	I	
x	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	NA	--	--	--					
	156-59-2	Dichloroethylene, 1,2-cis-	NA	--	--	--					
	156-60-5	Dichloroethylene, 1,2-trans-	NA	--	--	--			6.00E-02	P	
	78-87-5	Dichloropropane, 1,2-	NA	--	--	--	1.00E-05	CA	4.00E-03	I	
	142-28-9	Dichloropropane, 1,3-	NA	--	--	--					
	542-75-6	Dichloropropene, 1,3-	NA	--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene	NA	--	--	--			7.00E-03	P	
	75-37-6	Difluoroethane, 1,1-	NA	--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole	NA	--	--	--					
	108-20-3	Diisopropyl Ether	NA	--	--	--			7.00E-01	P	
	1445-75-6	Diisopropyl Methylphosphonate	NA	--	--	--					
	121-69-7	Dimethylaniline, N,N-	NA	--	--	--					
	120-61-6	Dimethylterephthalate	NA	--	--	--					
	513-37-1	Dimethylvinylchloride	NA	--	--	--					
	505-29-3	Dithiane, 1,4-	NA	--	--	--					
	106-89-8	Epichlorohydrin	NA	--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-	NA	--	--	--			2.00E-02	I	
	759-94-4	EPTC	NA	--	--	--					
	141-78-6	Ethyl Acetate	NA	--	--	--					
x	140-88-5	Ethyl Acrylate	NA	--	--	--					
	75-00-3	Ethyl Chloride	NA	--	--	--			1.00E+01	I	
	60-29-7	Ethyl Ether	NA	--	--	--					
	97-63-2	Ethyl Methacrylate	NA	--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene	NA	--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide	NA	--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine	NA	--	--	--					
	86-73-7	Fluorene	NA	--	--	--					
	110-00-9	Furan	NA	--	--	--					
	822-06-0	Hexamethylene Diisocyanate, 1,6-	NA	--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-	NA	--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-	NA	--	--	--			3.00E-02	I	
	74-90-8	Hydrogen Cyanide	NA	--	--	--			8.00E-04	I	
	NA (JP-7)	JP-7	NA	--	--	--			3.00E-01	A	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	7439-97-6	Mercury (elemental)	NA	--	--	--			3.00E-04	I	
	126-98-7	Methacrylonitrile	NA	--	--	--			7.00E-04	H	
	79-20-9	Methyl Acetate	NA	--	--	--					
	96-33-3	Methyl Acrylate	NA	--	--	--					
	78-93-3	Methyl Ethyl Ketone (2-Butanone)	NA	--	--	--			5.00E+00	I	
	108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentan	NA	--	--	--			3.00E+00	I	
	624-83-9	Methyl Isocyanate	NA	--	--	--					
	80-62-6	Methyl Methacrylate	NA	--	--	--			7.00E-01	I	
	25013-15-4	Methyl Styrene (Mixed Isomers)	NA	--	--	--			4.00E-02	H	
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	NA	--	--	--	2.60E-07	CA	3.00E+00	I	
	75-09-2	Methylene Chloride	NA	--	--	--	1.00E-08	I	6.00E-01	I	Mut
	90-12-0	Methylnaphthalene, 1-	NA	--	--	--					
	91-57-6	Methylnaphthalene, 2-	NA	--	--	--					
	98-83-9	Methylstyrene, Alpha-	NA	--	--	--					
	8012-95-1	Mineral oils	NA	--	--	--					
	64724-95-6	Naphtha, High Flash Aromatic (HFAN)	NA	--	--	--			1.00E-01	P	
	91-20-3	Naphthalene	NA	--	--	--	3.40E-05	CA	3.00E-03	I	
	98-95-3	Nitrobenzene	NA	--	--	--	4.00E-05	I	9.00E-03	I	
	75-52-5	Nitromethane	NA	--	--	--	9.00E-06	P	2.00E-02	P	
	79-46-9	Nitropropane, 2-	NA	--	--	--	2.70E-03	H	2.00E-02	I	
	924-16-3	Nitroso-di-N-butylamine, N-	NA	--	--	--	1.60E-03	I			
	88-72-2	Nitrotoluene, o-	NA	--	--	--					
	111-84-2	Nonane, n-	NA	--	--	--			2.00E-01	P	
	109-66-0	Pentane, n-	NA	--	--	--			1.00E+00	P	
	75-44-5	Phosgene	NA	--	--	--			3.00E-04	I	
	123-38-6	Propionaldehyde	NA	--	--	--			8.00E-03	I	
	103-65-1	Propyl benzene	NA	--	--	--			1.00E+00	X	
	115-07-1	Propylene	NA	--	--	--					
	75-56-9	Propylene Oxide	NA	--	--	--	3.70E-06	I	3.00E-02	I	
	129-00-0	Pyrene	NA	--	--	--					
	110-86-1	Pyridine	NA	--	--	--					
	100-42-5	Styrene	NA	--	--	--			1.00E+00	I	
	630-20-6	Tetrachloroethane, 1,1,1,2-	NA	--	--	--	7.40E-06	I			
x	79-34-5	Tetrachloroethane, 1,1,2,2-	NA	--	--	--	5.80E-05	CA			
x	127-18-4	Tetrachloroethylene	NA	--	--	--	2.60E-07	I	4.00E-02	I	
	811-97-2	Tetrafluoroethane, 1,1,1,2-	NA	--	--	--			8.00E+01	I	
	109-99-9	Tetrahydrofuran	NA	--	--	--					
	463-56-9	Thiocyanate	NA	--	--	--					
x	108-88-3	Toluene	9.4E-01	9.40E-02	No IUR	1.8E-05			5.00E+00	I	
	76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	NA	--	--	--			3.00E+01	H	
	87-61-6	Trichlorobenzene, 1,2,3-	NA	--	--	--					
	120-82-1	Trichlorobenzene, 1,2,4-	NA	--	--	--			2.00E-03	P	
x	71-55-6	Trichloroethane, 1,1,1-	8.2E-01	8.20E-02	No IUR	1.6E-05			5.00E+00	I	
x	79-00-5	Trichloroethane, 1,1,2-	NA	--	--	--	1.60E-05	I	2.00E-04	X	
x	79-01-6	Trichloroethylene	NA	--	--	--	see note	I	2.00E-03	I	TCE
	75-69-4	Trichlorofluoromethane	8.4E-01	8.40E-02	No IUR	1.2E-04			7.00E-01	H	
	598-77-6	Trichloropropane, 1,1,2-	NA	--	--	--					
	96-18-4	Trichloropropane, 1,2,3-	NA	--	--	--			3.00E-04	I	Mut
	96-19-5	Trichloropropene, 1,2,3-	NA	--	--	--			3.00E-04	P	
	121-44-8	Triethylamine	NA	--	--	--			7.00E-03	I	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	526-73-8	Trimethylbenzene, 1,2,3-	NA	--	--	--			5.00E-03	P	
	95-63-6	Trimethylbenzene, 1,2,4-	NA	--	--	--			7.00E-03	P	
	108-67-8	Trimethylbenzene, 1,3,5-	NA	--	--	--					
	108-05-4	Vinyl Acetate	NA	--	--	--			2.00E-01	I	
	593-60-2	Vinyl Bromide	NA	--	--	--	3.20E-05	H	3.00E-03	I	
x	75-01-4	Vinyl Chloride	NA	--	--	--	4.40E-06	I	1.00E-01	I	VC
	108-38-3	Xylene, m-	NA	--	--	--			1.00E-01	S	
x	95-47-6	Xylene, o-	NA	--	--	--			1.00E-01	S	
x	106-42-3	Xylene, P-	NA	--	--	--			1.00E-01	S	
x	1330-20-7	Xylenes	NA	--	--	--			1.00E-01	I	

x

x **Notes:**

x

x (1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	ATc_SG	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	30	ATnc_C_SG	25	ATnc_SG	30
Exposure duration	(yrs)	ED_R_SG	30	ED_C_SG	25	ED_SG	30
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	EF_SG	350
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	ET_SG	24

x

x (2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	(-)	AFgw_R_SG	0.001	AFgw_C_SG	0.001	AFgw_SG	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.1	AFss_C_SG	0.1	AFss_SG	0.1

x

x (3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

x

x (4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

x

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 30 years	14	1

Mutagenic-mode-of-action (MMOA) adjustment factor 76 This factor is used in the equations for mutagenic chemicals.

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
x										
x	Vinyl Chloride	See the Navigation Guide equation for Cia,c for vinyl chloride.								
x										

x **Notation:**

x I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

x P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

x A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

x CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

x H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

x S = See RSL User Guide, Section 5

x X = PPRTV Appendix

x Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

x VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

x TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

x Yellow highlighting indicates site-specific parameters that may be edited by the user.

x Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be change

x Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
			Csg	Cia	CR	HQ	IUR		RfC		
			(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
	83-32-9	Acenaphthene	NA	--	--	--					
	75-07-0	Acetaldehyde	NA	--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone	NA	--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin	NA	--	--	--			6.00E-02	P	
	75-05-8	Acetonitrile	NA	--	--	--			6.00E-02	I	
	98-86-2	Acetophenone	NA	--	--	--					
	107-02-8	Acrolein	NA	--	--	--			2.00E-05	I	
	107-13-1	Acrylonitrile	NA	--	--	--	6.80E-05	I	2.00E-03	I	
	107-05-1	Allyl Chloride	NA	--	--	--	6.00E-06	CA	1.00E-03	I	
	120-12-7	Anthracene	NA	--	--	--					
	11104-28-2	Aroclor 1221	NA	--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232	NA	--	--	--	5.70E-04	S			
	103-33-3	Azobenzene	NA	--	--	--	3.10E-05	I			
	100-52-7	Benzaldehyde	NA	--	--	--					
x	71-43-2	Benzene	5.1E-01	5.10E-02	1.6E-07	1.6E-03	7.80E-06	I	3.00E-02	I	
	108-98-5	Benzenethiol	NA	--	--	--					
	98-07-7	Benzotrichloride	NA	--	--	--					
	100-44-7	Benzyl Chloride	NA	--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-	NA	--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether	NA	--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether	NA	--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether	NA	--	--	--	6.20E-02	I			
	107-04-0	Bromo-2-chloroethane, 1-	NA	--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene	NA	--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane	NA	--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane	NA	--	--	--	3.70E-05	CA			
	74-83-9	Bromomethane	NA	--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-	NA	--	--	--	3.00E-05	I	2.00E-03	I	
	104-51-8	Butylbenzene, n-	NA	--	--	--					
x	75-15-0	Carbon Disulfide	NA	--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride	NA	--	--	--	6.00E-06	I	1.00E-01	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-	NA	--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-	NA	--	--	--	3.00E-04	I	2.00E-02	I	
	107-20-0	Chloroacetaldehyde, 2-	NA	--	--	--					
	108-90-7	Chlorobenzene	NA	--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-	NA	--	--	--			3.00E-01	P	
	109-69-3	Chlorobutane, 1-	NA	--	--	--					
	75-45-6	Chlorodifluoromethane	NA	--	--	--			5.00E+01	I	
	67-66-3	Chloroform	NA	--	--	--	2.30E-05	I	9.80E-02	A	
x	74-87-3	Chloromethane	NA	--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether	NA	--	--	--	6.90E-04	CA			
	91-58-7	Chloronaphthalene, Beta-	NA	--	--	--					
	95-57-8	Chlorophenol, 2-	NA	--	--	--					
	76-06-2	Chloropicrin	NA	--	--	--			4.00E-04	CA	
	95-49-8	Chlorotoluene, o-	NA	--	--	--					
	106-43-4	Chlorotoluene, p-	NA	--	--	--					
	123-73-9	Crotonaldehyde, trans-	NA	--	--	--					
	98-82-8	Cumene	NA	--	--	--			4.00E-01	I	
	57-12-5	Cyanide (CN-)	NA	--	--	--					
	460-19-5	Cyanogen	NA	--	--	--					

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	506-68-3	Cyanogen Bromide	NA	--	--	--					
	506-77-4	Cyanogen Chloride	NA	--	--	--					
	110-82-7	Cyclohexane	NA	--	--	--			6.00E+00	I	
	132-64-9	Dibenzofuran	NA	--	--	--					
	96-12-8	Dibromo-3-chloropropane, 1,2-	NA	--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane	NA	--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-	NA	--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)	NA	--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-	NA	--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-	NA	--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-	NA	--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-	NA	--	--	--			2.00E-01	H	
x	106-46-7	Dichlorobenzene, 1,4-	NA	--	--	--	1.10E-05	CA	8.00E-01	I	
x	75-71-8	Dichlorodifluoromethane	1.5E+01	1.50E+00	No IUR	1.4E-02			1.00E-01	X	
x	75-34-3	Dichloroethane, 1,1-	NA	--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-	NA	--	--	--	2.60E-05	I	7.00E-03	P	
x	75-35-4	Dichloroethylene, 1,1-	NA	--	--	--			2.00E-01	I	
x	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	NA	--	--	--					
	156-59-2	Dichloroethylene, 1,2-cis-	NA	--	--	--					
	156-60-5	Dichloroethylene, 1,2-trans-	NA	--	--	--			6.00E-02	P	
	78-87-5	Dichloropropane, 1,2-	NA	--	--	--	1.00E-05	CA	4.00E-03	I	
	142-28-9	Dichloropropane, 1,3-	NA	--	--	--					
	542-75-6	Dichloropropene, 1,3-	NA	--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene	NA	--	--	--			7.00E-03	P	
	75-37-6	Difluoroethane, 1,1-	NA	--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole	NA	--	--	--					
	108-20-3	Diisopropyl Ether	NA	--	--	--			7.00E-01	P	
	1445-75-6	Diisopropyl Methylphosphonate	NA	--	--	--					
	121-69-7	Dimethylaniline, N,N-	NA	--	--	--					
	120-61-6	Dimethylterephthalate	NA	--	--	--					
	513-37-1	Dimethylvinylchloride	NA	--	--	--					
	505-29-3	Dithiane, 1,4-	NA	--	--	--					
	106-89-8	Epichlorohydrin	NA	--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-	NA	--	--	--			2.00E-02	I	
	759-94-4	EPTC	NA	--	--	--					
	141-78-6	Ethyl Acetate	NA	--	--	--					
x	140-88-5	Ethyl Acrylate	NA	--	--	--					
	75-00-3	Ethyl Chloride	NA	--	--	--			1.00E+01	I	
	60-29-7	Ethyl Ether	NA	--	--	--					
	97-63-2	Ethyl Methacrylate	NA	--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene	NA	--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide	NA	--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine	NA	--	--	--					
	86-73-7	Fluorene	NA	--	--	--					
	110-00-9	Furan	NA	--	--	--					
	822-06-0	Hexamethylene Diisocyanate, 1,6-	NA	--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-	NA	--	--	--			7.00E-01	I	
	591-78-6	Hexanone, 2-	NA	--	--	--			3.00E-02	I	
	74-90-8	Hydrogen Cyanide	NA	--	--	--			8.00E-04	I	
	NA (JP-7)	JP-7	NA	--	--	--			3.00E-01	A	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	7439-97-6	Mercury (elemental)	NA	--	--	--			3.00E-04	I	
	126-98-7	Methacrylonitrile	NA	--	--	--			7.00E-04	H	
	79-20-9	Methyl Acetate	NA	--	--	--					
	96-33-3	Methyl Acrylate	NA	--	--	--					
	78-93-3	Methyl Ethyl Ketone (2-Butanone)	5.9E-01	5.90E-02	No IUR	1.1E-05			5.00E+00	I	
	108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentan	NA	--	--	--			3.00E+00	I	
	624-83-9	Methyl Isocyanate	NA	--	--	--					
	80-62-6	Methyl Methacrylate	NA	--	--	--			7.00E-01	I	
	25013-15-4	Methyl Styrene (Mixed Isomers)	NA	--	--	--			4.00E-02	H	
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	NA	--	--	--	2.60E-07	CA	3.00E+00	I	
	75-09-2	Methylene Chloride	NA	--	--	--	1.00E-08	I	6.00E-01	I	Mut
	90-12-0	Methylnaphthalene, 1-	NA	--	--	--					
	91-57-6	Methylnaphthalene, 2-	NA	--	--	--					
	98-83-9	Methylstyrene, Alpha-	NA	--	--	--					
	8012-95-1	Mineral oils	NA	--	--	--					
	64724-95-6	Naphtha, High Flash Aromatic (HFAN)	NA	--	--	--			1.00E-01	P	
	91-20-3	Naphthalene	NA	--	--	--	3.40E-05	CA	3.00E-03	I	
	98-95-3	Nitrobenzene	NA	--	--	--	4.00E-05	I	9.00E-03	I	
	75-52-5	Nitromethane	NA	--	--	--	9.00E-06	P	2.00E-02	P	
	79-46-9	Nitropropane, 2-	NA	--	--	--	2.70E-03	H	2.00E-02	I	
	924-16-3	Nitroso-di-N-butylamine, N-	NA	--	--	--	1.60E-03	I			
	88-72-2	Nitrotoluene, o-	NA	--	--	--					
	111-84-2	Nonane, n-	NA	--	--	--			2.00E-01	P	
	109-66-0	Pentane, n-	NA	--	--	--			1.00E+00	P	
	75-44-5	Phosgene	NA	--	--	--			3.00E-04	I	
	123-38-6	Propionaldehyde	NA	--	--	--			8.00E-03	I	
	103-65-1	Propyl benzene	NA	--	--	--			1.00E+00	X	
	115-07-1	Propylene	NA	--	--	--					
	75-56-9	Propylene Oxide	NA	--	--	--	3.70E-06	I	3.00E-02	I	
	129-00-0	Pyrene	NA	--	--	--					
	110-86-1	Pyridine	NA	--	--	--					
	100-42-5	Styrene	NA	--	--	--			1.00E+00	I	
	630-20-6	Tetrachloroethane, 1,1,1,2-	NA	--	--	--	7.40E-06	I			
x	79-34-5	Tetrachloroethane, 1,1,2,2-	NA	--	--	--	5.80E-05	CA			
x	127-18-4	Tetrachloroethylene	1.3E+01	1.33E+00	1.4E-07	3.2E-02	2.60E-07	I	4.00E-02	I	
	811-97-2	Tetrafluoroethane, 1,1,1,2-	NA	--	--	--			8.00E+01	I	
	109-99-9	Tetrahydrofuran	NA	--	--	--					
	463-56-9	Thiocyanate	NA	--	--	--					
x	108-88-3	Toluene	5.3E-01	5.33E-02	No IUR	1.0E-05			5.00E+00	I	
	76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	NA	--	--	--			3.00E+01	H	
	87-61-6	Trichlorobenzene, 1,2,3-	NA	--	--	--					
	120-82-1	Trichlorobenzene, 1,2,4-	NA	--	--	--			2.00E-03	P	
x	71-55-6	Trichloroethane, 1,1,1-	NA	--	--	--			5.00E+00	I	
x	79-00-5	Trichloroethane, 1,1,2-	NA	--	--	--	1.60E-05	I	2.00E-04	X	
x	79-01-6	Trichloroethylene	NA	--	--	--	see note	I	2.00E-03	I	TCE
	75-69-4	Trichlorofluoromethane	NA	--	--	--			7.00E-01	H	
	598-77-6	Trichloropropane, 1,1,2-	NA	--	--	--					
	96-18-4	Trichloropropane, 1,2,3-	NA	--	--	--			3.00E-04	I	Mut
	96-19-5	Trichloropropene, 1,2,3-	NA	--	--	--			3.00E-04	P	
	121-44-8	Triethylamine	NA	--	--	--			7.00E-03	I	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	526-73-8	Trimethylbenzene, 1,2,3-	NA	--	--	--			5.00E-03	P	
	95-63-6	Trimethylbenzene, 1,2,4-	NA	--	--	--			7.00E-03	P	
	108-67-8	Trimethylbenzene, 1,3,5-	NA	--	--	--					
	108-05-4	Vinyl Acetate	NA	--	--	--			2.00E-01	I	
	593-60-2	Vinyl Bromide	NA	--	--	--	3.20E-05	H	3.00E-03	I	
x	75-01-4	Vinyl Chloride	NA	--	--	--	4.40E-06	I	1.00E-01	I	VC
	108-38-3	Xylene, m-	NA	--	--	--			1.00E-01	S	
x	95-47-6	Xylene, o-	NA	--	--	--			1.00E-01	S	
x	106-42-3	Xylene, P-	NA	--	--	--			1.00E-01	S	
x	1330-20-7	Xylenes	NA	--	--	--			1.00E-01	I	

x

x **Notes:**

x

x (1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	ATc_SG	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	30	ATnc_C_SG	25	ATnc_SG	30
Exposure duration	(yrs)	ED_R_SG	30	ED_C_SG	25	ED_SG	30
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	EF_SG	350
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	ET_SG	24

x

x (2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	(-)	AFgw_R_SG	0.001	AFgw_C_SG	0.001	AFgw_SG	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.1	AFss_C_SG	0.1	AFss_SG	0.1

x

x (3) **Formulas**

Cia, target = MIN(Cia,c; Cia,nc)

Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

x

x (4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

x

Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 30 years	14	1

Mutagenic-mode-of-action (MMOA) adjustment factor 76 This factor is used in the equations for mutagenic chemicals.

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
x										
x	Vinyl Chloride	See the Navigation Guide equation for Cia,c for vinyl chloride.								
x										

x **Notation:**

x I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

x P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

x A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

x CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

x H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

x S = See RSL User Guide, Section 5

x X = PPRTV Appendix

x Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

x VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

x TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

x Yellow highlighting indicates site-specific parameters that may be edited by the user.

x Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be change

x Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
			Csg	Cia	CR	HQ	IUR		RfC		
			(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
	83-32-9	Acenaphthene	NA	--	--	--					
	75-07-0	Acetaldehyde	NA	--	--	--	2.20E-06	I	9.00E-03	I	
	67-64-1	Acetone	NA	--	--	--			3.10E+01	A	
	75-86-5	Acetone Cyanohydrin	NA	--	--	--			6.00E-02	P	
	75-05-8	Acetonitrile	NA	--	--	--			6.00E-02	I	
	98-86-2	Acetophenone	NA	--	--	--					
	107-02-8	Acrolein	NA	--	--	--			2.00E-05	I	
	107-13-1	Acrylonitrile	NA	--	--	--	6.80E-05	I	2.00E-03	I	
	107-05-1	Allyl Chloride	NA	--	--	--	6.00E-06	CA	1.00E-03	I	
	120-12-7	Anthracene	NA	--	--	--					
	11104-28-2	Aroclor 1221	NA	--	--	--	5.70E-04	S			
	11141-16-5	Aroclor 1232	NA	--	--	--	5.70E-04	S			
	103-33-3	Azobenzene	NA	--	--	--	3.10E-05	I			
	100-52-7	Benzaldehyde	NA	--	--	--					
x	71-43-2	Benzene	NA	--	--	--	7.80E-06	I	3.00E-02	I	
	108-98-5	Benzenethiol	NA	--	--	--					
	98-07-7	Benzotrichloride	NA	--	--	--					
	100-44-7	Benzyl Chloride	NA	--	--	--	4.90E-05	CA	1.00E-03	P	
	92-52-4	Biphenyl, 1,1'-	NA	--	--	--			4.00E-04	X	
	108-60-1	Bis(2-chloro-1-methylethyl) ether	NA	--	--	--	1.00E-05	H			
	111-44-4	Bis(2-chloroethyl)ether	NA	--	--	--	3.30E-04	I			
	542-88-1	Bis(chloromethyl)ether	NA	--	--	--	6.20E-02	I			
	107-04-0	Bromo-2-chloroethane, 1-	NA	--	--	--	6.00E-04	X			
	108-86-1	Bromobenzene	NA	--	--	--			6.00E-02	I	
	74-97-5	Bromochloromethane	NA	--	--	--			4.00E-02	X	
	75-27-4	Bromodichloromethane	NA	--	--	--	3.70E-05	CA			
	74-83-9	Bromomethane	NA	--	--	--			5.00E-03	I	
	106-99-0	Butadiene, 1,3-	NA	--	--	--	3.00E-05	I	2.00E-03	I	
	104-51-8	Butylbenzene, n-	NA	--	--	--					
x	75-15-0	Carbon Disulfide	NA	--	--	--			7.00E-01	I	
	56-23-5	Carbon Tetrachloride	NA	--	--	--	6.00E-06	I	1.00E-01	I	
	75-68-3	Chloro-1,1-difluoroethane, 1-	NA	--	--	--			5.00E+01	I	
	126-99-8	Chloro-1,3-butadiene, 2-	NA	--	--	--	3.00E-04	I	2.00E-02	I	
	107-20-0	Chloroacetaldehyde, 2-	NA	--	--	--					
	108-90-7	Chlorobenzene	NA	--	--	--			5.00E-02	P	
	98-56-6	Chlorobenzotrifluoride, 4-	NA	--	--	--			3.00E-01	P	
	109-69-3	Chlorobutane, 1-	NA	--	--	--					
	75-45-6	Chlorodifluoromethane	NA	--	--	--			5.00E+01	I	
	67-66-3	Chloroform	NA	--	--	--	2.30E-05	I	9.80E-02	A	
x	74-87-3	Chloromethane	NA	--	--	--			9.00E-02	I	
	107-30-2	Chloromethyl Methyl Ether	NA	--	--	--	6.90E-04	CA			
	91-58-7	Chloronaphthalene, Beta-	NA	--	--	--					
	95-57-8	Chlorophenol, 2-	NA	--	--	--					
	76-06-2	Chloropicrin	NA	--	--	--			4.00E-04	CA	
	95-49-8	Chlorotoluene, o-	NA	--	--	--					
	106-43-4	Chlorotoluene, p-	NA	--	--	--					
	123-73-9	Crotonaldehyde, trans-	NA	--	--	--					
	98-82-8	Cumene	NA	--	--	--			4.00E-01	I	
	57-12-5	Cyanide (CN-)	NA	--	--	--					
	460-19-5	Cyanogen	NA	--	--	--					

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
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Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	506-68-3	Cyanogen Bromide	NA	--	--	--					
	506-77-4	Cyanogen Chloride	NA	--	--	--					
	110-82-7	Cyclohexane	NA	--	--	--			6.00E+00	I	
	132-64-9	Dibenzofuran	NA	--	--	--					
	96-12-8	Dibromo-3-chloropropane, 1,2-	NA	--	--	--	6.00E-03	P	2.00E-04	I	Mut
	124-48-1	Dibromochloromethane	NA	--	--	--	2.70E-05	CA			
	106-93-4	Dibromoethane, 1,2-	NA	--	--	--	6.00E-04	I	9.00E-03	I	
	74-95-3	Dibromomethane (Methylene Bromide)	NA	--	--	--			4.00E-03	X	
	764-41-0	Dichloro-2-butene, 1,4-	NA	--	--	--	4.20E-03	P			
	1476-11-5	Dichloro-2-butene, cis-1,4-	NA	--	--	--	4.20E-03	P			
	110-57-6	Dichloro-2-butene, trans-1,4-	NA	--	--	--	4.20E-03	P			
	95-50-1	Dichlorobenzene, 1,2-	NA	--	--	--			2.00E-01	H	
x	106-46-7	Dichlorobenzene, 1,4-	NA	--	--	--	1.10E-05	CA	8.00E-01	I	
x	75-71-8	Dichlorodifluoromethane	1.1E+00	1.15E-01	No IUR	1.1E-03			1.00E-01	X	
x	75-34-3	Dichloroethane, 1,1-	NA	--	--	--	1.60E-06	CA			
	107-06-2	Dichloroethane, 1,2-	NA	--	--	--	2.60E-05	I	7.00E-03	P	
x	75-35-4	Dichloroethylene, 1,1-	NA	--	--	--			2.00E-01	I	
x	540-59-0	Dichloroethylene, 1,2- (Mixed Isomers)	NA	--	--	--					
	156-59-2	Dichloroethylene, 1,2-cis-	NA	--	--	--					
	156-60-5	Dichloroethylene, 1,2-trans-	NA	--	--	--			6.00E-02	P	
	78-87-5	Dichloropropane, 1,2-	NA	--	--	--	1.00E-05	CA	4.00E-03	I	
	142-28-9	Dichloropropane, 1,3-	NA	--	--	--					
	542-75-6	Dichloropropene, 1,3-	NA	--	--	--	4.00E-06	I	2.00E-02	I	
	77-73-6	Dicyclopentadiene	NA	--	--	--			7.00E-03	P	
	75-37-6	Difluoroethane, 1,1-	NA	--	--	--			4.00E+01	I	
	94-58-6	Dihydrosafrole	NA	--	--	--					
	108-20-3	Diisopropyl Ether	NA	--	--	--			7.00E-01	P	
	1445-75-6	Diisopropyl Methylphosphonate	NA	--	--	--					
	121-69-7	Dimethylaniline, N,N-	NA	--	--	--					
	120-61-6	Dimethylterephthalate	NA	--	--	--					
	513-37-1	Dimethylvinylchloride	NA	--	--	--					
	505-29-3	Dithiane, 1,4-	NA	--	--	--					
	106-89-8	Epichlorohydrin	NA	--	--	--	1.20E-06	I	1.00E-03	I	
	106-88-7	Epoxybutane, 1,2-	NA	--	--	--			2.00E-02	I	
	759-94-4	EPTC	NA	--	--	--					
	141-78-6	Ethyl Acetate	NA	--	--	--					
x	140-88-5	Ethyl Acrylate	NA	--	--	--					
	75-00-3	Ethyl Chloride	NA	--	--	--			1.00E+01	I	
	60-29-7	Ethyl Ether	NA	--	--	--					
	97-63-2	Ethyl Methacrylate	NA	--	--	--			3.00E-01	P	
	100-41-4	Ethylbenzene	NA	--	--	--	2.50E-06	CA	1.00E+00	I	
	75-21-8	Ethylene Oxide	NA	--	--	--	8.80E-05	CA	3.00E-02	CA	
	151-56-4	Ethyleneimine	NA	--	--	--					
	86-73-7	Fluorene	NA	--	--	--					
	110-00-9	Furan	NA	--	--	--					
	822-06-0	Hexamethylene Diisocyanate, 1,6-	NA	--	--	--			1.00E-05	I	
	110-54-3	Hexane, N-	2.8E-01	2.80E-02	No IUR	3.8E-05			7.00E-01	I	
	591-78-6	Hexanone, 2-	NA	--	--	--			3.00E-02	I	
	74-90-8	Hydrogen Cyanide	NA	--	--	--			8.00E-04	I	
	NA (JP-7)	JP-7	NA	--	--	--			3.00E-01	A	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	7439-97-6	Mercury (elemental)	NA	--	--	--			3.00E-04	I	
	126-98-7	Methacrylonitrile	NA	--	--	--			7.00E-04	H	
	79-20-9	Methyl Acetate	NA	--	--	--					
	96-33-3	Methyl Acrylate	NA	--	--	--					
	78-93-3	Methyl Ethyl Ketone (2-Butanone)	1.3E+00	1.35E-01	No IUR	2.6E-05			5.00E+00	I	
	108-10-1	Methyl Isobutyl Ketone (4-methyl-2-pentan	NA	--	--	--			3.00E+00	I	
	624-83-9	Methyl Isocyanate	NA	--	--	--					
	80-62-6	Methyl Methacrylate	NA	--	--	--			7.00E-01	I	
	25013-15-4	Methyl Styrene (Mixed Isomers)	NA	--	--	--			4.00E-02	H	
	1634-04-4	Methyl tert-Butyl Ether (MTBE)	NA	--	--	--	2.60E-07	CA	3.00E+00	I	
	75-09-2	Methylene Chloride	NA	--	--	--	1.00E-08	I	6.00E-01	I	Mut
	90-12-0	Methylnaphthalene, 1-	NA	--	--	--					
	91-57-6	Methylnaphthalene, 2-	NA	--	--	--					
	98-83-9	Methylstyrene, Alpha-	NA	--	--	--					
	8012-95-1	Mineral oils	NA	--	--	--					
	64724-95-6	Naphtha, High Flash Aromatic (HFAN)	NA	--	--	--			1.00E-01	P	
	91-20-3	Naphthalene	NA	--	--	--	3.40E-05	CA	3.00E-03	I	
	98-95-3	Nitrobenzene	NA	--	--	--	4.00E-05	I	9.00E-03	I	
	75-52-5	Nitromethane	NA	--	--	--	9.00E-06	P	2.00E-02	P	
	79-46-9	Nitropropane, 2-	NA	--	--	--	2.70E-03	H	2.00E-02	I	
	924-16-3	Nitroso-di-N-butylamine, N-	NA	--	--	--	1.60E-03	I			
	88-72-2	Nitrotoluene, o-	NA	--	--	--					
	111-84-2	Nonane, n-	NA	--	--	--			2.00E-01	P	
	109-66-0	Pentane, n-	NA	--	--	--			1.00E+00	P	
	75-44-5	Phosgene	NA	--	--	--			3.00E-04	I	
	123-38-6	Propionaldehyde	NA	--	--	--			8.00E-03	I	
	103-65-1	Propyl benzene	NA	--	--	--			1.00E+00	X	
	115-07-1	Propylene	NA	--	--	--					
	75-56-9	Propylene Oxide	NA	--	--	--	3.70E-06	I	3.00E-02	I	
	129-00-0	Pyrene	NA	--	--	--					
	110-86-1	Pyridine	NA	--	--	--					
	100-42-5	Styrene	NA	--	--	--			1.00E+00	I	
	630-20-6	Tetrachloroethane, 1,1,1,2-	NA	--	--	--	7.40E-06	I			
x	79-34-5	Tetrachloroethane, 1,1,2,2-	NA	--	--	--	5.80E-05	CA			
x	127-18-4	Tetrachloroethylene	3.3E+00	3.29E-01	3.5E-08	7.9E-03	2.60E-07	I	4.00E-02	I	
	811-97-2	Tetrafluoroethane, 1,1,1,2-	NA	--	--	--			8.00E+01	I	
	109-99-9	Tetrahydrofuran	NA	--	--	--					
	463-56-9	Thiocyanate	NA	--	--	--					
x	108-88-3	Toluene	6.8E-01	6.80E-02	No IUR	1.3E-05			5.00E+00	I	
	76-13-1	Trichloro-1,2,2-trifluoroethane, 1,1,2-	NA	--	--	--			3.00E+01	H	
	87-61-6	Trichlorobenzene, 1,2,3-	NA	--	--	--					
	120-82-1	Trichlorobenzene, 1,2,4-	NA	--	--	--			2.00E-03	P	
x	71-55-6	Trichloroethane, 1,1,1-	4.2E+00	4.24E-01	No IUR	8.1E-05			5.00E+00	I	
x	79-00-5	Trichloroethane, 1,1,2-	NA	--	--	--	1.60E-05	I	2.00E-04	X	
x	79-01-6	Trichloroethylene	NA	--	--	--	see note	I	2.00E-03	I	TCE
	75-69-4	Trichlorofluoromethane	7.9E-01	7.95E-02	No IUR	1.1E-04			7.00E-01	H	
	598-77-6	Trichloropropane, 1,1,2-	NA	--	--	--					
	96-18-4	Trichloropropane, 1,2,3-	NA	--	--	--			3.00E-04	I	Mut
	96-19-5	Trichloropropene, 1,2,3-	NA	--	--	--			3.00E-04	P	
	121-44-8	Triethylamine	NA	--	--	--			7.00E-03	I	

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

	CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration Csg (ug/m^3)	Calculated Indoor Air Concentration Cia (ug/m^3)	VI Carcinogenic Risk CR	VI Hazard HQ	Inhalation Unit Risk IUR (ug/m^3)$^{-1}$	IUR Source*	Reference Concentration RfC (mg/m^3)	RFC Source*	Mutagenic Indicator i
	526-73-8	Trimethylbenzene, 1,2,3-	NA	--	--	--			5.00E-03	P	
	95-63-6	Trimethylbenzene, 1,2,4-	NA	--	--	--			7.00E-03	P	
	108-67-8	Trimethylbenzene, 1,3,5-	NA	--	--	--					
	108-05-4	Vinyl Acetate	NA	--	--	--			2.00E-01	I	
	593-60-2	Vinyl Bromide	NA	--	--	--	3.20E-05	H	3.00E-03	I	
x	75-01-4	Vinyl Chloride	NA	--	--	--	4.40E-06	I	1.00E-01	I	VC
	108-38-3	Xylene, m-	NA	--	--	--			1.00E-01	S	
x	95-47-6	Xylene, o-	3.5E-01	3.50E-02	No IUR	3.4E-04			1.00E-01	S	
x	106-42-3	Xylene, P-	NA	--	--	--			1.00E-01	S	
x	1330-20-7	Xylenes	NA	--	--	--			1.00E-01	I	

x

x **Notes:**

x

x (1) **Inhalation Pathway Exposure Parameters (RME):**

Exposure Scenario	Units	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Averaging time for carcinogens	(yrs)	ATc_R_SG	70	ATc_C_SG	70	ATc_SG	70
Averaging time for non-carcinogens	(yrs)	ATnc_R_SG	30	ATnc_C_SG	25	ATnc_SG	30
Exposure duration	(yrs)	ED_R_SG	30	ED_C_SG	25	ED_SG	30
Exposure frequency	(days/yr)	EF_R_SG	350	EF_C_SG	250	EF_SG	350
Exposure time	(hr/day)	ET_R_SG	24	ET_C_SG	8	ET_SG	24

x

x (2) **Generic Attenuation Factors:**

Source Medium of Vapors		Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
Groundwater	(-)	AFgw_R_SG	0.001	AFgw_C_SG	0.001	AFgw_SG	0.001
Sub-Slab and Exterior Soil Gas	(-)	AFss_R_SG	0.1	AFss_C_SG	0.1	AFss_SG	0.1

x

x (3) **Formulas**

x Cia, target = MIN(Cia,c; Cia,nc)

x Cia,c (ug/m3) = TCR x ATc x (365 days/yr) x (24 hrs/day) / (ED x EF x ET x IUR)

x Cia,nc (ug/m3) = THQ x ATnc x (365 days/yr) x (24 hrs/day) x RfC x (1000 ug/mg) / (ED x EF x ET)

x

x (4) **Special Case Chemicals**

Trichloroethylene	Residential Symbol	Residential Value	Commercial Symbol	Commercial Value	Selected (based on scenario) Symbol	Selected (based on scenario) Value
	mIURTCE_R_SG	1.00E-06	mIURTCE_C_SG	0.00E+00	mIURTCE_SG	1.00E-06
	IURTCE_R_SG	3.10E-06	IURTCE_C_SG	4.10E-06	IURTCE_SG	3.10E-06

x

x Mutagenic Chemicals — The exposure durations and age-dependent adjustment factors for mutagenic-mode-of-action are listed in the table below:

x

x Note: This section applies to trichloroethylene and other mutagenic chemicals, but not to vinyl chloride.

Age Cohort	Exposure Duration	Age-dependent adjustment factor
0 - 2 years	2	10
2 - 6 years	4	3
6 - 16 years	10	3
16 - 30 years	14	1

x

x **Mutagenic-mode-of-action (MMOA) adjustment factor** 76 This factor is used in the equations for mutagenic chemicals.

OSWER VAPOR INTRUSION ASSESSMENT

Sub-slab or Exterior Soil Gas Concentration to Indoor Air Concentration (SGC-IAC) Calculator Version 2.0, May 2012 RSLs

Parameter	Symbol	Value	Instructions
Exposure Scenario	Scenario	Residential	Select residential or commercial scenario from pull down list
Target Risk for Carcinogens	TCR_SG	1.00E-06	Enter target risk for carcinogens (for comparison to the calculated VI carcinogenic risk in column F)
Target Hazard Quotient for Non-Carcinogens	THQ_SG	1	Enter target hazard quotient for non-carcinogens (for comparison to the calculated VI hazard in column G)

CAS	Chemical Name	Site Sub-slab or Exterior Soil Gas Concentration	Calculated Indoor Air Concentration	VI Carcinogenic Risk	VI Hazard	Inhalation Unit Risk	IUR Source*	Reference Concentration	RFC Source*	Mutagenic Indicator
		Csg	Cia	CR	HQ	IUR		RfC		
		(ug/m^3)	(ug/m^3)			(ug/m^3)$^{-1}$		(mg/m^3)		i
x										
x	Vinyl Chloride	See the Navigation Guide equation for Cia,c for vinyl chloride.								
x										

x **Notation:**

x I = IRIS: EPA Integrated Risk Information System (IRIS). Available online at: http://www.epa.gov/iris/subst/index.html

x P = PPRTV. EPA Provisional Peer Reviewed Toxicity Values (PPRTVs). Available online at: http://hhpprtv.ornl.gov/pprtv.shtml

x A = Agency for Toxic Substances and Disease Registry (ATSDR) Minimum Risk Levels (MRLs). Available online at: http://www.atsdr.cdc.gov/mrls/index.html

x CA = California Environmental Protection Agency/Office of Environmental Health Hazard Assessment assessments. Available online at: http://www.oehha.ca.gov/risk/ChemicalDB/index.asp

x H = HEAST. EPA Superfund Health Effects Assessment Summary Tables (HEAST) database. Available online at: http://epa-heast.ornl.gov/heast.shtml

x S = See RSL User Guide, Section 5

x X = PPRTV Appendix

x Mut = Chemical acts according to the mutagenic-mode-of-action, special exposure parameters apply (see footnote (4) above).

x VC = Special exposure equation for vinyl chloride applies (see Navigation Guide for equation).

x TCE = Special mutagenic and non-mutagenic IURs for trichloroethylene apply (see footnote (4) above).

x Yellow highlighting indicates site-specific parameters that may be edited by the user.

x Blue highlighting indicates exposure factors that are based on Risk Assessment Guidance for Superfund (RAGS) or EPA vapor intrusion guidance, which generally should not be change

x Pink highlighting indicates VI carcinogenic risk greater than the target risk for carcinogens (TCR) or VI Hazard greater than or equal to the target hazard quotient for non-carcinogens (THQ).

Technical Memorandum

Johnson and Ettinger (JE) Model

(Version 3.1, February 2004)

AVATAR
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A Service-Disabled Veteran-Owned Small Business

30 May 2013

Mr. Tim Andrews
Nobis Engineering, Inc.
18 Chenell Drive
Concord, NH 03301

SUBJECT: Eastland Woolen Mill Superfund Site, Vapor Intrusion Technical Memorandum

Dear Mr. Andrews,

Avatar Environmental is pleased to provide the Vapor Intrusion (VI) Technical Memorandum for the Eastland Woolen Mill Superfund Site. The VI evaluation presented in the Technical Memorandum serves as a measure of determining if the nearby residences are at risk from the VI pathway. The Johnson and Ettinger Model (Version 3.1, February 2004) was used to estimate the potential exposure associated with the soil gas data collected from the Site. The results of the investigation indicate that the VI pathway associated with the Eastland Woolen Mill Superfund Site results in negligible risks and no further evaluation of the VI pathway is required.

If you have any questions regarding this submittal please contact me at (610) 692-8330 ext. 14 or by email (twoods@avatarenviro.com).

Sincerely,

Tim Woods.
Project Manager/Senior Risk Assessor

Enclosures

107 South Church Street, West Chester, PA 19382
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This Technical Memorandum presents the vapor intrusion analysis for the Eastland Woolen Mills (EWM) Superfund Site. The potential exists for subsurface contamination to migrate into structures via the vapor intrusion (VI) pathway and impact the indoor air. The area of focus is not developed, but residences exist within a few hundred feet of the sampling area. As such, residential exposure to predicted indoor air concentrations was evaluated. The VI evaluation presented in this Technical Memorandum serves as a measure of determining if the nearby residences are at risk from the VI pathway. The samples collected to support this analysis were from areas of elevated contamination and, therefore, act as a conservative representation of the nearby residences where no subsurface contamination exists. If the results of the VI analysis show no concern, it is expected that the nearby residences are not at risk from the VI pathway.

Five soil gas (SG) samples plus one field duplicate were collected and analyzed for volatile organic compounds (VOCs) in October 2012. The SG samples were collected from approximately 3.5 feet below ground surface. For the purposes of the VI evaluation, it was assumed that homes would be constructed within the sampling area. The building construction scenario was assumed to be slab on grade. Table 1 presents the SG sampling results in units of $\mu g/m^3$. The following analytes were detected in the SG samples:

- 1,1,1-Trichloroethane
- 1,1-Dichloroethane
- Benzene
- Carbon Tetrachloride
- Chloroform
- Dichlorodifluoromethane
- Hexane
- Methyl Ethyl Ketone
- Methyl Isobutyl Ketone
- Methylchloride
- o-Xylene
- Tetrachloroethylene
- Toluene
- Trichlorofluoromethane

The Johnson and Ettinger Model (JE, Version 3.1, February 2004) was used to estimate the potential exposure associated with the SG data collected from the Site. Using a combination of default settings and site-specific input parameters, the JE model predicted the indoor air concentrations of the analytes detected in the SG samples. Table 2 presents the inputs used in the JE Model. The average SG concentrations based on detected results were used as the model input concentrations. The average SG concentrations are presented on Table 3.

The JE Model-predicted indoor air concentrations are presented on Table 4. The JE Model output is presented in Attachment 1. The toxicity values presented on Table 4 that were used to

calculate the inhalation of indoor air risks (cancer and noncancer) were obtained from EPA's *Integrated Risk Information System* database or from secondary sources as presented in the EPA's *Regional Screening Levels Table* (November 2012).

The JE Model-predicted air concentrations were adjusted to reflect residential exposure using the equation shown in the notes associated with Table 4. Standard residential exposure assumptions such as an exposure frequency of 350 days/year, an exposure duration of 30 years, and an exposure time of 24 hours/day were used to calculate the Exposure Concentrations presented on Table 4.

The individual contaminant cancer risk and noncancer hazard associated with the VI pathway were derived using Equations 1 and 2, respectively.

Equation 1

$$\text{Inhalation Cancer Risk} = EC \times URF$$

where:

EC = Exposure concentration assuming residential exposure ($\mu g/m^3$).

URF = COPC-specific inhalation unit risk factor $(\mu g/m^3)^{-1}$.

Equation 2

$$\text{Inhalation HQ} = EC / (RfC \times CF)$$

where:

HQ = Hazard quotient

EC = Exposure concentration assuming residential exposure ($\mu g/m^3$).

RfC = COPC-specific reference concentration (mg/m^3)

CF = Conversion factor (1,000 µg/mg)

A Total Hazard Index (HI) is generated by summing the individual HQs for all COPCs. A Total cancer risk is generated by summing the individual cancer risks for all COPCs. The calculated risk levels were interpreted as follows. If the total cancer risk was greater than 1E-06 (1×10^{-6}) or the total noncancer hazard index was greater than 1, further evaluation of the VI pathway may be required. If the predicted risks were less than these risk level benchmarks, the VI pathway results in negligible risks and does not warrant further investigation.

As shown on Table 4, the total cancer risk level was 8E-08 and the noncancer hazard was

0.0009. Both of these risk levels were less than the established risk thresholds. This indicates that the VI pathway associated with the hypothetical slab on grade evaluation results in negligible risks and no further evaluation of the VI pathway is required.

TABLE 1
October 2012 Soil Vapor VOC Concentrations
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location:	SP-12-05	SP-12-04	SP-12-03	SP-12-02	SP-12-01	Duplicate
Collection Date:	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012	10/12/2012
Units:	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3	ug/m^3
Analyte						
1,1,1-Trichloroethane	**4**	0.66 U	0.82	**12**	**20**	**12**
1,1,2,2-Tetrachloroethane	0.50 U	0.83 U	0.53 U	0.56 U	0.51 U	0.53 U
1,1,2-Trichloroethane	0.40 U	0.66 U	0.42 U	0.45 U	0.41 U	0.42 U
1,1-Dichloroethane	0.29 U	0.49 U	0.31 U	0.33 U	**0.41**	0.31 U
1,1-Dichloroethylene	0.29 U	0.48 U	0.31 U	0.32 U	0.30 U	0.31 U
1,2,4-Trichlorobenzene	0.54 U	0.90 U	0.58 U	0.61 U	0.55 U	0.58 U
1,2,4-Trimethylbenzene	0.36 U	0.60 U	0.38 U	0.40 U	0.37 U	0.38 U
1,2-Dibromoethane	0.56 U	0.93 U	0.60 U	0.63 U	0.57 U	0.60 U
1,2-Dichlorobenzene	0.44 U	0.73 U	0.47 U	0.49 U	0.45 U	0.47 U
1,2-Dichloroethane	0.29 U	0.49 U	0.31 U	0.33 U	0.30 U	0.31 U
1,2-Dichloropropane	0.34 U	0.56 U	0.36 U	0.38 U	0.35 U	0.36 U
1,3,5-Trimethylbenzene	0.36 U	0.60 U	0.38 U	0.40 U	0.37 U	0.38 U
1,3-Butadiene	0.31 U	0.54 U	0.34 U	0.36 U	0.33 U	0.33 U
1,3-Dichlorobenzene	0.44 U	0.73 U	0.47 U	0.49 U	0.45 U	0.47 U
1,4-Dichlorobenzene	0.44 U	0.73 U	0.47 U	0.49 U	0.45 U	0.47 U
2-Hexanone	0.30 U	0.50 U	0.32 U	0.34 U	0.31 U	0.32 U
4-Ethyltoluene	0.36 U	0.60 U	0.38 U	0.40 U	0.37 U	0.38 U
Acrylonitrile	0.16 U	0.26 U	0.17 U	0.18 U	0.16 U	0.17 U
Allyl Chloride	0.23 U	0.38 U	0.24 U	0.26 U	0.23 U	0.24 U
Benzene	0.23 U	**0.51**	0.25 U	0.26 U	**0.45**	**0.26**
Benzylchloride	0.38 U	0.63 U	0.40 U	0.42 U	0.39 U	0.40 U
Bromodichloromethane	0.49 U	0.81 U	0.52 U	0.55 U	0.50 U	0.52 U
Bromoform	0.75 U	1.25 U	0.80 U	0.85 U	0.77 U	0.80 U
c-1,2-Dichloroethylene	0.29 U	0.48 U	0.31 U	0.32 U	0.30 U	0.31 U
c-1,3-Dichloropropylene	0.33 U	0.55 U	0.35 U	0.37 U	0.34 U	0.35 U
Carbon Tetrachloride	0.46 U	0.76 U	0.49 U	0.51 U	**4.7**	**2.6**
Chlorobenzene	0.33 U	0.56 U	0.36 U	0.38 U	0.34 U	0.36 U
Chloroethane	0.19 U	0.32 U	0.21 U	0.22 U	0.20 U	0.21 U
Chloroform	0.36 U	0.59 U	**0.64**	**6.5**	**2.9**	**1.7**
Cyclohexane	0.25 U	0.42 U	0.27 U	0.28 U	0.26 U	0.27 U
Dibromochloromethane	0.62 U	1.03 U	0.66 U	0.70 U	0.64 U	0.66 U
Dichlorodifluoromethane	**1.1**	**150**	**0.79**	0.40 U	**0.37**	**0.89**
Dichlorotetrafluoroethane	0.51 U	0.85 U	0.54 U	0.57 U	0.52 U	0.54 U
Ethylbenzene	0.32 U	0.53 U	0.34 U	0.36 U	0.32 U	0.34 U
Heptane	0.30 U	0.50 U	0.32 U	0.34 U	0.31 U	0.32 U
Hexachloro-1,3-butadiene	0.74 U	1.23 U	0.79 U	0.83 U	0.76 U	0.79 U
Hexane	**0.28**	0.43 U	0.27 U	**0.49**	**0.49**	**0.74**
m/p-Xylenes	0.61 U	1.05 U	0.68 U	0.70 U	0.66 U	0.66 U
Methyl Ethyl Ketone	**1.3**	**0.59**	0.23 U	**0.68**	**1.9**	**1.3**
Methyl Isobutyl Ketone	0.30 U	0.50 U	0.32 U	**0.74**	0.31 U	0.32 U
Methylbromide	0.28 U	0.47 U	0.30 U	0.32 U	0.29 U	0.30 U
Methylchloride	0.15 U	0.25 U	**0.31**	0.17 U	**0.48**	**0.56**
Methylene Chloride	0.25 U	0.42 U	0.27 U	0.28 U	0.26 U	0.27 U
Methyl-t-Butyl Ether	0.26 U	0.44 U	0.28 U	0.30 U	0.27 U	0.28 U
o-Xylene	**0.35**	0.53 U	0.34 U	0.36 U	0.32 U	0.34 U
Styrene	0.31 U	0.52 U	0.33 U	0.35 U	0.32 U	0.33 U
t-1,2-Dichloroethylene	0.29 U	0.48 U	0.31 U	0.32 U	0.30 U	0.31 U
t-1,3-Dichloropropylene	0.33 U	0.55 U	0.35 U	0.37 U	0.34 U	0.35 U
Tetrachloroethylene	**3.3**	**13**	0.53 U	0.55 U	**1.2**	**0.61**
Tetrahydrofuran	0.21 U	0.36 U	0.23 U	0.24 U	0.22 U	0.23 U
Toluene	**0.68**	**0.53**	**0.94**	**3.2**	**0.45**	**0.83**
Trichloroethylene	0.39 U	0.65 U	0.42 U	0.44 U	0.40 U	0.42 U
Trichlorofluoromethane	**0.79**	0.68 U	**0.84**	**0.79**	**0.96**	**0.96**
Trichlorotrifluoroethane	0.56 U	0.93 U	0.60 U	0.63 U	0.57 U	0.60 U
Vinyl Bromide	0.32 U	0.53 U	0.34 U	0.36 U	0.33 U	0.34 U
Vinylchloride	0.19 U	0.31 U	0.20 U	0.21 U	0.19 U	0.20 U

Bold cell indicates a detected concentration.

TABLE 2
Summary of Johnson and Ettinger Model Input Parameters
Eastland Woolen Mill Superfund Site
Corinna, Maine

Input Parameter	Value
Average soil gas concentration ($\mu g/m^3$). Calculated based on detected values.	see Table 3
Depth below grade to bottom of enclosed space floor (cm) assuming slab on grade construction.	15 (default)
Soil gas sampling depth (cm).	106.68 (3.5 ft bgs)
Average soil temperature (C).	10 (Default)
Vadose zone SCS soil type.	Silt Loam (SIL)
Vadose zone soil dry bulk density (g/cm^3) based on SCS soil type.	1.49
Vadose zone soil total porosity (cm^3/cm^3) based on SCS soil type.	0.439
Vadose zone soil water-filled porosity (cm^3/cm^3) based on SCS soil type.	0.18

TABLE 3
Calculation of Average Soil Gas Concentrations
Eastland Woolen Mill Superfund Site
Corinna, Maine

Analyte	SP-12-05 10/12/2012 ug/m^3	SP-12-04 10/12/2012 ug/m^3	SP-12-03 10/12/2012 ug/m^3	SP-12-02 10/12/2012 ug/m^3	SP-12-01 10/12/2012 ug/m^3	Duplicate 10/12/2012 ug/m^3	**Average Detected Concentration ug/m^3**
1,1,1-Trichloroethane	4	ND	0.82	12	20	12	**10**
1,1-Dichloroethane	ND	ND	ND	ND	0.41	ND	**0.41**
Benzene	ND	0.51	ND	ND	0.45	0.26	**0.41**
Carbon Tetrachloride	ND	ND	ND	ND	4.7	2.6	**3.7**
Chloroform	ND	ND	0.64	6.5	2.9	1.7	**2.9**
Dichlorodifluoromethane	1.1	150	0.79	ND	0.37	0.89	**31**
Hexane	0.28	ND	ND	0.49	0.49	0.74	**0.5**
Methyl Ethyl Ketone	1.3	0.59	ND	0.68	1.9	1.3	**1.2**
Methyl Isobutyl Ketone	ND	ND	ND	0.74	ND	ND	**0.74**
Methylchloride	ND	ND	0.31	ND	0.48	0.56	**0.45**
o-Xylene	0.35	ND	ND	ND	ND	ND	**0.35**
Tetrachloroethylene	3.3	13	ND	ND	1.2	0.61	**4.6**
Toluene	0.68	0.53	0.94	3.2	0.45	0.83	**1.1**
Trichlorofluoromethane	0.79	ND	0.84	0.79	0.96	0.96	**0.87**

Note: Average concentration was based on the detect results.

TABLE 4
Calculation of Residential Risks from Vapor Intrusion Pathway
Eastland Woolen Mill Superfund Site
Corinna, Maine

Analyte	Average Soil Gas Concentration[a] ug/m³	Predicted Indoor Air Concentration[b] ug/m³	Unit Risk Factor $(\mu g/m^3)^{-1}$		Reference Concentration (mg/m^3)		Residential Exposure Concentration $(\mu g/m^3)$		Indoor Air Risk	
							Cancer Effects	Noncancer Effects	Cancer Risk	Hazard Quotient
1,1,1-Trichloroethane	10	0.0182	NA		5	I	0.0075	0.018	-	0.000004
1,1-Dichloroethane	0.41	0.000752	0.0000016	C	NA		0.00031	0.00073	5E-10	-
Benzene	0.41	0.000805	0.0000078	I	0.03	I	0.00033	0.00078	3E-09	0.00003
Carbon Tetrachloride	3.7	0.00675	0.000006	I	0.1	I	0.0028	0.0065	2E-08	0.00007
Chloroform	2.9	0.00628	0.000023	I	0.098	A	0.0026	0.0061	6E-08	0.00006
Dichlorodifluoromethane	31	0.051	NA		0.1	X	0.021	0.049	-	0.0005
Hexane	0.5	0.00148	NA		0.7	I	0.00061	0.0014	-	0.000002
Methyl Ethyl Ketone	1.2	0.00228	NA		5	I	0.00094	0.0022	-	0.0000004
Methyl Isobutyl Ketone	0.74	0.00133	NA		3	I	0.00055	0.0013	-	0.0000004
Methylchloride	0.45	0.00108	NA		0.09	I	0.00045	0.0010	-	0.00001
o-Xylene	0.35	0.000683	NA		0.1	I	0.00028	0.00066	-	0.000007
Tetrachloroethylene	4.6	0.00797	0.00000026	I	0.04	I	0.0033	0.0077	9E-10	0.0002
Toluene	1.1	0.00215	NA		5	I	0.00089	0.0021	-	0.0000004
Trichlorofluoromethane	0.87	0.0017	NA		0.7	H	0.00070	0.0016	-	0.000002
								Total:	**8E-08**	**0.0009**

[a] See Table 3.

[b] Calculated using the average soil gas concentration, the input parameters presented on Table 2, and the Johnson and Ettinger Model spreadsheet, SG-Screen.xls - Version 3.1, 02/04.
A = ATSDR Minimal Risk Level (obtained from November 2012 Regional Screening Level Table).
C = California Environmental Protection Agency (obtained from November 2012 Regional Screening Level Table).
H = Health Effects Assessment Summary Table (obtained from November 2012 Regional Screening Level Table).
I = Intergated Risk Information System.
NA = not available.
X = Provisional Peer-Reviewed Toxicity Value (obtained from November 2012 Regional Screening Level Table).

Exposure Concentration $(\mu g/m^3)$ = Air Conc x EF x ED x ET x CF x 1/AT

Where: EF = exposure frequency, 350 days/year.
ED = exposure duration, 30 years.
ET = exposure time, 24 hours/day.
CF = conversion factor, 0.042 days/hour.
AT = averaging time.
Cancer AT = 25550 days
Noncancer AT = 10950 days

Attachment 1

Johnson and Ettinger Model Output

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71556	1.00E+01			1,1,1-Trichloroethane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

1,1,1-Trichloroethane

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	1.00E+01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	7,885	8.48E-03	3.65E-01	1.75E-04	4.50E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	1.00E+01	0.10	8.33E+01	4.50E-03	4.00E+02	8.55E+200	1.82E-03	**1.82E-02**

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
75343	4.10E-01			1,1-Dichloroethane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

1,1-Dichloroethane

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	4.10E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	7,450	2.88E-03	1.24E-01	1.75E-04	4.28E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	4.10E-01	0.10	8.33E+01	4.28E-03	4.00E+02	1.48E+211	1.77E-03	**7.25E-04**

DATA ENTRY SHEET

Benzene

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
71432	4.10E-01			Benzene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Benzene

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	4.10E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	8,122	2.68E-03	1.15E-01	1.75E-04	5.08E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	4.10E-01	0.10	8.33E+01	5.08E-03	4.00E+02	1.16E+178	1.96E-03	**8.05E-04**

DATA ENTRY SHEET

Carbon Tetrachloride

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
56235	3.70E+00			Carbon tetrachloride

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Carbon Tetrachloride

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	3.70E+00	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	7,859	1.50E-02	6.46E-01	1.75E-04	4.50E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	3.70E+00	0.10	8.33E+01	4.50E-03	4.00E+02	8.71E+200	1.82E-03	**6.75E-03**

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
67663	2.90E+00			Chloroform

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Chloroform

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	2.90E+00	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	7,554	1.86E-03	8.02E-02	1.75E-04	6.01E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	2.90E+00	0.10	8.33E+01	6.01E-03	4.00E+02	4.56E+150	2.16E-03	**6.28E-03**

DATA ENTRY SHEET

Dichlorodifluoromethane

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
75718	3.10E+01			Dichlorodifluoromethane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Dichlorodifluoromethane

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	3.10E+01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	8,386	1.62E-01	6.96E+00	1.75E-04	3.84E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	3.10E+01	0.10	8.33E+01	3.84E-03	4.00E+02	5.01E+235	1.64E-03	**5.10E-02**

DATA ENTRY SHEET

Hexane

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
110543	5.00E-01			Hexane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Hexane

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	5.00E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	7,737	8.32E-01	3.58E+01	1.75E-04	1.15E-02	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	5.00E-01	0.10	8.33E+01	1.15E-02	4.00E+02	2.35E+78	2.96E-03	**1.48E-03**

DATA ENTRY SHEET

Methyl Ethyl Ketone

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
78933	1.20E+00			Methylethylketone (2-butanone)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Methyl Ethyl Ketone

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	1.20E+00	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	8,419	2.63E-05	1.13E-03	1.75E-04	4.81E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	1.20E+00	0.10	8.33E+01	4.81E-03	4.00E+02	9.61E+187	1.90E-03	**2.28E-03**

DATA ENTRY SHEET

Methyl Isobutyl Ketone

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108101	7.40E-01			Methylisobutylketone (4-methyl-2-pentanone)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Methyl Isobutyl Ketone

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	7.40E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	9,862	5.70E-05	2.45E-03	1.75E-04	4.38E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	7.40E-01	0.10	8.33E+01	4.38E-03	4.00E+02	2.42E+206	1.79E-03	**1.33E-03**

DATA ENTRY SHEET

Methylchloride

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
74873	4.50E-01			Methyl chloride (chloromethane)

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Methylchloride

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	4.50E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	4,747	5.76E-03	2.48E-01	1.75E-04	7.27E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	4.50E-01	0.10	8.33E+01	7.27E-03	4.00E+02	2.46E+124	2.40E-03	**1.08E-03**

DATA ENTRY SHEET

o-Xylene

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
95476	3.50E-01			o-Xylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

o-Xylene

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	3.50E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	10,404	**7.89E+04** 2.04E-03	1.20E+00 8.79E-02	1.75E-04	5.02E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	3.50E-01	0.10	8.33E+01	5.02E-03	4.00E+02	1.24E+180	1.95E-03	**6.83E-04**

DATA ENTRY SHEET

Tetrachloroethylene

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
127184	4.60E+00			Tetrachloroethylene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Tetrachloroethylene

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	4.60E+00	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	9,553	7.81E-03	3.36E-01	1.75E-04	4.16E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	4.60E+00	0.10	8.33E+01	4.16E-03	4.00E+02	4.73E+217	1.73E-03	**7.97E-03**

DATA ENTRY SHEET

Toluene

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
108883	1.10E+00			Toluene

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Toluene

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	1.10E+00	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	9,154	2.92E-03	1.26E-01	1.75E-04	5.02E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	1.10E+00	0.10	8.33E+01	5.02E-03	4.00E+02	1.32E+180	1.95E-03	**2.15E-03**

DATA ENTRY SHEET

Trichlorofluoromethane

SG-SCREEN
Version 3.1; 02/04

Soil Gas Concentration Data

ENTER Chemical CAS No. (numbers only, no dashes)	ENTER Soil gas conc., C_g ($\mu g/m^3$)	OR	ENTER Soil gas conc., C_g (ppmv)	Chemical
75694	8.70E-01			Trichlorofluoromethane

ENTER Depth below grade to bottom of enclosed space floor, L_F (15 or 200 cm)	ENTER Soil gas sampling depth below grade, L_s (cm)	ENTER Average soil temperature, T_S (^oC)	ENTER Vadose zone SCS soil type (used to estimate soil vapor permeability)	OR	ENTER User-defined vadose zone soil vapor permeability, k_v (cm^2)
15	106.68	10	SIL		

ENTER Vandose zone SCS soil type (Lookup Soil Parameters)	ENTER Vadose zone soil dry bulk density, ρ_b^A (g/cm^3)	ENTER Vadose zone soil total porosity, n^V (unitless)	ENTER Vadose zone soil water-filled porosity, θ_w^V (cm^3/cm^3)	ENTER Average vapor flow rate into bldg. (Leave blank to calculate) Q_{soil} (L/m)
SIL	1.49	0.439	0.18	5

INTERMEDIATE CALCULATIONS SHEET

Trichlorofluoromethane

Source-building separation, L_T (cm)	Vadose zone soil air-filled porosity, θ_a^V (cm^3/cm^3)	Vadose zone effective total fluid saturation, S_{te} (cm^3/cm^3)	Vadose zone soil intrinsic permeability, k_i (cm^2)	Vadose zone soil relative air permeability, k_{ra} (cm^2)	Vadose zone soil effective vapor permeability, k_v (cm^2)	Floor-wall seam perimeter, X_{crack} (cm)	Soil gas conc. ($\mu g/m^3$)	Bldg. ventilation rate, $Q_{building}$ (cm^3/s)
91.68	0.259	0.307	2.82E-09	0.798	2.25E-09	4,000	8.70E-01	1.69E+04

Area of enclosed space below grade, A_B (cm^2)	Crack-to-total area ratio, η (unitless)	Crack depth below grade, Z_{crack} (cm)	Enthalpy of vaporization at ave. soil temperature, $\Delta H_{v,TS}$ (cal/mol)	Henry's law constant at ave. soil temperature, H_{TS} (atm-m^3/mol)	Henry's law constant at ave. soil temperature, H'_{TS} (unitless)	Vapor viscosity at ave. soil temperature, μ_{TS} (g/cm-s)	Vadose zone effective diffusion coefficient, D^{eff}_V (cm^2/s)	Diffusion path length, L_d (cm)
1.00E+06	4.00E-04	15	6,158	**7.89E+04**	1.20E+00	1.75E-04	5.02E-03	91.68

Convection path length, L_p (cm)	Source vapor conc., C_{source} ($\mu g/m^3$)	Crack radius, r_{crack} (cm)	Average vapor flow rate into bldg., Q_{soil} (cm^3/s)	Crack effective diffusion coefficient, D^{crack} (cm^2/s)	Area of crack, A_{crack} (cm^2)	Exponent of equivalent foundation Peclet number, $exp(Pe^f)$ (unitless)	Infinite source indoor attenuation coefficient, α (unitless)	**Infinite source bldg. conc., $C_{building}$ ($\mu g/m^3$)**
15	8.70E-01	0.10	8.33E+01	5.02E-03	4.00E+02	1.45E+180	1.95E-03	**1.70E-03**

APPENDIX G

Eastland Woolen Mill
East Branch Sebasticook River
Screening Evaluation of Sediment Data
Metals
July 2015

	EPA	Maine DEP	Maine DEP			
	Regional Screening Levels	Remedial Action Guidelines	Remedial Action Guidelines			
	Residential Soil Exposure (350 days per year exposure)	Residential Soil (150 days per year exposure)	Park Exposure (90 days per year exposure)	Highest concentration detected in sediment	Frequency of detection	Frequency above MEDEP Park Exposure action level
	mg/kg	mg/kg	mg/kg	mg/kg		
Aluminum	77,000.00	170,000	280,000	22,000	29/29	0/29
Antimony	31.00	68	110	not detected		0/29
Arsenic	0.68	1.3	2.3	41	29/29	28/29
Barium	15,000.00	10,000	10,000	200	29/29	0/29
Beryllium	160.00	340	570	not detected		0/29
Cadmium	71.00	11	18	1.2	2/29	0/29
Calcium						
Chromium (III)	120,000.00	10,000	10,000	420	29/29	0/29
Cobalt	23.00	51	85	11	29/29	0/29
Copper	3,100.00	2,400	4,000	75	29/29	0/29
Iron	55,000.00	120,000	200,000	27,000	29/29	0/29
Lead	400.00	340	530	81	29/29	0/29
Magnesium						
Manganese	1,800.00	4,100	6,800	1,600	29/29	0/29
Nickel	820.00	510	850	35	29/29	0/29
Potassium						
Selenium	390.00	850	1,400	2.4	4/29	0/29
Silver	390.00	850	1,400	not detected	0/20	0/29
Sodium						
Thallium						
Vanadium	390.00	1,200	1,200	42	29/29	0/29
Zinc	23,000.00	10,000	10,000	2,900	29/29	0/29

Notes: EPA Regional Screening Levels from June 2015 published Regional Screening Level Table which can be found at: http://www.epa.gov/region9/superfund/prg/

Maine DEP Remedial Action Guidelines from: http://www.maine.gov/dep/spills/publications/guidance/#new_rag
Background data for soils in Maine can be found in the document SUMMARY REPORT FOR EVALUATION OF CONCENTRATIONS OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) AND METALS IN BACKGROUND SOILS IN MAINE Prepared for: Maine Department of Environmental Protection, November 16, 2012. This document is located at: http://www.maine.gov/dep/ftp/RAGS-Background-Documents/Metals-and-PAH-Background-Study-2012/

Eastland Woolen Mill
East Branch Sebsticook River
Screening Evaluation of Sediment Data
VOCs and Pesticides
July 2015

	EPA	Maine DEP	Maine DEP			
	Regional Screening Levels	Remedial Action Guidelines	Remedial Action Guidelines			
	Residential Soil Exposure (350 days per year exposure)	Residential Soil (150 days per year exposure)	Park Exposure (90 days per year exposure)	Highest concentration detected in sediment	Frequency of detection	Frequency above MEDEP Park Exposure action level
	ug/kg	ug/kg	ug/kg	ug/kg		
4,4'-DDD	2,300	45,000	75,000	670	27/29	0
4,4'-DDE	2,000	32,000	53,000	1,100	27/29	0
4,4'-DDT	1,900	38,000	64,000	not detected	0/29	0
Aldrin	39	64	1,100	50	1/29	0
Dieldrin	34	680	1,100	760	1/29	0
Chlorobenzene	280,000	3,400	5,700	766	1/29	0

Notes: EPA Regional Screening Levels from June 2015 published Regional Screening Level Table which can be found at: http://www.epa.gov/region9/superfund/prg/
Maine DEP Remedial Action Guidelines from: http://www.maine.gov/dep/spills/publications/guidance/#new_rag
Background data for soils in Maine can be found in the document SUMMARY REPORT FOR EVALUATION OF CONCENTRATIONS OF POLYCYCLIC AROMATIC HYDROCARBONS (PAHs) AND METALS IN BACKGROUND SOILS IN MAINE Prepared for: Maine Department of Environmental Protection, November 16, 2012. This document is located at: http://www.maine.gov/dep/ftp/RAGS-Background-Documents/Metals-and-PAH-Background-Study-2012/

TABLE 1A
SUMMARY OF METAL SEDIMENT ANALYSES
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location	SED 1	SED2	SED3	SED4	SED5	SED6	SED6dup	SED7	SED8	SED8dup	SED9	SED10	SED11	SED12	SED13	SED14
Sample Date	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011
Metals (mg/kg)																
Aluminum	12000	13000	18000	22000	22000	13000	12000	14000	17000	17000	11000	19000	16000	18000	17000	13000
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	7.2	5.9	9.3	8.5	41	15	13	14	15	15	14	13	5	14	7.2	15
Barium	49	37	75	86	200	60	57	54	75	74	64	81	79	88	87	74
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	16000	2700	5000	11000	26000	11000	11000	3400	5400	5700	10000	5200	5600	6600	8000	7500
Chromium	43	110	140	130	36	300	290	100	360	340	270	180	420	250	300	400
Cobalt	5.7	7.2	9.6	7.2	5.9	9.2	9	8.4	11	11	7.9	11	7.2	11	9.1	9.7
Copper	26	20	30	31	12	68	66	22	69	69	60	45	71	58	71	75
Iron	11000	18000	21000	19000	15000	18000	17000	21000	23000	22000	18000	27000	17000	22000	18000	20000
Lead	17	31	35	32	15	69	66	26	80	79	66	55	74	66	73	81
Magnesium	2700	5100	5000	5200	5500	3500	3400	4600	5000	5000	3200	5600	4500	5500	4200	3600
Manganese	370	270	400	480	700	600	630	380	440	420	590	580	370	340	510	500
Nickel	18	28	30	27	28	28	27	26	35	35	26	36	29	34	29	29
Potassium	880	930	1500	1900	1500	1300	1200	1300	1800	1700	1300	1700	1400	1700	1600	1300
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	130	210	190	190	230	170	170	190	200	180	200	210	200	240	180	170
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	18	24	30	30	19	33	31	25	42	40	38	36	39	46	24	38
Zinc	180	130	480	630	55	2200	2000	620	2300	2200	1500	720	1600	1200	660	2900

TABLE 1B
SUMMARY OF METAL SEDIMENT ANALYSES
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location	SED15	SED16	SED17	SED18	SED18dup	SED19	SED20	SED21	SED22	SED23	SED24	SED25	SED26	SED27	SED27dup	SED28	SED29
Sample Date	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011
Metals (mg/kg)																	
Aluminum	12000	13000	16000	16000	16000	8100	8800	8600	8100	11000	9200	13000	12000	14000	14000	15000	13000
Antimony	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Arsenic	12	7.1	11	12	12	9.3	3.6	8.1	2.1	7.9	3.9	13	9.7	8.3	8.3	7.3	8.7
Barium	55	46	84	80	81	62	17	62	25	66	43	80	67	62	61	79	58
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	1.2	ND	ND	1.2	1.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Calcium	9600	3900	5900	5200	4600	3200	1300	7900	2500	8500	3100	5900	6100	5800	4500	4600	3800
Chromium	230	100	340	260	260	20	44	40	17	88	27	170	100	97	97	170	91
Cobalt	8.1	7	8.5	9	9.1	8.6	5.9	5.7	4.9	5.2	4.3	8.4	6.8	9.1	9.2	8.2	7.9
Copper	53	21	64	54	54	6.6	2.9	19	3.8	25	7.4	37	28	25	25	38	23
Iron	16000	15000	18000	22000	22000	20000	17000	13000	9100	14000	12000	20000	17000	20000	20000	20000	20000
Lead	52	25	74	60	60	7.4	3.9	15	3.7	24	9.3	41	33	30	29	48	33
Magnesium	3000	3900	4300	4600	4600	4400	5200	2700	3000	2700	3000	3500	3200	4600	4700	4400	4200
Manganese	440	300	410	500	490	1600	320	2300	210	1400	680	970	1300	490	460	430	420
Nickel	24	21	29	30	31	22	21	17	14	17	14	24	21	27	27	28	25
Potassium	1100	1000	1500	1500	1500	480	510	770	500	930	480	1300	1300	1200	1200	1300	1000
Selenium	2.4	ND	ND	2.2	2.2	ND	ND	ND	ND	1.9	ND	2.1	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sodium	120	230	160	160	170	150	74	130	210	180	240	140	170	220	210	160	170
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vanadium	28	20	41	39	39	12	14	14	10	19	14	30	24	26	26	35	22
Zinc	1500	350	850	1000	1000	96	53	190	48	290	100	520	370	350	340	500	410

TABLE 2A
SUMMARY OF PESTICIDE/PCB SEDIMENT ANALYSES
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location	SED 1	SED2	SED3	SED4	SED5	SED6	SED7dup	SED7	SED8	SED8dup	SED9	SED10	SED11	SED12	SED13	SED14
Sample Date	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011
Pest/PCB (ug/kg)																
4,4'-DDD	160	240	170	ND	28	600	64	56	130	250	250	70	670	130	72	250
4,4'-DDE	60	110	190	370	ND	800	120	100	540	1100	370	190	800	400	120	880
4,4'-DDT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	ND	50	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alpha Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND	760	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Ketone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Gamma Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Technical Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1221	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1232	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1262	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1268	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 2B
SUMMARY OF PESTICIDE/PCB SEDIMENT ANALYSES
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location **Sample Date** **Pest/PCB (ug/kg)**	SED15 8/23/2011	SED16 8/23/2011	SED17 8/23/2011	SED18 8/23/2011	SED19 8/23/2011	SED20 8/23/2011	SED20dup 8/23/2011	SED21 8/23/2011	SED22 8/23/2011	SED23 8/23/2011	SED24 8/23/2011	SED25 8/23/2011	SED26 8/23/2011	SED27 8/23/2011	SED27dup 8/23/2011	SED28 8/23/2011	SED29 8/23/2011
4,4'-DDD	270	41	190	180	28	ND	ND	59	ND	120	17	140	92	42	38	93	68
4,4'-DDE	670	46	310	380	30	ND	ND	57	ND	110	12	170	98	88	99	130	140
4,4'-DDT	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aldrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alpha Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Alpha-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1016	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Beta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Delta-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dieldrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan I	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan II	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endosulfan Sulfate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Aldehyde	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Endrin Ketone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Gamma Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Gamma-BHC	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Heptachlor Epoxide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methoxychlor	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Technical Chlordane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toxaphene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1221	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1232	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1242	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1248	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1254	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1260	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1262	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor-1268	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3A
SUMMARY OF VOAs SEDIMENT ANALYSES
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location	SED 1	SED2	SED3	SED4	SED5	SED6	SED7	SED8	SED8dup	SED9	SED10	SED11	SED12	SED13	SED14
Sample Date	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011
VOAs (ug/kg)															
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-Trifluoroetha	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-Chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propanone (acetone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone(MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3B
SUMMARY OF VOAs SEDIMENT ANALYSES (Cont.)
Eastland Woolen Mill Superfund Site
Corinna, Maine

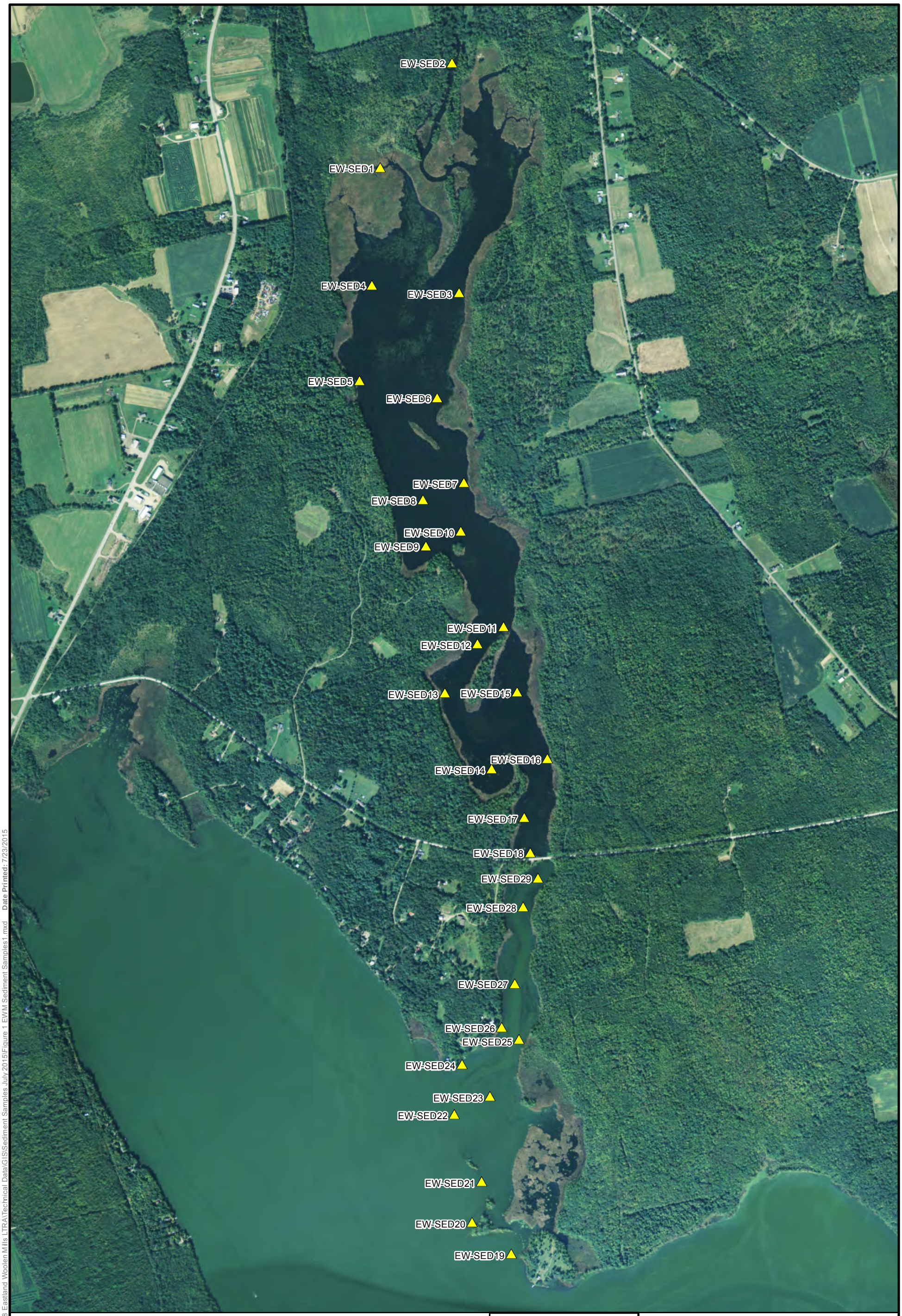
Sample Location	SED 1	SED2	SED3	SED4	SED5	SED6	SED7	SED8	SED8dup	SED9	SED10	SED11	SED12	SED13	SED14
Sample Date	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011	8/23/2011
VOAs (ug/kg)															
c-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	766.5	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-t-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ortho Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Para-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3C
SUMMARY OF VOAs SEDIMENT ANALYSES
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location **Sample Date** **VOAs (ug/kg)**	SED15 8/23/2011	SED16 8/23/2011	SED16dup 8/23/2011	SED17 8/23/2011	SED18 8/23/2011	SED19 8/23/2011	SED20 8/23/2011	SED21 8/23/2011	SED22 8/23/2011	SED23 8/23/2011	SED24 8/23/2011	SED25 8/23/2011	SED26 8/23/2011	SED27 8/23/2011	SED27dup 8/23/2011	SED28 8/23/2011	SED29 8/23/2011
1,1,1,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloro-1,2,2-Trifluoroetha	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,3-Trichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2,4-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromo-3-Chloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dibromoethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3,5-Trimethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone (MEK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Propanone (acetone)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone(MIBK)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND

TABLE 3D
SUMMARY OF VOAs SEDIMENT ANALYSES (Cont.)
Eastland Woolen Mill Superfund Site
Corinna, Maine

Sample Location **Sample Date** **VOAs (ug/kg)**	SED15 8/23/2011	SED16 8/23/2011	SED16dup 8/23/2011	SED17 8/23/2011	SED18 8/23/2011	SED19 8/23/2011	SED20 8/23/2011	SED21 8/23/2011	SED22 8/23/2011	SED23 8/23/2011	SED24 8/23/2011	SED25 8/23/2011	SED26 8/23/2011	SED27 8/23/2011	SED27dup 8/23/2011	SED28 8/23/2011	SED29 8/23/2011
c-1,3-dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dichlorodifluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isopropylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
M/P Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methyl-t-Butyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Propylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ortho Xylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Para-Isopropyltoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Sec-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
t-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tert-Butylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrahydrofuran	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND



Notes:

1. Location of site features depicted hereon is approximate and given for illustrative purposes only.

0 500 1,000 2,000

Feet

1 inch = 1,000 feet

N

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FIGURE 1

SEDIMENT SAMPLE LOCATIONS
EASTLAND WOOLEN MILL
SUPERFUND SITE
CORINNA, MAINE

PREPARED BY: JH	CHECKED BY: TA
PROJECT NO. 80038	DATE: JULY 2015

Path: R:\80000 Task Orders\80038 Eastland Woolen Mills LTRA\Technical Data\GIS\Sediment Samples July 2015\Figure 1 EWM Sediment Samples1.mxd Date Printed: 7/23/2015