

**REMEDIAL WORK PLAN
AND
SAMPLING AND ANALYSIS PLAN**

FOR THE

**SEDIMENT AND SOIL FLOODPLAIN EXCAVATION AND
REMOVAL**

AT THE

**LEMON LANE LANDFILL SITE
ILLINOIS CENTRAL SPRING
BLOOMINGTON, INDIANA**

Civil Action Number: IP 81-448-C, “Agreed Amendment to the Consent Decree Providing for Remedial Actions at Neal’s Landfill, Lemon Lane Landfill and Bennett’s Dump and Addressing General Matters”, USA et al. v. CBS Corporation et al., United States District Court for the Southern District of Indiana, Indianapolis, Division, entered July 24, 2009.

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July 2010

TABLE OF CONTENTS

	<u>Page No.</u>
1.0 Introduction	6
2.0 Site Background	6
2.1 Description and Site History	7
2.1.1 Illinois Central Spring Emergence (EM) Area Description.....	8
2.1.2 Swallow Hole (SH) Description	9
2.1.3 Quarry Springs (QS) Area Description.....	9
2.2 Previous Site Investigation Activities.....	11
2.2.1 ICS Emergence (EM) Area Previous Sample Results	11
2.2.2 Swallow Hole (SH) Area Previous Sample Data.....	12
2.2.3 Quarry Springs Area Previous Sample Results	12
3.0 Project Organization and Administration	13
3.1 Organizations, Roles, and Responsibilities	13
3.2 Project Meetings and Reporting	16
3.3 Project Schedule	17
4.0 Remedial Objectives	17
4.1 Cleanup Criteria.....	17
4.1.1 Final Drainageway Criteria	18
4.1.2 Non-Drainageway Criteria	18
5.0 Technical Approach.....	18
5.1 Pre-Remediation Activities	19
5.1.1 Clearing.....	19
5.1.2 Delineation Grid Sampling	19
5.1.2.1 Phase 1 Emergence Area Delineation Sampling	20
5.1.2.2 Quarry Springs Area Delineation Sampling	20
5.1.2.3 Swallow Hole Area Delineation Sampling	21
5.1.3 New ICSTF Effluent Line.....	21
5.1.4 New Quarry A Culvert.....	22
5.2 Mobilization and Site Setup	22
5.3 Soil Removal Approach	22
5.3.1 Emergence Area	22
5.3.1.1 French Drain Installation	24
5.3.2 Quarry Springs Area	24
5.3.3 Swallow Hole Area	28
6.0 Delineation and Verification Sampling and Re-excavation.....	30
6.1 Pre-Excavation Grid Delineation Sampling.....	31
6.2 Grid Bottom Verification Sampling.....	32
6.3 Final Drainage Way Verification Sampling	32
6.4 Stockpile Sampling	33

TABLE OF CONTENTS (CONTINUED)

	<u>Page No.</u>
7.0 Waste Transportation and Disposal.....	33
7.1 Transportation	34
7.2 Inspections	34
7.3 Scale Operations and Truck Log Records	34
7.4 Manifesting and Placarding	35
7.5 Disposal Facilities	35
7.6 Solid Waste and Fuel Spills	35
8.0 Water Management	36
8.1 Diversion of Clean Storm Water	37
8.1.1 Diversion of Quarry Springs Water	37
8.2 Retention and Treatment of Potentially Impacted Water.....	38
8.3 Spill Prevention and Control	39
9.0 Air Monitoring	39
10.0 Site Restoration	39
10.1 Grading and Seeding.....	39
10.2 Erosion Controls	40
10.3 Fencing.....	40
11.0 Project Closeout and Completion Report	40

Appendix A.

Sampling and Analysis Plan

	<u>Page No.</u>
A1.0 Introduction.....	42
A2.0 Data Quality Objectives.....	42
A.2.1 Stating the Problem.....	42
A.2.2 Identifying the Decision.....	43
A.2.3 Identifying Inputs to the Decision	43
A.2.4 Defining the Boundaries of the Study.....	43
A.2.5 Developing a Decision Rule	46
A.2.6 Specifying Limits on Decision Errors.....	46
A.2.7 Optimizing the Design	46
A.3.0 Soil Sampling Procedures	49
A.3.1 Pre-Excavation Grid Delineation Sampling.....	49
A.3.2 Grid Bottom Verification Sampling and Reexcavation.....	50
A.3.3 Final Drainage Way Verification Sampling	51
A.3.4 Stockpile Sampling	51
A.4.0 Quality Control Samples.....	52
A.5.0 Personnel and Equipment Decontamination.....	53
A.6.0 Investigation-Derived Waste	53
A.7.0 Sample Management.....	54
A.7.1 Sample Identification System	54
A.7.2 Sample Containers, Preservatives, and Holding Times	55
A.7.3 Sample Labeling	55
A.7.4 Sample Shipping.....	55
A.7.5 Sample Custody	55
A.7.6 Field Sampling Logbook.....	55
A.8.0 Laboratory Analysis.....	56
A.9.0 Data Validation and Reporting	56
A.9.1 Data Validation	56
A.9.2 Data Reporting.....	57

References

TABLE OF CONTENTS (CONTINUED)

List of Tables

Table 1.	Soil and Sediment Sampling PCB Results for the Emergence Area
Table 2.	Soil and Sediment Sampling PCB Results for the Swallow Hole Area
Table 3.	Soil and Sediment Sampling PCB Results for the Quarry Springs Area
Table 4.	IC Emergence Area - Grid Sampling Results
Table 5.	IC Quarry Springs Area - Grid Sampling Results
Table 6	IC Shallow Hole Area – Grid Sampling Results
Table 7	Sample Requirements

List of Figures

Figure 1.	Site Location Map
Figure 2.	General Site Area
Figure 3.	Existing Features
Figure 4.	PCB Soil Results, Emergence Area
Figure 5.	PCB Soil Results, Shallow Hole Area
Figure 6.	PCB Soil Results, Quarry Springs Area
Figure 7.	Project Schedule
Figure 8.	Conceptual Remediation Site Layout
Figure 9.	New ICSTF Effluent Line
Figure 10.	French Drain Layout
Figure 11a.	French Drain Design
Figure 11b.	French Drain Design
Figure 12.	IC Emergence Grid Sampling Plan
Figure 13.	IC Emergence Excavation Plan
Figure 14.	IC Emergence Constructed Drainage Channel and Final Grading Plan
Figure 15.	Shallow Hole Grid Sampling and Excavation Plan
Figure 16.	Quarry Springs Grid Sampling and Excavation Plan
Figure 17.	Swallow Hole Final Drainage Channel and Final Grading Plan
Figure 18.	Quarry Springs Final Drainage Channel and Final Grading Plan

1.0 Introduction

The purpose of this work plan and SAP is to provide a plan for the work required at the Lemon Lane Landfill site (LLL) by the Consent Decree Amendment (CDA) and the associated Record of Decision Amendment (RODA) and Statement of Work (SOW). Collectively, the CDA/RODA/SOW will be referred to as the CDA (Reference 1) in this document. The CDA details the final remedial actions and monitoring requirements for the LLL site. One of those requirements is to sample the soils and sediments in the Illinois Central Spring (ICS) emergence area (EM), the Swallow Hole (SH) area and the Quarry Springs (QS) area.

The LLL site has been separated into operable units. The first operable unit was the source control operable unit (OU1). The remediation of OU1 occurred in 2000 in accordance with a negotiated SOW (Reference 2). The recently entered CDA sets forth those actions required for the final two operable units at the site. OU2 addresses groundwater at the site and OU3 addresses sediments.

A sampling plan for the Delineation of the Emergence area, (Reference 4), has been previously approved by EPA. This plan contains a Remediation Work Plan and a Sampling and Analysis Plan for the sediment and soil removal in the three areas, EM/SH/QS. It specifies the verification sampling required in the EM and SH areas and the delineation and verification sampling required in the QS area. This plan is based on the "Remedial Design/Remedial Action Work Plan Operable Units 2 and 3 Site Groundwater and Sediments, Lemon Lane Landfill Site, Bloomington, Monroe County, Indiana" submitted by CBS to the EPA in January 2010. (Reference 5)

This plan contains the following:

- Site description/history
- Project Organization
- Performance objectives
- General construction approach
- Site environmental controls
- Cleanup confirmation methods
- Sampling and Analysis Plan

This Plan is supported by and intended to be used in conjunction with the Quality Assurance Project Plan (QAPP) (Reference 6) for the Bloomington Sites.

2.0 Site Background

The EM/SH/QS areas are associated with LL Landfill, which is a National Priority List (NPL) site with the EPA ID No. IND980794341. LL Landfill is part of a Consent Decree (CD) entered on August 27, 1985, in Civil Action No. IP 83-9-C and IP 81-448-C. The remedy required by the 1985 decree was later modified. The final remedies required for the site are included in the 2009 CDA.

LL Landfill is located on the northwest side of the city of Bloomington in Monroe County, Indiana as shown in Figure 1. The relationship between LL Landfill and the ICS EM/SH/QS locations are shown on Figure 2. OU2 and OU3 remedial actions are to be carried out at the site of the groundwater discharge impacted by the site, the Illinois Central Spring (ICS) which is located about 2,500 feet southeast of the landfill.

2.1 Description and Site History

The City of Bloomington operated the Lemon Lane Landfill from 1950 to 1964 as a municipal waste landfill. It was also used as a repository for industrial debris and waste. Electrical capacitors containing PCBs from the Westinghouse Bloomington plant were deposited there from 1958 to 1964 by contracted local waste haulers. The City closed the landfill in 1964 and partially covered the landfill with soil.

Investigations at the site began as early as 1976. Extensive site sampling began in the early 1980s. The site was placed on the NPL in 1983, at which time the initial site cleanup activities began.

The 1985 consent decree required interim measures at the site and detailed final remedial and closure activities. The final landfill remedy was modified in 2000. At that time the site was divided into operable units. The first operable unit, OU1 was designated as the source control operable unit. The remedy specified for OU1 involved the landfill area.

The remedy for OU1 was prescribed in the Statement of Work (SOW) for OU1 (Reference 2). The work required in the SOW resulted in the following:

- Excavation and off site disposal of 80,087 tons of PCB contaminated material greater than or equal to 50 parts per million (ppm)
- Excavation and transportation of a total of 4,402 capacitors offsite for incineration.
- Consolidation of 40,000 cubic yards of landfill material within the final capped area to shrink the size of the landfill to approximately 9 acres.
- Installation of a RCRA Subtitle C compliant cap over the remaining landfill material. The cap consists of 6-inches of topsoil, 18-inches of clean granular fill, a geocomposite drainage layer, 40 millimeter thick geomembrane, geosynthetic clay layer and perimeter drainage and stormwater retention pond.
- Installation of 4 piezometers into the landfill to determine if the landfill waste is getting wet by backflooding.
- Clean up of areas outside the landfill boundary.
- Implementation of a Groundwater Monitoring Plan and Cap Inspection Plan

Illinois Central Spring (ICS) is located approximately a half mile southeast of LL Landfill as shown on Figure 2. ICS has been proven to be the outlet for groundwater impacted by the landfill. ICS discharges through a railroad culvert to an area known as the Swallow Hole Area (SH). As the name implies, this area is a low spot that contains several swallow holes. These swallow holes route surface water back below the surface. At non-storm conditions, the swallow holes in this area pass all the water from ICS to the subsurface. However, during storms, these swallow holes cannot pass enough flow and the area floods.

As the SH area floods, it overflows through a culvert to the Quarry Springs (QS) area. The QS area is so named because quarrying was done historically in the general vicinity and there are also several springs in the area. These springs have been proven to be the discharge points for the waters which sink into the swallow holes in the SH area. The QS area is drained by a 36 inch culvert which routes storm water to the headwaters of Clear Creek near the intersection of Third and Adams Streets.

In 1999, the USEPA began construction of a Spring Treatment Facility (STF) in the swallow hole area to capture the water emanating from the ICS emergence, treat it for PCBs and then discharge the treated water to the stream upstream of the swallow hole. Some areas in the flood plain of ICS emergence (EM) area were covered with fill during the construction of the STF.

In spring 2000, the EPA STF went into operation with the capability to treat up to 1000 gpm. Flows greater than 1000 gpm were bypassed in an untreated state. In 2001 the EPA completed construction of storage tanks at the treatment plant. With the tanks, the facility has the capacity to continuously treat 1000 gpm and store up to four acre-feet of water when flows exceed 1000 gpm. This plant is currently operated by CBS.

The EM/SH/QS areas are all prone to flood during large storm events when ICS spring flow can rise by several orders of magnitude and culverts/swallow holes clog or otherwise cannot pass all the spring flow. During these flood events, solids entrained in the spring flow are settled out. These solids are contaminated with PCBs which then contaminates the flood plain.

The ICS EM/SH/QS areas have been sampled several times beginning as early as 1982. ICS was fenced by EPA in 1985. By the mid 1990s this fence had fallen into disrepair. Based on a sampling event in 1995, the flood plains associated with the EM and SH areas were fenced by Westinghouse to prevent access to nearby residents. The PCB levels found at the QS area did not warrant fencing.

Most of the property in these areas had been owned by various railroads. In 1997, the rail lines were abandoned by CSX Railroad. The SH area property became the property of the City of Bloomington and the IC emergence area was sold to Renaissance Rentals. Some of the property north and west of the IC emergence is owned by Valhalla Cemetery. The QS area is largely owned by an adjacent church and David Kleindorfer, the owner of an adjacent hardware store.

2.1.1 Illinois Central Spring Emergence (EM) Area Description

The Emergence Area (EM) is the area fenced immediately around the ICS emergence flood plain. This encompasses about 1 acre. The general topography of the area is a moderately sloped valley oriented from northwest to southeast which is truncated by a railroad berm along the southern boundary. Figure 3 shows the area and the approximate location of the fence. Most of this area is wooded with extensive underbrush.

The main spring emergence is located near the southern boundary of the area. There are overflow springs up the hill to the west of the main emergence. During non-storm conditions, the flow from ICS averages about 30 gallons per minute (gpm). During intense storms, with wet pre-storm conditions, flows can exceed 4000 gpm. PCB levels in spring water ranges from 4 to 20 ppb during non-storm conditions to over 1000 ppb during peak storm periods.

In the early 1990s, a depression formed to the north of the ICS emergence. It appears this depression was formed because storm water from the underlying conduit had pushed above the top of rock and eroded the soils. In 2008, additional depressions were forming to the northeast of this original depression and the original depression has grown larger.

During the construction of the STF in 1999, a storm water diversion berm was installed to divert surface water runoff from the north and east and keep it separate from the ICS emergence water which is sent to the STF. The diverted storm water collects in a low area and is directed through the bypass piping, bypassing the inlet to the STF. This storm water bypass sump was sampled, regraded and filled during the construction of the STF.

2.1.2 Swallow Hole (SH) Description

The Swallow Hole (SH) area and associated floodplain is the fenced area just south of the STF. The size of the area is approximately 1 acre. Figure 3 shows the features and topography of the area. The general topography of the area is that of a low lying, wide, shallow valley running from west-northwest to east-southeast, between the old railroad berms on the west, south and east perimeters of the area. On the north perimeter of Swallow Hole area, the ground rises up the slope of the fill that was placed to build the STF. Most of this area is wooded with extensive underbrush.

The area begins where the ICS water emerged from the old railroad culvert just south of the railroad tracks before construction of the STF. In addition to waters which flow from ICS, this area also receives surface water drainage from the IC emergence area, and surface water drainage from the immediate swallow hole area. Before the ICS was diverted as part of the construction of the STF, the ICS water flowed on the surface in a small stream channel for approximately 300 feet and then, at low flows, the water was routed to the subsurface via the swallow hole. The small stream channel is a few feet wide with a bottom generally on top of bedrock with a few areas of deeper soft sediments, especially near the swallow hole.

At high flows, the swallow hole can not drain all the flow and flooding occurs in the area southeast of the swallow hole, depositing contaminated sediments. There are a number of channels which route storm flow from the SH towards the overflow culvert. The floodwater is relieved through a culvert under the embankment that releases the water to the QS A area. The culvert invert is higher than some of the low spots which causes a pond to form in the SH area. CBS has observed that the flood prone area in the SH area is limited to below about the 810 foot amsl elevation.

Since the year 2000, when the EPA built STF went into operation, the PCB loading to the SH area has been drastically reduced. However, the STF discharges the treated water to this area and the dynamics of flooding during storms still occurs.

2.1.3 Quarry Springs (QS) Area Description

The Quarry Springs area is southeast of the SH area, across the ICSTF access road, as shown in Figure 3. Within the QS area the Illinois Central Stream (ICS) flow which sank into the swallow holes in the SH area re-emerges at four springs in the QS area and flows along the surface to a 36" city sewer culvert.

The four springs are designated Quarry A, Quarry B and Quarry C and Rinker Spring. The locations of the springs and their relationship to the SH and QS areas are shown on Figure 3. The floodplain area around the Quarry Springs is approximately 1.5 acres in size. The general topography of the area is that of a low lying, wide, shallow valley running from the culvert outlet at Quarry A southeast to the entrance of the combined 36 inch storm sewer culvert. Within this flood plain are small stream channels that normally contain the flows from the various springs except in very large storm events or when the 36 inch discharge culvert becomes blocked by debris.

The topography of the QS area rises from the QS stream channels, up the railroad berm to the ICSTF access road on the west side of the area. On the north, east and south perimeters of the area, the topography rises out of the low lying area, up the slope of fill placed during development of the area. The area is not as heavily wooded as the EM and SH areas, but does contain extensive underbrush.

The QS stream channels are a few feet wide and have little soft sediment material. There is mostly just a thin layer of coarse gravel, sand and stone on bedrock. Exceptions to this are areas that can routinely pond, for example in front of the 36 inch exit culvert. This area in front of the 36 inch exit culvert has been blocked several times by beavers and this has allowed more sediment to accumulate in this area.

As indicated above, Quarry A and B Springs are fed directly by the swallow holes in the SH area. The flows at Quarry A and B Springs follow closely the flow at ICS during non-storm conditions. Under low flow conditions, when ICS flow is less than 500 gpm, Quarry B is the main resurgence of the water from the SH area. Quarry B is actually on the west side of the abandoned railroad tracks which is now the ICSTF access road. It was piped through a culvert to the eastern side between 1949 and the early 1980s. The area on the west side was then filled for development.

During large storm events when the ICS flow is greater than 500 gpm, the swallow holes in the SH area cannot pass all the storm flow and therefore a pond forms at the downstream end of the SH area at the entrance to the culvert which runs under the ICSTF access road to the QS area. During storms, most of the water entering the QS area enters as surface flow through this culvert near the Quarry A Spring. However, some water does still sink into the swallow holes and emerges at both Quarry A and B Springs.

PCB levels in Quarry A and B Springs have dropped since the EPA built the STF. The PCB levels in these springs are currently from 0.5 to 2 ppb.

Rinker Spring is a much smaller spring emanating from under the trailer park to the north of the Quarry Springs area. Flows in Rinker Spring are typically less than 10 gpm during non-storm conditions. During large storms flow can approach 100 gpm. PCB levels in Rinker Spring are comparable to levels in Quarry A and B Springs.

Quarry C emerges from the ground approximately 200 feet east of the STF access road. Quarry C is an intermittent spring that runs only in wet weather and forms a pond as shown on Figure 3. Dye tracing has shown that Quarry C is not connected with ICS waters and therefore not influenced by swallow hole water flows. Sampling has shown that Quarry C is not contaminated. PCB levels in this spring are non-detect at less than 0.1 ppb.

The small stream channels from all four springs eventually combine and flow to the south into the 36 inch storm water culvert. The combined QS waters currently form the

headwaters of Clear Creek at the outlet of this stormwater culvert near South Adams Street.

When there is blockage at the entrance to the 36 inch storm water culvert, the QS waters can pond during storm events. The ponded waters have been observed to back up and flow east via a small surface channel towards the intersection of South Adams and Third Street at the rear of Hinkle's Restaurant.

2.2 Previous Site Investigation Activities

2.2.1 ICS Emergence (EM) Area Previous Sample Results

Table 1 lists the historical PCB soil/sediment sample results for the ICS emergence. Figure 4 presents the data showing the locations of most of these samples. The first samples taken from the ICS emergence area were in February 1982 by the City of Bloomington. The highest PCB levels were 360 ppm from near the ICS emergence.

Since that time, soil/sediment samples have also been taken in 1983, 1991, 1994, 1995, 1999, 2004 and 2008.

Note that the pre-1995 soil and the pre-2004 sediment data are listed on the table but not all shown on the figure. The reasons for this are:

- The pre-2004 sediment samples were all taken within 20 feet of the emergence. The possible exception to this is the 1982 sediment samples taken by the City of Bloomington (CBU). The map scale depicting the 1982 CBU data makes it too difficult to pinpoint the location. Putting all the pre-2004 sediment sample results on the figure would make it too busy and is unnecessary since they were all taken at essentially the same location.
- The pre-1995 soil data were also taken by the CBU. Again the scale of the map provided showing the sample locations makes it difficult to pinpoint their location.

Additionally, in 1995 some soil data was generated using immuno-assay (IA) kits. This IA data is listed on the table but not shown on the figure.

The most extensive sampling occurred in 1995 and 2004. The 1995 samples were used to establish a clean perimeter to site the fence. The fence was conservatively placed based on those results.

The data show the following:

- The flood plain is generally to the east-north east of the main emergence and the PCB levels greater than 1 ppm in the floodplain are generally below an elevation of 826 to 827 feet amsl.
- PCB levels greater than 10 ppm are generally restricted to active flow channels for spring water or to one particular area of the northwest – southeast oriented valley

The 2004 and 2008 results stand out in that they identify a hot spot in soils with PCB levels just over 100 ppm. This hot spot area is to the east of the eroded depression area. It is not

clear why there would be a hot spot in this area. The two potential conceptual models for a hot spot in this location are preferential settling of storm sediments at this location and/or up flow of contaminated water from underlying conduits during large storm events from which the soils could sorb higher levels of PCBs. The Phase 1 EM sample results, as discussed in Section 5.1.2.1, seem to disprove the up flow from underlying conduits theory. Whichever mechanisms are in play, this data showed a need for further delineation of this hot spot especially since this area may be within the final surface water drainage way.

2.2.2 Swallow Hole (SH) Area Previous Sample Data

Table 2 lists the historical PCB soil/sediment sample results for the SH Area. Figure 5 shows the locations of the recent relevant data. The first samples taken from the ICS emergence and SH area were in February 1982 by the City of Bloomington. The highest PCB levels at that time were 65 ppm from the extreme northwest corner where the ICS waters enter the area.

Since that time, soil/sediment samples have also been taken in 1983, 1991, 1994, 1995, 1999, 2004 and 2008. The most extensive sampling occurred in 1995 and 2004. Because of the sample results obtained by Normandeau Associates at the SH (165 ppm) in November 1994 and by Westinghouse in May 1995, the decision was made to fence this area.

The 2004 and 2008 sample results are thought to best represent present day conditions. In the last ten years since 2000 the clean treated water emanating from the ICSTF has likely flushed away much of the earlier sediments, especially in the drainage channels. The average PCB content in the stream channel sediments in this area, based on the 2004 results, was 34 ppm. While the average PCB level in the flood plain soils in this area based on the 2004 results, is 8.7 ppm. Generally, the higher levels of PCBs are found in the small stream channels that contain either the low flow stream or storm overflow. The flood plain appears to have contamination mostly in the upper 6 inches. Contamination is limited to elevations below 810 feet amsl which appears to be the limits of the flood prone area.

2.2.3 Quarry Springs Area Previous Sample Results

Table 3 lists the historical PCB soil/sediment sample results for the QS area. Figure 6 shows the locations of the recent relevant data. The first samples in this area were taken in 1983. There also were soil/sediment samples taken in 1991, 1994, 1995, 1999, 2004 and 2008. The most extensive sampling occurred in 1995 and 2004.

The average PCB content in the stream channel sediments in this area, based on the 2004 results, was 6.9 ppm. While the average PCB level in the flood plain soils in this area, based on the 2004 results, is 2.9 ppm. There were no PCB samples with results greater than 50 ppm in 2004. Generally, the highest PCB levels were found in the stream channel carrying flow from Quarry A and Quarry B Springs.

The previous results show that the most heavily contaminated materials are found in the stream channel sediments with generally lower amounts of contamination found as you progress further and higher away from the main stream channel. This pattern of contamination is most likely due to a lesser frequency of inundation as you progress higher in the flood plain.

Reference 5, "Remedial Design/Remedial Action Work Plan Operable Units 2 and 3 Site Groundwater and Sediments, Lemon Lane Landfill Site, Bloomington, Monroe County, Indiana", CBS, January 2010 contains a more extensive discussion of the various investigations that occurred in the ICS areas over the years.

3.0 Project Organization and Administration

3.1 Organizations, Roles, and Responsibilities

CBS Corporation is the corporate entity responsible for implementation of the provisions of the CDA. The CBS Project Director has overall responsibility for his/her company's involvement in the project. The CBS Onsite Representative will report to the Project Director. The CBS Onsite Representative will be responsible for implementation and completion of the project on behalf of CBS. Other key roles on this project are the Site Remediation Contractor hired by CBS to execute the work described in the RWP and the government oversight agency. The key roles and personnel are:

<u>Project Director</u> CBS Corporation	Russ Cepko	412-642-2569
<u>CBS Onsite Representative</u> CBS Corporation	Ray Taylor	724-433-7438
<u>Site Health and Safety Coordinator</u> PSARA Technologies, Inc.	Christina L. Whitehead	513-403-2342
<u>Site Remediation Contractor</u>	(To be determined)	
<u>Site Superintendent</u>	(To be determined)	
<u>Transportation Coordinator</u>	(To be determined)	
<u>Site Sampling Leader</u> PSARA Technologies, Inc.	Scott Spesshardt	513-603-0213
<u>Government Agency</u> U.S. EPA Region 5	Thomas Alcamo	312-886-7278
<u>Other Subcontractors</u> Analytical Laboratory	Heritage Environmental Services Pace Analytical Services, Inc.	317-390-3128 317-875-5894
<u>Disposal Sites</u> TSCA:	Heritage Subtitle C Landfill, Roachdale, IN, or EQ Landfill, Belleville, MI.	
Special Waste:	Southside Landfill, Indianapolis, IN.	

3.1.1 Project Director

The Project Director will have overall responsibility to meet the project objectives and quality standards and can commit staff and financial resources to the project as required. The Project Director, or designee, will represent CBS at meetings with the U.S. EPA.

3.1.2 CBS Onsite Representative

The CBS Onsite Representative will have overall responsibility for all aspects of the remediation project and will report directly to the Project Director. The Onsite Representative or his designee will have direct supervision of the Site Remediation Contractor and Site Sampling Leader and will ensure that all remediation activities are performed in accordance with the RWP and pursuant to the master schedule. The Onsite Representative or his designee will:

- Hold daily project meetings with the remediation contractor and the sampling contractor to coordinate sampling and water management activities with the excavation progress.
- Document work progress and identify problems or special circumstances to be addressed by the Project Director.
- be responsible for maintaining all field files, project tracking, and
- prepare daily and weekly progress reports.
- Review and approve Remediation Contractor, Sampling Contractor and Disposal facility invoices
- serve as the day-to-day point of contact with the U.S. EPA On-Scene Coordinator (OSC) or his designee
- serve as the day-to-day point of contact with the remediation Contractor and Site Sampling Leader.

3.1.3 Site Health and Safety Coordinator

The Site Health and Safety Coordinator (HSC) will have primary responsibility for the daily implementation of the Health and Safety Plan (HASP) at the site. The HSC or his/her designee will oversee all health and safety issues associated with excavation, air monitoring, site inspections, decontamination of equipment and personnel, and materials leaving the site. The HSC will verify proper training of all site personnel and will have the authority to require the use of personal protective equipment as outlined in the HASP. The HSC will have stop work authority if methods or practices are unsafe in her opinion. A copy of the HASP is provided in Appendix B.

3.1.4 Site Remediation Contractor

The Site Remediation Contractor will be the corporate entity responsible for implementation of all work specified in the contract documents. The Site Remediation Contractor will report directly to the CBS Onsite Representative or his designee. The Site Remediation Contractor will be responsible for overseeing all operations related to demolition, excavation, construction, handling, transportation, and disposal of materials from the site. The Site Remediation Contractor will be responsible for ensuring that all work activities are performed in accordance with the requirements of the RWP and the HASP.

3.1.5 Site Superintendent

The Site Superintendent will be a member of the Site Remediation Contractor's staff assigned full time to this project. The Site Superintendent will direct all remediation operations by the Site Remediation Contractor and will be the day-to-day point of contact for coordination with the Onsite Representative or his designee. The Site Superintendent will be responsible to assign and coordinate all Site Remediation Contractor work crews and equipment to complete the scope of work in accordance with the RWP and master schedule for the project.

3.1.6 Transportation Coordinator

The Transportation Coordinator will be a member of the Site Remediation Contractor's staff responsible for all operations related to scheduling, loading, transportation, and disposal of wastes and other materials from the site, including labeling, manifesting, and placarding waste shipments in accordance with all applicable U.S. Department of Transportation (DOT) rules and regulations. The Transportation Coordinator will maintain a daily truck log for each load of TSCA or Special Waste shipped, as described in Section 7.3.

3.1.7 Site Sampling Leader

The Site Sampling Leader will be responsible for leading and coordinating the various day-to-day sampling and remediation activities with the Site Remediation Contractor and analytical laboratory during the project. The Site Sampling Leader will also be responsible for any water storage and water sampling required and for any supplemental water treatment required. The Site Sampling Leader will report to the CBS Onsite Representative. The Site Sampling Leader will:

- Coordinate and track all soil and water confirmation and delineation sampling on the project.
- Responsible for waste water storage, sampling and any supplemental water treatment system, if required.
- Observe and evaluate survey work performed by the Site Remediation Contractor.
- Observe the progress of the work and evaluate site conditions for compliance with the provisions of the RWP and the HASP.
- Evaluate remediation compliance for personnel air monitoring per the HASP
- Perform and track any general or perimeter air monitoring required
- Attend daily project meetings to coordinate sampling and water management activities with the excavation progress.
- Coordinate all soil and water sampling activities with the remediation contractor
- Coordinate sample pickup and overnight sample result reports from the lab

- responsible for maintaining all field sampling and sample result files

3.1.8 Government Agency

The U.S. EPA Remedial Project Manager (RPM) is the U.S. EPA Regional point of contact and will represent the EPA in the administration of the CDA. This person, or his designee, will participate in the development of the objectives and requirements of the Field Sampling Plans (FSP) for the project and will review all plans, procedures, and verification data developed on this project.

3.1.9 Other Subcontractors

Other subcontractors will be identified as they are selected. Other subcontractors may contract directly with CBS, the Site Sampling Leader or with the Site Remediation Contractor where approved by the Project Director or his designee. Subcontractors will include analytical laboratories, trucking firms, soil testing firms, and a host of suppliers.

3.2 Project Meetings and Reporting

3.2.1 Project Meetings

Project meetings will consist of daily meetings between the CBS Onsite Representative or his designee and the Site Remediation Contractor and Site Sampling Leader. Daily meetings will be used to review work recently completed and work planned for the day.

Weekly meetings will be held as appropriate with the CBS Onsite Representative, the Site Superintendent (on behalf of the Site Remediation Contractor), the Site Sampling Leader, the EPA OSC or his designee, and other government participants. Weekly progress meetings will be held to discuss the overall progress of the work, task-specific problems or issues that may develop in the course of the project, health and safety issues including perimeter and personnel air monitoring results, projections of anticipated progress for the upcoming week, and the overall project schedule. Also during these meetings, CBS will present any recommended changes to this Work Plan to the government parties for their approval. The CBS Onsite Representative or his designee will ensure that all issues raised in these meetings are addressed in a timely manner and that decisions made in the weekly meetings are clearly and concisely documented in the weekly progress summary report.

CBS may modify the frequency of these meetings with approval of USEPA in consultation with the other governmental parties. Telephone calls may be substituted for meetings if agreed upon by CBS and USEPA.

3.2.2 Project Reports

Project reporting will consist of Daily Progress Reports to the CBS Project Director and Weekly Progress Reports to the U.S. EPA OSC. Daily progress reports will consist of a brief narrative of the day's activities and will be issued electronically to the Project Director. Weekly progress reports will be a summary of work completed for the week and will address problems encountered and the overall schedule for the project. The report will be distributed electronically to the Project Director and their oversight staff, the Site Remediation Contractor, and the OSC or his designee.

3.3 Project Schedule

The schedule for completing this work involves a sequence of interrelated critical-path tasks. The Cleanup of the ICS Emergence, Swallow Hole and Quarry Springs Areas and the installation of the new effluent line must be completed by December 19, 2010, pursuant to the schedule in the CDA (Reference 1). Figure 7 provides a proposed project schedule for the remediation and site restoration activities. The remediation project described in this Work Plan is to be initiated in mid-July 2010 and completed in mid-September 2010. This remediation project will be completed by mid-September, 2010 to allow the ICSTF plant expansion to begin.

The schedule in Figure 7 also shows the EM area being completed by the middle of August. It is desired to have the EM area remediation completed before ICSTF refurbishment work in the ICSTF SRS sump begins.

The initiation of the excavation in the Swallow Hole and Quarry Springs area will be contingent upon the completion of the installation of the new Effluent Line from the ICSTF which is separate from this project. The new Effluent Line will divert the plant discharge and clean storm water bypass from the Emergence area around the SH and QS areas, allowing the remediation to be done without the risk of flooding. Storm water can collect locally, though, and will be handled separately. The EM/SH/QS remediation will be done during the dry summer conditions to minimize water handling and local flooding problems.

Also, as part of the Effluent Line installation, and therefore before the EM/SH/QS remediation, the pathway of the new effluent line through areas of contamination within the Swallow Hole and Quarry Springs areas will be verified clean to the full depth of installation or to the top of bedrock.

The selected Site Remediation Contractor will provide his own schedule during the bid/contractor selection phase of the project. However the contractors schedule will be required to show the EM area completed by mid-August and the SH and QS areas done by mid-September. The CBS Onsite Representative or his designee will be responsible for tracking the progress of those activities.

4.0 Remedial Objectives

The CDA contains remedial action objectives (RAOs) for this project. The RAOs provide a general description of what the cleanup will accomplish. Under USEPA guidelines, the continuing release of PCBs from the ICS spring system connected to the LLL has produced unacceptable risks to human health and the environment. According to the CDA, the RAO's for operable unit three (sediments) is to reduce the amount of PCB mass in sediments that may be released to Clear Creek.

4.1 Cleanup Criteria

For the soil and sediment remediation at the ICS emergence, Swallow Hole and Quarry Springs areas there are two sets of cleanup criteria per the CDA, one for final drainageway areas and one for non drainageway areas.

The cleanup criteria will include both not-to-exceed values for individual delineation, verification or stockpile sample results and separate averages for individual drainage ways and non-drainage way areas. Separate non-drainage way and drainage way averages will be calculated for each area, EM, SH and QS.

The non-drainageway average will include verification sample results and delineation results representing soils remaining within an area within any grid where PCBs were detected. Delineation and verification sample results for stockpiled materials returned as backfill within an area will also be included in the non-drainageway average calculation.

The drainage way average will be determined by the results of the composite surface samples taken along the surface of the final drainage channel after it is constructed. Delineation sample results are not to be used in the drainage way average, only the final composite samples.

4.1.1 Final Drainageway Criteria

The cleanup criteria are 1 ppm PCBs on average with a not-to-exceed of 5 ppm PCBs in final drainage ways. Final drainage ways will be constructed in each of the three areas and sampled separately from the general non-drainage way grids shown in the figures.

4.1.2 Non-Drainageway Criteria

The cleanup criteria in non-drainage way areas are 5 ppm PCBs on average with a not-to-exceed concentration of 10 ppm.

5.0 Technical Approach

There are 3 separate work areas to be remediated under this plan, the ICS Emergence Area (EM), the Swallow Hole Area (SH) and the Quarry Springs Area (QS). Figure 3 shows the relationship of the three areas. The EM area is separated from the other sites by active railroad tracks and therefore will require separate access.

After remediation, the ICS emergence area will continue to contain the contaminant source (i.e. the ICS Spring Emergence) and therefore access to this area will continue to be controlled. However, it is anticipated that the final fenced foot print will be reduced. The site features which will continue to be within the final fence line are:

- The small stream channels directly fed by the ICS spring
- A new French drain through the area of the erosion driven depressions
- ICSTF plant intake structures and storm water bypass intake area
- The lower portion of the site access road and parking area
- The steep hillside to the west which will contain a new rip rap drainage channel
- the steep railroad berm to the south of the emergence

It is proposed that the cleanup goals will not be applied to certain portions within the final fenced area of the ICS emergence such as active stream channels, because continuing contamination from active sources to this area will continue for the foreseeable future. Also final grading will be such that any water draining over these possibly contaminated areas will be collected and sent to the ICSTF for treatment. The area around the new French drain will be maintained within the fence line but will be cleaned up and graded to

drain toward the clean storm water bypass area. Figure 14 shows the proposed final fence line at the ICS emergence area.

This remediation will be done in the summer in dry conditions to minimize flooding problems. The general sequence of events in each area will include:

- Clearing and grubbing
- Establishing a grid to determine excavation boundaries
- Removal of soils and sediments
- Confirmation of clean bottoms
- Backfilling with clean soils and grading to establish final drainage ways

5.1 Pre-Remediation Activities

5.1.1 Clearing

The Swallow Hole and Quarry Springs areas are heavily vegetated. General Site clearing of all three areas occurred before mobilization for excavation. Clearing was performed in early spring before the growing season became established, to allow easier access and to limit the amount of clearing required. To minimize spreading contaminated soils the sites was cleared without pulling up large root balls. Brush and trees were cut off just above ground level. The brush and small trees were chipped and shredded and set aside for reuse as mulch during site restoration. Large trees were cut down and stacked or left standing and will be worked around if not in a final drainage way. Stacked trees will be chipped later.

The Quarry Springs area was initially cleared sufficiently to allow access for delineation sampling and to allow equipment access for installing the new effluent line. Once the sampling results showed the areas that will be excavated, general clearing was performed as required. This clearing also occurred before mobilization for excavation. Some additional clearing may occur after mobilization as required for the site setup.

In the Emergence area, general clearing over the French drain installation area and over the grids that are determined to require excavation based on the delineation sampling was performed before mobilization for excavation. Again, some additional clearing may occur after mobilization as required for the site setup.

In the SH and QS areas, stretches of the creek channel that are suspected to have deep sediments were probed to determine the depths.

5.1.2 Delineation Grid Sampling

Phase 1 delineation grid sampling occurred in the Emergence Area from March 15 to 17, 2010. Phase 2 sampling in the EM area occurred on April 1, 2010. Sampling was performed according to the approved Emergence Area SAP (Reference 4).

Delineation grid sampling according to this Work Plan / SAP started in the QS Area on April 28 to 30, 2010 and in the SH Area on May 20 to 24, 2010 and was completed on June 10, 2010.

5.1.2.1 Emergence Area Delineation Sampling

During the week of March 15, 2010 the Phase 1 delineation sampling grid was laid out in the Emergence Area as shown on Figure 12. The general Emergence Area was segregated into 30 foot grids and samples were taken in 6 inch intervals down to 12 inches. In the area of the local depressions and the known hot spot area where the 2008 samples were over 100 ppm, the grid size was reduced to 15 feet and the grab samples were taken in 12 inch intervals to bedrock. All samples from the surface to 3 feet deep and the sample at bedrock were analyzed. The samples in between, if any, were archived. Table 4 shows the Phase 1 sample results.

Table 4 and Figure 13 show that only surface contamination from 0 to 1 foot depth was found. Eight of the 15' x 15' ED grids are shown to be contaminated above the non-drainage way cleanup criteria of ≤ 10 ppm. Six of these contaminated grids are on the Phase 1 grid layout perimeter. Therefore according to the EM SAP, new step out grids were established and sampled to establish a clean perimeter next to the contaminated grids.

Figure 12 shows the six new Phase 2 perimeter (step out) grids that were added and sampled according to the EM SAP (Reference 4). Core samples from 0 to 1' were analyzed from the center of each of these six grids. Table 4 shows all the results were below the cleanup criteria, thereby establishing a clean perimeter.

5.1.2.2 Quarry Springs Area Delineation Sampling

Initial delineation grid sampling in the QS Area occurred on April 28 to 30, 2010, after the initial version of this plan was issued to the USEPA. Sampling was performed according to the SAP included in Appendix A. Additional delineation sampling occurred during the week of May 17 and on June 9, 2010. The general area was segregated into 63 grids as shown in Figure 16 and samples were taken in 6 inch intervals down to a clean bottom. Perimeter grids were added as required to establish a clean perimeter.

Twenty foot grids were positioned at the exit of the Quarry A culvert to determine soil that would need to be removed to replace the culvert. Three samples, DEX01 thru 03, were taken at the inlet and outlet of the new Quarry A culvert and at the new effluent line outlet into the southern Quarry Springs area to determine if soil would need to be removed to install the new Quarry A culvert and the Effluent Line.

Results of the delineation sampling are shown in Figure 16 and listed in Table 5. Nine grids were found to contain PCB content greater than the non-drainage way criteria of >10 ppm. One grid, Z4, near the Quarry A outlet, contains PCB >10 ppm down to a depth of 18 inches. Figure 16 also shows 2 grids, J7 and K7, within the Quarry C pond that contain PCBs over the drainage way limit of 5 ppm at the surface. Three grids, J2, A6 and B6, through which the final drainage way channel will run contain PCB results >5 ppm, but < 10 ppm, in the 0-6" or 6-12" intervals.

Figure 16 and Table 5 show that no TSCA material was discovered in the Quarry Springs area and a clean perimeter and clean bottom were determined around all the contaminated intervals.

5.1.2.3 Swallow Hole Area Delineation Sampling

Delineation grid sampling in the SH Area occurred on May 20 to 24 and again on June 10, 2010. The SH area was initially segregated into thirty foot grids below the 810 ft amsl elevation which was historically shown to be the extent of the flood plain contamination (see Figure 5). Samples were initially taken in 6 inch intervals down to 12 inches. During the phase 2 sampling on June 10th, deeper samples were taken in 6 inch intervals where required to establish a clean bottom. Perimeter half grids, 15' x 30', were also added as required to establish a clean perimeter.

A total of 81 grids were sampled in the SH area as shown in Figure 15. Table 6 shows the results of the delineation sampling. Eight grids were found to contain a total of 117 cys of TSCA material (>50 ppm). Nineteen grids were found to contain material with PCB content between 10 and 50 ppm. This material will be excavated and disposed of as low-level PCB Special Waste. Six grids through which the final drainage way channel will run contain PCB results >5 ppm, but < 10 ppm, in the 0-6" or 6-12" intervals. This soil will be excavated across the width of the final drainage channel plus 2 additional feet on each side and repositioned outside of the channel.

Of 32 SH grids requiring excavation, 25 grids require excavation 6" deep, 6 grids require excavation 12" deep, and one grid, L4, contains Special Waste to 18" deep.

As shown in Figure 6, four additional subsurface samples are required to complete the SH delineation, SH-M4-1.0-2.0, L3-1.0-1.5, L5-1.0-1.5 and B10-0.5 to 1.0. These are all in grids with a clean surface and that are currently not to be excavated. The adjacent interval in the next grid over is above the clean criteria and will therefore be excavated.

Instead of mobilizing a sampling team to the site to obtain only 4 samples, these final 4 delineation samples will be obtained when mobilization for the excavation occurs.

5.1.3 New ICSTF Effluent Line

The ICSTF currently discharges treated water into the existing creek channel in the SH area as shown in Figure 15. The storm bypass from the clean side of the EM area is also currently directed to the existing SH area creek channel. More contaminated ICS water previously flowed through the existing SH and QS creek channels before the installation of the ICSTF.

The CDA requires that the ICSTF discharge line be enclosed and routed through or around the SH and QS area to prevent future ICSTF discharge water from sinking into the swallow holes. This will prevent re-contamination of the clean plant discharge waters by contaminated sediments in the subterranean conduit system connected to the swallow holes.

As indicated above, mobilization for excavation of the SH and QS areas will be contingent upon the installation and operation of the new Effluent line. This will allow the ICSTF discharge and EM storm water bypass to be routed around the SH and QS excavation areas. The new effluent line will bypass the SH and QS areas and carry the ICSTF discharge directly to the existing 36 inch storm water culvert that runs under Adams St from the QS area as shown on Figure 9.

The Effluent Line routing was changed from south of the SH to north of the SH area due to the amount of bedrock removal required. As shown in Figure 9 the new Effluent line enters the southern end of the QS area near the entrance to the existing 36 inch culvert. The pathway for the new effluent line into the QS area was sampled during the QS delineation and found to be clean. Sample DEX03 was 0.98 ppm. Therefore the area where the new Effluent Line enters the QS area does not require remediation before the Effluent Line is installed.

5.1.4 New Quarry A Culvert

When the new Effluent Line is installed between the QS and SH areas it will cross the main plant access road. At the same time that this effluent line is installed across the plant access road, a new deeper culvert for Quarry A will be installed under the plant access road to prevent flooding on the SH side entrance to the culvert. The new culvert will be 2.7 ft lower than the existing culvert so that the new drainageway will be above the invert elevation of the QA culvert, (803 ft amsl) and therefore water will not pond at the entrance to the culvert.

This work is also part of a separate project.

5.2 Mobilization and Site Setup

The schedule in Figure 7 shows that the EM area will be prepared for excavation first, as the new permanent plant effluent line is being completed at its US end, between the ICSTF and SH area. Initially any additional clearing and grubbing required in the EM area will be performed. Then access roads will be built and stockpile areas and load out areas prepared for the EM area. The site preparation crew will then move on to the QS Area as excavation begins in the EM area. The SH area will be prepared after the QS area.

Figure 8 shows a conceptual site setup for the remediation. Stockpile areas for the three areas are designated in the eastern section of the EM area, to the north and south of the Swallow Hole area and in the southwestern part of the QS area as shown on Fig 8. A site access road will be constructed along the southern perimeter of the SH sampling grid connecting to the ICS plant access road. An access road for the QS area will be built from the ICS plant access road as shown in Fig 8. For the EM area a stockpile area and the separate access road turn around will be located as shown in Fig 8.

Frac tanks will be set up in front of the ICSTF as shown in Figure 8. As discussed in Section 8.0, storm water from the open excavations will either be pumped directly into the ICSTF inlet sump for treatment or collected in frac tanks and pumped into the ICSTF inlet sump when capacity allows.

5.3 Soil Removal Approach

5.3.1 Emergence Area

This area will be accessed separately from the SH/QS area by the existing EM access road shown in Figure 12. The emergence soils and sediments above the non-drainageway cleanup goal will be removed with earth moving equipment such as backhoes and/or track excavators. Storm water diversion berms, silt fences and/or hay

bales will be used during construction to minimize the impact of storm water drainage down the valley.

Recent grid sampling results per the grid system shown in Figure 12 are shown in Table 4. Figure 13 shows the grid layers that will be removed based on the sample results.

Table 4 and Figure 13 show that only surface contamination from 0 to 1' depth was found in any of the sampling grids. Eight of the 15'x15' ED grids are shown to be excavated from 0 to 1' for disposal. Two of the grid layers comprised of approximately 30 ton of soil are above 50 ppm and will therefore be disposed of as TSCA. Six grid layers comprised of approximately 90 ton are between 10 and 50 ppm and will be disposed of as Special Waste.

Three grids are shown to be excavated from 0 to 1' and stockpile sampled to confirm their PCB content. These grids contained 2008 sample results up to 130 ppm at the surface, as shown in Figure 4. The recent Phase I results for these grids were all <5 ppm. It may be that the surface contamination was flushed away by storm water flow in the last couple years. In any case, because of the inconsistency, the 25 cubic yards of 0 to 1ft surface layers in these 3 grids will be stockpiled and sampled per the stockpile sampling procedure in Section 6.4. The stockpile material will be disposed of or reused as backfill based on the stockpile results.

Figure 12 shows six new Phase 2 perimeter (step out) grids that were added and sampled according to the EM SAP (Reference 4). They were all below the cleanup criteria and therefore established a clean perimeter next to the contaminated grids. Areas within the new proposed fenceline which drain to the ICSTF inlet will not be remediated.

All the grids will be excavated one foot as required to meet the <10 ppm NTE / <5 ppm average criteria based on the grid sample delineation results. The 1 to 2' depth delineation sample in each of eleven Phase 1 grids excavated to a one foot depth meets the non-drainageway clean up standard. However 10% of the grids excavated for disposal will be re-sampled for verification per Section 6.0. The grids selected for verification will be those containing the highest PCB content to be excavated. Therefore, since 8 grids will be excavated for disposal in the EM area, the resulting surface in one grid, grid ED-22 at 98.9 ppm, will be confirmed clean with a post-excavation verification sample taken per Section 6.2.

Clean stockpile soils, if any, may be set aside and reused as backfill based on its delineated PCB content. During backfilling and grading the clean overburden will be placed in a drainage way or non-drainage way according to the delineated PCB result.

After the French Drain is installed as discussed below in Section 5.3.1.1, the Final Drainage Channel will be roughed in as shown in Figure 14. The 6 foot wide path of the drainage channel as shown in Figure 14 will then be laid over the general grid system shown in Figure 12. Where the drainage channel crosses any grid which contains PCB levels between 5 and 10 ppm, the drainage way dirt plus 2 additional feet on each side will be removed to be placed as backfill in a non-drainage way area. Clean imported fill or dirt from grids with low sample results will be used to construct the drainage way, if additional fill is required.

Figure 12 shows that the path of the Final drainage way channel is preliminarily planned to traverse grid DW-7. Table 4 shows the PCB content of the 0 to 6" layer is 7.04 ppm. Therefore if the final location of the drainage way channel is through DW-7, the 6" surface soil will be removed across the full 6 foot width of the channel plus 2 additional feet on each side for the full length of DW-7. The 6 to 12" sample in DW-7 is 3.27 ppm which meets the drainageway NTE limit of 5 ppm.

Grids 6' wide by 50' long will be set up along the constructed channel. Surface grab samples will be taken per Section 6.3 and composited to verify the <5 ppm NTE / <1 ppm average in the drainage way is achieved. If the average is above 1ppm, the grid layers with the highest PCB content (between 1 and 5 ppm) will be removed and replaced with clean fill until the average is less than or equal to 1 ppm.

5.3.1.1 French Drain Installation

After contaminated soil/sediment removal, and before the final drainage way is installed, the top of rock will be exposed in the area of eroded depressions. A perforated drain pipe network surrounded with gravel (French drain) will be constructed at the top of rock leading to the spring emergence to allow storm water which may emerge from the top of rock to flow into the spring emergence area without eroding additional soils.

After the French drain is constructed, a stabilization fabric will be placed over the drain. The drain will be backfilled with clean soil to match surrounding grade. The reconstructed area will then be sloped and bermed if necessary to allow storm surface flows from clean areas of the natural valley to bypass the ICS collection area and flow to the existing clean storm water bypass collection culvert. Figures 10, 11a and 11b show the French Drain layout and details.

After the French drain installation is complete the final constructed drainage way will be finish graded and sodded.

5.3.2 Quarry Springs Area

As indicated above, the new permanent plant effluent line will have been installed and will be in operation before the QS excavation is started. This will divert the plant discharge and the clean emergence area storm water bypass from the QS area to prevent flooding during excavation.

In both the 2004 and 2010 sampling events, all soil PCB results in the QS area were below 50 ppm with the arithmetic average at less than 5 ppm. The highest value obtained was 48 ppm. The highest PCB values were within the existing stream channels with much lower values in the flood plain between the stream channels and near the opening to the existing 36 inch culvert.

The delineation sampling grids shown in Figure 16 were sampled according to the SAP contained in Appendix A of this plan. Results of this sampling are shown in Figure 16 and listed in Table 5. The delineation sample results as shown in Figure 16 will guide grid excavation.

Upon mobilization, excavation of the area will begin from the clean perimeter proceeding inward. The flood plain soils will be removed based on the grid sample results as compared to the non drainage way criteria. Six grids were found to contain PCB content

>10 ppm in only the 0 to 6" interval. Two grids at the Quarry A spring culvert outlet were found to contain PCBs >10 ppm in the 0 to 12" interval and one grid, Z4, near the Quarry A outlet, contains PCB >10 ppm down to a depth of 18 inches. These grid intervals will be excavated and disposed of as low level PCB Special Waste.

Figure 16 also shows 2 grids within the Quarry C pond that contain PCBs over the drainage way limit of 5 ppm. These full grid intervals will be removed to 6" and repositioned outside of the pond or final drainage way. Three grids, J2, A6 and B6, through which the final drainage way channel will run contain PCB results >5ppm, but <10 ppm, in the 0-6" or 6-12" intervals. This soil will be excavated across the width of the final drainage channel plus 2 additional feet on each side and repositioned outside of the channel.

As with the Emergence and Swallow Hole areas, 10% of the excavated grids are to be sampled for verification. Since 8 grids are to be excavated, one grid will be sampled for verification. The grid containing the highest PCB content to be removed is grid A5 at 34.9 ppm, as shown in Table 5. Therefore this grid will be re-sampled for verification after it is excavated one foot.

To prevent driving on dirty surfaces and spreading contamination, the excavation process will work from a clean perimeter and work inward. Each contaminated perimeter grid will be excavated from the clean area outside the perimeter. All grid excavation per delineation sample results, and any required confirmation sampling and re-excavations will be completed in a grid before excavation equipment is permitted to drive onto the surface of the cleaned grid to perform the creek excavation or access the next adjacent dirty grid.

The width of all of the existing drainage channels will be scraped to bedrock and the removed soils will be stockpile sampled to determine final disposition. It is anticipated that any contaminated soils will be sent to a non-TSCA landfill. Areas of the creek channels with deep sediments, such as in the Rinker and Quarry A spring branch, may not be excavated all the way to bedrock but only to a clean surface as shown by final drainage way sampling according to Section A.3.3.

After the excavation and stream scraping are complete, the pathway for the new drainage way will be laid out. It is anticipated that the path will follow the existing channel stream channels fed by the QS spring flows as shown on Fig 18.

Pre-remediation work involved:

- Initial clearing as required for sampling access.
- Laying out the 30 foot grid system over the floodplain area as shown on Fig 16.
- The gridded area within the Quarry Springs area is about 1 acre. Figure 16 shows the grid layout that was sampled and the grids that will be excavated as a result of that sampling.
- The area around the grids to be excavated and along the creek channels was cleared. Vehicles that were used were light enough to not disturb the surface soil more than 6" deep. The brush and small trees were chipped and set aside for reuse as mulch. Larger trees were cut and will be set aside or left standing and will be worked around if outside of existing or final drainage channels. Stacked trees will be chipped later.

The remediation excavation will involve:

- After mobilization, perform any additional clearing required.
- Route a temporary clean access road to the grids to be excavated as shown in Figure 16. Keep the access road on clean material, taking into account the surface slope and creek beds.
- Prepare a stockpile area and loadout pile as shown in Figure 8.
- Dam the new culvert that runs from the Swallow Hole (SH) area under the ICSTF access road to the QS area to minimize storm flows from Quarry A (QA) spring.
- Berm around the existing swallow holes in the SH area to contain surface water within the SH area to minimize storm flows from QA and Quarry B (QB) springs from the re-emerging swallow hole waters.
- Install sumps and divert spring flows from the QS springs as required.
- Contain and pump or divert Quarry A spring flows to the sump at the downstream end of the Quarry A existing flow channel.
 - o Assume <3 gpm normal flow / up to 20 gpm storm flow with SH area flows dammed off. (Flows would be up to 250 gpm during storms if the SH water was allowed to sink in swallow holes and thru QA culvert.)
- Install a sump at the Rinker Spring emergence
- Contain and pump or divert Rinker spring flows to the sump at the downstream end of the Quarry A existing flow channel
 - o Assume 3 to 5 gpm normal flow.
 - o Assume up to 50 gpm storm flow.
- Remediate grids to the <10 ppm limit up to and across the Quarry A existing drainage channel.
 - o As the grids are scraped, 10% confirmation sampling will be performed, with results expedited for next morning delivery. The underlying residual surface will be sampled for verification per Section 6.2.
 - o Contain rain water collected in any disturbed grid that requires confirmation sampling until it is shown to be clean. Pump the contained water directly to the ICSTF SRS sump or stage in frac tanks for treatment.
 - o Prevent water from grid excavations that require confirmation sampling from flowing into existing creek channels and on downstream until the grid is confirmed clean.
- Once the grids containing the existing Quarry A creek channel are confirmed clean, backfill up to and around the creek channel if required to contain storm water within the creek channel during the channel scrape.
- Straddle the creek channel, if possible, with the excavator on clean surfaces and scrape it to bedrock or to a confirmed clean bottom, starting at the US end.
 - o Scraped materials will be stockpiled and sampled per Section 6.4 to determine final disposition.
 - o Contain rain water collected in the disturbed section of the existing creek channel for treatment.
 - o Contain rain water falling on stockpiles until they are confirmed clean.
- Build the final constructed drainage channel including the rip rap spillway per Figure 18 with clean soil for sidewalls and bottom (where required) thru the existing Quarry A creek channel that will be reused for the new final drainage channel.

- o Remove soils in grids A6 and B6 with PCBs between 5 and 10 ppm for the width of the final drainage channel plus 2 additional feet on each side and reposition outside of the drainage way.
 - o Confirm per Section 6.3 that the new constructed channel is clean from the QA emergence to the existing channel from Quarry C (QC).
 - o After confirmed allow water from QA to run thru the new final QA drainage channel to the intersection with the existing creek channel from QC.
- Remediate grids to the <10 ppm limit up to and across the Rinker Spring existing drainage channel controlling storm water as above.
- Once the grids containing the existing Rinker creek channels are confirmed clean, straddle the creek channel and scrape and stockpile the creek bed to bedrock or to a confirmed clean bottom, starting at the US end.
- Build the final constructed drainage channel with clean soil for sidewalls and bottom (where required) in the section of the existing Rinker creek channel that will be reused for the new final drainage channel, to the intersection with the final QA drainage channel.
 - o Confirm the new constructed channel is clean.
- Allow the water from Rinker Spring to flow through the new Rinker and QA final drainage channel to the existing drainage ditch
- Excavate the remainder of the contaminated grids to the east of the QA final drainage channel and south to the QC spring.
- Dig a sump at QC spring or use the existing pond as a sump to collect the flow from QC.
 - o Assume minimal flow, <1 gpm
- Pump water from QC sump to existing drainage ditch past the intersection with QA final drainage channel
- Excavate grids K7 and J7 to 6" and place outside of pond or drainage channel.
- Scrape from QC pond or sump to intersection with QA final drainage channel.
 - o Contain rain water collected in the disturbed section of the existing creek channel for treatment.
- Build final constructed drainage channel with clean soil for sidewalls and bottom (where required) from the QC emergence to the intersection with the QA final drainage channel.
- Confirm the new constructed channel is clean.
- Dig a sump at the intersection of QA and QC final drainage channels and pump water directly to the 36" culvert
- Dig a sump at QB and pump water directly to 36" culvert
 - o Assume <3 gpm normal flow / up to 20 gpm storm flow if Westplex and SH flows are diverted.
 - o Assume up to 250 gpm storm flow if Westplex flows enter QB.
- Scrape channel from the sump at the intersection of QA and QC final drainage channels to the 36" culvert.
- Take care to not damage the outlet of the new effluent line at the entrance to the 36" culvert.
- Scrape the channel from QB to meet the channel from the intersection of QA and QC
- Build final constructed drainage channel with clean soil for sidewalls and bottom (where required) from the QC/QA intersection sump and from the QB sump to the 36" culvert.

- o Remove soils in grid J2 with PCBs between 5 and 10 ppm for the width of the final drainage channel plus 2 additional feet on each side and reposition outside of the drainage way.
- Confirm the new constructed channel is clean.
- If the average is above 1ppm, the grid layers with the highest PCB content (between 1 and 5 ppm) will be removed and replaced with clean fill until the average is less than or equal to 1 ppm.
- After the final constructed drainage way is confirmed clean, it will be finish graded and sodded.
- Extend the riprap spillway from the Effluent line outfall to the inlet to the 36" culvert as shown on Figure 18.
- Open all the sumps and allow flow through the new drainage channels from QA/QB/QC/ and Rinker springs.
- Excavate any remaining contaminated grids.
- Backfill and final grade the flood plains to drain to the final constructed drainage ways.
- Restore and seed the flood plains.

5.3.3 Swallow Hole Area

After the Quarry Springs area is remediated, the swallowhole area will be excavated. Site clearing and site preparation activities, such as building access roads and preparing stockpile areas will have been done previously as shown on the schedule in Figure 7.

The swallowhole area was heavily overgrown, flood prone and consistently contaminated within the stream channels and the flood plain up to an elevation of about 810 feet amsl. The ICSTF currently discharges treated water directly into the existing creek channel in the SH area as shown in Figure 3. The storm bypass from the clean side of the EM area is also currently directed to the SH area.

As indicated above, the new Effluent line and new Quarry A culvert will be installed under a separate project before remediation of the SH area. The SH area was also cleared before mobilization for remediation.

The Swallow Hole grid area has been delineated for excavation. The 81 full and partial delineation sampling grids shown in Figure 15 were sampled during the week of May 17 and on June 10, according to the SAP contained in Appendix A of this plan. Results of this sampling are shown in Figure 15 and listed in Table 6. The delineation sample results as shown in Figure 16 will guide grid excavation.

Upon mobilization, excavation of the area will begin from the clean perimeter proceeding inward. The flood plain soils will be removed based on the grid sample results as compared to the non drainage way criteria.

As with the Emergence and Quarry Springs areas, 10% of the excavated grids are to be re-sampled for verification. Since 27 grids in the SH are to be excavated for disposal, 3 grids containing the highest PCB content next to the residual surface will be sampled for verification after they are excavated, grids E9, O3 and P3.

Two 50 foot long segments of the existing creek channels were found to be TSCA during the 2004 sampling. These will be scraped 1 foot deep and disposed of as TSCA. The

residual surface layer will be sampled per Section 6.3 and confirmed to be below the TSCA limit. After the TSCA is removed the remaining existing creek channels will be scraped, stockpiled and sampled per Section 6.4 for final disposition. The upstream drainage channel to the main swallow holes will be scraped to bedrock and stockpiled. The overflow channels, as shown on Figure 15 will be scraped to 6 inches, stockpiled and sampled for disposition. The residual creek surfaces will be sampled per Section 6.3 to verify they meet the cleanup criteria.

To prevent driving on dirty surfaces and spreading contamination, the excavation process will work from a clean perimeter inward like the QS area.

Pre-remediation work involved:

- Clearing the area entire area below an elevation of 810 feet amsl manually or by means that would minimize surface disruption. Vehicles used were light enough to not disturb the surface soil more than 6" deep. The brush and smaller trees were chipped and set aside for reuse as mulch. Larger trees were cut and set aside for stacking or future chipping or left in place and will be worked around.

The remediation excavation will involve:

- After mobilization, perform any additional clearing required.
- Route a temporary clean access road along the southwest perimeter as close to the perimeter line as possible, taking into account the surface slope as shown on Figure 15.
- Prepare a stockpile and load out area as shown in Figure 8.
- Re-establish the grid system as shown on Figure 15 for excavation.
- Dam the new culvert that runs from the SH area under the ICSTF access road to the QS area, if not already done.
- Berm around the existing swallow holes, if not already done, to contain surface water within the excavation area for collection and treatment.
- Excavate grids above the non-drainageway cleanup level as determined by the delineation sampling. Start excavation along the southwest perimeter while keeping excavators and haul trucks always on a clean surface outside the southwest perimeter line. There are more than 18 - 30' grids along the southwest perimeter.
- 10% of the excavated grids, as indicated above, will have confirmation sampling performed, with results expedited for next morning delivery. The underlying residual surface will be sampled for verification per Section 6.0.
- Re-scrape grids that do not pass the non-drainage way criteria an additional 6". Equipment will not be permitted on a verified grid until confirmation samples verify it is clean.
- The area below 810' is about 1 acre. Fig 15 shows about 81 - 30'x30' grids and partial grids of which 26 will be excavated for disposal.
- Once a perimeter grid is excavated and verified clean, if required, the excavator can be moved onto it to scrape the existing creek channels or to access adjacent grids to the northeast, working from clean inward.
- Excavate two 50' TSCA creek segments 1' deep, as shown on Figure 15.
- After the US TSCA creek segment is removed the remaining US drainage channel (green and red on Figure 15) will be scraped to bedrock (320' lg) and stockpile sampled. Possibly stream lengths with thicker sediments, such as the upstream

grids, B9, C9, and D9, will be scraped to a confirmed clean bottom per Section 6.3 rather than to bedrock

- After the DS TSCA creek segment is removed the existing overflow channels (blue on Fig 15) (760' lg) will be scraped 6" and stockpiled. Channel bottoms and stockpiles will be confirmed per Section 6.0.
- Areas of the creek channels with deep sediments may not be excavated all the way to bedrock but only to a clean surface as shown by final drainage way verification sampling per Section 6.3.
- Stockpile sample results will determine whether to dispose of creek channel soils as TSCA or special waste, or to reuse them as backfill. Based on 2004 sample results, it is anticipated that most of these materials will be disposed of in a non-TSCA landfill.
- After all soils are removed, the 8 swallowholes as shown on Fig 15 will be grouted. Swallowholes will be excavated to a 5' x 5' bedrock surface. A grout plug will be placed in any apparent bedrock openings to seal them. A grout layer will be applied to the bedrock surface. The scraped material will be stockpile sampled for disposition.
- The swallowholes will then be backfilled with compacted clay in 12" lifts.
- The new drainage channel will be constructed as shown in Figure 17 to the new culvert leading to Quarry A. Soils will be removed in grids that the final drainage channel runs through that have PCBs between 5 and 10 ppm, as shown on Figure 15. Soils will be removed for the width of the final drainage channel plus 2 additional feet on each side and repositioned outside of the drainage way.
- The bedrock surface can be used as the bottom of the new drainage channel where possible, however a downward slope will be maintained to prevent pools from forming in the final channel. Only clean backfill from offsite or onsite soils that are known to meet the drainage way criteria will be used for the new drainage channel sidewalls and bottom, where required.
- Final fill and grading will be done per Figure 17.
- After the Final Drainage Channel is built obtain and analyze verification samples in the SH channel per Section 6.3.
- Remove and replace any soils that do not meet the drainageway criteria of NTE 5 ppm / 1ppm average max.
- After the final drainage way channel is confirmed clean, sod the sidewalls and the bottom if it is not on bedrock.
- Open the culvert to the QS area for surface drainage.
- Restore and seed the final graded surfaces.

6.0 Delineation and Verification Sampling and Reexcavation

Extensive delineation sampling has been performed in these three areas over the years, as indicated in Section 2. The lateral extent of contamination has generally been established in each flood plain area. During this project various forms of additional soil sampling and analysis will be performed. The EM, SH and QS areas were further delineated before grid excavation to determine disposition. The EM area grid layout was delineated according to the SAP in Reference 4 and as shown in Figure 12. The SH and QS area were similarly further delineated according to Section 6.1 and Appendix A in this document and as shown in Figures 15 and 16, respectively.

Pre-excavation vertical delineation was generally completed in all three areas. 10% of excavated grids where the remaining layer has already been characterized to be clean

by a delineation result will be verified clean by verification sampling performed according to Section 6.2. The grids with the highest PCB level excavated next to the residual soil layer will be verified. Section 5.3 indicated which grids will be sampled for verification in each area.

However, if the remaining layer after excavation had not been previously delineated, additional grid bottom verification sampling will be required (according to Section 6.2) to document and verify that the remediation has been completed.

Soils in the existing drainage channels (other than known TSCA segments) in the SH and QS areas will be scraped and stockpile sampled per Section 6.4. Excavation verification sampling will be performed on the underlying surface per Section 6.3 if a residual soil layer is to be left at the bottom of the channel.

Elongated grids will be laid out over the final constructed surface drainage ways and sampled according to Section 6.3 to verify that these surfaces satisfy the drainage way clean criteria.

Table 7 lists the number of each different type of sample that will be taken in each area and also lists the sample requirements. Sampling procedures are summarized in the SAP, which is provided in Appendix A. Soil samples will be obtained according to the QAPP Field Procedure FP-16, Soil Sampling. The decontamination procedure is described in Section A.5 and waste handling procedures are described in Section A.6 of the SAP in Appendix A and conform to the 2010 QAPP revision 9.

6.1 Grid Delineation Sampling

The QS, SH and EM areas were delineated before mobilization for excavation. Sampling and analysis was performed in accordance with Appendix A in this document. The grid layouts for the EM, SH and QS areas are shown in Figures 12, 15 and 16, respectively.

A hand auger or soil probe is used to obtain the samples. In each grid, a grab sample is taken from the center. If an existing drainage channel ran through a grid, the sample location was offset to be outside of the drainage channel. The channels will be scrapped and stockpile sampled and verified separately, as discussed below.

Each grab is initially advanced in 12 inch lifts with a hand auger which is fitted with an internal plastic sleeve. The sleeve contains the sample. After removing the sleeve from the auger, the sleeve is sliced along its length and the 0 to 6 inch and the 6 to 12 inch portions removed. Deeper 6 inch segments were sampled as required to obtain a clean bottom.

As each sample is removed from the sleeve by the field technician, the technician visually inspects the sample to provide qualitative descriptions of color, texture, odor, presence of plants or animals, presence of sediments or clay, or other relevant field observations, and notes them in the field logbook. The depth of soil in each sleeve is noted.

Larger pieces of stone and any debris such as vegetation and roots are removed from the sample and discarded. The remaining sample is homogenized. The sample is placed into a 4 ounce pre-cleaned bottle that is labeled in accordance with the QAPP

field procedure requirements, and prepared for shipment to the laboratory. The samples are submitted to the laboratory for EPA Method 8082 PCB analysis, as described in Section A.8 of this Plan.

After the collection of each core sample, all sampling equipment that has come into contact with the soil samples (scoops, spatulas, mixing pans, etc.) are thoroughly cleaned to avoid cross contamination.

After receiving results for all initial grid samples, additional samples were taken to close out all results above the not to exceed standard. If a sample is above the not to exceed value on a perimeter grid, then a step out from the grid boundary was made and a sample taken at the depth in question.

6.2 Grid Bottom Verification Sampling and Re-excavation

To verify the success of the remediation, soil samples will be collected and analyzed from the bottom of 10% of excavated grids that have been previously delineated to a clean surface.

In addition, if a particular grid is excavated to a depth that has not been characterized by a delineation sample result, then a 6 inch composite sample from the next underlying interval will be taken for verification.

For 30' x 30' grids, bottom samples will comprise a composite of four grab samples randomly collected from the four quadrants of that grid. Since 15' x 15' grids are equivalent to a quadrant of a 30' square grid, only one grab will be taken in the center of the 15' square grids. The number of grabs comprising a partial 30' grid will be based on the relative area of the partial grid to a full 30' grid (i.e. the verification sample for half of a full grid will be comprised of 2 grabs).

Several 30' grids have the existing creek channel running through them. None of the four grabs will be taken in the width of the creek channel that will be scraped and stockpile sampled, separately, as indicated in Section 6.4 below.

The results of the composite sample will be compared to the non-drainageway not-to-exceed value of 10 ppm. If the verification sample analytical result exceeds the corresponding not-to-exceed value, then an additional 6" lift of soil will be removed followed by additional verification sampling. Material may be removed from the entire grid, or the quadrant grab samples may be analyzed separately and the excavation may then focus on one or more sub-grids as appropriate.

6.3 Final Drainage Way and Excavated Creek Channel Verification Sampling

Existing drainage channels not excavated all the way to bedrock and the final constructed drainage way channels will be sampled according to this procedure. Grids 50' long, the width of the drainage way will be set up along the channel. In sections of the channel where the sidewalls are made up of fill, five 0 to 6" surface grab samples will be taken, spaced at 10' apart along the center of each drainage way grid and composited to verify the <5 ppm NTE / <1 ppm average in the drainage way is achieved.

In sections of the channel where the sidewalls are made up of native soil, 6 grabs will be staggered along the 50' length, 2 in each sidewall where there is native soil and 2 in the

center. All sidewall and center grabs within a 50' section will be composited into one composite sample for analysis.

If the bottom of the constructed channel is on bedrock, the surface grabs will be staggered at 10' intervals along both sidewalls. Again, all sidewall and center grabs within a 50' section will be composited into one composite sample for analysis.

If this composite sample result is >5 ppm the drainageway will be excavated 6" deep over the 50' length and the width of the channel plus 2 extra feet on each side. The sidewalls will be in native soil in 800' of the total 1470' of final constructed drainageway.

The remaining bottom of the two 50 ft long TSCA channels and the overflow channels in the SH area will also be verified according to this procedure. If the bottom of the channel is not within the Final Drainage way path, the verification sample is only required to meet the non-drainage way clean criteria, NTE 10 ppm. These sample results will be included in the non-drainage way average for the SH area.

The first 30' of the existing channel from the Quarry C pond to Hinkle's Restaurant was composite sampled as a drainage way grid during delineation and was found to be clean.

6.4 Stockpile Sampling

The nominal stockpile size for sampling will be up to 120 cubic yards. Ten grab samples will be randomly collected from each stockpile at various depths and thoroughly homogenized. A composite sample will be obtained from the mixture for analysis of PCBs. This composite will be compared with the drainage way and non-drainage way cleanup criteria for final disposition.

If the composite sample result is greater than 10 ppm it will be disposed off site. If less than 50 ppm it will be sent as Special Waste. If greater than 50 ppm the stockpile will be sent off as TSCA.

If the stockpile PCB level of < 5 ppm is not exceeded, the stockpile will be considered suitable for use as backfill in either a non-drainage way or drainage way, depending on the area average. If the analysis shows that the PCB level is between 5 and 10 ppm, the material will be suitable for use as backfill only in non-drainage way areas, again depending on the area average.

These data will be used to determine area average PCB concentrations prior to placement to ensure that the average cleanup criteria will be met.

7.0 Waste Transportation and Disposal

The general approach to transporting and disposing of waste from this project involves loading soil into dump trucks and shipping it to a permitted disposal facility. The Site Remediation Contractor's Transportation Coordinator will coordinate the transportation of all shipments of regulated waste from the site.

7.1 Transportation

Contracts will be placed with one or more waste transporters subject to approval by CBS. The waste transporters may be contracted by CBS separately, through the disposal facility, or through the Site Remediation Contractor. The transporter's DOT safety record will be a key component of the transporter selection process.

Daily coordination with the waste transporter will ensure an adequate number of trucks are available each day, Monday through Friday. A route map will be posted showing the route that the loaded trucks will take from the site to each permitted disposal facility. Trucks will be staged in a manner that will expedite daily loading and movement. All trucks will comply with DOT requirements.

7.2 Inspections

All trucks will be inspected as they arrive at the site to ensure that they are sound and empty prior to being loaded. Empty trucks will be lined prior to loading. As soon as a truck is filled, it will be covered with a tarp, dispatched to the disposal facility, unloaded, and returned to the site. An adequate supply of liners and tarps will be maintained on site throughout the project. Unsuitable or dirty trucks will be rejected and not permitted on site.

7.3 Scale Operations and Truck Log Records

Onsite Site Truck Scales will probably not be used because of the low volume of material, which will mainly be Special Waste. Very little TSCA material is expected from this site. Also, use of one truck scale would be problematic because of the separate accesses to the EM area and the SH/QS areas. Truck loads will be estimated on site visually and by the number of excavator buckets loaded. Actual calibrated scale weights will be obtained from the landfills.

If temporary truck scales are used, however, they will be calibrated before first use. The calibrated truck scales would be utilized to monitor the amount of material being transported offsite on a daily basis. Each truckload of contaminated material would be weighed on these scales prior to being transported to a permitted disposal facility.

The empty tare weight of each truck would be recorded and loaded weight tickets for each truck would be collected.

Regardless of a scale being used, a unique and sequential tracking number would be assigned to each load, and a tally of the weight placed in each truck would be maintained. A daily summary will be prepared of all trucks loaded and dispatched each day. At a minimum, an electronic waste tracking spreadsheet will provide the following information:

- Trucking company name;
- Truck identification number;
- Unique sequential load number;
- Manifest number;
- Tare weight of the truck (if a scale is used);

- Loaded (estimated) weight of the truck;
- Time of departure from the site; and,
- Name of the destination landfill.

The CBS Onsite Representative or his designee will be responsible for the management of records associated with waste transportation and disposal on this project. The CBS Onsite Representative's designee and the Site Remediation Contractor will each maintain a complete set of records associated with waste shipment and disposal (e.g., load tickets, landfill receipts, and manifests). In addition, electronic spreadsheet tables will be maintained in accordance with the format specified by the CBS Onsite Representative's designee. All electronic files will be backed up on a separate computer, a memory stick, satellite hard drive, or other suitable device at the end of each work day. All project records will be turned over to CBS at the conclusion of the project.

7.4 Manifesting and Placarding

State of Indiana or Federal manifests will be used for all shipments of regulated waste from the site. The site EPA identification number site will appear on each manifest, and the truck weights determined at the scales or estimated will be used to complete the manifests. Manifests will be prepared by the Site Remediation Contractor's Transportation Coordinator and signed by the CBS Onsite Representative or his designee on behalf of CBS. Manifest and load numbers will be logged into a manifest tracking system. All dump trucks will be properly placarded before leaving the site. Placards will be placed on the sides and back of each truck and will comply with DOT specification HM-126F.

7.5 Disposal Facilities

All disposal facilities shall be selected contracted by CBS, subject to the approval of the U.S. EPA. Only those materials that are contaminated with PCBs above the site cleanup levels will be shipped offsite. The preferred disposal facility for material with PCB content >50 ppm is the Heritage Subtitle C Landfill in Roachdale, Indiana. This material would be disposed of under the Megarule, 40 CFR Part 761.61, with the approval of EPA Region 5.

The Site Remediation Contractor will ship all PCB wastes to the following permitted disposal facilities:

- TSCA waste: Heritage Subtitle C Landfill, Roachdale, Indiana, or EQ Landfill, Belleville, Michigan.
- Special waste: Southside Landfill, Indianapolis, Indiana.

7.6 Solid Waste and Fuel Spills

7.6.1 Solid Waste Spills

Wherever possible, trucks will be parked on solid ground during loading. Trucks may not travel across disturbed or partially excavated areas in which the truck tires may encounter impacted soils.

Any soil spillage that occurs during truck loading operations will be promptly cleaned up to prevent vehicles from tracking the material away from the excavation. To prevent spillage during hauling, trucks will be loaded such that at least 6 in. of freeboard is present around the entire rim of the truck bed.

A secondary containment liner will be placed at the truck loading area to collect any accidental spillage during loading operations. Site Remediation Contractor personnel will be responsible for promptly cleaning any spillage from the liner to prevent trucks from tracking through any spilled soils prior to leaving the site.

7.6.2 Fuel and Lubricant Spills

All fuels will be stored in a designated fuel storage area in accordance with OSHA regulation 29 CFR 1926.152. The fuel storage area will be clearly marked, will include adequate secondary containment, and will be barricaded to prevent vehicle accidents. Fire extinguishers, absorbent pads, oil dry, and plastic shovels will be stored in the immediate area for use in the event of a spill.

8.0 Water Management

The management of storm water and other water encountered during remediation is divided into four components:

- 1) The diversion of site runoff away from areas with known contamination to diversion channels or sumps;
- 2) The retention of any storm water that comes in contact with potentially impacted soil or debris;
- 3) The collection, storage and transfer of potentially impacted storm water or groundwater from the collection areas to the ICSTF wastewater treatment system; and
- 4) Wastewater treatment.

The primary objective of this plan is to divert the flow of runoff from rainfall events away from contaminated material and to minimize the accumulation of storm water in areas containing contaminated materials.

Storm and groundwater that accumulates in site excavations or that comes in contact with contaminated materials will be collected and treated on site. These areas include the open excavations and stockpile, decontamination, or truck loading areas. Storm water will be diverted around these areas using berms, sandbags, or other control measures as much as possible. Storm water that falls on or runs onto a controlled area will be collected, pumped to temporary storage tanks, and held there until it can be sent to the ICSTF for treatment.

Alternately the collected water may be sampled to determine if the batch can be discharged without treatment (i.e. PCB <0.3 ppb).

Due to the capacity limits of the ICSTF, it may become necessary to mobilize a portable water treatment system on site to treat the collected water. This system would typically

consist of a settling tank and a sand and/or bag filter system followed by primary and secondary carbon treatment vessels incorporating granular activated carbon. The wastewater treatment area will be constructed with a high-density polyethylene (HDPE) liner, a perimeter berm, and a water collection sump.

8.1 Diversion of Clean Storm Water

Runoff flow from rainfall events will be diverted away from site excavations to minimize the accumulation of storm water in the excavations, stockpile areas, and other work zones. To accomplish this, temporary earthen berms will be constructed around any open excavation or stockpile area that appears to lie in the natural drainage path. The purpose is to prevent storm water runoff from coming in contact with potentially contaminated material. Any storm water that does come in contact with contaminated materials will be contained, collected and treated on site.

Storm water that can be diverted on clean surfaces away from site excavations and other contaminated areas will be discharged to existing surface drainage ditches on the site.

8.1.1 Diversion of Quarry Springs Water

The ICSTF currently discharges treated water from the Illinois Central Stream (ICS) into the existing creek channel in the SH area as shown in Figure 15. The storm bypass from the clean side of the EM area is also currently directed to the existing SH area creek channel. This water normally sinks into the swallow holes in the SH area and re-emerges at two springs in the QS area, Quarry A (QA) and Quarry B (QB) springs and flows along the surface to a 36" city sewer culvert. Quarry A and B Springs are fed directly by the swallow holes in the SH area and by the Quarry A culvert which carries surface flow from the SH area to the QA spring.

The QS area contains four springs, altogether. Besides QA and QB there is Quarry C (QC) and Rinker Spring. The locations of the springs and their relationship to the SH and QS areas are shown on Figure 3.

Under low flow conditions, Quarry B is the main resurgence of the water from the SH area. Quarry B is actually on the west side of the abandoned railroad tracks which is now the ICSTF access road. It was piped through a culvert to the eastern side of the RR tracks between 1949 and the early 1980s. The area on the west side was then filled for construction of the Westplex development.

During large storm events, the swallow holes in the SH area cannot pass all the storm flow and therefore a pond forms at the downstream end of the SH area at the entrance to the QA culvert which runs under the ICSTF access road to the QS area. During storms, most of the water entering the QS area enters as surface flow through this culvert near the Quarry A Spring. However, some water does still sink into the swallow holes and emerges at both Quarry A and B Springs.

A new ICSTF effluent line is planned and will be installed and put into operation before the SH and QS remediation. The new effluent line will contain and route all the flow from the EM area and the ICSTF plant around the SH and QS areas to prevent this water from sinking into the swallow holes. The new effluent line will bypass the SH and QS areas and carry the ICSTF discharge directly to the existing 36 inch storm water culvert

that runs under Adams St from the QS area as shown on Figure 9. This will prevent re-contamination of the clean plant discharge waters by contaminated sediments in the subterranean conduit system connected to the swallow holes.

Therefore after the new effluent line is put into service, the flows in the QS springs will be reduced. Rain falling and collecting on the surface within the bathtub-like Swallow Hole area swale itself will still be able to flow thru the swallow holes and Quarry A culvert to the Quarry A and Quarry B springs. A large part of the storm flow at QB spring will still come from a 12" drainage pipe which discharges from the Westplex development across the ICSTF access road from the QS area and runs along the surface into a beehive surface drain and into the Quarry B culvert to the QB spring as shown in Figure 16.

After the installation of the new Effluent line, the flows in QA and QB are projected to be about 5 gpm normally and up to 250 gpm, each, during a major summer storm (2" in 24 hours). The flow at Rinker Spring is assumed to be about 5 gpm normally and up to 50 gpm during a major storm. The flows from these springs will be contained and diverted around excavations during the remediation of the QS area.

The storm flow at QA will be reduced by blocking off the culvert from the SH area to QA and by berming off the surface flow in the SH area from the main swallow holes. If this water is trapped in the bathtub-like SH area, QA storm flows should be reduced to about 20 gpm, greatly reducing the amount of water that must be diverted around any channel excavation downstream of QA during a storm. The water contained in the SH area would be contained and will ultimately be sent to the ICSTF inlet sump for treatment. During the subsequent excavation within the SH area the culvert at QA and the swallow holes in the SH area will continue to be dammed off and bermed to contain storm water.

If the surface flow off of the Westplex development is contained and piped into one of the manholes for the new effluent line, it will be carried to the 36" culvert separately and the QB spring storm flows should also be greatly reduced from about 250 gpm to about 20 gpm. This again reduces the amount of water that must be diverted around any channel excavation downstream of QB.

The Contractor has the option to contain and divert up to 250 gpm at the QB culvert during storm conditions or to divert the Westplex flow so that only up to about 20 gpm of storm flows will need to be contained and diverted around channel excavations downstream of QB during storms.

Spring flows from Quarry A, B and C and Rinker Springs will continue to flow through the new final drainageway channels that will be constructed through the Quarry Springs area after the remediation is complete.

Section 5.3.2 presents a conceptual scenario for diverting the creek flows as the QS area drainage channels are excavated.

8.2 Retention and Treatment of Potentially Impacted Water

All accumulated surface water and groundwater in the open soil excavations will be pumped to the holding tanks and treated as necessary to continue soil excavation. In the SH area and other swale type areas where storm water runs across or into

contaminated or suspect areas that have not been confirmed clean, the water will be contained and stored for treatment thru the ICSTF.

Removal of accumulated sub-grade water or groundwater will be accomplished using sump pumps. Where the potential for overflow of an excavation exists due to storm water run-on, sump pumps will be installed prior to the rainfall event and connected directly to the holding tanks staged at the site.

Soils of unknown PCB content that are being excavated to be stockpile sampled, such as the existing creek channel sediments, will be treated as contaminated until confirmed as clean. They will be placed on poly sheeting and bermed to contain any water that comes in contact. After a stockpile is confirmed clean it may be removed from the poly sheeting and staged on a clean surface for use as backfill.

8.3 Wastewater Spill Prevention and Control

The Site Remediation Contractor will mobilize all necessary pumps, hoses, storage containers, vacuum, and other equipment needed to respond to any incidental release of wastewater and to remove, containerize, and manage all liquids recovered during a wastewater spill.

As mentioned previously, the frac tank area and the wastewater treatment area, if needed, will be constructed on an HDPE liner, with a perimeter berm, and a water collection sump to collect and remove any spilled wastewater.

9.0 Air Monitoring

The vast majority of waste at this site will be non-TSCA Special Waste, less than 50 ppm PCBs. Because of the very low PCB levels and small volume of any TSCA impacted soil at this site, perimeter air monitoring may not be required. Instead, a “no visual dust” standard may be monitored and enforced at the perimeter of the project work area.

Under this protocol, if an excavation or loading operation is deemed to be in violation, excavation or loading procedures will be modified or water sprays will be employed.

Air monitoring is still currently being evaluated by the government regulators. The requirements set forth by the government parties will be implemented.

10.0 Site Restoration

Following completion of soil excavation and all other remediation activities, the site will be restored to a condition required by the CDA and mutually agreed to between CBS, the U.S. EPA and the site owners. Any incidental surface debris and other waste generated during remediation shall be collected and disposed of at a municipal solid waste landfill or otherwise as appropriate.

10.1 Grading and Seeding

Soil excavations will be backfilled with clean clay soil as necessary to provide for site drainage and minimize the potential for ponding and infiltration of water into the backfilled excavations. Approximately 1500 cubic yards of clean clay and top soil from

the Effluent Line trench excavation project will be staged on site for use as backfill for this ICS flood plain remediation project.

Site restoration will involve grading of the finished soil surface within and around the three ICS areas to drain to the southeast. Rough grading of exposed soils, including all backfilled soil excavations, will be performed in general accordance with Figures 14, 17 and 18. These figures show proposed finish grade contours across and around the areas to direct drainage to the final constructed drainageway channels.

Left over clean soil stockpiles and left over backfill from the effluent line will be spread out around the site to allow drainage. Tree trunks left on site from the clearing will be chipped. Clean trunks and rootballs will be shredded. The shredded chips will be spread out around the site as surface mulch.

In all fill areas, backfill and overburden soils will be spread or placed in up to 12-in. loose lifts and compacted. All graded areas will be seeded and mulched. Following seeding, straw, hydromulch, or the mulched brush pile will be placed over the area to promote seed germination and the development of grass cover.

After the final drainage way channel is confirmed clean, sod will be installed in the newly final constructed drainage way channels on the sidewalls and the bottom if it is not on bedrock.

10.2 Erosion Controls

Following the completion of final grading and seeding as discussed in Section 10.2, the Site Remediation Contractor will apply erosion control netting over graded areas that are susceptible to erosion. In addition, the Site Remediation Contractor will install silt fencing or may use straw bales at the outfall into existing storm water control structures and surface ditches to collect silt and other sediment. Following installation, the CBS Onsite Representative or his designee and the Parties will inspect all erosion/sedimentation controls. The Site Remediation Contractor will install any additional erosion/sedimentation controls as deemed necessary by the CBS Onsite Representative, his designee, or the Government Representatives.

10.3 Fencing

Existing gates and fencing around the EM area will be relocated as shown on Figure 13. The fence around the SH area will be taken down as required for access and stored for later reuse as security around the ICSTF plant. Any damage to gates or fencing that is to stay in place that is caused by the Site Remediation Contractor or its subcontractors during the project will be repaired prior to demobilization from the site.

11.0 Project Closeout and Completion Report

At the conclusion of the project, a punch list of action items will be prepared. All work on the punch list will be completed to the satisfaction of the CBS Onsite Representative or his designee, the Parties, and the U.S. EPA prior to final demobilization from the site. Following completion of all remediation activities described herein, CBS will prepare a comprehensive project report that summarizes all work performed as part of this remediation project. Specifically, the report will include a discussion of pre-excavation delineation activities, excavation activities, final quantities and disposition of removed

wastes, verification sampling procedures and results, final area averages, restoration activities, and water treatment. The completion report will include color-coded post-excavation verification sampling data maps depicting final excavation depths. Extensive documentation consisting of, but not limited to, the following items will be available for review but not included in the report:

- Sample logs;
- Chain-of-custody records;
- Certificates of analysis;
- Sampling progress maps;
- Excavation progress maps;
- Daily safety logs;
- Daily tailgate safety meeting records;
- Photo documentation;
- Shipping manifests;
- Disposal receipts;
- Destruction certificates; and,

Within 60 days of the completion of all work specified in the RWP, CBS will submit a final completion report to the U.S. EPA.

Appendix A.

Sampling and Analysis Plan

A.1.0 Introduction

The purpose of this Sampling and Analysis Plan (SAP) is to provide a plan for the sampling work required at the Lemon Lane (LL) Landfill Site by the consent decree amendment (CDA).

The CDA details a set of final remediation and monitoring requirements for the LL Landfill Site. One of those requirements is to sample the soils and sediments in the Illinois Central Spring (ICS) emergence area (EM), the Swallow Hole (SH) area and the Quarry Springs (QS) area.

This document describes the sampling and analysis procedures for performing soil and sediment sampling in and around the ICS EM/SH/QS areas. This Plan is derived from a previous SAP document (Reference 3) which was submitted to the EPA in August 2009. Comments received on the August 2009 plan from EPA and IDEM on September 15, 2009 have been addressed in this plan. A sampling plan for the Delineation of the Emergence area, (Reference 4), has been previously approved by EPA. Phase I and 2 sampling of the EM area has been performed as discussed in Section 5.1.2.1. Table 4 and Figure 13 show the Phase 1 and 2 results.

This Plan is supported by and intended to be used in conjunction with the Quality Assurance Project Plan (QAPP), Revision 9 (Reference 6) for the Bloomington Sites.

A.2.0 Data Quality Objectives

This section shows how the Data Quality Objective (DQO) process was applied for this Plan. The DQO process focuses studies by clarifying vague objectives and limiting the number of decisions that must be made (Reference 7). The process enables data users and technical experts to specify data requirements prior to collection events. It provides a convenient way to document activities and decisions, to communicate the data collection design to others, and to give the data user confidence that the data collected support the decisions concerning remediation and redevelopment of the site. Finally, the DQO process is designed to save resources by streamlining the study process and making data collection operations more resource-effective.

A.2.1 Stating the Problem

The conceptual model for the EM/SH/QS areas involves the following:

- ICS is the emergence of groundwater contaminated with PCBs from historical operations at Lemon Lane Landfill.
- During non-storm conditions, the ICS waters flow along the surface in defined channels to the SH area and then sink back underground. These waters then re-emerge to the surface primarily at Quarry A and B Springs with some input possibly to Rinker Spring. The defined channels carrying these flows have been

contaminated with PCBs.

- During storm conditions, flooding can occur in all three areas due to flow restrictions from culvert blockage or the inability of the swallow holes to pass the much higher flows of water. The flooding deposits contaminated sediments outside the normal stream channels in the flood plain.

These areas are heavily vegetated, undeveloped, flood prone and have some moderate slopes. Therefore, they are likely to remain undeveloped. However, there are residential areas near by so future exposure scenarios could involve trespassers being exposed to contaminated soils and sediments. The USEPA has determined that PCBs are the contaminant of concern.

The USEPA has determined that removal of contaminated sediments and soils is necessary to protect human health and the environment. The USEPA has set target cleanup goals for these areas as follows:

- For areas that will serve as final drainage ways: 1 ppm PCBs as an area arithmetic average with a 5 ppm not to exceed limit for any one sample
- For final non-drainage way areas: 5 ppm PCBs as an area arithmetic average with a not to exceed limit of 10 ppm for any one sample.

A.2.2 Identifying the Decision

Based on the EPA set cleanup criteria for these areas, the decision statements are as follows:

- Determine if the average PCB value is greater than 1 ppm in soils/sediments of final drainage ways or determine if any one grid is greater than 5 ppm PCBs in a final drainage way. If either of these conditions exists, then remove the offending materials.
- Determine if the average PCB value is greater than 5 ppm in soil/sediments of final non-drainage ways or determine if any one grid is greater than 10 ppm PCBs in a final non-drainage way area. If either of these conditions exists, then remove the offending material.

A.2.3 Identifying Inputs to the Decision

The data needed to support the decision is the PCB content of residual soils and sediments in these areas. The PCB reporting limits need to be less than 1 ppm on a dry weight basis to allow proper quantitation to the lowest action limit.

A.2.4 Defining the Boundaries of the Study

The boundaries of the study refer to the area, depth and temporal aspects of the sampling plan. The study areas can be bounded by the previous sample results and the

physical realities of the areas. Specifically, since the main mechanism of contamination migration in these areas are spring flows in channels and deposition throughout the floodplain during large storm events, the area of investigation can be limited to stream channels and flood plains below elevations that previous sampling has shown is not contaminated.

A.2.4.1 Emergence Area

For the IC emergence (EM) area, this area is bounded by the fenced area and an elevation of approximately 827 feet amsl. Previous data shows that soils sampled above this elevation consistently have been less than 1 ppm PCBs. The existing fence was sited where sampling results showed a reliably clean perimeter.

Within the EM area, there are several areas that should be considered as not requiring additional sampling for various reasons. These would include:

- There are two small channels that extend from the existing spring emergences to the plant intake. One of these is the normal low flow emergence channel and the other is a major storm overflow spring channel. These channels will remain active in the future and will be continually contaminated by untreated spring flows. There is no need to sample and remove material from these small lengths of channel since they will be continually re-contaminated.
- The lower portion of the gravel access road/parking area. This roadway area was sampled, remediated and constructed in 1999. This area has not flooded since the 1999 construction.
- The steep hillside to the west and steep railroad berm to the south of the main emergence. These areas are not flood prone to any extent and the areas which may have seen some flood waters over the years are very small. These areas will remain within the fence for the foreseeable future and will drain to the ICSTF inlet sump.
- Within the existing fenced area are also the intake structures for the ICS STF.

These four areas described above will require continued access restrictions for the foreseeable future and should remain fenced off from the general public. However, outside these areas, after removing soils greater than the cleanup standard, the fencing can be removed and access restored to the property owners. Sampling and removal inside the future smaller fenced area that will restrict access to the above areas should not be required at this time except in the area of the hot spot indicated in Section 2.2 and in the final constructed drainage way. Table 4 and Figure 12 show the sampling results in this area. Figure 13 shows the grids that will be removed based on the results.

Based on both historical and the delineation sample results, the depth of contamination over 5 ppm outside stream channels is typically restricted to the surface interval up to about 12 inches.

From a timing perspective, much of the existing data which was taken in 2004 or earlier and in active flood prone areas or the eroded depression area may not be representative of current conditions.

There are also existing and developing depressions above the main emergence as shown in Fig 10. These are occurring from erosive flows at the top of rock during storm events. The area of eroded depressions is also causing additional sediment loading to the water treatment plant. The erodible materials at the top of rock near the emergence and overflow springs will be removed and a French drain will be installed to reduce flow restrictions near the emergence as shown in Figure 10.

Fig 14 shows the area of the Emergence area that has been determined to be fenced to prevent access to the active spring channels and water treatment related structures.

A.2.4.2 Swallow Hole Area

This area was heavily overgrown, flood prone and consistently contaminated within the stream channels and the flood plain up to about 810 feet asml. The final remedial actions outlined in the CDA require an extension of the STF discharge line around this area to prevent future STF discharge water from sinking into the swallow holes. This is being done to prevent re-contamination of the plant discharge by subterranean contaminated sediments in the conduit system fed by the swallow holes. Known active swallow holes in this area will be grouted.

The existing fence around the SH area, was originally located based on sampling to ensure the fence would be in areas with less than 1 ppm PCBs and out of flood prone areas. Based on the 2004 sample results, PCB levels greater than 1 ppm are restricted to elevations below 810 feet amsl. Therefore the focus of future sampling and remediation in the SH area will be within the existing fence and below an elevation of 810 feet amsl. The depth of contamination, outside defined channels is typically limited to the top 6 inches. The depth of non-drainageway contamination was determined during delineation and verification sampling. Within channels, it appears that the contamination is the full depth of the soft sediment layer. A shallower depth of contamination in existing drainage channels may be determined by verification sampling.

A.2.4.3 Quarry Springs Area

At the QS area, the previous sampling has shown that most of the contamination is limited to:

- The existing stream channels from the Quarry A area, from the Rinker Spring area and the channel formed from the combination of these two headed towards the 36 inch storm culvert
- The low flood plain between the two channels
- The small flood plain immediately north of the 36 inch storm water culvert.
- The Quarry B Spring emergence

There are areas of fill that define the limits of flooding to the east of the Rinker Channel and to the southeast of the entire area. To the west, the flood prone areas are bounded by the hillside descending from the STF access road which extends almost to the Quarry A stream channel.

Based on field observations in the QS area, the above areas are the only areas subject to flow and/or flooding. The exception to this is that there is a channel which runs from the south end of the Quarry C ponding area to the east/southeast towards Hinkles Restaurant. This channel carries flood overflows periodically during major storm events if the 36 inch culvert is partially blocked. Eight composite samples taken in 2004 showed this channel to have no PCB levels greater than 1 ppm. This was confirmed during the recent QS delineation sampling as shown in Figure 16 and Table 5. Since the vast majority of storm flows this channel has seen since 2004 would be comprised of clean water discharged by the STF, it is assumed that this channel would be as clean as or cleaner than in 2004.

A.2.5 Developing a Decision Rule

The decision rule set in the CDA for these areas requires:

- If the average PCB value is greater than 1 ppm in soils/sediments of final drainage ways or if any one grid is greater than 5 ppm PCBs in a final drainage way, then remove the offending materials.
- If the average PCB value is greater than 5 ppm in soils/sediments of non-final drainage ways or if any one grid is greater than 10 ppm PCBs in a non drainage way area, then remove the offending materials.

A.2.6 Specifying Limits on Decision Errors

The EPA has specified the method of showing achievement of the cleanup goal. Both an arithmetic average is to be met in an area and a not to exceed value for any one grid or individual sample in an area. Delineation, verification or stockpile sample results for soils that will remain on site will be compared with the not to exceed limits for drainage way and non-drainage way compliance. The arithmetic average of all such sample results within non-drainage way areas will be shown to satisfy the average requirements. In the final drainage ways the average of the verification composite sample results over the length of each individual constructed drainageway will be used to determine compliance with the average cleanup criteria of 1 ppm.

The actual cleanup requirements in the CDA do not require comparison of a UCL to the cleanup standard. Therefore actual minimum sample numbers will be driven by the confirmation data such as the final not to exceed values achieved.

A.2.7 Optimizing the Design

The above DQO steps have been applied to this sampling effort to provide estimated parameters that will achieve project goals. This process has yielded:

- An area of sampling concern for each of the three areas of interest
- Approximate depths of interest in each area

The sampling design for each area will be optimized taking these parameters as guidance along with the physical realities of each area and the anticipated order of operations.

A.2.7.1 ICS Emergence Area

The Emergence Area has a separate SAP (Reference 4) for delineation purposes. Delineation sampling was performed per the separate EM SAP. Figure 12 and Table 4 show the sample results that were obtained.

It is anticipated that the final fenced foot print around the Emergence Area will be reduced. The site features which will be included in the final footprint are:

- The existing small stream channels directly fed by each spring
- The area of erosion driven depressions
- The STF plant intake structures and storm water bypass intake area
- The steep hillside to the west and the steep railroad berm to the south of the emergence

Several of the above areas will continue to have active sources and/or are very small and relatively inaccessible such as the steep hillsides to the west and south. Since the surface water draining over the contaminated areas will be collected and sent to the ICSTF for treatment, it is proposed that the cleanup goals not be applied and that no further sampling be performed in the active channels and the steep hillsides. No sampling is also proposed for the gravel access road since this area was remediated and then constructed in 1999 and no flooding has occurred on this road since then.

Outside these areas, a 30 foot grid was placed in the flood prone valley up to 827 feet amsl. Samples were taken in 6 inch intervals down to 12 inches in the center of each grid. Additionally, in the known hot spot area, where the 2004 or 2008 samples were over 100 ppm, and in the area of eroded depressions the grid size was reduced to 15 feet and the initial samples will be taken in 12 inch intervals to bedrock. A layout of this sampling approach is shown in Figure 12. Table 4 lists the delineation results. Figure 13 shows the grids that will be excavated to the clean criteria for non-drainageways. Figure 13 also shows the grids that were sampled to establish a clean perimeter. The drainageway will be constructed separately and sampled separately to confirm it clean to the drainage way criteria.

Note that some portion of the valley leading to the storm water bypass piping will be a final drainage way. The final size and preliminary location of the final drainage way is shown on Fig 14. Once the final drainage way is constructed, 6' wide by 50' long grids will be laid out along the full length. Each grid will be sampled from 0-6" to a not-to-exceed limit of 5 ppm. All these sample results along the final drainageway will be compared to the not-to-exceed value of 5 ppm and also averaged and compared to the average limit of 1ppm.

The layout depicted in Figure 13 can be used to estimate the number of samples which will be generated to calculate the final average level of residual PCBs in the non-drainageway. There are 17 - 30 foot grids and 28 - 15 foot grids shown on Figure 14. Each 30 foot grid will initially generate at least 1 sample result and each 15 foot grid will initially generate at least 4 sample results. The actual final data set used to compare the average to the cleanup standards will vary and include stockpile results and some final confirmation data as well.

A.2.7.2 The Swallow Hole (SH) Area

The Swallow Hole grid area will be delineated before mobilization for excavation. The conceptual approach to both contamination removal and sampling to support that removal is outlined in Section 5.3.3.

- A 30 foot square grid pattern will be placed over the entire area below an elevation of 810 feet amsl as shown in Fig 15 and sampled for delineation before remediation .
- 10% of the excavated grids will have confirmation sampling performed according to Section A.3.2 with results expedited for next morning delivery.
- Two 50' TSCA creek segments as shown on Figure 15 will be excavated 1' deep and the residual surfaces will be verification sampled per section A.3.3.
- After the TSCA creek segments are removed the remaining US drainage channel (green and red on Figure 15) will be scraped to bedrock or to a confirmed clean bottom and the existing overflow channels (blue on Fig 15) will be scraped 6". The channel bottoms will be confirmed clean by composite samples along 50' segments per section A.3.3. The scraped material will be stockpiled and stockpile sampled for disposition per Section A.3.4.
- Areas of the creek channels with deep sediments may not be excavated all the way to bedrock but only to a clean surface as shown by final drainage way sampling according to Section A.3.3.
- The swallow holes will be excavated as indicated in Section 5.3.3. The excavated material will be stockpile sampled per Section A.3.4.
- After all soils are removed and the swallow holes grouted, final fill and grading and the construction of the new drainage way will be completed as shown in Fig 17.
- As in the emergence area, once the final drainage way is constructed, 50' long grids the width of the constructed drainage channel will be laid out along the full length. Each grid will be sampled according to Section A.3.3 with results compared to the drainage way clean limit of not-to-exceed 5 ppm. All the composite sample results along the final drainageway will be averaged and compared to the average drainage way limit of 1ppm.
- If the average is above 1ppm, the grid layers with the highest PCB content (between 1 and 5 ppm) will be removed and replaced with clean fill until the average is less than or equal to 1 ppm.

A.2.7.3 The Quarry Springs Area

The previous sample data for this area showed that all 2004 data was below 50 ppm with the arithmetic average at less than 5 ppm and the highest value at 48 ppm. The highest PCB values were within the stream channels with much lower values in the flood plain between the stream channels and near the 36 inch culvert.

The Quarry Springs area remediation, as described in Section 5.3.2, will be similar to the approaches used in the Swallow hole and Emergence areas. The QS area was cleared and grid sampled upfront, before mobilization for remediation. Fig 16 and Table 5 show the grid layout and sample results. Samples were initially taken in 6 inch intervals down to 12 inches in the center of each grid. During delineation some grids were sampled deeper, as required to obtain clean bottoms.

The pathway for the new drainage way will be laid out. It is anticipated that the path will follow the existing channel stream fed by Quarry A Spring as shown on Fig 16.

Upon mobilization the flood plain soils will be removed based on the 30 foot grid sample results as compared to the non drainage way criteria. 10% of the excavated grids that were delineated to a clean interval will have confirmation sampling performed according to Section A.3.2. All grids excavated beyond the depth of a clean delineation sample, will require an additional verification sample.

The width of the existing drainage channels will be scraped to bedrock and the removed soils will be stockpile sampled per Section A.3.4 to determine final disposition. Areas of the creek channels with deep sediments may not be excavated all the way to bedrock but only to a clean surface as shown by drainage way sampling according to Section A.3.3.

A conceptual layout of the new drainage way and the sample grid for the flood plain area is shown in Figure 16.

A.3.0 Soil Sampling Procedures

To verify the success of the remediation, various forms of additional soil sampling and analysis will be performed during this project as indicated earlier. First, additional grid delineation sampling may be performed. Second, post-excavation verification samples will be collected and analyzed from the bottom of grids containing unknown levels of PCBs and 10% of excavated surfaces previously delineated to clean. Third, post-excavation drainage way composite samples will be taken over 50 ft channel segments. Finally, verification sampling will be conducted to characterize stockpiled material. Clean stockpiled soils may be returned to the excavated areas as backfill.

Figure 7 lists the number of the various types of samples in each area and also the sample requirements. Soil samples will be obtained according to the QAPP Field Procedure FP-16, Soil Sampling. The decontamination procedure is described in Section A.5 and waste handling procedures are described in Section A.6.

A.3.1 Pre-Excavation Grid Delineation Sampling

Extensive delineation sampling has been performed in these three areas over the years, as indicated in Section 2. The lateral extent of contamination has generally been established in each flood plain area. Additional Pre-excavation grid delineation sampling was performed in all areas.

Pre-excavation grid delineation sampling involves using a hand auger or soil probe to obtain samples.

In each grid, a grab sample will be taken from the center. If an existing drainage channel runs through a grid, the sample location will be offset to be outside of the drainage channel. The channels will be scraped and stockpile sampled and verified separately, as discussed below.

Each grab will be advanced in 12 inch lifts with a hand auger which is fitted with an internal plastic sleeve. The sleeve will contain the sample. After removing the sleeve from the auger, the sleeve will be sliced along its length and the 0 to 6 inch and the 6 to

12 inch portions removed. Deeper samples will be taken in 6 inch intervals if required to obtain a clean bottom.

As each sample is removed from the sleeve by the field technician, the technician will visually inspect the sample to provide qualitative descriptions of color, texture, odor, presence of plants or animals, presence of sediments or clay, or other relevant field observations, and will note them in the field logbook. The depth of soil in each sleeve will also be noted.

Larger pieces of stone and any debris such as vegetation and roots will be removed from the sample and discarded. The remaining sample will be homogenized. The sample will be placed into a 4 ounce pre-cleaned bottle that is labeled in accordance with the QAPP field procedure requirements, and prepared for shipment to the laboratory. The samples will be submitted to the laboratory for PCB analysis as described in Section A.8 of this Plan.

After the collection of each core sample, all sampling equipment that has come into contact with the soil samples (scoops, spatulas, mixing pans, etc.) will be thoroughly cleaned to avoid cross contamination.

A.3.2 Grid Bottom Verification Sampling and Re-excavation

Vertical delineation has generally been done to 12 inches to obtain a clean bottom. In a few Delineation has shown only surface contamination, typically only to 6 to 12". Grids with surface contamination to be excavated have typically been delineated to a clean level. 10% of grids to be excavated to a clean delineation result will be verified clean by this sampling procedure. Also, if the remaining layer after excavation had not been previously delineated, an additional bottom verification sample will be required to document and verify that the remediation has been completed in that grid.

For 30' x 30' grids, bottom samples will comprise a composite of four grab samples randomly collected from the four quadrants of that grid. Since 15' x 15' grids are equivalent to a quadrant of a 30' square grid, only one grab will be taken in the center of the 15' square grids. The number of grabs comprising a partial 30' grid will be based on the relative area of the partial grid to a full 30' grid (i.e. the verification sample for half of a full grid will be comprised of 2 grabs). CBS may choose to take two separate 0-6 inch and 6-12 inch composite verification samples at the same time. These will be made up of four 12 inch cores from the center of the 4 quadrants of the 30 ft grid.

Several 30' grids have the existing creek channel running through them. None of the four grabs will be taken in the width of the creek channel that will be scraped to bedrock and stockpile sampled as indicated in Section 6.4 below.

The 0-6 inch composite will be analyzed first. If the PCBs in that sample meet the cleanup criteria, then the 6 to 12 inch grab will not be analyzed. If the 0-6" sample exceeds the clean up limit the 6 to 12 sample will be analyzed and handled accordingly. A clean bottom verification sample will be achieved in 10% of grids excavated to a surface that was delineated as clean.

The results of the composite sample will be compared to the non-drainageway not-to-exceed value of 10 ppm. If the analytical result exceeds the corresponding not-to-exceed value, material may be removed from the entire grid, or the quadrant grab

samples may be analyzed separately and the excavation may then focus on one or more sub-grids as appropriate.

If the verification sample exceeds the not-to-exceed cleanup criteria then an additional lift of 6" of soil will be removed followed by additional verification sampling.

A.3.3 Drainage Way and Excavated Creek Channel Verification Sampling

Existing drainage channels not excavated all the way to bedrock and the final constructed drainage way channels will be sampled according to this procedure. Grids 50' long, the width of the drainage way will be set up along the channel. In sections of the channel where the sidewalls are made up of fill, five 0 to 6" surface grab samples will be taken, spaced at 10' apart along the center of each drainage way grid and composited to verify the <5 ppm NTE / <1 ppm average in the drainage way is achieved.

In sections of the channel where the sidewalls are made up of native soil, 6 grabs will be staggered along the 50' length, 2 in each sidewall where there is native soil and 2 in the center. All sidewall and center grabs within a 50' section will be composited into one composite sample for analysis.

If the bottom of the constructed channel is on bedrock, the surface grabs will be staggered at 10' intervals along both sidewalls. Again, all sidewall and center grabs within a 50' section will be composited into one composite sample for analysis.

If this composite sample result is >5 ppm the drainageway will be excavated 6" deep over the 50' length and the width of the channel plus 2 extra feet on each side. The sidewalls will be in native soil in 800' of the total 1470' of final constructed drainageway.

The remaining bottom of the two 50 ft long TSCA channels and the overflow channels in the SH area will also be verified according to this procedure. If the bottom of the channel is not within the Final Drainage way path, the verification sample is only required to meet the non-drainage way clean criteria, NTE 10 ppm. These sample results will be included in the non-drainage way average for the SH area.

The first 30' of the existing channel from the Quarry C pond to Hinkle's Restaurant was sampled as a drainage way grid and compared to the drainage way not to exceed limit of 5 ppm. This composite sample result from the upstream end of the existing drainageway was 0.86 ppm, confirming it is still clean.

A.3.4 Stockpile Sampling

The nominal stockpile size for overburden sampling will be up to 120 cubic yards. Ten grab samples will be randomly collected from each stockpile at various depths and thoroughly homogenized. A composite sample will be obtained from the mixture for analysis of PCBs. This composite will be compared with the drainage ditch and non-drainage ditch cleanup criteria.

If the composite sample result is greater than 10 ppm it will be disposed off site. If less than 50 ppm it will be sent as Special Waste. If greater than 50 ppm the stockpile will be sent off as TSCA.

If the stockpile composite level is less than 5 ppm, the stockpile will be considered suitable for use as backfill in either a non-drainage way or drainage way, depending on the area average. If the analysis shows that the PCB level is between 5 and 10 ppm, the material will be suitable for use as backfill only in non-drainage way areas, again depending on the area average.

These data will be used to determine area average PCB concentrations prior to placement to ensure that the average cleanup criteria will be met.

A.4.0 QUALITY CONTROL SAMPLES

Quality control (QC) samples will be analyzed to assess the quality of the data resulting from the field sampling program. Three types of QC samples will be collected:

- Duplicate Samples
- Rinseate Blanks
- MS/MSDs Samples

Duplicate Samples: Duplicate samples will be collected periodically to check the laboratory analyses for consistency. Duplicates will be collected during sampling events at a frequency of one duplicate per ten samples collected. Duplicate samples will be obtained by equally dividing a sufficient amount of the homogenized composite or grab sample to perform the required analyses. Duplicate samples will be transferred to the laboratory in pre-cleaned glass jars and submitted for analysis.

Rinseate Blanks: Rinseate blanks will be collected to ensure that all sampling equipment is being properly decontaminated between sampling events. Rinseate samples will be collected in the field at a frequency of one per day. Rinseate samples will be collected by pouring distilled, deionized, or “analyte-free” water over the decontaminated sampling equipment and collecting it in a one liter amber glass sample container. Sampling personnel will not be told which equipment to sample until after decontamination procedures have been completed at the end of the day.

MS/MSD Samples: MS/MSD samples provide information about the effect of the sample matrix on the sample preparation and measurement methodology. These samples document the bias and precision of a method. The precision of the method is a variance of the analytical techniques. MS/MSD samples are considered laboratory QC samples.

Volume for one MS/MSD sample will be collected for every batch of up to twenty samples or fewer per matrix (soil or water) sampled. The sample that will be used to prepare the MS/MSD samples will be indicated on the chain of custody. The laboratory will prepare the MS/MSD samples from the original volume of sample collected. At least 40 grams of sediment or soil will be collected for each sample indicated for MS/MSD sample preparation.

The rate of collection for the QC samples applies to the entire ICS EM area covered by this plan, not to each sub-area (EM, SH, QS) individually.

CBS will allow the government parties to take split and/or duplicate samples of any samples collected by CBS or its contractors or agents.

A.5.0 PERSONNEL AND EQUIPMENT DECONTAMINATION

This section provides the general guidelines for the decontamination of personnel and sampling equipment. A portable decontamination area will be established at the site to contain liquid and solid waste generated during the decontamination of equipment and personnel between sampling locations. All waste generated from decontamination will be containerized and disposed of properly.

Soil sampling equipment (e.g., scoops, trowels, and mixing bowls) will be cleaned prior to collecting each composite or grab sample to prevent cross contamination. All equipment will be decontaminated using the following five-step procedure as described in Field Sampling Procedure FP-2 in Volume I, Appendix B, of the QAPP:

1. Scrub and wash with laboratory-grade detergent.
2. Rinse with tap water.
3. Rinse with deionized water.
4. Rinse with isopropanol (wash bottle).
5. Rinse with deionized water.

The following decontamination procedures will be performed by site personnel after completion of tasks whenever the potential for contamination exists. When leaving the contaminated area:

- Disposable latex booties are to be worn over boots in the sampling area. Remove and discard when leaving area.
- Remove disposable coveralls (e.g., Tyveks) and discard.
- Remove latex gloves and discard. If sediment samples are being taken directly with the sampling personnel's gloved hand, gloves will be changed between each composite sample.
- At the end of the work day, shower entire body, including hair, either at the work site or at home.

A.6.0 INVESTIGATION-DERIVED WASTES

It is anticipated that the investigation-derived waste (IDW) that may be generated during the field investigation may include the following items:

- Personal protective equipment (PPE) – including disposable coveralls, gloves, booties, and other PPE
- Disposable equipment – which may include plastic sheeting and equipment covers, aluminum foil, broken or unused sample containers, sample container boxes, tape, and other related items
- Decontamination fluids - any spent solvents and wash water

- Packing and shipping materials
- Unused sediment or soil sample material

Solid nonhazardous IDW, which includes PPE, disposable equipment, and packing and shipping materials, will be disposed of as solid waste in a dumpster or similar container. Rinse water from decontamination of sampling equipment, which does not contain any organic solvents that were used for decontamination, will be disposed of in the ICSTF inlet sump.

Spent organic solvents used for decontamination will be containerized separately from the aqueous decontamination fluid wastes. In accordance with USEPA regulations, containers will be labeled and disposed of by CBS at an appropriate treatment and disposal facility within 90 days of generation.

Any unused sediment or soil material, such as that adhering to the sampling equipment and material collected but not used for analysis will be returned to the creek sediment bed or bank in the same area that it was collected.

A.7.0 SAMPLE MANAGEMENT

Field personnel are responsible for the identification, preservation, packaging, handling, shipping, and storage of samples obtained in the field such that all samples can be readily identified and will retain, to the extent possible, *in situ* characteristics to be determined through analysis. All samples collected will be tracked by preparing and using a sample chain-of-custody form as described in Field Procedure FP-12 in Volume I, Appendix B, of the QAPP.

A.7.1 Sample Identification System

Each sample, including duplicates and blank QC samples, will be identified with a unique sample number. This number will provide easy identification of the sample in field logs, field data sheets, analytical reports, chain-of-custody forms, and project reports.

Sample numbers will be assigned in accordance with the procedures in the Bloomington Project Data Management Program. A listing of sample identification numbers will be maintained in the Bloomington Project sampling logbook. Each sample number will consist of two components that are described below:

- A two-digit project identification code (e.g., EM for Emergence, SH for Swallow Hole, QS for Quarry Spring)
- A four-digit sequential sample number

Sample numbers will not be repeated. Duplicate samples will not be distinguished within the sample numbers, but will be distinguished through the sample identification within the sample tracking and data management systems. This is done to eliminate potential bias in the analyses of the samples.

A.7.2 Sample Containers, Preservatives and Holding Times

Upon collection, samples will be transferred directly into the appropriate sample container. Only pre-cleaned sampling containers supplied by the laboratory will be used. All samples will be cooled to 4°C immediately upon collection and maintained at this temperature during sample shipment.

A.7.3 Sample Labeling

Samples will be labeled at the time of sample collection by affixing a self-stick label to the sample container. All sample labels will include the following information:

- Project name
- Unique sample identification number (see Section 7.1)
- Date and time the sample was collected
- Initials of the sample collector
- Sampling location and sample description

A.7.4 Sample Shipping

All samples collected during this project will be properly labeled and packaged for courier pickup or shipment by overnight courier to the offsite laboratory. Glass containers will be secured in sturdy coolers to prevent breakage during transport. Ice in leak-proof bags will be placed in the coolers to preserve the samples at 4°C. Coolers will be secured with tape and labeled to ensure the samples are not disturbed during transportation. A chain-of-custody seal(s) will be attached so that any attempts at opening or tampering will result in a broken seal.

A.7.5 Sample Custody

The sample chain of custody tracks the life of a sample from collection to analysis. A record of the sample custody will be maintained to establish and document sample possession during collection, shipment, laboratory receipt, and laboratory analysis. This documentation will be evidenced on a chain-of-custody record by the signatures of the individuals collecting, shipping, and receiving each sample. Procedures for sample handling, shipping, and transfer of custody are described in Section 3.0 of Volume I of the QAPP.

A.7.6 Field Sampling Logbook

A field sampling logbook, as described in Field Sampling Procedure FP-1, will be initiated at the start of the first onsite sampling activity and maintained to record sampling activities throughout this remediation project. The field sampling logbook is a controlled document that becomes part of the permanent site file. The logbook will consist of a bound notebook with consecutively numbered pages that cannot be removed. All data entries will be recorded using a non-erasable ink pen.

The following items will be included in the daily entries in the field sampling logbook:

- Date of activities
- Arrival and departure of sampling personnel and observers
- Field sampling activities
- Individual sample description (color, consistency, odor, etc.)
- Individual sample location (sediment and soils)
- Sample pick-up, including chain-of-custody form number, carrier, date and time
- Unusual events during sampling
- Health and safety issues related to sampling
- Weather conditions

Field Procedure FP-1 of the QAPP discusses field logbook record keeping.

In addition to the field logbook, data also will be recorded daily on spreadsheets and site maps for communication to the remediation contractor and onsite representatives.

A.8.0 LABORATORY ANALYSIS

Pace Laboratories in Indianapolis, Indiana, has been selected as the analytical laboratory for this plan. Samples will be submitted to Pace for analysis via hand delivery or overnight courier.

All samples will be analyzed for PCBs in accordance with EPA Method 8082 (SW-846). No data packages are provided for sample results greater than 55 ppm that will be disposed of as TSCA.

Sample results at less than 55 ppm PCB will have a full data package provided by the lab and with results reported on a dry basis. Material with full QC results less than 50 ppm dry can be disposed of as non-TSCA waste.

The laboratory will transmit preliminary analytical results via facsimile or email. Original final data reports will be forwarded in the mail.

MS/MSD sample analyses will be required at the laboratory for each batch of the sediment sample matrices and one for each batch of soil samples. Additional sample volume may be required for the field duplicates and MS/MSD samples as indicated in Section A.4.0.

Pace Laboratory Standard Operating Procedures for performing these analyses are included in Volume I, Appendix A, Laboratory Procedures, of the QAPP.

A.9.0 DATA VALIDATION AND REPORTING

A.9.1 Data Validation

Data validation begins with the laboratory analyst and continues until the data are reported. Individual analysts will verify the completion of the appropriate data forms to ensure the completeness and correctness of data acquisition and reduction. All in-laboratory data validation will be conducted in accordance with methods delineated in the USEPA's "Test Methods for Evaluating Solid Waste, Physical/Chemical Methods"

(SW-846), and "Manual for Chemical Analysis of Water and Wastes" (EPA 600/4-79-020).

CBS will perform additional data validation of analytical results. The data will be reviewed to ensure holding times are met, matrix spike recoveries are within acceptable ranges, and blank sample results do not exceed acceptable concentrations. If PCBs are detected in the blanks, the data will be evaluated on a case-by-case basis to assess the effect on the project objective. When determined to be necessary, corrective actions, such as reanalysis or resampling and analysis, will be evaluated and implemented.

The quality assurance (QA) objectives for precision, accuracy, representativeness, completeness, and comparability of the data for this project are specified in the QAPP. Full data validation will be performed in accordance with the QAPP on 100 percent of the data which will be used to support confirmation that the cleanup objectives have been met.

Field data will be recorded on the appropriate field record form or in a bound field sample logbook. All field data will be verified and reviewed by the Field Sampling Manager.

A.9.2 Data Reporting

All results will be reported by the laboratory to the Field Sampling Leader or his designee by sample batch and will be certified by the laboratory. Preliminary results will be forwarded by email or facsimile. Data turnaround time is two weeks following laboratory receipt of samples for delineation samples. Verification samples will have preliminary results reported the morning after courier pickup.

All reports and documentation required, including QC results will be clearly labeled with the laboratory sample number and associated field sample number.

The analytical results will be adjusted for dry weight concentrations for sample results that were screened at <55 ppm PCB. Color-coded, delineation maps showing final dry weight sample results will be generated for the Final Report.

Analytical results for PCBs will be given in units of mg/kg for solids and µg/L for liquid samples. In addition to the analytical results and QC data, details regarding the corrective actions taken and a discussion of any necessary modifications of the protocols established in the referenced methods will be included in the final data report. Following completion of the field investigation and chemical analyses, CBS will prepare a letter report that will include the following elements:

- Observations made during collection of field samples.
- Summary of any variances from the sampling plan or field sampling procedures, and the potential impact on data usability.
- Tabulation and field maps of the analytical results, with cross-referencing to the sampling stations.
- Discussion of the results determining if PCB content is consistent across an elevation within each separate flood plain. This will allow sediment removal to be

performed, if necessary, within specified flood plain elevation contours. If PCB content and depth is not consistent across flood plain elevations within each area, additional delineation sampling may be required.

References

1. "Agreed Amendment to the Consent Decree Providing for Remedial Actions at Neal's Landfill, Lemon Lane Landfill and Bennett's Dump and Addressing General Matters", United States District Court for the Southern District of Indiana, Indianapolis, Division, entered July 24, 2009.,
2. "Statement of Work for the Remedial Action at Lemon Lane Landfill OU1" (USEPA May 2000)
3. "Sampling and Analysis Plan for Delineation of Contaminated Soils and Sediments - Illinois Central Spring, Swallow Hole and Quarry Springs Area, Associated with the Lemon Lane Landfill, Bloomington Indiana", CBS, August 24, 2009
4. "Sampling and Analysis Plan for Delineation of Contaminated Soils and Sediments at Illinois Central Spring Emergence Area, Associated with the Lemon Lane Landfill, Bloomington Indiana", CBS, December 18, 2009
5. "Remedial Design/Remedial Action Work Plan Operable Units 2 and 3 Site Groundwater and Sediments, Lemon Lane Landfill Site, Bloomington, Monroe County, Indiana", CBS, January 2010
6. "Amendment 9 to the Bloomington Project QAPP", CBS, February 2010.
7. "Guidance for the Data Quality Objectives Process" (EPA QA/G-4, USEPA 2000)

Table 1: ICS Emergence Area Previous Data

Sample Date	Sediments	Soils	Sample Date	Sediments	Soils	Sample Date	Sediments	Soils
1982	360	0.2	1999		26	2004		0.15 J
1982		4.5	1999		6.8	2004		2.1
1982		9	1999		<1	2004		1.2
1983	5.8		1999		3.4	2004		< 0.13
1991	22		1999		2.1	2004		6.0
1991	58		1999		4.1	2008		7
1991	21		1999		<1	2008		6
1994	37.4		1999		<1	2008		130
1995	28	6.4	1999		<1	2008		29
1995	17	3.4	1999		<1	2008		130
1995	39	14.4	1999		<1	2008		79
1995	56	19.1	1999		<1	2008		26
1995	57	6	1999		10	2008		24
1995	1400	<1	1999		<1	2008		120
1995	293	<1	1999		<1	2008		9.4
1995	107	133	1999		<1	2008		6.2
1995	500	56.7	1999		<1	2008		7.3
1995		27	2004	7.3	15	2008		5.7
1995		<1	2004	6	4.3			
1995		4.2	2004	69.5	8.6			
1995		<1	2004	4.1	2.4			
1995		<1	2004	1.7 J	1.4			
1995		<1	2004	9.5	200			
1995		107	2004	2.6	77.5			
1995		>20	2004	10	4.2			
1995		11.7	2004		17			
1995		20	2004		64			
1995		10.6	2004		120			
1995		30.8	2004		1.3			
1995		133	2004					
1995		3.6						

Notes:

1. All data is ppm dry basis.
2. The bolded italicized data for soils in 1995 is immuno assay data
3. Dupes are not shown separately. Rather the average for that location is shown.
4. Some data that reflects sediment samples taken at the emergence in 2005 and 2006 for bench scale testing is not reflected.

Table 2: Swallow Hole-Fence Area 2 Previous Data								
Sample Date	Sediments	Soils	Sample Date	Sediments	Soils	Sample Date	Sediments	Soils
1982	65		1995		100	2004	12	0.50
1983	2.5		1995		<.8	2004	22	42
1991	7.8		1995		<.8	2004	9.9	6.9
1991	11		1995		13.7	2004	9.6	27
1991	17		1995		>20	2004	33	0.74
1991	4.1		1995		42.8	2004	10	0.26
1991	14		1995		21	2004	47	9.2
1991	6.7		1995		10	2004	130	0.25 J
1991	14		1995		<.8	2004		0.18 J
1991	2.5		1995			2004		14
1991	3.8		1995			2004		0.40
1994	165		2004	28	0.14 J	2004		< 0.13
1995	1100	<1	2004	25	2.8	2004		45
1995	950	<1	2004	27	5.1	2004		47
1995	275	<1	2004	24	28	2004		1.9
1995	270	<1	2004	44	14	1999		<1
1995	1100	<1	2004	48	0.64	1999		<1
1995	98	<1	2004	68	0.76	1999		<1
1995	130	<1	2004	41	1.0	1999		<1
1995	130	<1	2004	32	< 0.12	1999		<1
1995	25	<1	2004	23	13	1999		<1
1995	10	<1	2004	38	23	1999		<1
1995	8.4	<1	2004	21	1.0	1999		<1
1995	11	<1	2004	32	0.40	1999		<1
1995		<1	2004	34	< 0.13	1999		3.5
1995		<1	2004	35	< 0.13	1999		3.4
1995		<1	2004	39	< 0.16			
1995		<1	2004	37	0.23 J			
1995		<1	2004	13	0.44			

Note: All data is ppm dry basis

Table 3: Quarry Springs Area Previous Data								
Sample Date	Sediments	Soils	Sample Date	Sediments	Soils	Sample Date	Sediments	Soils
1981	0.5		2004	3.0	2.4	2004		< 0.16
1991	2.4		2004	4.6	7.1	2004		2.2
1991	0.69		2004	3.4	1.2	2004		0.88
1991	4.8		2004	2.4	0.12 J	2004		4.2
1991	0.56		2004	3.1	0.16 J	2004		4.6
1991	0.43		2004	3.1	4.2	2004		3.0
1991	1.6		2004	2.5	< 0.14			
1991	0.87		2004	0.68	< 0.13			
1991	0.58		2004	0.67	0.14 J			
1991	0.11		2004	0.24 J	< 0.13			
1991	0.61		2004	0.51	< 0.13			
1991	5.4		2004	0.48	0.14 J			
1991	2.5		2004	0.24 J	8.4			
1995	45.3		2004	0.74	0.35			
1995	5.2		2004	0.83	19			
1995	6.6		2004	0.34	28			
1995	5.6		2004	0.28	< 0.15			
1995	5.1		2004	6.1	< 0.13			
1995	9.7		2004	3.6	6.2			
1995	8.5		2004	3.0	< 0.13			
1995	7.1		2004	48	0.67			
1995	8		2004	25	0.47			
1995	8.7		2004	37	< 0.13			
1995	10		2004	16	< 0.13			
1995	6.5		2004		< 0.16			
1995	11		2004		< 0.16			
1995	62		2004		1.8			

Note: All data is ppm dry basis

Table 4

**IC Emergence Area
Grid Sampling Results**

PCBs, ppm

15 x 15 Ft Grids

Grid ID	Sampling Interval, feet			Bedrock Interval	
	0 - 1	1 - 2	2 - 3	bedrock Interval, ft	PCB Result, ppm
ED-01	0.06	ND	ND	11 - 11.5	ND
ED-02	0.135	ND / ND	ND	8 - 8.5	ND
ED-03	0.3	ND	ND	15 - 16	ND / ND
ED-04	37	0.1 / 0.1	0.1	7 - 8	ND
ED-05	0.98	0.06	0.05	7 - 7.9	ND
ED-06	0.087	ND	ND	11 - 12	ND
ED-07	0.5	0.1 / 0.1	0.8	6 - 7	ND
ED-08	5.3	0.15	ND	5 - 6	ND
ED-09	0.7 / 1.8	0.08	ND	10 - 11	1.18
ED-10	2.6	0.15	0.06	8 - 9	0.45
ED-11	0.4	0.07 / 0.1	0.14	8 - 8.8	0.44
ED-12	0.48	ND	ND	3 - 3.7	ND
ED-13	0.14	0.5	ND	11 - 12	2.26
ED-14	35.6	0.05	7.4	4 - 5	ND
ED-15	23.2	0.5	na	1 - 1.8	0.5
ED-16	1.6	0.8	0.08	8 - 8.2	0.1 / 0.1
ED-17	4.75	0.06	0.06	8 - 8.2	ND
ED-18	9.4	1.85	ND	11 - 12	ND
ED-19	40.7	4.6	0.6	12 - 13	ND
ED-20	13.4	0.18	na	1 - 1.8	0.18
ED-21	67.4	0.9 / 0.5	na	2 - 2.2	0.9
ED-22	98.9	5.16	0.34	8 - 9	ND
ED-23	16.5	0.1	ND	8 - 8.5	ND
ED-24	1.53				
ED-25	0.2 / 0.3				
ED-26	0.1				
ED-27	0.3				
ED-28	2.51				
ED-29	0.48				

 -Special Waste Grid Interval, 10 ppm < PCB < 50 ppm

 -TSCA Grid Interval, PCBs > 50 ppm

0.18 **Bold result is at bedrock and therefore not the full depth interval**

ND Non Detect

na not applicable

Table 4 (continued)

**IC Emergence Area
Grid Sampling Results**

PCBs, ppm

30 x 30 Ft Grids

Grid ID	Sampling Interval, feet	
	0 to 0.5	0.5 to 1.0
DW-1	0.113	
DW-2	0.094	
DW-3	0.83	
DW-4	0.29	
DW-5	1.79	
DW-6	0.35	
DW-7	7.04	3.27
DW-8	0.24	
DW-9	2.84 / 3.13	
DW-10	3.79	
DW-11	0.69	
DW-12	1.02	
DW-13	1.41	
DW-14	0.58	
DW-15	0.34	
DW-16	0.13 / 0.09	
DW-17	0.099	

Table 5

**IC Quarry Springs Area
Grid Sampling Results**

PCBs, ppm

Sample ID	Grid ID	Sampling Interval, feet			
		0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0
	A3	1.3 / 0.94	0.64		
	A4	0.74	1.2	0.9	
	A5	26	34.9	0.742	
	A6	6.7	0.439		
	A7	1.1			
	A8	ND / ND			
	AA5	2.2	3.1		
	B5	ND			
	B6	14	5.7	0.3	
	B7	1.7			
	B8	ND			
	C6	8			
	C7	ND			
	C8	3.0 / 4.7			
	D6	4.4 / 2.7			
	D7	0.94 / 1.4			
	D8	2.1			
	E6	2.4			
	E7	1.9			
	F6	ND / ND			
	F7	ND			
	G6	ND			
	G7	0.92			
	H2	ND			
	H3	ND			
	H6	0.96			
	H7	2.9			
	I2	ND			
	I3	ND			
	I4	ND / ND			
	I5	1.6			
	I6	4.6			
	I7	10.7	1.9		
	I8	3.6			
	J2	5.6	0.916		
	J3	1.3			
	J4	2.5			
	J5	15.5	3.1		

Table 5 (continued)

IC Quarry Springs Area
Grid Sampling Results

PCBs, ppm

Sample ID	Grid ID	Sampling Interval, feet			
		0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0
	J6	0.75 / 0.62			
	J7	8.8	0.133		
	J8	ND			
	K2	2.6			
	K3	2.1			
	K4	1.1			
	K5	1.1			
	K6	0.5			
	K7	6.8	2.38		
	K8	1.0 / 0.7			
	L1	1.3			
	L2	1.5			
	L7	ND			
	M1	0.58			
DEX03	M1	0.98			
	M2	1.1			
	Y3	0.65 / ND	ND		
	Y4	20.1	8.2	1.9	
	Y5	1.7	1.8		
	Y7	0.5			
DEX02	Z3	13.5		1.1	
A00	Z4	19.6	11.7	11.1	4.63
A0	Z6	15.6	0.7	0.4	
	Z7	15.4	0.214		
	Z8	0.2			
	DEX01	16.6			
	CSG	0.86			

-Grid Interval, 5 ppm < PCB < 10 ppm

-Special Waste Grid Interval, 10 ppm < PCB < 50 ppm

ND -Non Detect

Table 6

**IC Swallow Hole Area
Grid Sampling Results**

PCBs, ppm

Grid ID	Sampling Interval, feet			
	0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0
B8	0.1	0.7		
B9	56.2	53.1	0.9 / ND	
B10	0.1	no archive		
C8	0.1	0.1		
C9	15.6	16.6	ND	
C10	ND	0.2		
D8	ND	ND		
D9	12.2	10.5	ND	
D10	0.7	0.2		
E8	0.1			
E9	83.8	6.54	ND	
E10	4.5			
F8	1.8	ND		
G7	9.4	0.231		
G8	7.6	9.49	ND / ND	
H6	7.6			
H7	7	0.585		
H8	ND / ND			
I5	0.4			
I6	20.7	ND		
I7	8.1	0.998		
I8	ND			
I9	ND			
J5	ND			
J6	2.3	0.118		
J7	2.1			
J8	ND			
J9	ND			
K4	ND			
K5	20.1	0.0512		
K6	33.5	50.3	1.8	
K7	0.75 / 0.60	0.249		
K8	ND			
L3	0.1	ND	no archive	
L4	17.7	24.5	12.8	1.6
L5	15.6	0.115	no archive	
L6	0.46	0.247		
L7	1.3			

Table 6 (continued)

**IC Swallow Hole Area
Grid Sampling Results**

PCBs, ppm

Grid ID	Sampling Interval, feet			
	0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0
L8	ND			
M3	3.6			
M4	27.2	1.23	no archive	
M5	5.2			
M6	3.7			
N2	0.56			
N3	82.5	0.371		
N4	2.5			
N5	15.8	0.2		
N6	5.7	0.307		
O2	0.72			
O3	94.1	2.42		
O4	2.3 / 3.1			
O5	34	1.16		
O6	11.5	0.231		
O7	ND			
P1	ND			
P2	6			
P3	85	0.83		
P4	45	3.27		
P5	13.1	0.386		
P6	47.7	0.096		
P7	ND			
Q1	ND			
Q2	ND			
Q3	54 / 47	0.455		
Q4	15.4	0.33		
Q5	36.1 / 32.3	1.07		
Q6	65.8 / 76.5	8.84	0.1	
Q7	0.3			
R2	0.81			
R3	1.6			
R4	30.1	0.525		
R5	41.6	1.84		
R6	15 / 19.8	0.109		
R7	0.1			
S3	0.87			
S4	4.9			

Table 6 (continued)

IC Swallow Hole Area
Grid Sampling Results

PCBs, ppm

Grid ID	Sampling Interval, feet			
	0 to 0.5	0.5 to 1.0	1.0 to 1.5	1.5 to 2.0
S5	1.9			
S6	5.3	0.141		
T4	ND			
T5	0.56			
T6	ND / ND			
U6	ND			

 -Grid Interval, 5 ppm < PCB < 10 ppm

 -Special Waste Grid Interval, 10 ppm < PCB < 50 ppm

 -TSCA Grid Interval, PCBs > 50 ppm

ND -Non Detect

no archive -sample will be taken upon mobilization

Table 7
Sample Requirements
Illinois Central Spring Flood Plain Remediation Sampling
Bloomington, Indiana

	Sample Designation prefix	Delineation Samples (Actual)	Grid Bottom Verification Samples**	Final Drainageway Composite Samples	Stockpile Composite Samples
Emergence Area	EM	123	1 (ED-22)	4	1
Swallow Hole Area	SH	147*	3 (E9, O3 & P3)	12	3
overflow channels, 760'				15	
TSCA segments, 100'				2	
Quarry Springs Area	QS	101	1 (A5)	15	3
Totals		371	5	48	7

* includes 4 samples that will be taken during mobilization

** Grids with the highest PCB content where post-excavation verification samples will be taken

Notes:

1. Hold time for solids properly preserved can be up to 1 year until extract, 40 days for extract.
2. Hold time for liquids is 7 days until extraction, 40 days for extract
3. All samples are to be analyzed for Aroclor PCBs via EPA method 8082 and solids will also be analyzed for percent solids to determine PCBs on a dry weight basis via Standard Methods 2540b.
4. Sample containers will be amber glass, 4 oz for soil samples, 1 liter for liquids
5. The samples are to be sent to Heritage Labs in Indianapolis.
6. Solid samples will be extracted per EPA SW 846 3550
7. Liquid samples will be extracted per EPA SW 846 3510c
8. All samples are to be chilled to 4 degrees C for preservation
9. The reporting limit for all soils is 0.1 ppm and for liquids is 0.1 ppb. The solid reporting limit is on a wet basis. Dry basis reporting limit is typically 20% higher.
10. Duplicates will be collected at a frequency of one duplicate per ten samples collected.
11. Rinseate samples will be collected in the field at a frequency of one per day.