Remedial Design/Remedial Action Work Plan

Operable Unit 2
Site Groundwater
Bennett's Dump Site
Monroe County, Indiana

December 2009

Prepared by CBS Bloomington Project, Pittsburgh, PA
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Introduction</td>
<td>1</td>
</tr>
<tr>
<td>2. Site Description</td>
<td>1</td>
</tr>
<tr>
<td>a. Site Description, History and Current Conditions</td>
<td>1</td>
</tr>
<tr>
<td>b. Summary of Groundwater Investigations</td>
<td>3</td>
</tr>
<tr>
<td>3. Project Description</td>
<td>7</td>
</tr>
<tr>
<td>a. Remedial Action Objectives</td>
<td>7</td>
</tr>
<tr>
<td>b. Remedial Components</td>
<td>7</td>
</tr>
<tr>
<td>c. Remedial Performance Objectives</td>
<td>9</td>
</tr>
<tr>
<td>d. General Construction Approach</td>
<td>11</td>
</tr>
<tr>
<td>e. Site Environmental Controls</td>
<td>14</td>
</tr>
<tr>
<td>f. Cleanup Confirmation Methods</td>
<td>15</td>
</tr>
<tr>
<td>4. Remedial Design Activities</td>
<td>16</td>
</tr>
<tr>
<td>5. Institutional Controls</td>
<td>17</td>
</tr>
<tr>
<td>6. Plans</td>
<td>17</td>
</tr>
<tr>
<td>7. Project Organization</td>
<td>19</td>
</tr>
<tr>
<td>8. Project Schedule</td>
<td>20</td>
</tr>
<tr>
<td>9. References</td>
<td>23</td>
</tr>
</tbody>
</table>

# Figures

- Figure 1: General Site Location
- Figure 2: Site Features
- Figure 3: Passive Drain Concept
- Figure 4: Collection Trench Concept
1. Introduction:

The purpose of this remedial design/remedial action work plan is to provide a plan for the work required at the Bennett’s Dump site (BD) by the Consent Decree Amendment (CDA) and the associated Record of Decision Amendment (RODA) and Statement of Work (SOW), (U.S. District Court 2009). Collectively, the CDA/RODA/SOW will be referred to as the CDA in this document. The CDA details the final remedial actions and monitoring requirements for the BD site.

The BD site has been separated into operable units. The first operable unit was the source control operable unit (OU1). The remediation of OU1 occurred in 1999 in accordance with a negotiated SOW (USEPA 1999). 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 sediments in Stout’s Creek. The CDA requires no additional actions for OU3, therefore this plan focuses on those further actions required for site wide groundwater under OU2.

This plan contains the following:

- Site Description/History
- Project Remedial Action Descriptions
- Performance Objectives
- General Construction Approach
- Site Environmental Controls
- Cleanup Confirmation Methods
- Land Use Controls
- List of plans required for implementation of remedy/investigations/monitoring
- Project Organization
- Project Schedule

2. Site Description and History

a. Site Description, History and Current Conditions

CBS Corporation (formerly Westinghouse), owned and operated a capacitor production plant in Bloomington. The insulating fluid used in the manufacture of the capacitors contained polychlorinated biphenyls (PCBs). During the 1960's, portions of the Bennett’s Quarry, located 2.5 miles northwest of Bloomington (Figure 1), were used as an uncontrolled dump for electrical parts and capacitors containing PCB dielectric fluid, originating at the plant.

Monroe County first discovered the site and the U.S.EPA did an initial inspection in May 1983. The main fill area appeared to be immediately to the east of Stout’s Creek and west of the gravel access road. Another area, referred to as the satellite area, was located approximately one hundred feet to the east of the main area immediately south of the Icebox Quarry. The satellite area is approximately one half acre in size. Figure 2 shows the site layout and pertinent site features.
The initial condition of this site indicated that most of the visible capacitors had been crushed, burned, or otherwise torn open with insulator wrapping paper, ceramic bushings, and other electrical parts scattered about the surface. Stained soil was also evident on the surface of the dump. Sampling showed that PCBs were found in large concentrations across the site. Based on site sample data, visual inspections and site history, U.S. EPA determined that PCBs were the main contaminant of concern.

Interim remedial measures were initiated by the U.S. EPA in June 1983. The interim remedial measures included the following:

- Installation of a locked, 8-foot high chain link barbed wire security fence surrounding the three contaminated areas.

- Removal of a total of 252 visible capacitors for off-site incineration and excavation of 20 cubic yards of stained soil and disposed of it in an approved off-site landfill.

- Installation of a 16 to 22 inch clay cap and 6 inches of topsoil cover over the main site.

The BD site was placed on the National Priorities List on September 21, 1984 and was one of the six sites included in a Consent Decree that was entered with the Court on August 22, 1985 (U.S. District Court 1985). The Consent Decree called for the construction of a permitted, TSCA-approved, dedicated, municipal solid waste-fired incinerator to be used to destroy PCB contaminated soils and materials excavated from the six sites. Public opposition to this remedy and laws passed by the State of Indiana convinced the Consent Decree parties to choose alternative remedies.

The alternative remedy for the source control operable unit was implemented in 1999 and consisted of:

- Excavation and off-site disposal at a permitted landfill of all materials at the site containing greater than 50 parts per million (ppm) PCBs, followed by placement of a 12-inch thick clean soil cover. The final average site PCB level was targeted to be less than 25 ppm.

- Incineration of PCB containing capacitors at a permitted incinerator.

- Excavation of sediment in Stout's Creek containing concentrations greater than 1 ppm PCBs with subsequent placement of excavated sediment under the clean soil cover referred to above.

- Monitoring of groundwater monitoring wells and on-site springs.

Excavation activities began in August 1999. A total of 36,172 tons of PCB-contaminated material were excavated and disposed of in an off-site landfill permitted to accept PCBs. A total of 1,756 capacitors (118.72 tons) were excavated and incinerated at an off-site
incinerator permitted to accept PCBs. The site was then covered with a 12-inch soil cover. The arithmetic average of all confirmation samples from the main site area and the satellite area is 11.3 ppm. However, when considering backfill, the final site wide average is less than 6 ppm. This is lower than cleanup levels typically required for commercial/industrial sites. A total of 10 cubic yards of sediment were also excavated from Stout’s Creek in September 2000.

During excavation activities in 1999, three locations were discovered which revealed deep quarry pits filled with soil/rock rubble and fill (Viacom 2000). Capacitor parts and PCB contaminated soils were found above the rubble and groundwater at these locations had a light oil sheen. Analysis of the oil showed it to be a mix of PCBs with diesel fuel. Due to the contaminated groundwater and deep heterogenous rubble/fill mixture, further excavation at these locations was discontinued and these three locations did not meet the less than 50 ppm cleanup criteria.

Since 1999, a series of groundwater investigations have been conducted at the site and in the adjacent creek to determine the extent of groundwater contamination and PCB transport to the creek. EPA has also performed risk assessments for the site for both potential human and ecological receptors (EPA 2006, EPA 2005). The risk assessments concluded that the exposure to biota from the stream was the most significant future hazard to any receptor consuming the biota (fish). The risk from exposure to water, sediments and bank soils was found to be insignificant.

The PCB levels in stream biota is driven by the continuous discharge of PCB contaminated groundwater to the creek. Therefore, groundwater investigations have focused on sources of PCBs in groundwater, sources of recharge water that drives the PCB discharges to Stout’s Creek and the intervening migration pathways.

b. Summary of Groundwater Investigations

BD is located on the eastern margin of the Mitchell Plain physiographic region, a low plateau developed on limestones of the Mississippian Blue River and Sanders Group. The building stone unit of the Salem limestone immediately underlies the site and the underlying geology is karst. Karst geology is characterized by groundwater flow through cave passages or conduits and contains sinkholes and swallow holes. Also, during the remediation of the site in 1999, filled quarried areas near the former landfill area were discovered.

Stout’s Creek is the main surface water body associated with the BD site, flowing from south to north along the western edge of the site. All known springs and surface storm water from the site eventually flow into Stout’s Creek. Open quarry pits in the area collect surface water and groundwater. The water from the quarry pits also seeps into Stout’s Creek. Upstream of BD, water sampling within Stout’s Creek has not found detectable levels of PCBs, but adjacent to and downstream of the site, water samples typically show PCB concentrations between .3 and 1 parts per billion (ppb).

The groundwater flow system associated with the site is composed of recharge areas, flow areas and discharge areas. Recharge to the groundwater flow system occurs in the
topographically higher areas east and south of the site through open water-filled quarry pits and through old quarries that have been backfilled with rubble. Surface water runoff is a contributing source of water to the quarries.

There are five springs within the BD site as shown in Figure 2 and are referenced as Middle Spring, Mound Spring, North Spring, Mid-North Spring and Rusty Spring. The springs associated with the BD site do not flow continuously. Both Mid-North and North Springs only flow for brief times during extremely wet periods while Mound, Middle and Rusty Springs flow consistently except during extended dry periods.

Since completion of the source control remedy in 1999, groundwater and sediment investigations have been conducted at the site. The results of the groundwater investigation were presented in the final report for the groundwater investigation (Viacom 2004b). The main findings of that work are:

- Groundwater at the site flows from east to west and is discharging to Stout’s Creek through several site springs, bank seepage at the top of bedrock, and sub-colluvial epikarst fractures.

- There are open water filled quarry pits on the eastern side of the site which appear to be collecting surface water drainage and contributing groundwater recharge to the site. The nearby highway construction, completed in recent years, routes additional surface water runoff into one of these quarry complexes, Wedge Quarry. This appears to have increased overall groundwater recharge through the site.

- One of the site springs, Mound Spring, appears to be an overflow discharge from a buried quarry pit immediately adjacent to and on the eastern margin of the site. This now buried quarry pit was partially open during the time of PCB waste disposal at the dump site and did receive some waste material that contained PCB. During implementation of the source control remedy some residual PCBs were left in this buried pit and these residuals are likely a source of PCBs in Mound Spring waters. The flow variation and natural geo-chemistry of Mound Spring waters are similar to the water in the Wedge Quarry complex, indicating that the waters in Wedge Quarry are a likely source to Mound Spring.

- There is a buried bedrock valley oriented north/south through the middle of the site. The elevation of bedrock in this valley is generally lower than the present channel of Stout’s Creek. This valley has some sand and gravel material at the top of rock, which together with the elevation data is an indication that it may be a former channel location of Stout’s Creek. This valley appears to rejoin the present Stout’s Creek channel at the northern fringe of the site. A railroad berm was constructed over this channel and may be impeding flow within this channel, causing some groundwater mounding in the northern portion of the site.

12/10/2009
• Middle Spring is located near the terminus of this buried former stream channel and may be at least partially fed by groundwater mounding in this channel. It may also receive some direct recharge from Icebox Quarry.

• The PCB mass observed in Stout’s Creek just downstream of the site is typically higher than can be accounted for by the visible site springs. This indicates that seepage into the creek along the top of bedrock and within the first few feet of highly fractured bedrock (epikarst) may be a significant mechanism for PCB transport in addition to the known springs.

• There are portions of buried quarries that are filled with rubble which extends above the local grade. These highly permeable rubble piles allow direct infiltration of rain water and runoff to easily enter the buried quarry pits.

• There is a partially filled quarry pit which has been designated as “Pit A” to the east of the site just north of Wedge Quarry. This pit has a water pool at the surface that never freezes in the winter nor does it ever dry out during dry summer periods. This indicates a source of groundwater recharge to this pit. The water level in this pit was not significantly affected by lowering the water level in Wedge Quarry. This indicates a poor connection between these quarries. As the water level in Pit A is higher than Wedge Quarry, this indicates separate recharge sources both of which could contribute flow through the site.

After completing the initial groundwater investigation, several additional investigations were conducted to evaluate seepage flow control, sources areas and potential flow paths from source areas. These investigations have included:

• Flow and PCB measurements taken at several points along Stout’s Creek to discern where most of the PCBs entered the creek. These results were reported in October 2007 (Viacom 2007).

• A pump down test conducted on the Wedge and Icebox Quarries. The goal of the test was to determine the impact on spring flow and PCBs in Stout’s Creek. The results of this test were reported in June 2005 (Viacom 2005a).

• New wells were installed in several buried quarry pits to determine how contaminated the groundwater was in these pits and to see if large amounts of water could be withdrawn from these pits. These results were reported in August 2005 (Viacom 2005b). The recovery wells were not efficient in removing groundwater because the backfill in these buried quarry pits is highly heterogeneous. The buried quarries and recovery wells are shown in Figure 2.

• Dye injected in a buried quarry with known residual PCBs to determine if there was substantial transport from this pit to the site springs and/or Stout’s Creek. These results were reported in January 2004 (Viacom 2004b).
• Installation of recovery wells in the buried bedrock valley and a pump test from one of these new recovery wells to determine what impact withdrawal of water from the valley would have on spring flows and transport of PCBs to Stout's Creek. The test was conducted in November 2005 (Viacom 2005c).

• Installation of a large number of shallow piezometers to the top of rock in an attempt to discern specific flow paths from suspected source areas to site springs and/or Stout's Creek.

The results from the above investigations can be summarized as follows:

• Lowering the water levels in Wedge and Icebox Quarries had a pronounced effect on the flow from Mound Spring and possibly Middle Spring and appears to reduce PCB transport to Stout's Creek overall. However, the PCB transport to Stout's Creek was not completely eliminated. The data generated by this test can be used in a conceptual design of a passive quarry drain system.

• There are significant levels of PCBs in groundwater within three previously excavated buried quarry pits. However, attempts to discern flow paths from these buried pits has been inconclusive. Dye injected in PZH pit did not conclusively manifest itself at the site springs or at Stout's Creek, indicating little transport from this area to the creek.

• Shallow piezometers installed to the top of bedrock have indicated some potential flow paths from buried quarry pits to site springs and Stout's Creek, but the magnitude of the flow is not clear.

• A pump test from the buried bedrock valley had a significant impact on the flow at Middle Spring and there was a small apparent decrease in the PCB transport to Stout's Creek, but PCB transport to Stout's Creek was not completely halted during the test. This data can be used to estimate flows in a collection system.

• PCB levels in newly installed wells along the axis of the buried bedrock valley show inconsistent levels (high levels in some, much lower levels in others) of PCBs. This may be indicative of residual PCBs just below the top of rock in areas that were excavated to bedrock in 1999. These residuals may also contribute PCB loading to Stout's Creek.

• Flow and PCB measurements along Stout's Creek consistently show that a significant portion of the overall PCB flux to the creek occurs near the northern portion of the site in the vicinity of MW5. MW5 contained PCB DNAPL after initial installation. These DNAPLs were removed. This indicates that some PCB fluid entered the top of rock and is likely being transported via dissolution to the groundwater and seeping into the creek.
In summary, this testing indicates that spring flow and PCB transport to Stout’s Creek can be reduced by lowering quarry water levels to the east of the site and/or controlling the groundwater mounding in the northern portion of the buried bedrock valley in the vicinity of MW5.

Source removal or control measures in buried quarried pits, if successful, could also remove additional residual PCBs and were evaluated for cost and practicality. These measures would locally improve groundwater quality, but there is not sufficient data at this time to quantitate the reduction in PCB transport to Stout’s Creek since the contribution of each buried quarry pit to PCB transport to the creek has not been determined. Based on this as well as the difficulty of finding and removing PCB residuals within buried quarry rubble below the water table, EPA has determined that removing PCBs from within these buried quarries to lessen PCB transport to Stout’s Creek is not cost effective and may be technically impracticable.

3. Project Description

a. Remedial Action Objectives

The U.S.EPA has set the following remedial action objectives for OU2 at BD:

- Reduce the amount of PCBs released from groundwater to Stout’s Creek through mass reduction.

- Improve PCB levels in fish for beneficial reuse by reducing PCBs released to Stout’s Creek.

- Reduce the amount of PCB mass in sediments that may be available to fish by reducing PCBs released to Stout’s Creek.

b. Remedial Components

The remedial actions required for OU2 and OU3 at the BD site are described in the SOW included with the CDA. The U.S.EPA has determined that no additional remedial actions, beyond those performed in the year 2000, are required for the sediment operable unit (OU3). For the groundwater operable unit (OU2), the USEPA has determined that the following remedial actions are required:

- CBS shall design, install and maintain a passive quarry drain system to drain the Wedge Quarry Complex so that the water level within the quarry complex does not exceed an elevation of 737 feet above mean sea level (amsl). The purpose of this system is to reduce the groundwater elevation and thereby reduce groundwater flow from springs and seeps into Stout’s Creek. The elevation of 737 feet amsl may be revised, subject to review and approval by USEPA, if CBS can demonstrate to
U.S.EPA that a different elevation will improve the effectiveness of the passive quarry drain system in reducing the groundwater flow from springs and seeps into Stout’s Creek. The passive quarry drain system shall also drain the Pit A Area into the Wedge Quarry Complex to further reduce groundwater flow from the springs and seeps.

- After completing the passive quarry drain system for the Wedge Quarry Complex, CBS shall (i) investigate the impact of the passive quarry drain system and (ii) investigate lowering the water level in Icebox Quarry. CBS shall conduct these investigations in accordance with a plan approved by U.S.EPA after reasonable opportunity for review and comment by the other governmental parties. The approved plan shall require CBS to investigate the impact of the Wedge Quarry Complex passive quarry drain system upon groundwater elevation, the flow from springs and seeps, and PCB concentrations in springs and seeps. The approved plan shall also require CBS to investigate the feasibility of lowering the water level in Icebox Quarry on a permanent basis, as well as the effect of such action upon groundwater elevation, the flow from springs and seeps, and PCB concentrations in springs and seeps. After completing the investigations, CBS shall report its findings in a written report submitted to U.S.EPA for review and approval after reasonable opportunity for review and comment by the other governmental parties.

- Based upon the results of the investigation of Icebox Quarry, U.S.EPA may require CBS to lower the water level in Icebox Quarry on a permanent basis, either by extending the passive quarry drain system for the Wedge Quarry Complex to include Icebox Quarry or by discharging water from Icebox Quarry into Stout’s Creek. If U.S.EPA requires CBS to lower the water level in Icebox Quarry on a permanent basis, discharges from Icebox Quarry shall not exceed a daily maximum concentration of 0.3 ppb PCBs. If water from Icebox Quarry is discharged to the Wedge Quarry Complex, treatment of Icebox Quarry water prior to entering the Wedge Quarry Complex shall be completed if PCB concentrations are greater than 0.3 ppb. In determining whether to require CBS to drain and treat water from Icebox Quarry, U.S.EPA shall weigh the benefit of reducing the flow of PCB-contaminated groundwater from springs and seeps in relationship to the benefit of collecting this water before it is released from springs and seeps and treating it in an on-Site water treatment plant. CBS shall comply with U.S.EPA’s determination with respect to draining and treating water from Icebox Quarry, subject to CBS’s right under Section XXIV (Dispute Resolution) of the Original Consent Decree to challenge U.S.EPA’s determination on the grounds that it is arbitrary and capricious or otherwise not in accordance with law.

- Subject to the “Suspension of Work” provision in Paragraph II.D of the SOW, CBS shall install a collection trench to capture groundwater feeding springs and seeps and thereby prevent flow from springs and seeps from entering into Stout’s Creek. The collection trench shall convey the water to a water treatment plant, which CBS shall design, construct and operate. Discharges from the water treatment plant shall not exceed a daily maximum effluent limit of 0.3 ppb for PCBs and shall comply with
other substantive requirements developed by the State of Indiana under the National Pollutant Discharge Elimination System ("NPDES"). Based upon the conceptual design of the collection trench in the BD RODA OU2/3, the trench will be located along the east side of Stout’s Creek and will be approximately 800-feet long and 8-feet deep. The trench will collect groundwater feeding springs and seeps and convey this water to the water treatment plant. Groundwater emerging from springs and seeps is assumed to flow at a maximum rate of 100 gallons per minute ("gpm") during storm events, although CBS shall be required to capture and treat groundwater emerging from springs and seeps even if the flow exceeds 100 gpm.

- CBS shall prepare an Operations and Maintenance Plan for the passive quarry drain system and the collection and treatment system for flow from the springs and seeps and prepare a long-term groundwater monitoring plan to monitor the effectiveness of the Remedial Action.

- CBS shall use best efforts to put into place appropriate deed restrictions upon the property currently owned by the Star Stone Company ("Star Stone") that is within the boundaries of the Site or may impact the Site.

- CBS shall install and maintain fencing around the treatment system.

- CBS shall use best efforts to put into place an agreement with the owner of the Site to ensure long-term access to the Site for itself and its contractors.

c. Remedial Performance Objectives:

This section provides the performance objectives, including key applicable or relevant and appropriate requirements (ARARs) for each of the remedial actions described in section 3. These performance objectives are listed in the RODA and the SOW portions of the CDA.

Key applicable or relevant and appropriate requirements (ARARs) for this alternative are designated in the RODA and include the following:

- Under 326 IAC 6-4-2, the State of Indiana has promulgated emission limits for fugitive dust, i.e. particulate matter that escapes beyond the boundaries of the Site. These emission limits are relevant and appropriate with respect to dust resulting from excavation activities at the site. Likewise, the emission limits are relevant and appropriate with respect to on-site construction of the water capture and treatment facilities, if required.

- Under 326 IAC 6-4-4, the State of Indiana has prohibited any vehicle from driving on any public right of way unless the vehicle has been so constructed as to prevent its contents from escaping and forming fugitive dust. This requirement is relevant and appropriate with respect to off site transport of any site construction spoil which may be sent to off site disposal facilities.
• 329 IAC 4.1-4 covers requirements for storage and disposal of wastes containing PCBs. Any sludge, soil, or other material generated by a water treatment facility or excavation of on-site material must be managed as PCB remediation in accordance with 40 CFR 761.61. This requirement is relevant and appropriate with respect to PCB-contaminated soil generated by any excavation at the site or by the construction of the water capture and treatment facilities. Likewise, this requirement is relevant and appropriate with respect to PCB-contaminated sludge generated by the potential water treatment facility.

• 329 IAC 3.1 Universal Waste Rule relates to all wastes generated by remediation activities which must be analyzed to determine whether they meet the characteristics of hazardous waste. If they meet these characteristics, they must be disposed of in an approved RCRA permitted facility in accordance with 40 C.F.R. 260-280. This requirement is relevant and appropriate with respect to waste generated by any excavation at the site or by the construction of the water capture and treatment facilities. Likewise, this requirement is relevant and appropriate with respect to PCB-contaminated sludge generated by the water treatment facility.

• 329 IAC 10 Solid Waste Land Disposal Facilities requires that all wastes determined to be non-hazardous must be disposed of in a facility permitted to accept such waste. This requirement is relevant and appropriate with respect to waste generated by any excavation at the site or by the construction of the water capture and treatment facilities. Likewise, this requirement is relevant and appropriate with respect to PCB-contaminated sludge generated by the water treatment facility.

The potential construction and operation of an on-site water treatment plant requires additional ARARS. This plant will not need to obtain a National Pollutant Discharge Elimination System (NPDES) permit because remedial actions are specifically exempt from such administrative requirements under Section 121(e) of CERCLA, 42 U.S.C. 96219(e). Nevertheless, certain regulations enacted by the State of Indiana under its federally-approved NPDES program are relevant and appropriate to discharges from the plant.

Specifically, the plant is subject to the following action-specific ARARS:

• 327 IAC 2-1-6 Table 1, Surface Water Quality Standards
• 327 IAC 5-2-8, Conditions Applicable to All Permits
• 327 IAC 5-2-11, Considerations in the calculation and specification of effluent limitations
• 327 IAC 5-2-11.1, Establishment of water quality-based effluent limitations for dischargers not discharging water to within the Great Lakes system
• 327 IAC 5-9-2, Applicability of Best Management Practices
• 327 IAC 5-2-13, Monitoring

As noted previously, the State of Indiana has stated in correspondence that it typically sets an effluent limit of .3 ppb for PCBs discharged by treatment plants into waters other than the Great Lakes System. The U.S.EPA has determined that notwithstanding the designation of 327 IAC 2-1-6 Table 1 as an ARAR, only the discharge limit of .3 ppb for PCBs is designated as a performance standard for any discharge to Stout’s Creek.

Additional, non-ARAR, performance standards required for each remedial component include the following:

• For the passive quarry drain that will connect Wedge and Pit A, the water level in the Wedge Quarry complex should be maintained at or below 737 feet above mean sea level (amsl) unless the parties mutually agree to an alternate elevation. CBS will maintain the water level in Pit A at approximately an elevation of 740 feet amsl.

• If CBS is required to build a passive drain to Icebox Quarry, then a level at which to maintain the water will be established upon completion of the investigation plan.

• If CBS is required to build the groundwater collection and treatment plant, U.S.EPA will determine performance standards taking into account the final flow from the springs and seeps and the PCB mass released to the stream after implementation of the passive drain system lowering water levels in the quarries.

• All systems installed shall also comply with the shut-off criteria. CBS shall operate and maintain the passive drain system, the collection trench and the water treatment plant until the PCBs in water flowing from the springs and seeps is equal to or less than 0.3 ppb PCBs for a 12-month period. CBS may propose an alternative shut-off criteria and, if U.S.EPA determines that the alternative shut-off criteria provides a standard that is protective of human health and the environment, U.S.EPA shall propose to amend the BD RODA OU2/3 consistent with the substantive and procedure requirements of CERCLA and the National Contingency Plan. In the event that U.S.EPA amends the BD RODA OU2/3 to include the new shut-off criteria, the consent decree parties shall petition the court to modify the consent decree to include the new shut-off criteria. CBS may propose to decommission certain remedy components based upon flow in springs and seeps and PCB concentrations.

The County of Monroe did not identify local storm water regulations as an ARAR for this project. However, CBS has advised the County Drainage Board of this remedy and the County has not identified any concern.

d. General Construction Approach

There are several anticipated or potential construction activities that may be implemented at the BD site. During the construction activities, weekly construction meetings shall be held to discuss the construction progress, future activities and present changes for approval. CBS
may modify the frequency of these meetings with approval of U.S.EPA in consultation with the other governmental parties. Telephone calls may be substituted for a meeting if agreed upon by CBS and U.S.EPA. The general construction approach is discussed for each potential activity in the paragraphs below.

The Phase 1 construction activity is the Wedge Complex passive drain. Figure 3 presents a conceptual pathway for the Wedge Quarry/Pit A passive drain. For the passive quarry drain from the Wedge Quarry Complex and Pit A the areas to be excavated are not in PCB contaminated areas so no special environmental controls to contain fugitive emissions of PCB will be required. The specific construction sequence and approach will be finalized after the designs are completed but are anticipated to generally involve the following activities:

- **Clearing and Grubbing:** The site is currently littered with waste rock piles and scrub vegetation. To clear the path for the drain, the waste rock piles, if any are on the final pathway, will be moved with conventional excavation equipment such as dozers and backhoes. The final location for any removed rock materials will be coordinated with the property owners. After moving any waste rock piles, the scrub vegetation will be cleared with a dozer blade. Vegetation will be chipped on site for use as mulch at the culmination of construction activities.

- **Test Pitting:** Test pitting will be done after vegetation is cleared to determine the actual depths to natural bedrock along the passive drain pathway. It is currently not known if any buried quarry pits will be along the final pathway chosen. To determine the actual subsurface conditions along the proposed pathway, a series of test pits will be dug with a backhoe. The test pits will be dug to the final depth anticipated for the drain or to natural bedrock, whichever is shallower. The results from the test pits will help determine the nature of the subsurface along the proposed path which will determine the final construction techniques needed for the excavation of the passive drain.

- **Quarry Draining:** Prior to beginning the excavation of the trench for the drain, the water level in the Wedge Quarry Complex and Pit A will be lowered using a construction pump to below the final trench depth. This will allow for an inspection of the quarry walls at the anticipated tie in for the passive drain and will prevent water from flooding the excavation trench during construction. Water will be discharged via temporary hose to Stout’s Creek. The water will be maintained below trench bottom by periodic pumping controlled via a float switch for the remainder of the passive drain installation period. Water levels in site wells and piezometers will be periodically monitored prior to, during and after construction per the Bennett’s Dump Groundwater Investigation Plan for Operable Unit 2 (CBS 2009b).

- **Overburden and Rock Excavation:** After test pitting, the final technique for soil and rock excavation will be determined and implemented. Soils will be removed with a dozer and/or backhoe. Rock will be removed with either a backhoe, rock trenching equipment or blasting/excavation techniques depending on the extent and nature of...
the rock to be removed. Rock spoil and soils removed will be placed on site at a location acceptable to the property owners. It is anticipated that sidewalls will be sloped back to ensure slope stability or trench boxes will be used to allow personnel entry in accordance with OSHA requirements for safe excavations.

- Drain Outlet Installation: It is anticipated that the outlet drain from the Wedge South Quarry to the stream will encompass a buried pipe of high density polyethylene. This pipe will be placed on a prepared bed of compacted soils/aggregate using a backhoe. The joints between pipe sections will be sealed in accordance with standards of construction for storm sewers, such as the Monroe County Ordinances Chapter 761 for Storm Water. The pipe would then be buried with aggregate and soils to match the existing site grades. The drain will be constructed with grates at the inlet and outlet to prevent debris entry. The drain will be constructed to facilitate inspection and removal of any accumulated blockages.

- Drain Inlets: The inlet drains will be constructed going north from Wedge Quarry into Pit A and possibly further north. These will be constructed to collect water from these northern pits in a French Drain configuration. Trenches will be excavated to Pit A and possibly further north to allow these waters to drain into Wedge Quarry. The collection trenches will be constructed using similar excavation techniques as discussed above, depending on the actual subsurface conditions. These collection trench pits will be lined with permeable fabric then bedded with permeable rock aggregate and then perforated plastic drain piping will be installed within the aggregate. The final trench will be backfilled to grade with aggregate to allow surface water to infiltrate.

- Drain Connection Between Wedge and Wedge South Quarry: The passive drain will include a connection between Wedge and Wedge South Quarry. This connection will be either a buried pipe or open trench design.

The Phase 2 construction activities may entail an additional passive drain from Ice Box Quarry and a possible collection trench/water treatment system along Stout’s Creek. Any passive drain from Ice Box Quarry will follow a similar construction approach as for the Wedge Quarry passive drain. The location of the potential groundwater collection trench is in an area to the east of Stout’s Creek within areas that were previously remediated for PCB contaminated soils. It is anticipated that these areas have PCB residual levels below levels protective of construction workers. However, the previous remedy stopped at the top of rock in these areas. It is possible that some PCBs have entered the top of rock and could be uncovered during rock excavation. Contingencies for encountering PCBs during rock excavation will be addressed in the section on environmental controls and the site specific health and safety plan.

The construction approach for the collection trench and water treatment facility, if required to be installed, would be finalized after the final design is completed but is expected to generally involve the following approach:
• Clearing and Grubbing: The site is currently littered with waste rock piles and scrub vegetation. To clear the path for the drain, the waste rock piles, if any are on the final pathway, will be moved with conventional excavation equipment such as dozers and backhoes. The final location for any removed rock materials will be coordinated with the property owners. After moving any waste rock piles, the scrub vegetation will be cleared with a dozer blade. Vegetation will be chipped on site for use as mulch at the culmination of construction activities.

• Overburden and Rock Excavation: After clearing and grubbing, the final technique for soil and rock excavation will be determined and implemented. Soils will be removed with a dozer and/or backhoe. Rock will be removed with either a backhoe, rock trenching equipment or blasting/excavation techniques depending on the extent and nature of the rock to be removed. Based on conceptual design activities it is anticipated that the final depth of the trench will go about 8 feet into bedrock. There will also be periodic pump vaults set several feet deeper along the path of the trench. Rock spoil and soils removed will be placed on site at a location acceptable to the property owners. It is anticipated that sidewalks will be sloped back to ensure slope stability or trench boxes will be used to allow personnel entry in accordance with OSHA requirements for safe excavations.

• Drain Inlets: These will be constructed to collect water from the trench in a french drain configuration. The collection trench will be lined with permeable fabric then bedded with permeable rock aggregate and then perforated PVC drain piping will be installed within the aggregate. The final trench will be backfilled to within 3 feet of grade with aggregate and then covered with compacted soils and vegetated to prevent any surface water infiltration. The pump vaults will be installed several feet deeper than the trench bottom and allow enough space for pump installation and personnel access for maintenance.

• Dewatering During Construction: The interceptor trench will be placed near Stout's Creek into the bedrock and is expected to encounter groundwater during construction. Groundwater will be removed during construction with temporary pumps placed in low spots. The water will be collected and tested for PCBs. It is anticipated that the water will need to be treated for PCBs prior to discharge in the creek.

• Water Treatment System: The water treatment system, if required, would be based on filtration and carbon sorption for PCB removal. The system would be housed in a heated metal building constructed on concrete slab on grade.

e. Site Environmental Controls

The environmental controls needed to accomplish the remedial actions depend on the location of the remedial action. As noted above, the passive quarry drain from the Wedge Quarry Complex is expected to be installed in areas of the site where no PCB disposal historically occurred. Thus, those construction activities will not need any special controls.
for PCBs and those construction activities will conform with general construction environmental control practices such as limiting fugitive dust emissions using water sprays and erosion control structures during excavation activities, as needed.

Prior to discharging any water to Stout's Creek during construction, the water will be tested for PCBs to ensure that it meets the discharge requirement of .3 ppb PCBs. If the water source does not meet this requirement and needs to be discharged, it will be treated with a temporary water treatment system brought on site for the construction activity. This would also be done for any testing/investigation activities that will be required to determine the feasibility of draining Ice Box Quarry.

Installation of the buried interceptor trench, if required, will entail excavation in saturated soils and bedrock. A temporary water treatment system will be used to remove PCBs from the collected waters. The system will be designed to meet the .3 ppb PCB standard for discharge of water to Stout’s Creek.

Since the site has been previously remediated for PCB soils, it is not anticipated that significant amount of PCB dust or fluids will be encountered. Additionally, there are no close residences or occupied buildings near the site. As such, there should not be a need for continuous air monitoring for PCBs at the site boundaries. Workers excavating the potential collection trench could encounter PCBs below the top of rock. If this happens, those workers will be monitored in the work zone for PCB exposure using minirams as necessary. The details of any personnel monitoring and safety controls will be discussed in the site specific health and safety plan, (PSARA 2009).

Any excavated spoils removed from areas with suspected PCB contamination will be stockpiled and sampled prior to disposition. Any soil materials found to contain more than 50 ppm PCBs will be sent off site to a permitted landfill. Soils found with PCBs from 10 to 49 ppm PCBs will be placed on site at depths greater than 2 feet and covered with clean soils. Soils requiring off site disposal will also be sampled for RCRA characteristics to determine final disposal requirements.

f. Cleanup Confirmation Methods

The cleanup criterion for collected and discharged waters is less than .3 ppb total PCBs. This will be confirmed by sampling the water for PCBs using U.S.EPA method 8082 for total Aroclor PCBs. The sampling and analysis will follow the project specific QAPP (CBS 2009a). Grab samples of the water from a representative location will be taken to confirm the PCB level.

Since diesel fuel has been found on site in the past, the first batch of water collected from any particular source area will also be screened for VOCs and SVOCs prior to treatment using U.S.EPA methods 8260 and 8270 if any sheen is present on the water. It is not anticipated that chemicals other than PCBs will be present at relevant levels.

For soils suspected of contamination, the materials will be stockpiled in piles up to 120 cubic yards. Stockpiles will then be sampled using 10 discreet grabs selected using a random
approach. The grabs will be composited into one composite sample for each stockpile. The composite sample will be sent to an approved lab for PCB analysis using U.S.EPA method 8082 per the approved QAPP (CBS 2009a). The final disposition of the material is based on the PCB content and is discussed in section e, above.

4. Remedial Design Activities

CBS will submit to U.S.EPA for review and approval (with a copy to the other governmental parties) preliminary designs for: (1) the installation of the Wedge Quarry Complex passive quarry drain system, (2) if required, the groundwater collection trench and the water treatment plant, and (3) if required by U.S.EPA, the system for permanently lowering the water elevation in Icebox Quarry. The preliminary design submittals shall be at the 50% completion point and include the following:

- Preliminary drawings and sketches
- Design assumptions and parameters, including design restrictions
- Design calculations
- Results of additional field sampling or tests
- Compliance with ARARs
- Technical specifications
- Proposed siting/locations of processes/construction activities
- Real estate, easement and substantive permit requirements

CBS will resolve with U.S.EPA, after reasonable opportunity for review and comment by the governmental parties, all comments on the preliminary design for the three design submittals described above.

As part of the design activity, CBS will sample the waters in Pit A and Test Pits 1 through 4. If these waters contain levels of PCBs which may cause the Wedge Complex drain to Stout’s Creek to consistently have PCBs greater than .1 ppb, then a contingency plan to exclude the offending waters will be developed.

The final design submittals, which shall be at the 100% completion point, shall include construction details, project schedules, and bid specifications and shall be subject to EPA approval.
5. Institutional Controls

The institutional controls for the site shall set forth the following unless the parties mutually agree otherwise:

- Future land use at the site, such as residential development, that is not consistent with cleanup levels or components of the remedy selected by U.S.EPA for OU1 or OU2 shall be prohibited.

- Excavation in areas of the site where PCBs greater that 25 ppm on average remain in the ground shall be prohibited.

- Drinking water wells shall not be installed on-site.

- Fencing of the water treatment plant.


- Rights to U.S.EPA, IDEM and CBS to enforce land use restrictions and access rights.

- Any stormwater collection basin constructed within the site boundaries shall be lined with an impermeable liner to prevent recharge of site groundwater.

CBS will arrange for the execution of such restrictive covenants and recording of such executed restrictive covenants with the Monroe County recorder. CBS shall use best efforts to secure the execution of the restrictive covenants from such owners. The United States and the State may consider, in their unreviewable discretion, using their enforcement authorities (including condemnation) to assist CBS in obtaining implementation of restrictive covenants in appropriate circumstances. In the event that any such use of enforcement authorities, including condemnation, results in an obligation to pay just compensation, CBS shall reimburse the United States or the State, as applicable, for just compensation. Such payment shall be made in accordance with the procedures provided to CBS by the United States or the State, as applicable. If both the United States and the State decide not to use their enforcement authorities, including condemnation, to obtain a restrictive covenant from a property owner, and CBS has not been able to reach agreement with the property owner to obtain the restrictive covenant after exerting its best efforts, CBS shall not be required to take any further action to obtain the restrictive covenant.

6. Plans

It is anticipated that the following plans will be prepared for the project activities.

Quality Assurance Project Plan (QAPP): CBS shall develop any necessary amendments to the existing project Quality Assurance Project Plan (QAPP) (Westinghouse 1995) to address sampling and analysis along with data handling for samples collected in all phases of future site work. CBS shall follow the latest U.S.EPA guidance on the development of
QAPPs (Instructions on the preparation of a Superfund Division Quality Assurance Project Plan, revision 0, June 2000).

Health and Safety (H+S) Plan: CBS will develop and submit to U.S.EPA for review and comment, after reasonable opportunity for review and comment by the other governmental parties, a draft and final Health and Safety Plan. The Health and Safety Plan shall address the areas listed below and include performance levels and criteria to assure protection of personnel and residents:

- Facility Description
- Personnel
- Levels of Protection
- Safe Work Practices and Safe Guards
- Medical Surveillance
- Personal and Environmental Air Monitoring
- Personal Protective Equipment
- Personal Hygiene
- Decontamination
- Site Work Zones
- Contaminant Control
- Contingency and Emergency Planning
- Logs, Reports and Record Keeping

Investigation Plan: CBS will submit a plan to (i) investigate the impact of the passive quarry drain system and (ii) investigate lowering the water level in Icebox Quarry. CBS shall conduct these investigations in accordance with a plan approved by U.S.EPA after reasonable opportunity for review and comment by the other governmental parties. The approved plan shall require CBS to investigate the impact of the Wedge Quarry Complex passive quarry drain system upon groundwater elevation, the flow from springs and seeps, and PCB concentrations in springs and seeps. The approved plan shall also require CBS to investigate the feasibility of lowering the water level in Icebox Quarry on a permanent basis, as well as the effect of such action upon groundwater elevation, the flow from springs and seeps, and PCB concentrations in springs and seeps.

Operations and Maintenance (O+M) Plan: CBS shall submit an Operation and Maintenance (O & M) Plan for the passive quarry drain system, groundwater collection trench and treatment plant. Further, CBS shall include in the O&M Plan any requirements for Icebox Quarry. The O&M Plan shall include the State of Indiana National Pollution Discharge Elimination System (NPDES) substantive requirements.

Closure Plan: CBS will submit to U.S.EPA for review and approval a plan for the closure of the portions of the site relating to OU2. The closure plan shall detail closure activities, post-closure activities and schedules of implementation. In the event that U.S.EPA rejects the proposed closure plan or conditionally approves the plan, CBS may challenge U.S.EPA’s decision under Section XXIV, Dispute Resolution of the Original Consent Decree on the
grounds that U.S.EPA’s decision is arbitrary and capricious or otherwise not in accordance with law.

**Institutional Controls (ICs) Plan:** CBS will submit an Institutional Controls Work Plan for review and approval by U.S.EPA that includes the following:

- A map that identifies the current boundaries of the restricted areas, boundaries of the site, property ownership, streets, easements, encumbrances, assessor’s parcel number or other recorded plat or survey information.
- A legal description of each restricted area prepared according to current ALTA Survey guidelines.
- Draft restrictive covenants and easements for the restricted areas that are enforceable under the laws of the State of Indiana and are substantially in the form set forth in Attachment A.
- A current title insurance commitment in the form of ALTA Commitment form -1982 (as amended) from a title company, which shows title to the restricted areas to be free and clear of all prior liens and encumbrances.
- Copies of encumbrances referenced in the title commitment. Identification of encumbrances that negatively impact the restricted areas. Copies of requests for subrogation agreements for such encumbrances. Identify the encumbrances on paper and maps that depict parcel numbers and the area impacted by the encumbrance.

**Long-term Groundwater Monitoring Plan:** CBS will submit to U.S.EPA a plan for the long-term groundwater monitoring of the site after all active remedial measures have been installed. The plan will detail the methods to ensure compliance with performance measures and to determine when the shutdown criteria have been satisfied.

7. **Project Organization**

The project management of all CBS activities will be performed by the CBS Bloomington Project organization in Pittsburgh, PA. Project management will ensure that competent contractors are hired for all activities, will set schedules for all activities, will review all draft submittals and will provide overall coordination with U.S.EPA and other government entities.

At this time, contractors have been determined for near term phase 1 activities only. The CBS Bloomington Project organization will be responsible for drafting changes to the project specific QAPP, drafting the remedial design/remedial action work plan, and drafting the investigation plan to evaluate the impact of passive quarry drains and the impact of draining Ice Box Quarry.
PSARA technologies has been selected to draft the project specific health and safety plan, to perform the preliminary design for the Wedge Quarry passive drain, and to assist CBS in conducting the investigation of the effect of the quarry drains on spring/seep flows to Stout’s Creek.

Other contractors will be selected to perform project activities such as final designs and construction as the need arises to ensure compliance with the project schedules.

Government approval and oversight will be provided by U.S.EPA through the Region V office in Chicago. Other government entities expected to comment on project plans are the State of Indiana through the Department of Environmental Management, the City of Bloomington through the Utility Services Department, and the County of Monroe through the Health Department.

8. Project Schedule

The following schedule shall be followed unless the Parties mutually agree otherwise:

<table>
<thead>
<tr>
<th>Task</th>
<th>Completion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Draft Remedial Design/Remedial Action Work Plan</td>
<td>30 days after entry of Consent Decree Amendment</td>
</tr>
<tr>
<td>Final Remedial Design/Remedial Action Work Plan</td>
<td>30 days after receipt of comments from the government parties</td>
</tr>
<tr>
<td>Revised Draft Quality Assurance Project Plan</td>
<td>30 days after entry</td>
</tr>
<tr>
<td>Draft Health and Safety Plan</td>
<td></td>
</tr>
<tr>
<td>Final Quality Assurance Project Plan And Health and Safety Plan</td>
<td>30 days after receipt of comments from the government parties</td>
</tr>
<tr>
<td>Preliminary Design of Wedge Quarry Complex/Pit A Passive Quarry Drain</td>
<td>60 days after entry</td>
</tr>
<tr>
<td>Final Design of the Wedge Quarry Complex/Pit A Passive Quarry Drain</td>
<td>30 days after receipt of comments from the government parties</td>
</tr>
<tr>
<td>Draft Investigation Plan on the Impact on Springs and Seeps of the Passive Quarry Drain and Icebox Quarry Investigation</td>
<td>60 days after entry</td>
</tr>
<tr>
<td>Task</td>
<td>Timeframe</td>
</tr>
<tr>
<td>----------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Final Investigation Plan on the Impact on Springs and Seeps of the Passive Quarry Drain and Icebox Quarry Investigation</td>
<td>30 days after receipt of comments on the Draft Investigation Plan</td>
</tr>
<tr>
<td>Completion of Construction of the Passive Quarry Drain</td>
<td>60 days after approval of Final Design of Passive Quarry Drain</td>
</tr>
<tr>
<td>Complete Investigation of the Impact on Springs and Seeps of the Passive Quarry Drain and Icebox Quarry Investigation and submit report of results to U.S.EPA</td>
<td>12 months after complete construction of Passive Quarry Drain</td>
</tr>
<tr>
<td>Preliminary Design of Collection Trench and Treatment plant</td>
<td>30 days after Report on the Results of the Passive Quarry Drain/Icebox Quarry Investigation</td>
</tr>
<tr>
<td>Final Design of the Collection Trench and Treatment Plant</td>
<td>30 days after receipt of comments on the Preliminary Design</td>
</tr>
<tr>
<td>Completion of Construction of Collection Trench and Treatment Plant</td>
<td>26 months after entry</td>
</tr>
<tr>
<td>Draft Operation and Maintenance Plan</td>
<td>26 months after entry</td>
</tr>
<tr>
<td>Final Operation and Maintenance Plan</td>
<td>30 days after receipt of comments on the Draft Operation and Maintenance Plan</td>
</tr>
<tr>
<td>Revised Long-term Groundwater Monitoring Plan</td>
<td>26 months after entry</td>
</tr>
<tr>
<td>Institutional Controls Work Plan</td>
<td>25 months after entry</td>
</tr>
<tr>
<td>Completion of Institutional Controls</td>
<td>23 months after entry</td>
</tr>
<tr>
<td>Completion of Remedial Action Report</td>
<td>30 months after entry</td>
</tr>
</tbody>
</table>
Request for Certification of Completion of Work

Closure Plan

Within 90 days after Completion of Work concludes (including O+M) have been fully performed

Within 30 days after receipt of U.S.EPA's Certification of Completion of Work
9. References


CBS 2009a, “Amendment 9 to the Bloomington Project QAPP”, CBS August 2009


U.S. District Court 2009, “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


Viacom 2004 (b), “BD Dye Trace Update”, Email from D. Alke to CD Parties dated March 18, 2004

Viacom 2005b, "Bennett's Dump Buried Quarry Pump Down Results" Presented at a CD Party Meeting on August 9, 2005

Viacom 2007, "Report of Results Measuring Groundwater Seepage into Stout's Creek", Email from D. Alke to CD Parties Dated October, 11, 2007
Figures

Figure 1: General Site Location
Figure 2: Site Features
Figure 3: Passive Drain Concept
Figure 4: Collection Trench Concept
LEGEND

- CBSS Monitoring Wells
- Springs Location
- Hydrogeologic Unit Boundaries

Figure 4: Conceptual Approach for the Interceptor Trench and Water Treatment System

A Bennetts Dump — Bedrock Contours Cross-Section
Location Bloomington, Indiana

TECHNOLOGIES, INC

- Topographic Contours Contour Interval 2 feet

Drewn By: [Signature] Date: [Date]

80 Fig 4 — Interception Trench.dwg 08/20/09 — 03:22 prn TAJ: tajouii