



**UNITED STATES  
Environmental Protection Agency**

**Final Decision  
for  
Soil and Groundwater Remedy**

**at  
C&D Technologies, Inc.  
200 W. Main Street,  
Attica, Indiana**

**IND 000 810 754**

# UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

## Final Decision

January 2015

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## I. INTRODUCTION

The U.S. Environmental Protection Agency (EPA), Region 5 presents this Final Decision (FD) document for cleanup of contamination at the C&D Technologies, Inc. (C&D) facility located in Attica, Indiana, pursuant to the Resource Conservation and Recovery Act (RCRA) Section 3008(h).

This Final Decision selects the remedy to be implemented within the C&D facility and the Wabash River Bank area adjacent to the Facility. This document provides a summary of conditions found at and near the Facility, the risks posed by those conditions, remedy alternatives considered for response action and the selection of the final remedy to protect human health and the environment. Additional details relating to the Facility conditions, and the alternatives considered are available in the Statement of Basis (Attachment 1) issued by EPA in June 2013. The Statement of Basis, proposing remedies for the cleanup of contamination at the C&D Facility, was made available for public review and comment from June 24<sup>th</sup> to July 24<sup>th</sup> 2013. No comments were received from the public or the Site owner during or after the commenting period. The selected remedies have not been altered from those proposed in the Statement of Basis.

## II. FACILITY CONDITIONS AND RISK ASSESSMENT

### 1. Location and History

C&D owns and operates a battery manufacturing plant at 200 West Main Street in the City of Attica, Fountain County, Indiana. The Facility is located on approximately 12.5 acres in the north-northwestern portion of the city. The Wabash River borders the Facility on the west and northwest. Residential and commercial properties surround the remaining sides of the Facility (Figure 1 in Attachment 2). The Facility contains an active battery manufacturing area, a former land fill, and riverbank property along the Wabash River.

The Attica plant manufactures lead acid batteries for commercial, industrial and military applications. Manufacturing processes include casting or curing lead battery parts, pasting battery grids, plate processing, battery assembling, charging and finishing. Supporting operations at the Facility include material receiving, product shipment, quality control laboratory analysis, equipment maintenance, wastewater pretreatment and waste management.

## **2. Hydro-geological Setting**

The Facility is located in the Wabash River Valley, which is underlain by approximately 140 feet of unconsolidated deposits containing sand and gravel. The Facility's terrain slopes northwest toward the river. Groundwater that enters bedrock in the up-gradient areas east and southeast of the C&D facility flows in a northwest direction to its discharge point, the alluvium and ultimately the Wabash River. Groundwater production wells owned by the City of Attica are located approximately 300 to 400 feet to the southwest of the site.

## **3. Ecological Setting**

The Riverbank area is a narrow riparian area between the Site and the Wabash River that is characterized by large cottonwood, box elder, silver maple, mulberry and sycamore trees with a sparse understory of herbaceous vegetation (primarily grasses).

## **4. Corrective Action Process**

In January 2007, EPA Region 5 and C&D entered into a RCRA Section 3008(h) Corrective Action Order (Corrective Action Order) that required C&D to investigate and address all historic releases of hazardous waste and constituents at or from the site. C&D identified sixteen Solid Waste Management Units (SWMU) identified as areas of concern in the Current Conditions Report (CCR) (Clayton, 2006) based upon current and historical site uses, documented releases, and material management practices. Figure 2-1 in Attachment 2 shows the location of these areas in and around the Facility. C&D collected and analyzed groundwater, surface water, sediment, soil, sub-slab soil gas and indoor air samples.

The Indiana Department of Environmental Management (IDEM) has calculated Default Closure Levels (DCLs) to protect human health and the environment from contaminants present in industrial and residential settings. The residual contaminant levels below these DCLs do not pose an unacceptable risk to people or the environment if exposure to the contaminated media occurs through the following pathways:

- incidental ingestion;
- incidental dermal contact; and
- inhalation of dust/volatiles

The acceptable target risk level for the IDEM DCLs has been set at  $1 \times 10^{-5}$  excess cancer risk (meaning one in one hundred thousand persons may experience an additional lifetime cancer risk) and at a hazard quotient value of 1 for non-cancer health risks. These target levels are derived from a combination of default exposure parameters, chemical/physical properties of contaminants, toxicological data and other relevant criteria to evaluate the impact of chemicals on human health.

C&D investigated the extent of soil and groundwater contamination in and around the Facility (Figure 2-1 in Attachment 2) as required under the Corrective Action Order. C&D's RFI report identified chlorinated organic solvents and metals (lead and arsenic) contamination in the surface

soil and subsurface soil based on exceedances of the IDEM Industrial DCL (IDCL). The IDEM Residential DCL (RDCL) and IDCL are the relevant cleanup standards or remediation criteria for this Facility.

C&D performed human health and ecological risk evaluations using the RFI data it had collected in 2008 and 2009 from the Areas by:

- Characterizing the potential pathways of contaminant migration
- Identifying any actual or potential receptors (people, plants or animals)
- Gathering all data to support a risk and/or ecological assessment
- Gathering all necessary data to support the Corrective Measures Study

### **5. Interim Measures Taken**

Pursuant to the Corrective Action Order between EPA and C&D, C&D has investigated the Facility and offsite areas. C&D has not conducted any interim measures at the Facility.

### **6. Investigative Results**

The following tables and paragraphs describe the waste management areas, areas of concern and contaminants that remain in those areas at the site and the risks posed by those contaminants. Table 1 describes surface soil and subsurface soil contaminant concentrations found at the site with the relevant screening criteria. Based on the contaminant concentrations found and the corresponding screening criteria, C&D has determined that Areas of concern are 3, 4, 5, 7, 8, 9, 11, 15 and the Riverbank area. The table presents the maximum concentration in the surface soil (0-1 ft) and in the subsurface soil (4-5 ft below ground and deeper). With the exception of Areas 4 and 15, all sampling locations within the site were under concrete flooring. EPA believes that these areas of concern are the areas of the site where remediation is required.

**Table 1: Surface soil and subsurface soil contaminant concentration in comparison with major screening criteria in specific areas of concern**

Contaminant	Area	Soil Boring Location** (SB)	Maximum Concentration (mg/Kg)†	GW Protection Criteria (mg/Kg)	IDEM DCL (mg/Kg)
Arsenic	Area 3	SB-14 (0-1 ft)	31.7	5.9	16
Lead	Area 3	SB-13 (4-5 ft)	2040	270	970
TCE	Area 4	SB-21	31	0.036	20
Lead	Area 5	SB- 22 (0-1 ft)	7840	270	1300
Arsenic	Area 7	SB- 26 (4-5 ft)	25.7	5.9	430
Arsenic	Area 8	SB-31 (19-20 ft)	29.6	5.9	430
Lead	Area 8	SB-32 (19-20 ft)	1460	270	970
TCE	Area 9	Multiple surface/ subsurface soil locations	31	0.036	20
PCE	Area 9	Multiple surface/ subsurface soil locations	23	0.045	26
Lead	Area 11	SB-36 (0-1 ft)	2930	270	1300
Arsenic	Area 15	SB-52 (0-1 ft)	24.4	5.9	16
Lead	Area 15	SB-50 (4-5 ft)	1140	270	970
Lead	Riverbank Area	SB-59	5356	270	1940§
Zinc	Riverbank Area	SB-59	2190	N/A	1059§
Lead	Residential Yard	CD 403	350	270	400

\* Area – SWMU/Area of Concern \*\* SB-14 (0-1 ft) denotes soil boring number and depth below ground surface (bgs) † mg/Kg – milligram per kilogram §-Ecological Toxicity Reference Value N/A Not Available

## 7. Summary of Facility Risks

### (a) Human Health Risk

#### *i. Onsite Industrial Worker Exposure*

The following paragraphs examine the contaminated areas or “hotspots” at the Facility where industrial workers might be exposed to contaminants.

**Area 3:** The Lead Oxide Storage Silos and Tanker Truck Loading Operations Area which contain contaminated soil together comprise Area 3. The Arsenic concentration is elevated in the surface soil at location SB-14, and the Lead concentration is elevated at location SB-13. Therefore, C&D identified Area 3 as an area of concern with hotspots.

**Area 4:** This area refers to storm water sewers located along Area 9. C&D combined one selected location (CD-SB-21) of Area 4 storm water sewers with Area 9 to investigate vapor intrusion and evaluate the potential for preferential pathways. Please refer to the Area 9 discussion for additional information.

**Area 5:** Area 5 is a former hazardous waste materials storage Area. C&D identified the surface soil at location SB-22 in Area 5 as an area of concern due to lead contamination.

**Area 7:** Due to the historical use and storage of solvents in the poly mixing room, C&D analyzed this area for metals, VOCs and SVOCs. A sample taken at 4-5ft bgs contained 25.7 ppm arsenic below the IDEM DCL but above the groundwater protection criteria.

**Area 8:** C&D identified Area 8 as the former Drive up and Disposal Area. The maximum concentration of Arsenic and Lead in Area 8 is above the IDEM DCL and the groundwater protection criteria.

**Area 9:** C&D identified Area 9 using a 1948 fire insurance map. Area 9 was a former waste and dust storage room. Area 9 is now an interior room centered over an abandoned rail spur between two manufacturing Areas. C&D combined Area 9 and a selected location (CD-SB-21) of Area 4 storm water sewers for a vapor intrusion investigation to evaluate the potential for preferential pathways. Volatile Organic Chemicals (VOCs) such as Trichloroethylene (TCE) and Tetrachloroethylene (also known as Perchloroethylene or PCE) were found in shallow (top 5 feet) soils in Area 9 and 4; both are areas of concern and pose a potential risk for migration of PCE and TCE to groundwater and indoor vapor intrusion.

**Area 11:** Area 11 is a historical former container storage area that C&D identified as a SWMU since the historical material storage practices in this area are unknown. C&D identified Lead contamination at location SB-36 in area 11 at concentrations exceeding both the groundwater protection criteria and the IDEM DCL.

**Area 15:** Area 15 is the West Container Storage Area located at the western and northwestern perimeter of the Facility. The maximum concentration of Arsenic and lead exceeds the IDEM DCL and ground water protection in this area.

*ii. On-site Construction Worker Exposure to Subsurface Soil*

The maximum lead concentration at Area 3,5,8,11,15 and the Riverbank could pose an unacceptable risk to construction workers.

*iii. On-site Industrial Worker Exposure to Vapors in Indoor Air*

C&D evaluated the potential for industrial worker exposure to vapors arising from the contaminated soil in Area 9 and Area 4. The risk screening analysis showed that there are potential health risks due to an indoor air inhalation pathway from soil and sub-slab soil gas contaminated with TCE and PCE. C&D monitored the air and did not detect these chemicals in the indoor air. This indicates that, if PCE and TCE are present in soil vapor under the building, the concrete slab currently in place across Area 9 and Area 4 (SB-21) provides an adequate barrier to prevent vapor intrusion. However, under current or future conditions if the integrity of the concrete becomes compromised, the risks due to cancer and non-cancer health endpoints may become unacceptable due to PCE and TCE inhalation exposure. See Table 2 below for the estimated cancer and non-cancer hazard quotient.

**Table 2: Subsurface soil contamination at Area 9 and Area 4 evaluated for Indoor Air Inhalation Pathway**

Medium	Unit	TCE level	Potential Excess Cancer Risk***	HQ	IDEM IDCL *	PCE level	Potential Excess Cancer Risk***	HQ	IDEM IDCL *
Soil	mg/Kg	31	2.2x10 <sup>-5</sup>	1.55	0.036	23	0.2x 10 <sup>-6</sup>	0.05	0.045
Sub-slab Soil Gas	µg/m <sup>3</sup> **	89,000	2.9x10 <sup>-4</sup>	101	N/A	10,000	0.2x 10 <sup>-5</sup>	0.57	N/A
Indoor air	µg/m <sup>3</sup>	ND †	N/A ††	N/A	N/A	ND	N/A	N/A	N/A

\* IDEM IDCL for ground water Protection through migration from soil \*\* µg/m<sup>3</sup> - micrograms per cubic meter \*\*\* Based on IDEM 2012 Remediation Closure Guide. Default exposure parameters based on 25 year exposure to industrial land use , HQ – Non cancer hazard quotient † ND - Not Detected †† N/A - Not Applicable

*iv. Off-site Residential Exposure to Surface Soil*

C&D collected soil samples (from 0 to 1 ft below ground surface (bgs)) at twenty locations within commercial/industrial and residential areas north and east of the Facility to evaluate the airborne migration of lead dust downwind from the site. Figure 2-1 in Attachment 2 shows the off-site sample location areas. The maximum lead concentration of 770 mg/Kg in the industrial area did not exceed the IDEM IDCL of 970 mg/Kg. A maximum concentration of lead at 280 mg/Kg in the right-of-way at the residential area did not exceed the IDEM RDCL of 400 mg/Kg. Since the preliminary RFI investigation focused on right-of-way samples and not the actual residential lots, C&D conducted an additional offsite investigation for lead contamination in December 2011 at eleven residential properties adjoining the Facility.

Data from lead emissions collected from the stack were used to identify areas of potential lead impact in the neighborhood (through air dispersion model analysis. C&D selected eleven homes from the high concentration zone of the dispersion model and soil samples were collected from 0-2 inches and 2-6 inches below ground surface in different areas of the lawn. Of the eleven properties, two areas were identified as play areas for children.

The levels in the play area were below the IDEM RDCL of 400 mg/kg. The average lead concentration found at depth 0-2 inches at the properties tested ranged from 114 mg/kg to 350 mg/kg. Similarly, the average lead concentration found at depth 2-6 inches ranged from 109mg/kg to 340 mg/kg. Overall, levels found in off-site locations indicate that residents, including children, do not have unacceptable or significant risk due to exposure to lead in the soil.

C&D did not detect TCE and PCE vapors during testing of the indoor air in the on-site buildings. Since sampling indicated that the VOC contamination from C&D does not extend off-site, there is no reason for EPA to suspect that the indoor air of any residences might be contaminated with vapors.

*v. Off-site Recreational Receptor Exposure*

The level of lead in the riverbank soil exceeded IDEM RDCL of 400 mg/kg. C&D used a tiered risk-based approach to evaluate potential human health risks associated with recreational use. Using the Adult Lead Model (ALM) and Integrated Exposure Uptake BioKinetic (IEUBK) Model, C&D calculated that the average concentration of lead in the riverbank soil at 558 mg/kg did not pose an adverse impact to the health of children based on the limited exposure frequency assumptions associated with recreation. However, the risk to ecological receptors exceeded the acceptable ecological target limit.

*vi. Potential for soil contamination migration to groundwater*

The approximate depth to groundwater ranges between 30 and 40 ft bgs at the Facility. The low concentrations of TCE in soil at the 9-10 ft depth in Area 9, combined with water quality data from down gradient wells MW-1S, MW-2S, MW-4S, MW-6S and MW-7S, indicates that TCE has not migrated vertically beyond approximately the 5ft depth in Area 9. However, under current or future conditions, if the integrity of the concrete was compromised, potential migration of chlorinated solvents from soil to groundwater might occur. See Table 3 for the potential for contaminants migration from soil to ground water.

*vii. Resident and Water Department Worker Exposure to Groundwater*

Following the detection of trichloroethylene (TCE) in the City of Attica drinking water supply wells, C&D conducted ground water profiling at the Facility and up gradient of the Facility. Monitoring well data are presented in the Volatile Organic Chemical (VOC) Investigation Report (Clayton, 2006). Analytical results for groundwater samples collected from shallow wells MW-1S through MW-8S representing groundwater in December 2007, January 2008, and June 2008 at and down gradient of the Facility indicate that TCE is not present at concentrations greater than the maximum contaminant limit (MCL) (USEPA, 2003) and the IDEM Groundwater RDCL. As shown in Table 3, TCE was found in excess of the IDEM RDCL in MW-2 which is located up gradient of the Facility. The groundwater flow direction data and the VOC concentration data indicate that the Facility is not a source of the VOCs detected in the municipal wells. A Facility

up gradient of C&D facility appears responsible for the contamination of the municipal wells. The drinking water for the city is currently treated before distribution to the residents.

Monitoring Well 4S exceeded the IDEM RDCL for lead in one of the two rounds of sampling for inorganics that have occurred to date. The lead concentration in MW-4S showed a highest level of 22 µg/l exceeding the IDEM RDCL of 15 µg/l. About 20 samples were collected during the monitoring period of 2008 to 2010. The average concentration of lead during the monitoring period was reported to be 6 µg/l.

**Table 3: Ground Water Contamination in comparison with Major Screening Criteria**

Contaminant	Location	Maximum Concentration (µg/l)*	IDEM RDCL (µg/l)
TCE	MW -2	20	5
Lead	MW-4S	22	15

\* µg/l - micrograms per liter

*viii. Recreational Receptor Exposure to Sediment*

Arsenic at a maximum concentration of 5.2 mg/kg did not exceed the IDEM residential direct contact screening concentration of 5.5 mg/kg in the sediment.

**(b) Ecological Risk**

*Risk to mammals and terrestrial birds*

The Baseline Ecological Risk Assessment (BERA) conducted at the Facility identified two areas of interest relevant to the ecological risk evaluation: (1) the Wabash River, and (2) the Riverbank Area adjacent to the Wabash River. Based on the analytical results, Arsenic, Cadmium, Copper, Thallium, Tin and Zinc were identified as constituents of ecological interest (COEIs) in surface soils of the Riverbank Area. Through the BERA process, EPA did not identify any site-related COEIs in surface water or sediment in the Wabash River or in groundwater with the potential to discharge to the Wabash River. EPA summarized the risk for ecological receptors in Table 4.

**Table 4: Risk for Ecological Receptors in the Riverbank soil at Wabash River**

COEI	EPC 0-1 ft mg/kg*	Short tailed Shrew		American Robin	
		EEQ**NOAEL †	EEQLOAE ††	EEQNOAEL	EEQLOAE
Cadmium	11.5	7.7	5	4.4	2.8
Lead	5356	2.2	1.7	15	14
Tin	108	0.16	0.2	3.3	1.3
Zinc	2190	1.5	1.5	2.6	2.6
Thallium	1.55	2.8	0.3	0.5	0.5

\* EPC - Exposure Point Concentration \*\* EEQ - Environmental Effects Quotient

† NOAEL - No Observable Adverse Effect Level †† LOAEL - Lowest Observed Adverse Effect Level

EPA determined from the BERA that there are potential adverse ecological effects at the Riverbank soil due to the soil erosion or surface water run-off from the C&D facility. Table 5 provides the estimated hazard quotients for mammals and terrestrial animals after the installation of exposure barrier.

**Table 5: Estimated Risk for Ecological Receptors in the Riverbank soil at Wabash River after installation of barrier.**

COEI	EPC 0-1 ft mg/kg*	Short tailed Shrew		American Robin	
		EEQ**NOAEL†	EEQLOAEL††	EEQNOAEL	EEQLOAEL
Cadmium	1.09	1.2	0.8	0.7	0.4
Lead	965	0.5	0.4	3.3	3.0
Tin	12.8	0	0	0.4	0.2
Zinc	144	0.6	0.6	0.8	0.8
Thallium	1.08	1.9	0.2	0.4	0.4

\* EPC - Exposure Point Concentration \*\* EEQ - Environmental Effects Quotient

† NOAEL - No Observable Adverse Effect Level †† LOAEL - Lowest Observed Adverse Effect Level

### III. SCOPE OF CORRECTIVE ACTION

The Corrective Action Order required C&D to meet the short-term goals listed below by August 2008:

1. Control all current human exposures to contamination at or from the Facility. That is, C&D must establish controls so that significant or unacceptable exposures do not exist for all media known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above risk-based levels for which there are complete pathways between contamination and human receptors.
2. Stabilize migration of contaminated groundwater at or from the Facility. That is, C&D must stabilize the migration of all groundwater known or reasonably suspected to be contaminated with hazardous wastes or hazardous constituents above acceptable levels so that the groundwater remains within any existing areas of contamination as defined by monitoring locations designated at the time of the demonstration. In addition, any discharge of groundwater to surface water is either insignificant or currently acceptable according to an appropriate interim assessment. C&D must collect monitoring and measurement data in the future as necessary to verify the migration of any contaminated groundwater is stabilized.

In accordance with the Corrective Action Order, C&D submitted a RCRA Facility Investigation to demonstrate that the short-term goals (current conditions under control for human health and groundwater migration) had been achieved. In June 2009, EPA determined that these short term goals had been achieved (see Administrative Record, Item 7, URS 2009 RCRA Facility Investigation Part 2A Report: Additional Sampling and Analysis, C&D Technologies, Attica, IN).

EPA's long-term goals for the remedy being selected for final remedy selection are:

- Protecting human health and the environment;
- Attaining the applicable media (soil, water or air) cleanup standards;
- Controlling the sources of the releases to the extent practicable; and
- Managing all remediation waste in compliance with the applicable standards.

Returning usable groundwater to its maximum beneficial use wherever practical is a factor leading to the goal of protecting human health and the environment.

#### **IV. SUMMARY OF POTENTIAL REMEDY ALTERNATIVES**

EPA uses four threshold criteria and five balancing criteria to evaluate alternative remedies. Any alternative that fails to meet the four threshold criteria are screened out from further consideration. The five balancing criteria are used to identify the remedy that provides the best relative combination of attributes.

The four threshold criteria are:

1. Protection of Human Health and the Environment
2. Attain Media Cleanup Standards
3. Controlling the Sources of Releases
4. Compliance with Waste Management Standards

The five balancing criteria are:

1. Long-term Reliability and Effectiveness
2. Reduction of Toxicity, Mobility or Volume of Wastes
3. Short-term Effectiveness
4. Implementability
5. Cost

EPA's remedy decision includes consideration of several of the alternative components listed below. For example, EPA's selected remedy for a certain area might include excavation to a certain action level or covering contaminated soil with clean soil to block exposure pathways for routine industrial workers, but deeper contaminated soils might be left in place. So, another component of the remedy would involve implementing a health and safety plan to assure that construction workers would use the appropriate personal protective equipment when digging down into the deeper soils that remain contaminated. Some alternatives are best implemented for the entire site rather than for specific units or Areas, while other alternatives are best implemented for a specific unit or area only.

## 1. Site-wide Actions

EPA's long term goal is to remediate the contamination found at the Facility and to manage any unacceptable risk human health and the environment at or near the C&D facility. In order to manage the risk at the facility, the EPA has reviewed a number of actions that would reduce the current risk at the Facility. For each Area, a number of alternative approaches were assessed and those alternatives and their assessments are documented below. However, for all areas that require corrective action, C&D must take the following actions at the Facility:

### (a) Implement and Maintain Institutional Controls

C&D must implement enforceable institutional controls to conduct periodic monitoring and maintenance of exposure barriers, to restrict the current and future use of the property to industrial or commercial land use to make sure that human exposure pathways in the future will not be substantially different from the exposure pathways that were described in the studies and reports, which serve as the basis for EPA's proposed remedies. Within 90 days of completion of cleanup activities, C&D will record an EPA-approved environmental protection easement and declaration of restrictive covenants with the Fountain County Recorder of Deeds to restrict future land use and maintain exposure barrier at the areas identified and will provide that the State or EPA may enforce the covenant.

In addition, C&D must comply with its *Health and Safety Plan* to assure that industrial workers and construction workers are protected from unacceptable exposures unless they are using the appropriate personal protective equipment. An Operation and monitoring schedule will be established as part of the corrective action implementation plan to conduct soil vapor extraction operations and periodic monitoring and maintenance of exposure barriers. C&D must submit its *Health and Safety Plan* to EPA for approval within 90 days after EPA issues the *Final Decision*.

### (b) Financial Assurance

C&D will need adequate funds to cover the costs of the construction, as well as the operation, maintenance, and monitoring of the selected remedy. C&D must provide EPA-approved financial assurance in an amount sufficient to cover the cost of the cleanup within 90 days after EPA selects the remedy and issues its *Final Decision* document. C&D may demonstrate the adequacy of its financial assurance by using mechanisms that comply with EPA regulations at 40 Code of Federal Regulation 265 or 264 Subpart F. Those financial assurance mechanisms include financial trusts, surety bonds, letters of credit, insurance, or self-insurance as demonstrated by a financial test. After successfully completing the construction and annually during the operation and maintenance phase of the remedy, C&D may request that the amount of the financial assurance be reduced, consistent with the work accomplished and the remaining work to be completed.

In the bullet point paragraphs below, EPA summarizes the potential remedy alternatives evaluated by C&D to address the onsite soil and the offsite Riverbank Area. A more detailed discussion of the alternatives is in C&D's revised CMS Report dated February 22, 2010. See

Administrative Record, Item 14, URS 2010. Corrective Measures Proposal. C&D Technologies, Attica, IN. February 22, 2010.

## 2. Specific Area Actions

### (a) Area 7 Remedial Alternatives (Poly-Mixing Room Storage)

- i. **Alternative 1 - No Further Action:** EPA would not require C&D to conduct any remedial action at this area.
- ii. **Alternative 2 – Exposure barrier:** C&D will leave the concrete slab covering Area 7 in place. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the concrete slab.

### (b) Area 9 and Area 4 Remedial Alternatives (Former Waste and Dust Storage and Storm Sewer SB-21)

- i. **Alternative 1 - No Further Action:** EPA would not require C&D to conduct any remedial action; C&D will leave the concrete slab covering Area 9 in place.
- ii. **Alternative 2 - Excavation and Offsite Disposal of Contaminated Soil:** C&D will leave soils contaminated with PCE and TCE beneath active manufacturing areas in place. C&D will excavate accessible soil to a depth of five feet below ground surface. C&D estimated the volume of soil removed to be approximately 231 cubic yards. C&D will dispose of the excavated soil off site at an EPA approved landfill.
- iii. **Alternative 3 - Soil Vapor Extraction (SVE):** C&D will use this *in-situ* remedial technology to reduce concentrations of VOCs adsorbed to soils in the unsaturated (vadose) zone. The SVE system will utilize three extraction wells screened across the shallow contaminated zone to maximize soil vapor collection. C&D estimated that a 20ft effective radius of influence will be around each SVE well. The extracted vapors from each SVE well would be released in to the atmosphere without treatment. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the concrete foundation slab.
- iv. **Alternative 4 - Soil Vapor Extraction (SVE) with off-gas treatment:** C&D will use this *in-situ* remedial technology to reduce concentrations of VOCs adsorbed to soils in the unsaturated (vadose) zone. The SVE system will utilize three extraction wells screened across the shallow contaminated zone to maximize soil vapor collection. A 20 ft effective radius of influence is estimated around each SVE well. C&D will treat the extracted vapors discharged over time with an appropriate vapor treatment system (activated carbon) before discharging to the atmosphere. With the exception of well installation, C&D will not modify the existing concrete foundation slab in Area 9 since the slab will continue to serve as the cap. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the concrete foundation slab.

- v. **Alternative 5 - Excavation and Off-site Disposal and SVE:** With this alternative, C&D will excavate contaminated soil from the outdoor alleyway and dispose of the soil off-site at an EPA approved landfill. C&D will backfill the excavated area with clean fill and restore the area to the pre-excavation condition. C&D will use a modified a SVE system to treat PCE and TCE contaminated soils that are not excavated from beneath the active manufacturing areas. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the concrete foundation slab.

**(c) Areas 3, 5 and 11 Remedial Alternative (Lead Oxide Storage Areas, Exterior Former Hazardous Waste Storage Area and Northeastern Former Container Storage Area)**

- i. **Alternative 1 - No Further Action:** EPA would not require C&D to conduct any remedial action to mitigate potential lead and Arsenic exposure from the surface soil to Facility workers.
- ii. **Alternative 2 - Exposure Barrier:** C&D will pave the currently unpaved surface areas at the Facility (most of the Facility's grounds are already paved with concrete). EPA requires C&D to pave the locations labeled SB -14, SB -21, SB -22 and SB-36, located in areas 3, 5 and 11, with concrete consistent with other paved areas at the Facility. The contaminants are of concern at the surface due to direct contact with Facility workers and migration potential to groundwater. Paving the surface would provide an exposure barrier for workers as well as prevent migration of soil contaminants to groundwater. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the concrete exposure barrier.

**(d) River Bank Area Remedial Alternatives**

- i. **Alternative 1 - No Further Action:** EPA would not require C&D to conduct a remedial action to mitigate potential Lead exposure ecological receptors.
- ii. **Alternative 2 - Immobilization and Exposure Barrier:** This alternative involves excavation of lead contaminated soil and on-site treatment (immobilization) with Triple Super Phosphate (TSP). C&D will place treated soil back in the excavation footprint and cover the soil with an exposure barrier. C&D will construct the exposure barrier with a permeable geo-textile fabric covered with appropriately sized riprap. Such a measure will aid in bank stabilization and erosion control. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the geo-textile exposure barrier.
- iii. **Alternative 3 - On-Site Treatment and Off-Site Disposal with Exposure Barriers:** This alternative involves excavation of lead contaminated soil, on-site treatment (immobilization), and off-site disposal at an EPA approved landfill. The C&D

selected excavation area covers 800 square feet. Approximately 30 cubic yards of contaminated soil will be removed for off-site disposal.

- iv. **Alternative 4 - Exposure Barrier:** This alternative involves construction of an exposure barrier to contain and isolate lead-contaminated soils associated with CD-SB-59. C&D will construct the exposure barrier to cover approximately 800 square feet of the Riverbank Area. C&D will construct the cap using a permeable geo-textile fabric overlain with riprap. As established by an approved and enforceable institutional control, C&D will conduct routine monitoring and will maintain the integrity of the geo-textile exposure barrier.

## V. SELECTED REMEDIES

The EPA selects the following corrective measures as the remedies to address soil and groundwater in identified areas of contamination and directs C&D to implement them.

### 1. Area 7

EPA's selected remedy for Area 7 is C&D to conduct routine inspection and maintenance in accordance with an approved and enforceable institutional control to ensure the integrity of the existing concrete flooring in Area 7 that is acting as an exposure barrier for Arsenic contamination. In the event the existing surface covers are removed, the use restrictions would require either replacement of the barrier or excavation and disposal of soil with contaminant concentrations above industrial cleanup standards.

### 2. Area 9 and 4

EPA's selected remedy for Area 9 and 4 is SVE and capping with off- gas Treatment (Alternative 4). C&D will use *in-situ* remediation technology to reduce PCE and TCE concentration in the soil underneath the manufacturing building. Approximately 2.4 to 5 pounds of PCE and 8 to 16 pounds of TCE are present in the subsurface soil in Area 9 and 4. The SVE system will utilize three extraction wells screened across the shallow contaminated zone to maximize soil vapor collection (Figure 3-3 in Attachment 2). Treatment will continue until the soil vapor levels do not exceed the IDEM IDCL of 880  $\mu\text{g}/\text{m}^3$  of TCE. The PCE level in the soil gas is already below the IDEM IDCL of 17,500  $\mu\text{g}/\text{m}^3$ . C&D will treat the extracted vapor if necessary (based on the nature, concentration, and total mass discharged over time) with an appropriate vapor treatment system (activated carbon) before discharging to the atmosphere.

With the exception of well installation, C&D will not modify the existing concrete foundation slab in Area 9 so that the existing slab will continue to serve as the cap. During system operation, C&D will monitor influent soil gas vapor concentrations on a routine basis. C&D will pave areas where surface soil contamination exceeds the IDEM groundwater protection criteria. The paved area would act as an exposure barrier to workers and limit infiltration of precipitation into the subsurface. The selected remedy also requires routine inspection and maintenance of the

exposure barrier to ensure the integrity of the concrete slab foundation and pavement in Area 9 that is acting as an exposure barrier for remaining contamination.

### **3. Area 3, 5 and 11**

EPA's selected remedy for the areas of concern in Area 3, 5 and 11 is capping with concrete (Alternative 2). The contaminants of concern are at the surface, posing a direct contact threat to Facility workers and potential for migration to groundwater. Paving the surface will provide an exposure barrier for workers, as well as prevent migration of soil contaminants to groundwater. EPA's selected remedy requires C&D to conduct routine inspection and maintenance to ensure the integrity of the concrete and pavement in Areas 3, 5, and 11 that is acting as an exposure barrier for remaining contamination.

### **4. Riverbank**

EPA's selected remedy for the Riverbank Area is construction of an exposure barrier (Alternative 4). This barrier will have minimal impact to the native soils and will help stabilize the stream bank and prevent erosion. Prior to construction, C&D will remove the understory vegetation and visible surface debris from the work area. Since mature trees are present within the footprint of the exposure barrier, C&D will cut and fit the geo-textile around the base of each tree. Riprap will be placed over the geo-textile fabric. Riprap will be sized based on the velocity of the Wabash River during flood stage. During installation, soil will be trenched along the hill side at the base of the work area to provide a base and reduce the potential for erosion during the flood events. In addition, riprap on the upstream and downstream sides of the exposure barrier will also be keyed in to prevent dislodging. C&D will conduct routine inspections of the exposure barrier after heavy rain or flood events. EPA's selected remedy requires routine inspection and maintenance to ensure the integrity of the geotextile and riprap exposure barrier.

### **5. Groundwater Monitoring**

At this Facility, C&D must monitor the groundwater contamination for metals at MW-4S to make sure that the contaminant levels do not increase, or cause any harm to surface waters. Monitoring will continue until the lead level in groundwater does not exceed the IDEM RDCL for two consecutive rounds six months apart. C&D may request EPA approval to discontinue the groundwater monitoring if/when the IDEM DCLs have been met.

### **6. Deed Restriction**

C&D must file a deed restriction for the site within 90 days of completion of cleanup activities. The following three part statement should be recorded in the deed restriction:

- (a) The site has received a cleanup approval from EPA for a risk-based hazardous waste cleanup under the RCRA Corrective Action Program. Final Remedy Decisions for the Site establish institutional controls for the property that include industrial and commercial land use restrictions to the property.

- (b) The cap in the identified locations serves as protective barrier to prevent direct human contact and must be maintained in accordance with the Final Remedies selected for the Site. The Deed must include a map of the site that shows the types and locations of the engineered barriers at the property and the Riverbank area.
- (c) The subsurface soil beneath the cap with lead and Arsenic will have to be remediated if the protective barriers are removed and not immediately replaced.

The EPA believes that the chosen remedial measures can be readily implemented, will prevent exposure to human and ecological receptors, will reduce the toxicity and volume of on-site contaminants, and will minimize worker contact with contaminated soil. The selected remedial measures were chosen with consideration of the following balancing/evaluation criteria; long-term reliability and effectiveness; short-term effectiveness; ease of implementation; reduction of toxicity, mobility, and/or volume of chemicals of concern; cost; and public acceptance. Detailed analysis of each can be found in the Statement of Basis document included in the Administrative Record for the site.

## **VI. CORRECTIVE MEASURES IMPLEMENTATION WORK PLAN**

Within 90 days after EPA makes its final remedy selection, C&D must submit its corrective measures implementation work plan for EPA approval. This document will provide specific details about institutional controls, dust control, confirmation sampling, health and safety of remediation workers, etc., as necessary to implement the selected remedy. Within one year after selection of the final remedy, C&D must submit its operation and maintenance plan for EPA approval. C&D must periodically, but no less than annually, monitor and maintain as necessary the integrity of the any exposure barrier.

## **VII. PUBLIC PARTICIPATION ACTIVITIES**

For more detailed information on anything in this document, please refer to the C&D Statement of Basis found in Attachment 2 of this document and the Administrative Record located at the Attica Public Library and at the 7<sup>th</sup> floor of the Metcalfe building at 77 W. Jackson Blvd, Chicago. EPA held a 30-day public comment period to receive comments on the Statement of Basis, from June 24, 2013 to July 24<sup>th</sup>, 2013. A fact sheet summarizing the Statement of Basis along with a reference to the EPA webpage for the C&D site was mailed to the residents. The public was notified of this public comment period through "The Review Republican" newspaper. No comments were received from the Facility, City or the residents from Attica community.

## **VIII. ADMINISTRATIVE RECORD**

A copy of the Administrative Record for the selected remedy in this Final Decision response to Comments is available for review at the Attica Public Library, 305 S. Perry St, Attica, IN 47918 and at the 7<sup>th</sup> floor Records Center at EPA Region 5, 77 West Jackson Boulevard, Chicago, Illinois 60604 or through the internet at URL:  
<http://www.epa.gov/region5/cleanup/rera/edtechnologies/index.html>

An index to the Administrative Record is provided in Attachment 1.

## IX. CORRECTIVE ACTION COMPLETION DETERMINATION

Once C&D believes it has met its corrective measures obligations, it may submit a request with supporting information to EPA Region 5 for a corrective action complete determination (CACD). After receipt of this request, EPA may issue a CACD based on the content and completeness of information provided by C&D, EPA guidance, and the terms of this FD (which supplements the 2009 AOC referenced above). The facility's request should include a written explanation and supporting documentation demonstrating that the Facility satisfies the criteria for the CAC determination, based on information outlined in the February 23, 2005, EPA guidance on CACD; the selected measures, contaminant cleanup goals and criteria, and other conditions specified in the 2009 AOC supplemented by and implementing this FR. At a minimum, the Facility's CACD request must: 1) demonstrate that construction activities are complete, 2) demonstrate that all required institutional controls have been implemented, 3) demonstrate that the cleanup goals and objectives have been achieved for obtaining a CACD and 4) where FD provided for any post-CACD remedial activities such as continuing an soil vapor extraction system or groundwater monitoring, a) identify criteria and standards that would either confirm that these long term remedial activities are functioning as intended, or would be the basis for additional work, and b) identify the criteria for satisfaction and termination of these post-CACD activities.

## X. DECLARATION

Based on the information in this Final Decision document and the Administrative Record compiled for this corrective action at the C&D facility in Attica, IN, EPA has determined that the selected remedies for the C&D facility is appropriate and is protective of human health and the environment.

  
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Margaret M. Guerriero, Director  
Land and Chemicals Division  
U. S. Environmental Protection Agency

April 1, 2015  
Date

Attachment 1

## Administrative Record Index

C&D Technologies, Inc.

Attica, IN

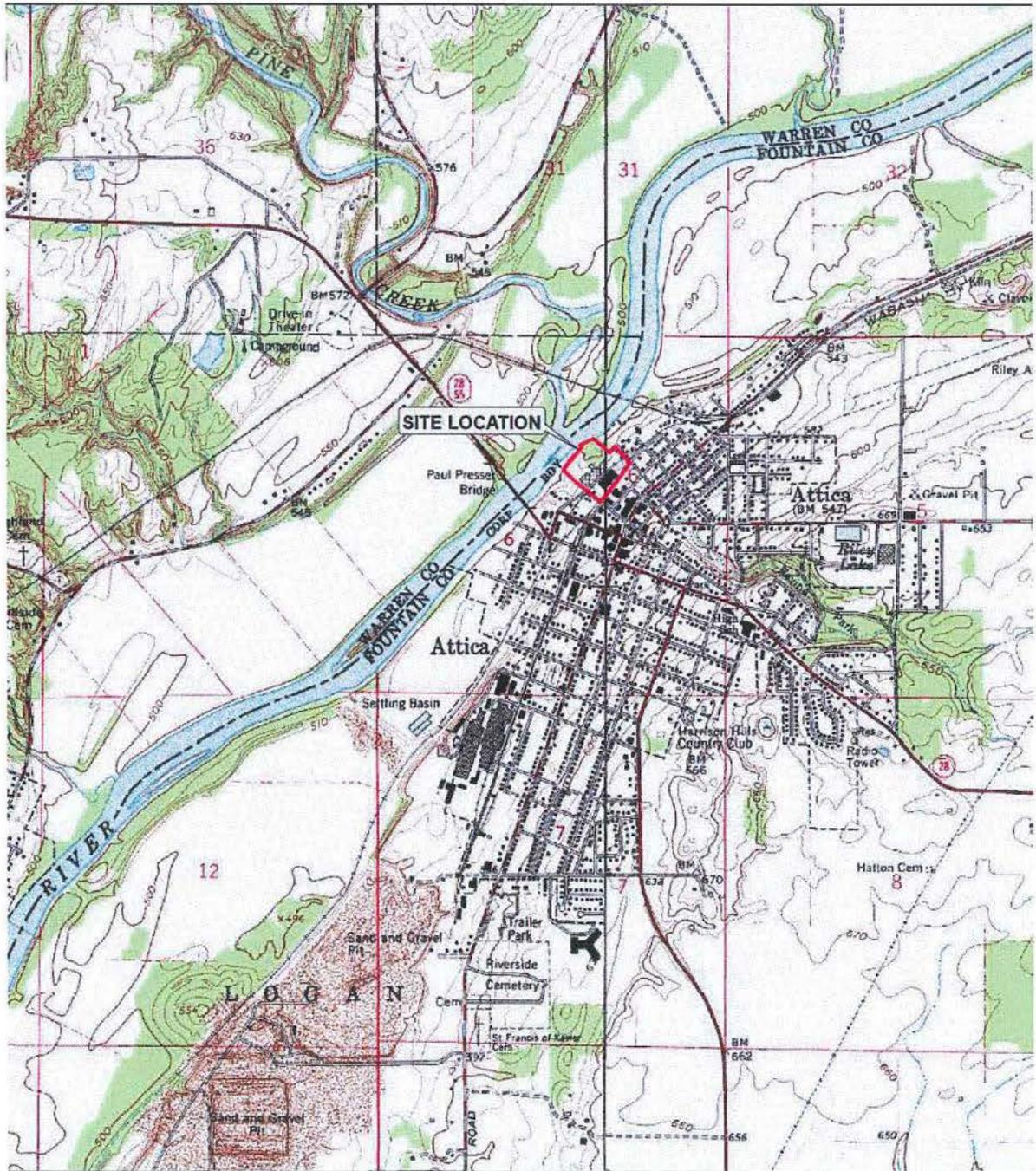
IND 000 810 754

	Date:	To:	From:	Format:	Subject:
1	October 12, 1990	USEPA	Ecology & Environment, Inc.	Report	PA/VSI Screening site Inspection for Eltra Corporation C&D Batteries Division, Attica, IN
2	February 25, 2003	Public	USEPA	Report	Final Guidance on Completion of Corrective Action Activities at RCRA Facilities, 68 Fed. Reg. 8757 (Feb. 25, 2003)
3	March 1, 2007	USEPA	Clayton Group Services, Inc.	Report	Current Conditions Report, C&D Technologies, Attica, IN
4	January 18, 2007	C&D Technologies	USEPA	Administrative Order on Consent	Administrative Order on Consent under RCRA 3008(h) between USEPA and C&D Technologies, Attica, IN, Docket #RCRA-05-2007-0003
5	September 25, 2007	USEPA	URS Corporation	Report	RCRA Facility Investigation Work Plan, C&D Technologies, Attica, IN
6	November 1, 2007	USEPA	URS Corporation	Report	RCRA Facility Investigation Work Plan Addendum C&D Technologies, Attica, IN
7	October 30, 2008	USEPA	URS Corporation	Report	RCRA Facility Investigation at C&D Technologies, Attica, IN. Part 1 Report
8	June 5, 2009	USEPA	URS Corporation	Report	RCRA Facility Investigation at C&D Technologies, Attica, IN. Additional sampling and Analysis, Part 2A Report
9	June 5, 2009	USEPA	URS Corporation	Report	RCRA Facility Investigation at C&D Technologies, Attica, IN. Baseline Ecological Assessment

	Date:	To:	From:	Format:	Subject:
10	July 28, 2009	USEPA	URS Corporation	Report	RCRA Facility Investigation at C&D Technologies, Attica, IN. Vapor Intrusion Evaluation Work Plan
11	October 26, 2009	USEPA	URS Corporation	Report	Baseline Ecological Assessment Addendum for C&D Technologies, Attica, IN
12	November 2, 2009	USEPA	URS Corporation	Report	RCRA Facility Investigation at C&D Technologies, Attica, IN. Vapor Intrusion Evaluation
13	July 30, 2008	USEPA	URS Corporation	Report	Current Human Exposures Under Control at C&D Technologies, Attica, IN
14	July 30, 2008	USEPA	URS Corporation	Report	Migration of Contaminated Groundwater Under Control at C&D Technologies, Attica, IN
15	February 22, 2010	USEPA	URS Corporation	Report	Corrective Measures Proposal for C&D Technologies, Attica, IN
16	February 10, 2012	USEPA	URS Corporation	Report	RFI Results of Off-site supplemental lead investigation at C&D Technologies, Attica, IN
17	June 24, 2013	Public	USEPA	Report	Statement of Basis for the Proposed Remedy at C&D Technologies, Attica, IN
18	June 24, 2013	Public	USEPA	Report	Statement of Basis Factsheet for the Proposed Remedy at C&D Technologies, Attica, IN
19	Quarterly 2007-2010	USEPA	C&D Technologies	Reports	Quarterly Progress Reports

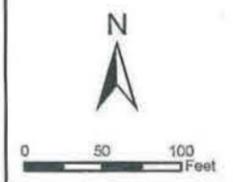
Attachment 2

Figure 1: C&D Facility Location Map



- Legend**
- Monitoring Well
  - Soil Boring
  - Railroad
  - Property Boundary (approximate)
  - SWMU/AOC Boundary

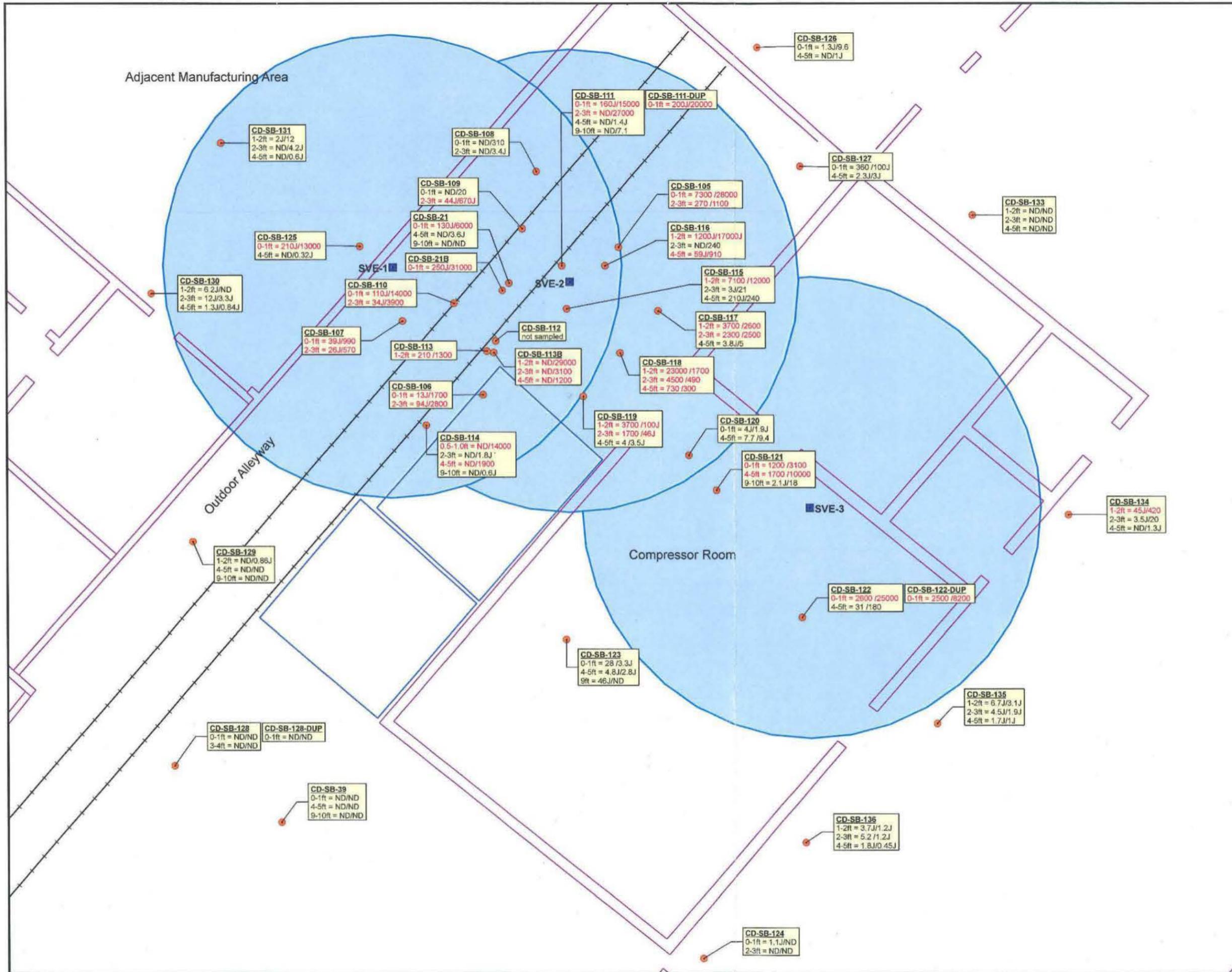
- SWMU/AOCs**
- 1 - Wastewater pre-treatment plant
  - 2 - Current/former acid lofts
  - 3 - Lead oxide storage silos
  - 4 - Storm water sewers (not shown)
  - 5 - Exterior former hazardous material storage area
  - 6 - Exterior former drum storage area and transfer pad
  - 7 - Poly-mixing room
  - 8 - Historical drive-up disposal area
  - 9 - Historical former waste and dust storage room
  - 10 - Southwest historical former container storage area
  - 11 - Northeastern historical former container storage area
  - 12 - Central vacuum systems
  - 13 - Former oxide mill area
  - 14 - Former onsite filling station
  - 15 - West container storage area
  - 16 - Former DC Generators Location



**Figure 2-1**  
**SWMU/AOCs, Monitoring Wells and Soil Sample Locations**

C & D Technologies, Inc.  
 200 West Main Street  
 Attica, Indiana

Drawn By:	Projection:
RL	UTM, Zone 16N, NAD83, Meters
Checked By:	Source(s):
PR	Indiana Spatial Data Portal - 2005 aerial

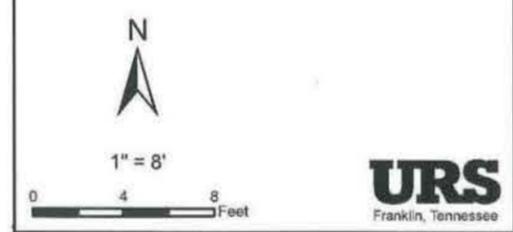


- Legend**
- 3.7/0.1 = PCE/TCE (ug/kg)
  - Proposed SVE Well Location
  - Soil Sample Location
  - Abandoned Railroad
  - Outside Equipment
  - Building/Wall
  - Interpreted SVE Radius of Influence

**Note(s):**

- 1.) Sample locations are approximate.
- 2.) ND = not detected
- 3.) Red text denotes PCE concentrations exceeding 640 ug/kg and/or TCE concentrations exceeding 350 ug/kg. (IDEM Direct Closure Levels for Migration to Groundwater).

**CD-SS-DATE-R-005:**  
 CD = C&D Technologies  
 SS = Sub-Slab  
 IA = Indoor Air  
 AA = Ambient Air (outside)  
 DATE = Sample Collection Date  
 R = Routine  
 005 = Sample Number



**Figure 3-3**  
**Alternative 4 -**  
**Area 9 SVE & Capping**

C & D Technologies, Inc.  
 200 West Main Street  
 Attica, Indiana

Drawn By:	Projection:
RL	UTM, Zone 16N, NAD83, Meters
Checked By:	Source(s):
JW	URS Corporation