DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION

Interim Final 2/5/99

RCRA Corrective Action
Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Facility Name:	**C & D Technologies, Inc**
Facility Address:	**200 West Main St, Attica, IN**
Facility EPA ID #:	**IND 000 810 754**

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMU), Regulated Units (RU), and Areas of Concern (AOC)), been considered in this EI determination?

_X_ If yes - check here and continue with #2 below.

____ If no - re-evaluate existing data, or

____ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

RCRA Corrective Action activities at the C&D Technologies, Inc. (C&D) Attica facility are performed under an Administrative Order of Consent issued by the U.S.EPA, Region 5. The Order states that C&D must identify and define the nature and extent of releases of hazardous constituents at or from the facility. Currently 15 solid waste management units (SWMUs) and areas of concern (AOCs) are to be further evaluated as part of the RFI.

The C&D Attica facility is located at 200 West Main Street in Attica, Indiana along the eastern bank of the Wabash River (see ***Figure 1****). The land use surrounding the facility is industrial, commercial, and residential with the Attica Wellhead Protection Area located southwest of the facility along the Wabash River. The Facility is bounded on the southeast by Third Street; to the southwest by Main Street; the Wabash River to the northwest; and is located in a mixed area of industrial, commercial, and residential use.*

The C&D facility manufactures lead acid batteries for commercial, industrial, and military applications. Manufacturing processes include casting / curing lead battery parts, pasting battery grids, plate processing, battery assembling, charging and finishing. The facility is partially enclosed with chain-link fencing and occupies approximately 12.5 acres. Building walls form entry barriers elsewhere.

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental Indicators (EI) are measures being used by the RCRA Corrective Action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EI developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

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Environmental Indicator (EI) RCRIS code (CA750)

Migration of Contaminated Groundwater Under Control

Relationship of EI to Final Remedies

While Final remedies remain the long-term objective of the RCRA Corrective Action program the EI are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI Determinations status codes should remain in RCRIS national database ONLY as long as they remain true (i.e., RCRIS status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is **groundwater** known or reasonably suspected to be **"contaminated"**[i] above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA Corrective Action, anywhere at, or from, the facility?

_X_ If yes - continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

_____ If no - skip to #8 and enter "YE" status rode, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

_____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): *See Attachment*

Key contaminants identified are trichloroethylene (TCE), bis(2-ethylhexyl)phthalate (BEHP), lead, and arsenic. The appropriately protective levels used for comparison purposes are the Indiana Department of Environmental Management (IDEM) Residential Default Closure Levels (RDCLs) that are provided as part of IDEM's Risk Integrated System of Closure (RISC). Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established. Also, Indiana Surface Water Quality Standards (SWQS) (or if unavailable, EPA Region 5 ecological screening levels) are considered with respect to potential surface water impacts.

TCE has been detected in deeper monitoring wells MW-1 and MW-2 in the two most recent sampling events (December 2007-January 2008 and June 2008) at maximum concentrations of 7.3 and 20 micrograms per liter (ug/L), respectively. The IDEM RDCL for TCE is 5.0 ug/L. The source of TCE is not C&D Technologies; it is from the upgradient source (RMC site).

BEHP was detected in several June 2008 groundwater samples at the 0.98 to 1.3 ug/L range, as compared to the RDCL of 6 ug/L. BEHP is listed in the National Functional Guidelines as a common lab and field containment, and all detected values are below the quantitation limit of 2 ug/L. BEHP is considered in the evaluation of groundwater discharge to surface water, due to the EPA Region 5 ecological screening level of 0.3 ug/L.

Lead was detected in one June 2008 groundwater sample from MW-4S at a concentration of 22.2 ug/L, which exceeds the RDCL for lead of 15 ug/L, and the surface water screening value of 6.7 ug/L. Barium was detected in the same sample at a concentration of 225 ug/L, which exceeds the surface water screening value of 220 ug/L.

Arsenic was detected in most all groundwater samples (including background wells MW-3 and MW-3S) at concentrations of 0.69 ug/L to 7.6 ug/L. This value is less than the RDCL of 10 ug/L. The IDEM SWQS for arsenic is 0.175 ug/L (human health criterion continuous concentration outside of the mixing zone). Therefore, arsenic is considered in the evaluation of groundwater discharge to surface water.

Additional documentation, data tables, and figures are included in the Attachment to this document.

Footnotes:

[i] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

3. Has the migration of contaminated groundwater stabilized (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

X If yes - continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"[2]) - skip to #8 and enter "NO" status code, after providing an explanation.

____ If unknown - skip to #8 and enter "IN" status code.

Rationale and Reference(s): *See Attachment*

Concentrations of identified groundwater contaminants have remained consistent since the original VOC Investigation Report (Clayton 2006). Additional documentation including data tables and figures are included in the Attachment to this document.

[2] "existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring. Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

X If yes - continue after identifying potentially affected surface water bodies.

____ If no - skip to #7 (and enter a "YE" status code in #8, if #7 yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

____ If unknown - skip to #8 and enter "IN" status code.
Rationale and Reference(s):

Rationale and Reference(s): *See Attachment*

Groundwater discharges to the Wabash River. Additional documentation including data tables and figures are provided in the Attachment to this document.

5. Is the discharge of "contaminated" groundwater into surface water likely to be "insignificant" (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

X If yes - skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

____ If no - (the discharge of "contaminated" groundwater into surface water is potentially significant) - continue after documenting: 1) the maximum known or reasonably suspected concentration[3] of each contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

____ If unknown - enter "IN" status code in #8.

Rationale and Reference(s): *See Attachment*

The maximum known concentration of TCE detected in site groundwater is 20 ug/L, which is less than ten times the RDCL for TCE of 5 ug/L (10 x 5 ug/L = 50 ug/L). C&D is not the source of the TCE detected in deeper groundwater wells on-site. The maximum concentration of BEHP was 1.3 ug/L, which is less than the RDCL for BDHP of 6 ug/L, but greater than the EPA Region 5 surface water ecological screening value of 0.3 ug/L. However, BEHP is listed as a common lab and field contaminant. BEHP was also detected in the background river water sample at 2.4 ug/L (see ***Table 4****). Therefore, the discharge is not having unacceptable impacts to the river.*

The maximum known concentration of lead detected was 22.2 ug/L, which is less the ten times the RDCL of (10 x 15 ug/L = 150 ug/L). Additionally, the concentration of lead detected was also below ten times the more stringent IDEM Surface Water Quality Standard for ecological receptors of 6.7 ug/L (IDEM 327 IAC 2-1-6). Barium at 225 ug/L in one sample slightly exceeded its surface water screening value of 220 ug/L, and therefore is much less than ten times the screening value (= 2,220 ug/L).

The maximum known concentration of arsenic detected in site groundwater is 7.6 ug/L (collected at MW-4S in December 2007), which is more than ten times the IDEM Surface Water Quality Standard of 0.175 ug/L. However, the background surface water sample shows that the river water contains 2.6 ug/L arsenic, and background groundwater (MW-3S) contained 1.5 ug/L (December 2007) and 3.9 ug/L (June 2008) of arsenic. Therefore, the discharge of groundwater containing arsenic above the IDEM SWQS is not having unacceptable impacts to the river. Further, the arsenic concentrations detected in site monitoring wells in December 2007-January 2008 and June 2008 are stable. The concentration at well MW-4S was 4.2 ug/L in the June 2008 sampling event, versus 7.6 ug/L in December 2007.

Additional documentation including data tables and figures are in the Attachment to this document.

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

6. Can the discharge of "contaminated" groundwater into surface water be shown to be "currently acceptable" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes - continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim- assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

_____ If no - (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**") - skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown - skip to 8 and enter "IN" status code.

Rationale and Reference(s): *See #5 and skip to #7.*

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or CCO-systems.

7. Will groundwater monitoring / measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

_X_ If yes – continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

____ If no - enter "NO" status code in #8.

____ If unknown - enter "IN" status code in #8.

Rationale and
Reference(s):

Additional groundwater monitoring will continue in accordance with the ongoing RCRA Corrective Action program including the RCRA Facility Investigation (RFI), Corrective Measures Study (CMS), RCRA Closure, and Post-closure (if necessary).

8. Check the appropriate RCM status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

   _X_ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at C & D Technologies, Inc. IND00810754 200 W. Main St, Attica, IN. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater." This determination will be reevaluated when the Agency becomes aware of significant changes at the facility.

   ____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

   ____ IN – More information is needed to make a determination.

U.S. EPA File Room 77
W. Jackson Blvd.
Chicago, IL 60604

Completed by (signature) _____ Date _____
(print) _____
(title) _____

Supervisor (signature) _____ Date _____
(print) _____
(title) _____

(EPA Region or State)

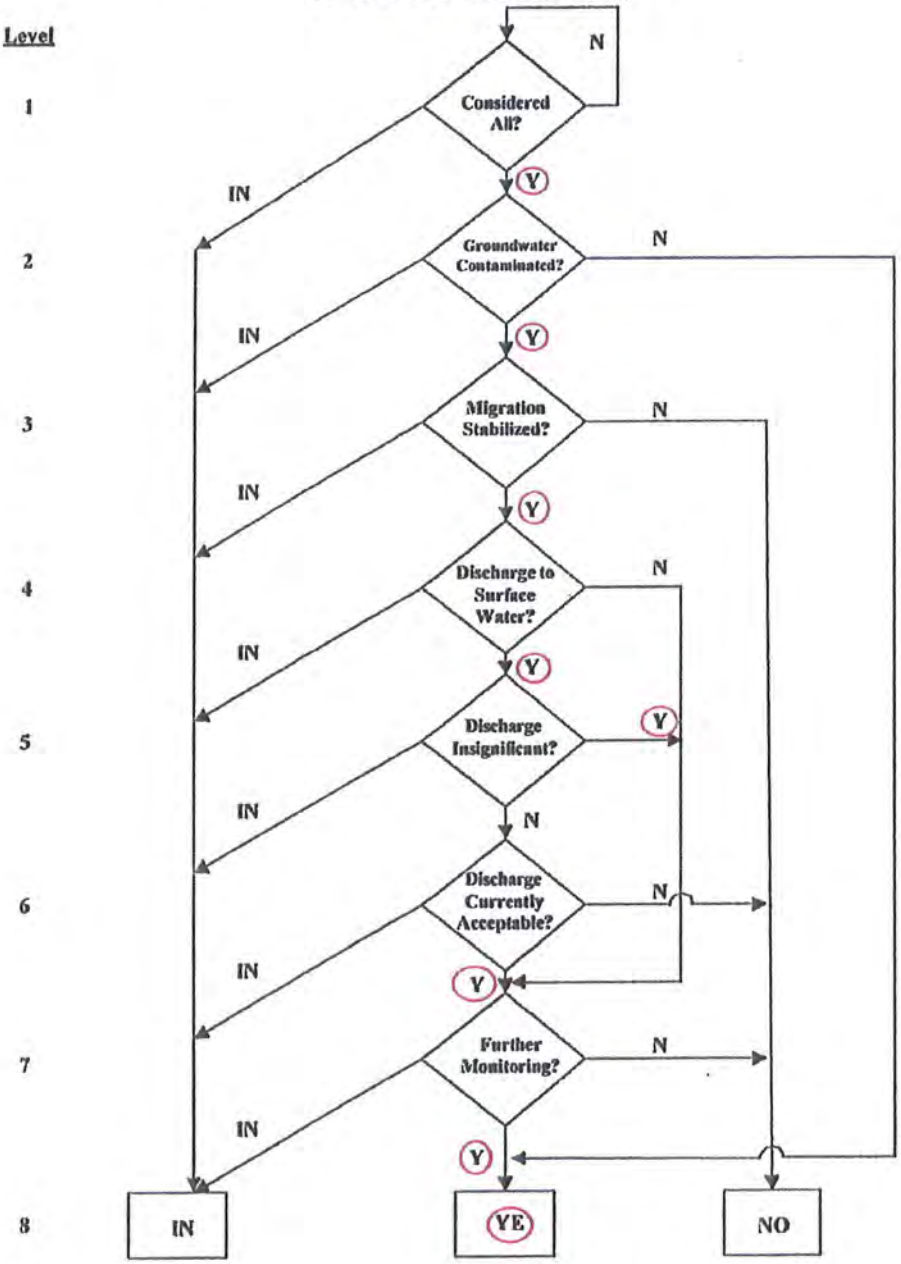
Locations where References may be found:

_____
_____
_____
_____
_____

Contact telephone and e-mail numbers
(name)_____
(phone #)_____
(e-mail)_____

Facility Name: C & D Technologies, Inc.
EPA ID#: IND000810754
City/State: Attica, IN

MIGRATION OF CONTAMINATED GROUNDWATER UNDER CONTROL (CA 750)



Attachment to:

Documentation of Environmental Indicator Determination
CA750 Migration of Contaminated Groundwater Under Control

C&D Technologies, Inc
200 West Main Street
Attica, Indiana
USEPA ID# IND 000 810 754

Regulatory Background

RCRA Corrective Action activities at the C&D Technologies, Inc. (C&D) Attica facility are performed under an Administrative Order of Consent issued by the U.S.EPA, Region 5. The Order states that C&D must identify and define the nature and extent of releases of hazardous constituents at or from the Facility. Currently 15 solid waste management units (SWMUs) and areas of concern (AOCs) are to be further evaluated as part of the RCRA Facility Investigation (RFI).

The Order requires C&D to demonstrate by July 30, 2008, through submitting an Environmental Indicators (EIs) Report that all current human exposures to contamination at or from the Facility are under control and migration of all contaminated groundwater at or from the Facility is stabilized.

Facility Location and Description

The C&D Attica facility is located at 200 West Main Street in Attica, Indiana along the eastern bank of the Wabash River (see **Figure 1**). The land use surrounding the facility is industrial, commercial, and residential with the Attica Wellhead Protection Area located southwest of the Facility along the Wabash River. The Facility is bounded on the southeast by Third Street; to the southwest by Main Street; the Wabash River to the northwest; and is located in a mixed area of industrial, commercial, and residential use.

The C&D facility is located approximately 3,000 feet west of the Radio Materials Corporation (RMC) site. The RMC site is located topographically and hydraulically up-gradient from the C&D facility. Waste management activities at the RMC site have resulted in soil and groundwater contamination by tetrachloroethene (PCE), trichloroethylene (TCE), and other organic contaminants. Groundwater contaminated with TCE and cis-1,2-dichloroethylene (cis-1,2-DCE), a biodegradation product of TCE, have been documented at offsite locations downgradient from the RMC site.

The C&D facility manufactures lead acid batteries for commercial, industrial, and military applications. Manufacturing processes include casting / curing lead battery parts, pasting battery grids, plate processing, battery assembling, charging and finishing. The facility is surrounded by chain-link fencing and occupies approximately 12.5 acres.

Physical Setting

The physical setting surrounding the C&D facility is characterized as the northwest border of the Tipton Till Plain physiographic province of Indiana. The Tipton Till plain is generally featureless, flat to gently-rolling plain, which is interrupted in places by very low-relief end moraines and extensive areas of ice disintegration features that resulted from the Wisconsinan glacial advancement. The border of the Tipton Till plain is marked by the Wabash River Valley, which is the principal feature beneath the facility (USDA, 2003).

Local Geology and Hydrogeology

The local geology consists of glacially derived unconsolidated sediments (alluvium) underlain by and in contact with steep bedrock valley walls that run approximately parallel to the Wabash River. The unconsolidated sediments consist of approximately 140 feet of sand and gravel, The underlying and adjacent bedrock consists of shale and sandstone with limestone that dips to the southwest (USGS, 1994). East of the facility lies the contact between the unconsolidated sediments and sandstone, shale, and siltstone bedrock units.

Water is produced from the sand and gravel of Pleistocene age that is overlain by till (USGS, 1994). The depth to groundwater at the site (as measured in three events in 2008) typically ranges from 15 to 20 feet below ground surface (bgs) in wells nearest the riverbank, and 20 to 30 feet bgs in wells away from the river. Groundwater flow in the alluvial aquifer is typically to the northwest toward the Wabash River. However, interaction between the alluvial aquifer and the Wabash River can impact the groundwater flow direction near the river, causing groundwater to flow subparallel to the river in a westerly direction.

Groundwater that enters bedrock in the up gradient areas east and southeast of the C&D facility (i.e., RMC site) flows in a northwest direction to its discharge point, the alluvium, and ultimately the Wabash River (IDEM, 1999). Groundwater flow in both the bedrock and alluvial aquifers is depicted on **Figure 1**.

Groundwater production wells owned by the City of Attica are located approximately 300-400 feet to the southwest of the C&D site. These wells are completed in the alluvial sand and gravel deposits along the east bank of the Wabash River at a depth of approximately 110 to 120 feet bgs. The RMC EI CA750 Documentation of EI Determination indicates that groundwater flow is influenced by these wells.

Depth to water (DTW) measurements were collected from C&D facility monitoring wells on January 9, March 25, and June 3, 2008. Water table elevations for each well were calculated from the DTW data and potentiometer contour maps were drawn to estimate the flow direction and gradient (see **Figures 2, 3, and 4**). All three maps depict a shallow gradient; however, the potentiometer contours from January 9 and June 3 indicate a groundwater flowing toward, but sub-parallel to the Wabash River. Potentiometer contours from March 25 indicate groundwater flow towards the Wabash River. This variation in flow direction is likely due to water table interaction with the river level at the time DTW was measured.

Groundwater Comparison Criteria

Groundwater sample data were compared to the Indiana Department of Environmental Management (IDEM) Residential Default Closure Levels (RDCLs) that are provided as part of IDEM's Risk Integrated System of Closures (RISC). The RDCLs represent appropriate and conservative comparison criteria. Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established. For contaminants where an MCL has not been established, the default closure level is the lowest of either the groundwater pathway or the solubility limit (IDEM RISC) criteria. Groundwater sample data were also compared to surface water criteria. For human health, comparison values were obtained preferentially from the Indiana Surface Water Quality Standards (SWQS) for human health outside the mixing zone. Secondarily, values were obtained from the National Ambient Water Quality Criteria for human health (organisms only). A similar approach was taken for evaluation of aquatic biota. Values were preferentially obtained from the Indiana chronic SWQS, and secondarily from chronic National Ambient Water Quality Criteria. If unavailable from either source, aquatic biota screening criteria were obtained from USEPA Region 5 Ecological Screening Levels.

Groundwater Sampling Summary

Groundwater sampling data used in this EI CA750 Documentation of EI Determination included off-site historical groundwater data presented in the RMC EI CA 750 Documentation of EI Determination, onsite groundwater sampling conducted in 2006 (VOC Investigation Report, Clayton, April 2006), and onsite sampling by URS in December 2007, January 2008, and June 2008.

The data contained in the RMC EI CA750 Documentation of EI Determination submittal documents the release of contaminants to groundwater up gradient of the C&D facility, and demonstrates that migration of contaminated groundwater associated with the RMC site has stabilized.

Groundwater sample data collected onsite in 2006, 2007, and 2008 document groundwater quality for locations on the C&D facility and demonstrate stability of groundwater contamination.

2006 Groundwater Investigation and Comparison to Appropriate GW Levels

A groundwater VOC investigation was conducted by Clayton Group Services, Inc. (Clayton) in January and February 2006. Low concentrations of TCE were detected in groundwater samples collected from three of the five on-site monitoring wells (MW-1, 2, and 3) existing on the site, at that time. Monitoring well locations are shown on **Figure 5**. Laboratory results from this investigation are shown on **Table 1**. Two of the three wells exhibited TCE concentrations exceeding IDEM Residential Default Closure Levels (RDCLs) of 5.0 ug/L. Additionally, the sample from MW-2 had a detectable concentration of cis-1,2-dichloroethylene that was below its respective RDCL.

Table 1
C&D Technologies, Inc.
Attica, Indiana
Groundwater Monitoring Results
Samples Collected on February 26, 2006

		Trichloroethylene	***Cis-1,2-dichloroethylene***
Well Location	Units	ug/L	*ug/L*
	IDEM RDCL	5	*70*
MW-1		**5.7**	*<1*
MW-1 duplicate		**6.0**	*<1*
MW-2		**20**	*2.2*
MW-3		*3.0*	*<1*

Notes: Exceedance shown in bold type

2007-08 Groundwater Investigation and Comparison to Appropriate Groundwater Levels

Seven additional monitoring wells (MW-1S, 2S, 3S, 4S, 6S, 7S, and 8S) were installed at the C&D facility in December 2007 and January 2008 to provide additional monitoring coverage for the site (**Figure 2**). Wells MW-3 and MW-3S are considered the background wells for the deeper and shallower groundwater intervals, respectively. The wells were sampled on December 17, 18, 19, 2007 and January 9, 2008 for both organics (VOCs, SVOCs) and metals. Laboratory analytical results (detected constituents only) for this sampling event are provided in **Tables 2 and 3**. TCE was detected in MW-1 and MW-2 above the RDCL/MCL. Of the metals, arsenic concentrations exceeded the most conservative IDEM Surface Water Quality Standards (SWQS) value of 0.175 ug/L, in most of the monitoring wells sampled. Comparisons are provided in **Tables 2 and 3**.

2008 Groundwater Investigation and Comparison to Appropriate GW Levels

In response to RFI soil boring sample results showing relatively high lead and arsenic values in Area 8 soils (at SB-28, SB-31, and SB-32 at the 19-20 feet bgs depth), two additional wells (MW-9S and 10S) were installed in early June (see **Figure 2**). The wells were sampled and analyzed for metals on June 5, 2008. Results are provided in Table 3a. Lead concentrations detected in these two samples were less than the SWQS level of 6.7 ug/L, indicating no lead leaching to groundwater from soils at SB-28, -31, and -32 at the 19-20 feet bgs depth. Arsenic concentrations in groundwater samples from wells MW-9S and -10S, and from background well MW-3S, exceeded the IDEM SWQS value of 0.175 ug/L.

In June samples were also taken at wells MW-1, -1S, -2, -2S, -3, -3S, -4, -4S, -5, -6S, -7S, and -8S. These wells were sampled on June 3, 4, and 5, 2008 for VOCs, SVOCs, and metals. Laboratory analytical results (detected constituents only) for this sampling event are provided in **Tables 2a and 3a**. The only VOC detected above its respective RDCL was TCE in MW-1, MW-1-DUP and MW-2. BEHP exceeded its Region 5 ecological screening value (surface water discharge) in MW-1, MW-4, MW-5, and MW-6S. Lead, arsenic and barium were detected above their respective surface water screening values in MW-4S. The lead level, however, was less than ten times the surface water screening value. Similarly, the barium in MW-4S (225 ug/L) exceeded its Region 5 ecological screening level by 5 ug/L, and was far less than ten times the screening level. Arsenic concentrations in groundwater samples from all wells (including background) sampled in June 2008 exceeded the IDEM SWQS value of 0.175 ug/L. Comparisons are provided in **Tables 2a and 3a**.

Plume Stability/Concentration Trends

Detections of contaminants in groundwater wells at the C&D Technologies site have been isolated but consistent. The only wells where TCE has been detected above MCLs are MW-1, and -2. These isolated detections are not indicative of a plume, and are more likely the remnants of a larger plume from an up gradient source. The concentrations detected in both 2006, 2007 and 2008 are consistent and indicate that these remnant concentrations are stable.

Discharge to Surface Water

Groundwater from the C & D facility discharges to the Wabash River (see **Figures 2, 3, and 4**). **Figure 5** depicts a broader conceptual view of the area illustrating groundwater flow, surface water flow, and ground discharge.

Acceptability of Discharge to Surface Water

The maximum concentrations of the TCE, BEHP, lead, and barium were compared to the value of ten times their respective RCDLs or surface water screening values, as appropriate. The comparison shows that the groundwater concentrations are less than ten times the "appropriate groundwater level"; therefore the discharge is deemed "acceptable".

When compared to IDEM surface water quality standards for arsenic (0.175 ug/L), the groundwater values (ranging from 0.64 to 6.6 ug/L in the June sampling) for the most part exceed the ten times rule. Arsenic in the June 2008 background well MW-3S sample was 3.9 ug/L. Also, the background concentration of arsenic in the Wabash River is naturally about 2.6 ug/L (see **Table 4**). Therefore, the discharge to surface water is deemed "acceptable".

Future Groundwater Monitoring

Future groundwater monitoring is planned for the C & D facility as part of the ongoing RCRA CA program. Groundwater monitoring is planned for the RCRA Facility Investigation (RFI) and any Closure or Post-closure activities (if necessary).

Table 2
C&D Technologies
Attica, IN
Organics in Groundwater
December 17, 18, 19, 2007 and January 9, 2008

LOCATION	cis-1,2-Dichloroethene		Toluene		Trichloroethene		Carbon disulfide		Carbon tetrachloride	
CD-MW-1	0.22	J	0.22	J	7.3					
CD-MW-1S					1.5					
CD-MW-1S-DUP					1.6					
CD-MW-2	3				20					
CD-MW-2S			0.23	J	2.1		0.34	J	0.3	J
CD-MW-3			0.18	J	1.9					
CD-MW-3S			0.17	J						
CD-MW-4			0.22	J						
CD-MW-5			0.25	J						
CD-MW-5-DUP			0.25	J						
CD-MW-6S					0.55	J				
IDEM RDCL	**70**		**1000**		**5**		**1300**		**5**	
SW SV	**970***		**253**		**47**		**15**		**69.4**	

Notes:

Table shows detected values only.

All results reported in micrograms per liter (ug/L)

IDEM RDCL = Indiana Department of Environmental Management Residential Default Closure Level - Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established.

SW SV = Surface water quality screening value

*: Region V SW screening value based on trans-1,2-dichloroethene

NE = IDEM RDCL or SW SV has not been established for this constituent.

J = Compound detected below the quantitation limit, but above the MDL.

Jv = Result is considered to be an estimated value based on data validation.

B = Analyte was detected in method blank.

B J = Analyte was detected in method blank and below the quantitation limit.

= Constituent detected above the IDEM RDCL

= Constituent detected above the SW SV

Table 2A
C&D Technologies
Attica, IN
Organics in Groundwater
June 3, 4, 5, 2008

LOCATION	cis-1,2-Dichloroethene	Trichloroethene	** bis(2-Ethylhexyl) phthalate	Styrene	2-Butanone (MEK)	Bromodichloromethane
CD-MW-1	0.25 J	6.9	1 J			
CD-MW-1-DUP	0.25 J	6.8				
CD-MW-1S	0.35 J	3.6				
CD-MW-2	2.1	16				
CD-MW-2S		1.8				
CD-MW-2S-DUP		1.7				
CD-MW-3		2.5		0.44 J		
CD-MW-4			1.3 J			
CD-MW-5			0.98 J			
CD-MW-6S			1 J			
CD-MW-CITY2					0.7 J	2.7
IDEM RDCL	**70**	**5**	**6**	**100**	**8400**	**80**
SW SV	**970***	**47**	**0.3**	**32**	**2200**	**NE**

Notes:

Table shows detected values only.

All results reported in micrograms per liter (ug/L)

IDEM RDCL = Indiana Department of Environmental Management Residential Default Closure Level - Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established.

SW SV = Surface water quality screening value

*: Region V SW screening value based on trans-1,2-dichloroethene

** bis(2-Ethylhexyl) phthalate is listed as a common lab and field contaminant in the National Functional Guidelines for Data Review.

NE = IDEM RDCL or SW SV has not been established for this constituent.

J = Compound detected below the quantitation limit, but above the MDL.

Jv = Result is considered to be an estimated value based on data validation.

B = Analyte was detected in method blank.

B J = Analyte was detected in method blank and below the quantitation limit.

= Constituent detected above the IDEM RDCL

= Constituent detected above the SW SV

Table 3
C&D Technologies
Attica, IN
Inorganics in Groundwater
December 17, 18, 19, 2007 and January 9, 2008

LOCATION	Barium	Antimony	Cobalt	Copper	Lead	Nickel	Vanadium	Zinc	Arsenic	Chromium	Thallium
CD-MW-1	83.6 B J	0.14 B	0.76 B	1.4 B	1.3	4.2	0.86 B				
CD-MW-1S	84 B J	0.13 B	0.77 B	5.8	0.83 B	4.8	1.2 B	8.7 B	0.69 B		
CD-MW-1S-DUP	83.8 B J		0.72 B	5.8	0.89 B	4.6	1.2 B	9.2 B	0.65 B		
CD-MW-2	104 B J		0.7 B	1.4 B	0.62 B	3.7	1.2 B		0.79 B		
CD-MW-2S	85.8 B J	0.16 B	4	7.5	2.2	13.2	3 B	13.5 B	1.9	5.4 B	0.17 B
CD-MW-3	109 B J	0.34 B	3.6	5.2	2	5.4	3.9 B		1.4	7.1 B	
CD-MW-3S	56 B J		1.3	2.5	1.1	6	2 B	14 B	1.5		
CD-MW-4	83.8 B J		0.58 B	1.5 B	0.81 B	2.7	1.4 B	5.9 B	0.69 B		
CD-MW-4S	210 J	0.17 B	3.1	8.1	3.2	7.7	2.8 B	19.9 B	7.6	2.3 B	
CD-MW-5	125 B J		1.4	2.3	0.95 B	4	2 B	10.2 B	4.7		
CD-MW-5-DUP	125 B J		1.6	2.7	1.9	4.5	2.4 B	11.1 B	5.2		
CD-MW-6S	81.6 B J	0.22 B	1.9	7	4.4	7.8	4.6 B	21.7	4.6	3.3 B	
CD-MW-7S	65.2 B J		0.47 B	1.1 B	0.56 B	3.4	0.52 B		0.6 B		
CD-MW-8S	74.9 B J	0.38 B	0.72 B	3.4	1.4	5.2	1.9 B	10.7 B	1.2		
IDEM RDCL	**2000**	**6**	**NE**	**1300**	**15**	**730**	**NE**	**11000**	**10**	**100**	**2**
SW SV	**220**	**80**	**24**	**25**	**6.7**	**100**	**12**	**230**	**0.175**	**380**	**10**

Notes:

Table shows detected values only.

All results reported in micrograms per liter (ug/L)

IDEM RDCL = Indiana Department of Environmental Management Residential Default Closure Level - Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established.

SW SV = Surface water quality screening value; Hardness dependent metals SVs were based on a hardness of 250 mg/L (as CaCo3) from background sample.

NE = IDEM RDCL or SW SV has not been established for this constituent.

J = Compound detected below the quantitation limit, but above the MDL.

Jv = Result is considered to be an estimated value based on data validation.

B = Analyte was detected in method blank.

B J = Analyte was detected in method blank and below the quantitation limit.

= Constituent detected above the IDEM RDCL

= Constituent detected above the SW SV

Table 3A
C&D Technologies
Attica, IN
Inorganics in Groundwater
June 3, 4, 5, 2008

LOCATION	Arsenic	Barium	Cadmium	Chromium	Cobalt	Copper	Lead	Nickel
CD-MW-1	2	80.3 B J	0.14 B	8.5 B	1.4	4 Jv	2	3.1 J
CD-MW-1-DUP	1.2	80.6 B J		3.2 B	0.57 B		0.89 B	
CD-MW-1S	1.1	71.6 B J		1.1 B	0.4 B		0.7 B	0.97 B
CD-MW-2	2	91 B J		4.5 B	0.91 B		0.84 B	1.8 B
CD-MW-2S	2.2	76 B J		5.8 B	1.7	3.9 Jv	2.9	5.4
CD-MW-2S-DUP	2.1	77.9 B J		5.7 B	1.8	3.9 Jv	3	5.9
CD-MW-3	0.64 B	93.2 B J			0.46 B		0.96 B	
CD-MW-3S	3.9	62.7 B J		2.9 B	1.8	5.1 J	3.1	4.4 J
CD-MW-4	1	61.4 B J		2 B	0.6 B		1.2	1.5 B
CD-MW-4S	4.2	225 J	0.18 B	2.9 B	1.8	11.9 J	22.2	5.6
CD-MW-5	6.6	118 B J		0.97 B	1.5		2.1	2.3
CD-MW-6S	2.1	82.4 B J		1.3 B	0.75 B	4 Jv	2.3	2.4
CD-MW-7S	1.2	84 B J			0.36 B		1.8	1.7 B
CD-MW-8S	1.3	61.5 B J			0.35 B		1.5	2.5
CD-MW-9S	2.2	86.3 B J		2.5 B	1.3	4.1 J	2.8 J	4.5
CD-MW-10S	3.1	189 B J		1.2 B	1.5	2.3 J		3.9
IDEM RDCL	**10**	**2000**	**5**	**100**	**NE**	**1300**	**15**	**730**
SW SV	**0.175**	**220**	**2**	**380**	**24**	**25**	**6.7**	**100**

Notes:

Table shows detected values only.

All results reported in micrograms per liter (ug/L)

IDEM RDCL = Indiana Department of Environmental Management Residential Default Closure Level - Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established.

SW SV = Surface water quality screening value; Hardness dependent metals SVs were based on a hardness of 250 mg/L (as CaCo3) from background sample.

NE = IDEM RDCL or SW SV has not been established for this constituent.

J = Compound detected below the quantitation limit, but above the MDL.

Jv = Result is considered to be an estimated value based on data validation.

B = Analyte was detected in method blank.

B J = Analyte was detected in method blank and below the quantitation limit.

= Constituent detected above the IDEM RDCL

= Constituent detected above the SW SV

Table 3A cont.
C&D Technologies
Attica, IN
Inorganics in Groundwater
June 3, 4, 5, 2008

LOCATION	Vanadium	Zinc	Antimony	Selenium	Beryllium	Lead, diss	Tin	Thallium
CD-MW-1	4.3 B	11.6 B						
CD-MW-1-DUP	1.6 B	3.7 B						
CD-MW-1S	1.8 B		0.17 B	1.4 B				
CD-MW-2	2.4 B							
CD-MW-2S	4.9 B		0.15 B	1.8 B				
CD-MW-2S-DUP	4.6 B		0.18 B	1.6 B				
CD-MW-3								
CD-MW-3S	6 B	15.8 B	0.18 B	1.5 B				
CD-MW-4	2.7 B							
CD-MW-4S	3.9 B	30.7 Jv	0.24 B		0.25 B	0.22 B	1.4 B	
CD-MW-5	2.9 B			1.2 B				
CD-MW-6S	2.4 B		0.16 B				0.92 B	
CD-MW-7S	1.1 B		0.14 B					
CD-MW-8S	1.8 B		0.4 B					
CD-MW-9S	3 B		0.3 B				0.31 B	0.15 B
CD-MW-10S	1.1 B		0.2 B					
IDEM RDCL	**NE**	**11000**	**6**	**50**	**4**	**15**	**NE**	**2**
SW SV	**12**	**230**	**80**	**35**	**1.17**	**6.7**	**180**	**10**

Notes:

Table shows detected values only.

All results reported in micrograms per liter (ug/L)

IDEM RDCL = Indiana Department of Environmental Management Residential Default Closure Level - Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established.

SW SV = Surface water quality screening value; Hardness dependent metals SVs were based on a hardness of 250 mg/L (as CaCo3) from background sample

NE = IDEM RDCL or SW SV has not been established for this constituent.

J = Compound detected below the quantitation limit, but above the MDL.

Jv = Result is considered to be an estimated value based on data validation.

B = Analyte was detected in method blank.

B J = Analyte was detected in method blank and below the quantitation limit.

= Constituent detected above the IDEM RDCL

= Constituent detected above the SW SV

Table 4
C&D Technologies
Attica, IN
Surface Water Background Data

SAMPLE ID		Copper, Dissolved	Arsenic	Barium	Chromium	Cobalt	Copper	Thallium	Vanadium
CD-SW-BKG01	6/5/2008	4.5 J	2.6	67.1 B J	3.7 B	1.3	5.8 J	0.43 B	7.9 B
IDEM RDCL	6/5/2008	1300	10	2000	100	NE	1300	2	NE
SW SV		25	0.175	220	380	24	25	10	12

SAMPLE ID		bis(2-Ethylhexyl) phthalate	Zinc	Antimony	Tin	Methylene chloride	Lead	Nickel
CD-SW-BKG01	6/5/2008	2.4	21.1 J	0.47 B	0.32 B	0.5 J	2.6 J	4.4
IDEM RDCL	6/5/2008	6	11000	6	NE	NE	15	730
SW SV		0.3	230	80	180	2200	6.7	100

Notes:

Table shows detected values only.

All surface water results reported in micrograms per liter (ug/L).

IDEM RDCL = Indiana Department of Environmental Management Residential Default Closure Level - Federal Safe Drinking Water Act (SWDA) maximum contaminant levels (MCLs) represent the default RDCL for those contaminants where an MCL has been established.

SW SV = Surface water quality screening value; Hardness dependent metals SVs were based on a hardness of 250 mg/L (as CaCo3) from background sample.

NE = Screening value has not been established for this constituent.

J = Compound detected below the quantitation limit, but above the MDL.

Jv = Result is considered to be an estimated value based on data validation.

B = Analyte was detected in method blank.

B J = Analyte was detected in method blank and below the quantitation limit.

UJ = Analyte is considered not detected for QA/validation reason.

U = Not Detected.

= Constituent detected above the SW SV