EPA Region 5 Records Ctr.
295754

Five-Year Review Report

Second Five-Year Review Report

for

Envirochem Site

Zionsville

Boone County, Indiana

April 2008

PREPARED BY:

United States Environmental Protection Agency
Region 5
Chicago, Illinois

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Date: 04/04/08

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Five-Year Review Report

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List of Acronyms

ARARs Applicable or Relevant and Appropriate Requirements

CALs Cleanup Action Levels

CERCLA Comprehensive Environmental Response Compensation and Liability Act of 1980

CD Consent Decree

EPA Environmental Protection Agency

IDEM Indiana Department of Environmental Management

ICs Institutional Controls

MCL Maximum Contaminant Level

NCP National Oil and Hazardous Substance Contingency Plan

NPL National Priorities List

O&M Operation and Maintenance

PRGS Passive Reactive Gate System

PRPs Potentially Responsible Parties

RA Remedial Action

RAO Remedial Action Objective

RD Remedial Design

ROD Record of Decision

RPM Remedial Project Manager

SARA Superfund Amendments and Reauthorization Act of 1986

VOCs Volatile Organic Compounds

UU/UE Unlimited Use or Unrestricted Exposure

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Executive Summary

Based upon an ESD issued in September 2006, additional remedial work is under construction including the installation of additional SVE trenches. The new SVE trenches will be connected to the existing SVE system. The purpose of these measures is to capture and treat through the SVE system the more mobile contaminants in the vicinity of the SVE trenches and moisture in sand seams that enter the SVE trenches. The trench system along with a barrier wall and a passive reactive gate system (PRGS) will be in place and are expected to passively collect and treat this contamination in the future.

The remedy is expected to be protective of human health and the environment upon completion and in the short term, exposure pathways that could result in unacceptable risks are being controlled. In order for the remedy to be protective in the long-term additional remedial action contemplated in the Consent Decree and described in the 2006 ESD is necessary to ensure protectiveness. The Trustees who represent the PRPs for the site are completing construction of the additional remedial action. Protectiveness requires compliance with effective institutional Controls (ICs). Long-term stewardship must be assured which includes implementing, maintaining and monitoring effective ICs.

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Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name ***(from WasteLAN)*****: Envirochem**		
EPA ID ***(from WasteLAN)*****:**		
Region: 5	**State: IN**	**City/County: Zionsville/Boone County**
SITE STATUS		
NPL status: X Final □ Deleted □ Other (specify)		
Remediation status (choose all that apply): X Under Construction □ Operating □ Complete		
Multiple OUs?* □ YES X NO	**Construction completion date:** ___/___/_____	
Has site been put into reuse? □ YES X NO		
REVIEW STATUS		
Lead agency: X EPA □ State □ Tribe □ Other Federal Agency _____		
Author name: Matthew J. Ohl		
Author title: Remedial Project Manager	**Author affiliation:**	
Review period:** 04 /00/ 2007 to 04 /08/2008		
Date(s) of site inspection: 01/11/2008		
Type of review: X Post-SARA □ Pre-SARA □ NPL-Removal only □ Non-NPL Remedial Action Site □ NPL State/Tribe-lead □ Regional Discretion		
Review number: □ 1 (first) X 2 (second) □ 3 (third) □ Other (specify) _____		
Triggering action: □ Actual RA Onsite Construction at OU #____ □Actual RA Start at OU#____ □ Construction Completion X Previous Five-Year Review Report □ Other (specify)		
Triggering action date ***(from WasteLAN)*****:** 04 / 08 / 2003		
Due date ***(five years after triggering action date)*****:** 04 / 08 / 2008		

* ["OU" refers to operable unit.]
** [Review period should correspond to the actual start and end dates of the Five-Year Review in WasteLAN.]

Five-Year Review Summary Form, cont'd.

Issues:

Construction is ongoing to address the failure of the remedy and is expected to be completed in 2008. Further IC evaluation and planning activities are needed to assure the ICs continue to function as intended. Long-term stewardship must be assured which includes maintaining and monitoring effective ICs.

Recommendations and Follow-up Actions:

The PRPs should continue to complete construction of the ongoing remedial action activities; and operate and monitor the remedy to ensure future protectiveness. The PRPs and U.S. EPA will conduct additional IC Evaluation activities. Based upon the IC evaluation activities, U.S. EPA will prepare an IC Plan for required follow-up actions to assure that the remedy remains protective including planning for implementation of ICs and long-term stewardship.

Protectiveness Statement(s):

The remedy is expected to be protective of human health and the environment upon completion and in the short term, exposure pathways that could result in unacceptable risks are being controlled. In order for the remedy to be protective in the long-term additional remedial action contemplated in the Consent Decree and described in the 2006 ESD is necessary to ensure protectiveness. The Trustees who represent the PRPs for the site are completing construction of the additional remedial action.

Other Comments:

Date of last Regional review of Human Exposure Indicator (from WasteLAN): 07/26/2006
Human Exposure Survey Status (from WasteLAN): Current Human Exposure Controlled
Date of last Regional review of Groundwater Migration Indicator (from WasteLAN): 03/14/2007
Groundwater Migration Survey Status (from WasteLAN): Contaminated Groundwater Migration Not Under Control
Ready for Reuse Determination Status (from WasteLAN): Not Ready for Reuse

Five-Year Review Report

I. Introduction

The purpose of the five-year review is to determine whether the remedy at a site is protective of human health and the environment. The methods, findings, and conclusions of reviews are documented in Five-Year Review reports. In addition, Five-Year Review reports identify issues found during the review, if any, and identify recommendations to address them.

The United States Environmental Protection Agency (EPA or "the Agency") is preparing this Five-Year Review report pursuant to Section 121 of the Comprehensive Environmental Response Compensation and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and Section 300.430(f)(4)(ii) of the National Oil and Hazardous Substance Contingency Plan (NCP). CERCLA §121 states:

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

The Agency interpreted this requirement further in the NCP. 40 CFR §300.430(f)(4)(ii) states:

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

EPA, Region 5, conducted the five-year review of the remedy implemented at the Envirochem Superfund Site ("Site") in Zionsville, Boone County, Indiana. This report documents the results of this review conducted by Matthew J. Ohl, Remedial Project Manager ("RPM") for the site. The Indiana Department of Environmental Management ("IDEM") also reviewed and provided comments on the report. IDEM's assistance is appreciated and their comments were fully incorporated in the report. The review was initiated in April 2007 and completed in April 2008.

This is the second five-year review for the Site. The triggering action for this statutory review is the completion of the first five-year review on April 8, 2003 as shown in EPA's WasteLAN database. The five-year review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

II. Site Chronology

Table 1: Chronology of Site Events

Event	Date
Initial discovery of problem or contamination	April 1, 1979
NPL listing	September 8, 1983
Removal actions	1983-1985
Remedial Investigation/Feasibility Study complete	September 25, 1987
ROD signature	September 25, 1987
ROD Amendments or ESDs	June 7, 1991; June 1997; September 2006
Enforcement documents (CD, AOC, Unilateral Administrative Order)	November 9, 1983; September 10, 1991
Actual remedial action start	November 25, 1998
Construction start date	December 1997
Deletion from NPL	Site has not been deleted
Previous five-year review	April 8, 2003

III. Background

Physical Characteristics

The Site (also known as the "Environmental Conservation and Chemical Corporation," or the "ECC" Site) is located east and south of the Boone County Resource Recovery Systems, Inc. facility on U.S. Highway 421 in a primarily rural area of Boone County, Indiana, approximately 5 miles north of Zionsville and ten miles northwest of Indianapolis. The Site, which occupies approximately 6.5 acres of land, was placed on the National Priorities List ("NPL") for site cleanup in September 1983. The Northside Sanitary Landfill Superfund Site is located immediately to the east of the Site and the Third Site is located immediately to the south of the Site. A non time critical removal action is ongoing at Third Site. The last five-year review for the Northside Sanitary Landfill Superfund Site conducted in September 2004 is available online at http://www.epa.gov/R5Super/fiveyear/reviews_pdf/indiana/northside_landfill.pdf

An unnamed ditch near the west side of the site flows into Finley Creek which flows into Eagle Creek about a half-mile downstream of the site. Eagle Creek in turn feeds into the Eagle Creek Reservoir about ten miles further downstream. The Eagle Creek Reservoir has a storage capacity of 7.8 billion gallons and is one of several sources of drinking water for Indianapolis. More information on water quality is provided in the 2006 Indianapolis Water Drinking Water Report available online at http://www.indianapoliswater.com/Assets/pdf/IWCCR07_4-13-07.pdf

Land and Resource Use

The current land use for the surrounding area is residential, commercial, and agricultural. Nearby residents that are not connected to the municipal water supply use private wells for their water supply. A Health Consultation prepared by the Indiana State Department of Health for the adjacent Third Site concluded that private wells in the area are not impacted and deeper groundwater is protected by a confining layer. The Health Consultation is available online at http://www.atsdr.cdc.gov/HAC/PHA/thirdsite/thi_p1.html These conclusions are consistent with the findings of the March 14, 1986 final Remedial Investigation Report for the Site.

History of Contamination

Envirochem began operations in 1977 and was engaged in the recovery, reclamation, and brokering of primary solvents, oils and other wastes received from industrial clients. Waste products were received in drums and bulk tankers and prepared for subsequent reclamation or disposal. The accumulation of contaminated stormwater on-site, poor management of the drum inventory, and several spills caused State and EPA investigations of Envirochem. The State pursued Envirochem for violations of the Environmental Management Act, the Air Pollution Control Law, and the Stream Pollution Control Law, resulting in a July 1981, Consent Decree approved by the Boone County Circuit Court. That Court imposed a civil penalty against Envirochem and placed Envirochem into receivership. In May 1982, Envirochem was ordered by the court to close and environmentally secure the Site for failure to reduce hazardous waste inventories. By August 1982, Envirochem was found to be insolvent.

Initial Response

EPA proposed the Site for the NPL in December 1982 and the Site was placed on the list in September 1983. EPA's contractor, CH2M Hill performed a Remedial Investigation ("RI") in 1983 and 1984 which involved an investigation of the nature and extent of contamination in soil, groundwater, surface water and sediments on and around the Site. The RI Report dated March 14, 1986, documented the results of the investigation as well as historical investigations performed by other parties. The historical investigations were conducted from 1976 through 1982. Sources of data were primarily laboratory data sheets or handwritten data summary tables, generally unaccompanied by descriptions of the sampling and testing procedures used. As such, much of this historical data could not be used as a basis for definitive interpretations of existing conditions onsite or offsite. Rather, the data could be used in qualitative assessments of contamination and in determining locations where further testing would be needed.

Soil contaminants found onsite were primarily volatile organic compounds (VOC's) and phthalates. Migration of VOC's in the soil to the shallow saturated silty clay zone has occurred onsite. The shallow sand and gravel deposit (approximately 18 feet below ground surface) has also been found to be contaminated with VOC's though the source may have been the former cooling pond onsite rather than downward migration from the shallow saturated zone. Organic contaminants were also found in Finley Creek immediately downstream of the site. Under Site conditions at the time of the RI, the VOC's and certain phthalates were expected to tend to leach

from subsurface soil into the groundwater and slowly migrate to the unnamed ditch or Finley Creek downgradient of the Site. Once in the surface waters, contaminants would either volatilize, adsorb to sediments, or experience dilutions on the order of 20 to 1 before reaching the downstream Eagle Creek Reservoir (about 10 miles).

The endangerment assessment found that under the no action alternative potential risk to human health and the environment exists at the Site (excess lifetime cancer risk levels as high as 4×10^{-1} were estimated). For public health concerns, the exposure routes that resulted in an excess lifetime risk greater than 1×10^{-6} were:

- o Soil via ingestion. Excess lifetime cancer risk of 4×10^{-3} to 8×10^{-6}. This route requires soil below existing cap to be uncovered for exposure to occur.
- o Groundwater in the shallow saturated zone and shallow sand and gravel deposit via ingestion or dermal absorption. Excess lifetime cancer risk of 4×10^{-1} to 3×10^{-3}. This route requires installation of a potable water well in area of contamination.
- o Ingestion of fish with bio-concentrated contaminants. Excess lifetime cancer risk of 3×10^{-6}. This route requires regular fishing in the unnamed ditch or Finley Creek downstream to confluence with Eagle Creek.

Risk from dermal absorption of VOC's during wading in the unnamed ditch or Finley Creek downstream to Eagle Creek was calculated to be between 1×10^{-6} and 1×10^{-7}.

For environmental concerns the RI determined that the projected release of contaminants to the surface water in the Unnamed Ditch should not exceed the ambient water quality criteria for protection of aquatic life. A fish consumption advisory remains in place for certain fish caught in Eagle Creek due to elevated levels of PCBs.

The major public health and environmental risks from the Site were derived in the endangerment assessment are outlined in Table 6-16 of the RI Report. The major risks come from the contaminated soil via direct contact and release of soil contaminants to the groundwater and subsequent use of groundwater for bathing and drinking water source. The population at risk was determined to be limited and while the area was projected to grow the impact of the Site appeared to be localized. In conclusion, the RI determined that the Site posed a potential threat to the public health, welfare, and environment, and recommended that a feasibility study of remedial action to cost-effectively mitigate the site hazards should be performed.

EPA's contractor, CH2M Hill performed a Feasibility Study ("FS") and produced a FS report dated December 5, 1986, which evaluated several alternatives for cleaning-up the Site to be combined with the remedial action for the neighboring Northside Landfill Site, which had also been placed on the NPL.

Surface contaminants were removed from the Site in an operation extending from March 1983 through 1984. These cleanup efforts were initiated by EPA and completed by a group of PRPs. The cleanup was overseen by EPA and IDEM, pursuant to a Consent Decree entered on November 9, 1983. Actions included removal and treatment or disposal of cooling pond waters, approximately 30,000 drums of waste, 220,000 gallons of hazardous waste from tanks, 5,650 cubic yards of contaminated soil and cooling pond sludge.

In March 1985, ponded water containing hazardous substances was discovered on the concrete pad at the southern end of the Site. During the resulting emergency action, EPA constructed a sump at the southeast corner of the Site, and removed and disposed of 20,000 gallons of contaminated water containing high levels of volatile organics.

Basis for Taking Action

Soils at the site contaminated with high levels of numerous volatile and semi-volatile organic compounds present potential exposures to soil and groundwater associated with human health risks. The health risks are due to levels of hazardous substances exceeding EPA's risk management criteria for either the average or reasonable maximum exposure scenarios. Risks from exposure to groundwater are attributed to the presence of various organic and inorganic hazardous substances that exist at concentrations exceeding State and Federal drinking water standards and surface water quality standards.

IV. Remedial Actions

Remedy Selection

A ROD was issued by EPA on September 25, 1987, selecting a combined remedy for the Site and the adjacent Northside Sanitary Landfill Site. That ROD provided for an impermeable cap over the contaminated areas and a groundwater extraction and treatment system.

Based on a treatability study performed by the PRPs, EPA and IDEM later determined that it would be feasible and preferable to actively treat the contaminant source at the Site, rather than simply containing these materials as provided for in the 1987 ROD. EPA therefore issued Amended RODs in June 1991, establishing separate, complementary remedial approaches for the Envirochem and Northside Sites.

The remedial action objectives include the following: preventing direct contact with contaminated soils, reducing infiltration, enhancing the soil vapor extraction system, removing and destroying volatile organic compounds and selected base neutral/acid organics from the soils.

As amended, the ROD for the Site required:

- Access Restrictions: Placement of deed restrictions on the property to prevent future development of the land thereby protecting against direct contact with contaminated soil and groundwater.

- Soil vapor extraction ("SVE"): Construction of a system utilizing injection and extraction trenches to vaporize and extract volatile organic compounds and phenols from

contaminated soils. These contaminants would be captured and removed utilizing granular activated carbon. The goal of the soil vapor extraction system was to clean the soil contamination source areas to cleanup levels that would assure long-term protection of groundwater and surface water.

- RCRA Compliant Cap and Surface Controls: Construction of a multi-layered cap over the entire Site. The cap would comply with Resource Conservation and Reclamation Act ("RCRA") performance-based standards. (The presence of the cap would also improve the efficiency of the soil vapor extraction system by reducing the amount of air and vapor that could escape from that system.) Surface controls included rerouting of the unnamed ditch west of the Site to keep surface waters further away from contaminated soil areas, and demolition and disposal of on-site buildings.

- Contingent Groundwater Treatment: In the event the soil vapor extraction system did not achieve soil cleanup standards within a five-year operation period, or if at that time surface water or groundwater samples still showed unacceptable levels of contamination, groundwater extraction and treatment would be required. Collected groundwater would be treated to meet effluent standards before discharge into Finley Creek. Groundwater extraction and treatment would continue until cleanup standards were met.

The objectives of the cap are to prevent direct contact with contaminated soils, reduce infiltration, and enhance the soil vapor extraction system. The objective of the soil vapor extraction activity is to remove and destroy volatile organic compounds and selected base neutral/acid organics from the soils

Remedy Implementation

EPA and IDEM have jointly overseen cleanup activities at the Site under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980, as amended ("CERCLA"), 42 U.S.C. §9601, et seq. EPA and IDEM entered into a Consent Decree with certain potentially responsible parties ("PRPs") who agreed to perform the final remedy for the Site. That Consent Decree was approved by the U.S. District Court for the Southern District of Indiana on September 10, 1991. The Consent Decree requires those PRPs to implement the remedy selected by EPA (with IDEM's concurrence) in a September 25, 1987, ROD and a June 7, 1991, ROD Amendment.

Since that time, the PRPs have, under EPA and IDEM supervision: (1) conducted a Supplemental Investigation in January 1993, to collect groundwater data needed to design dewatering and treatment facilities associated with the SVE system; (2) obtained the necessary access agreements in July 1993, with the site owners to permit cleanup of contaminated areas and support activities on adjacent property; (3) completed site preparation work in the Fall of 1993 (with final supplemental work in the Spring of 1994), including an upgrade of site fencing, removal of site structures and debris, decontamination and disposal of tanks, construction of pads for future decontamination and storage activities, site grading and construction of drainage channels; (4) from September 1994, through January 22, 1996, secured, inventoried, analyzed

and removed drums of contaminated material that had accumulated on-site during previous investigations and response activities; and (5) submitted a 90% design for completion of the remedial action on December 19, 1991 which the parties recognized (in light of circumstances described below) required substantial revision, submitted a new 30% design plan for review and comment in July, 1994, submitted a revised 30% design plan in January 1995, submitted a 90% design plan on October 27, 1995, and submitted a draft 100% design on September 26, 1996.

While the PRPs began designing and implementing the final remedy for the Site under EPA and IDEM oversight, newly developed information persuaded EPA and IDEM that certain technical modifications and improvements to the selected remedy were appropriate. Section 117(c) of CERCLA and Section 300.435(c)(2)(I) of the National Oil and Hazardous Substances Contingency Plan establish procedures for explaining, documenting, and informing the public of significant changes to the remedy that occur after the ROD is signed. An Explanation of Significant Differences ("ESD") was required since the remedial action to be taken differed significantly from the remedy selected in the ROD but did not fundamentally alter that remedy with respect to scope, performance or cost. The ESD addressed several issues. The Consent Decree and accompanying documents were modified to reflect the remedy changes described in the ESD.

First, during the January 1993, Supplemental Investigation, the PRPs identified nine organic compounds in site groundwater that had not been identified at levels of concern in the Remedial Investigation (and thus did not have cleanup standards in the ROD). The parties discussed and agreed to a mechanism for establishing appropriate cleanup standards for certain of these additional compounds.

Second, the Supplemental Investigation also showed that the water table at the southern end of the site was higher than it was during the SVE pilot test conducted in 1987, and was high enough that it could be expected to hamper the effectiveness of SVE in that area. In response to this data, the PRPs evaluated other options for addressing contamination in the southern end of the site and presented this evaluation to EPA and IDEM.

In order to remediate soils in the southern portion of the Site, soils beneath the concrete pad were generally excavated to a depth of 9 feet. This is the depth to which SVE was originally expected to be effective. Sheet pilings were used in the eastern portion of this area to reduce the amount of water that will seep into the excavated area. When the 9 foot depth was reached, any remaining visible contamination was also excavated where possible, and any contamination of concern identified through field screening was also excavated. Excavation was limited by concerns about sidewall stability and the need to avoid an underlying zone of highly permeable sand. Most of the water accumulated in the excavation area was collected, characterized, treated to meet discharge standards and appropriately disposed of through discharge to an on-site surface water body. Confirmatory soil samples were collected and the excavation was backfilled with clean soil from an off-site borrow source. The concrete pad overlying this area was crushed and excavated with the underlying soil. The excavated soils and crushed concrete was moved to the northern area of the Site where SVE was performed on the soil and crushed concrete. An impermeable cap which complies with RCRA Subtitle C standards was to be placed over the

excavated area unless the confirmatory sampling shows that the excavation produced the equivalent of a clean closure (i.e., no detectable contamination) under RCRA. This cap was not constructed while the PRPs pursued clarification from IDEM on RCRA closure ARARs for the area.

Third, during excavation activities conducted as part of the site preparation work (both in preparing the drainage channels and in preparing the decontamination pad), contamination was encountered to the west of the approximate western site boundary identified in the ROD and the Consent Decree. This required the PRPs to conduct additional sampling along a portion of the western boundary of the site to better determine the nature and extent of contamination in that area. The PRPs had planned to use this area as part of the "Central Support Zone" for storage and movement of equipment and materials for the remedy. The PRPs conducted their Central Support Zone Investigation in July 1995.

Fourth, further researching SVE technologies in preparing the design, the PRPs learned that: (1) SVE technology developments made it possible that extraction wells might prove to be as effective, or more effective, than the extraction trenches specified in the Amended ROD; (2) on-site activities to operate and maintain the SVE system would likely damage the integrity of the RCRA cap, requiring potentially difficult repairs and suggesting that use of an interim cap could still improve the effectiveness of SVE and be upgraded to a full RCRA cap after SVE was complete; (3) SVE contractors possess specialized and sometimes proprietary information on extraction processes that are necessary to a complete design but would not be available until after a SVE contractor is selected based on an initial design, an approach that was somewhat inconsistent with the procedures described in the 1991 Consent Decree.

As noted above, soils and crushed concrete from the southern area of the Site were excavated and moved to the northern portion of the Site. After this material was placed and graded properly, a surface cover was placed over this area. This cover consisted of a minimum of 3 feet of compacted, impermeable native soil and 1 foot of top soil to support vegetation. This cover also facilitated the proper operation of the SVE system. The final cover, consisting of a geo-composite drainage net with a minimum transmissivity of 0.01 ft^2/sec., a minimum of 1 foot of soil and 1 foot of topsoil was placed on top of the originally placed soil layer described above. The final cover is therefore essentially identical to the cover described in the Amended ROD with one major exception. This final cover was not extended over the excavated area on the southern end of the Site as the PRPs pursued clarification from IDEM on RCRA closure ARARs for the area.

Fifth, Central Support Zone Investigation data indicated that the organic carbon content of site soils was generally higher than was assumed in the model used to set soil cleanup levels in the ROD Amendment. That model calculated the rate at which contamination in the soil would be transferred to groundwater as groundwater flowed through the Site. Using that model, EPA calculated cleanup standards that would reduce soil contamination to levels that would be protective of groundwater. The site-specific data on the organic carbon content of site soils indicated that a slightly higher level of contamination in the soil would likely remain adsorbed to the soil rather than carried along with the groundwater than was originally predicted. As a result

of this new information, EPA and IDEM agreed to make minor revisions to the model and the cleanup standards to reflect the actual site conditions. Since cleanup standards were going to be revised, EPA and IDEM also agreed to add a minor change in the cleanup standard for 1,1-Dichloroethane ("DCA"). The change in the DCA cleanup standard was based on information about the cancer potency of DCA developed since the time of the 1991 ROD Amendment. Since that time, a general scientific consensus has developed that concludes DCA does not pose the level of cancer risk previously believed. For more information see the Agency for Toxic Substances and Disease Registry's toxicological profile for DCA available online at http://www.atsdr.cdc.gov/toxprofiles/tp133.html As a result, the risk calculation and cleanup standard for DCA were re-calculated to reflect this information.

Institutional Controls

Institutional controls (ICs) are non-engineered instruments, such as administrative and/or legal controls that help minimize the potential for exposure to contamination and protect the integrity of the remedy. Compliance with ICs is required to assure long-term protectiveness for those areas that do not allow for unlimited use or unrestricted exposure (UU/UE).

The Remedy embodied in the ROD and Consent Decree requires containment of waste on site and place operation and maintenance obligations on the PRPs for the foreseeable future. As long as those obligations exist, the site cannot be disturbed or developed. The PRPs are obliged to maintain the cap and the remedy elements under the Consent Decree, as amended, through an O&M plan. This is important because wastes and contaminated soils remain beneath the cap that would pose a potential threat to human health or the environment if the integrity of the cap was compromised.

As required by the Consent Decree, the Trustees entered an access agreement with the Bankert family, who own the site property through a trust and live adjacent to and southwest of the site. In addition to providing unrestricted access for site work, the Bankerts also agree "that they will not construct or place any improvements within the Remedial Action Boundary or Support Zone Area Boundary ... unless and until the Court enters an order in USA v. Enviro-Chem determining that [the PRPs] have no further obligations...." These areas include all of the relevant portions of the site and will be identified in maps to be developed as part of the IC evaluation activities or IC Plan. The agreement was recorded with the Boone County Recorder's office in 1993.

The objective of the access agreement is to ensure access by U.S. EPA and Indiana Department of Environmental Management and prevent-any use of the site property and any disturbance of the cap or the remedy elements. The agreement imposing these restrictions is recorded and states that the covenants run with the land.

Table 2: Institutional Controls Summary Table

Media, Engineered Controls, & Areas that Do Not Support UU/UE Based on Current Conditions.	IC Objective	Title of Institutional Control Instrument Implemented
Containment area on Envirochem Property - Cap and Other Remedy Components *(Maps to be developed)	Prohibit interference with remedy components; Prohibit residential use of property	Restrictive covenant in access agreement that states it runs with the land recorded at Boone County Recorder's Office in 1993 (under Review)
Groundwater on Envirochem property which exceeds cleanup standards *(Maps to be developed)	Prohibit installation of wells; Prohibit use of groundwater	Restrictive covenant in access agreement that states it runs with the land recorded at Boone County Recorder's Office in 1993 (under Review)
Groundwater on Envirochem property which exceeds cleanup standards *(Maps to be developed)	Prohibit installation of wells; Prohibit use of groundwater until performance standards are met	(Under Review)

*Maps which depict the current conditions of the site and areas which do not allow for UU/UE will be developed as part of the IC evaluation activities or IC Plan discussed below.

Current Compliance: Based on inspections and interviews, EPA is not aware of site or media uses which are inconsistent with the stated objectives of the ICs. Access to the Site is limited. The remedy appears to be functioning as intended and is protective in the short term.

IC Evaluation: The ICs have been implemented in order to prohibit–interference with the cap and the other remedy elements, and prohibiting any use of the site. Although the recorded agreement does not specifically prohibit installation and use of on-site wells, interference with the cap or residential use of the property, the even broader limitations in the agreement appear that they will accomplish those ends. Initial IC evaluation activities have-revealed that additional steps must be taken to evaluate the protectiveness of ICs.

U.S. EPA will work with the PRPs to conduct the necessary IC evaluation activities within six months of this review. Because U.S. EPA does not have a recent title report for the site properties, an updated title commitment would be useful to verify the presence and effectiveness of the use restrictions and confirm that there are no conflicting property rights. Once the IC evaluation activities have been completed, an IC plan will be developed by U.S. EPA. The IC Plan will be developed within 6 months to incorporate the results of the evaluation and plan for additional IC activities as needed including long-term stewardship.

Long-term Stewardship: Long-term protectiveness at the site requires compliance with use restrictions to assure the remedy continues to function as intended. To assure proper maintenance and monitoring effective ICs, long-term stewardship procedures will be reviewed and a plan developed. The plan would include regular inspection of ICs at the site and annual certification to U.S. EPA that ICs are in place and effective. Additionally, use of a communications plan and use of one-call system should be explored for long-term stewardship.

System Operation/Operation & Maintenance

The SVE system was operated from 1998 until early 2001. Under the ROD, as amended and modified, the PRPs had five years to demonstrate that the SVE system had achieved the remedial cleanup objectives. If the PRPs could not demonstrate that the cleanup standards had been achieved, the Consent Decree required them to implement a contingent remedy to assure containment of site-related contamination. That contingent "Additional Work" provision required the PRPs to construct and operate a groundwater collection trench along the south and east boundaries of the site to assure protection of off-site groundwater and surface water.

In the 2003 Five-Year Review, EPA confirmed that the SVE remedy could not meet cleanup standards, so that the contingent containment remedy was required to assure long-term protectiveness. The PRPs proposed to add an active SVE extraction component and a barrier wall to improve the effectiveness of the collection system in the contingent remedy. EPA, in consultation with IDEM, agreed to modify the Additional Work provisions of the Consent Decree and the Amended ROD. An ESD issued in September 2006, provides for the remedy to be revised to install additional SVE trenches generally along the alignment previously required in Revised Exhibit A for the subsurface water interception trench. The new SVE trenches will be connected to the existing SVE system and will be operated using all of the basic operations of the existing SVE system. The purpose of these measures is to capture and treat through the SVE system the more mobile contaminants in the vicinity of the SVE trenches and moisture in sand seams that enter the SVE trenches. Because groundwater generally moves very slowly at the Site, it will be many years before the remaining contamination at the Site not captured by SVE reaches the trench interception system. The volume of groundwater reaching the trench is expected to be low and some attenuation of this contamination may occur prior to arrival at the trench. The trench system along with a barrier wall and a PRGS will be in place and are expected to passively collect and treat this contamination in the future. U.S. EPA in consultation with IDEM expect this will treat all remaining contaminants of concern that may migrate to the trench and be protective of human health and the environment.

As discussed in the March 2003 Five-year Review of the Site (available online at http://www.epa.gov/superfund/sites/fiveyear/f03-05008.pdf), significant groundwater contamination was documented within the till unit with only minor contamination of a few wells screened in the underlying shallow sand and gravel unit. Contamination of the shallow sand and gravel deposit may have occurred either via migration through the silty clay till on-site or through contaminated water and sediment in the former cooling water pond. The cooling pond had intersected the sand and gravel deposit before removal of contaminated water and sludge and backfilling with clean soil during removal actions in 1985. The deep confined aquifer below the site has not been found to be contaminated. Future migration of onsite contaminants to the deep aquifer is highly unlikely because of an upward vertical hydraulic gradient from the aquifer. Vapor intrusion is not expected to be an issue at the site considering that groundwater is flowing to the southeast toward the Northside Sanitary Landfill and residences are not located above the known extent of groundwater contamination.

Only a minor amount of dense non-aqueous phase liquid ("DNAPL") was identified at the Site in till well T-2. When present in significant quantity, DNAPL may act as a continuing source of groundwater contamination. Therefore, DNAPL is considered to be a principal threat waste. At this Site, however, DNAPL is not known to be a significant problem. Groundwater discharge to the unnamed ditch remains a potential concern to be addressed by the additional remedial action. Given that DNAPL is not a significant problem, the groundwater flow through the till is slow, and other site characteristics discussed previously, EPA expects that this response action will effectively protect the unnamed ditch.

After completion of construction, there will be several distinct phases for the operation of the modified Additional Work. The activities will be different for each period. The periods and the associated activities are as follows:

A. Active Phase: This is defined as the period of operation of the augmented SVE trench system.

B. Phase I Monitoring: This is defined as a one-year period beginning when the Soil Vapor Standards have been achieved in the augmented SVE trenches. At the completion of the Phase I Monitoring period, Phase II Long-term Monitoring will begin at the Site.

C. Phase II Long-term Monitoring: This is defined as the period following the completion of Phase I Monitoring.

Additionally, as contemplated by the amended ROD, because the SVE system did not achieve the cleanup standards, the focus of the remedy has shifted to preventing migration of contamination off of the Site. The barrier wall and reactive gate are expected to provide a containment and treatment system. The barrier wall has been installed and the remaining components of the revised contingent remedy are currently under construction and to begin operation in 2008. System operations and O&M costs will be evaluated in the next five-year review if there is adequate data at that time. O&M costs since the last five-year review are provided in Table 3.

Table 3: Annual O & M Costs from March 30, 2003 through December 30, 2007

2003	$35,497.78
2004	$43,398.45
2005	$67,699.57
2006	$17,149.30
2007	$27,778.81
TOTAL	$191,523.91

Surface Water and Groundwater Monitoring Systems

The monitoring system consists of surface water monitoring points, groundwater monitoring wells and piezometers. Installation of the groundwater monitoring wells has been documented

including boring logs and well construction details. Monitoring will be restarted after the construction is completed.

The Remedial Action systems were inspected and found to comply with the intent of the Remedial Design. The Settling Defendants are represented by Trustees who have contracted with Environ and others to perform site operation and maintenance (O&M) activities. The work is being conducted in accordance with O&M requirements. The O&M requirements incorporate all EPA and State quality assurance and quality control procedures and protocols.

The long-term remedial action requirements at the site for O&M include, but are not limited to routine maintenance of any groundwater monitoring systems, fencing and warning signs; and periodic sampling and testing of groundwater monitoring wells and surface water.

V. Progress Since the Last Review

Table 4: Actions Taken Since the Last Five-Year Review

Issues from Previous Review	Recommendations/ Follow-up Actions	Party Responsible	Milestone Date	Action Taken and Outcome	Date of Action
Remedy Failure	Further remedial action is necessary	PRP	04/30/2009	ESD	9/2006
Fence	The openings in the fence should be repaired, all openings should be closed, vegetative growth should be removed, and protective bumpers or equivalent protective devices should be installed to protect the fence from the heavy equipment operating in the area.	PRP	12/02/2003	Repairs completed and confirmed in writing	2004
Fence and Signs	The fence and warning signs should be regularly inspected for integrity and repaired as necessary.	PRP	12/02/2003	Inspections conducted, repairs completed, and confirmed in writing	2004
Wells	The groundwater monitoring wells and casings should be inspected for integrity and repaired as necessary. Casings should be provided where missing and all casings should be locked.	PRP	12/02/2003	Inspections conducted, repairs completed, and confirmed in writing	2004

VI. Five-Year Review Process

Administrative Components of the Five-Year Review Process
EPA notified the Trustees representing the PRPs for the site and IDEM informally of the five-year review in early 2007. Additional notification included a formal written notification on October 22, 2007.

Community Notification and Involvement
The community notification included a newspaper ad in the Zionsville Times Sentinel on March 28, 2007.

Document Review
Relevant portions of previous documents were reviewed including the ROD, ROD amendment, ESDs, consent decrees, and the first five-year review.

Data Review
The failure of the remedy was documented in the first five-year review, the SVE system has been shut down since early 2001, and additional remedial action modifying the original remedial action is under construction. Therefore, additional data was not collected and reviewed for the purposes of this five-year review. EPA expects the Trustees to conduct monitoring of surface water, fine-grained sediments, and groundwater; and evaluate the potential for vapor intrusion issues in the summer of 2008. Data collected during or after construction of the additional remedial action will be reviewed in the next five-year review.

Interviews
The community involvement plan was updated in December 2007 by EPA. EPA conducted interviews in support of the community involvement plan. Additional interviews solely for the purpose of the five-year review were not deemed necessary.

Site Inspection
EPA, IDEM, and representatives of the PRPs inspected the site on Friday, January 11, 2007. The inspection included the monitoring wells, vegetative cover, silt fence, drainage ditches, access roads, security fence, above-ground utilities, treatment building, tanks and ancillary piping. In addition to the remedy failure to be addressed by the current remedial action activities, EPA only noted minor site issues such as fencing maintenance, unsecured electrical boxes and conduit, an unsecured monitoring well cover and sediment accumulation in some drainage ditches leading to Unnamed Ditch. With the exception of the sediment accumulation, all of these minor site issues were promptly addressed by the PRPs before the completion of this report. IDEM is following up on the discharge of surface water from off-site that may be related to the sediment accumulation issue.

VII. Technical Assessment

Question A: Is the Remedy functioning as intended by the Decision Document

No. Since the last five-year review was completed, the SVE treatment system required by the 1997 ESD has been shut down and the remedial action activities have failed to meet cleanup standards. The containment component of the selected remedy was a low permeability cover and it appears to be in good condition; however, it can't prevent the release of hazardous substances in contact with the groundwater. Changes in operating procedures would not be expected to maintain the effectiveness of response actions; however, additional remedial action is under construction. Given the current SVE treatment system has been shut down and additional remedial action is under construction, O&M costs, optimization opportunities to improve the performance and/or reduce costs will be evaluated in the next five-year review. The failure of the remedial action could place protectiveness at risk in the future. Access controls are in place to prevent exposure (*e.g.*, fencing and warning signs). ICs are also in place to prevent exposure and interference with the remedial action. Removal actions necessary to ensure that immediate threats have been addressed were completed in the 1980's. Based on inspections, monitoring and interviews, there appears to be compliance with the objectives of the required land and groundwater restrictions.

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

Yes. Since the last five-year review was completed, there has been no new information that standards identified in the ROD have been revised and call into question the protectiveness of the remedy. Potential Federal ARARs of the ROD consist of the Clean Water Act, the Clean Air Act, National Ambient Air Quality Standard, and OSHA and DOT standards. Potential State ARARs include the groundwater standards and other appropriate sections of Part 201 and Part 31 of the Natural Resources and Environmental Protection Act (NREPA), 1994 PA 451, as amended. With the exception of arsenic, neither Federal MCLs nor State groundwater standards have changed significantly since the time of the ROD, as amended. Federal and State standards for surface water quality and protection of aquatic life have not changed since the time of the ROD, as amended. Toxicity and other factors for some contaminants of concern have not changed significantly except for 1,1-dichloroethane as discussed previously in this report under the section entitled, "Remedy Implementation." For more information see the Agency for Toxic Substances and Disease Registry's toxicological profile for DCA available online at http://www.atsdr.cdc.gov/toxprofiles/tp133.html Changes in risk assessment methodologies since the time of the ROD do not significantly impact the protectiveness of the remedy. There are no known newly promulgated standards applicable to the site. There is no known use of TBCs to establish cleanup levels at the site. Land use or expected land use on or near the site has not changed. There has been no new identification of or changes to human health or ecological routes of exposure or receptors that may affect the protectiveness of the remedy. There are no known newly identified contaminants or contaminant sources. Unanticipated toxic byproducts of the remedy not previously addressed by the decision documents have not been identified. Physical site conditions or the understanding of these conditions have not changed in a way that

could affect the protectiveness of the remedy. Toxicity factors for contaminants of concern at the site have not changed in a way that could affect the protectiveness of the remedy. Other contaminant characteristics have not changed in a way that could affect the protectiveness of the remedy. Standardized risk assessment methodologies have not changed in a way that could affect the protectiveness of the remedy. The remedy is not expected to progress toward meeting the RAOs until the operation of the additional remedial action. Finally, no Site uses which are inconsistent with the implemented ICs or the remedy IC objectives have been noted during the Site inspection or via interviews. Long-term protectiveness requires compliance with effective ICs.

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

No. Since the last five-year review was completed, no other new information has come to light that may affect the protectiveness of the remedy. New ecological or human health risks have not been identified. There have been no impacts from natural disasters.

Technical Assessment Summary

ICs are in place that prohibit interference with the site including the use of groundwater. Based on inspections, monitoring and interviews, there appears to be compliance with the land and groundwater use restrictions. The property is currently zoned for commercial industrial use. Future industrial uses on adjacent parcels are not anticipated to significantly impact the site. Public water supply is available in the area. Any significant future groundwater demand could only be met through deep wells because of the limitations of the shallower till unit underlying the area. The confining unit is expected to prevent migration of shallow contamination to the deeper groundwater.

Additional remedial action contemplated in the Consent Decree and described in the 2006 ESD is necessary to ensure protectiveness. The Trustees who represent the PRPs for the site are completing construction of the additional remedial action. The only outstanding issue and recommendation from the previous five-year review is remedy failure, and the implementation of the containment remedy required upon failure of the treatment remedy.

VIII. Issues

Construction is ongoing to address the failure of the remedy and is expected to be completed in 2008. Further IC evaluation and planning activities are needed to assure the ICs continue to function as intended. Long-term stewardship must be assured which includes maintaining and monitoring effective ICs.

Table 5: Issues

Issues	Affects Current Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
Remedy failure to meet performance standards	N	Y
Further IC Evaluation is needed to assure the ICs continue to function as intended	N	Y
Long-term stewardship must be assured which includes maintaining and monitoring effective ICs.	N	Y

IX. Recommendations and Follow-up Actions

The PRPs should continue to complete the following: construction of the ongoing remedial action activities; and operation and monitoring of the remedy; and additional IC evaluation and planning activities to ensure future protectiveness.

Table 6: Recommendations and Follow-up Actions

Issue	Recommendations and Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
Remedy Failure	Complete construction, operate and monitor remedy	PRP	EPA	4/30/2009	N	Y
Further IC Evaluation is needed to assure the ICs continue to function as intended	Conduct additional IC evaluation activities.	PRP	EPA	10/30/2008	N	Y
Long-term stewardship must be assured which includes maintaining, monitoring, and enforcing effective ICs.	Based upon the IC evaluation activities, an IC Plan will be prepared for required follow-up actions to assure that the remedy remains protective including planning for implementation of ICs and long-term stewardship.	EPA	EPA	10/30/2009	N	Y

X. Protectiveness Statement(s)

The remedy is expected to be protective of human health and the environment upon completion of the additional remedial action and in the short term exposure pathways that could result in unacceptable risks are being controlled. In order for the remedy to be protective in the long-term additional remedial action contemplated in the Consent Decree and described in the 2006 ESD is necessary to ensure protectiveness. The Trustees who represent the PRPs for the site are completing construction of the additional remedial action. Long-term protectiveness requires compliance with effective ICs. Long-term stewardship must be assured which includes implementing, maintaining and monitoring effective ICs.

XI. Next Review

The next five-year review for the Site is required five years from the date of this review.

Attachments

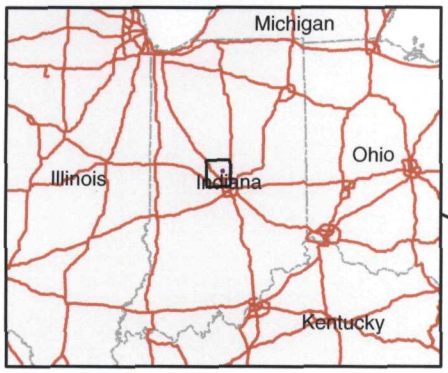
Site Maps

Site Location

Superfund
U.S. Environmental Protection Agency

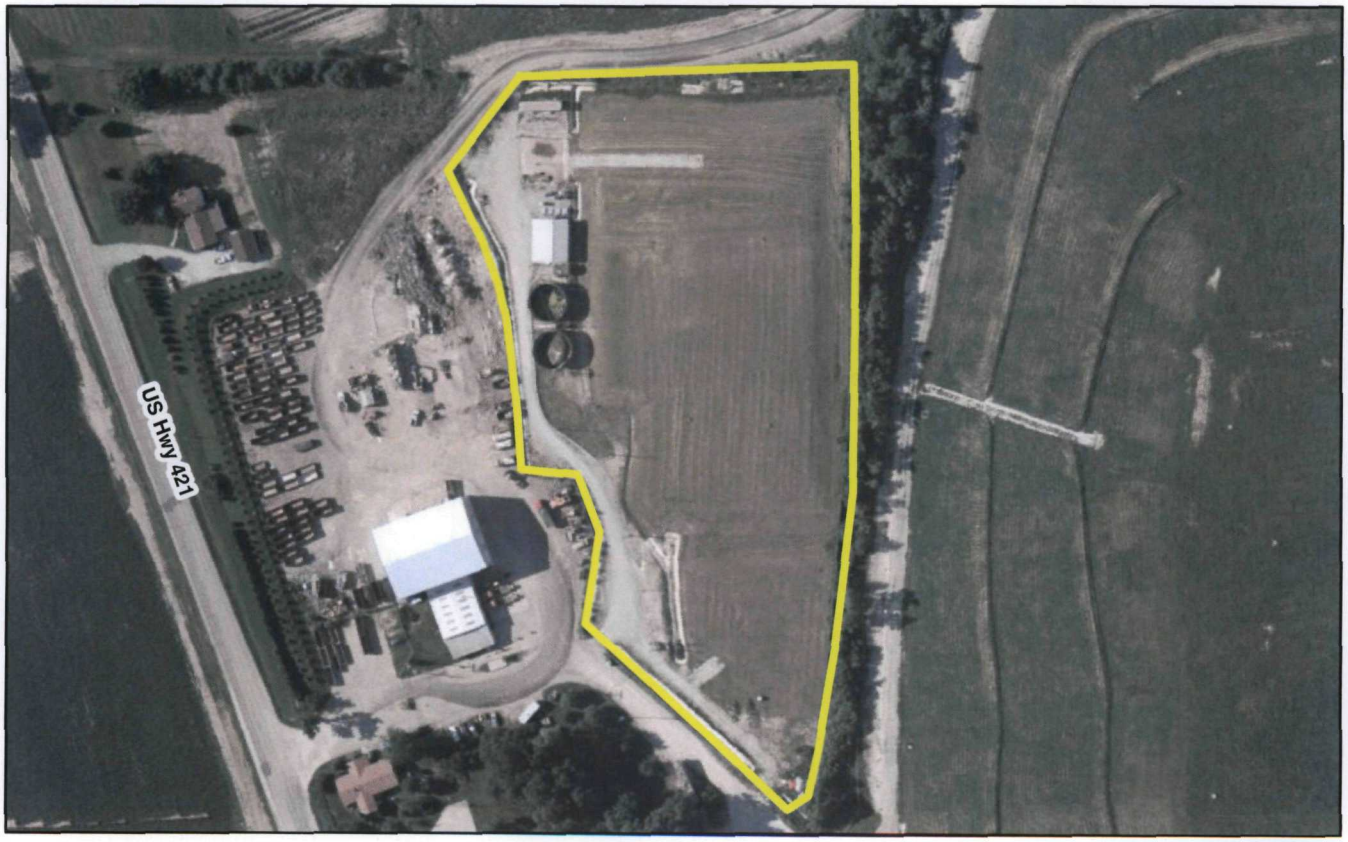
EnviroChem Corporation
Boone County, IN

IND084259951



State

County



Site

Legend

EnviroChem Corp. Site

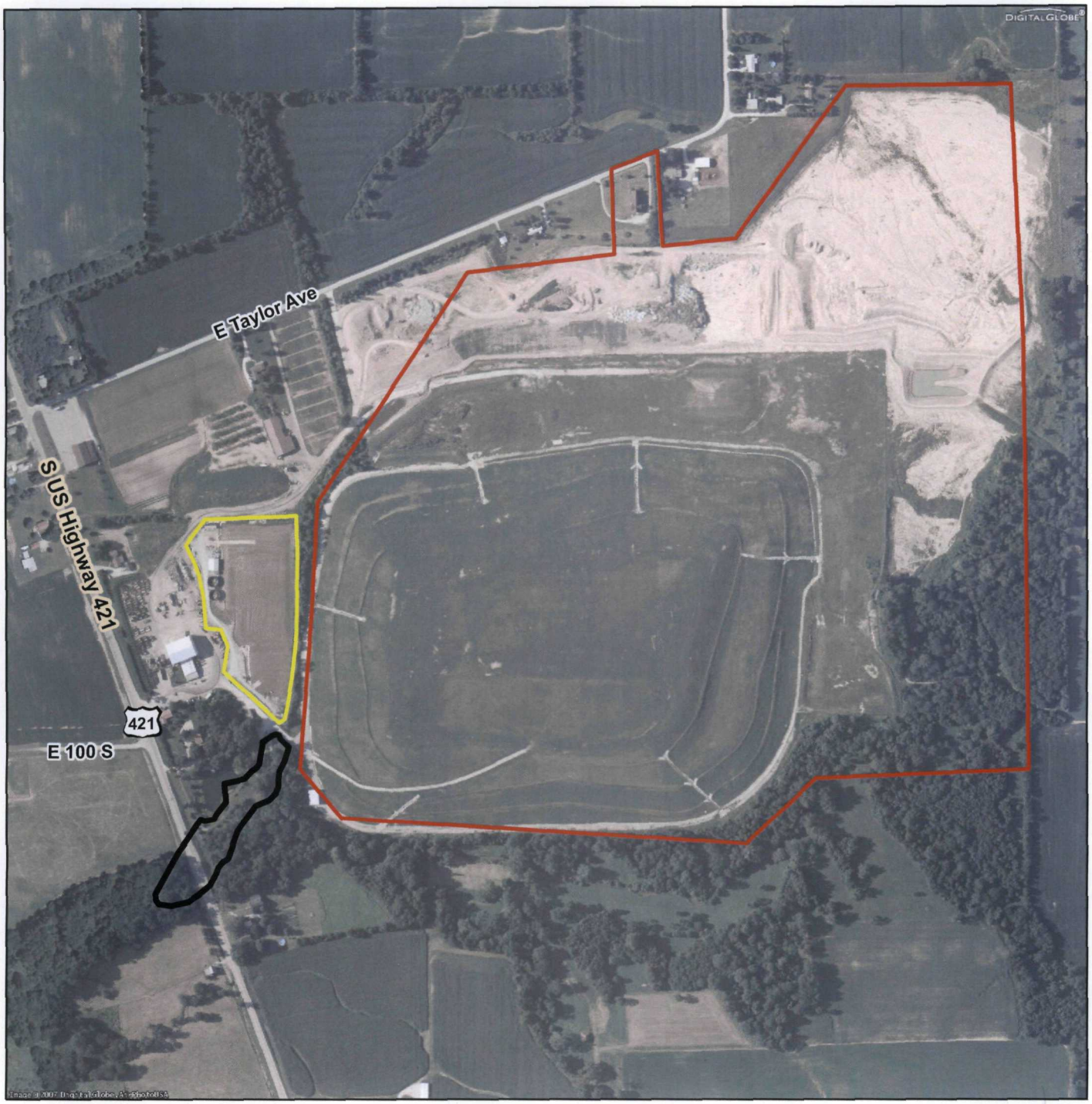
N

Produced by Julie Schilf
U.S. EPA Region 5 on 4/3/08
Image Date: 2005

GEOS
Groundwater Evaluation and Optimization System

EnviroChem Corporation
Boone County, IN

IND084259951



0.25 Miles

Legend

- Northside Sanitary Landfill
- Third Site Boundary
- EnviroChem Corp.

N

Produced by Julie Schilf
U.S. EPA Region 5 on 4/3/08
Image Date: 2005

GEOS
Groundwater Evaluations and Optimization System