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FIGURE 1 & 2 - SITE MAPS; TABLES (PAGE 11 & 12)

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Rev. 07/10/02

Five-year Review Report

Second Five-year Review Report

For

Main Street Well Field
Elkhart, Indiana

September 2002

PREPARED BY:

United States Environmental Protection Agency
Region 5
Chicago, Illinois

Approved By: **Date:**

9/30/02

William E. Muno
Superfund Division Director
U.S. EPA, Region 5

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Main Street Well Field		
EPA ID *(from WasteLAN)*: IND980794358		
Region: 5	**State:** IN	**City/County:** Elkhart, Indiana
SITE STATUS		
NPL status: ☒ Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction ☐ Operating ☒ Complete		
Multiple Operable Units? ☐ YES ☒ NO	**Construction completion date:** 09/28/95	
Has site been put into reuse? ☒ YES (partially) ☐ NO		
REVIEW STATUS		
Lead agency: ☒ EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: L. Hill		
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA, Region 5	
Review period: 08 /15 / 2002 to 09 / 30 / 2002		
Date(s) of site inspection: 09 / 16 / 2002		
Type of review: Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☒ Regional Discretion		
Review number: ☐ 1 (first) ☒ 2 (second) ☐ 3 (third) ☐ Other (specify)		
Triggering action: ☐ Actual RA On-site Construction at OU # ___ ☐ Actual RA Start at Site ☐ Construction Completion ☒ Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 09/30/97		
Due date *(five years after triggering action date)*: 09/30/02		

Five-Year Review Summary Form, cont'd.

Issues:

There are no significant issues surrounding the remedy at the Site.

Recommendations and Follow-up Actions:

The operations and maintenance activities should be continued for the air stripper.

Groundwater monitoring and sampling should be continued for the Site.

West side responsible party should improve the presentation of analytical data in the groundwater sampling reports.

West side responsible party should resume groundwater sampling immediately.

Protectiveness Statement(s):

All immediate threats at the Site have been addressed, and the remedy is expected to be protective of human health and the environment after the groundwater cleanup goals are achieved within an estimated 20 years.

Long-term Protectiveness:

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate potential migration of contaminants down gradient from the Site. Additional sampling and analysis should be completed within the next 30 days. Current monitoring data indicate that the remedy is functioning as required to achieve groundwater cleanup goals.

Other Comments:

There are no other issues which impact the protectiveness of the remedy.

Executive Summary

The remedy for the Main Street Well Field Superfund Site in Elkhart, Indiana, included an air stripper system, an interceptor well system, a soil vapor extraction system, groundwater monitoring, and institutional controls. The Site achieved construction completion with the signing of the Preliminary Close Out Report on September 28, 1995. The trigger for this five-year review was the completion date of the first five-year review on September 30, 1997.

The assessment of this five-year review found that the remedy was constructed in accordance with the requirements of the Record of Decisions (RODs). The remedy is functioning as designed. The immediate threats have been addressed and the remedy is expected to be protective when all groundwater cleanup goals are achieved.

Main Street Well Field
Elkhart, Indiana

Second Five-year Review Report

I. Introduction

The purpose of a 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 Agency is preparing this Five-year Review report pursuant to CERCLA §121 and the National 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 to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment 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 FR §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.

The United States Environmental Protection Agency (U.S. EPA), Region 5, conducted the five-year review of the remedy implemented at the Main Street Well Field in Elkhart, Indiana ("the Site"). This review was conducted by the Remedial Project Manager for the Site from August through September 2002. *This report documents the results of the review*.

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 in September 1997. The five-year review is required since 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

Contamination of Site reported	1950's
Proposed listing on U.S. EPA National Priorities List	12/30/82
Final listing on U.S. EPA National Priorities List	9/08/83
Phased Remedial Investigation/Feasibility Study conducted at the Site for operable unit 1.	4/1985
ROD issued selecting an remedial action for operable unit 1.	8/02/85
Proposed plan identifying U.S. EPA's preferred remedy for operable unit 2 presented to the public; start of public comment period.	1/23/91
ROD #2 issued by U.S. EPA addressing operable unit #2.	3/29/91
Administrative Order required the responsible parties to implement remedial measures.	2/21/92
Pre-final and final inspection of remedial action.	1/21/94
Remedial Action report submitted to U.S. EPA by responsible parties.	2/22/94
Certified Completion of on-Site construction and remedial action activities.	
Preliminary Close-out Report signed.	9/28/95
Remedial Action Report submitted by responsible party.	9/08/94
O&M Plan submitted to U.S. EPA.	02/1994
Last five year review	09/30/97
Last Site Inspection	09/16/02

II. Background

Physical Characteristics

The Main Street Well Field Site is located in the City of Elkhart, Elkhart, Indiana, at 942 North Main Street. The Site consists of approximately 48 acres of property. The Site is bordered on the north, south, and west by residential areas. Industrial and commercial facilities border the Site on the northeast, east, and southwest. Christiana Creek enters the Site at the northwestern corner and flows through the Site where it is diverted into recharge ponds. The creek exits the Site on the southeast side and discharges to the St. Joseph River. (Refer to Figures 1 and 2.)

Land and Resource Use

The historic and current land use of the Site are similar. The Site has been used as the City of Elkhart's primary source of water. The well field contains 15 production wells, 2 interceptor/production wells, 6 recharge ponds, an air stripper unit, a water treatment facility, and storage tanks.

As mentioned above, the current land use for the surrounding area is residential, light industrial, and agricultural. Recently, the City of Elkhart added biking and jogging trails near the Site. However, it is anticipated that a mix of land uses similar to the current uses will continue around the Site in the future.

Near the Site, there is a coarse sand and gravel unconfined aquifer system ranging from about 140 to 215 feet in thickness. Within the Site area, glacial outwash occurs at depths ranging from 42 to 58 feet. Regionally, below the outwash is a gray and hard to very dense silty clay layer which separates the unconfined aquifer from a deeper aquifer. The lower aquifer ranges from 0 to 120 feet thick within the city boundaries. The confining layer is at least 10 to 160 feet thick. The lower aquifer appears to be absent under the Main Street Well Field Site. Beneath the lower aquifer lie the Devonian and Mississippian shale bedrock.

The regional aquifer is part of a designated sole source aquifer. The direction of the regional groundwater flow is generally south, toward the St. Joseph River and its tributary, Christiana Creek. This southerly flow is more predominant east of the well field. In the area west of the well field, the groundwater flow tends from northwest to southeast toward the well field. The groundwater flow in this area is influenced by natural factors such as Christiana Creek and by groundwater pumping and recharge. The effect of Main Street Well Field on groundwater flow patterns is dependent upon the following: groundwater levels; the number of wells; the location of wells; the rate of pumping of the supply wells; the recharge from Christiana Creek; and other industrial groundwater use and recharge in the area.

The water-table configuration is dramatically influenced by artificial recharge, draw-down from the industrial wells in the area. The response of the water-table is directly related to the number of wells pumping and the respective pumping rates. The groundwater flow patterns are also impacted daily, or even hourly. Therefore, the dynamic nature of the unconfined aquifer and impact of the wells creates the potential for groundwater mixing and rapid fluctuations in flow velocities.

History of Contamination

Since the 1920's, industry near the Main Street Well Field utilized trichloroethene and other chlorinated solvents as part of their process operations. Groundwater contamination was discovered as a result of releases from a fuel tank farm east of the Site during the 1950's. The contamination was addressed by excavating 6 recharge ponds in the well field and diverting water to the ponds from Christiana Creek. Also, the Elkhart Water Works acquired the water rights to the Christiana Creek from the Indiana-Michigan state line to the Main Street Well Field.

In 1981, U.S. EPA conducted a national groundwater supply survey. The Site was found to be contaminated with trichloroethene at 94 ug/L 1,2-dichloroethene at 33 ug/L, 1,1,1-trichloroethane at 5 ug/L and 1,1-dichloroethene at 2 ug/L. In response to this survey, the City of Elkhart performed the following actions which resulted in a temporary decrease of volatile organic concentrations:

- installed observation wells to monitor groundwater on and near Excel and Durakool, corporations on the East Side of the Site;
- constructed two interceptor wells in the well field on the eastern edge of the property;
- took production wells near the contaminated area out of service;
- discharged the interceptor wells to Christiana Creek under a State permit.

In 1982, Durakool and Excel conducted investigations of the extent of trichloroethene contamination at their East side properties. Studies revealed that trichloroethene concentrations ranged from 60 ug/L to 570,000 ug/L. Subsurface soil samples showed trichloroethene contamination to depths of 40 feet, with concentrations ranging from 5,300 ug/L to 270,000 ug/L.

In 1984, trichloroethene concentrations began to increase on the West side of the well field; and by 1985, all 15 production wells showed measurable trichloroethene levels.

Initial Response

As discussed above, groundwater sampling showed that the water quality at the Site was contaminated with volatile organic compounds. This resulted in the Site being proposed for the National Priorities List in December 1982. The Site was listed on the final National Priorities List on September 8, 1983, (48 Federal Register 40658). Observation wells were installed near the Site and identified likely sources of the contamination. The City of Elkhart implemented short term remedial measures which proved to be successful until 1985 when trichloroethene was observed at significantly elevated levels in all of the production wells.

In April 1985, U.S. EPA initiated a remedial investigation/feasibility study at the Site. U.S. EPA divided the Site into two operable units. Operable unit 1 addressed measures for an alternate water supply for the community. Operable unit 2 addressed the remaining Site issues through the second ROD. Both RODs are discussed in more detail in the Remedial Actions section.

Basis for Taking Action

Contaminants

The groundwater investigations indicated that hazardous organic substances were detected in the groundwater at the Site above the Federal and/or State drinking water standards. Among these hazardous substances were trichloroethene, vinyl chloride, and tetrachloroethene. Other hazardous substances such as xylenes, lead, and trichloroethene were detected in a residual paint layer in surface soils on the East side of the Site.

IV. Remedial Actions

Remedy Selection

The ROD for operable unit 1 for the Main Street Well Field Site was signed in August 1985. The remedial action objectives were developed as a result of data collected during sampling efforts and studies. The remedial action objectives for the Site were as described below:

Source Control Response Objective

- Reduce risks to human health by preventing direct contact with contaminated groundwater; and,

- Reduce risks to human health by preventing ingestion of contaminated groundwater.

These objectives were accomplished by the following remedial actions:

- providing an alternate water supply to the City of Elkhart
- installation of an air stripper treatment system
- installation of 2 interceptor wells
- reconfiguration of production well flows.

Remedy Implementation

While the remedial components for the first ROD were underway, U.S. EPA issued a remedial investigation report for operable unit 2 in May 1989. This report was supplemented by a technical memorandum and feasibility study for operable unit 2 in January 1991. A second ROD was signed on April 29, 1991. The purpose of the second ROD were to provide remediation of the soil and groundwater contamination on the East side of the well field and to provide the restoration of the well field by intercepting the plume from undefined sources on the West side of the well field.

The second ROD required the East side responsible parties to:

- install additional interceptor wells to prevent plume migration and provide well field restoration;

- monitor groundwater to ensure adequate performance of the air stripper and attainment of groundwater standards;

- delineate the extent of volatile organic compound contamination in the soils;

- design, construction, and operate an in-situ soil vapor extraction system to remove volatile organic compounds from contaminant soils;

- to remove and dispose off-Site the paint residue layer and areas of soil exceeding clean up standards;

- implement institutional controls on the East side of the Site until cleanup goals are met.

A unilateral administrative order was issued to the responsible parties in January 1992 and became effective in February 1992. This order, among other things, transferred financial responsibility for the operation and maintenance of the air stripper to the East and West side responsible parties.

Institutional controls were established and recorded in the Elkhart County Recorder's Office on August 18, 1992. The objective of the institutional controls was to reduce risks to human health by preventing direct contact or exposure to contaminated groundwater. Specifically, the restrictions were as follows:

- no consumptive or other use of the groundwater underlying the Excel property for purposes other than compliance with the administrative order;

- no future use of the Excel property that may interfere with the work performed under the administrative order;

- except as contemplated by the administrative order, no residential or recreational use of the Excel property including, but not limited to, any construction of residences, excavation, grading, filling, drilling, mining or other construction or development, farming, placing of any waste material at any portion of the property or any other activity which may damage or impair the effectiveness of any remedial action undertaken pursuant to the administrative order, except with the approval of the U.S. EPA.

U.S. EPA approved the final design report for the soil vapor extraction system on September 30, 1993. Remedial action construction activities commenced in October 1993. Construction of the soil vapor extraction system was completed in January 1994 and full scale operation of the system began in February 1994. The system consisted of 5 extraction wells and 2 separate blower stations. Soil vapor extraction blower station #1 was located on the Excel property and was connected to vapor extraction wells EW1, EW4A, EW5A, and EW6A. Soil vapor extraction blower station #2 was located on Durakool's property and was connected to vapor extraction well EW2A.

On January 21, 1994, U.S. EPA conducted the final inspection of the remedial action. The Site achieved construction completion status when the Preliminary Close Out Report was signed on September 28, 1995.

U.S. EPA and the State have determined that all remedial action construction activities were performed according to specifications. It is anticipated that the cleanup levels for all groundwater contaminants will be reached 20 years after the start of the remedial action. After all cleanup standards have been met, U.S. EPA will issue a Final Close Out Report.

System Operation/Operation and Maintenance

The East side responsible parties submitted an operation and maintenance (O&M) plan to U.S. EPA in February 1994. The plan included the O&M activities for the soil vapor extraction system. The O&M plan included procedures for proper operation and inspection of the system. Inspections of the soil vapor extraction system consisted of, among other things, visual inspections of the system for leaks, excessive vibrations, noise, overheating conditions, and the recording of operating parameters such as flow rates, temperatures, pressures, water levels, weather conditions, and maintenance activities performed.

The primary ongoing Site costs include expenses associated with the groundwater sampling, the maintenance of the groundwater monitoring and interceptor wells, the operation of the air stripper, the maintenance of the air stripper, operation of pumps, maintenance of pumps, tanks, and fencing. The ROD estimated annual O&M costs at $130,000 to $170,000. Current annual O&M costs are within an acceptable range.

V. Progress Since the Last Five Year Review

Since the last five-year review, the Site continued to operate in accordance with the RODs and the administrative orders. The protectiveness statement from the last review stated that the remedies selected for this Site remain protective of the public health and the environment. As well, the last five-year review recommended the continuation of monitoring the remedial action. This recommendation was followed. Operation and maintenance of the remedial action components have continued at the Site while the State and Federal agencies have monitored compliance with the remedy.

In October 1998, the East side responsible parties submitted a recommendation and a program to initiate pulsed operation of the soil vapor extraction system. This recommendation was made because the East side responsible parties believed the soil vapor extraction system analytical data suggested that the volatile organic compound mass extraction rates had reached asymptotic conditions. (Attachment 1). The program included the following:

- shut down of the soil vapor extraction system for 2 weeks to allow the adsorbed volatile organic compounds to equilibrate with the soil gas phase;

- restart of the soil vapor extraction system to purge extraction wells with soil gas from the area around the screened interval;
- collection of static soil gas samples from each of the 5 vapor extraction wells (EW-1, EW-2A, EW-4A, EW-5A and EW-6A);
- collection of field measurements of static soil gas concentrations during pulsed operation of the soil vapor extraction system;
- collection of grab samples of soil gas from sampling ports at extraction wells under static conditions during soil vapor extraction system shutdown.

The program commenced in November/December 1998 (January 1999). Attempts were made to demonstrate asymptotic conditions but were not achieved until December 1999.

VI. Five-year Review Process

Administrative Components

The Main Street Well Field Five-year Review team was led by Lolita Hill of U.S. EPA, Remedial Project Manager for the Main Street Well Field Superfund Site. Also, Stuart Hill, of U.S. EPA, the Community Involvement Coordinator, and Craig Melodia, of the Office of Regional Counsel, participated in the Five-year Review process. Prabhakar Kasarabada of the Indiana Department of Environmental Management assisted in the review as the representative for the State agency.

From August 2002 to September 2002, the review team conducted document review, data review, community involvement, discussions with community residents, a Site Inspection, five-year review report development.

Community Involvement

U.S. EPA notified the public of this review on September 3, 2002, through the Elkhart Truth newspaper. The Remedial Project Manager conducted telephone discussions with community residents to discuss the Site. Residents did not express concerns with the Site operations. Instead, some residents were concerned because the City of Elkhart initiated a project which included the construction of walking and biking trails along the Site. These residents did not want to see the increased traffic in their community. The City of Elkhart was contacted regarding the nature of this construction project and provided more details. The construction of the trails was completed in the Summer of 2002.

U.S. EPA will conclude the review process by providing notification to the public of its findings.

Document Review

This five-year review consisted of a review of relevant documents including groundwater monitoring results, air stripper information, and soil vapor extraction system reports for the East and West sides of the Site. Applicable groundwater cleanup standards and performance standards for the remedy were reviewed.

East Side

The major cleanup standards for the East side of the Site are presented in Table 2.

Table 2. East Side Cleanup Standards

Contaminant	**Groundwater (ug/L)**	**Soil (ug/L)**
trichloroethene	1.0	100
tetracholoroethene	0.6	----
vinyl chloride	0.3	----

Cleanup standards for the soil, groundwater, and air shall not exceed $1x10^{-6}$ based on potential future use for cumulative pathways. Groundwater monitoring shall continue on the East side until the cleanup levels are maintained for 5 consecutive years after the close of the interceptor wells. Cumulative air stripper and soil vapor extraction emissions shall not exceed 3 pounds per hour, 15 pounds per day, or 25 tons per year.

West Side

The major cleanup standards for the West side of the Site included Federal Maximum Contaminant Levels for compounds detected in the groundwater. These compounds and their respective cleanup goals are provided in Table 5.

Table 5. Maximum Contaminant Levels

Groundwater monitoring for the West side of the Site shall continue until the cleanup levels are maintained for 5 consecutive years after the close of the interceptor wells.

Data Review

East Side

Since June 1995, data has been collected from the East side groundwater monitoring wells. Groundwater monitoring wells were sampled annually for metals and quarterly for volatile organic compounds, including vinyl chloride, trichloroethene, and tetrachloroethene. Tetrachloroethene was detected in groundwater monitoring well MW#2 in December 1995 and in MW#10 on February 1996. With the exception of these two tetrachloroethene detections, trichloroethene has been the only volatile organic compound detected at the East side groundwater monitoring wells.

Trichloroethene excursions detected in East side monitoring wells during quarterly sampling events are shown in Table 3. The concentrations of trichloroethene detected in the groundwater monitoring wells appear to vary from well to well.

Table 3. Trichloroethene Concentrations in East Side Wells

Well Number	1997 Concentrations (ug/L)	1998 Concentrations (ug/L)	1999 Concentrations (ug/L)	2000 Concentrations (ug/L)	2001 Concentrations (ug/L)
MW #1	64, 75, 68	45, 65, 71, 58, 55	84, 91, 75, 75	39, 50, 36, 50	68, 63, 51, 56
MW #3	220, 240, 100, 57, 71	200, 200, 140, 87, 86, 53, 38, 39, 39	280, 300, 160, 140, 160, 130, 98, 100	82, 74,120, 120, 48, 47, 190, 190	110, 110, 79, 92, 58, 63, 340, 320
MW #4	28, 18, 85	49, 12, 12, 47, 33	40, 16, 84, 45	23, 15, 38, 37	48, 6, 12, 21
MW #27	7.9, 5.6, 6.2	5.9	6.0, 5.1	no detections	5.9

Data has been collected from the East side soil vapor extraction system since February 1994. Trichloroethene (TCE) concentrations in the extracted air and the mass removal rate were calculated from the soil vapor extraction system data for blower station #1 and #2. Trichloroethene extracted from the system are included in Table 4.

Table 4. TCE from East Side Soil Vapor Extraction System Blower Station #1 and #2

Date	TCE Extracted (mg/m3)	TCE Extracted (lbs/day)	TCE Extracted (lbs)	Date	TCE Extracted (mg/m3)	TCE Extracted (lbs/day)	TCE Extracted (lbs)
02/02/94	220	2.83	0	02/02/94	8.9	0.07	0
05/05/94	250	3.25	299	05/05/94	18.5	0.13	12
09/01/94	120	1.62	193	09/01/94	10.0	0.08	10
01/31/95	49	0.67	101	01/31/95	2.1	0.01	2
06/20/95	200	2.72	381	06/20/95	14	0.10	14
08/15/95	130	1.97	111	08/15/95	14	0.12	7
10/18/95	140	1.90	122	10/18/95	9.7	0.09	6
12/28/95	15	0.20	14	- - -	- - -	- - -	- - -
02/23/96	87	1.19	68	05/23/96	3.0	0.02	4
03/15/96	12	0.16	3	08/28/96	2	0.01	1
08/28/96	16	0.22	36	11/22/96	13	0.09	8
11/21/96	54	0.73	62	02/25/97	1.5	0.01	1
02/25/97	22	0.30	29	05/22/97	3.6	0.02	2
05/22/97	23	0.32	27	08/29/97	0.1	0.00	0
08/29/97	18	0.25	24	01/22/98	0.3	0.00	0
01/22/98	4	0.06	8	02/25/98	1.0	0.01	0
02/25/98	18	0.24	8	06/03/98	3.6	0.02	2
08/21/98	20	0.27	21	08/21/98	4.5	0.03	3
12/08/98	20	0.28	30	12/08/98	2.4	0.02	2
03/09/99	6	0.08	8		0.4	0.00	0
05/25/99	13	---	----	05/25/99	3.7	---	- - -
09/16/99	15	0.21	39	09/16/99	8.4	0.05	10
11/18/99	21	0.30	19	11/18/99	3.3	0.00	0

blower station #1 - denoted by unshaded area
blower station #2 - denoted by shaded area

West Side

Groundwater monitoring on the West side of the Site includes monitoring of wells *MW13*, MW#14, MW#15, MW#16, MW#17, MW#18, MW#20, and MW#21. Common program wells are MW#24, MW#24-91, MW#25, MW#26, and GWTB1-01, and GWFB1-01. The wells are sampled semi-annually for volatile organics and sampled annually for inorganics. Analytical results show that inorganics such as metals were not detected in the groundwater samples above their respective maximum

contaminant levels. Trichloroethene and tetrachloroethene were detected during all sampling events in all West side monitoring well. The maximum contaminant level for trichloroethene was exceeded in monitoring wells MW#18 and MW#21. The maximum contaminant level (MCL) for tetrachloroethene was exceeded in monitoring wells MW#14 and MW#16. These excursions are presented in Table 6.

Table 6. Contaminants Exceeding MCLs in West Side Monitoring Wells

Contaminant	**Well No.**	**MCL (ug/L)**	**1997**	**1998**	**1999**	**2000**	**2001**
trichloroethene							
	MW18	5.0	85	92	92, 94	88	48, 46
	MW21	5.0	81	67	66, 67	41, 39	38, 55
tetrachloroethene							
	MW14	5.0	16				
	MW16	5.0	18, 30				

Trichloroethene concentrations in monitoring well MW#18 increased from 1997 to 1999 but began to decrease in the year 2000. There has been a decreasing trend of trichloroethene in monitoring well MW#21 since the beginning of this review period. There does not appear to be an increasing or decreasing trend of tetrachloroethene in monitoring well MW#14 or in monitoring well MW#16.

Site Inspection

An inspection at the Site was conducted on September 16, 2002, by the Remedial Project Manager, and the State Project Manager. Mr. John Mahoney, of Elkhart Water Works, accompanied the inspectors on the West side of the Site. The purpose of the inspection was to assess the protectiveness of the remedial action performed at the Site. During this inspection, the inspectors noted that the City of Elkhart had built a recreation area along the West side of the Site which included paved biking trails, walking trails, swings, and benches. All remedial action components such as the groundwater monitors, air stripper columns, the pumps, and tanks were fenced or secured in buildings and segregated from potential disturbances by park patrons. All fences had gates which were locked. There were no major issues noted related to the West side of the Site.

The East side of the Site was inspected as well. Mr. David Carlson, of Atwood Mobile Products, accompanied the inspectors during the Site visit. It was determined during the inspection that Atwood Mobile Products, a subsidiary of Dura Automotive

currently owns and operates the former Excel Corporation facility. The soil vapor extraction system is located inside of this facility. The soil vapor extraction system was not in operation because the soil cleanup standard was achieved in the year 2000. Groundwater monitoring wells were observed at the Site. Compliance with the deed restrictions was observed. There were no indications of new water sources on the property. There was no evidence of construction activities including excavation, drilling, or grading at the Site, or impairment of remedial action components at the Site. Recreational or residential installations were not observed at the Site.

Interviews

As discussed above, the review team had telephone discussions with citizens who resided near the Site. Some of the residents were concerned because the City of Elkhart implemented a project that would include the construction of paved trails along the West side of the Side. Citizens were concerned about the increased traffic and activity around in the community.

With respect to the actual remedy at the Site, the residents did not identify any problems with the remedy or any emergency responses at the Site since the last five-year review or since the implementation of the remedy.

VII. Technical Assessment

Question A: Is the remedy functioning as intended by the decision documents?

The review of documents, ARARs, risk assumptions, and the results of the Site inspection indicate that the remedy is functioning as intended by the Site RODs. The installation of the interceptor wells, the air stripper, and the soil vapor extraction system have achieved the remedial objectives to minimize the migration of contaminants to groundwater, and to prevent direct contact with, or ingestion of, contaminants in the groundwater and soil.

Operation and maintenance of the interceptor wells, the air stripper, and the soil vapor extraction system have been effective. Equipment repairs or replacements to remedial systems were made as necessary and identified to the U.S EPA. Annual O&M costs are consistent with anticipated cost estimates and there are no indications of any difficulties with the remedy.

There were no opportunities for system optimization observed during this review. The monitoring well networks, the air stripper, and the soil vapor extraction system provided sufficient data to assess the progress of the remedy at the Site. There are no concerns that a plume may be migrating down off-Site. Maintenance of the air stripper,

monitoring wells, and the soil vapor extraction system were sufficient to maintain the overall integrity of the remedy.

The institutional controls were implemented for the Site and have been effective. No activities were observed that would have violated the intent of these institutional controls. There were no new uses of groundwater observed at the Site.

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

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy.

Changes in Standards and Things To Be Considered

As the remedial work has been completed, some of the ARARs or performance standards cited in the RODs have been met. ARARs that still must be met at this time and that have been evaluated include: the Safe Drinking Water Act (40 FR 141.11-141.16) from which many of the groundwater cleanup levels were derived - Maximum Contaminant Levels. There have been no changes in these ARARs and no new standards affecting the protectiveness of the remedy.

Changes in Exposure Pathways, Toxicity, and Other Contaminant Characteristics

The exposure assumptions used to develop the Human Health Risk Assessment included both current exposures (older child trespasser, adult trespasser) and potential future exposures (young and older future child resident, future adult resident and future adult worker). There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. These assumptions are considered to be conservative and reasonable in evaluating risk and developing risk-based cleanup levels. No change to these assumptions, or the cleanup levels developed from them is warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected and it is expected that all groundwater goals will be maintained in the future should the Site conditions and surroundings remain constant.

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

No ecological targets were identified during the baseline risk assessment and none were identified during the five-year review. Therefore monitoring of ecological targets is not necessary. There were no weather-related events have affected the

protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

According to the data reviewed and the Site inspection, the remedy is functioning as intended by the final RODs. There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. Some of the ARARs or performance standards for the Site, as described in the ROD, have been met. There are some performance standards that have not been achieved for volatile organic compounds. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment, and there have been no changes to the standardized risk assessment methodology that could affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Trichloroethene and tetrachloroethene exceeded the maximum contaminant levels at groundwater monitoring wells on the East and West sides of the Site. However, at this time, these excursions do not appear to affect the protectiveness of the remedy. There is evidence of decreasing trichloroethene and tetrachloroethene concentrations in some monitoring wells.

Table 7. Issues

Issue	Currently Affects Protectiveness (yes/no)	Affects Future Protectiveness (yes/no)
Some contaminants exceeded the MCLs and cleanup goals.	No	No
Only one quarterly groundwater monitoring event was conducted in 2002 on the West side of the Site.	No	Yes

IX. Recommendations and Follow-up Actions

The performance standard for the soil vapor extraction system has been achieved. Groundwater monitoring wells have achieved cleanup goals for some contaminants. Other contaminants in the groundwater have not reached the cleanup goals. Therefore, the recommendation resulting from this five year review would be to

continue operation and/or maintenance of the air stripper and the groundwater monitoring wells until all performance standards are achieved.

Table 8. Recommendations and Follow-up Actions

Issue	Recommendations Follow-up Actions	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness? (Yes or No)
air stripper	Continue to perform operations and maintenance related activities.	East side & West side responsible parties	Federal, State	Until cleanup goals are met for all contaminants.	No, current. No, future.
groundwater monitoring	Resume quarterly groundwater sampling at the West side of the Site and submit analytical reports.	West side responsible party	Federal, State	October 30, 2002	No, current. Yes, future.
groundwater monitoring	Continue to collect and analyze ground water samples; conduct operations and maintenance related activities; and, submit monthly reports.	East side responsible party	Federal, State	Until 5 years after the shut down of interceptor wells the cleanup goals are maintained.	No, current. No, future.
groundwater sampling analytical reports	Actual numerical value of analysis should be reported rather than numerical range of analysis.	West side responsible party	Federal, State	Sept. 30, 2002	No, current. Yes, future.
soil vapor extraction system	System has met cleanup goals.	-------	-------	-------	No, current No, future

X. Protectiveness Statement

The remedy is expected to be protective of human health and the environment upon attainment of all cleanup standards which may be within the next 10 years. In the interim, exposure pathways that could result in unacceptable risks are being controlled by preventing exposure to, or the ingestion of, contaminated groundwater. All threats at the Site have been addressed through the installation and operation of interceptor wells, the air stripper, and the soil vapor extraction system. Fencing is located around the remedial action components to prevent the interference with the remedial action. Site deed restrictions were implemented and have contributed to restricting exposure pathways and threats.

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater samples to fully evaluate potential migration of contaminants

down gradient from the Site. Current data indicate that a plume has not migrated off-Site. Sampling and analysis of groundwater monitoring wells for the presence of volatile organic compounds will be continued on a quarterly basis. The groundwater monitoring wells will be sampled for metals on an annual basis. Current groundwater monitoring data indicate that the remedy is functioning as required to achieve groundwater goals. The air stripper and the interceptor wells are functioning as designed to ensure adequate performance of the remedial action.

XI. Next Review

The next five-year review for the Main Street Well Field Superfund Site is required by September 30, 2007, five years from this review.

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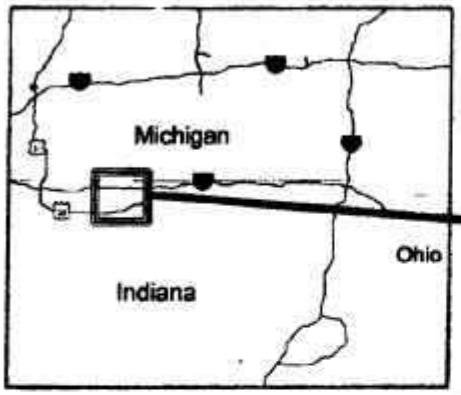
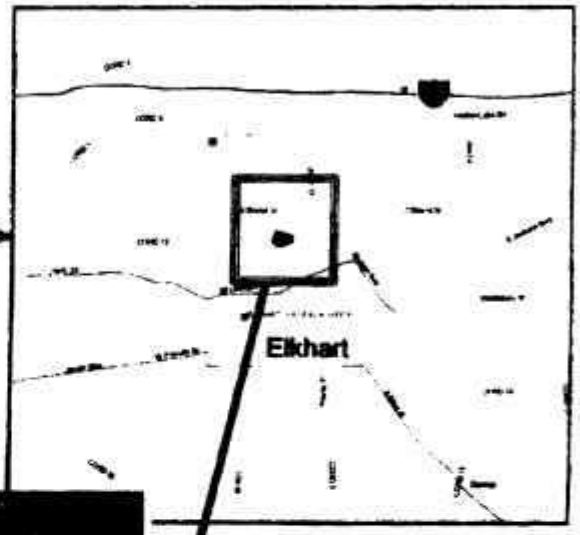
Main Street Well Field Superfund Site
Elkhart County, Indiana

1) State



2) City of Elkhart

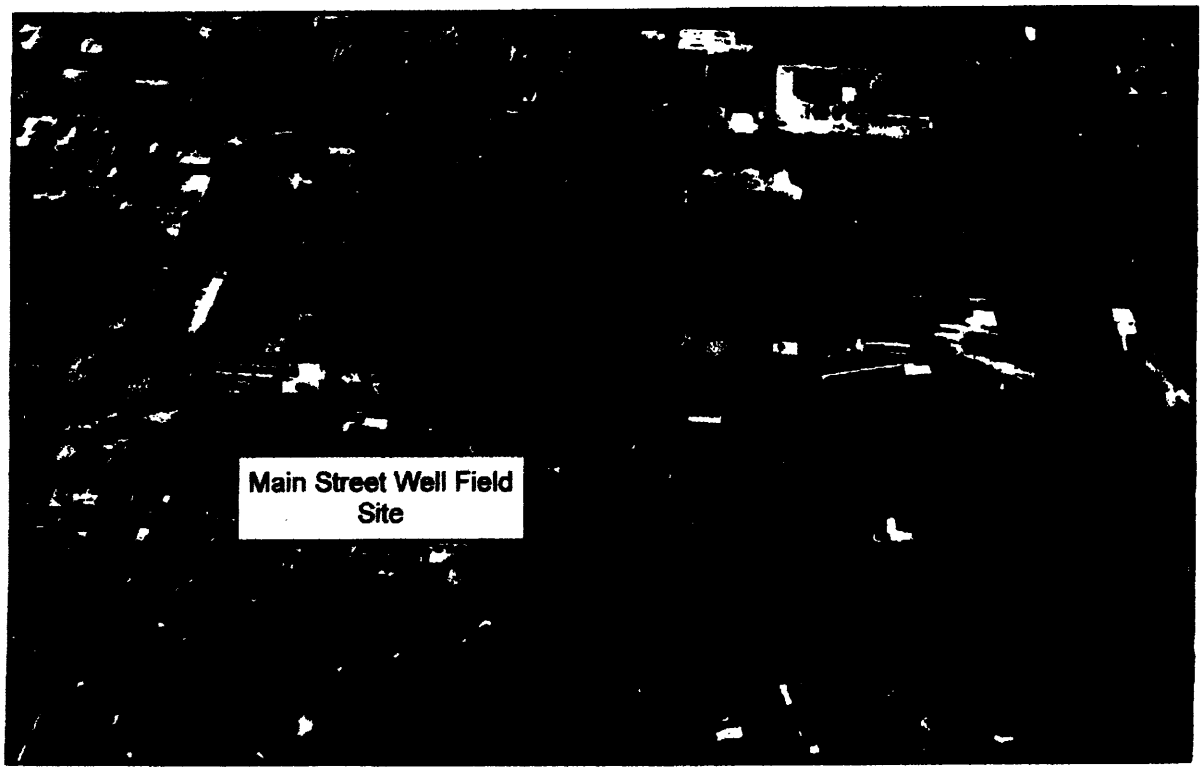


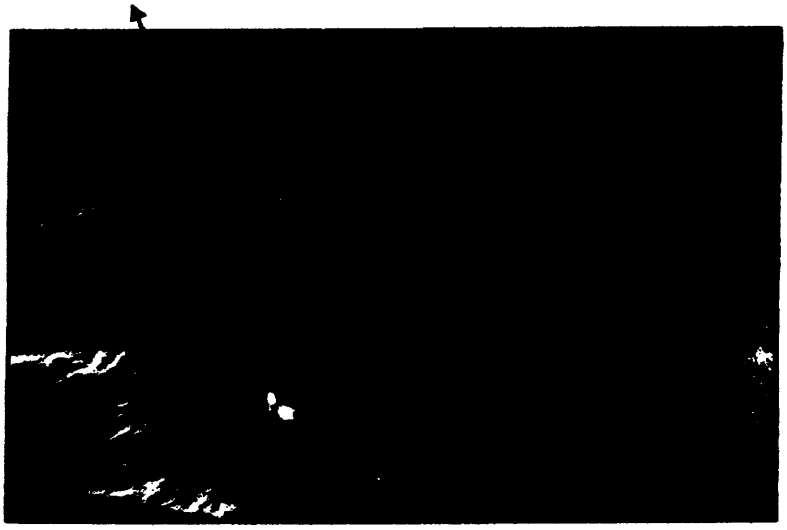
3) Main Street Well Field Superfund Site

Plot created by U.S. EPA Region 5 on 9/12/2002
B&W Image Date 3/20/1999

Figure 1

Main Street Well Field Superfund Site
3D Surface Terrain Model





Elevation Feet

- 262 - 268
- 257 - 262
- 252 - 257
- 247 - 252
- 242 - 247
- 237 - 242
- 232 - 237
- 227 - 232
- 222 - 227

N

Plot created by U.S. EPA Region 5 on 9/15/2002
B&W Image Date 3/20/1999

SEPA [redacted] Region [redacted]

Figure 2

ATTACHMENT 1

ATTACHMENT 1

RECOMMENDATION TO INITIATE PULSED OPERATION
SOIL VAPOR EXTRACTION SYSTEM
EAST SIDE PROPERTIES
MAIN STREET WELL FIELD SITE
ELKHART, INDIANA

SOIL VAPOR EXTRACTION SYSTEM EVALUATION

Subsurface volatile organic compound (VOC) removal from SVE system operations generally starts at a relatively high rate, declines rapidly and eventually approaches an asymptotic value. This decrease may indicate the change from advective transport of VOCs to a diffusion limited transport. Extracted vapor monitoring data can be utilized to evaluate changes in VOC mass removal rates and may be used to predict eventual asymptotic VOC concentrations. Following a reasonable approach to the asymptotic concentrations in the extracted vapors, SVE system operation may be modified to assess static soil gas concentrations in the vadose zone at various locations.

Based on extracted vapor analytical data collected to date at the East Side Properties, VOC concentrations appear to have reached asymptotic levels. ARCADIS Geraghty & Miller recommends that a program of intermittent system operation be implemented as a means to assess static soil VOC concentrations prior to initiating confirmation soil sampling.

Sampling Program and Procedures

The SVE system will be shut down initially for a period of approximately 2 weeks to allow adsorbed VOCs, if present, to equilibrate with the soil gas phase. Static soil gas samples will then be obtained from each of the five (5) vapor extraction wells (EW-1, EW-2A, EW-4A, EW-5A and EW-6A) at the East Side Properties for chemical analysis. Prior to collection of the soil gas samples from the vapor extraction wells, the SVE system will be restarted for a period of

approximately five (5) minutes to purge the extraction wells with soil gas from the area around the screened interval. Static soil gas samples will then be obtained at the extraction well heads by disconnecting the vacuum gauge and filling an evacuated SUMMA canister with gas from each extraction well. The canister will be labeled to show date and time, as well as the well location sampled, and the elapsed operating time since the SVE system startup.

Field measurements of static soil gas concentrations will also be made during pulsed operation of the SVE system as part of the monitoring program. Field samples of soil gas will be collected using Tedlar bags. Grab samples of soil gas will be collected from sampling ports at each of the individual vapor extraction wells under static conditions (SVE system shutdown). Teflon™ tubing will be connected to a vacuum pump that will be used to draw the soil gas sample from the sampling port at each well head.

Evaluation of Static Soil Gas Monitoring Data

Static soil gas concentrations may be used to provide a reasonable estimate of equilibrium VOC concentrations in soil. By using an average partition coefficient, soil gas concentrations may be related to average soil concentrations and compared to the target levels established for the East Side Properties. It is expected that the initial static soil gas levels will result in VOC concentration "spikes", which are significantly higher than the asymptotic values that have been observed in the extracted vapor samples. In this case, continuous operation of the SVE system will be resumed with normally scheduled extracted vapor sampling until TCE concentrations again decrease to asymptotic levels, at which point another round of static soil gas samples will be collected for chemical analysis.

Soil gas concentrations in the extraction wells will also be monitored in the field during pulsed system operation. The field measurements of static soil gas concentrations will be performed periodically between the regularly scheduled extracted vapor sampling events. The field measurements of static soil gas will be compared to the asymptotic levels measured during

the extracted vapor sampling, and also to calculated soil gas concentrations corresponding to chemical equilibrium with the soil cleanup objective.

Several restarts of the SVE system may be required before the static soil gas concentrations approach the asymptotic levels. This “pulsed” operation cycle will be repeated until either the sampling results indicate that asymptotic levels are maintained without the appearance of any soil gas “spikes”, or until static soil gas levels are below the calculated equilibrium level of TCE.

Note also that since individual wells and areas at the East Side Properties will be sampled, it may become apparent that certain Target Areas at the site are being remediated sooner than others. When sufficient evidence exists to shut down certain vapor extraction wells and/or conduct confirmatory soil sampling for certain Target Areas at the site, the Respondents will petition EPA for closure of that particular area.

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