



Five-Year Review Report

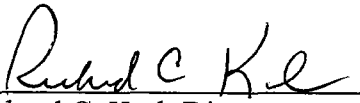
Second Five-Year Review Report Vandale Junkyard Superfund Site Washington County, Ohio

February 2009

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List of Abbreviations and Acronyms

ARAR	Applicable or Relevant and Appropriate Requirement
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	Contaminant of Concern
DCE	Dichloroethylene
EC	Environmental Covenant
EMI	Engineering Management, Incorporated (the PRP Group Project Coordinator)
EPA	United States Environmental Protection Agency
CFR	Code of Federal Regulations
CIC	Community Involvement Coordinator
GEOS	Groundwater Evaluation and Optimization System
HDPE	High-Density Polyethylene
IMMP	Inspection, Maintenance, and Monitoring Plan
IC	Institutional Control
IOC	Inorganic Compound
LPL	Lower prediction limit
LURA	Land Use Restriction Agreement
MNA	Monitored Natural Attenuation
NCP	National Contingency Plan
NPL	National Priorities List
OAC	Ohio Administrative Code
Ohio EPA	Ohio Environmental Protection Agency
O&M	Operation and Maintenance

List of Abbreviations and Acronyms, cont.

PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethylene
PRP	Potentially Responsible Party
RA	Remedial Action
RAO	Remedial Action Objective
RCRA	Resource Conservation and Recovery Act
RD	Remedial Design
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RPM	Remedial Project Manager
SVOC	Semi-volatile Organic Compound
TBC	To Be Considered
TCA	Trichloroethane
TCE	Trichloroethylene
UAO	Unilateral Administrative Order
UCL	Upper confidence limit
UU/UE	Unlimited use or unrestricted exposure
UPL	Upper prediction limit
USACE	United States Army Corps of Engineers
U.S. EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compound

Executive Summary

The remedy for the Vandale Junkyard Superfund Site in Washington County, Ohio includes off-site disposal of hazardous wastes exposed during the soil and solid waste consolidation activity; consolidation of soils and solid wastes exceeding soil cleanup levels under a hazardous waste cap; institutional controls (ICs); monitored natural attenuation (MNA) of groundwater, sediments, and surface water; and other operation and maintenance (O&M) requirements such as cap mowing, inspection, and repair. The Site achieved construction completion with the signing of the Preliminary Close Out Report (PCOR) on July 7, 2000. The trigger for this Five-Year Review is the completion date of the first Five-Year Review Report of April 15, 2004.

The assessment of this Five-Year Review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The constructed waste cap portion of the remedy is functioning as designed. The remedy at the Site currently protects human health and the environment because immediate threats at the Site have been addressed. For the long term, the remedy will be protective when groundwater cleanup levels are achieved through MNA. Also, for the remedy to be protective in the long term, the following actions need to be taken: determine the cause of increasing contaminant levels at some monitoring wells and obtain an enforceable environmental covenant that runs with the land on the Vandale property.

Five-Year Review Summary Form

Site name (from CERCLIS): Van Dale Junkyard Superfund Site		
EPA ID (from CERCLIS): OHD980794606		
Region: 5	State: OH	City/County: Washington County
NPL status: <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
Remediation status (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
Multiple Operable Units (OU)? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	Construction completion date: July 7, 2000	
Has site been put into reuse? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
Lead agency: <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
Author name: Ronald W. Murawski		
Author title: Remedial Project Manager	Author affiliation: U.S. EPA, Region 5	
Review period: July 2008 to February 2009		
Date of Site inspection: September 3, 2008		
Type of review: <input checked="" type="checkbox"/> Post-SARA <input type="checkbox"/> Pre-SARA <input type="checkbox"/> NPL-Removal only <input type="checkbox"/> Non-NPL Remedial Action Site <input type="checkbox"/> NPL State/Tribe-lead <input type="checkbox"/> Regional Discretion		
Review number: <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
Triggering action: <input type="checkbox"/> Actual RA On-site Construction at OU #____ <input type="checkbox"/> Actual RA Start at OU# N/A <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
Triggering action date (from CERCLIS): April 15, 2004		
Due date (five years after triggering action date): April 15, 2009		

Issues:

1. Groundwater contaminant levels are increasing at certain monitoring wells.
2. An enforceable Environmental Covenant is not in place to restrict Site use.
3. Long-term stewardship must be assured to include maintaining and monitoring ICs; these ICs include the implementation of a communications plan.

Recommendations and Follow-up Actions:

1. Evaluate the reason for increasing groundwater contaminant levels at some wells and evaluate the effectiveness of the MNA component of the remedy. Also, produce a Contingency Evaluation Report as described in Section 3.7 of the April 2001 Inspection, Maintenance, and Monitoring Plan.
2. Continue to work with the Site owner and his attorney to obtain an enforceable Environmental Covenant.
3. Develop an IC Plan that includes planning for additional IC evaluation activities as needed and planning for long-term stewardship.

Protectiveness Statement:

The assessment of this Five-Year Review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The constructed waste cap portion of the remedy is functioning as designed. The remedy at the Site currently protects human health and the environment because immediate threats at the Site have been addressed. For the long term, the remedy will be protective when groundwater cleanup levels are achieved through MNA. Also, for the remedy to be protective in the long term, the following actions need to be taken: determine the cause of increasing contaminant levels at some groundwater monitoring wells and obtain an enforceable environmental covenant that runs with the land on the Vandale property.

Other Comments:

None.

**VANDALE JUNKYARD SUPERFUND SITE
WASHINGTON COUNTY, OHIO
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 (U.S. EPA) 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.

U.S. EPA 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.

U.S. EPA Region 5 conducted the Five-Year Review of the remedy implemented at the Vandale Junkyard Superfund Site in Washington County, Ohio. This review was conducted for the entire Site from July 2008 to February 2009 by a regulatory team headed by U.S. EPA and including Ohio EPA. This report documents the results of the review.

This is the second Five-Year Review for the Vandale Junkyard Superfund Site. The triggering action for this statutory review is the completion date of the first Five-Year Review of April 15, 2004. This 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

<i>EVENT</i>	<i>DATE</i>
Junkyard operation receives wastes	1945-1980 (est.)
U.S. EPA proposes Site for National Priorities List (NPL)	10/15/1984
Final Listing on U.S. EPA NPL	06/10/1986
U.S. EPA signs Consent Order for PRPs to perform RI/FS	07/24/1987
PRPs begin RI field work	09/1988
U.S. EPA takes over responsibility of the RI from the PRPs	08/18/1990
U.S. EPA completes RI Report	02/18/1992
Public comment period to comment on U.S. EPA's Proposed Plan for the preferred remedy	08/27/92-11/13/1992
U.S. EPA presentation to the public of the Proposed Plan	09/10/1992
ROD selecting the remedy is signed	03/31/1994
Unilateral Administrative Order (UAO) issued to PRPs to design and implement the remedy, and reimburse U.S. EPA for all response costs incurred by the United States	08/16/1994
Second UAO issued to additional PRPs	10/16/1995
PRP Remedial Design approved by U.S. EPA	01/31/1997
Start of on-site construction to implement the remedy	04/02/1997
PRP Modified Remedial Design approved by U.S. EPA	02/09/1999
Re-start of on-site construction to implement the remedy (date that triggers a five-year review)	04/22/1999
Pre-final inspection of the remedial construction completed	06/09/2000
Preliminary Close Out Report signed	07/07/2000
Final inspection of the remedial construction completed	07/17/2000
Inspection, Maintenance, and Monitoring Plan approved by U.S. EPA (conditional on a Land Use Restriction Agreement being signed and recorded)	04/13/2001
U.S. EPA approves PRP work plan to install additional groundwater monitoring wells	01/31/2003
PRPs issue report of completing new monitoring well installation	08/04/2003

U.S. EPA issues first Five-Year Review Report	04/15/2004
U.S. EPA approves a discontinuance in groundwater monitoring for sulfate, sulfide, phosphate, and ammonia nitrogen	07/28/2004
U.S. EPA approves a reduction in surface water monitoring frequency from quarterly to annually	07/28/2004
U.S. EPA approves a discontinuance in surface water monitoring for naphthalene, bis(2-ethylhexyl)phthalate, antimony, beryllium, cadmium, nickel, and thallium	10/13/2004
U.S. EPA approves the PRP work plan to install two off-site groundwater monitoring wells	10/04/2007
PRPs issue report of completing off-site well monitoring installation (installation completed in October 2007)	01/30/2008
Environmental Covenant recorded in Washington County, Ohio for land east of the Site boundary that includes a portion of the remedy	04/09/2008

III. BACKGROUND

Physical Characteristics

The Vandale Junkyard Site (the Site) is located in a rural area approximately 1.5 miles northeast of Marietta, Ohio, on an unpaved access road off of Marietta Township Road 83 in Washington County. See Figure 1. Marietta is located north of and adjacent to the Ohio River. The Site is located in the rolling hills of the Appalachian Plateau Province in southeastern Ohio. Duck Creek, a small tributary to the Ohio River, is located less than one-quarter of a mile west of the Site. Surface water drainage from the Site flows through two intermittent streams to Duck Creek.

The Site encompasses approximately 31 acres, approximately 10 acres of which were used as a junkyard at the top of the ridge of the Site. The ridge is bordered on the north and east by steep, wooded ravines with depths approaching 200 feet. The remainder of the Site consists of portions of steeply sloped ravines. The Marietta Sanitation Corporation Landfill, now closed, borders the Site on the south.

Land and Resource Use

The Site contains several barns and two mobile-home trailers, one of which is occupied occasionally by the Site owner. The Site also contains various scrap materials and equipment. Agriculture and residential dwellings are the primary land uses in the area. Approximately 200 residences are located within one mile of the Site. According to information provided by the PRP Group (comprised of the PRP Performing Respondents to the UAOs) to U.S. EPA, nearby residents use the City of Marietta public water supply system as a drinking water source. There is no known use of Site groundwater.

The capped area of the Site, approximately four acres on the eastern end, is surrounded by a six-

foot fence with barbed wire and locking gates. Fourteen groundwater monitoring wells exist in and around the capped area. See Figure 2. The current Site owner uses areas outside of the capped area for cattle grazing.

Due mostly to the steeply sloped topography, the Site is not a likely candidate for redevelopment.

History of Contamination

The Vandale Junkyard has been a county-licensed junkyard operation since the early 1960s and may have been operating since the 1940s. During its operation, it received a variety of materials for disposal and/or salvage. These materials included typical household and commercial waste, such as scrap metal, white goods, tires, batteries, automobiles, and non-putrescible municipal waste.

The junkyard also accepted several thousand 55-gallon drums containing variable quantities of industrial waste solvents and degreasers, waste tar and iron cakes, sludges from organic chemical manufacturing, paint thinners, paints, and ink wastes from local and distant industrial firms. The owner reportedly dumped any materials from the drums onto the ground. The owner then reportedly burned the liquids. The owner also reportedly burned any materials inside the drums that could not be poured onto the ground.

The Remedial Investigation (RI) Report demonstrated the existence of widespread organic and inorganic contamination in Site soils, groundwater, surface water, and sediments. The main risk to human health identified in the RI Report is through ingestion of Site groundwater. The contaminants which contribute most to excess risks and hazards in groundwater include antimony, arsenic, barium, bis(2-ethylhexyl) phthalate, cadmium, 1,1-dichloroethene, nickel, tetrachloroethene, vanadium, and vinyl chloride.

Initial Response

Although investigations of hazardous waste disposal at the Site began in 1980 when Ohio Environmental Protection Agency (Ohio EPA) personnel first visited the Site, the Site had a history of complaints to local authorities from nearby residents dating back to at least 1969. Most of the complaints appear to have been related to open-burning and accepting wastes which created nuisances such as odors and rodents. Based on observations of drummed waste at the Site in 1980, U.S. EPA and Ohio EPA conducted preliminary assessments of contamination from 1980 to 1983 under the authority of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA).

The State of Ohio filed suit against the owner/operator of the Site in 1984, and the two parties reached a settlement which assured access to the Site for investigations and prohibited filling, grading, excavation, and burning activities, and any further collection of solid or hazardous waste. Washington County allowed the owner/operator to continue junkyard operations. Since

1984, concern from nearby residents has greatly decreased.

Based on the assessments of the release of hazardous substances, U.S. EPA proposed the Site for inclusion on the National Priorities List (NPL) on October 15, 1984. Final listing on the NPL occurred on June 10, 1986. On July 24, 1987, U.S. EPA and Ohio EPA entered into an Administrative Order on Consent with the PRPs for the PRPs to perform the Remedial Investigation and Feasibility Study (RI/FS).

On August 18, 1990, U.S. EPA terminated the authority of the PRPs to conduct the RI/FS, after a dispute about the work conducted by the PRPs. U.S. EPA assumed responsibility for completion of the RI/FS, with the cooperation of Ohio EPA.

U.S. EPA issued the final RI Report on February 18, 1992 and issued the final FS Report on August 12, 1992. On September 10, 1992, U.S. EPA presented the Proposed Plan, including U.S. EPA's preferred remedy, to the public. The public comment period lasted from August 27 through November 13, 1992.

Basis for Taking Action

The RI Report and ROD documented releases from hazardous wastes at the Site to groundwater, surface water, sediments, and soil. The reports documented volatile organic compounds (VOC), semi-volatile organic compounds (SVOC), and inorganic compounds (IOC) in each of the four media.

The Baseline Risk Assessment portion of the RI Report concluded that the contaminants which contributed most to elevated Site risks for human health include: the VOCs 1,1-dichloroethene, tetrachloroethene, and vinyl chloride; the SVOCs bis(2-ethylhexyl)phthalate and polycyclic aromatic hydrocarbons (PAHs); and the IOCs antimony, arsenic, barium, cadmium, and lead.

The risk assessment also concluded that approximately 95 percent of the excess risk to human health associated with the Site is due to potential use of groundwater, with the remaining 5 percent associated with dermal contact with Site soils. The contaminants which contribute most to excess risks and hazards in groundwater include antimony, arsenic, barium, bis(2-ethylhexyl) phthalate, cadmium, 1,1-dichloroethene, nickel, tetrachloroethene, vanadium, and vinyl chloride. The contaminants which contribute most to excess risks and hazards in soils include antimony, arsenic, bis(2-ethylhexyl)phthalate, lead, and PAHs.

IV. REMEDIAL ACTIONS

Remedial Action Objectives

The ROD for the Site was signed on March 31, 1994. The ROD identified the following Remedial Action Objectives (RAO) for the Site. These RAOs were developed as a result of data collected during the RI to aid in the development and screening of remedial alternatives:

1. Achieve a total Site risk of 10^{-6} or less for carcinogens;
2. Achieve a total Site hazard index of 1 or less for noncarcinogens; and
3. Meet all applicable or relevant and appropriate requirements (ARAR).

Remedy Selection

The selected remedy in the ROD includes the following components:

1. Collection and consolidation of materials estimated at 9,000 cubic yards of soils (including drummed wastes) containing organic and inorganic contaminants that existed beyond the Site containment area;
2. Segregation of collected and consolidated solid wastes, including drummed wastes, from soils;
3. Off-site disposal of drummed materials, sludges, and other collected and consolidated wastes which contain substances, especially hazardous wastes, not suitable for on-site containment;
4. Screening of collected and consolidated solid waste materials for salvageable materials to be decontaminated on-site and taken off-site for salvage;
5. Consolidation in the on-site containment area of soils and non-salvageable solid wastes which exceed soil cleanup levels, followed by the construction of a RCRA Subtitle C hazardous waste cap;
6. In-place bioremediation of sediments as necessary in the seeps on the north slope which exceed cleanup levels for organic contaminants;
7. Fencing to restrict Site access and institutional controls necessary to ensure the integrity of the remedial action, including deed restrictions to prevent the installation of drinking water wells and the disturbance of the capped area while cleanup levels are being achieved;
8. Groundwater and surface water/sediments monitoring program to confirm that the removal, treatment, and containment of source materials and the natural attenuation of residual contaminants allow for the expeditious attainment of cleanup levels; and
9. Other operation and maintenance (O&M) requirements, including cap mowing, inspection, and repair.

The selected remedy protects human health and the environment by removing, treating, or containing all significant threats at the Site, thereby reducing human health and environmental risks to acceptable levels.

Remedy Implementation

On August 16, 1994, U.S. EPA issued a UAO to the PRPs, including the Site owner, to perform the Remedial Design and Remedial Action (RD/RA) to design and implement the remedy, and to reimburse U.S. EPA for all response costs incurred by the United States. On October 31, 1995, U.S. EPA issued a similar UAO to additional PRPs.

In September of 1994, the PRP Group began the RD. Between 1994 and 1996, the PRP Group implemented source control measures at the Site as required in the ROD; including relocation, consolidation, and off-site disposal of scrap metal, non-metallic debris, tires, drums and drum fragments, and impacted soil. In January of 1997, U.S. EPA approved the Final Design Report. In April of 1997, the PRP Group began the RA construction at the Site. In July of 1997, the United States Army Corps of Engineers (USACE, the former RA oversight grantee for U.S. EPA) and the PRP Group reported that geological shifting was occurring in and around the area to be capped. Shortly after, U.S. EPA and the PRP Group agreed that the remedy could not be implemented as stated in the ROD, due to the geological shifting. Therefore, the PRP Group ceased construction activities.

For the remainder of 1997 and the first half of 1998, the PRP Group conducted and reported on additional Site investigations related to conceptual Site modeling of physical and environmental conditions. In September of 1998, U.S. EPA approved the PRP Group's Conceptual Site Model Physical Conditions Report and the Conceptual Site Model Environmental Conditions Report.

For most of 1998, the PRP Group worked on the Modified RD for the Site. The Modified Final Design Report, approved by U.S. EPA in February of 1999, contains design features to stabilize the area to be capped, most notably an earthen buttress which was later constructed at the toe of the cap. U.S. EPA considered design modifications associated with the Modified Final Design Report to be nonsignificant.

During the Pre-Remedial Design phase and at the beginning of the construction of the modified remedy, the PRP Group sampled sediment and water samples from the seeps on the north slope. U.S. EPA reviewed subsequent analytical results and a risk assessment from the PRP Group and agreed that bioremediation of the seeps was not necessary.

In April of 1999, the PRP Group mobilized on-site to restart construction to implement the modified design. On July 7, 2000, U.S. EPA issued the Preliminary Close-Out Report, indicating the completion of RA construction activities. The following text documents the main components of the "enhanced remedy" of the Modified Final Design Report that the PRP Group has implemented.

1. Construction of a slope buttress near the toe of the northeast slope of the area to be capped;
2. Installation of a subsurface drainage system, including installation of a geotextile filter, high-density, polyethylene (HDPE) piping, drainage gravel, and two concrete collection sumps;
3. Excavation and consolidation of impacted material to designated areas up slope of the buttress;
4. Construction of a final cap system over the consolidated, impacted material, including:
 - Placement, grading, and compaction of impacted material under the cap;
 - Placement of 12 inches of bedding soil;
 - Placement of a 60-mil, HDPE geomembrane liner;
 - Placement of a geocomposite drainage layer;
 - Placement of 18 inches of cover soil;
 - Placement of 6 inches of topsoil; and
 - Establishment of a full, vegetative, grass cover;
5. Installation of surface water management structures to manage run-on and run-off on and around the final remedy containment structure, including installation of perimeter drainage ditches, intermediate cover benches, and a buttress wall diversion ditch;
6. Implementation of erosion and sedimentation controls:

In areas north, south, east, and west of the cap, the PRP Group performed grading, seeding, and mulching; and installed silt fencing. Vegetation has already been fully established in these areas; therefore, the silt fencing, which was a temporary measure until vegetation was established, has been removed; and
7. Regrading and revegetation of disturbed areas of the slope:

The PRP Group periodically performs these functions as part of the O&M activities, as necessary.

Institutional Controls

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

At this Site, ICs are required where waste is left in place (i.e., under the RCRA Subtitle C hazardous waste cap) and where cleanup levels exceed health-based standards. Restricted areas will be shown on an IC map that will be part of an IC Plan developed by U.S. EPA in consultation with Ohio EPA.

The table below summarizes existing ICs for these restricted areas and their corresponding IC objectives:

<i>Media, remedy components & areas that do not support UU/UE based on current conditions</i>	<i>Objectives of IC</i>	<i>Title of IC instrument implemented</i>
<i>Capped Area on Vandale Junkyard Site Property:</i> Site Area with RCRA Subtitle C hazardous waste cap	Prohibit residential use of the areas and prohibit interference with the cap	Environmental Covenant not yet implemented
<i>Area of the Site where soil has been remediated to non-residential cleanup levels</i>	Prohibit residential use	Environmental Covenant not yet implemented
<i>Site remedial components:</i> RCRA Subtitle C cap Monitoring well network Surface water and sediment monitoring Access roads, manholes, drainage ditches, and flowmeter Erosion control	Prohibit interference with the systems	Environmental Covenant not yet implemented except for Spindler property Ohio Administrative Code (OAC) Chapter 3745-27-13 prohibiting filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility was operated
<i>Groundwater:</i> Area of the Site where groundwater plume exceeds performance standards on-site. (to be included in the IC Plan)	Prohibit groundwater use until cleanup standards are achieved	Environmental Covenant not yet implemented OAC Chapter 3701-28-10(C) prohibiting installation of drinking water wells in a contaminated aquifer or within 1,000 feet of a landfill

In July 2008, U.S. EPA sent a request to Engineering Management, Inc. (EMI, the PRP Group Project Coordinator) for EMI to conduct an IC Study and perform specific IC evaluation activities. Engineering Management, Inc. agreed to honor the request and submitted an IC Study in September 2008. The text below includes information from the IC Study and describes any follow-up actions needed by the regulatory agencies or the PRP Group.

The majority of the Site remedy is implemented on the Vandale property. Thomas Vandale is the former junkyard and landfill owner and operator. A portion of the capped area and a remedial component (a surface water ditch) is located on the Spindler property, owned by Dr. David Spindler, Louis Spindler, and Marla Kniffin Spindler. That portion of the Spindler property is shown as the blue, diagonal striped area of Figure 3.

The IC Study emphasized two types of ICs: proprietary controls and governmental controls. According to the September 2000 U.S. EPA guidance titled “Institutional Controls: A Site Manager’s Guide to Identifying, Evaluating, and Selecting Institutional Controls at Superfund and RCRA Corrective Action Cleanups” (OSWER 9355.0-7-4FS-P, EPA 540-F-00-005), proprietary ICs involve legal instruments placed in the chain of title of the site or property, and governmental controls are usually implemented and enforced by a state or local government, and can include zoning restrictions, ordinances, statutes, building permits, or other provisions that restrict land or resource use at a site.

Vandale Property

Proprietary Controls

Proprietary controls have not been established on Mr. Thomas Vandale’s property. Mr. Vandale, a PRP as the former owner and operator of the junkyard and landfill, and a Respondent to the 1994 UAO, continually refuses to cooperate with either U.S. EPA or the PRP Group. For example, Mr. Vandale has elected not to execute the land use restriction document that the PRP Group provided to him shortly after cap construction was completed. In September 2000, the PRP Group notified U.S. EPA that it had been unsuccessful in securing Mr. Vandale’s signature on the land use restriction and requested U.S. EPA’s assistance. In March 2003, U.S. EPA provided a Land Use Restriction Agreement (LURA) to Mr. Thomas Vandale and his attorney, Mr. Dennis Sipe. Mr. Vandale refused to sign the LURA. U.S. EPA and Ohio EPA subsequently prepared an Environmental Covenant (EC) in accordance with the Ohio Uniform Environmental Covenants Act; a signed, recorded version of this EC would be enforceable by U.S. EPA, Ohio EPA, or the PRP Group. In March 2007, U.S. EPA provided the EC to Mr. Thomas Vandale and Mr. Dennis Sipe, with the same negative response. Therefore, to date, the EC exists only in draft, unsigned form. The Report of Record Title for the Site property does not identify any encumbrances (easements and leases) on the Vandale Property. To date, U.S. EPA has not proceeded with any enforcement actions against Mr. Vandale to enforce the IC provisions of the UAO.

Governmental Controls

The Ohio Department of Health regulates private water systems under Chapter 3701-28 of the Ohio Administrative Code (OAC). Private water systems include any cistern or groundwater well installed for potable use. Permits are required for any new construction or alteration of a private water system. Permits can be denied if the proposed installation does not meet the requirements of Chapter 3701-28-10(C), which states, "A private water system shall be located only where the system and its surroundings can be maintained in a sanitary condition, and only where surface and subsurface conditions will not permit contamination of the private water system or aquifer. Where available, hydrogeologic data shall be used to select the location of a well or spring. Any well or spring used as a source of water for a private water system shall be located hydraulically upgradient of any potential or known sources of contamination. A well or spring shall be located the maximum practical distance from a known or suspected source of contamination." Chapter 3701-28-10(G) also requires that private water systems be installed at least 1,000 feet from a landfill. This rule precludes the installation of a well or cistern on the Vandale property. Since there are no private water systems currently located on the Vandale property, this restriction achieves the IC objective of prohibiting groundwater use.

Ohio EPA regulates solid waste under Chapter 3745-27 of the OAC. Chapter 3745-27-13 states that "no person shall, without authorization from the director, engage in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated." A facility is defined as the limits of solid waste placement or handling, or area of hazardous waste treatment, storage or disposal. The definition of facility also includes areas within 300 feet of the limits noted above, if the filling, grading, excavating, building, drilling, or mining will impact the integrity of waste placement or ancillary structures. This rule precludes activities that could result in damage to the waste cap area and Site remedial components, including access roads, manholes, drainage ditches, and flowmeter.

Evaluation of Existing Controls Covering the Entire Area that Needs to be Restricted

The Site property and the capped area have been surveyed, and legal descriptions exist for each. As such, the ICs related to the Site boundaries are based on reliable and up-to-date information, data, and maps. The governmental restrictions on installation of private water systems cover the State of Ohio; therefore, the installation or alteration of a private water system within groundwater on the Vandale Property is restricted. The governmental restriction on filling, grading, excavating, building, drilling, or mining covers "land where a hazardous waste facility or solid waste facility was operated"; therefore, the cap and any ancillary structures are protected.

Objectives, Restrictions, and Performance Standards of the ICs

The IC objectives, restrictions, and performance standards that are applicable to the Vandale Property are to prohibit residential use of the area where soil has been remediated to non-residential cleanup levels, prohibit interference with Site remedial components, prohibit consumptive use of the groundwater until performance standards are achieved, and prohibit

interference with the cap. These objectives are clearly stated in the unsigned EC developed by U.S. EPA in consultation with Ohio EPA. Section V.24.a. of the draft EC states, “Specified activity and use limitations are intended to protect the performance of the remedy for the Site and prevent the exposure of humans or the environment to hazardous substances and contaminants by limiting future uses of property at and near where remedial construction has occurred, and by limiting future uses that may interfere with access to, monitoring the performance of, assessing or maintaining the remedy.”

The IC objective of prohibiting consumptive use of the groundwater until performance standards are achieved is also clearly reflected in OAC Chapter 3701-28-10(C) as noted previously. The IC objectives of prohibiting interference with Site remedial components and prohibiting interference with the cap are clearly reflected in OAC Rule No. 3745-27-13 as noted previously.

Monitoring and Compliance with ICs

Proprietary Controls

Although there are no proprietary controls on the Vandale Property, the PRP Group monitors and reports on Site activity, as required by the April 2001 Inspection, Maintenance, and Monitoring Plan (IMMP) prepared by GeoSyntec Consultants. Compliance with the unsigned EC is monitored, and any Site use that is inconsistent with IC objectives, restrictions, and performance standards is identified. This annual inspection identifies any residential use of the area where soil has been remediated to non-residential cleanup levels, interference with Site remedial components, use of groundwater that exceeds performance standards, and interference with the waste cap. The PRP Group submits a formal written report summarizing the findings of the inspection to U.S. EPA and Ohio EPA within 30 days of the inspection. A portion of the inspection is dedicated to restrictive covenants and deed restrictions, and identifies any unauthorized groundwater well installation or construction on-site. Sections dedicated to the area of the Site with the waste cap and Site remedial components identify any damage to or interference with Site remedial components.

Sections V.25 and V.26 of the unsigned EC require written U.S. EPA approval before Site use or any restrictions are modified. To date, there have been no variances to the recommended Site use restrictions, except that U.S. EPA has not granted written approval to Mr. Thomas Vandale of his occasional, residential use of the on-site, mobile-home trailer.

Although the EC remains unsigned, the PRP Group and the Agencies have discussed the use restrictions with Mr. Thomas Vandale and Mr. Dennis Sipe multiple times, and Messrs. Vandale and Sipe appear to understand the restrictions.

The capped area is surrounded by a fence and has been undisturbed since it was constructed. The non-capped portion of the Site is used for grazing cattle and other livestock, hiking, and hunting; these Site uses are consistent with the restrictions described above.

The mobile-home trailer is just west of the capped area. U.S. EPA has discussed the mobile-home trailer with Mr. Vandale several times, informing him that, because of safety concerns, it should be moved off-Site or away from the capped area if it is to be used as a residence. Until

recently, Mr. Vandale had intermittently worked on the mobile home, but had not, to the PRP Group's knowledge, used it as a residence. At the beginning of June 2008, the PRP Group first became aware that the mobile-home trailer was occupied, and the PRP Group notified U.S. EPA. A second mobile-home trailer sits west of the first trailer, and it is currently used for storage.

Governmental Controls

Compliance with the restriction on installation of private water systems (Chapter 3701-28 of the OAC) is monitored and reported as part of the PRP Group's annual Site inspection described previously. As noted above, the inspection form specifically requests information on any unauthorized well installation on-Site. To date, there have been no unauthorized wells installed in the area of the Site where the groundwater exceeds performance standards. Information about the restrictions on installation of private water systems is provided on the Washington County Department of Health website at <http://www.washco-ohhealth.org/37>. Although Mr. Thomas Vandale may be unaware of the requirements of Chapter 3701-28 of the OAC, any licensed water contractor, such as a driller, would be familiar with the permit process and would notify the property owner.

Compliance with the restriction on filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated (Chapter 3745-27-13 of the OAC) is monitored and reported on as part of the annual Site inspection described previously. As noted above, the inspection form includes sections dedicated to the area of the Site with the waste cap and Site remedial components, and any unauthorized filling, grading, excavating, building, drilling, or mining would be noted. To date, none of these activities have been performed in the area of the waste cap or remedial components. Information about this rule is provided on Ohio EPA's website at <http://www.epa.state.oh.us/dsiwm/pages/3745-27.html>.

Effectiveness of ICs

The unsigned EC includes a provision that it will run with the land (see Section VI.28., Running with the Land). In addition, Section VI.29 of the unsigned EC requires that U.S. EPA be notified of any transfer of interest, changes in use, applications for building permits, or proposals for work in the Site areas where the waste cap exists and where O&M activities are occurring, and that the property owner obtain U.S. EPA's approval for any such activity. Once signed, the Vandale EC will be effective in the short term because the current property owner is aware of and understands the requirements of the EC. Once signed, the EC will also be effective in the long term because it runs with the land, and requires that U.S. EPA be notified of any changes in land use, which will ensure that future property owners are aware of the existence and requirements of the EC. Also, on-site devices such as signs and fencing provide notice to future property owners of the existence of a hazardous waste area.

Except for the recent habitation of the mobile-home trailer, land use on the Vandale Property has not changed since the ROD was issued in 1994, and the PRP Group is unaware of any plans to change the land use, sell or transfer the property, or construct any new developments in the area. No water systems (drinking or irrigation) have been installed on the Vandale Property since the

ROD was issued. In addition, there has been no filling, grading, excavating, building, drilling, or mining in the area of the waste cap and remedial components.

Spindler Property

Proprietary Controls

The PRP Group had an EC recorded by Washington County on April 9, 2008 for the portion of the remedy extending onto the Spindler property. The property owners and U.S. EPA signed the EC. The EC restricts use of the cap area and surface water ditch that extend onto the Spindler property, and allows access onto the property. This portion (less than 0.2 acres) of the Spindler property is immediately east of the Vandale property and is shown as the blue-striped area in Figure 3. The EC was prepared in accordance with the Ohio Uniform Environmental Covenants Act and is enforceable by U.S. EPA, Ohio EPA, or the PRP Group. There are several encumbrances (easements and leases) noted in the Report of Record Title. None of the encumbrances affect the small, remote area addressed by the EC. In addition, all oil and gas leases identified by the Report of Record Title have expired, as evidenced by the affidavit of David Spindler dated February 6, 2007.

Governmental Controls

The Ohio EPA regulates solid waste under Chapter 3745-27 of the OAC. Chapter 3745-27-13 states that “no person shall, without authorization from the director, engage in filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated.” A facility is defined as the limits of solid waste placement or handling, or area of hazardous waste treatment, storage or disposal. The definition of facility also includes areas within 300 feet of the limits noted above, if the filling, grading, excavating, building, drilling, or mining will impact the integrity of solid waste placement or ancillary structures. This rule precludes activities that could result in damage to the portion of the Spindler property in question.

Evaluation of Existing Controls Covering the Entire Area that Needs to be Restricted

The restricted areas covered by the proprietary controls are: 1) Site remedial components defined by the physical limits of rip rap located in the surface water ditch extending from the northeastern corner of the cap to Tributary A; and 2) area of the Site with the waste cap defined by the Spindler property line and the physical limits of the fence line surrounding the cap. The portion extending onto Spindler property includes a corner of the buttress wall and reinforced soil slope.

Each of these restricted areas was surveyed, and a legal description is included in the Spindler EC. As such, the restricted areas and associated ICs are based on reliable and up-to-date information, data, and maps. The governmental restriction on filling, grading, excavating, building, drilling, or mining covers “land where a hazardous waste facility or solid waste facility was operated”; therefore, the cap and any ancillary structures are protected.

Objectives, Restrictions, and Performance Standards of the ICs

The IC objectives, restrictions, and performance standards applicable to the Spindler property are to prohibit interference with a Site remedial component (the surface water ditch) and prohibit interference with the cap. These objectives are clearly stated in the EC. Section V.19 of the EC states, "Specified activity and use limitations are intended to protect the performance of the remedy for the Site and prevent the exposure of humans or the environment to hazardous substances and contaminants, by limiting future uses of property at and near where remedial construction has occurred, and by limiting future uses that may interfere with access to, monitoring the performance of, assessing or maintaining the remedy."

The IC objectives of prohibiting interference with Site remedial components and prohibiting interference with the cap are clearly reflected in OAC Chapter 3745-27-13 as noted previously.

Monitoring and Compliance with ICs

Proprietary Controls

The PRP Group monitors and reports on Site activity, including activity in this corner of the Spindler property, as required by the IMMP. Compliance with the EC is monitored, and any Site use that is inconsistent with IC objectives, restrictions, and performance standards is identified. This annual inspection identifies any interference with Site remedial components and interference with the waste cap. The PRP Group submits a formal written report summarizing the findings of the inspection to U.S. EPA and Ohio EPA within 30 days of the inspection. The same form is used at every inspection, as required by the IMMP. A section of the form is dedicated to the area of the Site with the waste cap and Site remedial components and would identify any damage to or prohibited interference in those restricted areas.

Section V.19 of the EC requires written U.S. EPA approval before land use or any restrictions are modified. To date, there have been no variances to the recommended land use restrictions.

Conversations between EMI and Dr. David Spindler, one of the Spindler property owners, indicate that he is aware of, understands, and complies with the restrictions described in the Spindler EC. Since the ROD was signed, the Spindler property has been used in a manner consistent with restrictions.

The cap area is surrounded by a fence and has been undisturbed since it was constructed. The surface water ditch and area surrounding the ditch have been used for grazing cattle and other livestock, hiking, and hunting; these Site uses are consistent with the restrictions described above.

Governmental Controls

Compliance with the restriction on filling, grading, excavating, building, drilling, or mining on land where a hazardous waste facility or solid waste facility was operated (Chapter 3745-27-13 of the OAC) is monitored and reported as part of the PRP Group's annual Site inspection described previously in this report. As noted above, the inspection form includes sections

dedicated to the area of the Site with the waste cap and Site remedial components, and any unauthorized filling, grading, excavating, building, drilling, or mining would be noted. To date, none of these activities have been performed in the area of the waste cap or remedial components. Information about this rule is provided on Ohio EPA's website at <http://www.epa.state.oh.us/dsiwm/pages/3745-27.html>.

Effectiveness of ICs

The Spindler EC includes a provision that it shall run with the land (see Section VI.20., Running with the Land). In addition, Section VI.21 of the EC requires that U.S. EPA be notified of any transfer of interest, changes in use, applications for building permits, or proposals for work in the restricted areas, and that the property owner obtain U.S. EPA's approval for any such activity. The Spindler EC is effective in the short term because the current property owners are aware of and understand the requirements of the EC. The EC will also be effective in the long term because it runs with the land, and requires that U.S. EPA be notified of any changes in land use, which will ensure that future property owners are aware of the existence and requirements of the EC.

The use of the Spindler property has not changed since the ROD was issued in 1994, and the PRP Group is unaware of any plans to modify that use, sell or transfer the property, or construct any new developments in the area. There has been no filling, grading, excavating, building, drilling, or mining in the area of the waste cap and remedial components.

Follow-up IC Actions

In consultation with Ohio EPA, U.S. EPA will further review the PRP Group's IC Study to determine if additional information is needed. In consultation with Ohio EPA, U.S. EPA will develop an IC Plan for additional IC evaluation activities to include preparation of paper and electronic versions of maps of all areas that require land and groundwater use restrictions, review of the enforceability and effectiveness of the ICs, and a provision to amend the IMMP or prepare a stand-alone document to include mechanisms to ensure regular inspection of ICs at the Site, annual certification by the PRP Group to U.S. EPA that ICs are in place and effective, and a communications plan.

The primary purpose of the communications plan is to inform local governmental and health authorities, and the appropriate offices of Ohio EPA, that U.S. EPA regards this Site to be subject to the well drilling restrictions in OAC 3701-28 and the restrictions on interfering with a solid or hazardous waste facility in OAC 3745-27-13. This plan could identify who in each group should be notified in the event of a violation of these restrictions, and which group would be responsible for taking appropriate enforcement or other corrective action. Another purpose of the communications plan is to provide clear, effective lines of communication between the UAO Respondents, the State and local governmental and health authorities, and the local residents. The plan will provide a means by which the State authorities, and local authorities and residents are kept informed about Site-related developments and activities. It will also provide contact information should there be any inquiries related to Site activities.

As described earlier in this IC section of the report, the PRP Group is already performing and periodically completing some IC activities, and that will be noted in the IC Plan. The PRP Group will be responsible for implementing the remainder of the items in the IC Plan.

Current Compliance

An enforceable EC that runs with the land needs to be signed by the Vandale property owner and recorded in the Washington County Recorder's Office.

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 of ICs, U.S. EPA, in consultation with Ohio EPA, will review long-term stewardship procedures and develop an IC Plan. The plan will include regular inspection of ICs at the Site and annual certification. As described earlier in this IC section of the report, the PRP Group already performs regular inspection of ICs at the Site, and that will be noted in the IC Plan. Additionally, the PRP Group should explore use of a communications plan and use of a one-call system for long term stewardship.

Operation and Maintenance (O&M)

The U.S. EPA-conditionally approved, April 2001 IMMP will receive full approval when the PRP Group produces a signed, recorded EC for the Vandale property.

The IMMP requirements include a groundwater, surface water, sediments, and sump monitoring program; periodic inspection and maintenance of the cap and surrounding areas; and a groundwater contingency evaluation if the groundwater component of the remedy fails to demonstrate expeditious progress toward meeting cleanup levels. The IMMP requirements also include an MNA efficacy evaluation report that contains an evaluation of the effectiveness of MNA processes, including a definition of "expeditious progress" toward meeting cleanup levels. The PRP Group conducts the periodic (now, annual) inspections of the cap and surrounding areas. Ohio EPA assists U.S. EPA to perform oversight of the PRP Group's O&M activities.

The groundwater contingency evaluation and subsequent Contingency Evaluation Report are described in Section 3.7 of the IMMP and include documentation of the following activities:

- Evaluating monitoring frequency and parameters;
- Evaluating installation of additional monitoring wells at new locations and depths;
- Evaluating technologies for groundwater collection and/or extraction (evaluation will include risk analysis);
- Evaluating technologies for groundwater containment (evaluation will include risk analysis);

- Evaluating additional source removal/control measures;
- Evaluating additional institutional controls; and
- Evaluating submission of a technical impracticability petition for purposes of attaining an ARAR waiver.

The PRP Group began groundwater, surface water, and sediment sampling in June 2001. The sampling plan approved by U.S. EPA in 2001 called for quarterly groundwater and surface water sampling, and annual sediment sampling. In July 2004, U.S. EPA approved a reduction in frequency of surface water sampling to annually. This Five-Year Review Report covers the sampling events from June 2001 through August 2008. Due to concerns that U.S. EPA had with how the PRP Group was developing replacement groundwater monitoring wells, the December 2001 sampling event did not occur.

From April through June 2001, the PRP Group installed the initial groundwater monitoring well network. The PRP Group installed replacement groundwater monitoring wells in May and June of 2003, either because the existing wells were dry or low yielding, or because U.S. EPA did not believe that enough boundary wells existed to define the groundwater contaminant plume.

In October 2007, due to U.S. EPA concern that the groundwater monitoring network was not fully delineating the contaminant plume, the PRP Group installed two groundwater monitoring wells just west of the Vandale property (wells MW07-13 and MW07-14 in Figure 2). U.S. EPA and the PRP Group's preferred location for the two wells was on-site, but the Site owner would not allow the wells to be installed on his property. The PRP Group has not been able to collect a sample from MW07-13 yet, due to a low yield of water.

U.S. EPA, in consultation with Ohio EPA, will continue to work with the PRP Group and the Site owner to obtain a signed EC for the Vandale property. This document will describe the land use restrictions needed to ensure the remedy continues to protect human health and the environment.

V. PROGRESS SINCE THE LAST FIVE-YEAR REVIEW

This is the second Five-Year Review for the Site.

The following text identifies the recommendations from the first Five-Year Review Report issued on April 15, 2004, the status of the recommendations, and any follow-up actions that may have occurred since the 2004 report.

1. **Recommendation:** Repair current animal burrows in waste cap. Continue to ensure future burrows are identified and repaired.

Status: During the September 3, 2008 five-year review inspection, the inspection team found no animal burrows in the waste cap. Annual inspections by the City of Marietta include inspecting the cap for animal burrows and making subsequent

repairs.

2. **Recommendation:** Continue to work with the Site owner to obtain a signed, recorded land use restriction agreement (now called an EC).

Status: The PRP Group, U.S. EPA, and Ohio EPA have separately and jointly attempted to obtain a signed EC from the Vandale property owner, with no success. The property owner considers the draft EC to be too restrictive and will only sign it if the PRP Group gives him an amount of money considered inappropriately high by the PRP Group and U.S. EPA. The PRP Group, U.S. EPA, and Ohio EPA will continue to try to obtain a signed, recorded EC; however, it is unlikely that the current Site owner will ever sign an EC.

As described in the IC section of this report, the PRP Group obtained a signed, recorded EC for the small portion of the adjacent, Spindler property onto which the remedy extends.

3. **Recommendation:** Continue to implement controls such as rock placement, revegetation, and diversion measures to avoid sedimentation into Tributary A.

Status: The PRP Group has been implementing such measures to avoid sedimentation into Tributary A, but only around the waste cap area. The Site owner prevents the PRP Group from implementing such measures Site-wide.

During the September 3, 2008 Site inspection, the inspection team found little evidence of erosion that could cause sedimentation into Tributary A. Most of the sloped area in question is covered with grass that prevents erosion.

4. **Recommendation:** Continue to work with PRP Group and Site owner to have the Site owner not interfere with O&M activities; enforce against Site owner as necessary.

Status: The Site owner continues to interfere with or prevent certain O&M activities, such as on-site, groundwater monitoring well installation and Site-wide erosion control measures. To date, U.S. EPA has not enforced against the Site owner. The PRP Group continues to work with the Site owner, U.S. EPA, and Ohio EPA to perform O&M activities, despite interference from the Site owner.

5. **Recommendation:** Move the residential trailer home away from the O&M area (to the southwest corner of the Site, for example).

Status: The PRP Group, Ohio EPA, and U.S. EPA have notified the Site owner several times of the need to move the trailer, but to no avail. There are no human health risks related to the current location of the trailer; however, safety concerns

remain due to the trailer being too near the O&M activities.

6. **Recommendation:** Repair and activate the flowmeter used to measure the volume of water flowing from under the waste cap.

Status: The PRP Group has repaired and activated the flowmeter.

7. **Recommendation:** Continue to control erosion by adding rock, etc.

Status: See the current status of action item #3.

8. **Recommendation:** Periodically inspect and unclog drainage pipes that exit from the waste cap.

Status: The PRP Group has been performing this function.

9. **Recommendation:** Repair crack or replace collar for well MW03-12.

Status: The PRP Group has completed this repair.

10. **Recommendation:** Continue collection and analysis of groundwater samples to determine whether expeditious progress is shown toward meeting cleanup goals.

Status: The PRP Group continues to collect and analyze groundwater samples. This second Five-Year Review Report has concluded that expeditious progress toward meeting groundwater cleanup goals is not occurring, and that an evaluation is needed to determine the reason for increasing groundwater contaminant levels, such as those shown in Figures 4-8.

11. **Recommendation:** Conduct a groundwater contingency evaluation, due to groundwater triggers in the 2001 IMMP being activated.

Status: On September 1, 2004, the PRP Group submitted a groundwater contingency evaluation; however, the report did not define expeditious progress toward meeting groundwater cleanup goals. See the previous recommendation status on additional evaluation needed. Also, this Five-Year Review Report recommends that another Contingency Evaluation Report be produced to include the evaluations listed earlier in the O&M section.

On April 2, 2004 the PRP Group petitioned U.S. EPA for reduced groundwater and surface water monitoring. On July 28, 2004, U.S. EPA approved a discontinuance in groundwater monitoring for the following MNA parameters: sulfate, sulfide, phosphate, and ammonia nitrogen. However, U.S. EPA did not approve a reduction in groundwater monitoring frequency. Also on July 28, 2004, U.S. EPA approved a reduction in surface water monitoring frequency from

quarterly to annually. On October 13, 2004, U.S. EPA approved a discontinuance in surface water monitoring for the following analytes: naphthalene, bis(2-ethylhexyl)phthalate, antimony, beryllium, cadmium, nickel, and thallium.

The 2004 Five-Year Review Report for the Site documented the Protectiveness Statement and Long-Term Protectiveness as follows:

“All immediate threats at the Site have been addressed, and the remedy is expected to be protective of human health and the environment after groundwater, surface water, and sediment cleanup goals are achieved.

Long-term protectiveness of the remedial action will be verified by obtaining additional groundwater, surface water, and sediment samples to fully evaluate potential migration of any contaminant plume downgradient from the capped area. Current monitoring data indicates that only a minimal number of groundwater wells is showing statistically significant decreasing trends. This suggests that monitored natural attenuation is not occurring at an expeditious rate to meet cleanup goals. Additional data collection is warranted to determine whether the remedy may be functioning as required to achieve groundwater, surface water, and sediment cleanup goals.”

Since groundwater cleanup goals have not been achieved, additional monitoring is required. Also, increasing groundwater contaminant levels at some wells requires an evaluation to determine the reason for this phenomenon and requires an evaluation of the effectiveness of the MNA component of the remedy.

VI. FIVE-YEAR REVIEW PROCESS

Administrative Components

The U.S. EPA Remedial Project Manager (RPM), Ron Murawski, notified Ohio EPA of the initiation of the five-year review process in April 2008 and notified EMI in July 2008. Mr. Murawski headed the five-year review team, and Dr. Luanne Vanderpool, a U.S. EPA hydrogeologist, assisted him. The team also included Ohio EPA, whose primary contact for the review is Site Coordinator Michael D. Sherron. Mr. Murawski also engaged the services of the U.S. EPA Region 5 Superfund Groundwater Evaluation and Optimization System (GEOS) group to produce a report on groundwater statistical analysis; the findings of which have been included in this Five-year Review Report.

The review schedule included the following components:

- Community Notification;
- Document Review;
- Data Review;
- Site Inspection;

- Interviews; and
- Five-Year Review Report Development and Review.

Community Notification

Beginning in April 2008, the RPM discussed with the U.S. EPA Community Involvement Coordinator (CIC), Patricia Krause, the need to notify the community that the five-year review process was underway. On May 16, 2008, the U.S. EPA Office of Public Affairs placed an ad in the Marietta Times announcing that the Five-Year Review was in progress and requesting that any interested parties contact U.S. EPA for more information.

Since the ad was issued, no member of the community voiced an interest in the Five-Year Review.

Document Review

This Five-Year Review consisted of a review of relevant documents including O&M quarterly monitoring reports and monitoring data, the 1994 ROD, the 1994 and 1995 UAOs, and related records and reports (see Table 2). The regulatory team also reviewed applicable cleanup levels as listed in the ROD.

Data Review

See Figure 2 for locations of the groundwater, surface water, and sediment monitoring points.

Groundwater Monitoring

The PRP Group has conducted quarterly groundwater sampling at the Site since June 2001. The most commonly and consistently observed constituents that exceed the groundwater cleanup levels in the ROD are chlorinated VOCs (1,1-dichloroethene (1,1-DCE), cis-1,2-dichloroethene (cis-1,2-DCE), tetrachloroethylene (PCE), and vinyl chloride). There have been occasional detections of the semi-volatile compound bis(2-ethylhexyl)phthalate that have exceeded the groundwater cleanup level; however, none of these elevated detections have been measured consistently at any of the monitoring wells.

Elevated levels of the chlorinated VOCs have been detected consistently at wells MW01-07, MW01-08, MW03-09, MW01-10 and MW03-11. See Figure 2 for well locations. Since construction completion in 2000, 4 of the 13 contaminants for which groundwater cleanup levels have been established (arsenic, beryllium, cadmium, nickel) have remained below their respective cleanup levels in all sampling events. There was only a single exceedance for vanadium (although many of the recent detection limits for vanadium have exceeded the cleanup level). Since the previous Five-Year Review, 1,1,1-trichloroethane (1,1,1-TCA) has also remained below its cleanup level in all sampling events.

The U.S. EPA Region 5 GEOS group performed statistical analyses of groundwater data sampled from June 2001 through August 2008 for contaminants of concern for all the monitoring wells except the newly installed monitoring well MW07-13, which has not yielded sufficient groundwater for sampling. GEOS ran three different statistical tests as described below. Each procedure was run for each contaminant of concern at each of the wells. All tests were run at a 95 percent confidence level.

- Comparison to Standard: The 95 percent upper confidence limit (UCL) for the median of the contaminant concentration of the four most recent samples is compared to the cleanup standard to determine if a statistically significant exceedance has occurred. Results of this test are shown in the “Exceedance?” column of Table 3.
- Comparison to Baseline: The upper 95 percent prediction limit (UPL) and lower 95 percent prediction limit (LPL) of the contaminant level for the sampling events between June 2001 and September 2002 (“the baseline”) were calculated for each contaminant. The most recent sampling result (August 2008) is compared to the prediction limits to determine if the sample is significantly better or worse than during the baseline period. Results of this test are shown in the “Better or Worse?” column of Table 3.
- Trend Analysis: The Mann-Kendall-Sen test for trend used all data points for each contaminant at each well location and tested for a statistically increasing or decreasing trend through time. Results of this test are shown in the “Trend?” column of Table 3. An “upward” designation in the table means that there is a statistically significant, increasing trend through time.

In the Comparison-to-Standard Test, the UCL of the following five constituents exceeded their cleanup standards in at least one well location:

- 1,1-DCE;
- bis(2-ethylhexyl)phthalate;
- cis-1,2-DCE;
- PCE; and
- vinyl chloride.

The detection of bis(2-ethylhexyl)phthalate has been variable with results that are frequently non-detect, with occasional detections that are exceedances and no discernible, temporal trend.

At seven wells (MW01-07, MW01-08, MW01-10, MW03-05, MW03-06, MW03-09, and MW03-11), one or more standards for a VOC was exceeded based on the Comparison-to-Standard Test. However, in no case in which an exceedance was identified did the most recent sample exceed the baseline in the Comparison-to-Baseline testing.

At one well (MW01-07), the concentration of bis(2-ethylhexyl)phthalate from the most recent sample exceeded the baseline UPL, based on the Comparison-to-Baseline Test. At one other well (MW03-11), the concentration of cis-1,2-DCE from the most recent sample exceeded the baseline UPL, based on the Comparison-to-Baseline Test. The Comparison-to-Baseline Test

identified multiple other instances (also labeled “worse” in Table 3) where the contaminant concentration of the most recent sample exceeded the baseline UPL for that well. For all these other instances that the Comparison-to-Baseline Test identifies as “worse,” the most recent sample is a non-detect, and the detection limit is higher than the baseline prediction interval. These “worse” results occurred because the detection limits are too high to detect differences between current results and baseline.

Generally, based on the Trend Test, the quarterly monitoring data appears to indicate steady-state conditions with regard to VOC levels in the groundwater. In most cases, there is no clearly apparent increase or decrease in VOC concentrations since the quarterly monitoring began in 2001. Also, many VOC levels continue to be under the cleanup levels established. There is a statistically significant increasing trend for 1,1-DCE at MW03-05 (Figure 4). There are statistically significant increasing trends for cis-1,2- DCE at MW01-08 (Figure 5), MW03-05 (Figure 6), and MW03-11 (Figure 7). While there is no statistically significant upward trend in vinyl chloride concentrations when the entire date range of the data set is considered, there is a statistically significant upward trend in the December 2003 through August 2008 data at MW01-08 (Figure 8). This increasing trend coupled with continued recent exceedances far above the standard (e.g., the August 2008 sampling event yielded a vinyl chloride level of 235 µg/l at well MW01-08, whereas the cleanup level is 0.5 µg/l) indicate cause for concern about groundwater conditions at MW01-08. (In the previous Five-Year Review, only one increasing trend was identified; this Five-Year Review identifies five increasing trends.) Additional evaluation is needed to determine the reason for the statistically significant increases in contaminant levels described in this paragraph.

U.S. EPA evaluated the progress of the natural attenuation processes at the Site using four of the monitoring objectives identified in the Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites (OSWER Directive No. 9200.4-17P; April 21, 1999) for evaluating the performance of an MNA remedy. These objectives are:

- Demonstrate that natural attenuation is occurring according to expectations;
- Detect changes in environmental conditions that may reduce the efficacy of the natural attenuation processes;
- Identify any potentially toxic or mobile transformation products; and
- Verify that the plume is not expanding either downgradient, laterally, or vertically.

Qualitatively, VOC concentrations have been diminishing with distance away from the source area, and there is evidence of degradation products as the contaminated groundwater moves away from the capped area. The ROD requires that natural attenuation proceed expeditiously toward meeting the groundwater cleanup levels. To provide a positive declaration that natural attenuation is making expeditious progress, statistically significant, decreasing, contaminant trends through time should occur at every sampling location. Despite over seven years of monitoring, the record does not demonstrate such trends. Currently, there is not a statistically significant decreasing trend through time for every constituent at every sampling location. While decreasing trends were identified by GEOS for many of the Trend Tests, no overall trend was

identified. Four statistically significant increasing trends (Table 3) were identified at three wells over the seven years of monitoring and a fifth statistically significant increasing trend was identified based on the past five years. The statistical analysis does not demonstrate that natural attenuation is occurring expeditiously at the Site.

The contaminants that had an increasing trend since 2001 were 1,1-DCE and cis-1,2-DCE. Generally, the presence of 1,1 DCE is most likely due to the degradation of 1,1,1-TCA, and increases of cis-1,2-DCE are likely due to the degradation of trichlorethene (TCE). Consequently, increases in daughter products 1,1- DCE and cis-1,2-DCE may indicate that natural attenuation is functioning according to expectations, when the increase is coupled with an appropriate decrease in parent compounds. However, there are higher levels of daughter products being detected at the Site than would be expected based on the levels of parent compounds 1,1,1-TCA and TCE, and the source of the daughter products 1,1- DCE and cis-1,2-DCE at the levels detected is unclear.

As part of the quarterly sampling and analysis requirements, the PRP Group measured and analyzed a suite of MNA indicator parameters, including nitrogen, total organic carbon, ethane, ethene, nitrate, and nitrite. These analyses indicate that any environmental conditions that might reduce the effectiveness of the naturally occurring, biodegradation processes have not changed on the Site since the previous Five-Year Review.

Biodegradation processes may result in the formation of new chemicals that are more toxic or more mobile than their "parent" compounds. The presence of such compounds may raise doubts about the appropriateness of the natural attenuation remedy. No potentially toxic or mobile transformation products were identified during sampling events that were not already present at the time of the ROD.

Regarding plume expansion, downgradient wells MW03-04, MW03-05, and MW03-12 have concentrations of dissolved VOCs at less than the detection limit and/or below the ROD cleanup levels, suggesting that the plume is not expanding downgradient in the vicinity of these wells. MW07-13 and MW07-14 were installed in 2007 because of concern that the plume may be expanding in the vicinity of monitoring wells MW01-07 and MW03-11. Monitoring wells MW01-07 and MW03-11 have detectable concentrations of 1,1,1-TCA; PCE; 1,1-DCE; cis-1,2-DCE; and vinyl chloride; and MW01-07 has exceedances of the cleanup levels for 1,1-DCE; cis-1,2-DCE; vinyl chloride; and PCE. MW03-11 has exceedances of the cleanup levels for 1,1-DCE and PCE as well as an increasing trend for cis-1,2-DCE. Only two rounds of sampling data are available from MW07-14 since it was installed during 2007; it had no detectable concentrations of VOCs during that time. There has been insufficient water in MW07-13 to sample the well using the low-flow purging and sampling method described in the IMMP; groundwater flow maps suggest that there is a flow divide east of MW07-13 which may preclude plume expansion in the vicinity of MW07-13. Additional monitoring of MW07-13 and MW07-14 is needed to confirm that the plume is not expanding in the vicinity of these wells. Consideration should be given to alternate, no-purge sampling methods for MW07-13 that could allow VOC samples to be collected.

Surface Water, Seep, and Sediment Monitoring

The PRP Group has conducted surface water and seep sampling at the Site since June 2001. Surface water samples have been collected and analyzed quarterly from June 2001 to June 2005 and annually since June 2005 from five sampling locations (SW-01, SW-02, SW-03, SW-04, and SW-05) in Tributary A (shown in blue in Figure 2) and from one seep (SW-06) for five VOCs (1,1,-TCA; 1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; and PCE) and three metals (arsenic, lead, and silver). Figure 2 shows these sampling locations.

Analysis of the surface water samples from Tributary A found that most contaminants of concern were not detected. There were no exceedances during the most recent (June 2008) sampling event. There were no detections of any VOCs since June 2004. There have been occasional detections of arsenic, lead, and silver at all of the sampling locations (including SW-01 which is located upstream of the Site); only lead has been detected at levels that have exceeded the ROD cleanup levels in the surface water and seep samples. However, none of the elevated detections of lead have been measured consistently at any of the sample locations, and the highest levels of lead were generally detected at SW-01. Therefore, the detected surface water contamination in Tributary A does not appear to be Site-related.

Analysis of the seep samples found that levels of most contaminants of concern were below detection. There were no exceedances during the most recent (June 2008) sampling event. Since June 2005, four VOCs (1,1-DCE; cis-1,2-DCE; trans-1,2-DCE; and PCE) were detected at concentrations below cleanup levels. There have been occasional detections of arsenic, lead, and silver at the seep sampling location; however, only lead has been detected at levels that have exceeded the ROD cleanup levels in the seep samples. The detected seep contamination appears to be Site-related.

Sediment samples have been collected and analyzed annually since June 2001 from eight sampling locations in Tributary A (see Figure 2). Five of the sediment sample locations coincide with the location of the surface water samples. Since June 2005, the sediment samples were analyzed for one VOC parameter (PCE), one SVOC parameter (bis(2-ethylhexyl)phthalate), and three metals (antimony, arsenic, and lead). All of the sampling at sediment locations (including at SED-01 which is located upstream of the Site) have consistently detected arsenic and lead at levels that exceed the ROD sediment cleanup levels. No other constituents have been detected. Arsenic and lead from the samples located downslope and downstream of the capped area are being detected at levels less than those detected at the upstream sediment sampling location. Therefore, sediment contamination does not appear to be Site-related.

Consideration for Monitoring Program Reductions

Based on the preceding data review, the following reductions in sampling frequencies or in analytes sampled should be considered. These reductions should be considered because of continued contaminant trends of non-detections or low detections.

1. Groundwater:

- a. Consider reducing the sampling frequency from quarterly to annually for bis(2-ethylhexyl)phthalate.
- b. Consider reducing the sampling frequency from quarterly to annually for antimony, barium, vanadium, arsenic, and beryllium.
- c. Consider deleting cadmium and nickel from the list of analytes to be sampled.
- d. Consider reducing the sampling frequency from quarterly to annually for VOC sampling at the following wells: MW01-01; MW01-02; MW01-03; MW01-07; MW01-10; MW03-04; and MW03-12.

2. For surface water and sediment, consider reducing the sampling frequency from annually to a lesser frequency.

Site Inspection

U.S. EPA and Ohio EPA conducted a Site inspection on September 3, 2008. EMI and GeoSyntec accompanied the regulatory team in the inspection. The purpose of the inspection was to assess the protectiveness of the remedy, including the condition of fencing to restrict access, the integrity of the cap, the condition of the monitoring wells and other physical devices associated with the remedy, the effectiveness of erosion and sedimentation controls, and the effectiveness of land use restrictions.

The inspection revealed that the Site was in good condition, in general. The waste cap had a consistent grass cover on it that had been recently mown. There were no animal burrows visible on the cap. The monument pins on the cap, used to determine movement of the cap over time, were in good condition. There were a few small trees on and near the northern end of the cap and on the buttress wall that EMI committed to have removed. EMI also committed to weed the buttress vegetation. The buttress, bordering the north side of the cap, was otherwise in good condition.

Monitoring wells and access roads were in good condition. EMI committed to painting the well casings and bollards that were rusty and to mark identifications on wells that were not identified. Erosion control measures toward the tributary, such as rock placement and grass seeding, were not being performed because the Site owner has been preventing the PRP Group from doing so. However, much of the terrain that is sloped toward the tributary is now vegetated. There are still a few areas on the slope where erosion control is needed.

Gates, fences, barbed wire, and locks were in good condition. There were no large gaps noted under the gates or fences. In 2007, the PRP Group installed a gate and cattle guard on the

western boundary of the Site, near the off-site monitoring wells. This was done at the request of the Site owner. The gate and cattle guard were in good condition.

There are two mobile home trailers on-site, just west of the capped area. The Site owner resides occasionally in the trailer nearer the cap. The other trailer is used for storage. There is no human health risk associated with residents occupying the trailers. State and local restrictions prevent drilling, excavating, installing potable wells, and other activities that could introduce a human health risk.

Interviews

The RPM interviewed Michael D. Sherron, who is the Ohio EPA Site Coordinator for the Vandale Junkyard Site. The RPM also interviewed City of Marietta employees Bill Dauber (Assistant Safety and Service Director) and Todd Stockel (Street Superintendent). The City of Marietta, a PRP, conducts annual inspections of the Site. The RPM also interviewed Michelle Gillenwalters, who lives on property immediately west of the Site, and Dr. David Spindler, who owns property immediately east of the Site. Prior to the interviews, the RPM discussed the low level of community interest at the Site with the CIC, Patti Krause. Also, no community members responded to the five-year review ad that invited readers to contact U.S. EPA Region 5 for more information on the five-year review process.

Mr. Sherron felt that the Site was in good condition, in general. He felt that the main issues at the Site were subsurface issues. These included the need for the PRP Group to develop an efficacy projection of how much time is needed to determine whether the MNA remedy is working and the need to assess remedy effectiveness. The latter topic is covered in this report.

The City of Marietta employees stated that minimal deficiencies are found during the annual inspections. On occasion, woody growth on and near the cap is found and removed. On occasion, areas near the cap need more dirt or rock for erosion control, and the PRP Group subsequently adds these materials.

Mrs. Gillenwalters was concerned about residents near the Site, including her mother, getting sick in the 1990s, and wondered whether this was Site-related. Also, EMI explained to Mrs. Gillenwalters some high values of indicator parameters from the quarterly sampling results of well MW03-14. (Wells MW03-13 and MW03-14 are on Mrs. Gillenwalters' property.)

Dr. David Spindler, his sister, and brother own about 100 acres of land immediately east of the Site. There is a vacant house on the property. In 2008, the Spindler's signed an EC for a small part of his land that includes the waste cap. Dr. Spindler had no comments on the remedy or the O&M activities, other than stating that he felt the buttress that supports the waste cap would eventually fail.

VII. TECHNICAL ASSESSMENT

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

The answer to this question is yes for the following reasons:

Review of the documents, ARARs, risk assumptions, monitoring data, and the results of the Site inspection indicate that the remedy is functioning as intended by the ROD.

The RCRA Subtitle C hazardous waste cap has consolidated and is effectively containing contaminated soils and solid waste, and has achieved the remedial objectives to minimize the migration of contaminants to groundwater and surface water, and to prevent direct contact with or ingestion of contaminants in soil and waste.

The ROD requires that natural attenuation proceeds expeditiously toward meeting the groundwater cleanup levels. Sampling results analyzed from the Site indicate that natural attenuation processes are occurring. To provide a positive declaration that natural attenuation is making expeditious progress, statistically significant, decreasing contaminant trends through time should occur at every sampling location. Figures 4-8 of this report show statistically significant, increasing contaminant levels for certain contaminants at certain wells. There is some concern that the plume may be expanding in the vicinity of monitoring wells MW01-07 and MW03-11. Additional monitoring is needed to further evaluate potential plume expansion and groundwater contaminant levels over time. An evaluation is needed to determine the reason for increasing groundwater contaminant levels, such as those shown in Figures 4-8. Finally, since expeditious progress toward meeting groundwater cleanup goals has not been demonstrated, a contingency evaluation and subsequent Contingency Evaluation Report is required as described in Section 3.7 of the IMMP.

Review of surface water and sediment sampling results shows that surface water and sediment contamination at the Site do not appear to be Site-related. No elevated contaminant detections have been measured consistently at any of the surface water or sediment sampling locations. Consideration should be given to reducing the surface water and sediment sampling frequency from annually to a lesser frequency.

Governmental controls are in place at the Site to prevent use of the Site that could adversely affect human health and the environment, or interfere with remedy implementation. However, an enforceable EC that runs with the land needs to be signed by the Vandale property owner and recorded in the Washington County Recorder's Office.

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

The answer to this question is yes for the following reasons:

There have been no changes in the physical conditions of the Site that would affect the protectiveness of the remedy. The exposure assumptions, toxicity data, cleanup levels, and RAOs used at the time of the remedy selection are still valid.

Changes in Standards and To be Considereds (TBC)

A list of the primary ARARs and TBCs are included in Table 4. There have been no changes in these ARARs and TBCs that affect 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 include current exposures of adults, adolescents, and children who live in the immediate vicinity of the Site and/or visit the Site or trespass onto it; potential future exposures include residential, on-site use.

There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment that would affect the protectiveness of the remedy. U.S. EPA considers the assumptions in the baseline risk assessment to be conservative and reasonable in evaluating risk-based cleanup levels. No change to these assumptions or to the cleanup levels developed from them is warranted. There has been no change in the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is progressing as expected, except for expeditious progress toward cleanup levels not being made.

The fact that the Site owner occasionally occupies a mobile home trailer near the capped area does not expose the Site owner to an unacceptable risk related to inhalation, ingestion, or dermal contact pathways; however, the location of the trailer could interfere with O&M activities and could present an unsafe situation for occupants or visitors when O&M activities are occurring.

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

The answer to this question is no.

No other events have affected the protectiveness of the remedy, and there is no other information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

Based on a review of relevant documents, data, ARARs, risk assumptions, and the results of the Site inspection, the remedy is functioning as intended by the ROD. Although there is evidence that natural attenuation of groundwater contaminants is occurring, the MNA portion of the remedy has not demonstrated expeditious progress toward meeting groundwater cleanup levels as shown by statistical trend analysis of groundwater data from all wells where data was collected. There have been no changes in the physical conditions of the Site that would affect

the protectiveness of the remedy. There have been no changes in the toxicity factors for the contaminants of concern that were used in the baseline risk assessment. No changes to these assumptions are warranted. There has been no change to the standardized risk assessment methodology that could affect the protectiveness of the remedy. The remedy is generally progressing as expected; however, continued and additional monitoring is needed to further evaluate potential plume expansion and groundwater contaminant levels over time. Also, an evaluation is needed to determine the reason for the incidences of increasing groundwater contaminant levels, such as those shown in Figures 4-8. Finally, although governmental controls are in place to restrict use at the Site, an enforceable EC that runs with the land needs to be signed by the Vandale property owner and recorded in the Washington County Recorder's Office.

VIII. ISSUES

Table 5: Issues

Issue	Currently Affects Protectiveness (Y/N)	Affects Future Protectiveness (Y/N)
1. Groundwater contaminant levels are increasing at certain monitoring wells.	N	Y
2. An enforceable Environmental Covenant is not in place.	N	Y
3. Long-term stewardship must be assured to include maintaining and monitoring ICs; ICs include the implementation of a communications plan.	N	Y

IX. Recommendations and Follow-Up Actions

Table 6: Recommendations and Follow-up Actions

Issue	Recommendation/ Follow-up Actions	Party Respon- sible	Oversight Agency	Milestone Date	Affects Protective- ness? (Y/N)	
					Cur- rent	Fu- ture
1. Ground- water contaminant levels are increasing at certain monitoring wells.	Evaluate the reason for increasing groundwater contaminant levels at some wells and evaluate the effectiveness of the MNA component of the remedy. Produce a Contingency Evaluation Report as described in Section 3.7 of the April 2001 IMMP.	PRP Group	U.S. EPA in consulta- tion with Ohio EPA	July 2009	N	Y
2. An enforceable Environ- mental Covenant is not in place.	Continue to work with the Site owner and his attorney to obtain an enforceable Environmental Covenant.	PRP Group with assistance from U.S. EPA	U.S. EPA in consulta- tion with Ohio EPA	July 2009	N	Y
3. Long- term stewardship must be assured to include maintaining and monitoring ICs; ICs include implementa- tion of a communica- tions plan.	Develop an IC Plan that includes planning for additional IC evaluation activities as needed and planning for long-term stewardship.	U.S. EPA in consulta- tion with Ohio EPA		July 2009	N	Y

X. Protectiveness Statement

The assessment of this Five-Year Review found that the remedy was constructed in accordance with the requirements of the Record of Decision (ROD). The constructed waste cap portion of the remedy is functioning as designed. The remedy at the Site currently protects human health and the environment because immediate threats at the Site have been addressed. For the long term, the remedy will be protective when groundwater cleanup levels are achieved through MNA. Also, for the remedy to be protective in the long term, the following actions need to be taken: determine the cause of increasing contaminant levels at some monitoring wells and obtain an enforceable environmental covenant that runs with the land on the Vandale property.

XI. Next Review

The next Five-Year Review for the Vandale Junkyard Superfund Site is required by February 2014, five years from the signature date of this review.

TABLES

Table 2: List of Documents Reviewed

Construction Completion Report, Vandale Junkyard Superfund Site, GeoSyntec Consultants, August 2000

Environmental Covenant (draft), Vandale Junkyard Superfund Site, U.S. EPA Region 5, undated

Final Remedial Investigation Report, Vandale Junkyard Superfund Site, Metcalf & Eddy, Inc. for the U.S. Environmental Protection Agency; February 18, 1992

Five-Year Review Report, Vandale Junkyard Superfund Site, U.S. EPA Region 5; April 15, 2004

Groundwater, Surface Water, and Sediment Sampling and Analysis Reports, GeoSyntec Consultants, September 2001 through August 2008

Inspection, Maintenance, and Monitoring Plan, Vandale Junkyard Superfund Site, GeoSyntec Consultants, April 2001

Institutional Control Study; Vandale Junkyard Site; Engineering Management, Inc.; September 2008

Monitored Natural Attenuation Efficacy Evaluation Report, Vandale Junkyard Superfund Site, GeoSyntec Consultants, December 2003

Record of Decision, Vandale Junkyard Superfund Site, U.S. EPA Region 5; March 31, 1994

Superfund Preliminary Close-Out Report, Vandale Junkyard Superfund Site, U.S. EPA Region 5; July 7, 2000

Unilateral Administrative Order, Docket Number V-W-'96-C-318, Administrative Order for Remedial Design and Remedial Action, Vandale Junkyard Site, U.S. EPA Region 5; October 16, 1995 signature date

Unilateral Administrative Order, Docket Number V-W-'94-C-307, Administrative Order for Remedial Design and Remedial Action, Vandale Junkyard Site, U.S. EPA Region 5; August 16, 1994 signature date

Use of Monitored Natural Attenuation at Superfund, RCRA Corrective Action, and Underground Storage Tank Sites, OSWER Directive 9200.4-17P; April 21, 1999

Van Dale Junkyard (EPA ID # OHD980794606) Statistical Analysis Report, Sampling Period June 2001 – August 2008; U.S. EPA Region 5, December 2008

Table 3: Summary of Statistically Significant Results for COC Levels

Contaminants and Wells	Standard	UCL	Exceedance?	Trend?	Better or Worse?
1,1-DICHLOROETHENE	1.5				
MW01-07		9.498	Exceedance	Downward	Better
MW01-08		120.3	Exceedance	No Trend	No Change
MW01-10		5.907	Exceedance	Downward	Better
MW03-05		1.571	Exceedance	Upward	No Change
MW03-06		4.843	Exceedance	Downward	Better
MW03-09		11.14	Exceedance	No Trend	No Change
MW03-11		3.808	Exceedance	Downward	Better
BIS(2-ETHYLHEXYL) PHTHALATE	1				
MW01-07		8.556	Exceedance	No Trend	Worse
MW01-08		1.104	Exceedance	No Trend	Better
MW03-06		2.872	Exceedance	No Trend	No Change
MW03-11		7.626	Exceedance	No Trend	No Change
CADMIUM	8.5				
MW01-01		0.25	Compliance	No Trend	Worse
MW01-07		0.25	Compliance	No Trend	Worse
MW01-08		0.25	Compliance	No Trend	Worse
MW01-10		0.25	Compliance	No Trend	Worse
CIS-1,2-DICHLOROETHYLENE	100				
MW01-08		1342	Exceedance	Upward	No Change
MW03-05		39.12	Compliance	Upward	No Change
MW03-09		176.5	Exceedance	No Trend	No Change
MW03-11		1.672	Compliance	Upward	Worse
TETRACHLOROETHYLENE(PCE)	1.5				
MW01-07		2.466	Exceedance	Downward	No Change
MW01-08		6.517	Exceedance	No Trend	No Change
MW01-10		3.004	Exceedance	Downward	Better
MW03-09		3.136	Exceedance	No Trend	No Change
MW03-11		26.29	Exceedance	Downward	Better
TRANS-1,2-DICHLOROETHENE	100				
MW03-06		0.5362	Compliance	No Trend	Worse
VANADIUM	40				
MW01-01		25	Compliance	No Trend	Worse
MW01-02		25	Compliance	No Trend	Worse
MW01-03		25	Compliance	No Trend	Worse
MW01-07		25	Compliance	No Trend	Worse
MW01-08		50	None	No Trend	Worse
MW01-10		37.5	Compliance	No Trend	Worse
MW03-04		25	Compliance	No Trend	Worse
MW03-05		31.71	Compliance	No Trend	Worse
MW03-09		50	None	No Trend	Worse
MW03-12		25	Compliance	No Trend	Worse
VINYL CHLORIDE	0.5				
MW01-07		8.333	Exceedance	Downward	Better
MW01-08		255.1	Exceedance	No Trend	No Change
MW01-10		1.476	Exceedance	Downward	No Change
MW03-06		1.61	Exceedance	Downward	No Change

Table 4: List of Primary ARARs and TBCs

<u>Description of Federal ARAR</u>	<u>Reference</u>
groundwater maximum contaminant levels	Safe Drinking Water Act
surface water quality standards	Clean Water Act U.S. EPA Ambient Water Quality Criteria
standards for owners and operators of hazardous waste treatment, storage, and disposal facilities	40 CFR Part 264
Resource Conservation and Recovery Act (RCRA) Land Disposal Restrictions	40 CFR Part 268
standards for airborne releases	Clean Air Act
procedures for planning and implementing off-site response actions	40 CFR Part 300.440
<u>Description of State ARAR</u>	
management of hazardous wastes	Ohio Administrative Code (OAC) 3745-54
closure and post-closure requirements	OAC 3745-55
hazardous wastes restricted from land disposal	OAC 3745-59
primary drinking water rules	OAC 3745-81
air pollution control requirements	OAC 3745-15, 17, and 21
recyclable material standards	OAC 3745-58
water quality standards	OAC 3745-1
<u>Description of TBCs</u>	
classification of groundwater aquifers	U.S. EPA Groundwater Classification Guidelines
development of health-based cleanup goals	U.S. EPA Integrated Risk Information System (IRIS)

FIGURES

Figure 1

Van Dale Junkyard Superfund Site Washington County, Ohio

1) State



2) City of Marietta

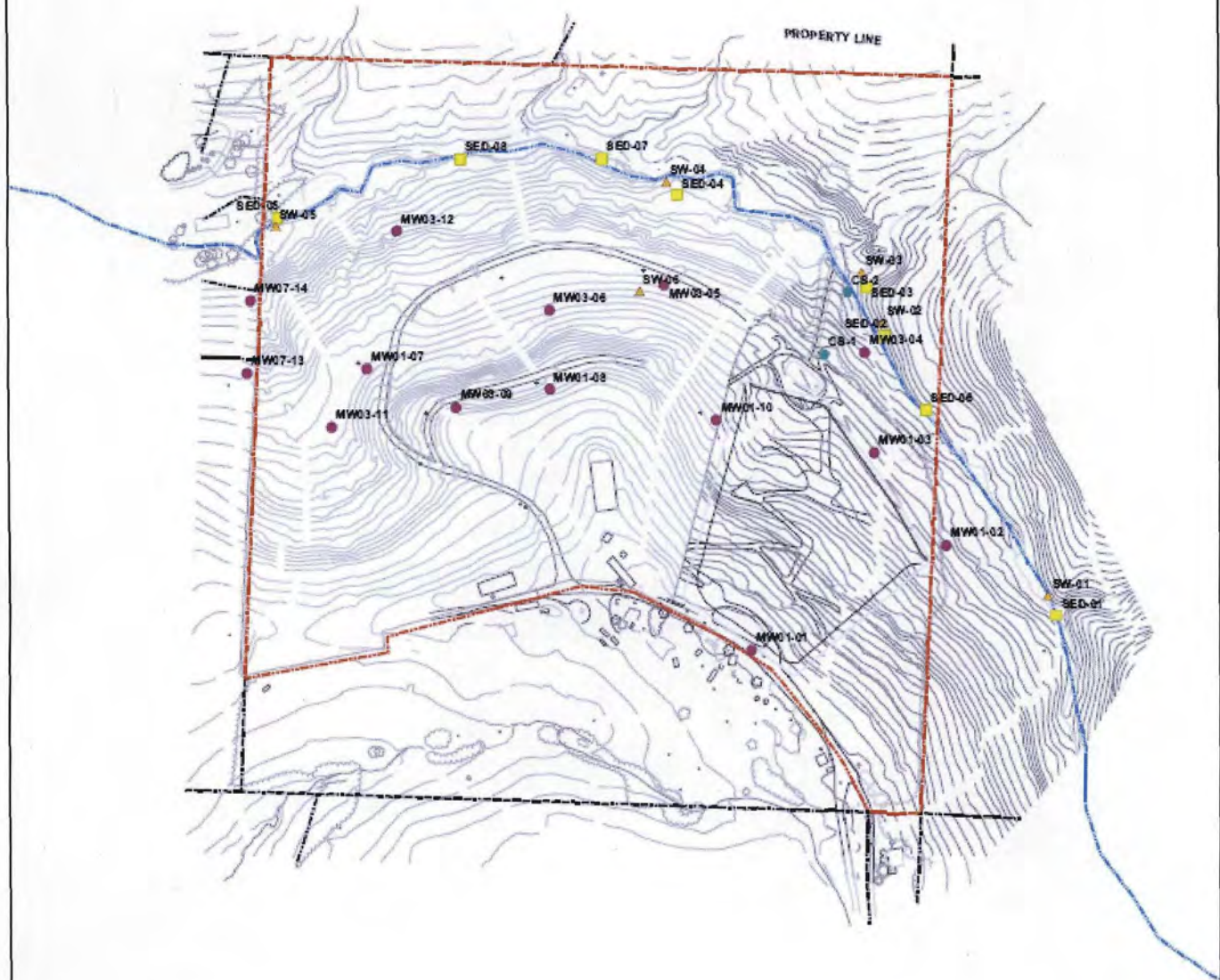


3) Van Dale Junkyard Superfund Site



Plot created by David Wilson U.S. EPA Region 1/28/2004
Image Date: 4/5/1998

MONITORING POINTS VAN DALE JUNKYARD SUPERFUND SITE



LEGEND

- - - Property Line
- Water Features
- Topography Contour
- Subsurface Collection Sump Monitoring Point
- Monitoring Well
- Sediment Sampling Point
- ▲ Surface Water Monitoring Point



Geosyntec[®]
consultants

DATE: 06/05/2008	SCALE: 1"=300 FEET
PROJECT NO: GR111-200	FIGURE NO: 2
DOCUMENT NO: GA080396	FILE NO: Figure2_2ndQuarter2008.mxd

Figure 3: Vandale Junkyard Site Map Showing Portion of Remedy on Adjacent, Spindler Property

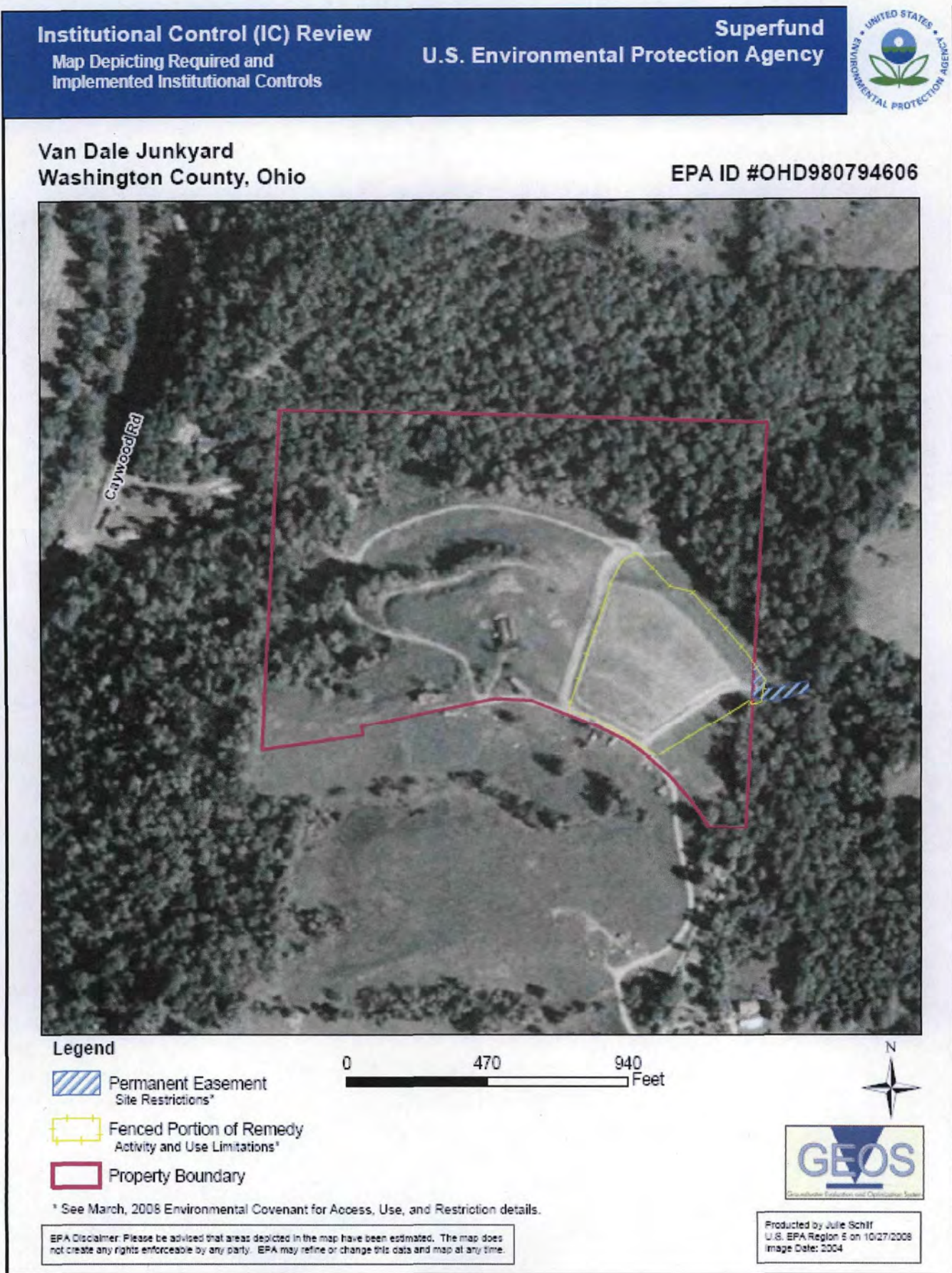
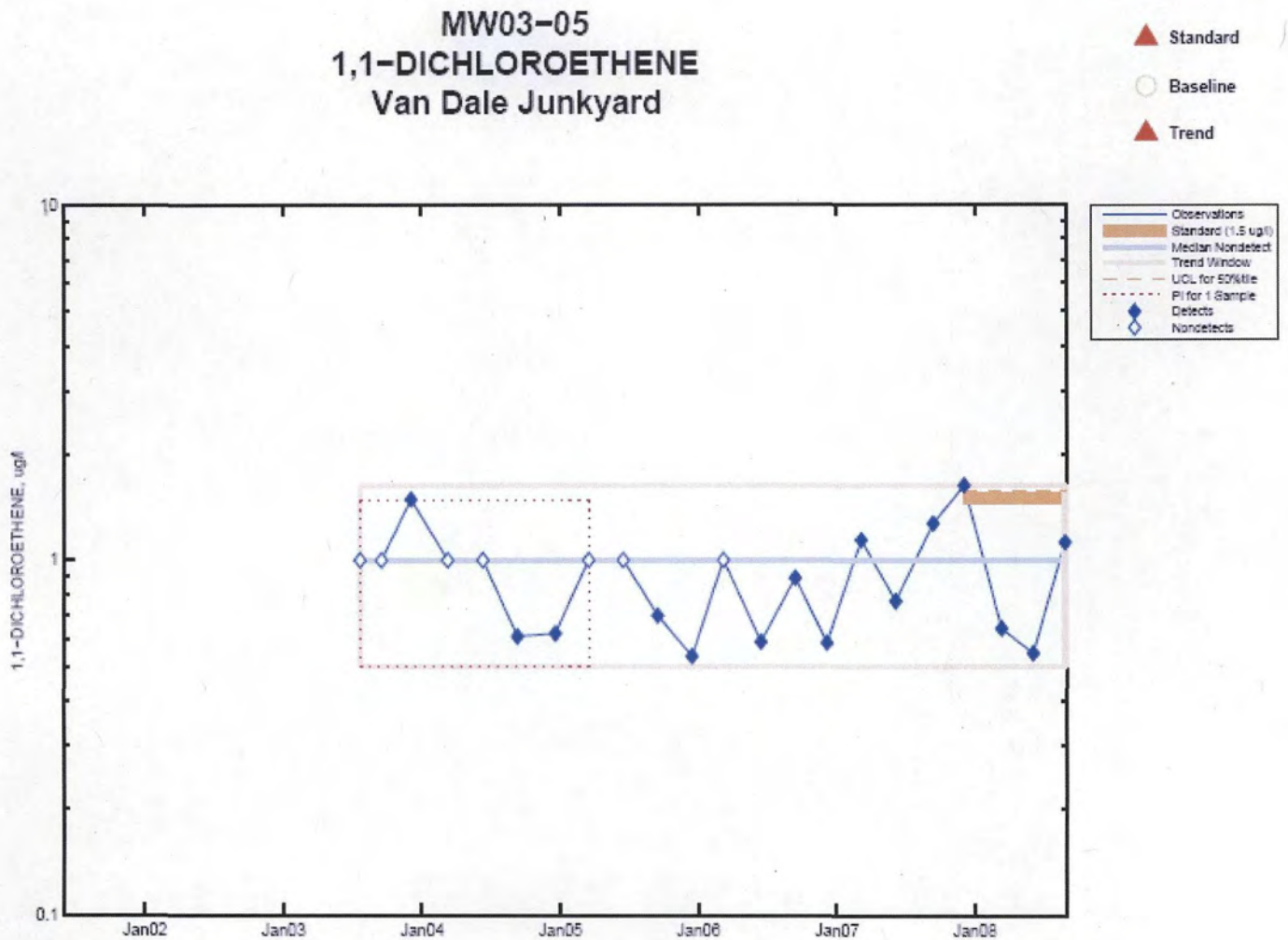


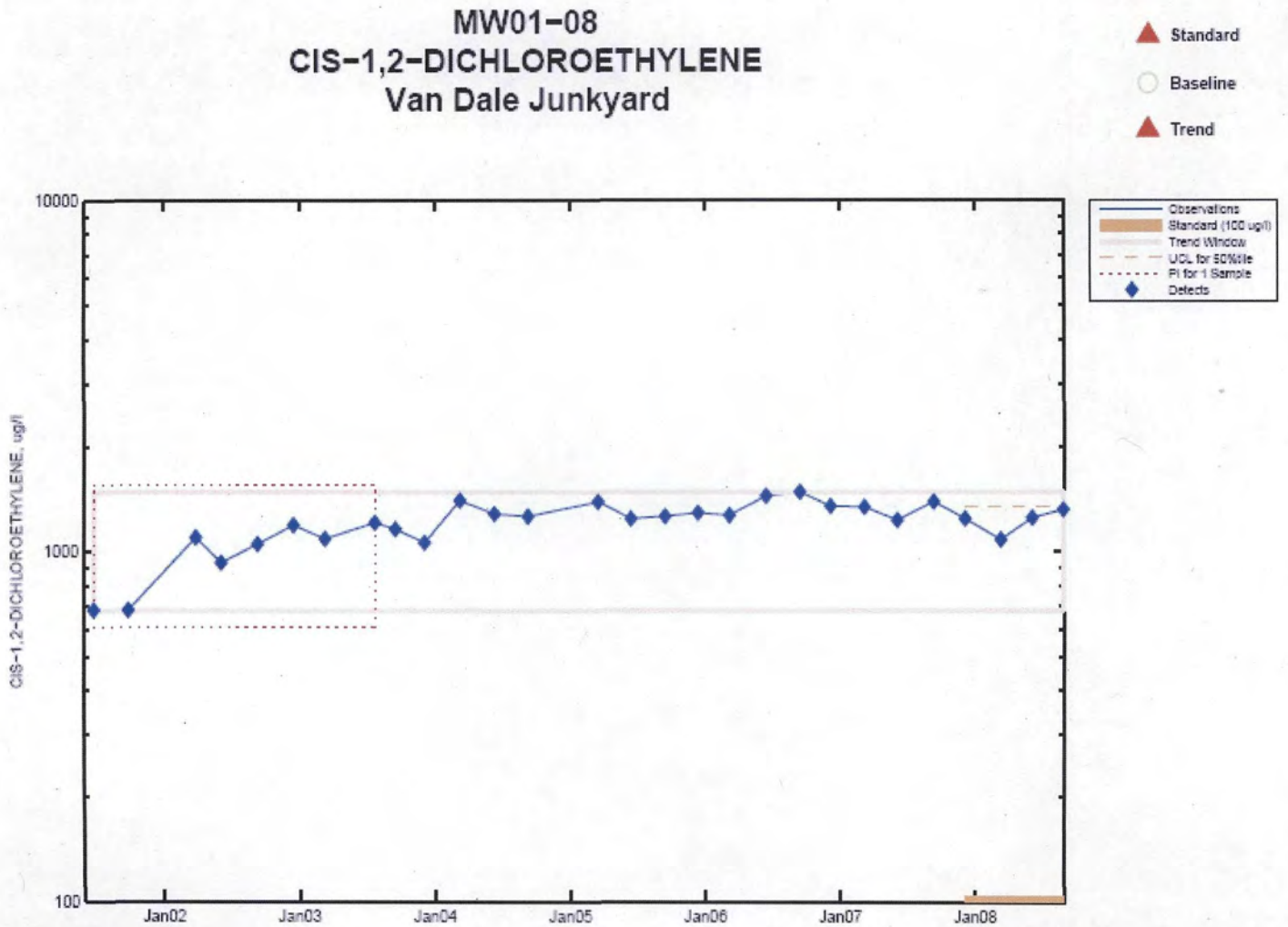
Figure 4: Statistically Increasing Trend for 1,1-DCE at Well MW03-05



Standard Test (95%): Exceedance <UCL = 1.57e+000 ug/l>
 Baseline Test (95%): No Change <UPL/LPL = 1.49e+000/5.00e-001 ug/l>
 Trend Test (90%): Upward <Slope = 3.22e-002 log-ug/l/year>
 Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 03-Dec-2008
 Prepared by: US EPA, Region 5

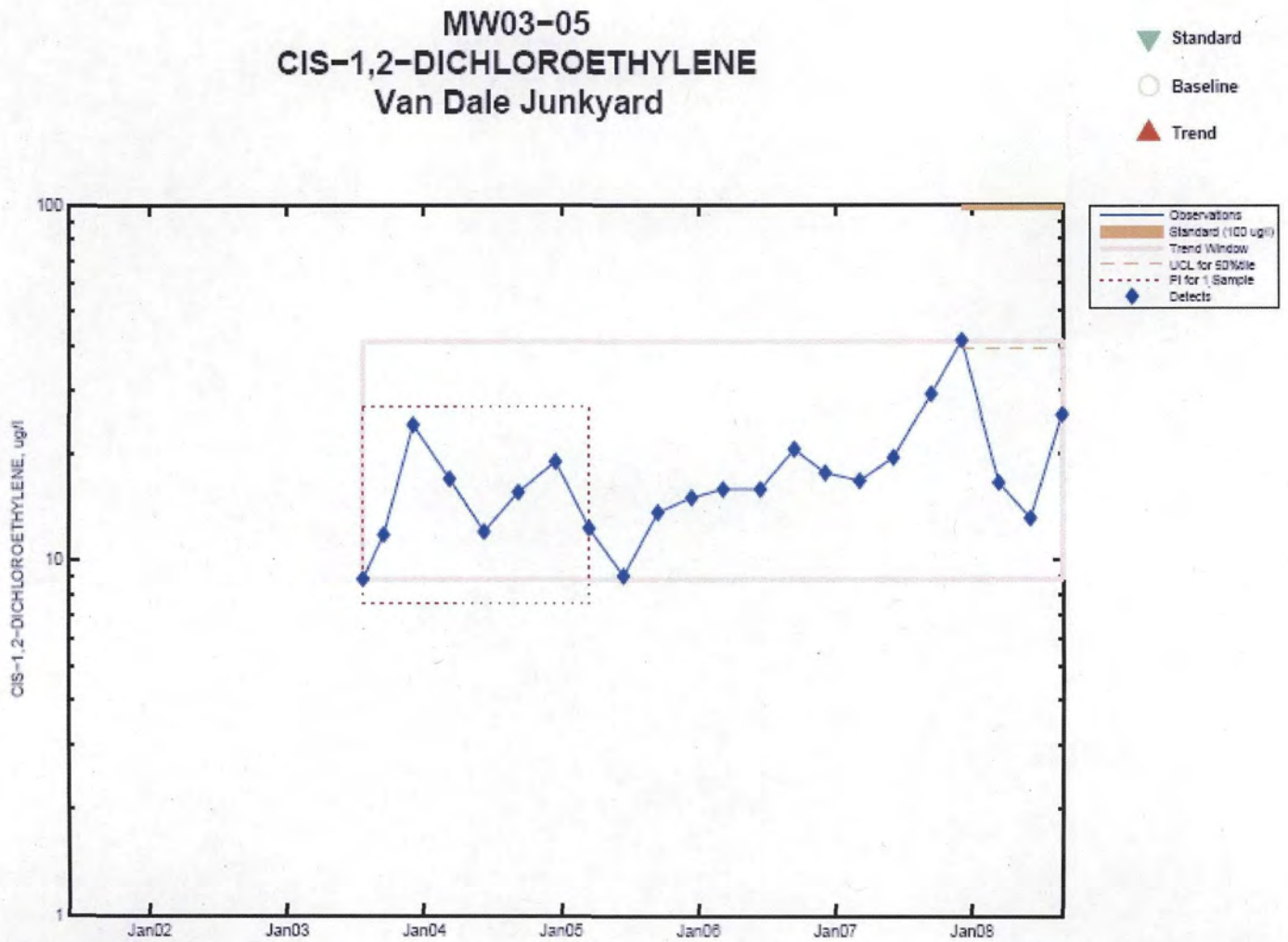
Figure 5: Statistically Increasing Trend for Cis-1,2-DCE at Well MW01-08



Standard Test (95%): Exceedance <UCL = 1.34e+003 ug/l>
 Baseline Test (95%): No Change <UPL/LPL = 1.55e+003/5.07e+002 ug/l>
 Trend Test (90%): Upward <Slope = 4.25e-002 log-ug/l/year>
 Statistical Note: ND surrogates = 0.5 X Median of nondetects' PQLs

Run Date: 03-Dec-2008
 Prepared by: US EPA, Region 5

Figure 6: Statistically Increasing Trend for Cis-1,2-DCE at Well MW03-05

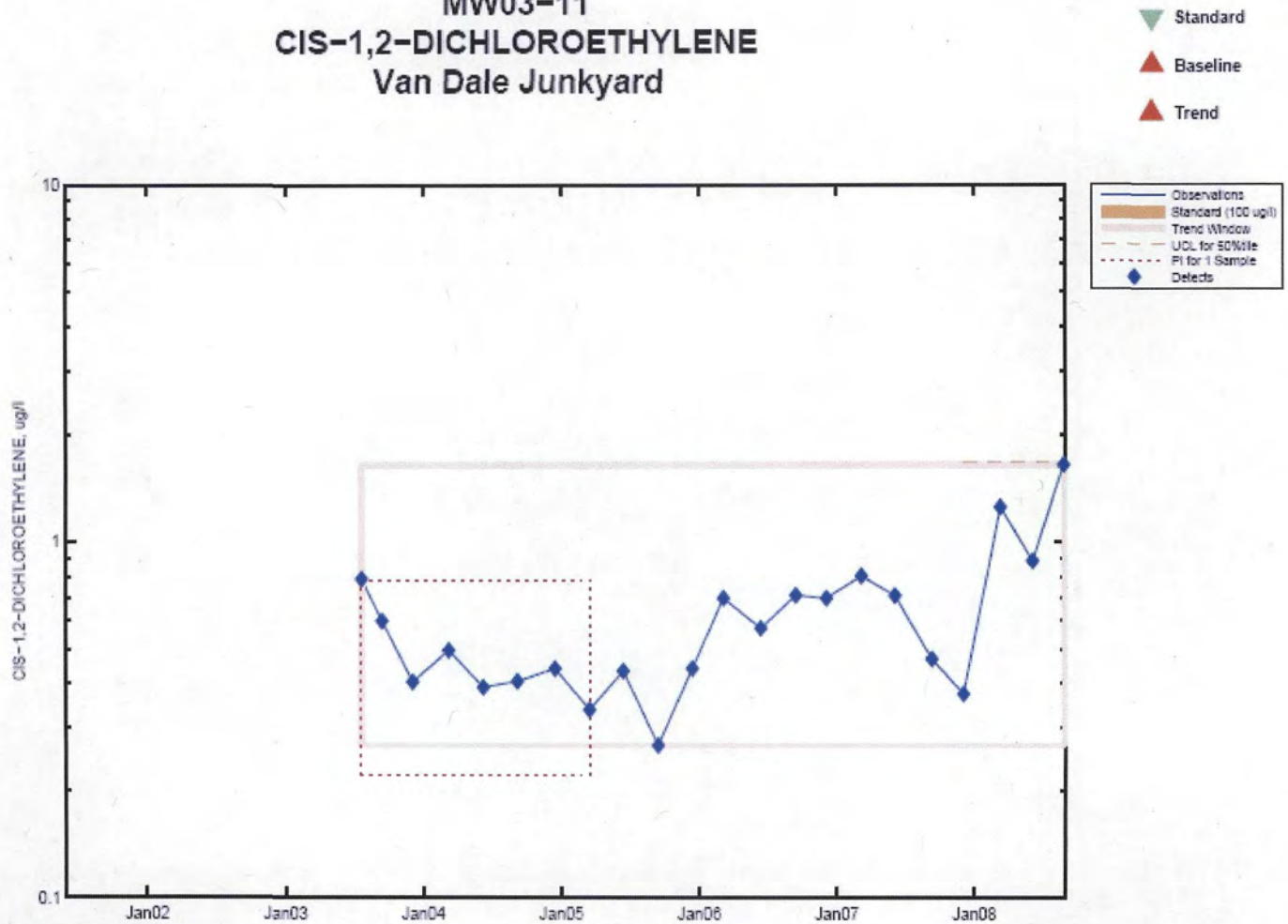


Standard Test (95%): Compliance <UCL = 3.91e+001 ug/l>
 Baseline Test (95%): No Change <UPL/LPL = 2.70e+001/7.50e+000 ug/l>
 Trend Test (90%): Upward <Slope = 1.33e-001 log-ug/l/year>
 Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 03-Dec-2008
 Prepared by: US EPA, Region 5

Figure 7: Statistically Increasing Trend for Cis-1,2-DCE at Well MW03-11

**MW03-11
CIS-1,2-DICHLOROETHYLENE
Van Dale Junkyard**

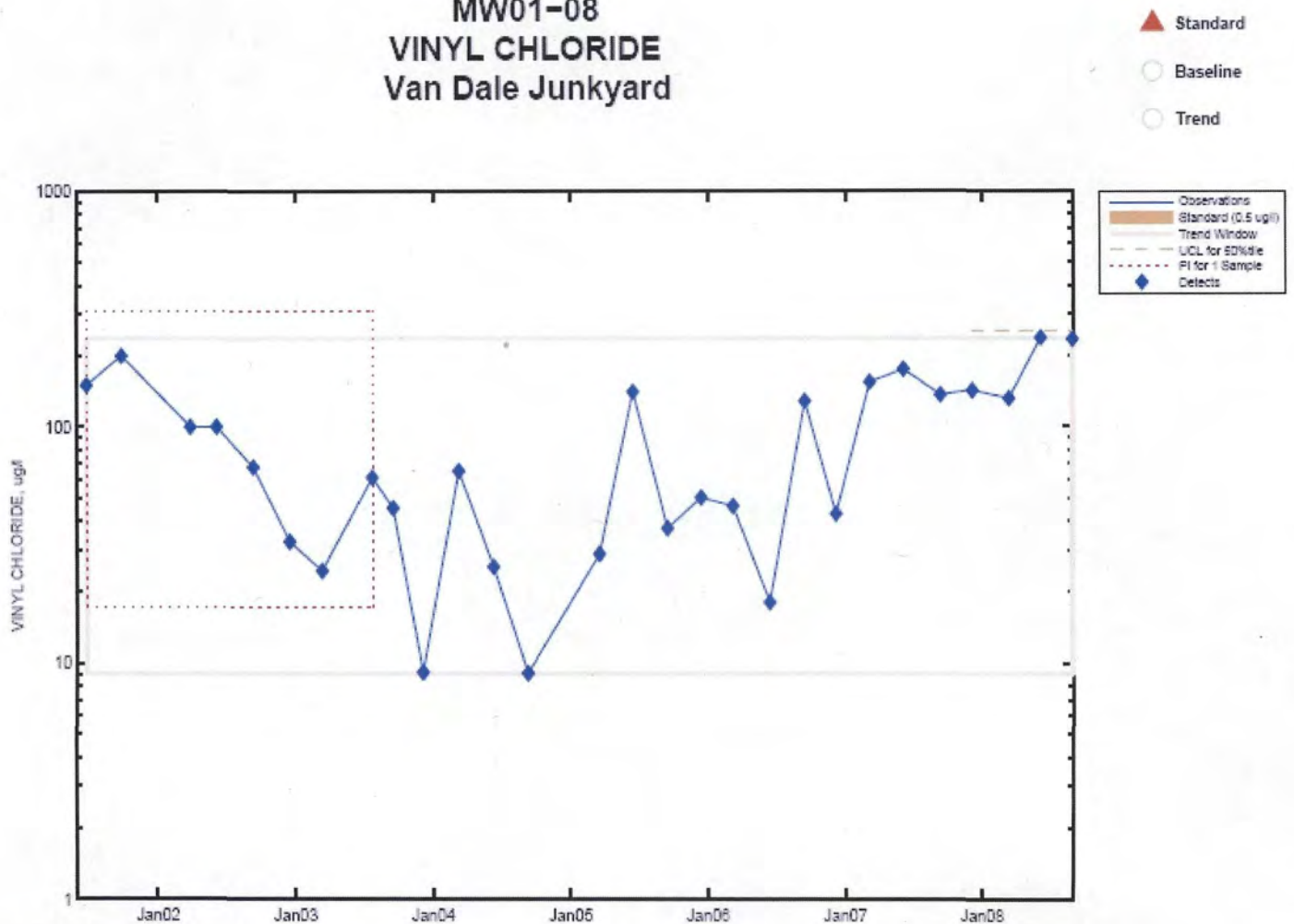


Standard Test (95%): Compliance <UCL = 1.67e-000 ug/l>
 Baseline Test (95%): Worse <UPL/LPL = 7.84e-001/2.22e-001 ug/l>
 Trend Test (90%): Upward <Slope = 5.74e-002 log-ug/l/year>
 Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 03-Dec-2008
 Prepared by: US EPA, Region 5

**Figure 8: Statistically Increasing Trend (from December 2003 through August 2008)
for Vinyl Chloride at Well MW01-08**

**MW01-08
VINYL CHLORIDE
Van Dale Junkyard**



Standard Test (95%): Exceedance <UCL = 2.55e+002 ug/l>
 Baseline Test (95%): No Change <UPL/LPL = 3.13e-002/1.74e-001 ug/l>
 Trend Test (90%): No Trend <Slope = 1.35e-001 log-ug/l/year>
 Statistical Note: ND surrogate = 0.5 X Median of nondetects' PQLs

Run Date: 03-Dec-2008
 Prepared by: US EPA, Region 5