UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Statement of Basis
April 2015

Anderson Redevelopment Commission
Former GM Plant 7, Area 7
2900 South Scatterfield Road
Anderson, Indiana
EPA ID # IND 980 503 825

INTRODUCTION

This Statement of Basis (SB) for the Anderson Redevelopment Commission, former General Motors (GM) Energy and Engine Management Facility (Facility), Plant 7, Area 7 (Area 7), explains the United States Environmental Protection Agency's proposed revised remedy to eliminate hazardous constituents in soil and prevent their release to ground water in order to protect human health. A Final Decision and Response to Comments was previously issued in 2006 for the entire facility. In 2014, EPA issued a second Final Decision and Response to Comments for excavation and removal of contaminated soil at Area 7; however EPA has determined that the estimated cost for the excavation remedy may have been underestimated, so in response, EPA is revisiting its 2014 decision.

This SB is for EPA's proposed remedy for Plant 7, Area 7, only (Figure 1). In addition to the preferred proposed remedy, this SB includes summaries of other potential remedies analyzed and considered for Area 7. EPA will select a final remedy for Area 7 only after the public comment period has ended and the information submitted during this time has been reviewed and considered. As such, EPA is issuing this SB as part of its public participation responsibilities under the Resource Conservation and Recovery Act (RCRA).

This document summarizes information that can be found in greater detail in the April 2001 *RCRA Facility Investigation (RFI) Report*, the December 2011 *Final Corrective Measure Recommendation, Anderson Redevelopment Commission*, and other documents in the administrative record for the facility. EPA encourages the public to review these documents to gain a more comprehensive understanding of the facility and RCRA activities that have been conducted there. Copies of these documents may be found at the Anderson Public Library, 111 East 12th Street, Anderson, Indiana, or at the EPA Region 5 Records Center, 77 West Jackson Boulevard, Chicago, Illinois.

EPA may modify the proposed remedy or select another remedy based on new information or public comments. Therefore, the public is encouraged to review and comment on all alternatives. The public can be involved in the remedy selection process by reviewing the documents contained in the administrative record file and submitting comments to the EPA during the public comment period. In this document, EPA informs the public of the location and availability of the administrative record, as well as the dates for the public comment period. Although no public meeting has been scheduled as of the start date of the public comment period, members of the public can request a public meeting during the open public comment period.

PROPOSED REMEDY

EPA proposes that Anderson Redevelopment Commission (ARC) eliminate soil and ground water volatile organic compounds (VOCs) contamination at Area 7 through a technique called Electrical Resistive Heating (ERH) which will volatilize the contamination, allowing the vapors to be removed by vacuum extraction, and subsequent monitoring of ground water for attenuation of any remaining contaminants.

During GM's ownership of the Facility, GM installed a network of ground water monitoring wells between Area 7 and the Facility property line, and off-site in the north/northwesterly direction of ground water flow (downgradient). EPA proposes using these wells in a monitoring program to evaluate the remedy's effectiveness in removing ground water contamination released from Area 7. EPA proposes to use existing institutional controls (ICs) to assure the site's continued use as an industrial property.

Restrictive covenants have been recorded in the property deed which:

- Restrict the property to commercial and industrial uses for ARC and future owners;
- Prohibit the use of on-site ground water for any potable (i.e., drinking water) or non-potable purpose, except for corrective action activities;
- Require any soil, sediment, debris, surface water, ground water, and any other media that are excavated or disturbed on the property to be managed as hazardous wastes under RCRA if identified as such; and
- Are permanently enforceable on the property, regardless of changes of ownership.

FACILITY BACKGROUND

Location and Description

The Facility is located at 2900 South Scatterfield Road, on the southeast side of the City of Anderson in Madison County, Indiana (Figure 1). The 18 acre Plant 7 was part of a much larger automotive manufacturing facility. While operated by GM, the former 220 acre Facility produced electronic components such as ignitions, turn signals, distributors, horns, and alternators for the automotive industry. Manufacturing began in the late 1930s and ceased in the late 1990s. A RCRA corrective action was initiated in 1998; interim measures were implemented between 1998 and 2001, and a Final Decision was issued for the entire Facility in 2006.

The former Plant 7 was located in the northwestern portion of the Facility. It was built in 1940 and expanded several times to approximately 427,000 square feet. The building was demolished in 1996, and the foundation and slab were removed in 2004. This location is bounded on the north by Conrail railroad tracks and the Phillips Industries scrap yard, on the east by the former Plant 3, on the south by the former Plant 10, and on the west by the Facility's former waste water treatment plant and industrial and residential properties.

While Plant 7 was active, GM operated an in-ground degreaser and associated trench system in the western portion of the building. The degreaser was installed in 1976 and taken out of service in 1986. A VOC known as trichloroethene (TCE) was used as the solvent in the degreaser. For the RCRA Facility Investigation (RFI), which is described below in this SB, the former degreaser was designated as Area 7 (Figure 2). The degreaser and trench system were removed during demolition of Plant 7. During the RFI, TCE was detected in ground water downgradient of Area 7, which indicated past releases from the degreaser.

Area 7 Geology

Area 7 is approximately 18 acres in size. The soils are variable lenses and layers of silty clay and gravelly sand with a total depth ranging from 25 to 53 feet. A thick formation of dense and dry gravelly clay, known as the basal till, lies beneath the soil layers.

Area 7 Hydrogeology

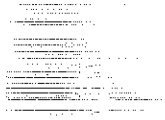
Because of the variable soil types underlying the area, the depth to the water table ranges from 15 to 17 feet below ground surface. Overall thickness of the saturated soils above the basal till is approximately 30 feet. The direction of ground water flow in the area is north-northwesterly, toward the White River, which is approximately 0.75 mile from the northern property boundary of the ARC facility.

Surface Water Near Area 7

The Pittsford Ditch, a tributary of the White River, lies 50 feet to the west of Area 7 and flows south to north. Within the Facility boundaries the Pittsford Ditch is either lined with concrete or flows underground through culverts.

Area 7 Ecological Setting

The Facility is located in a highly developed area which is a combination of industrial, commercial and residential properties. The site itself is a formerly active manufacturing facility with little natural soil, and is covered by native grass. Currently, the area is predominantly covered by pavement and crushed rock. The only surface water body, the Pittsford Ditch, flows either through concrete-lined channels or underground culverts. Based on these observations, no environmentally sensitive habitats exist at the Facility, and no endangered or threatened species are expected to be present.



Evaluation of Present Human Health Risk from Area 7

Access to Area 7 (by trespassers) is restricted by a fence which surrounds the Facility. Exposure to fugitive dust is prevented by an engineered cover which consists of a synthetic membrane, compacted clay and vegetated top soil installed on the contaminated area. EPA contractors have not detected chlorinated VOCs after sampling and analyzing ground water near a residential area approximately 2,800 feet downgradient of Area 7 (Figure 3). Although releases are occurring from Area 7, the contaminant mass does not currently pose risk to human receptors either on or off-site. However, EPA seeks to eliminate the potential for future exposures to TCE and its degradation products through the corrective measures proposed in this SB, thereby removing any potential endangerment to human health and the environment.

Interim Measures Taken at Area 7

In 2001, in an effort to address TCE contamination in the ground water migrating beyond the northern boundary of the Facility, GM proposed to install a line of injection wells near the property line. Through these wells, GM proposed to inject a solution of molasses into the plume of contamination. The sulfur and the organic composition of the molasses were to stimulate the growth of existing bacteria, which would degrade the TCE. This process is known as Enhanced Reductive Dechlorination (ERD). EPA approved GM's plan for this interim measure on June 7, 2001. GM installed twenty-two injection wells near the property line on 10-foot centers. Operation of the ERD system began in August 2001; however, GM shut the system down in November 2003 due to its failure to completely remove all contamination. Although the system effectively degraded the TCE, the concentrations of the TCE degradation product vinyl chloride were not effectively treated by the ERD system. EPA and GM decided to address the contamination at Area 7 through the remedy discussed below.

Interim Measures Taken Throughout the Facility

In addition to addressing contamination at Area 7, GM voluntarily removed contamination from other areas (Figure 2) at the Facility during its RCRA Facility Investigation (RFI) between 1998 and 2001. These actions are summarized in Table 1 below:

Table 1 – Interim Measures Taken by GM at Other Areas

Area	Interim Measures Taken	Contaminant Levels Remaining	Standards	Rationale
Former Plant 3 Area 3	Soil vapor extraction to remove TCE in soil at initial maximum concentration of 950 mg/kg (Action taken in 1999-2001)	Average remaining TCE concentration 3 mg/kg in soil Average TCE ground water concentration 0.03 mg/L	Industrial screening level for TCE in soil 61.2 mg/kg Residential screening level for TCE in soil 23.2 mg/kg Site-specific screening level for TCE in ground water 0.005 mg/L	Remaining contamination meets calculated site-specific human health risk goals approved by EPA for industrial/commercial reuse of property *
Former Plant 11 Chrome Plater and Degreaser	Concrete floor removed as hazardous waste characteristic for chromium (Action taken 1998-2000)	Average remaining chromium concentration in soil 142.31 mg/kg Average remaining TCE Concentration in soil 14.85 mg/kg Average concentration of TCE in ground water 0.016 mg/L	Industrial screening level for TCE in soil 61.2 mg/kg Industrial screening level for chromium in soil 4,480 mg/kg Site-specific screening level for TCE in ground water 0.005 mg/L	Remaining contamination meets calculated site-specific human health risk goals approved by EPA for industrial/commercial reuse of property *
Former Plant 17 Area 24	Soil vapor extraction performed 1999-2000 to remove TCE (Action taken in 1999-2000)	Average remaining TCE concentration in soil 15.17 mg/kg Average concentration of TCE in ground water 0.39 mg/L	Industrial screening level for TCE in soil 61.2 mg/kg Site-specific screening level for TCE in ground water 0.005 mg/L	Remaining contamination meets calculated site-specific human health risk goals approved by EPA for industrial/commercial reuse of property *
Former Plant 7 Area 1	Waste cutting oil and metal chips removed from concrete drip pads (1999)	Average TCE concentration in soil 0.6 mg/kg Average lead concentration in soil 234 mg/kg	Industrial screening level for TCE in soil 61.2 mg/kg Industrial screening level for lead in soil 750 mg/kg	Remaining contamination meets calculated site-specific human health risk goals approved by EPA for industrial/commercial reuse of property *
Area 5 – Pittsford Ditch	Stream that traverses site in underground culverts and concrete swales – sediment and water sampled (1998)	Average lead concentration in water 0.005 mg/L Average lead concentration in sediment 381.67 mg/kg	Screening level for lead in water 0.015 mg/L Screening level for lead in sediment 400 mg/kg	Remaining contamination meets calculated site-specific human health risk goals approved by EPA for industrial/commercial reuse of property *

mg/kg = milligrams per kilogram soil **mg/L = milligrams per liter water** *** Cumulative cancer risk of 1 x 10^{-4} (one in 10,000) and non-cancer hazard index of 1.0**

Corrective Measures Taken in 2006

From 1998 through 2001, GM conducted an RFI for the entire Facility under the conditions of a RCRA permit for hazardous waste management. GM described and investigated releases from the former degreaser at Area 7 as part of the facility-wide RFI. In its April 2001 RFI Report, GM noted that TCE was embedded in the sand and clay layers at depths of nearly 30 feet, at concentrations of 0.004 to 5,400 milligrams per kilogram (mg/kg) of soil. Concentrations of TCE in ground water ranged from 31 milligrams per liter (mg/L) directly below the former degreaser to non-detect approximately 2,800 feet downgradient of Area 7.

On May 9, 2002, EPA and GM entered into a Consent Agreement and Final Order (CAFO) for the completion of corrective action at the Facility, which included Area 7. As shown in Table 1, GM addressed releases of contamination at other areas of concern at the Facility through interim measures. GM submitted the final revised Corrective Measures Proposal (CMP) for Area 7 on December 19, 2005. In order to prevent ongoing releases of TCE to ground water from the contaminated soil at Area 7, GM proposed to isolate and contain this contamination by installing an in-ground barrier of bentonite clay mixed with native soil, called a slurry wall. The slurry wall would be emplaced by excavation of soil with a backhoe followed by installation of the clay/soil slurry with a rotary auger device. When saturated, bentonite clay expands and fills voids between soil grains, thereby preventing the flow of ground water through the barrier. The slurry wall would be anchored 2.5 feet into the basal till, effectively sealing the bottom of the containment system. In order to alleviate pressure against the slurry wall created by ground water within the structure, GM proposed to install a pumping well within the containment. The extracted ground water would be held in a 5,000 gallon underground storage tank and periodically removed off-site. The containment area would be covered by an engineered cap consisting of compacted clay and a synthetic membrane.

On April 27, 2006, EPA gave public notice of its proposed final corrective measures decision for the Facility. EPA determined that the Facility, with the exception of Area 7, required no further corrective action beyond the previously implemented interim measures and was suitable for commercial or industrial reuse.

For Area 7, the features of the proposed remedy are summarized below in Table 2:

Table 2: 2006 Remedy for Area 7

Corrective Measure	Medium Protected	Protective Standard	Rationale
Slurry wall enclosure	soil, ground water	15 mg/kg TCE	TCE concentration calculated by GM and approved by EPA as maximum allowable in soil to prevent mobilization of TCE to ground water at concentrations above threshold calculated for property boundary, and to ensure that indoor vapor intrusion into buildings constructed at the site will not be a human health risk.
Ground water extraction within enclosure	ground water		Ground water extracted through a well in order to reduce internal pressure of ground water within enclosure and prevent stress on the slurry wall, stored in 5,000 gallon tank and removed off-site for treatment and disposal.
Composite cap	soil, ground water		Cap consisting of clay and synthetic membrane was installed to prevent precipitation from coming into contact with contaminated soil within enclosure, and to prevent release of fugitive dust.
Ground water monitoring at downgradient property boundary	ground water	0.520 mg/L TCE 0.483 mg/L cis-1,2 DCE 0.035 mg/L vinyl chloride	Property Boundary Goals were calculated by GM and approved by EPA as threshold concentrations in ground water migrating past property line that will be protective of human health through non-potable dermal contact and will attenuate to allowable Federal drinking water standards (MCLs) off-site of the facility.
Final goals for off-site ground water protective of human health	ground water	0.005 mg/L TCE 0.070 mg/L cis-1,2 DCE 0.002 mg/L vinyl chloride	Federal Maximum Contaminant Levels (MCLs) set by EPA as maximum concentrations allowable for safe drinking water.

The 45 day public comment period for the proposed remedy for Area 7 and for EPA's proposal of no further corrective action for the remainder of the Facility ran from April 27, 2006, through June 12, 2006. EPA received no public comments. On July 11, 2006, EPA issued its Notification of Final Decision for the Area 7 remedy and no further corrective action determination for the remainder of the Facility. The proposed remedy was selected as the Final Decision for the Facility and GM implemented the remedy immediately.

Construction of the containment system at Area 7 began in September 2006 and was completed in July 2007. Operation of the internal ground water extraction system began on July 11, 2007. During the remainder of 2007, GM operated the pumping well and measured the depths to the water table within and outside of the containment to determine if inward flow of ground water within the enclosure had been achieved.

Evaluation of the Containment System

In 2006, GM deeded the entire Facility to the ARC, but continued to administer the Area 7 remedy. By early 2008, GM determined that inward flow of ground water was not occurring, and that ground water was likely flowing through the northern and eastern portions of the enclosure. The containment of ground water on-site was not occurring. Over the remainder of the year and into early 2009, GM conducted ground water pumping tests and drilled exploratory soil borings in the areas suspected of leakage. At two locations in the northern and eastern portions of the enclosure, GM discovered that the slurry wall had been anchored into a clay horizon which lies over a permeable sandy layer, rather than anchored as intended into the underlying basal till. Ground water has been flowing through the sandy material.

GM continued its ground water pumping tests and soil borings while evaluating options for repairing the gaps in the slurry wall until June 2009, when General Motors Corporation declared bankruptcy. When this declaration was made, all work ceased at Area 7, including evaluation of the slurry wall and operation of the ground water extraction system.

Remedy Proposed by EPA in April 2013

On April 8, 2013, EPA gave public notice of a proposed remedy for Area 7. This proposal was for repair of the slurry wall in order to provide immediate containment of the contamination, combined with the injection of chemical additives below ground within the enclosure. The process of degrading the contaminants via injection of additives is known as in-situ chemical oxidation (ISCO). The public comment period for this proposed remedy ran from April 8, 2013, to May 23, 2013. EPA received several comments from community leaders, local business interests, and remediation contractors who questioned the benefits of ISCO and recommended either Electrical Resistive Heating (ERH) or excavation and removal of contaminated soil for Area 7. EPA reviewed these comments and revisited the remedial alternatives.

September 2014 Final Remedy Decision

Following the 2013 public comment period described above and as a result of the comments received, EPA issued a Notification of Final Decision and Response to Comments (FD/RC) on September 9, 2014, for excavation of all soil containing TCE at concentrations above 15 mg/kg, followed by ground water monitoring. The basis for selection of excavation as the remedy for the site in the Final Decision was a 2013 EPA consultant's cost analysis for remedial alternatives, which included a cost estimate of $1,773,000 for excavation of TCE contamination at Area 7 to a depth of 15' and other costs associated with the excavation. The actual depth of soil contamination is 36 feet, more than double the depth used in the cost estimate. EPA requested its consultant to revise the excavation cost estimate for removal of contamination to a depth of 36', which is the actual maximum depth of TCE detects at the Area. The June 2014 revised excavation cost estimate was $3,846,572. Although the cost was higher than the original estimate, EPA considered excavation and off-site removal of contaminated media to be a rapid and effective corrective measure, and that the revised cost estimate was still within the ARC's environmental trust fund budget.

After EPA's Final Decision, ARC began soliciting bids and remedial proposals from environmental consultants. However, the consultants expressed concern that the assumed $3,846,572 excavation cost is underestimated. Among the concerns expressed were increased costs for managing contaminated ground water, transportation of contaminated media, and that the likely expansion of the lateral and vertical dimensions of the Area 7 excavation in order to remove all soil containing TCE above the cleanup standard would raise the final cost of the remedy significantly above the ARC's budget.

On January 30, 2015, ARC submitted a letter expressing its concerns to EPA about the implementability of the excavation and removal remedy named above. ARC requested EPA to revisit its Final Decision and to reconsider ERH as the most appropriate remedial alternative for Area 7.

EPA concurs with ARC's request for reconsideration, and is issuing this new Statement of Basis.

Regulatory History

Hazardous waste management and RCRA corrective action at the Facility (then known as GM Delco Remy) had been conducted under a RCRA permit issued by EPA on November 19, 1998. After lapse of that permit, EPA and GM entered into a CAFO in May 9, 2002. Under this CAFO, GM conducted the RFI and other corrective action activities described above in this SB.

GM posted a $1.2 million surety bond as financial assurance for corrective action under the CAFO.

From 1992 through 2006, GM demolished the plant buildings and removed residual wastes as described above in this SB. The only remaining buildings belong to Hi-Tech Engineering (former Plant 18) and AMACOR (former Plant 19).

On September 20, 2006, GM deeded the entire Facility in its possession, including Area 7, to the ARC. ARC is an Indiana statutory redevelopment commission formed for the purpose of identifying, creating and funding redevelopment activities that will increase the tax base, create new jobs, and improve the economic conditions for the City of Anderson. By written agreement with ARC, GM retained responsibility to complete RCRA corrective action obligations for Area 7. Prior to the transfer, GM notified ARC of the terms and obligations of the CAFO and provided a copy of the document to ARC.

On June 1, 2009, GM, then known as Motors Liquidation Corporation (MLC) filed for bankruptcy in the United States Bankruptcy Court under Chapter 11 of the United States Code. On October 20, 2009, MLC informed EPA, in writing, that it would default on its obligations under the CAFO and that it would not complete the required RCRA corrective action at the Facility.

Under the CAFO, GM maintained financial assurance in the form of a surety bond issued by Westchester Fire Insurance Company (Westchester), to guarantee its financial ability to perform the corrective action. On February 2, 2010, EPA presented a claim to Westchester for the full amount of the surety bond. On November 19, 2010, Westchester deposited into a trust account at the Bank of New York/Mellon (BNY Mellon as Trustee) the amount of $1,200,435.09 (the Insurance Trust). EPA is the beneficiary of the BNY Mellon Insurance Trust. The trust money may only be used to reimburse persons specified by the EPA Regional Administrator for expenditures to perform RCRA corrective action at the Facility.

Additionally, on March 7, 2011, the United States Bankruptcy Court entered into a Consent Decree and Settlement Agreement among MLC, the United States of America, and the State of Indiana. Under this Consent Decree, MLC was obligated to make a cash payment in the amount of $3,599,039.00 into a trust account, of which EPA is the beneficiary, to conduct corrective action at the Facility. On April 1, 2011, MLC deposited the funds into a trust account at First Merchants Trust Company (First Merchants as Trustee), known as the Bankruptcy Trust, with a total budget of $4,799,474.09.

Administrative Order on Consent

On July 11, 2011, EPA and ARC entered into an Administrative Order on Consent (AOC) to select and implement a new and effective remedy at Area 7. Under the terms of the AOC, ARC can apply to EPA for reimbursement of cleanup costs to be made from the Insurance Trust and the Bankruptcy Trust. This Statement of Basis is EPA's proposal of the remedy to be implemented by the ARC.

SCOPE OF CORRECTIVE ACTION

ARC must implement corrective measures at Area 7 that meet the following objectives:

- Remove TCE in Area 7 soil to concentrations at or below 15 mg/kg, which is the calculated target concentration to prevent mobilization to ground water and volatilization to indoor air in future structures;
- Eliminate on-going release of TCE to ground water;
- Monitor downgradient ground water to verify remedy performance by observing decreasing concentrations of TCE and its degradation products; and
- Protect human health by eliminating ground water contamination.

EPA'S PREFERRED REMEDY

The Agency proposes that the remedial objectives listed above can be best met at Area 7 by application of Electrical Resistive Heating and vacuum extraction of vapors to remove TCE contamination from soil and ground water within and near the containment area. ARC would monitor contaminant levels in ground water downgradient of Area 7 to assess the performance of the remedy. Existing institutional controls such as restrictive covenants on the property deed and a City ordinance which prohibits the installation of wells for potable use, are components of the preferred remedy. EPA's preferred remedy and the remedial alternatives considered by the Agency in making the proposed selection are discussed in greater detail below in this SB.

Performance Standards for Corrective Measures

Remedial alternatives must meet three performance standards, which are the main objectives of corrective action under the RCRA program. These standards are:

1. Attain media cleanup standards;

2. Control the sources of releases; and

3. Protect human health and the environment.

Balancing Criteria

Often, more than one remedial procedure will meet the performance standards listed above. For EPA to select the most appropriate remedy, the technological options must be evaluated before a procedure or combination of procedures is proposed as the final remedy. The balancing criteria for such a decision are:

- Long-term reliability and effectiveness;
- Reduction of toxicity, mobility, or volume of wastes;
- Short-term effectiveness;
- Implementability;
- Cost; and
- State and community acceptance.

SUMMARY OF ALTERNATIVES

The alternatives analyzed for Area 7 at the Facility are as follows:

1. Repair of the Existing Slurry Wall.
2. In-Situ Chemical Oxidation (ISCO).
3. Electrical Resistive Heating.
4. Air Sparging/Soil Vapor Extraction (AS/SVE).
5. Excavation and Monitored Natural Attenuation (MNA).
6. Thermal Conductive Heating (TCH).

Table 3 summarizes the cost associated with each remedy alternative:

Table 3 – Cost Associated with Each Remedy Alternative for the ARC Facility

Alternative	Description	Cost
1	Repair of Existing Slurry Wall	$2,730,000
2	In-Situ Chemical Oxidation	$1,887,000
3	Electrical Resistive Heating	$4,426,000
4	Air Sparging/Soil Vapor Extraction	$2,377,000
5	Excavation and MNA	$3,846,572 *
6	Thermal Conductive Heating	$8,011,000

*Actual cost would likely be over $7,730,000.

Alternative 1: Repair of the Existing Slurry Wall

This alternative is a viable option for the hydraulic isolation of the contaminant source area and would take advantage of the extraction and monitoring well network. However, the persistence of contaminants in the source area soil and ground water will require ongoing barrier maintenance and ground water extraction to isolate known contamination in perpetuity. Costs have been estimated for a period of 30 years, but ongoing operation and maintenance (O&M) may be needed beyond that time. Long-term restrictions on use of the area would also be required, limiting redevelopment options for the ARC. Importantly, this option does not include any efforts to address contamination outside of the slurry wall. Because its applicability is limited and it would not ensure compliance with the property boundary goals for ground water, Alternative 1 is eliminated from further consideration.

Alternative 2: In-Situ Chemical Oxidation (ISCO)

ISCO is the injection of an oxidizing chemical solution into contaminated soil and ground water through wells which have been installed throughout the contaminated area. In the case of Area 7, the oxidizing chemicals would be sodium persulfate and sodium hydroxide. A network of injection wells would be installed within the slurry wall enclosure, and the oxidizing solution would be injected into soil and ground water which contains TCE. The oxidizing chemicals would degrade the TCE into the non-hazardous compounds ethane and ethene. ARC would periodically sample and analyze the soil to determine if the cleanup target of 15 mg/kg has been achieved. Additional injections of oxidizer may be necessary to address TCE that may be released after initial treatment, known as "rebound". ARC would monitor ground water downgradient of Area 7 and the property line to assess decreasing contamination levels, after the source has been eliminated.

ISCO is a proven technology which has been successful in eliminating TCE and its degradation products, and it can be readily implemented at Area 7. Before implementing this remedy at Area 7, ARC would have to conduct bench tests (in the laboratory) and pilot tests (in the field) to evaluate any effects the oxidizing chemical solution would have on the slurry wall and on the natural minerals which make up the soil. The bench and pilot tests would also indicate how effectively the oxidizers would eliminate the TCE under actual conditions at Area 7. Although ISCO is effective in degrading TCE and other chlorinated VOCs, the chemical reaction can produce heat and hazardous gases such as chlorine. Bench and pilot tests are necessary to adjust application rates and amounts of the oxidizers in order to minimize generation of these hazardous by-products.

Direct and sustained contact between the injected oxidizers and the contaminants may be difficult to achieve if the contaminants are embedded in the soil matrix in their undissolved form, known as dense non-aqueous phase liquid (DNAPL). In such cases, DNAPL could persist as an ongoing source of ground water contamination at Area 7. It is also possible that the injected oxidizers may degrade the slurry wall itself, allowing contamination to migrate from the source area before it can be effectively treated. Heterogeneity of the soil (i.e., random distribution of fine and coarse grained zones) may also hinder the uniform distribution of the injected oxidants. EPA will not give further consideration to ISCO unless the Agency receives new information regarding this technology's potential effectiveness at Area 7.

Alternative 3: Electrical Resistive Heating

ERH is a technology that removes organic compounds in soil by heating the soil/contaminant mass with electrodes, volatilizing the contamination, and removing it in its gaseous form. The electrodes are inserted into soil borings at horizontal spacing that is calculated during the design phase of the project. Electric current is passed through the contaminated soil between the electrodes, which heats the material and converts the organic contamination to vapor. This vapor would be captured by a system of vapor extraction wells that would be installed to prevent release to air and to control horizontal migration beyond the treatment zone.

ERH technology has proven effective in removing volatile contaminants in dissolved phase and DNAPL at numerous project locations, and it is not significantly affected by heterogeneity of soil. However, the existing slurry wall at Area 7 may complicate heating. Therefore, the system design would have to allow for installation of electrodes on both sides of the enclosure. ERH requires water to be present in soil to be effective. Water (typically recirculated condensate) can be injected into the treatment zone where soil is dry.

The estimated cost of ERH remediation at Area 7 ($4,426,000) is within the scope of ARC's budget, and allows funds for the extension of electrical utilities to Area 7. Although this estimate amount is greater than the estimated cost for the excavation alternative, EPA feels that the final cost of excavation to cleanup standards will likely exceed the estimate for ERH, based upon the estimated increased costs that were received by ARC.

Alternative 4: Air Sparging/Soil Vapor Extraction

Air Sparging/Soil Vapor Extraction (AS/SVE) is a method for removing volatile organic contamination from soil. Air Sparging is the injection of compressed air into contaminated soil through a well or hydraulically driven shaft. The pressurized air displaces VOC vapors from the pore spaces of the soil and mobilizes the vapors, which are extracted by screened wells that are connected to vacuum lines. When the extent of VOC contamination in soil is delineated, the network of AS and SVE points is installed to ensure that VOC vapors are driven to the extraction points as effectively as possible.

In locations with coarse grained permeable soil, such as the Former Plant 3, Area 3 (Ref. Table 1), SVE can be very effective in removing VOCs. However, AS/SVE is much less effective in finer grained soils (e.g., clay, silt, fine sand) with less pore space and permeability. AS/SVE is not effective in contaminated soil below the water table. VOCs tend to bond with organic carbon and become difficult to extract, which makes AS/SVE marginally effective in soils containing high amounts of humus. Because AS/SVE technology removes VOCs only through their vapor phase, the rates of contaminant removal are not as rapid as those for technologies that eliminate VOCs on contact or remove them in bulk form. Costs of an AS/SVE remedy will increase if stronger vacuum and additional treatment time is needed in soils which are less conducive to this technology.

AS/SVE will generate vapors and condensed water which is contaminated with VOCs. This water must be managed and disposed as hazardous waste, which poses a challenge similar to the one presented by Alternative 3. Vapors would be captured by vapor extraction wells and contained in vessels such as activated carbon canisters and removed them off-site for proper disposal. EPA will not give further consideration to AS/SVE unless the Agency receives new information regarding this technology's potential effectiveness at Area 7.

Alternative 5: Excavation and Monitored Natural Attenuation

This alternative involves soil containing TCE concentrations above 15 mg/kg inside and surrounding the slurry wall being physically removed from the ARC site. This option would rapidly address soil contamination and eliminate ongoing migration of contaminants to ground

water. The estimated cost of $3,846,572 is within the ARC budget. During removal actions, representative samples of soil and ground water must be analyzed for regulatory characterization. Storage, transportation, treatment and disposal costs for excavated media that meet the regulatory definition of hazardous waste are substantially higher than the costs for management of non-hazardous wastes. Implementation of this alternative carries an inherent risk that analytical results may raise the costs of waste management and disposal beyond the initial estimate and budget. Contaminated soil which is excavated below the water table would have to undergo a dewatering process, and the contaminated water would have to be managed appropriately. Measures to prevent spillage would be taken for trucks that would transport the media off-site on Scatterfield Road and highways. Excavation of Area 7 would expose volatile compounds to the atmosphere, and air monitoring may be required for the work site. As explained earlier in this SB, prospective contractors for the ARC have expressed their concerns that the final cost of excavation and removal to cleanup standards would substantially exceed the $3,846,572 estimate.

EPA has estimated a cost of approximately $7,730,000 for expansion of the excavation and for managing contaminated ground water as hazardous waste. The Agency notes that this estimate exceeds the ARC's remedial budget. EPA may consider excavation and off-site removal as part of a contingency remedy for removal of contamination to cleanup standards, but does not consider this alternative, alone, to be a feasible remedy for Area 7.

Alternative 6: Thermal Conductive Heating

TCH is an electronic heating technology similar to Alternative 3; however, this method treats contaminated media with inserted heating elements, rather than by transmission of current through electrodes. TCH effectively removes volatile contaminants from both dry and saturated soils. However, this technology may create fractures in the soil, through which contamination may unexpectedly migrate. In addition, TCH requires much higher energy input than ERH and subsequently higher costs. The estimated cost of TCH remediation for Area 7 exceeds $8 million, which is almost twice the estimated cost of Alternative 3. TCH will not be further evaluated as a remedial alternative.

Monitored Natural Attenuation

MNA may be a feasible component of a final remedy for Area 7. Historical ground water analytical data for the ARC site indicate natural degradation of TCE is occurring, albeit not at rapid rates. Ground water samples from within and downgradient of Area 7 would have to be analyzed for natural geochemical parameters, and historical analytical data would be used for predictive MNA calculations for achieving the property boundary goals listed in Table 2 of this SB.

EVALUATION OF THE PROPOSED REMEDY AND ALTERNATIVES

EPA's proposed remedy for cleaning up the soil and ground water at, and downgradient of, Area 7 is Alternative 3: Electrical Resistive Heating. A monitored natural attenuation study will be incorporated into the ground water performance monitoring plan This section profiles the performance of the proposed remedy and the other alternatives against the four threshold criteria and the five balancing criteria, noting how the preferred alternative compares to the alternatives.

1. Overall Protection: Alternatives 2, 3, 4, and 5 are protective of human health and the environment by removing the contamination from Area 7 or by degrading it in-place.

2. Attainment of Media Cleanup Standards: Alternative 5 would achieve the cleanup standard for soil by removing the contamination to an off-site disposal facility. Alternative 3 would be very effective at removing contamination in its vapor phase from soil and ground water. Proper implementation of Alternative 2 could attain the media cleanup standards by chemically eliminating the VOCs in-place; although additional treatments would likely be necessary. Alternative 4 would be minimally effective at removing contamination from the soils at Area 7 and would have little effect on ground water contamination. Proper implementation of Alternatives 3 and 6 are effective in removal of VOC contamination in a variety of soil conditions. The effectiveness of Alternatives 2, 3, 4, and 5 in the reduction of ground water contaminant concentrations must be evaluated through a ground water monitoring program.

3. Controlling the Sources of Releases: Alternative 5 controls the source of contamination by direct removal. Alternatives 2 may control the source of releases by eliminating the contamination in-place, and Alternatives 3 and 4 provide source control by removing contamination in its vapor phase from soil, although Alternative 3 would be more effective in the soil conditions at Area 7.

4. Compliance with Waste Management Standards: Alternative 5 would generate a large volume of contaminated media, some of which could be characterized as hazardous waste, and could make compliance with waste management standards very expensive. Alternative 5 would present public safety and transport issues which would need to be addressed. Alternatives 2, 3, and 4 would generate varying amounts of vapor which would have to be extracted and managed as hazardous waste.

5. Long-term Reliability and Effectiveness: Alternative 5 would be effective in the long term because it would quickly remove the contaminant mass. Alternatives 2 and 4 would remove contamination by in-situ degradation or vapor phase removal, but may leave residual contamination in the fine grained soil at Area 7. Alternative 3 has been historically effective in the long term at removing VOC contamination to protective levels in soil conditions similar to those found at Area 7. Implementation of a monitoring program would be necessary to determine each alternative's effectiveness at attaining ground water cleanup goals.

6. Reduction of Toxicity, Mobility or Volume of Wastes: Alternatives 3 and 5 are most effective by removal of contamination from the site. Alternative 3 has a favorable history of VOC removal in soil conditions such as those at Area 7 through volatilization at high temperature and vacuum extraction of the vapor. The thoroughness of VOC removal at Area 7 by application of Alternatives 2 or 4 would be questionable because pockets of contamination may remain. A ground water monitoring program with an MNA study must be included with any of the alternatives in order to evaluate achievement of ground water remediation goals.

7. Short-term Effectiveness: Alternative 5 would be immediately effective for soil remediation. Alternative 3 would require a period of operation, but should be of shorter duration than Alternatives 2 and 4. Ground water performance monitoring would be required for all of the alternatives.

8. Implementability: All of the alternatives could be implemented at Area 7, although at different costs and levels of difficulty. Alternative 5 could be completed in the least amount of time, but would require extensive mobilization of heavy equipment, trucks, soil processing machinery, and decontamination procedures. Dust suppression measures would have to be implemented. Alternatives 2, 3, and 4 would not require heavy excavation equipment but would use mobile drill rigs, pumps, storage tanks, containers for water and vapor collection, and sampling equipment. Alternative 3 would require a drill rig, numerous electrodes, electrical conduits, a vapor collection system, and either an on-site generator or access to a municipal power supply. Area 7 and the ARC site are

owned by the municipality, and it is hoped that such ownership will facilitate access to municipal electrical service at reasonable cost.

9. Cost: Alternative 2 is the least expensive but is of questionable effectiveness. The estimated costs of Alternatives 3, 4, and 5 are comparable. The estimated cost of Alternative 5 would likely increase if a higher volume of contaminated soil would have to be excavated than originally anticipated. Alternative 6 is the most expensive option at $8,011,000. Alternative 3 would cost $4,426,000 and is within the ARC budget.

In summary, Alternative 3 (EPA's proposed remedy) would achieve the goals described above at Area 7 by eliminating the source of contamination in both soil and ground water. Prior to application of ERH, ARC may have to sample and analyze the soil within Area 7 to determine the distribution of TCE and its degradation products. After ERH treatment, ARC will sample the soil to confirm that TCE at Area 7 has been removed to meet the cleanup standard. ARC will then submit to EPA its Remedy Completion Report and its plan for ground water monitoring which will evaluate the remedy's effectiveness and will include an MNA study plan for achieving the property boundary goals listed in Table 2 of this SB. During implementation of the remedy, under the terms of the AOC, ARC may petition EPA for disbursements from the trust funds previously described in this ASB, for reimbursement of material and labor costs.

This remedy also includes the following protective institutional controls which are currently in place:

- Restrictive covenants recorded in the property deed that restrict the land to commercial and industrial use;

- Restrictive covenants recorded in the property deed that prohibit the extraction of on-site ground water for any purpose other than corrective action;

- Restrictive covenants recorded in the property deed that require any soil, sediment, debris, surface water, ground water and any other media that are excavated or disturbed on the property to be managed as hazardous waste under RCRA if identified as such; and

- The restrictive covenants described above are permanently enforceable on the property, regardless of changes of ownership.

- An Ordinance has been established by the City of Anderson (Ordinance No. 50.070) which prohibits installation of private potable water wells.

The AOC includes financial assurance requirements which ensure adequate funds are available for completion of the remedy. The AOC can be amended to include all institutional controls as necessary to implement and maintain the remedy.

PUBLIC PARTICIPATION

EPA is soliciting comments from the public on the corrective measures alternatives, and particularly the preferred remedy Alternative 3, presented in this document for Area 7 at the Facility. EPA has scheduled a public comment period of 45 days from May 15, 2015, to June 29, 2015, to encourage public participation in the decision process. During the public comment period, EPA will accept written comments on the proposed action. The public may request that EPA hold a public meeting during the public comment period. The public may submit written comments, questions, and requests for a public meeting to the following address:

United States Environmental Protection Agency, Region 5
Remediation and Reuse Branch (LU-9J)
77 West Jackson Boulevard
Chicago, Illinois 60604
Attention: Don Heller
(312) 353-1248
Heller.donald@epa.gov

The administrative record is available for public review at the following two locations:

Anderson Public Library
111 East 12th Street
Anderson, Indiana 46016
http://www.and.lib.in.us/

and

United States Environmental Protection Agency, Region 5
77 West Jackson Boulevard
Chicago, Illinois 60604
Hours
Monday-Friday: 8:00 AM to 4:00 PM

After EPA's consideration of the public comments that are received, EPA will summarize the comments and provide responses in a Response to Comments document. EPA will prepare the Final Decision and Response to Comments after the conclusion of the public comment period and both of these documents will be included in the administrative record. Based on the comments received, EPA may make changes to the proposed corrective measures which will be documented in the Final Decision and Response to Comments.

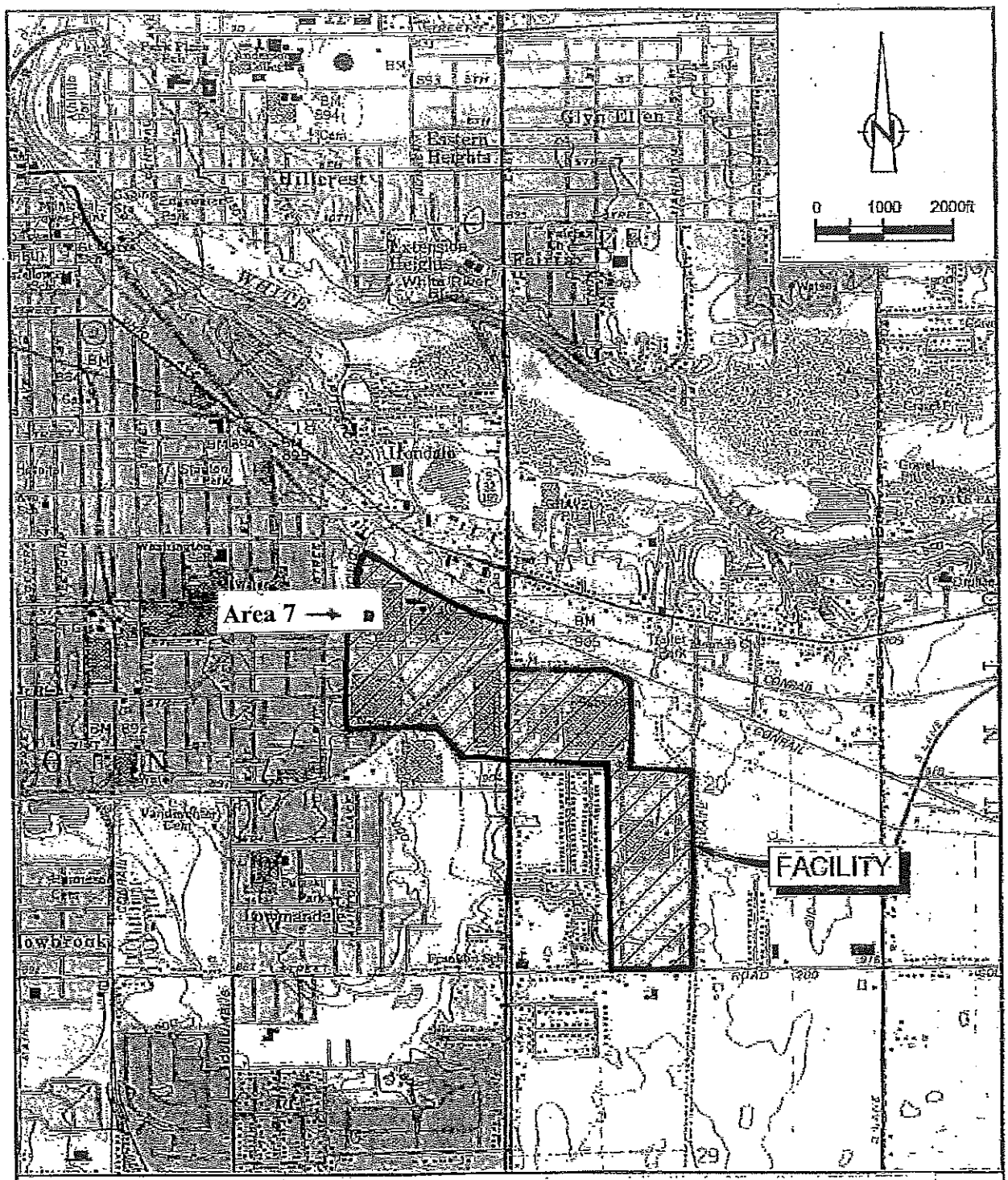


FIGURE 1

FACILITY LOCATION

Anderson Redevelopment Commission – Scatterfield Road Facility

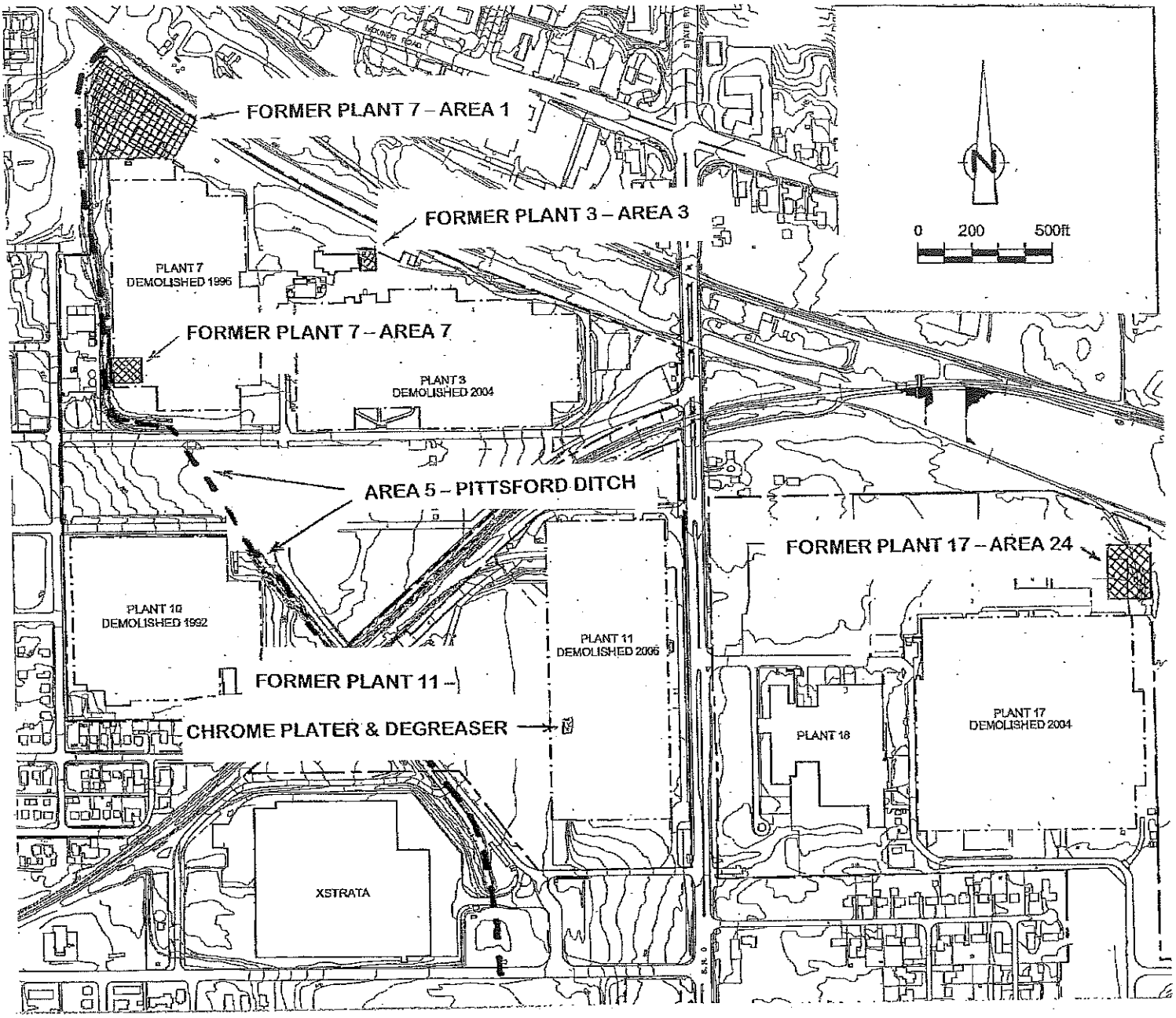


FIGURE 2

FACILITY LAYOUT AND AREAS OF INTEREST

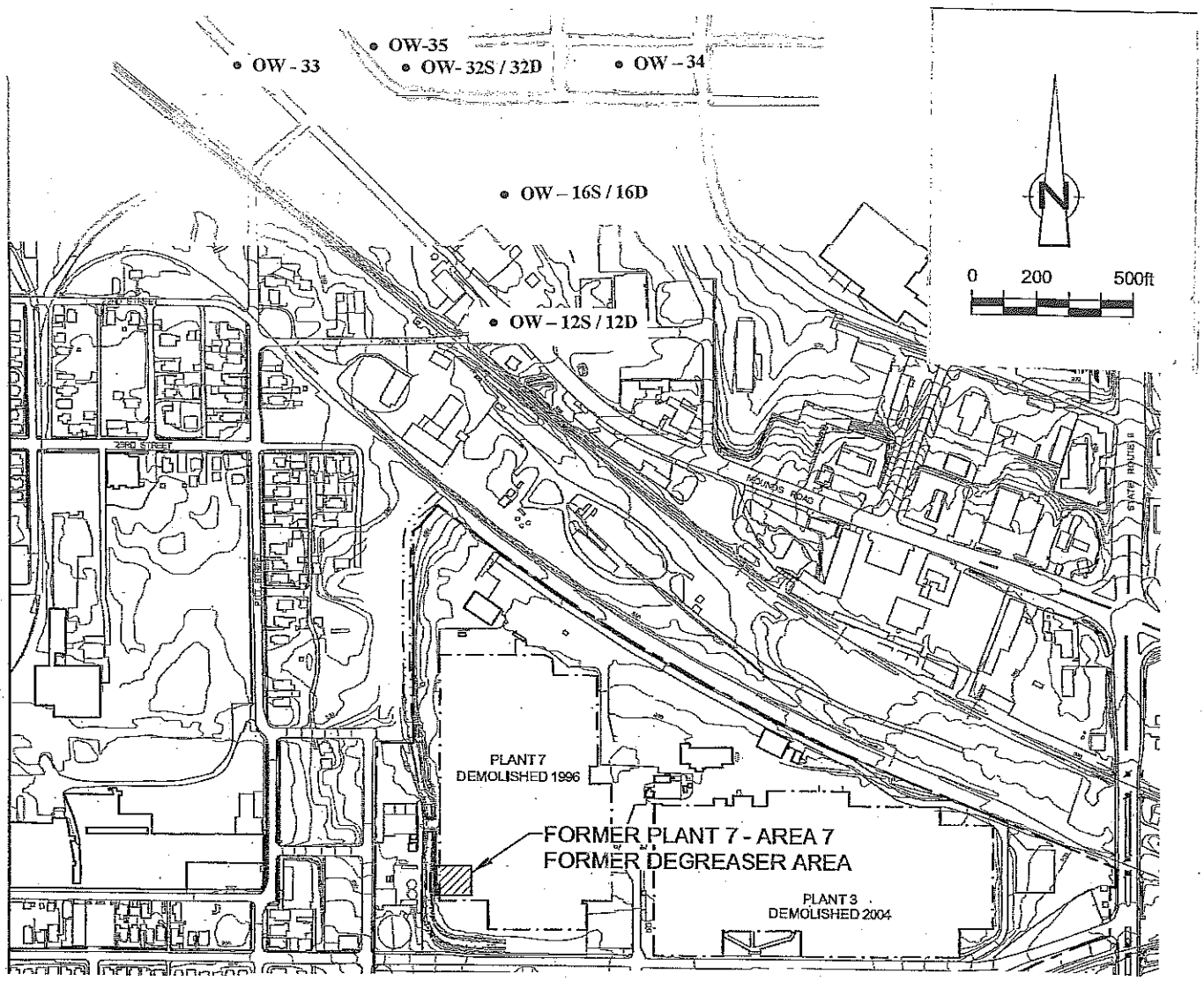


FIGURE 3 - Historical Ground Water Monitoring Data Downgradient of Area 7

Well OW – 12S	2 / 2000	10 / 2012
TCE	0.079	0.01
vinyl chloride	ND	ND
cis 1,2-DCE	0.14	ND

Well OW – 12D	2 / 1999	2 / 2000	10 / 2012
TCE	ND	ND	ND
vinyl chloride	ND	ND	ND
cis 1,2-DCE	ND	ND	ND

Well OW – 16S	11 / 1999	2 / 2000	10 / 2012
TCE	0.064	0.051	0.021
vinyl chloride	0.003	0.0023	ND
cis 1,2-DCE	0.11	0.12	0.008

Well OW – 16D	11 / 1999	2 / 2000	10 / 2012
TCE	0.088	0.12	0.082
vinyl chloride	0.003	0.002	ND
cis 1,2-DCE	0.085	0.12	0.122

Well OW – 32S	7 / 2000	10 / 2012
TCE	0.003	ND
vinyl chloride	ND	ND
cis 1,2-DCE	0.005	ND

Well OW – 32D	7 / 2000	10 / 2012
TCE	ND	ND
vinyl chloride	ND	ND
cis 1,2-DCE	ND	ND

Well OW – 33	8 / 2000	10 / 2012
TCE	ND	ND
vinyl chloride	ND	ND
cis 1,2-DCE	ND	ND

Well OW – 34	8 / 2000	10 / 2012
TCE	ND	ND
vinyl chloride	ND	ND
cis 1,2-DCE	ND	ND

Well OW – 35	8 / 2000	10 / 2012
TCE	ND	ND
vinyl chloride	ND	ND
cis 1,2-DCE	ND	ND

Concentrations in mg/L ND = non - detect
TCE = trichloroethene
cis 1,2-DCE = cis 1,2 dichloroethene