

# Second Five-Year Review Report

## Cleburn Street Well Site Grand Island, Nebraska


August 2008

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## List of Abbreviations

ARAR	Applicable or Relevant and Appropriate Requirements
AS/SVE	Air Stripper/Soil Vapor Extraction
ATS	Alternative Treatment Study
BTEX	Benzene, Toluene, Ethylbenzene, Xylene
CD	Consent Decree
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
cis-1,2-DCE	cis-1,2-dichloroethene
EE/CA	Engineering Evaluation/Cost Analysis
EPA	United States Environmental Protection Agency
ESD	Explanation of Significant Differences
EW	Extraction Wells
GET	Groundwater Extraction and Treatment
gpm	gallons per minute
HVAC	Heating, Ventilating, And Air Conditioning
ICs	Institutional Controls
LNAPL	Light Nonaqueous Phase Liquid
LTRA	Long-Term Response Action
MCL	Maximum Contaminant Level
MW	Monitoring Well
NCP	National Contingency Plan
NDEQ	Nebraska Department of Environmental Quality
NDOH	Nebraska Department of Health
NPL	National Priorities List
O&M	Operation and Maintenance
OU	Operable Unit
PCE	Tetrachloroethylene
POTW	Publicly Owned Treatment Works
ppm	parts per million
PRP	Potentially Responsible Parties
RAOs	Remedial Action Objectives
RD/RA	Remedial Design/Remedial Action
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
RSE	Remedial System Evaluation
SVE	Soil Vapor Extraction
TCE	Trichloroethene
TI	Technical Impracticability
UPRR	Union Pacific Railroad
VOC	Volatile Organic Compounds
µg/l	Microgram per liter

## Executive Summary

The Cleburn Street Well Site (Site) consists of a former municipal water supply well, the Cleburn Street well, and surrounding groundwater and soils containing volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE). Results of the remedial investigation completed in 1993 indicate four separate source areas including three dry cleaning facilities and a former solvents distribution facility.

Because the source areas were separate and distinct and involved varying degrees of contamination, the United States Environmental Protection Agency (EPA) divided the source areas into operable units (OUs). OU 1 included source soils at the One Hour Martinizing source area. Groundwater associated with the One Hour Martinizing source area was addressed by OU 2. The Liberty Cleaners source area was identified as OU 3, and OU 4 was the Ideal Cleaners source area. The Nebraska Solvents source area became OU 5.

In 1996, EPA signed a record of decision (ROD) addressing OUs 1–4. The ROD selected soil vapor extraction (SVE) for OU 1, groundwater extraction and treatment by air stripping for OU 2, and groundwater monitoring for OUs 3 and 4. No viable potentially responsible parties (PRPs) were identified for OUs 1–4, so those OUs were addressed as fund-lead actions. The remedies for OUs 1–4 have been implemented and are functioning as designed.

The Nebraska Solvents Company had operated on property owned by Union Pacific Railroad (UPRR), which was notified of its potential liability in February 1997. The remedial investigation/feasibility study (RI/FS) for OU 5 was completed by UPRR and a final ROD for OU 5 was signed in September 2001. The selected remedy included SVE to address source soils and air sparging to address groundwater and the light hydrocarbons on the surface of the groundwater. The remedy for OU 5 has been implemented and is functioning as designed.

The first five-year review for the Site was completed in September 2003. That review found that the remedies for OUs 1–4 were protective. At the time of the first review, the OU 5 remedy had not yet been implemented. Completion of remedial action for OU 5 occurred in 2004 and the Site achieved construction completion on September 14, 2004.

This five-year review concludes that the remedies at all OUs are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The OU 1 remedy is complete and the associated remediation system SVE has been combined with OU 2. All remediation systems are operating as designed. Additional actions will be considered to address high concentration source areas at OU 2 and OU 5. Exposure pathways are being controlled through plume containment, treatment, and long-term monitoring. There are no groundwater exposures since all businesses and residents in the area are connected to city water and city ordinance prohibits the installation of private water wells in the vicinity of the Site. The vapor intrusion pathway was evaluated in 2007 and determined to be of no concern.

## Five-Year Review Summary Form

SITE IDENTIFICATION		
<b>Site name (from WasteLAN):</b> Cleburn Street Well Site		
<b>EPA ID (from WasteLAN):</b> NED981499312		
<b>Region:</b> 7	<b>State:</b> NE	<b>City/County:</b> Grand Island / Hall
SITE STATUS		
<b>NPL status:</b> <input checked="" type="checkbox"/> Final <input type="checkbox"/> Deleted <input type="checkbox"/> Other (specify)		
<b>Remediation status</b> (choose all that apply): <input type="checkbox"/> Under Construction <input checked="" type="checkbox"/> Operating <input type="checkbox"/> Complete		
<b>Multiple OUs?*</b> <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	<b>Construction completion date:</b> 09 / 14 / 2004	
<b>Has site been put into reuse?</b> <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		
REVIEW STATUS		
<b>Lead agency:</b> <input checked="" type="checkbox"/> EPA <input type="checkbox"/> State <input type="checkbox"/> Tribe <input type="checkbox"/> Other Federal Agency		
<b>Author name:</b> Mary Peterson		
<b>Author title:</b> Project Manager	<b>Author affiliation:</b> EPA	
<b>Review period:**</b> 09 / 30 / 2003 to 9 / 30 / 2008		
<b>Date(s) of site inspection:</b> 5/13/2008		
<b>Type of review:</b> Policy		
<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		
<b>Review number:</b> <input type="checkbox"/> 1 (first) <input checked="" type="checkbox"/> 2 (second) <input type="checkbox"/> 3 (third) <input type="checkbox"/> Other (specify)		
<b>Triggering action:</b>		
Actual RA On-site Construction at OU___ <input type="checkbox"/> Actual RA Start at OU#___ <input type="checkbox"/> Construction Completion <input checked="" type="checkbox"/> Previous Five-Year Review Report <input type="checkbox"/> Other (specify)		
<b>Triggering action date (from WasteLAN):</b> 9 / 30 / 2003		
<b>Due date (five years after triggering action date):</b> 9 / 30 / 2008		

## Five-Year Review Summary Form, Cont'd

### Issues, Recommendations, and Follow-up Actions:

Issues	Recommendations and Follow-up Actions
Administrative record for OUs 1–4 is missing at local library	Generate a new copy and send to the library in both hard copy and electronic format on a compact disc.
Sampling ports on air stripper are not properly labeled.	Label the sampling ports on the air stripper.
Existing OU 2 remediation system may not be capable of achieving remedial action objectives in a reasonable time frame.	Evaluate additional technologies to address source area at OU 2.
Operation and Maintenance (O&M) Plan and manual for the OU 2 systems need to be updated.	Update O&M Plans and manuals for the OU 2 systems.
OU 5 SVE system unable to address shallow soil.	Consider alternate means to address shallow soils at OU 5.

### Protectiveness Statements:

#### Operable Units 1 and 2

The remedies at OUs 1 and 2 are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Both remedial actions are operating as designed. However, the SVE system which began operating as OU 1 for the purpose of addressing source soils is now being operated as part of the OU 2 remedial action to address groundwater contamination. Exposure pathways are being controlled through plume containment, treatment, and long-term monitoring. The vapor intrusion pathway was evaluated in 2007 and determined to be of no concern. There are no groundwater exposures since all businesses and residents in the area are connected to city water and city ordinance prohibits the installation of private water wells in the vicinity of the Site.

#### Operable Units 3 and 4

The remedies at OUs 3 and 4 are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The OUs 3 and 4 remedies consist of groundwater monitoring events to be conducted at least once every five years to support five-year reviews. All deep wells continue to show PCE levels well below the Maximum Contaminant Level (MCL). The two shallow wells at OU 3 recently showed PCE levels only slightly above the MCL. The shallow well at OU 4 showed a PCE level slightly below the MCL. There are no groundwater exposures since all businesses and residents in the area are connected to city water and city ordinance prohibits the installation of private water wells in the vicinity of the Site.

## Operable Unit 5

The remedy at OU 5 currently protects human health and the environment because the remedies for addressing VOCs in the groundwater and the vadose zone are functioning as intended and the institutional controls (ICs) are in place. However, in order for the remedy to be protective in the long-term, additional actions may be necessary to address shallow soils. Long-term protectiveness will be achieved by modifying the decision document and implementing the necessary remedy modifications to address shallow soils. Groundwater concentrations have been significantly reduced since the AS/SVE systems began operating in 2004. Currently, the systems are operated in pulsed mode to allow periods of rebound to maximize mass removal. In addition, the presence of light phase hydrocarbons has been reduced to only a few wells. The only remaining concern relates to shallow soil concentrations which do not appear to be responding to the SVE system. The UPRR has proposed an alternative for excavating and treating the shallow soils. The Environmental Protection Agency (EPA) plans to consider this approach and may modify the decision document in the near future. Groundwater exposures are being controlled since all businesses and residents in the area are connected to city water supply and city ordinance prohibits the installation and use of private water wells in the vicinity of the Site. Soil exposures are controlled by restricted access and the fact that the property is used for limited industrial purposes.

## Overall Protectiveness

Because additional actions are needed to achieve long-term protectiveness at OU 5, the Site is protective of human health and the environment only in the short term.



## **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 such reviews are documented in the Five-Year Review Report. In addition, Five-Year Review Reports identify problems or issues discovered concerning the remedy during the review process, and recommend actions to resolve them.

The United States Environmental Protection Agency (EPA) is preparing this Five-Year Review Report pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) section 121 and the National Contingency Plan (NCP). CERCLA section 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 5 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, and the results of all such reviews, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the NCP. Specifically, 40 CFR section 300.430(f)(4)(ii) states:

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

EPA Region 7 conducted the first five-year review for the Cleburn Street Well Site (Site) in Grand Island, Hall County, Nebraska, in 2003. The triggering action for the first five-year review was the start of physical on-site construction of the remedial action for operable units (OUs) 1 and 2. The triggering action for this five-year review is the date of the first five-year review. This five-year review is a policy review because the selected remedial actions will not leave hazardous substances on the site above levels that will allow for unlimited use and unrestricted exposure, but five or more years are required to meet cleanup levels. The Site consists of five OUs. This report documents the findings of the second five-year review for the Site.

## II. Site Chronology

Table 1 Chronology of Site Events	
Description of Event	Date
Tetrachloroethylene discovered in city water supply	3/1986
Cleburn Street supply well disconnected from water supply	4/1986
EPA conducts soil gas survey in Grand Island	1988
EPA conducts search for Potentially Responsible Parties	1990-1992
Site proposed for National Priorities List	7/29/1991
Remedial Investigation/Feasibility Study started	9/1991
Final listing on National Priorities List	10/14/1992
Engineering Evaluation/Cost Analysis completed	4/1993
Action Memorandum signed/Removal Action started	8/1993
OUs 1-4 Remedial Investigation completed	1/1994
OUs 1-4 Feasibility Study completed	7/1995
OUs 1-4 signed Record of Decision	6/7/1996
OUs 3 and 4 completed Remedial Design	6/1997
OUs 1 and 2 completed Remedial Design	9/1997
OUs 1 and 2 started Remedial Action	12/1997
Removal Action completed	6/1998
OUs 3 and 4 started Remedial Action	9/15/1997
OUs 1 and 2 Remedial Action physical construction complete	9/18/1998
OUs 3 and 4 Remedial Action complete	7/14/1999
OUs 3 and 4 Operation and Maintenance started	9/10/1999
OUs 1 and 2 determined Operational and Functional	10/29/1999
OU 1 enters Operation and Maintenance and turned over to state	2/8/2000
OU 2 enters Long-Term Response Action phase	2/8/2000
OU 5 Remedial Investigation/Feasibility Study started	6/13/1997
OU 5 Remedial Investigation/Feasibility Study completed	9/10/2001
OU 5 Record of Decision signed	9/10/2001
OU 5 Consent Decree entered	9/20/2002
OU 5 Remedial Design complete	1/7/2004
OU 5 Remedial Action complete	9/28/2004
First five-year review complete	9/30/2003
Site-wide construction complete	9/14/2004
OU 1 Operation and Maintenance complete	2/22/2007

### III. Background

#### Physical Characteristics

The Site is located in Grand Island, Hall County, Nebraska. The Site is situated in central Nebraska, approximately two miles north of the Wood River and approximately seven miles northeast of the Platte River. The Site is comprised of four separate source areas encompassing a portion of the downtown area and is surrounded by a variety of light industries, commercial businesses, and residential dwellings.

The Site is located in the Great Plains physiographic province in the middle of the Platte River Basin. Surface topography is generally flat with natural surface drainage flowing in a northeasterly direction. Much of the surface water runoff from the Site is controlled by man-made features such as storm sewers and gutters. The Platte River flows from southwest to northeast and is situated approximately seven miles south of Grand Island. Groundwater flows in a northeasterly direction in the vicinity of the Site.

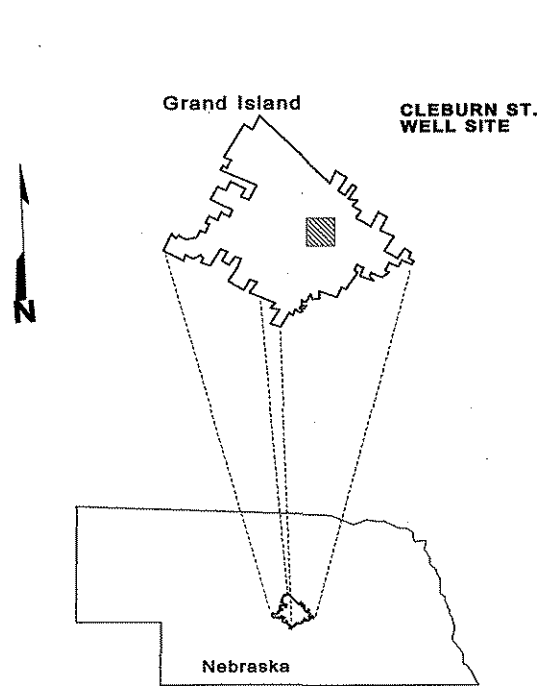


Figure 2

The Site consists of a former municipal water supply well, the Cleburn Street well, and surrounding groundwater and soils containing volatile organic compounds (VOCs), primarily tetrachloroethylene (PCE). Results of the remedial investigation completed in 1993 indicate four separate source areas including three dry cleaning facilities and a former solvents distribution facility. Figure 2 shows the location of all four source areas.

The three dry cleaner source areas include the former One Hour Martinizing facility, the Liberty Services facility, and the Ideal Cleaners of Grand Island facility. Results of the RI indicate that the primary source area responsible for contamination of the Cleburn Street municipal well is the former One Hour Martinizing facility. Extremely high contaminant levels were found in the shallow groundwater in the vicinity of this facility. The Liberty Services and Ideal Cleaners source areas exhibit lesser degrees of contamination and are not believed to contribute to contamination of the Cleburn Street well.

The fourth source area is a former solvents distribution company known as Nebraska Solvents and is located at the intersection of Lincoln Street and North Front Street, a few blocks west of the Cleburn Street municipal well. Contamination at this source area includes soil and groundwater containing VOCs.

## Land and Resource Use

Land use surrounding each of the four source areas can best be described as mixed use, consisting of light industrial operations, commercial businesses, and residential dwellings. The contaminated shallow aquifer was historically used as the city's main water source. However, all municipal wells in the vicinity of the Site have been disconnected from the public water supply, and a new well field has been installed several miles from the Site along the Platte River. In addition, the city has passed an ordinance prohibiting groundwater use or installation of wells within the affected area around the Site.

Land use at the Liberty Cleaners and Ideal Cleaners source areas continues to be commercial dry cleaning operations. The former One Hour Martinizing property had been used as a pawn shop for a few years and is currently used as a commercial operation for audio and hydraulic enhancements for automobiles. A portion of the former Nebraska Solvents source area is now leased by the city street department to store and maintain trucks and equipment and also contains a small sign shop.

## History of Contamination

The presence of PCE in the Cleburn Street Well was first discovered in 1986 by the Nebraska Department of Health (NDOH). The city quickly disconnected the well from the public water supply but continued to operate the well to alleviate flooding problems in a nearby railroad underpass. Water from the well was discharged to the storm sewer for a number of years and then later diverted to the sanitary sewer for treatment in the city's publicly owned treatment works (POTW).

EPA became involved with the Site in 1987 and conducted site investigations including a soil gas survey to locate potential source areas. Based on the findings of the early investigations, the Site was proposed for listing on the National Priorities List (NPL) on July 29, 1991, and was finalized on the NPL on October 14, 1992.

Based on results of a soil gas survey completed in 1989, EPA conducted a search for potentially responsible parties (PRPs) and issued notice letters to the parties involved with the various source areas. In 1992, EPA initiated a fund-lead remedial investigation/feasibility study (RI/FS) for three of the four source areas because the PRPs lacked the financial resources to conduct the work. The three source areas addressed by the initial RI/FS included the former One Hour Martinizing dry cleaners, Liberty Cleaners, and Ideal Cleaners of Grand Island.

In the early stages of the RI/FS, it was discovered that the PCE concentrations in groundwater at the former One Hour Martinizing source area were extremely high (over 170,000 micrograms per liter or  $\mu\text{g/l}$ ). In order to contain this highly contaminated groundwater, EPA initiated a time-critical removal action in 1993. The removal action included the installation of a single Extraction Well (EW) with the extracted water discharged to the city sanitary sewer for treatment in the POTW. This action was taken as a gross containment action to prevent further migration until a permanent remedy could be selected and implemented.

Results of the RI indicated that the various source areas were separate and distinct plumes and the only source area responsible for contaminating the Cleburn Street municipal well was the former One Hour Martinizing source area. Because the source areas were clearly separate and distinct, and involved varying degrees of contamination, EPA divided the source areas into OUs. OU 1 included source soils at the One Hour Martinizing source area. Groundwater associated with the One Hour Martinizing source area was addressed by OU 2. The Liberty Cleaners source area was identified as OU 3, and OU 4 was the Ideal Cleaners source area. The Nebraska Solvents source area became OU 5 and would be addressed later in a separate RI/FS to be performed by PRPs.

In 1996, EPA signed a Record of Decision (ROD) addressing OUs 1–4. The ROD selected soil vapor extraction for OU 1, groundwater extraction and treatment by air stripping for OU 2, and for OUs 3 and 4, the selected remedy included groundwater monitoring. The implementation status of each of these remedies is discussed later in this report.

The Nebraska Solvents Company had operated on property owned by Union Pacific Railroad (UPRR). The Nebraska Solvents Company was defunct, and UPRR was notified of its potential liability for the Site in February 1997. In June 1997, EPA signed a consent order with UPRR for the completion of an RI/FS for OU 5. Between 1997 and 2001, the OU 5 RI/FS was conducted.

The OU 5 area consists of two parcels of land known as the east parcel and the west parcel. The west parcel was used for storage and distribution of industrial solvents including PCE. The solvents were stored in above-ground tanks. Results of the RI indicated significant levels of VOCs in the soil and groundwater (up to 4100 µg/l PCE) at the west parcel. In addition, high levels of benzene, toluene, ethylbenzene, and xylene (collectively referred to as BTEX) were detected in the shallow groundwater at the west parcel. It is believed that these compounds are associated with a light phase hydrocarbon floating on top of the groundwater surface. The east parcel was used for warehousing, handling, and loading solvents in drums. Results of the RI indicate low levels of VOCs in the soils at the east parcel but significant concentrations of PCE in shallow groundwater (up to 1600 µg/l PCE).

A final remedy was selected for OU 5 in a ROD signed in September 2001. The selected remedy included soil vapor extraction to address source soils and air sparging to address groundwater and the light phase hydrocarbons on the surface of the groundwater. The remedy also included institutional controls (ICs) to restrict groundwater use and certain subsurface construction activities on the UPRR property.

EPA negotiated a Consent Decree (CD) with UPRR for the Remedial Design/Remedial Action (RD/RA) for OU 5. The CD was entered by the District Court of Nebraska on September 20, 2002. The implementation status of the OU 5 remedy is discussed later in this report.

## Initial Response

In 1993, EPA initiated a time-critical removal action to address the most highly contaminated groundwater at the One Hour Martinizing source area. Using the information obtained in the early stages of the RI/FS, EPA prepared an Engineering Evaluation/Cost Analysis (EE/CA) and an action memorandum to support the time critical removal action. The Action Memorandum authorized the expenditure of funds for installation of a groundwater EW which was located near the high concentration source area, and discharge piping, which was connected to the sanitary sewer. Groundwater was extracted at a rate of approximately 50 gallons per minute (gpm) and discharged to the sanitary sewer for treatment in the city's POTW. This gross containment action continued until a permanent groundwater extraction and treatment system was constructed in 1998 as the OU 2 remedy.

#### Basis for Taking Action

High concentrations of VOCs detected in the soils and shallow groundwater at facilities known to have used the VOCs in their operations served as the basis for taking action at this Site. Information obtained during the various investigations indicated a release to the environment of hazardous substances. Contamination of the shallow groundwater had impacted the public water supply and necessitated the shut down of a municipal supply well known as the Cleburn Street well.

## IV. Remedial Actions

### Remedy Selection

Remedies for OUs 1–4 were selected in a ROD signed on June 7, 1996. The selected remedy for OU 1 included soil vapor extraction (SVE) to address source soils at the One Hour Martinizing source area. Groundwater extraction and treatment by air stripping was the remedy selected for OU 2 to address contaminated groundwater at the One Hour Martinizing source area. The selected remedies for OUs 3 and 4 included groundwater monitoring, with soil vapor extraction as a contingency action, to address shallow groundwater contamination at the Liberty Cleaners and Ideal Cleaners source areas, respectively. The 1996 ROD also called for ICs to restrict groundwater use in the vicinity of the Site. Remedial action objectives (RAOs) set forth in OUs 1–4 ROD included:

- Prevent or minimize ingestion of groundwater having a carcinogenic risk greater than  $1 \times 10^{-6}$  and/or a hazard index for noncarcinogens greater than 1.0
- Restore groundwater quality to below Maximum Contaminant Levels (MCLs) for all contaminants that have an MCL
- Prevent or minimize direct contact with soils having a carcinogenic risk greater than  $1 \times 10^{-6}$  and/or a hazard index greater than 1.0
- Prevent the migration of contaminants that would result in groundwater contamination at levels above MCLs

A final ROD for OU 5 was signed on September 10, 2001. The selected remedy for OU 5 included SVE to address source soils and air sparging to address groundwater and the light nonaqueous phase liquid (LNAPL) on the surface of the groundwater. The remedy also included ICs to restrict groundwater use and certain subsurface construction activities on the UPRR property. RAOs for OU 5 include the following:

- Reduce or eliminate further contamination of the groundwater from the source
- Restore the aquifer to drinking water standards within a reasonable time frame
- Prevent future migration of groundwater contamination
- Reduce or eliminate sporadic polluting of the aquifer surface

Target concentrations for specific compounds in groundwater and a standard for the LNAPL reduction were set forth in the OU 5 ROD. Those standards include:

- 5  $\mu\text{g/l}$  PCE
- 5  $\mu\text{g/l}$  trichloroethene (TCE)
- 70  $\mu\text{g/l}$  cis-1,2-dichloroethene (cis-1,2-DCE)
- 10,000  $\mu\text{g/l}$  xylenes
- 1000  $\mu\text{g/l}$  toluene
- 700  $\mu\text{g/l}$  ethylbenzene
- 5  $\mu\text{g/l}$  benzene
- Sheen standard for LNAPL

## Remedy Implementation

The RD for OUs 1 and 2 were completed in September 1997, and the remedies were constructed and operating by October 1998. Following the first year of operation, a joint inspection was conducted by EPA and the state, and the remedies were determined to be operational and functional on October 29, 1999. The OU 1 remedy was turned over to the state for Operation and Maintenance (O&M). The OU 2 remedy entered into the ten year period for long-term response action (LTRA) on February 8, 2000, marked by approval of the interim RA report. Refer to Appendix 1 for a diagram of the OUs 1 and 2 remediation systems. The required ICs were implemented in February 1998 when the city passed Ordinance No. 8363. This ordinance established a Groundwater Control Area encompassing all OUs of the Site, restricted the use of groundwater pumped from within this area, and required the registration of all new wells placed within the area. The ordinance contains a provision that it shall remain in effect for an initial term of 25 years, with an option of extending it if groundwater contamination persists beyond that time frame.

The RDs for OUs 3 and 4 were completed in June 1997. The RA included the installation of two down gradient monitoring wells at each OU and six quarterly monitoring events. The final RA Report for OUs 3 and 4 was approved on July 14, 1999. The OUs 3 and 4 remedies were turned over to the state for O&M on September 10, 1999.

For the OU 5 SVE and air sparging systems, the RD was completed in January 2004, and construction was completed by August of the same year. The RD and RA were performed pursuant to a CD entered on September 20, 2002. A RA report was signed in September 2004 marking the start of O&M for OU 5. Since OU 5 was the final remedy for the Site, a preliminary close out report was prepared following completion of construction activities for the OU 5 remedy, and the Site achieved construction completion on September 14, 2004. Refer to Appendix 3 for a diagram of the OU 5 area.

## System Operation and Maintenance

The state operated the OU 1 SVE system for a period of approximately 4 years between 1998 and 2002. In July 2002, the SVE system was shut down due to equipment failures and low influent vapor concentrations. In March 2004 the state collected soil borings which indicated that the remediation goal had not yet been achieved. The state replaced the blower and operated the system from April 2005 through early 2006. During this period of operation, vapor influent concentrations dropped dramatically. In April 2006, the state notified EPA of its position that the OU 1 remedy was complete because soil vapor concentrations had reached asymptotic levels and no further mass removal was being achieved by the SVE system. In a letter dated February 22, 2007, EPA agreed that the OU 1 remedy had achieved its intended purpose of addressing source soils, and indicated that any further operation of the SVE system would be conducted by EPA in association with its ongoing LTRA of the OU 2 groundwater remedy. In other words, further operation of the SVE system may enhance groundwater cleanup and would thus be considered part of the OU 2 LTRA.



During the first year of operation of the OU 1 SVE system, operating costs were about \$80,000, mostly due to the high cost of changing out the carbon canisters. However, the need for offgas treatment from the SVE system quickly ended following state take over of the O&M. The state has reported annual O&M costs for the SVE system ranged from \$34,000 - \$41,000 for the years it operated the SVE system.

The OU 2 groundwater extraction and treatment (GET) system began operating in 1999. The design extraction rate was 120 gpm. However, the system flow rate was quickly reduced to about 90 gpm because of excessive pump cycling. Groundwater modeling conducted during the RD had indicated that this reduced flow rate was sufficient to provide plume capture. The system has operated continuously except for short periods of shut down for minor repairs. Operating costs for the first year of operation were approximately \$150,000. However, these costs have been reduced to about \$100,000 per year in recent years.

A remedial systems evaluation (RSE) was conducted in 2001 as part of the national optimization pilot project. The RSE recommended various improvements for the system including combining the operation of the OUs 1 and 2 systems, performing a capture zone study, and cleaning EW screens, among other things. Most of the recommendations have now been implemented. Since 2006, EPA Region 7 has been conducting additional optimization activities in order to prepare the remedy for state take over in 2010.

The GET system has operated continuously since its startup in 1999 except for brief periods of shut down for mechanical repairs. The system is now operating near design capacity at 110 gpm. Influent concentrations have declined from over 1,500 µg/l PCE in 1999 to approximately 500 µg/l PCE in 2007. Concentrations of PCE in the Cleburn Street well have declined from over 1,000 µg/l in 1999 to less than 5 µg/l in 2007. The GET system has been successful in cleaning up the Cleburn Street well and preventing further migration of highly contaminated groundwater. However, a significant source area remains in very close proximity to the former One Hour Martinizing facility. In general, operating costs for the GET system are approximately \$100,000 per year. During the past two years, operating costs have been higher due to system optimization and rehabilitation efforts.

EPA began operating the SVE system in January 2008 to enhance the OU 2 groundwater cleanup. Initial monitoring after startup indicated that vapor concentrations decline significantly after about 48 hours of operation. Therefore, the SVE system is operated on an intermittent basis. Currently, the system is operated for a few days out of every 2-3 week period.

The O&M program for the GET system currently consists of weekly system inspections and quarterly groundwater monitoring events, with an expanded annual groundwater monitoring event. O&M activities for the SVE system include routine system checks when the system is operating and the collection of field measurements including vapor flow rates and concentrations. Weekly inspection reports are completed and submitted to EPA on a monthly basis.

The Nebraska Department of Environmental Quality (NDEQ) began conducting O&M for the OUs 3 and 4 groundwater monitoring remedies in September 1999. Routine monitoring was conducted by the state from 1999 until March 2004, and the state reports that monitoring

costs ranged from \$10,000-\$12,000 per year. During that time, PCE concentrations remained below the MCL of 5 µg/l in all deep wells. Groundwater from the shallow wells contained low concentrations of PCE, with the highest concentration detected in monitoring well (MW)-1C at OU 3 at a level of approximately 50 µg/l. This concentration has remained fairly steady in well MW-1C since the start of the RA.

Following the March 2004 monitoring event, NDEQ recommended that further groundwater monitoring be discontinued due to the stability of PCE concentrations in the wells. EPA agreed that monitoring could be limited to one event every five years to support the five-year reviews.

O&M for OU 5 is conducted by the Forrester Group, consultant for the Union Pacific Railroad. Initially, O&M for OU 5 included weekly monitoring of the SVE influent and effluent concentrations. Monitoring was reduced to monthly and then to quarterly as influent concentrations dropped. When the SVE system was first started up, a thermal oxidizer was used to treat extracted vapors. After a few months of operation, vapor treatment was no longer required, and the thermal oxidizer was removed from service. No major mechanical repairs have been necessary for system components.

Since the remedy started up in 2004, great strides have been made toward achieving RAOs. The air sparging system has reduced the maximum PCE concentration in groundwater from 5,000 µg/l in April 1998 to 9.4 µg/l in March 2008. Other VOCs have also been significantly reduced. Some of the reduction in PCE concentration was due to injection of potassium permanganate into the dissolved PCE plume downgradient from the west parcel. This alternative treatment study (ATS) was proposed by Forrester Group in November 2006 and completed in January/February 2007. The injection has resulted in the acceleration of the degradation of PCE and daughter products in the groundwater to levels below or slightly above their MCLs. Refer to Appendix 3 for a summary of groundwater data. To address LNAPL, the Forrester Group injected a proprietary chemical into the subsurface. Subsequent monitoring events have indicated a significant reduction of LNAPL in many wells. However, the LNAPL sheen standard has not yet been achieved in all wells.

The O&M program currently consists of quarterly groundwater monitoring events, bi-weekly LNAPL checks, and quarterly vapor monitoring when the SVE is running. The SVE and air sparging systems are currently shut down to allow rebound. The Forrester Group does not submit information regarding operating costs for the OU 5 remedy.

The Forrester Group does not believe that the existing SVE system will be able to meet RAOs for shallow soils. For that reason, excavation and on-site treatment of shallow soils has been proposed. EPA may modify the ROD by issuing an Explanation of Significant Differences (ESD) to support this remedy change.

## V. Progress Since Last Five-Year Review

The first five-year review was completed in September 2003. At that time, the remedies were found to be protective of human health and the environment for OUs 1–4, and the RD for OU 5 was in progress. Recommendations included the continued operation of the OU 1 SVE system, continued operation of the OU 2 GET system, continued groundwater monitoring in OUs 1–4, continue optimization efforts related to OUs 1 and 2, and implement the OU 5 remedy. Each of these recommendations has been fully implemented.

For the OU 1 remedy, progress since the last five-year review includes soil sampling conducted by NDEQ and operation of the SVE system from April 2005 through early 2006. NDEQ shut down the SVE system in early 2006 due to low influent vapor concentrations. In April 2006, the state notified EPA of its position that the OU 1 remedy was complete because soil vapor concentrations had reached asymptotic levels and no further mass removal was being achieved by the SVE system. In a letter dated February 22, 2007, EPA agreed that the OU 1 remedy had achieved its intended purpose of addressing source soils, and indicated that any further operation of the SVE system would be conducted by EPA in association with its ongoing LTRA of the OU 2 groundwater remedy.

Since the last five-year review, the OU 2 GET system has operated continuously, but extraction rates decreased steadily between 2004 and 2007. In 2006, EPA conducted a source investigation to determine whether source soils still existed beneath the former One Hour Martinizing building. During the RI, sampling beneath the building was not possible due to the dilapidated condition of the building and ownership complications (abandoned facility). By 2006, the property had been purchased and the building had been restored to a condition that would allow for sampling. With the owner's permission, EPA collected soil, soil gas, and groundwater samples from temporary boreholes drilled through the concrete floor of the building. In addition, EPA installed five 2-inch SVE wells, four 1-inch vapor monitoring points, and three 1.5-inch groundwater monitoring wells inside the building to expand the capabilities of the SVE system and improve the monitoring of both the SVE and the GET systems.

The 2006 source investigation and subsequent sampling by EPA has indicated that the remaining source appears to be an area of highly concentrated groundwater contamination on the eastern edge of the building. Soil samples have shown very little PCE while soil gas samples show very high PCE levels. This indicates that the PCE is volatilizing from the groundwater and filling in the void spaces in the vadose zone and becoming trapped beneath the concrete building. To address this situation and to enhance groundwater cleanup, EPA began operating the SVE system in January 2008.

In order to bring the SVE system back into operation and to optimize performance of the GET system, EPA completed a number of mechanical repairs and improvements during 2007 and 2008. In order to increase the extraction rate from the GET system, all three EWs were chemically cleaned and new pumps were installed in June 2007. Additionally, the acid circulation pump was replaced and improvements were made to the acid wash system so that the tray air stripper can be routinely cleaned. A series of improvements were made for the SVE system in 2007 including the installation of a new water knock-out tank, reconfiguration of well-head piping to allow collection of vapor flow measurements, and replacement of all pressure gages.

In May 2008, EPA conducted additional groundwater investigation activities to better characterize vertical and horizontal plume characteristics and to determine whether contamination existed at depth. Results of this investigation indicate that deep groundwater contamination is not a problem, and that there is a zone of low permeability between 25-35 feet. This area of low permeability is likely preventing the contamination from migrating into deeper portions of the aquifer. Also, the cleanup of the high concentrations of PCE in the shallow groundwater is likely being slowed because the EWs have depths and screened intervals below this silty zone.

All studies conducted at the Site indicate that there remains a significant, localized source very near the east edge of the former One Hour Martinizing building. Operation of the existing SVE and GET systems will not likely reduce groundwater concentrations to cleanup levels within a reasonable time period. In order to address this high concentration area, EPA plans to conduct pilot studies of certain technologies and may implement remedy modifications upon completion of the studies. Technologies being considered include air sparging and chemical oxidation. Further optimization of the GET system may also be considered.

For OUs 3 and 4, progress since the last five-year review includes the completion of groundwater monitoring events through March 2004. Following this event, NDEQ discontinued monitoring due to stabilized contaminant concentrations. In February 2007, EPA agreed that further groundwater monitoring at OUs 3 and 4 is only necessary to support five-year reviews. In support of this review, NDEQ conducted a monitoring event at OUs 3 and 4 in April 2008. Results of this event indicate that PCE concentrations are below the MCL at all wells at OU 4, and the maximum PCE concentration at OU 3 is 12.7 µg/l. Refer to Appendix 2 for a summary of the April 2008 groundwater data for OUs 3 and 4.

Since the OU 5 remedy was started up in 2004, great strides have been made toward achieving RAOs. The air sparging system has reduced the maximum PCE concentration in groundwater from 5000 µg/l in April 1998 to 9.4 µg/l in March 2008. Other VOCs have also been significantly reduced. Injection of potassium permanganate into the dissolved PCE plume downgradient from the west parcel was conducted during January and February 2007. Subsequent monitoring of groundwater has shown an accelerated decline in plume VOC concentrations to levels near or below their MCLs. To address LNAPL, the Forrester Group injected a proprietary chemical into the subsurface. This effort seems to have resulted in a reduction of the LNAPL. However, LNAPL continues to be monitored in a few wells and is removed whenever possible.

To achieve RAOs for shallow soil, the Forrester Group has proposed excavation and on-site thermal treatment because they do not believe the existing SVE system will be able to address shallow soils. EPA is considering modifying the decision document to support this remedy change.

## **VI. Five-Year Review Process**

### Administrative Component

The state was notified of the start of the five-year review in April 2008 when it was asked to participate by conducting a monitoring event for OUs 3 and 4. The city was notified of the start of the five-year review in a meeting in January 2008. Members of the review team include the EPA project managers, the state project manager, and risk assessors for human health and ecological risk.

### Community Involvement

A fact sheet announcing the start of the five-year review was mailed to Congressional offices and on November 20, 2007, was published on the EPA Region 7 Website. In addition, an ad was placed in the local newspaper on December 2, 2007, and the EPA project manager met with local officials in January 2008. Following completion of the Five-Year Review Report, another fact sheet and ad will be prepared to announce the availability of the report for public viewing. Additionally, the report will be published on the EPA Website.

### Document Review

Due to the multiple OUs on this Site and the number of years of operation of the various remedies, many Site documents were reviewed for this report. Documents reviewed include RODs, O&M reports, RI reports and risk assessments, and the first Five-Year Review Report. A complete list of Site documents reviewed is included as Appendix 4.

### Data Review

For the OU 1 SVE system, PCE vapor concentrations dropped from over 1500 ppm to approximately 10 ppm over the period from 1998 to 2002. The NDEQ operated the system again between April 2005 and early 2006, during which time the PCE vapor concentrations dropped from around 300 ppm to less than 1 ppm. At that time, NDEQ shut down the SVE system and declared that it had fulfilled its purpose of addressing source soils.

In February 2007, EPA elected to take over the SVE system for the purpose of enhancing the OU 2 groundwater remedy. After completing additional source characterization and system rehabilitation, EPA restored the SVE system to operation in January 2008. Initial PCE vapor concentrations were about 40 ppm. Start-up monitoring indicated that the vapor concentrations decreased to about 2 ppm within the first 48 hours of operation. For this reason, the SVE system is now being operated in a pulsed mode to maximize mass removal and minimize operating costs. Operation of the SVE system in this manner also promotes diffusion from groundwater thereby enhancing groundwater cleanup by evacuating accumulated vapors from the vadose zone beneath the building. Refer to Appendix 1 for a graph of the PCE vapor concentrations during the first 48 hours of operation of the SVE system. Under current operating conditions, approximately 1 lb per day of PCE can be removed. Additional data is being gathered to evaluate optimum operating conditions to make the best use of the existing SVE system.

For the OU 2 GET system, influent PCE concentrations have dropped from over 2,000 µg/l to approximately 500 µg/l since the system was started up in 1998. Refer to Figure 3.1 from the 2007 Annual Performance Report included as Appendix 1. Concentrations of PCE in the Cleburn Street well have dropped from over 1,200 µg/l in 1998 to 6.8 µg/l in 2007. Refer to Figure 3.2 from the 2007 Annual Performance Report included as Appendix 1. With regard to the EWs, PCE concentrations remain highest in EW-1, which is the closest EW to MW-2A (the area of highest PCE contamination). Since start-up of the system in 1998, PCE concentrations in MW-2A show a generally declining trend but remain extremely high at approximately 70,000 µg/l. Figure 3.10 from the 2007 Annual Performance Report included as Appendix 1 shows that there continues to be a small, localized area of high PCE concentration very near the east edge of the former One Hour Martinizing building. It is not likely that the GET system alone will be able to achieve RAOs within a reasonable time frame. For this reason, EPA plans to conduct pilot studies to evaluate the ability of various technologies to address this area of high concentration. If supplemental technologies can not achieve RAOs within a reasonable time frame, it is possible that a technical impracticability (TI) waiver will be sought pursuant to section 121(d) of CERCLA at some point within the next five years.

Due to fouling of the EWs and pumps over time, the extraction rate had declined to about 60 gpm during 2006. EPA completed rehabilitation of the wells and replaced all the well pumps in June 2007. As a result of these actions, the extraction rate was restored to 110 gpm, near design capacity of 120 gpm. Under current operating conditions, approximately 1 lb PCE per day is being removed. The air stripper continues to remove PCE at a calculated efficiency of 99 percent.

Since 2000, all deep monitoring wells at OUs 3 and 4 have been below 5 µg/l PCE. NDEQ continued groundwater monitoring at OUs 3 and 4 through March 2004. Shallow groundwater concentrations at OU 3 remained fairly steady over time and in March 2004, the maximum PCE concentration was 49 µg/l. The maximum PCE concentration detected at OU 4 during the March 2004 event was 6.6 µg/l.

In support of this five-year review, NDEQ conducted groundwater monitoring at OUs 3 and 4 in April 2008. The PCE concentrations in shallow groundwater at OU 3 have declined to a maximum of 12.7 µg/l. The concentration of PCE in the shallow groundwater at OU 4 has also declined to 4.7 µg/l PCE. All deep wells at OUs 3 and 4 continue to show nondetectable levels of PCE. Refer to Appendix 2 for a summary of the April 2008 groundwater data from OUs 3 and 4.

Groundwater concentrations have been significantly reduced for all contaminants of concern at OU 5 since the remediation systems began operating in 2004. The table included as Appendix 3 demonstrates the reductions of each contaminant in groundwater.

## Site Inspection

The site inspection was conducted on May 13, 2008, by the EPA project manager. Activities included a visual inspection of all mechanical equipment associated with the OUs 1 and 2 SVE and GET systems, review of on-site documents such as the O&M manuals, completion of the five-year review site inspection checklist, and review of the administrative record at the local public library.

The site inspection revealed that all mechanical equipment for the SVE and GET systems is operating properly and most equipment is clearly labeled. However, the blower for the SVE system was awaiting a minor electrical repair to prevent the blower from shutting down due to high amp draw. The repair has been completed and the blower restored to service. Sampling ports on the air stripper need to be labeled.

Operating manuals and health and safety materials were stored in a file cabinet on-site. One spare extraction pump is stored in the treatment building. The heating, ventilating, and air conditioning (HVAC) system and other facility support equipment is operating properly. However, the water service has been disconnected for some time due to a frozen water pipe that burst and flooded the building a few years back. The building owner does not heat his portion of the building enough to protect the line, so no water service is currently available in the treatment building. This is a potential health and safety concern for the operator, especially during periodic cleanouts of the air stripper. EPA directed the LTRA contractor to provide a temporary water source, and EPA is currently evaluating more permanent solutions.

A visit to the local public library revealed that the administrative record for OUs 1–4 is missing, except for the 2003 Five-Year Review Report. The administrative record for OU 5 appeared to be in tact. The EPA project manager met with the manager of the library, who asked that EPA provide another copy of the record. EPA plans to reproduce the administrative record in both hard copy and on compact disc as requested by the library manager.

## Interviews

Given the active status of the various remedies at the Site, formal interviews were not conducted. EPA met with city officials in January 2008 at the start of the review and no specific concerns or issues were identified. EPA maintains routine communication with the LTRA contractor for OUs 1 and 2 and the UPRR's contractor for OU 5. Regarding OUs 3 and 4, EPA coordinated with NDEQ for completion of the monitoring needed to support this review. The EPA project manager met with the manager of the local public library concerning the administrative record.

## VII. Technical Assessment

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

The OU 1 SVE remedy for addressing source soils was operated by NDEQ for a few years and was shut down in early 2006 due to declining influent concentrations and low mass removal. The SVE system had operated as intended. In February 2007, EPA notified NDEQ that the OU 1 remedy was complete and that EPA may elect to operate the SVE system in conjunction with the OU 2 GET system to enhance groundwater cleanup. Further operation of the SVE system will be considered part of the OU 2 remedy.

Overall, the OU 2 GET system is functioning as intended. The PCE concentrations in the Cleburn Street well have been reduced to below 5 µg/l. The air stripper continues to remove PCE at an efficiency of 99 percent, and the extraction system is containing the plume. However, contaminant concentrations remain extremely high near the source area. It is not likely that the GET system alone can achieve RAOs within a reasonable time frame. For this reason, EPA plans to conduct pilot studies of various technologies to more aggressively address the localized hot spot.

The OUs 3 and 4 groundwater monitoring remedies are functioning as intended, in that shallow groundwater concentrations continue to decline. Monitoring at OUs 3 and 4 has been reduced to once every five years.

The OU 5 remedy has performed as intended and has reduced groundwater PCE concentrations from 700 µg/l in 2004 to 9.4 µg/l in March 2008. LNAPL continues to be monitored and removed when possible. The only issue remaining to be resolved is residual PCE in very shallow soils, which the existing technologies may not be able to address. For this reason, UPRR has proposed excavation and on-site treatment of shallow soils in order to fully meet the cleanup criteria established in the ROD. EPA may modify the decision document to support implementation of this supplemental remedy.

ICs required by both RODs have been fully implemented and remain in effect. Refer to Appendix 5 for a copy of the city ordinance.

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

To answer this question, a risk assessment review was completed by EPA Region 7. Relevant Site documents for all OUs were reviewed and a memorandum report was prepared. The risk assessment review concluded that there have been no changes in applicable or relevant and appropriate requirements (ARARs) since the RODs were signed. Similarly, there have been no newly promulgated standards that would call into question the protectiveness of the remedies.

With regard to changes in exposure pathways, there have been no changes in land use at the Site. The vapor intrusion pathway has been evaluated at the former One Hour Martinizing source area due to the high VOC concentrations in shallow groundwater and in subsurface



vapors beneath the building. Indoor air monitoring was conducted in 2007 and showed no concerns related to vapor intrusion. Low levels of VOCs were detected but could not be attributed to vapor intrusion because of the use of solvents in a business being conducted in the building above the source area. No residential properties are within the plume area.

There have been no newly identified contaminants or sources. There have been no unanticipated by-products due to remediation activities. Physical Site conditions have not changed in any way that would impact the remedies.

Toxicity factors have not changed for Site related contaminants in a way that would impact the protectiveness of the remedy, nor have there been changes in contaminant characteristics. EPA has revised its dermal risk assessment guidance since the 1993 risk assessment for the Site. In addition, EPA Region 7 now uses a different approach for estimating health risks from inhalation of VOCs during household activities. These changes in risk assessment procedure may alter some of the input parameters used in the 1993 risk assessment, but would not significantly alter the conclusions.

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

A review of ecological risks was performed for this five-year review and concludes that the ecological risks at this Site are low. Contaminated soil is the only potentially complete exposure pathway since the groundwater plume does not extend to surface water features. However, the soil pathway is not a concern given that the entire area around the main source area is covered with concrete.

There have been no natural disasters at the Site, and no other information has come to light that would call into question the protectiveness of the remedies.

## VIII. Issues

Table 8-1 below summarizes the major issues identified during the review and whether those issues affect the protectiveness of the remedy.

Table 8-1  
Issues Identified During the Five-Year Review

Issues Identified	Affects Current Protectiveness? (Y/N)	Affects Future Protectiveness? (Y/N)
AR for OUs 1-4 missing at library	N	N
Sampling ports on air stripper not clearly labeled	N	N
GET system not enough to meet RAOs in reasonable time frame	N	N
O&M Plan and Manual for GET and SVE systems need to be updated to reflect system modifications made during optimization	N	N
OU 5 SVE system unable to address shallow soils	N	Y, if land use changes

## IX. Recommendations and Follow-up Actions

Table 9-1 below identifies the recommendations and follow-up actions identified during the five-year review.

Table 9-1  
Recommendations and Follow-up Actions

Issue	Recommendation or Follow-up Action	Party Responsible	Oversight Agency	Milestone Date	Affects Protectiveness (Y/N)	
					Current	Future
AR for OUS 1-4 missing at library	Generate copy of AR and send both hard copy and CD to library	EPA	None	9/30/08	N	N
Sampling ports on air stripper not labeled	Label sampling ports on air stripper	LTRA contractor	EPA	9/30/08	N	N
GET system not enough to meet RAOs in reasonable time frame	Evaluate additional technologies to address source area	LTRA Contractor	EPA	6/30/09	N	N
O&M Plan and manual for GET and SVE system need to be updated	Update O&M Plan and manual for GET and SVE system	LTRA contractor	EPA	Following completion of pilot studies and remedy modifications	N	N
OU 5 SVE system unable to address shallow soils	Consider alternate means to address shallow soils in OU 5	UPRR	EPA	6/30/09	N	Y, if land use changes

## **X. Protectiveness Statements**

### Operable Units 1 and 2

The remedies at OUs 1 and 2 are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. Both RAs are operating as designed. However, the SVE system which began operating as OU 1 for the purpose of addressing source soils is now being operated as part of the OU 2 RA to address groundwater contamination. Exposure pathways are being controlled through plume containment, treatment, and long-term monitoring. The vapor intrusion pathway was evaluated in 2007 and determined to be of no concern. There are no groundwater exposures since all businesses and residents in the area are connected to city water and city ordinance prohibits the installation of private water wells in the vicinity of the Site.

### Operable Units 3 and 4

The remedies at OUs 3 and 4 are protective of human health and the environment, and in the interim, exposure pathways that could result in unacceptable risks are being controlled. The OUs 3 and 4 remedies consist of groundwater monitoring events to be conducted at least once every five years to support five-year reviews. All deep wells continue to show PCE levels well below the MCL. The two shallow wells at OU 3 recently showed PCE levels only slightly above the MCL. The shallow well at OU 4 showed a PCE level slightly below the MCL. There are no groundwater exposures since all businesses and residents in the area are connected to city water and city ordinance prohibits the installation of private water wells in the vicinity of the Site.

### Operable Unit 5

The remedy at OU 5 currently protects human health and the environment because the remedies for addressing VOCs in the groundwater and the vadose zone are functioning as intended and the ICs are in place. However, in order for the remedy to be protective in the long-term, additional actions may be necessary to address shallow soils. Long-term protectiveness will be achieved by modifying the decision document and implementing the necessary remedy modifications to address shallow soils. Groundwater concentrations have been significantly reduced since the AS/SVE systems began operating in 2004. Currently, the systems are operated in pulsed mode to allow periods of rebound to maximize mass removal. In addition, the presence of LNAPL has been reduced to only a few wells. The only remaining concern relates to shallow soil concentrations which do not appear to be responding to the SVE system. The UPRR has proposed an alternative for excavating and treating the shallow soils. EPA plans to consider this approach and may modify the decision document in the near future. Groundwater exposures are being controlled since all businesses and residents in the area are connected to city water supply and city ordinance prohibits the installation and use of private water wells in the vicinity of the Site. Soil exposures are controlled by restricted access and the fact that the property is used for limited industrial purposes.

### Overall Protectiveness

Because additional actions are needed to achieve long-term protectiveness at OU 5, the Site is protective of human health and the environment in the short-term.

## **XI. Next Review**

The next five-year review for the Site is required by August 2013, five years from the date of this review. Prior to the next five-year review, O&M of OU 2 will be turned over to the state, and completion of the OU 5 remedy is likely.

# Appendix 1

OU 1 and OU 2 Tables and Figures

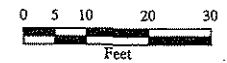
**Figure 1.2**  
**OU2 Soil and Groundwater**  
**Treatment Well Locations**

U.S. EPA Region 7

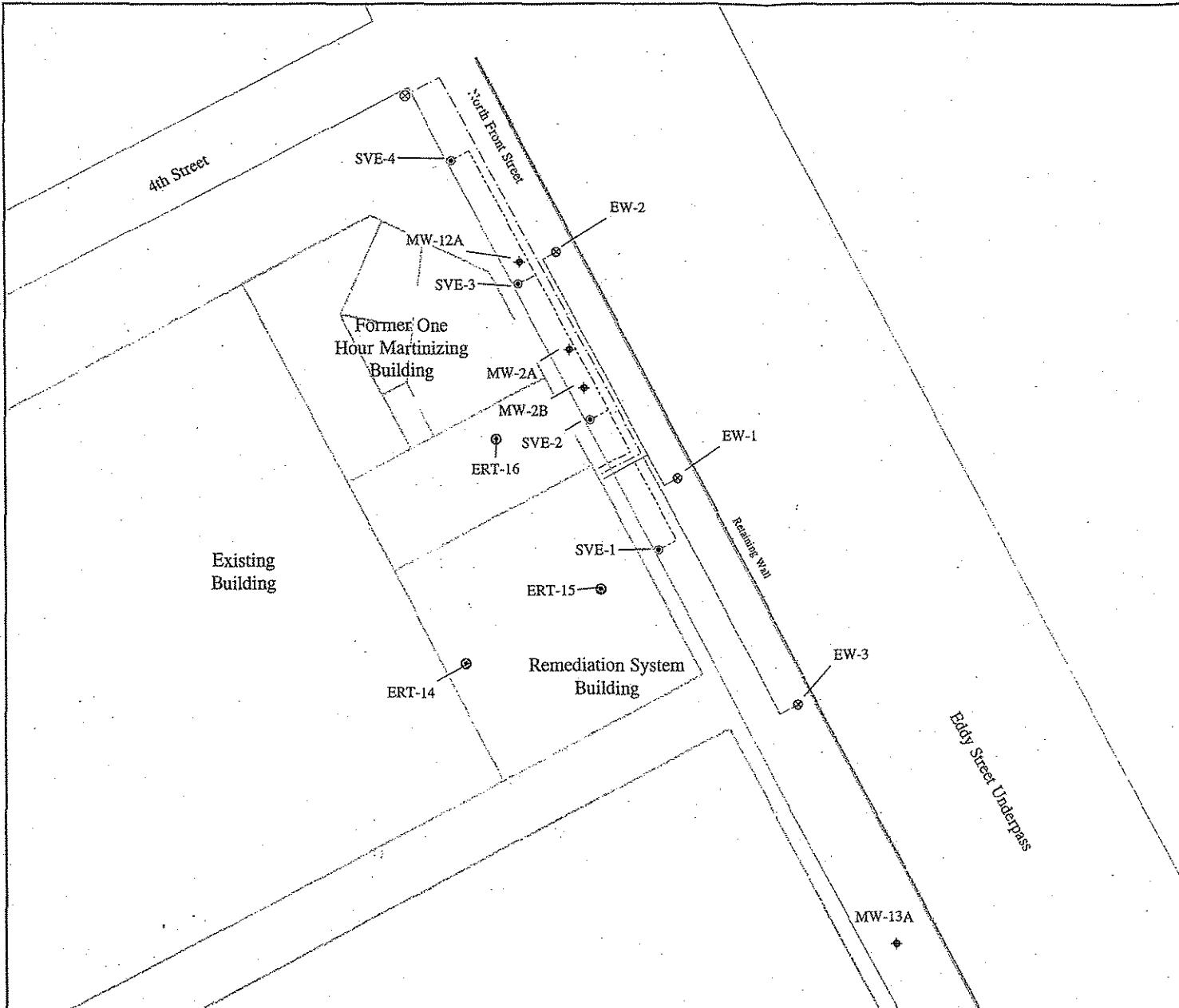


**Legend**

- ⊗ Extraction Well
- ⊕ Monitoring Well
- ⊙ Soil Vapor Extraction Well
- ⊕ Storm Sewer Manhole
- ⊙ ERT Groundwater Well
- Groundwater Extraction Line
- Soil Vapor Extraction Line
- Treated Water Discharge Line



Filename: X:\EPA009\Cleburn\MAPS\QPR  
SoilGroundwater\_Well\_Loc.mxd  
Project: EPA009-019-11-42-04  
Revised: 02/26/08 CV  
Source: Jacobs Federal Operations  
Interim Remedial Action Report  
Cleburn Street Site Operable  
Units 1 & 2; 12/28/99



**Figure 3.10**  
**PCE in Groundwater**  
**Isoconcentration Map**

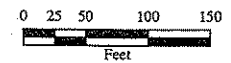
U.S. EPA Region 7



**Legend**

- Existing Building
- Curb Line
- Railroad Line
- ERT Groundwater Well
- Monitoring Well
- EW Well
- Municipal Water Well
- SVE Well
- 7.6 PCE Concentration  
October 2007 ( $\mu\text{g/L}$ )
- PCE Isoconcentration Contour  
Line in  $\mu\text{g/L}$  (dashed where inferred)
- ND Not Detected

Note:  
B wells were not used for contours.



Filename: X:\EPA009\Cleburn\MAPS\  
PCE\_Isoconcentration\_Map.mxd  
Project: EPA009-019-11  
Revised: 02/23/08 CV  
Source: Grand Island Utilities Dept  
(GIS Basemap) 2007

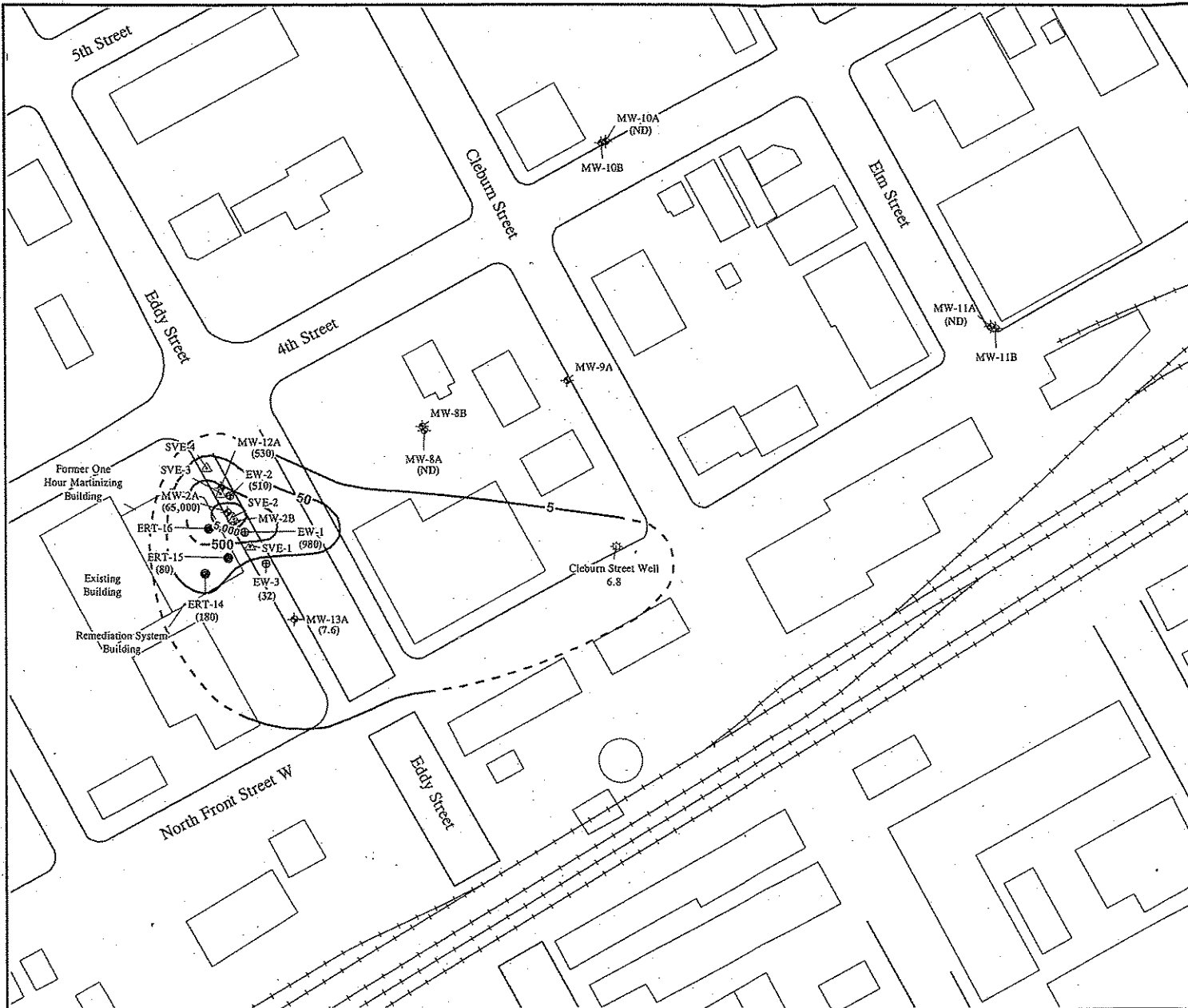




Figure 3.1  
PCE Concentrations in GET System Influent and Effluent

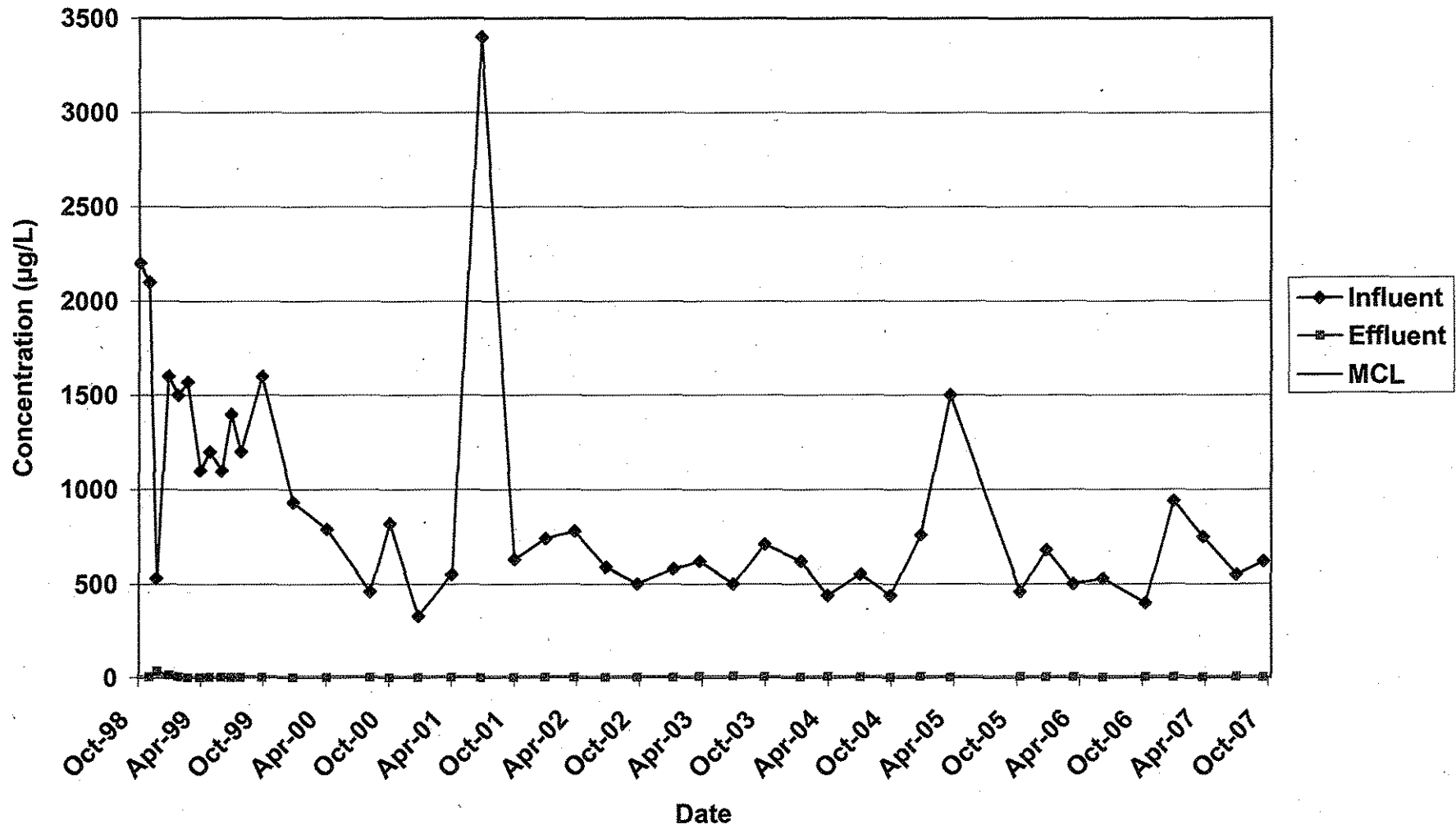


Figure 3.2  
PCE Concentrations - Cleburn Street Well

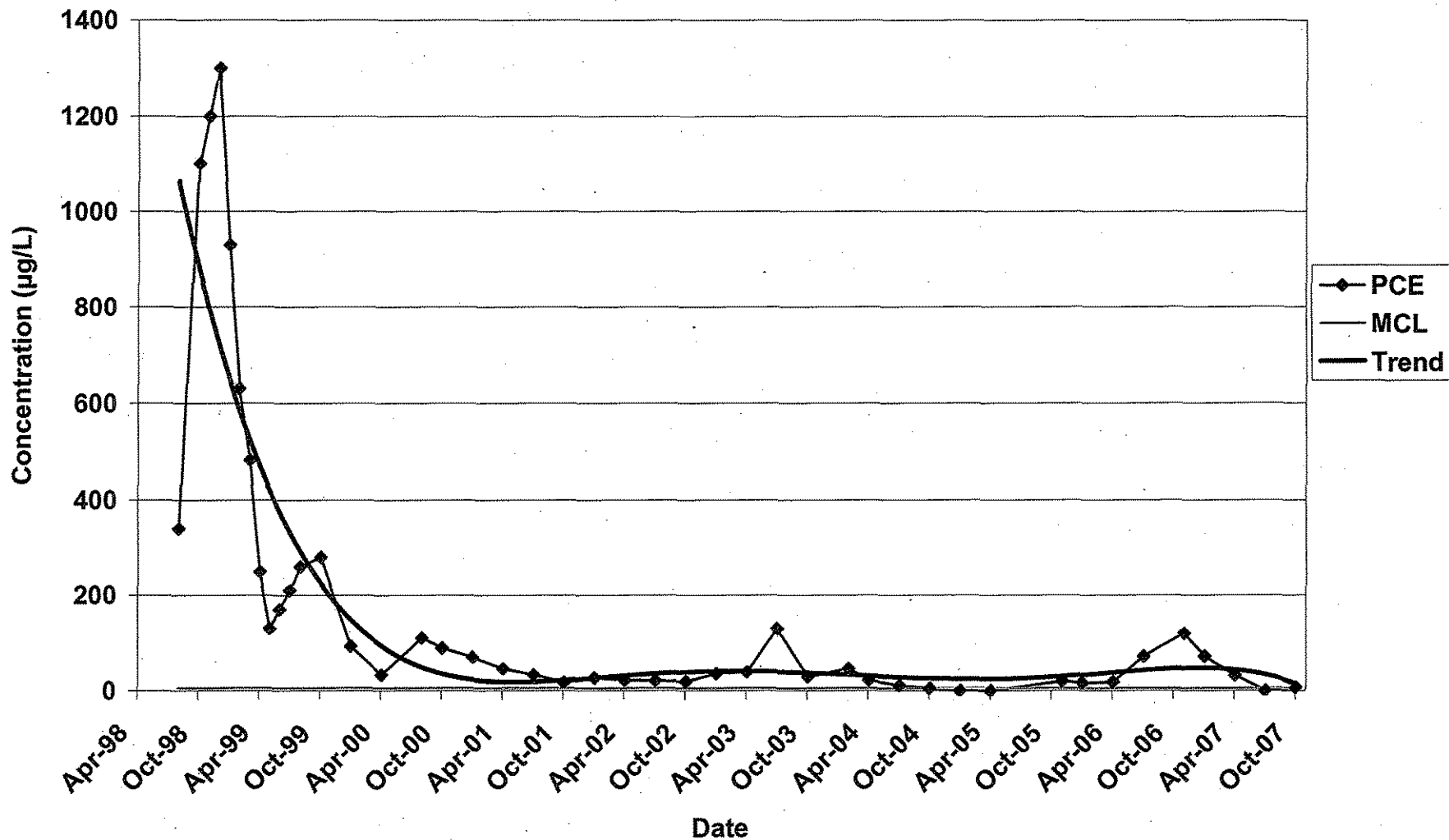
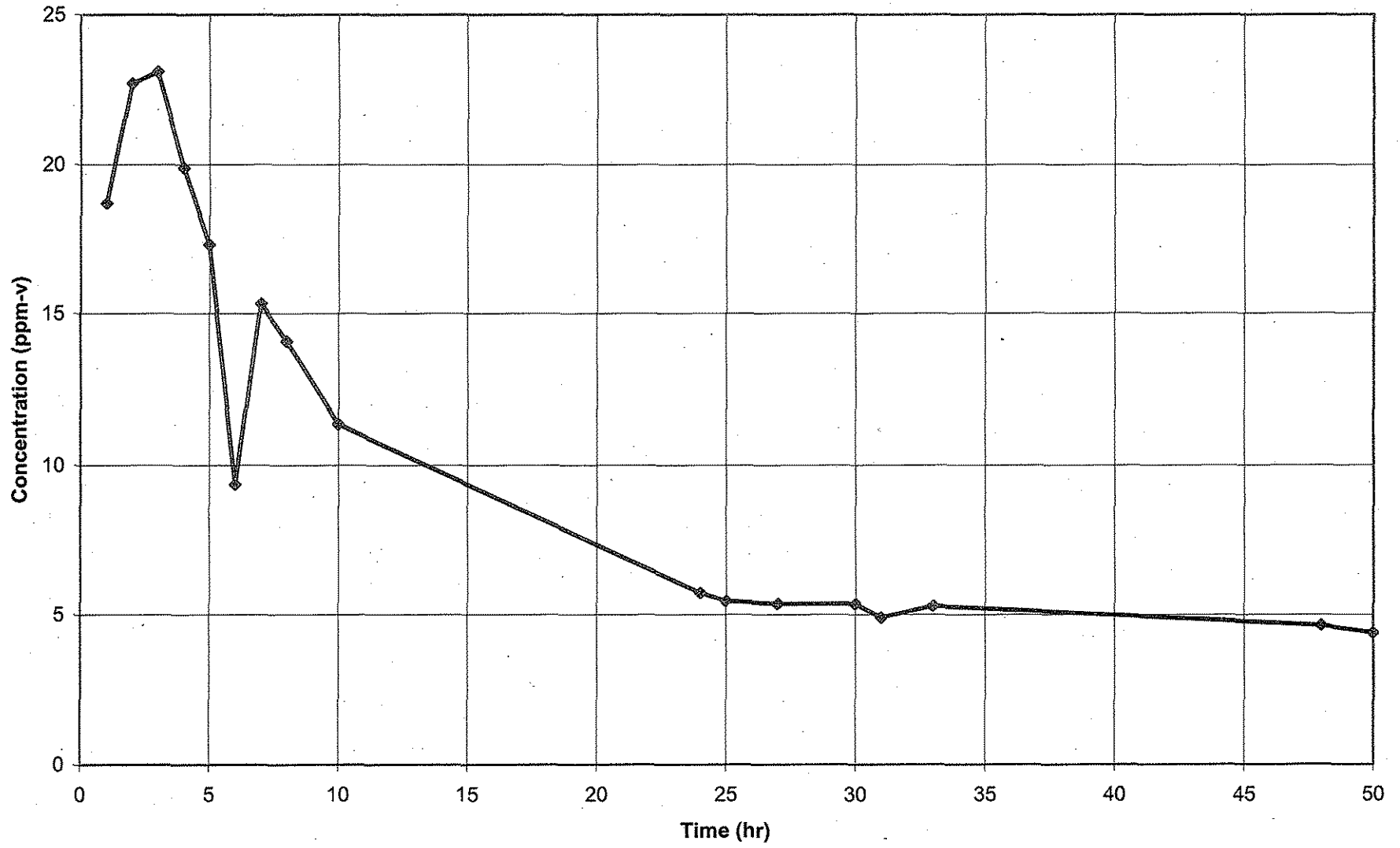


Figure 3: PCE Concentrations in Combined SVE Influent Line



# Appendix 2

Summary of OU 3 and OU 4 Ground Water Data

## Appendix 2.0

### Summary of April 2008 Groundwater Data

#### OU3 and OU4

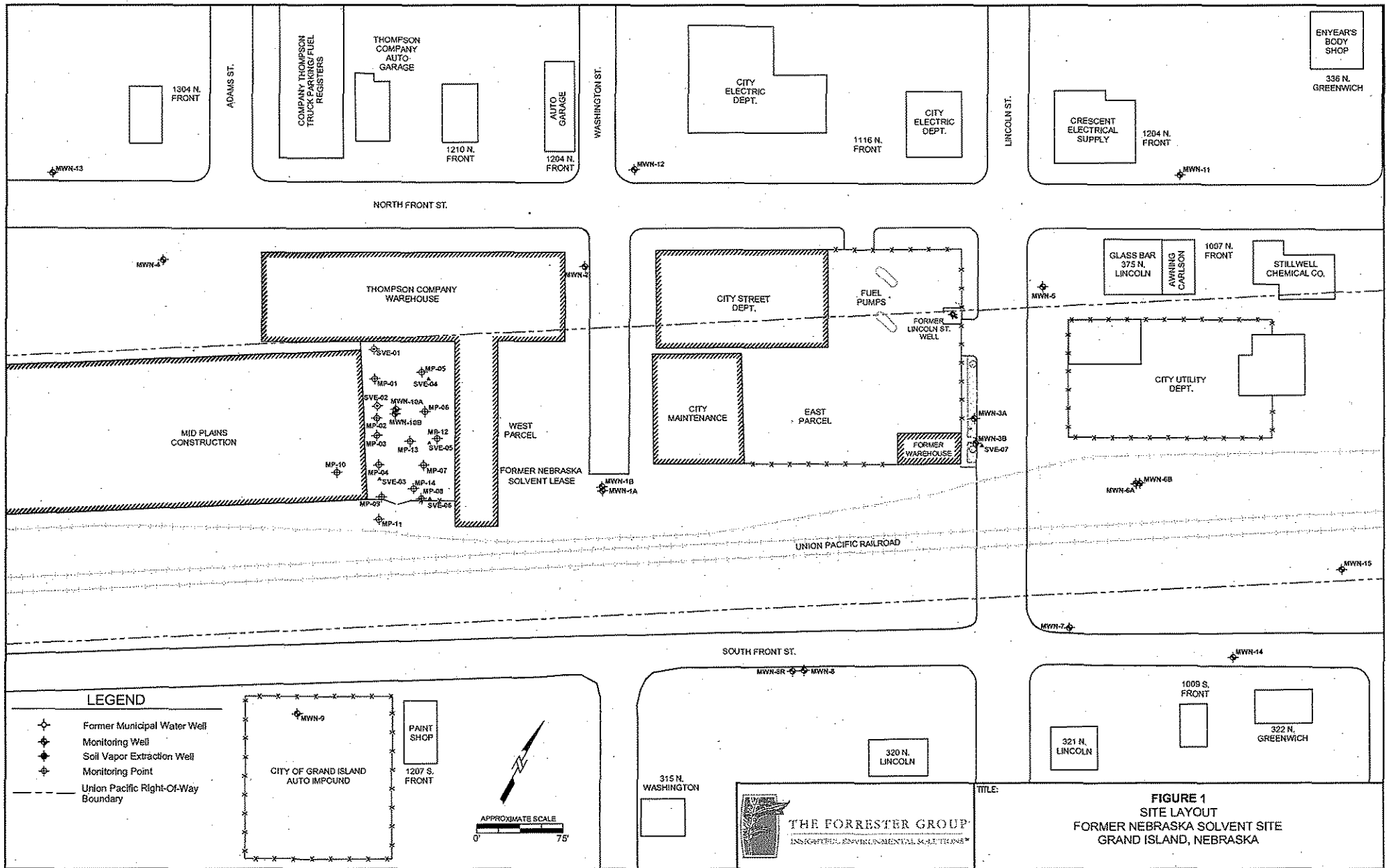
Well Identification	Screen Interval (ft bgs)	PCE Concentration (ug/l)
Maximum Contaminant Level (MCL)		5.0
OU3 - Liberty Cleaners		
MW-1A	14.4 - 29.6	12.7
MW-1A (Duplicate)	14.4 - 29.6	12.6
MW-1B	76.7 - 86.4	ND (1.0)
MW-1C	13 - 28	6.04
MW-1D	78.5 - 88.5	ND (1.0)
OU4 - Ideal Cleaners		
MW-4A	18.4 - 33.6	4.76
MW-4C	17.5 - 32.5	ND (1.0)
MW-4D	85 - 95	ND (1.0)
Trip Blank	n/a	ND (1.0)
FB-01	n/a	ND (1.0)
RB-01	n/a	ND (1.0)

Notes:

1. ft bgs = feet below ground surface.
2. ND = Compound not detected at or above the detection limit provided in parentheses.

# Appendix 3

OU 5 Tables and Figures



Groundwater Analytical Data Summary  
 Cleburn Street OU5  
 Grand Island, Nebraska

Contaminant	Goal	Unit	MWN-1A		MWN-1B		MWN-2		MWN-3A		MWN-3B	
			Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08
cis-1,2-Dichloroethene	70	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	810	1.69	< 5.0	< 1.0	390	1.69
Ethylbenzene	700	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0
Tetrachloroethene (PCE)	5	µg/L	52	7.15	< 5.0	< 1.0	58	2.32	< 5.0	< 1.0	1,600	3.31
Toluene	1,000	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0
Trichloroethene (TCE)	5	µg/L	< 5.0	45.2	< 5.0	< 1.0	11	< 1.0	< 5.0	< 1.0	100	< 1.0
Total Xylenes	10,000	µg/L	< 5.0	< 3.0	< 5.0	< 3.0	25	< 3.0	< 5.0	< 3.0	< 5.0	< 3.0



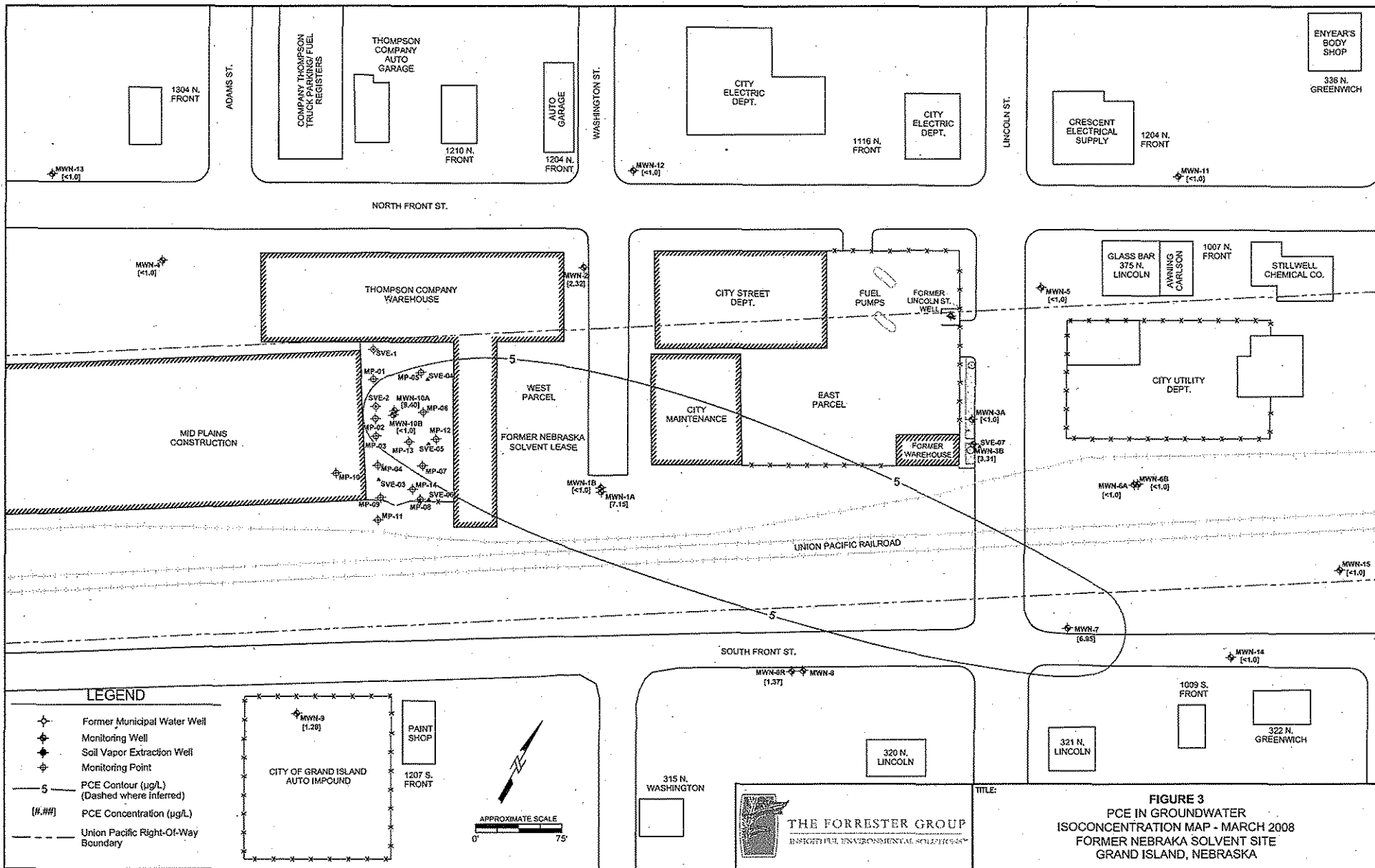
Groundwater Analytical Data Summary  
 Cleburn Street OU5  
 Grand Island, Nebraska

Contaminant	Goal	Unit	MWN-4		MWN-5		MWN-6A		MWN-6B		MWN-7	
			Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08
cis-1,2-Dichloroethene	70	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0
Ethylbenzene	700	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0
Tetrachloroethene (PCE)	5	µg/L	6.9	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	13	6.95
Toluene	1,000	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0
Trichloroethene (TCE)	5	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0	< 5.0	< 1.0
Total Xylenes	10,000	µg/L	< 5.0	< 3.0	< 5.0	< 3.0	< 5.0	< 3.0	< 5.0	< 3.0	< 5.0	< 3.0

Groundwater Analytical Data Summary  
 Cleburn Street OU5  
 Grand Island, Nebraska

Contaminant	Goal	Unit	MWN-8	MWN-8R	MWN-9		MWN-10A		MWN-10B		MWN-11	
			Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08	Apr-98	Mar-08	Aug-00	Mar-08
cis-1,2-Dichloroethene	70	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	11,000	127	< 5.0	< 1.0	< 1.0	< 1.0
Ethylbenzene	700	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	5,000	< 1.0	7.6	< 1.0	< 1.0	< 1.0
Tetrachloroethene (PCE)	5	µg/L	< 5.0	1.37	3	1.28	5,000	9.4	13	< 1.0	< 1.0	< 1.0
Toluene	1,000	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	8,200	< 1.0	3	< 1.0	< 1.0	< 1.0
Trichloroethene (TCE)	5	µg/L	< 5.0	< 1.0	< 5.0	< 1.0	76	< 1.0	< 5.0	< 1.0	< 1.0	< 1.0
Total Xylenes	10,000	µg/L	< 5.0	< 3.0	< 5.0	< 3.0	19,000	< 3.0	26	< 3.0	< 3.0	< 3.0





# Appendix 4

## List of Documents Reviewed

## Appendix 4.0

### List of Documents Reviewed

#### Second Five Year Review for the Cleburn Street Well Site

<b>Title of Document</b>	<b>Author</b>	<b>Date</b>
First Five Year Review	EPA	September 30, 2003
OU1-4 Record of Decision	EPA	June 7, 1996
OU5 Record of Decision	EPA	September 10, 2001
Technical Assessment for Ecological Risk	EPA	May 27, 2008
Technical Assessment for Human Health Risk	EPA	June 19, 2008
Preliminary Closeout Report	EPA	August 2004
Groundwater Sampling Report for OU3 and OU4	Tetra Tech	June 4, 2008
Letter Regarding OU1 SVE System, OU3 and OU4	NDEQ	April 4, 2006
Remediation System Evaluation Report	EPA	July 30, 2001
Source Investigation Report	Hydrogeologic, Inc.	February 22, 2007
2007 Annual Performance Report, OU2	Hydrogeologic, Inc.	March 2008
Start-up/Semi-annual Performance Report, OU1 and OU2	Sverdrup	September 15, 1999
Second Semi-annual Performance Report, OU1 and OU2	Sverdrup	September 29, 1999
Interim Remedial Action Report, OU1 and OU2	Sverdrup	December 29, 1999
Final Remedial Action Report, OU3 and OU4	EPA	July 14, 1999
Technical Memorandum on SVE System Operation	Hydrogeologic, Inc.	April 16, 2008
Operations Reports, OU2	Hydrogeologic, Inc.	Multiple reports

# Appendix 5

Institutional Control – City Ordinance

**§35-60. Purpose**

The United States Environmental Protection Agency issued a Record of Decision (ROD) for the Cleburn Street Well Superfund Site on June 7, 1996, which identified three sources of subsurface soil and groundwater contamination. These sources included the former One Hour Martinizing facility, Liberty Cleaners and Shirt Launderers, and Ideal Cleaners. The former Nebraska Solvent Company was identified as a possible fourth contamination source subject to subsequent evaluation and testing. The ROD described selected remedies for the three source areas, an element of which required the City of Grand Island to enact and enforce institutional control ordinances designating a Groundwater Control Area No. 1 in which groundwater use would be restricted to prevent human exposure and consumption of potentially contaminated groundwater, requiring registration of existing wells and requiring approval and registration of new wells. The institutional control ordinances are to remain in full force and effect until the groundwater contamination identified in the ROD is reduced to a level making the groundwater safe to be used as a source of drinking water pursuant to 42 USC §300g, et seq., the Safe Drinking Water Act, or its successor legislation.

**§35-61. Definitions**

As used in this Article, the following terms mean:

Groundwater means water pumped from a well located within the Groundwater Control Area No. 1 described in Section 35-62.

Groundwater Contamination means the chemicals of concern (COC) described in the United States Environmental Protection Agency Record of Decision (ROD) for the Cleburn Street Well Superfund Site date June 7, 1996, which was received and accepted by the Mayor and City Council pursuant to Resolution 98-28.

Groundwater Control Area No. 1 means a defined area within the corporate limits of the City of Grand Island subject to the institutional controls provided in this Article which are intended to prohibit human consumption of potentially contaminated groundwater from wells.

Well means a hole or shaft sunk into the earth in order to obtain water from a natural subterranean supply or aquifer.

The definitions found in Neb. Rev. Stat., Chapter 46 - Irrigation and Regulation of Water are adopted by reference, except where such definitions are in conflict with those provided in this section above.

**§35-62. Groundwater Control Area Boundaries**

The outer boundaries of the Groundwater Control Area No. 1 are described as follows: Commencing at the southeasterly corner of the intersection of 9<sup>th</sup> Street and Adams Street; thence running northeasterly along the south boundary of 9<sup>th</sup> Street to the southwesterly corner of the intersection of 9<sup>th</sup> Street and Sycamore Street; thence running southeasterly along the west boundary of Sycamore Street to the northwesterly corner of the intersection of Sycamore Street and 1<sup>st</sup> Street; thence running southwesterly along the north boundary of 1st Street to the northwesterly corner of the intersection of 1st Street and Locust Street; thence running southerly along the west boundary of Locust Street



to the intersection of Locust Street and Division Street; thence, running southwesterly along the north boundary of Division Street to the northeasterly corner of the intersection of Division Street and Adams Street; thence running northwesterly along the east boundary of Adams Street to the point of beginning.

#### **§35-63. Duration of Institutional Control Ordinance**

(A) This Article shall remain in full force and effect for an initial term of twenty-five (25) years from the effective date following approval and adoption by the Mayor and City Council.

(B) The term of this Article may be extended by the Mayor and City Council if at the end of the initial term there remains groundwater contamination identified in the ROD described in Section 35-60 making the groundwater unsafe to be used as a source of drinking water pursuant to the Safe Drinking Water Act or its successor legislation.

(C) In the event the City of Grand Island is notified during the initial term by the Environmental Protection Agency that groundwater contamination within the Groundwater Control Area No. 1 has been reduced to a level making the groundwater safe to be used as a source of drinking water pursuant to the Safe Drinking Water Act or its successor legislation, the Mayor and City Council may proceed to repeal this Article forthwith.

#### **§35-64. Prohibited Groundwater Uses**

(A) Groundwater pumped from wells within the Groundwater Control Area No. 1 shall not be used for any human consumption including drinking water, cooking, washing or other household uses. Because groundwater from wells within the groundwater control area may be contaminated and present a hazard to the health, safety and welfare of persons exposed to said water, any known human consumption of groundwater from wells within the Groundwater Control Area No. 1 is a violation of this Article and is declared a public nuisance subject to abatement as provided hereafter.

(B) This Article shall not apply to uses of groundwater pumped from wells within the Groundwater Control Area No. 1 which do not involve human consumption, including, but not limited to, non-contact cooling water for industrial, commercial or residential uses and watering of vegetation other than gardens, plants and trees producing food for human consumption.

#### **§35-65. Well Registration**

(A) All wells for which drilling has commenced or existing within the Groundwater Control Area No. 1 as of the effective date of this Article shall be registered with the Building Department by the person owning the real estate on which the well is located. There shall be no fee for registering an existing well.

(B) No person shall drill or install a well within the Groundwater Control Area No. 1 prior to applying for and obtaining a well permit from the Building Department. There shall be a nonrefundable fee in accordance with the City of Grand Island Fee Schedule paid to the Building Department contemporaneously with making an application for a well permit.

### **§35-66. Existing Well Registration, Information Required**

The following information shall be submitted to the Building Department in connection with registering a well in existence as of the effective date of this Article:

- (A) The name and address of the person owning the real estate on which the well is located.
- (B) The address and legal description of the property on which the well is located.
- (C) The address of all properties being served by groundwater pumped from the well.
- (D) A description of the uses of the water pumped from the well, including specifically whether such groundwater is used for human consumption including, but not limited to drinking, cooking, washing, or other household uses.
- (E) Whether City water is available to the property currently served by the well.
- (F) The depth of the well, if known.
- (G) A diagram showing the location of the well.

### **§35-67. New Well Registration, Application for Well Permit**

The following information shall be submitted to the Building Department in connection with applying for a well permit for a new well in the Groundwater Control Area No. 1:

- (A) The name and address of the person owning the real estate on which the proposed well is to be located.
- (B) The address and legal description of the property on which the proposed well is to be located.
- (C) The address of all properties to be served by groundwater pumped from the proposed well.
- (D) A description of the uses to be made of water pumped from the proposed well, including a certification that said groundwater will not be used for human consumption, including but not limited to drinking, cooking, washing, or other household uses.
- (E) Whether City water is available to the property to be served by the proposed well.
- (F) The depth of the proposed well.
- (G) A diagram showing the location of the proposed well.

### **§35-68. Violations of Institutional Control Ordinance, Abatement of Public Nuisance**

Whenever the Building Department Director, or his/her designee has inspected any well within the Groundwater Control Area No. 1 and determined that groundwater pumped from the well is being used in violation of this Article, he/she shall send a written notice to the owner of record or owner's duly authorized agent, or person in

possession, charge or control, or to the occupant by ordinary first-class mail and by certified mail, return receipt requested, notifying the addressee of the violation. The written notice shall contain the following information:

- (A) The street address and a legal description sufficient for identification of the premises on which the well is located.
- (B) A brief and concise description of the acts or circumstances constituting a violation of this Article.
- (C) A brief and concise description of the corrective action required to be taken to render the well and groundwater uses in compliance with this code.
- (D) A brief and concise statement advising the addressee that if the well and groundwater uses are not brought into compliance with this Article within the time specified, that the Building Department Director, or his/her designee may order electrical power to the well disconnected and may request the City Attorney, with the consent of the Mayor, to file an action to abate the public nuisance and charge the costs thereof against the real estate, the owner of record and the addressee.

**§35-69. Procedure for Abatement of Public Nuisance**

If the addressee of the written notice described in Section 35-68 fails to abate said nuisance within the time specified, the City of Grand Island, at the written request of the Building Department Director, or his/her designee directed to the City Attorney, and with the consent of the Mayor, may proceed to abate said public nuisance pursuant to Section 20-15 of the Grand Island City Code, and charge the costs thereof against the real estate on which the well is located and the addressee of the written notice.

In the event the use of the groundwater in violation of this Article might cause irreparable harm or poses a threat to public health, safety or welfare, or the health, safety or welfare of the persons using the groundwater, the written notice to abate pursuant to Section 20-15 shall not be required as a condition precedent to commencing a legal action to obtain abatement of the nuisance. The City of Grand Island, with the consent of the Mayor, may immediately file an action requesting such temporary and permanent orders as are appropriate to expeditiously and permanently abate said public nuisances and protect the public health, safety or welfare or the health, safety or welfare of persons using the groundwater in violation of this Article.