Site: Waverly GW
ID #: NED980862718
Break: 8.0
Other: 9-28-04

071X

Five -Year Review Report

Third Five-Year Review Report

for

Waverly Groundwater Contamination Site

Lancaster County
Waverly, Nebraska

Prepared By:

U.S. Environmental Protection Agency
Region VII
Kansas City, Kansas

Approved By:

Cecilia Tapia
Superfund Division Director
Region VII

Date:

9/28/04

40161787
SUPERFUND RECORDS

Table of Contents

Page No.

List of Acronyms iii
Executive Summary iv
Five-Year Review Form v

I. Introduction 1

II. Site Chronology 2

III. Background 3
Physical Characteristics 3
Land and Resource Use 3
History of Contamination 3
Initial Response 4
Basis for Taking Action 4

IV. Remedial Actions 4
Remedy Selection 4
Remedy Implementation 5
System Operations/Operation and Maintenance (O&M) 6

V. Progress Since Last Five-Year Review 8

VI. Five-Year Review Process 9
Administrative Components 9
Community Notification 9
Document Review 10
Data Review 10
Site Inspection 12
Interviews 12

VII. Technical Assessment 12

Question A: Is the remedy functioning as intended by the decision documents? 12
Question B: Are the exposures assumptions, toxicity data, cleanup levels, and remedial action objectives (RAOs) used at the time of the remedy selection still valid? 13

Question C: Has any other information come to light that could call into question the protectiveness of the remedy? 13

Technical Assessment Summary 13

VIII. Issues 13

IX. Recommendations and Follow-up Actions 13

X. Protectiveness Statement 14

XI. Next Review 14

Figures

Figure 1 - General location of Waverly, Nebraska

Figure 2 - Location of Former CCC/USDA Grain Storage Facility

Figure 3 - Well Locations

Attachments

Attachment 1 - Documents reviewed

Attachment 2 - Site Checklist

Attachment 3 - Site Visit/Inspection Personnel Roster

Tables

Table 1 - Compliance Points and Criteria

List of Acronyms

ARAR	Applicable and Relevant and Appropriate Requirements
CERCLA	Comprehensive Environmental Response Compensation and Liability Act
CERCLIS	Comprehensive Environmental Response Compensation and Liability Act Information System
CCC	Commodity Credit Corporation
EPA	U.S. Environmental Protection Agency
ERA	Expedited Response Action
GPM	Gallons Per Minute
NDEQ	Nebraska Department of Environmental Quality
NHHS	Nebraska Health and Human Services
NCP	National Oil and Hazardous Substances Pollution Contingency Plan
NPL	National Priority List
PWS	Public Water Supply
μg/L	Micrograms per Liter
RAO	Remedial Action Objectives
RI/FS	Remedial Investigation/Feasibility Study
ROD	Record of Decision
SVE	Soil Vapor Extraction
USDA	U.S. Department of Agriculture

Executive Summary

The remedy for the Waverly Groundwater Contamination Site as stated in the Record of Decision (ROD) addresses the principal threat through the remediation of groundwater and soil contamination by eliminating or reducing the risks posed by the site through treatment.

The EPA chose a pump and treat system; which includes a groundwater extraction and air stripping system and an active soil gas extraction system. The groundwater extraction and air stripping system consists of groundwater extraction wells and air strippers that remove contaminants from the aquifer; helps to contain the spread of the contaminated groundwater plume; and remove and treat the contaminated groundwater. An active soil gas extraction system (SVE) removes the contaminants from site soils above the water table.

The first Five-Year Review report for this site was completed by the EPA, Region 7 Superfund Division in September 1993 and concluded that, "the existing system has been effective in controlling the migration of contaminated water from the site and is progressing toward clean up and restoration of the aquifer." The second Five-Year Review report was completed by the EPA, Region 7 Superfund Division in September 1999 and concluded that the remedial action in operation at the Waverly site is protective of human health an the environment.

The conclusion of this Five-Year Review assessment is that the remedial action in operation at the Waverly site currently is protective of human health and the environment. However, hazardous substances, and pollutants remain on site at levels above the compliance levels outlined in the ROD. Therefore, actions outlined in this review need to be conducted to ensure the long-term protectiveness at the site. This conclusion is based upon a comprehensive file review and collection of groundwater samples at the site.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site name *(from WasteLAN)*: Waverly Groundwater Contamination		
EPA ID *(from WasteLAN)*: NED980862718		
Region: 7	**State:** NE	**City/County:** Waverly/Lancaster
SITE STATUS		
NPL status: X Final ☐ Deleted ☐ Other (specify)		
Remediation status (choose all that apply): ☐ Under Construction X Operating ☐ Complete		
Multiple OUs? ☐ YES X NO	**Construction completion date:** 03 / 29 / 1994	
Has site been put into reuse? ☐ YES X NO		
REVIEW STATUS		
Reviewing agency: X EPA ☐ State ☐ Tribe ☐ Other Federal Agency		
Author name: Jeffrey L. Field		
Author title: Remedial Project Manager	**Author affiliation:** U.S. EPA Region 7	
Review period: February 2004 - August 2004		
Date(s) of site inspection: 07/08/2004		
Type of review: ☐ Statutory X Policy (X Post-SARA ☐ Pre-SARA ☐ NPL-Removal only ☐ Non-NPL Remedial Action Site ☐ NPL State/Tribe-lead ☐ Regional Discretion)		
Review number: ☐ 1 (first) ☐ 2 (second) X 3 (third) ☐ Other (specify)		
Triggering action: ☐ Actual RA Onsite Construction at OU #____ ☐ Actual RA Start at OU#____ ☐ Construction Completion X Previous Five-Year Review Report ☐ Other (specify)		
Triggering action date *(from WasteLAN)*: 09/30/99		
Due date *(five years after triggering action date)*: 09/30/04		

Five-Year Review Summary Form, cont'd.

Issues:

Historic contamination migration within the upper sandy aquifer was not effectively represented by the long-term sampling in the existing network of permanent monitoring wells, which for the most part was screened above or below the critical zone. Recent results, using the cone penetrometer, reflect the contaminant migration pattern more accurately. This issue does not affect the current or future overall effectiveness or protectiveness of the remedy, but needs to be monitored on a scheduled basis.

Recommendations and Follow-up Actions:

Maintain sampling of monitoring wells MW5, MW9, and install additional monitoring wells to sample groundwater in tracking the movement and concentration levels in the relatively small residual plume.

Protectiveness Statement(s):

The remedy at the Waverly Groundwater Contamination site currently protects human health and the environment because the compliance criteria outlined in the ROD have been met for air emissions, soil, and groundwater on site. The exception to this is the small plume of carbon tetrachloride found between MW5 and the SGWEX, and the ROD action level of soil gas. In order for the remedy to be protective in the long-term, these actions need to be taken to ensure long-term protectiveness:

- Reconcile the methodology of determining ROD soil gas compliance level for carbon tetrachloride with current methods.

- Continue monitoring of monitoring wells MW5, MW9 and collect groundwater samples from new monitoring wells.

Other Comments:

Waverly Groundwater Contamination Site
Waverly, Nebraska
Third Five-Year Review Report

I. Introduction

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

The agency is preparing this Five-Year Review report pursuant to CERCLA §121 and the National Contingency Plan (NCP). CERCLA states:

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

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

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

The United States Environmental Protection Agency (EPA), Region 7 conducted the five-year review of the remedy implemented at the Waverly Groundwater Contamination Site in Waverly, Nebraska. This review was conducted by the Remedial Project Manager (RPM) for the entire site from February 2004 through August 2004. This report documents the results of the review.

This is the third Five-Year Review for the Waverly Site. The triggering action for this policy review is the signature date of the previous Five-Year Review report. The Five-Year Review is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for the unlimited use and unrestricted exposure.

II. Site Chronology

Event	Date
Site Discovery	03/01/1983
HRS Package	04/09/1984
Proposed to NPL	10/15/1984
NPL PRP Search	05/15/1985
Final Listing on NPL	06/10/1986
Preliminary Assessment 1	01/22/1987
PRP RI/FS	04/24/1987
Preliminary Assessment/Site Inspection	12/24/1987
Consent Agreement	05/27/1988
Site Inspection	12/22/1989
Proposed Plan	08/01/1990
ROD	09/26/1990
1st Five-Year Review Completed	09/27/1993
Preliminary Close Out Report	03/29/1994
2nd Five -Year Review Completed	09/30/1999
Site Inspection Completed	07/06/2004

III. Background

Physical Characteristics

The Waverly Groundwater Contamination Site is located in Lancaster County in southeastern Nebraska, in and near the City of Waverly. Figure 1 shows the general location of the Waverly site in Township 11 North and Range 8 East of Lancaster County. Waverly is located along State Highway 6, approximately 10 miles northeast of Lincoln, Nebraska. The site's property, currently owned by the Lancaster County Engineering Department, is located along the south side of Oldfield Street, just west of North 141st Street (Figure 2). The site's legal description is as follows: Lot 158, I.T. in the SW 1/4 of Section 16, Township 11 North, Range 8 East of the 6th Prime Meridian, Lancaster County, Nebraska.

Land and Resource Use

The population of the city of Waverly is approximately 2,000. The land immediately north of the site is used primarily for agriculture, and the land immediately to the south is residential. The city of Waverly obtains all of its drinking water supply from municipal wells that tap the groundwater aquifer.

The Waverly aquifer is the principal near-surface aquifer in the Waverly area. The aquifer occurs in fluvial sands deposited in a bedrock paleovalley. The Waverly aquifer is divided into an upper and lower aquifer at the Waverly site, separated by a barrier clay layer. North of the site, however, only one aquifer was documented in driller's logs at a number of well locations

History of Contamination

The Commodity Credit Corporation/U.S. Department Agriculture (CCC/USDA) operated a grain storage facility in Waverly between 1952 and 1974. The facility consisted of grain storage structure (approximately 100 bins and 13 Quonset huts) on concrete foundations. The fumigant "80/20" was used at the facility between approximately 1955 and 1965. The fumigant is reported to have been composed of 80% carbon tetrachloride and 20% carbon disulfide. Trace amounts of chloroform also may have been present in the 80/20 fumigant as a by-product of the production of carbon tetrachloride.

Since 1975, the former CCC/USDA grain storage facility property has been owned by Lancaster County, which operates a district office and maintenance facility on the premises. Parts of the site are covered by piles of road maintenance and construction materials and graveled parking areas. Some of original grain storage foundations still exist.

The EPA sampled the Waverly municipal water system in July 1982 as part of a nationwide survey. The analytical results indicated contamination of the public water supply (PWS) wells 1 and 3 with carbon tetrachloride and chloroform at concentrations of up to 200 μg/L and 7.5 μg/L, respectively. Subsequent sampling of PWS 3 in 1983, 1984, 1985 and 1986 showed high levels of carbon tetrachloride and chloroform. In October 1984, the site was placed on the National Priorities List of sites requiring long-term remedial action.

Initial Response

After the discovery of contamination, PWS 1 and PWS 2 were relegated to standby status, and PWS 3 was removed from service. Between 1982 and 1987, four additional PWS wells were installed south of the site. Two of these wells are 2 miles southwest of town, outside the study area and outside the known extent of the contaminated plume associated with the site.

In 1985, 47 wells near the site were sampled for a wide range of parameters, including volatile organic compounds (VOCs), semi-volatile organic compounds, metals, and pesticides, as part of the characterization of the site.

In May 1986, the EPA developed an engineering evaluation and cost analysis report outlining an Expedited Response Action (ERA), including pumping and treating with air stripping technology and soil gas extraction. Design of the system was completed in May 1987, and a public meeting was held in Waverly with the mayor and city council to receive their comments on the ERA system.

The EPA began operation of the current ERA systems at the site in February 1988. A compliance agreement between the CCC/USDA and the EPA went into effect in May 1988. In June 1988 the CCC/USDA took over the operation and maintenance of the ERA. In September 1990, the ROD was issued for Waverly. The CCC/USDA is responsible for implementing the actions described in the ROD for the Waverly site.

Basis for Taking Action

The basis for taking action at this site under Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) authorities are a concern for human exposure to carbon tetrachloride and chloroform through ingestion of contaminated groundwater through drinking water wells, exposure through inhalation from carbon tetrachloride in the vapor phase, and dermal contact from contaminated soils.

IV. Remedial Actions

The principal threat at the Site is the carbon tetrachloride and chloroform contamination in the Waverly aquifer which was used by the city as a source of drinking water. The selected response actions will address the principal threat through the remediation of contaminated groundwater as well as the remediation of contaminated soils. To address the potential risks the following remedial action objectives (RAOs) were identified in the ROD:

- Prevent potential exposure to contaminated groundwater;
- Protect uncontaminated groundwater for future use by preventing future migration of the contaminated groundwater plume; and,
- Restore the contaminated aquifer for future use as drinking water by reducing the carbon tetrachloride and chloroform concentrations below health based criteria.

In addition to the RAO's, the EPA required the CCC/USDA to conduct an additional site investigation program. The purpose of the investigation was to verify the down gradient performance of the ERA system and further characterize the hydrogeologic setting. The main objectives of this ROD site investigation were to:

- Drill and install a nest of monitoring wells northwest of the site.
- Determine flow directions in both the upper and lower aquifers.
- Determine the stratigraphic sequence, to map the distributions of the individual aquifers, and to determine the chemical signatures of the individual aquifers at critical locations to the northwest and northeast of the site.
- Identify the hydraulic interconnections between the upper and lower aquifers.
- Conduct both down-hole and surface geophysical measurements.
- Estimate the area of influence of the Groundwater Extraction System (GWEX) currently in operation at the site.

Remedy Implementation

In May 1986, the EPA developed an engineering evaluation and cost analysis report outlining an ERA, including pumping and treating with air stripping technology and soil gas extraction. Design of the systems was completed in May 1987, and a public meeting was held in Waverly with the mayor and city council to receive their comments on the ERA systems.

The EPA began operation of the current ERA system at the site in February 1988. A compliance agreement between the CCC/USDA and the EPA went into effect in May 1988. In June 1988 the CCC/USDA took over the operation and maintenance of the ERA. In September 1990, the ROD was issued for Waverly. The CCC/USDA is responsible for implementing the actions described in the ROD for the Waverly site.

In 1991-1992 the CCC/USDA conducted additional site investigations at Waverly to satisfy the requirements of the ROD. The principal conclusion of these site investigations were as follows:

- Groundwater beneath the Waverly site flows in a north-northeast direction.
- Groundwater contamination was present only in the upper aquifer.
- A plume of groundwater contaminated with carbon tetrachloride and chloroform was present to the northeast of the Waverly ERA site.

Maximum contaminant levels detected in this northeast plume were 400 μg/L (carbon tetrachloride) and 200 μg/L (chloroform).

The groundwater extraction system, installed as part of the ERA in 1988, has been effective in controlling the migration of contaminated water from the site. The contaminant plume to the northeast of the site identified during CCC/USDA's 1991-1992 investigations was beyond the capture zone of the existing GWEX and is believed to have migrated from the Waverly site before the ERA remedial system began operation. This northeast plume also needed to be captured and treated to comply fully with the ROD. To meet this objective, modifications for the remedial system were proposed by CCC/USDA in 1993 and approved by the EPA and the state of Nebraska. The modification involved installing a supplementary groundwater extraction well (SGWEX)(Figure 3) northeast of the site and pumping the groundwater to the Waverly ERA process building for treatment in the existing air stripper system. Additional monitoring wells were also installed to monitor the progress of the aquifer cleanup. The SGWEX system began operation in 1994.

The site achieved construction completion status in August 1988. The Preliminary Close Out Report was signed in March 1994. After all performance criteria, outlined in the ROD, have been met, the EPA will issue a Final Close Our Report.

System Operation/Operation and Maintenance

The ERA systems were designed by an EPA contractor (Woodward-Clyde Consultants) with design specifications and operation and maintenance plans described in their February 29, 1988 report, *Treatment Plant Facility Operations and Maintenance Manual for the Expedited Response Action Waverly Groundwater Contamination Site, Waverly, Nebraska.*

The ERA system includes a GWEX, an air stripper for treating groundwater contamination, and a vapor extraction system (VES) for treating soil-source contamination. The VES has been shut down since August 1993. The SGWEX was added to the system in April 1994 to capture a groundwater contamination plume northeast of the site. In April 1995 the GWEX was shut down, leaving the SGWEX as the only operating groundwater extraction well.

In November 1988, Argonne National Laboratory was contracted by the CCC/USDA to manage the site, continue sampling, and operate/maintain the ERA systems.

The basic operation of the systems has not changed since they were first installed. However, a number of modifications and additions have been made by Argonne to improve the systems' effectiveness and to facilitate operation. These changes are described in Argonne's 1991, *Final Work Plan: Expedited Remedial Action, Waverly Contaminated Groundwater Site, Waverly, Nebraska*, and include the following:

- Rewire the air stripper control panel to allow single-tower operation.
- Install piping to bypass the main tower feed pump, if necessary, and use an alternate pump as backup.
- Add individual VES sample port valves to minimize the chance of cross-contamination. (The original design manifolded all sample ports together).
- Install an ozone generator for continuous, on-line cleaning of the packing material.
- Modify piping to keep the recycle meter continuously flooded, allowing it to operate more efficiently.
- Install an automatic, solenoid-activated drain on the VES inlet separator to prevent problems with moisture buildup in that unit.

The sampling and analysis program requires monthly and quarterly sampling and analysis of groundwater for carbon tetrachloride (CCL_4) and chloroform ($CHCL_3$). The data are used to track the overall progress toward site cleanup and to monitor potential off-site migration of contaminated groundwater. Cleanup progress is determined by comparing the measured contaminant concentrations of the environmental samples to specific target concentrations or action levels for CCL_4 and $CHCL_3$. The action levels, sampling points, and sampling frequency are listed in Table 1.

Annual System Operation/O&M Costs

Dates	Total Costs
Sept 1999 - Sept 2000	$38,714.77
Sept 2000 - Sept 2001	$15,443.01
Sept 2001 - Sept 2002	$19,283.24
Sept 2002 - Sept 2003	$ 4,868.64*
Sept 2003 - Sept 2004	$10,851.05

* Under review by USDA

V. Progress Since Last Five-Year Review

Groundwater

Sampling of designated wells has continued on a quarterly basis. As of October 1998 (1st Quarter FY 99) annual sampling of all wells, only monitoring well MW09 exceeded the action level (5.0 μg/L) for carbon tetrachloride at 8.4 μg/L. Chloroform was below the action level (3.8 μg/L) at all monitoring locations. In December 1998, the carbon tetrachloride concentration in monitoring well MW09 remained at 8.0 μg/L.

Monitoring well MW09 has continued to show contaminant levels above the Maximum Contaminant Levels (MCL) for carbon tetrachloride. Analytical results from sampling activities during the 2nd Quarter FY 2004 showed carbon tetrachloride concentrations at MW09 ranging from 8.5 μg/L to 12.5 μg/L. However, water samples collected from the SGWEX indicate that carbon tetrachloride and chloroform concentrations remain below the detection limit of 1.0 μg/L during 2nd Quarter FY 2004.

The EPA and the CCC/USDA identified a significant technical concern about the understanding of the contaminant distribution at Waverly. This concern stems from the continuing presence of carbon tetrachloride contamination in groundwater - at levels above the MCL - in the northeastern plume at MW09 and in the vicinity of the SGWEX, after 15 years of active remediation with the GWEX and the SGWEX extraction wells.

In the 4th Quarter FY 2004 the CCC/USDA submitted a work plan to address the areas of technical concern regarding the distribution and potential fate of the carbon tetrachloride contamination at the site. To date, the field work has been completed and a preliminary final report has been submitted to EPA. The final report for this field work has not been submitted.

Surface Water

The air stripping system falls under the National Pollutant Discharge Elimination System (NPDES) discharge limit, first established at 6.5 μg/L for carbon tetrachloride and 5.0 μg/L for chloroform and later revised to 6.35 μg/L for carbon tetrachloride and 5.0 μg/L for chloroform. Monthly compliance samples have been met throughout the history of the air stripper operation. Since April 1998, the SGWEX produces water that is below the NPDES discharge limits for carbon tetrachloride and chloroform. As a result the operation of the air stripper system was discontinued, with EPA approval, in 1999.

VI. Five-Year Review Process

Administrative Component

The Waverly Groundwater Contamination Site Five-Year Review was led by the RPM, of the EPA, Region VII. Aradhna Srivastav from the Nebraska Department of Environmental Quality assisted in the review as the representative for the support agency.

The Review components included:

- Community Involvement
- Document Review
- Data Review
- Site Inspection
- Interviews; and
- Five-Year Review Report Development and Review

Community Involvement

Activities to involve the community in the Five-Year Review were initiated with a meeting in late March 2004 between the RPM and the Community Involvement Coordinator (CIC) for the Waverly Groundwater Contamination Site. A notice was sent to two local newspapers and numerous local television and radio stations. A notice stating the same was sent to the local and state health departments, county commissioners, city council members, and other local and state officials. A fact sheet was also made available on the EPA's web site.

On September 30, 2004, a notice was sent to the same local and state office that received the initial notice of the five year review that announced that the Five-Year review report for the Waverly Groundwater Contamination Site was complete, and that the results of the review and report were available to the public at the Waverly City Hall and the EPA Region VII Record Center.

Document Review

This Five-Year Review consisted of a review of all relevant documents including O&M records and monitoring data (See Attachment 1). Applicable groundwater cleanup standards, as listed in the 1990 Record of Decision, were reviewed (See Table 1).

Data Review

Groundwater

The ERA systems originally included the GWEX and the SGWEX, and an air stripper for treating groundwater contamination, as well as a vapor extraction system for treating soil source contamination. These systems operated (1) to protect uncontaminated groundwater for future use by halting the migration of the plume of groundwater contaminated with carbon tetrachloride (CCL_4) and chloroform ($CHCL_3$) and (2) to restore the contaminated groundwater for future use as a source of drinking water by reducing the concentrations of contaminants to their respective performance criterion levels. Figure 2 shows the locations of the GWEX and the SGWEX, and associated monitoring wells at the Waverly site.

Action levels for carbon tetrachloride and chloroform were set at 5.0 μg/L and 3.8 μg/L respectively. The frequency of long-term monitoring for the monitoring wells was specified as quarterly if the results were above the action level, and otherwise annually while the extraction systems are in operation. The public supply system was also to be sampled on an annual basis. The groundwater extraction wells were to be sampled monthly during operation. Since its shutdown in April 1995, the GWEX has served as an additional monitoring well for the level of groundwater contamination at the former CCC/USDA site.

Since construction completion in 1988 all the contaminants for which groundwater cleanup levels have been established, have shown a marked trend downward in concentrations. The CCL_4 and $CHCL_3$ concentrations in all sampled monitoring wells were well below the action levels with the exception of CCL_4 levels in MW-9 that ranged from 5.0 μg/L to 12.5 μg/L.

Monitoring well MW-9 has continued to show contaminant levels above the MCL for CCL_4. Additional field work was conducted in the spring of 2004 to better understand the contaminant distribution at the Waverly site.

Monitoring of MW-9 should continue monthly, and all other monitoring wells should be sampled annually until one year after final shutdown of the SGWEX. Progress of the residual plume should be monitored quarterly along the road between MW-9 and the SGWEX until the concentrations of carbon tetrachloride and chloroform in the upper aquifer fall below the action levels after the SGWEX is shutdown.

Surface Water

The air stripping system falls under the NPDES discharge limit, first established at 6.95 μg/L for CCL_4 and 5.0 µg/L $CHCL_3$, and later revised to 6.35 μg/L for carbon tetrachloride and 5 μg/L for chloroform. Monthly compliance samples are collected at the point of discharge to the Salt Creek drainage. The action levels have been met throughout the history of the air stripper operation. At present the, the SGWEX produces water that is below the NPDES discharge limits for both carbon tetrachloride and chloroform, therefore the water does not require additional processing through the air stripper. As a result the air stripper is no longer needed.

Monthly grab samples are still collected from the outflow in the drainage ditch to the north of the process building. Input to the plant from the SGWEX is below both the NPDES action level and the MCL. Monthly sampling will continue until the SGWEX is shut down.

Soil

Action levels for soils were set at 1.1 mg/kg and 1.7 mg/kg for carbon tetrachloride and chloroform respectively (Table 1). Because the initial soil samples from the site were in compliance with the action levels, no additional soil sampling was required.

Soil Gas

The action level for soil gas was set at 6.5 $\mu g/m^3$ for combined carbon tetrachloride and chloroform in all soil gas monitoring wells and the VES well. The frequency of long-term monitoring was set at quarterly if results were above the action level; annually otherwise. The VES has been shut down since August 1993. As of December 1998 the soil gas concentrations were reported as 2,000 - 5,000 $\mu g/m^3$ for carbon tetrachloride and 100 - 200 $\mu g/m^3$ for chloroform.

The present levels of combined contaminants in soil gas exceed the action level, which was based on calculated health risks due to inhalation of soil vapors. However, according to USDA's *Draft Remedial Action Report,* because the contaminants in soil gas are heavier than air and occur at depth, in excess of 8ft, the inhalation pathway is unlikely to pose a significant risk to human health. The report also goes on to say that the major impact of residual soil contamination is that it continues to provide a source of groundwater contamination. Thus, a more realistic action level for the VES should perhaps be based on the steady-state soil gas concentration at which the contaminant flux to the groundwater does not result in groundwater concentrations higher than the action level.

For the Waverly site, USDA's contractor Argonne National Laboratory (ANL) recommended an action level of 50,000 $\mu g/m^3$ higher by an order of magnitude than current contaminant levels.

In 1995, the state of Nebraska recommended adopting a 5,000 $\mu g/m^3$ as the soil gas action level as this was the concentration in air in equilibrium with 5.0 $\mu g/L$ carbon tetrachloride in water. This approach was designed to protect the groundwater from infiltrating water in equilibrium with soil gas at 5,000 $\mu g/m^3$. However, this approach neglects the dilution attenuation factor (DAF) that is described in the 1996 EPA Soil Screening Guidance.

The EPA Region VII and the NDEQ are currently working on the soil gas compliance level.

Air

Combined VOC emissions from the VES and air stripper system were set at 0.0147 g/s (total carbon tetrachloride and chloroform), with long-term monitoring required at quarterly intervals while the system was in operation. Air emissions were calculated quarterly from March 1992 until the shutdown of the VES in 1993. During this period, the total air emissions decreased from 0.0007 to 0.0001 g/s, substantially below the allowed rate. The air emissions rate at the time of the ROD in March 1992 was 0.0011g/s.

Site Inspection

A site inspection was conducted on July 8, 2004 by the RPM and representatives from NDEQ, USDA, Argonne National Laboratory, and Tony's Cement Works, USDA's Operation & Maintenance contractor (See Attachment 3). The purpose of the inspection was to assess the protectiveness of the remedy, including the presence of fencing to restrict access, and the general condition of the facility.

Interviews

During the site inspection, the O&M contractor was interviewed. The Project Manager from USDA, Steve Gilmore was also interviewed through a course of several conversations. No significant problems regarding the site were identified during the interviews.

VII. Technical Assessment

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

The review of documents, Applicable and Relevant and Appropriate Requirements, risk assumptions, and the results of the site inspection indicate that the remedy is functioning as intended by the ROD.

There is a relatively small plume of carbon tetrachloride between MW9 and the SGWEX that is slowly migrating to the north. This plume was not detected earlier because monitoring wells along the plume route were sampled at incorrect depths.

The plume is located beneath 141st Street and is moving north. Due to its depth and direction of movement and that there are no potential receptors in the pathway; this plume presents minimal risk to health or the environment.

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

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

Changes in Standards and To Be Considered

As the remedial work has been completed, the ROD action level for soil gas has been reexamined and found to be based on incorrect data. A revised soil gas action level will be developed and appropriate documentation if any changes will be developed following CERCLA, the NCP and Superfund guidance.

Question 3: Has any other information come to light that could call into question the protectiveness of the remedy?

There has not been any information that calls into question the protectiveness of the remedy.

Technical Assessment Summary

Based on the data reviewed, the site inspection, and interviews, the remedy is functioning as intended in the ROD. There have been no changes at the site that would affect the protectiveness of the remedy. There is no other information that calls into question the protectiveness of the remedy.

VIII. Issues

Historic contamination migration within the upper sandy aquifer was not effectively represented by the long-term sampling in the existing network of permanent monitoring wells, which for the most part was screened above or below the critical zone. Recent results, using the cone penetrometer, reflect the contaminant migration pattern more accurately. This issue does not affect the current or future overall effectiveness or protectiveness of the remedy, but needs to be monitored on a scheduled basis.

IX. Recommendations and Follow-Up Actions

Maintain sampling of monitoring wells MW5, MW9, and install additional monitoring wells to sample groundwater in tracking the movement and concentration levels in the relatively small residual plume moving north along 141st Street.

X. Protectiveness Statement

The remedy at the Waverly Groundwater Contamination site currently protects human health and the environment because the compliance criteria outlined in the ROD have been met for air emissions, soil, and groundwater on site. The exceptions to this are the small plume of carbon tetrachloride under 141st Street between MW5 and the SGWEX, and level of soil gas. In order for the remedy to be protective in the long-term, these actions need to be taken to ensure long-term protectiveness is:

- Reconcile the methodology of determining ROD soil gas compliance level for carbon tetrachloride with current methods.
- Continue monitoring of monitoring wells MW5, MW9 and install additional monitoring wells to collect groundwater samples to track plume movement and to observe carbon tetrachloride concentration levels.

XI. Next Review

Because contaminants remain on site above compliance levels outlined in the ROD, and because of the need for additional monitoring, another Five-Year Review assessment will be necessary.

Figures

Figure 1

General Location of Waverly, Nebraska

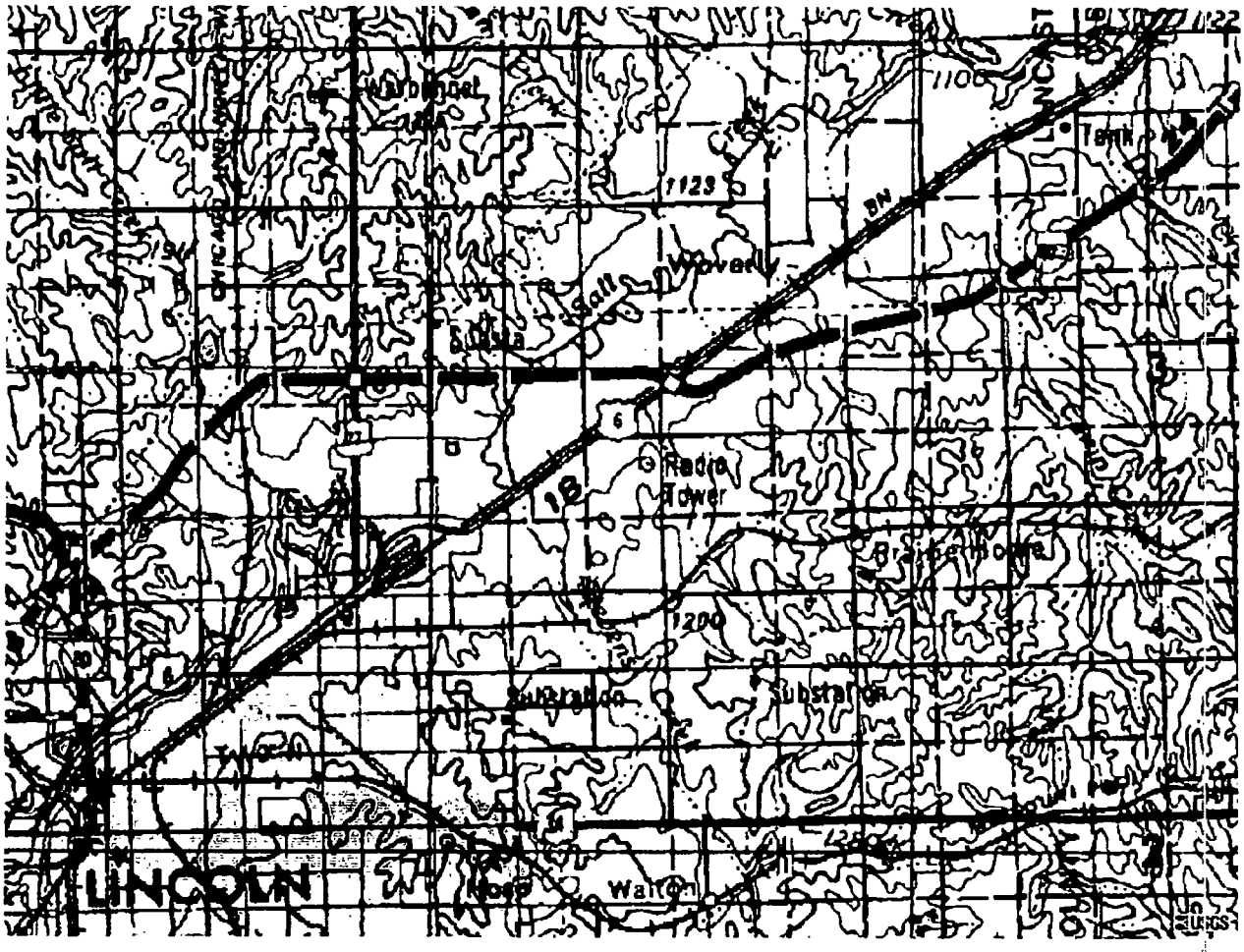


Figure 2

Location of Former CCC/USDA Storage Facility

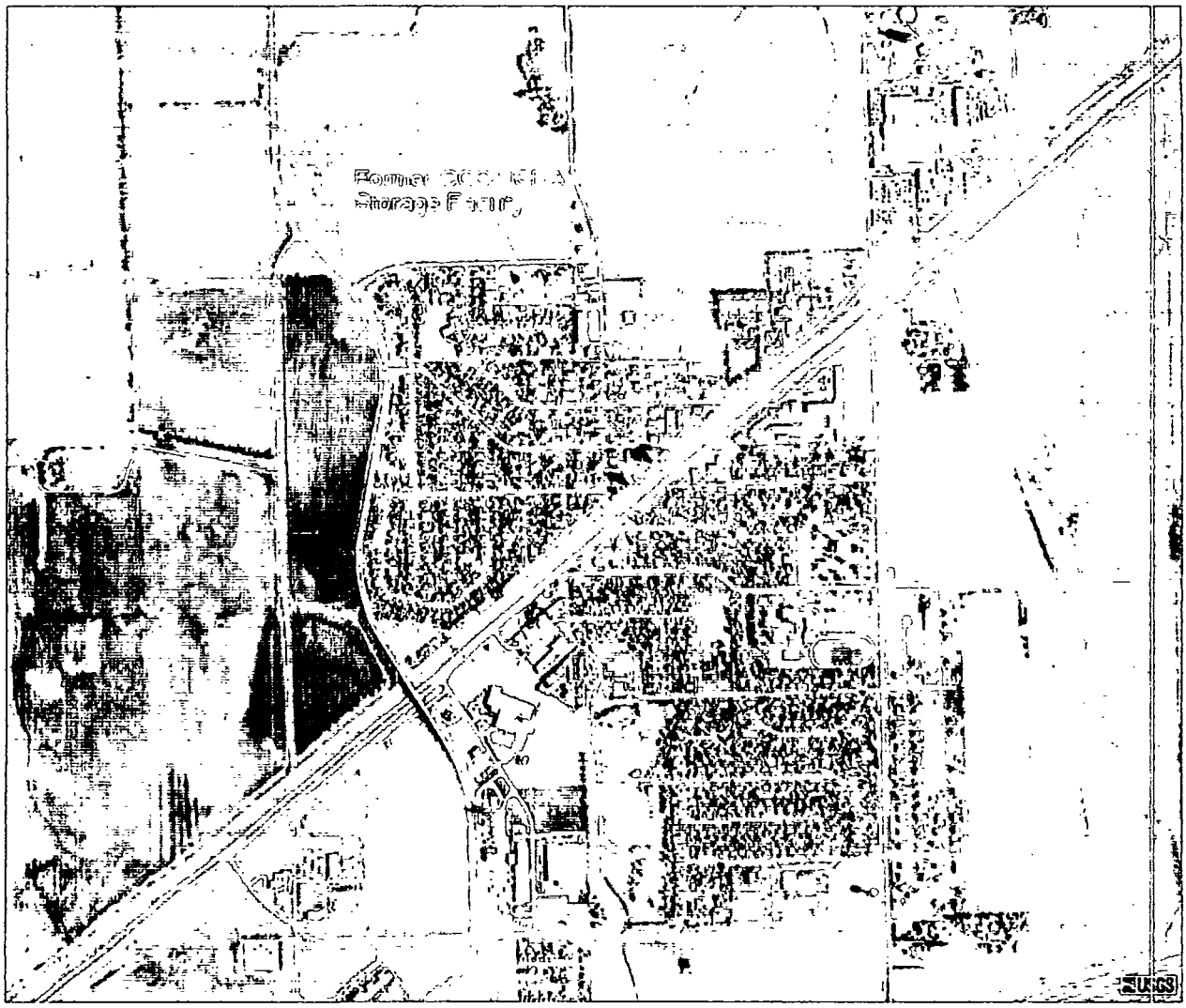
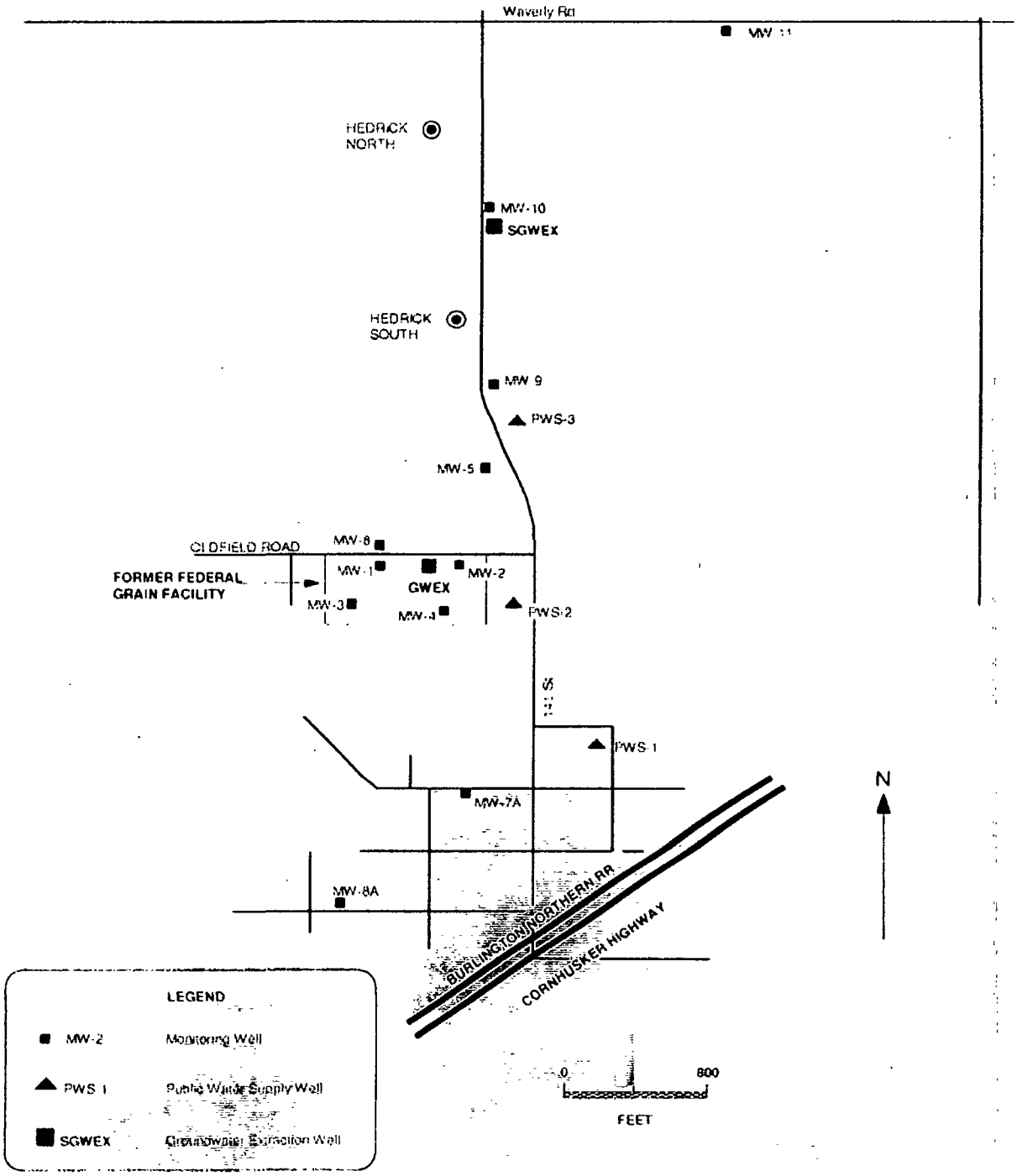


Figure 3

Monitoring Wells and Sampling Points



Tables

Table 1

Record of Decision
Compliance Points and Sampling Frequency

Media	Compliance Points	Action Level Carbon Tet.	Action Level Chloroform	Compliance Period
Air	Combined VOC emissions from VES and Air Stripper	0.147 g/s	-	During all operations
"	Ambient Air	1.25 $\mu g/m^3$ Above background	-	NA
Groundwater	All on-site monitoring wells (1-4)	5.0 $\mu g/L$	3.8 $\mu g/L$	1 year (4 events after GWEX wells are off)
Surface Water	Air Stripping System discharge	6.95 $\mu g/L$	5.0 $\mu g/L$	During all operations
Soil	Former Federal Grain Facility	1.1 mg/kg	1.7 mg/kg	NA
Soil Gas	SGMW 1-5 (A, B, & C) and all VES wells	6.5 $\mu g/m^3$	-	1 year (4 events)

Attachments

Attachment 1
List of Documents Reviewed

EPA Superfund Record of Decision: Waverly Groundwater Contamination Site, EPA ID NED 980862718, September 1990.

Final Work Plan: Expedited Remedial Action, Waverly Contaminated groundwater Site, Waverly, Nebraska, August, 1991.

Final Design Report for Modifications to the Waverly Groundwater Treatment System, Waverly, Nebraska, May, 1993.

Final Report: Second Performance Evaluation of the Waverly Remediation Systems, Expedited Response Action, Waverly, Nebraska, May 1999.

Record of Decision Site Investigation Report, Waverly, Nebraska, February 1992.

Second Quarter FY 2004 Groundwater Sampling Report, Expedited Response Action, Waverly, Nebraska, April 2004.

Supplement to ROD Decision Site Investigation Report, Waverly, Nebraska, July 1992.

Treatment Plant Facility Operations and Maintenance Manual for the Expedited Response Action, Waverly Groundwater Contamination Site, Waverly, Nebraska, February 1988.

Attachment 2

Site Inspection Checklist

I. SITE INFORMATION	
Site name: Waverly Groundwater Contamination Site	**Date of inspection:** 07/08/04
Location and Region: Waverly, Nebraska	**EPA ID: NED980862718**
Agency, office, or company leading the five-year review: EPA Region 7	**Weather/temperature:** Cloudy/75 degrees

Remedy Includes: (Check all that apply)

- ☐ Landfill cover/containment
- ☐ Access controls
- ☐ Institutional controls
- X Groundwater pump and treatment
- ☐ Surface water collection and treatment
- ☐ Other___Vapor Extraction System_____
- ☐ Monitored natural attenuation
- ☐ Groundwater containment
- ☐ Vertical barrier walls

Attachments: X Inspection team roster attached X Site map attached

II. INTERVIEWS (Check all that apply)

1. **O&M site manager** _Tony Rughe_____ __ Site Manager_____ 07/08/04
   Name Title Date
   Interviewed X at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

2. **O&M staff** _____ _____ _____
   Name Title Date
   Interviewed ☐ at site ☐ at office ☐ by phone Phone no. _____
   Problems, suggestions; ☐ Report attached _____

3. **Local regulatory authorities and response agencies** (i.e., State and Tribal offices, emergency response office, police department, office of public health or environmental health, zoning office, recorder of deeds, or other city and county offices, etc.) Fill in all that apply.

Agency _Nebraska Dept of Environmental Quality
Contact _Aradhna Srivastav_____ Program Specialist 07/08/2004 402-471-3388
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

Agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.
Problems; suggestions; ☐ Report attached _____

4. **Other interviews** (optional) ☐ Report attached.

III. ON-SITE DOCUMENTS & RECORDS VERIFIED (Check all that apply)

1. **O&M Documents**

X O&M manual	X Readily available	☐ Up to date	☐ N/A
☐ As-built drawings	☐ Readily available	☐ Up to date	☐ N/A
X Maintenance logs	X Readily available	☐ Up to date	☐ N/A

Remarks_____

2. **Site-Specific Health and Safety Plan** X Readily available ☐ Up to date ☐ N/A

☐ Contingency plan/emergency response plan	☐ Readily available	☐ Up to date	☐ N/A

Remarks_____

3. **O&M and OSHA Training Records** X Readily available ☐ Up to date ☐ N/A

Remarks_____

4. **Permits and Service Agreements**

X Air discharge permit	X Readily available	☐ Up to date	☐ N/A
X Effluent discharge	X Readily available	☐ Up to date	☐ N/A
☐ Waste disposal, POTW	☐ Readily available	☐ Up to date	☐ N/A
☐ Other permits_____	☐ Readily available	☐ Up to date	☐ N/A

Remarks_____

5. **Gas Generation Records** ☐ Readily available ☐ Up to date X N/A

Remarks_____

6. **Settlement Monument Records** ☐ Readily available ☐ Up to date X N/A

Remarks_____

7. **Groundwater Monitoring Records** ☐ Readily available ☐ Up to date X N/A

Remarks_____

8. **Leachate Extraction Records** ☐ Readily available ☐ Up to date X N/A

Remarks_____

9. **Discharge Compliance Records**

☐ Air	☐ Readily available	☐ Up to date	☐ N/A
X Water (effluent)	X Readily available	☐ Up to date	☐ N/A

Remarks_____

10. **Daily Access/Security Logs** ☐ Readily available X Up to date ☐ N/A

Remarks_____

IV. O&M COSTS

1. **O&M Organization**

☐ State in-house ☐ Contractor for State
☐ PRP in-house X Contractor for PRP
☐ Federal Facility in-house ☐ Contractor for Federal Facility
☐ Other_____

2. **O&M Cost Records**

X Readily available ☐ Up to date
☐ Funding mechanism/agreement in place
Original O&M cost estimate_____ ☐ Breakdown attached

Total annual cost by year for review period if available

From	Sept 1999 Date	To	Sept 2000 Date	$38,714.77 Total cost	☐ Breakdown attached
From	Sept 2000 Date	To	Sept 2001 Date	$15,443.01 Total cost	☐ Breakdown attached
From	Sept 2001 Date	To	Sept 2002 Date	$19,283.24 Total cost	☐ Breakdown attached
From	Sept 2002 Date	To	Sept 2003 Date	$ 4,868.64 Total cost	☐ Breakdown attached
From	Sept 2003 Date	To	Sept 2004 Date	$10,851.05 Total cost	☐ Breakdown attached

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons: _____

V. ACCESS AND INSTITUTIONAL CONTROLS X Applicable N/A

A. Fencing

1. **Fencing damaged** X Location shown on site map ☐ Gates secured ☐ N/A

Remarks_____

B. Other Access Restrictions

1. **Signs and other security measures** X Location shown on site map N/A

Remarks___Building housing system always seured_____

C. Institutional Controls (ICs)

1. **Implementation and enforcement**

Site conditions imply ICs not properly implemented ☐ Yes ☐ No X N/A
Site conditions imply ICs not being fully enforced ☐ Yes ☐ No X N/A

Type of monitoring (*e.g.*, self-reporting, drive by) _____
Frequency _____
Responsible party/agency _____
Contact _____ _____ _____ _____
Name Title Date Phone no.

Reporting is up-to-date ☐ Yes ☐ No X N/A
Reports are verified by the lead agency ☐ Yes ☐ No X N/A

Specific requirements in deed or decision documents have been met ☐ Yes ☐ No X N/A
Violations have been reported ☐ Yes ☐ No X N/A
Other problems or suggestions: ☐ Report attached

_____
_____
_____
_____

2. **Adequacy** ☐ ICs are adequate ☐ ICs are inadequate X N/A
Remarks_____
_____
_____

D. General

1. **Vandalism/trespassing** ☐ Location shown on site map X No vandalism evident
Remarks_____
_____

2. **Land use changes on site** X N/A
Remarks_____
_____

3. **Land use changes off site** X N/A
Remarks_____
_____

VI. GENERAL SITE CONDITIONS

A. Roads X Applicable ☐ N/A

1. **Roads damaged** ☐ Location shown on site map X Roads adequate ☐ N/A
Remarks_____
_____

B. Other Site Conditions

Remarks _____

_____

_____

_____

_____

_____

VII. LANDFILL COVERS ☐ Applicable X N/A

A. Landfill Surface

1. **Settlement** (Low spots) ☐ Location shown on site map ☐ Settlement not evident
   Areal extent_____ Depth_____
   Remarks_____

2. **Cracks** ☐ Location shown on site map ☐ Cracking not evident
   Lengths_____ Widths_____ Depths_____
   Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ Erosion not evident
   Areal extent_____ Depth_____
   Remarks_____

4. **Holes** ☐ Location shown on site map ☐ Holes not evident
   Areal extent_____ Depth_____
   Remarks_____

5. **Vegetative Cover** ☐ Grass ☐ Cover properly established ☐ No signs of stress
   ☐ Trees/Shrubs (indicate size and locations on a diagram)
   Remarks_____

6. **Alternative Cover (armored rock, concrete, etc.)** ☐ N/A
   Remarks_____

7. **Bulges** ☐ Location shown on site map ☐ Bulges not evident
   Areal extent_____ Height_____
   Remarks_____

8. **Wet Areas/Water Damage** ☐ Wet areas/water damage not evident
☐ Wet areas ☐ Location shown on site map Areal extent_____
☐ Ponding ☐ Location shown on site map Areal extent_____
☐ Seeps ☐ Location shown on site map Areal extent_____
☐ Soft subgrade ☐ Location shown on site map Areal extent_____
Remarks_____

9. **Slope Instability** ☐ Slides ☐ Location shown on site map ☐ No evidence of slope instability
Areal extent_____
Remarks_____

B. Benches ☐ Applicable X N/A
(Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)

1. **Flows Bypass Bench** ☐ Location shown on site map X N/A or okay
Remarks_____

2. **Bench Breached** ☐ Location shown on site map X N/A or okay
Remarks_____

3. **Bench Overtopped** ☐ Location shown on site map X N/A or okay
Remarks_____

C. Letdown Channels ☐ Applicable X N/A
(Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)

1. **Settlement** ☐ Location shown on site map ☐ No evidence of settlement
Areal extent_____ Depth_____
Remarks_____

2. **Material Degradation** ☐ Location shown on site map ☐ No evidence of degradation
Material type_____ Areal extent_____
Remarks_____

3. **Erosion** ☐ Location shown on site map ☐ No evidence of erosion
Areal extent_____ Depth_____
Remarks_____

4. **Undercutting** ☐ Location shown on site map ☐ No evidence of undercutting
Areal extent_____ Depth_____
Remarks_____

5. **Obstructions** Type_____ No obstructions
☐ Location shown on site map Areal extent_____
Size_____
Remarks_____

6. **Excessive Vegetative Growth** Type_____
☐ No evidence of excessive growth
☐ Vegetation in channels does not obstruct flow
☐ Location shown on site map Areal extent_____
Remarks_____

D. Cover Penetrations ☐ Applicable **X** N/A

1. **Gas Vents** ☐ Active ☐ Passive
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance
☐ N/A
Remarks_____

2. **Gas Monitoring Probes**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

3. **Monitoring Wells** (within surface area of landfill)
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

4. **Leachate Extraction Wells**
☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
☐ Evidence of leakage at penetration ☐ Needs Maintenance ☐ N/A
Remarks_____

5. **Settlement Monuments** ☐ Located ☐ Routinely surveyed ☐ N/A
Remarks_____

E. Gas Collection and Treatment ☐ Applicable ☐ N/A

1. **Gas Treatment Facilities**
   ☐ Flaring ☐ Thermal destruction ☐ Collection for reuse
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

2. **Gas Collection Wells, Manifolds and Piping**
   ☐ Good condition ☐ Needs Maintenance
   Remarks_____

3. **Gas Monitoring Facilities** (*e.g.*, gas monitoring of adjacent homes or buildings)
   ☐ Good condition ☐ Needs Maintenance ☐ N/A
   Remarks_____

F. Cover Drainage Layer ☐ Applicable **X** N/A

1. **Outlet Pipes Inspected** ☐ Functioning ☐ N/A
   Remarks_____

2. **Outlet Rock Inspected** ☐ Functioning ☐ N/A
   Remarks_____

G. Detention/Sedimentation Ponds ☐ Applicable **X** N/A

1. **Siltation** Areal extent_____ Depth_____ ☐ N/A
   ☐ Siltation not evident
   Remarks_____

2. **Erosion** Areal extent_____ Depth_____
   ☐ Erosion not evident
   Remarks_____

3. **Outlet Works** ☐ Functioning ☐ N/A
   Remarks_____

4. **Dam** ☐ Functioning ☐ N/A
   Remarks_____

H. Retaining Walls ☐ Applicable **X** N/A

1. **Deformations** ☐ Location shown on site map ☐ Deformation not evident
Horizontal displacement_____ Vertical displacement_____
Rotational displacement_____
Remarks_____

2. **Degradation** ☐ Location shown on site map ☐ Degradation not evident
Remarks_____

I. Perimeter Ditches/Off-Site Discharge **X** Applicable ☐ N/A

1. **Siltation** ☐ Location shown on site map **X** Siltation not evident
Areal extent_____ Depth_____
Remarks_____

2. **Vegetative Growth** ☐ Location shown on site map ☐ N/A
X Vegetation does not impede flow
Areal extent_____ Type_____
Remarks_____

3. **Erosion** ☐ Location shown on site map **X** Erosion not evident
Areal extent_____ Depth_____
Remarks_____

4. **Discharge Structure** **X** Functioning ☐ N/A
Remarks_____

VIII. VERTICAL BARRIER WALLS ☐ Applicable **X** N/A

1. **Settlement** ☐ Location shown on site map ☐ Settlement not evident
Areal extent_____ Depth_____
Remarks_____

2. **Performance Monitoring** Type of monitoring_____
☐ Performance not monitored
Frequency_____ ☐ Evidence of breaching
Head differential_____
Remarks_____

IX. GROUNDWATER/SURFACE WATER REMEDIES X Applicable ☐ N/A	
A. Groundwater Extraction Wells, Pumps, and Pipelines	X Applicable ☐ N/A
1.	**Pumps, Wellhead Plumbing, and Electrical** X Good condition ☐ All required wells properly operating ☐ Needs Maintenance ☐ N/A Remarks___The GWEX has been shut down (meets compliance), The SGWEX has low pumpage rate due to pump problems, but still functioning.___
2.	**Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition X Needs Maintenance Remarks__Extraction system not on line (compliance met)___
3.	**Spare Parts and Equipment** X Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks___
B. Surface Water Collection Structures, Pumps, and Pipelines	☐ Applicable X N/A
1.	**Collection Structures, Pumps, and Electrical** ☐ Good condition ☐ Needs Maintenance Remarks___
2.	**Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances** ☐ Good condition ☐ Needs Maintenance Remarks___
3.	**Spare Parts and Equipment** ☐ Readily available ☐ Good condition ☐ Requires upgrade ☐ Needs to be provided Remarks___

C. Treatment System X Applicable ☐ N/A

1. **Treatment Train** (Check components that apply)
   ☐ Metals removal ☐ Oil/water separation ☐ Bioremediation
   X Air stripping ☐ Carbon adsorbers
   ☐ Filters_____
   ☐ Additive (*e.g.*, chelation agent, flocculent)_____
   ☐ Others_____
   ☐ Good condition ☐ Needs Maintenance
   ☐ Sampling ports properly marked and functional
   ☐ Sampling/maintenance log displayed and up to date
   ☐ Equipment properly identified
   ☐ Quantity of groundwater treated annually_____
   ☐ Quantity of surface water treated annually_____
   Remarks__Air stripper system is off-line (in compliance)_____

2. **Electrical Enclosures and Panels** (properly rated and functional)
   ☐ N/A X Good condition ☐ Needs Maintenance
   Remarks_____

3. **Tanks, Vaults, Storage Vessels**
   ☐ N/A X Good condition ☐ Proper secondary containment ☐ Needs Maintenance
   Remarks_____

4. **Discharge Structure and Appurtenances**
   ☐ N/A X Good condition ☐ Needs Maintenance
   Remarks_____

5. **Treatment Building(s)**
   ☐ N/A X Good condition (esp. roof and doorways) ☐ Needs repair
   ☐ Chemicals and equipment properly stored
   Remarks_____

6. **Monitoring Wells** (pump and treatment remedy)
   ☐ Properly secured/locked ☐ Functioning X Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance ☐ N/A
   Remarks_____

D. Monitoring Data

1. Monitoring Data
   X Is routinely submitted on time ☐ Is of acceptable quality

2. Monitoring data suggests:
   ☐ Groundwater plume is effectively contained X Contaminant concentrations are declining

D. Monitored Natural Attenuation

1. **Monitoring Wells** (natural attenuation remedy)
   ☐ Properly secured/locked ☐ Functioning ☐ Routinely sampled ☐ Good condition
   ☐ All required wells located ☐ Needs Maintenance X N/A
   Remarks_____

X. OTHER REMEDIES

If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

The remedy in place has functioned as designed and has been effective in contaning the movement of the plume and removing contaminants from the groundwater. The continuing decline in contaminant concentrations has been shown in the quarterly monitoring reports.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

Since compliance has been met as set forth in the ROD the major components of the remedial system have been shut down. Therefore, over time the amount of O&M needed to maintain the system has also declined. However, the system is maintained to be protective of the environment.

Attachment 3

Site Visit/Inspection Personnel Roster

Jeff Field	EPA, Region 7	Remedial Project Manager
Aradhna Srivastav	Nebraska Department of Environmental Quality	Program Specialist
Steve Gilmore	U.S. Department of Agriculture	Program Specialist
Don Steck	U.S. Department of Agriculture	Program Specialist
Lorraine LaFreniere	Argonne National Laboratory	Section Head/Geologist
Bob Sedivy	Argonne National Laboratory	Hydrogeologist
Tony Rughe	TCW	O&M Site Manager