HRS DOCUMENTATION RECORD COVER SHEET

Name of Site: **Old HWY 275 and N 288th Street**

EPA ID No. NEN000704272

Contact Persons

Site Investigation: Jenna Mead / Tetra Tech, Inc.
Randy Schademann / EPA Region 7 On Scene Coordinator

Documentation Record: David Zimmermann / Tetra Tech, Inc.
Brian Mitchell / EPA Region 7 NPL Coordinator

Pathways, Components, or Threats Not Scored

The air and surface water migration, and soil exposure pathways were not scored as part of this Hazard Ranking System (HRS) evaluation. These pathways or components were not included because a release to these media does not significantly affect the overall site score and because the ground water migration pathway alone produces an overall site score well above the minimum required for the site to qualify for inclusion on the National Priorities List (NPL). These pathways are of concern to EPA and may be evaluated during future investigations.

HRS DOCUMENTATION RECORD

Name of Site:	Old HWY 275 and N 288th Street
Date Prepared:	September 2016
EPA Region:	7
Street Address of Site*:	The intersection of old U.S. Highway 275 (now Reichmuth Road) and North 288th Street represents the approximate center of the ground water plume.
City, County, State, Zip Code:	Valley, Douglas, Nebraska, 68064
General Location in the State:	Eastern Nebraska (Figure 1 of the documentation record)
Topographic Map:	Valley, Nebraska Quad (7.5') (Ref. 3, p.1) Leshara, Nebraska Quad (7.5') (Ref. 4, p. 1)
Latitude:	41° 19' 44.73" North
Longitude:	96° 22' 02.4" West
Ref:	5; Figure 1 of the documentation record

Pathway Scores	
Ground Water Migration Pathway	100.00
Surface Water Migration Pathway	Not Scored
Soil Exposure Pathway	Not Scored
Air Migration Pathway	Not Scored
HRS SITE SCORE	**50.00**

**The street address, coordinates, and contaminant locations presented in this HRS documentation record identify the general area the site is located. They represent one or more locations EPA considers to be part of the site based on the screening information EPA used to evaluate the site for NPL listing. EPA lists national priorities among the known "releases or threatened releases" of hazardous substances; thus, the focus is on the release, not precisely delineated boundaries. A site is defined as where a hazardous substance has been "deposited, stored, disposed, or placed, or has otherwise come to be located." Generally, HRS scoring and the subsequent listing of a release merely represent the initial determination that a certain area may need to be addressed under CERCLA. Accordingly, EPA contemplates that the preliminary description of facility boundaries at the time of scoring will be refined as more information is developed as to where the contamination has come to be located.*

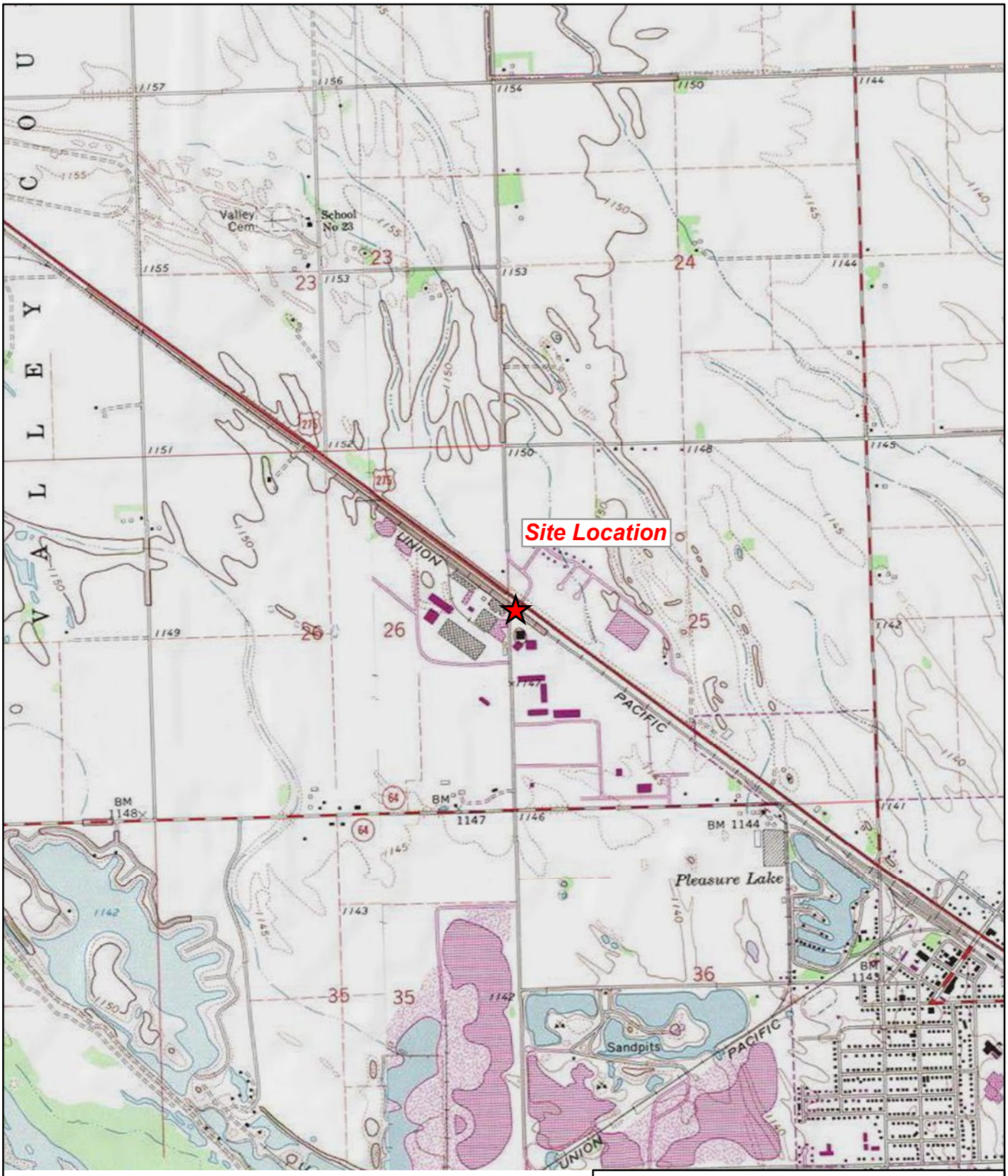
WORKSHEET FOR COMPUTING HRS SITE SCORE

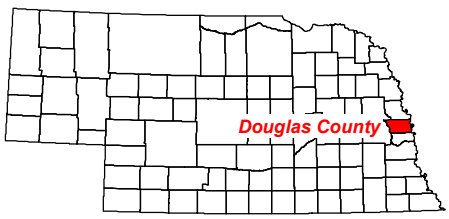
		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	100.00	10,000
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	Not Scored	Not Scored
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	Not Scored	Not Scored
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	Not Scored	Not Scored
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	Not Scored	Not Scored
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	Not Scored	Not Scored
5.	Total of $S_{gw}^2 + S_{sw}^2 + S_s^2 + S_a^2$		10,000
6.	**HRS Site Score** Divide the value on line 5 by 4 and take the square root	50.00	

HRS TABLE 3-1 – GROUND WATER MIGRATION PATHWAY SCORESHEET

Factor Categories and Factors	Maximum Value	Value Assigned
Likelihood of Release to an Aquifer:		
1. Observed Release	550	550
2. Potential to Release:		
2a. Containment	10	NE
2b. Net Precipitation	10	NE
2c. Depth to Aquifer	5	NE
2d. Travel Time	35	NE
2e. Potential to Release [lines 2a(2b + 2c + 2d)]	500	NE
3. Likelihood of Release (higher of lines 1 and 2e)	550	550
Waste Characteristics:		
4. Toxicity/Mobility	a	10,000
5. Hazardous Waste Quantity	a	100
6. Waste Characteristics	100	32
Targets:		
7. Nearest Well	50	50
8. Population:		
8a. Level I Concentrations	b	2,424.7
8b. Level II Concentrations	b	NS
8c. Potential Contamination	b	131.9
8d. Population (lines 8a + 8b + 8c)	b	2,556.6
9. Resources	5	5
10. Wellhead Protection Area	20	5
11. Targets (lines 7 + 8d + 9 + 10)	b	2,616.6
Ground Water Migration Score for an Aquifer:		
12. Aquifer Score [(lines 3 x 6 x 11)/82,500][c]	100	100.00
Ground Water Migration Pathway Score:		
13. Pathway Score (S_{gw}), (highest value from line 12 for all aquifers evaluated)	100	100.00

a Maximum value applies to waste characteristics category
b Maximum value not applicable
c Do not round to nearest integer
NE Not Evaluated





N

0 1,000 2,000

Feet

Source: Source of this map image is ESRI, used by the EPA with ESRI's permission.; Refs.; 3, 4

Old HWY 275 and 288th Street Site
Valley, Nebraska

Figure 1
Site Location Map

TETRA TECH

Date: 4/12/2016 Drawn By: Clayton Hayes Project No: X9025.16.0124

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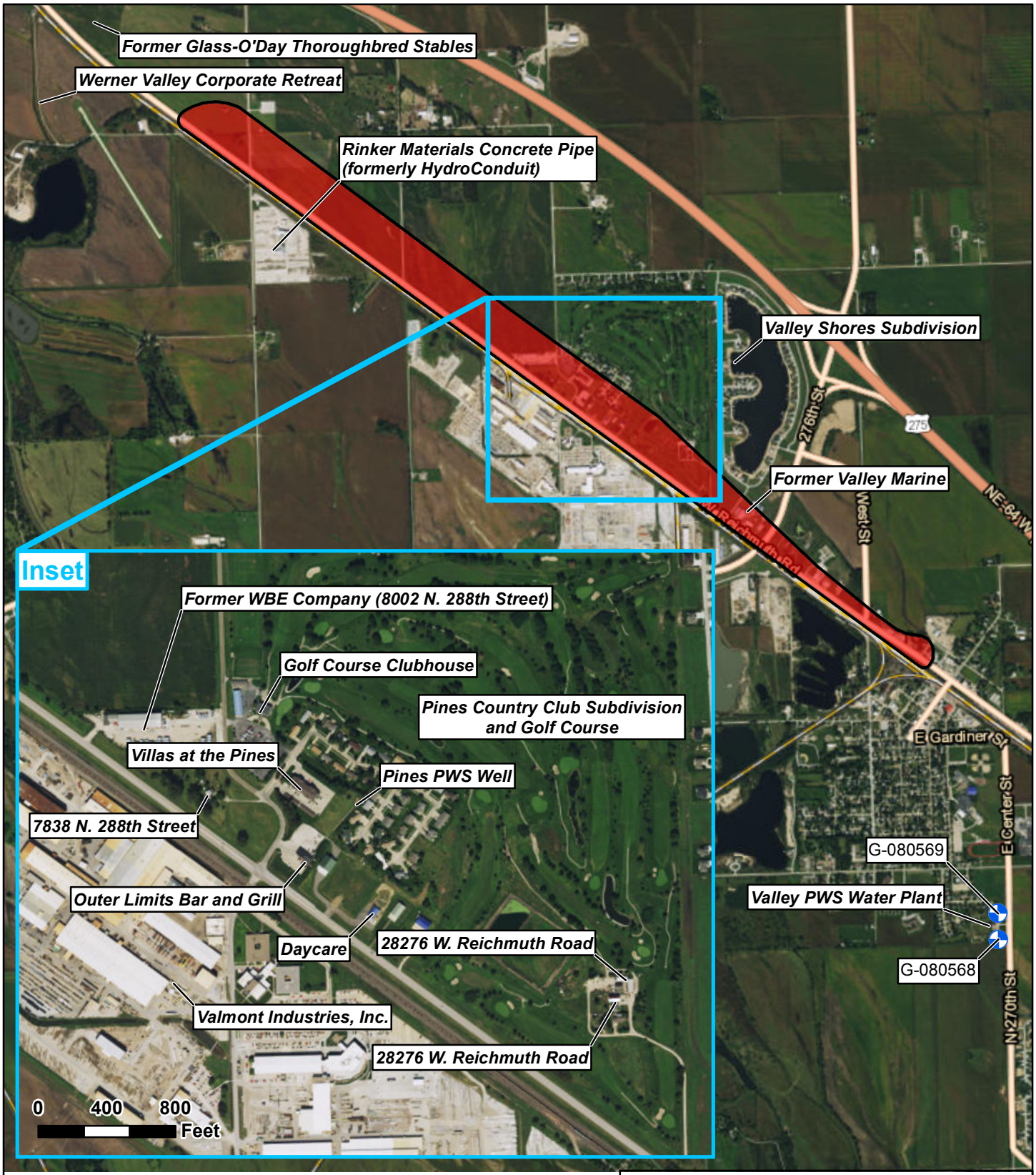

Legend

- Public water well location
- Approximate extent of 2015 TCE plume
- TCE Trichloroethene
- PWS Public water supply

N

0 1,200 2,400

Feet

Source: Source of this map image is ESRI, used by the EPA with with ESRI's permission.; Refs.; 7 p. 42; 8 p. 43

Old HWY 275 and 288th Street Site
Valley, Nebraska

Figure 2

Site Layout Map

TETRA TECH

Date: 4/12/2016 Drawn By: Clayton Hayes Project No: X9025.14.00124

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SITE SUMMARY

The Old HWY 275 and 288th Street site is near Valley, Douglas County, Nebraska. "Highway 275" refers to the current West Reichmuth Road or Old U.S. Highway 275. In about 2002, U.S. Highway 275 was realigned to pass northeast of the City of Valley, about 0.75 mile northeast of W. Reichmuth Road (see Figure 1 of this HRS documentation record). The site consists of a ground water plume containing volatile organic compounds (VOC), predominantly trichloroethylene (TCE), along W. Reichmuth Road (see Figure 2 of this HRS documentation record). This contamination has resulted in the closure of a public water supply well operated by the Pines Homeowners Association that served approximately 230 people at the time of closure and numerous private wells (Ref. 8, pp. 5, 9). EPA Region 7 conducted removal actions at the private wells that consisted of the installation of whole house water filtration systems (Ref. 17, pp. 5). As summarized below, numerous investigations have been conducted to identify the source of the VOC contamination; however, to date no source has been identified.

The VOC ground water plume was discovered by Valmont Industries (Valmont) in 2000 when ground water sampling performed as part of a Resource Conservation and Recovery Act (RCRA) closure investigation identified VOCs in two of Valmont's monitoring wells (Ref. 7, p. 10). Further investigation identified several nearby private drinking water wells contaminated with TCE at levels above the maximum contaminant level (MCL) of 5 micrograms per liter (µg/L) (Ref. 6, pp. 9-11). PCE and *cis*-1,2-dichloroethene (*cis*-1,2-DCE) were also detected in some of the private wells at concentrations below their MCLs of 5 µg/L and 70 µg/L, respectively (Ref. 7, p. 10-12).

The Nebraska Health and Human Services System (NHHSS) subsequently identified TCE (at levels below the MCL) in a public Water Supply (PWS) well for the Pines Homeowners Association, a small subdivision located northeast of Old U.S. Highway 275 and east of 288th Street (Refs. 6, pp. 293-306; 7, pp. 10-12).

Valmont's contractor, HDR Engineering, Inc. (HDR), of Omaha, Nebraska, investigated the VOC ground water plume in 2001 and 2002, and concluded that the VOC plume was not originating from Valmont's facility. This conclusion was based on the presence of VOCs crossgradient of the Valmont facility and upgradient of the production processes at Valmont (Refs. 8, p. 11; 23, pp. 9-10, 30-31). In addition, HDR concluded irrigation wells crossgradient of the Valmont facility were not influencing the ground water flow direction (Ref. 7, p. 10).

The site was entered into the Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS) in February 2002 with Identification (ID) Number NEN000704272 (Ref. 8, p. 5).

In June 2002, Tetra Tech conducted a Preliminary Assessment/Site Inspection (PA/SI) under contract with the Nebraska Department of Environmental Quality (NDEQ). The PA/SI concentrated on potential source areas at the Valmont and nearby Weichhorst Brothers Excavation Company (WBE) facilities. A direct push technology (DPT) apparatus was used to sample ground water from multiple depths at nine locations—including two samples intended to be background locations—along the Old U.S. Highway 275 corridor. A TCE concentration of 21 µg/L was detected in one background sample (GPW-BK2-50') collected from a depth of 50 feet below ground surface (bgs) north of Old U.S. Highway 275, about 1,000 feet upgradient of WBE (Ref. 6, pp. 40, 99, 346, 474). No VOCs were detected in the second background ground water sample, collected from the northwestern portion of Valmont, where the borrow pits were located. The PA/SI and subsequent Valmont investigations found the highest concentrations of TCE in ground water east of Valmont and south of WBE. In that area, a TCE concentration of 51 µg/L was reported in a ground water sample collected at a depth of 40 feet bgs. The TCE has generally been found at shallower depths in the northwest (upgradient) portion of the plume, presumably closer to the undefined source (Ref. 7, pp. 8, 10). Soils were sampled at potential source areas at Valmont and WBE and no chlorinated solvents were detected (Ref. 6, pp. 31, 96, 97, 308-316, 336-339, 344, 345, 347, 348, 355, 363, 375-426).

The extent of the VOC plume to the northwest, north, and southeast was not defined during these previous investigations (Refs. 6, p. 55; 23, p. 30). HDR identified low concentrations of TCE in ground water (2.3 µg/L at 50 feet bgs) at the northeast corner of the intersection of 294th Street and Old U.S. Highway 275, generally crossgradient of the northernmost edge of the Valmont property (Ref. 8. p. 11). In addition, low concentrations of VOCs were detected as far south as the intersection of Old U.S. Highway 275 and Ida Street (Nebraska Highway 64) (Ref. 8, p. 11). See Figure of 2 of this HRS documentation record for an overview of the site area.

In 2004 and 2005, EPA conducted a combined Removal Site Evaluation and Expanded Site Inspection (RSE/ESI). As part of this investigation, 10 soil samples were collected in October 2004 at suspected source locations. Six were on the Valmont property; two in the location of the former central drainage ditch and the remaining four in low lying areas along the highway railroad tracks and borrow pits to investigate the potential for release from a surface spill. The other four samples were along low lying areas of the old Highway 275 easement (Ref. 7, pp. 6, 13, 42). Samples were analyzed for VOCs and no chlorinated compounds were found (Ref. 7, pp. 13, 14, 290, 336-343). Additionally, Tetra Tech START on behalf of EPA collected ground water samples at multiple depths at 25 DPT locations, and from 34 private or PWS wells (including six irrigation wells). Access was not granted for sampling at WBE (Refs. 7, pp. 16-22; 8, p. 13). WBE indicated that its well was used only for commercial production, and that bottled water was used for drinking (Refs. 7, p. 16; 8, p. 13). The highest

TCE concentration detected in a drinking water well was 25 µg/L at 28272 W. Reichmuth Road. The neighboring private well at 28276 W. Reichmuth Road contained 21 µg/L of TCE, and the upgradient well at 7838 N. 288th Street contained 3.1 µg/L. The Pines PWS well contained 1.9 µg/L, which is similar to the TCE concentrations reported by NDHHS in 2003 and 2004 (Ref. 7, pp. 11, 12, 27-28).

No VOCs were detected in individual well samples collected from the Valley PWS wells in 2004 (Ref. 7, p. 27).

In June 2015, additional soil sampling was conducted by the removal program at the former WBE facility in an area where elevated ground water contamination was discovered (Ref. 8, pp. 7, 26, 37, 45). Two depths were sampled at 5 boring locations (Ref. 8, pp. 26, 45). No chlorinated VOCs were detected in any of the soil samples submitted for analysis (Ref. 8, pp. 31, 189-196).

2.2 SOURCE CHARACTERIZATION

2.2.1 SOURCE IDENTIFICATION

Name of source: Contaminated Ground Water Plume Number of source: 1

Source Type: Other – Ground Water Plume with No Identified Source

Description and Location of Source (with reference to a map of the site):

Source 1 consists of a contaminated ground water plume with no identified source to the northwest of the town of Valley, Nebraska (Ref. 7, pp. 6, 7, 41, 42; see also Figure 2 of this HRS documentation record). The plume extends southeast along the old U.S. Highway 275 corridor (Ref. 6, pp. 9, 15, 42-47). The chlorinated volatile organic plume (consisting primarily of trichloroethylene [TCE]), was discovered during Resource Conservation and Recovery Act (RCRA) related ground water monitoring at Valmont Industries Inc. (Valmont), which is a manufacturing facility of center pivot and linear-move irrigation systems (Ref. 6. pp. 9, 10, 15). TCE contamination was identified in 2001 in nearby public and private drinking water wells (Ref. 6, p. 9). Other facilities in the area that may have used solvents include Weikhorst Brothers Excavating Co. (WBE), and a maintenance shed for a golf course (Ref. 6, pp. 19, 20). Other manufacturing facilities include Hydroconduit, which manufactures concrete pipe and is located to the Northwest of Valmont (Ref. 6, p. 20). All of these businesses are shown on Figure 2 of this HRS documentation record. In addition, businesses and residences along the north side of old Highway 285 have historically relied on individual septic systems, which is another possible source of volatile organic compounds (VOCs) contamination in the ground water (Ref. 23, p. 9).

As documented below, despite initial concerns that Valmont might be contributing to TCE in the ground water, subsequent rounds of soil and ground water sampling after the initial discovery of the ground water plume and since the preliminary assessment/site inspection (PA/SI) have not documented a definitive source for the ground water contamination.

Valmont used chlorinated solvents in the past including TCE (Ref. 6, pp. 15-18). Facility records document the use of halogenated solvents in the 1980s and 1990s (Ref. 6, pp. 16 -19). According to Valmont, monitoring wells sampled at the facility did not contain halogenated compounds until first detected in July 1989 (Ref. 23, pp. 14-15). Subsequent sampling did not show halogenated compound detections in the ground water until June 1992 (Ref. 23, pp, 14-16). As part of the RCRA Facility Assessment (RFA) at Valmont, soil samples were collected in September 1990 from several potential source areas (Ref. 23, p. 18). Of all the soil samples collected, one

contained 1,2-dichloroethane at 97 µg/kg (Ref. 23, p. 18). This sample was collected near building 518, in the southeast portion of the Valmont property (Ref. 23, pp 18. 33). Sediment samples collected from the central drainage ditch by Valmont in 1990 did not contain VOCs (Ref. 23, p. 18). In October 1993, Valmont submitted a document requesting modifications to their ground water monitoring program, which included eliminating sampling for VOC, citing the infrequent detections and low concentrations encounter as well as a statistical analysis for their rational to discontinue the VOC analysis (Ref. 23, p. 14). NDEQ approved the demonstration and allowed Valmont to discontinue this portion of their sampling program (Ref. 23, p. 14).

The pre-remedial program of NDEQ concludes in the 2003 PA/SI that Valmont was a contributing source of the halogenated ground water contamination plume (Ref. 6, pp. 7, 54). The combined Preliminary Assessment/Site Inspection (PA/SI) report includes a summary table of all detected volatile organic compounds (VOC) and semi-volatile organic compounds (SVOC) in soil and sediment in 2002 (Ref. 6, pp 20-21, 275-280). TCE was not detected in any sample; however, the halogenated VOC tetrachloroethylene (PCE) was reported in two samples at concentrations of 54.3 micrograms per kilogram (µg/kg) and 24.1 µg/kg (Ref. 6, p. 280). Other halogenated VOCs reported in soil or sediment include *cis*-1,2 dichloroethylene (*cis*-1,2-DCE) in one sample at 6.4 µg/kg; 1,1,2,2-tetracholoethane in two samples (8.3 and 9.5 µg/kg); and carbon tetrachloride in three samples (14.7, 15, and 14.4 µg/kg) (Ref. 6, pp. 276, 277).

In an attempt to locate a source of the TCE contamination multiple rounds of ground water and soil samples were collected by NDEQ and EPA in 2002, 2004/2005 and 2015 as described below.

Soil Samples

Twenty four soil samples were collected in June 2002 as part of the NDEQ PA/SI (Ref. 6, pp. 25, 96). Eight sampling location were located at Valmont Industries, three locations were at WBE Construction Company and two were designated as background locations (Ref. 6, pp. 29-32). TCE was not detected in any of the soil samples (Ref. 6, pp. 97, 375-426). In October 2004, as part of the combined removal assessment and expanded site inspection, EPA sampled soils at 10 locations, two at the approximate location of a former drainage ditch at Valmont industries, and the remainder within low lying areas along the highway, railroad tracks and borrow pits (Ref. 7, pp. 13, 14, 42). No VOCs other than the common laboratory contaminants acetone and 2-butanone were reported in the ten soil samples (Ref. 7, pp. 14, 290, 336-343). In June of 2015, as part of a removal assessment, 10 soil samples were collected from five locations at the former WBE facility and analyzed for volatile organic compounds (Ref. 8, pp. 5, 26, 45). No chlorinated solvents were detected in these samples (Ref. 8, pp. 31, 183,

189-196). Currently no definitive source of the chlorinated solvent contaminated ground water has been identified (Ref. 8, pp. 215, 216).

Ground Water Samples

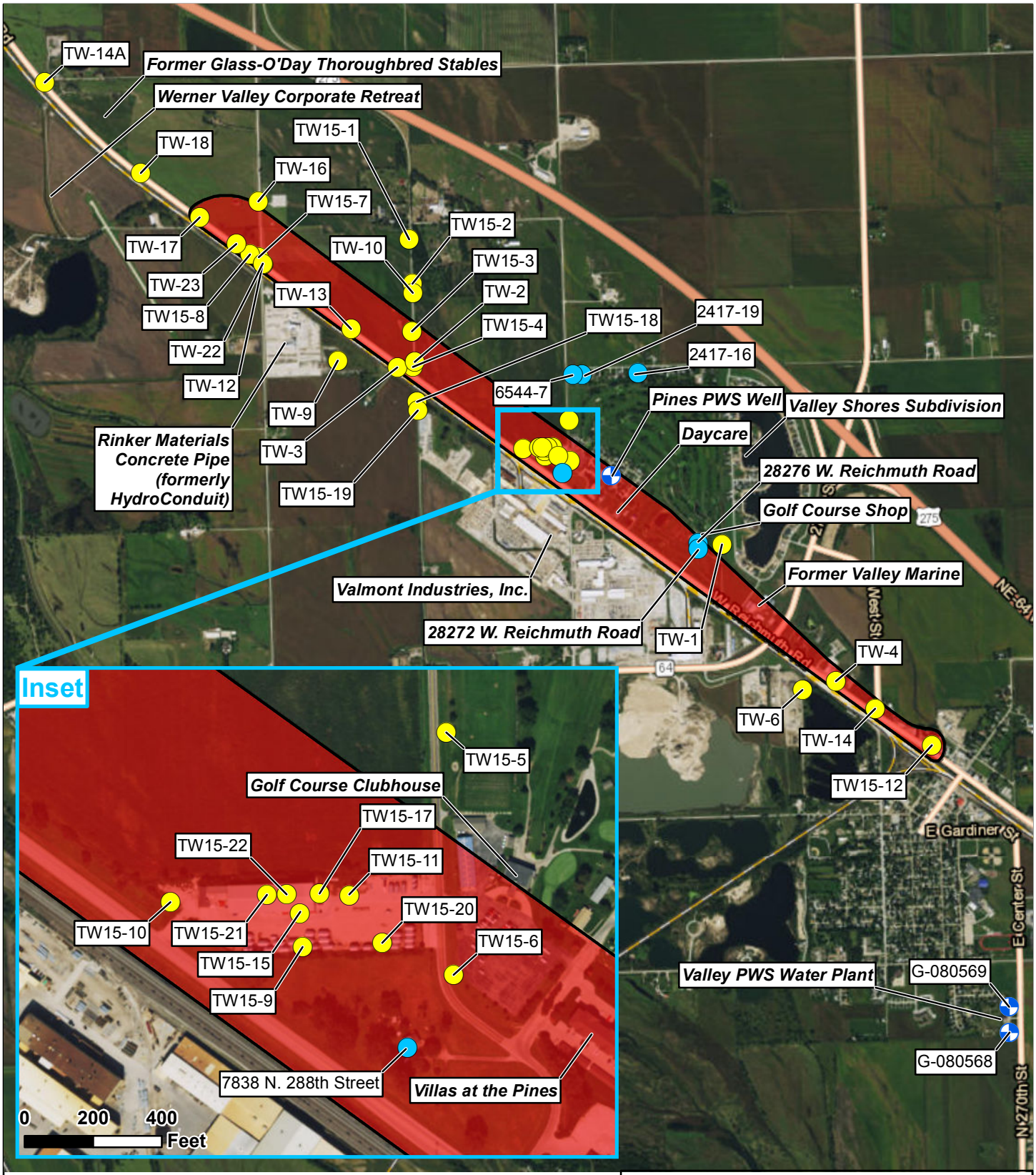
With each sampling activity, ground water sampling locations were placed farther upgradient and downgradient of Valmont in an attempt to delineate the full lateral extent of the TCE plume in ground water (Ref. 6, p. 40; 7, p. 42; 8, pp. 44, 45). The farthest upgradient detection is about 1,500 feet northwest of the intersection of Old Highway 275 and 300th Street (Ref. 7, pp. 35-36, 42; 8, p. 44).

However, in defining this source for HRS purposes, only data collected and analyzed by EPA is used (i.e., 2004 and 2015 data). As indicated in Reference 23, numerous ground water monitoring wells both on and off the Valmont Industries facility have contained TCE and other chlorinated compounds (Ref. 23, pp. 14-17, 21-24). This data as well as the data generated as part of the NDEQ PA/SI was not used primarily due to the age of the data. The approximate extent of the ground water plume is defined by direct push technology (DPT) installed temporary wells sampled over multiple investigations as well as three drinking water wells and a public water supply well (see Figure 3 of this HRS documentation record). All of the temporary wells that define the plume were sampled at multiple depths in the aquifer. In October 2004, 14 temporary wells (TW) were installed and sampled and in January 2005, 11 temporary wells were installed and sampled (Ref. 7, pp. 19-23). During both occasions, ground water samples were delivered to the EPA Regional laboratory for analysis of VOCs in water by gas chromatography/mass spectrometry (GC/MS) for low detection limits (Ref. 7, pp. 289, 294, 346, 347). As shown in section 2.2.2 of this documentation record, temporary wells TW-2, TW-3, TW-4, TW-12, TW-13, TW-14 installed and sampled in October 2004 contained chlorinated solvents at concentrations the meet observed release criteria. As shown in section 2.2.2 of this documentation record, temporary wells TW-16, TW-17, TW-22, and TW-23 installed and sampled in January-February 2005 contained chlorinated solvents at concentrations that meet observed release criteria (Refs. 7, pp. 19-26, 42; 8, p. 44).

In February and June 2015, 21 temporary wells were installed and sampled (Ref. 8, pp. 23-25). During both occasions, ground water samples were delivered to the EPA Regional laboratory for analysis of VOCs in water by GC/MS for low detection limits (Ref. 8, pp. 160, 161, 183, 184, 185). As shown in section 2.2.2 of this documentation record temporary wells TW-15-3, TW15-4, TW15-6, TW15-7, TW15-8, TW15-9, TW15-10, TW15-11, TW15-12, TW15-15 installed and sampled in February 2015 contained chlorinated solvents at concentrations that meet observed release criteria (Ref. 8, pp. 23, 24, 25, 45). As shown in section 2.2.2 of this

documentation record, temporary wells TW15-17, TW15-20, TW15-21 and TW15-22 installed and sampled in June 2015 contained chlorinated solvents at concentrations that meet observed release criteria (Ref. 8, pp. 23, 24, 25, 45).

Three privately owned domestic wells (7838 N. 288th Street, 28272 W. Reichmuth Road, and 28276 W. Reichmuth Road) and one former public water supply system well (Pines Country Club Homeowners Association) have also been sampled and shown to contain concentrations of chlorinated solvent that meet observed release criteria. All drinking water samples collected were delivered to the EPA Regional laboratory for analysis of VOCs in drinking water by GC/MS (Refs. 7, pp. 288, 293, 346, 347; 8, pp. 160, 161). These wells are also documented in section 2.2.2 of this documentation record. All of the wells mentioned above are displayed on Figure 3 of this HRS documentation record.



Legend

- Domestic well location
- Groundwater sample location
- Public water well location
- Approximate extent of 2015 TCE plume

PWS Public water supply

TCE Trichloroethene

N

0 1,200 2,400

Feet

Source: Source of map image is ESRI, used by the EPA with ESRI's permission.; Refs.; 7, p.42; 8 pp. 44,45

Old HWY 275 and 288th Street Site
Valley, Nebraska

Figure 3

Groundwater Sample Location Map

TETRA TECH

Date: 4/12/2016 Drawn By: Clayton Hayes Project No: X9025.16.0124

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2.2.2 HAZARDOUS SUBSTANCES ASSOCIATED WITH THE SOURCE

As documented below, ground water samples collected in 2004, 2005 and 2015 from DPT temporary wells, three private wells, and public water supply wells indicate the presence of PCE, TCE, *cis*-1,2-DCE, and vinyl chloride. These hazardous substances are synthetic chemicals (Refs. 20, p. 1; 21, p. 1). In the environment PCE can degrade to TCE, which can degrade to *cis*-1,2-DCE, which can degrade to vinyl chloride (Refs. 20, 21). Samples from these various types of wells are used to define the boundaries of source 1. All samples presented below and the associated data were generated through the EPA Region 7 laboratory and in accordance with site specific quality assurance project plans (Refs. 7, pp. 7, 22-23; 8, pp. 22, 24, 29). Reference 9 of this documentation record dictated sample collection, handling, analysis, and validation procedures for the removal site evaluation and expanded site inspection (RSE/ESI) activities in 2004 and 2005. For the 2015 investigation, References 10, 11, and 12 of this documentation record dictated sample collection, handling, analysis, and validation procedures for the follow up removal assessment conducted in 2015.

- Background Concentrations:

In October 2004, wells TW12 and TW13 were designated as background for samples analyzed under analytical services request (ASR) 2417 because they were the furthest upgradient of the known ground water plume (Ref. 7, pp. 42, 129-131). However, upon receipt of analytical data these locations were shown to be contaminated with TCE at one or more depth intervals sampled (Ref. 7, p. 25). Temporary well TW9, TW10, TW1 and TW6 were chosen to represent background conditions because they were north and south of the plume at the upper (northwest) and lower (southeast) ends of the plume and did not contain chlorinated solvents (Ref. 7, pp 19, 20, 25, 42). Domestic wells at 28711 State Street and 28505 State Street were selected to represent background conditions for the contaminated domestic wells because they were screened at different depths in the aquifer (Refs. 7, pp. 28, 42; 13, pp. 1, 11-13, 14-15, 16-17). The state database for the well at 28505 State Street has an address of 802 South Valley View Street (Ref. 13, p. 1); however, the well owner, location and latitude and longitude description on the registration form indicates the well is at 28505 State Street (Ref. 13, p. 16). The Pines County Club Homeowners association public water supply well is screened from 77.7 to 98 feet below ground surface (Ref. 7, pp. 366, 367), and was compared to the deep domestic well at 28711 State Street (Ref. 7, p. 28).

In January and February 2005, 11 additional temporary well were sample upgradient of the known area of ground water contamination (Ref. 7, pp. 21, 22). These locations are not on the Figure 2 of the RSE/ESI report (Ref. 7, p.

42) but do show on subsequent report figures (Ref. 8, p. 44). Temporary wells TW14A and TW18 were chosen as background for samples analyzed under ASR 2515 in January/February 2005 because they are both northeast (upgradient) of plume (Refs. 7, pp. 21, 344, 346; 8, p. 44). The domestic well sampled in February 2015 at 28721 State Street (sample number 6544-7) was selected as background for comparison to the private wells sampled on Reichmuth Road (Refs. 8, pp. 23, 45).

DPT ground water samples were collected within multiple intervals at 15 locations in February 2015 under ASR 6544, and at an additional 6 locations in June 2015 under ASR 6814 (Ref 8, pp. 23-25). The February locations were designed to identify a possible source area and evaluate the current extent of the ground water plume (Ref. 8, p. 23). The June locations were mainly at the former WBE facility (where the highest historical TCE concentrations had been detected), or southwest of W. Reichmuth Road at about N. 294th Street to define the plume edge (Ref. 8, pp. 23, 25). Of the samples collected in February, locations TW-15-1, TW15-2, and TW15-5 were selected as background. In June TW15-18 and TW15-19 were selected as background.

These background locations were collected in the same time period, by the same sampling technique, at about the same depths, and were analyzed using the same methods as the source samples.

Location Sample Identification	**Sample Depth***	**Date**	**Hazardous Substance**	**Results (µg/L)**	**Reporting Limit (µg/L)[1]**	**Reference**
PRIVATE WELLS						
28711 State St. 2417-19	85-95	10/13/2004	PCE TCE *cis*-1,2-DCE VC	0.50 U 0.50 U 0.50 U 0.50 U	0.50 0.50 0.50 0.50	7, pp. 18, 90, 288, 303, 304; 13, pp. 1, 14-15; 14, pp. 28, 29
28505 State St. 2417-16	47-57	10/13/2004	PCE TCE *cis*-1,2-DCE VC	0.50 U 0.50 U 0.50 U 0.50 U	0.50 0.50 0.50 0.50	7, pp. 18, 87, 288, 301, 302; 13, pp. 1, 16-17; 14, p. 24
28721 State St. 6544-7	36-46	2/19/2015	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 102, 160, 165, 166; 13, pp. 1, 11-13; 16, pp. 9, 10
TEMPORARY WELLS						
2417-119 (TW-9)	44-48	10/13/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 123, 162, 289, 321, 322; 14, pp. 69, 70
2417-120 (TW-9)	32-36	10/13/2004	PCE TCE	0.50 U 0.50 U	0.50 0.50	7, pp. 124, 162, 289, 323, 324; 14, p. 71

Location Sample Identification	Sample Depth*	Date	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	Reference
			cis-1,2-DCE	0.50 U	0.50	
2417-121 (TW-10)	44-48	10/13/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 125, 162, 289, 323, 324; 14, p. 72
2417-122 (TW-10)	32-36	10/13/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 126, 162, 289, 323, 324; 14, p. 73
2417-103 (TW-1)	56-60	10/12/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 107, 162, 289, 313, 314; 14, p. 52
2417-104 (TW-1)	44-48	10/12/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 108, 162, 289,315, 316; 14, p. 53
2417-113 (TW-6)	56-60	10/12/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 117, 162, 289, 319, 320; 14, p. 63
2417-114 (TW-6)	44-48	10/12/2004	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 118, 162, 289, 319, 320; 14, p. 64
2515-205 (TW-14A)	16-20	1/31/2005	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 21, 177, 199, 346, 353, 354; 15, p. 14
2515-204 (TW-14A)	32-36	1/31/2005	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 21, 176, 199, 346, 353, 354; 15, p. 13
2515-206 (TW-18)	32-36	1/31/2005	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 178, 199, 346, 353, 354; 15, p. 16
2515-207 (TW-18)	16-20	1/31/2005	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 179, 199, 346, 355, 356; 15, p. 17
6544-102 (TW15-1)	12-16	2/16/2015	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 45, 71, 81, 160, 168, 169; 16, p. 16
6544-103 (TW15-2)	20-24	2/16/2015	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 45, 71, 82, 160, 170; 16, p. 17
6544-106 (TW-15-5)	32-36	2/17/2015	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 45, 71, 85, 160, 170; 16, p. 21
6814-208 (TW15-18)	10-14	6/9/2015	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 136, 183, 200; 18, pp. 21, 22
6814-207 (TW15-18)	16-20		TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 135, 183, 198; 18, pp. 20, 21
6814-206 (TW15-18)	31-35		TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 134, 183, 198; 18, pp. 19, 20
6814-205 (TW15-18)	46-50		TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 133, 183, 198; 18, pp. 18, 19
6814-212	10-14	6/9/2015	TCE	0.5 U	0.5	8, pp. 25, 45, 106, 140,

Location Sample Identification	Sample Depth*	Date	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	Reference
(TW15-19)			*cis*-1,2-DCE	0.5 U	0.5	183, 202; 18, p. 25
6814-211 (TW15-19)	16-20		TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 139, 183, 200; 18, p. 24
6814-210 (TW15-19)	31-35		TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 138, 183, 200; 18, p. 23
6814-209 (TW15-19)	46-45		TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 137, 183, 200; 18, p. 22

Notes:

* All sample depths are in feet below ground surface

1 The reporting limit is the laboratory reporting limit with any dilution factor, volume adjustment, or percent solids for each sample taken into account and is equivalent to the SQL as defined in the HRS (Refs. 1, Section 1.1; 14, p. 1; 15, p. 1; 16, p. 1; 18, p. 1).

µg/L micrograms per liter
DCE Dichloroethylene
PCE Tetrachloroethene
TCE Trichloroethene
U The analyte was not detected at or above the reporting limit.
VC Vinyl chloride

- Source Samples:

Location Sample Identification	Sample Depth	Date	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L) [1]	Reference
PRIVATE WELLS						
7838 N. 288th St. 2417-11	unknown	10/12/2004	TCE *cis*-1,2-DCE	3.1 1.7	0.50 0.50	8, p. 44; 7, pp. 82, 163, 288, 299, 300; 14, p.16
2658-2		7/27/2005	TCE *cis*-1,2-DCE	3.5 1.4	0.50 0.50	17, pp. 6, 15, 22, 34, 38, 41, 42; 19, p. 4
28272 W. Reichmuth Rd. 2417-8	unknown	10/12/2004	PCE TCE *cis*-1,2-DCE	1.4 25 11	0.50 0.50 0.50	8, p. 44; 7, pp. 79, 163, 288, 297, 298; 14, p. 12
2658-7		7/27/2005	PCE TCE *cis*-1,2-DCE	1.7 31 9.9	0.50 0.50 0.50	17, pp. 6, 15, 27, 34, 38, 43, 44; 19, p. 11
6544-2		2/18/2015	TCE	1.8	0.50	8, pp. 45, 71, 74, 160, 164 ; 16, p. 3
28276 W. Reichmuth Rd. 2417-10	unknown	10/12/2004	PCE TCE VC	1 21 0.51	0.50 0.50 0.50	7, pp. 81, 163, 288, 299, 300; 14, p.15
6544-5		2/18/2015	TCE *cis*-1,2-DCE	2.9 0.58	0.50 0.50	8, pp. 45, 71, 77, 160, 165, 166; 16, p. 7
2417-1 Pines PWS	77.7-98	10/12/2004	TCE *cis*-1,2-DCE	1.9 1.2	0.50 0.50	7, pp. 72, 162, 288, 295, 296, 366, 367; 14, p. 2

Location Sample Identification	Sample Depth	Date	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L) [1]	Reference
2004 TEMPORARY WELLS						
2417-105 (TW-2)	44-48	10/12/2004	TCE	4.5	0.50	8, p. 44; 7, pp. 109, 162, 289, 316; 14, p. 54
2417-106 (TW-2)	32-36	10/12/2004	TCE	3.6	0.50	8, p. 44; 7, pp. 110, 162, 289, 316; 14, p. 55
2417-107 (TW-3)	44-48	10/12/2004	TCE	0.51	0.50	8, p. 44; 7, pp. 111, 162, 289, 316; 14, p. 56
2417-110 (TW-4)	44-48	10/12/2004	PCE TCE	0.72 2.3	0.50 0.50	8, p. 44; 7, pp. 114, 162, 289, 317, 318; 14, pp. 59, 60
2417-125 (TW-12)	44-48	10/14/2004	*cis*-1,2-DCE TCE	1.7 6.5	0.50 0.50	8, p. 44; 7, pp. 129, 165, 289, 325, 326; 14, p. 76
2417-126 (TW-12)	32-36	10/14/2004	*cis*-1,2-DCE TCE	5.7 24	0.50 0.50	8, p. 44; 7, pp. 130, 165, 289, 325, 326; 14, p. 77
2417-127 (TW-13)	56-60	10/14/2004	*cis*-1,2-DCE	0.59	0.50	7, pp. 131, 165, 289, 325; 14, p. 78
2417-128 (TW-13)	44-48	10/14/2004	*cis*-1,2-DCE TCE	0.96 0.67	0.50 0.50	8, p. 44; 7, pp. 132, 165, 289, 327, 328; 14, p. 79
2417-129 (TW-13)	32-36	10/14/2004	*cis*-1,2-DCE	0.66	0.50	8, p. 44; 7, pp. 133, 165, 289, 327; 14, p. 80
2417-130 (TW-14)	56-60	10/14/2004	*cis*-1,2-DCE TCE	0.81 0.62	0.50 0.50	8, p. 44; 7, pp. 134, 165, 289, 327, 328; 14, pp. 81, 82
2005 TEMPORARY WELLS						
2515-213 (TW-16)	16-20	2/01/2005	TCE	0.8	0.50	8, p. 44; 7, pp. 185, 199, 346, 358; 15, p. 23
2515-215 (TW-17)	16-20	2/01/2005	TCE	14	0.50	8, p. 44; 7, pp. 187, 199, 346, 360; 15, p. 25
2515-221 (TW-22)	16-20	2/01/2005	TCE	0.89	0.50	8, p. 44; 7, pp. 193, 199, 346, 362; 15, p. 32
2515-223 (TW-23)	16-20	2/02/2005	*cis*-1,2-DCE TCE	0.93 1.7	0.50 0.50	8, p. 44; 7, pp. 195, 199, 346, 363, 364; 15, p. 34
FEBRUARY 2015 TEMPORARY WELLS						
6544-104 (TW15-3)	8-12	02/16/2015	TCE	2.5	0.5	8, pp. 45, 71, 83, 160, 170; 16, p. 18

Location Sample Identification	Sample Depth	Date	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L) [1]	Reference
6544-105 (TW15-4)	32-36	02/16/2015	TCE *cis*-1,2-DCE	45 8.8	0.5 0.5	8, pp. 45, 71, 84, 160, 170; 16, p. 20
6544-107 (TW15-6)	20-24	02/17/2015	TCE *cis*-1,2-DCE	35 0.53	0.5 0.5	8, pp. 45, 71, 86, 160, 172; 16, p. 22
6544-108 (TW15-7)	32-36	02/17/2015	TCE *cis*-1,2-DCE	18 4.6	0.5 0.5	8, pp. 45, 71, 87, 160, 172; 16, p. 23
6544-109 (TW15-8)	20-24	02/17/2015	TCE *cis*-1,2-DCE	8.5 2.4	0.5 0.5	8, pp. 45, 71, 88, 160, 172, 16, pp. 24, 25
6544-110 (TW15-9)	20-24	02/17/2015	TCE	20	0.5	8, pp. 45, 71, 89, 160, 172; 16, p. 26
6544-111 (TW15-10)	32-36	02/17/2015	TCE	7.9	0.5	8, pp. 45, 71, 90, 160, 174; 16, p. 27
6544-113 (TW15-11)	20-24	02/17/2015	TCE *cis*-1,2-DCE	68 0.75	0.5 0.5	8, pp. 45, 71, 92, 160, 174; 16, p. 29
6544-112 (TW15-11)	32-36	02/17/2015	TCE *cis*-1,2-DCE	150 1.3	0.5 0.5	8, pp. 45, 71, 91, 160, 174; 16, p. 28
6544-114 (TW15-12)	48-52	02/17/2015	TCE *cis*-1,2-DCE	2.6 2	0.5 0.5	8, pp. 45, 71, 93, 160, 174; 16, p. 30
6544-119 (TW15-15)	31-35	02/18/2015	TCE *cis*-1,2-DCE	85 1.1	0.5 0.5	8, pp. 45, 72, 98, 160, 178; 16, pp. 35, 36
6544-118 (TW15-15)	47-51	02/18/2015	TCE	18	0.5	8, pp. 45, 72, 97, 160, 176; 16, p. 34
6544-117 (TW15-15)	63-67	02/18/2015	TCE *cis*-1,2-DCE	20 0.52	0.5 0.5	8, pp. 45, 72, 96, 160, 176; 16, p. 33
JUNE 2015 TEMPORARY WELLS						
6814-204 (TW15-17)	12-16	06/09/2015	TCE	1.8	0.5	8, pp. 25, 45, 106, 132, 183, 198; 18, p. 17
6814-203 (TW15-17)	16-20	06/09/2015	TCE	11	0.5	8, pp. 25, 45, 106, 131, 183, 197; 18, p. 16
6814-202 (TW15-17)	31-35	06/09/2015	TCE *cis*-1,2-DCE	84 1.1	5 0.5	8, pp. 25, 45, 106, 130, 183, 196, 197; 18, pp. 14, 15
6814-201 (TW15-17)	46-50	06/09/2015	TCE *cis*-1,2-DCE	58 1	2.5 0.5	8, pp. 25, 45, 106, 129, 183, 196, 197; 18, p. 13
6814-218 (TW15-20)	10-14	06/10/2015	TCE	5.3	0.5	8, pp. 25, 45, 106, 146, 183, 204; 18, p. 33
6814-217 (TW15-20)	16-20	06/10/2015	TCE *cis*-1,2-DCE	36 0.6	2 0.5	8, pp. 25, 45, 106, 145, 183, 204; 18, p. 32
6814-216 (TW15-20)	31-35	06/10/2015	TCE *cis*-1,2-DCE	72 1.2	4 0.5	8, pp. 25, 45, 106, 144, 183, 204; 18, p. 31

Location Sample Identification	Sample Depth	Date	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L) [1]	Reference
6814-215 (TW15-20)	46-50	06/10/2015	TCE *cis*-1,2-DCE	29 0.91	2 0.5	8, pp. 25, 45, 106, 143, 183, 202; 18, pp. 29, 30
6814-224 (TW15-21)	10-14	06/10/2015	TCE	3.6	0.5	8, pp. 25, 45, 106, 151, 184, 206; 18, p. 38
6814-223 (TW15-21)	16-20	06/10/2015	*cis*-1,2-DCE	0.69	0.5	8, pp. 25, 45, 106, 150, 184, 206; 18, p. 37
6814-220 (TW15-21)	31-35	06/10/2015	TCE *cis*-1,2-DCE	89 1.7	0.5 0.5	8, pp. 25, 45, 106, 148, 183, 206; 18, p. 35
6814-219 (TW15-21)	46-50	06/10/2015	TCE *cis*-1,2-DCE	51 1.3	0.5 0.5	8, pp. 25, 45, 106, 147, 183, 204; 18, p. 34
6814-228 (TW15-22)	10-14	06/10/2015	TCE	2.3	0.5	8, pp. 25, 45, 107, 154, 184, 208; 18, p. 43
6814-227 (TW15-22)	16-20	06/10/2015	TCE	29	0.5	8, pp. 25, 45, 56, 107, 184, 208; 18, p. 42
6814-226 (TW15-22)	31-35	06/10/2015	TCE *cis*-1,2-DCE	69 1.3	0.5 0.5	8, pp. 25, 45, 107, 153, 184, 208; 18, pp. 40, 41
6814-225 (TW15-22)	46-50	06/10/2015	TCE *cis*-1,2-DCE	54 1.2	0.5 0.5	8, pp. 25, 45, 106, 152, 184, 208; 18, p. 39

Notes:
Sample depths are feet below ground surface.

1 The reporting limit is the laboratory reporting limit with any dilution factor, volume adjustment, or percent solids for each sample taken into account and is equivalent to the SQL as defined in the HRS (Refs. 1, Section 1.1; 14, p. 1; 15, p. 1; 16, p. 1; 18, p. 1).

µg/L micrograms per liter
DCE Dichloroethylene
PCE Tetrachloroethene
TCE Trichloroethene
U The analyte was not detected at or above the reporting limit.
VC Vinyl chloride

2.2.3 HAZARDOUS SUBSTANCES AVAILABLE TO A PATHWAY

Samples collected from Source No. 1 contained PCE, TCE, *cis*-1,2-DCE and vinyl chloride (see section 2.2.2 of this HRS documentation record). Source No. 1 consists of a contaminated ground water plume with no identified source to the northwest of the city of Valley (see section 2.2.1 of this HRS documentation record). Analytical results for ground water samples collected from temporary monitoring wells and domestic wells, as well as the former Pines Public Water Supply well, indicate that a release of hazardous substances has occurred to the ground water migration pathway as documented in Section 3.1.1 of this HRS documentation record. Because an observed release by chemical analysis has been documented demonstrating that hazardous substances have migrated to the regional aquifer, a containment factor value of 10, as indicated below, was assigned for the ground water migration pathway (Ref. 1, Section 3.1.2.1, Table 3-2).

Containment Description	**Containment Factor Value**	**References**
Gas release to air:	NS	NA
Particulate release to air:	NS	NA
Release to ground water: The Containment Factor Value for the ground water migration pathway was evaluated for "All Sources" for evidence of hazardous substance migration from source area. Ground water samples from multiple wells provide evidence that the hazardous substances trichloroethylene, *cis*-1,2-dichloroethylene, tetrachloroethylene and vinyl chloride have migrated to the regional aquifer.	10	1, Section 3.1.2.1, Table 3-2; see also Section 3.1.1 of this HRS documentation record.
Release via overland migration and/or flood:	NS	NA

Notes:

NS Not Scored
NA Not Applicable

2.4.2 HAZARDOUS WASTE QUANTITY

Insufficient information exists to evaluate hazardous constituent quantity and hazardous wastestream quantity. Additionally, Tier D is not evaluated for source type "other." Therefore, the hazardous waste quantity value will be calculated using Tier C, the volume of source type other – a plume (Ref. 1, Section 2.4.2.1, pp. 51590, 51591, Table 2-5).

2.4.2.1.1. Hazardous Constituent Quantity

The Hazardous Constituent Quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the total mass of all Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) hazardous substances in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51590-51591 (Section 2.4.2.1.1)]. Insufficient historical and current data (manifests, potentially responsible parties [PRPs] records, State records, permits, waste concentration data, etc.) are available to adequately calculate the total or partial mass of all CERCLA hazardous substances in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the hazardous constituent quantity for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier B, hazardous wastestream quantity [Ref. 1, p. 51591 (Section 2.4.2.1.1)].

Hazardous Constituent Quantity Assigned Value: Not Evaluated

2.4.2.1.2. Hazardous Wastestream Quantity

The Hazardous Wastestream Quantity for Source No. 1 could not be adequately determined according to the HRS requirements; that is, the mass of the hazardous wastestreams plus the mass of any additional CERCLA pollutants and contaminants in the source and releases from the source is not known and cannot be estimated with reasonable confidence [Ref. 1, pp. 51591 (Section 2.4.2.1.2)]. Insufficient historical and current data (manifests, PRP records, State records, permits, waste concentration data, annual reports, etc.) are available to adequately calculate the total or partial mass of the wastestreams plus the mass of all CERCLA pollutants and contaminants in the source and the associated releases from the source. Therefore, there is insufficient information to evaluate the associated releases from the source to calculate the Hazardous Wastestream Quantity for Source No. 1 with reasonable confidence. Scoring proceeds to the evaluation of Tier C, volume [Ref. 1, p. 51591 (Section 2.4.2.1.2)].

Hazardous Wastestream Quantity Assigned Value: Not Evaluated

2.4.2.1.3. Volume

Based on sampling data, a contaminated ground water plume with no identified source has been documented. The vertical and horizontal extent of ground water contamination has not been fully defined. The area of the plume (See Figure 3 of this documentation record) was determined by computer mapping techniques to be over 8,000,000 square feet. Documented depth of contamination varies throughout the extent of the plume. In wells used to define Source 1, the maximum depth where TCE has been detected is 77.7-98 feet bgs in the Pines PWS well sample collected in 2004 (see section 2.2.2 of this HRS documentation record). Determination of plume volume should depend on areal and vertical extents of the plume as delineated from results of ground water sampling that meet observed release criteria. Insufficient data are available to accurately or reasonably determine the depth and thus calculate the volume measure.

Therefore, for Source No. 1, a value of greater than 0 but exact amount unknown has been assigned for the source hazardous waste quantity (HWQ) value for volume (Ref. 1, Section 2.4.2.1.3).

Volume Assigned Value: >0

2.4.2.1.4. Area

Tier D is not evaluated for source type "other" (Ref. 1, Table 2-5).

Area Assigned Value: 0

2.4.2.1.5. Source Hazardous Waste Quantity Value

Source No. 1 is assigned a source HWQ value of greater than zero (Ref. 1, Section 2.4.2.1.5).

Highest assigned value assigned from Ref. 1, Table 2-5: >0

SUMMARY OF SOURCE DESCRIPTIONS

Source No.	Source Hazardous Waste Quantity Value	Source Hazardous Constituent Quantity Complete? (Y/N)	Containment Factor Value by Pathway			
			Ground Water (GW) (Ref. 1, Table 3-2)	Surface Water (SW) Overland/flood (Ref. 1, Table 4-2)	Air	
					Gas (Ref. 1, Table 6-3)	Particulate (Ref. 1, Table 6-9)
1	>0	No	10	NS	NS	NS

Notes:

> Greater than
NS Not scored

Total Source Hazardous Waste Quantity Value: >0

Description of Other Possible Sources:

Searches for sources of the ground water contamination were conducted over multiple investigations (Ref. 7, pp. 6, 13-14, 36; 8, pp. 26, 31, 215-217, 219). None of the soil samples collected over the course of these investigation contained reportable concentrations of chlorinated solvents.

3.0 GROUND WATER MIGRATION PATHWAY

3.0.1 GENERAL CONSIDERATIONS

Ground Water Migration Pathway Description

Regional Geology/Aquifer Description: Douglas County is in eastern Nebraska and lies within the Great Plains physiographic province (Ref. 22, pp. 3, 6). Uppermost bedrock in the Valley area is Cretaceous-aged sandstones and shales of the Dakota Group (Refs. 24, pp. 3, 7, 12; 25, p. 8; 27). The site is within the Platte River Valley ground water Region of Nebraska (Refs. 22, p. 8; 25, pp. 6, 7). High yields of good quality water are obtained from sand and gravel of Quaternary age in most parts of the region (Ref. 25, p. 7). Depth to the regional water table ranges from 0 to 50 feet (Refs. 22, p. 8; 25, pp. 18, 19) and the saturated thickness ranges from 100 to 300 feet thick (Ref. 25, pp. 16, 17).

Site Geology/Aquifer Description: Soils in the site area largely belong to the Gibbon-Eudora-Wabash association which is described as being located on the bottom lands between the Platte and Elkhorn Rivers and between the bluffs and the rivers. The soils formed in medium-textured to fine-textured sediments deposited by water (Ref. 22, pp. 4, 5, 8). Within this association the water table fluctuates between 2 and 10 feet below ground surface (Ref. 22, p. 5).

In the Valley area, the Dakota Group is overlain by Quaternary gravel and sand deposited by the Platte River. Ground water within the Platte River Valley is obtained primarily from shallow Quaternary alluvial sand and gravel, interlayered with lesser amounts of silt and clay deposited by the Platte River. The surficial geologic unit is characterized as Platte River alluvium, former braided channel belt, fine-grained sediment thin or absent (Holocene) Qap2 (Refs. 3; 22, p. 8; 24, pp. 3, 7; 25, pp. 6-7; 26, pp. 12, 40). The unit is characterized as well-sorted fine-to-coarse sand, with thin, patchy surficial deposits of silt or clay (Ref. 26, p. 12). The sediment at the ground surface is fine-to-medium sand or with some areas of silt or clay, generally less than three feet thick. Below this is medium-to-coarse sand and gravel up to at least 90 feet thick, with rare thin beds of silt or clay (Ref. 26, p. 12). The Platte River Alluvial Aquifer extends from the static water level to the underlying Dakota Formation. In the area of the site, ground water flows to the southeast, paralleling Reichmuth Road (Ref. 33, pp. 9, 55).

Registered well logs in Section 25 of Township 16 North, Range 9 East (Section 25 is adjacent to the east of the center of the plume as shown on Figures 1 and 2 of this HRS documentation record), available through Nebraska Department of Natural Resources (NDNR), indicate that ground water generally occurs at shallow depths

typically between 6 and 8 feet below ground surface (bgs) although depth of between 1 and 23 feet bgs are reported (Ref. 13, pp 1-6). Sands and gravels are present to about 100 feet bgs, with a discontinuous, clay layer of varying thickness at about 60 feet bgs (Ref. 13, pp. 10, 15, 21, 27, 34). The driller's log for a 1979 registered domestic well at "Valley Country Club Estates" (possibly corresponding to the western irrigation well at the golf course) indicates sands and gravels are present to 57.6 feet bgs; a 7.4 feet thick blue clay layer is present from 57.6 to 65 feet bgs; sands and gravels were encountered from 65 to 98 feet bgs; and shale bedrock was penetrated from 98 to 101 feet bgs (Ref. 13, pp. 19-21). Shale bedrock of the Cretaceous Dakota Group was encountered at 97.8 feet bgs in a test-hole (20-A-62) just north of U.S. Highway 275 at Valley (Refs. 24, p. 7; 26, p. 15; 27, p. 1). The log for this test hole described and 3.5 feet thick layer of silt between 13.0 and 16.5 feet bgs, 3.5 feet thick layer of greenish gray clay at 16.5 to 20 feet bgs, and a thin 0.5 foot thick silt layer at 25.8 feet bgs. Between 50 and 60 feet bgs at this location the material logged was sand and gravel, brownish gray; between 60 and 70 feet bgs the material was logged as sand and gravel, pale yellow, clayey, silty, some pebbles. The remainder of the material above bedrock was sands and gravels (Ref. 27. p. 1). Well logs from two Valmont industrial wells with registration numbers of G-49895 and G-49895B, west of the approximate center of the ground water plume in the east half of Section 26, Township 16 N, Range 9 show coarse sand and gravel between 10 and 81 feet bgs in well G-49895, and course sand with lesser amounts of gravel and gray clay between 49 and 73 feet bgs in well G-49895B (Ref. 34, pp. 1-7; see also Figure 4 of this HRS documentation record).

Aquifer Interconnection

As noted above, a clay layer exists within the Platte River Valley Alluvial Aquifer (i.e., the Quaternary sand and gravel geologic unit) near the site at about 60 feet bgs (Ref. 13, pp. 10, 15, 21, 27, 34). However, this clay layer is discontinuous and does not represent an aquifer boundary as is evidenced by the well log for Valmont industrial well G-49895, which is within ½ mile of the center of the plume source and shows only sand and gravel down to 81 ft bgs where Dakota Group shales begin (Refs. 1, p. 51595, Section 3.0.1.2.1; 34, pp. 1-3; see also Figure 4 of this HRS documentation record).

Aquifer Discontinuities

No geologic, topographic, or other structure or feature that entirely transects the Platte River Valley aquifer within the 4-mile target distance limit is known to exist. Within the Platte River valley, the surficial geologic units overlie a variable thickness of alluvial sediments, which in turn directly overlies bedrock in most places. This valley fill is often thicker than the likely depth of Platte or Elkhorn River channel scour during floods (Refs. 1, p. 51595, Section 3.0.1.2.2; 3; 4; 24, p. 7; 26, p.19; see also Figure 4 of this HRS documentation record).

SUMMARY OF AQUIFER BEING EVALUATED

Aquifer Name	Is Aquifer Interconnected with Upper Aquifer within 2 Miles? (Yes/No/NA)	Is Aquifer Continuous within 4-mile TDL? (Yes/No)	Is Aquifer Karst? (Yes/No)
Platte River Alluvial	NA	Yes	No

Notes:

TDL Target distance limit
NA Not applicable, the Platte River alluvial aquifer is the uppermost aquifer.

3.1 LIKELIHOOD OF RELEASE

3.1.1 OBSERVED RELEASE

Aquifer Being Evaluated: Platte River Alluvial

Chemical Analysis

The VOC ground water plume was discovered by Valmont in 2000 when ground water sampling performed as part of a RCRA closure investigation identified VOCs in two of Valmont's monitoring wells (Ref. 7, p. 10). Further investigation identified several nearby private drinking water wells contaminated with TCE at levels above the maximum contaminant level (MCL) of 5 micrograms per liter (µg/L). PCE and *cis*-1,2-dichloroethene (*cis*-1,2-DCE) were also detected in some of the private wells at concentrations below their MCLs of 5 µg/L and 70 µg/L, respectively. The Nebraska Health and Human Services System (NHHSS) subsequently identified TCE (at levels below the MCL) in a PWS well for the Pines Homeowners Association, a small subdivision located northeast of Old U.S. Highway 275 and east of 288th Street (Refs. 6, pp. 9-11, 293-306; 7, pp. 10-12).

Valmont's contractor, HDR Engineering, Inc. (HDR), of Omaha, Nebraska, investigated the VOC ground water plume in 2001 and 2002, and concluded that the VOC plume was not originating from Valmont's facility (Ref. 8, pp. 10, 11; 23, pp. 9-10, 30-31). This conclusion was based on the presence of VOCs crossgradient of the site and upgradient of the production processes at Valmont (Ref. 23, pp. 30, 31).

In June 2002, Tetra Tech conducted a Preliminary Assessment/Site Inspection (PA/SI) under contract with the Nebraska Department of Environmental Quality (NDEQ). The PA/SI concentrated on potential source areas at the Valmont and nearby WBE Company facilities. A DPT apparatus was used to sample ground water from multiple depths at nine locations—including two samples intended to be background locations—along the Old U.S. Highway 275 corridor. A TCE concentration of 21 µg/L was detected in one background sample (GPW-BK2-50') collected from a depth of 50 feet below ground surface (bgs) north of Old U.S. Highway 275, about 1,000 feet upgradient of WBE (Ref. 6, pp. 40, 99, 346, 474). No VOCs were detected in the second background ground water sample, collected from the northwestern portion of Valmont, where the borrow pits are located. The PA/SI and subsequent Valmont investigations found the highest concentrations of TCE in ground water east of Valmont and south of WBE. In that area, a TCE concentration of 51 µg/L was reported in a ground water sample collected at a depth of 40 feet bgs. The TCE has generally been found at shallower depths in the northwest (upgradient) portion of the plume, presumably closer to the undefined source (Ref. 7, p. 8, 10).

Chemical analysis data from the investigations above are not used in this HRS documentation record due to the age of the data and missing quality assurance information such as data validation reports.

- Background Concentrations:

In October 2004, wells TW12 and TW13 were designated as background for samples analyzed under analytical services request (ASR) 2417 because they were the furthest upgradient of the known ground water plume (Ref. 7, pp. 42, 129-131). However, upon receipt of analytical data these locations were shown to be contaminated with TCE at one or more depth intervals sampled (Ref. 7, p. 25). Temporary well TW9, TW10, TW1 and TW6 were chosen to represent background conditions because they were north and south of the plume at the upper (northwest) and lower (southeast) ends of the plume and did not contain chlorinated solvents (Ref. 7, pp. 19, 20, 25, 42). Domestic wells at 28711 State Street and 28505 State Street were selected to represent background conditions for the contaminated domestic wells because they were screened at different depths in the aquifer (Refs. 7, pp. 28, 42; 13, pp. 1, 14-15, 16-17). The state database for the well at 28505 State Street has an address of 802 South Valley View Street (Ref. 13, p. 1); however, the well owner, location and latitude and longitude description on the registration form indicates the well is at 28505 State Street (Ref. 13, p. 16). The Pines County Club Homeowners association public water supply well is screened from 77.7 to 98 feet bgs (Ref. 7, pp. 366, 367), and was compared to the deep domestic well at 28711 State Street (Ref. 7, p. 28).

In January and February 2005, 11 additional temporary well were sample upgradient of the known area of ground water contamination (Ref. 7, pp. 21, 22). These locations are not on the Figure 2 of the RSE/ESI report (Ref. 7, p. 42) but do show on subsequent report figures (Ref. 8, p. 44). Temporary wells TW14A and TW18 were chosen as background for samples analyzed under ASR 2515 in January/February 2005 because they are both northeast (upgradient) of plume (Refs. 7, pp. 21, 344, 346; 8, p. 44). The domestic well sampled in February 2015 at 28721 State Street (sample number 6544-7) was selected as background for comparison to the private wells sampled on Reichmuth Road (Ref. 8, pp. 23, 45).

DPT ground water samples were collected within multiple intervals at 15 locations in February 2015 under ASR 6544, and at an additional 6 locations in June 2015 under ASR 6814 (Ref 8, pp. 23-25). The February locations were designed to identify a possible source area and evaluate the current extent of the ground water plume (Ref. 8, p. 23). The June locations were mainly at the former WBE facility (where the highest historical TCE concentrations had been detected), or southwest of W. Reichmuth Road at about N. 294th Street to define the

plume edge (Ref. 8, pp. 23, 25). Of the samples collected in February, locations TW-15-1, TW15-2, and TW15-5 were selected as background. In June TW15-18 and TW15-19 were selected as background.

These background locations were collected in the same time period, by the same sampling technique, at about the same depths, and were analyzed using the same methods as the source samples.

Sample ID	Screened Interval (feet bgs)	Date	References
Private Wells			
28711 State St. 2417-19	85-95	10/13/2004	7, pp. 18, 90, 288, 303, 304; 13, pp. 1, 14-15
28505 State St. 2417-16	47-57	10/13/2004	7, pp. 18, 87, 288, 301, 302; 13, pp. 1, 16-17
28721 State St. 6544-7	36-46	2/19/2015	8, pp. 45, 101, 102, 165, 166; 13, pp. 1, 11-13
DPT Temporary Wells			
2417-103 (TW-1)	56-60	10/12/2004	8, p. 44; B pp. 107, 162, 313; 14, p. 51
2417-104 (TW-1)	44-48		8, p. 44; 7 pp. 108, 162, 315; 14, p. 52
2417-113 (TW-6)	56-60	10/12/2004	8, p. 44; 7 pp. 117, 162, 319; 14, p. 62
2417-114 (TW-6)	44-48		8, p. 44; 7 pp. 118, 162, 319; 14, p. 63
2417-119 (TW-9)	44-48	10/13/2004	8, p. 44; 7 pp. 123, 162, 321; 14, p. 69
2417-120 (TW-9)	32-36		8, p. 44; 7 pp. 124, 162, 323; 14, p. 70
2417-121 (TW-10)	44-48	10/13/2004	8, p. 44; 7 pp. 125, 162, 323; 14, p. 71
2417-122 (TW-10)	32-36		8, p. 44; 7 pp. 126, 162, 323; 14, p. 72
2515-204 (TW-14A)	32-36	1/31/2005	8, p. 44; 7 pp. 21, 176, 199, 353; 15, p. 12
2515-205 (TW-14A)	16-20		8, p. 44; 7 pp. 21, 177, 199, 353; 15, p. 14
2515-206 (TW-18)	32-36	1/31/2005	8, p. 44; 7 pp. 178, 199, 353; 15, p. 16
2515-207 (TW-18)	16-20		8, p. 44; 7 pp. 179, 199, 355; 15, p. 17
6544-102 (TW15-1)	12-16	2/16/2015	8, pp. 24, 45, 71, 81, 168; 16, p. 16
6544-103 (TW15-2)	20-24		8, pp. 24, 45, 71, 82, 170; 16, p. 17

Sample ID	Screened Interval (feet bgs)	Date	References
6544-106 (TW15-5)	32-36		8, pp. 24, 45, 71, 85, 170; 16, p. 21
6814-205 (TW15-18)	46-50	6/9/2015	8, pp. 25, 45, 106, 133, 198; 18, p. 18
6814-206 (TW15-18)	31-35		8, pp. 25, 45, 106, 134, 198; 18, p. 19
6814-207 (TW15-18)	16-20		8, pp. 25, 45, 106, 135, 198; 18, p. 20
6814-208 (TW15-18)	10-14		8, pp. 25, 45, 106, 136, 200; 18, p. 21
6814-209 (TW15-19)	46-50	6/9/2015	8, pp. 25, 45, 106, 137, 200; 18, p. 22
6814-210 (TW15-19)	31-35		8, pp. 25, 45, 106, 138, 200; 18, p. 23
6814-211 (TW15-19)	16-20		8, pp. 25, 45, 106, 139, 200; 18, p. 24
6814-212 (TW15-19)	10-14		8, pp. 25, 45, 106, 140, 202; 18, p. 25

Notes:
Sample depths are feet below ground surface (feet bgs)
DPT Direct push technology
TW Temporary well

Sample ID	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	References
Private Wells				
28711 State St. 2417-19	PCE TCE *cis*-1,2-DCE VC	0.50 U 0.50 U 0.50 U 0.50 U	0.50 0.50 0.50 0.50	7, pp. 18, 90, 288, 303, 304; 14, pp. 28, 29
28505 State St. 2417-16	PCE TCE *cis*-1,2-DCE VC	0.50 U 0.50 U 0.50 U 0.50 U	0.50 0.50 0.50 0.50	7, pp. 18, 87, 288, 301, 302; 14, p. 24
28721 State St. 6544-7	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 102, 160, 165, 166; 16, pp. 9, 10
DPT Temporary Wells				
2417-103 (TW-1)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 107,162, 289, 313, 314; 8, p. 44; 14, p. 52
2417-104 (TW-1)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 108, 162, 289, 315, 316; 8, p. 44; 14, p. 53

Sample ID	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	References
		0.50 U	0.50	
2417-113 (TW-6)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 117, 162, 289, 319, 320; 8, p. 44; 14, p. 63
2417-114 (TW-6)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 118, 162, 289, 319, 320; 8, p. 44; 14, p. 64
2417-119 (TW-9)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 123, 162, 289, 321, 322; 8, p. 44; 14, pp. 69, 70
2417-120 (TW-9)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 124, 162, 289, 323, 324; 8, p. 44; 14, p. 71
2417-121 (TW-10)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 125, 162, 289, 323, 324; 8, p. 44; 14, p. 72
2417-122 (TW-10)	PCE TCE *cis*-1,2-DCE	0.50 U 0.50 U 0.50 U	0.50 0.50 0.50	7, pp. 126, 162, 289, 323, 324; 8, p. 44; 14, p. 73
2515-204 (TW-14A)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 21, 176, 199, 346, 353, 354; 8, p. 44; 15, p. 13
2515-205 (TW-14A)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 21, 177, 199, 346, 353, 354; 8, p. 44; 15, p. 14
2515-206 (TW-18)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 178,199, 346, 353, 254; 8, p. 44; 15, p. 16
2515-207 (TW-18)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	7, pp. 179, 199, 346, 355, 356; 8, p. 44; 15, p. 17
6544-102 (TW15-1)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 45, 71, 81, 160, 168, 169; 16, p. 16
6544-103 (TW15-2)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 45, 71, 82, 160, 170; 16, p. 17
6544-106 (TW15-5)	TCE *cis*-1,2-DCE	0.50 U 0.50 U	0.50 0.50	8, pp. 45, 71, 85, 160, 170; 16, p. 21
6814-205 (TW15-18)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 133, 183, 198; 18, pp. 18, 19
6814-206 (TW15-18)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 134, 183, 198; 18, pp. 19, 20
6814-207 (TW15-18)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 135, 183, 198; 18, pp. 20, 21
6814-208 (TW15-18)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 136, 183, 200; 18, pp. 21, 22
6814-209 (TW15-19)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 137, 183, 200; 18, p. 22
6814-210	TCE	0.5 U	0.5	8, pp. 25, 45, 106, 138, 183,

Sample ID	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	References
(TW15-19)	*cis*-1,2-DCE	0.5 U	0.5	200; 18, p. 23
6814-211 (TW15-19)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 139, 183, 200; 18, p. 24
6814-212 (TW15-19)	TCE *cis*-1,2-DCE	0.5 U 0.5 U	0.5 0.5	8, pp. 25, 45, 106, 140, 183, 202; 18, p. 25

Notes:
1 The reporting limit is the laboratory reporting limit with any dilution factor, volume adjustment, or percent solids for each sample taken into account and is equivalent to the SQL as defined in the HRS (Refs. 1, Section 1.1; 14, p. 1; 15, p. 1; 16, p. 1; 18, p. 1).
µg/L micrograms per liter
DCE Dichloroethene
PCE Tetrachloroethylene
TCE Trichloroethylene
TW Temporary well
U The analyte was not detected at or above the reporting limit.
VC Vinyl chloride

- Contaminated Samples:

The approximate extent of the ground water plume is defined by direct push technology (DPT) installed temporary wells sampled over multiple investigations as well as three private drinking water wells and a public water supply well (see Figure 3 of this HRS documentation record). All of the temporary wells that define the plume were sampled at multiple depths in the aquifer (see contaminated samples listed below in this HRS documentation record). In October 2004, 14 temporary wells (TW) were installed and sampled and in January 2005, 11 temporary wells were installed and sampled (Ref. 7, pp. 19-23). As shown in section 2.2.2 of this documentation record, temporary wells TW-2, TW-3, TW-4, TW-12, TW-13, and TW-14, which were installed and sampled in October 2004, contained chlorinated solvents at concentrations the meet observed release criteria. As shown in section 2.2.2 of this documentation record, temporary wells TW-16, TW-17, TW-22, and TW-23 installed and sampled in January-February 2005 contained chlorinated solvents at concentrations that meet observed release criteria (Refs. 7, pp. 19-26, 42; 8, p. 44).

In February and June 2015, 21 temporary wells were installed and sampled (Ref. 8, pp. 23-25). As shown in section 2.2.2 of this documentation record temporary wells TW-15-3, TW15-4, TW15-6, TW15-7, TW15-8, TW15-9, TW15-10, TW15-11, TW15-12, TW15-15 installed and sampled in February 2015 contained chlorinated solvents at concentrations that meet observed release criteria (Ref. 8, pp. 23, 24, 25, 45). As shown in section 2.2.2 of this documentation record temporary wells TW15-17, TW15-20, TW15-21 and TW15-22 installed and sampled in June 2015 contained chlorinated solvents at concentrations that meet observed release criteria (Ref. 8, pp. 23, 24, 25, 45).

Three privately owned domestic wells and one former public water supply system well have also been sampled and shown to contain concentrations of chlorinated solvent that meet observed release criteria. These wells are also documented in section 2.2.2 of this documentation record. All of the wells mentioned above are displayed on Figure 3 of this HRS documentation record presented in Section 2.2.1.

Sample ID	**Screened Interval (feet bgs)**	**Date**	**References**
Private Wells			
Pines PWS 2417-1	77.7-98	10/12/04	7 pp. 72, 162, 288, 295, 296, 366, 367; 14, p. 2
28272 W. Reichmuth Rd. 2417-8	Unknown	10/12/04	8, p. 44; 7 pp. 79, 163, 288, 297, 298; 14, p. 12
2658-7		7/27/05	17, pp. 6, 15, 27, 34, 38, 43, 44; 19, p. 11
6544-2		2/18/15	8, pp. 45, 71, 74, 160, 164; 16, p. 3
28276 Reichmuth Rd. 2417-10	Unknown	10/12/04	7 pp. 81, 163, 288, 299, 300; 14, p. 15
6544-5		2/18/15	8, pp. 45, 71, 77, 160, 165, 166; 16, p. 7
7838 N 288th Street 2417-11	Unknown	10/12/04	8, p. 44; 7 pp. 82, 163, 288, 299, 300; 14, p. 16
2658-2		7/27/05	17, pp. 6, 15, 22,34, 38, 41, 42; 19, p. 4
DPT Temporary Wells			
October 2004			
2417-105 (TW-2)	44-48	10/12/04	8, p. 44; 7 pp. 109, 162, 289, 315, 316; 14, p. 54
2417-106 (TW-2)	32-36	10/12/04	8, p. 44; 7 pp. 110, 162, 289, 315, 316; 14, p. 55
2417-107 (TW-3)	44-48	10/12/04	8, p. 44; 7 pp. 111, 162, 289, 315, 316; 14, p. 56
2417-110 (TW-4)	44-48	10/12/04	8, p. 44; 7 pp. 114, 162, 289, 317, 318; 14, pp. 59, 60
2417-125 (TW-12)	44-48	10/14/04	8, p. 44; 7 pp. 129, 165, 289, 325, 326; 14, p. 76
2417-126 (TW-12)	32-36	10/14/04	8, p. 44; 7 pp. 130, 165, 289, 325, 326; 14, p. 77
2417-127 (TW-13)	56-60	10/14/04	7 pp. 131, 165, 325; 14, p. 78
2417-128 (TW-13)	44-48	10/14/04	8, p. 44; 7 pp. 132, 165, 289, 327, 328; 14, p. 79
2417-129 (TW-13)	32-36	10/14/04	8, p. 44; 7 pp. 133, 165, 289, 327; 14, p. 80

Sample ID	Screened Interval (feet bgs)	Date	References
2417-130 (TW-14)	56-60	10/14/04	8, p. 44; 7 pp. 134, 165, 289, 327, 328; 14, pp. 81, 82
February 2005			
2515-213 (TW-16)	16-20	2/1/05	8, p. 44; 7 pp. 185, 199, 346, 358; 15, p. 23
2515-215 (TW-17)	16-20	2/1/05	8, p. 44; 7 pp. 187, 199, 346, 360; 15, p. 25
2515-221 (TW-22)	16-20	2/1/05	8, p. 44; 7 pp. 193, 199, 346, 362; 15, p. 32
2515-223 (TW-23)	16-20	2/2/05	8, p. 44; 7 pp. 195, 200, 346, 363, 364; 15, p. 34
February 2015			
6544-104 (TW15-3)	8-12	2/16/15	8, pp. 45, 71, 83, 160, 170; 16, p. 18
6544-105 (TW15-4)	32-36	2/16/15	8, pp. 45, 71, 84, 160, 170; 16, p. 20
6544-107 (TW15-6)	20-24	2/17/15	8, pp. 45, 71, 86, 160, 172; 16, p. 22
6544-108 (TW15-7)	32-36	2/17/15	8, pp. 45, 71, 87, 160, 172; 16, p. 23
6544-109 (TW15-8)	20-24	2/17/15	8, pp. 45, 71, 88, 160, 172; 16, p. 24
6544-110 (TW15-9)	20-24	2/17/15	8, pp. 45, 71, 89, 160, 172; 16, p. 26
6544-111 (TW15-10)	32-36	2/17/15	8, pp. 45, 71, 90, 160, 174; 16, p. 27
6544-112 (TW15-11)	32-36	2/17/15	8, pp. 45, 71, 91, 160, 174; 16, p. 28
6544-113 (TW15-11)	20-24	2/17/15	8, pp. 45, 71, 92, 160, 174; 16, p. 29
6544-114 (TW15-12)	48-52	2/17/15	8, pp. 45, 71, 93, 160, 174; 16, p. 30
6544-117 (TW15-15)	63-67	2/18/15	8, pp. 45, 72, 96, 160, 176; 16, p. 33
6544-118 (TW15-15)	47-51	2/18/15	8, pp. 45, 72, 97, 160, 176; 16, p. 34
6544-119 (TW15-15)	31-35	2/18/15	8, pp. 45, 72, 98, 160, 178; 16, p. 35
June 2015			
6814-201 (TW15-17)	46-50	6/9/15	8, pp. 25, 45, 106, 129, 196, 197; 18, p. 13
6814-202 (TW15-17)	31-35	6/9/15	8, pp. 25, 45, 106, 130, 183, 196, 197; 18, p. 14
6814-203	16-20	6/9/15	8, pp. 25, 45, 106, 131,

Sample ID	Screened Interval (feet bgs)	Date	References
(TW15-17)			183, 197; 18, p. 16
6814-204 (TW15-17)	12-16	6/9/15	8, pp. 25, 45, 106, 132, 183, 198; 18, p. 17
6814-215 (TW15-20)	46-50	6/10/15	8, pp. 25, 45, 106, 143, 183, 202; 18, p. 29
6814-216 (TW15-20)	31-35	6/10/15	8, pp. 25, 45, 106, 144, 183, 204; 18, p. 31
6814-217 (TW15-20)	16-20	6/10/15	8, pp. 25, 45, 106, 145, 183, 204; 18, p. 32
6814-218 (TW15-20)	10-14	6/10/15	8, pp. 25, 45, 106, 146, 183, 204; 18, p. 33
6814-219 (TW15-21)	46-50	6/10/15	8, pp. 25, 45, 106, 147, 183, 204; 18, p. 34
6814-220 (TW15-21)	31-35	6/10/15	8, pp. 25, 45, 106, 148, 183, 206; 18, p. 35
6814-223 (TW15-21)	16-20	6/10/15	8, pp. 25, 45, 106, 150, 184, 206; 18, p. 37
6815-224 (TW15-21)	10-14	6/10/15	8, pp. 25, 45, 106, 151, 184, 206; 18, p. 38
6814-225 (TW15-22)	46-50	6/10/15	8, pp. 25, 45, 106, 152, 184, 208; 18, p. 39
6814-226 (TW15-22)	31-35	6/10/15	8, pp. 25, 45, 107, 153, 184, 208; 18, p. 40
6814-227 (TW15-22)	16-20	6/10/15	8, pp. 25, 45, 107, 184, 208; 18, p. 42
6814-228 (TW15-22)	10-14	6/10/15	8, pp. 25, 45, 107, 154, 184, 208; 18, p. 43

Notes:

Sample ID	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	References
Private Wells				
2417-1 Pines PWS	TCE *cis*-1,2-DCE	1.9 1.2	0.50 0.50	7, pp. 72, 162, 288, 295, 296; 14, p. 2
28272 W. Reichmuth Rd. 2417-8	PCE TCE *cis*-1,2-DCE	1.4 25 11	0.50 0.50 0.50	7, pp. 79, 163, 288,297, 298; 14, p. 12
2658-7	PCE TCE *cis*-1,2-DCE	1.7 31 9.9	0.50 0.50 0.50	17, pp. 6, 15, 27, 34, 38, 43, 44; 19, p. 11
6544-2	TCE	1.8	0.50	8, pp. 45, 71, 74, 160, 164 ; 16, p. 3
28276 Reichmuth Rd. 2417-10	PCE TCE VC	1 21 0.51	0.50 0.50 0.50	7, pp. 81, 163, 288, 299, 300; 14, p.15
6544-5	TCE *cis*-1,2-DCE	2.9 0.58	0.50 0.50	8, pp. 45, 71, 77, 160, 165, 166; 16, p. 7
7838 N 288th Street 2417-11	TCE *cis*-1,2-DCE	3.1 1.7	0.50 0.50	8, p. 44; 7, pp. 82, 163, 288, 299, 300; 14, p.16
2658-2	TCE *cis*-1,2-DCE	3.5 1.4	0.50 0.50	17, pp. 6, 15, 22, 34, 38, 41, 42; 19, p. 4
DPT Temporary Wells				
October 2004				
2417-105 (TW-2)	TCE	4.5	0.50	8, p. 44; 7, pp. 109, 162, 289, 316; 14, p. 54
2417-106 (TW-2)	TCE	3.6	0.50	8, p. 44; 7, pp. 110, 162, 289, 316; 14, p. 55
2417-107 (TW-3)	TCE	0.51	0.50	8, p. 44; 7, pp. 111, 162, 289, 316; 14, p. 56
2417-110 (TW-4)	PCE TCE	0.72 2.3	0.50 0.50	8, p. 44; 7, pp. 114, 162, 289, 317, 318; 14, pp. 59, 60
2417-125 (TW-12)	*cis*-1,2-DCE TCE	1.7 6.5	0.50 0.50	8, p. 44; 7, pp. 129,165, 289, 325, 326; 14, p. 76
2417-126 (TW-12)	*cis*-1,2-DCE TCE	5.7 24	0.50 0.50	8, p. 44; 7, pp. 130, 165, 289, 325, 326; 14, p. 77
2417-127 (TW-13)	*cis*-1,2-DCE	0.59	0.50	7, pp. 131, 165, 289, 325; 14, p. 78
2417-128 (TW-13)	*cis*-1,2-DCE TCE	0.96 0.67	0.50 0.50	8, p. 44; 7, pp. 132, 165, 289, 327, 328; 14, p. 79
2417-129 (TW-13)	*cis*-1,2-DCE	0.66	0.50	8, p. 44; 7, pp. 133, 165, 289, 327; 14, p. 80
2417-130 (TW-14)	*cis*-1,2-DCE TCE	0.81 0.62	0.50 0.50	8, p. 44; 7, pp. 134, 165, 289, 327, 328; 14, pp. 81, 82

Sample ID	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	References
February 2005				
2515-213 (TW-16)	TCE	0.8	0.50	8, p. 44; 7, pp. 185, 199, 346, 358; 15, p. 23
2515-215 (TW-17)	TCE	14	0.50	8, p. 44; 7, pp. 187, 199, 346, 360; 15, p. 25
2515-221 (TW-22)	TCE	0.89	0.50	8, p. 44; 7, pp. 193, 199, 346, 362; 15, p. 32
2515-223 (TW-23)	*cis*-1,2-DCE TCE	0.93 1.7	0.50 0.50	8, p. 44; 7, pp. 195, 200, 346 363, 364; 15, p. 34
February 2015				
6544-104 (TW15-3)	TCE	2.5	0.5	8, pp. 45, 71, 83, 160, 170; 16, p. 18
6544-105 (TW15-4)	TCE *cis*-1,2-DCE	45 8.8	0.5 0.5	8, pp. 45, 71, 84, 160, 170; 16, p. 20
6544-107 (TW15-6)	TCE *cis*-1,2-DCE	35 0.53	0.5 0.5	8, pp. 45, 71, 86, 160, 172; 16, p. 22
6544-108 (TW15-7)	TCE *cis*-1,2-DCE	18 4.6	0.5 0.5	8, pp. 45, 71, 87, 160, 172; 16, p. 23
6544-109 (TW15-8)	TCE *cis*-1,2-DCE	8.5 2.4	0.5 0.5	8, pp. 45, 71, 88, 160, 172, 16, pp. 24, 25
6544-110 (TW15-9)	TCE	20	0.5	8, pp. 45, 71, 89, 160, 172; 16, p. 26
6544-111 (TW15-10)	TCE	7.9	0.5	8, pp. 45, 71, 90, 160, 174; 16, p. 27
6544-112 (TW15-11)	TCE *cis*-1,2-DCE	150 1.3	0.5 0.5	8, pp. 45, 71, 91, 160, 174; 16, p. 28
6544-113 (TW15-11)	TCE *cis*-1,2-DCE	68 0.75	0.5 0.5	8, pp. 45, 71, 92, 160, 174; 16, p. 29
6544-114 (TW15-12)	TCE *cis*-1,2-DCE	2.6 2	0.5 0.5	8, pp. 45, 71, 93, 160, 174; 16, p. 30
6544-117 (TW15-15)	TCE *cis*-1,2-DCE	20 0.52	0.5 0.5	8, pp. 45, 72, 96, 160, 176; 16, p. 33
6544-118 (TW15-15)	TCE	18	0.5	8, pp. 45, 72, 97, 160, 176; 16, p. 34
6544-119 (TW15-15)	TCE *cis*-1,2-DCE	85 1.1	0.5 0.5	8, pp. 45, 72, 98, 160, 178; 16, pp. 35, 36
June 2015				
6814-201 (TW15-17)	TCE *cis*-1,2-DCE	58 1	2.5 0.5	8, pp. 25, 45, 106, 129, 183, 196, 197; 18, p. 13
6814-202 (TW15-17)	TCE *cis*-1,2-DCE	84 1.1	5 0.5	8, pp. 25, 45, 106, 130, 183, 196, 197; 18, pp. 14, 15
6814-203 (TW15-17)	TCE	11	0.5	8, pp. 25, 45, 106, 131, 183, 197; 18, p. 16

Sample ID	Hazardous Substance	Results (µg/L)	Reporting Limit (µg/L)[1]	References
6814-204 (TW15-17)	TCE	1.8	0.5	8, pp. 25, 45, 106, 132, 183, 198; 18, p. 17
6814-215 (TW15-20)	TCE *cis*-1,2-DCE	29 0.91	2 0.5	8, pp. 25, 45, 106, 143, 183, 202; 18, pp. 29, 30
6814-216 (TW15-20)	TCE *cis*-1,2-DCE	72 1.2	4 0.5	8, pp. 25, 45, 106, 144, 183, 204; 18, p. 31
6814-217 (TW15-20)	TCE *cis*-1,2-DCE	36 0.6	2 0.5	8, pp. 25, 45, 106, 145, 183, 204; 18, p. 32
6814-218 (TW15-20)	TCE	5.3	0.5	8, pp. 25, 45, 106, 146, 183, 204; 18, p. 33
6814-219 (TW15-21)	TCE *cis*-1,2-DCE	51 1.3	0.5 0.5	8, pp. 25, 45, 106, 147, 183, 204; 18, p. 34
6814-220 (TW15-21)	TCE *cis*-1,2-DCE	89 1.7	0.5 0.5	8, pp. 25, 45, 106, 148, 183, 206; 18, p. 35
6814-223 (TW15-21)	*cis*-1,2-DCE	0.69	0.5	8, pp. 25, 45, 106, 150, 184, 206; 18, p. 37
6814-224 (TW15-21)	TCE	3.6	0.5	8, pp. 25, 45, 106, 151, 184, 206; 18, p. 38
6814-225 (TW15-22)	TCE *cis*-1,2-DCE	54 1.2	0.5 0.5	8, pp. 25, 45, 106, 152, 184, 208; 18, p. 39
6814-226 (TW15-22)	TCE *cis*-1,2-DCE	69 1.3	0.5 0.5	8, pp. 25, 45, 107, 153, 184, 208; 18, pp. 40, 41
6814-227 (TW15-22)	TCE	29	0.5	8, pp. 25, 45, 56, 107, 184, 208; 18, p. 42
6814-228 (TW15-22)	TCE	2.3	0.5	8, pp. 25, 45, 107, 154, 184, 208; 18, p. 43

Notes:
Sample depths are feet below ground surface.
1 The reporting limit is the laboratory reporting limit with any dilution factor, volume adjustment, or percent solids for each sample taken into account and is equivalent to the SQL as defined in the HRS (Refs. 1, Section 1.1; 14, p. 1; 15, p. 1; 16, p. 1; 18, p. 1).

µg/L micrograms per liter
DCE Dichloroethylene
DPT Direct push technology
PCE Tetrachloroethene
TCE Trichloroethene
U The analyte was not detected at or above the reporting limit.
VC Vinyl chloride

Attribution:

As shown on Figure 3 of this HRS documentation record contaminated domestic wells and the former well serving the Pine PWS are within the boundaries of source 1. As discussed in section 2.2.1 of this documentation record, numerous investigations have been conducted to locate a source of the contamination but no definitive source has been identified.

Hazardous Substances in the Release

Tetrachloroethylene (PCE)
Trichloroethylene (TCE)
cis-1,2-Dichloroethylene (DCE)
Vinyl Chloride

Ground Water Observed Release Factor Value: 550

3.2 WASTE CHARACTERISTICS

3.2.1 TOXICITY/MOBILITY

Hazardous Substance	Source No.	Toxicity Factor Value	Mobility Factor Value*	Does Haz. Substance Meet Observed Release? (Y/N)	Toxicity/ Mobility (Ref. 1, Table 3-9)	References
Tetrachloroethylene	1	100	1	Y	100	1, Section 3.2.1; 2, pp. 1, 3, 5, 7
Trichloroethylene	1	1,000	1	Y	1,000	
cis-1,2-Dichloroethylene	1	1,000	1	Y	1,000	
Vinyl chloride	1	10,000	1	Y	10,000	

Notes:

* Liquid, non-karst mobility factor value used, or if substance was found in an observed release to ground water, then a mobility factor value of 1 is assigned (Ref. 1, Sec. 3.2.1.2).

Toxicity/Mobility Factor Value: 10,000
(Ref. 1, Table 3-9)

3.2.2 HAZARDOUS WASTE QUANTITY

Source No.	Source Type	Source Hazardous Waste Quantity	Source Hazardous Constituent Quantity Complete?
1	Other	100	No

The hazardous constituent quantity for Source 1 is not adequately determined. The source HWQ is greater than zero but exact amount is unknown. As specified in Reference 1, Section 2.4.2.2, a HWQ factor value of 100 was assigned because targets in the Ground Water Migration Pathway are subject to actual contamination at Level I concentrations (Ref. 1, Section 2.4.2.2).

Sum of Values: > 0
Hazardous Waste Quantity Factor Value: 100
(Ref. 1, Section 2.4.2.2, Table 2-6)

3.2.3 WASTE CHARACTERISTICS FACTOR CATEGORY VALUE

As specified in the HRS (Ref. 1, Section 3.2.3), the Hazardous Waste Quantity Factor Value of 100 was multiplied by the highest toxicity/mobility value of 10,000 for vinyl chloride, resulting in a product of 1,000,000 (1.0E+06). Based on this product, a waste characteristics factor value (WCFV) of 32 was assigned from Table 2-7 of the HRS (Ref.1, Section 2.4.3.1).

Toxicity/Mobility Factor Value: 10,000
Hazardous Waste Quantity Factor Value: 100

Toxicity/Mobility Factor Value × Hazardous Waste Quantity Factor Value: 1,000,000
Waste Characteristics Factor Category Value: 32
(Ref. 1, Table 2-7)

3.3 TARGETS

Level I Concentrations

The Pines Country Club Homeowners Association public water system (Pines PWS) has been sampled multiple times since contamination was detected in the area (Ref. 8, pp. 15, 21). With the exception of October 2013, TCE commonly had been detected at concentrations less than 2 µg/L in the Pines PWS well between July 2000 and October 2005 (Ref. 8, p. 15). No VOCs were detected from January 2006 through July 2010. In October 2010, TCE was reported at 0.673 µg/L in the Pines PWS well, and the TCE concentration increased to 1.8 µg/L in January 2011. TCE concentrations increased each quarter throughout the remainder of 2011 and exceeded the 5 µg/L MCL in January 2012 at a concentration of 5.35 µg/L. In 2012, TCE concentrations ranged from 6.49 to 7.96 µg/L. TCE concentrations from April 2014 through January 2015 (final data listed before PWS closure) exceeded 10 µg/L in the Pines PWS well (Refs. 8, p. 21; 28, pp. 5-12). These concentrations reported by the state exceeded the federal MCL for TCE, resulting in numerous violations for the PWS in 2012, 2013, 2014 and 2015 (Ref 28, pp. 3, 4).

Other domestic wells containing contaminants above HRS health-based benchmark concentrations are at 7838 N. 288th Street, 28272 West Reichmuth Road, and 28276 West Reichmuth Road (see below table).

Sample ID	Hazardous Substance	Hazardous Substance Concentration (µg/L)	Benchmark Concentration (µg/L)	Benchmark	References for Benchmark
Pines PWS 2417-1	TCE	1.9	1.1	CRSC	1, Section 3.3.2.1, Table 3-10; 2, pp. 1-8
28272 W. Reichmuth Rd. 2658-7	TCE	25	1.1	CRSC	
28276 W. Reichmuth Rd 2417-10	TCE Vinyl chloride	21 0.51	1.1 0.021	CRSC CRSC	
7838 N. 288th Street 2658-2	TCE	3.1	1.1	CRSC	

Notes:

µg/L	Micrograms per liter
CRSC	Cancer risk screening concentration
TCE	Trichloroethylene

As documented above, TCE exceeds the cancer risk screening concentration in all three domestic wells and the Pines PWS well. In addition, the vinyl chloride concentration in the 28276 W. Reichmuth Road well sample exceeded the cancer risk screening concentration.

3.3.1 NEAREST WELL

Well ID: Pines PWS well (sample 2417-1)
Level of Contamination (I, II, or potential): I

As documented in Section 3.1.1 and Section 3.3, sample 2417-1 from the Pine PWS well contains TCE at a concentration that both meet the observed release criteria and is subject to Level I contamination. Therefore, in accordance with Reference 1, Section 3.3.1, Table 3-11, a nearest well factor value of 50 is assigned to the site.

Nearest Well Factor Value: 50
(Ref. 1, Table 3-11)

3.3.2 POPULATION

3.3.2.1 Level of Contamination

Presented below in Section 3.3.2.2 are the numbers of people drinking from wells that have documented actual contamination based on hazardous substance concentrations that meet the observed release criteria (see Section 3.1.1 of this HRS documentation record). Section 3.3.2.2 presents the number of people drinking from wells that contain hazardous constituents above a health-based benchmark (see section 3.3 of this HRS documentation record).

3.3.2.2 Level I Concentrations (concentrations associated with Level I targets are presented in Section 3.1.1)

Prior to closure in early 2015, the Pines PWS (Water system Number NE3150247) supplied water to a population of between 230 and 235 persons, which included about 40 homes, the golf course clubhouse, an apartment building, and a restaurant (Refs. 28, p. 2; 8, pp. 9, 215). The Pines well, northeast of the intersection of W. Reichmuth Road and N. 288th Street, was installed in 1994 and was screened from 77.7 feet bgs to its total depth at 98 feet bgs (Refs. 7, pp. 366, 367; 8, pp. 43; 28, pp. 2, 3).

In addition to the Pines PWS well, three other private residences (7838 N. 288th Street and 28272 and 28276 W. Reichmuth Road) were supplied by separate domestic wells until 2015. In 2015, the residence at 7838 N. 288th

Street was connected to the Valley PWS (Refs. 8, p. 37; 17, p. 5). The two residences east of the golf course remain on private wells and have whole-house filtration (WHF) systems installed (Refs. 8, pp. 9, 37; 17, p. 5).

Level I Population Targets

Level I Well	Aquifer No.	Population	References
Pines PWS	1	235	28, p. 2
7838 N. 288th Street	1	2.49	29, p. 1
28272 W. Reichmuth Road	1	2.49	29, p. 1
28276 W. Reichmuth Road	1	2.49	29, p. 1

Sum of Population Served by Level I Wells: 242.47
Sum of Population Served by Level I Wells x 10: 2,424.7

Level I Concentrations Factor Value: 2,424.7
(Ref. 1, Section 3.3.2.2)

3.3.2.3 Level II Concentrations

Not Scored

Sum of Population Served by Level II Wells: Not scored

Level II Concentrations Factor Value: Not scored

3.3.2.4 Potential Contamination

The Valley PWS serves a population of 2,000 via two active water wells; a third well is inactive and has been disconnected from the system (Ref. 30, pp. 1-3). The two active PWS wells are at the water treatment plant near the southeastern city limits, about 2.25 miles southeast of the site. The inactive well is near N. West and W. Church Streets, about 1,500 feet south of the southeastern edge of the plume as defined in 2005. The City disconnected this well from the PWS in 2005 (Refs. 8, p. 9, 43; 30, pp. 1-3; see also Figure 4 of this HRS documentation record). A well head protection area has been established for this PWS (Ref. 31).

Other systems within the 4-mile target distance limit are shown on Figure 4 of this HRS documentation record and include Ginger Cove (NE3105520) and Ginger Woods (NE3105519) between 1 and 2 miles southwest of the plume (Ref. 30, pp. 7-12). Ginger Cove serves a population of 340 through 153 residential service connections. The system maintains two wells (G-072203 and G-072266) (Ref. 30, pp. 7-9). Ginger Woods serves a population of 230 through 75 residential service connections. The system maintains one wells (G-122767) (Ref. 30, pp. 10-12). Valmont maintains a non-transient non-community system (NE3150238) consisting of two wells that serves a worker population of 1,700 (Ref. 30, pp. 4-6). These wells are between 0.25 and 0.5 mile west of the center of the plume (see Figure 4 of this HRS documentation record).

The table below lists the potential target population within a 4-mile radius of the site.

Potential Population Targets

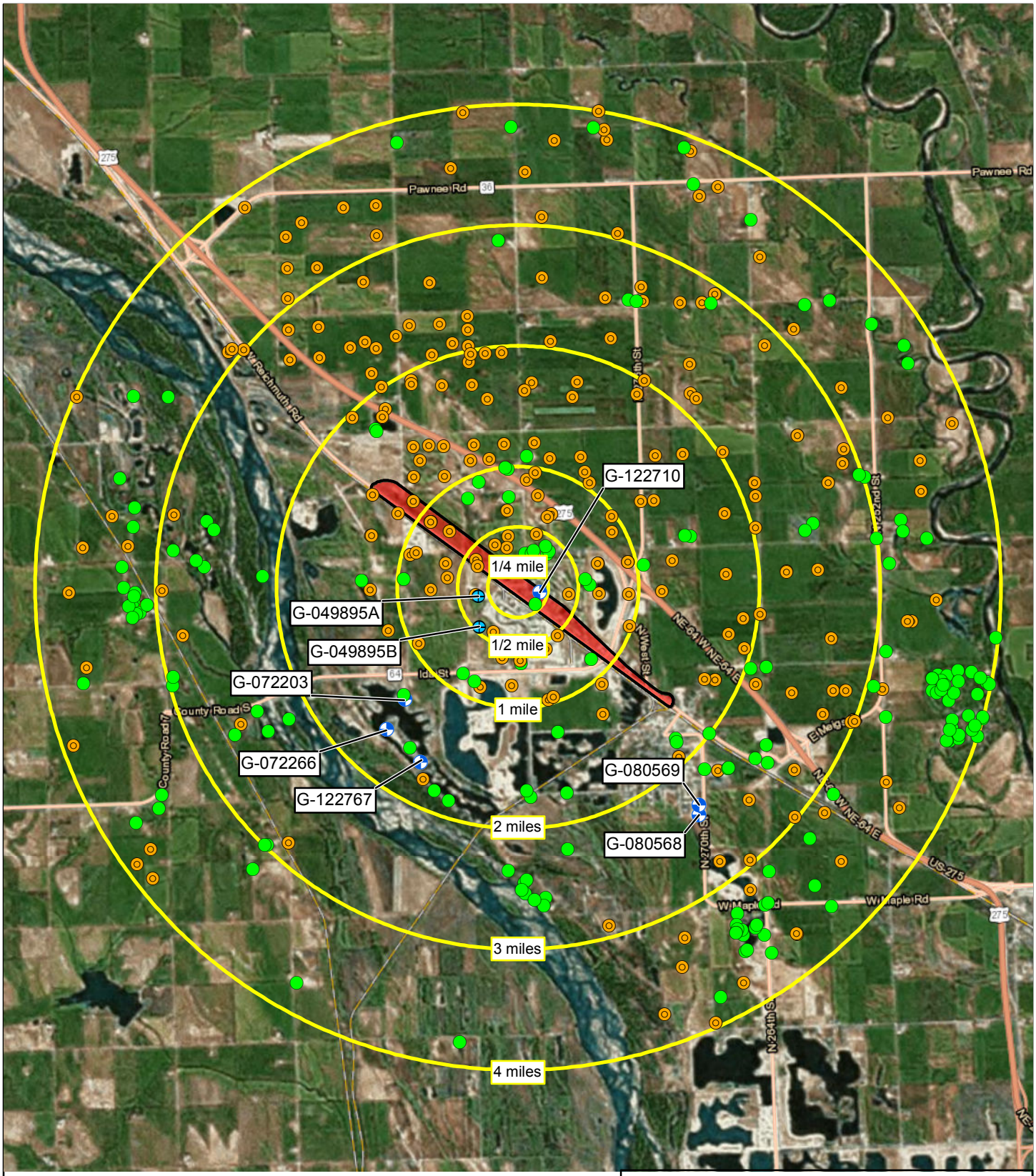
Distance Category (miles)	**Well (Registration Number)**	**Population**	**References**	**Distance-Weighted Population Value* (Ref. 1, Table 3-12)**
0 to 1/4	None			
>1/4 to 1/2	Valmont (G-049895) Valmont (G-049895B)	850 850	30, pp. 4-6	1,013
>1/2 to 1	No PWS Wells			
>1 to 2	Ginger Cove (G-072203) Ginger Cove (G-072266) Ginger Woods (G-122767)	170 170 230	30, pp. 7-12	94
>2 to 3	Valley Well (G-080569) Valley Well (G-080568)	1,000 1,000	30, pp. 1-3	212
>3 to 4	Not Evaluated			
	Total Population	4,270		1,319

*Distance-weighted population values derived from the "Other Than Karst" portion of Reference 1, Table 3-12.

Sum of Distance-Weighted Population Values: 1,319
Sum of Distance-Weighted Population Values/10: 131.9

Potential Contamination Factor Value: 131.9
(Ref. 1, Section 3.3.2.4)

GW-Targets



Legend

- Commercial/Indusrial well location
- Domestic well location
- Irrigation well location
- Public water well location
- Approximate extent of 2015 TCE plume
- Buffer from 2005 TCE plume centroid

TCE Trichloroethene

N

0 3,000 6,000

Feet

Source: Source of map image is ESRI, used by the EPA with ESRI's permission.; Nebraska DNR, Registered Groundwater Wells Data Retrieval, 2015

Old HWY 275 and 288th Street Site
Valley, Nebraska

Figure 4

Wells within Target Distance Limit

TETRA TECH

Date: 4/12/2016 Drawn By: Clayton Hayes Project No: X9025.16.0124

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3.3.3 RESOURCES

This factor value was assigned a score of 5 because ground water within Section 25 of Township 16 North, Range 9 East is utilized by 9 active irrigation wells that irrigate between 30 and 140 acres (Ref. 13, pp. 3-6). This one square mile section of land is located directly east of the approximate center of the ground water plume (see Figure 1 of this HRS documentation record). Although Reference 13 is not specific to the type of crop irrigated, Reference 22 indicates that farms in the area are mainly cash-grain types with corn, soybeans, small-grain and alfalfa being the main type of crops produced (Ref. 22, pp. 5, 8). In accordance with Section 3.3.3 of Reference 1, a value of 5 is assigned.

Resources Factor Value: 5
(Ref. 1, Section 3.3.3)

3.3.4 WELLHEAD PROTECTION AREA

Within the 4-mile target distance limit, a designated well head protection area for the Valley PWS has been established (Ref. 31). Nebraska's wellhead protection program was approved by EPA in June 1991 (Ref 32). Well logs for the two active Valley PWS wells referred to as the south well and north well indicated they are screened in the alluvial aquifer from 64 to 99 feet bgs and from 65 to 100 feet bgs respectively (Refs. 7, pp. 365, 368, 369; 31). In accordance with Section 3.3.4 of Reference 1, a value of 5 is assigned.

Wellhead Protection Area Factor Value: 5
(Reference 1, Section 3.3.4)