Hazard Ranking System Documentation Record

Pelican Bay Ground Water Plume
Azle, Tarrant County, Texas
TXN 000605649

Volume I of II

REGION VI

Prepared in cooperation with the
U.S. Environmental Protection Agency

March 2005

Hazard Ranking System Documentation Report

Pelican Bay Ground Water Plume
Azle, Tarrant County, Texas
TXN 000605649

Prepared in cooperation with the

U.S. Environmental Protection Agency

Region VI

Prepared by

Protecting Texas
by Reducing and Preventing Pollution

Texas Commission on Environmental Quality
Superfund Site Discovery and Assessment Program
Austin, Texas

March 2005

The preparation of this report was financed through
grants from the U.S. Environmental Protection Agency.

Pelican Bay Ground Water Plume Site
Azle, Tarrant County, Texas
TXN 000605649

Site History

The Pelican Bay Ground Water Plume site consists of a trichloroethene (TCE) contaminated ground water plume originating from an unidentified source(s). The ground water plume is situated in Tarrant County, in and around the City of Pelican Bay, encompassing an area that is approximately one-half mile wide by one mile long. The plume is centered in a rural residential area, with some light industry, along Sandy Beach Road at the intersection of Allison Avenue.

In March 2004, the Texas Commission on Environmental Quality (TCEQ) brought the site into the United States Environmental Protection Agency (U.S. EPA) Preliminary Assessment/Site Inspection (PA/SI) Grant Program for investigation. A pre-CERCLIS inspection was conducted on March 17, 2004 by TCEQ personnel. Due to findings of ground water contamination in the City of Pelican Bay Public Water Supply (PWS) wells, and the location of nearby private wells, the TCEQ and EPA agreed to move forward to a Screening Site Inspection (SSI). In June 2004, the TCEQ Superfund Site Discovery and Assessment Program (SSDAP) conducted an SSI at the site under the PA/SI Grant Program for the U.S. EPA Region 6.

On July 29, 2004, the TCEQ received notice of preliminary results for the samples collected during the SSI. These results revealed levels of TCE at 46 ppb and 32 ppb and 1.5 ppb in three Pelican Bay PWS wells, Well 12, Well 13, and Well 10. Pelican Bay PWS wells 12 and 13 were taken out of service in January 2004 due to TCE contamination. Four private ground water wells sampled during the SSI were also found to have levels of TCE at 33 ppb, 63 ppb, 82 ppb, and 6.1 ppb. The three private wells with the highest TCE levels were used for drinking water. The Primary Drinking Water Regulations Maximum Contaminant level (MCL) for TCE is 5 ppb. In response to the contamination found in private drinking water wells, the U.S. EPA provided those residents with bottled drinking water while the TCEQ installed ground water filtration systems on their wells. Since other private wells may be located in the area, TCEQ contractors conducted a one-half mile door to door well survey to locate additional private wells.

From August 2004 to present the TCEQ has identified 22 additional private ground water wells with TCE concentrations ranging from 644 ppb to none detected. Nine (9) of those wells used for drinking water were found to be contaminated with TCE, and 6 wells had levels exceeding the MCL. The impacted drinking water well owners were provided with bottled water until a ground water filtration system was installed on their wells.

Elevated levels of cis-1,2-dichloroethene (DCE) ranging from 531 ppb to 2.53 ppb were also detected in many of the wells. The MCL for DCE is 70 ppb. Other contaminants detected in drinking water wells include: 1,1-dichloroethane, 1,1-dichloroethene, and trans-1,2-dichloroethene.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLES

FIGURES

NOTES TO THE READER

The following rules were used when citing references in the Documentation Record:

1. All references attached to this report have been stamped with a designated page number (example: Ref. 1, p. 10 = 01 010).

2. The State predecessor agencies: Texas Natural Resource Conservation Commission (TNRCC), Texas Water Quality Board (TWQB), Texas Department of Water Resources (TDWR), Texas Water Commission (TWC), and Texas Air Control Board (TACB), referred to throughout this report are now known as the Texas Commission on Environmental Quality (TCEQ). The new agency, TCEQ, became effective September 1, 2002, as mandated under House Bill 2912, Article 18 of the 77th Regular Legislative Session.

1.0 INTRODUCTION

The Hazard Ranking System (HRS) is the principle mechanism the U.S. Environmental Protection Agency (EPA) uses to place sites on the National Priorities List (NPL). The HRS serves as a screening device to evaluate the potential for releases of uncontrolled hazardous substances to cause human health or environmental damage. The HRS provides a measure of relative rather than absolute risk. It is designed so that it can be consistently applied to a wide variety of sites.

2.0 HRS DOCUMENTATION RECORD - REVIEW COVER SHEET

SITE NAME: PELICAN BAY GROUND WATER PLUME

CONTACT PERSON:

Documentation: Brenda Cook, USEPA 214/665-7436
Region 6 NPL Coordinator

Pathway, Components, or Threats Not Evaluated

Surface Water Pathway

The Surface Water Pathway was evaluated and not scored due to lack of documentation of a release to surface water.

Soil Exposure Pathway

The Soil Exposure Pathway was evaluated and not scored due to lack of documentation of an area of observed contamination.

Air Migration Pathway

The Air Migration Pathway was evaluated and not scored due to lack of documentation of a release to air.

2.1 HRS DOCUMENTATION RECORD - OVERVIEW

Name of Site: Pelican Bay Ground Water Plume **Date Prepared:** 03/05

CERCLIS Site ID Number: TXN 000605649

Site Specific Identifier: Unidentified Ground Water Plume (Other)

Street Address of Site*: 1713 Pelican Oval

City, County, State: Azle, Tarrant County, Texas 76020

General Location in the State:
The Pelican Bay Ground Water Plume site is situated in Tarrant County, in and around the City of Pelican Bay. The ground water plume is centered along Sandy Beach Road at the intersection of Allison Avenue. (see Figure 1, Regional Location Map and Figure 2, Site Location Map)

Topographic Map:US Geological Survey 7.5 Minute Topographic Map, Azle Quadrangle. Photorevised 1968 and 1972 (Ref. 4, p.1).

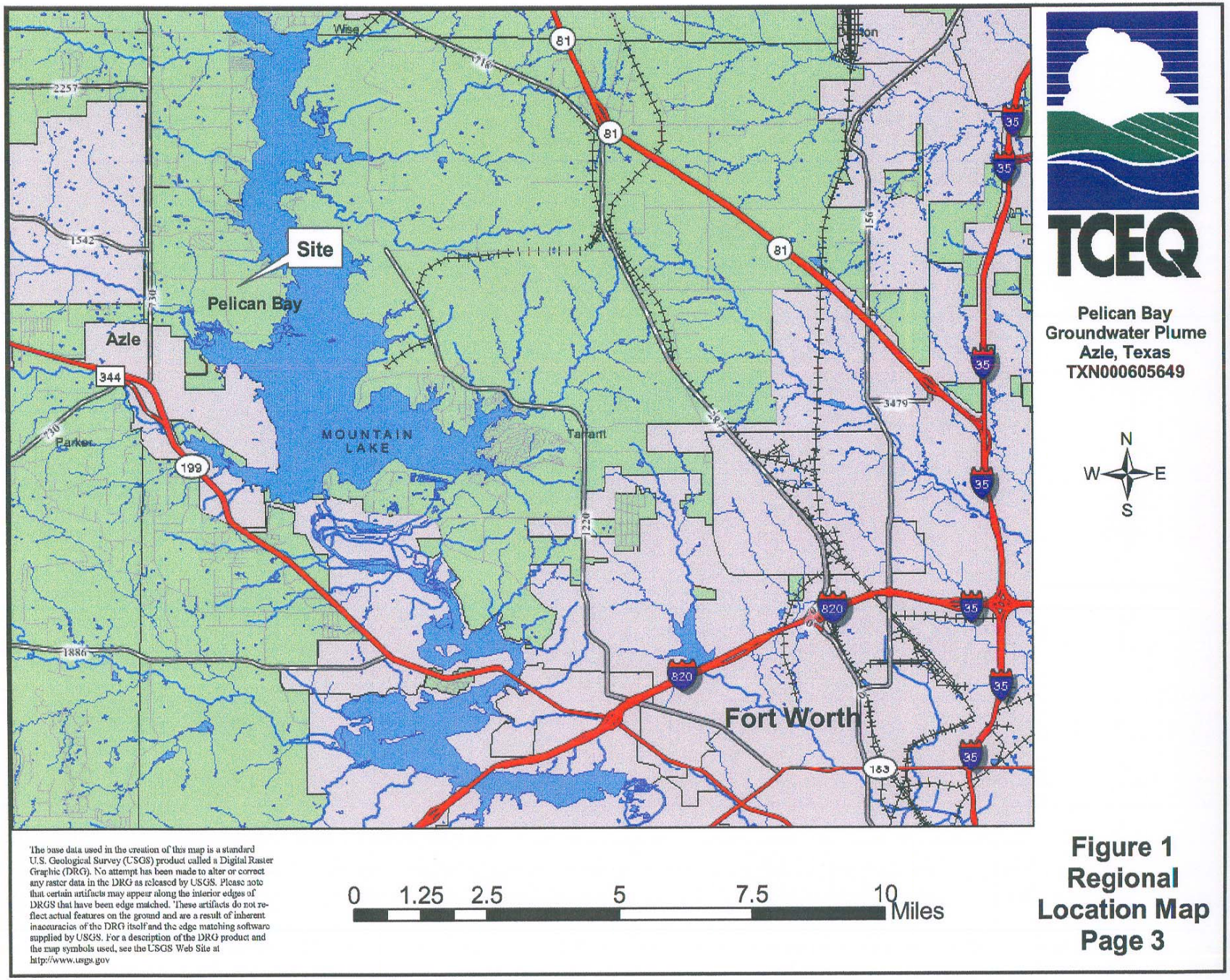
Latitude: 32° 55' 42.5" North **Longitude:** 97° 31' 30" West
The geographic coordinates represent the center of the ground water plume (Reference 4, Topographic Map).

*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, placed, or 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.

Pathway Scores:
Ground Water Migration Pathway - 100
Surface Water Migration Pathway - NS
Soil Exposure Pathway - NS
Air Migration Pathway - NS
*NS = Not Scored

(*Pathways were evaluated but not scored due to their minimal contribution to the overall site score)

HRS SITE SCORE: 50

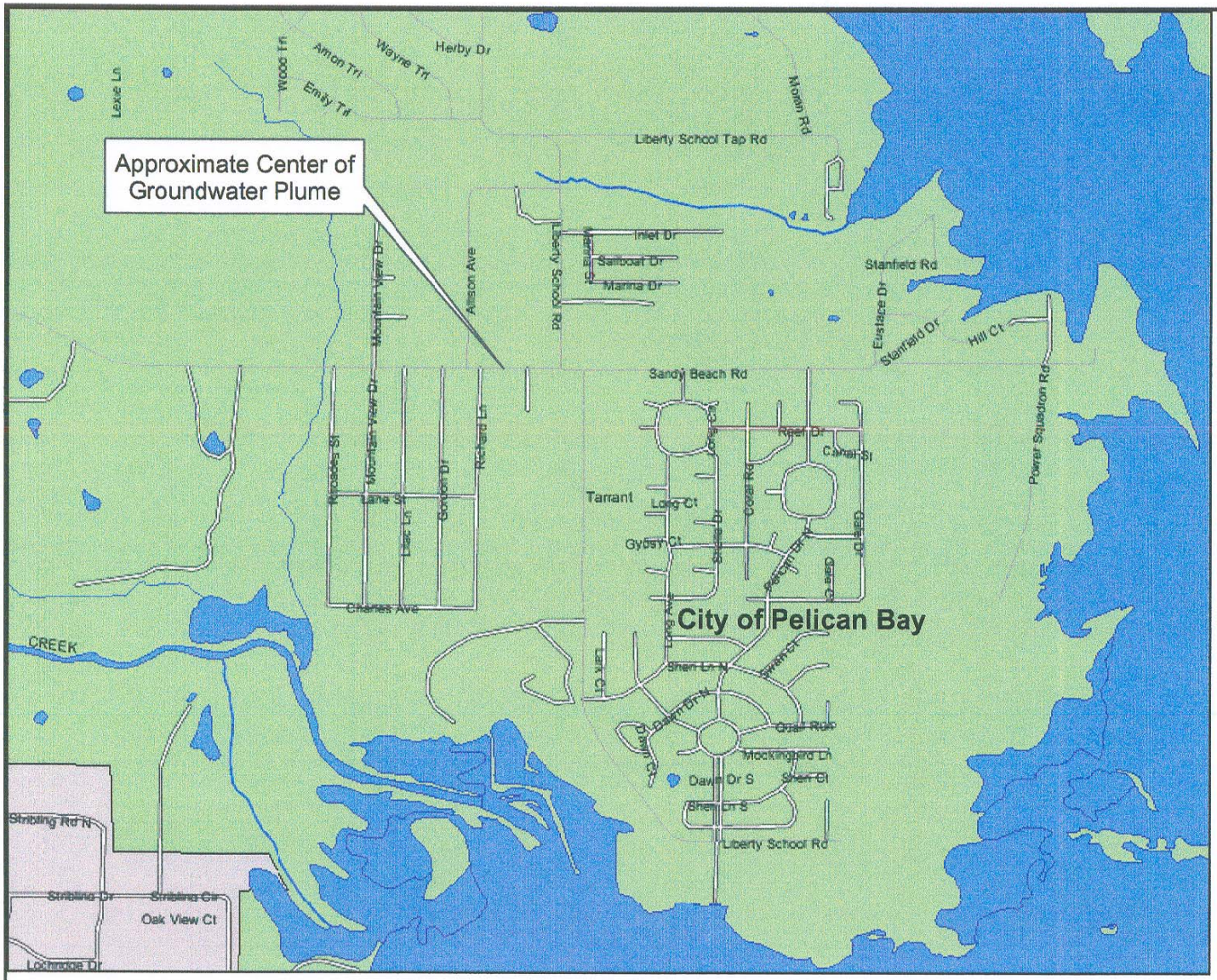


TCEQ

Pelican Bay Groundwater Plume
Azle, Texas
TXN000605649

The base data used in the creation of this map is a standard U.S. Geological Survey (USGS) product called a Digital Raster Graphic (DRG). No attempt has been made to alter or correct any raster data in the DRG as released by USGS. Please note that certain artifacts may appear along the interior edges of DRGS that have been edge matched. These artifacts do not reflect actual features on the ground and are a result of inherent inaccuracies of the DRG itself and the edge matching software supplied by USGS. For a description of the DRG product and the map symbols used, see the USGS Web Site at http://www.usgs.gov

Figure 1
Regional Location Map
Page 3



TCEQ

Pelican Bay Groundwater Plume Azle, Texas TXN000605649

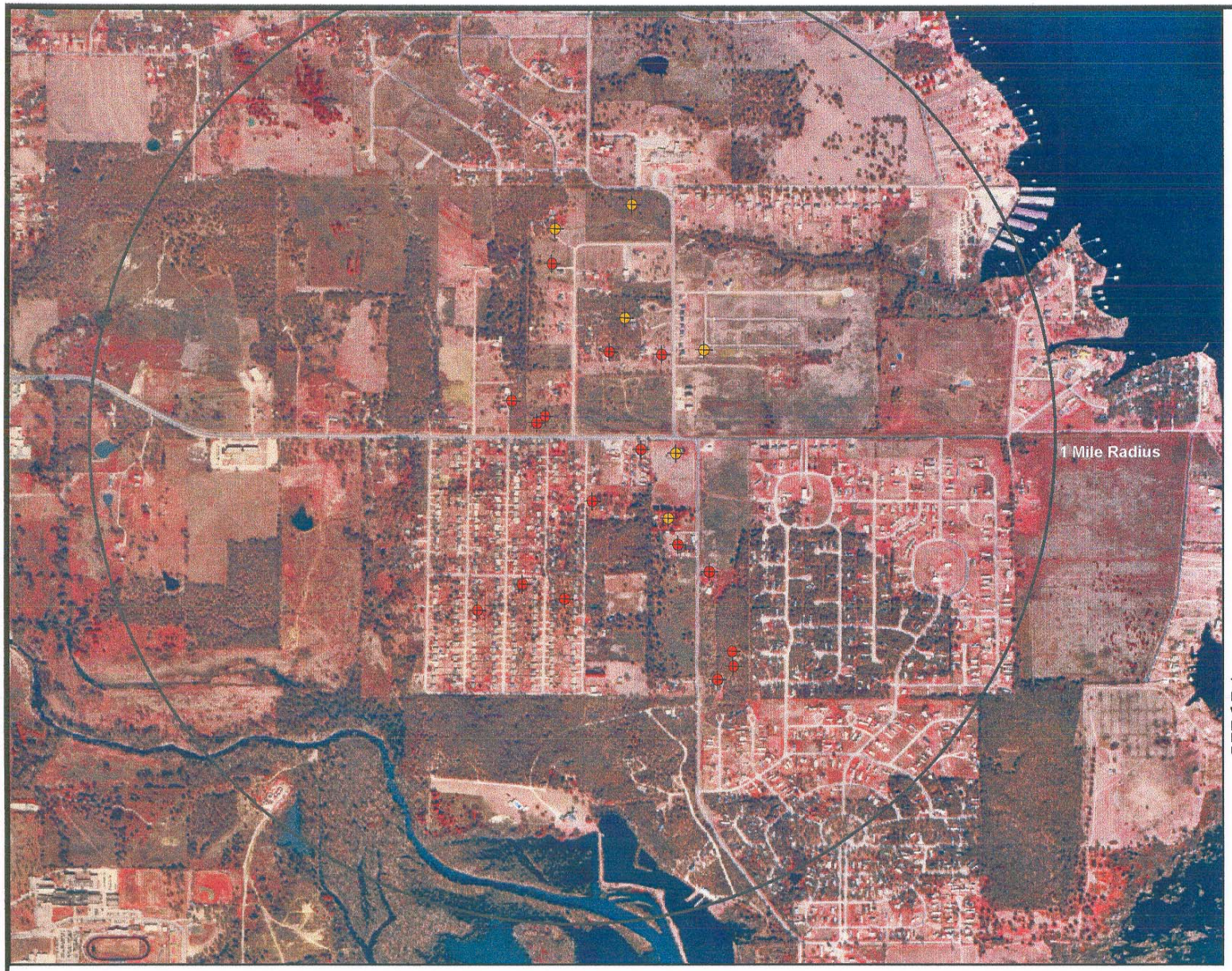
N W E S

The base data used in the creation of this map is a standard U.S. Geological Survey (USGS) product called a Digital Raster Graphic (DRG). No attempt has been made to alter or correct any raster data in the DRG as released by USGS. Please note that certain artifacts may appear along the interior edges of DRGS that have been edge matched. These artifacts do not reflect actual features on the ground and are a result of inherent inaccuracies of the DRG itself and the edge matching software supplied by USGS. For a description of the DRG product and the map symbols used, see the USGS Web Site at http://www.usgs.gov

0 0.2 0.4 0.8 1.2 1.6

Miles

Figure 2 Site Location Map Page 4



TCEQ

Pelican Bay Groundwater Plume Azle, Texas TXN000605649

N
W E
S

The base data used is the 3297044a.sid Digital Orthoquarter Quad (DOQQ), which is a digital version of an aerial photograph. This DOQQ was produced by the TCEQ using USGS guidelines UTM NAD83 Zone 14.

Legend

- Observed Release for TCE in Groundwater/Below MCL
- Observed Release for TCE in Groundwater/Above MCL

(see References 7, 8, 9, 10, 11, 12, 13, 14, and 30)

0 0.1 0.2 0.4 0.6 0.8
Miles

Figure 3 Groundwater Plume Map Page 5

WORKSHEET FOR COMPUTING HRS SITE SCORE

		S	S^2
1.	Ground Water Migration Pathway Score (S_{gw}) (from Table 3-1, line 13)	100	10,000
2a.	Surface Water Overland/Flood Migration Component (from Table 4-1, line 30)	NS	
2b.	Ground Water to Surface Water Migration Component (from Table 4-25, line 28)	NS	
2c.	Surface Water Migration Pathway Score (S_{sw}) Enter the larger of lines 2a and 2b as the pathway score.	NS	
3.	Soil Exposure Pathway Score (S_s) (from Table 5-1, line 22)	NS	
4.	Air Migration Pathway Score (S_a) (from Table 6-1, line 12)	NS	
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	

NS = Not Scored

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		
	2b.	Net Precipitation	10		
	2c.	Depth to Aquifer	5		
	2d.	Travel Time	35		
	2e.	Potential to Release			
		(Lines 2a(2b + 2c + 2d))	500		
3.	Likelihood of Release				
	(Higher of Line 1 and 2e)		550		550
Waste Characteristics					
4.	Toxicity/Mobility		*	10,000	
5.	Hazardous Waste Quantity		*	100	
6.	Waste Characteristics		100		32
Targets					
7.	Nearest Well		50	50	
8.	Population:				
	8a.	Level I Concentrations	**	3690	
	8b.	Level II Concentrations	**	0	
	8c.	Potential Contamination	**	NS	
	8d.	Population (Lines 8a + 8b + 8c)	**	3690	
9.	Resources		5	0	
10.	Wellhead Protection Area		20	20	
11.	Targets (Lines 7 + 8d + 9 + 10)		**		3760
Ground Water Migration Score for an Aquifer					
12.	Aquifer Score				
	((Lines 3 x 6 x 11)/82,500)(Max Value is 100)		100		100
Ground Water Migration Pathway Score					
13.	Pathway Score (S_{gw}), (Highest value from Line 12 for all aquifers evaluated)(Max Value is 100)		100		100

REFERENCE LISTING

Reference
Number Description of the Reference

1. U.S. Environmental Protection Agency. Federal Register - 40 CFR Part 300; Hazard Ranking System; Final Rule, Volume 55, No. 241, December 14, 1990. 1 page.

2. U.S. Environmental Protection Agency. Hazard Ranking System Guidance Manual, EPA 540-R-92-026, OSWER Publication 9345.1-07, November 1992. 1 page.

3. U. S. Environmental Protection Agency, Superfund Chemical Data Matrix (SCDM), EPA/540/R-96/028, OERR Publication 9345.1-21, January 2004. 12 pages.

4. U.S. Geological Survey. Azle, Texas Quadrangle, 7.5 Minute Series Topographic Map. Photorevised 1968 and 1972. 1 sheet.

5. Texas Commission on Environmental Quality, Water Supply Division. PWS Data Update Request the Pelican Bay PWS. January 23, 2004. 1 page.

6. State of Texas Water Well Reports. City of Pelican Bay and Private Wells. June 11, 1982 through July 18, 2001. 11pages.

7. Texas Commission on Environmental Quality. Field Log Notes from Lloyd Johnson. May 21, 2004 through September 29, 2004. 50 pages.

8. Texas Commission on Environmental Quality. Field Log Notes from Kelly Cook. November 16, 2004 through December 1, 2004. 18 pages.

9. U.S. Environmental Protection Agency. Contract Laboratory Program Data Review, SDG Number F1171, Case Number 33032. August 6, 2004. 121 pages.

10. U.S. Environmental Protection Agency. Contract Laboratory Program Data Review, SDG Number F1168, Case Number 33032. August 6, 2004. 103 pages.

11. ECS Environmental Chemistry Services. Data Usability Summary, Pelican Site Sampling Event. August 17 and 18, 2004. 112 pages.

12. ECS Environmental Chemistry Services. Data Usability Summary, Pelican Site Sampling Event. September 9, 2004. 47 pages.

13. ECS Environmental Chemistry Services. Data Usability Summary, Pelican Site Sampling Event. September 28 and 29, 2004. 120 pages.

REFERENCE LISTING (continued...)

Reference
Number Description of the Reference

14. ECS Environmental Chemistry Services. Data Usability Summary, Pelican Site Sampling Event. November 17 and 18, 2004. 44 pages.

15. Texas Commission on Environmental Quality. Quality Assurance Project Plan for Texas Commission on Environmental Quality Preliminary Assessment/Site Inspection Program (FY 2004-2005). November 2003. 113 pages.

16. LandView 6 - Census 2000, Version 1.0. Census 2000 Profile of General Demographics for Tarrant County, Texas. 2 pages.

17. Texas Commission on Environmental Quality. Public Water System Data Sheet for the City of Pelican Bay PWS ID 2200164, Last Survey Date March 16, 2004. January 10, 2005. 13 pages.

18. U. S. Environmental Protection Agency. E-mail Communication from Richard Franklin, to Kelly Cook at the Texas Commission on Environmental Quality. September 2, 2004. 1 page.

19. Texas Commission on Environmental Quality. Wellhead Protection Area (WHPA) Map for Pelican Bay, Texas. January 12, 2005. 1 sheet.

20. U.S. Environmental Protection Agency. Evaluating Ground Water Plumes Under the Hazard Ranking System, EPA 540-F-95-034, OSWER Publication 9320.8-01FS, September 1998. 5 pages.

21. Texas Commission on Environmental Quality. Screening Site Inspection Report for Pelican Bay Public Water System Ground Water Plume, Azle, Tarrant County, Texas. TXN 000605649. January 2005. 54 pages.

22. Aerial photographs of Sandy Beach Road and Mountain View Drive, Azle, Texas. 1956, 1964, 1970 and 1976. 4 pages.

23. Texas Commission on Environmental Quality. Interoffice Memorandum. From Lloyd Johnson to Kelly Cook. January 14, 2005. 1 page.

24. U.S. Environmental Protection Agency. Fact Sheet - Using Qualified Data to Document an Observed Release and Observed Contamination. November 1996. 18 pages.

REFERENCE LISTING (continued...)

Reference
Number Description of the Reference

25. Texas Department of Water Resources. Report 269 - Occurrence, Availability, and Chemical Quality of Ground Water in the Cretaceous Aquifers of North-Central Texas, Volume 1. April 1982. 19 pages.

26. United States Department of Agriculture - Soil Conservation Service. Soil Survey of Tarrant County, Texas. June 1981. 15 pages.

27. Texas Commission on Environmental Quality, Public Drinking Water Section. Letter to the City of Pelican Bay, Water System Official. February 9, 2004. 8 Pages.

28. United States Environmental Protection Agency, Region VI. Pollution Report for Pelican Bay Water System. February 28, 2005. 2 pages.

29. URS Group, Inc. Letter to Kelly Cook, Texas Commission on Environmental Quality. Results of Water Well Report. July 27, 2004. 5 Pages.

30. Texas Commission on Environmental Quality, GPS Collection Points for Pelican Bay, Texas. June 29, 2004 through September 28, 2004. 30 Pages.

SOURCE DESCRIPTION

2.2 SOURCE CHARACTERIZATION

2.2.1 Source Identification

Number of the source: 1

Name and description of the source: Ground Water Plume (with no identified source)

In June 2004, the TCEQ Superfund Site Discovery and Assessment Program (SSDAP) conducted an SSI at the site under the PA/SI Grant Program for the U.S. EPA Region 6.

The results from the June-July 2004 SSI revealed levels of trichloroethylene (also referred to as trichloroethene or TCE) at 46 ppb and 32.0 ppb and 1.2 ppb in three Pelican Bay PWS wells, Well 12, Well 13, and Well 10 (Ref. 9, pp. 65-70; Ref. 10, pp.74-79, 98-100). Pelican Bay PWS wells 12 and 13 were taken out of service in January 2004 due to TCE contamination (Ref. 5, p. 1). Four private ground water wells sampled during the SSI were also found to have levels of TCE at 33 ppb, 63 ppb, 82 ppb, and 6.1 ppb (Ref. 9, pp. 83-94, 98-100, 110-112). The three private wells with the highest TCE levels were used for drinking water. The Primary Drinking Water Regulations Maximum Contaminant Level (MCL) for TCE is 5 ppb. In response to the contamination found in private drinking water wells the U.S. EPA provided those residents with bottled drinking water while the TCEQ installed ground water filtration systems on their wells (Ref. 28, p. 1).

From August 2004 to present the TCEQ has identified 22 additional private ground water wells with TCE concentrations ranging from 644 ppb to none detected (Ref. 11; 12; 13; and 14). Nine (9) of those wells used for drinking water were found to be contaminated with TCE, and 6 wells had levels exceeding the MCL. The impacted drinking water well owners were provided with bottled water until a ground water filtration system was installed on their wells (Ref. 28, p. 1; see Tables 6 and 7 for Observed Release Sample Results).

Elevated levels of cis-1,2-dichloroethene (DCE) ranging from 531 ppb to 2.53 ppb were also detected in many of the wells. The MCL for DCE is 70 ppb. Other contaminants detected in drinking water wells include: 1,1-dichloroethane, 1,1-dichloroethene, and trans-1,2-dichloroethene (see Tables 6 and 7 for Observed Release Sample Results).

The source of the contamination is unidentified and the area of contamination is undefined. Adequate documentation attributing the hazardous substances to one or more of the potential source areas has not been identified according to the HRS criteria. Therefore, a ground water plume with no identified source was used for HRS scoring. The ground water plume with no identified source was characterized as the source based on the following:

- The source of the ground water plume contamination is unidentified and undefined (Ref. 21, p. 16; 28, p. 2).

- Additional sampling and site reconnaissance was conducted after the SSI (Ref. 11; 12; 13; 14; and 28, p. 2). Local interviews were also conducted to gain information about the possible source of the ground water contamination (Ref. 7, p. 21; 8, p. 16; 22; and 23, p. 1).

The following businesses are noted to be within the contaminated ground water plume area either by TCEQ file review or by field observation:

- The Wells Wrecker Service is located on Liberty School Road. There are abandoned cars, trucks, and boats on the property. The business includes a workshop. There is a residence which obtains drinking water from an on-site well contaminated with TCE above the MCL (Ref. 7, p 14; Ref. 9, pp. 98-100; Ref. 21, p. 16).

- A Fina Gas Station is located on Sandy Beach Road. The business is known locally as the "Lucky Lady." There is a residential trailer park adjacent to the Fina Gas Station property which obtains drinking water from an on-site well contaminated with TCE above the MCL (Ref. 7, p. 28; Ref. 11, p. 111; Ref. 21, p. 16).

- An abandoned landfill is located on Mountain View Drive north of Sandy Beach Road (according to a review of aerial photographs from 1956, 1964, 1970 and 1976). The landfill may have operated from sometime before 1964 to sometime after 1970 (Ref. 22). The landfill was not licensed to operate. The property is now divided into several individually owned parcels. No other information is known about the landfill at this time.

- A privately owned auto restoration facility is located on Sandy Beach Road. The facility has a garage with several ongoing automobile frame-up restoration projects. There is a residence which obtains drinking water from an on-site well contaminated with TCE and DCE above the MCL, and 1,1-Dichloroethane, 1,1-Dichloroethene and trans-1,2-Dichloroethene. The property owner has stated that he has used TCE at this location (Ref. 7, p. 40; Ref. 12, pp. 15-16; Ref. 23).

- An area resident reported that the previous owner of a residence located on Lilac Lane operated a automotive repair business out of the residence. The adjacent property has an irrigation ground water well contaminated with TCE and DCE above the MCL, and 1,1-Dichloroethane, 1,1-Dichloroethene and trans-1,2-Dichloroethene (Ref. 7, p. 39; Ref. 8, p. 16; Ref. 12, pp. 11-12).

- A privately owned dump site, locally known as "Lloyd Bilbry's Property," is located west of Rhoades Street along Sandy Beach Road. Numerous drums, buried trash, auto parts, abandoned automotive gasoline tanks, and a 2,000 gallon storage tank have been observed on the property (Ref. 7, p. 21).

Location of the source, with reference to a map of the site:
The outer boundaries of the contaminated ground water plume have tentatively been established along Rhoades Street to the west and Wayne Trail Road to the north with the identification of clean ground water wells. Clean wells have also been established on the east and south sides of Pelican Bay along Pelican Drive and Sheri Lane. (See Figure 3, Ground water Plume Map).

Source type for HRS evaluation purposes: Ground Water Plume (Other).

Containment
Gas release to air: The air migration pathway was not evaluated; therefore, gas containment was not scored.

Particulate release to air: The air migration pathway was not evaluated; therefore, particulate containment was not scored.

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 (i.e., source area includes source and any associated containment structures). The applicable containment factor value was determined based on existing analytical evidence of hazardous substance in ground water samples from public wells (Ref. 27, pp. 1-8). Therefore, based on no liner and evidence of a release, the highest Ground Water Migration Pathway Containment Factor Value of 10 was assigned to Source No. 1 as specified in Table 3-2 of the HRS Rule (Ref. 1, Section 3.1.2.1).

Release to surface water overland/flood migration component: The surface water pathway was not scored; therefore, surface water overland/flood migration component containment was not evaluated.

2.2.2 Hazardous Substances Associated With A Source

The ground water plume source hazardous substances are those hazardous substances for which an observed release was established within the Paluxy Formation, the aquifer of concern for the Ground Water Migration Pathway. The hazardous substances listed below in Table 1 were detected in samples collected by the TCEQ during the SSI sampling event tasked by the U.S. Environmental Protection Agency June 28, 2004 through July 1, 2004 (Ref. 9; 10), and during immediate response activities in August, September and November of 2004 (Ref. 11, 12, 13 and 14). Also, ground water samples collected from City of Pelican Wells 12 and 13 on June 14, 2000 are included. The June 14, 2000 ground water samples from Wells 12 and 13 were collected prior to the wells being taken out of service in January 2004 due to contamination (Ref. 5; 27, pp. 1-8).

Table 1 - Ground Water Plume (with no identified source)
Source Hazardous Substances

Hazardous Substance	Evidence	
	Sample Location/Station Sample Number [Date]	References
Trichloroethylene	Well 10/GW- 15 F1169 [6/28/04]	Ref. 7, p. 3; Ref. 10, pp. 22-23, 52, & 98-100
	Well 12/EP00-8377 [6/14/00]	Ref. 27, pp. 1-2 & 5-6
	Well 13/EP00-8378 [6/14/00]	Ref. 27, pp. 1-2 & 7-8
	GW-19 F1173 [6/30/04]	Ref. 7, p. 12; Ref. 9, pp. 17-19, 61, & 83-88
	GW-20 F1174 [6/30/04]	Ref. 7, p. 9; Ref. 9, pp.19-21, 60, & 89-94
	GW-27 F1181 [6/30/04]	Ref. 7, p. 11; Ref. 9, pp. 25-26, 63, & 110-112
	GW-23 F1177 [7/01/04]	Ref. 7, p. 14; Ref. 9, pp. 22-23, 57, & 98-100
	W-1 [8/17/04]	Ref. 7, p. 24; Ref. 11, pp. 4, 15-16, & 109
	W-2 013A [8/18/04]	Ref. 7, p. 28; Ref. 11, pp. 4, 40-41, & 111
	W-3 014A [8/18/04]	Ref. 7, p. 29; Ref. 11, pp. 4, 42-43, & 111

Table 1 - Ground Water Plume (with no identified source) Source Hazardous Substances		
Hazardous Substance	**Evidence**	
	Sample Location/Station Sample Number [Date]	**References**
Trichloroethylene (continued...)	W-4 015A [8/18/04]	Ref. 7, p. 29; Ref. 11, pp. 4, 44-45, & 111
	W-5 016A [8/18/04]	Ref. 7, p. 29-30; Ref. 11, pp. 4, 46-47, & 111
	W-6 017A [8/18/04]	Ref. 7, p. 39; Ref. 11, pp. 4, 48-49, & 111
	W-7 018A [8/18/04]	Ref. 7, p. 30; Ref. 11, pp. 4, 50-51, & 111
	W-8 019A [8/18/04]	Ref. 7, p. 31; Ref. 11, pp. 4, 52-53, & 111
	W-10 022A [8/18/04]	Ref. 7, p. 32; Ref. 11, pp. 4, 58-59, & 112
	W-11 023A [8/18/04]	Ref. 7, p. 32-33; Ref. 11, pp. 4, 60-61, & 112
	W-12 026A [8/18/04]	Ref. 7, p. 33; Ref. 11, pp. 4, 66-67, & 112
	W-1B 001A [9/09/04]	Ref. 7, p. 39; Ref. 12, pp. 8-10, & 47
	W-2B 002A [9/09/04]	Ref. 7, p. 39; Ref. 12, pp. 8, 11-12, & 47
	W-4B 004A [9/09/04]	Ref. 7, p. 40; Ref. 12, pp. 8, 15-16, & 47
	QM1-GW8 001A [11/17/04]	Ref. 8, p. 7; Ref. 14, pp. 2-4, 39

Table 1 - Ground Water Plume (with no identified source) Source Hazardous Substances		
Hazardous Substance	**Evidence**	
	Sample Location/Station Sample Number [Date]	**References**
cis-1,2- Dichloroethene	GW-19 F1173 [6/30/04]	Ref. 7, p. 12; Ref. 9, pp. 17-19, 61, & 83-88
	GW-20 F1174 [6/30/04]	Ref. 7, p. 9; Ref. 9, pp.19-21, 60, & 89-94
	GW-23 F1177 [7/01/04]	Ref. 7, p. 14; Ref. 9, pp. 22-23, 57, & 98-100
	W-4 015A [8/18/04]	Ref. 7, p. 29; Ref. 11, pp. 4, 44-45, & 111
	W-5 016A [8/18/04]	Ref. 7, p. 29-30; Ref. 11, pp. 4, 46-47, & 111
	W-7 018A [8/18/04]	Ref. 7, p. 30; Ref. 11, pp. 4, 50-51, & 111
	W-8 019A [8/18/04]	Ref. 7, p. 31; Ref. 11, pp. 4, 52-53, & 111
	W-12 026A [8/18/04]	Ref. 7, p. 33; Ref. 11, pp. 4, 66-67, & 112
	W-2B 002A [9/09/04]	Ref. 7, p. 39; Ref. 12, pp. 8, 11-12, & 47
	W-4B 004A [9/09/04]	Ref. 7, p. 40; Ref. 12, pp. 8, 15-16, & 47

Table 1 - Ground Water Plume (with no identified source) Source Hazardous Substances		
Hazardous Substance	**Evidence**	
	Sample Location/Station Sample Number [Date]	**References**
1,1- Dichloroethane	W-4 015A [8/18/04]	Ref. 7, p. 29; Ref. 11, pp. 4, 44-45, & 111
	W-5 016A [8/18/04]	Ref. 7, p. 29-30; Ref. 11, pp. 4, 46-47, & 111
	W-2B 002A [9/09/04]	Ref. 7, p. 39; Ref. 12, pp. 8, 11-12, & 47
	W-4B 004A [9/09/04]	Ref. 7, p. 40; Ref. 12, pp. 8, 15-16, & 47
1,1- Dichloroethene	W-2B 002A [9/09/04]	Ref. 7, p. 39; Ref. 12, pp. 8, 11-12, & 47
	W-4B 004A [9/09/04]	Ref. 7, p. 40; Ref. 12, pp. 8, 15-16, & 47
trans-1,2- Dichloroethene	W-4 015A [8/18/04]	Ref. 7, p. 29; Ref. 11, pp. 4, 44-45, & 111
	W-5 016A [8/18/04]	Ref. 7, p. 29-30; Ref. 11, pp. 4, 46-47, & 111
	W-2B 002A [9/09/04]	Ref. 7, p. 39; Ref. 12, pp. 8, 11-12, & 47
	W-4B 004A [9/09/04]	Ref. 7, p. 40; Ref. 12, pp. 8, 15-16, & 47

Two (2) ground water samples were collected during the site sampling investigations to be used as background samples. On July 1, 2004 during the EPA SSI sampling event one ground water sample GW-16/F1170 was collected outside of the suspected ground water plume area for establishing background levels (Ref. 7, pp. 15-16; Figure 4). On August 18, 2004 another ground water sample W-9/021A was collected up gradient of the suspected ground water plume for additional background levels (Ref. 7, pp. 31-32; Figure 4). Table 2 provides a summary of the background sample descriptions and Table 3 provides a summary of the background sample results.

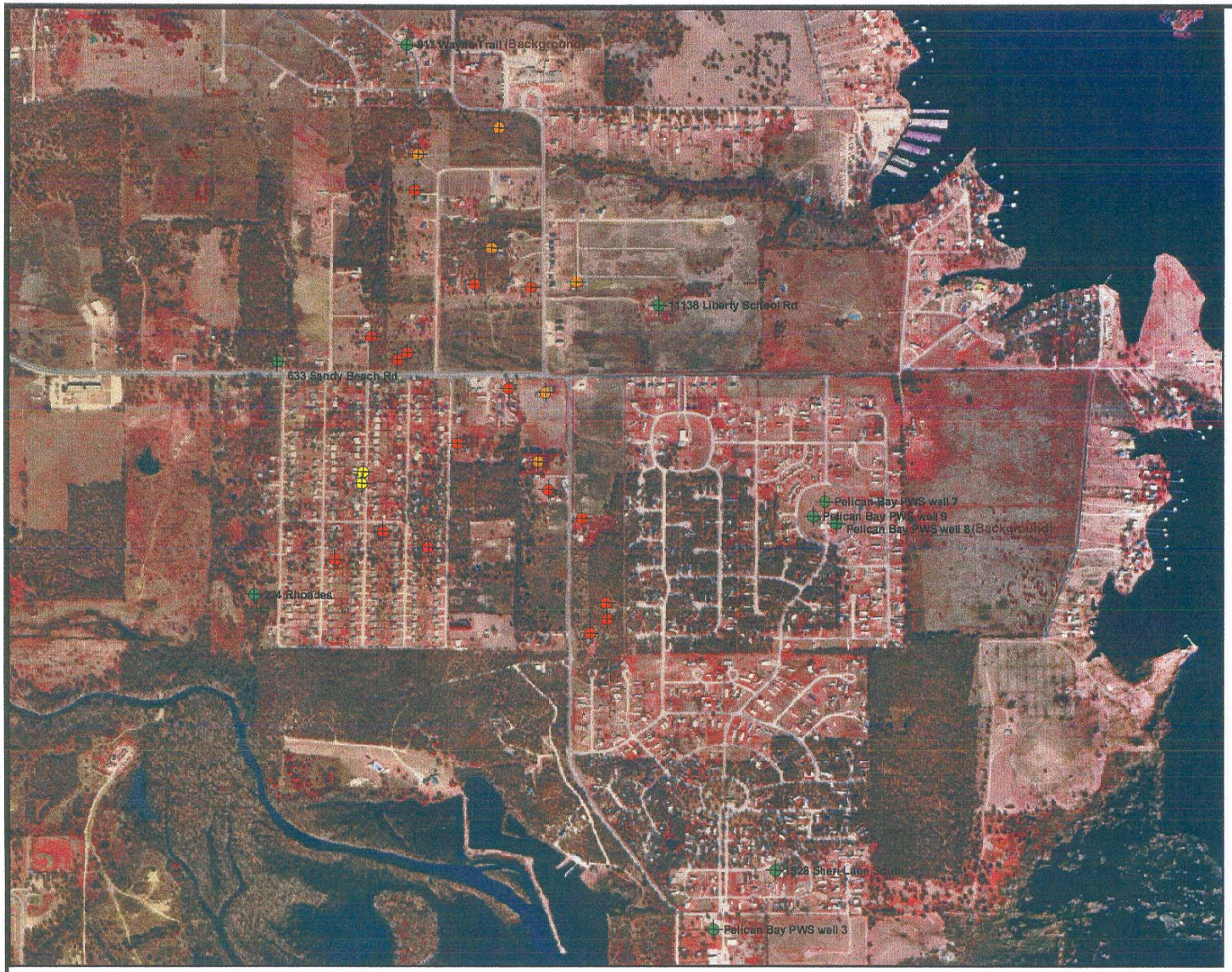
Table 2 - Ground Water Migration Pathway
Background Sample Descriptions

Sample Location/Station No. [EPA ID]	Date Collected	Well Screened Interval (feet)	References
Well 8/GW- 16[F1170] Pelican Bay PWS	7/01/04	40'-75'	Ref. 6, p. 10 Ref. 7, pp. 15-16
W-9 Private Well	8/18/04	146'-200'	Ref. 6 , p. 11 Ref. 7, pp. 31-32

Table 3 - Ground Water Plume (with no identified source) Background Sample Results				
Sample Location/Station No. [EPA ID]	**Background Samples**			
	Hazardous Substances	**Sample Concentrations (ug/L)**	**Sample Quantitation Limit (or equivalent) (ug/L)**	**References**
Well 8/GW- 16 [F1170]	Trichloroethene	ND	0.50	Ref. 9, pp. 14-15, 59, & 74-76
	cis-1,2-Dichloroethene	ND	0.50	
	1,1-Dichloroethane	ND	0.50	
	1,1-Dichloroethene	ND	0.50	
	trans-1,2-Dichloroethene	ND	0.50	
917 Wayne Trail/W-9	Trichloroethene	ND	0.06	Ref. 11, pp. 4, 56-57
	cis-1,2-Dichloroethene	ND	0.06	
	1,1-Dichloroethane	ND	0.06	
	1,1-Dichloroethene	ND	0.07	
	trans-1,2-Dichloroethene	ND	0.06	

Notes: ND = Not Detected at the SQL. [SQL] = Sample Quantitation Limit.

A complete listing of all source characterization sample results is included as References 7, 8, 9, 10, 11, 12, 13 and 14. All samples were collected according to the EPA approved, FY 2004-2005 TCEQ Quality Assurance Project Plan (Ref. 15).



TCEQ

Pelican Bay Groundwater Plume
Azle, Texas
TXN000605649

N
W E
S

The base data used is the 3297044a.sid Digital Orthoquarter Quad (DOQQ), which is a digital version of an aerial photograph. This DOQQ was produced by the TCEQ using USGS guidelines UTM NAD83 Zone 14.

Legend (References 7, 8, 9, 10, 11, 12, 13, 14, and 30)

- None Detected for TCE in Groundwater
- Owner Denied Access for Sampling
- Observed Release for TCE in Groundwater/Below MCL
- Observed Release for TCE in Groundwater/Above MCL

0 0.125 0.25 0.5 0.75 1
Miles

Figure 4
Background Sample Location Map
Page 20

2.2.3 Hazardous Substances Available to a Pathway

Because the containment factor value for Source 1 is greater than 0, the following hazardous substances associated with Source 1 can migrate via the ground water pathway: TCE, DCE, 1,1-Dichloroethane, 1,1-Dichloroethene and trans-1,2-Dichloroethene (Ref. 1, Section 2.2.3).

2.3 LIKELIHOOD OF RELEASE

An observed release to the Ground Water Migration Pathway has been established based on chemical analyses. Ground water samples from the aquifer of concern indicate that concentrations of hazardous substances are present at three times greater than the designated background levels and in concentrations greater than the corresponding SQLs (see Tables 6 and 7 for Observed Release Sample Results).

Refer to Section 3.1.1 of this documentation record for specific information related to the observed release to the Ground Water Migration Pathway.

2.4 WASTE CHARACTERISTICS

2.4.1 Selection of Substance Potentially Posing Greatest Threat

The Mobility Factor Value for all hazardous substances that meet the criteria for an observed release by chemical analysis to one or more aquifers underlying the source(s) at the site, regardless of the aquifer being evaluated, is assigned a mobility factor value of 1 (Ref. 1, Section 3.2.1.2).

Contaminant characteristic values for hazardous substances found in an observed release to ground water were derived from SCDM (Ref. 3). The hazardous substance with the highest toxicity/mobility factor value available to the ground water migration pathway is TCE (10,000). Therefore, the hazardous substance TCE is the hazardous substance associated with this source posing the greatest threat (Ref. 1, Sections 2.4.1.2, 3.2.1).

Specific factors of the hazardous substances available to the Ground Water Migration Pathway and selection of the hazardous substance with the highest combined factor value (toxicity and mobility), are presented under the Ground Water Migration Pathway section (Section 3.2.1) of this documentation record.

2.4.2. Hazardous Waste Quantity

2.4.2.1 Source Hazardous Waste Quantity

2.4.2.1.1. Hazardous Constituent Quantity (Tier A) - Not Evaluated (NE)

The information available is not sufficient to evaluate Tier A, as required in Section 2.4.2.1.1 of the HRS Rule. As a result, the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier B, hazardous waste quantity (Ref. 1, Section 2.4.2.1.1).

2.4.2.1.2. Hazardous Wastestream Quantity (Tier B) - NE

The information available is not sufficient to evaluate Tier B, as required in Section 2.4.2.1.2 of the HRS Rule. As a result the evaluation of Hazardous Waste Quantity proceeds to the evaluation of Tier C, volume (Ref. 1, Section 2.4.2.1.2).

2.4.2.1.3. Volume (Tier C)

Since the hazardous wastestream was not adequately determined under Tier B, the volume will be evaluated under Tier C. For the migration pathways, the source is assigned a value for volume using the appropriate Tier C equation from Table 2-5 (Ref. 1, Section 2.4.2.1.3). The hazardous waste quantity for a plume site with no identified source can be determined by measuring the area within all observed release samples combined with the vertical extent of contamination, to arrive at an estimate of the plume volume (Ref. 20, p. 4).

Since the vertical extent of the ground water plume is unknown, the volume for the ground water plume will be designated as unknown, but greater than zero.

2.4.2.1.4. Area (Tier D) - NE

The area measure (Tier D) cannot be evaluated because the hazardous waste quantity table (Ref.1 Table 2-5) does not provide a divisor for source type “other” in this tier (Ref. 20, p. 4).

2.4.2.1.5. Source Hazardous Waste Quantity Value

As described in the HRS Rule, the highest value assigned to a source from among the four tiers of hazardous constituent quantity (Tier A), hazardous wastestream quantity (Tier B), volume (Tier C) or area (Tier D) shall be selected as the source hazardous waste quantity value (Ref. 1, Section 2.4.2.1).

Table 4 - Source 1 Ground Water Plume (with no identified source)
Source Hazardous Waste Quantity

Tier Measure	Migration Pathway (Ground Water)
Tier A, Constituent Quantity	NE
Tier B, Wastestream Quantity	NE
Tier C, Volume	Unknown, but > 0
Tier D, Area	NE

NE = Not Evaluated

Source 1 - Hazardous Waste Quantity Value: > 0

SITE SUMMARY OF SOURCE DESCRIPTIONS

Table 5
Site Summary of Source Descriptions

Source Number	Source Hazardous Waste Quantity Value	Containment			
		Ground Water	Surface Water	Gas	Air Particulate
1	Unknown, but > 0	10	NS	NS	NS

NS = Not Scored

Source Hazardous Waste Quantity Factor Value: > 0

3.0 GROUND WATER PATHWAY

3.0.1 GENERAL CONSIDERATIONS

General Regional Geology

The area of the contaminated ground water plume is located in the Cretaceous aquifers of North Central Texas. The site is on the outcrop of the Paluxy Formation. The wells which were sampled draw water from the Paluxy and Twin Mountains Formations of the Trinity Group. Pre-Cretaceous undifferentiated Paleozoic rocks underlie the Trinity Group. The water quality in the Trinity Group ranges from fresh to slightly saline, but is suitable for most public supply and industrial uses (Ref. 25, p. 2). The site is about 30 miles south of the Glen Rose pinch-out, hence the Antlers Formation is not present (Ref. 25, p. 16).

The four most predominant soil types at the site are: the Windhorst fine sandy loam; eroded Windhorst fine sandy loam and Selden loamy fine sand; Rader fine sandy loam; and, Nimrod fine sand (Ref. 26). There are two aquifers that supply drinking water at the site. The Paluxy Formation (Aquifer 1) is the top shallow aquifer that supplies most of the drinking water to private wells and some public wells in the local area (Ref. 6, pp. 1-11). And, the Twin Mountain Formation (Aquifer 2), which is the deeper aquifer serving mostly public supply wells in the area (Ref. 6, pp. 1-11). The contaminated ground water has only been found in the wells completed into the Paluxy Formation at this time (see Tables 6 and 7, Observed Release Samples).

Stratum 1a

Stratum Name: Windhorst fine sandy loam (the soil type found at Pelican Bay PWS Wells 12 and 13, W4B and W5)

Description: This is a deep, gently sloping to sloping soil on hillsides and ridges. The surface layer is typically brown fine sandy loam. The subsoil is red, yellowish red, to yellow clay. The soil is moderately well drained, permeability is moderately slow, and available water capacity is high. Runoff is rapid, and the hazard of erosion is severe. The shrink-swell potential with varying moisture content is low in the surface layer, and moderate in the subsoil. The soil is typically acidic in the upper part, grading to mildly alkaline in the lower part. There is a high risk of corrosion of uncoated steel, and a low risk of corrosion of concrete (Ref. 26, p.7).

Stratum 1b

Stratum Name: Eroded Windhorst fine sandy loam and Selden loamy fine sand (the soil type in the vicinity of Pelican Bay PWS Well 10 and W3)

Description: Eroded Windthorst fine sandy loam is moderately deep, gently sloping to sloping loamy soil on narrow ridges and side slopes below ridges. Erosion has removed most of the loamy surface layer, exposing the reddish clay subsoil in many places, and forming a few shallow gullies.

The surface layer is light brown fine sandy loam. The subsoil is red clay to yellowish red sandy clay loam. Below that is weakly cemented sandstone. The soil is moderately well drained, permeability is moderately slow, and available water capacity is high. Runoff is rapid, and the hazard of erosion is severe. The shrink-swell potential with varying moisture content is low in the surface layer, and moderate in the subsoil. The soil is typically acidic in the upper part, and mildly alkaline in the lower part. There is a high risk of corrosion of uncoated steel, and a low risk of corrosion of concrete (Ref. 26, pp. 7-8).

Selden loamy fine sand is deep, gently sloping, sandy soil on uplands. The surface layer is brownish loamy fine sand. The subsoil is sandy clay loam, yellowish brown to mottled yellow, red, and gray. The soil is moderately well drained, permeability is moderately slow, and available water capacity is medium. Runoff is slow, and the hazard of erosion is slight. The shrink-swell potential with varying moisture content is very low in the surface layer, and low in the subsoil. The soil is typically neutral in the upper part, grading to strongly acid in the lower part. There is a high risk of corrosion of uncoated steel, and a moderate risk of corrosion of concrete (Ref. 26, p. 6).

Stratum 1c

Stratum Name: Rader fine sandy loam (the soil type in the vicinity of Pelican Bay PWS Wells 5, 7, 8 and 9)

Description: This is a deep, nearly level and gently sloping, loamy soil on low terraces and in valleys. The surface layer is fine sand, brown to pale brown. The subsoil has a yellowish brown sandy clay loam upper layer. Below this the subsoil is mottled yellow, gray, brown and red, with a sandy clay layer, and a sandy clay loam lower layer. The soil is moderately well drained, permeability is very slow, and available water capacity is medium. Runoff is slow, and the hazard of erosion is slight. A perched water table is present on the clayey lower layers after periods of heavy rainfall. The shrink-swell potential with varying moisture content is low in the surface layer, moderate in the upper sandy clay loam subsoil layer, high in the sandy clay layer, and moderate in the lower sandy clay loam subsoil layer. The soil is slightly acid in the upper part, and medium or strongly acid in the lower part. There is a high risk of corrosion of uncoated steel, and a moderate risk of corrosion of concrete (Ref. 26, pp. 4-5).

Stratum 1d

Stratum Name: Nimrod fine sand (the soil in the vicinity of W2, GW-23, and W7)

Description: This is a deep, gently sloping, sandy soil on ridges and side slopes. The surface layer is brownish fine sand. The subsoil is reddish yellow sandy clay loam, grading to mottled grayish, reddish and yellowish sandy clay loam in the lower part. The soil is moderately well drained. Permeability is moderately slow, and available water capacity is medium. The surface layer absorbs rainfall rapidly, and runoff is very slow. A perched water table is at the top of the upper part of the subsoil for short periods following heavy rainfall. The shrink-swell potential is very low in the surface layer, and low in the layers beneath (Ref. 26, pp.2-3).

Stratum 2

Stratum Name: Paluxy Formation (Aquifer 1)

Description: The Paluxy is composed predominantly of fine- to coarse-grained, friable, homogeneous, white quartz sand, interbedded with sandy, silty, calcareous, or waxy clay and shale. The upper Paluxy is fine-grained sand with variable amounts of shale and clay. In general, coarse-grained sand is in the lower part. The sands are usually well-sorted, poorly cemented, and crossbedded. Pyrite and iron nodules are often associated with the sands, and frequently contribute a red stain to the individual beds. In some areas along the outcrop, high iron concentrations are present in ground water analyses (Ref. 25, p. 9). The depth to water varies from 24 to 96 feet below ground surface at the site (Ref. 6, pp. 1-11). The thickness at the site varies from 400 feet to less than 100 feet (Ref. 25, pp. 17-18).

The primary source of recharge to the Paluxy is precipitation on the outcrop. The average annual precipitation on the outcrop is approximately 31 inches. Only a small fraction of the amount is available as effective recharge since there is much runoff and evapotranspiration. Secondary sources include recharge from streams flowing across the outcrop and surface water seepage from lakes, such as Eagle Mountain Lake. The hydraulic gradient is approximately 27 feet per mile. The average movement of water in the Paluxy amounts to less than 2 feet per year in an easterly direction, except in downdip areas of heavy pumpage. In these areas, cones of depression have formed, and movement is towards the center of the pumped wells. There are no long-range declines in the outcrop nor adjacent to it. The aquifer is under water-table conditions in this area, and observation wells show minor fluctuations from year-to-year. Discharge from the Paluxy occurs naturally through springs and evapotranspiration and artificially through pumpage from water wells (Ref. 25, p. 9). The contaminated ground water has only been found in the wells completed into the Paluxy Formation at this time (see Tables 6 and 7, Observed Release Samples).

Stratum 3

Stratum Name: Glen Rose Formation

Description: The Glen Rose Formation underlies the Paluxy. The Glen Rose is predominantly limestone and yields small quantities of water only to localized areas. The depth to the top of the formation is approximately 200 feet. The thickness is approximately 200 feet throughout the area (Ref. 6, pp. 1-11; 25, pp. 2 and 6).

Stratum 4

Stratum Name: Twin Mountain Formation (Aquifer 2)

Description: The Twin Mountains Formation underlies the Glen Rose. The Twin Mountains consists mainly of medium- to coarse-grained sands, red and gray silty clays, and siliceous conglomerates of chert, quartzite, and quartz pebbles. Coarse- to fine-grained sands interspersed with varicolored shale grades downward into a basal conglomerate of chert and quartz. The upper part of the formation contains considerable sand and sandstone strata, which decrease with depth due

to increased interbedding of shale and clay. The sand strata are more thickly bedded in the lower part of the formation than the upper and middle. The depth to the top of the Twin Mountains is approximately 400 feet at the site. The thickness varies from 200 feet at the outcrop to over 860 feet east of the site (Ref. 25, pp. 8-9).

The primary source of recharge to the Twin Mountains is precipitation on the outcrop. The average annual precipitation on the outcrop is 30 inches. Probably less than 1 inch per year is available for recharge, due to losses from runoff and evapotranspiration. Secondary sources include recharge from surface water seepage onto the outcrop. The hydraulic gradient is extremely variable due to the large cone of depression surrounding the Dallas-Fort Worth metroplex. Beyond this influence, the average gradient is approximately 22 feet per mile. The average movement of water is less than 2 feet per year in an easterly direction. Some water is discharged naturally from springs. The Twin Mountain Formation (Aquifer 2) is not known to be interconnected with the Paluxy Formation (Aquifer 1) (Ref. 25, pp. 8-9).

3.1 LIKELIHOOD OF RELEASE

3.1.1 Observed Release

Aquifer Being Evaluated: Paluxy Formation (Aquifer 1)

An observed release to Aquifer 1 has been documented. This aquifer is a major source of drinking water for many private well owners in the Pelican Bay area (Ref. 6, pp. 1-11). The City of Pelican Bay has five active public supply wells (wells nos. 3, 7, 8, 9 and 10) that supply drinking water from the Paluxy Formation (Ref. 17, p. 8). The City of Pelican Bay also has two inactive public supply wells that were closed due to TCE contamination in January 2004 (Ref. 5, p. 1; 17, p. 8).

No observed release was documented in the Twin Mountain Formation (see Tables 6 and 7, Observed Release Samples).

Chemical Analysis

An observed release has been documented to the ground water pathway for the site by chemical analysis (see Table 7). Establishing an observed release by chemical analysis requires analytical evidence of a hazardous substance in the media significantly above the background level. If the background concentration is not detected (or is less than the detection limit), an observed release is established when the sample measurement equals or exceeds its own sample quantitation limit and that of the background sample (Ref. 1, Section 2.3, Table 3).

Background Concentration

Two (2) background ground water samples were collected during the site sampling investigations to be used as background levels. On July 1, 2004 during the EPA SSI sampling event one ground water sample GW-16/F1170 was collected outside of the suspected ground water plume area for background levels (Ref. 7, pp. 15-16). On August 18, 2004 another ground water sample W-9/021A was collected up gradient of the suspected ground water plume for additional background levels (Ref. 7, pp. 31-32).

TCE is a man made substance and is not naturally occurring. TCE, DCE, 1,1-Dichloroethane, 1,1-Dichloroethene and trans-1,2-Dichloroethene were not detected in the background ground water samples (see Table 3).

Contaminated Samples

The following samples meet the observed release criteria and are presented below indicating organic hazardous substances with their concentrations and SQLs. These samples were qualified as "releases" based on the criteria in Table 2-3 (Ref. 1, Section 2.3). The well locations can be seen in Figure 5.

Table 6 - Ground Water Migration Pathway Observed Release Sample Descriptions			
Sample Location/Station No. [EPA ID]	**Date Collected [Well Type]**	**Well Screened Interval (feet)**	**References**
Well 10/GW- 15 [F1169]	6/28/04 [Public Supply]	40'-60' 90'-120'	Ref. 6, p. 1; Ref. 7, p. 3
Well 12/EP00-8377	6/14/00 [Public Supply]	110'-200'	Ref. 6, p. 2
Well 13/EP00-8378	6/14/00 [Public Supply]	110'-200'	Ref. 6, p. 3
GW-19 [F1173]	6/30/04 [Drinking Water]	60'-100'	Ref. 7, p. 12; Ref. 29, pp. 1, 3 and 5
GW-20 [F1174]	6/30/04 [Drinking Water]	N/A*	Ref. 7, p. 9
GW-27 [F1181]	6/30/04 [Irrigation]	N/A*	Ref. 7, p. 11
GW-23 [F1177]	7/01/04 [Drinking Water]	85'-100'	Ref. 6, p. 7; Ref. 7, p. 14
W-1	8/17/04 [Drinking Water]	N/A*	Ref. 7, p. 24
W-2	8/18/04 [Drinking Water]	N/A*	Ref. 7, p. 28
W-3	8/18/04 [Irrigation]	N/A*	Ref. 7, p. 29
W-4	8/18/04 [Drinking Water]	N/A*	Ref. 7, p. 29
W-5	8/18/04 [Drinking Water]	N/A*	Ref. 7, p. 29-30
W-6	8/18/04 [Drinking Water]	N/A*	Ref. 7, p. 39
W-7	8/18/04 [Irrigation]	113'-173'	Ref. 6, p. 5; Ref. 7, p. 30
W-8	8/18/04 [Drinking Water]	120'-160'	Ref. 6, p. 6; Ref. 7, p. 31
W-10	8/18/04 [Irrigation]	141'-200'	Ref. 6, p. 8; Ref. 7, p. 32

N/A* = This well is not being counted as a target for the Ground Water Pathway since a well log was not available and the well depth could not be confirmed.

Table 6 (continued...) - Ground Water Migration Pathway Observed Release Sample Descriptions			
Sample Location/Station No. [EPA ID]	**Date Collected [Well Type]**	**Well Screened Interval (feet)**	**References**
W-11	8/18/04 [Drinking Water]	N/A*	Ref. 7, p. 32-33
W-12	8/18/04 [Irrigation]	146'-184'	Ref. 6, p. 4; Ref. 7, p. 33
W-1B	9/09/04 [Drinking Water]	145'-175'	Ref. 6, p. 9; Ref. 7, p. 39
W-2B	9/09/04 [Irrigation]	N/A*	Ref. 7, p. 39
W-4B	9/09/04 [Drinking Water]	N/A*	Ref. 7, p. 40
QM1-GW8	11/17/04 [Irrigation]	N/A*	Ref. 8, p. 7

N/A* = This well is not being counted as a target for the Ground Water Pathway since a well log was not available and the well depth could not be confirmed.

TCEQ

Pelican Bay Groundwater Plume
Azle, Texas
TXN000605649

N
W E
S

The base data used is the 3297044a.sid Digital Orthoquarter Quad (DOQQ), which is a digital version of an aerial photograph. This DOQQ was produced by the TCEQ using USGS guidelines UTM NAD83 Zone 14.

Legend (References 7, 8, 9, 10, 11, 12, 13, 14, and 30)

- TCE in Groundwater Meeting Observed Release Criteria/Below MCL
- TCE in Groundwater Meeting Observed Release Criteria/Above MCL

0 0.05 0.1 0.2 0.3 0.4
Miles

Figure 5
Observed Release
Sample Location Map
Page 32

Table 7 - Ground Water Migration Pathway Observed Release Sample Results				
Sample Location/Station No. [EPA ID]	**Contaminated Samples**			
	Hazardous Substances	**Sample Concentrations (ug/L)**	**SQL (or equivalent) (ug/L)**	**References**
Well 10/GW- 15 [F1169]	Trichloroethene	1.2 J	0.50	Ref. 10, pp. 22-23, 52, & 98-100
Well 12/EP00-8377	Trichloroethene	18	0.50	Ref. 27, pp.1-2 & 5-6
	cis-1,2-Dichloroethene	1.6	0.50	
Well 13/EP00-8378	Trichloroethene	21	0.50	Ref. 27, pp.1-2 & 7-8
	cis-1,2-Dichloroethene	1.7	0.50	
GW-19 [F1173/F1173DL]	Trichloroethene	63	3.1	Ref. 9, pp. 17-19, 61, & 83-88
	cis-1,2-Dichloroethene	9.2	0.50	
GW-20 [F1174/F1174DL]	Trichloroethene	33	8.3	Ref. 9, pp.19-21, 60, & 89-94
	cis-1,2-Dichloroethene	4.2	0.50	
GW-27 [F1181]	Trichloroethene	6.1	0.50	Ref. 9, pp. 25-26, 63, & 110-112
GW-23 [F1177]	Trichloroethene	82	3.6	Ref. 9, pp. 22-23, 57, & 98-100
	cis-1,2-Dichloroethene	17	3.6	
W-1	Trichloroethene	0.55	0.06	Ref. 11, pp. 4, 15-16, & 109
W-2	Trichloroethene	32	0.06	Ref. 11, pp. 4, 40-41, & 111
W-3	Trichloroethene	5.53	0.06	Ref. 11, pp. 4, 42-43, & 111

Notes: [SQL] = Sample Quantitation Limit.
J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Table 7 (continued...) - Ground Water Migration Pathway Observed Release Sample Results				
Sample Location/Station No. [EPA ID]	**Contaminated Samples**			
	Hazardous Substances	**Sample Concentrations (ug/L)**	**SQL (or equivalent) (ug/L)**	**References**
W-4	Trichloroethene	217	1.3	Ref. 11, pp. 4, 44-45, & 111
	cis-1,2-Dichloroethene	531	1.12	
	1,1-Dichloroethane	2.27	0.06	
	1,1-Dichloroethene	0.76	0.07	
	trans-1,2-Dichloroethene	0.50	0.06	
W-5	Trichloroethene	644	1.3	Ref. 11, pp. 4, 46-47, & 111
	cis-1,2-Dichloroethene	485	1.12	
	1,1-Dichloroethane	1.17	0.06	
	trans-1,2-Dichloroethene	0.87	0.06	
W-6	Trichloroethene	2.19	0.06	Ref. 11, pp. 4, 48-49, & 111
W-7	Trichloroethene	138	0.32	Ref. 11, pp. 4, 50-51, & 111
	cis-1,2-Dichloroethene	48.3	0.06	
W-8	Trichloroethene	19.8	0.06	Ref. 11, pp. 4, 52-53, & 111
	cis-1,2-Dichloroethene	2.53	0.06	
W-10	Trichloroethene	0.52	0.06	Ref. 11, pp. 4, 58-59, & 112
W-11	Trichloroethene	0.46 J	0.06	Ref. 11, pp. 4, 60-61, & 112
W-12	Trichloroethene	24.2	0.06	Ref. 11, pp. 4, 66-67, & 112
	cis-1,2-Dichloroethene	8.27	0.06	
W-1B	Trichloroethene	20.1	0.06	Ref. 12, pp. 8-10, & 47

Notes: [SQL] = Sample Quantitation Limit.
J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Table 7 (continued...) - Ground Water Migration Pathway Observed Release Sample Results				
Sample Location/Station No. [EPA ID]	**Contaminated Samples**			
	Hazardous Substances	**Sample Concentrations (ug/L)**	**SQL (or equivalent) (ug/L)**	**References**
W-2B	Trichloroethene	107	1.3	Ref. 12, pp. 8, 11-12, & 47
	cis-1,2-Dichloroethene	105	1.12	
	1,1-Dichloroethene	0.25 J	0.07	
W-4B	Trichloroethene	80.8	1.3	Ref. 12, pp. 8, 15-16, & 47
	cis-1,2-Dichloroethene	204	1.12	
	1,1-Dichloroethane	1.44	0.06	
	1,1-Dichloroethene	0.33 J	0.07	
QM1-GW8	Trichloroethene	5.26	0.06	Ref. 14, pp. 2-4, 39

Notes: [SQL] = Sample Quantitation Limit.
J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.

Table 8
Data Usability for Observed Release Samples

Sample Location/Station No. [EPA ID]	Hazardous Substance	Concentration [SQL] ug/L	Bias	Bias Correction Calculation	Concentration Corrected for Bias in ug/L	Usable as a Release Value?
Well 10/GW- 15 [F1169] (Release)	Trichloroethene	1.2 J [0.50]	Unknown	÷ 1.66 (Ref. 24, p.4-8, 12)	0.72	Yes
W-11 (Release)	Trichloroethene	0.46 J [0.06]	Unknown	÷ 1.66 (Ref. 24, p.4-8, 12)	0.27	Yes
W-2B (Release)	1,1-Dichloroethene	0.25 J [0.07]	Unknown	÷ 2.35 (Ref. 24, p.4-8, 11)	0.10	Yes
W-4B (Release)	1,1-Dichloroethene	0.33 J [0.07]	Unknown	÷ 2.35 (Ref. 24, p.4-8, 11)	0.14	Yes

[SQL] = The sample quantitation limit.
J = The value is an estimated concentration because one or more of the quality control criteria have not been met. It is included to show that the substance has been qualitatively identified as present in this source.
N/A = Not Applicable.

Attribution:

The site is designated as a contaminated ground water plume originating from unknown source(s) where hazardous substances may have been released and seeped through the ground to the aquifer. When the source itself consists of a ground water plume with no identified source, no separate attribution is required (Ref. 1, Section 3.1.1)

Hazardous Substances Released:

- Trichloroethene (TCE)
- cis-1,2-Dichloroethene (DCE)
- 1,1-Dichloroethane
- 1,1-Dichloroethene
- trans-1,2-Dichloroethene

As specified in the HRS Rule (Ref. 1, Section 3.1.1), an observed release factor value of 550 was assigned to the Paluxy Formation (Aquifer 1) since an observed release by chemical analysis was established to the aquifer.

Observed Release Factor Value: 550

3.1.2 Potential to Release

As specified in the HRS Rule, since an observed release was established for the Paluxy Formation (Aquifer 1), the potential to release was not evaluated (Ref. 1, Section 3.1.1).

3.1.3 Likelihood of Release Factor Category Value

As stated in the HRS Rule, if an observed release is established for an aquifer, assign the observed release factor value of 550 as the likelihood of release factor category value for the aquifer (Ref. 1, Section 3.1.3). Since an observed release has been established for the Paluxy Formation aquifer, the Observed Release Factor Value of 550 is assigned as the likelihood of release factor category value.

Likelihood of Release Factor Category: 550

3.2 WASTE CHARACTERISTICS

3.2.1 Toxicity/Mobility

The following toxicity, mobility and combined toxicity/mobility factor values have been assigned to those substances associated with Source No. 1, or present in the observed release, which have a containment value greater than 0.

Table 9 - Waste Characteristic Toxicity/Mobility Factor Values

Hazardous Substance	Toxicity Factor Value	Mobility Factor Value *	Toxicity / Mobility Value	Reference
Trichloroethene	10,000	1	10,000	Ref. 1, Sections 2.4.1.2, 3.2.1; Ref. 3, pp. 2-4
cis-1,2-Dichloroethene	100	1	100	Ref. 1, Sections 2.4.1.2, 3.2.1; Ref. 3, pp. 5 and 6
1,1-Dichloroethane	10	1	10	Ref. 1, Sections 2.4.1.2, 3.2.1; Ref. 3, pp. 9 and 10
1,1-Dichloroethene	100	1	100	Ref. 1, Sections 2.4.1.2, 3.2.1; Ref. 3, pp. 11 and 12
trans-1,2-Dichloroethene	100	1	100	Ref. 1, Sections 2.4.1.2, 3.2.1; Ref. 3, pp. 7 and 8

Documentation for Toxicity/Mobility Values:

*The Mobility Factor Value for all hazardous substances that meet the criteria for an observed release by chemical analysis to one or more aquifers underlying the source(s) at the site, regardless of the aquifer being evaluated, is assigned a mobility factor value of 1 (Ref. 1, Section 3.2.1.2).

Contaminant characteristic values for hazardous substances found in an observed release to the Paluxy Formation aquifer were derived from SCDM (Ref. 3). The hazardous substance with the highest toxicity/mobility factor value available to the ground water migration pathway is TCE (10,000).

Toxicity/Mobility Factor Value: 10,000

3.2.2 Hazardous Waste Quantity

Table 10
Source Hazardous Waste Quantity Values

SOURCE NUMBER	SOURCE HAZARDOUS WASTE QUANTITY VALUE	HAZARDOUS CONSTITUENT QUANTITY DATA COMPLETE?
1	> 0	NO
Total	> 0*	

* According to Section 2.4.2.2. of the HRS Rule, a hazardous waste quantity factor value of 100 was assigned because the hazardous constituent quantity data are not adequately determined for one or more sources, and targets for the Ground Water Migration Pathway are subject to Level I concentrations (Ref. 1, Section 2.4.2.2).

3.2.3 Waste Characteristics Factor Category Value

As specified in the HRS Rule (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, resulting in a product of 1,000,000 (1.0E+06). Based on this product, a Waste Characteristics Factor Value of 32 was assigned from Table 2-7 of the HRS Rule (Ref. 1, Section 2.4.3.1).

Hazardous Waste Quantity Factor Value: 100

Hazardous Waste Quantity X Toxicity X Mobility = 1.0E+06

Waste Characteristics Factor Category Value: 32

3.3 Ground Water Pathway Targets

The aquifer being evaluated for ground water pathway targets is the Paluxy Formation aquifer. The ground water pathway targets for this aquifer identified within a one mile radius of the site include:

- 7 Public Water Supply Wells from the City of Pelican Bay (Ref. 17, pp. 1-8),
- and, approximately 15 private drinking water wells (Ref. 7; 8).

The City of Pelican Bay Public Water Supply (PWS) System (PWS ID 2200164) identified within one mile of the site is a blended system that currently serves 1,470 people as of the last water system survey conducted on March 16, 2004. There are a total of 13 public water supply wells in the Pelican Bay PWS, of which 11 wells are currently in service. None of the wells provides more than 40% of the total rated supply capacity (Ref. 17, pp. 1-8). Seven of the City of Pelican Bay PWS wells (well nos. 3, 7, 8, 9, 10, 12 and 13) are screened into the Paluxy Formation aquifer (Ref. 17, p. 8) (see Figure 3 for well locations). Three of the PWS wells (well nos. 10, 12 and 13) are contaminated (see Table 7). PWS Wells 12 and 13 were taken out of service in January of 2004 due to contamination (Ref. 5). The remaining 6 wells from the Pelican Bay PWS are screened into the deeper Twin Mountain Formation aquifer (Ref. 17, pp. 1-8). The 15 private drinking water wells identified within one mile of the site draw ground water from the Paluxy Formation aquifer. Twelve of the private drinking water wells are contaminated (see Tables 6 and 7). The number of targets and levels of exposure are shown in Table 11.

Additional ground water wells were also identified within a 2, 3, and 4 mile radius of the site. These additional wells are used as public supply, private drinking water and/or irrigation. The additional wells are concentrated northeast, east, and southeast of the site (Ref. 29, p. 2 and 4).

The approximate screened interval for the contaminated drinking water wells sampled ranges from 40 to 200 feet deep (see Table 6). The regional direction of ground water flow is generally in an easterly direction (Ref. 25, p. 9).

Detected levels of TCE in drinking water wells range from 644 ppb to 0.46 ppb. The MCL for TCE is 5 ppb. Elevated levels of DCE in drinking water wells range from 531 ppb to 2.53 ppb. The MCL for DCE is 70 ppb. Other contaminants detected in drinking water wells include: 1,1-dichloroethane, 1,1-dichloroethene, and trans-1,2-dichloroethene (see Table 7).

3.3.1 Nearest Well

According to Section 3.3.1 of the HRS Rule, if one or more drinking water wells is subject to Level I concentrations, a Nearest Well Factor value of 50 is assigned. Level I concentrations have been documented at 15 wells within the ground water plume (see Section 3.3.2.2 of this HRS Documentation Record).

Level of Contamination (I, II, or potential): Level I

Location of Well: Level I concentrations have been documented at 15 drinking water wells within the ground water plume. Well location descriptions are identified in Table 6, Section 3.3.2.2 of this HRS documentation record (see Tables 7 and 11 for the identified wells).

For a well with Level I concentrations, a Nearest Well Factor Value of 50 is assigned (Ref. 1, Section 3.3.1).

Nearest Well Factor Value: 50

3.3.2 Population

3.3.2.1 Level of Contamination

3.3.2.2 Level I Concentrations

The Pelican Bay PWS system is a blended system that currently serves 1,470 people as of the last water system survey conducted on March 16, 2004. There are a total of 11 Pelican Bay PWS wells currently in service. None of the wells provides more than 40% of the total rated supply capacity (Ref. 17, pp. 1-8). The 1,470 people served was divided by the 11 wells currently in operation for an average number of persons served by each well of 133 (1,470/11=133.63). This value is used as the population served for Pelican Bay PWS Well 10 since it is currently operational and contamination was documented since the last water system survey conducted on March 16, 2004.

Since the contamination in Pelican Bay PWS Wells 12 and 13 was last documented in samples collected on June 14, 2000, when the now inactive wells were still operational, the previous water system survey conducted on January 9, 2002 will be used to calculate the people served. The January 9, 2002 survey for the Pelican Bay PWS indicates that 1,470 people were served and 13 wells were operational (Ref. 17, pp. 9-13). The 1,470 people served was divided by the 13 operational wells for an average number of persons served by each well of 113 (1,470/13=113.07). This value is used as the population served for Pelican Bay PWS Wells 12 and 13 since they were still operational at the time of the water system survey on January 9, 2002.

The estimated number of people served by a private drinking water well was calculated by using the United States Census Bureau 2000 profile of general demographic characteristics for Tarrant County, Texas to determine the average number of persons per residence. The total population for Tarrant County (1,446,219) was divided by the total number of housing units (565,830) for an average number of persons per residence of 2.5 (1,446,219/565,830=2.55) (Ref. 16, p. 2).

The concentrations of hazardous substance shown below include concentrations of hazardous substances detected in drinking water wells that meet or exceed their corresponding benchmark concentrations (Ref. 3, SCDM). An observed release to the Ground Water Migration Pathway has been established based on the detection of these compounds found in the below drinking water wells; thus, these wells are associated with Level I concentrations (Ref. 1, Section 3.3.2.1, 3.3.2.2).

As specified in the HRS Rule, (Ref. 1, Section 3.3.2.2), the number of people served by drinking water from points of withdrawal subject to Level I concentrations were summed. The total population counted from the 7 wells is 369 (133+113+113+2.5+2.5+2.5+2.5= 369). The total of 369 was multiplied by 10, for a product of 3,690 (Ref. 1, Section 3.3.2.2).

Table 11 - Ground Water Migration Pathway
Drinking Water Wells with Level I Concentrations

Sample Location/Station No. [EPA ID]	TCE Concentrations (ug/L)	Benchmark Concentrations			Population Served	
		MCL/ MCLG (ug/L)	Cancer Risk Conc. (ug/L)	Non Cancer Risk Conc. (ug/L)	People	Reference
Well 10/GW- 15[F1169]	1.2 J (0.72)	5	0.21	11	133	Ref. 17, p. 1
Well 12/EP00-8377	18				113	Ref. 17, p. 9
Well 13/EP00-8378	21				113	Ref. 17, p. 9
GW-19[F1173DL]	63				2.5	Ref. 16, p. 2
GW-20[F1174DL]	33				N/A*	Ref. 16, p. 2
GW-23[F1177]	82				2.5	Ref. 16, p. 2
W-1	0.55				N/A*	Ref. 16, p. 2
W-2	32				NA*	Ref. 18, p. 1
W-4	217				N/A*	Ref. 16, p. 2
W-5	644				N/A*	Ref. 16, p. 2
W-6	2.19				N/A*	Ref. 16, p. 2
W-8	19.8				2.5	Ref. 16, p. 2
W-11	0.46 J				N/A*	Ref. 16, p. 2
W-1B	20.1				2.5	Ref. 16, p. 2
W-4B	80.8				N/A*	Ref. 16, p. 2

N/A* = This well is not being counted as a target for the Ground Water Pathway since a well log was not available and the well depth could not be confirmed.

( ) Adjusted concentration per Reference 24.

Population Served by Level I Well: 369

Level I Concentration Factor Value: 3,690

3.3.2.3 Level II Concentrations

All contaminated drinking water wells had concentrations that met the criteria to be counted as Level I wells. The Cancer Risk Bench Mark for TCE is 0.21 ppb (see Ref. 3, p. 3). The MCL for TCE is 5 ppb. While some wells had TCE concentrations below the MCL, they all still exceeded the Cancer Risk Bench Mark and were subject to Level I concentrations (see Table 11). No other drinking water wells subject to Level II concentrations have been identified.

Level II Concentration Factor Value: 0

3.3.2.4 Potential Contamination

The potential contamination factor was evaluated and not scored because a maximum score for the ground water migration pathway was achieved in scoring the Level I contamination. Although not scored in this document, the TCEQ and the USEPA are concerned about populations that are potentially exposed to contamination.

Potential Contamination Factor Value: NS

3.3.3 Resources

No resource, as defined in HRS Section 3.3.3, were documented for the aquifer (Ref. 1).

Resources Factor Value: 0

3.3.4 Wellhead Protection Area

According to Section 3.3.4 of the HRS Rule, if a Wellhead Protection Area (WHPA) is located either partially or fully within an area of observed ground water contamination attributable to the source(s) at the site, assign a value of 20 as the Wellhead Protection Area Factor Value.

The City of Pelican Bay PWS (ID G2200164) participates in the Wellhead Protection Area (WHPA) Program. TCEQ data indicates that the City of Pelican Bay Well nos. 10, 12 and 13, which have documented ground water contamination, are located within a designated WHPA (Ref. 19). Therefore, a Wellhead Protection Area Factor Value is assigned a value of 20 (Ref. 1, Section 3.3.4).

Wellhead Protection Area Factor Value: 20

3.3.5 Calculation of Targets Factor Category Value

The target factor category value is calculated by determining the sum of the factor values for the nearest well (50), population (3,690), resources (0), and Wellhead Protection Area (20) (Ref. 1, Section 3.3.5).

Calculations: 50 + 3690 + 0 + 20 = 3760

3.4 Ground Water Migration Score for an Aquifer

The ground water migration score for an aquifer is calculated by multiplying the factor category values for likelihood of release (550), waste characteristics (32), and targets (3870). Divide by 82,500, the resulting value (maximum value 100) is assigned as the ground water migration pathway score (Ref.1, Section 3.4).

Calculations: (550 x 32 x 3760) ÷ 82,500 = 802.13 (100 maximum)

3.5 Calculation of Ground Water Migration Pathway Score

The Ground Water Migration Pathway Score is calculated by assigning the highest ground water migration score for the Paluxy Formation Aquifer (100).

Ground Water Migration Pathway Score: 100

4.0 Surface Water Migration Pathway

The Surface Water Pathway was evaluated and not scored due to lack of documentation of a release to surface water.

5.0 Soil Exposure Pathway

The Soil Exposure Pathway was evaluated and not scored due to lack of documentation of an area of observed contamination.

6.0 Air Migration Pathway

The Air Migration Pathway was evaluated and not scored due to lack of documentation of a release to air.