Site Hazard Assessment
Worksheet 1
Summary Score Sheet

Texaco Station Kirkland

Address:	460 Central Way Kirkland, WA, 98033		
County:	King	Tax Parcel:	3900101460
CSID:	10432	Sect/Town/Range:	5/25N/05E
FSID:	75999694	Lat/Long:	47.679
LUST ID:	4501	Long.	-122.199

This site was assessed for the February 2016 update of the Hazardous Sites List.

Property Description

The parcel is on the northwest corner of Central Way and 5th Street in downtown Kirkland in a mixed commercial/residential area. The 1.17-acre property is covered primarily with a paved parking lot and a 5,130 square-foot, one-story building. There are landscaped borders around the perimeter. Currently, Wells Fargo operates a bank branch on the property. Previously, the property was used as a gasoline service station and an automotive repair station.

The Texaco Moss Bay site is located close to the Texaco Kirkland site at 406 Central Way. The FSID for the Texaco Moss Bay site is 2516 and the CSID is 5131. The Texaco Moss Bay station is not addressed in this site hazard assessment.

Site Ownership

From	To	Owner/Operator	Activity
		Texaco	Gasoline service station
	1987	Leased from Texaco	Auto service and repair
1987	Present	Wells Fargo	Bank

Site Background

Various reports dated April 1986 through August 1996 contain apparent discrepancies regarding the number, sizes, and contents of underground storage tanks (USTs) formerly located on the property.

In April 1986, Ecology received a notification form for two USTs at the property, each made with carbon steel, unlined, without cathodic protection, and in use (Texaco 1986). One tank was 500-

999 gallons, was 66 years old, and contained waste oil. The other tank was 1,000-4,999 gallons, was 75 years old, and contained fuel oil.

Ecology staff visited the property on September 10, 1987 (Ecology 1987). A 1,000-5,000 gallon heating oil tank, which was 11-15 years old, was located in the northeast corner of the property. A 500-1,000 gallon waste oil tank, which was 16-20 years old, was located in the northwest corner. The tanks were in the process of being removed. Soils in each of the excavations were visibly contaminated. There were three holes in the wall of the heating oil tank.

On September 17, 1987, Norton Corrosion Limited, Inc. (Norton) drilled five soil borings at the Site, three in a former gasoline tank bed on the east side of the property and one each by the former heating oil tank and the former waste oil tank (GTI 1987). All of the tanks had been removed at this point, but at least some of the excavations were still open. Free product was observed floating on the water in the waste oil tank pit. Soil samples collected at 7 and 14 feet below ground surface (bgs) in each boring were analyzed for total petroleum hydrocarbons (TPH, undifferentiated). TPH concentrations in the samples collected near the gasoline tank bed ranged 200 to 1,800 mg/kg, with the highest concentrations at 14 feet bgs. TPH concentrations near the heating oil tank ranged 500 to 1,100 mg/kg and near the waste oil tank ranged 100 to 1,400 mg/kg, in both cases with the highest concentrations at 7 feet bgs.

Groundwater Technology, Inc. (GTI 1987) conducted a site investigation on October 12-14, 1987. Six soil borings were drilled to depths ranging 15 to 30 feet; four were completed as monitoring wells. Sixteen soil samples were analyzed for benzene, toluene, ethylbenzene, xylenes (BTEX) and three were analyzed for volatile organic compounds (VOCs) and extraction procedure toxicity (EPTox) metals. None of the analytes was detected (detection limits not provided), except EPTox barium, which ranged 0.03 to 0.15 mg/L. Three ground water samples were analyzed for BTEX, which were detected in all three samples, and one was analyzed for VOCs, which were not detected. The concentration of benzene in MW-3 (370 ug/L), downgradient of the gasoline tank pit, exceeded the Method A cleanup level (5 ug/L). Concentrations of TEX were below their Method A ground water cleanup levels. Based on the results from the first three wells, the fourth well was not sampled.

On January 7, 1988, Ecology sent a letter to MJ Salmon summarizing the results of the GTI investigation (Ecology 1988a). Ecology determined that the excavation (unclear which one) had achieved the soil cleanup levels established at that time (200 mg/kg TPH, 66 to 666 mg/kg benzene, and 143 mg/kg toluene) and approved backfilling the excavation. Ecology directed Texaco to abandon all of the monitoring wells except MW-3, which was to be maintained for future monitoring.

On April 7, 1988, Ecology sent a letter to GTI discussing results of the sampling of MW-3 on February 19, 1988 (Ecology 1988b). The concentration of benzene was 84 ug/L. The concentrations of TEX were below Method A.

On February 28, 2005, Ecology sent a letter to First Inter Bank of Kirkland (Wells Fargo), the current owner of the property, inviting them to submit compliance data (Ecology 2005). There is no indication in the file that Wells Fargo responded to the letter.

On June 14, 2007, Ecology sent an early notice letter to Shell Oil for a list of multiple sites,

including this site (Ecology 2007). Shell Oil responded on August 17, 2007, that they believed Texaco was the responsible party for this site (Shell 2007).

Current Site Conditions

The most recent soil and ground water data for the site are over 25 years old. The ground water concentration of benzene (84 μg/L) measured in MW-3, southwest of the middle of the site, in February 1988 exceeded the Method A concentration (5 μg/L).

Data from Farr, Friedman & Bruya, Inc., dated December 29, 1987, indicated the following maximum soil concentrations apparently remaining on Site:

Analyte	Maximum Soil Concentration (mg/kg)	Location	Current Method A Soil Cleanup Level (mg/kg)
Benzene	**1**	**GP-5, GP-7**	**0.03**
Toluene	1	GP-2, 6 ft	7
Ethylbenzene	2.90	BB-2	6
Xylenes	4	GP-2, 6 ft	9
TPH (not differentiated)	500	BB-3	30 (TPH-G) 2,000 (TPH-O)
TPH-G	**43**	**GP-8**	**30**
TPH oil and grease	61	WOP-2	2,000
Lead	< 1	1-A	250

Bold face indicates maximum soil concentrations exceeding current Method A cleanup levels.

No containment measures are in place. Ten percent of the area of the property (5,096 sq ft) was assumed to be contaminated and the contamination was assumed to be three feet thick, for an estimated volume of 1,699 cu yd soil contamination.

Geology

The property is situated on the west slope of a small stream-cut valley (GTI 1987). The top one to two feet of soil is reddish brown gravely sand underlain by fine to medium sand interbedded with thin layers of silt. At about 20 to 25 feet bgs is an overconsolidated silt (hardpan or till), which is at least five feet thick.

Ground Water

During the GTI site investigation in October 1987, ground water was encountered at 8 to 10 feet bgs. GTI considered the overconsolidated silt at 20-25 feet bgs to act at a low permeability barrier to vertical groundwater movement. Based on groundwater elevations measured at the site, groundwater flows southwest across the site with a 2 to 3 percent slope.

Drinking Water

Drinking water is provided to the property by the City of Kirkland, which obtains its water from Seattle Public Utilities' South Fork Tolt River Watershed. No water supply wells were identified within two miles of the site. The site is not located in a ground water management area, an area considered susceptible to ground water contamination, a critical aquifer recharge area, a sole source aquifer, or a wellhead protection area.

Surface Water

The land surface slopes southwest toward Moss Bay, part of Lake Washington, about 0.5 mile from the site. The elevation at the northeast corner of the property is 75 feet above mean sea level (amsl) and the elevation at the southwest corner of the property is 60 feet amsl. The distance between the corners is 300 feet and the slope is 5 percent. The site is not located within a FEMA floodplain.

The property and Lake Washington lie within the Cedar-Sammamish water resource inventory area (WRIA 8). Waters in Lake Washington are protected for core summer habitat, primary contact recreation, domestic water, agricultural water, stock water, wildlife habitat, harvesting, and aesthetics, among other uses.

Surrounding Population

The property and areas east, south, and west are zoned central business district (CBD 7). Properties to the north are zoned high density residential (PLA 7B).

East of the Site is 5th Street and across that are a restaurant and an apartment or condominium complex. South of the Site is Central Way (NE 85th Street) and across that is a commercial shopping district. West of the Site is an apartment or condominium complex currently under construction and beyond that are a gas station and office building. North of the Site is 4th Avenue and across that is an apartment or condominium complex. At the time of the 1987 site investigation, a heating oil distributor was located north of and adjacent to the Site.

The total population living within a half mile of the property is 5,378. The closest building to the Site is the apartment/condo complex 35 feet to the north.

Ecological Setting

The land on the property and in the immediate vicinity is primarily covered by buildings, pavement, and landscaped borders. Peter Kirk Park is 270 feet southwest of the site. The park includes broad expanses of landscaped lawns and plantings, walking paths, a play area, a ball field, and a swimming pool complex. Lake Washington is 0.5 miles southwest of the site. There are no wetlands within two miles of the site.

Special Considerations for Scoring

Surface Water

Not scored because releases were at depth.

Air

Benzene has been detected in soil and ground water and could migrate to indoor or outdoor air.

Groundwater

Benzene was documented in ground water at concentrations above the Method A cleanup level. TPH in the gasoline range and benzene were documented in soil at concentrations above their Method A cleanup levels. The soil contamination could migrate to ground water.

Route Score Summary

Route	Human Health	Environment
Surface Water	--	--
Air	40.9	1.6
Groundwater	35.4	

Overall Rank: 3

References

WARM Database	Ecology. 1992. Toxicology database for use in Washington ranking method scoring. Prepared by: Science Applications International Corporation, Olympia, WA. Prepared for: Washington State Department of Ecology, Olympia, WA. Publ. no. 92-37. Updated July 2015.
WARM Scoring Manual	Ecology. 1992. Washington ranking method, scoring manual. Washington State Department of Ecology, Olympia, WA. Publ. No. 90-14. Revised April 1992.
iMap	King County i-map. Available at: http://gismaps.kingcounty.gov/iMap/.
Well Log Viewer	Washington State well log viewer. Available at: https://fortress.wa.gov/ecy/waterresources/map/WCLSWebMap/default.aspx. Washington State Department of Ecology, Olympia, WA.
Drinking Water System Data	Drinking water system data. Available at: http://www.doh.wa.gov/DataandStatisticalReports/EnvironmentalHealth/DrinkingWaterSystemData. Washington State Department of Health, Olympia, WA.
Precip Map	King County precipitation map. November 2011.
WA Interactive Geologic Map	Washington interactive geologic map. Available at: http://www.dnr.wa.gov/ResearchScience/Topics/GeosciencesData/Pages/geology_portal.aspx.
MO CDC	Missouri Census Data Center. Circular Area Profiles (CAPS). Available at: http://mcdc2.missouri.edu/websas/caps.html. Missouri State Library.
Texaco (1986)	Washington State underground storage tank notification form. April 21.
Ecology (1987)	Letter from Lynn Cashion, Department of Ecology NWRO, to M.J. Salmon, Field Maintenance Supervisor, re: Former Texaco station site at 5th and Central. September 24.
GTI (1987)	Letter from Mark Nichols, Groundwater Technology, Inc., to Mike Salmon, Texaco Refining and Marketing, Inc., re: Texaco service station, 496 Central Way, Kirkland. November 10.
Ecology (1988a)	Letter from Lynn Cashion, Department of Ecology NWRO, to Texaco Refining and Marketing, Inc., re: Site remediation at former Texaco station. January 7.
Ecology (1988b)	Letter from Lynn Cashion, Department of Ecology NWRO, to Groundwater Technology re: Kirkland Texaco – L.U.S.T. groundwater monitoring. April 7.
Ecology (2005)	Letter from Carrie Pederson, Department of Ecology NWRO, to First Inter Bank-Kirkland re: Former Texaco station, 496 Central Way, Kirkland, WA. February 28.
Ecology (2007)	Letter from Wallace Reid, Department of Ecology NWRO, to Karen Lyons, Shell Oil Products US, re: Reported releases of hazardous substances and potential liability for the releases at sites listed in Enclosure 1. June 14.
Shell (2007)	Letter from Karen Lyons, Manager, Western Region, Shell Oil Products US, to Wallace Reid, Department of Ecology NWRO, re: Response to request for review of reported releases of hazardous substances at 57 sites in the State of Washington. August 17.

Worksheet 2
Route Documentation

Site Name: Kirkland Texaco
CSID: 10432
FSID: 75999694

1. SURFACE WATER ROUTE

Substances Used for Scoring
Not scored
Basis for Selection of Substances

Management Units for Scoring

Basis for Selection of Management Units

2. AIR ROUTE

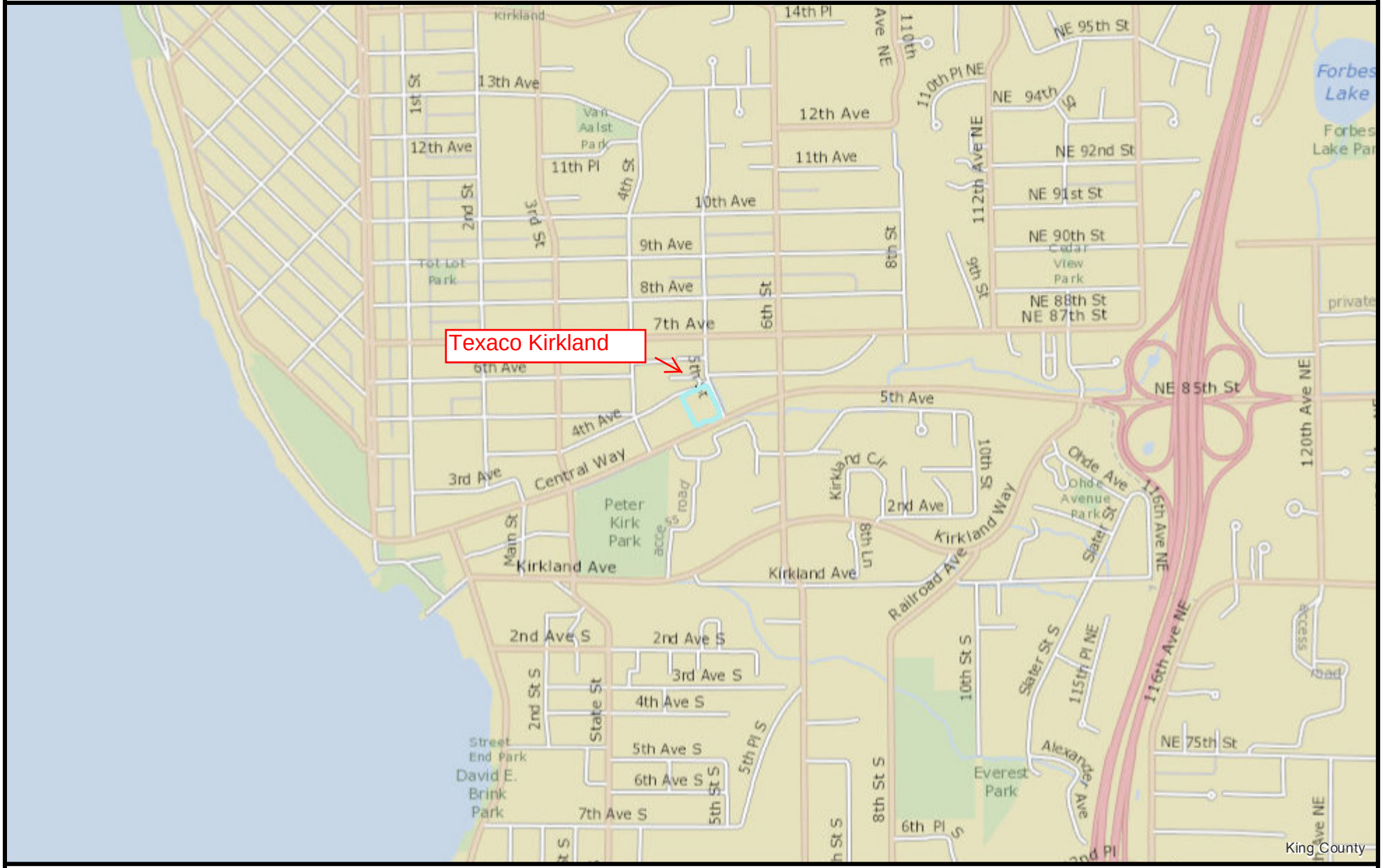
Substances Used for Scoring
Gasoline (benzene)
Basis for Selection of Substances
Detected above Method A
Management Units for Scoring
Soil and ground water
Basis for Selection of Management Units
Detected in soil and ground water

3. GROUND WATER ROUTE

Substances Used for Scoring
Gasoline (benzene)
Basis for Selection of Substances
Benzene was detected above Method A
Management Units for Scoring
Ground water
Basis for Selection of Management Units
Confirmed release to ground water

Figures

Texaco Kirkland Location

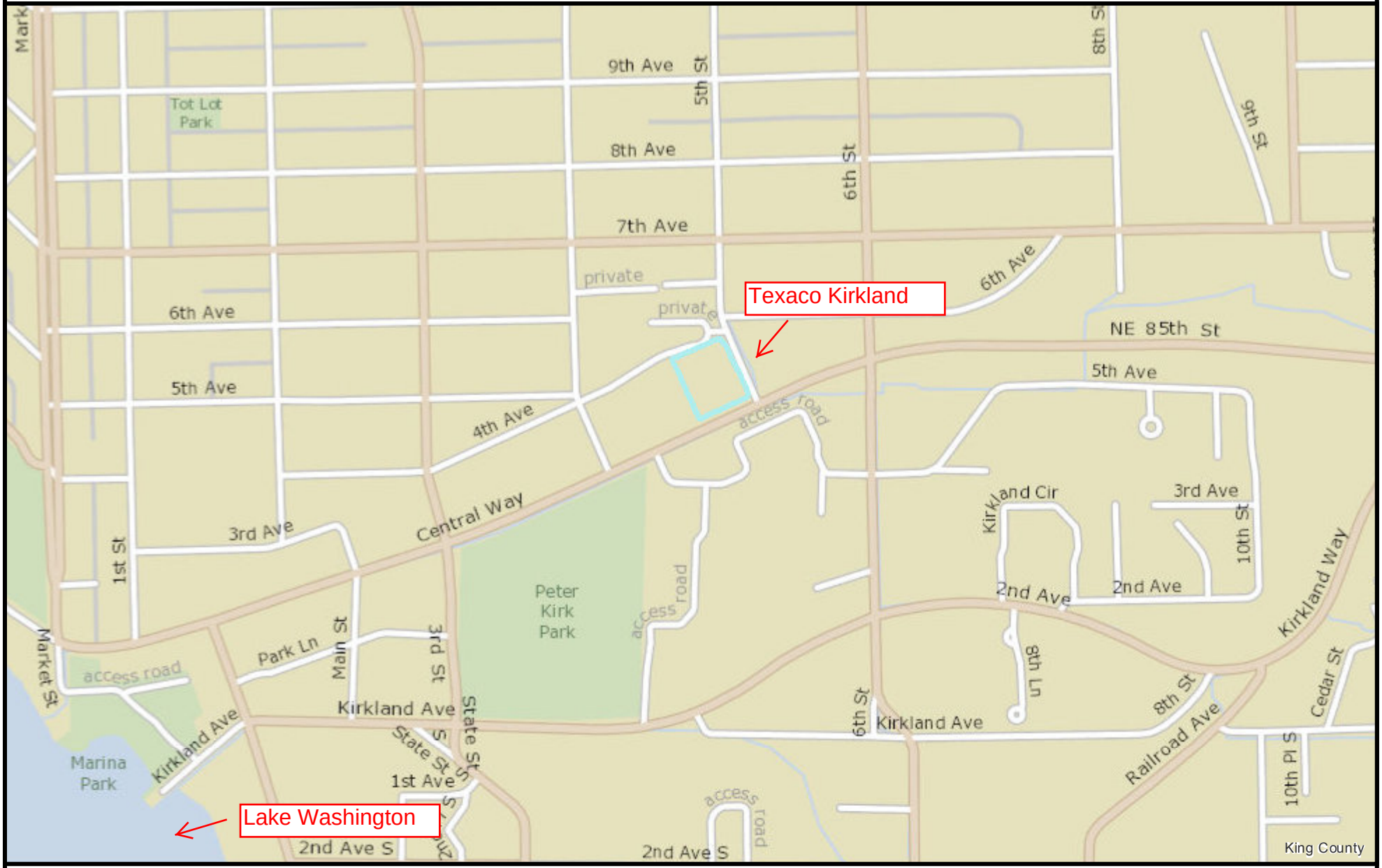


Date: 10/5/2015 Notes:

N

King County GIS Center

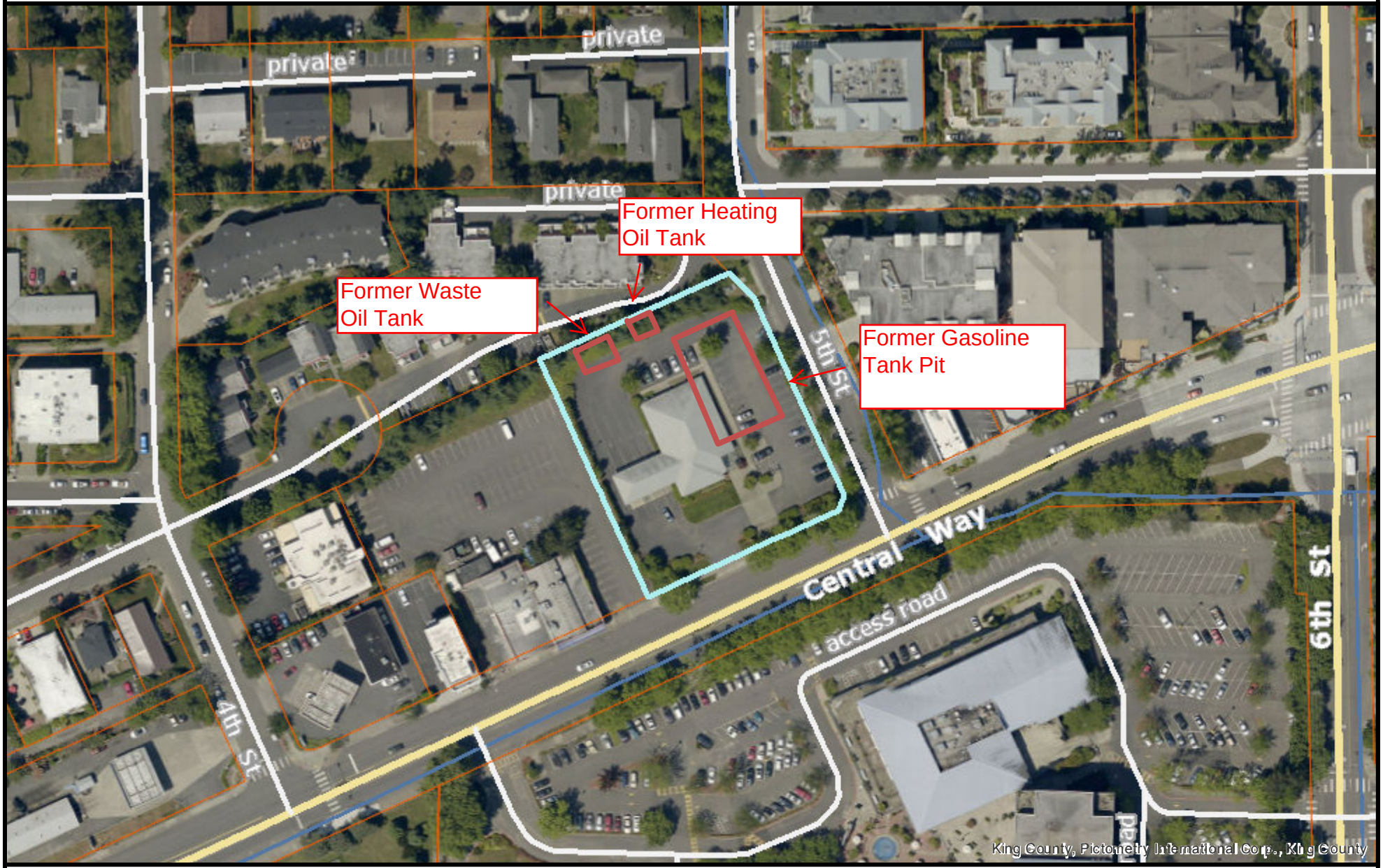
Texaco Kirkland Vicinity



Date: 10/5/2015 Notes:

King County
GIS Center

Texaco Kirkland Aerial



Date: 10/5/2015 Notes:

N

King County GIS Center

Worksheet 4
Surface Water Route

CSID: **10432**

Site: **Texaco Kirkland**

Not scored.

Worksheet 5
Air Route

CSID: 10432

Site: Texaco Kirkland

1.0 SUBSTANCE CHARACTERISTICS

1.1 Introduction

No scoring in Section 1.1.

1.2 Human Toxicity

Substance	Amb. Air Stnd. Value (ug/m^3)	Score	Acute Toxicity Value (mg/m^3)	Score	Chronic Toxicity Value (ug/m^3)	Score	Carcinogenicity WOE	Score
Gasoline (benzene)	0.0345	10	31947	3	8.57E-03	8	2.73E-02	5

Maximum score:	10		
Bonus points:	2	Human Toxicity Score:	12
Source:	WARM Toxicity Database	Range: 1-12	

1.3 Mobility

Gaseous Mobility

Substance	Vapor Pressure Value (mm Hg)	Score	Henry's Law Value (atm-m3/ mol)	Score
Gasoline (benzene)	95	4	0.00556	4

Maximum score:	4		
Source:	WARM Toxicity Database		

Particulate Mobility

Soil type:	not used		
Erodibility factor:			
Climatic factor:			
Mobility value:		Mobility Score:	4
Source:	iMap	Range: 0-4	

1.4 Human Toxicity/Mobility

Source:	WARM Scoring Manual	Human Tox/Mobil Score:	24
		Range: 1-24	

1.5 Environmental Toxicity/Mobility

Substance	Acute Value (ug/m^3)	Score
Gasoline (benzene)	3.19E+04	3

Maximum score 3
Source: WARM Toxicity Database

Environmental Toxicity Score: 3
Range: 1-10

Environmental Tox/Mobil Score: 6
Range: 1-24

1.6 Substance Quantity

Quantity: 1699 cu yd
Basis: Estimated per text
Source: Estimated based on site documents

Substance Quantity Score: 7
Range: 1-10

2.1 Containment

Description: Cover over 2 feet thick; no vapor containment system
Source: Sub-surface release

Containment Score: 5
Range: 0-10

SUBSTANCE PARAMETER CALCULATIONS

Human Health Pathway
SUBh (Human Tox/Mobil + 5) x (Containment +1) + Substance Quantity: 181.0

Environmental Pathway
SUBe (Environ. Tox/Mobil + 5) x (Containment +1) + Substance Quantity: 73.0

3.0 TARGETS

3.1 Nearest Population

Description: Apartment complex
Distance (ft): 35
Source: iMap

Nearest Population Score: 10
Range: 0-10

3.2 Nearest Sensitive Environment

Description: Peter Kirk Park
Distance (ft): 270
Source: iMap

Nearest Sensitive Environment Score: 7
Range: 0-7

3.3 Population within One-Half Mile

Number: 5,378
Source: MO CDC

Population within Half Mile Score: 73.33
Range: 0-75

TARGET PARAMETER CALCULATIONS

Human Health Pathway

TARh= Nearest Population + Population within Half Mile 83.3

Environmental Pathway

TARe Nearest Sensitive Environment 7.0

4.0 RELEASE

Evid. of release? No

Source: Site documentation

Release Score (REL): 0.0

Range: 0 or 5

AIR ROUTE CALCULATIONS

Human Health Pathway

AIRh = (SUBh x 60/329) x {REL + (TARh x 35/85} / 24 47.2

Environmental Pathway

AIRe = (SUBe x 60/329) x {REL + (TARe x 35/85} / 24 1.6

Range: 0-100

Worksheet 6
Groundwater Route

CSID: 10432

Site: Texaco Kirkland

1.0 SUBSTANCE CHARACTERISTICS

1.1 Human toxicity

Substance	Drink. Wat. Stnd Value (ug/L)	Score	Acute Toxicity Value (ug/L)	Score	Chronic Toxicity Value (ug/L)	Score	Carcinogenicity WOE	Score
Gasoline (benzene)	5	8	3,306	3	4.00E-03	3	5.50E-02	5

Maximum score: 8
Bonus points: 0
Source: WARM Toxicity Database

Human Toxicity Score: 8
Range: 1-12

1.2 Mobility

Substance	Solubility Value (ug/L)	Score
Gasoline (benzene)	1.75E+03	3

Maximum value: 3
Source: WARM Toxicity Database

Mobility Score: 3
Range: 1-3

1.3 Substance quantity

Quantity: 1699 cu yd
Basis: Estimated per text
Source: Estimated based on site documents

Substance Quantity Score: 7
Range: 1-10

2.1 Containment

Description: Contaminated soil
Source: Site documentation

Containment Score: 10
Range: 0-10

SUBSTANCE PARAMETER CALCULATION

SUB = (Human Toxicity + Mobility + 3) x (Containment + 1) + Substance Quantity **161.0**

2.0 MIGRATION POTENTIAL

2.2 Net precipitation

Amount (in.):	35-40	Net Precipitation Score:	4
Source:	Precip Map	Range: 0-5	

2.3 Subsurface Hydraulic Conductivity

Description:	Sand with silt		
Source:	GTI (1987)	Hydraulic Conductivity Score:	3
		Range: 1-4	

2.4 Vertical Depth to Aquifer

Depth (ft):	8-10	Depth to Aquifer Score:	8
Source:	GTI (1987)	Range: 1-8	

MIGRATION PARAMETER CALCULATION

MIG = Depth to Aquifer + Net Precipitation + Hydraulic Conductivity **15.0**

3.0 TARGETS

3.1 Aquifer Usage

Description:	Ground water not used, but usable		
Source:	Drinking Water System Data, Well Log Viewer	Aquifer Use Score:	2
		Range: 1-10	

3.2 Distance to Nearest Drinking Water Well

Distance (ft):	> 10,000	Well Distance Score:	0
Source:	Drinking Water System Data, Well Log Viewer	Range: 0-5	

3.3 Population Served by Drinking Water Wells within Two Miles

		Population Served Score:	0
No. of people:	0	Range: 0-100	
Source:	Drinking Water System Data, Well Log Viewer		

3.4 Area Irrigated by Wells within Two Miles

		Area Irrigated Score:	0
Area (acres):	0	Range: 0-50	
Source:	Well Log Viewer		

TARGET PARAMETER CALCULATION

2.0

TAR = Aquifer Use + Well Distance + Population Served + Area Irrigated

4.0 RELEASE

Evid. of release? Yes

Source: Ecology (1988b)

Release Score (REL): 5.0

Range: 0 or 5

GROUND WATER ROUTE CALCULATION

35.4

GW = (SUB x 40/208) x {(MIG x 25/17) + REL + (TAR x 30/165)} / 24

Range: 0-100

Washington Ranking Method
Route Scoring Summary and Ranking Calculation

Site Name: **Texaco Kirkland**
Site Address: **15753 Renton-Issaquah Road SE, Renton, WA 98059-6218**
CSID: **10432**
FSID: **1292568**

Human Health Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	47.2	5
Ground water	35.4	3

Quintile	Value
High (H)	5
Middle (M)	3
Low (L)	

Human Health Pathway Quintiles - February 2015

Quintile	Surface Water		Air		Ground Water	
1	<=	7.9	<=	8.4	<=	23.5
2	8.0	15.4	8.5	15.9	23.6	32.8
3	15.5	22.6	16.0	24.9	32.9	40.1
4	22.7	29.8	25.0	39.3	40.2	50.0
5	>=	29.9	>=	39.4	>=	50.1

$(H^2 + 2M + L) / 8$

Human Health Priority Bin Score: 4

Environmental Route Scores

Pathway	Score	Quintile
Surface water	0.0	
Air	1.6	2

Quintile	Value
High (H)	2
Low (L)	

Environmental Pathway Quintiles - February 2015

Quintile	Surface Water		Air	
1	<=	11.0	<=	1.4
2	11.1	23.9	1.5	2.4
3	24.0	31.9	2.5	16.4
4	32.0	49.9	16.5	28.1
5	>=	50.0	>=	28.2

$(H^2 + 2L) / 7$

Environmental Priority Bin Score: 1

FINAL MATRIX RANKING

Human Health Priority	Environmental Priority 5	4	3	2	1	n/a
5	1	1	1	1	1	1
4	1	2	2	2	3	2
3	1	2	3	4	4	3
2	2	3	4	4	5	3
1	2	3	4	5	5	5
n/a	3	4	5	5	5	NFA

n/a - not applicable

NFA - no further action

Site Rank: 3

References

WARM Database	Ecology. 1992. Toxicology database for use in Washington ranking method scoring. Prepared by: Science Applications International Corporation, Olympia, WA. Prepared for: Washington State Department of Ecology, Olympia, WA. Publ. no. 92-37. Updated July 2015.
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Ecology (1988a)	Site remediation at former Texaco station. Letter from L. Cashion, Ecology NWRO, to M. Salmon, Texaco Refining and Marketing, Inc., Kirkland, WA. January 7.
Ecology (1988b)	Kirkland Texaco – LUST groundwater monitoring. Letter from L. Cashion, Ecology NWRO, to Groundwater Technology, Renton, WA. April 7.

Ecology (2005)	Former Texaco station, 496 Central Way, Kirkland, QA, underground storage tank #4501, requesting additional information relating to site cleanup activities. Letter from C. Pederson, Ecology NWRO, to First Inter Bank Kirkland, Wells Fargo Bank 92685, San Francisco, CA. February 28.
Ecology (2007)	Reported releases of hazardous substances and potential liability for the releases at sites listed in enclosure 1. Letter from W. Reed, Ecology NWRO, to K. Lyons, Shell Oil Products US. June 14.
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