

WORKSHEET 1
Summary Score Sheet

SITE INFORMATION:

Name: Chevron Chemical Co
Address: 7515 E. Bowles Road
City: Kennewick County: Benton State: WA Zip: 99337
Section/Township/Range: S23/T08N/R30E
Latitude: 46° 10' 6.00" Longitude: 119° 2' 4.00"
TCP ID #: 304

Site scored/ranked for the 02/27/07 update

SITE DESCRIPTION (management areas, substances of concern, and quantities):

Background

This site has had various acidic spills reported to the Washington State Department of Ecology (Ecology) and the United States Environmental Protection Agency (EPA). The first spill was reported to the EPA in November of 1979, and reports filtered in until the late 1980s. The spills occurring in the early 80s were of ammonium nitrate and nitric acids; however in November on 1987 and January 1988 the facility spilled a total of 2,600 pounds of 100% equivalent sulfuric acid.

In 1985 the EPA performed a Potential Hazardous Waste Site Preliminary Assessment of the site recommending continued nitrate-nitrogen groundwater monitoring and increasing the number of monitoring wells on site. It was deemed to need no further action by the EPA due to no Resource Conservation Recovery Act (RCRA) wastes having been generated or stored at the site. Due to the previous spills and the sulfuric acid spilled in November of 1987 and January of 1988, the site was added to Ecology's Confirmed and Suspected Contaminated Sites List on March 1, 1988.

In February 1992, two underground storage tanks (USTs) were removed from the site. Petroleum contaminated soil and groundwater was discovered during the excavating and removal of the USTs and the dispensers. The EPA again reviewed the site's files and other pertinent information and found the site needed no further investigation under the Federal Superfund Program.

On July 23, 2003, Ecology's spill response team responded to the site due to a reported anhydrous ammonia leak at the fertilizer plant. A valve leaked during the loading operation releasing approximately 500 lbs of ammonia to the air. The leak was caused by an error with the newly installed temperature controller on the pH probe. The temperature controller was taken out of service and the manual system of operation resumed. Spill response reported that there was not any acute or chronic health risk expected to be associated with the release.

Site Description/Investigations

The subject site is located at the end of Bowles Road next to the Columbia River in the Finley area of Benton County. The Chevron Chemical Company (Chevron) had operated a fertilizer production facility at the site from the 1959 until the 1993 sale of the site to the Unocal Corporation (Unocal). Unocal then sold the facility in 2000 to Agrium U.S. Inc. (Agrium). Before construction of the nitrogen fertilizer plant the land was used for agricultural purposes. The following products have been produced during the facility's life: nitric acid, ammonium nitrate solution, granular ammonium nitrate, urea ammonium nitrate (32% solution), unpeels, a granular solid fertilizer, and Ice-B-Gon, a calcium magnesium acetate solid used as a paving deicer.

Nitrate spills occurred at the site as early as 1979 and continued up until 1989. Throughout the Ecology's file there are various reports of ammonium nitrate and nitric acid spills and recovery actions taken, but not all releases can be accounted for. Initially five wells were installed to monitor the elevated nitrate levels in the groundwater at the site with two additional wells constructed in 1982 to provide more specific information on the extent and direction of the groundwater flow.

Furthermore, three other projects were underway in 1982 to eliminate potential sources of the nitrate contamination. Construction began to re-grade, seal, and provide a drainage and sump system for portions of the plant to contain and recycle leaks and spills back into the process. Second, a direct line and pumping system was installed to transport recycled water to and from the plants, which was previously done by tank cars. Lastly, a maintenance shut down was scheduled to drain, clean, and inspect the inside floor and sump for surface cracks or other maintenance issues. Sampling of the groundwater for nitrate and chromium, which was apparently at one time used at the site, was performed biannually showing steady improvement.

Nitrate contamination at the site has been confirmed in the soils and groundwater. The site is currently working with Ecology's Industrial Section to reduce the nitrate levels in the groundwater. During irrigation season the groundwater is pumped and used as irrigation water on an alfalfa field leased by a farmer from Agrium on a nearby parcel. Nitrate contamination in the groundwater under the plant is above the Safe Drinking Water Act's Maximum Contamination Level (MCL) for drinking water.

In November of 1987 and January of 1988, Chevron reported two separate sulfuric acid spills at the site. Chevron conducted a neutralization and recovery plan to mitigate the spill due to the acid being retained in the soil and Chevron did not want to excavate the effected area. The first step of the neutralization plan was to apply 725 gallons of a solution of 18.9% potassium carbonate, 1.9% potassium bicarbonate, and 79.2% water; pH 11, to the soil in the spill area. Step two occurred one week later by applying 365 gallons of a solution, pH 9, containing 21.5% potassium bicarbonate, 3.9% potassium carbonate, and 74.6% water to the area. The third step was to apply irrigation water for an extended period of time while continuously pumping monitoring well 11 drilled at the release site. The water pumped from well 11 was monitored for pH. The recovery well was pumped continuously at 90 gallons per minute between March 25, 1988 and December 1, 1989. Results from the pH monitoring ranged between 6.4 and 7.3 through October 1988 and Chevron continued monitoring, but did not report any data. Chevron was to report any pH result under 6.0. It appears that the sulfuric acid spill had been neutralized during this time.

In 1992 as part of the sale agreement between Chevron and Unocal, Chevron removed two USTs and the dispensing equipment at the site. The USTs were located northwest of a small storage shed between two warehouses along the Columbia River. On January 17, 1992, White Shield Inc. (WSI) removed a 12,000 gallon diesel and a 2,000 gallon regular gasoline tank. There is information that an aboveground 1,000 gallon regular gasoline tank existed at the site prior to 1976; however there is no visual evidence of its former location. WSI inspected the removed tanks and found no evidence of leaks or spills of the petroleum products. Inspection of the excavations however revealed visual and olfactory evidence of petroleum contamination in the gasoline dispenser excavation. Twenty-three soil samples and five groundwater samples were taken throughout the four excavations. Sample results showed contamination of gasoline in the soil under and adjacent to the gasoline dispenser, gasoline and lead contamination of groundwater under the gasoline tank, and diesel and lead in groundwater under the diesel tank with concentrations exceeding Model Toxic Control Act (MTCA) Cleanup Levels.

Approximately 150 additional cubic yards were removed from underneath the gasoline dispenser due to soil contamination in that area. After the additional excavation ten soil samples were taken at the extent for characterization. One of the samples on the east wall of the excavation showed concentrations of gasoline, benzene, toluene, ethylbenzene, and xylene (BTEX) all above their respective MTCA Method A Cleanup Levels. A sample one foot below this sample on the east wall of the excavation found no detectable limits of any petroleum hydrocarbon constituents. The first sample was taken in a silty soil while the second sample was taken in the coarse sand and cobbles below a caliché layer. It appears that the affinity of the gasoline for the finer textured soil and the caliché zone halted the downward migration of the contaminants. This remaining contamination was estimated to be less than 10 cubic yards under the foundation of the small storage shed. The storage shed foundation and an electrical line prevented the removal of this remaining contaminated soil.

Groundwater tested at the time of the USTs removal found contamination above MTCA Method A Cleanup Levels for total petroleum hydrocarbons-gasoline (TPH-GX), benzene, xylene, and lead under the diesel tank. Groundwater sampled under the gasoline dispenser exceed MTC Method A Cleanup Levels for total petroleum hydrocarbons-diesel (TPH-Dx), xylene, and lead; however the chromatographic trace may be indicative of aged gasoline not diesel.

In April 1993, a monitoring well (K-26) was drilled approximately 40 feet down gradient from the former gasoline dispenser. Groundwater was sampled periodically from 1993 to 1995. Sample results from November 10, 1994, January 30, 1995, and November 1, 1996 were below MTCA Method A Cleanup Levels for all constituents, gasoline, BTEX, and lead. Unocal submitted an "Independent Remedial Action Report Summary" in July 1997 asking for a "no further action" determination by Ecology.

Due to remaining contaminated soil at the site and only three "clean" groundwater samples submitted Ecology as part of the site hazard assessment, Agrium sampled the site again in 2006. The site was sampled by PBS Engineering and Environmental, Inc. (PBS) on September 12, 2006. A water sample was collected from K-26 monitoring well and sampled for TPH-Gx, TPH-Dx, and BTEX. PBS also took a soil sample by auger 9 feet north of the southwest corner of the storage building and approximately two feet beneath the foundation. This sample was tested by TPH-Gx and TPH-Dx. Neither the soil nor the groundwater sample contained any detectable petroleum contaminants.

SPECIAL CONSIDERATIONS (include limitations in site file data or data which cannot be accommodated in the model, but which are important in evaluating the risk associated with the site, or any other factor(s) over-riding a decision of no further action for the site):

Due to the significant contamination documented on-site being primarily subsurface, the surface water and air routes are not applicable for WARM scoring for this site. Thus, only the groundwater route will be scored.

ROUTE SCORES:

Surface Water/Human Health: NS
Air/Human Health: NS
Groundwater/Human Health: 25.6

Surface Water/Environmental.: NS
Air/Environmental: NS

OVERALL RANK: 5

WORKSHEET 2
Route Documentation

1. **SURFACE WATER ROUTE** – Not Scored

2. **AIR ROUTE** –Not Scored

3. **GROUNDWATER ROUTE** –

a. List those substances to be considered for scoring:

Source: 2

Nitrate

b. Explain basis for choice of substance(s) to be used in scoring:

Above MCL in groundwater

c. List those management units to be considered for scoring:

Source: 2

Contaminated soils and groundwater

d. Explain basis for choice of unit to be used in scoring:

Analytic results of soil and groundwater at the site.

WORKSHEET 6
Groundwater Route

1.0 SUBSTANCE CHARACTERISTICS

1.2 Human Toxicity										
Substance		Drinking Water Standard (µg/L)	Value	Acute Toxicity (mg/ kg-bw)	Value	Chronic Toxicity (mg/kg/day)	Value	Carcinogenicity		Value
								WOE	PF*	
1	Nitrate	1000	2	ND	-	ND	-	ND	ND	-

* Potency Factor

Source: 2,8,9

Highest Value: 2
(Max = 10)

Plus 2 Bonus Points? 0

Final Toxicity Value: 2
(Max = 12)

1.2 Mobility (use numbers to refer to above listed substances)		
Cations/Anions	OR	Solubility (mg/L)
1=		$1 = 2.0 \times 10^2 = 2$

Source: 2,8,9

Value: 2
(Max = 3)

1.3 Substance Quantity:	
Explain basis: Unknown Quantity, use default = 1	<p>Source: <u>2</u></p> <p>Value: <u>1</u> (Max=10)</p>

2.0 MIGRATION POTENTIAL

		Source	Value
2.1	Containment (explain basis): Spills documented with contaminated soil and groundwater	2	10 (Max = 10)
2.2	Net precipitation: $5.0 - 4.1 = 0.9$ inches	14	1 (Max = 5)
2.3	Subsurface hydraulic conductivity: Poorly sorted, coarse, basaltic sands, and cobbles	4	4 (Max = 4)
2.4	Vertical depth to groundwater: 15 feet	4	8 (Max = 8)

3.0 TARGETS

		Source	Value
3.1	Groundwater usage: There are many small public water supplies in the area which do not have an alternate unthreatened source available with minimal hookups	10,11,12	9 (Max = 10)
3.2	Distance to nearest drinking water well: <u>< 600</u> feet, Drinking water well onsite	12	5 (Max = 5)
3.3	Population served within 2 miles: $\sqrt{\text{pop.}} = \sqrt{3129} = 55.9$	10,11,12	56 (Max = 100)
3.4	Area irrigated by (groundwater) wells within 2 miles: $(0.75)*\sqrt{\# \text{ acres}} = 0.75*\sqrt{939.7} = 22.99$	15	23 (Max = 50)

4.0 RELEASE

	Source	Value
Explain basis for scoring a release to groundwater: Analytical data documenting a release to groundwater	2	5 (Max = 5)

SOURCES USED IN SCORING

1. Ecology Central Region Office's site file and correspondence.
2. "Land Application of Recovered Groundwater Permit Application for Unocal Agricultural Products", May 18, 1992, Woodward-Clyde Consultants for Unocal.
3. "Kennewick Facility Former UST and Fuel Dispensing Area Independent Remedial Action Report" July 1997, CH2M Hill for Chevron Chemical Company.
4. "Closure Site Assessment Report Unocal Chemical Facility" March 1992, White Shield Inc., for Chevron Chemical Company.
5. "Report of Hydrological Consulting Services, Installation of Wells R-6 and R-7, Chevron Chemical Company, Kennewick, Washington." May 11, 1982, Dames & Moore for Chevron Chemical Company.
6. "Potential Hazardous Waste Site Preliminary Assessment, Summary Memorandum", August 26, 1985, United States Environmental Protection Agency
7. "K-26 Groundwater And Soil Sampling, Agrium Facility, Kennewick, Washington", September 29, 2006, PBS Engineering and Environmental for Agrium U.S. Inc.
8. Washington State Department of Ecology, Toxicology Database for Use in Washington Ranking Method Scoring, January 1992
9. Washington State Department of Ecology, WARM Scoring Manual, April 1992.
10. Washington State Department of Ecology Well Logs,
<http://apps.ecy.wa.gov/welllog/MapSearch/viewer.htm>
11. Washington State Department of Ecology Facility/Site Atlas,
<http://apps.ecy.wa.gov/websie/facsite/viewer.htm>.
12. Washington State Department of Health Division of Environmental Health Office of Drinking Water Public Water Supply Database (Sentry),
<http://www4.doh.wa.gov/SentryInternet/Disclaimer.aspx?Page=/SentryInternet/FindWaterSystem.aspx>
13. Washington State Department of Ecology CLARC Database,
<https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>
14. Washington Climate for Benton, Franklin Counties, Cooperative Extension Services, College of Agriculture, Washington State University.
15. Washington State Department of Ecology, Water Rights Application System (WRATS)
16. Site Hazard Assessment Site Visit by Kay Rottell and Justin Wilde, September 1, 2006

WASHINGTON RANKING METHOD

ROUTE SCORES SUMMARY AND RANKING CALCULATION SHEET

Site Name: Chevron Chemical Co. Region: Central

Street, City, County: 7515 E. Bowles Road, Kennewick, Benton

Facility ID: 304

This site was(X) ranked,() re-ranked, on February 26, 2007 based on the August 23, 2006 quintile values from a total of 912 assessed/scored sites.

<u>Pathway</u>	<u>Route Scores</u>	<u>Quintile Group number(s)</u>	<u>Priority scores:</u>
SW-HH	<u> </u>	<u> </u>	$\frac{H^2 + 2M + L}{7} = 1$
Air – HH	<u>25.6</u>	<u>2</u>	$2^2/8 = 0.5 = 1$
GW-HH	<u> </u>	<u> </u>	
SW-En	<u> </u>	<u> </u>	$\frac{H^2 + 2L}{7} =$
Air-En	<u> </u>	<u> </u>	

Use the matrix presented to the right, along with the two priority scores, to determine the site ranking. N/A refers to where there is no applicable pathway (e.g. typically with ground water route-only sites).

	Human Health					Environment
	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	N/A

DRAFT / FINAL

Matrix ("bin") Ranking: 5, No Further Action

CONFIDENCE LEVEL: The relative position of this site within this bin is:
 almost into the next higher bin.
 right in the middle, unlikely to ever change.
 X almost into the next lower bin.