



PERIODIC REVIEW

**Bingo Fuel Stop
FS ID#: 388**

**Exit 101 and Interstate 90
Thorp, Washington 98946**

Central Region Office

TOXICS CLEANUP PROGRAM

June 2011

PERIODIC REVIEW	1
1.0 INTRODUCTION.....	1
2.0 SUMMARY OF SITE CONDITIONS.....	2
2.1 Site Description and History	2
2.2 Remedial Actions and Investigations.....	2
2.2.1 Emergency Remedial Action	2
2.2.2 Remedial Investigation/Feasibility Study (RI/FS).....	3
2.2.3 Cleanup Action	3
2.3 Cleanup Levels.....	5
2.4 Points of Compliance.....	5
2.5 Groundwater Monitoring	5
2.6 Natural Attenuation.....	6
2.7 Institutional Controls	7
3.0 PERIODIC REVIEW	9
3.1 Effectiveness of completed cleanup actions	9
3.2 New scientific information for individual hazardous substances for mixtures present at the Site	9
3.3 New applicable state and federal laws for hazardous substances present at the Site	9
3.4 Current and projected Site use	10
3.5 Availability and practicability of higher preference technologies	10
3.6 Availability of improved analytical techniques to evaluate compliance with cleanup levels	10
4.0 CONCLUSIONS	11
5.0 REFERENCES.....	12
6.0 APPENDICIES	13
6.1 Vicinity Map	14
6.2 Site Plan	15
6.3 Groundwater Monitoring Data.....	16
6.4 Monitored Natural Attenuation Decision Flow Chart	18
6.5 Photo log	19

1.0 INTRODUCTION

This document is the Department of Ecology's review of site conditions and monitoring data to assure that human health and the environment are being protected at the Bingo Fuel Stop property located at Exit 101 off of Interstate 90 (Site). Cleanup at this Site was implemented under the Model Toxics Control Act (MTCA), Chapter 173-340 WAC.

Cleanup actions at this Site are being conducted under Agreed Order No. DE 02TCPCR-3976. The cleanup actions have resulted in residual concentrations of petroleum hydrocarbons (TPH) exceeding MTCA Method A cleanup levels for soil and groundwater established under WAC 173-340-740(2). The MTCA Method A cleanup levels for soil are established under WAC 173-340-740(2). The MTCA Method A cleanup levels for groundwater are established under WAC 173-340-720(3). WAC 173-340-420 (2) requires that Ecology conduct a periodic review of a site every five years under the following conditions:

- (a) Whenever the department conducts a cleanup action
- (b) Whenever the department approves a cleanup action under an order, agreed order or consent decree
- (c) Or, as resources permit, whenever the department issues a no further action opinion
- (d) And one of the following conditions exists
 - 1. Institutional controls or financial assurance are required as part of the cleanup
 - 2. Where the cleanup level is based on a practical quantitation limit
 - 3. Where, in the department's judgment, modifications to the default equations or assumptions using site-specific information would significantly increase the concentration of hazardous substances remaining at the site after cleanup or the uncertainty in the ecological evaluation or the reliability of the cleanup action is such that additional review is necessary to assure long-term protection of human health and the environment.

When evaluating whether human health and the environment are being protected, the factors the department shall consider include [WAC 173-340-420(4)]:

- (a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the Site;
- (b) New scientific information for individual hazardous substances of mixtures present at the Site;
- (c) New applicable state and federal laws for hazardous substances present at the Site;
- (d) Current and projected Site use;
- (e) Availability and practicability of higher preference technologies; and
- (f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

The department shall publish a notice of all periodic reviews in the Site Register and provide an opportunity for public comment.

2.0 SUMMARY OF SITE CONDITIONS

2.1 Site Description and History

The Bingo Fuel Stop Site is located at the southwest corner of the exit 101 at Interstate 90 south of Thorp, Kittitas County, Washington. The Site is located in a rural area with agricultural land located to the south and west. Four-lane Interstate 90 is located to the north, and the Thorp Highway is located to the east. A vicinity map is available as Appendix 6.1 and a Site plan is available as Appendix 6.2.

The Site was operated as a car and truck fueling station from 1968 until 1992. In February 1992, Ecology received a report of a flash fire during underground storage tank (UST) excavation activities at the Site. Ecology personnel conducted a Site visit on February 7, 1992. During this visit, Ecology personnel observed petroleum product floating on groundwater within open excavations resulting in explosive concentrations of gasoline vapors while the facility was open for business.

Ecology issued Enforcement Order No. DE-92TC-C109 on February 11, 1992 directing fuel dispensing activities at the Site to stop and requiring preparation and implementation of an Emergency Remedial Action Work Plan. Following the emergency remedial action, the parties entered into Agreed Order No. DE 93TC-C171 to conduct a Remedial Investigation/Feasibility Study (RI/FS). Following the completion of the RI/FS, Agreed Order No. DE 95TC-C236 was entered into to direct the final remedial action which was selected through the RI/FS. In 2002, Agreed Order No. DE 02TCPCR-3976 was entered to guide long-term operation, maintenance and monitoring at the Site.

2.2 Remedial Actions and Investigations

2.2.1 Emergency Remedial Action

Applied Geotechnology Inc., (AGI) prepared and submitted an Emergency Remedial Action Work Plan on March 5, 1992. Five of seven USTs at the Site were removed during the Emergency Remedial Action. Hydrocarbon contamination in soil and groundwater was encountered in each of the UST excavations. Soil samples were collected and submitted for analyses in accordance with Ecology's 1991 *Guidance for Site Checks and Site Assessment for Underground Storage Tanks*. Sample results indicated that remaining soil in the UST excavations and associated piping trenches contained petroleum hydrocarbon contamination at concentrations above Washington State Method A soil cleanup levels.

During the emergency remedial action a groundwater pump and treat system was installed and operated to recover free product and treat contaminated groundwater. Petroleum hydrocarbon-contaminated groundwater was recovered, treated to reduce concentrations of dissolved hydrocarbons, and reintroduced into an open UST excavation.

Water samples were collected from potentially affected surface and groundwater sources and submitted for chemical analyses. Domestic water supply wells were within federal drinking water standards, as were potentially affected surface waters.

2.2.2 Remedial Investigation/Feasibility Study (RI/FS)

Twelve soil borings were drilled during the Remedial Investigation (RI) and completed as 12 groundwater monitoring wells and one piezometer. Soil and groundwater samples were collected from the borings and wells and submitted to a laboratory for analysis. Two surface water samples and two sediment samples were also collected during the RI and submitted to a laboratory for analysis.

The results of the analyses indicated soil and groundwater downgradient of the former USTs and dispenser islands contained petroleum hydrocarbons above MTCA Method A cleanup levels. In addition, one sediment sample northeast of the Site contained petroleum hydrocarbons above cleanup levels, likely a result of surface spills in the past.

Risk-based soil and groundwater cleanup levels were developed for chemicals of concern. Cleanup levels for chemicals present above draft cleanup levels are discussed in Section 2.3. The Feasibility Study (FS) identified three alternatives for Site cleanup. Alternative 3 was selected, which consisted of product recovery, source area and downgradient petroleum-contaminated soil (PCS) excavation and treatment, and groundwater extraction and treatment.

PCS was to be remediated using Solid Phase treatment and re-used as backfill at the Site. Recovered groundwater will be treated in an aboveground bioreactor to at or near drinking water standards and discharged to the subsurface at the Site.

2.2.3 Cleanup Action

The cleanup action at Bingo Fuel Stop was directed by Agreed Order No. DE 95TC-C236 and was conducted in multiple phases. Each phase consisted of one or more of the following activities:

- Excavation of PCS from source areas and downgradient
- Aboveground Solid Phase treatment of PCS
- Product and groundwater recovery and reintroduction trench installation
- Product and contaminated groundwater recovery
- Groundwater treatment system operation and maintenance
- Groundwater treatment system monitoring
- Vapor extraction system (VES) installation and operation
- Groundwater monitoring following the completion of Site cleanup

2.2.3.1 Source Removal

Remedial activities at the Site included excavation and on-site treatment of approximately 15,700 cubic yards of PCS. Excavated soils were stockpiled on a treatment pad and allowed to aerate and bioremediate. Following passive treatment, the stockpiles were sampled to confirm

that contamination had remediated below cleanup levels prior to reuse as backfill. Soil sample analyses of samples collected from excavation sidewalls and bases indicated that all soil containing PCS at concentrations exceeding MTCA Method A cleanup levels was removed from the subsurface within the property boundaries. PCS could not be excavated from beneath the I-90 off-ramp right-of-way or under the Thorp Highway right-of-way without risking structural damage to the roadway.

2.2.3.2 Groundwater Treatment

Prior to the first phase of soil excavation, groundwater extraction and reintroduction trenches were installed to extend the recovery network. Expanded groundwater recovery and treatment for one season will reduce the total volume of impacted soil requiring excavation and treatment.

Recovery trenches were installed near MW3 and east of Thorp Highway. A groundwater reintroduction trench was installed along the northeast side of the property. The recovery/reintroduction trenches were used to flush mobile hydrocarbons from beneath Thorp Highway to the recovery trench, and to stimulate in situ biological activity to degrade any remaining hydrocarbons beneath Thorp Highway.

Recovered product and groundwater were piped to an oil/water separator and an aboveground bioreactor. Recovered product and groundwater were routed through the 1,100-gallon oil/water separator, and discharge water was routed to the bioreactor. The bioreactor consists of a 10,000-gallon reactor, segmented into two chambers. Each chamber is supplied with oxygen by a set of diffuser pads. A regenerative blower provides sufficient air to the bioreactor diffuser pads to maintain the concentration of dissolved oxygen in the bioreactor at approximately 10 parts per million.

Discharge from the groundwater treatment system was monitored in accordance with the Temporary State Waste Discharge Permit No. ST-9172. Monitoring consisted of periodically collecting samples from the treatment system discharge and submitting the samples for chemical analyses for benzene, ethylbenzene, toluene and total xylenes (BETX) and TPH.

2.2.3.3 Vapor Extraction System

A soil VES was installed to address gasoline-range petroleum-contaminated soil east of the former gasoline UST excavation beneath Thorp Highway. The VES consisted of 4-inch diameter slotted PVC piping extending along the eastern edge of the Bingo Fuel Stop property. The piping was buried approximately 6 feet below ground surface and was connected to an aboveground blower. Extracted vapors were treated using the aboveground bioreactor or activated carbon filters.

The VES discharge was monitored on a monthly basis. Volatile organic compounds in the air stream were measured using a photoionization detector.

2.3 Cleanup Levels

MTCA Method B was used in the RI/FS to develop risk-based Site specific cleanup levels. Method B was appropriate for determining cleanup levels at Bingo Fuel stop due to the presence of hazardous substances not listed in Method A cleanup tables. Cleanup levels are available in the table below.

Table 1

Cleanup Levels		
<u>Contaminant</u>	<u>Soil in ppm</u>	<u>Groundwater in ppb</u>
TPH, Gas	400.0**	1000.0
TPH, Diesel	400.0**	1000.0
Benzene	0.5	5.0
Ethylbenzene	40.0	400.0
Toluene	80.0	800.0
Total xylenes	800.0	8000.0
Anthracene	N/A*	4800.0
Fluorene	32.0	320.0
Naphthalene	32.0	320.0
Lead	250.0	3.2

* not applicable.

** for those portions of the site within 20 feet of surface water, or where saturated conditions are encountered due to surface water influence, soil cleanup levels for TPH are method A: 100ppm for TPH gasoline and 200ppm for TPH diesel.

2.4 Points of Compliance

Points of compliance for soil are throughout the Site, and will be demonstrated at the perimeter of excavations where concentrations of TPH in soil are below CULs. In addition, the completeness of soil cleanup will be further evaluated during groundwater compliance monitoring.

Points of compliance for groundwater are throughout the Site, and will be demonstrated by samples obtained from selected on- and off-site groundwater monitoring wells. Samples collected from monitoring wells provide information to evaluate the completeness of soil and groundwater remediation.

2.5 Groundwater Monitoring

The Clean-up Action Plan (CAP) specified that a Compliance Monitoring Plan (CMP) would be developed based on results of soil and groundwater sample analyses obtained during the Cleanup Action. The CMP initiated quarterly groundwater performance monitoring in 1996, and required groundwater monitoring until contaminants were no longer detected at concentrations exceeding

Site-specific cleanup levels. It was anticipated that groundwater monitoring would be required for two years after the completion of the Cleanup Action.

Ecology stated, in a February 5, 2001 letter, that soil and groundwater remediation within the legal boundaries of the property is complete. Monitored natural attenuation coupled with institutional controls was selected as the remediation alternative for the areas adjacent to (and downgradient of) the Former Bingo Fuel Stop and underlying the Interstate 90 and Thorp Highway rights-of-way. Natural attenuation occurs passively to reduce the concentration of contaminants in soil and groundwater without further active remediation.

Current efforts to monitor natural attenuation include:

- Measuring water levels and collecting samples from three off-site monitoring wells (MW6A, MW8, and MW12).
- Measuring field parameters (pH, temperature, conductivity, oxidation/reduction potential (ORP), dissolved oxygen, and turbidity) prior to collecting groundwater samples and at 5-minute intervals during sampling.
- Submitting groundwater samples to an analytical laboratory for analysis of gasoline and diesel-range petroleum hydrocarbons; benzene, ethylbenzene, toluene, and total xylenes (BETX); and nitrate and sulfate.

As of the most recent reported groundwater monitoring event in February 2010, monitoring results indicate concentrations of gasoline and benzene in MW6A exceeding cleanup levels established for the off-site areas. At MW8, gasoline and BETX were not detected for the first time in the sampling record for this well. During the previous sampling event in February 2009, gasoline and BETX were detected at 442 micrograms per liter (ug/L) and 1,400 ug/L, respectively. The absence of gasoline and BETX at MW8 in February 2010 is not consistent with the historic data trend at this well. In addition, the nitrate, sulfate, dissolved oxygen, and specific conductance concentrations were significantly higher in February 2010 than any other sampling event.

Groundwater monitoring data is available as Appendix 6.3.

2.6 Natural Attenuation

Natural attenuation processes are evaluated following the decision flow chart presented in the August 15, 2002 Operation and Maintenance Plan. The decision flow chart is available as Appendix 6.4.

Based on historical groundwater monitoring results, water levels and contaminant concentrations vary seasonally throughout the year and contaminant concentrations are highest during the winter months when irrigation of surrounding farmlands is not occurring. Therefore, only the groundwater sampling results from the winter months are compared in evaluating natural attenuation processes at the Site.

Biodegradation of BETX and gasoline within the plume is evaluated by comparing dissolved oxygen (DO), nitrate, and sulfate concentrations within the plume area to concentrations downgradient of the plume. Lower concentrations of DO, nitrate, and sulfate within the plume area may indicate increased biological activity and conditions favorable for biodegradation of BETX and gasoline. The results of the February 2010 sampling event indicate that DO, nitrate, and sulfate concentrations are lower in the plume area well MW6A relative to downgradient well that is outside of the plume (MW12). Data from MW8 was excluded from the natural attenuation evaluation due to the anomalous concentrations of gasoline, BETX, DO, and nitrate measured during the February 2010 sampling event. Within the plume area wells, DO concentrations have been low (below 2 mg/L) for the last nine years of monitoring, while nitrate and sulfate concentrations have shown decreasing trends over this same period. In the downgradient well, DO, sulfate, and nitrate concentrations have shown stable to slightly increasing trends. The low DO concentrations and decreasing sulfate and nitrate concentrations in the plume area compared to the stable to slightly increasing concentrations of DO, nitrate, and sulfate in the downgradient well indicate that increased aerobic, nitrate- and sulfate-reducing biodegradation is occurring within the plume.

The assimilative capacity of groundwater was calculated using February 2010 DO, nitrate, and sulfate results to confirm that complete biodegradation of BETX within the plume continues to occur. The calculation methods presented in the August 15, 2002 Operation and Maintenance Plan were followed for calculation of the assimilative capacity. Dissolved oxygen, nitrate, and sulfate concentrations at MW12 were assumed to represent background conditions and DO, nitrate, and sulfate concentrations at MW6A were assumed to represent conditions within the plume. The result of the calculations indicates that groundwater at the Site has an assimilative capacity of 4.4 mg/L for BETX. This exceeds the maximum concentration of BETX that was detected in February 2010, which was 0.42 mg/L.

2.7 Institutional Controls

The CAP states that a restrictive covenant will be placed on the property preventing activities which may result in a release of hazardous substances present on the property or exposure of human health or the environment to hazardous substances remaining on the property, if any remain. The covenant was to be recorded with the registrar of deeds for Kittitas County.

Additionally, Agreed Order No. DE 02TCPCR-3976 requires that within thirty (30) calendar days from the effective date of the Order, Burns Brothers shall implement institutional controls for the petroleum contaminated soil under the eastbound I-90 off-ramp and under the Thorp Highway right-of-way. The institutional controls shall include, at a minimum, the following: use restrictions requiring cleanup of contaminated soils disturbed or removed from road maintenance; maintenance of monitoring wells; inspection of highway conditions to ensure that contaminated soils are capped; and educational measures in the form of notification letters to local agencies. The notification letter shall be sent to the following agencies at a minimum: Department of Transportation, Kittitas County Department of Health and Kittitas County Highway Department.

The institutional controls are required to be implemented in accordance with WAC 173-340-440, which states that all institutional controls shall be described in a restrictive covenant; however, for properties owned by a local, state, or federal government entity, a restrictive covenant is not always required if an effective alternative system can be implemented that provides the same protections.

3.0 PERIODIC REVIEW

3.1 Effectiveness of completed cleanup actions

Cleanup actions at the Site have included the following:

- Installation and operation of product recovery wells
- Installation and operation of a soil vapor extraction system
- Remedial excavation
- Long-term groundwater monitoring
- Monitored Natural Attenuation

Cleanup actions began at the Site in 1992. Soil and groundwater contamination have been successfully remediated throughout the subject property, but off-site contamination remains. Groundwater monitoring and monitored natural attenuation analyses indicate that off-site groundwater contamination continues to attenuate without active remediation. Off-site soil contamination remains beneath public roadways to the north and east of the subject property.

Institutional controls are required at the Site. These institutional controls should be implemented through a restrictive covenant (now called environmental covenant), or another administrative system maintained by the property owner that provides an equivalent level of protection. The institutional controls should include appropriate use restrictions, maintenance requirements for monitoring wells, Site and road surface inspections, and notification letters to relevant public agencies. To date, Ecology has received copies of notification letters to appropriate public transportation agencies. Evidence of implementation of the other institutional control requirements has not been submitted to Ecology.

Without the implementation of institutional controls, contaminated soils contained beneath the Thorp Highway and I-90 right-of-way continue to pose a threat to human health and the environment.

3.2 New scientific information for individual hazardous substances for mixtures present at the Site

There is no new relevant scientific information for the petroleum contaminants related to the Site.

3.3 New applicable state and federal laws for hazardous substances present at the Site

Site-specific cleanup levels were implemented at the Site. Several relevant MTCA Method A and Method B cleanup levels have been modified since the cleanup action was conducted; however, WAC 173-340-702(12) (a) [2001 ed.] provides that,

“For cleanup actions conducted by the department, or under an order or decree, the department shall determine the cleanup level that applies to a release based on the rules in effect under this chapter at the time the department issues a final cleanup action plan for that release.”

The cleanup levels specified in the CAP for the Site will be used to determine whether cleanup actions successfully protect human health and the environment.

3.4 Current and projected Site use

Based on a Site visit conducted on June 7, 2011, the former Bingo Fuel Stop property remains vacant. The Site has a mixture of asphalt and compacted gravel or soil surfaces. Grasses and noxious weeds are growing throughout the Site. There have been no changes in current or projected future Site or resource uses.

3.5 Availability and practicability of higher preference technologies

The remedy implemented included remedial excavation, active groundwater treatment and product recovery, soil vapor extraction and monitored natural attenuation. Other treatment technologies may be successful at remediating remaining soil and groundwater contamination, but they would be cost prohibitive.

3.6 Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the remedial action were capable of detection below Site-specific cleanup levels for the contaminants of concern. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

.

4.0 CONCLUSIONS

- The cleanup actions completed at the Site fail to be protective of human health and the environment.
- Institutional Controls are required per the CAP and in Agreed Order No. DE 02TCPPCR-3976 and have not been fully implemented at the Site.
- The cleanup actions completed at the Site would likely be protective of human health if institutional controls were implemented, as required.
- Soil and ground water cleanup levels specified in the CAP have not been met at the Site.

Based on this periodic review, the Department of Ecology has determined that the remedial actions at the Site fail to be protective of human health and the environment. The requirements of the CAP and current Agreed Order for the Site must be fulfilled.

5.0 REFERENCES

Ecology. *Enforcement Order No. DE 92TC-C109*. February 11, 1992.

Applied Geotechnology, Inc. *Emergency Remedial Action Report For Bingo Fuel Stop*.
June 5, 1992.

Ecology. *Agreed Order No. 93TC-C171*. March 17, 1993.

Applied Geotechnology, Inc. *Remedial Investigation Report*. March 31, 1994.

Ecology. *Agreed Order No. 95TC-C236*. January 10, 1996.

Ecology. *Agreed Order No. 02TCPCR-3976*. June 3, 2002.

CDM. *2010 Natural Attenuation Monitoring Report*. April 7, 2010.

Ecology. *Site Visit*. June 7, 2010.

6.0 APPENDICIES

6.1 Vicinity Map



BURNS BROTHERS, INC. / BINGO FUEL STOP
NATURAL ATTENUATION MONITORING REPORT
THORP, WASHINGTON

CDM

Figure No. 1
Vicinity Map

6.2 Site Plan

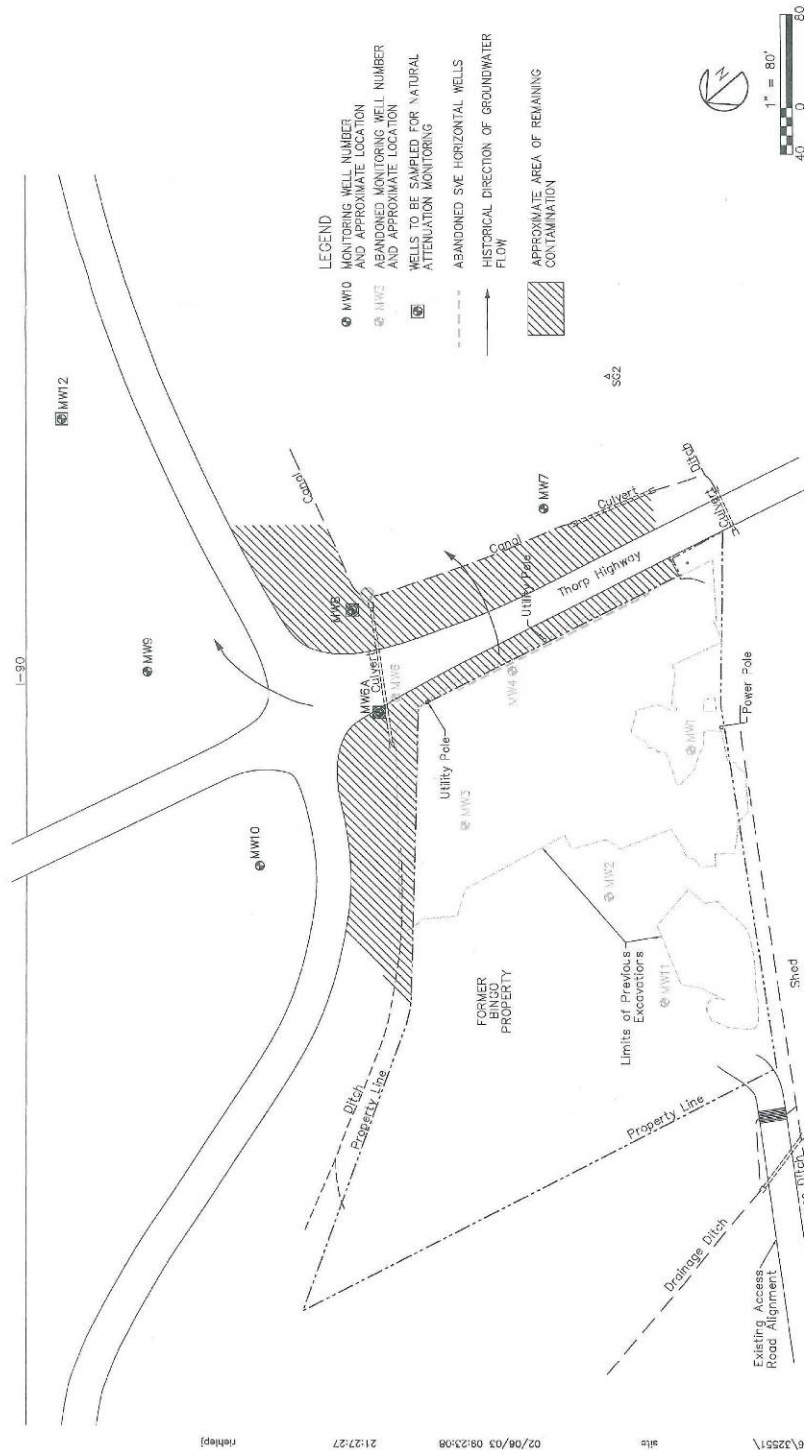


Figure No. 2
Site Plan

BURNS BROTHERS, INC. / BINGO FUEL STOP
NATURAL ATTENUATION MONITORING REPORT
THORP, WASHINGTON

CDM

Reference: Portland State University, Department of Geology, dated 8/24/93, and CDM Field Measurements, dated 3/96, 5/97, 7/98, and 5/99.

6.3 Groundwater Monitoring Data

Table 2
Summary of Chemical Analyses - Groundwater
Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

Well I.D.	Sample I.D.	Date	EPA Method 8020				TPH	
			Benzene	Ethylbenzene	Toluene	Xylenes	Gasoline	Diesel ^a
			µg/L				mg/L	
MW6A	MW6A	09/21/99	72	1,000	96	3,650	34	5.1/<0.50
	MW6A	12/16/99	190	610	1,000	2,300	26	<0.25/<0.50
	MW6A	03/23/00	84	100	47	1,600	18	3.3/<0.50
	MW6A	06/15/00	63	28	50	1,580	14	<0.25/<0.50
	MW6A	11/20/00	39	230	21	465	7.5	2.1/<0.50
	MW6A	03/08/01	40	190	30	660	10.0	1.2/<0.50
	MW6A Duplicate	03/08/01	39	200	33	720	10.0	1.6/<0.50
	MW6A	07/13/01	20	2.0	<1.0	11.1	0.63	<0.25/<0.50
	MW-6A-2/02	02/28/02	24	110	11	250	2.5	<0.25/<0.50
	MW-6A	01/15/03	23	87	14	240	2.3	0.6/<0.41
	MW-6A	02/10/04	23	120	19	250	2.2	<0.26/<0.41
	MW-6A	02/15/05	10	110	13	263	2.1	<0.25/<0.40
	MW6A	02/15/06	8.9	190	29	740	4.3	<0.25/<0.40
	MW6A	02/16/07	<1.0	6.6	<1.0	14.4	<0.1	<0.25/<0.40
	MW6A	03/19/08	7.1	220	7.4	534	2.1	<0.25/<0.40
	MW6A	02/09/09	4.6	170	7.9	477	3.0	<0.26/<0.41
	MW6A	02/11/10	5.4	130	3.4	286	2.3	<0.28/<0.41
MW8	MW8-10/93	10/29/93	2,800	410	79	950	3.0	<1.0
	MW8-4/95	04/06/95	1,500	330	19	490	3.3	<0.24
	MW8-01/96	01/31/96	1,920	536	33	874	6.32	<0.25/<0.75
	MW8-05/96	05/30/96	267	72	4	58	0.63	<0.25/ 0.76
	MW8-08/96	08/29/96	72.5	17	<1.0	2	0.12	<0.25/<0.75
	MW8-11/96	11/25/96	1,360	338	36	630	2.89	<0.25/<0.75
	MW8-02/97	02/26/97	24.8	8	<1.0	<1.0	0.05	NA
	MW8-5/28/97	05/28/97	799.0	199	11	200	1.84	<0.25/<0.75
	MW8	08/28/97	385	128	3	60	0.87	<0.25
	MW8	11/18/97	411	136	3	41	0.90	0.28
	MW8	02/17/98	47	28	<1.0	<1.0	0.27	<0.25/<0.50
	MW8	03/27/98	760	300	7.5	80	2.4	<0.25/<0.50
	MW8	04/27/98	520	230	<1.0	6.6	1.5	<0.25/<0.50
	MW8	05/22/98	200	75	<1.0	<5.0	0.51	<0.25
	MW8	06/18/98	490	180	21	101	1.60	<0.25/<0.50
	MW8	09/28/98	74	19	9.6	10	0.19	<0.25/<0.50
	MW8	12/09/98	380	120	10.0	113	1.10	<0.25/<0.50
	MW8	03/10/99	320	210	17	200	1.50	<0.25/<0.50
	MW8	06/16/99	250	98	5.3	44	0.70	<0.25/<0.50
	MW8	09/21/99	260	65	5.6	43	0.59	<0.25/<0.50
	MW8	12/16/99	1,700	680	33	640	7.1	<0.25/<0.50
	MW8	03/23/00	700	490	22	414	3.9	<0.25/<0.50
	MW8	06/15/00	94	9.5	<1.0	<1.0	<0.10	<0.25/<0.50
	MW8	11/20/00	550	150	6.6	18.8	1.2	<0.25/<0.50
	MW8	03/08/01	850	250	26	130.0	2.9	<0.25/<0.50
	MW8	07/13/01	120	<5.0	<5.0	<5.0	<0.5	<0.25/<0.50
	MW8 Duplicate	07/13/01	100	<5.0	5.5	<5.0	<0.5	<0.25/<0.50

CDM

Q:\11000-19999\19956-Bingo Fuel\64415\Table 2 SUM-GW.XLS

Page 1 of 2

Table 2
Summary of Chemical Analyses - Groundwater
Burns Bros./Bingo Fuel Stop Cleanup Action
Thorp, Washington

Well I.D.	Sample I.D.	Date	EPA Method 8020				TPH	
			Benzene	Ethylbenzene	Toluene	Xylenes	Gasoline	Diesel ^a
			µg/L				mg/L	
	MW8-2/02	02/28/02	960	56	6.1	12.0	1.0	<0.25/<0.50
	MW8	01/14/03	1,100	580	81	499	5.2	<0.25/<0.50
	MW8A (Duplicate)	01/14/03	1,100	590	89	516	5.6	<0.25/<0.50
	MW8	02/10/04	640	530	81	820	6.2	<0.26/<0.41
	MW8A (Duplicate)	02/10/04	660	550	86	840	6.5	<0.26/<0.41
	MW8	02/15/05	120	1.2	<1.0	<1.0	0.38	<0.26/<0.41
	MW8A (Duplicate)	02/15/05	120	<1.0	<1.0	<1.0	0.28	<0.26/<0.41
	MW8	02/15/06	340	130	26	55	1.1	<0.26/<0.41
	MW8A (Duplicate)	02/15/06	360	140	29	58	1.1	<0.26/<0.41
	MW8	02/16/07	100	10	5.0	1.8	0.35	<0.25/<0.40
	MW8A (Duplicate)	02/16/07	120	11	5.7	1.9	0.38	<0.25/<0.40
	MW8	03/18/08	180	52	5.7	5.3	0.47	<0.25/<0.41
	MW8A (Duplicate)	03/18/08	190	59	6.3	6.3	0.52	<0.25/<0.40
	MW8	02/09/09	210	100	14.0	118.4	1.4	<0.25/<0.40
	MW8	02/11/10	<1.0	<1.0	<1.0	<1.0	<0.10	<0.26/<0.41
	MW8 (Duplicate)	02/11/10	<1.0	<1.0	<1.0	<1.0	<0.10	<0.25/<0.40
MW12	MW12	07/14/01	<1.0	<1.0	<1.0	<1.0	<0.10	<0.25/<0.50
	MW12-2/02	02/28/02	<1.0	<1.0	<1.0	<1.0	<0.10	<0.25/<0.50
	MW12	01/15/03	<1.0	<1.0	<1.0	<1.0	<0.10	<0.25/<0.40
	MW12	02/10/04	<1.0	<1.0	<1.0	<1.0	<0.10	<0.26/<0.41
	MW12	02/15/05	<1.0	<1.0	<1.0	<1.0	<0.10	<0.26/<0.41
	MW12	02/15/06	<1.0	<1.0	<1.0	<1.0	<0.10	<0.26/<0.41
	MW12	02/16/07	<1.0	<1.0	<1.0	<1.0	<0.10	<0.26/<0.41
	MW12	03/18/08	<1.0	<1.0	<1.0	<1.0	<0.10	<0.26/<0.41
	MW12	02/09/09	<1.0	<1.0	<1.0	<1.0	<0.10	<0.25/<0.40
	MW12	02/11/10	<1.0	<1.0	<1.0	<1.0	<0.10	<0.25/<0.40
Bingo Fuel Stop Cleanup Levels			5.0	400	800	8,000	1.0	1.0

Notes:

Well MW6 was replaced in September 1999 by well MW6A.

a) WTPH-Diesel Extended, quantified as diesel/oil.

mg/L - milligrams per liter.

µg/L - micrograms per liter.

NA - not analyzed.

TPH-G and TPH-D analyses in 1993 performed using EPA 8015 Modified.

< - analyte not detected at/or greater than the stated concentration.

6.4 Monitored Natural Attenuation Decision Flow Chart

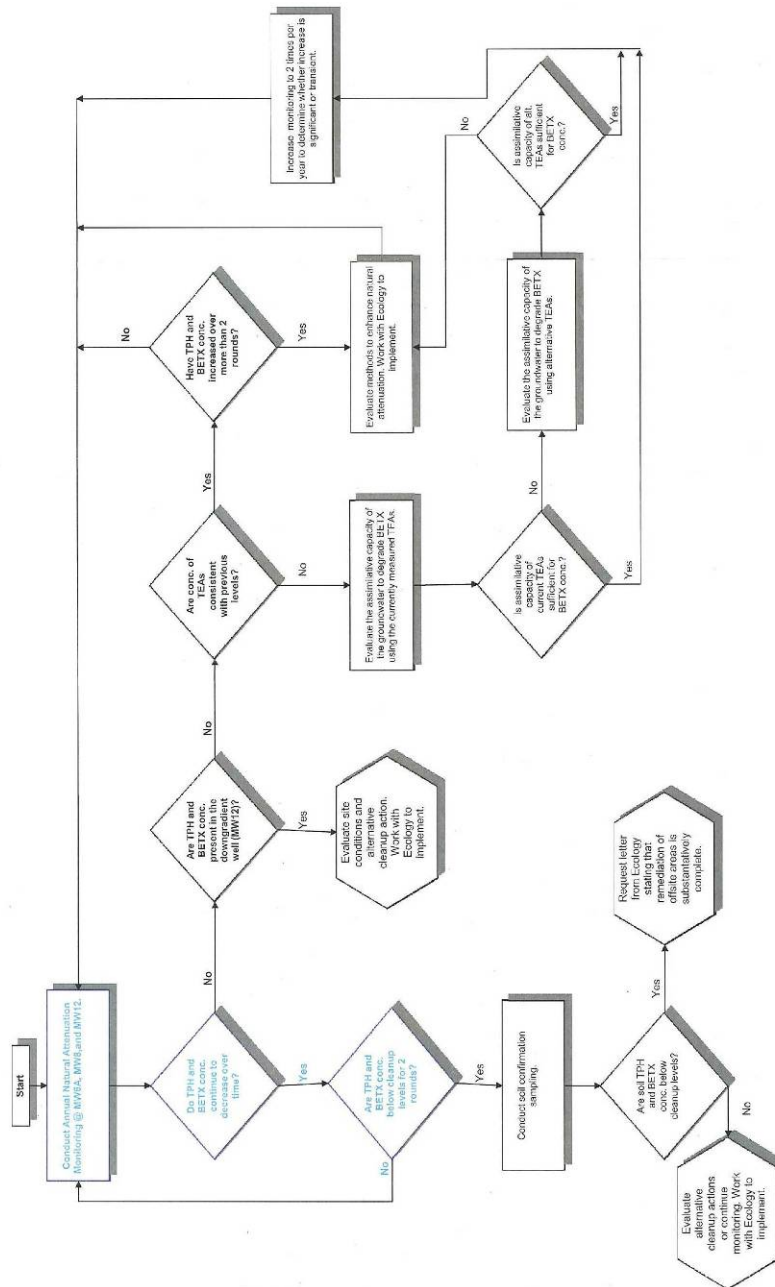


Figure No. 3
Natural Attenuation
Decision Flow Chart

BURNS BROTHERS, INC./BINGO FUEL STOP NATURAL ATTENUATION MONITORING REPORT
THORP, WASHINGTON

CDM

Q:\1996-Burns-Eval\1413\Figure 3 NA Decision Chart

6.5 Photo log

Photo 1: Bingo Site – from the east



Photo 2: Paved portion of Bingo Site – from the southeast



Photo 3: Downgradient Monitoring Wells – from the west.



Photo 4: Monitoring Well East of Thorp Highway – from the northeast

