

Cleanup Action Plan

Darling-Tacoma Facility

(aka Darling Delaware Co., Inc. and Puget Sound By-Products)

Facility No.: 25455514, Cleanup Site No.: 8475, VCP Project No.: SW1317

#117-8090003

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PRESENTED TO

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TABLE OF CONTENTS

1.0 INTRODUCTION	1
1.1 site Location and Description	1
1.2 Site Operational History	1
1.3 Site Cleanup and Investigation History	1
2.0 CAP PURPOSE	4
3.0 CAP REQUIREMENTS	5
3.1 Groundwater Monitoring.....	5
3.2 Long-Term Facility Maintenance.....	5
3.3 Subsurface Soil Investigation & Disposal of Impacted Soil	6
4.0 REFERENCES	6

APPENDICES

APPENDIX A – FIGURES

APPENDIX B - TABLES

ACRONYMS/ABBREVIATIONS

Acronyms/Abbreviations	Definition
µg/L	Micrograms per liter
aka	Also known as
CAP	Cleanup Action Plan
DII	Darling Ingredients, Inc.
mg/kg	Milligrams per kilogram
MTCA	Model Toxics Control Act
NFA	No further action
RZA	Rittenhouse, Zeman, & Associates, Inc.
SGT	Silica gel treatment
TPCHD	Tacoma-Pierce County Health Department
µg/L	Micrograms per liter
USTs	Underground storage tanks
VCP	Voluntary cleanup program

1.0 INTRODUCTION

Tetra Tech, Inc. (Tetra Tech) has developed this Cleanup Action Plan (CAP) on behalf of Darling Ingredients, Inc. (DII) at the request of Washington Department of Ecology (Ecology) and the Port of Tacoma (the Port). This CAP was prepared as part of efforts to address residual petroleum hydrocarbons remaining in the subsurface at DII's Tacoma facility (the Facility) known as Darling Delaware Co., Inc. (aka Puget Sound By-Products). The Facility is located at 2041 Marc Avenue in Tacoma, Washington. This CAP presents a brief site location and description, and site operational and investigative history, and CAP requirements.

Sections 1.1 through 1.3 of this CAP provide a brief introduction, summarized from detailed information in Tetra Tech's Site Investigation Report (Tetra Tech 2019). The reader is referred to the Site Investigation Report for additional details. **Appendix A** includes figures and **Appendix B** includes site investigation data tables.

1.1 SITE LOCATION AND DESCRIPTION

DII's ingredients processing operation resides on an approximately 4-acre property owned by Port of Tacoma. The Facility is located at 2041 Marc Avenue in a primarily heavy industrial area of Tacoma (**Figure 1; Appendix A**). Properties surrounding the Facility include Tri Pack Transloading Warehouse on the north, Tacoma Rail followed by multiple industrial properties to the east, and undeveloped land on the south and west. Puyallup River flows from southeast to northwest approximately 1,300 feet west of the Facility. The Puyallup River enters Commencement Bay of the Puget Sound waterway approximately 1.5 mile not-northwest of the Facility.

Several structures comprise DII's operation including an office, office/storage room, workshop, office/shower/lunchroom with adjoining carport parking for motorcycles, truck shop, rendering plant, scrubbing room, wastewater room, an aboveground biological wastewater treatment reactor, finished product load-out building, chemical storage area, and multiple silos (**Figure 2; Appendix A**). The remaining portions of the property are used for vehicle and equipment parking and storage. The surface of the Facility is paved with asphalt, except for the southern equipment storage area.

1.2 SITE OPERATIONAL HISTORY

Since the early 70's the site has been used to operate a food processing by-products conversion plant, which collects and transforms these byproducts into valued fat and protein ingredients for use in the production of food, feed, fuel, and fertilizer products. The byproducts are of animal and vegetable origin. Darling began its operation of the processing facility in the mid 70's and still operates there today. Prior to the by-products conversion operations at the site, the City of Tacoma operated the property and greater surrounding properties as an unregulated and unsupervised landfill constructed over dredged tidal flat material. The landfill operated from the 1940s until approximately 1964.

1.3 SITE CLEANUP AND INVESTIGATION HISTORY

The by-products operation once used two 10,000-gallon underground storage tanks (USTs). One tank contained diesel for truck fueling and the other contained Bunker-C fuel oil for heating site buildings. The former tank location is beneath the present-day office/shower/lunchroom building (**Figure 2**). The two USTs were removed in 1989 along with approximately 1,000 gallons of wastewater from the tank excavation and 112 cubic yards of petroleum-contaminated soil. The water and soil were disposed off-site. Excavated soil was sampled for waste disposal characterization. Ecology sampled groundwater from the excavation and also sampled soil from the north and south excavation sidewalls. Groundwater and soil indicated petroleum hydrocarbon impacts from the USTs above cleanup levels. In a May 24, 1989 letter from Ecology, Ecology instructed Darling the excavation could be backfilled but left the case open.

Subsurface soil and groundwater investigations have been conducted at the Facility since 1989, following removal of the USTs and impacted soil. The following presents a very brief summary of the investigations. The Site Investigation Report (Tetra Tech 2019) provides details regarding each of the below investigations.

- **1989:** Rittenhouse, Zeman & Associates, Inc. (RZA) advanced three subsurface soil borings in the area adjoining the UST excavation area. RZA completed the boings as groundwater monitoring wells. Soil and groundwater analytical results from the investigation indicated residual petroleum hydrocarbons.
- **2002 - 2004:** Tetra Tech (formerly MFG, Inc.) installed four groundwater monitoring wells in 2002 to replace the three wells originally installed in 1989, plus one additional well (**Figure 2**, and **Table 1, Appendix B**). Soil results from 2002 indicated residual petroleum hydrocarbons in soil above Model Toxics Control Act (MTCA) Method A Soil Cleanup levels at a depth of 7 to 8.5 feet below grade, within the water table fluctuation zone (**Tables 2 and 3; Appendix A**). Quarterly groundwater monitoring results between 2002 and 2004 indicated a groundwater flow generally to the north-northwest, with some fluctuation likely due to precipitation and runoff events. Quarterly groundwater monitoring also indicated residual petroleum hydrocarbons above MTCA Method A Groundwater Cleanup Levels. However, the same groundwater samples analyzed after silica gel treatment (SGT) indicated petroleum hydrocarbons were either non-detect or well below the cleanup level of 500 micrograms per liter ($\mu\text{g/L}$) (**Table 3; Appendix B**). Darling requested site closure based on the results and risk assessment.
- **2012:** In 2012, the Facility entered Ecology's Voluntary Cleanup Program (VCP) by submitting a VCP application. Ecology recommended additional site investigation, which began in 2017.
- **2017 - 2019:** In 2017, a subsurface soil and groundwater investigation was conducted as per work requested by Ecology in response to the VCP application. One additional groundwater monitoring event was conducted in 2019. The 2017 investigation included abandonment of well MFG-3. Well MFG-4 was also proposed for abandonment but could not be found. The 2017 subsurface investigation indicated residual petroleum hydrocarbons above the MTCA Method A Soil Cleanup Levels in soil between 6.5 and 7.5 feet below grade, within the water table fluctuation zone (**Tables 2 and 3**), on the south sides of the former UST basin. Groundwater monitoring results for 2017 and 2019 indicated residual petroleum hydrocarbons above MTCA Method A Groundwater Cleanup Levels. However, the same groundwater samples analyzed after SGT indicated petroleum hydrocarbons were either non-detect or well below the cleanup level of 500 $\mu\text{g/L}$ (**Table 3, Appendix B**). The results also indicated that residual petroleum hydrocarbons did not appear to be migrating off site.

The Site Investigation Report also included evaluating the data by Mann-Kendall Statistical Analysis, comparison of non-SGT with SGT results, and a risk assessment. These are summarized below:

- **Mann-Kendall Statistical Analysis:** The Mann-Kendall Statistical Analysis was conducted on groundwater monitoring results between 2002 and 2019. The statistical results indicated confidence intervals of 97% to 99% for a decreasing trend for diesel range organics, 83% to 94% for decreasing heavy oil range organics, and 83% to 95% for decreasing mineral oil range organics. The decreasing trends are likely due to natural degradation of petroleum hydrocarbons in the subsurface.
- **SGT Evaluation:** Tetra Tech evaluated the groundwater data in relation to samples analyzed with and without SGT. SGT is used to separate the polar hydrocarbons (e.g., naturally occurring organics) from the non-polar hydrocarbons (e.g., petroleum hydrocarbons) within the same samples. The laboratory also noted elution patterns occurred both earlier and later than typical diesel fuel and that the peak profile present was atypical for hydrocarbons. Ecology's guidance document indicates that up to 10% of petroleum hydrocarbon constituents, such as Bunker-C, may be extracted during SGT; suggesting that SGT results should not be used in evaluating cleanup. However, the 2017 and 2019 total petroleum hydrocarbons (TPH) with SGT results indicates that one would need to increase polar hydrocarbon amounts in the samples by 417% to 1,299% before concentrations would meet or exceed the MTCA Method A Groundwater Cleanup

Level. So, the Ecology-estimated 10% of petroleum hydrocarbons lost during SGT is minimal compared to the amount needed to exceed the MTCA Method A Groundwater Cleanup Level for site sample results. Based on these calculations using the SGT data, Tetra Tech stated that it is reasonable to conclude that the majority of hydrocarbons observed in groundwater at the Facility are the result of dissolved and colloidal organic matter from sources such as degrading landfill and tideflat organic debris, and possibly even tallow or fats that may have migrated to subsurface soil prior to paving of the facility.

- Risk Assessment: Tetra Tech conducted risk assessments on facility data in 2002 and again in 2019. The 2002 risk assessment found that residual petroleum hydrocarbon constituents present in subsurface soil/landfill materials and groundwater at the Facility do not pose an adverse human health or ecological risk. The 2019 risk assessment: 1) indicated concentrations of TPH in subsurface soil (located at 6.5 to 7 feet below grade) at the Facility are well below the site-specific TPH cleanup level of 19,498 milligrams per kilogram (mg/kg) calculated as part of the 2019 risk assessment; 2) there are no unacceptable risks from contact with soil to industrial receptors based on the site-specific screening level; 3) concluded that based on analytical results, lack of a complete exposure pathway, and site-specific considerations, groundwater does not pose a threat to human health; and 4) TPH appears in equilibrium with groundwater and bound to subsurface soil materials. Therefore, TPH does not appear to be leaching to groundwater or migrating off site.

The 2019 Site Investigation Report (Tetra Tech 2019) presented a number of conclusions and requested facility closure based on analysis of the data collected between 2002 and 2019. The Site Investigation Report provides additional details.

- Statistical analysis completed on petroleum hydrocarbons for groundwater data available between 2002 and 2019 indicates that the concentrations of petroleum hydrocarbons have declined over the last 30 years and these declines are statistically significant. This implies that the residual hydrocarbon mass in the soil is tightly sorbed onto the highly organic subsurface materials and, as such, appear to be relatively immobile and in equilibrium with the groundwater.
- Groundwater TPH with SGT results indicate that the concentrations of petroleum hydrocarbons have been below MTCA Method A Groundwater Cleanup Levels since at least 2003. Improvements in analytical techniques has allowed quantification of the concentration of TPH after the SGT to concentrations that are well below the MTCA Method A Groundwater Cleanup Level, and support the conclusion that concentrations continue to decline.
- 2017 and 2019 groundwater TPH with SGT results for diesel range and heavy oil range hydrocarbons would require an and increase between 417% and 1,299% before the potential loss of polar organics from using SGT would result in hydrocarbon concentrations meeting or exceeding the MTCA Method A Groundwater Cleanup Levels of 500 µg/L.
- The 2002 and 2019 risk assessments both indicated acceptable levels of risk for human health and ecological receptors to subsurface soil and groundwater.
 - Concentrations of TPH in subsurface soil at the Facility are well below the site-specific TPH cleanup level of 19,498 mg/kg calculated as part of the 2019 risk assessment. Based on the site-specific screening level, there are no unacceptable risks from contact with soil to industrial receptors.
 - Risks from groundwater ingestion are close to and below the acceptable noncarcinogenic risk value of 1.0 for TPH without SGT and well below for results of TPH with SGT. TPH with SGT are also well below the groundwater cleanup level of 500 µg/L and are associated with noncarcinogenic risks well below 1.0. In addition, Concentrations of TPH in groundwater with and without SGT at the Facility are well below the site-specific TPH cleanup level of 74,000 µg/L for incidental ingestion exposure, which may be expected for construction workers.

2.0 CAP PURPOSE

While facility soil concentrations for petroleum hydrocarbons remain above MTCA Method A Soil Cleanup Levels, the site-specific human health risk assessment indicated acceptable risk to construction workers. In addition, the depth to impacted soil is at depths beginning at 6.5 to 7 feet below grade and within the water table fluctuation zone, depths at which are below the level of most utility and construction projects. In addition, petroleum hydrocarbons do not appear to be migrating off-site in groundwater based on the analyses presented above.

DII, the Port, Ecology, and Tetra Tech held a conference call during January 2020 to discuss current facility conditions and the potential for facility closure. During the call, Ecology and the Port expressed concern about the potential for human contact with subsurface soil in cases where excavation by construction workers may extend into subsurface soil zones where residual petroleum hydrocarbons are present. Based on these concerns, facility closure at the time of this CAP was not an option.

Also discussed was the current facility layout, in which the lunchroom structure resides above the former UST basin and thick asphalt is present beneath and surrounding the lunchroom structure (Figure 2). As such, access to the former UST basin is currently not available for investigation and/or soil removal efforts. The area adjoining the lunchroom and work shop are the main truck delivery areas for access to the rendering plant operation. Gaining access to the former UST Basin area for investigation and soil removal, if necessary, would be extremely costly for DII. This high cost to DII is due to 1) high material and labor costs for lunchroom structure and asphalt paving removal and replacement; and 2) restriction or elimination of raw material deliveries for processing during the downtime required to conduct the investigation and soil removal effort.

While restrictive covenants or deed restrictions are potential options for conditional site closure at some facilities, the Port stated that these are not viable options for them as owners of the property. Multiple other potential closure or no further action (NFA) options were discussed during the January 2020 call. One potential option that Ecology may agree to is an **NFA Likely** designation, which would require certain commitments on the part of DII.

An NFA Likely designation would be of benefit for the DII, the Port, and Ecology for the following reasons:

1. It provides a vehicle for which DII would commit to future site investigation and cleanup work at such time that access to the former UST basin area becomes available to satisfy the Port and Ecology requirements for cleanup; and
2. It may also allow for DII, with assistance from the Port, to request a variance from Tacoma Pierce County Health Department (TPCHD) for the yearly UST permit fee until such time that the former UST basin can be investigated and, if needed, impacted soil removed.

The purpose of this CAP is to outline the requirements that DII would need to commit to under an NFA Likely designation in order for Ecology to consider issuance of an NFA Likely designation or agreement, and by which the Port would be satisfied with a commitment that ensures eventual site cleanup, as necessary. The anticipated NFA Likely components would include the following commitments by DII:

1. Periodic maintenance and groundwater monitoring of downgradient wells MFG-1 and MFG-2.
2. Long-term maintenance of the existing asphaltic concrete driving surface and office/shower/lunchroom structure (hereinafter, "lunchroom" structure) that serves as temporary cap over petroleum hydrocarbon-impacted subsurface soil.
3. Future subsurface soil investigation and, as needed, removal and disposal of petroleum hydrocarbon-impacted subsurface soil in and adjacent to the former UST basin at such time that: 1) existing structure(s) over the former UST basin are removed; 2) asphalt over and/or adjoining the former UST basin is removed; and 3) DII's lease with the Port is discontinued and the Facility will be vacated.

3.0 CAP REQUIREMENTS

3.1 GROUNDWATER MONITORING

Two remaining wells (MFG-1 and MFG-2) exist at the Facility on the northern side of the work shop (MFG-1) and at the property boundary (MFG-2) in downgradient locations from the former UST basin. Groundwater monitoring will require that these wells be properly maintained and not paved over or destroyed during maintenance of the asphalt paving. Repairs to the wells will be required if wells become damaged, or replacement wells will be installed and the old wells abandoned should wells be destroyed or compromised.

Groundwater monitoring will occur at a frequency of once every 3 years during the period between January and March of the monitoring year; the period when hydrocarbons historically were typically at their highest concentration (**Table 4**). Based on the 3 year schedule, the next groundwater monitoring event would be conducted January-March of 2022, based on the most recent monitoring event conducted in January 2019.

DII will conduct the groundwater sampling for the purpose of evaluating site conditions for changes in petroleum hydrocarbon concentrations. The need for continuation of the monitoring program on a 3-year basis will be re-evaluated with DII, Ecology, and the Port after each monitoring period based on: 1) groundwater concentrations; 2) status of structures over the former UST basin in anticipation of petroleum-impacted soil removal; and 3) status of DII's property lease with the Port.

Groundwater monitoring will include recording water levels and sampling of the two remaining wells, MFG-1 and MFG-2, which are downgradient of the former UST basin and at and near the northern property line (**Figure 2**). The wells will be sampled using low-flow purging and sampling methods (e.g., peristaltic or bladder pump) using designated, disposable tubing and bladders, as applicable. Field personnel will purge wells at a consistent rate between 0.1 and 0.5 liters per minute such that drawdown is less than 0.3 feet. Purge water will be monitored using a multi-parameter meter with flow-through cell. Purging will continue until field parameters, recorded at approximately 5-minute increments, stabilize for three consecutive readings based on the following schedule, or until a minimum of 3 well volumes have been purged if parameters fail to stabilize:

- pH: ± 0.1 pH units
- Specific conductance: $\pm 3\%$
- Oxidation-Reduction Potential: ± 10 millivolts
- Temperature: $\pm 3\%$
- Dissolved oxygen: $\pm 10\%$ if > 0.5 mg/L or stable if three values less than 0.5 mg/L
- Turbidity: < 5 NTUs or $\pm 10\%$ when turbidity is 5 NTUs or greater

Once field parameters stabilize, field personnel will collect groundwater samples in laboratory-provided sample containers. The selected laboratory will analyze the samples for diesel-range petroleum hydrocarbons by method NWTPH-Dx, with SGT and without SGT. Field personnel will preserve the samples in coolers containing doubled re-sealable bags with ice and handle the samples under standard chain-of-custody procedures.

3.2 LONG-TERM FACILITY MAINTENANCE

Subsurface soil impacted by residual petroleum hydrocarbons resides at depths of 6.5 to 7 feet below grade, which is within the water table fluctuation zone. The existing asphaltic concrete driving surface provides a cap over the subsurface soil that may be impacted by petroleum hydrocarbons in and adjacent to the former UST basin area. The asphalt-paved areas are a critical component of the Facility due to truck traffic for deliveries. DII performs regular maintenance of the asphalt, which includes re-sealing the surface and, when needed, applying additional layers of asphalt. The lunchroom structure also serves as a cap over a portion of the former UST basin.

Long-term facility maintenance of these features is a CAP requirement to limit precipitation infiltration into the subsurface in the former UST basin area to limit migration of remaining contaminants. Secondly, the asphalt surface and structure acts as a barrier to potential inadvertent construction worker exposure to impacted subsurface soil. The only known subsurface utility (a drainpipe) near the former UST basin is in the corridor between the workshop and rendering plant buildings. This is the only area known where construction workers would have the potential to contact subsurface soil in the former UST basin area should the drainpipe require repair.

3.3 SUBSURFACE SOIL INVESTIGATION & DISPOSAL OF IMPACTED SOIL

DII's current lease on the property extends to September 30, 2028. At the time of this CAP, DII anticipates that near the end of the lease with the Port, that the lease will be extended and DII will continue operating at the 2041 Marc Avenue location for the foreseeable future. DII understands that, together, the CAP and an NFA Likely designation by Ecology constitutes an agreement that further investigation of subsurface soil and, potentially, a soil removal action will be required in the case that subsurface soil in the former UST basin area exhibits petroleum hydrocarbons impacts above the established Ecology cleanup Levels at the time of the investigation.

Implementation of a subsurface soil investigation, and potentially soil removal, will be triggered by one or both of the following:

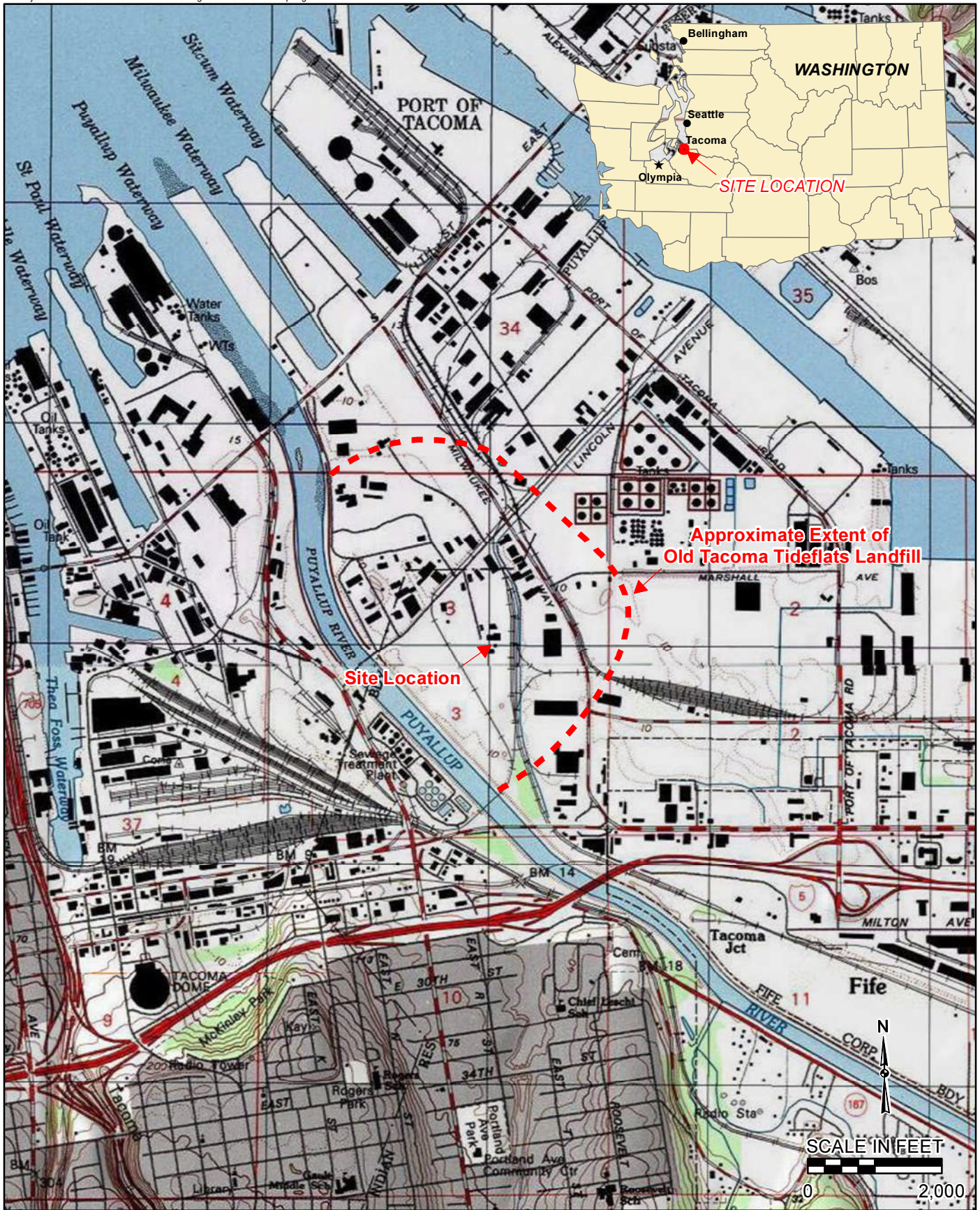
1. Removal of the lunchroom structure and asphalt driving surface; and/or
2. Discontinuation of the lease with the Port and DII vacating the facility.

Site-specific investigation and cleanup work plans will be developed at the time that one or both of the above criteria are met. The work plan will provide for the lateral and vertical characterization of subsurface soil impacts such that cleanup will be effective to address the residual petroleum hydrocarbons associated with the former UST basin. The work plan(s) will specify the analytical parameters required and the soil screening/cleanup levels by which those parameters will be compared to evaluate which areas require soil removal. Soil removed during the effort will be properly characterized for disposal and disposed at an approved disposal facility.

4.0 REFERENCES

Tetra Tech, Inc. (Tetra Tech), 2019. Site Investigation Report, Darling-Tacoma Facility, Darling Delaware Co., Inc. (aka Puget Sound By-Products) Facility, 2041 Marc Avenue, Tacoma, WA. Facility No. 25455514; Cleanup Site No.: 8475; VCP Project No.: SW1317. Dated July 1, 2019. Prepared for Darling Ingredients Inc.

APPENDIX A – FIGURES



Topographic Quad Background: Tacoma North 1993 (North Half) / Tacoma South 1978 (South Half)

January 2017



Figure 1
Location Map
Darling-Tacoma
2041 Marc Avenue, Tacoma, WA

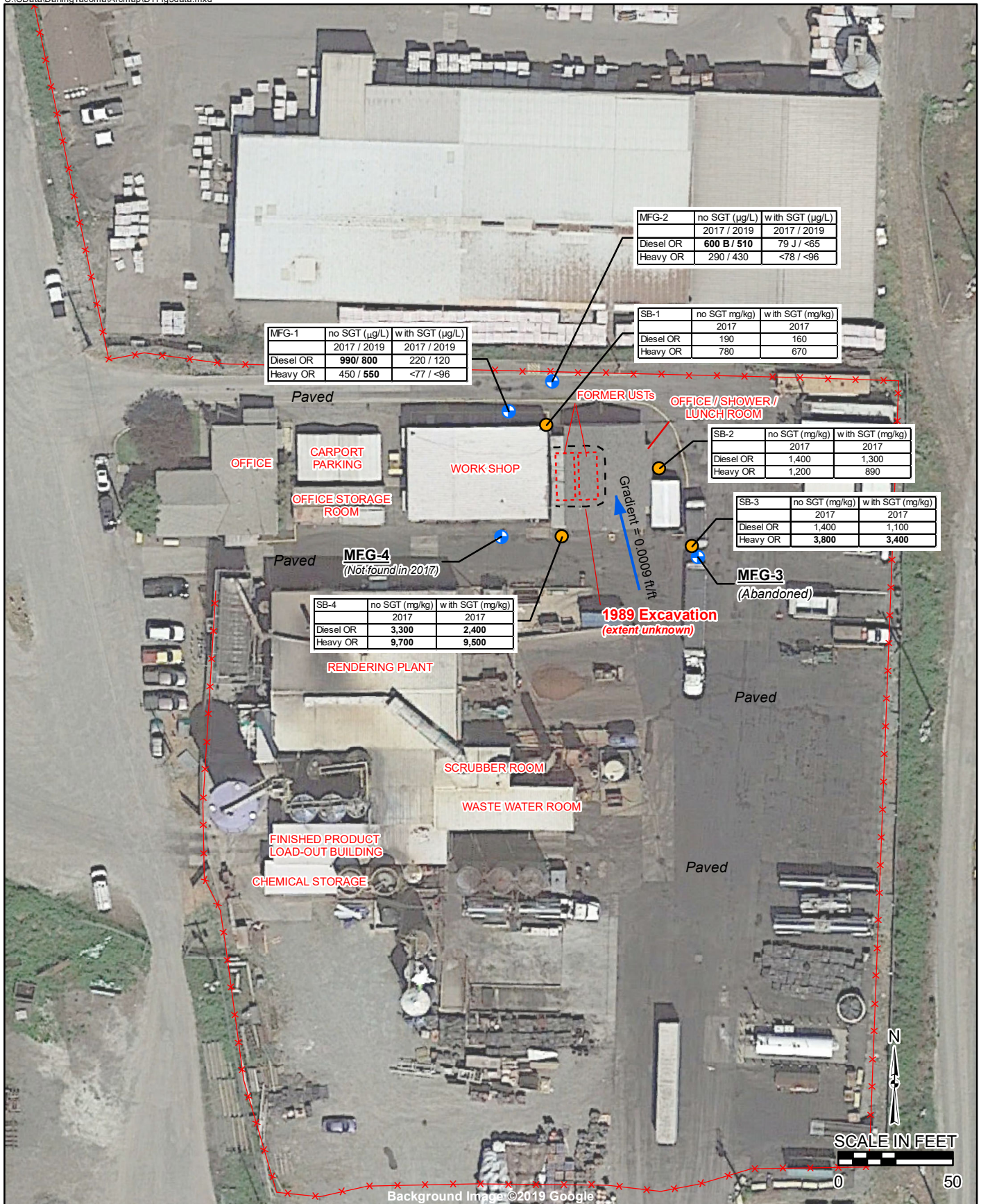


114-570494
4/5/2019



- ← Groundwater Flow (estimated)
 - Groundwater Monitoring Well
 - Soil Boring Location
 - - - Fence
 - Former USTs
- 8.99 (10.54) 2017 (2019) Water Table Elevation (feet amsl)

Figure 2
Site Map
Darling-Tacome
2041 Marc Avenue
Tacoma, Washington



	no SGT (µg/L)		with SGT (µg/L)	
	2017 / 2019	2017 / 2019	2017 / 2019	2017 / 2019
Diesel OR	600 B / 510	79 J / <65		
Heavy OR	290 / 430	<78 / <96		

	no SGT (µg/L)		with SGT (µg/L)	
	2017 / 2019	2017 / 2019	2017 / 2019	2017 / 2019
Diesel OR	990 / 800	220 / 120		
Heavy OR	450 / 550	<77 / <96		

	no SGT (mg/kg)		with SGT (mg/kg)	
	2017	2017	2017	2017
Diesel OR	190	160		
Heavy OR	780	670		

	no SGT (mg/kg)		with SGT (mg/kg)	
	2017	2017	2017	2017
Diesel OR	1,400	1,300		
Heavy OR	1,200	890		

	no SGT (mg/kg)		with SGT (mg/kg)	
	2017	2017	2017	2017
Diesel OR	1,400	1,100		
Heavy OR	3,800	3,400		

	no SGT (mg/kg)		with SGT (mg/kg)	
	2017	2017	2017	2017
Diesel OR	3,300	2,400		
Heavy OR	9,700	9,500		

114-570494
4/5/2019



- Groundwater Flow (estimated)
 - Groundwater Monitoring Well
 - Soil Boring Location
 - Fence
 - Former USTs
- Bold - Exceeds MTCA A Cleanup Level
SGT - Silica Gel Treatment

Figure 3
Sampling Results
Darling-Tacome
2041 Marc Avenue
Tacoma, Washington

APPENDIX B - TABLES

TABLE 1
WELL COMPLETION SUMMARY
 DARLING - TACOMA
 2041 Marc Avenue, Tacoma, WA

MFG Well#	WA State Unique Well#	Soil Boring Name	Date Well Completed	Well Construction	Well Dia. (inch.)	PVC Screen Slot Size	Total Depth of Borehole (ft bgs)	Total Depth of Well (ft bgs)	Screened Interval (ft bgs)	^{1,2} Measuring Point Elevation (ft AMSL)	³ Northing Coordinate	³ Easting Coordinate
MFG-1	AGP054	MFG-B1	2/5/2002	Sch. 40 PVC	2	0.010	16.5	15.2	5.1 - 14.4	16.01	704986.791	1167047.768
MFG-2	AGP055	MFG-B2	2/5/2002	Sch. 40 PVC	2	0.010	14	10.13	4.97 - 9.3	15.64	705002.12	1167066.675
MFG-3	AGP056	MFG-B3	2/5/2002	Sch. 40 PVC	2	0.010	16.5	15.26	5.89 - 14.43	16.85	704924.7	1167130.23
MFG-4	AGP057	MFG-B4	2/6/2002	Sch. 40 PVC	2	0.010	14.5	15.4	5.24 - 14.57	15.67	704933.66	1167044.13

Sch. = Schedule

PVC = Polyvinylchloride

ft = feet

bgs = below ground surface

MFG-3 was abandoned on July 20, 2017.

MFG-4 could not be found on July 20, 2017 for abandonment, the well had been paved and the metal surface protector removed.

AMSL = Above Mean Sea Level (NAVD88 survey datum)

¹Measuring Point = Top of PVC casing, north side

²Survey datum = NAVD88

³Washington State Plane Coordinate System - South Zone

July 2017 - MFG-1 & MFG-2 elevation and coordinates updated to NAVD88/2012B

TABLE 2
SUBSURFACE SOIL ANALYTICAL RESULTS
DARLING - TACOMA
2041 Marc Avenue, Tacoma, WA

Boring Location	MTCA Method A Soil Cleanup Levels	MFG-B2	MFG-B3		MFG-B4		SB-1	SB-2	SB-3	SB-4
Sample Depth Interval (ft bgs)		10.5-11'	3-3.5'	7-8.5'	3-3.5'	8-8.5'	4.5 - 5'	6.5 - 7.5	6.5 - 7.5	6.5 - 75'
Date Sample Collected		2/5/2002	2/5/2002	2/5/2002	2/6/2002	2/6/2002	7/20/2017	7/20/2017	7/20/2017	7/20/2017
Percent Moisture (%)		50.6	5.4	51.0	8.1	50.5	8.7	20.5	19.8	50.2
Dry weight / Percent Solids (%)		49.4 ³	94.6	49.0 ³	91.9	49.5 ³	91.3	79.5	80.2	49.8
Total Petroleum Hydrocarbons (mg/kg)										
Diesel Range (C10-C18)	2,000	37	<10	<820	17	650	190	1,400	1,400	3,300
Heavy Oil / Motor Oil Range (>C24-C36)	2,000	120	<20	3,000	43	1,300	780	1,200	3,800	9,700
Mineral Oil Range (<C10)	4,000	180	<25	3,200	59	2,200	---	---	---	---
Total Petroleum Hydrocarbons with SGT (mg/kg)										
Diesel Range (C10-C18)	2,000	---	---	---	---	---	160	1,300	1,100	2,400
Heavy Oil / Motor Oil Range (>C24-C36)	2,000	---	---	---	---	---	670	890	3,400	9,500
Mineral Oil Range (<C10)	4,000	---	---	---	---	---	---	---	---	---
Extractable Petroleum Hydrocarbons (mg/kg)										
C8-C10 Aliphatics	---	<10.1	<5	<10.2	<5	<10.1	4.3 JB	6.9 JB	5.6 JB	49 JB
C10-C12 Aliphatics	---	<10.1	<5	<10.2	<5	23.2	3.3 JB	17 JB	6.5 JB	57 JB
C12-C16 Aliphatics	---	<10.1	<5	<10.2	<5	26.9	25 JB	110 J	<24	80 J
C16-C21 Aliphatics	---	<10.1	<5	22.9	<5	100	<21	110 J	37 J	310
C21-C34 Aliphatics	---	40.3	<5	176	8.48	369	120	170	880	2000
C8-C10 Aromatics	---	---	---	---	---	---	<210	<50	<49	<400
C10-C12 Aromatics	---	<10.1	<5	<10.2	<5	<10.1	25 JB	10 JB	<49	<400
C12-C16 Aromatics	---	<10.1	<5	<10.2	<5	<10.1	<210	<50	<49	85 JB
C16-C21 Aromatics	---	<10.1	<5	71.6	<5	39.6	<210	81 JB	230 JB	510 JB
C21-C34 Aromatics	---	<10.1	<5	207	<5	160	<210	94 J	470	1,400
Total EPH	---	40.3	<5	477	8.48	718	178	599	837	4,491
Carcinogenic Polynuclear Aromatic Hydrocarbons (mg/kg)										
Benzo(a)anthracene	---	<0.020	<0.010	4.2	<0.010	0.27	---	---	---	---
Benzo(a)pyrene	0.1 (2 ²)	<0.020	<0.010	4.9	<0.010	0.51	---	---	---	---
Benzo(b)fluoranthene	---	<0.020	<0.010	4.4	0.01	0.64	---	---	---	---
Benzo(k)fluoranthene	---	<0.020	<0.010	1.3	<0.010	0.18	---	---	---	---
Chrysene	---	<0.020	<0.010	4.4	<0.010	0.34	---	---	---	---
Dibenz(a,h)anthracene	---	<0.020	<0.010	0.56	<0.010	<0.020	---	---	---	---
Ideno(1,2,3-cd)pyrene	---	<0.020	<0.010	2.7	<0.010	0.39	---	---	---	---
Total Carcinogenic PAHs	0.1 (2 ²)	NA	NA	22.5	0.01	2.3	---	---	---	---
Naphthalenes (mg/kg)										
1-Methylnaphthalene	---	<0.020	<0.010	0.17	<0.010	0.084	---	---	---	---
2-Methylnaphthalene	---	<0.020	<0.010	0.23	<0.010	0.08	---	---	---	---
Naphthalene	---	<0.020	<0.010	0.30	<0.010	0.047	---	---	---	---
Total Naphthalenes	5	NA	NA	0.70	NA	0.21	---	---	---	---
BTEX (mg/kg)										
Benzene	0.03	<0.0607	<0.0300	<0.0612	<0.0300	<0.0606	---	---	---	---
Toluene	7	<0.101	<0.0500	<0.102	<0.0500	<0.101	---	---	---	---
Ethylbenzene	6	<0.101	<0.0500	<0.102	<0.0500	<0.101	---	---	---	---
Xylenes (total)	9	<0.202	<0.100	<0.204	<0.100	<0.202	---	---	---	---

bgs = below ground surface

NA = Not Applicable.

J - Value is considered estimated.

B - Estimated due to detections in field or method blank.

Bold = Result is above method detection limit but not above MTCA Method A Soil Cleanup Levels

 Result is above MTCA Method A Soil Cleanup Level for unrestricted use and industrial properties.

² MTCA Method A Soil Cleanup Level for Industrial Properties

³ Low percent dry weight (high moisture content) may affect analytical results.

TABLE 3
Water Table Elevation Data
 Darling International, Inc.
 2041 Marc Avenue, Tacoma, Washington

Well	Date	Measuring Point Elevation (ft AMSL)	Depth to Water (top of PVC)	Potentiometric Surface Elevation (ft AMSL)
MFG-1	2/8/2002	16.27	5.06	11.21
	2/13/2002		5.30	10.97
	2/26/2002		5.20	11.07
	6/19/2002		7.09	9.18
	9/26/2002		8.33	7.94
	12/19/2002		7.46	8.81
	9/3/2003		8.27	8.00
	12/9/2003		5.75	10.52
	3/4/2004		5.50	10.77
	6/8/2004		7.06	9.21
	7/20/2017	16.01	7.02	8.99
	1/24/2019		5.47	10.54
MFG-2	2/8/2002	15.8	4.59	11.21
	2/13/2002		4.82	10.98
	2/26/2002		4.72	11.08
	6/19/2002		6.63	9.17
	9/26/2002		7.86	7.94
	12/19/2002		7.00	8.80
	9/3/2003		7.81	7.99
	12/9/2003		5.30	10.50
	3/4/2004		5.06	10.74
	6/8/2004		6.63	9.17
	7/20/2017	15.64	6.83	8.81
	1/24/2019		5.25	10.39
MFG-3	2/8/2002	16.85	5.69	11.16
	2/13/2002		5.89	10.96
	2/26/2002		5.77	11.08
	6/19/2002		7.66	9.19
	9/26/2002		8.87	7.98
	12/19/2002		8.04	8.81
	9/3/2003		8.84	8.01
	12/9/2003		6.31	10.54
	3/4/2004		6.06	10.79
	6/8/2004		7.82	9.03
7/20/2017		7.37	9.48 (9.22*)	
MFG-4	2/8/2002	15.67	4.51	11.16
	2/13/2002		4.70	10.97
	2/26/2002		4.58	11.09
	6/19/2002		6.49	9.18
	9/26/2002		7.71	7.96
	12/19/2002		6.86	8.81
	9/3/2003		7.67	8.00
	12/9/2003		5.16	10.51
	3/4/2004		4.91	10.76
	6/8/2004		6.46	9.21

Survey datum = NAVD88

Survey datum = NAVD88/2012B for 2017 elevations for MFG-1 and MFG-2

*MFG-3 value adjusted to estimate NAVD88/2012B elevation.

MFG-3 - abandoned in 2017 due to destruction during asphalt paving.

MFG-4 - could not be found in 2017, likely destroyed and paved over.

**TABLE 4
GROUNDWATER ANALYTICAL RESULTS**

DARLING - TACOMA
2041 Marc Avenue, Tacoma, WA

Monitoring Well	MTCA Method A Groundwater Cleanup Levels	MFG-1									
		2/13/2002	6/19/2002	9/26/2002	12/19/2002	9/3/2003	12/9/2003	3/4/2004	6/8/2004	7/20/2017	1/24/2019
Field Measurements											
Water Table Elevation (ft amsl)		10.97	9.18	7.94	8.81	8.00	10.52	10.77	9.21	8.99	10.54
Temperature (°C)	---	12.8	18.7	19.4	16.4	16.9	15.3	14.2	17.7	15.8	12.7
pH (standard units)	---	6.1	6.0	5.9	5.9	6.7	6.7	6.7	7.4	6.5	6.5
Specific Conductivity (µS/cm)	---	1,043	1,311	1,133	1,081	1,830	1,284	787	751	1,980	1,258
Oxidation-Reduction Potential (mV)	---	-322	-87	-87	-81	NM	NM	NM	NM	-146.9	-86.2
Dissolved Oxygen (mg/L)	---	-322	-87	-87	-81	NM	NM	NM	NM	0.29	NM
Total Petroleum Hydrocarbons (ug/L) without Acid/Silica Gel Treatment											
Diesel Range (C10-24)	500	3,100	4,160	3,130	1,350	2,870	1,350	3,120	1,270	990	800
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	730	763	612	514	<500	<500	666	<500	450	550
Mineral Oil Range (<C10)	500	3,300	2,390	1,970	949	2,300	976	2,100	852	---	--
Total Petroleum Hydrocarbons (ug/L) with Acid/Silica Gel Treatment											
Diesel Range (C10-24)	500	---	---	---	---	<250	<250	<250	<250	220	120
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	---	---	---	---	<500	<500	<500	<500	<77	<96
Mineral Oil Range (<C10)	500	---	---	---	---	<500	<500	<500	<500	---	--
Extractable Petroleum Hydrocarbons (ug/L)											
C8-C10 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C10-C12 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C12-C16 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C16-C21 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	<4.4	
C21-C34 Aliphatics	---	126	<100	<50	<50	<50	<50	<50	<50	<10	
C8-C10 Aromatics	---									<14	
C10-C12 Aromatics	---	<100	<100	<50	<50	63.3	<50	<50	<50	47 J	
C12-C16 Aromatics	---	<100	<100	<50	82.1	<50	<50	<50	58.6	16 J	
C16-C21 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C21-C34 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50	<14	
<i>Total EPH</i>	---	126	NA	NA	82.1	63.3	NA	NA	58.6	63	
Carcinogenic Polynuclear Aromatic Hydrocarbons (ug/L)											
Benzo(a)anthracene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Benzo(a)pyrene	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Benzo(b)fluoranthene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Benzo(k)fluoranthene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Chrysene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Dibenz(a,h)anthracene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Ideno(1,2,3-cd)pyrene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
<i>Total Carcinogenic PAHs</i>	0.1	NA	NA	NA	NA	NA	NA	NA	NA		
Naphthalenes (ug/L)											
1-Methylnaphthalene	---	1.0	2.5	1.08	0.738	3.04	0.343	0.904	<0.100		
2-Methylnaphthalene	---	<0.10	0.416	<0.10	<0.10	0.170	<0.100	<0.100	<0.100		
Naphthalene	---	<0.10	0.277	<0.10	<0.10	0.321	<0.100	<0.100	<0.100		
<i>Total Naphthalenes</i>	160	1.0	3.19	1.08	0.738	3.53	0.343	0.904	NA		
BTEX (ug/L)											
Benzene	5	<0.5	<0.5	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500		
Toluene	1,000	<0.5	<0.5	<0.500	<2.00	<0.500	<0.500	<0.500	<0.500		
Ethylbenzene	700	<0.5	<0.5	<0.500	<1.00	<0.500	<0.500	<0.500	<0.500		
Xylenes (total)	1,000	<1.00	<1.00	<1.00	<1.50	<1.00	<1.00	<1.00	1.08		

bgs = below ground surface

Bold=At or Above MTCA Method A Groundwater Cleanup Level

< =analyte was not detected at or above the method reporting limit

NM = Not Measured

NA = Not Applicable.

--- Not Analyzed

U Qualified as non-detect at reporting limit due to blank contamination.

2003-2004 PAHs results are for dissolved PAHs

Total/Semivolatile Petroleum Hydrocarbons NWTPH-Dx with acid/silica gel clean-up and without acid/silica gel cleanup

EPH by Modified WDOE Interim TPH Policy Method GC/MS-SIM

BTEX by EPA Method 8021B

SGT - Silica Gel Treatment

**TABLE 4
GROUNDWATER ANALYTICAL RESULTS**

DARLING - TACOMA
2041 Marc Avenue, Tacoma, WA

Monitoring Well	MTCA Method A Groundwater Cleanup Levels	MFG-2									
		2/13/2002	6/19/2002	9/26/2002	12/19/2002	9/3/2003	12/9/2003	3/4/2004	6/8/2004	7/20/2017	1/24/2019
Field Measurements											
Water Table Elevation (ft amsl)		10.98	9.17	7.94	8.80	7.99	10.50	10.74	9.17	8.81	10.39
Temperature (°C)	---	13.5	19.8	21.6	18.2	20.0	16.5	13.3	20.3	17.5	13.3
pH (standard units)	---	6.2	6.1	5.9	6.0	6.5	6.6	6.7	7.5	6.7	6.5
Specific Conductivity (µS/cm)	---	992	1,181	982	1,111	1,693	1,434	815	1,200	1,281	989
Oxidation-Reduction Potential (mV)	---	-331	-93	-98	-96	NM	NM	NM	NM	-87	-112
Dissolved Oxygen (mg/L)	---	-331	-93	-98	-96	NM	NM	NM	NM	0.31	NM
Total Petroleum Hydrocarbons (ug/L) without Acid/Silica Gel Treat											
Diesel Range (C10-24)	500	2,300	2,920	1,710	1,630	2,050	1,430	2,000	837	600 B	510
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	<500	992	634	620	1,110	897	607	<500	290	430
Mineral Oil Range (<C10)	500	2,500	1,750	1,120	1,160	1,790	1,130	1,390	615	---	--
Total Petroleum Hydrocarbons (ug/L) with Acid/Silica Gel Treatme											
Diesel Range (C10-24)	500	---	---	---	---	<250	<250	<250	<250	79 J	<65
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	---	---	---	---	<500	<500	<500	<500	<78	<96
Mineral Oil Range (<C10)	500	---	---	---	---	<500	<500	<500	<500	---	--
Extractable Petroleum Hydrocarbons (ug/L)											
C8-C10 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C10-C12 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C12-C16 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C16-C21 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	<4.4	
C21-C34 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50	<10	
C8-C10 Aromatics										<14	
C10-C12 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50	12 J	
C12-C16 Aromatics	---	<100	<100	<50	79.9	<50	<50	<50	<50	6.2 J	
C16-C21 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50	48 U	
C21-C34 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50	<14	
Total EPH	---	NA	NA	<50	79.9	NA	NA	NA	NA	38.2	
Carcinogenic Polynuclear Aromatic Hydrocarbons (ug/L)											
Benzo(a)anthracene	---	<0.100	<0.100	0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Benzo(a)pyrene	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Benzo(b)fluoranthene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Benzo(k)fluoranthene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Chrysene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Dibenz(a,h)anthracene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Ideno(1,2,3-cd)pyrene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100		
Total Carcinogenic PAHs	0.1	NA	NA	0.100	NA	NA	NA	NA	NA		
Naphthalenes (ug/L)											
1-Methylnaphthalene	---	0.330	0.218	0.120	<0.10	<0.10	<0.100	<0.100	<0.100		
2-Methylnaphthalene	---	0.21	<0.10	<0.10	<0.10	<0.10	<0.100	<0.100	<0.100		
Naphthalene	---	<0.10	<0.10	<0.10	<0.10	<0.10	<0.100	<0.100	<0.100		
Total Naphthalenes	160	0.54	0.218	0.12	NA	NA	NA	NA	NA		
BTEX (ug/L)											
Benzene	5	<0.5	<0.5	<0.5	<0.500	<0.500	<0.500	<0.500	<0.500		
Toluene	1,000	<0.5	<0.5	<0.5	<2.00	<0.500	<0.500	<0.500	<0.500		
Ethylbenzene	700	<0.5	<0.5	<0.5	<1.00	<0.500	<0.500	<0.500	<0.500		
Xylenes (total)	1,000	<1.00	<1.00	<1.00	<1.50	<1.00	<1.00	<1.00	<1.00		

bgs = below ground surface

Bold=At or Above MTCA Method A Groundwater Cleanup Level

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NA = Not Applicable.

--- Not Analyzed

U Qualified as non-detect at reporting limit due to blank contamination

2003-2004 PAHs results are for dissolved PAHs

Total/Semivolatile Petroleum Hydrocarbons NWTPH-Dx with
acid/silica gel clean-up and without acid/silica gel cleanup

EPH by Modified WDOE Interim TPH Policy Method GC/MS-SIM

BTEX by EPA Method 8021B

SGT - Silica Gel Treatment

**TABLE 4
GROUNDWATER ANALYTICAL RESULTS**

DARLING - TACOMA
2041 Marc Avenue, Tacoma, WA

Monitoring Well	MTCA Method A Groundwater Cleanup Levels	MFG-3							
		2/13/2002	6/19/2002	9/26/2002	12/19/2002	9/3/2003	12/9/2003	3/4/2004	6/8/2004
Field Measurements									
Water Table Elevation (ft amsl)		10.96	9.19	7.98	8.81	8.01	10.54	10.79	9.03
Temperature (°C)	---	13.7	23.5	20.8	15.3	20.2	16.0	12.7	19.9
pH (standard units)	---	6.6	6.4	6.1	6.2	6.7	6.8	6.9	7.5
Specific Conductivity (µS/cm)	---	689	879	777	769	1,184	1,312	1,038	1,260
Oxidation-Reduction Potential (mV)	---	-363	-159	-122	-113	NM	NM	NM	NM
Dissolved Oxygen (mg/L)	---	-363	-159	-122	-113	NM	NM	NM	NM
Total Petroleum Hydrocarbons (ug/L) without Acid/Silica Gel Treat									
Diesel Range (C10-24)	500	6,100	1,760	1,270	1,670	1,090	1,290	1,150	1,090
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	1,100	761	636	936	<500	1,040	562	<500
Mineral Oil Range (<C10)	500	7,300	1,150	904	1,280	976	1,080	834	859
Total Petroleum Hydrocarbons (ug/L) with Acid/Silica Gel Treatme									
Diesel Range (C10-24)	500	---	---	---	---	<250	<250	<250	<250
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	---	---	---	---	<500	<500	<500	<500
Mineral Oil Range (<C10)	500	---	---	---	---	<500	<500	<500	<500
Extractable Petroleum Hydrocarbons (ug/L)									
C8-C10 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C10-C12 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C12-C16 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C16-C21 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C21-C34 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C8-C10 Aromatics									
C10-C12 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C12-C16 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C16-C21 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50
C21-C34 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<50
<i>Total EPH</i>	---	NA	NA	NA	NA	NA	NA	NA	NA
Carcinogenic Polynuclear Aromatic Hydrocarbons (ug/L)									
Benzo(a)anthracene	---	<0.200	<0.100	0.182	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(a)pyrene	0.1	<0.200	<0.100	0.182	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(b)fluoranthene	---	<0.200	<0.100	0.121	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(k)fluoranthene	---	<0.200	<0.100	0.162	<0.100	<0.100	<0.100	<0.100	<0.100
Chrysene	---	<0.200	<0.100	0.162	<0.100	<0.100	<0.100	<0.100	<0.100
Dibenz(a,h)anthracene	---	<0.200	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Ideno(1,2,3-cd)pyrene	---	<0.200	<0.100	0.101	<0.100	<0.100	<0.100	<0.100	<0.100
<i>Total Carcinogenic PAHs</i>	0.1	NA	NA	0.910	NA	NA	NA	NA	NA
Naphthalenes (ug/L)									
1-Methylnaphthalene	---	0.39	0.24	<0.10	<0.10	<0.10	<0.100	<0.100	<0.100
2-Methylnaphthalene	---	<0.20	0.12	<0.10	<0.10	<0.10	<0.100	<0.100	<0.100
Naphthalene	---	<0.20	<0.10	0.303	<0.10	<0.10	<0.100	<0.100	<0.100
<i>Total Naphthalenes</i>	160	0.39	0.36	0.303	NA	NA	NA	NA	NA
BTEX (ug/L)									
Benzene	5	<0.5	<0.5	<0.5	<0.500	<0.500	<0.500	<0.500	<0.500
Toluene	1,000	0.513	<0.5	<0.5	<2.00	<0.500	<0.500	<0.500	<0.500
Ethylbenzene	700	<0.5	<0.5	<0.5	<1.00	<0.500	<0.500	<0.500	<0.500
Xylenes (total)	1,000	1.08	<1.00	<1.00	<1.50	<1.00	<1.00	<1.00	<1.00

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BTEX by EPA Method 8021B

SGT - Silica Gel Treatment

TABLE 4
GROUNDWATER ANALYTICAL RESULTS

DARLING - TACOMA
2041 Marc Avenue, Tacoma, WA

Monitoring Well	MTCA Method A Groundwater Cleanup Levels	MFG-4							
		2/13/2002	6/19/2002	9/26/2002	12/19/2002	9/3/2003	12/9/2003	3/4/2004	6/8/2004
Field Measurements									
Water Table Elevation (ft amsl)		10.97	9.18	7.96	8.81	8.00	10.51	10.76	9.21
Temperature (°C)	---	15.5	23.9	21.2	16.8	19.7	15.5	13.1	18.1
pH (standard units)	---	6.2	6.1	5.9	6.0	6.7	6.5	6.6	7.6
Specific Conductivity (µS/cm)	---	1,026	1,362	1,235	1,182	2,120	1,635	1,679	2,060
Oxidation-Reduction Potential (mV)	---	-345	-115	-83	-94	NM	NM	NM	NM
Dissolved Oxygen (mg/L)	---	-345	-115	-83	-94	NM	NM	NM	NM
Total Petroleum Hydrocarbons (ug/L) without Acid/Silica Gel Treat									
Diesel Range (C10-24)	500	4,700	4,770	4,480	3,460	3,770	2,220	3,130	1,170
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	1,000	1,590	1,420	1,190	1,720	1,040	747	<500
Mineral Oil Range (<C10)	500	5,100	2,680	2,970	2,450	3,260	1,680	2,100	769
Total Petroleum Hydrocarbons (ug/L) with Acid/Silica Gel Treatme									
Diesel Range (C10-24)	500	---	---	---	---	<250	<250	<250	<250
Heavy Oil Range / Motor Oil Range (>C24-C36)	500	---	---	---	---	<500	<500	<500	<500
Mineral Oil Range (<C10)	500	---	---	---	---	<500	<500	<500	<500
Extractable Petroleum Hydrocarbons (ug/L)									
C8-C10 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
C10-C12 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
C12-C16 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
C16-C21 Aliphatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
C21-C34 Aliphatics	---	148	<100	95.9	91.4	<50	<50	<50	<59.5
C8-C10 Aromatics	---								
C10-C12 Aromatics	---	<100	<100	<50	50.6	<50	<50	<50	<59.5
C12-C16 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
C16-C21 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
C21-C34 Aromatics	---	<100	<100	<50	<50	<50	<50	<50	<59.5
Total EPH	---	148	NA	NA	142	NA	NA	NA	NA
Carcinogenic Polynuclear Aromatic Hydrocarbons (ug/L)									
Benzo(a)anthracene	---	<0.100	<0.100	0.139	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(a)pyrene	0.1	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(b)fluoranthene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Benzo(k)fluoranthene	---	<0.100	<0.100	0.119	<0.100	<0.100	<0.100	<0.100	<0.100
Chrysene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Dibenz(a,h)anthracene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Ideno(1,2,3-cd)pyrene	---	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100	<0.100
Total Carcinogenic PAHs	0.1	NA	NA	0.258	NA	NA	NA	NA	NA
Naphthalenes (ug/L)									
1-Methylnaphthalene	---	2.5	3.27	0.97	1.47	4.23	0.712	1.96	<0.100
2-Methylnaphthalene	---	0.45	0.554	0.158	0.121	0.212	0.481	<0.100	0.254
Naphthalene	---	0.41	0.535	<0.10	0.222	0.192	0.173	<0.100	<0.100
Total Naphthalenes	160	1.6	4.36	1.13	1.81	4.63	1.37	1.36	0.254
BTEX (ug/L)									
Benzene	5	1.7	2.24	0.598	0.630	<0.500	<0.500	<0.500	<0.500
Toluene	1,000	0.648	0.504	<0.5	<2.00	<0.500	<0.500	<0.500	<0.500
Ethylbenzene	700	<0.5	<0.5	<0.5	<1.00	<0.500	<0.500	<0.500	<0.500
Xylenes (total)	1,000	1.38	<1.00	<1.00	<1.50	<1.00	<1.00	<1.00	<1.00

bgs = below ground surface

Bold=At or Above MTCA Method A Groundwater Cleanup Level

< =analyte was not detected at or above the method reporting limit

NM = Not Measured

NA = Not Applicable.

--- Not Analyzed

U Qualified as non-detect at reporting limit due to blank contamination

2003-2004 PAHs results are for dissolved PAHs

Total/Semivolatile Petroleum Hydrocarbons NWTPH-Dx with acid/silica gel clean-up and without acid/silica gel cleanup

EPH by Modified WDOE Interim TPH Policy Method GC/MS-SIM

BTEX by EPA Method 8021B

SGT - Silica Gel Treatment