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June 3, 2002  
MFG Project No.: 020255

Ms. Sharon Bell  
Tacoma-Pierce County Health Department  
3629 South D Street  
Tacoma, WA 98418-6813

**RE: Darling International, Inc. Underground Storage Tank Site; Parcel No.: 0320031019**

Dear Ms. Bell:

Please find enclosed the February 2002 site investigation report for the Darling International, Inc. site located at 2041 Marc Avenue, Tacoma, Washington. Please contact the undersigned with questions or comments at (425) 921-4000.

Sincerely,  
MFG, INC.

Natalie J. Morrow, P.G., P.H.G.  
Senior Staff Hydrogeologist

Douglas R. Frick, P.G., P.H.G.  
Senior Hydrogeologist

NJM:bms

Enclosure

cc: Bill McMurtry – Darling International, Inc.  
Pat Behling – Pastor, Behling, & Wheeler

**SITE INVESTIGATION REPORT  
DARLING INTERNATIONAL, INC. LUST SITE  
2041 MARC AVENUE  
TACOMA, WASHINGTON**

**June 3, 2002**

**Prepared for:**

**Darling International, Inc.  
Irving, Texas**

**Prepared by:**

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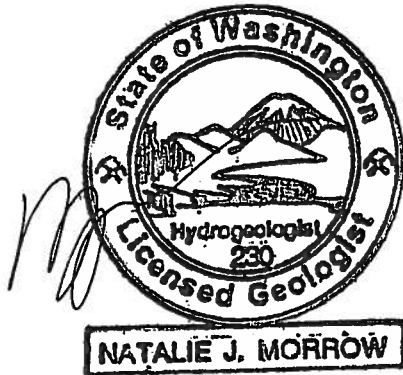
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## PROFESSIONAL CERTIFICATION

This report has been prepared by MFG, Inc. under the professional supervision of Natalie J. Morrow. The findings, recommendations, specifications and/or professional opinions presented in this report have been prepared in accordance with generally accepted professional hydrogeologic practice, and within the scope of the project. There is no other warranty, either express or implied.



Natalie J. Morrow  
Washington P.G. No. 230  
Senior Staff Hydrogeologist  
MFG, Inc.

## 1.0 INTRODUCTION

MFG, Inc. performed a site investigation at the Darling International, Inc. (DII) rendering plant (animal by-products recycling facility) located at 2041 Marc Avenue in Tacoma, Washington during February 2002. The site investigation was performed to address concerns the Tacoma Pierce County Health Department (TPCHD) has with respect to possible petroleum hydrocarbons left in the subsurface after removal of two underground storage tanks (USTs) at this address in May 1989. The following provides background information for the Site and a summary of previous field activities performed as a result of the removal of two USTs.

This report is organized as follows. Section 1 provides an introduction including information about the site and previous site investigation activities. Section 2 discusses the method of investigation. The results of the site investigation are discussed in Section 3. Waste disposal is discussed in Section 4. Conclusions and recommendations are presented in Section 5, and references in Section 6. Tables and figures are presented at the end of the report. Appendix A contains boring and well logs. Appendix B contains the data packages for subsurface soil and Appendix C contains the laboratory data packages for groundwater.

### 1.1 Site Location And Background

DII owns and operates an animal by-products recycling facility (the "Site") located at 2041 Marc Avenue in Tacoma, Washington (Figure 1). The DII facility, previously known as Puget Sound By-Products, is located in a primarily heavy industrial area located on the Tacoma Tideflats, east of the Puyallup River and southeast of Commencement Bay of the Puget Sound. The Site is located in Township 20N, Range 3E, Section 3. The Site lies within the boundaries of the Old Tacoma Tideflats Landfill (also known as the Lincoln Avenue Landfill). The approximate extent of the landfill is shown on Figure 1.

This landfill was constructed on top of dredged sediment fill material in a former tideflat area and was further filled with waste material so the land could be utilized for industrial and commercial development. The landfill was operated by the City of Tacoma from the 1940's through approximately 1964 and can generally be characterized as an unregulated dumping area for

municipal waste for residents of Tacoma. In addition, it is believed that industries may have deposited solid and/or hazardous waste materials in the landfill (TPCHD, 2001).

There are three buildings located at the Site (Figure 2). These include the office, the rendering plant, and a work shop. The Site is mostly asphalt paved with the exception of unpaved portions of the east and southeast areas of the Site where three wastewater treatments lagoons and a clarifier were previously located.

During this Site investigation, a discrepancy was observed between what had previously been noted as the north direction on maps obtained from the reports prepared by Rittenhouse-Zeman & Associates, Inc. (RZA, 1989) and Whitman Environmental Sciences (WES, 1998). APS Survey and Mapping (APS) was contracted to survey new wells installed at the Site during this investigation (see Sections 2 and 3). APS identified the north direction as shown in Figures 2 and 3. The north direction noted by RZA and WES is as also shown in Figure 2. APS was contacted regarding the discrepancy and, after review of their survey data, it was determined that the north direction at the Site is as APS located it and is as shown on Figures 2 and 3. All references to direction in this report have been corrected accordingly.

## **1.2 Underground Storage Tanks Removal**

Two 10,000 gallon USTs were previously located at the Site. The tanks were located adjacent to the ~~north-northeast~~ northeast side of the workshop (Figure 2). One tank held diesel fuel for use by company trucks and the other tank held Bunker C fuel oil for use in the DII facility's boiler. The two USTs and associated piping were removed on May 11, 1989 and properly disposed (WES, 1998).

Approximately 112 cubic yards of soil were excavated during the removal of the USTs (WES, 1998). The soil was stockpiled and sampled. The samples were analyzed for total petroleum hydrocarbons (TPH), and benzene, toluene, ethylbenzene, and xylenes (BTEX). The method used to analyze for TPH was EPA method 418.1. This method does not differentiate between fuel types; therefore, the results are presented as a total value for TPH. TPH results ranged from 4,672 to 8,370 mg/kg; ethybenzene was detected at 0.41 mg/kg, and xylenes at 1.93 mg/kg. No benzene or toluene was detected. The soil contained in the stockpiles was removed from the Site and properly disposed on May 23, 1989 (WES, 1998).

Soil samples were collected from the walls of the UST excavation and a grab sample was collected from groundwater in the excavation (WES, 1998). The samples were collected by the Washington Department of Ecology (Ecology). The soil samples were analyzed for TPH only and the groundwater sample was analyzed for TPH and BTEX. Soil TPH results ranged from 1,874 to 2,854 mg/kg. TPH in the groundwater sample was 4,565 mg/L and ethylbenzene and xylenes were detected at 0.5 mg/L and 0.44 mg/L, respectively. Benzene and toluene were not detected in the groundwater sample. The analytical results for soils and groundwater collected from the excavation exceeded the Washington MTCA Method A cleanup levels used at the time of the removal.

### **1.3 1989 Site Assessment**

A subsurface investigation was performed at the Site in September 1989 by RZA (RZA 1989 and WES, 1998). WES performed a UST closure review for the Site in 1998. This report summarized tank closure and site investigation activities between 1989 and 1997. Three borings were installed during the site assessment and completed as groundwater monitoring wells in the shallow groundwater system at the Site. Total depths of the borings ranged from 14 to 16.5 feet below ground surface (bgs) and groundwater was encountered approximately 9 feet bgs (WES, 1998). One well was completed to the northwest of the former USTs location (MW-4), on the north side of the work shop. A second was installed east of the former USTs location (MW-5) and a third well was installed southwest of the former USTs location, on the south side of the workshop (MW-6; see Figure 3).

Fill material was encountered to depths of 12 to 16.5 feet bgs during drilling. The fill material consisted of medium dense, gray to brown silty sand with some gravel, followed by loose to medium dense black silty sand with wood chip waste, glass, metal, and organic matter. Soil material encountered below the fill material consisted of stiff to medium stiff gray silt. This soil material may be dredged fill material. The approximate groundwater flow direction in the upper groundwater zone at the Site, as inferred from these three wells, was to the north. All groundwater monitoring wells at the Site were abandoned in 1997 (RZA, 1989 and WES, 1998).

Soil samples were collected during drilling and analyzed for TPH by EPA method 418.1. Results ranged from 141 to 645 mg/kg TPH (RZA, 1989 and WES, 1998). Groundwater sampling was



performed in September 1989 after completion of the wells. Initial results indicated no TPH above 10 mg/L. However continued sampling from 1990 through 1993 showed TPH concentrations in MW-4 ranged from less than 1.0 to 20 mg/L; concentrations in MW-5 ranged from less than 1.0 to 44 mg/L; and TPH concentrations in MW-6 ranged from 2.2 to 82 mg/L (WES, 1998).

Previously, three wells (MW-1, MW-2, and MW-3) were installed to monitor groundwater quality upgradient and downgradient of three wastewater treatment lagoons and one clarifier (Figure 2). The wells were completed at a depth of approximately 30 feet bgs. These three wells, completed in the lower groundwater system beneath the Site, were also abandoned in 1997 by a licensed well driller (WES, 1998). The lagoons and clarifier are no longer present at the Site. The approximate groundwater flow direction of the lower groundwater zone at the Site, as inferred previously from these three wells, is to the east.

## **2.0 METHODS OF INVESTIGATION**

A site investigation was performed at the Site in February 2002. The site investigation was performed according to the Site Investigation Work Plan (MFG, 2002) and involved the installation of soil borings and monitoring wells, and groundwater sampling. The following sections discuss the activities that were performed to complete this site investigation.

### **2.1 Purpose of Investigation**

The purpose of this site investigation was to: 1) evaluate the nature and extent of petroleum hydrocarbons in the subsurface materials/soil and groundwater in the vicinity of the former USTs; and 2) evaluate the direction of groundwater flow.

To meet these goals, the following activities were performed: 1) a site visit and document review were performed; 2) four soil borings were installed and completed as monitoring wells in the vicinity of the former USTs; 3) sampling and analysis of subsurface soil/waste and groundwater were performed to evaluate petroleum hydrocarbons present in subsurface materials and groundwater; and 4) the location and measuring point elevation for each monitoring well was surveyed by a licensed surveyor. The following sections provide details of the completed work

### **2.2 Site Visit and Document Review**

A site visit was performed on December 10, 2001, prior to performing field work to identify the location of the former USTs; observe Site conditions, physical features, and the surrounding area; and evaluate placement of borings in the vicinity of the former USTs. In addition, available documents and information that pertain to the Site were reviewed, including the Old Tacoma Tideflats Landfill, the geology and hydrogeology of the Site and vicinity, and adjacent properties were reviewed at TPCHD office in Tacoma, Washington and at the Ecology office in Lacey, Washington.

## **2.3 Boring and Monitoring Well Installation**

Four new subsurface borings were installed during this investigation using the hollow stem auger drilling method. Each boring was completed as a groundwater monitoring well. Surveyed monitoring well locations are shown on Figure 3. Boring MFG-B1 was completed as monitoring well MFG-1, MFG-B2 was completed as well MFG-2, boring MFG-B3 was completed as MFG-3, and MFG-B4 was completed as well MFG-4. Hereafter, the borings will be referenced by their well name.

### **2.3.1 Subsurface Sampling**

A Dames & Moore split spoon sampler was used during drilling to collect subsurface samples at the Site. Samples were logged during drilling generally following USCS guidelines. Boring logs are presented in Appendix A. Subsurface samples were screened on-site using a PID to evaluate the presence of VOCs. Samples with the highest PID readings were collected from each borehole and/or where enough soil volume was recovered to collect a sample. Samples were labeled according to the boring number (MFG-B#) plus depth interval the sample was collected from (i.e., MFG-B2(10.5-11')).

Each subsurface soil sample was collected from the split spoon sampler and transferred directly to laboratory provided sample jars. After sample collection, each sample was placed immediately in a cooler containing doubled Ziploc™ bags filled with ice. All samples were hand delivered to North Creek Analytical in Bothell, Washington for analysis. Each sample was analyzed for BTEX, carcinogenic polynuclear aromatic hydrocarbons (PAHs), naphthalene, extractable petroleum hydrocarbons (EPH), and diesel, heavy oil, and mineral range hydrocarbons. Analytical methods included analysis of BTEX by EPA Method 8021B, PAHs and naphthalenes by GC/MS-SIM, EPH by modified WDOE Interim TPH Policy Method, and diesel, heavy oil, and mineral range hydrocarbons by NWTPH-Dx.

### **2.3.2 Monitoring Well Installation**

Each monitoring well was constructed in accordance with the requirements of Chapter 173-160 WAC. Each well screen consisted of 2-inch diameter 0.010-slot Schedule 40 polyvinylchloride (PVC) flush-threaded screen. Well screens varied from five feet to 10 feet in length. The well filter pack consisted of 10-20 silica sand. The monitoring well riser was constructed of 2-inch

Schedule 40 PVC flush-treaded casing. Each well was completed as a flush mount well. Detailed well construction diagrams are included in Appendix A.

## **2.4 Well Development and Sampling**

Each monitoring well was developed after a minimum of 24 hours had passed since installation. Development was performed using a surge block and purge pump. A minimum of ten well casing volumes were purged from each well. During development, the field parameters of pH, specific conductance, dissolved oxygen, oxidation-reduction potential, and temperature were monitored.

The wells were allowed to sit for approximately five days prior to performing groundwater sampling. Low flow purging was performed for each well. Each well was purged at an approximate rate of less than 0.5 to one liter per minute using a purger pump. The pump intake was placed approximately two feet below the top of the well screen. The field parameters of pH, specific conductance, and temperature were continuously monitored during purging and groundwater samples were collected after pH had stabilized to +/- 0.1 pH units, specific conductivity to +/- 10 percent, and temperature to +/- 0.5 degrees Celsius (C). Dissolved oxygen and oxidation-reduction potential were also monitored during purging.

Samples were collected in laboratory provided sample containers and preserved in the field as requested by the analytical laboratory. After samples were collected, they were immediately placed in a cooler containing doubled Ziploc™ bags filled with ice.

Samples were hand delivered to North Creek Analytical in Bothell, Washington the same day as collected. Each groundwater sample was analyzed for BTEX, carcinogenic PAHs, naphthalene, NWTPH-Dx, and EPH. Analytical methods included analysis of BTEX by EPA Method 8021B, PAHs and naphthalenes by GC/MS-SIM, EPH by modified WDOE Interim TPH Policy Method, and diesel, heavy oil, and mineral range hydrocarbons by NWTPH-Dx.

## **2.5 Surveying**

The northing and easting coordinates, latitude and longitude, and measuring point elevations of each groundwater monitoring well installed during this investigation was surveyed by a licensed surveyor. The survey datum used by APS Survey & Mapping (APS) for obtaining northing and

easting coordinates was the Washington State Plane Coordinate system (WSPC) – South Zone and the NAVD88 coordinate system was used to obtain measuring point elevations. Table 1 presents the coordinates and measuring point elevations for each well. Surveyed well locations are presented on Figure 3.

## **2.6 Decontamination**

All non-disposable equipment was decontaminated prior to use at the Site, between borings and wells, and after the collection of each sample. Disposable equipment was placed in a DII waste receptacle for disposal in a sanitary landfill. Drill cuttings were placed in 55-gallon drums for disposal in an approved landfill (see Section 5). Decontamination water, well development water, and purged groundwater was placed in 55-gallon drums and disposed in a wastewater recycling facility (see Section 5).

## 3.0 RESULTS

### 3.1 Subsurface Soil Results

The following sections present the results of the subsurface borings and subsurface soil analytical results.

#### 3.1.2 Subsurface Soil Borings

Subsurface boring results indicate the Site contains between two to seven feet of brown to olive gray sand and sandy gravel cover material. Below the cover material lies artificial fill to total depths ranging from 13.5 feet below ground surface (bgs) to just over 15 feet bgs. The artificial fill material consists of brown, dark brown, to black organic material in a silty sand matrix. The amount of silty sand within the artificial fill varies. Organic material within this unit consists of wood, fine organics (organic paste), roots, sticks, and long grass and/or weeds. A silt layer is present below the artificial fill layer. The silt layer is light gray, olive gray, to dark brown or black in color. Some organic material and rootlets are present in the silt layer. Boring logs are presented in Appendix A.

#### 3.1.2 Subsurface Analytical Results

Poor recovery during sampling limited the number of sample intervals logged and the number of samples collected for laboratory analysis. No subsurface soil samples were collected from MFG-1, one sample was collected from MFG-2, and two samples each from MFG-3 and MFG-4.

Table 2 presents the subsurface analytical results. Figure 3 summarizes the soil results exceeding MTCA Method A Soil Cleanup Levels for unrestricted land use and industrial properties.

Subsurface laboratory analytical data packages are contained in Appendix B. The analytical results for each subsurface sample were compared with MTCA Method A Soil Cleanup Levels for unrestricted land use and industrial properties.

The concentration of diesel range TPH ranged from not detected to 650 mg/kg; heavy oil range TPH from not detected to 3,000 mg/kg; and mineral range TPH from not detected to 3,200 mg/kg. Total EPH concentrations ranged from not detected to 718 mg/kg; total carcinogenic

PAHs ranged from not detected to 22.5 mg/kg; and total naphthalenes concentrations ranged from not detected to 0.70 mg/kg. No benzene, toluene, ethylbenzene, and xylenes were detected in the samples. The following summarizes the analytical results for each subsurface materials sample analyzed:

- MFG-B2(10.5-11'): Diesel range, heavy oil range, and mineral range TPH, and C21-C34 aliphatics were detected at concentrations above the method detection limit. No other analytes were detected above method detection limits in the sample.
- MFG-B3(7-8.5'): Heavy oil range TPH was detected in the sample above MTCA Method A Soil Cleanup Levels for unrestricted and industrial properties. Mineral range TPH, C16-C21 aliphatics, C21-C34 aliphatics, C16-C21 aromatics, and C21-C34 aromatics were detected at concentrations above the method detection. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenz(a,h)anthracene, and ideno(1,2,3-cd)pyrene were detected at concentrations such that the total carcinogenic PAH value is above MTCA Method A Soil Cleanup Levels for unrestricted and industrial properties. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above the method detection limits; the total naphthalene concentration is below the MTCA Method A Soil Cleanup Level for unrestricted and industrial properties. No other analytes were detected above the method detection limits.
- MFG-B4(3-3.5'): Diesel range, heavy oil range, and mineral oil range TPH, C21-C34 aliphatics, and benzo(b)fluoranthene were detected above the method detection limits. No other analytes were detected above method detection limits and no results exceeded MTCA Method A Soil Cleanup Levels for unrestricted or industrial properties.

- MFG-B4(8-8.5'): Diesel range, heavy oil range, and mineral oil range TPH, C10-C12 aliphatics, C12-C16 aliphatics, C16-C21 aliphatics, C21-C34 aliphatics, C16-C21 aromatics, C21-C34 aromatics were detected at concentrations above the method detection limits. Benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, and ideno(1,2,3-cd)pyrene were detected at concentrations above the method detection limits and their total concentration is above the MTCA Method A Soil Cleanup Level for total carcinogenic PAHs for unrestricted properties and just above the MTCA Method A Soil Cleanup Level for industrial properties. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected at concentrations above the method detection limit; the total naphthalenes concentration does not exceed the MTCA Method A Soil Cleanup Level. No other analytes were detected above method detection limits.

### 3.2 Groundwater Analytical Results

Table 3 presents the groundwater analytical results for monitoring wells MFG-1, MFG-2, MFG-3, and MFG-4. Groundwater laboratory analytical data packages are contained in Appendix C. Temperature in groundwater ranged from 12.8 °C to 15.5 °C, pH ranged from 12.8 to 15.5 standard units, and specific conductance ranged from 689 µS to 1,043 µS. Dissolved oxygen ranged from 1.7 mg/L to 3.7 mg/L, and oxidation-reduction potential ranged from -322 millivolts (mV) to -363 mV (strongly reducing).

In summary, the concentration of diesel range TPH in groundwater at the Site ranged from 2,300 µg/L to 4,700 µg/L; heavy oil range TPH ranged from not detected to 1,100 µg/L; and mineral oil range TPH concentrations ranged from 2,500 µg/L to 5,100 µg/L. Total EPH concentrations ranged from not detected to 148 µg/L; total naphthalenes concentrations ranged from 0.39 µg/L to 1.6 µg/L; benzene ranged from not detected to 1.7 µg/L; toluene concentrations ranged from not detected to 0.648 µg/L; and total xylenes ranged from not detected to 1.38 µg/L. PAHs and ethylbenzene were not detected in any sample. Figure 4 summarizes the results exceeding MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. The following summarizes the results of each groundwater sample analyzed:



- **MFG-1:** Diesel range, heavy oil range, and mineral oil range TPH were detected at concentrations above MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. C21-C34 aliphatics and 1-methylnaphthalene were detected above method detection. No other analytes were detected above method detection limits.
- **MFG-2:** Diesel range and mineral oil range TPH were detected at concentrations above MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. Two naphthalene components (1-methylnaphthalene and 2-methylnaphthalene) were detected above method detection limits but their total concentration did not exceed MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. No other analytes were detected above method detection limits.
- **MFG-3:** Diesel range, heavy oil range, and mineral oil range total petroleum hydrocarbons exceeded MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. Toluene, total xylenes, and 1-methylnaphthalene were detected at concentrations above the method detection limits but did not exceed MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. No other analytes were detected above method detection limits.
- **MFG-4:** Diesel range, heavy oil range, and mineral range TPH exceeded MTCA Method A Groundwater Cleanup Levels. C21-C34 aliphatics and benzene, toluene, and total xylenes were detected above the method detection limits. Naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene were detected above the method detection limits but the total naphthalenes concentration did not exceed MTCA Method A Groundwater Cleanup Levels for unrestricted and industrial properties. No other analytes were detected above method detection limits.

### **3.3 Site Hydrogeology**

According to previous reports at the Site and reports from adjacent sites, two groundwater systems are present in the area. These consist of a shallow groundwater system and a deeper groundwater system. Neither of the groundwater systems are used as a potable source of water at

the Site nor in the vicinity of the Site. Potable water is supplied to the area by Tacoma public utilities.

During drilling, the shallow groundwater system was first encountered between approximately seven to 7.5 feet bgs. The four monitoring wells completed during this investigation were completed in the shallow groundwater system. The shallow groundwater system encountered during this investigation consisted of artificial fill material as described in Section 3.1. The two groundwater systems at the Site are separated by a silt layer (see Section 3.1). Drilling during this investigation was not advanced past the silt layer.

Current water table elevation data are presented in Table 4. Previous reports by RZA (1989) and WES (1998) suggested that groundwater flow direction is to the north. Currently, it appears the groundwater flow direction may be southward. The analytical results also support this conclusion; higher concentrations of constituents are present on the southern side of the investigation area (Figure 4). Water level elevations collected at the site vary by one to a few 100<sup>th</sup>s of a foot. The groundwater gradient at the site was calculated between MFG-2 and MFG-3 and varies between 0.0002 ft/ft to 0.0005 ft/ft. In addition, the area under investigation is relatively small. However, because of these three factors, the direction of groundwater flow at the Site is unclear.

#### 4.0 WASTE HANDLING AND DISPOSAL

Soil cuttings, and decontamination and purge water from the Site were temporarily contained in 55-gallon drums for disposal. Prior to disposal the analytical results for both subsurface material and groundwater samples collected from the Site during this investigation were provided to Pacific Industrial Resources, L.L.C. (PIR), the disposal contractor.

After consultation with the disposal landfill, PIR informed MFG that additional analysis of the subsurface material for Toxicity Characteristic Leaching Procedure (TCLP; EPA Method 1311) for 8 RCRA metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver) was required prior to disposal. A composite sample was prepared by North Creek Analytical of Bothell, Washington from each subsurface soil sample collected at the Site. No TCLP values exceeded Washington State Dangerous Waste regulations.

Soil cuttings were removed from the Site and disposed by PIR at the Rabanco Recycling, Co. facility in Seattle, Washington on May 8, 2002. Decontamination and purge water were also removed from the Site by PIR and transported to Puget Sound Recycling in Auburn, Washington for recycling on May 3, 2002. Waste disposal information is provided in Appendix D.

## 5.0 CONCLUSIONS AND RECOMMENDATIONS

The Site and vicinity are zoned heavy industrial. A majority of the Site is paved with asphalt, including the portion under investigation. The Site was constructed on top of a portion of the Old Tacoma Tideflats Landfill. Investigations at nearby sites within the Old Tacoma Tideflats Landfill have identified two groundwater zones. These same two groundwater zones have also been identified at the Site. The two groundwater zones are separated by a silt layer. The silt layer consists of dredged material from the Tacoma tideflats. This silt layer was encountered during drilling at approximately 13 to 15 feet bgs.

Landfill debris/fill material was encountered up to 13 to 15 feet bgs at the Site and groundwater at the Site is approximately 5 to 6 feet bgs. The upper groundwater zone is located within the subsurface soil/fill materials at the Site. The subsurface fill material contains an abundance of wood, sticks, and other fine organic material. Metal, glass, and wire are also present in the subsurface fill material. In addition, monitoring for oxidation-reduction potential during well purging indicated the upper groundwater zone at the Site is strongly reducing. Groundwater analytical results indicate diesel range, heavy oil range, and mineral range TPH exceeded MTCA Method A Groundwater Cleanup Levels at the Site. Heavy oil range TPH and PAHs exceeded both MTCA Method A Soil Cleanup Levels for unrestricted and industrial properties. However, PAHs were not detected in groundwater at the Site. Therefore, PAHs in the subsurface fill material are not impacting groundwater at the Site.

Groundwater and subsurface soil/fill material at several other sites in the vicinity of the Site are also contaminated. For example, the Milwaukee Railyard, located north of the Site, has soil and groundwater contaminated with diesel, bunker fuels, lubricating oils, and arsenic, chromium, copper, pentachlorophenol, and naphthalene. Another example is the Cascade Pole and Lumber Company, also located north of the Site. Soil and groundwater at this facility contains pentachlorophenol, chromated copper arsenate, creosote, and PAHs. In addition, results from other sampling of landfill soil/fill material have indicated low levels of PAHs and groundwater results showed low levels of metals and total organic halogens (Pierce County, 1985).

After consideration of all of the above factors, there is an extremely low probability that groundwater beneath the Site and in the vicinity of the Site will be classified as a potential future

source of drinking water (WAC 173-340-720(2)). Therefore, MFG recommends no remedial action at the Site. MFG recommends the following actions for the Site:

1. Perform quarterly monitoring for one year. The February 2002 sampling event constitutes the first quarterly event for 2002. Three remaining quarterly events will be performed during June, September, and December 2002. Monitoring will consist of water level measurements and low flow groundwater sampling. Field parameters of temperature, pH, specific conductance, dissolved oxygen, and oxidation-reduction potential will be monitored in the field. Groundwater samples will be analyzed for NWTPH-Dx, carcinogenic PAHs, BTEX, EPH, and naphthalenes.
2. A summary monitoring report will be prepared following the fourth quarterly event. Development of site-specific risk based soil and groundwater cleanup levels under MTCA Method B or C Cleanup Levels for nonpotable groundwater will also be evaluated. The report will summarize the results and recommendations for additional actions, if necessary.

### 3.0 REFERENCES

- MFG, Inc., 2002. Site Investigation Work Plan, Darling International, Inc. LUSTs Site, 2041 Marc Avenue, Tacoma, Washington. Prepared for Darling International, Inc. Dated January 2, 2002.
- Pierce County, 1985. Potential Hazardous Waste Site Preliminary Assessment, Summary Memorandum. City of Tacoma, Lincoln Avenue Landfill, Site No. WA D980511844. Prepared by Jon Hixon on September 28, 1985.
- Rittenhouse-Zeman & Associates, Inc. (RZA), 1989. Subsurface Petroleum Hydrocarbon Evaluation, Puget Sound By Products Site, 2041 Marc Avenue, Tacoma, Washington. Dated September 27, 1989.
- Tacoma-Pierce County Health Department (TPCHD), 2001. Memorandum to Tacoma Tideflats closed landfill site file, from John Wright. Subject: Correspondence with Fred Seavey, U.S. Fish & Wildlife. Dated February 13, 2001.
- Whitman Environmental Sciences (WES), 1998. Underground Storage Tank Closure Review, Darling International, Inc. Facility, 2041 Marc Avenue, Tacoma, Washington. Dated April 17, 1998.

**TABLE 1**  
**Well Completion Information**  
 Darling International, Inc.  
 2041 Marc Avenue, Tacoma, Washington

Well Identification		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)	<sup>1,2</sup> Measuring Point Elevation (ft AMSL)	<sup>3</sup> Northing Coordinate	<sup>3</sup> Easting Coordinate	<sup>2</sup> Latitude	<sup>2</sup> Longitude
MFG Well#	WA State Unique Well#													
MFG-1	AGP054	MFG-B1	2/5/2002	Sch. 40 PVC	2	0.010	16.5	15.2	5.1 - 14.4	16.27	704986.37	1167047.48	47°15'02.9585	122°24'22.4035
MFG-2	AGP055	MFG-B2	2/5/2002	Sch. 40 PVC	2	0.010	14	10.13	4.97 - 9.3	15.80	705001.71	1167066.46	47°15'03.1144	122°24'22.1339
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	47°15'02.3697	122°24'21.1828
MFG-3	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	47°15'02.4376	122°24'22.4336

<sup>1</sup>Measuring Point = Top of PVC casing, north side

<sup>2</sup>Survey datum = NAVD88

<sup>3</sup>Washington State Plane Coordinate System - South Zone

Sch. = Schedule

PVC = Polyvinylchloride

ft = feet

bgs = below ground surface

AMSL = Above Mean Sea Level (NAVD88 survey datum)

TABLE 2  
February 2002 Subsurface Boring Analytical Results  
Darling International, Inc.  
2041 Marc Avenue, Tacoma, Washington

Boring Location	MTCA Method A Soil Cleanup Levels	MFG-B2	MFG-B3		MFG-B4	
Sample Depth Interval (ft bgs)		10.5-11'	3-3.5'	7-8.5'	3-3.5'	8-8.5'
Date Sample Collected		2/5/2002	2/5/2002	2/5/2002	2/6/2002	2/6/2002
Dry weight (%)		49.4 <sup>3</sup>	94.6	49.0 <sup>3</sup>	91.9	49.5 <sup>3</sup>
<b>Total Petroleum Hydrocarbons (mg/kg)</b>						
Diesel Range	2,000	37	<10	<820	17	650
Heavy Oil Range	2,000	120	<20	<b>3,000<sup>1</sup></b>	43	1,300
Mineral Oil Range	4,000	180	<25	3,200	59	2,200
<b>Extractable Petroleum Hydrocarbons (mg/kg)</b>						
C8-C10 Aliphatics	—	<10.1	<5	<10.2	<5	<10.1
C10-C12 Aliphatics	—	<10.1	<5	<10.2	<5	23.2
C12-C16 Aliphatics	—	<10.1	<5	<10.2	<5	26.9
C16-C21 Aliphatics	—	<10.1	<5	22.9	<5	100
C21-C34 Aliphatics	—	40.3	<5	176	8.48	369
C10-C12 Aromatics	—	<10.1	<5	<10.2	<5	<10.1
C12-C16 Aromatics	—	<10.1	<5	<10.2	<5	<10.1
C16-C21 Aromatics	—	<10.1	<5	71.6	<5	39.6
C21-C34 Aromatics	—	<10.1	<5	207	<5	160
Total EPH	—	40.3	<5	477	8.48	718
<b>Carcinogenic Polynuclear Aromatic Hydrocarbons (mg/kg)</b>						
Benzo(a)anthracene	—	<0.020	<0.010	4.2	<0.010	0.27
Benzo(a)pyrene	0.1 (2 <sup>2</sup> )	<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
<b>Total Carcinogenic PAHs</b>	0.1 (2 <sup>2</sup> )	NA	NA	22.5 <sup>1</sup>	0.01	2.3 <sup>1</sup>
<b>Naphthalenes (mg/kg)</b>						
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
<b>Total Naphthalenes</b>	5	NA	NA	0.70	NA	0.21
<b>BTEX (mg/kg)</b>						
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.

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

**Bold<sup>1</sup>** = Result is above MTCA Method A Soil Cleanup Level for unrestricted land use and industrial properties.

<sup>2</sup> MTCA Method A Soil Cleanup Level for Industrial Properties

<sup>3</sup> Low percent dry weight (high moisture content) may affect analytical results.



TABLE 3  
February 2002 Groundwater Analytical Results  
Darling International, Inc.  
2041 Marc Avenue, Tacoma, Washington

Monitoring Well	MTCA Method A Groundwater Cleanup Levels	MFG-1	MFG-2	MFG-3	MFG-4
Date Sample Collected		2/13/2002	2/13/2002	2/13/2002	2/13/2002
<b>Field Parameters</b>					
Temperature (°C)	—	12.8	13.5	13.7	15.5
pH (standard units)	—	6.1	6.2	6.6	6.2
Specific Conductivity (uS)	—	1,043	992	689	1,026
Dissolved Oxygen (mg/L)	—	2.9	2.3	1.7	3.7
Oxidation-Reduction Potential (mV)	—	-322	-331	-363	-345
Dry weight (%)	—				
<b>Total Petroleum Hydrocarbons (ug/L)</b>					
Diesel Range	500	<b>3,100<sup>1</sup></b>	<b>2,300<sup>1</sup></b>	<b>6,100<sup>1</sup></b>	<b>4,700<sup>1</sup></b>
Heavy Oil Range	500	<b>730<sup>1</sup></b>	<500	<b>1,100<sup>1</sup></b>	<b>1,000<sup>1</sup></b>
Mineral Oil Range	500	<b>3,300<sup>1</sup></b>	<b>2,500<sup>1</sup></b>	<b>7,300<sup>1</sup></b>	<b>5,100<sup>1</sup></b>
<b>Extractable Petroleum Hydrocarbons (ug/L)</b>					
C8-C10 Aliphatics	—	<100	<100	<100	<100
C10-C12 Aliphatics	—	<100	<100	<100	<100
C12-C16 Aliphatics	—	<100	<100	<100	<100
C16-C21 Aliphatics	—	<100	<100	<100	<100
C21-C34 Aliphatics	—	126	<100	<100	148
C10-C12 Aromatics	—	<100	<100	<100	<100
C12-C16 Aromatics	—	<100	<100	<100	<100
C16-C21 Aromatics	—	<100	<100	<100	<100
C21-C34 Aromatics	—	<100	<100	<100	<100
Total EPH	—	126	<100	<100	148
<b>Carcinogenic Polynuclear Aromatic Hydrocarbons (ug/L)</b>					
Benzo(a)anthracene	—	<0.10	<0.10	<0.20	<0.10
Benzo(a)pyrene	0.1	<0.10	<0.10	<0.20	<0.10
Benzo(b)fluoranthene	—	<0.10	<0.10	<0.20	<0.10
Benzo(k)fluoranthene	—	<0.10	<0.10	<0.20	<0.10
Chrysene	—	<0.10	<0.10	<0.20	<0.10
Dibenz(a,h)anthracene	—	<0.10	<0.10	<0.20	<0.10
Ideno(1,2,3-cd)pyrene	—	<0.10	<0.10	<0.20	<0.10
Total Carcinogenic PAHs	0.1	NA	NA	NA	NA
<b>Naphthalenes (ug/L)</b>					
1-Methylnaphthalene	—	1.0	0.33	0.39	2.5
2-Methylnaphthalene	—	<0.10	0.21	<0.20	0.45
Naphthalene	—	<0.10	<0.10	<0.20	0.41
Total Naphthalenes	160	1.0	0.54	0.39	1.6
<b>BTEX (ug/L)</b>					
Benzene	5	<0.5	<0.5	<0.5	1.7
Toluene	1,000	<0.5	<0.5	0.513	0.648
Ethylbenzene	700	<0.5	<0.5	<0.5	<0.5
Xylenes (total)	1,000	<1	<1	1.08	1.38

bgs = below ground surface

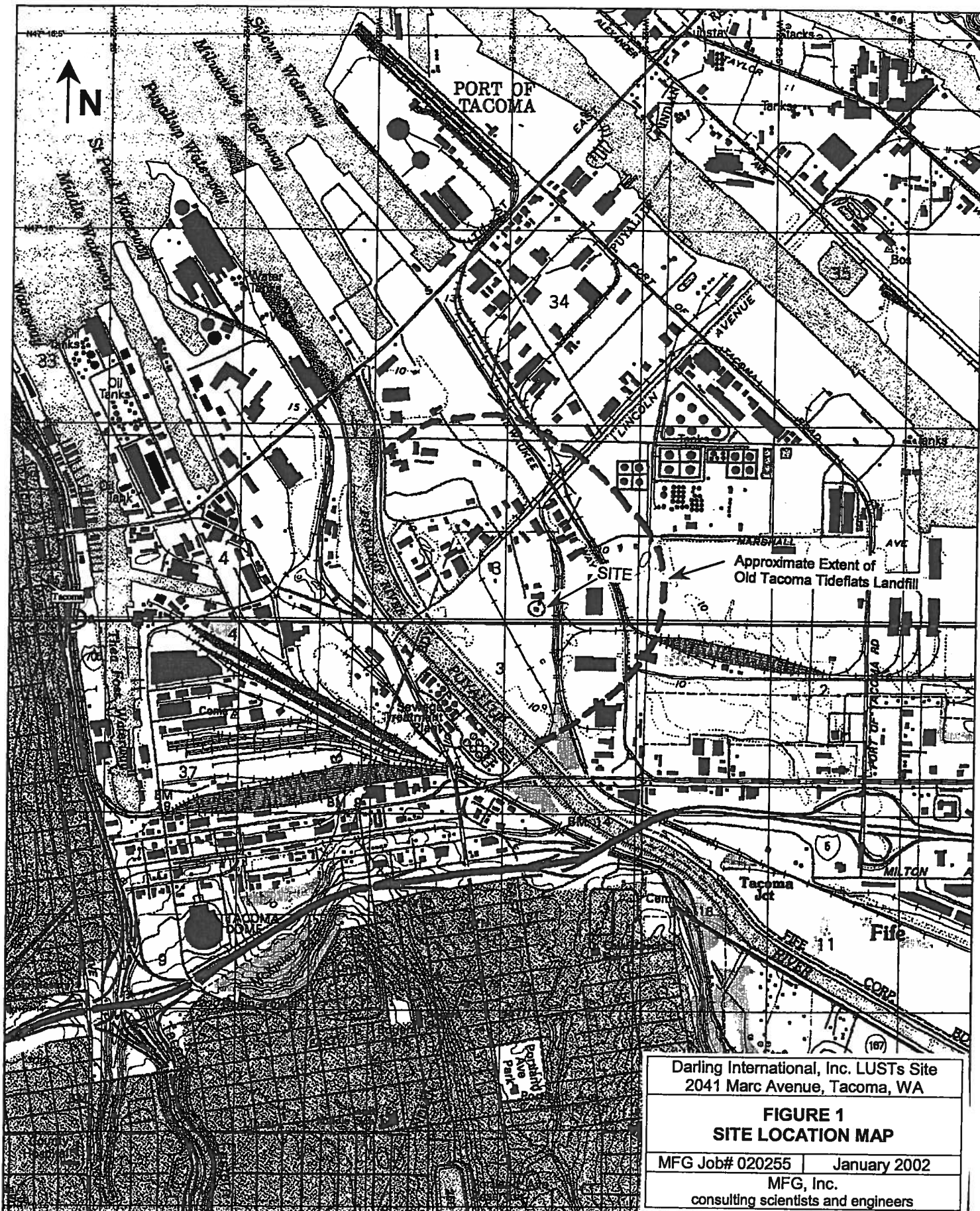
NA = Not Applicable.

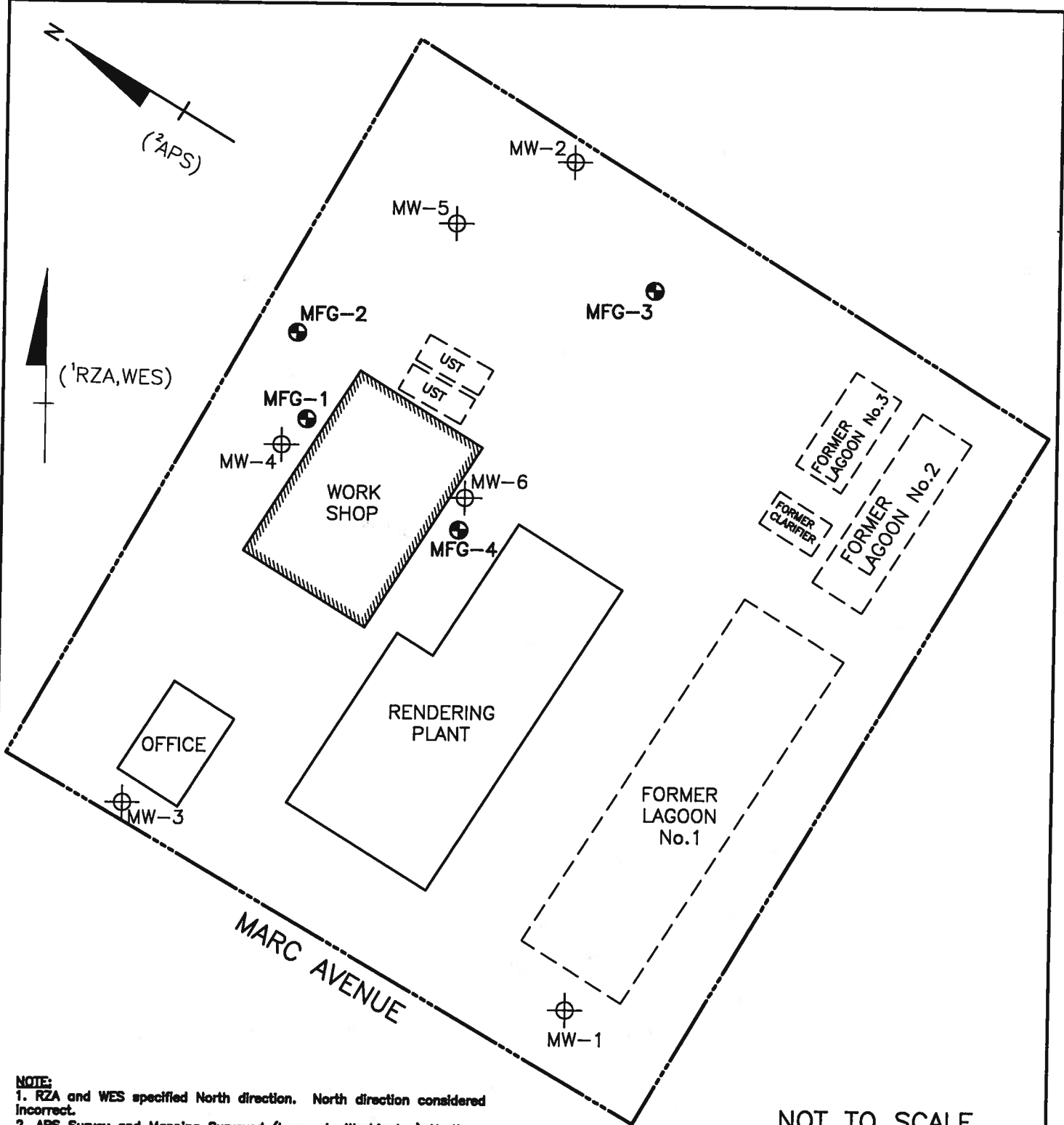
**Bold** = Concentration is above method detection limit but below MTCA Method A Groundwater Cleanup Levels

**Bold<sup>1</sup>** = Above MTCA Method A Groundwater Cleanup Level

**TABLE 4**  
**Water Table Elevation Data**  
**Darling International, Inc.**  
**2041 Marc Avenue, Tacoma, Washington**

Well	Date	Measuring Point Elevation (NAVD88)	Depth to Water (top of PVC)	Water Table Elevation (NAVD88)
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
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
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
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








**NOTE:**

1. RZA and WES specified North direction. North direction considered incorrect.
2. APS Survey and Mapping Surveyed (Issaquah, Washington) North direction. Survey datum: NAVD88 and Washington State Plane Coordinate System - South Zone. APS North direction is considered correct.
3. Structure and well locations are approximate.

**LEGEND:**

-  NEW MONITORING WELL
-  PREVIOUSLY EXISTING MONITORING WELL
-  FORMER STRUCTURES

NOT TO SCALE

DARLING INTERNATIONAL, INC. LUSTs SITE  
2041 MARC AVENUE, TACOMA, WA

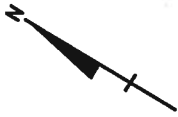
FIGURE 2

**SITE MAP**

PROJECT: 020255.1	DATE: MARCH 2002
REV:	BY: ALJ   CHECKED: NM

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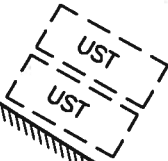
RFIELD C:\SEATTLE\020255\0255-1.dwg PPT1 3/18/02 12:07 pm  
 Plot time: 12:07 pm  
 Plot date: 3/18/02



Approximate Property Line

⊕ MFG-2

MFG-1 ⊕



WORK SHOP

⊕ MFG-4

MFG-3

Depth: 7-8.5'	Result (mg/kg)
TPH-Diesel	3,000
cPAHs	22.5

Depth: 8-8.5'	Result (mg/kg)
cPAHs	2.3

**NOTE:**

- Wells located according to survey datum NAVD88 and Washington State Plane Coordinate System - south zones (surveyed by APS Survey and Mapping of Issaquah, Washington)
- Results presented are those exceeding MTCA Method A Soil Cleanup levels for unrestricted land use and industrial properties.
- cPAHs = total carcinogenic PAHs.

**LEGEND:**

- ⊕ NEW MONITORING WELL
- [---] FORMER STRUCTURES (Approximate Sizes and Locations)

SCALE



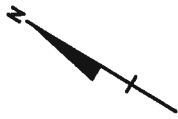
30 15 0 30 FEET

**DARLING INTERNATIONAL, INC. LUSTs SITE**  
2041 MARC AVENUE, TACOMA, WA

FIGURE 3  
**February 2002 Subsurface Soil Analytical Results**

PROJECT: 020255.1	DATE: MARCH 2002
REV:	BY: ALJ   CHECKED: NM

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Approximate Property Line

TPH	Result (µg/L)
Diesel	2,300
Heavy Oil	<500
Mineral	2,500

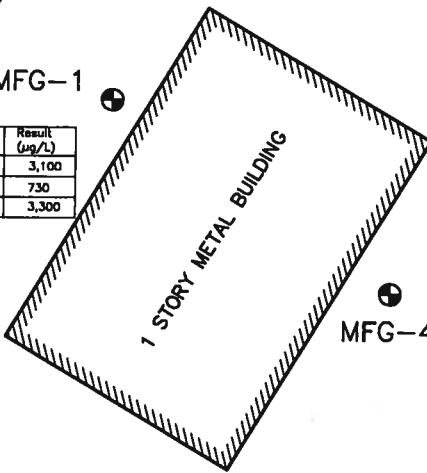
TPH	Result (µg/L)
Diesel	8,100
Heavy Oil	1,100
Mineral	7,300

MFG-2

MFG-3

MFG-1

TPH	Result (µg/L)
Diesel	3,100
Heavy Oil	730
Mineral	3,300



MFG-4

TPH	Result (µg/L)
Diesel	4,700
Heavy Oil	1,000
Mineral	5,100

SCALE



30 15 0 30 FEET

**NOTE:**

- Wells located according to survey datum NAVD88 and Washington State Plane Coordinate System – south zones (surveyed by APS Survey and Mapping of Issaquah, Washington)
- Results presented are those exceeding MTCA Method A Soil Cleanup levels for unrestricted land use and industrial properties.

**LEGEND:**

- NEW MONITORING WELL
- FORMER STRUCTURES (Approximate Sizes and Locations)

**DARLING INTERNATIONAL, INC. LUSTs SITE**  
2041 MARC AVENUE, TACOMA, WA

FIGURE 4  
**February 2002 Groundwater Analytical Results**

PROJECT: 020255.1      DATE: MARCH 2002  
REV:                      BY: ALJ      CHECKED: NM

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**APPENDIX A**  
**BORING AND WELL LOGS**



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# LOG OF BORING MFG-B1

(Page 1 of 1)

Darling International, Inc.  
2041 Marc Avenue  
Tacoma, WA 98421  
  
MFG Project No. 020255

Drilling Agency : Hoyt Drilling, Inc.  
Drilling Rig & Method : Mobile B-59 HSA  
Drill Bit Size : 8" OD, 4-1/4" ID  
Sample Method : 300 lb hammer, 30" drop  
Sample Type : SPT; D&M Sampler

Start/Complete Date : 2-5-02/2-5-02  
Northing Coordinate : 704986.37  
Easting Coordinate : 1167047.48  
Top PVC Elevation : 16.27 ft AMSL  
Logged By : N. Morrow

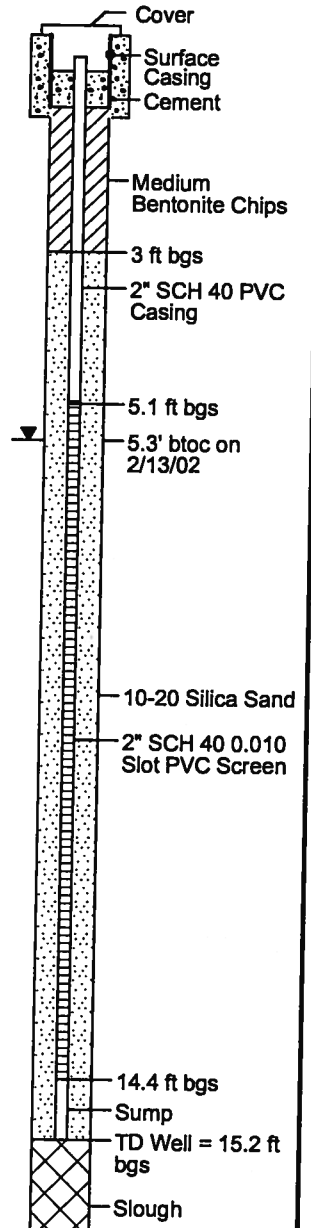
Depth in	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	PID (ppm)	REMARKS
----------	-------------	------	---------	---------	------------	--------------	-----------	---------

0	Asphalt.							SPT = Standard Penetration Test AR = Artificial Fill
1	Cuttings: SANDY GRAVEL, olive gray, gravel up to 2-inch size, fine to medium sand, trace silt, moist. Fill.	GP						No chemical samples obtained, not enough recovery.
2	Organic Fill. Dark brown to black, wood, fine organics (coarse paste), few glass and metal, some to few silt and fine sand, some to few subangular gravel up to 1/2-inch size, dry to slightly moist.			1	3	15	0	No hydrocarbon odor.
3				3				
4				2				
5	As above. Brown, larger wood chips.			1				
6				2	10	500		Moderate hydrocarbon odor. First encountered water approx. 7-7.5 ft bgs.
7				3				
8	SILTY SAND, black, fine to medium sand, some organic paste, saturated.	AR		3	26	0		Moderate hydrocarbon odor.
9				6	7	0		
10	Organic fill. Black, organic paste, wood chips, some to few sand, few glass and metal, saturated.			4	50/	0	1000	Strong hydrocarbon odor.
11				6"	3			
12				1				
13				2				
14	As above. Subangular gravel up to 1.5-inch size.			5				
15	SILT, olive gray, wet.	ML		6	3	15	0	
16				2				

17 Total depth of borehole = 16.5 feet bgs.  
Survey coordinate system: NAVD88

18

Well: MFG-1 (AGP054)  
Top PVC Elev.: 16.27' AMSL



05-27-2002 w:020255 - Darling Tacoma USTVLogs\MFG-1.BOR





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# LOG OF BORING MFG-B2

(Page 1 of 1)

Darling International, Inc.  
2041 Marc Avenue  
Tacoma, WA 98421

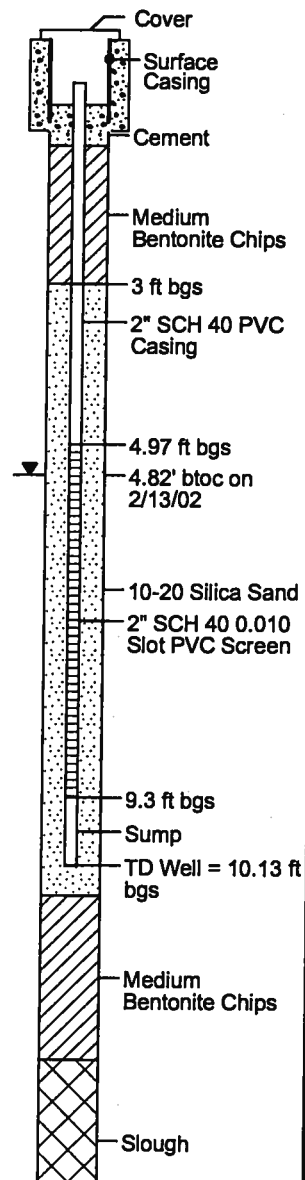
MFG Project No. 020255

Drilling Agency : Holt Drilling, Inc.  
Drilling Rig & Method : Mobile B-59 HSA  
Drill Bit Size : 8" OD, 4-1/4" ID  
Sample Method : 300 lb hammer, 30" drop  
Sample Type : SPT; D&M Sampler

Start/Complete Date : 2-5-02/2-5-02  
Northing Coordinate : 705001.71  
Easting Coordinate : 1167066.46  
Top PVC Elevation : 15.80 ft AMSL  
Logged By : N. Morrow

Well: MFG-2 (AGP055)  
Top PVC Elev.: 15.80' AMSL

Depth in	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	PID (ppm)	REMARKS
0	Asphalt.							SPT = Standard Penetration Test AR = Artificial Fill
1	SAND, brown, fine to medium sand, some to few gravel up to 1/2-inch size, some silt, few to trace organics and metal, slightly moist.	SP		1	2			No hydrocarbon odor.
2				2	15	0		
3				1				
4				1				
5				2	10	500		
6	Saturated.	AR		2	1			First encountered water approx. 7-7.5 feet bgs.  Moderate hydrocarbon odor.
7				1				
8				1	0			
9				1				
10				1				
11	SILT AND ORGANICS, brown silt, mottling with black and brown organics, some to few roots and sticks, moist to wet.			4	1	0	1000	Strong hydrocarbon odor. Sample: MFG-B2(10.5-11')
12	SILT AND ORGANICS, light gray silt, black mottling of organics, roots mottled with black organics, some long pieces of organics, very moist to wet.			5	1/12"			Slight hydrocarbon odor.
13	SILT, light gray, few rootlets, very moist to wet.	ML			1			
14	Total depth of borehole = 14 feet bgs. Survey coordinate system: NAVD88							



05-27-2002 w:\020255 - Darling Tacoma USTLogs\MFG-2.BOR



**MFG, Inc.**  
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# LOG OF BORING MFG-B3

(Page 1 of 1)

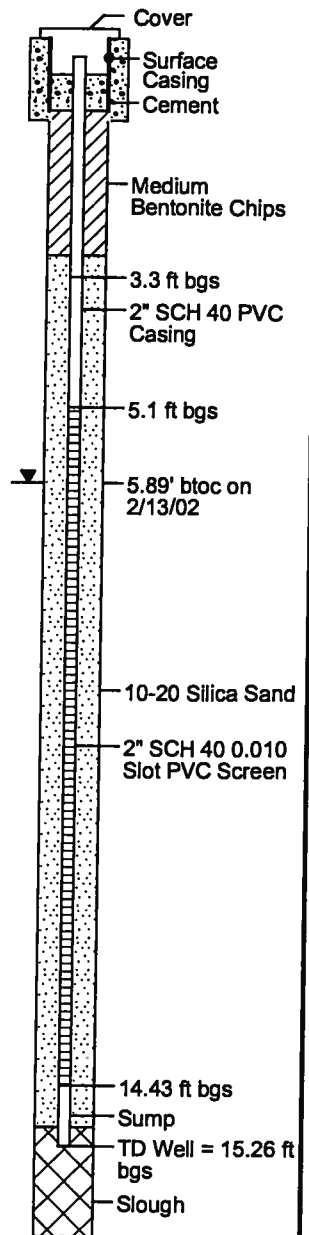
Darling International, Inc.  
2041 Marc Avenue  
Tacoma, WA 98421  
  
MFG Project No. 020255

Drilling Agency : Holt Drilling, Inc.  
Drilling Rig & Method : Mobile B-59 HSA  
Drill Bit Size : 8" OD, 4-1/4" ID  
Sample Method : 300 lb hammer, 30" drop  
Sample Type : SPT; D&M Sampler

Start/Complete Date : 2-5-02/2-5-02  
Northing Coordinate : 704924.70  
Easting Coordinate : 1167130.23  
Top PVC Elevation : 16.85 ft AMSL  
Logged By : N. Morrow

Well: MFG-3 (AGP056)  
Top PVC Elev.: 16.85' AMSL

Depth in	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	PID (ppm)	REMARKS
0	Asphalt.							SPT = Standard Penetration Test AR = Artificial Fill
1	SANDY GRAVEL to SAND WITH GRAVEL, olive gray, gravel up to 3-inch size, fine to medium sand, few coarse sand, moist. Fill.	GP/SP		1	15			No hydrocarbon odor. 0 ppm Sample: MFG-B3(3-3.5')
2				16	100			
3				19				
4	As above. Olive gray to gray.	GP/SP		2	7			No odor. 0 ppm First water encountered approx. 7-7.5 ft bgs.
5				7	10			
6	SILTY SAND WITH GRAVEL, brown with yellowish orange mottling, fine to medium sand, broken gravel up to 1.5-inch size, wet to saturated. Fill.	AR		3	1			No to slight hydrocarbon odor. 0 ppm Sample: MFG-B3(7-8.5')
7				1	30			
8				2				
9	SAND WITH GRAVEL to SANDY GRAVEL, fine to medium sand, gravel up to 1/2-inch size, few to trace silt, glass and wire, large wood piece stuck in shoe, saturated.	AR		4	10			Strong hydrocarbon odor. 1500 ppm
10				15	15			
11				20				
12	Organic paste with sandy gravel, black, gravel up to 1/2-inch size, wire, glass, saturated.	AR		5	18			Slight hydrocarbon odor. 0 ppm
13				50/5"	5			
14	As above.	AR		6	0			Moderate hydrocarbon odor. 1000 ppm Sample: MFG-B3(15.5-16')
15				1	100			
16	SILT, dark brown to black, some organics, wet.	ML		6	1			
17	Total depth of borehole = 16.5 feet bgs. Survey coordinate system: NAVD88							



05-27-2002 w:020255 - Darling Tacoma UST\Logs\MFG-3.BOR



**MFG, Inc.**  
Consulting Scientists and Engineers

# LOG OF BORING MFG-B4

(Page 1 of 1)

Darling International, Inc.  
2041 Marc Avenue  
Tacoma, WA 98421

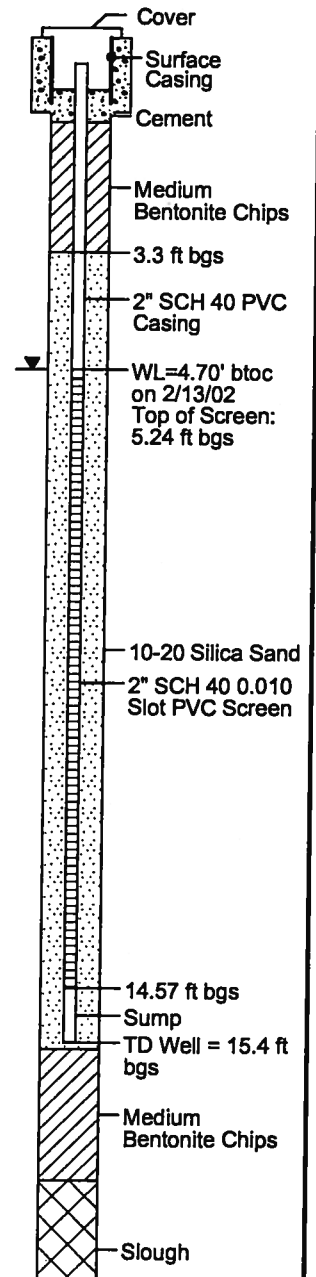
MFG Project No. 020255

Drilling Agency : Hoyt Drilling, Inc.  
Drilling Rig & Method : Mobile B-59 HSA  
Drill Bit Size : 8" OD, 4-1/4" ID  
Sample Method : 300 lb hammer, 30" drop  
Sample Type : SPT; D&M Sampler

Start/Complete Date : 2-6-02/2-6-02  
Northing Coordinate : 704933.66  
Easting Coordinate : 1167044.13  
Top PVC Elevation : 15.67 ft AMSL  
Logged By : N. Morrow

Well: MFG-4 (AGP057)  
Top PVC Elev.: 15.67' AMSL

Depth in	DESCRIPTION	USCS	GRAPHIC	Samples	Blow Count	Recovery (%)	PID (ppm)	REMARKS
0	Asphalt.							SPT = Standard Penetration Test AR = Artificial Fill
1	Cuttings: SANDY GRAVEL TO SAND WITH GRAVEL, olive gray, gravel up to 2-inch size, fine to medium sand, slightly moist to moist.							
2	As above.							
3		GP/SP		1	3	30		No hydrocarbon odor.
4	SANDY SILT, dark brown, some organics (roots).				9			
5	SILTY SAND, yellowish brown, few gravel, some organic paste, metal, moist.			2	3	10	0	No odor.
6					3			
7								First water encountered approx. 7-7.5 ft bgs.
8	Organic fill. Black, organic paste, some silt and fine sand, wet to saturated.			3	7	60	1000	Moderate to strong hydrocarbon odor. 1000 ppm
9	SILT, olive gray, some debris and organics, very moist to wet.	AR			9			Sample: MFG-B4(8-8.5)
10	SAND AND Organic fill. Dark gray to black, fine to medium sand, few silt, saturated.			4	3			
11	Wood, black, saturated.				2	50	500	Moderate to strong hydrocarbon odor. 500 ppm
12					3			Sample: MFG-B4(10-10.5)
13	Wood with SILTY SAND, black, saturated.			5	7	14	10	1500
14					5			Strong hydrocarbon odor. 1500 ppm
15								
16	SILT. Wood stuck in shoe. Per driller, thinks hit silt layer at approx. 14.5 ft bgs, wood carried.			6	2	0	—	
17					3			
18		ML		7	2			
19					1	0	—	
20					1			



Total depth of borehole = 19 ft bgs.  
Survey coordinate system: NAVD88

05-27-2002 w:\020255 - Drilling Tacoma USTLogs\MFG-4.BOR

**APPENDIX B**  
**SUBSURFACE SOIL ANALYTICAL RESULTS**



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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/20/02 09:11
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**ANALYTICAL REPORT FOR SAMPLES**

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MFG-B3 (3-3.5')	B2B0146-01	Soil	02/05/02 14:50	02/06/02 14:10
MFG-B3 (7-8.5')	B2B0146-02	Soil	02/05/02 15:00	02/06/02 14:10
MFG-B4 (8-8.5')	B2B0146-04	Soil	02/06/02 09:15	02/06/02 14:10
MFG-B4 (3-3.5')	B2B0146-05	Soil	02/06/02 09:00	02/06/02 14:10
MFG-B2 (10.5-11')	B2B0146-07	Soil	02/05/02 11:50	02/06/02 14:10

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**Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-B3 (3-3.5') (B2B0146-01) Soil</b> <b>Sampled: 02/05/02 14:50</b> <b>Received: 02/06/02 14:10</b>									
Diesel Range Hydrocarbons	ND	10	mg/kg dry	1	2B08036	02/08/02	02/09/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	ND	20	"	"	"	"	"	"	
Mineral Oil Range Hydrocarbons	ND	25	"	"	"	"	02/11/02	"	
Surrogate: 2-FBP	75 %	50-138			"	"	02/09/02	"	
Surrogate: Octacosane	90 %	56-139			"	"	"	"	
<b>MFG-B3 (7-8.5') (B2B0146-02) Soil</b> <b>Sampled: 02/05/02 15:00</b> <b>Received: 02/06/02 14:10</b>									
Diesel Range Hydrocarbons	ND	820	mg/kg dry	40	2B08036	02/08/02	02/09/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	3000	1600	"	"	"	"	"	"	
Mineral Oil Range Hydrocarbons	3200	2000	"	"	"	"	02/11/02	"	
Surrogate: 2-FBP	%	50-138			"	"	02/09/02	"	S-01
Surrogate: Octacosane	59 %	56-139			"	"	"	"	
<b>MFG-B4 (8-8.5') (B2B0146-04) Soil</b> <b>Sampled: 02/06/02 09:15</b> <b>Received: 02/06/02 14:10</b>									
Diesel Range Hydrocarbons	650	200	mg/kg dry	10	2B08036	02/08/02	02/09/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	1300	400	"	"	"	"	"	"	
Mineral Oil Range Hydrocarbons	2200	500	"	"	"	"	02/11/02	"	
Surrogate: 2-FBP	64 %	50-138			"	"	02/09/02	"	
Surrogate: Octacosane	86 %	56-139			"	"	"	"	
<b>MFG-B4 (3-3.5') (B2B0146-05) Soil</b> <b>Sampled: 02/06/02 09:00</b> <b>Received: 02/06/02 14:10</b>									
Diesel Range Hydrocarbons	17	10	mg/kg dry	1	2B08036	02/08/02	02/09/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	43	20	"	"	"	"	"	"	
Mineral Oil Range Hydrocarbons	59	25	"	"	"	"	02/11/02	"	
Surrogate: 2-FBP	81 %	50-138			"	"	02/09/02	"	
Surrogate: Octacosane	83 %	56-139			"	"	"	"	

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**Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)**  
**North Creek Analytical - Bothell**

Analyte	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
	Result	Limit							
<b>MFG-B2 (10.5-11') (B2B0146-07) Soil</b> <b>Sampled: 02/05/02 11:50</b> <b>Received: 02/06/02 14:10</b>									
Diesel Range Hydrocarbons	37	20	mg/kg dry	1	2B08036	02/08/02	02/09/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	120	40	"	"	"	"	"	"	
Mineral Oil Range Hydrocarbons	180	51	"	"	"	"	02/11/02	"	
Surrogate: 2-FBP	64 %	50-138			"	"	02/09/02	"	
Surrogate: Octacosane	73 %	56-139			"	"	"	"	

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/20/02 09:11
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**Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**MFG-B3 (3-3.5') (B2B0146-01) Soil**    **Sampled: 02/05/02 14:50**    **Received: 02/06/02 14:10**

C8-C10 Aliphatics	ND	5.00	mg/kg dry	1	2B08035	02/08/02	02/14/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	5.00	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	5.00	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	5.00	"	"	"	"	"	"	
C21-C34 Aliphatics	ND	5.00	"	"	"	"	"	"	
C10-C12 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C16 Aromatics	ND	5.00	"	"	"	"	"	"	
C16-C21 Aromatics	ND	5.00	"	"	"	"	"	"	
C21-C34 Aromatics	ND	5.00	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	ND	5.00	"	"	"	"	"	"	
Surrogate: 2-FBP	66.9 %	50-150			"	"	"	"	
Surrogate: Octacosane	79.1 %	50-150			"	"	"	"	
Surrogate: Undecane	70.7 %	30-150			"	"	"	"	

**MFG-B3 (7-8.5') (B2B0146-02) Soil**    **Sampled: 02/05/02 15:00**    **Received: 02/06/02 14:10**

C8-C10 Aliphatics	ND	10.2	mg/kg dry	1	2B08035	02/08/02	02/15/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	10.2	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	10.2	"	"	"	"	"	"	
C16-C21 Aliphatics	22.9	10.2	"	"	"	"	"	"	
C21-C34 Aliphatics	176	10.2	"	"	"	"	"	"	
C10-C12 Aromatics	ND	10.2	"	"	"	"	"	"	
C12-C16 Aromatics	ND	10.2	"	"	"	"	"	"	
C16-C21 Aromatics	71.6	10.2	"	"	"	"	"	"	
C21-C34 Aromatics	207	10.2	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	477	10.2	"	"	"	"	"	"	
Surrogate: 2-FBP	66.0 %	50-150			"	"	"	"	
Surrogate: Octacosane	81.5 %	50-150			"	"	"	"	
Surrogate: Undecane	66.2 %	30-150			"	"	"	"	

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 Project: Darling-Tacoma UST  
 Project Number: 020255  
 Project Manager: Natalie Morrow  
 Reported: 02/20/02 09:11

**Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**MFG-B4 (8-8.5') (B2B0146-04) Soil** Sampled: 02/06/02 09:15 Received: 02/06/02 14:10

C8-C10 Aliphatics	ND	10.1	mg/kg dry	1	2B08035	02/08/02	02/15/02	WA MTCA-EPH	
C10-C12 Aliphatics	23.2	10.1	"	"	"	"	"	"	
C12-C16 Aliphatics	26.9	10.1	"	"	"	"	"	"	
C16-C21 Aliphatics	100	10.1	"	"	"	"	"	"	
C21-C34 Aliphatics	369	10.1	"	"	"	"	"	"	
C10-C12 Aromatics	ND	10.1	"	"	"	"	"	"	
C12-C16 Aromatics	ND	10.1	"	"	"	"	"	"	
C16-C21 Aromatics	39.6	10.1	"	"	"	"	"	"	
C21-C34 Aromatics	160	10.1	"	"	"	"	"	"	
<b>Extractable Petroleum Hydrocarbons</b>	<b>718</b>	<b>10.1</b>	"	"	"	"	"	"	
<i>Surrogate: 2-FBP</i>	66.9 %	50-150			"	"	"	"	
<i>Surrogate: Octacosane</i>	79.1 %	50-150			"	"	"	"	
<i>Surrogate: Undecane</i>	67.4 %	30-150			"	"	"	"	

**MFG-B4 (3-3.5') (B2B0146-05) Soil** Sampled: 02/06/02 09:00 Received: 02/06/02 14:10

C8-C10 Aliphatics	ND	5.00	mg/kg dry	1	2B08035	02/08/02	02/15/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	5.00	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	5.00	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	5.00	"	"	"	"	"	"	
C21-C34 Aliphatics	8.48	5.00	"	"	"	"	"	"	
C10-C12 Aromatics	ND	5.00	"	"	"	"	"	"	
C12-C16 Aromatics	ND	5.00	"	"	"	"	"	"	
C16-C21 Aromatics	ND	5.00	"	"	"	"	"	"	
C21-C34 Aromatics	ND	5.00	"	"	"	"	"	"	
<b>Extractable Petroleum Hydrocarbons</b>	<b>8.48</b>	<b>5.00</b>	"	"	"	"	"	"	
<i>Surrogate: 2-FBP</i>	70.8 %	50-150			"	"	"	"	
<i>Surrogate: Octacosane</i>	87.9 %	50-150			"	"	"	"	
<i>Surrogate: Undecane</i>	81.8 %	30-150			"	"	"	"	

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**Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method  
 North Creek Analytical - Bothell**

Analyte	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
	Result	Limit							
<b>MFG-B2 (10.5-11') (B2B0146-07) Soil</b> <b>Sampled: 02/05/02 11:50</b> <b>Received: 02/06/02 14:10</b>									
C8-C10 Aliphatics	ND	10.1	mg/kg dry	1	2B08035	02/08/02	02/15/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	10.1	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	10.1	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	10.1	"	"	"	"	"	"	
<b>C21-C34 Aliphatics</b>	<b>40.3</b>	10.1	"	"	"	"	"	"	
C10-C12 Aromatics	ND	10.1	"	"	"	"	"	"	
C12-C16 Aromatics	ND	10.1	"	"	"	"	"	"	
C16-C21 Aromatics	ND	10.1	"	"	"	"	"	"	
C21-C34 Aromatics	ND	10.1	"	"	"	"	"	"	
<b>Extractable Petroleum Hydrocarbons</b>	<b>40.3</b>	10.1	"	"	"	"	"	"	
<i>Surrogate: 2-FBP</i>	<i>61.5 %</i>	<i>50-150</i>							
<i>Surrogate: Octacosane</i>	<i>69.5 %</i>	<i>50-150</i>							
<i>Surrogate: Undecane</i>	<i>56.2 %</i>	<i>30-150</i>							

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**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>MFG-B3 (3-3.5') (B2B0146-01) Soil</b> <b>Sampled: 02/05/02 14:50</b> <b>Received: 02/06/02 14:10</b>										
Benzo (a) anthracene	ND	0.010		mg/kg dry	1	2B14023	02/14/02	02/16/02	8270-SIM	
Benzo (a) pyrene	ND	0.010		"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.010		"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.010		"	"	"	"	"	"	
Chrysene	ND	0.010		"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.010		"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.010		"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.010		"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.010		"	"	"	"	"	"	
Naphthalene	ND	0.010		"	"	"	"	"	"	
<i>Surrogate: p-Terphenyl-d14</i>	94 %	30-150				"	"	"	"	

<b>MFG-B3 (7-8.5') (B2B0146-02) Soil</b> <b>Sampled: 02/05/02 15:00</b> <b>Received: 02/06/02 14:10</b>										
Benzo (a) anthracene	4.2	0.041		mg/kg dry	2	2B14023	02/14/02	02/16/02	8270-SIM	
Benzo (a) pyrene	4.9	0.041		"	"	"	"	"	"	
Benzo (b) fluoranthene	4.4	0.20		"	10	"	"	02/18/02	"	
Benzo (k) fluoranthene	1.3	0.041		"	2	"	"	02/16/02	"	
Chrysene	4.4	0.041		"	"	"	"	"	"	
Dibenz (a,h) anthracene	0.56	0.041		"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	2.7	0.041		"	"	"	"	"	"	
1-Methylnaphthalene	0.17	0.041		"	"	"	"	"	"	
2-Methylnaphthalene	0.23	0.041		"	"	"	"	"	"	
Naphthalene	0.30	0.041		"	"	"	"	"	"	
<i>Surrogate: p-Terphenyl-d14</i>	91 %	30-150				"	"	"	"	

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MFG  
 19203 36th Avenue, Suite 101  
 Lynnwood WA/USA, 98036

Project: Darling-Tacoma UST  
 Project Number: 020255  
 Project Manager: Natalie Morrow

Reported:  
 02/20/02 09:11

**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>MFG-B4 (8-8.5') (B2B0146-04) Soil</b> <b>Sampled: 02/06/02 09:15</b> <b>Received: 02/06/02 14:10</b>										
Benzo (a) anthracene	0.27	0.020		mg/kg dry	1	2B14023	02/14/02	02/16/02	8270-SIM	
Benzo (a) pyrene	0.51	0.020		"	"	"	"	"	"	
Benzo (b) fluoranthene	0.64	0.020		"	"	"	"	"	"	
Benzo (k) fluoranthene	0.18	0.020		"	"	"	"	"	"	
Chrysene	0.34	0.020		"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.020		"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	0.39	0.020		"	"	"	"	"	"	
1-Methylnaphthalene	0.084	0.020		"	"	"	"	"	"	
2-Methylnaphthalene	0.080	0.020		"	"	"	"	"	"	
Naphthalene	0.047	0.020		"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	82 %	30-150				"	"	"	"	
<b>MFG-B4 (3-3.5') (B2B0146-05) Soil</b> <b>Sampled: 02/06/02 09:00</b> <b>Received: 02/06/02 14:10</b>										
Benzo (a) anthracene	ND	0.010		mg/kg dry	1	2B14023	02/14/02	02/16/02	8270-SIM	
Benzo (a) pyrene	ND	0.010		"	"	"	"	"	"	
Benzo (b) fluoranthene	0.010	0.010		"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.010		"	"	"	"	"	"	
Chrysene	ND	0.010		"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.010		"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.010		"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.010		"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.010		"	"	"	"	"	"	
Naphthalene	ND	0.010		"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	100 %	30-150				"	"	"	"	

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/20/02 09:11
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**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-B2 (10.5-11') (B2B0146-07) Soil</b> <b>Sampled: 02/05/02 11:50</b> <b>Received: 02/06/02 14:10</b>									
Benzo (a) anthracene	ND	0.020	mg/kg dry	1	2B14023	02/14/02	02/16/02	8270-SIM	
Benzo (a) pyrene	ND	0.020	"	"	"	"	"	"	"
Benzo (b) fluoranthene	ND	0.020	"	"	"	"	"	"	"
Benzo (k) fluoranthene	ND	0.020	"	"	"	"	"	"	"
Chrysene	ND	0.020	"	"	"	"	"	"	"
Dibenz (a,h) anthracene	ND	0.020	"	"	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND	0.020	"	"	"	"	"	"	"
1-Methylnaphthalene	ND	0.020	"	"	"	"	"	"	"
2-Methylnaphthalene	ND	0.020	"	"	"	"	"	"	"
Naphthalene	ND	0.020	"	"	"	"	"	"	"
<i>Surrogate: p-Terphenyl-d14</i>	91 %	30-150			"	"	"	"	

North Creek Analytical - Bothell

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<b>MFG</b> 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	<b>Project: Darling-Tacoma UST</b> <b>Project Number: 020255</b> <b>Project Manager: Natalie Morrow</b>	<b>Reported:</b> <b>02/20/02 09:11</b>
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**BTEX by EPA Method 8021B**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-B3 (3-3.5') (B2B0146-01) Soil</b> <b>Sampled: 02/05/02 14:50</b> <b>Received: 02/06/02 14:10</b>									
Benzene	ND	0.0300	mg/kg dry	1	2B08039	02/08/02	02/10/02	EPA 8021B	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	92.9 %	54-123			"	"	"	"	
<b>MFG-B3 (7-8.5') (B2B0146-02) Soil</b> <b>Sampled: 02/05/02 15:00</b> <b>Received: 02/06/02 14:10</b>									
Benzene	ND	0.0612	mg/kg dry	1	2B08039	02/08/02	02/10/02	EPA 8021B	
Toluene	ND	0.102	"	"	"	"	"	"	
Ethylbenzene	ND	0.102	"	"	"	"	"	"	
Xylenes (total)	ND	0.204	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	70.2 %	54-123			"	"	"	"	
<b>MFG-B4 (8-8.5') (B2B0146-04) Soil</b> <b>Sampled: 02/06/02 09:15</b> <b>Received: 02/06/02 14:10</b>									
Benzene	ND	0.0606	mg/kg dry	1	2B08039	02/08/02	02/10/02	EPA 8021B	
Toluene	ND	0.101	"	"	"	"	"	"	
Ethylbenzene	ND	0.101	"	"	"	"	"	"	
Xylenes (total)	ND	0.202	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	71.9 %	54-123			"	"	"	"	
<b>MFG-B4 (3-3.5') (B2B0146-05) Soil</b> <b>Sampled: 02/06/02 09:00</b> <b>Received: 02/06/02 14:10</b>									
Benzene	ND	0.0300	mg/kg dry	1	2B08039	02/08/02	02/10/02	EPA 8021B	
Toluene	ND	0.0500	"	"	"	"	"	"	
Ethylbenzene	ND	0.0500	"	"	"	"	"	"	
Xylenes (total)	ND	0.100	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	93.6 %	54-123			"	"	"	"	

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**BTEX by EPA Method 8021B**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<b>MFG-B2 (10.5-11') (B2B0146-07) Soil</b> <b>Sampled: 02/05/02 11:50</b> <b>Received: 02/06/02 14:10</b>										
Benzene	ND	0.0607		mg/kg dry	1	2B08039	02/08/02	02/10/02	EPA 8021B	
Toluene	ND	0.101		"	"	"	"	"	"	
Ethylbenzene	ND	0.101		"	"	"	"	"	"	
Xylenes (total)	ND	0.202		"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	<i>65.6 %</i>	<i>54-123</i>				"	"	"	"	

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**Physical Parameters by APHA/ASTM/EPA Methods**  
**North Creek Analytical - Bothell**

Analyte	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
	Result	Limit							
<b>MFG-B3 (3-3.5') (B2B0146-01) Soil</b>	<b>Sampled: 02/05/02 14:50 Received: 02/06/02 14:10</b>								
Dry Weight	94.6	1.00	%	1	2B11006	02/11/02	02/12/02	BSOPSPL003R07	
<b>MFG-B3 (7-8.5') (B2B0146-02) Soil</b>	<b>Sampled: 02/05/02 15:00 Received: 02/06/02 14:10</b>								
Dry Weight	49.0	1.00	%	1	2B11006	02/11/02	02/12/02	BSOPSPL003R07	
<b>MFG-B4 (8-8.5') (B2B0146-04) Soil</b>	<b>Sampled: 02/06/02 09:15 Received: 02/06/02 14:10</b>								
Dry Weight	49.5	1.00	%	1	2B11006	02/11/02	02/12/02	BSOPSPL003R07	
<b>MFG-B4 (3-3.5') (B2B0146-05) Soil</b>	<b>Sampled: 02/06/02 09:00 Received: 02/06/02 14:10</b>								
Dry Weight	91.9	1.00	%	1	2B11007	02/11/02	02/12/02	BSOPSPL003R07	
<b>MFG-B2 (10.5-11') (B2B0146-07) Soil</b>	<b>Sampled: 02/05/02 11:50 Received: 02/06/02 14:10</b>								
Dry Weight	49.4	1.00	%	1	2B11007	02/11/02	02/12/02	BSOPSPL003R07	

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**Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B08036: Prepared 02/08/02 Using EPA 3550B**

**Blank (2B08036-BLK1)**

Diesel Range Hydrocarbons	ND	10	mg/kg							
Heavy Oil Range Hydrocarbons	ND	20	"							
Mineral Oil Range Hydrocarbons	ND	25	"							
Surrogate: 2-FBP	9.2		"	11		84	50-138			
Surrogate: Octacosane	9.5		"	11		86	56-139			

**LCS (2B08036-BS1)**

Diesel Range Hydrocarbons	54	10	mg/kg	67		81	72-120			
Surrogate: 2-FBP	8.1		"	11		74	50-138			

**LCS Dup (2B08036-BSD1)**

Diesel Range Hydrocarbons	62	10	mg/kg	67		93	72-120	14	40	
Surrogate: 2-FBP	9.7		"	11		88	50-138			

**Duplicate (2B08036-DUP1)**

**Source: B2A0613-10**

Diesel Range Hydrocarbons	ND	10	mg/kg dry		ND			26	40	
Heavy Oil Range Hydrocarbons	ND	20	"		ND			12	200	
Mineral Oil Range Hydrocarbons	ND	25	"		ND				200	
Surrogate: 2-FBP	8.3		"	11		75	50-138			
Surrogate: Octacosane	9.5		"	11		86	56-139			

North Creek Analytical - Bothell

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**Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method - Quality Control  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B08035: Prepared 02/08/02 Using EPA 3550B**

**Blank (2B08035-BLK1)**

C8-C10 Aliphatics	ND	5.00	mg/kg							
C10-C12 Aliphatics	ND	5.00	"							
C12-C16 Aliphatics	ND	5.00	"							
C16-C21 Aliphatics	ND	5.00	"							
C21-C34 Aliphatics	ND	5.00	"							
C10-C12 Aromatics	ND	5.00	"							
C12-C16 Aromatics	ND	5.00	"							
C16-C21 Aromatics	ND	5.00	"							
C21-C34 Aromatics	ND	5.00	"							
Extractable Petroleum Hydrocarbons	ND	5.00	"							
Surrogate: 2-FBP	8.80		"	12.5		70.4	50-150			
Surrogate: Octacosane	10.1		"	12.0		84.2	50-150			
Surrogate: Undecane	10.6		"	14.0		75.7	30-150			

**LCS (2B08035-BS1)**

Extractable Petroleum Hydrocarbons	113	5.00	mg/kg	167		67.7	30-120			
Surrogate: 2-FBP	9.05		"	12.5		72.4	50-150			
Surrogate: Octacosane	10.1		"	12.0		84.2	50-150			
Surrogate: Undecane	9.86		"	14.0		70.4	30-150			

**LCS Dup (2B08035-BSD1)**

Extractable Petroleum Hydrocarbons	125	5.00	mg/kg	167		74.9	30-120	10.1	40	
Surrogate: 2-FBP	7.99		"	12.5		63.9	50-150			
Surrogate: Octacosane	10.8		"	12.0		90.0	50-150			
Surrogate: Undecane	10.6		"	14.0		75.7	30-150			

**Matrix Spike (2B08035-MS1)**

**Source: B2B0015-21**

Extractable Petroleum Hydrocarbons	1040	5.00	mg/kg dry	201	1040	0.00	30-120			Q-03
Surrogate: 2-FBP	8.02		"	15.0		53.5	50-150			
Surrogate: Octacosane	12.4		"	14.4		86.1	50-150			
Surrogate: Undecane	12.3		"	16.8		73.2	30-150			

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**Extractable Petroleum Hydrocarbons by modified WDOE Interim TPH Policy Method - Quality Control  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B08035: Prepared 02/08/02 Using EPA 3550B**

**Matrix Spike Dup (2B08035-MSD1)**

**Source: B2B0015-21**

Extractable Petroleum Hydrocarbons	1110	5.00	mg/kg dry	201	1040	34.8	30-120	6.51	40	
Surrogate: 2-FBP	12.5		"	15.0		83.3	50-150			
Surrogate: Octacosane	13.4		"	14.4		93.1	50-150			
Surrogate: Undecane	12.6		"	16.8		75.0	30-150			

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**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B14023: Prepared 02/14/02 Using EPA 3550B**

**Blank (2B14023-BLK1)**

Benzo (a) anthracene	ND	0.010	mg/kg							
Benzo (a) pyrene	ND	0.010	"							
Benzo (b) fluoranthene	ND	0.010	"							
Benzo (k) fluoranthene	ND	0.010	"							
Chrysene	ND	0.010	"							
Dibenz (a,h) anthracene	ND	0.010	"							
Indeno (1,2,3-cd) pyrene	ND	0.010	"							
1-Methylnaphthalene	ND	0.010	"							
2-Methylnaphthalene	ND	0.010	"							
Naphthalene	ND	0.010	"							
Surrogate: p-Terphenyl-d14	1.6		"	1.7		94	30-150			

**LCS (2B14023-BS1)**

Chrysene	0.29	0.010	mg/kg	0.33		88	10-125			
Indeno (1,2,3-cd) pyrene	0.27	0.010	"	0.33		82	10-147			
Surrogate: p-Terphenyl-d14	1.6		"	1.7		94	30-150			

**LCS Dup (2B14023-BSD1)**

Chrysene	0.28	0.010	mg/kg	0.33		85	10-125	3.5	28	
Indeno (1,2,3-cd) pyrene	0.25	0.010	"	0.33		76	10-147	7.7	34	
Surrogate: p-Terphenyl-d14	1.5		"	1.7		88	30-150			

**Matrix Spike (2B14023-MS1)**

**Source: B2B0172-17**

Chrysene	0.35	0.010	mg/kg dry	0.41	ND	85	10-125			
Indeno (1,2,3-cd) pyrene	0.30	0.010	"	0.41	ND	73	10-144			
Surrogate: p-Terphenyl-d14	1.9		"	2.1		90	30-150			

**Matrix Spike Dup (2B14023-MSD1)**

**Source: B2B0172-17**

Chrysene	0.36	0.010	mg/kg dry	0.41	ND	88	10-125	2.8	28	
Indeno (1,2,3-cd) pyrene	0.34	0.010	"	0.41	ND	83	10-144	12	47	
Surrogate: p-Terphenyl-d14	1.9		"	2.1		90	30-150			

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**BTEX by EPA Method 8021B - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

**Batch 2B08039: Prepared 02/08/02 Using EPA 5030B (P/T)**

**Blank (2B08039-BLK1)**

Benzene	ND	0.0300	mg/kg							
Toluene	ND	0.0500	"							
Ethylbenzene	ND	0.0500	"							
Xylenes (total)	ND	0.100	"							
Surrogate: 4-BFB (PID)	3.95		"	4.00		98.8	54-123			

**LCS (2B08039-BS1)**

Benzene	0.483	0.0300	mg/kg	0.500		96.6	80-120			
Toluene	0.486	0.0500	"	0.500		97.2	80-120			
Ethylbenzene	0.481	0.0500	"	0.500		96.2	80-120			
Xylenes (total)	1.49	0.100	"	1.50		99.3	80-120			
Surrogate: 4-BFB (PID)	3.96		"	4.00		99.0	54-123			

**LCS Dup (2B08039-BSD1)**

Benzene	0.477	0.0300	mg/kg	0.500		95.4	80-120	1.25	40	
Toluene	0.483	0.0500	"	0.500		96.6	80-120	0.619	40	
Ethylbenzene	0.473	0.0500	"	0.500		94.6	80-120	1.68	40	
Xylenes (total)	1.47	0.100	"	1.50		98.0	80-120	1.35	40	
Surrogate: 4-BFB (PID)	3.87		"	4.00		96.8	54-123			

**Matrix Spike (2B08039-MS1)**

Source: B2B0146-01

Benzene	0.470	0.0300	mg/kg dry	0.528	ND	89.0	64-130			
Toluene	0.471	0.0500	"	0.528	ND	89.2	66-130			
Ethylbenzene	0.466	0.0500	"	0.528	ND	88.3	72-130			
Xylenes (total)	1.45	0.100	"	1.59	ND	91.2	73-130			
Surrogate: 4-BFB (PID)	3.83		"	4.23		90.5	54-123			

**Matrix Spike Dup (2B08039-MSD1)**

Source: B2B0146-01

Benzene	0.487	0.0300	mg/kg dry	0.528	ND	92.2	64-130	3.55	40	
Toluene	0.480	0.0500	"	0.528	ND	90.9	66-130	1.89	40	
Ethylbenzene	0.479	0.0500	"	0.528	ND	90.7	72-130	2.75	40	
Xylenes (total)	1.48	0.100	"	1.59	ND	93.1	73-130	2.05	40	
Surrogate: 4-BFB (PID)	3.90		"	4.23		92.2	54-123			

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/20/02 09:11
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**Physical Parameters by APHA/ASTM/EPA Methods - Quality Control  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
<b>Batch 2B11006: Prepared 02/11/02 Using Dry Weight</b>										
<b>Blank (2B11006-BLK1)</b>										
Dry Weight	100	1.00	%							
<b>Batch 2B11007: Prepared 02/11/02 Using Dry Weight</b>										
<b>Blank (2B11007-BLK1)</b>										
Dry Weight	100	1.00	%							

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/20/02 09:11
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**Notes and Definitions**

- Q-03 The percent recovery for this QC spike sample cannot be accurately calculated due to the high concentration of analyte already present in the sample.
- S-01 The surrogate recovery for this sample is not available due to sample dilution required from high analyte concentration and/or matrix interferences.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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 Environmental Laboratory Network**

WD# B2B0146

**MFG, INC.**

**CHAIN-OF-CUSTODY RECORD AND REQUEST FOR ANALYSIS**

COC No. 45151

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Seattle Office  
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Lynnwood, WA 98036-5707  
Tel: (425) 821-4000  
Fax: (425) 821-4040

PROJECT NO: 020255 PROJECT NAME: Darling-Tacoma UST PAGE: 1 OF: 1

SAMPLER (Signature): [Signature] PROJECT MANAGER: Nate McMorris DATE: 2/6/02

METHOD OF SHIPMENT: Hand Delivered CARRIER/WAYBILL NO.: \_\_\_\_\_ DESTINATION: A/CA - Bethel

Field Sample Identification	Sample			Preservation			Containers			ANALYSIS REQUEST					
	DATE	TIME	Matrix*	HCl	HNO <sub>3</sub>	H <sub>2</sub> SO <sub>4</sub>	VOLUME (ml/oz)	TYPE*	NO.	Constituents/Method	Handling	Remarks	Cooler Temp:		
MFG-B3 (3-3.5')	2/5/02	1400	SD					G	2	XMPH-DX BTEX Carc. PAHs Volatile EPOH	RUSH STANDARD	Analyses + Results must meet M-TCA req. for comparison			
MFG-B3 (7-8.5')	2/5/02	1500	SD					G	2	X X X X	X X	B2B0146 01			
MFG-B3 (15.5-16')	2/5/02	1520	SD					G	2	X X X X	X X	02 03			
MFG-B4 (8-8.5')	2/6/02	0915	SD					G	2	X X X X	X X	04 05			
MFG-B4 (3-3.5')	2/6/02	0900	SD					G	2	X X X X	X X	06 07			
MFG-B4 (10-10.5')	2/6/02	0925	SD					G	2	X X X X	X X				
MFG-B2 (10.5-11')	2/5/02	1150	SD					G	2	X X X X	X X				
TOTAL NUMBER OF CONTAINERS										LABORATORY COMMENTS/CONDITION OF SAMPLES				Cooler Temp:	

RELINQUISHED BY:			RECEIVED BY:		
SIGNATURE	PRINTED NAME	COMPANY	SIGNATURE	PRINTED NAME	COMPANY
<u>[Signature]</u>	<u>Nate McMorris</u>	<u>MFG, Inc.</u>	<u>[Signature]</u>	<u>C. Nichols</u>	<u>MCA</u>

\*KEY Matrix: AO - aqueous NA - nonaqueous SD - soil SL - sludge P - petroleum A - air OT - other Containers: P - plastic G - glass T - teflon B - brass OT - other Filtration: F - filtered U - unfiltered  
DISTRIBUTION: PINK: Field Copy YELLOW: Laboratory Copy WHITE: Return to Originator

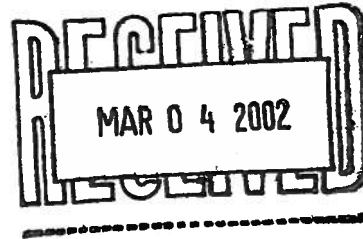
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**APPENDIX C**  
**GROUNDWATER ANALYTICAL RESULTS**

## CASE NARRATIVE for B2B0324

Client: MFG  
Project Manager: Natalie Morrow  
Project Name: Darling-Tacoma UST  
Project Number: 020255



### 1.0 DESCRIPTION OF CASE

Four water samples and one trip blank were submitted for analysis of Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up), Extractable Petroleum Hydrocarbons by modified WDOE TPH Policy Method, Polynuclear Aromatic Hydrocarbons by GC/MS-SIM, and BTEX by EPA 8021B.

### 2.0 COMMENTS ON SAMPLE RECEIPT

Samples were received and logged in on February 14, 2002. The temperature of the samples at time of receipt was 6.0 degrees Celsius.

### 3.0 PREPARATION AND ANALYSIS

#### *Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)*

All criteria for acceptable QC measurements were met, with the following exceptions:

- The concentrations for the Diesel Range Hydrocarbons for laboratory samples B2B0324-03 and B2B0324-04 in laboratory batch 2B15021 are partially due to one or more individual peaks eluting in the diesel/heavy oil range. Quantification by EPA method 8270 is recommended.

#### *Extractable Petroleum Hydrocarbons by modified WDOE TPH Policy Method*

No anomalies were associated with sample preparation and analysis. All criteria for acceptable QC measurements were met.

#### *Polynuclear Aromatic Hydrocarbons by GC/MS-SIM*

All criteria for acceptable QC measurements were met, with the following exceptions:

- The surrogate recovery of *p-Terphenyl-d14* for laboratory sample B2B0324-04 in laboratory batch 2B15022 was below the established control limits for the method possibly due to an extraction anomaly. The sample was re-extracted, however, the re-extraction was performed outside the established control limits for the method. The results for the original and re-extraction have been included in the final report for comparison purposes.
- The spike recoveries of Indeno (1,2,3-cd) pyrene for the MS and MSD and of Chrysene for the MSD in laboratory batch 2B15022 were below the established control limits for the method. The spike recoveries for the LCS and LCS duplicate were acceptable, no further action was deemed necessary.

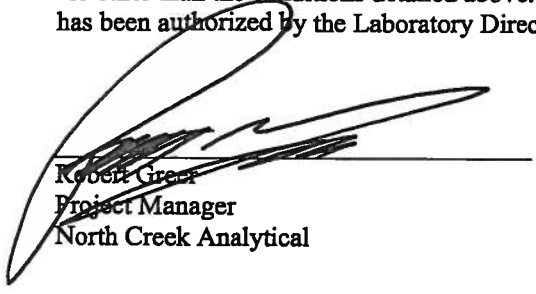


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***BTEX by EPA 8021B***

No anomalies were associated with sample preparation and analysis. All criteria for acceptable QC measurements were met.

"I certify that this data package is in compliance with the Contract both technically and for completeness, for other than the conditions detailed above. Release of the data contained in this hard copy data package has been authorized by the Laboratory Director or his designee, as verified by the following signature."



Robert Green  
Project Manager  
North Creek Analytical



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MFG  
19203 36th Avenue, Suite 101  
Lynnwood WA/USA, 98036

Project: Darling-Tacoma UST  
Project Number: 020255  
Project Manager: Natalie Morrow

Reported:  
02/28/02 10:52

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MFG-1	B2B0324-01	Water	02/13/02 09:45	02/14/02 16:18
MFG-2	B2B0324-02	Water	02/13/02 10:40	02/14/02 16:18
MFG-3	B2B0324-03	Water	02/13/02 11:55	02/14/02 16:18
MFG-4	B2B0324-04	Water	02/13/02 12:45	02/14/02 16:18
Trip Blank	B2B0324-05	Water	02/13/02 12:00	02/14/02 16:18

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<b>MFG</b> 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	<b>Project: Darling-Tacoma UST</b> <b>Project Number: 020255</b> <b>Project Manager: Natalie Morrow</b>	<b>Reported:</b> <b>02/28/02 10:52</b>
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**Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up)**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-1 (B2B0324-01) Water</b> <b>Sampled: 02/13/02 09:45</b> <b>Received: 02/14/02 16:18</b>									
Diesel Range Hydrocarbons	3.1	0.25	mg/l	1	2B15021	02/15/02	02/19/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	0.73	0.50	"	"	"	"	"	"	"
Mineral Oil Range Hydrocarbons	3.3	0.50	"	"	"	"	"	"	"
Surrogate: 2-FBP	100 %	50-121			"	"	"	"	"
Surrogate: Octacosane	88 %	56-123			"	"	"	"	"
<b>MFG-2 (B2B0324-02) Water</b> <b>Sampled: 02/13/02 10:40</b> <b>Received: 02/14/02 16:18</b>									
Diesel Range Hydrocarbons	2.3	0.25	mg/l	1	2B15021	02/15/02	02/20/02	NWTPH-Dx	
Heavy Oil Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	"
Mineral Oil Range Hydrocarbons	2.5	0.50	"	"	"	"	"	"	"
Surrogate: 2-FBP	97 %	50-121			"	"	"	"	"
Surrogate: Octacosane	85 %	56-123			"	"	"	"	"
<b>MFG-3 (B2B0324-03) Water</b> <b>Sampled: 02/13/02 11:55</b> <b>Received: 02/14/02 16:18</b>									
Diesel Range Hydrocarbons	6.1	0.25	mg/l	1	2B15021	02/15/02	02/19/02	NWTPH-Dx	D-03
Heavy Oil Range Hydrocarbons	1.1	0.50	"	"	"	"	"	"	"
Mineral Oil Range Hydrocarbons	7.3	0.50	"	"	"	"	"	"	"
Surrogate: 2-FBP	91 %	50-121			"	"	"	"	"
Surrogate: Octacosane	85 %	56-123			"	"	"	"	"
<b>MFG-4 (B2B0324-04) Water</b> <b>Sampled: 02/13/02 12:45</b> <b>Received: 02/14/02 16:18</b>									
Diesel Range Hydrocarbons	4.7	0.50	mg/l	2	2B15021	02/15/02	02/20/02	NWTPH-Dx	D-03
Heavy Oil Range Hydrocarbons	1.0	1.0	"	"	"	"	"	"	"
Mineral Oil Range Hydrocarbons	5.1	1.0	"	"	"	"	"	"	"
Surrogate: 2-FBP	81 %	50-121			"	"	"	"	"
Surrogate: Octacosane	77 %	56-123			"	"	"	"	"

North Creek Analytical - Bothell

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MFG  
 19203 36th Avenue, Suite 101  
 Lynnwood WA/USA, 98036

Project: Darling-Tacoma UST  
 Project Number: 020255  
 Project Manager: Natalie Morrow

Reported:  
 02/28/02 10:52

**Extractable Petroleum Hydrocarbons by modified WDOE TPH Policy Method**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
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**MFG-1 (B2B0324-01) Water** Sampled: 02/13/02 09:45 Received: 02/14/02 16:18

C8-C10 Aliphatics	ND	100	ug/l	1	2B15023	02/15/02	02/21/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	100	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	100	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	100	"	"	"	"	"	"	
<b>C21-C34 Aliphatics</b>	<b>126</b>	100	"	"	"	"	"	"	
C10-C12 Aromatics	ND	100	"	"	"	"	"	"	
C12-C16 Aromatics	ND	100	"	"	"	"	"	"	
C16-C21 Aromatics	ND	100	"	"	"	"	"	"	
C21-C34 Aromatics	ND	100	"	"	"	"	"	"	
<b>Extractable Petroleum Hydrocarbons</b>	<b>126</b>	100	"	"	"	"	"	"	
<i>Surrogate: 2-FBP</i>	72.0 %	50-150			"	"	"	"	
<i>Surrogate: Octacosane</i>	83.8 %	50-150			"	"	"	"	
<i>Surrogate: Undecane</i>	72.2 %	30-150			"	"	"	"	

**MFG-2 (B2B0324-02) Water** Sampled: 02/13/02 10:40 Received: 02/14/02 16:18

C8-C10 Aliphatics	ND	100	ug/l	1	2B15023	02/15/02	02/21/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	100	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	100	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	100	"	"	"	"	"	"	
C21-C34 Aliphatics	ND	100	"	"	"	"	"	"	
C10-C12 Aromatics	ND	100	"	"	"	"	02/21/02	"	
C12-C16 Aromatics	ND	100	"	"	"	"	"	"	
C16-C21 Aromatics	ND	100	"	"	"	"	"	"	
C21-C34 Aromatics	ND	100	"	"	"	"	"	"	
<b>Extractable Petroleum Hydrocarbons</b>	<b>ND</b>	100	"	"	"	"	02/21/02	"	
<i>Surrogate: 2-FBP</i>	82.2 %	50-150			"	"	02/21/02	"	
<i>Surrogate: Octacosane</i>	88.2 %	50-150			"	"	02/21/02	"	
<i>Surrogate: Undecane</i>	76.4 %	30-150			"	"	"	"	

North Creek Analytical - Bothell

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MFG Project: Darling-Tacoma UST  
 19203 36th Avenue, Suite 101 Project Number: 020255  
 Lynnwood WA/USA, 98036 Project Manager: Natalie Morrow  
 Reported: 02/28/02 10:52

**Extractable Petroleum Hydrocarbons by modified WDOE TPH Policy Method  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-3 (B2B0324-03) Water</b> Sampled: 02/13/02 11:55 Received: 02/14/02 16:18									
C8-C10 Aliphatics	ND	100	ug/l	1	2B15023	02/15/02	02/21/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	100	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	100	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	100	"	"	"	"	"	"	
C21-C34 Aliphatics	ND	100	"	"	"	"	"	"	
C10-C12 Aromatics	ND	100	"	"	"	"	02/21/02	"	
C12-C16 Aromatics	ND	100	"	"	"	"	"	"	
C16-C21 Aromatics	ND	100	"	"	"	"	"	"	
C21-C34 Aromatics	ND	100	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	ND	100	"	"	"	"	02/21/02	"	
Surrogate: 2-FBP	77.1 %	50-150			"	"	02/21/02	"	
Surrogate: Octacosane	83.4 %	50-150			"	"	02/21/02	"	
Surrogate: Undecane	70.3 %	30-150			"	"	"	"	

<b>MFG-4 (B2B0324-04) Water</b> Sampled: 02/13/02 12:45 Received: 02/14/02 16:18									
C8-C10 Aliphatics	ND	100	ug/l	1	2B15023	02/15/02	02/21/02	WA MTCA-EPH	
C10-C12 Aliphatics	ND	100	"	"	"	"	"	"	
C12-C16 Aliphatics	ND	100	"	"	"	"	"	"	
C16-C21 Aliphatics	ND	100	"	"	"	"	"	"	
C21-C34 Aliphatics	148	100	"	"	"	"	"	"	
C10-C12 Aromatics	ND	100	"	"	"	"	02/21/02	"	
C12-C16 Aromatics	ND	100	"	"	"	"	"	"	
C16-C21 Aromatics	ND	100	"	"	"	"	"	"	
C21-C34 Aromatics	ND	100	"	"	"	"	"	"	
Extractable Petroleum Hydrocarbons	148	100	"	"	"	"	02/21/02	"	
Surrogate: 2-FBP	81.9 %	50-150			"	"	02/21/02	"	
Surrogate: Octacosane	88.8 %	50-150			"	"	02/21/02	"	
Surrogate: Undecane	73.8 %	30-150			"	"	"	"	

North Creek Analytical - Bothell

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**North Creek Analytical, Inc.**  
**Environmental Laboratory Network**



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MFG  
 19203 36th Avenue, Suite 101  
 Lynnwood WA/USA, 98036

Project: Darling-Tacoma UST  
 Project Number: 020255  
 Project Manager: Natalie Morrow

Reported:  
 02/28/02 10:52

**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-1 (B2B0324-01) Water</b> Sampled: 02/13/02 09:45 Received: 02/14/02 16:18									
Benzo (a) anthracene	ND	0.10	ug/l	1	2B15022	02/15/02	02/18/02	8270-SIM	
Benzo (a) pyrene	ND	0.10	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.10	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.10	"	"	"	"	"	"	
Chrysene	ND	0.10	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.10	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.10	"	"	"	"	"	"	
1-Methylnaphthalene	1.0	0.10	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.10	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	47 %	30-150			"	"	"	"	

<b>MFG-2 (B2B0324-02) Water</b> Sampled: 02/13/02 10:40 Received: 02/14/02 16:18									
Benzo (a) anthracene	ND	0.10	ug/l	1	2B15022	02/15/02	02/22/02	8270-SIM	
Benzo (a) pyrene	ND	0.10	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.10	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.10	"	"	"	"	"	"	
Chrysene	ND	0.10	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.10	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.10	"	"	"	"	"	"	
1-Methylnaphthalene	0.33	0.10	"	"	"	"	"	"	
2-Methylnaphthalene	0.21	0.10	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	50 %	30-150			"	"	"	"	

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-3 (B2B0324-03) Water</b> <b>Sampled: 02/13/02 11:55</b> <b>Received: 02/14/02 16:18</b>									
Benzo (a) anthracene	ND	0.20	ug/l	2	2B15022	02/15/02	02/22/02	8270-SIM	
Benzo (a) pyrene	ND	0.20	"	"	"	"	"	"	"
Benzo (b) fluoranthene	ND	0.20	"	"	"	"	"	"	"
Benzo (k) fluoranthene	ND	0.20	"	"	"	"	"	"	"
Chrysene	ND	0.20	"	"	"	"	"	"	"
Dibenz (a,h) anthracene	ND	0.20	"	"	"	"	"	"	"
Indeno (1,2,3-cd) pyrene	ND	0.20	"	"	"	"	"	"	"
1-Methylnaphthalene	0.39	0.20	"	"	"	"	"	"	"
2-Methylnaphthalene	ND	0.20	"	"	"	"	"	"	"
Naphthalene	ND	0.20	"	"	"	"	"	"	"
<i>Surrogate: p-Terphenyl-d14</i>	33 %	30-150			"	"	"	"	

<b>MFG-4 (B2B0324-04) Water</b> <b>Sampled: 02/13/02 12:45</b> <b>Received: 02/14/02 16:18</b>										<b>X</b>
Benzo (a) anthracene	ND	0.10	ug/l	1	2B15022	02/15/02	02/18/02	8270-SIM		
Benzo (a) pyrene	ND	0.10	"	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.10	"	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.10	"	"	"	"	"	"	"	
Chrysene	ND	0.10	"	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.10	"	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.10	"	"	"	"	"	"	"	
1-Methylnaphthalene	1.6	0.10	"	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.10	"	"	"	"	"	"	"	
Naphthalene	ND	0.10	"	"	"	"	"	"	"	
<i>Surrogate: p-Terphenyl-d14</i>	20 %	30-150			"	"	"	"		

North Creek Analytical - Bothell

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MFG  
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 Lynnwood WA/USA, 98036

Project: Darling-Tacoma UST  
 Project Number: 020255  
 Project Manager: Natalie Morrow

Reported:  
 02/28/02 10:52

**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-4 (B2B0324-04RE1) Water</b> <b>Sampled: 02/13/02 12:45</b> <b>Received: 02/14/02 16:18</b> <b>Q-29</b>									
Benzo (a) anthracene	ND	0.10	ug/l	1	2B26010	02/26/02	02/27/02	8270-SIM	
Benzo (a) pyrene	ND	0.10	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.10	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.10	"	"	"	"	"	"	
Chrysene	ND	0.10	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.10	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.10	"	"	"	"	"	"	
1-Methylnaphthalene	2.5	0.10	"	"	"	"	"	"	
2-Methylnaphthalene	0.45	0.10	"	"	"	"	"	"	
Naphthalene	0.41	0.10	"	"	"	"	"	"	
Surrogate: p-Terphenyl-d14	30 %	30-150			"	"	"	"	

North Creek Analytical - Bothell

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<b>MFG</b> 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	<b>Project: Darling-Tacoma UST</b> <b>Project Number: 020255</b> <b>Project Manager: Natalie Morrow</b>	<b>Reported:</b> <b>02/28/02 10:52</b>
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**BTEX by EPA Method 8021B**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>MFG-1 (B2B0324-01) Water</b> <b>Sampled: 02/13/02 09:45</b> <b>Received: 02/14/02 16:18</b>									
Benzene	ND	0.500	ug/l	1	2B19006	02/19/02	02/19/02	EPA 8021B	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	<i>108 %</i>	<i>62-125</i>			"	"	"	"	
<b>MFG-2 (B2B0324-02) Water</b> <b>Sampled: 02/13/02 10:40</b> <b>Received: 02/14/02 16:18</b>									
Benzene	ND	0.500	ug/l	1	2B19006	02/19/02	02/19/02	EPA 8021B	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	<i>109 %</i>	<i>62-125</i>			"	"	"	"	
<b>MFG-3 (B2B0324-03) Water</b> <b>Sampled: 02/13/02 11:55</b> <b>Received: 02/14/02 16:18</b>									
Benzene	ND	0.500	ug/l	1	2B19006	02/19/02	02/19/02	EPA 8021B	
Toluene	0.513	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	1.08	1.00	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	<i>108 %</i>	<i>62-125</i>			"	"	"	"	
<b>MFG-4 (B2B0324-04) Water</b> <b>Sampled: 02/13/02 12:45</b> <b>Received: 02/14/02 16:18</b>									
Benzene	1.70	0.500	ug/l	1	2B19006	02/19/02	02/19/02	EPA 8021B	
Toluene	0.648	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	1.38	1.00	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	<i>110 %</i>	<i>62-125</i>			"	"	"	"	

North Creek Analytical - Bothell

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**BTEX by EPA Method 8021B**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Trip Blank (B2B0324-05) Water    Sampled: 02/13/02 12:00    Received: 02/14/02 16:18</b>									
Benzene	ND	0.500	ug/l	1	2B19006	02/19/02	02/19/02	EPA 8021B	
Toluene	ND	0.500	"	"	"	"	"	"	
Ethylbenzene	ND	0.500	"	"	"	"	"	"	
Xylenes (total)	ND	1.00	"	"	"	"	"	"	
<i>Surrogate: 4-BFB (PID)</i>	<i>105 %</i>	<i>62-125</i>							

North Creek Analytical - Bothell

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**Semivolatile Petroleum Products by NWTPH-Dx (w/o Acid/Silica Gel Clean-up) - Quality Control  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B15021: Prepared 02/15/02 Using EPA 3520C**

**Blank (2B15021-BLK1)**

Diesel Range Hydrocarbons	ND	0.25	mg/l							
Heavy Oil Range Hydrocarbons	ND	0.50	"							
Mineral Oil Range Hydrocarbons	ND	0.50	"							
Surrogate: 2-FBP	0.34		"	0.32		110	50-121			
Surrogate: Octacosane	0.32		"	0.32		100	56-123			

**LCS (2B15021-BS1)**

Diesel Range Hydrocarbons	1.6	0.25	mg/l	2.0		80	62-122			
Surrogate: 2-FBP	0.28		"	0.32		88	50-121			

**LCS Dup (2B15021-BSD1)**

Diesel Range Hydrocarbons	1.7	0.25	mg/l	2.0		85	62-122	6.1	40	
Surrogate: 2-FBP	0.29		"	0.32		91	50-121			

**Matrix Spike (2B15021-MS1)**

**Source: B2B0324-02**

Diesel Range Hydrocarbons	3.8	0.25	mg/l	2.0	2.3	75	42-126			
Surrogate: 2-FBP	0.30		"	0.32		94	50-121			

**Matrix Spike Dup (2B15021-MSD1)**

**Source: B2B0324-02**

Diesel Range Hydrocarbons	4.2	0.25	mg/l	2.0	2.3	95	42-126	10	40	
Surrogate: 2-FBP	0.32		"	0.32		100	50-121			

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**Extractable Petroleum Hydrocarbons by modified WDOE TPH Policy Method - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B15023: Prepared 02/15/02 Using EPA 3510C**

**Blank (2B15023-BLK1)**

C8-C10 Aliphatics	ND	100	ug/l							
C10-C12 Aliphatics	ND	100	"							
C12-C16 Aliphatics	ND	100	"							
C16-C21 Aliphatics	ND	100	"							
C21-C34 Aliphatics	ND	100	"							
C10-C12 Aromatics	ND	100	"							
C12-C16 Aromatics	ND	100	"							
C16-C21 Aromatics	ND	100	"							
C21-C34 Aromatics	ND	100	"							
Extractable Petroleum Hydrocarbons	ND	100	"							
Surrogate: 2-FBP	269		"	374		71.9	50-150			
Surrogate: Octacosane	297		"	360		82.5	50-150			
Surrogate: Undecane	298		"	420		71.0	30-150			

**LCS (2B15023-BS1)**

Extractable Petroleum Hydrocarbons	2950	100	ug/l	5000		59.0	30-120			
Surrogate: 2-FBP	279		"	374		74.6	50-150			
Surrogate: Octacosane	280		"	360		77.8	50-150			
Surrogate: Undecane	298		"	420		71.0	30-150			

**LCS Dup (2B15023-BSD1)**

Extractable Petroleum Hydrocarbons	3210	100	ug/l	5000		64.2	30-120	8.44	40	
Surrogate: 2-FBP	306		"	374		81.8	50-150			
Surrogate: Octacosane	294		"	360		81.7	50-150			
Surrogate: Undecane	317		"	420		75.5	30-150			

**Matrix Spike (2B15023-MS1)**

**Source: B2B0324-02**

Extractable Petroleum Hydrocarbons	3340	100	ug/l	5160	ND	64.7	30-120			
Surrogate: 2-FBP	289		"	386		74.9	50-150			
Surrogate: Octacosane	315		"	371		84.9	50-150			
Surrogate: Undecane	334		"	433		77.1	30-150			

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**Extractable Petroleum Hydrocarbons by modified WDOE TPH Policy Method - Quality Control  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B15023: Prepared 02/15/02 Using EPA 3510C**

**Matrix Spike Dup (2B15023-MSD1)**

**Source: B2B0324-02**

Extractable Petroleum Hydrocarbons	3300	100	ug/l	5000	ND	66.0	30-120	1.20	40	
Surrogate: 2-FBP	289		"	374		77.3	50-150			
Surrogate: Octacosane	298		"	360		82.8	50-150			
Surrogate: Undecane	321		"	420		76.4	30-150			

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B15022: Prepared 02/15/02 Using EPA 3510C**

**Blank (2B15022-BLK1)**

Benzo (a) anthracene	ND	0.10	ug/l							
Benzo (a) pyrene	ND	0.10	"							
Benzo (b) fluoranthene	ND	0.10	"							
Benzo (k) fluoranthene	ND	0.10	"							
Chrysene	ND	0.10	"							
Dibenz (a,h) anthracene	ND	0.10	"							
Indeno (1,2,3-cd) pyrene	ND	0.10	"							
1-Methylnaphthalene	ND	0.10	"							
2-Methylnaphthalene	ND	0.10	"							
Naphthalene	ND	0.10	"							
Surrogate: p-Terphenyl-d14	31		"	50		62	30-150			

**LCS (2B15022-BS1)**

Chrysene	7.2	0.10	ug/l	10		72	50-150			
Indeno (1,2,3-cd) pyrene	9.4	0.10	"	10		94	50-150			
Surrogate: p-Terphenyl-d14	33		"	50		66	30-150			

**LCS Dup (2B15022-BSD1)**

Chrysene	7.8	0.10	ug/l	10		78	50-150	8.0	25	
Indeno (1,2,3-cd) pyrene	9.6	0.10	"	10		96	50-150	2.1	25	
Surrogate: p-Terphenyl-d14	40		"	50		80	30-150			

**Matrix Spike (2B15022-MS1)**

**Source: B2B0324-02**

Chrysene	5.5	0.10	ug/l	11	ND	50	50-150			
Indeno (1,2,3-cd) pyrene	3.3	0.10	"	11	ND	30	50-150			Q-01
Surrogate: p-Terphenyl-d14	20		"	53		38	30-150			

**Matrix Spike Dup (2B15022-MSD1)**

**Source: B2B0324-02**

Chrysene	4.3	0.10	ug/l	9.9	ND	43	50-150	24	25	Q-01
Indeno (1,2,3-cd) pyrene	2.7	0.10	"	9.9	ND	27	50-150	20	25	Q-01
Surrogate: p-Terphenyl-d14	20		"	50		40	30-150			

North Creek Analytical - Bothell

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Robert Greer, Project Manager

**North Creek Analytical, Inc.**  
**Environmental Laboratory Network**





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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**Polynuclear Aromatic Hydrocarbons by GC/MS-SIM - Quality Control**  
**North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B26010: Prepared 02/26/02 Using EPA 3520C**

**Blank (2B26010-BLK1)**

Benzo (a) anthracene	ND	0.10	ug/l							
Benzo (a) pyrene	ND	0.10	"							
Benzo (b) fluoranthene	ND	0.10	"							
Benzo (k) fluoranthene	ND	0.10	"							
Chrysene	ND	0.10	"							
Dibenz (a,h) anthracene	ND	0.10	"							
Indeno (1,2,3-cd) pyrene	ND	0.10	"							
1-Methylnaphthalene	ND	0.10	"							
2-Methylnaphthalene	ND	0.10	"							
Naphthalene	ND	0.10	"							
<i>Surrogate: p-Terphenyl-d14</i>	54		"	50		110	30-150			

**LCS (2B26010-BS1)**

Chrysene	8.6	0.10	ug/l	10		86	50-150			
Indeno (1,2,3-cd) pyrene	7.0	0.10	"	10		70	50-150			
<i>Surrogate: p-Terphenyl-d14</i>	49		"	50		98	30-150			

**LCS Dup (2B26010-BSD1)**

Chrysene	9.6	0.10	ug/l	10		96	50-150	11	25	
Indeno (1,2,3-cd) pyrene	6.9	0.10	"	10		69	50-150	1.4	25	
<i>Surrogate: p-Terphenyl-d14</i>	50		"	50		100	30-150			

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**BTEX by EPA Method 8021B - Quality Control  
 North Creek Analytical - Bothell**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 2B19006: Prepared 02/19/02 Using EPA 5030B (P/T)**

**Blank (2B19006-BLK1)**

Benzene	ND	0.500	ug/l							
Toluene	ND	0.500	"							
Ethylbenzene	ND	0.500	"							
Xylenes (total)	ND	1.00	"							
Surrogate: 4-BFB (PID)	50.0		"	48.0		104	62-125			

**LCS (2B19006-BS1)**

Benzene	9.88	0.500	ug/l	10.0		98.8	80-120			
Toluene	10.1	0.500	"	10.0		101	80-120			
Ethylbenzene	10.2	0.500	"	10.0		102	80-120			
Xylenes (total)	31.7	1.00	"	30.0		106	80-120			
Surrogate: 4-BFB (PID)	51.4		"	48.0		107	62-125			

**LCS Dup (2B19006-BSD1)**

Benzene	10.4	0.500	ug/l	10.0		104	80-120	5.13	40	
Toluene	10.2	0.500	"	10.0		102	80-120	0.985	40	
Ethylbenzene	10.7	0.500	"	10.0		107	80-120	4.78	40	
Xylenes (total)	32.6	1.00	"	30.0		109	80-120	2.80	40	
Surrogate: 4-BFB (PID)	51.7		"	48.0		108	62-125			

**Matrix Spike (2B19006-MS1)**

Source: B2B0324-02

Benzene	7.13	0.500	ug/l	6.01	ND	116	80-120			
Toluene	34.2	0.500	"	35.8	ND	95.0	75-117			
Ethylbenzene	9.16	0.500	"	8.37	ND	109	80-120			
Xylenes (total)	43.3	1.00	"	41.4	ND	103	80-120			
Surrogate: 4-BFB (PID)	50.0		"	48.0		104	62-125			

**Matrix Spike Dup (2B19006-MSD1)**

Source: B2B0324-02

Benzene	7.09	0.500	ug/l	6.01	ND	115	80-120	0.563	40	
Toluene	34.0	0.500	"	35.8	ND	94.4	75-117	0.587	40	
Ethylbenzene	9.02	0.500	"	8.37	ND	108	80-120	1.54	40	
Xylenes (total)	42.8	1.00	"	41.4	ND	102	80-120	1.16	40	
Surrogate: 4-BFB (PID)	49.9		"	48.0		104	62-125			

North Creek Analytical - Bothell

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MFG 19203 36th Avenue, Suite 101 Lynnwood WA/USA, 98036	Project: Darling-Tacoma UST Project Number: 020255 Project Manager: Natalie Morrow	Reported: 02/28/02 10:52
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**Notes and Definitions**

- D-03 The hydrocarbon concentration result in this sample is partially due to one or more individual peaks eluting in the diesel/heavy oil range. Quantitation by EPA method 8270 is recommended.
- Q-01 The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
- Q-29 This sample was prepared outside of the method established holding time.
- X See case narrative.
- DET Analyte DETECTED
- ND Analyte NOT DETECTED at or above the reporting limit
- NR Not Reported
- dry Sample results reported on a dry weight basis
- RPD Relative Percent Difference

North Creek Analytical - Bothell

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Environmental Laboratory Network**



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# CHAIN OF CUSTODY REPORT

Work Order #: **B2B032A**

CLIENT: **MFG** INVOICE TO: **(same)**

REPORT TO: **Natalie Morrow**  
 ADDRESS: **19203 36th Avenue W., Suite 101**  
**Lyndonwood WA 98037**

PHONE: **425-921-4000** FAX: **425-921-4040**

PROJECT NAME: **Darling - Tacoma GST**

PROJECT NUMBER: **020255**

SAMPLED BY: **Natalie Morrow**

TURNAROUND REQUEST in Business Days\*  
 Organic & Inorganic Analyses  
 Petroleum Hydrocarbon Analyses

STD.  7  5  4  3  2  1  <1  
 4  3  2  1  <1  
 STD.  4  3  2  1  <1

OTHER  Please Specify

\*Turnaround Requests less than standard may incur Rush Charges.

MATRIX (W, S, O)	# OF CONT.	COMMENTS	NCA WC ID
W	9		01
W	9		02
W	9		03
W	9		04
	3		05

CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	REQUESTED ANALYSES				
		BTEX	NUTR-DX	Carc. PAHs	Napthalenes	
1. MFG-1	2/13/02 0945	X	X	X	X	
2. MFG-2	2/13/02 1040	X	X	X	X	
3. MFG-3	2/13/02 1155	X	X	X	X	
4. MFG-4	2/13/02 1245	X	X	X	X	
5. TRIP Blank		X				
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						

RELINQUISHED BY: *[Signature]* DATE: **2/13/02** RECEIVED BY: *[Signature]* DATE: **2/13/02**  
 PRINT NAME: **Natalie Morrow** FIRM: **MFG** PRINT NAME: **BRADY TONG** FIRM: **NEA**  
 RELINQUISHED BY: DATE: TIME: RECEIVED BY: DATE: TIME:  
 PRINT NAME: DATE: TIME: PRINT NAME: DATE: TIME:  
 ADDITIONAL REMARKS:

6.0 TEMP. or 13.5  
 COC REV 3/99

**APPENDIX D**  
**WASTE DISPOSAL DOCUMENTS**

# Puget Sound Recycling

NO 1294

Industrial Wastewater Treatment Facility  
 523 A Street SE Auburn, WA 98002  
 (253)939-3740 plant

**ENTRY LOG FOR NON-HAZARDOUS ITEMS RECEIVED BY PSR AUBURN PLANT**

GENERATOR PROFILE NUMBER: 6029 B.O.L./ Manifest #: Job # 02-658

CUSTOMER: Pacific Industrial Resources

GENERATOR: Pacific Industrial Resources

JOB NUMBER: 02-658 DATE: 5-3-02

DRIVER NAME: (Print) Rudy & Mack

**A. TESTING**

FLASH: - CHLOR: - PH: -

% Suspended Solids By Centrifuge: - Estimated Solids: -

Wash Out: - Time In: -

**B. PRODUCTS:**

SHIPPING NAME:	Oil/Diesel	Water	Sludge/Solids	Drum/Size
<u>NON REGULATED MATERIAL</u>		<u>165</u>		
<u>9-Drums - 55 GAL EACH</u>				

THIS MATERIAL IS NOT REGULATED UNDER WAC-173 OR 40 CFR PART 261 & PART 761

TOP COPY - PLANT FILE

BOTTOM COPY - CUSTOMER



**RABANCO RECYCLING CO.**  
 A DIVISION OF RABANCO COMPANIES  
 2733 3rd Avenue South  
 Seattle, Washington 98134  
 (206) 623-4080



#02-658

TICKET NUMBER 1049094

DATE: 05/08/02  
 TIME: 10:11

FROM: CU TO COST ACCOUNT 106102-1079  
 PUBLIC THROUGHPUT CR 3975  
 PARK R# 3 PICK UP PLACE: COCADO  
 PRODUCT: PEA

WEIGHT	TARE	DATE	SCALE	NET TARE	NET TONNAGE	RATE PER TON	AMOUNT
14,260 LBS	14,151	05/08/02	IN		2,460		73.00
9289 LBS	15,110	05/08/02	OUT		39,700		2.66
REFUSE TAX 5.62%							
TOTAL AMOUNT \$							75.46
AMOUNT RECEIVED \$							75.46
OUTSIDE DUES \$							0.00

X

CUSTOMER SIGNATURE

I HAVE READ AND AGREE TO THE CONDITIONS ON THE REVERSE SIDE.



Recycled



**RABANCO RECYCLING CO.**  
 A DIVISION OF RABANCO COMPANIES  
 2733 3rd Avenue South  
 Seattle, Washington 98134  
 (206) 623-4080



#02-658

TICKET NUMBER 1000000000

DATE: 05/05/02  
 TIME: 14:35

TRUCK # 1000000000  
 TRUCK # 1000000000  
 TRUCK # 1000000000  
 TRUCK # 1000000000  
 TRUCK # 1000000000

WEIGHT: 0.0000000000  
 TYPE: 0000000000  
 DATE: 05/05/02

NET WT: 0.0000  
 VOLUNTARY: 0.0000  
 TOTAL: 0.0000

AMOUNT: 0.0000  
 AMOUNT: 0.0000

AMOUNT: 0.0000

**X** *[Signature]*

CUSTOMER SIGNATURE

I HAVE READ AND AGREE TO THE CONDITIONS ON THE REVERSE SIDE.



Recycled