

Tesoro 2 Go Mart #76
ADEC File #2265.26.037

October 2019
Monitoring Event Report

Prepared For



TESORO



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ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
AK	Alaska Test Method
BTEX	benzene, toluene, ethylbenzene, xylenes
DO	dissolved oxygen
DRO	diesel range organics
EPA	U.S. Environmental Protection Agency
GCL	groundwater cleanup level
GRO	gasoline range organics
mg/L	milligrams per liter
mV	millivolts
ORP	oxidation-reduction potential
PID	photoionization detector
ppmv	parts per million by volume
QA	quality assurance
QC	quality control
Stantec	Stantec Consulting Services Inc.
SVE	soil vapor extraction

1.0 EXECUTIVE SUMMARY

This fourth quarter 2019 monitoring event report was prepared by Stantec Consulting Services Inc. (Stantec), on behalf of Tesoro Refining and Marketing Company for Tesoro 2 Go Mart #76, located at 3600 Palmer-Wasilla Highway, Wasilla, Alaska (**Figure 1**). The methods used for this monitoring event were conducted in accordance with the Alaska Department of Environmental Conservation (ADEC) approved 2019 Corrective Action Work Plan for this site.

This monitoring event was conducted on October 18, 2019 by John Marshall, Environmental Scientist, and Bob Gilfilian, Principal Engineer, both with Stantec. The monitoring event included: measuring the depth to groundwater; measuring water quality parameters; and collecting and analyzing groundwater samples from Monitoring Wells MW-1, MW-2, MW-3, and MW-4 (**Figure 2**).

Results of the groundwater analytical sampling showed that analytes detected above ADEC groundwater cleanup levels (GCLs) in the primary samples were:

- Monitoring Well MW-2: Benzene and ethylbenzene.
- Monitoring Well MW-3: Benzene, ethylbenzene, xylenes, and gasoline range organics (GRO).
- Monitoring Well MW-4: Benzene.

The hydraulic gradient across the site was found to be approximately 0.013 feet per foot directed toward the north at 350 degrees (see **Appendix C**). The groundwater flow direction and gradient are consistent with past monitoring events. A historical summary of the groundwater flow is shown in the “rose diagram” presented on **Figure 2**.

The existing bio-sparge treatment system is not functional and is currently being replaced. Stantec is in the process of installing a groundwater recirculation system based on pump and treat technology. The 4” diameter remediation well (RW 19-1) was installed in October 2019. The new remediation well will be connected to the existing underground piping system (formerly used for the bio-sparge system) with chemical oxidation injection by early summer of 2020.

The contaminant vapor mass removal with the existing soil vapor extraction (SVE) system has been documented to be very low for the past couple of years; and therefore, was deactivated in December 2019. Subject to the findings and performance of the recently drilled 4” diameter remediation well (RW 19-1), a new work plan will be prepared and presented to ADEC for review and approval prior to making any changes to the groundwater treatment system.

2.0 SITE BACKGROUND

Background information for this site is summarized in **Appendix A**.

3.0 FIELD ACTIVITIES

The following field activities were conducted at the site during this monitoring event:

- Measured the depth to groundwater in Monitoring Wells MW-1, MW-2, MW-3, and MW-4. Groundwater depth measurements were used to calculate the hydraulic gradient and direction of flow for the groundwater table.
- Measured the following field intrinsic water quality parameters in all four monitoring wells: pH, temperature, dissolved oxygen (DO), oxidation-reduction potential (ORP), and specific conductance.
- Collected groundwater samples from all four monitoring wells and submitted them for laboratory analysis of: U.S. Environmental Protection Agency (EPA) Method 8260C for benzene, toluene, ethylbenzene, and xylenes (BTEX); Alaska Test Method (AK)101 for GRO; and AK102 for diesel range organics (DRO).
- Check the operation on the SVE treatment system.

Field methods and procedures are provided in **Appendix B**, and field measurements are provided in **Appendix C**.

4.0 GROUNDWATER MONITORING RESULTS

Groundwater Levels. **Table 1** presents groundwater elevations at this site based on the depths to static groundwater levels measured during this monitoring event. The average hydraulic gradient across the site was found to be approximately 0.013 feet per foot directed toward the north at 350 degrees. All available groundwater gradients and bearings from past site work are presented in the “rose diagram” on **Figure 2**.

Table 1 Groundwater Elevations

Measured on October 18, 2019

Monitoring Well Identification	Top of Casing Elevation (feet above datum) ¹	Depth to Groundwater (feet btoc)	Groundwater Elevation (feet above datum) ¹
MW-1	94.74	19.06	75.68
MW-2	95.08	18.03	77.05
MW-3	94.52	17.48	77.04
MW-4	95.02	17.99	77.03

Key:

1 – Based on a vertical control survey of October 18, 2019, using an elevation datum of 100.00 feet established on the bench mark on the concrete base of the existing on-site drinking water well.

feet btoc – feet below top of monitoring well casing

Water Sample Intrinsic Field Parameters. The results of intrinsic water quality parameter testing of the water samples collected during this monitoring event are presented in **Table 2**. The ORP measurements ranged from 102.7 millivolts (mV) in Monitoring Well MW-4 to 163.4 mV in Monitoring Well MW-1, which indicates a limited potential for oxidation of petroleum compounds. The pH values were consistent between monitoring wells and within an expected range at slightly below or near neutral. Conductance readings were also within typical values for groundwater. DO measurements ranged from 0.28 milligrams per liter (mg/L) in Monitoring Well MW-2 to 0.47 mg/L in Monitoring Well MW-1.

Table 2 Field Measured Intrinsic Water Quality Parameters
Measurements taken on October 18, 2019

Well ID	Volume Purged (gallons)	Sheen/Odor	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	ORP (mV)	Specific Conductance (µs/cm °C)
MW-1	2.25	N/N	9.9	5.97	0.47	163.4	1,697
MW-2	4.6	N/N	8.0	6.37	0.28	127.1	501
MW-3	4.2	Y/Y	8.0	6.52	0.34	105.4	573
MW-4	5.0	N/N	8.1	6.67	0.37	102.7	1,082

Key:

°C – degrees Celsius

µS/cm°C – microSiemens per centimeter °C

mg/L – milligrams per liter

mV – millivolts

N – no

ORP – oxidation-reduction potential

pH – -log [H+]

SC – specific conductance at 25°C

Temp. – temperature

Y - yes

Water Sample Laboratory Analytical Results. Historical monitoring data for this site are tabulated in **Appendix D**. Laboratory analytical results for BTEX, GRO, and DRO detected in groundwater samples collected during this monitoring event are summarized in **Table 3**. The laboratory analytical report is provided in **Appendix E**.

Table 3 Groundwater Analytical Results for BTEX, GRO, and DRO
 Samples collected on October 18, 2019

Sample Identification	Benzene ¹ (mg/L)	Toluene ¹ (mg/L)	Ethylbenzene ¹ (mg/L)	Xylenes ¹ (mg/L)	GRO (mg/L)	DRO (mg/L)
MW-1	U (0.003)	U (0.002)	U (0.003)	U (0.003)	U (0.25)	0.16
MW-2	0.025	0.0065	0.022	0.101	0.74	0.24
MW-3	0.21	0.66	1.7	9.7	21	1.2
MW-4	0.020	0.015	0.0059	0.0277	U (0.25)	U (0.12)
TNS 76 (DUP MW-3)	0.18	0.6	1.6	8.9	18	0.91
Trip Blank	U (0.003)	U (0.002)	U (0.003)	U (0.003)	U (0.25)	NT
GCLs	0.0046	1.1	0.015	0.19	2.2	1.5

Key:

1 – Analyzed by U.S. Environmental Protection Agency Method 8260C

AK – Alaska Test Method

BTEX – benzene, toluene, ethylbenzene, and xylenes

DRO – Diesel range organics, analyzed by AK102

GCLs – Groundwater cleanup levels, per Alaska Department of Environmental Conservation 18 Alaska Administrative Code 75.345, Table C, updated September 29, 2018.

GRO – Gasoline range organics, analyzed by AK101

mg/L – milligrams per liter

NT – Not tested

U – Undetected above laboratory reporting limits shown in parentheses

Bold indicates the concentration exceeds the GCL or, if not detected, the practical quantitation limit exceeds the GCL.

The GRO results from Monitoring Wells MW-2, MW-3 and TNS 76 were flagged by the laboratory with notes indicating the samples exhibited positive detects outside of the AK defined region. In addition, the GRO results from MW-3 were flagged by the laboratory with notes indicating the concentration reported was due to the presence of discrete peaks. The DRO results from Monitoring Wells MW-2, MW-3, and TNS 76 were flagged by the laboratory with notes indicating the samples contained a hydrocarbon pattern in the diesel range; however, the elution pattern was earlier than the typical diesel fuel pattern used by the laboratory.

Quality Assurance (QA)/ Quality Control (QC) Review. Eurofins TestAmerica, Inc. performed all analysis of groundwater samples for this sampling event. **Table 4** provides a summary of the laboratory QC objectives and outcomes for this monitoring event. Laboratory QC data and the ADEC Laboratory Data Review Checklist are included with the laboratory report in **Appendix E**. All QC criteria were met by the laboratory.

Table 4 Laboratory Quality Control Objectives

Quality Control Designation	Tolerance	Results for this Event
Holding Times		
DRO/Water/to analyze	40 days	15 days
DRO/Water/to extract	14 days	13 days
GRO/Water/to analyze	14 days	7-11 days
BTEX/Water/to analyze	14 days	6-7 days
Field Duplicates – Precision		
Benzene/Water	± 30%	15.38%
Toluene/Water	± 30%	9.52%
Ethylbenzene/Water	± 30%	6.06%
Xylenes/Water	± 30%	8.60%
GRO/Water	± 30%	15.38%
DRO/Water	± 30%	27.49%

Key:

% – percent

± – plus or minus

BTEX – benzene, toluene, ethylbenzene, and xylenes

DRO – diesel range organics

GRO – gasoline range organics

A duplicate sample set was collected to determine the precision of the field collection and laboratory analyses for this sampling event. Sample TNS 76 is a duplicate of sample MW-3. Data presented in **Table 4** show that the precision for the duplicate sample set was within the established QA criteria tolerances for BTEX, GRO, and DRO.

5.0 REMEDIATION SYSTEM

During the October 19, 2019 monitoring event, no petroleum odors could be detected by olfactory means in the vapor discharged from the SVE blower. An analytical sample was not collected from the SVE blower exhaust per the approved Work Plan guidance; therefore, the removal rate was not calculated. On December 10, 2019, the SVE system was deactivated by Stantec.

Stantec plans to repurpose the current bio-sparge system and convert it into a groundwater recirculation system to allow injection of chemical oxidation products. The implementation of this change in the remediation system will occur in the 2nd quarter of 2020.

6.0 DISCUSSION OF FINDINGS

Historical graphs of contaminant concentrations for Monitoring Wells MW-1, MW-2, MW-3, and MW-4 are presented on **Figure 3**. Results for previous monitoring events are presented in **Appendix D**.

Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs were:

- Monitoring Well MW-2: Benzene and ethylbenzene.
- Monitoring Well MW-3: Benzene, ethylbenzene, xylenes, and GRO.
- Monitoring Well MW-4: Benzene.

The approximate hydraulic gradient across the site was found to be approximately 0.013 feet per foot directed toward the north at 350 degrees. The groundwater flow direction and gradient are consistent with past monitoring events.

The SVE contaminant vapor mass removal is very low and, based on the pattern of decline, suggests that the SVE system performance requires additional optimization. Stantec plans to repurpose the current bio-sparg system and convert it into a groundwater recirculation system to allow injection of chemical oxidation products. The implementation of this change in the remediation system will occur in the 2nd quarter of 2020.

7.0 CONCLUSIONS AND RECOMMENDATIONS

No anomalies were found during the October 2019 monitoring event at this site that would require additional corrective action or changes to the ADEC-approved year 2019 Corrective Action Work Plan for this site.

8.0 LIMITATIONS

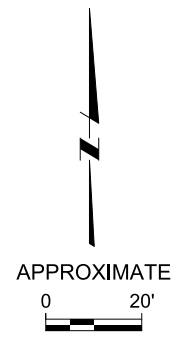
Stantec conducted this monitoring event in accordance with the Corrective Action Work Plan approved by ADEC, and in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. All sampling activities were completed in accordance with the ADEC *Underground Storage Tanks Procedures Manual – Standard Sampling Procedures* (March 22, 2017). No other warranty, expressed or implied, is made. Data and recommendations made herein were prepared for Tesoro 2 Go Mart #76 and Tesoro Refining and Marketing Company. Information herein is for use at this site in accordance with the purpose of the report described.

FIGURES

- Figure 1 Location and Vicinity Map
Figure 2 Site Plan with Groundwater Levels and Analytical Results
Figure 3 Graphs of Contaminant Concentrations and Groundwater Elevations
-



E. PALMER WASILLA HWY



APPROXIMATE LOCATION OF PROPERTY LINE
3600 PALMER-WASILLA HWY

WATER SUPPLY WELL LOCATION

UNDERGROUND STORAGE TANK
CANOPY
FUEL DISPENSER (TYP)

SEPTIC SYSTEM

MW-1

CAR WASH

TESORO
2 GO MART #76

UNDERGROUND PIPING

REMEDIAION WELL ACCESS POINT

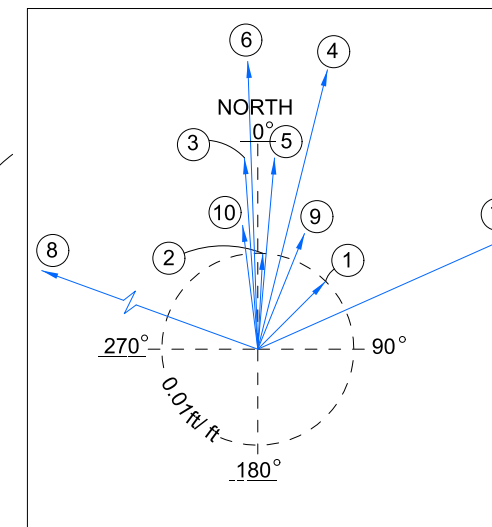
RW19-1

MW-4

MW-2

MW-3

CAMERON ACRES
BLOCK 1
LOT 7



GROUNDWATER FLOW SUMMARY

DATE	BEARING	GRADIENT (ft/ft)
1 APRIL 24, 2017	45°	0.01
2 SEP. 1, 2017	3°	0.01
3 FEB. 15, 2018	356°	0.02
4 JUNE 29, 2018	14°	0.03
5 SEP. 11, 2018	5°	0.02
6 OCT. 26, 2018	358°	0.03
7 FEB. 25, 2019	66°	0.03
8 APRIL 25, 2019	290°	0.04
9 JULY 25, 2019	22°	0.013
10 OCT. 18, 2019	353°	0.013

MW-1

Benzene	U (0.003)
Toluene	U (0.002)
Ethylbenzene	U (0.003)
Xylenes	U (0.003)
GRO	U (0.25)
DRO	0.16
GW Elev	75.68

MW-2

Benzene	0.025
Toluene	0.0065
Ethylbenzene	0.022
Xylenes	0.101
GRO	-0.74
DRO	0.24
GW Elev	77.05

MW-3

Benzene	0.21
Toluene	0.66
Ethylbenzene	1.7
Xylenes	9.7
GRO	21
DRO	1.2
GW Elev	77.04

MW-3 (Duplicate)

Benzene	0.18
Toluene	0.6
Ethylbenzene	1.6
Xylenes	8.9
GRO	18
DRO	0.91
GW Elev	77.04

MW-4

Benzene	0.020
Toluene	0.015
Ethylbenzene	0.0059
Xylenes	0.0277
GRO	U (0.25)
DRO	U (0.12)
GW Elev	77.03

LEGEND:

- F-UST FORMER UNDERGROUND STORAGE TANK
- ▲ MONITORING WELL LOCATION
- REMEDIATION WELL LOCATION
- DRO DIESEL RANGE ORGANICS
- GRO GASOLINE RANGE ORGANICS
- H SAMPLE WAS PREPPED OR ANALYZED BEYOND THE SPECIFIED HOLDING TIME
- RW REMEDIATION WELL
- U UNDETECTED ABOVE PRACTICAL QUANTITATION LIMITS SHOWN IN PARENTHESES
- W DRINKING WATER WELL

NOTES:

1. RESULTS SHOWN ARE FOR WELLS SAMPLED ON OCTOBER 18, 2019
2. RESULTS ARE IN MILLIGRAMS PER LITER
3. BOLD/ RED TEXT INDICATES CONTAMINANT CONCENTRATIONS ABOVE CLEANUP LEVELS FOR THIS SITE



TESORO COMPANY
TESORO 2 GO MART #76
OCTOBER 2019
MONITORING EVENT REPORT

SITE PLAN
WITH GROUNDWATER
ANALYTICAL RESULTS

FIGURE

2

185751226.
200.205

Figure 3
Graphs of Contaminant Concentrations and Groundwater Elevations

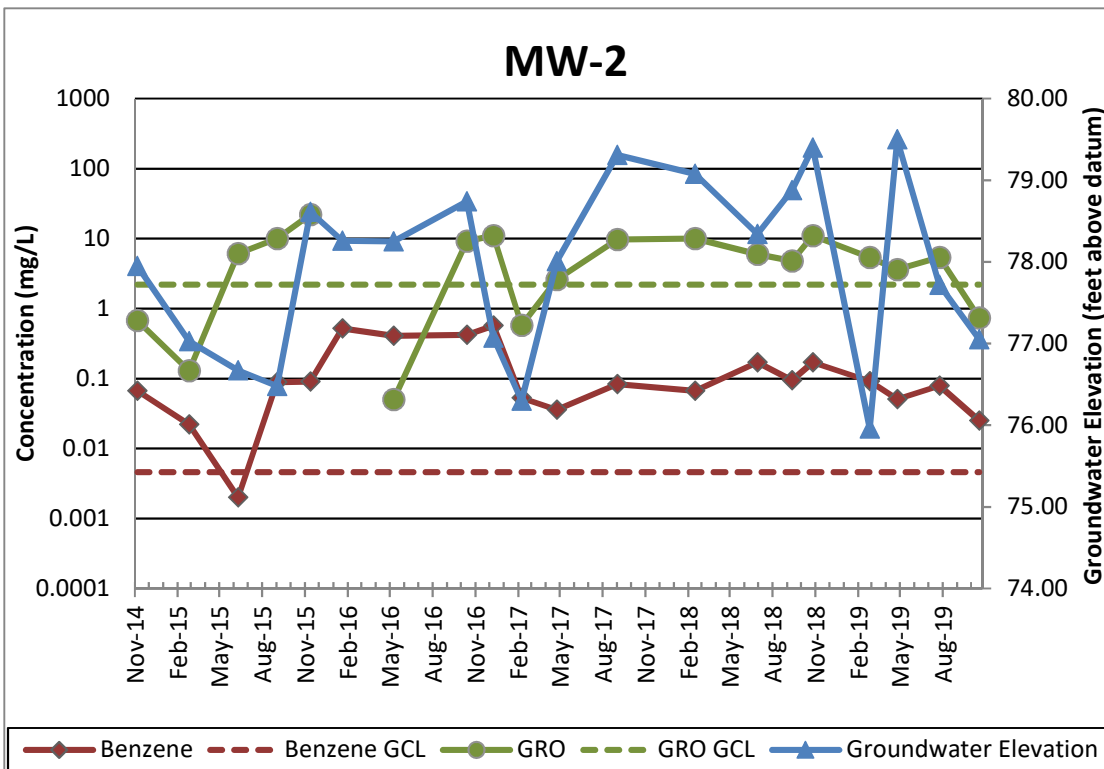
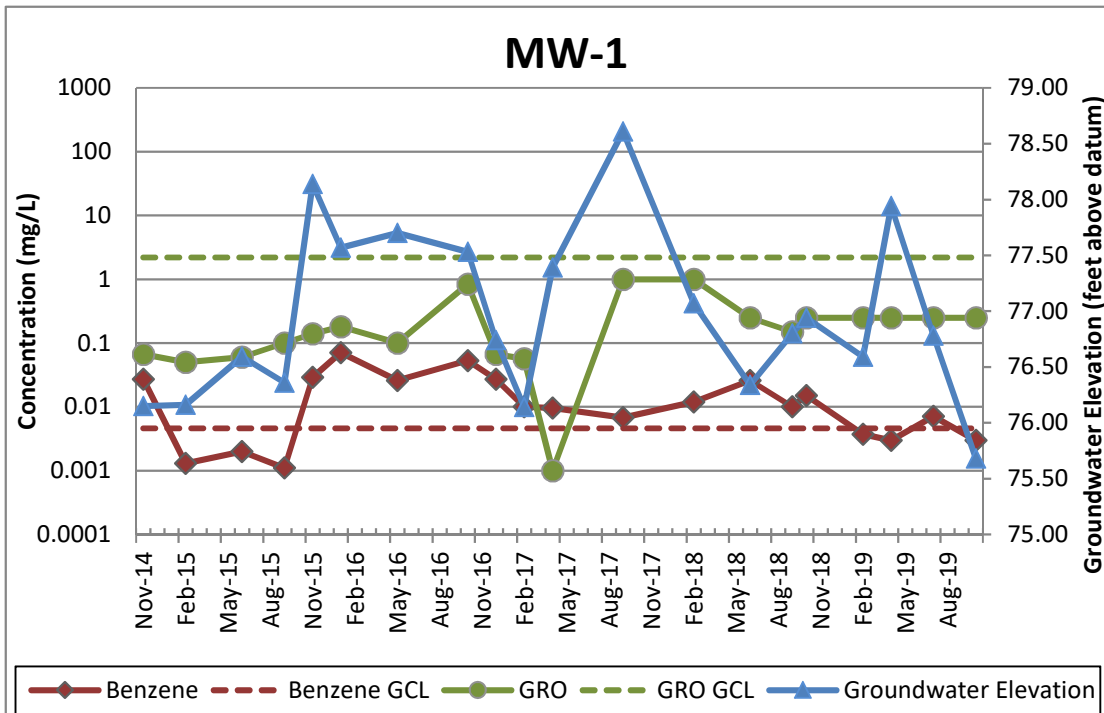
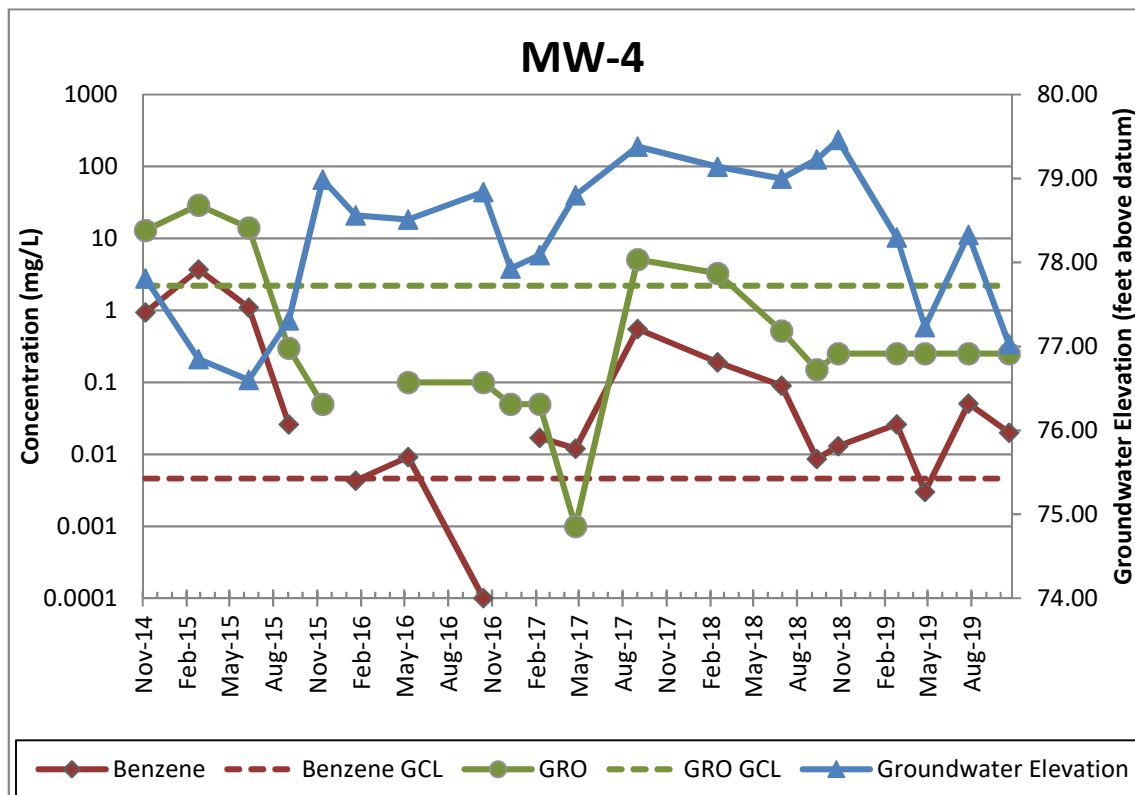
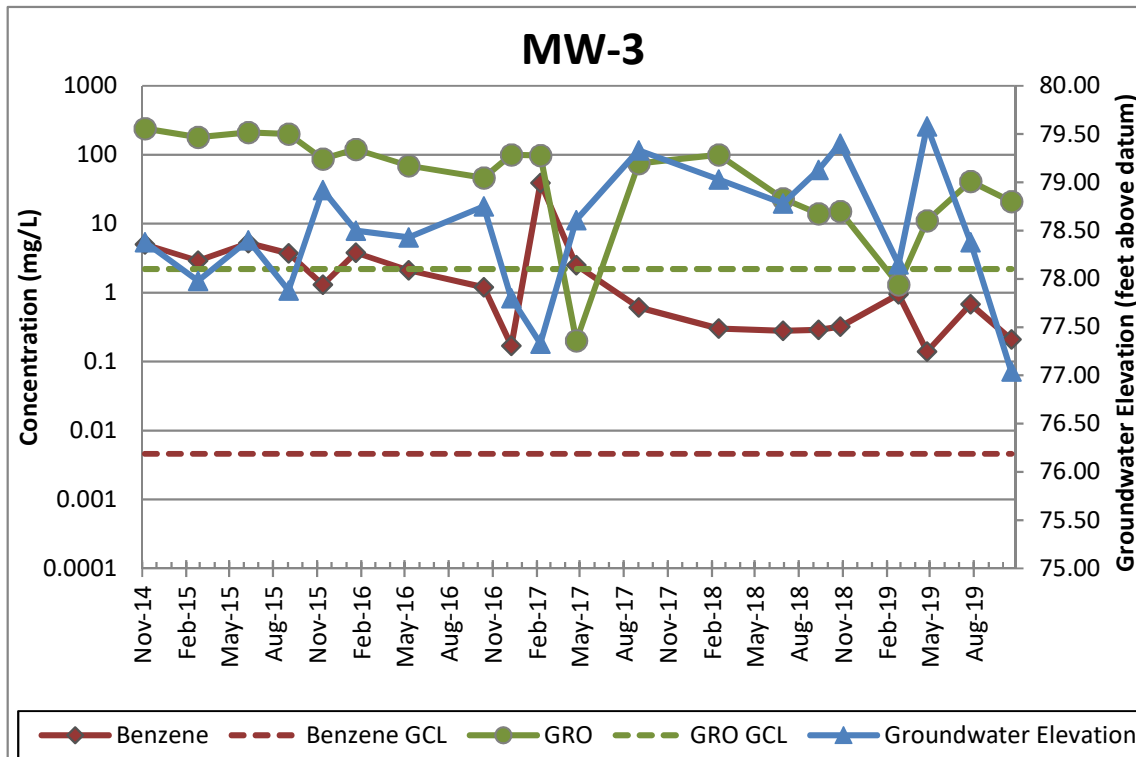


Figure 3
Graphs of Contaminant Concentrations and Groundwater Elevations



APPENDIX A

Site Background

APPENDIX A – SITE BACKGROUND

Tesoro 2 Go Mart #76 (3600 Palmer-Wasilla Highway, Wasilla, Alaska)
ADEC File #100.26.159

Tesoro 2 Go Mart #76 is a retail fuel and convenience store facility located at 3600 Palmer-Wasilla Highway, Wasilla, Alaska (Figure 1). The legal description for the property is Lot 7, Block 1, Cameron Acres Subdivision, Matanuska-Susitna Borough.

Two 15,000-gallon underground storage tanks (USTs) were installed at the site in 1995. Based on historical records, this is the first retail fuel convenience store to occupy this location. The site is covered with asphalt paving with concrete in the area over the USTs and fuel dispenser islands. The former UST system and dispensing components were removed from September to October 2014 and replaced with a new UST fueling system. The new UST fueling system consists of two 15,000-gallon fiberglass-reinforced plastic, double-walled USTs installed on January 29, 2015, and seven fuel dispensers (six gasoline and one diesel). Distribution piping consists of 2-inch fiberglass primary and 3-inch fiberglass secondary.

In addition, the former convenience store was demolished and replaced with a new convenience store that was constructed at a different location on the property. The property is over 1 acre in size and is served with an on-site drinking water well and on-site septic tank and drainfield system.

October 2014. During the 2014 Site Assessment of the UST closure, a petroleum fuel release was discovered in the subsurface soils partially surrounding and underlying the USTs. At that time, a very deep test pit was excavated beneath the former USTs to the groundwater table. Field screening with a photoionization detector (PID) indicated that petroleum contamination was present throughout the vadose zone and extended to the underlying groundwater table. Due to site safety concerns with sloughing soils, it was not feasible to excavate all of the contaminated soil below the former USTs.

A Release Investigation (RI) was conducted by MWH Americas, Inc. (MWH) subsequent to the closure of the former USTs. The RI included the installation of a soil vapor extraction (SVE) remediation well and several groundwater monitoring wells. MWH completed a groundwater monitoring event after the monitoring wells were installed. Follow-up water samples were collected from the onsite drinking water well for appropriate laboratory analyses.

The findings of the RI indicated a significant amount of petroleum contamination had impacted the subsurface soils and shallow groundwater table at the site. The soil samples collected indicate higher concentrations of gasoline range organics (GRO) and benzene, toluene, ethylbenzene, and xylenes (BTEX) constituents directly below the location occupied by the former USTs at Remediation Wells RW-2 and RW-3. Benzene was detected above Alaska Department of Environmental Conservation (ADEC) groundwater cleanup level (GCL) in groundwater at monitoring wells installed at the site. GRO contaminants have also impacted the groundwater table. The system has been monitored on a quarterly basis since the completion of the RI.

February 2015. Benzene exceeded the GCL in Monitoring Well MW-2. BTEX, GRO, and diesel range organics (DRO) exceeded GCLs in Monitoring Well MW-3. Benzene, toluene, and GRO exceeded GCLs in Monitoring Well MW-4.

June 2015. MWH installed and placed into operation a SVE system at the site. Early results indicate that the system is effectively removing petroleum-related vapors from the subsurface. Additionally, a surface water sample was collected from an on-site nearby wetland surface water area. Xylenes and DRO were detected in the water sample; however, the concentrations were below the ADEC groundwater and surface water cleanup levels.

September 2015. Benzene and DRO exceeded GCLs in Monitoring Well MW-2. BTEX and DRO exceeded GCLs in Monitoring Well MW-3. Benzene exceeded GCL in Monitoring Well MW-4. The SVE remediation system blower was offline, requiring maintenance.

November 2015. Benzene exceeded GCL in Monitoring Well MW-1. Benzene, GRO, and DRO exceeded the GCL in Monitoring Well MW-2. Benzene, toluene, and GRO all remained above their GCLs, consistent with the past five monitoring events, at Monitoring Well MW-3.

December 2015. Maintenance was performed on the SVE system on December 31, 2015. A replacement SVE system blower was installed. The system was brought back online on the date of the replacement blower installation. A PID was used to monitor the system effluent after the initial 15 minutes of operation and indicated that 424 parts per million by volume were being removed by the system.

January 2016. Benzene exceeded the GCL in Monitoring Well MW-1. Benzene, toluene, ethylbenzene, and DRO exceeded their GCLs in Monitoring Well MW-2; and benzene, toluene, ethylbenzene, xylenes, GRO, and DRO exceeded their GCLs in Monitoring Well MW-3. The laboratory did not provide results for requested GRO analyses for samples from Monitoring Wells MW-2 and MW-4.

May 2016. In Monitoring Wells MW-1, MW-2, and MW-4, only benzene exceeded GCL. MW-3 exceeded GCLs for all analytes tested. There were no detections in the Carmen Lot 7 drinking water sample. An SVE effluent sample was collected to monitor SVE performance.

October 2016. In Monitoring Well MW-1, only benzene exceeded GCL. In Monitoring Well MW-2, all analytes but toluene and DRO exceeded GCLs. Monitoring Well MW-3 exceeded GCLs for all analytes tested. Monitoring Well MW-4 had no exceedances. There were no detections in the Carmen Lot 7 drinking water sample. An SVE effluent sample was collected to monitor SVE performance.

December 2016. In Monitoring Well MW-1, only benzene exceeded GCL. In Monitoring Well MW-2, all analytes but toluene exceeded GCLs. Monitoring Well MW-3 exceeded GCLs for benzene, GRO, and DRO. Monitoring Well MW-4 and the Carmen Lot 7 drinking water sample had no exceedances. Both Monitoring Wells MW-3 and MW-4 had insufficient sample volumes to complete all analytical testing. The SVE system observed for operation and performance.

February 2017. Benzene was the only analyte to exceed the GCL in Monitoring Wells MW-1 and MW-4. Benzene and ethylbenzene exceeded GCLs in Monitoring Well MW-2, and all analytes exceeded their GCLs in Monitoring Well MW-3. The SVE system was frozen due to record cold temperatures experienced during January 2017. A subsequent site visit on February 16, 2017, was made to thaw and restore the SVE system to normal operation.

April 2017. In addition to testing for BTEX, DRO, and GRO, expanded testing for volatile organic compounds (VOCs), and polynuclear aromatic hydrocarbons (PAHs) were conducted on all monitoring wells. Benzene was the only analyte to exceed the GCL in Monitoring Wells MW-1 and MW-4. BTEX (minus toluene) and GRO exceeded their GCLs in Monitoring Well MW-2, consistent with previous monitoring events. The expanded testing found 1,2,4-trimethylbenzene and naphthalene to also exceed GCLs. In Monitoring Well MW-3, BTEX and DRO exceeded their GCLs, also consistent with previous monitoring events. The expanded testing found 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene to also exceed GCLs. Pilot Testing (conducted in May 2017) of air injection into remediation wells to volatilize groundwater and smear zone contaminants indicated a slight increase of volatilization when air is injected into RW-2, and RW-3.

September 2017. Except for the following, all analytes were below GCLs in the wells sampled:

- Monitoring Well MW-1 – benzene exceeded the GCL.
- Monitoring Well MW-2 – benzene, ethylbenzene, xylenes and GRO exceeded their GCLs.
- Monitoring Well MW-3 – BTEX, GRO, and DRO were above their GCLs. The MW-3 duplicate sample provided results within established Quality Assurance/Quality Control (QA/QC) standards.
- Monitoring Well MW-4 – benzene, ethylbenzene, xylenes, and GRO exceeded their GCLs.

The SVE contaminant vapor mass removal was less than observed during pilot test in May 2017 and requires additional optimization.

February 2018. Except for the following, all analytes were below GCLs in the wells sampled:

- Monitoring Well MW-1 – benzene.
- Monitoring Well MW-2 – benzene, ethylbenzene, xylenes, and GRO (GRO was not detected, but the Reporting Limit exceeded the GCL).
- Monitoring Well MW-3 – BTEX and GRO (GRO was not detected, but the Reporting Limit exceeded the GCL). The MW-3 duplicate sample provided results within established QA/QC standards.
- Monitoring Well MW-4 – benzene, ethylbenzene, xylenes, and GRO.

The SVE contaminant vapor mass removal was less than previously observed on site. In addition, the field work included an assessment of the buried piping systems for the air sparging (AS) and SVE systems. The assessment was performed with a downhole camera capable of recording photographs and video of the interior conditions of the piping system. The findings of the downhole camera assessment of the buried piping system was inconclusive.

June 2018. The results from the June 29, 2018, monitoring event supports the continued pattern that GRO contamination persists on site and is observed in Monitoring Wells MW-2 and MW-3. In addition, Monitoring Well MW-3 is consistently the most contaminated well. In summary, the results of the groundwater analytical sampling showed that analytes detected above the GCLs were:

- Monitoring Well MW-1: Benzene.
- Monitoring Well MW-2: Benzene, ethylbenzene, xylenes, GRO, and naphthalene.
- Monitoring Well MW-3: BTEX, GRO and naphthalene. Except for GRO, the duplicate sample provided results within established QA/QC standards.
- Monitoring Well MW-4: Benzene, ethylbenzene, and naphthalene.

A representative water sample from the on-site drinking water well serving the Tesoro 2 Go Mart was sampled and tested for VOCs. The water sample was found to have no detectable levels of contaminants of concern, except the laboratory reporting limits were over the GCLs for 1,1,2-trichloroethane (TCA) and vinyl chloride.

The SVE contaminant vapor mass removal is very low and based on the recent pattern of decline suggest that the SVE system performance requires additional optimization. Alternative treatment options are currently being evaluated and, if determine feasible, a new work plan will be presented to ADEC for review and approval prior to making any changes.

September 2018. Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs were:

- Monitoring Well MW-1: Benzene.
- Monitoring Well MW-2: Benzene, ethylbenzene, xylenes, GRO, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- Monitoring Well MW-3: Benzene, ethylbenzene, xylenes, GRO, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- Monitoring Well MW-4: Benzene, and 1,2,4-trimethylbenzene.

Several analytes for VOCs were reported as undetected but had laboratory reporting limits that equaled or exceeded their corresponding GCLs. The results from this monitoring event supports the continued pattern that GRO contamination persists at the site and is observed in Monitoring Wells MW-2 and MW-3. In addition, Monitoring Well MW-3 is consistently the most contaminated well.

The approximate hydraulic gradient across the site was found to be approximately 0.03 feet per foot directed toward the north-northeast at 14 degrees. The groundwater flow direction and gradient are consistent with past monitoring events.

The SVE contaminant vapor mass removal is very low and, based on the recent pattern of decline, suggests that the SVE system performance requires additional optimization. Alternative treatment

options are currently being evaluated and, if determine feasible, a new work plan will be presented to ADEC for review and approval prior to making any changes.

October 2018. Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs were:

- Monitoring Well MW-1: Benzene.
- Monitoring Wells MW-2 and MW-3: Benzene, ethylbenzene, xylenes, GRO, naphthalene, 1,2,4-trimethylbenzene, and 1,3,5-trimethylbenzene.
- Monitoring Well MW-4: Benzene.

Several VOCs were reported as undetected but had laboratory reporting limits that equaled or exceeded their corresponding GCLs. The results from this October 26, 2018, monitoring event supports the continued pattern that GRO contamination persists at the site and is observed in Monitoring Wells MW-2 and MW-3. In addition, Monitoring Well MW-3 is consistently the most contaminated on-site monitoring well.

The approximate hydraulic gradient across the site was found to be approximately 0.03 feet per foot directed toward the north at 358 degrees. The groundwater flow direction and gradient are consistent with past monitoring events.

The SVE contaminant vapor mass removal is very low and, based on the recent pattern of decline, suggests that the SVE system performance requires additional optimization. Alternative treatment options are currently being evaluated and, if determined to be feasible, a new work plan will be presented to ADEC in 2019 for review and approval prior to making any changes.

February 2019. Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs were:

- Monitoring Well MW-2: Benzene, ethylbenzene, xylenes, and GRO.
- Monitoring Well MW-3: Benzene, ethylbenzene, xylenes, and DRO.
- Monitoring Well MW-4: Benzene

The existing bio-sparge treatment system is not functional and will be replaced. In the 2nd quarter of 2019, Stantec plans to install a groundwater recirculation system based on pump and treat technology. The SVE contaminant vapor mass removal is very low and, based on the recent pattern of decline, suggests that the SVE system performance requires additional optimization. Alternative treatment options are currently being evaluated and, if determine feasible, a new work plan will be presented to ADEC for review and approval prior to making any changes.

April 2019. The monitoring event included: measuring the depth to groundwater; measuring water quality parameters; and collecting and analyzing groundwater samples from Monitoring Wells MW-1, MW-2, MW-3, and MW-4, as well as the on-site drinking water well.

Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs in the primary samples were:

-
- Monitoring Well MW-2: Benzene, xylenes, GRO, 1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, and naphthalene.
 - Monitoring Well MW-3: Benzene, GRO, and naphthalene.

A representative water sample from the on-site drinking water well serving the Tesoro 2Go Mart was sampled and tested for VOCs. The water sample was found to have no detectable levels of contaminants of concern, except the laboratory reporting limits were over the GCLs for 1,1,2-TCA, 1,2,3-trichloropropane, 1,2-dibromoethane, and vinyl chloride.

The groundwater hydraulic gradient across the site was found to be approximately 0.04 feet per foot directed toward the west-northwest at 290 degrees. The groundwater flow direction and gradient are inconsistent with past monitoring events in that the direction of flow is to the west rather than historically to the north with a slightly higher gradient.

July 2019. The monitoring event included: measuring the depth to groundwater; measuring water quality parameters; and collecting and analyzing groundwater samples from Monitoring Wells MW-1, MW-2, MW-3, and MW-4.

Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs in the primary samples were:

- Monitoring Well MW-1: Benzene.
- Monitoring Well MW-2: Benzene, ethylbenzene, xylenes, and GRO.
- Monitoring Well MW-3: BTEX, GRO, and DRO.
- Monitoring Well MW-4: Benzene.

The groundwater hydraulic gradient across the site was found to be approximately 0.013 feet per foot directed toward the north-northeast at 22 degrees. The groundwater flow direction and gradient are consistent with past monitoring events.

Stantec plans to drill a new 4" diameter remediation well and repurpose the current bio-sparge system. The new well and bio-sparge system will be converted into a groundwater recirculation system to allow injection of chemical oxidation products. The implementation of this change in the remediation system will occur in the 4th quarter of 2019.

October 2019. The monitoring event included: measuring the depth to groundwater; measuring water quality parameters; and collecting and analyzing groundwater samples from Monitoring Wells MW-1, MW-2, MW-3, and MW-4.

Results of the groundwater analytical sampling showed that analytes detected above ADEC GCLs in the primary samples were:

- Monitoring Well MW-2: Benzene and ethylbenzene.
- Monitoring Well MW-3: benzene, ethylbenzene, xylenes, and GRO.
- Monitoring Well MW-4: Benzene.

The groundwater hydraulic gradient across the site was found to be approximately 0.013 feet per foot directed toward the north at 350 degrees. The groundwater flow direction and gradient are consistent with past monitoring events.

Stantec drill a new 4” diameter remediation well (RW 19-1) and repurpose the current bio-sparge system. The new well and bio-sparge system will be converted into a groundwater recirculation system to allow injection of chemical oxidation products. The implementation of this change in the remediation system will occur in the 2nd quarter of 2020.

APPENDIX B

Field Methods and Procedures

APPENDIX B – FIELD METHODS AND PROCEDURES

Tesoro 2 Go Mart #76 (3600 Palmer-Wasilla Highway, Fairbanks, Alaska)
Lot 7, Block 1, Cameron Acres Subdivision, Matanuska-Susitna Borough
ADEC File #2265.26.037

The following table presents the proposed tasks for the Alaska Department of Environmental Conservation (ADEC)-approved 2019 Corrective Action Work Plan. The scope of these tasks is based on the results and findings of the monitoring and remediation completed to date at Tesoro 2 Go Mart #76 (ADEC File #2265.26.037).

2019 Work Plan Schedule

Work Plan Task		1 st Quarter	2 nd Quarter	3 rd Quarter	4 th Quarter
Task 1	MW-1, MW-2, MW-3, and MW-4	B, G, D, I	G, D, V, P, I	B, G, D, I	B, G, D, I
	On-site Domestic Drinking Water Well		D, E		
Task 2	Remediation System O&M	O&M	O&M	O&M	O&M
Task 3	Install Groundwater Pump and Treat System	✓	✓	✓	

Key:

AK – Alaska Test Method

B – Benzene, toluene, ethylbenzene, and total xylenes by EPA Method 8260C.

D – Diesel range organics by AK102.

E – Drinking Water parameters by EPA Test Method 524.2.

EPA – U.S. Environmental Protection Agency

G – Gasoline range organics by AK101.

I – Indicators, parameters tested include: dissolved oxygen, specific conductance, oxygen-reduction potential, pH, and temperature.

O&M – operation and maintenance

P – Polynuclear aromatic hydrocarbons (PAHs), i.e., semi-volatile organic compounds, by EPA Test Method 8270D Selective Ion Monitoring.

V – Volatile organic compounds by EPA Test Method 8260C.

All sampling activities will be completed in accordance with ADEC’s *Underground Storage Tanks Procedures Manual – Standard Sampling Procedures* (November 7, 2002). The methods that will be used for conducting each monitoring event, unless otherwise noted in the monitoring report, include:

- The static water levels in the monitoring wells will be measured with respect to the top of each well casing. The elevation of the static water level will be based on an arbitrary datum established during a vertical control survey completed by Stantec.
- The monitoring wells will not be purged prior to sampling. A new, disposable, Teflon[®] bailer will be used to sample each well. The first bail of water removed from each well will be examined for petroleum odor, sheen, and any other unique physical features.

- Water and vapor samples will be collected in laboratory-supplied sample containers. The samples will be delivered an ADEC-approved laboratory in accordance with standard chain-of-custody procedures.
- Remediation system vapors will be measured with a calibrated photoionization detector (PID).
- Additional water samples will be collected from the monitoring wells and tested in the field for chemical and physical parameters.

APPENDIX C

Field Measurements and Hydraulic Gradient Plot

**Appendix C
Field Measurements and Notes**

Project: Tesoro 2 Go Mart #76
Project number: 185751226

Date: 10/18/2019
Samplers: JM/BG

Temperature: 38.2°F Wind: East at 2.1 mph Humidity: 65% Pressure: 29.23 in wx source: KAKWASIL56

Well ID	Volume Purged (gallons)	Sheen/Odor	Temp. (°C)	pH	Dissolved Oxygen (mg/L)	ORP (mV)	Specific Conductance (µs/cm °C)	Top of Casing* (feet)	Depth to GW (feet btoc)	GW Elev.* (feet)	Total Depth (feet btoc)
MW-1	2.25	N/N	9.9	5.97	0.47	163.4	1,697	94.74	19.06	75.68	24.20
MW-2	4.6	N/N	8.0	6.37	0.28	127.1	501	95.08	18.03	77.05	27.33
MW-3	4.2	Y/Y	8.0	6.52	0.34	105.4	573	94.52	17.48	77.04	25.96
MW-4	5.0	N/N	8.1	6.67	0.37	102.7	1,082	95.02	17.99	77.03	28.29

°C - degree Celsius NM - Not measured
µs/cm - microsiemens per centimeter ORP - oxidation reduction potential
btoc - below top of casing Y - yes
elev. - elevation
GW - groundwater
mg/L - milligrams per liter
N - no

Instruments/methods used for above measurements	Model	
Static water level	Heron	H01L
Conductivity	YSI	556
Dissolved Oxygen	YSI	Pro Solo ODO
Temperature	YSI	Pro Solo ODO
ORP	YSI	556
pH	YSI	556

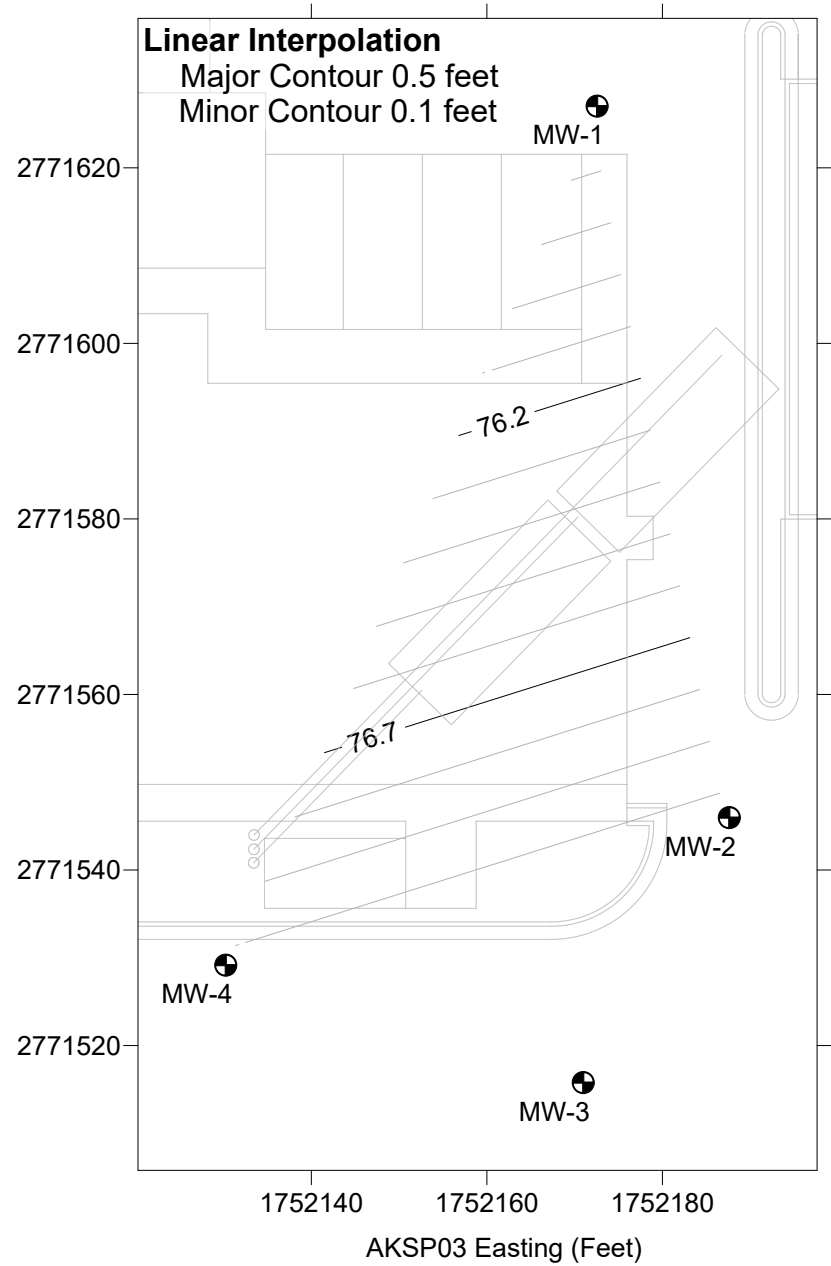
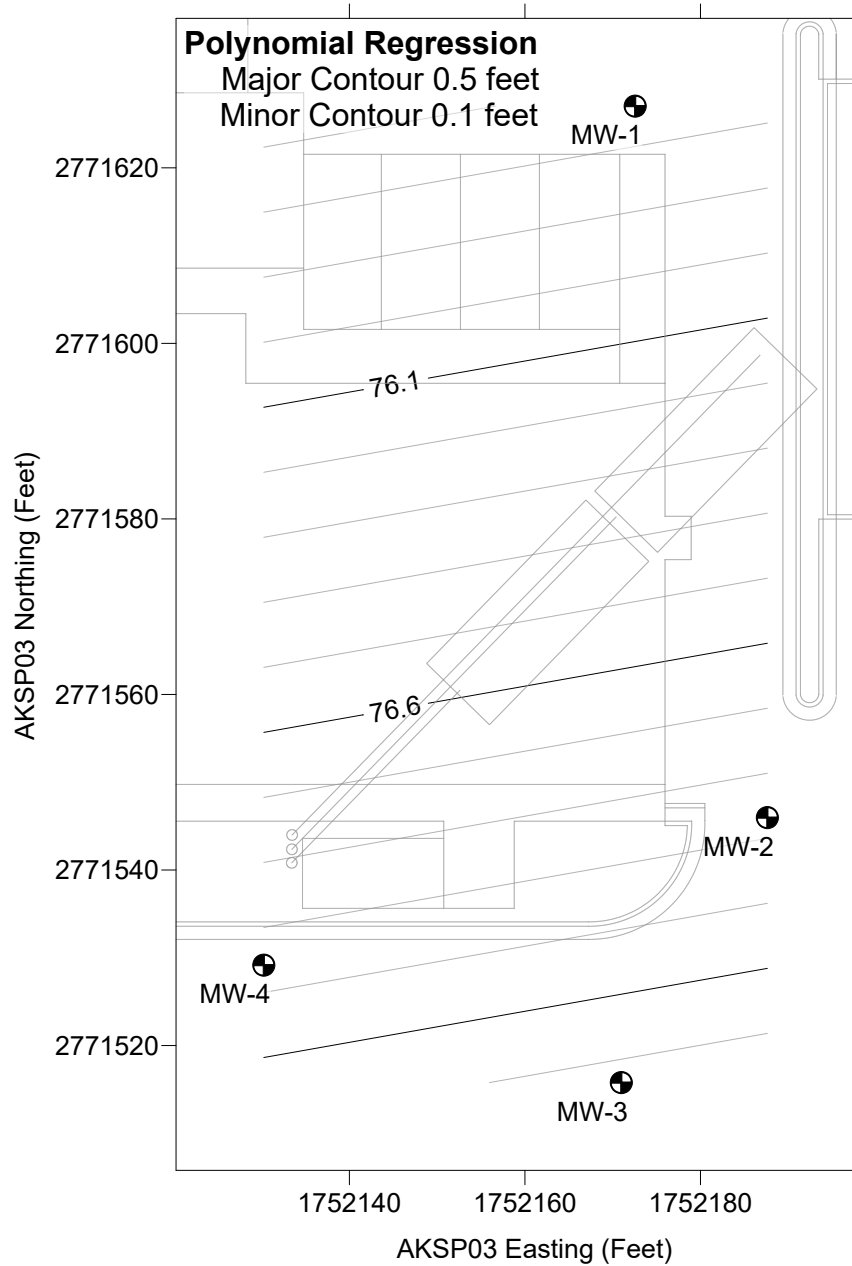
* Based on a vertical control survey of October 18, 2019.

Notes:

Well	Observations	Well Dia.	Time	8260C	AK101	AK102	EPA 524.2	
MW-1	Transparent/light orange/orange floc/springtails	2"	12:10	X	X	X	--	
MW-2	Transparent/light orange/springtails	2"	12:53	X	X	X	--	
MW-3	Transparent/light orange	2"	14:04	X	X	X	--	
MW-4	Transparent/light orange/springtails	2"	13:20	X	X	X	--	
TNS 76	Duplicate of MW-3	NA	14:06	X	X	X	--	

Extraction SVE Well RM-3	
Discharge (cfs)	NA
Vacuum (IWC)	NA
PID (ppmv)	NA

2 Go Mart #76 - Groundwater Elevations October 18, 2019



APPENDIX D

Tables of Historical Monitoring Data

**Appendix D
Tables of Historical Monitoring Data**

Monitoring Well MW-1

Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	GRO (mg/L)	DRO (mg/L)	GW Elev (feet)
06-Nov-14	0.027	U (0.0005)	U (0.0005)	U (0.0015)	0.067	0.36	76.15
25-Feb-15	0.0013	U (0.0005)	U (0.0005)	U (0.0015)	U (0.05)	U (0.41)	76.16
10-Jun-15	U (0.002)	U (0.002)	U (0.003)	U (0.002)	U (0.060)	0.50	76.59
02-Sep-15	0.0011	U (0.001)	U (0.001)	U (0.003)	U (0.1)	U (0.40)	76.36
12-Nov-15	0.029	U (0.002)	U (0.003)	U (0.002)	0.14	U (0.21)	78.14
20-Jan-16	0.071	U (0.002)	U (0.003)	U (0.002)	0.18	0.22	77.57
09-May-16	0.026	U (0.001)	U (0.001)	U (0.003)	0.1	U (0.45)	77.70
13-Oct-16	0.053	U (0.001)	U (0.001)	U (0.003)	0.84	0.36	77.53
09-Dec-16	0.027	U (0.002)	U (0.002)	U (0.003)	0.067	0.67	76.74
08-Feb-17	0.010	U (0.002)	U (0.003)	U (0.002)	0.057	0.27	76.14
24-Apr-17	0.0096	U (0.002)	U (0.003)	U (0.003)	U (0.001)	U (0.0003)	77.39
01-Sep-17	0.0068	U (0.002)	U (0.003)	U (0.002)	U (1.0)	0.250	78.61
15-Feb-18	0.012	U (0.002)	U (0.003)	U (0.003)	U (1.0)	U (0.13)	77.07
29-Jun-18	0.026	U (0.002)	U (0.003)	U (0.003)	U (0.25) H	0.30	76.34
11-Sep-18	0.01	U (0.001)	U (0.001)	U (0.002)	U (0.15)	U (0.27)	76.80
26-Oct-18	0.015	U (0.002)	U (0.003)	U (0.003)	U (0.25)	0.31	76.94
25-Feb-19	0.0037	U (0.002)	U (0.003)	U (0.003)	U (0.25)	0.19	76.59
25-Apr-19	U (0.003)	U (0.002)	U (0.003)	U (0.003)	U (0.25)	U (0.27)	77.94
25-Jul-19	0.0071	U (0.002)	U (0.003)	U (0.003)	U (0.25)	0.27	76.78
18-Oct-19	U (0.003)	U (0.002)	U (0.003)	U (0.003)	U (0.25)	0.16	75.68
GCLs	0.0046	1.1	0.015	0.19	2.2	1.5	NA

Monitoring Well MW-2

Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	GRO (mg/L)	DRO (mg/L)	GW Elev (feet)
06-Nov-14	0.067	0.026	0.016	0.130	0.68	0.19	77.95
25-Feb-15	0.022	0.0045	0.0034	0.020	0.130	U (0.41)	77.03
10-Jun-15	U (0.002)	U (0.002)	U (0.003)	1.8	6.1	1.1	76.67
02-Sep-15	0.089	0.056	0.065	1.4	U (10)	1.8	76.48
12-Nov-15	0.091	0.11	0.13	0.179	22	1.8	78.61
20-Jan-16	0.520	1.5	0.83	5.1	NL	1.6	78.28
09-May-16	0.41	0.37	0.35	2.8	U (10)	0.95	78.25
13-Oct-16	0.42	0.63	0.48	2.62	9.2	0.98	78.74
09-Dec-16	0.57	0.17	0.50	1.01	11	1.7	77.07
08-Feb-17	0.053	U (0.002)	0.02	0.096	0.58	0.20	77.32
24-Apr-17	0.036	0.012	0.035	0.66	2.6	0.94	78.01
01-Sep-17	0.083	0.026	0.450	2.330	9.7	1.3	79.31
15-Feb-18	0.067	0.02	0.14	0.97	U (10)	0.98	79.08
29-Jun-18	0.17	0.25	0.59	3.3	6.0 H	1.2	78.34
11-Sep-18	0.094	0.13	0.18	1.08	4.8	0.74	78.88
26-Oct-18	0.17	0.28	0.48	3.01	11	1.0	79.40
25-Feb-19	0.092	0.22	0.18	1.41	5.4	1.2	75.96
25-Apr-19	0.051	0.13	U (0.003)	1.28	3.6	0.93	79.50
25-Jul-19	0.079	0.13	0.2	1.47	5.4	0.89	77.72
18-Oct-19	0.025	0.0065	0.022	0.101	0.74	0.24	77.05
GCLs	0.0046	1.1	0.015	0.19	2.2	1.5	NA

**Appendix D
Tables of Historical Monitoring Data**

Monitoring Well MW-3

Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	GRO (mg/L)	DRO (mg/L)	GW Elev (feet)
06-Nov-14	5.0	7.4	37	39	240	3.5	78.38
25-Feb-15	2.9	34	6.7	37	180	8.6	77.98
10-Jun-15	5.2	38	8.2	48	210	9.5	78.40
02-Sep-15	3.7	24	4.4	28	U (200)	5.1	77.88
12-Nov-15	1.3	2.1	0.21	1.69	87	3.6	78.92
20-Jan-16	3.8	13	4.2	25.3	120	4.1	78.50
09-May-16	2.1	21	2.2	33	69	1.5	78.43
13-Oct-16	1.2	4.2	2.9	14.6	46	2	78.75
09-Dec-16	0.17 (E)	NL	NL	0.54 (E)	100	3.3	77.80
08-Feb-17	39	99	53	103	98	3.9	77.61
24-Apr-17	2.5	14	5.2	28.9	U (200)	6.7	78.61
01-Sep-17	0.610	9.300	3.700	21.400	75	1.9	79.33
15-Feb-18	0.3	3.8	2.9	15.6	U (100)	1.3	79.03
29-Jun-18	0.28	1.1	1.7	8.2 H	23 H	1.1	78.78
11-Sep-18	0.29	0.53	1	5.6	14	0.91	79.13
26-Oct-18	0.32	0.36	0.89	4.3	15	0.93	79.40
25-Feb-19	0.95	0.69	2.3	11.4	U (1.3)	4.6	78.15
25-Apr-19	0.14	0.13	U (1.5)	U (1.5)	11	0.64	79.58
25-Jul-19	0.68	1.2	2.4	11.6	41	1.9	78.38
18-Oct-19	0.21	0.66	1.7	9.7	21	1.2	77.04
GCLs	0.0046	1.1	0.015	0.19	2.2	1.5	NA

Monitoring Well MW-4

Date	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	GRO (mg/L)	DRO (mg/L)	GW Elev (feet)
06-Nov-14	0.940	1.9	0.3	1.5	13	0.45	77.81
25-Feb-15	3.7	6.6	0.56	2.7	29	1.0	76.85
10-Jun-15	1.1	2.3	0.54	2.7	14	1.0	76.60
02-Sep-15	0.026	U (0.001)	0.007	0.03	0.3	U (0.40)	77.31
12-Nov-15	NL	NL	NL	NL	U (0.050)	U (0.21)	78.99
20-Jan-16	0.0043	U (0.002)	U (0.003)	U (0.002)	NL	0.15	78.56
09-May-16	0.0092	U (0.001)	U (0.001)	U (0.003)	U (0.1)	U (0.42)	78.51
13-Oct-16	U (0.00020)	U (0.001)	U (0.001)	U (0.003)	U (0.1)	0.18	78.84
09-Dec-16	NL	NL	NL	NL	U (0.05)	0.18	77.93
08-Feb-17	0.017	U (0.002)	U (0.003)	U (0.002)	U (0.05)	0.18	78.81
24-Apr-17	0.012	U (0.002)	0.0049	U (0.003)	U (0.001)	U (0.0003)	78.8
01-Sep-17	0.550	U (0.050)	0.380	0.740	5.1	0.48	79.38
15-Feb-18	0.19	U (0.10)	0.26	0.438	3.3	0.29	79.14
29-Jun-18	0.09	U (0.002)	0.022	0.027	0.52	0.19	79.00
11-Sep-18	0.0086	U (0.001)	0.0052	0.0062	U (0.15)	U (0.28)	79.23
26-Oct-18	0.013	U (0.002)	0.0045	0.0089	U (0.25)	0.15	79.46
25-Feb-19	0.026	U (0.002)	0.0034	0.0089	U (0.25)	0.20	78.30
25-Apr-19	U (0.003)	U (0.002)	U (0.003)	U (0.003)	U (0.25)	U (0.27)	77.23
25-Jul-19	0.051	U (0.002)	U (0.003)	0.0078	U (0.25)	0.16	78.33
18-Oct-19	0.020	0.015	0.0059	0.0277	U (0.25)	U (0.12)	77.03
GCLs	0.0046	1.1	0.015	0.19	2.2	1.5	NA

Appendix D Tables of Historical Monitoring Data

Key: DRO - diesel range organics
E – There was insufficient sample to perform a re-extraction.
GCL - ground water cleanup level
GRO - gasoline range organics
GW Elev - groundwater elevation
H – Sample was prepped or analyzed beyond the specified holding time.
mg/L - milligrams per liter
NA - not applicable
NM - not measured
NL - Not analyzed due to laboratory error.
U - Undetected above practical quantitation limits.
Xylenes - total xylenes
Bold, shade indicates concentration exceeds the GCL.

APPENDIX E

*Laboratory Analytical Report and
ADEC Laboratory Data Review
Checklist*

ANALYTICAL REPORT

Eurofins TestAmerica, Seattle
5755 8th Street East
Tacoma, WA 98424
Tel: (253)922-2310

Laboratory Job ID: 580-90139-1
Client Project/Site: Tesoro - TNS 76

For:
Stantec Consulting Services Inc
1835 S. Bragraw
Suite 350
Anchorage, Alaska 99508

Attn: John Marshall

M. Elaine Walker

Authorized for release by:
11/4/2019 4:12:45 PM

Elaine Walker, Project Manager II
(253)248-4972
elaine.walker@testamericainc.com

LINKS

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www.testamericainc.com

This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.



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Case Narrative

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Job ID: 580-90139-1

Laboratory: Eurofins TestAmerica, Seattle

Narrative

Job Narrative 580-90139-1

Receipt

Six samples were received on 10/18/2019 4:01 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 5.6° C.

GC/MS VOA

Method 8260C: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-3 (580-90139-3) and TNS 76 (580-90139-5). Elevated reporting limits (RLs) are provided.

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC VOA

Method AK101: The following samples exhibited positive detects outside of the AK defined region: MW-2 (580-90139-2), MW-3 (580-90139-3) and TNS 76 (580-90139-5).

Method AK101: The following samples were diluted to bring the concentration of target analytes within the calibration range: MW-3 (580-90139-3) and TNS 76 (580-90139-5). Elevated reporting limits (RLs) are provided.

Method AK101: The Gasoline Range Organics (GRO) concentration reported for the following sample is due to the presence of discrete peaks: MW-3 (580-90139-3). Gasoline Range Organics (GRO)-C6-C10

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

GC Semi VOA

Method AK102 & 103: The following samples contained a hydrocarbon pattern in the diesel range; however, the elution pattern was earlier than the typical diesel fuel pattern used by the laboratory for quantitative purposes: MW-2 (580-90139-2), MW-3 (580-90139-3) and TNS 76 (580-90139-5).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Definitions/Glossary

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Client Sample Results

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: MW-1

Lab Sample ID: 580-90139-1

Date Collected: 10/18/19 12:10

Matrix: Water

Date Received: 10/18/19 16:01

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		3.0		ug/L			10/24/19 20:17	1
Toluene	ND		2.0		ug/L			10/24/19 20:17	1
Ethylbenzene	ND		3.0		ug/L			10/24/19 20:17	1
m-Xylene & p-Xylene	ND		3.0		ug/L			10/24/19 20:17	1
o-Xylene	ND		2.0		ug/L			10/24/19 20:17	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	102		80 - 120		10/24/19 20:17	1
Trifluorotoluene (Surr)	87		80 - 120		10/24/19 20:17	1
4-Bromofluorobenzene (Surr)	93		80 - 120		10/24/19 20:17	1
Dibromofluoromethane (Surr)	100		80 - 120		10/24/19 20:17	1
1,2-Dichloroethane-d4 (Surr)	95		80 - 126		10/24/19 20:17	1

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		0.25		mg/L			10/25/19 14:10	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	92		50 - 150		10/25/19 14:10	1
4-Bromofluorobenzene (Surr)	95		50 - 150		10/25/19 14:10	1

Method: AK102 - Nonhalogenated Organics by FID (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.16		0.12		mg/L		10/31/19 09:00	11/02/19 20:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	88		50 - 150	10/31/19 09:00	11/02/19 20:21	1

Client Sample Results

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: MW-2

Lab Sample ID: 580-90139-2

Date Collected: 10/18/19 12:53

Matrix: Water

Date Received: 10/18/19 16:01

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	25		3.0		ug/L			10/24/19 20:42	1
Toluene	6.5		2.0		ug/L			10/24/19 20:42	1
Ethylbenzene	22		3.0		ug/L			10/24/19 20:42	1
m-Xylene & p-Xylene	69		3.0		ug/L			10/24/19 20:42	1
o-Xylene	32		2.0		ug/L			10/24/19 20:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	106		80 - 120		10/24/19 20:42	1
Trifluorotoluene (Surr)	89		80 - 120		10/24/19 20:42	1
4-Bromofluorobenzene (Surr)	95		80 - 120		10/24/19 20:42	1
Dibromofluoromethane (Surr)	95		80 - 120		10/24/19 20:42	1
1,2-Dichloroethane-d4 (Surr)	98		80 - 126		10/24/19 20:42	1

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	0.74		0.25		mg/L			10/25/19 14:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		50 - 150		10/25/19 14:40	1
4-Bromofluorobenzene (Surr)	102		50 - 150		10/25/19 14:40	1

Method: AK102 - Nonhalogenated Organics by FID (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.24		0.12		mg/L		10/31/19 09:00	11/02/19 20:41	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	76		50 - 150	10/31/19 09:00	11/02/19 20:41	1

Client Sample Results

Client: Stantec Consulting Services Inc
 Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: MW-3

Lab Sample ID: 580-90139-3

Date Collected: 10/18/19 14:04

Matrix: Water

Date Received: 10/18/19 16:01

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	210		150		ug/L			10/25/19 20:23	50
Toluene	660		100		ug/L			10/25/19 20:23	50
Ethylbenzene	1700		150		ug/L			10/25/19 20:23	50
m-Xylene & p-Xylene	6700		150		ug/L			10/25/19 20:23	50
o-Xylene	3000		100		ug/L			10/25/19 20:23	50

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	105		80 - 120					10/25/19 20:23	50
Trifluorotoluene (Surr)	89		80 - 120					10/25/19 20:23	50
4-Bromofluorobenzene (Surr)	95		80 - 120					10/25/19 20:23	50
Dibromofluoromethane (Surr)	97		80 - 120					10/25/19 20:23	50
1,2-Dichloroethane-d4 (Surr)	98		80 - 126					10/25/19 20:23	50

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	21		2.5		mg/L			10/29/19 15:32	10

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	102		50 - 150					10/29/19 15:32	10
4-Bromofluorobenzene (Surr)	108		50 - 150					10/29/19 15:32	10

Method: AK102 - Nonhalogenated Organics by FID (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	1.2		0.12		mg/L		10/31/19 09:00	11/02/19 21:01	1

Surrogate	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
o-Terphenyl	75		50 - 150				10/31/19 09:00	11/02/19 21:01	1

Client Sample Results

Client: Stantec Consulting Services Inc
 Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: MW-4

Lab Sample ID: 580-90139-4

Date Collected: 10/18/19 13:20

Matrix: Water

Date Received: 10/18/19 16:01

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	20		3.0		ug/L			10/25/19 15:47	1
Toluene	15		2.0		ug/L			10/25/19 15:47	1
Ethylbenzene	5.9		3.0		ug/L			10/25/19 15:47	1
m-Xylene & p-Xylene	20		3.0		ug/L			10/25/19 15:47	1
o-Xylene	7.7		2.0		ug/L			10/25/19 15:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	109		80 - 120		10/25/19 15:47	1
Trifluorotoluene (Surr)	90		80 - 120		10/25/19 15:47	1
4-Bromofluorobenzene (Surr)	89		80 - 120		10/25/19 15:47	1
Dibromofluoromethane (Surr)	91		80 - 120		10/25/19 15:47	1
1,2-Dichloroethane-d4 (Surr)	95		80 - 126		10/25/19 15:47	1

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		0.25		mg/L			10/29/19 14:00	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	105		50 - 150		10/29/19 14:00	1
4-Bromofluorobenzene (Surr)	93		50 - 150		10/29/19 14:00	1

Method: AK102 - Nonhalogenated Organics by FID (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.12		mg/L		10/31/19 09:00	11/02/19 21:21	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	71		50 - 150	10/31/19 09:00	11/02/19 21:21	1

Client Sample Results

Client: Stantec Consulting Services Inc
 Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: TNS 76

Lab Sample ID: 580-90139-5

Date Collected: 10/18/19 14:06

Matrix: Water

Date Received: 10/18/19 16:01

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	180		150		ug/L			10/25/19 20:49	50
Toluene	600		100		ug/L			10/25/19 20:49	50
Ethylbenzene	1600		150		ug/L			10/25/19 20:49	50
m-Xylene & p-Xylene	6100		150		ug/L			10/25/19 20:49	50
o-Xylene	2800		100		ug/L			10/25/19 20:49	50

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	106		80 - 120		10/25/19 20:49	50
Trifluorotoluene (Surr)	90		80 - 120		10/25/19 20:49	50
4-Bromofluorobenzene (Surr)	92		80 - 120		10/25/19 20:49	50
Dibromofluoromethane (Surr)	96		80 - 120		10/25/19 20:49	50
1,2-Dichloroethane-d4 (Surr)	99		80 - 126		10/25/19 20:49	50

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	18		2.5		mg/L			10/28/19 13:43	10

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	64		50 - 150		10/28/19 13:43	10
4-Bromofluorobenzene (Surr)	109		50 - 150		10/28/19 13:43	10

Method: AK102 - Nonhalogenated Organics by FID (Diesel Range Organics)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	0.91		0.12		mg/L		10/31/19 09:00	11/02/19 21:42	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	60		50 - 150	10/31/19 09:00	11/02/19 21:42	1

Client Sample Results

Client: Stantec Consulting Services Inc
 Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-90139-6

Date Collected: 10/18/19 12:00

Matrix: Water

Date Received: 10/18/19 16:01

Method: 8260C - Volatile Organic Compounds by GC/MS

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		3.0		ug/L			10/24/19 17:47	1
Toluene	ND		2.0		ug/L			10/24/19 17:47	1
Ethylbenzene	ND		3.0		ug/L			10/24/19 17:47	1
m-Xylene & p-Xylene	ND		3.0		ug/L			10/24/19 17:47	1
o-Xylene	ND		2.0		ug/L			10/24/19 17:47	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	103		80 - 120		10/24/19 17:47	1
Trifluorotoluene (Surr)	93		80 - 120		10/24/19 17:47	1
4-Bromofluorobenzene (Surr)	91		80 - 120		10/24/19 17:47	1
Dibromofluoromethane (Surr)	95		80 - 120		10/24/19 17:47	1
1,2-Dichloroethane-d4 (Surr)	100		80 - 126		10/24/19 17:47	1

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		0.25		mg/L			10/25/19 13:40	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
Trifluorotoluene (Surr)	107		50 - 150		10/25/19 13:40	1
4-Bromofluorobenzene (Surr)	96		50 - 150		10/25/19 13:40	1

QC Sample Results

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Method: 8260C - Volatile Organic Compounds by GC/MS

Lab Sample ID: MB 580-315102/7
Matrix: Water
Analysis Batch: 315102

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	ND		3.0		ug/L			10/24/19 17:22	1
Toluene	ND		2.0		ug/L			10/24/19 17:22	1
Ethylbenzene	ND		3.0		ug/L			10/24/19 17:22	1
m-Xylene & p-Xylene	ND		3.0		ug/L			10/24/19 17:22	1
o-Xylene	ND		2.0		ug/L			10/24/19 17:22	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
Toluene-d8 (Surr)	106		80 - 120		10/24/19 17:22	1
Trifluorotoluene (Surr)	91		80 - 120		10/24/19 17:22	1
4-Bromofluorobenzene (Surr)	94		80 - 120		10/24/19 17:22	1
Dibromofluoromethane (Surr)	96		80 - 120		10/24/19 17:22	1
1,2-Dichloroethane-d4 (Surr)	96		80 - 126		10/24/19 17:22	1

Lab Sample ID: LCS 580-315102/4
Matrix: Water
Analysis Batch: 315102

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Benzene	10.0	9.15		ug/L		92	75 - 121
Toluene	10.0	10.3		ug/L		103	80 - 120
Ethylbenzene	10.0	10.1		ug/L		101	80 - 120
m-Xylene & p-Xylene	10.0	9.85		ug/L		99	80 - 120
o-Xylene	10.0	10.2		ug/L		102	80 - 120

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Toluene-d8 (Surr)	104		80 - 120
Trifluorotoluene (Surr)	92		80 - 120
4-Bromofluorobenzene (Surr)	95		80 - 120
Dibromofluoromethane (Surr)	98		80 - 120
1,2-Dichloroethane-d4 (Surr)	101		80 - 126

Lab Sample ID: LCSD 580-315102/5
Matrix: Water
Analysis Batch: 315102

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene	10.0	8.90		ug/L		89	75 - 121	3	14
Toluene	10.0	9.86		ug/L		99	80 - 120	5	19
Ethylbenzene	10.0	9.84		ug/L		98	80 - 120	3	14
m-Xylene & p-Xylene	10.0	9.61		ug/L		96	80 - 120	2	14
o-Xylene	10.0	9.89		ug/L		99	80 - 120	3	16

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Toluene-d8 (Surr)	102		80 - 120
Trifluorotoluene (Surr)	92		80 - 120
4-Bromofluorobenzene (Surr)	93		80 - 120
Dibromofluoromethane (Surr)	95		80 - 120

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QC Sample Results

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Lab Sample ID: LCSD 580-315102/5
Matrix: Water
Analysis Batch: 315102

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
1,2-Dichloroethane-d4 (Surr)	97		80 - 126

Lab Sample ID: MB 580-315172/7
Matrix: Water
Analysis Batch: 315172

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Benzene	ND		3.0		ug/L			10/25/19 13:07	1
Toluene	ND		2.0		ug/L			10/25/19 13:07	1
Ethylbenzene	ND		3.0		ug/L			10/25/19 13:07	1
m-Xylene & p-Xylene	ND		3.0		ug/L			10/25/19 13:07	1
o-Xylene	ND		2.0		ug/L			10/25/19 13:07	1

Surrogate	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Toluene-d8 (Surr)	104		80 - 120		10/25/19 13:07	1
Trifluorotoluene (Surr)	89		80 - 120		10/25/19 13:07	1
4-Bromofluorobenzene (Surr)	88		80 - 120		10/25/19 13:07	1
Dibromofluoromethane (Surr)	95		80 - 120		10/25/19 13:07	1
1,2-Dichloroethane-d4 (Surr)	98		80 - 126		10/25/19 13:07	1

Lab Sample ID: LCS 580-315172/4
Matrix: Water
Analysis Batch: 315172

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS		Unit	D	%Rec	%Rec. Limits
		Result	Qualifier				
Benzene	10.0	8.81		ug/L		88	75 - 121
Toluene	10.0	10.2		ug/L		102	80 - 120
Ethylbenzene	10.0	10.1		ug/L		101	80 - 120
m-Xylene & p-Xylene	10.0	9.71		ug/L		97	80 - 120
o-Xylene	10.0	9.67		ug/L		97	80 - 120

Surrogate	LCS		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	106		80 - 120
Trifluorotoluene (Surr)	89		80 - 120
4-Bromofluorobenzene (Surr)	92		80 - 120
Dibromofluoromethane (Surr)	93		80 - 120
1,2-Dichloroethane-d4 (Surr)	97		80 - 126

Lab Sample ID: LCSD 580-315172/5
Matrix: Water
Analysis Batch: 315172

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD		Unit	D	%Rec	%Rec. Limits	RPD	
		Result	Qualifier					RPD	Limit
Benzene	10.0	8.74		ug/L		87	75 - 121	1	14
Toluene	10.0	9.66		ug/L		97	80 - 120	5	19
Ethylbenzene	10.0	9.76		ug/L		98	80 - 120	3	14
m-Xylene & p-Xylene	10.0	9.40		ug/L		94	80 - 120	3	14
o-Xylene	10.0	9.29		ug/L		93	80 - 120	4	16

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QC Sample Results

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Method: 8260C - Volatile Organic Compounds by GC/MS (Continued)

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
Toluene-d8 (Surr)	105		80 - 120
Trifluorotoluene (Surr)	88		80 - 120
4-Bromofluorobenzene (Surr)	91		80 - 120
Dibromofluoromethane (Surr)	94		80 - 120
1,2-Dichloroethane-d4 (Surr)	95		80 - 126

Method: AK101 - Alaska - Gasoline Range Organics (GC)

Lab Sample ID: MB 580-315132/7

Matrix: Water

Analysis Batch: 315132

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		0.25		mg/L			10/25/19 12:07	1

Surrogate	MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Trifluorotoluene (Surr)	104		50 - 150		10/25/19 12:07	1
4-Bromofluorobenzene (Surr)	94		50 - 150		10/25/19 12:07	1

Lab Sample ID: LCS 580-315132/8

Matrix: Water

Analysis Batch: 315132

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Gasoline Range Organics (GRO) -C6-C10	1.00	0.983		mg/L		98	77 - 123

Surrogate	LCS		Limits
	%Recovery	Qualifier	
Trifluorotoluene (Surr)	106		50 - 150
4-Bromofluorobenzene (Surr)	100		50 - 150

Lab Sample ID: LCSD 580-315132/9

Matrix: Water

Analysis Batch: 315132

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10	1.00	0.974		mg/L		97	77 - 123	1	20

Surrogate	LCSD		Limits
	%Recovery	Qualifier	
Trifluorotoluene (Surr)	104		50 - 150
4-Bromofluorobenzene (Surr)	100		50 - 150

Lab Sample ID: MB 580-315249/7

Matrix: Water

Analysis Batch: 315249

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Gasoline Range Organics (GRO) -C6-C10	ND		0.25		mg/L			10/28/19 11:41	1

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QC Sample Results

Client: Stantec Consulting Services Inc
 Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Method: AK101 - Alaska - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: MB 580-315249/7
Matrix: Water
Analysis Batch: 315249

Client Sample ID: Method Blank
Prep Type: Total/NA

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Trifluorotoluene (Surr)	107		50 - 150		10/28/19 11:41	1
4-Bromofluorobenzene (Surr)	96		50 - 150		10/28/19 11:41	1

Lab Sample ID: LCS 580-315249/8
Matrix: Water
Analysis Batch: 315249

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

Surrogate	LCS LCS		Limits
	%Recovery	Qualifier	
Trifluorotoluene (Surr)	106		50 - 150
4-Bromofluorobenzene (Surr)	95		50 - 150

Lab Sample ID: LCSD 580-315249/9
Matrix: Water
Analysis Batch: 315249

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit

Surrogate	LCSD LCSD		Limits
	%Recovery	Qualifier	
Trifluorotoluene (Surr)	104		50 - 150
4-Bromofluorobenzene (Surr)	97		50 - 150

Lab Sample ID: MB 580-315376/7
Matrix: Water
Analysis Batch: 315376

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB MB		RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
	Result	Qualifier							
Gasoline Range Organics (GRO) -C6-C10	ND		0.25		mg/L			10/29/19 12:29	1

Surrogate	MB MB		Limits	Prepared	Analyzed	Dil Fac
	%Recovery	Qualifier				
Trifluorotoluene (Surr)	106		50 - 150		10/29/19 12:29	1
4-Bromofluorobenzene (Surr)	94		50 - 150		10/29/19 12:29	1

Lab Sample ID: LCS 580-315376/8
Matrix: Water
Analysis Batch: 315376

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits

Eurofins TestAmerica, Seattle

QC Sample Results

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Method: AK101 - Alaska - Gasoline Range Organics (GC) (Continued)

Lab Sample ID: LCS 580-315376/8
Matrix: Water
Analysis Batch: 315376

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Surrogate	LCS %Recovery	LCS Qualifier	Limits
Trifluorotoluene (Surr)	116		50 - 150
4-Bromofluorobenzene (Surr)	96		50 - 150

Lab Sample ID: LCSD 580-315376/9
Matrix: Water
Analysis Batch: 315376

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Gasoline Range Organics (GRO) -C6-C10	1.00	0.857		mg/L		86	77 - 123	2	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
Trifluorotoluene (Surr)	116		50 - 150
4-Bromofluorobenzene (Surr)	97		50 - 150

Method: AK102 - Nonhalogenated Organics by FID (Diesel Range Organics)

Lab Sample ID: MB 580-315583/1-A
Matrix: Water
Analysis Batch: 315825

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 315583

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
DRO (nC10-<nC25)	ND		0.11		mg/L		10/31/19 09:00	11/02/19 18:20	1

Surrogate	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	70		50 - 150	10/31/19 09:00	11/02/19 18:20	1

Lab Sample ID: LCS 580-315583/2-A
Matrix: Water
Analysis Batch: 315838

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 315583

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
DRO (nC10-<nC25)	2.00	1.52		mg/L		76	75 - 125

Surrogate	LCS %Recovery	LCS Qualifier	Limits
o-Terphenyl	76		50 - 150

Lab Sample ID: LCSD 580-315583/3-A
Matrix: Water
Analysis Batch: 315838

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 315583

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
DRO (nC10-<nC25)	2.00	1.66		mg/L		83	75 - 125	8	20

Surrogate	LCSD %Recovery	LCSD Qualifier	Limits
o-Terphenyl	76		50 - 150

Lab Chronicle

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: MW-1

Date Collected: 10/18/19 12:10

Date Received: 10/18/19 16:01

Lab Sample ID: 580-90139-1

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	315102	10/24/19 20:17	W1T	TAL SEA
Total/NA	Analysis	AK101		1	315132	10/25/19 14:10	EML	TAL SEA
Total/NA	Prep	3510C			315583	10/31/19 09:00	NRF	TAL SEA
Total/NA	Analysis	AK102		1	315825	11/02/19 20:21	W1T	TAL SEA

Client Sample ID: MW-2

Date Collected: 10/18/19 12:53

Date Received: 10/18/19 16:01

Lab Sample ID: 580-90139-2

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	315102	10/24/19 20:42	W1T	TAL SEA
Total/NA	Analysis	AK101		1	315132	10/25/19 14:40	EML	TAL SEA
Total/NA	Prep	3510C			315583	10/31/19 09:00	NRF	TAL SEA
Total/NA	Analysis	AK102		1	315825	11/02/19 20:41	W1T	TAL SEA

Client Sample ID: MW-3

Date Collected: 10/18/19 14:04

Date Received: 10/18/19 16:01

Lab Sample ID: 580-90139-3

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		50	315172	10/25/19 20:23	TL1	TAL SEA
Total/NA	Analysis	AK101		10	315376	10/29/19 15:32	EML	TAL SEA
Total/NA	Prep	3510C			315583	10/31/19 09:00	NRF	TAL SEA
Total/NA	Analysis	AK102		1	315825	11/02/19 21:01	W1T	TAL SEA

Client Sample ID: MW-4

Date Collected: 10/18/19 13:20

Date Received: 10/18/19 16:01

Lab Sample ID: 580-90139-4

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		1	315172	10/25/19 15:47	TL1	TAL SEA
Total/NA	Analysis	AK101		1	315376	10/29/19 14:00	EML	TAL SEA
Total/NA	Prep	3510C			315583	10/31/19 09:00	NRF	TAL SEA
Total/NA	Analysis	AK102		1	315825	11/02/19 21:21	W1T	TAL SEA

Client Sample ID: TNS 76

Date Collected: 10/18/19 14:06

Date Received: 10/18/19 16:01

Lab Sample ID: 580-90139-5

Matrix: Water

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	8260C		50	315172	10/25/19 20:49	TL1	TAL SEA
Total/NA	Analysis	AK101		10	315249	10/28/19 13:43	EML	TAL SEA
Total/NA	Prep	3510C			315583	10/31/19 09:00	NRF	TAL SEA
Total/NA	Analysis	AK102		1	315825	11/02/19 21:42	W1T	TAL SEA

Eurofins TestAmerica, Seattle

Lab Chronicle

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Client Sample ID: Trip Blank

Lab Sample ID: 580-90139-6

Date Collected: 10/18/19 12:00

Matrix: Water

Date Received: 10/18/19 16:01

<u>Prep Type</u>	<u>Batch Type</u>	<u>Batch Method</u>	<u>Run</u>	<u>Dilution Factor</u>	<u>Batch Number</u>	<u>Prepared or Analyzed</u>	<u>Analyst</u>	<u>Lab</u>
Total/NA	Analysis	8260C		1	315102	10/24/19 17:47	W1T	TAL SEA
Total/NA	Analysis	AK101		1	315132	10/25/19 13:40	EML	TAL SEA

Laboratory References:

TAL SEA = Eurofins TestAmerica, Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310



Accreditation/Certification Summary

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Laboratory: Eurofins TestAmerica, Seattle

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-024	01-19-22
ANAB	Dept. of Defense ELAP	L2236	01-19-22
ANAB	ISO/IEC 17025	L2236	01-19-22
California	State	2901	11-05-19
Montana (UST)	State	NA	04-13-21
Oregon	NELAP	WA100007	11-05-19
US Fish & Wildlife	US Federal Programs	058448	07-31-20
USDA	US Federal Programs	P330-17-00039	02-10-20
Washington	State	C553	02-17-20

Sample Summary

Client: Stantec Consulting Services Inc
Project/Site: Tesoro - TNS 76

Job ID: 580-90139-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
580-90139-1	MW-1	Water	10/18/19 12:10	10/18/19 16:01	
580-90139-2	MW-2	Water	10/18/19 12:53	10/18/19 16:01	
580-90139-3	MW-3	Water	10/18/19 14:04	10/18/19 16:01	
580-90139-4	MW-4	Water	10/18/19 13:20	10/18/19 16:01	
580-90139-5	TNS 76	Water	10/18/19 14:06	10/18/19 16:01	
580-90139-6	Trip Blank	Water	10/18/19 12:00	10/18/19 16:01	

Regulatory Program: DW NPDES RCRA Other: _____

Project Manager: Mike Zick Site Contact: _____
 Tel/Fax: _____ Lab Contact: _____
 Date: 10/18/19 Carrier: _____
 COC No.: _____ of _____ COCs

Company Name: Stantec
 Address: 705B Fireweed LN Suite 200
 City/State/Zip: Anchorage AK 99503
 Phone: 907-266-1183
 Fax: _____
 Project Name: TNS 76
 Site: PO# 500 to Anne Duarte @ Tesoro/Spectra

Analysis Turnaround Time
 CALENDAR DAYS WORKING DAYS
 TAT if different from Below
 2 weeks
 1 week
 2 days
 1 day

Sample Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)
10/18/19	1210	V	W	8		X
10/18/19	1253	V	W	8		X
10/18/19	1404	V	W	8		X
10/18/19	1320	V	W	8		X
10/18/19	1406	V	W	8		X
10/18/19	1200	V	W	6		X

Sample Identification

MW-1
 MW-2
 MW-3
 MW-4
 TNS 76
 Trip Blanks

Sample Specific Notes:

AK 101 / 8260
AK 102

Preservation Used: 1= Ice, 2= HCl; 3= H2SO4; 4=HNO3; 5=NaOH; 6= Other _____

Possible Hazard Identification: _____
 Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.

Non-Hazard Flammable Skin Irritant Poison B Unknown

Special Instructions/QC Requirements & Comments:
Please Report DRO BRO, BTEX only

Custody Seals Intact: Yes No
 Relinquished by: John Marshall Custody Seal No.: _____
 Relinquished by: John Marshall Company: Stantec

Received by: John Marshall Date/Time: 10/18/19 16:01
 Received by: _____ Date/Time: _____
 Received in Laboratory by: _____ Date/Time: _____

Relinquished by: _____ Date/Time: _____
 Relinquished by: _____ Date/Time: _____

Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)
 Return to Client Disposal by Lab Archive for _____ Months



Regulatory Program: DW NPDES RCRA Other: _____

Client Contact
 Project Manager: Mike Zick
 Site Contact: _____
 Lab Contact: _____
 Date: 10/18/19
 Carrier: _____
 COC No: _____
 Sampler: SM
 For Lab Use Only: _____

Address: 745 E. Firwood Ln. Ste. 200
 Anchorage, AK 99503
 Phone: 907-266-1188
 City/State/Zip: Anchorage, AK 99503
 Fax: _____
 Project Name: TNS 76
 P.O.# Sent to: Amy Quante @ Tesco/Spectro

Analysis Turnaround Time
 CALENDAR DAYS
 WORKING DAYS
 TAT if different from Below

1 day
 2 days
 1 week
 2 weeks

Sample Identification	Date	Sample Time	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS/MSD (Y/N)
MW-1	10/15/19	1210	V	W	8	X	X
MW-2	10/15/19	1253	V	W	8	X	X
MW-3	10/18/19	1404	V	W	8	X	X
MW-4	10/18/19	1320	V	W	8	X	X
TNS 76	10/18/19	1406	V	W	8	X	X
Trip Blanks	10/15/19	1200	V	W	6	X	X

Preservation Used: 1=Ice, 2=HCl, 3=H2SO4, 4=HNO3, 5=NaOH, 6=Other
 Possible Hazard Identification: Are any samples from a listed EPA Hazardous Waste? Please List any EPA Waste Codes for the sample in the Comments Section if the lab is to dispose of the sample.
 Non-Hazard Flammable Skin Irritant Poison B Unknown
 Return to Client Disposal by Lab Archive for _____ Months
 Sample Disposal (A fee may be assessed if samples are retained longer than 1 month)

Special Instructions/QC Requirements & Comments:
 Please Report DRO, BTEX only

Custody Seal No.: _____ Yes No
 Outbody Seals Intact: _____

Relinquished by: [Signature] Company: Starke Date/Time: 10/13/19 16:01
 Relinquished by: [Signature] Company: TA-AK Date/Time: 10/21/19 12:00
 Relinquished by: [Signature] Company: TA-AK Date/Time: 10/18/19 16:01
 Relinquished by: [Signature] Company: TA-AK Date/Time: 10/23/19 09:30

Received in Laboratory by: [Signature] Company: TA-AK
 Received by: [Signature] Company: TA-AK
 Received by: [Signature] Company: TA-AK
 Received by: [Signature] Company: TA-AK

Cooler Temp. (°C): Obs'd: _____ Cor'd: 5.6 Therm ID No.: _____

7-2.6

1
2
3
5
6
7
8
9
10
11

Login Sample Receipt Checklist

Client: Stantec Consulting Services Inc

Job Number: 580-90139-1

Login Number: 90139

List Number: 1

Creator: Pilch, Andrew C

List Source: Eurofins TestAmerica, Seattle

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

Laboratory Data Review Checklist

Completed By:

Erin O'Malley

Title:

Environmental Engineer

Date:

11/22/2019

Consultant Firm:

Stantec Consulting Services Inc.

Laboratory Name:

TestAmerica Seattle

Laboratory Report Number:

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

ADEC File Number:

2265.26.037

Hazard Identification Number:

26295

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

Note: Any N/A or No box checked must have an explanation in the comments box.

1. Laboratory

a. Did an ADEC CS approved laboratory receive and perform all of the submitted sample analyses?

Yes No N/A Comments:

b. If the samples were transferred to another “network” laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses ADEC CS approved?

Yes No N/A Comments:

2. Chain of Custody (CoC)

a. CoC information completed, signed, and dated (including released/received by)?

Yes No N/A Comments:

b. Correct analyses requested?

Yes No N/A Comments:

3. Laboratory Sample Receipt Documentation

a. Sample/cooler temperature documented and within range at receipt (0° to 6° C)?

Yes No N/A Comments:

b. Sample preservation acceptable – acidified waters, Methanol preserved VOC soil (GRO, BTEX, Volatile Chlorinated Solvents, etc.)?

Yes No N/A Comments:

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

c. Sample condition documented – broken, leaking (Methanol), zero headspace (VOC vials)?

Yes No N/A Comments:

d. If there were any discrepancies, were they documented? For example, incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, etc.?

Yes No N/A Comments:

e. Data quality or usability affected?

Comments:

No.

4. Case Narrative

a. Present and understandable?

Yes No N/A Comments:

b. Discrepancies, errors, or QC failures identified by the lab?

Yes No N/A Comments:

c. Were all corrective actions documented?

Yes No N/A Comments:

d. What is the effect on data quality/usability according to the case narrative?

Comments:

No effect on data quality/usability.

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

5. Samples Results

a. Correct analyses performed/reported as requested on COC?

Yes No N/A Comments:

b. All applicable holding times met?

Yes No N/A Comments:

c. All soils reported on a dry weight basis?

Yes No N/A Comments:

No soil samples.

d. Are the reported LOQs less than the Cleanup Level or the minimum required detection level for the project?

Yes No N/A Comments:

e. Data quality or usability affected?

No.

6. QC Samples

a. Method Blank

i. One method blank reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

ii. All method blank results less than limit of quantitation (LOQ) or project specified objectives?

Yes No N/A Comments:

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

iii. If above LOQ or project specified objectives, what samples are affected?

Comments:

iv. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No N/A Comments:

No affected samples.

v. Data quality or usability affected?

Comments:

No.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Organics – One LCS/LCSD reported per matrix, analysis and 20 samples? (LCS/LCSD required per AK methods, LCS required per SW846)

Yes No N/A Comments:

ii. Metals/Inorganics – one LCS and one sample duplicate reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

No metals/inorganics.

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes No N/A Comments:

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from LCS/LCSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No N/A Comments:

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No N/A Comments:

No affected samples.

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

No.

c. Matrix Spike/Matrix Spike Duplicate (MS/MSD)

Note: Leave blank if not required for project

i. Organics – One MS/MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

ii. Metals/Inorganics – one MS and one MSD reported per matrix, analysis and 20 samples?

Yes No N/A Comments:

iii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods: AK101 60%-120%, AK102 75%-125%, AK103 60%-120%; all other analyses see the laboratory QC pages)

Yes No N/A Comments:

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

iv. Precision – All relative percent differences (RPD) reported and less than method or laboratory limits and project specified objectives, if applicable? RPD reported from MS/MSD, and or sample/sample duplicate. (AK Petroleum methods 20%; all other analyses see the laboratory QC pages)

Yes No N/A Comments:

v. If %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

vi. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

Yes No N/A Comments:

vii. Data quality or usability affected? (Use comment box to explain.)

Comments:

d. Surrogates – Organics Only or Isotope Dilution Analytes (IDA) – Isotope Dilution Methods Only

i. Are surrogate/IDA recoveries reported for organic analyses – field, QC and laboratory samples?

Yes No N/A Comments:

ii. Accuracy – All percent recoveries (%R) reported and within method or laboratory limits and project specified objectives, if applicable? (AK Petroleum methods 50-150 %R; all other analyses see the laboratory report pages)

Yes No N/A Comments:

iii. Do the sample results with failed surrogate/IDA recoveries have data flags? If so, are the data flags clearly defined?

Yes No N/A Comments:

No failed surrogate recoveries.

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

iv. Data quality or usability affected?

Comments:

No.

e. Trip Blanks

i. One trip blank reported per matrix, analysis and for each cooler containing volatile samples? (If not, enter explanation below.)

Yes No N/A Comments:

ii. Is the cooler used to transport the trip blank and VOA samples clearly indicated on the COC? (If not, a comment explaining why must be entered below)

Yes No N/A Comments:

iii. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

iv. If above LOQ or project specified objectives, what samples are affected?

Comments:

v. Data quality or usability affected?

Comments:

No.

f. Field Duplicate

i. One field duplicate submitted per matrix, analysis and 10 project samples?

Yes No N/A Comments:

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

ii. Submitted blind to lab?

Yes No N/A Comments:

TNS 76 is a duplicate of MW-3.

iii. Precision – All relative percent differences (RPD) less than specified project objectives?
(Recommended: 30% water, 50% soil)

$$RPD (\%) = \text{Absolute value of: } \frac{(R_1 - R_2)}{((R_1 + R_2) / 2)} \times 100$$

Where R₁ = Sample Concentration
R₂ = Field Duplicate Concentration

Yes No N/A Comments:

iv. Data quality or usability affected? (Use the comment box to explain why or why not.)

Comments:

No

g. Decontamination or Equipment Blank (If not applicable, a comment stating why must be entered below)?

Yes No N/A Comments:

No decontamination or equipment blank required because no reusable (only disposable) equipment used for purging and sampling.

i. All results less than LOQ and project specified objectives?

Yes No N/A Comments:

No decontamination or equipment blank required.

ii. If above LOQ or project specified objectives, what samples are affected?

Comments:

No decontamination or equipment blank required.

iii. Data quality or usability affected?

Comments:

No decontamination or equipment blank required.

580-90139-1

Laboratory Report Date:

11/4/2019

CS Site Name:

Tesoro 2Go Mart 76

7. Other Data Flags/Qualifiers (ACOE, AFCEE, Lab Specific, etc.)

a. Defined and appropriate?

Yes No N/A

Comments: