Anacortes Refinery

Tesoro Refining & Marketing Company LLC

P.O. Box 700
Anacortes, WA 98221

March 28, 2024

Sarah Penfield
Environmental Engineer
Solid Waste Management, Industrial Section
PO Box 47600
Olympia, WA 98504-7600

Subject: Oily Water Sewer Annual Progress Report - 2023

Dear Ms. Penfield,

Enclosed is the 2023 Annual Progress Report, SWMU-12 Oily Water Sewer. This progress report has been prepared in accordance with the requirements in Section VII.C of Agreed Order No DE 16299 (AO). This report describes the 2023 inspection findings, ongoing site characterization efforts, and sewer repair.

Instances where the Investigation and Response Plan (IRP) was deviated from are discussed in section 3.1. Sections of the trunk line scheduled for 2023 were not inspected. These sections will be reattempted in 2024.

Repairs were made to an Area of Concern (AOC) identified in the 2022 inspections. This AOC is identified as AOC-1 and is discussed in section 2.1 of the Report. Initial investigation indicated benzene and arsenic concentrations exceeding MTCA Method C cleanup levels. Perimeter groundwater wells do not show evidence of release. Further characterization will continue in 2024.

A second AOC was discovered, identified as AOC-2, and is discussed in section 2.2 of the Report. Corrective actions were taken to isolate the affected area and repairs initiated. Perimeter groundwater wells do not show evidence of release. Further characterization will continue in 2024 after repairs are complete.

If you have questions on this information, please contact me at (360) 293-9122 or my ES&S Manager, Shannon Logan, at (360) 299-1712.

Sincerely,

DOA FROM CAMERON HUNT

Cameron Hunt.
General Manager
Tesoro Refining & Marketing Company LLC

Enclosure
2023 Annual Progress Report, SWMU-12 Oily Water Sewer

2023 Annual Progress Report

SWMU-12 Oily Water Sewer

Marathon Anacortes Refinery

March 27, 2024

Submitted by:

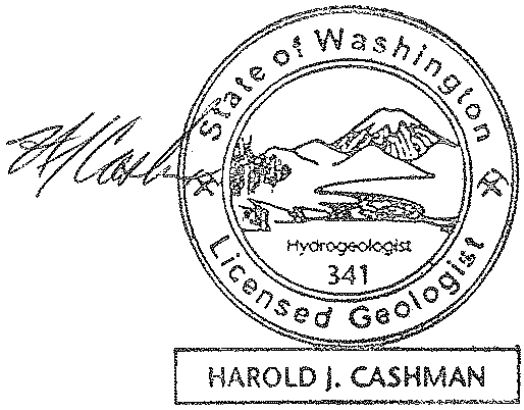
Tesoro Refining & Marketing Company LLC
Marathon Anacortes Refinery
10200 March's Point Road
Anacortes, Washington 98221

Submitted to:

Washington State Department of Ecology
Industrial Section
P.O. Box 47600
Olympia, WA 98504-7600

CERTIFICATION STATEMENT

All geologic and hydrogeologic work performed pursuant to this report was conducted under the supervision and direction of the geologist listed below:



3/27/2024

Harold Cashman P.G. Date

All engineering work performed pursuant to this report was conducted under the supervision and direction of the engineer listed below:

3/27/2024

Eric Libolt P.E. Date

TABLE OF CONTENTS

LIST OF APPENDICES

1. INTRODUCTION

This annual progress report has been prepared in accordance with the requirements in Section VII.C. of Agreed Order No. DE 16299 (AO). The AO was entered into by the Washington State Department of Ecology (Ecology) and the Tesoro Refining & Marketing Company LLC Marathon Anacortes Refinery (Marathon Anacortes Refinery) on November 1st, 2021. The objective of the AO is to investigate and conduct remedial actions for the Marathon Anacortes Refinery's Oily Water Sewer (OWS) system, also referred to as Solid Waste Management Unit 12 (SWMU-12).

Per Section VII.A of the AO, an Investigation and Response Plan (IRP) was prepared to provide a framework to investigate the integrity of the OWS and respond to any releases from the OWS to soil and/or groundwater. The AO requires Marathon Anacortes Refinery to submit an annual progress report to Ecology by April 1st of each year following the implementation of the IRP.

The IRP described ten inspection phases of the major OWS trunk lines to be completed by November 1st, 2031. This report summarizes the OWS inspection activities and findings of 2023. All Figures referenced in this report are included in Appendix A. All Tables referenced in this report are included in Appendix B.

1.1 GENERAL SITE INFORMATION

The Marathon Anacortes Refinery is located at 10200 March's Point Road in Anacortes, Washington (Parcel #P32990) within Section 27 of Township 35 North, Range 2 East. The refinery has a median elevation of approximately 100 ft. above mean sea level and the site topography generally slopes north. A site location map is provided as Figure A-1.

1.2 CONTACT INFORMATION

Contact information for the Ecology site manager, project consultant and property owner/facility operator are included below.

- Ecology Site Manager: Sarah Penfield
    - Address: P.O. Box 47600 Olympia, WA 98504-7600
    - Phone: (360) 280-2325
    - Email: sarah.penfield@ecy.wa.gov
- Project Consultant: ALL4, LLC.
    - Address: 228 E Champion St #101, Bellingham, WA 98225
    - Contact: Olana Costa
    - Phone: (360) 685-8343
    - Email: ocosta@all4inc.com
- Property Owner/Facility Operator: Marathon Anacortes Refinery
    - Address: 10200 March's Point Road, Anacortes, WA 98221
    - Contact: Shannon Logan
    - Phone: (360) 299-1712
    - Email: Slogan2@marathonpetroleum.com

2. 2023 RELEASES

Two releases from the Marathon Anacortes Refinery OWS were confirmed in 2023. The discovery of each release and the investigation and cleanup activities initiated in 2023 are described below.

2.1 AREA OF CONCERN-1

Per the IRP, inspections of the OWS were completed in August 2022 by BAI Environmental Services (BAI). The 2022 video inspections included the OWS main trunk lines from manhole F-1B to manhole F-8 along "F" Street.

All 2022 inspection videos were completed in general accordance with the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP). Sewer defects (e.g., cracking, fractures, offset joints, etc.) observed during the video inspections were assigned a NASSCO code by BAI. Mott MacDonald (the former project consultant) reviewed each NASSCO code and assigned a corresponding environmental rating (ER) based on the potential for a release. The ER values range from 1-5. A definition for each ER value can be found in Table B-1.

One location that contained an ER of 4 was identified as Area of Concern-1 (AOC-1) during the 2022 OWS inspections. A location map of AOC-1 is provided as Figure A-2. An ER of 4 equates to a significant structural defect with the potential for release. Per the IRP, an initial soil investigation was conducted in September 2023 to determine if a release had occurred. A release was confirmed in October 2023 following the review of laboratory analytical results of eight soil samples and one groundwater sample collected from AOC-1.

2.1.1 Soil Sample Collection

An initial soil investigation of AOC-1 was conducted in September 2023. The soil investigation location is shown on Figure A-2. Eight soil samples were collected and sent to Analytical Resources, LLC in Tukwila, WA. The soil boring locations are shown on Figure A-3. The soil sample descriptions and field screening results are included in Table B-2.

The following laboratory methods were used to analyze the soil samples:

- EPA Method 8260:
  - Benzene, toluene, ethylbenzene, and total xylenes (BTEX)
- EPA Method 8270:
  - Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(j)fluoranthene, benzo(a)pyrene, indeno(1,2,3cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene
- EPA Method 200.8:
  - Arsenic, cadmium, selenium, silver
- EPA Method 6010:
  - Barium, lead
- EPA Method 7471:
  - Mercury
- NWTPH-Gx:
  - Gasoline range TPH
- NWTPH-Dx:
  - Diesel range TPH, motor oil range TPH

2.1.2 Soil Sample Results

Soil sample *2023-13-09-B8-8ft* exceeded the following target cleanup levels (Table B-3):

- Gasoline range TPH concentration was 614 mg/kg, exceeding the MTCA Method A cleanup value of 100 mg/kg.

The laboratory analytical results are summarized in Tables B-3 through B-5. The original laboratory analytical data report is provided in Appendix C.

2.1.3 Groundwater Sample Collection

One groundwater sample was collected during the initial soil investigation on September 12, 2023, and sent to Analytical Resources, LLC in Tukwila, WA. Groundwater sample *2023-12-09-B5-8ft* was collected from an open boring (B5; Figure A-3) and is not considered a representative groundwater sample. The groundwater sample location is shown on Figure A-4. The following laboratory methods were used to analyze the groundwater sample:

- EPA Method 8260:
  - Benzene, toluene, ethylbenzene, and total xylenes (BTEX)
- EPA Method 8270:
  - Naphthalene, 1-methylnaphthalene, 2-methylnaphthalene, acenaphthylene, acenaphthene, dibenzofuran, fluorene, phenanthrene, anthracene, carbazole, fluoranthene, pyrene, benzo(a)anthracene, chrysene, benzo(b)fluoranthene, benzo(k)fluoranthene, benzo(j)fluoranthene, benzo(a)pyrene, perylene, indeno(1,2,3cd)pyrene, dibenzo(a,h)anthracene, benzo(g,h,i)perylene
- EPA Method 200.8:
  - Arsenic, cadmium, selenium, silver
- EPA Method 6010:
  - Barium, lead
- EPA Method 7471:
  - Mercury
- NWTPH-Gx:
  - Gasoline range TPH
- NWTPH-Dx:
  - Diesel range TPH, motor oil range TPH

2.1.4 Groundwater Sample Results

Groundwater sample *2023-12-09-B5-8ft* exceeded the following target cleanup levels (Table B-6):

- Benzene concentration was 15.8 µg/L, exceeding the MTCA Method C cleanup value of 8.0 µg/L.
- Arsenic concentration was 23.3 µg/L, exceeding the MTCA Method C cleanup values for groundwater (11.0 µg/L and 0.58 µg/L) and the MTCA Method C cleanup values for surface water (2.5 µg/L).

The laboratory analytical results are summarized in Table B-6. The original laboratory analytical data report is provided in Appendix C.

2.1.5 Geology and Hydrogeology

The stratigraphic sequence of major geologic units that underlie the Marathon Anacortes Refinery was described in a 1995 report titled, "*RCRA Facility Investigation Shell Anacortes Refinery Final Reports: SWMU 10, 17, 18, 20, 40. Phase II Report SWMU 12. Phase I Report SWMU 21*" (PGG, 1995).

The geologic units of importance that underlie AOC-1 are described below in stratigraphically descending order.

Unit S1 – Fine to coarse sand with minor gravel and cobbles. This unit is only present in the southern portion of AOC-1 and is generally less than 10 ft. in thickness.

Unit T1 - Densely compacted glacial drift consisting of clayey silt and silty clay with occasional gravelly zones and lenses of silty fine sand. This unit is generally less than 10 ft. in thickness beneath AOC-1. Unit T1 is present at the surface for most of AOC-1.

Unit S2 – Interbedded fine- to medium-grained sand and silt, and/or silty sand. This unit ranges from 12 to 26 ft. in thickness below AOC-1.

Unit T1 acts as an aquitard and impedes the vertical migration of residual hydrocarbons.

Unit S2 is the principal aquifer beneath AOC-1. Historic groundwater depth measurements suggest that saturation does not commonly occur above Unit S2 and that the general groundwater flow direction is to the north and east (PGG, 1995).

The soil sample exceeding target cleanup levels (*2023-13-09-B8-8ft)* was collected at 8 ft. below the surface, suggesting the release documented at AOC-1 occurred in Unit T1. Movement of hydrocarbons would be downward and slow due to the dense and compact nature of Unit T1. Horizontal movement is unlikely but may occur in lenses of sand or gravel.

In addition to the native soils underlying AOC-1, the OWS is surrounded by an unconsolidated backfill material that may serve as a semi-contained conduit of releases depending on the adsorption capacity of native soil, volatilization, and degradation (PGG, 2016).

2.1.6 Groundwater Data Review

Per the IRP, the Marathon Anacortes Refinery's existing perimeter monitoring data are reviewed for any area that is identified to have a potential leak from the OWS. Groundwater monitoring data were reviewed for AOC-1 in the 2022 OWS Annual Report. The review concluded that there was no evidence of a release to groundwater based on data from wells 94-1, 82-27, 82-26, 82-25, and 82-24 (Figure A-6).

2.1.7 2024 Site Characterization

The site characterization of AOC-1 will continue in 2024 to determine the horizontal and vertical extent of contamination and the potential impact to groundwater.

2.1.8 OWS Repairs

Repairs to the OWS at AOC-1 were completed in 2023 prior to the collection of soil and groundwater samples in September 2023.

2.1.9 Inaccessible Areas

There were no inaccessible areas at AOC-1 during repairs or the initial soil investigation. Inaccessible areas will be re-evaluated during further site characterization.

2.2 AREA OF CONCERN-2

A second release from the OWS was discovered on November 1st, 2023, between manhole F-11 and manhole F-12. The location of the release was identified as Area of Concern-2 (AOC-2) and is shown on Figure A-2.

A contract employee performing activities unrelated to the OWS investigation observed an oil sheen in a stormwater ditch approximately 130 ft. north of manhole F-11. It is suspected from a sewer inspection video recorded in July 2023 that a blockage within the OWS located approximately 237 ft. north of manhole F-11 caused a buildup of material that resulted in a release to the surface. The approximate location of the suspected blockage is shown on Figure A-5.

Immediate actions were taken to isolate and stop the release. Oil absorbent booms were deployed to contain the sheen. Upstream storage tank dewatering was halted to reduce flow within the OWS. A vacuum truck was deployed to reduce the accumulated OWS materials upstream of the sewer blockage. A bypass was installed to pump around the suspected blockage. Once the release was stopped, oil-stained soil was removed from the stormwater ditch. The OWS bypass has remained in place while a third party, Motiva, repairs the OWS at the location of the blockage.

2.2.1 Geology and Hydrogeology

The geologic units of importance that underlie AOC-2 are described below in stratigraphically descending order (PGG, 1995).

Unit T2 – Glacio-marine sediments consisting of finely laminated clay with occasional gravel and cobbles, sand lenses, and shell fragments and organic matter. This unit ranges from 11 to 63 ft. in thickness below AOC-2.

Unit T2 acts as an aquitard and impedes the vertical migration of residual hydrocarbons.

Migration of the release at AOC-2 would be downward and slow due to the dense and compact nature of Unit T2. Horizontal movement is unlikely but may occur in lenses of sand or gravel.

In addition to the native soils underlying AOC-2, the OWS is surrounded by unconsolidated backfill material that may serve as a semi-contained conduit of releases depending on the adsorption capacity of native soil, volatilization, and degradation (PGG, 2016).

2.2.2 Groundwater Data Review

Groundwater data collected from 2019-2023 as part of the refinery's existing perimeter monitoring program were reviewed for evidence of a release from the OWS at AOC-2. Groundwater monitoring wells 82-22, 14-4, 83-5, 82-21, 92-P5, 94-1, 82-27, and 83-8 were selected for review. Those well locations in relation to AOC-2 are shown on Figure A-6.

Wells 82-22, 14-4, 83-5, and 82-21, are located along "G" Street between manholes G-9 and G-13. Wells 82-22, 14-4, and 82-21 are sampled annually for gasoline and benzene, toluene, ethylbenzene, and xylenes (BTEX). Well 83-5 is sampled semi-annually for gasoline, diesel, motor oil, and BTEX. The groundwater samples collected from wells 82-22, 14-4, and 82-21 did not contain concentrations of gasoline or BTEX above the method reporting limits. Groundwater samples collected from well 83-5 did not contain concentrations of gasoline, diesel, motor oil, or BTEX above the method reporting limits.

Well 92-P5 is located on Tenth Street between tanks 171 and 142. Well 92-P5 is sampled annually for gasoline, diesel, motor oil, and BTEX. Groundwater samples collected from well 92-P5 did not contain concentrations of gasoline, diesel, motor oil, or BTEX above the method reporting limits.

Well 94-1 is located on "F" Street between manholes F-6 and F-7. Well 94-1 is sampled semi-annually for gasoline, diesel, motor oil, and BTEX. Groundwater samples collected from well 94-1 did not contain concentrations of gasoline, diesel, motor oil, or BTEX above the method reporting limits.

Wells 82-27 and 83-8 are located along “E” Street between manholes E-3 and E-6. Wells 82-27 and 83-8 are sampled semi-annually for gasoline, diesel, motor oil, and BTEX. Groundwater samples collected from wells 82-27 and 83-8 did not contain concentrations of gasoline, diesel, motor oil, or BTEX above the method reporting limits.

The review of groundwater data from Marathon Anacortes Refinery’s existing perimeter monitoring program did not provide evidence of a release to groundwater near AOC-2.

2.2.3 OWS Repairs

Repairs to the OWS at AOC-2 are ongoing and being completed by Motiva.

2.2.4 Inaccessible Areas

There were no inaccessible areas at AOC-2 during 2023 repairs or during immediate cleanup activities. Inaccessible areas will be re-evaluated during further site characterization.

3. 2023 OILY WATER SEWER INSPECTION

Per the IRP, BAI completed 2023 video inspections in July 2023. The OWS segments inspected in 2023 include the OWS main trunk line from manhole F-7 to manhole F-8 and manhole F-9 to manhole F-14 along "F" street. A map of the OWS segments inspected in 2023 is provided as Figure A-7.

3.1 DEVIATIONS FROM THE IRP

The OWS segments scheduled in the IRP for inspection in 2023 include the main trunk line from manhole F-7 to manhole F-14 along "F" Street. However, a video inspection of the OWS from F-8 to F-9 was not conducted in 2023. This segment of the OWS will be included in a future video inspection to remain in compliance with the AO.

The following limitations occurred during the 2023 OWS video inspections:

- Survey of sewer segment F-9 to F-10 was abandoned at 365.9 ft. due to a high-water level.
- Survey of sewer segment F-11 to F-12 was abandoned at 237.7 ft. due to an obstruction in the camera's pathway.
- Survey of sewer segment F-12 to F-12A was abandoned at 200.9 ft. due to a high-water level.

Inspection of these sewer segments will be reattempted to complete each survey and remain in compliance with the AO.

3.2 VIDEO INSPECTION FINDINGS

All 2023 video inspections were completed in general accordance with the National Association of Sewer Service Compliance (NASSCO) Pipeline Assessment Certification Program (PACP). Each sewer defect (e.g., cracking, fractures, offset joints, etc.) observed during the video inspections was assigned a NASSCO code by BAI.

ALL4 assigned each NASSCO code a corresponding ER based on the potential for a release. The ER values assigned by ALL4 are summarized in a 2023 ER evaluation report submitted to Marathon in February 2024, which is provided in Appendix D. The ER values range from 1-5. A definition for each ER value can be found in Table B-1.

The 2023 OWS ER evaluation identified the following ER values:

- Sixty-five ERs of 3
- Fifty-two ERs of 2
- Sixty-five ERs of 1

The ER evaluation did not yield any ERs of 4 or 5, which equate to a significant structural defect with either the potential for release (ER of 4) or with a confirmed release (ER of 5). Because this evaluation did not identify any ERs of 4 or 5, additional soil investigations related to the 2023 OWS inspections are not required at this time.

The required actions for an ER of 3 are to schedule a low priority mitigation effort and to document the defect in the refinery record. The required action for ERs of 2 and 1 is to document the defect in the refinery record (Table B-1).

3.2.1 Location of AOC-2

The ER evaluation based on review of the BAI inspection videos did not yield any ERs of 4 or 5, however, the confirmed release at AOC-2, described in section 2.2 of this report, is located between manhole F-11 and manhole F-12 (Figure A-2). The video inspection from manhole F-11 to manhole F-12 was abandoned at 237.7 ft. due to an obstruction in the camera's pathway. It is probable that an ER of 5 exists near the location of the obstruction/blockage because of the nearby release discovered at AOC-2.

Per the IRP, defects that are identified with an ER of 5 are considered confirmed releases. Site investigation activities will be initiated at AOC-2 in 2024 to determine the extent of the release. Repairs to the OWS at the location of AOC-2 were initiated in 2023 and are ongoing.

4. 2024 PLANS FOR SITE CHARACTERIZATION

Per the IRP, the site characterization of AOC-1 will continue, and the site characterization of AOC-2 will be initiated in 2024. The horizontal and vertical extent of contamination will be delineated and the potential impacts to groundwater will be assessed.

4.1 2024 OWS REPAIRS

Motiva is actively repairing the OWS at AOC-2. No additional repairs to the OWS are currently scheduled for 2024.

5. CONCLUSIONS

Two releases associated with the OWS were confirmed at the Marathon Anacortes Refinery in 2023 and were identified as Area of Concern-1 (AOC-1) and Area of Concern-2 (AOC-2).

Remedial activities were initiated at AOC-1 in 2023. Sewer repairs were completed at AOC-1 in 2023. Further site characterization will continue at AOC-1 in 2024 to delineate the extent of contamination.

Remedial activities were initiated at AOC-2 in 2023 and a site characterization of AOC-2 will begin in 2024. Sewer repairs are ongoing at AOC-2.

OWS video inspections were completed by BAI in July 2023. An ER evaluation of the NASSCO rated inspection videos did not yield any ERs of 4 or 5. It is not required to initiate any additional soil investigations at this time based on the conclusions of the ER evaluation.

In addition to AOC-1 and AOC-2 site characterization, the Marathon Anacortes Refinery will reattempt the incomplete video inspections from 2023 during the 2024 inspections.

6. REFERENCES

ALL4. February 20, 2024. Environmental Rating of 2023 Oily Water Sewer Video Inspections.

Mott MacDonald. May 2022. Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan, Anacortes, Washington.

Mott MacDonald. March 31, 2023. 2022 Annual Progress Report Oily Water Sewer Investigation, Marathon Anacortes Refinery.

Pacific Groundwater Group. 1995. RCRA Facility Investigation Shell Anacortes Refinery Final Reports: SWMU 10, 17, 18, 20, 40. Phase II Report SWMU 12. Phase I Report SWMU 21. Volume 1.

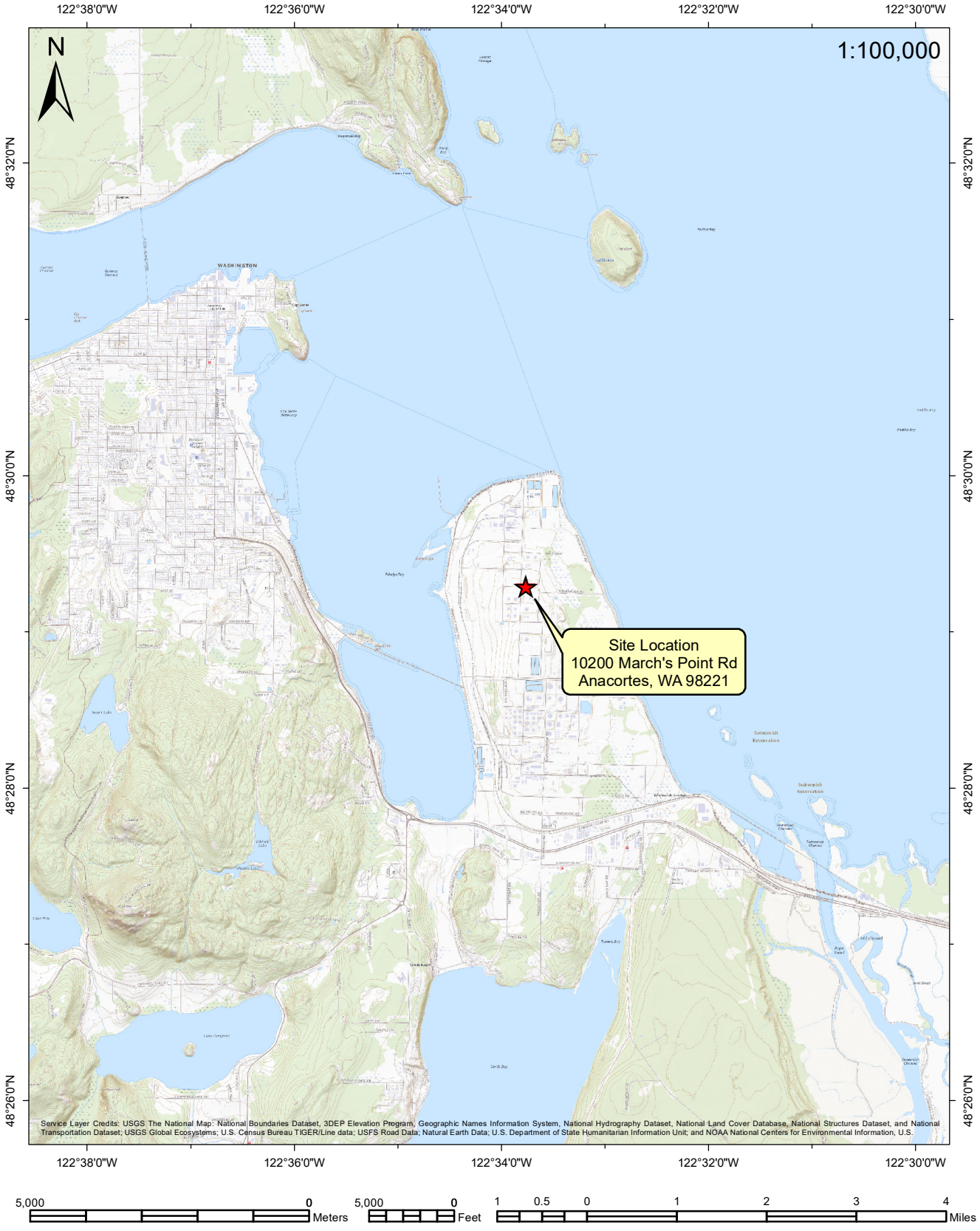
Pacific Groundwater Group. August 2016. SWMU 12 RCRA Corrective Action Plan, Tesoro Refining and Marketing Company, Anacortes, Washington.

Washington State Department of Ecology (Ecology). 2021. Agreed Order for Interim Action – Oily Water Sewer (SWMU-12). No. DE 16299.

Washington State Department of Ecology (Ecology). 2013. Model Toxics Control Act Cleanup Regulation Chapter 173-340 WAC. Publication No. 94-06.

APPENDIX A -
FIGURES

LIST OF FIGURES



Prepared for: MARATHON

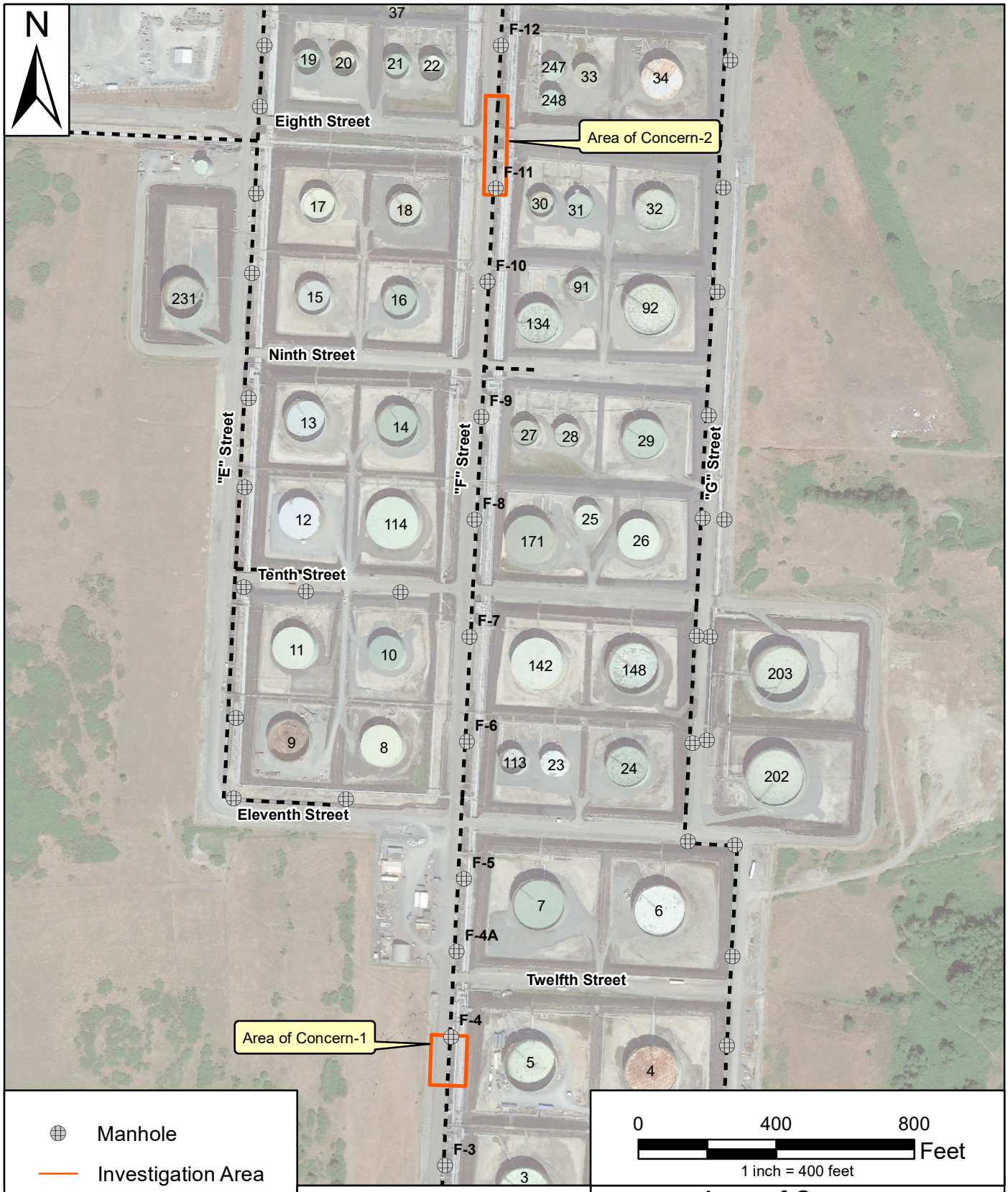
Prepared by: ALL4

Site Location Map

2023 OWS Annual Report

3/5/2024

Figure A-1



Manhole

Investigation Area

Oily Water Sewer

0 400 800 Feet

1 inch = 400 feet

All data are approximate and should be used for relative location reference only.

Area of Concern Location Map

Prepared for: MARATHON

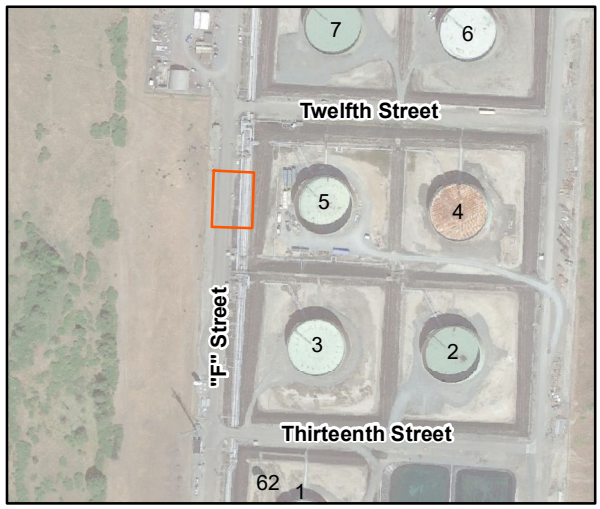
Prepared by: ALL4

10200 March's Point Rd
Anacortes, WA 98221

2023 OWS Annual Report

3/5/2024

Figure A-2



N

F-4

B3-7.7ft
B4-8.5ft
B1-7ft
B2-7ft
B6-8ft
B5-8ft
B7-8ft
B8-8ft

Exceeded MTCA Method A Cleanup Levels for Industrial Soil

Met MTCA Method A Cleanup Levels for Industrial Soil

Manhole

Area of Concern-1

Oily Water Sewer

0 30 60 Feet

1 inch = 30 feet

All data are approximate and should be used for relative location reference only.

AOC-1 Soil Sample Location Map

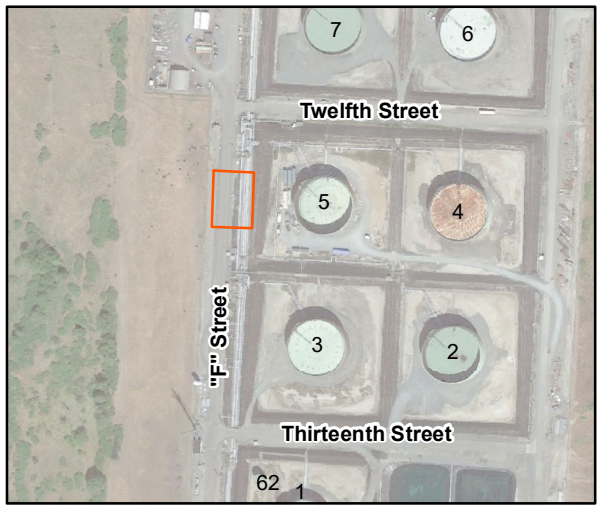
Prepared for: MARATHON

Prepared by: ALL4

10200 March's Point Rd
Anacortes, WA 988221

2023 OWS Annual Report
3/5/2024

Figure A-3



N

F-4

B5-8ft

Exceeded MTCA Method C Groundwater Cleanup Levels and/or Surface Water Cleanup Levels

Manhole

Area of Concern-1

Oily Water Sewer

0 30 60 Feet

1 inch = 30 feet

All data are approximate and should be used for relative location reference only.

AOC-1 Groundwater Sample Location Map

Prepared for: MARATHON

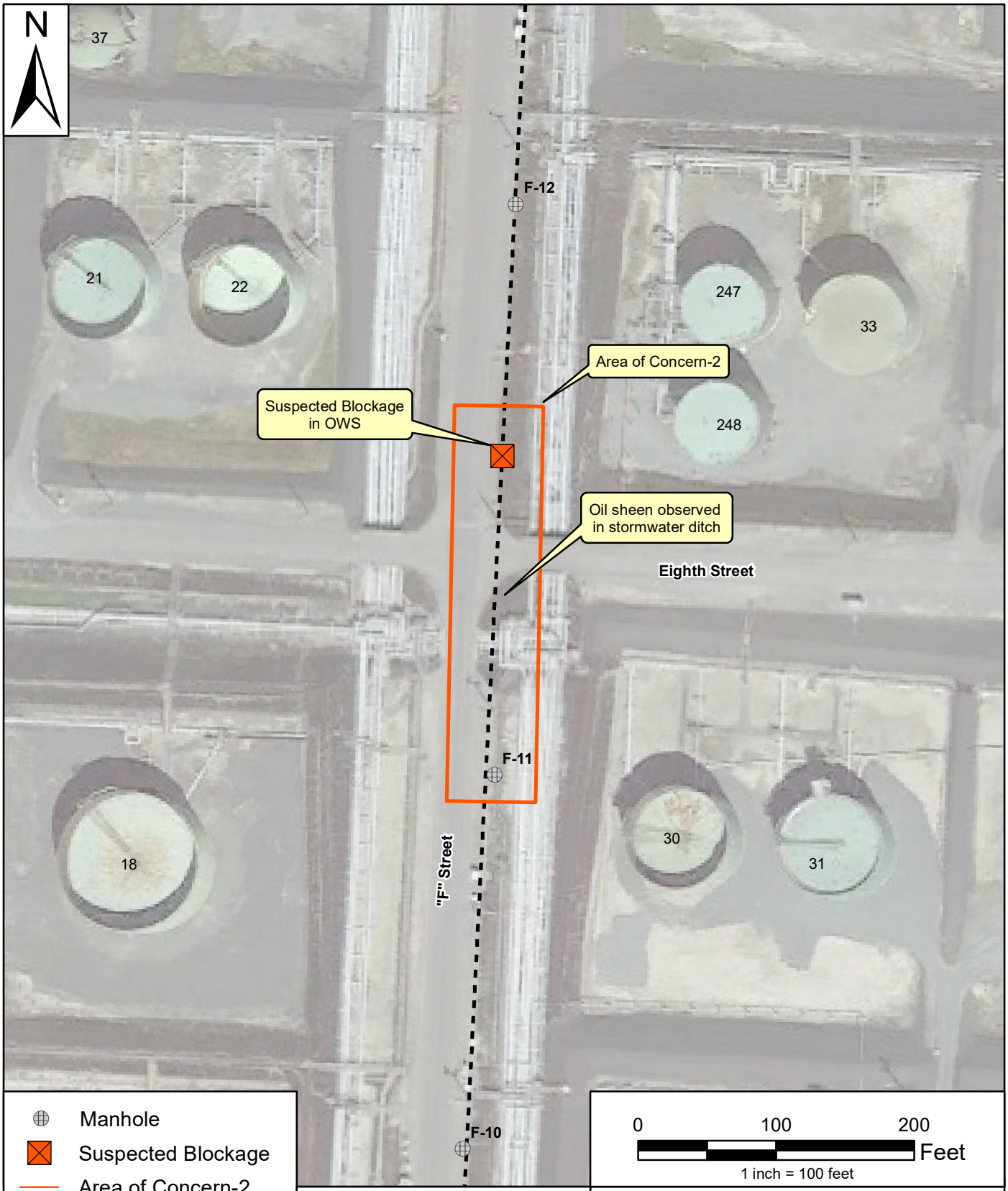
Prepared by: ALL4

10200 March's Point Rd
Anacortes, WA 988221

2023 OWS Initial Site Investigation

3/5/2024

Figure A-4



Manhole

Suspected Blockage

Area of Concern-2

Oily Water Sewer

0 100 200 Feet

1 inch = 100 feet

All data are approximate and should be used for relative location reference only.

AOC-2 Detailed Site Map

Prepared for: MARATHON

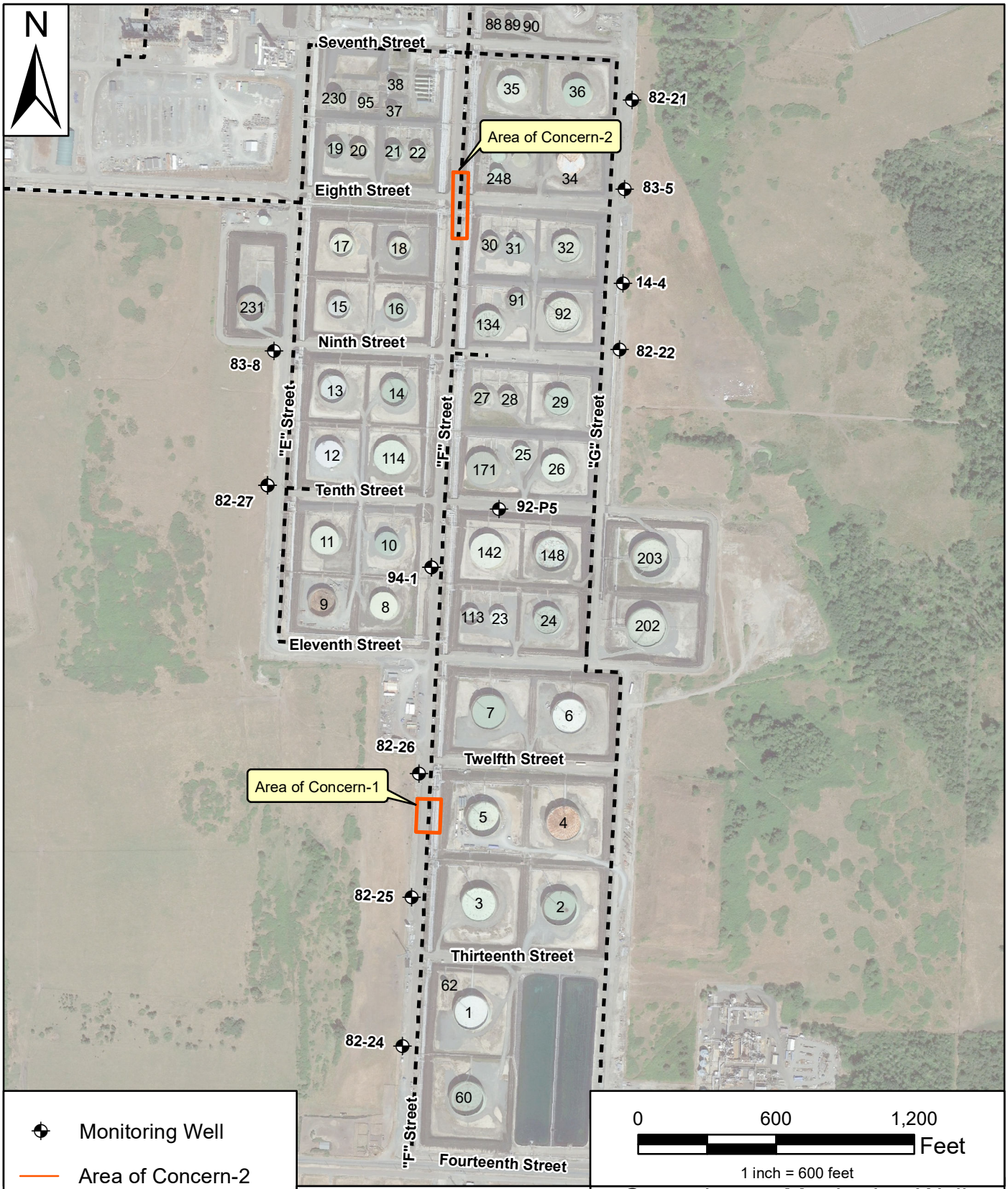
Prepared by: ALL4

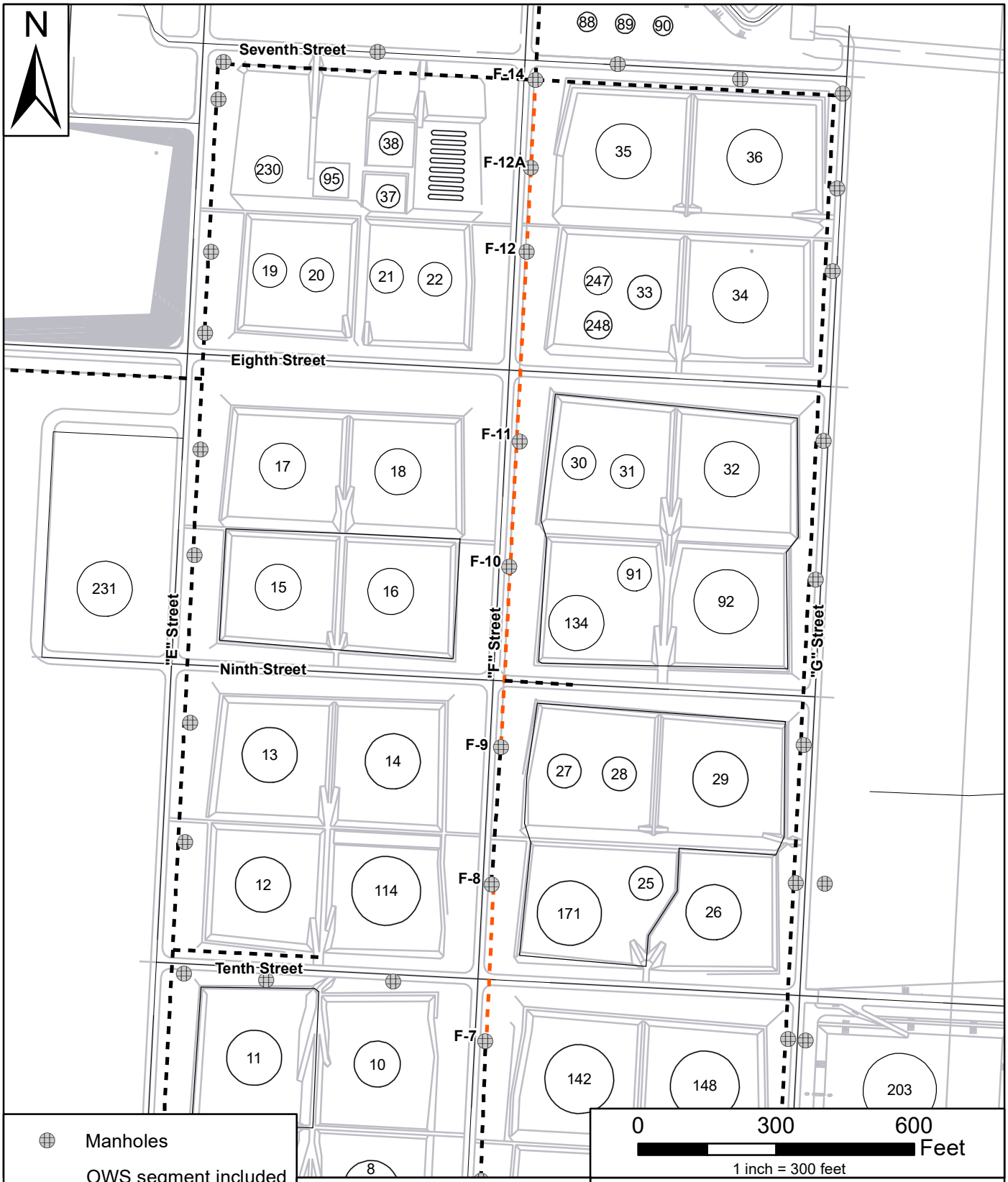
10200 March's Point Rd
Anacortes, WA 98221

2023 OWS Annual Report

3/5/2024

Figure A-5


N
Seventh Street
Eighth Street
Ninth Street
Tenth Street
Eleventh Street
Twelfth Street
Thirteenth Street
Fourteenth Street
"E" Street
"F" Street
"G" Street
"F" Street
Area of Concern-2
Area of Concern-1
82-21
83-5
14-4
82-22
92-P5
82-26
82-25
82-24
83-8
82-27
94-1
88 89 90
230 95 38 37
35 36
19 20 21 22
248 34
17 18
30 31 32
231
15 16
91 92 134
13 14
27 28 29
12 114
171 25 26
11 10
142 148
203
9 8
113 23 24
202
7 6
5 4
3 2
62 1
60
Monitoring Well
Area of Concern-2
Oily Water Sewer
0 600 1,200
Feet
1 inch = 600 feet
All data are approximate and should be used for relative location reference only.
Groundwater Monitoring Well Location Map
Prepared for:
MARATHON
Prepared by:
ALL4
10200 March's Point Rd
Anacortes, WA 98221
2023 OWS Annual Report
3/5/2024
Figure A-6



Manholes

OWS segment included in Phase II inspections

OWS

0 300 600 Feet

1 inch = 300 feet

All data are approximate and should be used for relative location reference only.

Phase II OWS Segment Map

Prepared for: MARATHON

Prepared by: ALL4

10200 March's Point Rd
Anacortes, WA 98221

2023 OWS Annual Report

3/5/2024

Figure A-7

APPENDIX B -
TABLES

LIST OF TABLES

Table B-1
Oily Water Sewer Environmental Rating Scale
Marathon Anacortes Refinery

Environmental Rating (ER)	Characteristic / Example	Action and Documentation
5	Significant structural defect with confirmed release. Examples: Large holes at or below the segment/manhole flow line and above groundwater table; completely separated joints with exposed surrounding soil above groundwater table; collapsed pipe sections.	Initial investigation confirmed soil or groundwater exceedance of cleanup levels specified in section 2.1 of IRP. Confirmed release from OWS will be reported to Ecology 90 days after discovery. Conduct site characterization and schedule for high priority mitigation effort (repair, ongoing monitoring for inaccessible sewers, etc.) If soil surrounding significant defect appears impacted due to a potential release from the OWS, then immediate response action will be initiated to stop the source of the potential release and begin clean-up activities.
4	Significant structural defect with potential for release. Examples: Same as ER = 5	Conduct initial release investigation involving the collection of soil and/or shallow groundwater sample(s). Groundwater samples will be collected only if the potential release occurred at or below the shallow groundwater table elevation. Increase to ER=5 if soil or groundwater concentrations exceed cleanup levels specified in Section 2.1 of IRP. Schedule for moderate priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
3	Moderate structural defect. Examples: Significant fractures/cracks at or below the pipe/manhole flow line; groundwater infiltration at defect; significant corrosion. Defects that pose a higher risk for future potential release or structural failure.	Document in the Refinery record. Schedule for low priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
2	Small to moderate structural defect. Examples: Moderate fractures/cracks above the pipe/manhole flow line; joint improperly seated; pipe reinforcement visible, moderate corrosion in pipe.	Document in Refinery Record.
1	Small structural defect. Examples: Hairline cracks; minor corrosion/deterioration of pipe/manhole material; visible aggregate; small offset joint; missing sealing rings.	Document in Refinery Record.

Table B-2
AOC-1 Soil Sample Descriptions
Marathon Anacortes Refinery

Sample ID	Date	Soil Sample Description	PID (ppm)	Sheen[(a)]
2023-11-09-B1-7ft	9/11/2023	Silty fine sand, gray	0.0	NS
2023-11-09-B2-7ft	9/11/2023	Silty fine sand, gray	0.2	NS
2023-11-09-B3-7.7ft	9/11/2023	Silty fine sand, dark gray	0.0	NS
2023-12-09-B4-8.5ft	9/12/2023	Silty fine sand, dark gray	0.0	NS
2023-12-09-B5-8ft	9/12/2023	Fine sand, dark brown	5.4	HS
2023-13-09-B6-8ft	9/13/2023	Silty fine sand, dark brown	0.0	NS
2023-13-09-B7-8ft	9/13/2023	Silty fine sand, dark gray	0.1	NS
2023-13-09-B8-8ft	9/13/2023	Silty fine sand, dark gray	0.2	MS

[(a)] - NS = No Sheen; VSS = Very Slight Sheen; SS = Slight Sheen; MS = Moderate Sheen; HS = Heavy Sheen

Table B-3
AOC-1 Soil Sample Petroleum Analytical Results
Marathon Anacortes Refinery

Constituent	Method	MTCA Method A Cleanup Levels for Industrial Soil[a] (mg/kg)	2023-11-09-B1-7ft (9/11/2023)	2023-11-09-B2-7ft (9/11/2023)	2023-11-09-B3-7.7ft (9/11/2023)	2023-12-09-B4-8.5ft (9/12/2023)	2023-12-09-B5-8ft (9/12/2023)	2023-13-09-B6-8ft (9/13/2023)	2023-13-09-B7-8ft (9/13/2023)	2023-13-09-B8-8ft (9/13/2023)
Gasoline Range TPH	NWTPH-Gx	30/100[b]	ND(<6.2)	22.10	ND(<7.07)	ND(<6.35)	ND(<5.92)	ND(<6.66)	ND(<4.82)	**614**[c]
Diesel Range TPH	NWTPH-Dx	2,000	ND(<6.2)	20.00	ND(<6.48)	ND(<6.61)	39.8	ND(<6.84)	ND(<5.83)	201
Motor Oil Range TPH	NWTPH-Dx	2,000	ND(<12.4)	32.00	54.3	13.5	33.3	ND(<13.7)	ND(<11.7)	181
Benzene	EPA-8260D	0.03	0.00017	0.00029[J]	ND(<0.00087)	ND(<0.00089)	0.00775	ND(<0.00101)	ND(<0.00075)	0.00057[J]
Toluene	EPA-8260D	7.0	0.00025[J]	ND(<0.00088)	ND(<0.00087)	ND(<0.00089)	0.0135	ND(<0.00101)	ND(<0.00075)	0.00054[J]
Ethylbenzene	EPA-8260D	6.0	0.00023	ND(<0.00088)	ND(<0.00087)	ND(<0.00089)	0.00265	ND(<0.00101)	ND(<0.00075)	ND(<0.00077)
Total Xylenes	EPA-8260D	9.0	0.0007	ND(<0.00175)	ND(<0.00173)	ND(<0.00177)	0.0191	ND(<0.00203)	ND(<0.00149)	0.0008[J]

[a] Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

[b] To use the cleanup level of 30 mg/kg the soil must meet the benzene soil cleanup level. To use the cleanup level of 100 mg/kg the soil must be found to contain no benzene and the total of ethylbenzene, toluene and xylene must be less than 1% of the gasoline mixture.

[c] The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)

[J] Estimated concentration value detected below the reporting limit.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table B-4
AOC-1 Soil Sample PAH Analytical Results
Marathon Anacortes Refinery

Constituent	Method	MTCA Method A Cleanup Levels for Industrial Soil[a] (mg/kg)	2023-11-09-B1-7ft (9/11/2023)	2023-11-09-B2-7ft (9/11/2023)	2023-11-09-B3-7.7ft (9/11/2023)	2023-12-09-B4-8.5ft (9/12/2023)	2023-12-09-B5-8ft (9/12/2023)	2023-13-09-B6-8ft (9/13/2023)	2023-13-09-B7-8ft (9/13/2023)	2023-13-09-B8-8ft (9/13/2023)
Naphthalene	EPA-8270E	5.0	0.00076	0.00146	0.00118	0.06110	0.00224	0.00173	ND(<0.0006)	0.00101
1-Methylnaphthalene	EPA-8270E	-	0.00033[J]	0.00125	0.00114	0.00624	0.00798	0.0004[J]	0.00014[J]	0.00715
2-Methylnaphthalene	EPA-8270E	-	0.00095	0.00192	0.00054	0.0117	0.00895	0.00083	0.00027[J]	0.00323
Acenaphthylene	EPA-8270E	-	ND(<0.0005)	ND(<0.0005)	0.00007[J]	0.00072[J]	ND(<0.0005)	0.0003[J]	ND(<0.0005)	ND(<0.0005)
Acenaphthene	EPA-8270E	-	0.00021[J]	0.00103	0.00064	0.00585	0.00218	0.00034[J]	ND(<0.0005)	0.0061
Dibenzofuran	EPA-8270E	-	0.00018[J]	0.00081	0.00014[J]	0.00174	0.00378	0.00068	0.00014[J]	0.00449
Fluorene	EPA-8270E	-	0.00024[J]	0.00241	0.00031[J]	0.00412	0.019	0.00094	0.00013[J]	0.022
Phenanthrene	EPA-8270E	-	0.00121[B]	0.012[B]	0.00146[B]	0.0112[B]	0.0266[B]	0.00213[B]	0.00056[B]	0.0182[B]
Anthracene	EPA-8270E	-	0.00021[J]	0.00223	0.00024[J]	0.0022	0.00226	0.00081	0.0002[J]	0.00507
Fluoranthene	EPA-8270E	-	0.00098[B]	0.00773[B]	0.00096[B]	0.00491[B]	0.00222[B]	0.00138[B]	0.00041[J],[B]	0.00531[B]
Pyrene	EPA-8270E	-	0.00121[B]	0.0287[B]	0.00126[B]	0.0062[B]	0.00404[B]	0.00132[B]	0.0005[B]	0.00985[B]
Benzo(a)anthracene	EPA-8270E	-	0.00058	0.00553	0.00046[J]	0.0016	0.00107	0.00038[J]	0.00024[J]	0.00171
Chrysene	EPA-8270E	-	0.00334	0.0209	0.00283	0.00229	0.00375	0.00042[J]	0.0004[J]	0.00971
Benzo(b)fluoranthene	EPA-8270E	-	0.00228	0.00346	0.0013	0.00114	0.00091	0.00027[J]	0.0002[J]	0.00205
Benzo(k)fluoranthene	EPA-8270E	-	0.00047[J]	0.00095	0.00024[J]	0.0006[J]	0.00039[J]	0.00019[J]	ND(<0.0005)	0.00029[J]
Benzo(j)fluoranthene	EPA-8270E	-	0.00022[J]	0.00048[J]	0.00016[J]	0.00054[J]	0.00035[J]	0.00011[J]	ND(<0.0005)	0.00041[J]
Benzo(a)pyrene	EPA-8270E	2.0	0.00071	0.00466	0.00079	0.00139	0.00079	0.00025[J]	0.00016[J]	0.00065
Indeno(1,2,3-cd)pyrene	EPA-8270E	-	0.0004[J]	0.00088	0.00039[J]	0.00063[J]	0.00049[J]	0.00018[J]	0.00011[J]	0.00034[J]
Dibenzo(a,h)anthracene	EPA-8270E	-	0.00064	0.00103	0.00043[J]	0.00029[J]	0.00023[J]	ND(<0.0005)	ND(<0.0005)	0.0003[J]
Benzo(g,h,i)perylene	EPA-8270E	-	0.00236	0.00328	0.00238	0.00120	0.00085	0.00027[J]	0.00039[J]	0.00094

[A] Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

[B] This analyte was detected in the method blank.

[J] Estimated concentration value detected below the reporting limit.

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table B-5
AOC-1 Soil Sample Metal Analytical Results
Marathon Anacortes Refinery

Constituent	Method	MTCA Method A Cleanup Levels for Industrial Soil[a] (mg/kg)	2023-11-09-B1-7ft (9/11/2023)	2023-11-09-B2-7ft (9/11/2023)	2023-11-09-B3-7.7ft (9/11/2023)	2023-12-09-B4-8.5ft (9/12/2023)	2023-12-09-B5-8ft (9/12/2023)	2023-13-09-B6-8ft (9/13/2023)	2023-13-09-B7-8ft (9/13/2023)	2023-13-09-B8-8ft (9/13/2023)
Arsenic	EPA 200.8	20	5.26	2.08	3.06	3.64	3.92	3.78	4.13	10.1
Cadmium	EPA 200.8	-	0.06[J]	0.08[J]	0.06[J]	0.07[J]	0.05[J]	0.08[J]	0.10[J]	0.14
Selenium	EPA 200.8	-	0.95	1.21	0.57[J]	0.61[J]	1.12	0.73	0.62	1.15
Silver	EPA 200.8	-	0.07[J]	0.07[J]	0.07[J]	0.07[J]	0.07[J]	0.07[J]	0.05[J]	0.08[J]
Barium	EPA 6010D	-	47.4	60.5	49	48.3	63.7	70.1	63.9	80.6
Lead	EPA 6010D	1,000	2.72	3.08	2.23[J]	3.65	1.93[J]	2.02[J]	2.3	3.19
Mercury	EPA 7471B	2.0	0.0164[J]	0.00716[J]	0.0204[J]	0.0134[J]	0.0102[J]	0.0132[J]	0.0117[J]	0.0165[J]

[a] Method A cleanup levels for industrial soil obtained from WAC 173-340-900, Table 745-1.

[J] Estimated concentration value detected below the reporting limit.

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

Table B-6
AOC-1 Groundwater Sample Analytical Results
Marathon Anacortes Refinery

Constituent	Method	MTCA Method C Cleanup Levels for Groundwater[a] (Noncancer) (µg/L)	MTCA Method C Cleanup Levels for Groundwater[a] (Cancer) (µg/L)	MTCA Method C Cleanup Levels for Surface Water[a] (Noncancer) (µg/L)	MTCA Method C Cleanup Levels for Surface Water[a] (Cancer) (µg/L)	2023-12-09-B5-8ft* (9/12/2023)
TPH/BTEX						
Gasoline Range Organics	NWTPH-Gx	-	-	-	-	793
Diesel Range Organics	NWTPH-Dx	-	-	-	-	5,720
Motor Oil Range Organics	NWTPH-Dx	-	-	-	-	3,210
Benzene	EPA-8260D	70	8.0	5000	570	**15.8**
Toluene	EPA-8260D	1400	-	48000	-	26.2
Ethylbenzene	EPA-8260D	1,800	-	17,000	-	5.01
Total Xylenes	EPA-8260D	3,500	-	-	-	33.01
PAHs						
Naphthalene	EPA-8270E	350	-	12,000	-	1.07
1-Methylnaphthalene	EPA-8270E	1,200	15	-	-	3.3
2-Methylnaphthalene	EPA-8270E	70	-	-	-	5.61
Acenaphthylene	EPA-8270E	-	-	-	-	ND(<0.01)
Acenaphthene	EPA-8270E	1,100	-	1,600	-	1.18
Dibenzofuran	EPA-8270E	18	-	-	-	0.602
Fluorene	EPA-8270E	700	-	8,600	-	3.26
Phenanthrene	EPA-8270E	-	-	-	-	2.31
Anthracene	EPA-8270E	5,300	-	65,000	-	0.118
Carbazole	EPA-8270E	-	-	-	-	0.028
Fluoranthene	EPA-8270E	1,400	-	230	-	0.052
Pyrene	EPA-8270E	530	-	6,500	-	0.114
Benzo(a)anthracene	EPA-8270E	-	-	-	-	0.016
Chrysene	EPA-8270E	-	-	-	-	0.134
Benzo(b)fluoranthene	EPA-8270E	-	-	-	-	0.012
Benzo(k)fluoranthene	EPA-8270E	-	-	-	-	ND(<0.010)
Benzo(j)fluoranthene	EPA-8270E	-	-	-	-	0.005[J]
Benzofluoranthenes, Total	EPA-8270E	-	-	-	-	0.024
Benzo(a)pyrene	EPA-8270E	11	0.88	65	5.4	0.007[J]
Perylene	EPA-8270E	-	-	-	-	ND(<0.0010)
Indeno(1,2,3-cd)pyrene	EPA-8270E	-	-	-	-	ND(<0.0010)
Dibenzo(a,h)anthracene	EPA-8270E	-	-	-	-	ND(<0.0010)
Benzo(g,h,i)perylene	EPA-8270E	-	-	-	-	0.012
Metals						
Arsenic	EPA 200.8 UCT-KED	11	0.58	44	2.5	**23.3**
Cadmium	EPA 200.8 UCT-KED	-	-	100	-	1.51
Selenium	EPA 200.8 UCT-KED	180	-	6,800	-	8.08
Silver	EPA 200.8	180	-	65,000	-	ND(<0.2)
Barium	EPA 6010D	7,000	-	-	-	1,950
Lead	EPA 6010D	-	-	-	-	100
Mercury	EPA 7471B	-	-	-	-	0.807

[a] Cleanup Levels for MTCA Method C from WA. Ecology CLARC Master Tables.

* Groundwater sample collected from open boring (B5) may contain particulates and is not considered a representative groundwater sample

[J] Estimated concentration value detected below the reporting limit.

BOLD & shaded - indicates that the concentration in the sample exceeds the most stringent cleanup level.

ND indicates analyte was not detected at level above reporting limit (shown in parentheses)

APPENDIX C -
ORIGINAL LABORATORY ANALYTICAL DATA REPORT

Analytical Resources, LLC
Analytical Chemists and Consultants
Tukwila, WA

24 October 2023

Travis Klaas
Mott MacDonald
1601 5th Avenue Suite 800
Seattle, WA 98101

RE: Tesoro/ Andeavo Solids (Tesoro)

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)	Associated SDG ID(s)
23I0284	N/A

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Kelly Bottem, Client Services Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

ACCREDITED IN ACCORDANCE WITH nelac
Cert# 100006-012

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 23I0284	Turn-around Requested: ~~3-5day~~ for 9/13/23	Page:	of
ARI Client Company: MOH MACDONALD	Phone: 206-329-1893	Date:	Ice Present? Yes
Client Contact: JANET KNOX		No. of Coolers: 1	Cooler Temps: 5.40
Client Project Name: TESORO - OWS Sampling 2023			
Client Project #: 51810485 8	Samplers: C. Stice		

Analytical Resources, LLC
Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested: PAHs/Dx/METALS	GX (5035)	VOCs (5035)	Total (5035) Solids	VOCs/GX	Total Metals	PAHs/Dx	Archive	Notes/Comments
2023-11-09-B1-7ft	9/11/2023	11:20	SOIL	7	1	2	3	1					
2023-11-09-B2-7ft	9/11/2023	14:40	SOIL	7	1	2	3	1					
2023-11-09-B3-7.7ft	9/11/2023	15:35	SOIL	7	1	2	3	1					
2023-12-09-B4-8.5ft	9/12/2023	09:40	SOIL	7	1	2	3	1					
2023-12-09-B5-8ft	9/12/2023	~~11:45~~	SOIL	7	1	2	3	1					
2023-12-09-B5-8ft	9/12/2023	12:25	WATER	10					5	1	4		water samples
2023-13-09-B6-8ft	9/13/2023	09:50	SOIL	7	1	2	3	1					
2023-13-09-B7-8ft	9/13/2023	11:30	SOIL	7	1	2	3	1					
2023-~~13~~-09-B5-6ft *	9/12/2023	11:10	SOIL	7	~~1~~	~~2~~	~~3~~	~~1~~	for 9/13/23			X	please hold/store this but do not analyze
2023-13-09-B8-8ft	9/13/2023	14:05	SOIL	7	1	2	3	1					

Comments/Special Instructions	Relinquished by:	Received by:	Relinquished by:	Received by:
* please store samples but not analyze	(Signature) Cheyenne Stice	(Signature)	(Signature)	(Signature)
	Printed Name: Cheyenne Stice	Printed Name: Roman M.	Printed Name:	Printed Name:
	Company: MOH MACDONALD	Company: ARI	Company:	Company:
Hard delivered	Date & Time: 9/13/2023 16:43	Date & Time: 9/13/23 1643	Date & Time:	Date & Time:

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
2023-11-09-B1-7ft	23I0284-01	Solid	11-Sep-2023 11:20	13-Sep-2023 16:43
2023-11-09-B2-7ft	23I0284-02	Solid	11-Sep-2023 14:40	13-Sep-2023 16:43
2023-11-09-B3-7.7ft	23I0284-03	Solid	11-Sep-2023 15:35	13-Sep-2023 16:43
2023-12-09-B4-8.5ft	23I0284-04	Solid	12-Sep-2023 09:40	13-Sep-2023 16:43
2023-12-09-B5-8ft	23I0284-05	Solid	12-Sep-2023 11:45	13-Sep-2023 16:43
2023-12-09-B5-8ft	23I0284-06	Water	12-Sep-2023 12:25	13-Sep-2023 16:43
2023-13-09-B6-8ft	23I0284-07	Solid	13-Sep-2023 09:50	13-Sep-2023 16:43
2023-13-09-B7-8ft	23I0284-08	Solid	13-Sep-2023 11:30	13-Sep-2023 16:43
2023-13-09-B8-8ft	23I0284-10	Solid	13-Sep-2023 14:05	13-Sep-2023 16:43

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Work Order Case Narrative

Gasoline by NWTPH-g (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements with the exception of all associated "Q" flagged analytes in the water analysis which are out of control high in the CCAL. All associated samples that contain analyte have been flagged with a "Q" qualifer.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

The soil method blank(s) contained phenanthrene, pyrene and fluoranthene. Samples that contain analyte have been flagged with a "B" qualifer.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total Metals - EPA Method 200.8, 6010D and 7470A/7471B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The blank spike (BS/LCS) percent recoveries were within control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits with the exception of surrogates flagged on the associated forms.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits with the exception of analytes flagged on the associated forms for the LCS . The LCSD is in control.

WORK ORDER

23I0284

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Mott MacDonald | **Project Manager:** Kelly Bottem

Project: Tesoro/ Andeavo | **Project Number:** Tesoro/518104858

Preservation Confirmation

Container ID	Container Type	pH
23I0284-01 A	Glass WM, Clear, 8 oz	
23I0284-01 B	Glass WM, Clear, 2 oz	
23I0284-01 C	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-01 D	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-01 E	VOA Vial, Clear, 40 mL, MeOH	
23I0284-01 F	VOA Vial, Clear, 40 mL, MeOH	
23I0284-01 G	VOA Vial, Clear, 40 mL, MeOH	
23I0284-02 A	Glass WM, Clear, 8 oz	
23I0284-02 B	Glass WM, Clear, 2 oz	
23I0284-02 C	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-02 D	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-02 E	VOA Vial, Clear, 40 mL, MeOH	
23I0284-02 F	VOA Vial, Clear, 40 mL, MeOH	
23I0284-02 G	VOA Vial, Clear, 40 mL, MeOH	
23I0284-03 A	Glass WM, Clear, 8 oz	
23I0284-03 B	Glass WM, Clear, 2 oz	
23I0284-03 C	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-03 D	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-03 E	VOA Vial, Clear, 40 mL, MeOH	
23I0284-03 F	VOA Vial, Clear, 40 mL, MeOH	
23I0284-03 G	VOA Vial, Clear, 40 mL, MeOH	
23I0284-04 A	Glass WM, Clear, 8 oz	
23I0284-04 B	Glass WM, Clear, 2 oz	
23I0284-04 C	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-04 D	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-04 E	VOA Vial, Clear, 40 mL, MeOH	
23I0284-04 F	VOA Vial, Clear, 40 mL, MeOH	
23I0284-04 G	VOA Vial, Clear, 40 mL, MeOH	
23I0284-05 A	Glass WM, Clear, 8 oz	
23I0284-05 B	Glass WM, Clear, 2 oz	
23I0284-05 C	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-05 D	VOA Vial, Clear, 40 mL, NaHSO4	
23I0284-05 E	VOA Vial, Clear, 40 mL, MeOH	
23I0284-05 F	VOA Vial, Clear, 40 mL, MeOH	

Reviewed By _____ Date _____

WORK ORDER

23I0284

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Mott MacDonald | **Project Manager:** Kelly Bottem

Project: Tesoro/ Andeavo | **Project Number:** Tesoro/518104858

23I0284-05 G	VOA Vial, Clear, 40 mL, MeOH		
23I0284-06 A	Glass NM, Amber, 500 mL		
23I0284-06 B	Glass NM, Amber, 500 mL		
23I0284-06 C	Glass NM, Amber, 500 mL		
23I0284-06 D	Glass NM, Amber, 500 mL		
23I0284-06 E	HDPE NM, 500 mL, 1:1 HNO3	<2	Pass
23I0284-06 F	VOA Vial, Clear, 40 mL, HCL		
23I0284-06 G	VOA Vial, Clear, 40 mL, HCL		
23I0284-06 H	VOA Vial, Clear, 40 mL, HCL		
23I0284-06 I	VOA Vial, Clear, 40 mL, HCL		
23I0284-06 J	VOA Vial, Clear, 40 mL, HCL		
23I0284-07 A	Glass WM, Clear, 8 oz		
23I0284-07 B	Glass WM, Clear, 2 oz		
23I0284-07 C	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-07 D	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-07 E	VOA Vial, Clear, 40 mL, MeOH		
23I0284-07 F	VOA Vial, Clear, 40 mL, MeOH		
23I0284-07 G	VOA Vial, Clear, 40 mL, MeOH		
23I0284-08 A	Glass WM, Clear, 8 oz		
23I0284-08 B	Glass WM, Clear, 2 oz		
23I0284-08 C	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-08 D	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-08 E	VOA Vial, Clear, 40 mL, MeOH		
23I0284-08 F	VOA Vial, Clear, 40 mL, MeOH		
23I0284-08 G	VOA Vial, Clear, 40 mL, MeOH		
23I0284-09 A	Glass WM, Clear, 8 oz		
23I0284-09 B	Glass WM, Clear, 2 oz		
23I0284-09 C	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-09 D	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-09 E	VOA Vial, Clear, 40 mL, MeOH		
23I0284-09 F	VOA Vial, Clear, 40 mL, MeOH		
23I0284-09 G	VOA Vial, Clear, 40 mL, MeOH		
23I0284-10 A	Glass WM, Clear, 8 oz		
23I0284-10 B	Glass WM, Clear, 2 oz		
23I0284-10 C	VOA Vial, Clear, 40 mL, NaHSO4		
23I0284-10 D	VOA Vial, Clear, 40 mL, NaHSO4		

Reviewed By _____ Date _____

WORK ORDER

23I0284

Samples will be discarded 90 days after submission of a final report unless other instructions are received.

Client: Mott MacDonald **Project Manager: Kelly Bottem**

Project: Tesoro/ Andeavo **Project Number: Tesoro/518104858**

23I0284-10 E	VOA Vial, Clear, 40 mL, MeOH
23I0284-10 F	VOA Vial, Clear, 40 mL, MeOH
23I0284-10 G	VOA Vial, Clear, 40 mL, MeOH

Preservation Confirmed By

9/14/23
Date

Reviewed By

Date

Analytical Resources, LLC
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Mott Mac

Project Name: Tesoro-ows Sampling

COC No(s): NA (circled)

Delivered by: Fed-Ex UPS Courier Hand Delivered (circled) Other:

Assigned ARI Job No: 23I0284

Tracking No: NA (circled)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO (circled)

Were custody papers included with the cooler? .... YES (circled) NO

Were custody papers properly filled out (ink, signed, etc.) .... YES (circled) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1643 5.4°

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: 9708

Cooler Accepted by: [signature] Date: 9/13/23 Time: 1643

Complete custody forms and attach all shipping documents

Log-In Phase:

Question			
Was a temperature blank included in the cooler?		YES	NO (circled)
What kind of packing material was used? ... Bubble Wrap (circled) Wet Ice (circled) Gel Packs Baggies Foam Block Paper Other:			
Was sufficient ice used (if appropriate)?	NA	YES (circled)	NO
How were bottles sealed in plastic bags?	Individually	Grouped	Not (circled)
Did all bottles arrive in good condition (unbroken)?		YES (circled)	NO
Were all bottle labels complete and legible?		YES (circled)	NO
Did the number of containers listed on COC match with the number of containers received?		YES (circled)	NO
Did all bottle labels and tags agree with custody papers?		YES (circled)	NO
Were all bottles used correct for the requested analyses?		YES (circled)	NO
Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...	NA	YES (circled)	NO
Were all VOC vials free of air bubbles?	NA	YES (circled)	NO
Was sufficient amount of sample sent in each bottle?		YES (circled)	NO
Date VOC Trip Blank was made at ARI................................	NA (circled)		

Were the sample(s) split by ARI? NA (circled) YES Date/Time: ____ Equipment: ____ Split by: ____

Samples Logged by: JS Date: 09/14/23 Time: 1049 Labels checked by: JS

***** Notify Project Manager of discrepancies or concerns *****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: Date:

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft
23I0284-01 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/11/2023 11:20
Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 14:23

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-01 C
Preparation Batch: BLI0419 — Sample Size: 6.19 g (wet) — Dry Weight:4.98 g
Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 80.46

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.17	1.00	ND	ug/kg	U
Toluene	108-88-3	1	0.25	1.00	0.25	ug/kg	J
Ethylbenzene	100-41-4	1	0.23	1.00	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.50	2.01	ND	ug/kg	U
o-Xylene	95-47-6	1	0.24	1.00	ND	ug/kg	U
Xylenes, total	1330-20-7	1	0.70	2.01	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*113*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*103*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*103*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/11/2023 11:20

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 14:24

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-01 E

Preparation Batch: BLI0415 — Sample Size: 6.232 g (wet) — Dry Weight:5.01 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 80.46

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	6200	ND	ug/kg	U
Surrogate: Toluene-d8			*80-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*93.8*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/11/2023 11:20

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 15:35

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-01 A 01
	Preparation Batch: BLI0445	Sample Size: 12.48 g (wet)	Dry Weight:10.04 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 80.46
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-01 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-01 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	0.76	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	0.33	ug/kg	J
2-Methylnaphthalene	91-57-6	1	0.13	0.50	0.95	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	ND	ug/kg	U
Acenaphthene	83-32-9	1	0.09	0.50	0.21	ug/kg	J
Dibenzofuran	132-64-9	1	0.13	0.50	0.18	ug/kg	J
Fluorene	86-73-7	1	0.07	0.50	0.24	ug/kg	J
Phenanthrene	85-01-8	1	0.11	0.50	1.21	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	0.21	ug/kg	J
Fluoranthene	206-44-0	1	0.08	0.50	0.98	ug/kg	B
Pyrene	129-00-0	1	0.09	0.50	1.21	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	0.58	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	3.34	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	2.28	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.47	ug/kg	J
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.22	ug/kg	J
Benzo(a)pyrene	50-32-8	1	0.09	0.50	0.71	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.40	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	0.64	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	2.36	ug/kg	
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*50.5*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*65.7*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*86.2*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/11/2023 11:20

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 18:48

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-01 A 04

Preparation Batch: BLI0448 — Sample Size: 10.03 g (wet) — Dry Weight:8.07 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 80.46

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.20	ND	mg/kg	U
Motor Oil Range Organics (C24-C38)	RRO	1	12.4	ND	mg/kg	U
Surrogate: o-Terphenyl			*50-150 %*	*91.0*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/11/2023 11:20

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:33

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-01 A 04

Preparation Batch: BLI0455 — Sample Size: 1.053 g (wet) — Dry Weight:0.85 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 81.01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.23	5.26	mg/kg	
Cadmium	7440-43-9	20	0.04	0.12	0.06	mg/kg	J
Selenium	7782-49-2	20	0.21	0.59	0.95	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/11/2023 11:20

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:33

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-01 A 04

Preparation Batch: BLI0455 — Sample Size: 1.053 g (wet) — Dry Weight:0.85 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 81.01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.23	0.07	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/11/2023 11:20

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:05

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-01 A 03

Preparation Batch: BLI0424 — Sample Size: 1.052 g (wet) — Dry Weight:0.85 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 81.01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.305	0.704	47.4	mg/kg	
Lead	7439-92-1	2	0.282	2.35	2.72	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/11/2023 11:20

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 14:55

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-01 A

Preparation Batch: BLI0456 — Sample Size: 0.228 g (wet) — Dry Weight:0.18 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 81.01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00568	0.0271	0.0164	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B1-7ft

23I0284-01 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/11/2023 11:20

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-01 A

Preparation Batch: BLI0583 — Sample Size: 20.6299 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.61	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/11/2023 14:40

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 14:49

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-02 C

Preparation Batch: BLI0419 — Sample Size: 7.39 g (wet) — Dry Weight:5.70 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 77.19

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.14	0.88	0.29	ug/kg	J
Toluene	108-88-3	1	0.22	0.88	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.20	0.88	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.43	1.75	ND	ug/kg	U
o-Xylene	95-47-6	1	0.21	0.88	ND	ug/kg	U
Xylenes, total	1330-20-7	1	0.61	1.75	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*112*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*102*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*106*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/11/2023 14:40

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 14:46

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-02 E

Preparation Batch: BLI0415 — Sample Size: 6.791 g (wet) — Dry Weight:5.24 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 77.19

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	6250	22100	ug/kg	
HC ID: GRO						
Surrogate: Toluene-d8			*80-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*101*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/11/2023 14:40

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 16:07

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-02 A 01
	Preparation Batch: BLI0445	Sample Size: 12.96 g (wet)	Dry Weight:10.00 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 77.19
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-02 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-02 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	1.46	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	1.25	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	1.92	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	ND	ug/kg	U
Acenaphthene	83-32-9	1	0.09	0.50	1.03	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	0.81	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	2.41	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	12.0	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	2.23	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	7.73	ug/kg	B
Pyrene	129-00-0	1	0.09	0.50	28.7	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	5.53	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	20.9	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	3.46	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.95	ug/kg	
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.48	ug/kg	J
Benzo(a)pyrene	50-32-8	1	0.09	0.50	4.66	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.88	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	1.03	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	3.28	ug/kg	
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*53.8*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*76.6*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*113*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/11/2023 14:40

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 19:08

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-02 A 04

Preparation Batch: BLI0448 — Sample Size: 10.02 g (wet) — Dry Weight:7.73 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 77.19

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.46	20.0	mg/kg	
HC ID: DIESEL						
Motor Oil Range Organics (C24-C38)	RRO	1	12.9	32.0	mg/kg	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*80.2*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/11/2023 14:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:37

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-02 A 04

Preparation Batch: BLI0455 — Sample Size: 1.032 g (wet) — Dry Weight:0.80 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 77.59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.05	0.25	2.08	mg/kg	
Cadmium	7440-43-9	20	0.04	0.12	0.08	mg/kg	J
Selenium	7782-49-2	20	0.22	0.62	1.21	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/11/2023 14:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:37

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-02 A 04

Preparation Batch: BLI0455 — Sample Size: 1.032 g (wet) — Dry Weight:0.80 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 77.59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.25	0.07	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/11/2023 14:40

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:25

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-02 A 03

Preparation Batch: BLI0424 — Sample Size: 1.041 g (wet) — Dry Weight:0.81 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 77.59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.322	0.743	60.5	mg/kg	
Lead	7439-92-1	2	0.297	2.48	3.08	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/11/2023 14:40

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 14:58

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-02 A

Preparation Batch: BLI0456 — Sample Size: 0.234 g (wet) — Dry Weight:0.18 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 77.59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00578	0.0275	0.00716	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B2-7ft

23I0284-02 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/11/2023 14:40

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-02 A

Preparation Batch: BLI0583 — Sample Size: 20.5643 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.40	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/11/2023 15:35

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 15:14

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-03 C

Preparation Batch: BLI0419 — Sample Size: 7.5 g (wet) — Dry Weight:5.78 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 77.06

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.14	0.87	ND	ug/kg	U
Toluene	108-88-3	1	0.21	0.87	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.20	0.87	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.43	1.73	ND	ug/kg	U
o-Xylene	95-47-6	1	0.21	0.87	ND	ug/kg	U
Xylenes, total	1330-20-7	1	0.60	1.73	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*114*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*100*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/11/2023 15:35

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 15:09

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-03 E

Preparation Batch: BLI0415 — Sample Size: 5.816 g (wet) — Dry Weight:4.48 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 77.06

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	7070	ND	ug/kg	U
Surrogate: Toluene-d8			*80-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*98.6*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/11/2023 15:35

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 16:39

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-03 A 01
	Preparation Batch: BLI0445	Sample Size: 12.98 g (wet)	Dry Weight:10.00 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 77.06
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-03 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-03 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	1.18	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	1.14	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	0.54	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	0.07	ug/kg	J
Acenaphthene	83-32-9	1	0.09	0.50	0.64	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	0.14	ug/kg	J
Fluorene	86-73-7	1	0.07	0.50	0.31	ug/kg	J
Phenanthrene	85-01-8	1	0.11	0.50	1.46	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	0.24	ug/kg	J
Fluoranthene	206-44-0	1	0.08	0.50	0.96	ug/kg	B
Pyrene	129-00-0	1	0.09	0.50	1.26	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	0.46	ug/kg	J
Chrysene	218-01-9	1	0.07	0.50	2.83	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	1.30	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.24	ug/kg	J
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.16	ug/kg	J
Benzo(a)pyrene	50-32-8	1	0.09	0.50	0.79	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.39	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	0.43	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	2.38	ug/kg	
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*53.7*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*63.9*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*91.9*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/11/2023 15:35

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 19:29

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-03 A 04

Preparation Batch: BLI0448 — Sample Size: 10.01 g (wet) — Dry Weight:7.71 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 77.06

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.48	ND	mg/kg	U
Motor Oil Range Organics (C24-C38)	RRO	1	13.0	54.3	mg/kg	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*89.8*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/11/2023 15:35

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:42

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-03 A 04

Preparation Batch: BLI0455 — Sample Size: 1.013 g (wet) — Dry Weight:0.77 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 75.75

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.05	0.26	3.06	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.06	mg/kg	J
Selenium	7782-49-2	20	0.23	0.65	0.57	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/11/2023 15:35

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:42

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-03 A 04

Preparation Batch: BLI0455 — Sample Size: 1.013 g (wet) — Dry Weight:0.77 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 75.75

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.26	0.07	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/11/2023 15:35

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:28

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-03 A 03

Preparation Batch: BLI0424 — Sample Size: 1.072 g (wet) — Dry Weight:0.81 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 75.75

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.320	0.739	49.0	mg/kg	
Lead	7439-92-1	2	0.296	2.46	2.23	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/11/2023 15:35

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 15:00

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-03 A

Preparation Batch: BLI0456 — Sample Size: 0.248 g (wet) — Dry Weight:0.19 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 75.75

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00559	0.0266	0.0204	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-11-09-B3-7.7ft

23I0284-03 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/11/2023 15:35

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-03 A

Preparation Batch: BLI0583 — Sample Size: 20.4322 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.13	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/12/2023 09:40

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 15:39

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-04 C

Preparation Batch: BLI0419 — Sample Size: 7.47 g (wet) — Dry Weight:5.64 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 75.52

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.15	0.89	ND	ug/kg	U
Toluene	108-88-3	1	0.22	0.89	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.20	0.89	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.44	1.77	ND	ug/kg	U
o-Xylene	95-47-6	1	0.21	0.89	ND	ug/kg	U
Xylenes, total	1330-20-7	1	0.62	1.77	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*112*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*102*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*103*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/12/2023 09:40

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 15:31

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-04 E

Preparation Batch: BLI0415 — Sample Size: 6.993 g (wet) — Dry Weight:5.28 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 75.52

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	6350	ND	ug/kg	U
Surrogate: Toluene-d8			*80-120 %*	*99.3*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*94.5*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/12/2023 09:40
Instrument: NT18 Analyst: RJL — Analyzed: 10/19/2023 14:23

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-04 A 01
	Preparation Batch: BLI0445	Sample Size: 13.24 g (wet)	Dry Weight:10.00 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 75.52
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-04 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-04 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	2	0.88	1.20	61.1	ug/kg	D
1-Methylnaphthalene	90-12-0	2	0.21	1.00	6.24	ug/kg	D
2-Methylnaphthalene	91-57-6	2	0.26	1.00	11.7	ug/kg	D
Acenaphthylene	208-96-8	2	0.13	1.00	0.72	ug/kg	J, D
Acenaphthene	83-32-9	2	0.18	1.00	5.85	ug/kg	D
Dibenzofuran	132-64-9	2	0.25	1.00	1.74	ug/kg	D
Fluorene	86-73-7	2	0.14	1.00	4.12	ug/kg	D
Phenanthrene	85-01-8	2	0.23	1.00	11.2	ug/kg	D, B
Anthracene	120-12-7	2	0.15	1.00	2.20	ug/kg	D
Fluoranthene	206-44-0	2	0.16	1.00	4.91	ug/kg	D, B
Pyrene	129-00-0	2	0.18	1.00	6.20	ug/kg	D, B
Benzo(a)anthracene	56-55-3	2	0.14	1.00	1.60	ug/kg	D
Chrysene	218-01-9	2	0.14	1.00	2.29	ug/kg	D
Benzo(b)fluoranthene	205-99-2	2	0.13	1.00	1.14	ug/kg	D
Benzo(k)fluoranthene	207-08-9	2	0.20	1.00	0.60	ug/kg	J, D
Benzo(j)fluoranthene	205-82-3	2	0.19	1.00	0.54	ug/kg	J, D
Benzo(a)pyrene	50-32-8	2	0.17	1.00	1.39	ug/kg	D
Indeno(1,2,3-cd)pyrene	193-39-5	2	0.18	1.00	0.63	ug/kg	J, D
Dibenzo(a,h)anthracene	53-70-3	2	0.21	1.00	0.29	ug/kg	J, D
Benzo(g,h,i)perylene	191-24-2	2	0.17	1.00	1.20	ug/kg	D
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*54.2*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*57.8*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*79.7*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/12/2023 09:40

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 19:49

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-04 A 04

Preparation Batch: BLI0448 — Sample Size: 10.01 g (wet) — Dry Weight:7.56 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 75.52

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.61	ND	mg/kg	U
Motor Oil Range Organics (C24-C38)	RRO	1	13.2	13.5	mg/kg	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*52.9*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/12/2023 09:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:47

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-04 A 04

Preparation Batch: BLI0455 — Sample Size: 1.019 g (wet) — Dry Weight:0.78 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 76.28

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.05	0.26	3.64	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.07	mg/kg	J
Selenium	7782-49-2	20	0.23	0.64	0.61	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/12/2023 09:40

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:47

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-04 A 04

Preparation Batch: BLI0455 — Sample Size: 1.019 g (wet) — Dry Weight:0.78 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 76.28

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.26	0.07	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/12/2023 09:40

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:31

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-04 A 03

Preparation Batch: BLI0424 — Sample Size: 1.05 g (wet) — Dry Weight:0.80 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 76.28

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.325	0.749	48.3	mg/kg	
Lead	7439-92-1	2	0.300	2.50	3.65	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/12/2023 09:40

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 15:02

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-04 A

Preparation Batch: BLI0456 — Sample Size: 0.235 g (wet) — Dry Weight:0.18 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 76.28

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00586	0.0279	0.0134	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B4-8.5ft

23I0284-04 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/12/2023 09:40

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-04 A

Preparation Batch: BLI0583 — Sample Size: 20.0007 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.85	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/12/2023 11:45

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 16:04

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-05 C

Preparation Batch: BLI0419 — Sample Size: 7.58 g (wet) — Dry Weight:5.86 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 77.30

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.14	0.85	7.75	ug/kg	
Toluene	108-88-3	1	0.21	0.85	13.5	ug/kg	
Ethylbenzene	100-41-4	1	0.19	0.85	2.65	ug/kg	
m,p-Xylene	179601-23-1	1	0.42	1.71	13.3	ug/kg	
o-Xylene	95-47-6	1	0.20	0.85	5.78	ug/kg	
Xylenes, total	1330-20-7	1	0.59	1.71	19.1	ug/kg	
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*112*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*101*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*103*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/12/2023 11:45

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 15:53

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-05 E

Preparation Batch: BLI0415 — Sample Size: 7.264 g (wet) — Dry Weight:5.62 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 77.30

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	5920	ND	ug/kg	U
Surrogate: Toluene-d8			*80-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*98.6*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/12/2023 11:45

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 17:44

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-05 A 01
	Preparation Batch: BLI0445	Sample Size: 12.94 g (wet)	Dry Weight:10.00 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 77.30
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-05 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-05 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	2.24	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	7.98	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	8.95	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	ND	ug/kg	U
Acenaphthene	83-32-9	1	0.09	0.50	2.18	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	3.78	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	19.0	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	26.6	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	2.26	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	2.22	ug/kg	B
Pyrene	129-00-0	1	0.09	0.50	4.04	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	1.07	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	3.75	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	0.91	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.39	ug/kg	J
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.35	ug/kg	J
Benzo(a)pyrene	50-32-8	1	0.09	0.50	0.79	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.49	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	0.23	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	0.85	ug/kg	
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*55.2*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*74.1*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*102*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/12/2023 11:45

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 20:09

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-05 A 04

Preparation Batch: BLI0448 — Sample Size: 10 g (wet) — Dry Weight:7.73 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 77.30

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.47	39.8	mg/kg	
HC ID: DIESEL						
Motor Oil Range Organics (C24-C38)	RRO	1	12.9	33.3	mg/kg	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*86.4*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/12/2023 11:45

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:51

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-05 A 04

Preparation Batch: BLI0455 — Sample Size: 1.003 g (wet) — Dry Weight:0.77 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 76.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.05	0.26	3.92	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.05	mg/kg	J
Selenium	7782-49-2	20	0.23	0.65	1.12	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/12/2023 11:45

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:51

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-05 A 04

Preparation Batch: BLI0455 — Sample Size: 1.003 g (wet) — Dry Weight:0.77 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 76.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.26	0.07	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/12/2023 11:45

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:34

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-05 A 03

Preparation Batch: BLI0424 — Sample Size: 1.072 g (wet) — Dry Weight:0.82 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 76.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.317	0.732	63.7	mg/kg	
Lead	7439-92-1	2	0.293	2.44	1.93	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/12/2023 11:45

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 15:05

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-05 A

Preparation Batch: BLI0456 — Sample Size: 0.265 g (wet) — Dry Weight:0.20 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 76.43

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00518	0.0247	0.0102	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-05 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/12/2023 11:45

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-05 A

Preparation Batch: BLI0583 — Sample Size: 20.5073 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.15	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/12/2023 12:25

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 13:56

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 23I0284-06 F

Preparation Batch: BLI0406 — Sample Size: 10 mL

Prepared: 09/14/2023 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.20	15.8	ug/L	
Toluene	108-88-3	1	0.20	26.2	ug/L	
Ethylbenzene	100-41-4	1	0.20	5.01	ug/L	
m,p-Xylene	179601-23-1	1	0.40	23.1	ug/L	
o-Xylene	95-47-6	1	0.20	9.91	ug/L	
Surrogate: Toluene-d8			*80-120 %*	*106*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*99.4*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/12/2023 12:25

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 13:56

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap) — Extract ID: 23I0284-06 F

Preparation Batch: BLI0406 — Sample Size: 10 mL

Prepared: 09/14/2023 — Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	793	ug/L	
HC ID: GAS						
Surrogate: Toluene-d8			*80-120 %*	*106*	*%*	
Surrogate: 4-Bromofluorobenzene			*80-120 %*	*99.4*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/12/2023 12:25

Instrument: NT18 Analyst: RJL — Analyzed: 09/28/2023 12:19

Sample Preparation: Preparation Method: EPA 3510C SepF — Extract ID: 23I0284-06 B 01

Preparation Batch: BLI0454 — Sample Size: 500 mL

Prepared: 09/18/2023 — Final Volume: 0.5 mL

Sample Cleanup: Cleanup Method: Silica Gel — Extract ID: 23I0284-06 B 01

Cleanup Batch: CLI0179 — Initial Volume: 0.5 uL

Cleaned: 27-Sep-2023 — Final Volume: 0.5 uL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.006	0.010	0.984	ug/L	
2-Methylnaphthalene	91-57-6	1	0.007	0.010	3.32	ug/L	E
1-Methylnaphthalene	90-12-0	1	0.008	0.010	5.70	ug/L	E
Acenaphthylene	208-96-8	1	0.005	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.004	0.010	0.669	ug/L	
Dibenzofuran	132-64-9	1	0.006	0.010	0.508	ug/L	
Fluorene	86-73-7	1	0.004	0.010	2.79	ug/L	E
Phenanthrene	85-01-8	1	0.005	0.010	2.21	ug/L	E
Anthracene	120-12-7	1	0.005	0.010	0.118	ug/L	
Carbazole	86-74-8	1	0.005	0.010	0.028	ug/L	
Fluoranthene	206-44-0	1	0.006	0.010	0.052	ug/L	
Pyrene	129-00-0	1	0.008	0.010	0.114	ug/L	
Benzo(a)anthracene	56-55-3	1	0.006	0.010	0.016	ug/L	
Chrysene	218-01-9	1	0.008	0.010	0.123	ug/L	
Benzo(b)fluoranthene	205-99-2	1	0.005	0.010	0.012	ug/L	
Benzo(k)fluoranthene	207-08-9	1	0.008	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.005	0.010	0.005	ug/L	J
Benzofluoranthenes, Total		1	0.017	0.020	0.024	ug/L	
Benzo(a)pyrene	50-32-8	1	0.005	0.010	0.007	ug/L	J
Perylene	198-55-0	1	0.004	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.008	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.008	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.009	0.010	0.012	ug/L	
Surrogate: 2-Methylnaphthalene-d10				*42-120 %*	*49.5*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*29-120 %*	*26.1*	*%*	*
Surrogate: Fluoranthene-d10				*57-120 %*	*72.5*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/12/2023 12:25

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 17:07

Sample Preparation: Preparation Method: EPA 3510C SepF — Extract ID: 23I0284-06 A 01

Preparation Batch: BLI0435 — Sample Size: 500 mL

Prepared: 09/15/2023 — Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	5	0.500	5.72	mg/L	D
HC ID: DIESEL						
Motor Oil Range Organics (C24-C38)	RRO	5	1.00	3.21	mg/L	D
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*42.2*	*%*	*

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/12/2023 12:25

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/19/2023 03:45

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 23I0284-06 E 01

Preparation Batch: BLI0443 — Sample Size: 25 mL

Prepared: 09/15/2023 — Final Volume: 25 mL

Analyte	CAS Number	Dilution		Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1		0.200	23.3	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	1.51	ug/L	
Selenium	7782-49-2	1		0.500	8.08	ug/L	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/12/2023 12:25

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/19/2023 03:45

Sample Preparation: Preparation Method: REN - EPA 3010A M — Extract ID: 23I0284-06 E 01

Preparation Batch: BLI0443 — Sample Size: 25 mL

Prepared: 09/15/2023 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/12/2023 12:25

Instrument: ICP3 Analyst: DOE — Analyzed: 09/21/2023 08:46

Sample Preparation: Preparation Method: TWC EPA 3010A — Extract ID: 23I0284-06 E 02

Preparation Batch: BLI0493 — Sample Size: 25 mL

Prepared: 09/19/2023 — Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.0026	0.0060	1.95	mg/L	
Lead	7439-92-1	1		0.0200	0.100	mg/L	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06 (Water)

Metals and Metallic Compounds

Method: EPA 7470A — Sampled: 09/12/2023 12:25

Instrument: HYDRA Analyst: ml — Analyzed: 09/20/2023 12:36

Sample Preparation: Preparation Method: TWM EPA 7470A — Extract ID: 23I0284-06 E

Preparation Batch: BLI0541 — Sample Size: 20 mL

Prepared: 09/19/2023 — Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000807	mg/L	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-12-09-B5-8ft

23I0284-06RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/12/2023 12:25

Instrument: NT18 Analyst: VTS — Analyzed: 09/28/2023 18:39

Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 23I0284-06RE1 B 01
	Preparation Batch: BLI0454	Sample Size: 500 mL	
	Prepared: 09/18/2023	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-06RE1 B 01
	Cleanup Batch: CLI0179	Initial Volume: 0.5 uL	
	Cleaned: 27-Sep-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	10	0.055	0.100	1.07	ug/L	D
2-Methylnaphthalene	91-57-6	10	0.067	0.100	3.30	ug/L	D
1-Methylnaphthalene	90-12-0	10	0.076	0.100	5.61	ug/L	D
Acenaphthylene	208-96-8	10	0.048	0.100	ND	ug/L	U
Acenaphthene	83-32-9	10	0.044	0.100	1.18	ug/L	D
Dibenzofuran	132-64-9	10	0.056	0.100	0.602	ug/L	D
Fluorene	86-73-7	10	0.044	0.100	3.26	ug/L	D
Phenanthrene	85-01-8	10	0.054	0.100	2.31	ug/L	D
Anthracene	120-12-7	10	0.051	0.100	0.113	ug/L	D
Carbazole	86-74-8	10	0.049	0.100	ND	ug/L	U
Fluoranthene	206-44-0	10	0.062	0.100	ND	ug/L	U
Pyrene	129-00-0	10	0.082	0.100	0.121	ug/L	D
Benzo(a)anthracene	56-55-3	10	0.064	0.100	ND	ug/L	U
Chrysene	218-01-9	10	0.083	0.100	0.134	ug/L	D
Benzo(b)fluoranthene	205-99-2	10	0.051	0.100	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	10	0.079	0.100	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	10	0.048	0.100	ND	ug/L	U
Benzofluoranthenes, Total		10	0.168	0.200	ND	ug/L	U
Benzo(a)pyrene	50-32-8	10	0.050	0.100	ND	ug/L	U
Perylene	198-55-0	10	0.042	0.100	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.082	0.100	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	10	0.075	0.100	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	10	0.086	0.100	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				*42-120 %*	*50.7*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*29-120 %*	*22.7*	*%*	*
Surrogate: Fluoranthene-d10				*57-120 %*	*72.7*	*%*	Q

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/13/2023 09:50

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 16:30

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-07 C

Preparation Batch: BLI0419 — Sample Size: 6.74 g (wet) — Dry Weight:4.93 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 73.09

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.17	1.01	ND	ug/kg	U
Toluene	108-88-3	1	0.25	1.01	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.23	1.01	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.50	2.03	ND	ug/kg	U
o-Xylene	95-47-6	1	0.24	1.01	ND	ug/kg	U
Xylenes, total	1330-20-7	1	0.71	2.03	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*112*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*101*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/13/2023 09:50

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 16:15

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-07 E

Preparation Batch: BLI0415 — Sample Size: 7.105 g (wet) — Dry Weight:5.19 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 73.09

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	6660	ND	ug/kg	U
Surrogate: Toluene-d8			*80-120 %*	*100*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*94.4*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/13/2023 09:50

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 18:16

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-07 A 01
	Preparation Batch: BLI0445	Sample Size: 13.65 g (wet)	Dry Weight:9.98 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 73.09
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-07 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-07 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	1.73	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	0.40	ug/kg	J
2-Methylnaphthalene	91-57-6	1	0.13	0.50	0.83	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	0.30	ug/kg	J
Acenaphthene	83-32-9	1	0.09	0.50	0.34	ug/kg	J
Dibenzofuran	132-64-9	1	0.13	0.50	0.68	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	0.94	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	2.13	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	0.81	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	1.38	ug/kg	B
Pyrene	129-00-0	1	0.09	0.50	1.32	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	0.38	ug/kg	J
Chrysene	218-01-9	1	0.07	0.50	0.42	ug/kg	J
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	0.27	ug/kg	J
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.19	ug/kg	J
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.11	ug/kg	J
Benzo(a)pyrene	50-32-8	1	0.09	0.50	0.25	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.18	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	0.11	0.50	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	0.09	0.50	0.27	ug/kg	J
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*46.4*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*60.9*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*78.4*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/13/2023 09:50

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 20:29

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-07 A 04

Preparation Batch: BLI0448 — Sample Size: 10 g (wet) — Dry Weight:7.31 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 73.09

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.84	ND	mg/kg	U
Motor Oil Range Organics (C24-C38)	RRO	1	13.7	ND	mg/kg	U
Surrogate: o-Terphenyl			*50-150 %*	*82.1*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/13/2023 09:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:56

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-07 A 04

Preparation Batch: BLI0455 — Sample Size: 1.013 g (wet) — Dry Weight:0.77 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 75.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.05	0.26	3.78	mg/kg	
Cadmium	7440-43-9	20	0.04	0.13	0.08	mg/kg	J
Selenium	7782-49-2	20	0.23	0.65	0.73	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/13/2023 09:50

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 20:56

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-07 A 04

Preparation Batch: BLI0455 — Sample Size: 1.013 g (wet) — Dry Weight:0.77 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 75.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.26	0.07	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/13/2023 09:50

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:38

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-07 A 03

Preparation Batch: BLI0424 — Sample Size: 1.039 g (wet) — Dry Weight:0.79 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 75.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.330	0.761	70.1	mg/kg	
Lead	7439-92-1	2	0.304	2.54	2.02	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/13/2023 09:50

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 15:07

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-07 A

Preparation Batch: BLI0456 — Sample Size: 0.244 g (wet) — Dry Weight:0.19 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 75.93

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00567	0.0270	0.0132	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B6-8ft

23I0284-07 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/13/2023 09:50

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-07 A

Preparation Batch: BLI0583 — Sample Size: 20.3811 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.34	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/13/2023 11:30

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 16:55

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-08 C

Preparation Batch: BLI0419 — Sample Size: 7.81 g (wet) — Dry Weight:6.70 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 85.81

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.12	0.75	ND	ug/kg	U
Toluene	108-88-3	1	0.18	0.75	ND	ug/kg	U
Ethylbenzene	100-41-4	1	0.17	0.75	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.37	1.49	ND	ug/kg	U
o-Xylene	95-47-6	1	0.18	0.75	ND	ug/kg	U
Xylenes, total	1330-20-7	1	0.52	1.49	ND	ug/kg	U
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*112*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*101*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*100*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*104*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/13/2023 11:30

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 16:37

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-08 E

Preparation Batch: BLI0415 — Sample Size: 7.303 g (wet) — Dry Weight:6.27 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 85.81

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	4820	ND	ug/kg	U
Surrogate: Toluene-d8			*80-120 %*	*102*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*97.4*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/13/2023 11:30

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 18:48

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-08 A 01
	Preparation Batch: BLI0445	Sample Size: 11.68 g (wet)	Dry Weight:10.02 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 85.81
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-08 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-08 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	0.11	0.50	0.14	ug/kg	J
2-Methylnaphthalene	91-57-6	1	0.13	0.50	0.27	ug/kg	J
Acenaphthylene	208-96-8	1	0.06	0.50	ND	ug/kg	U
Acenaphthene	83-32-9	1	0.09	0.50	ND	ug/kg	U
Dibenzofuran	132-64-9	1	0.13	0.50	0.14	ug/kg	J
Fluorene	86-73-7	1	0.07	0.50	0.13	ug/kg	J
Phenanthrene	85-01-8	1	0.11	0.50	0.56	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	0.20	ug/kg	J
Fluoranthene	206-44-0	1	0.08	0.50	0.41	ug/kg	J, B
Pyrene	129-00-0	1	0.09	0.50	0.50	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	0.24	ug/kg	J
Chrysene	218-01-9	1	0.07	0.50	0.40	ug/kg	J
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	0.20	ug/kg	J
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	ND	ug/kg	U
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	0.09	0.50	0.16	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.11	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	0.39	ug/kg	J
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*50.2*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*68.6*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*90.0*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/13/2023 11:30

Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 20:49

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-08 A 04

Preparation Batch: BLI0448 — Sample Size: 10 g (wet) — Dry Weight:8.58 g

Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 85.81

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	5.83	ND	mg/kg	U
Motor Oil Range Organics (C24-C38)	RRO	1	11.7	ND	mg/kg	U
Surrogate: o-Terphenyl			*50-150 %*	*87.3*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/13/2023 11:30

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 21:00

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-08 A 04

Preparation Batch: BLI0455 — Sample Size: 1.049 g (wet) — Dry Weight:0.90 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 85.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.22	4.13	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.10	mg/kg	J
Selenium	7782-49-2	20	0.20	0.56	0.62	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/13/2023 11:30

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 21:00

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-08 A 04

Preparation Batch: BLI0455 — Sample Size: 1.049 g (wet) — Dry Weight:0.90 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 85.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.02	0.22	0.05	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/13/2023 11:30

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:41

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-08 A 03

Preparation Batch: BLI0424 — Sample Size: 1.022 g (wet) — Dry Weight:0.87 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 85.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.297	0.686	63.9	mg/kg	
Lead	7439-92-1	2	0.274	2.29	2.30	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/13/2023 11:30

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 15:09

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-08 A

Preparation Batch: BLI0456 — Sample Size: 0.226 g (wet) — Dry Weight:0.19 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 85.55

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00543	0.0259	0.0117	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B7-8ft

23I0284-08 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/13/2023 11:30

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-08 A

Preparation Batch: BLI0583 — Sample Size: 20.339 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	7.53	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Volatile Organic Compounds

Method: EPA 8260D — Sampled: 09/13/2023 14:05

Instrument: NT5 Analyst: PB — Analyzed: 09/14/2023 17:21

Sample Preparation: Preparation Method: EPA 5035 (Sodium Bisulfate) — Extract ID: 23I0284-10 C

Preparation Batch: BLI0419 — Sample Size: 8.2 g (wet) — Dry Weight:6.52 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 79.48

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.13	0.77	0.57	ug/kg	J
Toluene	108-88-3	1	0.19	0.77	0.54	ug/kg	J
Ethylbenzene	100-41-4	1	0.17	0.77	ND	ug/kg	U
m,p-Xylene	179601-23-1	1	0.38	1.53	0.53	ug/kg	J
o-Xylene	95-47-6	1	0.18	0.77	0.27	ug/kg	J
Xylenes, total	1330-20-7	1	0.53	1.53	0.80	ug/kg	J
Surrogate: 1,2-Dichloroethane-d4				*80-149 %*	*111*	*%*	
Surrogate: Toluene-d8				*77-120 %*	*108*	*%*	
Surrogate: 4-Bromofluorobenzene				*80-120 %*	*101*	*%*	
Surrogate: 1,2-Dichlorobenzene-d4				*80-120 %*	*102*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/13/2023 14:05

Instrument: NT3 Analyst: PKC — Analyzed: 09/14/2023 16:59

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-10 E

Preparation Batch: BLI0415 — Sample Size: 7.883 g (wet) — Dry Weight:6.27 g

Prepared: 09/14/2023 — Final Volume: 5 mL — % Solids: 79.48

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	50	5280	614000	ug/kg	E
HC ID: GRO						
Surrogate: Toluene-d8			*80-120 %*	*110*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*97.7*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM — Sampled: 09/13/2023 14:05

Instrument: NT18 Analyst: RJL — Analyzed: 10/16/2023 19:20

Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level		Extract ID: 23I0284-10 A 01
	Preparation Batch: BLI0445	Sample Size: 12.6 g (wet)	Dry Weight:10.01 g
	Prepared: 09/15/2023	Final Volume: 0.5 mL	% Solids: 79.48
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 23I0284-10 A 01
	Cleanup Batch: CLJ0058	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:23I0284-10 A 01
	Cleanup Batch: CLJ0057	Initial Volume: 0.5 uL	
	Cleaned: 13-Oct-2023	Final Volume: 0.5 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	1.01	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	7.15	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	3.23	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	ND	ug/kg	U
Acenaphthene	83-32-9	1	0.09	0.50	6.10	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	4.49	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	22.0	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	18.2	ug/kg	B
Anthracene	120-12-7	1	0.07	0.50	5.07	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	5.31	ug/kg	B
Pyrene	129-00-0	1	0.09	0.50	9.85	ug/kg	B
Benzo(a)anthracene	56-55-3	1	0.07	0.50	1.71	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	9.71	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	2.05	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.29	ug/kg	J
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.41	ug/kg	J
Benzo(a)pyrene	50-32-8	1	0.09	0.50	0.65	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.34	ug/kg	J
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	0.30	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	0.94	ug/kg	
Surrogate: 2-Methylnaphthalene-d10				*30-160 %*	*48.6*	*%*	
Surrogate: Dibenzo[a,h]anthracene-d14				*30-160 %*	*63.7*	*%*	
Surrogate: Fluoranthene-d10				*30-160 %*	*106*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Petroleum Hydrocarbons

Method: NWTPH-Dx — Sampled: 09/13/2023 14:05
Instrument: FID4 Analyst: AA — Analyzed: 09/25/2023 21:50

Sample Preparation: Preparation Method: EPA 3546 (Microwave) — Extract ID: 23I0284-10 A 04
Preparation Batch: BLI0448 — Sample Size: 10.01 g (wet) — Dry Weight:7.96 g
Prepared: 09/15/2023 — Final Volume: 1 mL — % Solids: 79.48

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	6.28	201	mg/kg	
HC ID: DIESEL						
Motor Oil Range Organics (C24-C38)	RRO	1	12.6	181	mg/kg	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			*50-150 %*	*72.9*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 UCT-KED — Sampled: 09/13/2023 14:05

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 21:05

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-10 A 04

Preparation Batch: BLI0455 — Sample Size: 1.065 g (wet) — Dry Weight:0.87 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 81.89

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	20	0.04	0.23	10.1	mg/kg	
Cadmium	7440-43-9	20	0.03	0.11	0.14	mg/kg	
Selenium	7782-49-2	20	0.21	0.57	1.15	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Metals and Metallic Compounds

Method: EPA 200.8 — Sampled: 09/13/2023 14:05

Instrument: ICPMS2 Analyst: MCB — Analyzed: 09/20/2023 21:05

Sample Preparation: Preparation Method: SWN EPA 3050B — Extract ID: 23I0284-10 A 04

Preparation Batch: BLI0455 — Sample Size: 1.065 g (wet) — Dry Weight:0.87 g

Prepared: 09/19/2023 — Final Volume: 50 mL — % Solids: 81.89

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	20	0.03	0.23	0.08	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Metals and Metallic Compounds

Method: EPA 6010D — Sampled: 09/13/2023 14:05

Instrument: ICP3 Analyst: DOE — Analyzed: 09/18/2023 10:44

Sample Preparation: Preparation Method: SWC EPA 3050B — Extract ID: 23I0284-10 A 03

Preparation Batch: BLI0424 — Sample Size: 1.031 g (wet) — Dry Weight:0.84 g

Prepared: 09/15/2023 — Final Volume: 50 mL — % Solids: 81.89

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.308	0.711	80.6	mg/kg	
Lead	7439-92-1	2	0.284	2.37	3.19	mg/kg	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Metals and Metallic Compounds

Method: EPA 7471B — Sampled: 09/13/2023 14:05

Instrument: HYDRA Analyst: ML — Analyzed: 09/26/2023 15:12

Sample Preparation: Preparation Method: SMM EPA 7471B — Extract ID: 23I0284-10 A

Preparation Batch: BLI0456 — Sample Size: 0.242 g (wet) — Dry Weight:0.20 g

Prepared: 09/20/2023 — Final Volume: 50 mL — % Solids: 81.89

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.00530	0.0252	0.0165	mg/kg	J

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10 (Solid)

Wet Chemistry

Method: EPA 9045D — Sampled: 09/13/2023 14:05

Instrument: Accumet AB150 Analyst: SRB — Analyzed: 09/20/2023 15:22

Sample Preparation: Preparation Method: No Prep Wet Chem — Extract ID: 23I0284-10 A

Preparation Batch: BLI0583 — Sample Size: 20.0168 g (wet)

Prepared: 09/20/2023 — Final Volume: 20 g

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
pH		1	0.01	0.01	6.64	pH Units	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

2023-13-09-B8-8ft

23I0284-10RE1 (Solid)

Volatile Organic Compounds

Method: NWTPHg — Sampled: 09/13/2023 14:05

Instrument: NT3 Analyst: TWC — Analyzed: 09/17/2023 19:49

Sample Preparation: Preparation Method: EPA 5035 (Methanol Extraction) — Extract ID: 23I0284-10RE1 E

Preparation Batch: BLI0462 — Sample Size: 7.883 g (wet) — Dry Weight:6.27 g

Prepared: 09/15/2023 — Final Volume: 5 mL — % Solids: 79.48

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1000	106000	446000	ug/kg	D
HC ID: GRO						
Surrogate: Toluene-d8			*80-120 %*	*99.6*	*%*	
Surrogate: 4-Bromofluorobenzene			*78-123 %*	*97.8*	*%*	

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - NWTPHg

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0406-BLK1)			Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 12:20							
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	5.06		ug/L	*5.00*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.84		ug/L	*5.00*		*96.8*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - EPA 8260D

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0406-BLK2)			Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 12:20							
Benzene	ND	0.20	ug/L							U
Toluene	ND	0.20	ug/L							U
Ethylbenzene	ND	0.20	ug/L							U
m,p-Xylene	ND	0.40	ug/L							U
o-Xylene	ND	0.20	ug/L							U
Surrogate: Toluene-d8	5.06		ug/L	*5.00*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.84		ug/L	*5.00*		*96.8*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - NWTPHg

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0406-BS1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 10:06						
Gasoline Range Organics (Tol-Nap)	948	100	ug/L	1000		94.8	72-128			
Surrogate: Toluene-d8	4.92		ug/L	*5.00*		*98.5*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.74		ug/L	*5.00*		*94.9*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - EPA 8260D

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0406-BS2)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 10:28						
Benzene	9.38	0.20	ug/L	10.0		93.8	80-120			
Toluene	9.04	0.20	ug/L	10.0		90.4	80-120			
Ethylbenzene	9.20	0.20	ug/L	10.0		92.0	80-120			
m,p-Xylene	18.3	0.40	ug/L	20.0		91.4	80-121			
o-Xylene	8.72	0.20	ug/L	10.0		87.2	80-121			
Surrogate: Toluene-d8	5.18		ug/L	*5.00*		*104*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.92		ug/L	*5.00*		*98.3*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - NWTPHg

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0406-BSD1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 10:50						
Gasoline Range Organics (Tol-Nap)	921	100	ug/L	1000		92.1	72-128	2.88	30	
Surrogate: Toluene-d8	4.95		ug/L	*5.00*		*99.1*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.00		ug/L	*5.00*		*99.9*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - EPA 8260D

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0406-BSD2)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 11:12						
Benzene	8.71	0.20	ug/L	10.0		87.1	80-120	7.48	30	
Toluene	8.47	0.20	ug/L	10.0		84.7	80-120	6.54	30	
Ethylbenzene	8.29	0.20	ug/L	10.0		82.9	80-120	10.40	30	
m,p-Xylene	17.0	0.40	ug/L	20.0		85.2	80-121	7.04	30	
o-Xylene	8.22	0.20	ug/L	10.0		82.2	80-121	5.85	30	
Surrogate: Toluene-d8	5.08		ug/L	*5.00*		*102*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.77		ug/L	*5.00*		*95.5*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0406 - EPA 8260D

Volatile Organic Compounds - Quality Control

Batch BLI0415 - NWTPHg

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0415-BLK1)			Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 12:20							
Gasoline Range Organics (Tol-Nap)	ND	5000	ug/kg							U
Surrogate: Toluene-d8	5.06		ug/kg	*5.00*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.84		ug/kg	*5.00*		*96.8*	*78-123*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0415 - NWTPHg

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0415-BS1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 10:06						
Gasoline Range Organics (Tol-Nap)	47400	5000	ug/kg	50000		94.8	70-121			
Surrogate: Toluene-d8	4.92		ug/kg	*5.00*		*98.5*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.74		ug/kg	*5.00*		*94.9*	*78-123*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0415 - NWTPHg

Instrument: NT3 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0415-BSD1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 10:50						
Gasoline Range Organics (Tol-Nap)	46100	5000	ug/kg	50000		92.1	70-121	2.88	30	
Surrogate: Toluene-d8	4.95		ug/kg	*5.00*		*99.1*	*80-120*			
Surrogate: 4-Bromofluorobenzene	5.00		ug/kg	*5.00*		*99.9*	*78-123*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0415 - NWTPHg

Volatile Organic Compounds - Quality Control

Batch BLI0419 - EPA 8260D

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0419-BLK1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 12:26							
Benzene	ND	0.17	1.00	ug/kg							U
Toluene	ND	0.25	1.00	ug/kg							U
Ethylbenzene	ND	0.23	1.00	ug/kg							U
m,p-Xylene	ND	0.49	2.00	ug/kg							U
o-Xylene	ND	0.24	1.00	ug/kg							U
Xylenes, total	ND	0.70	2.00	ug/kg							U
Surrogate: 1,2-Dichloroethane-d4	47.9			ug/kg	*50.0*		*95.8*	*80-149*			
Surrogate: Toluene-d8	49.4			ug/kg	*50.0*		*98.9*	*77-120*			
Surrogate: 4-Bromofluorobenzene	50.1			ug/kg	*50.0*		*100*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	50.3			ug/kg	*50.0*		*101*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0419 - EPA 8260D

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0419-BS1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 11:35							
Benzene	44.8			ug/kg	50.0		89.7	80-120			
Toluene	44.7			ug/kg	50.0		89.4	75-120			
Ethylbenzene	44.4			ug/kg	50.0		88.8	80-125			
m,p-Xylene	89.8			ug/kg	100		89.8	76-121			
o-Xylene	44.6			ug/kg	50.0		89.1	67-132			
Xylenes, total	134			ug/kg	150		89.6	67-132			
Surrogate: 1,2-Dichloroethane-d4	49.2			ug/kg	*50.0*		*98.5*	*80-149*			
Surrogate: Toluene-d8	50.2			ug/kg	*50.0*		*100*	*77-120*			
Surrogate: 4-Bromofluorobenzene	50.0			ug/kg	*50.0*		*100*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	50.2			ug/kg	*50.0*		*100*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0419 - EPA 8260D

Instrument: NT5 Analyst: PB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0419-BSD1)				Prepared: 14-Sep-2023 Analyzed: 14-Sep-2023 12:01							
Benzene	46.8			ug/kg	50.0		93.6	80-120	4.22	30	
Toluene	46.7			ug/kg	50.0		93.4	75-120	4.39	30	
Ethylbenzene	47.4			ug/kg	50.0		94.9	80-125	6.56	30	
m,p-Xylene	95.7			ug/kg	100		95.7	76-121	6.35	30	
o-Xylene	47.2			ug/kg	50.0		94.4	67-132	5.77	30	
Xylenes, total	143			ug/kg	150		95.3	67-132	6.16	30	
Surrogate: 1,2-Dichloroethane-d4	46.3			ug/kg	*50.0*		*92.6*	*80-149*			
Surrogate: Toluene-d8	49.9			ug/kg	*50.0*		*99.9*	*77-120*			
Surrogate: 4-Bromofluorobenzene	51.0			ug/kg	*50.0*		*102*	*80-120*			
Surrogate: 1,2-Dichlorobenzene-d4	50.2			ug/kg	*50.0*		*100*	*80-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0419 - EPA 8260D

Volatile Organic Compounds - Quality Control

Batch BLI0462 - NWTPHg

Instrument: NT3 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0462-BLK1)			Prepared: 15-Sep-2023 Analyzed: 17-Sep-2023 16:52							
Gasoline Range Organics (Tol-Nap)	ND	100	ug/kg							U
Surrogate: Toluene-d8	4.95		ug/kg	*5.00*		*99.0*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.81		ug/kg	*5.00*		*96.3*	*78-123*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0462 - NWTPHg

Instrument: NT3 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0462-BS1)				Prepared: 15-Sep-2023 Analyzed: 17-Sep-2023 15:01						
Gasoline Range Organics (Tol-Nap)	55200	5000	ug/kg	50000		110	70-121			
Surrogate: Toluene-d8	5.13		ug/kg	*5.00*		*103*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.76		ug/kg	*5.00*		*95.3*	*78-123*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0462 - NWTPHg

Instrument: NT3 Analyst: TWC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0462-BSD1)				Prepared: 15-Sep-2023 Analyzed: 17-Sep-2023 15:46						
Gasoline Range Organics (Tol-Nap)	52000	5000	ug/kg	50000		104	70-121	5.96	30	
Surrogate: Toluene-d8	5.05		ug/kg	*5.00*		*101*	*80-120*			
Surrogate: 4-Bromofluorobenzene	4.85		ug/kg	*5.00*		*97.0*	*78-123*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BLI0462 - NWTPHg

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0445 - EPA 8270E-SIM

Instrument: NT18 Analyst: RJL

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0445-BLK1)				Prepared: 15-Sep-2023 Analyzed: 16-Oct-2023 13:58							
Naphthalene	ND	0.44	0.60	ug/kg							U
1-Methylnaphthalene	ND	0.11	0.50	ug/kg							U
2-Methylnaphthalene	ND	0.13	0.50	ug/kg							U
Acenaphthylene	ND	0.06	0.50	ug/kg							U
Acenaphthene	0.10	0.09	0.50	ug/kg							J
Dibenzofuran	ND	0.13	0.50	ug/kg							U
Fluorene	0.15	0.07	0.50	ug/kg							J
Phenanthrene	0.78	0.11	0.50	ug/kg							
Anthracene	0.20	0.07	0.50	ug/kg							J
Fluoranthene	0.90	0.08	0.50	ug/kg							
Pyrene	0.69	0.09	0.50	ug/kg							
Benzo(a)anthracene	0.33	0.07	0.50	ug/kg							J
Chrysene	0.35	0.07	0.50	ug/kg							J
Benzo(b)fluoranthene	0.28	0.07	0.50	ug/kg							J
Benzo(k)fluoranthene	0.16	0.10	0.50	ug/kg							J
Benzo(j)fluoranthene	0.13	0.10	0.50	ug/kg							J
Benzo(a)pyrene	0.22	0.09	0.50	ug/kg							J
Indeno(1,2,3-cd)pyrene	0.13	0.09	0.50	ug/kg							J
Dibenzo(a,h)anthracene	ND	0.11	0.50	ug/kg							U
Benzo(g,h,i)perylene	0.19	0.09	0.50	ug/kg							J
Surrogate: 2-Methylnaphthalene-d10	7.16			ug/kg	*15.0*		*47.8*	*30-160*			
Surrogate: Dibenzo[a,h]anthracene-d14	8.74			ug/kg	*15.0*		*58.2*	*30-160*			
Surrogate: Fluoranthene-d10	12.0			ug/kg	*15.0*		*80.1*	*30-160*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0445 - EPA 8270E-SIM

Instrument: NT18 Analyst: RJL

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0445-BS1)				Prepared: 15-Sep-2023 Analyzed: 16-Oct-2023 14:30							
Naphthalene	7.29	0.44	0.60	ug/kg	15.0		48.6	30-160			
1-Methylnaphthalene	7.80	0.11	0.50	ug/kg	15.0		52.0	30-160			
2-Methylnaphthalene	7.83	0.13	0.50	ug/kg	15.0		52.2	30-160			
Acenaphthylene	4.87	0.06	0.50	ug/kg	15.0		32.5	30-160			
Acenaphthene	7.74	0.09	0.50	ug/kg	15.0		51.6	30-160			
Dibenzofuran	7.83	0.13	0.50	ug/kg	15.0		52.2	30-160			
Fluorene	8.37	0.07	0.50	ug/kg	15.0		55.8	30-160			
Phenanthrene	9.24	0.11	0.50	ug/kg	15.0		61.6	30-160			B
Anthracene	9.25	0.07	0.50	ug/kg	15.0		61.7	30-160			
Fluoranthene	11.1	0.08	0.50	ug/kg	15.0		73.9	30-160			B
Pyrene	11.5	0.09	0.50	ug/kg	15.0		76.8	30-160			B
Benzo(a)anthracene	10.7	0.07	0.50	ug/kg	15.0		71.5	30-160			
Chrysene	10.0	0.07	0.50	ug/kg	15.0		66.7	30-160			
Benzo(b)fluoranthene	9.65	0.07	0.50	ug/kg	15.0		64.3	30-160			
Benzo(k)fluoranthene	9.75	0.10	0.50	ug/kg	15.0		65.0	30-160			
Benzo(j)fluoranthene	8.46	0.10	0.50	ug/kg	15.0		56.4	30-160			
Benzo(a)pyrene	8.14	0.09	0.50	ug/kg	15.0		54.2	30-160			
Indeno(1,2,3-cd)pyrene	9.34	0.09	0.50	ug/kg	15.0		62.3	30-160			
Dibenzo(a,h)anthracene	9.70	0.11	0.50	ug/kg	15.0		64.6	30-160			
Benzo(g,h,i)perylene	10.1	0.09	0.50	ug/kg	15.0		67.3	30-160			
Surrogate: 2-Methylnaphthalene-d10	7.69			ug/kg	*15.0*		*51.3*	*30-160*			
Surrogate: Dibenzo[a,h]anthracene-d14	9.40			ug/kg	*15.0*		*62.7*	*30-160*			
Surrogate: Fluoranthene-d10	12.5			ug/kg	*15.0*		*83.7*	*30-160*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0445 - EPA 8270E-SIM

Instrument: NT18 Analyst: RJL

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0445-BSD1)				Prepared: 15-Sep-2023 Analyzed: 16-Oct-2023 15:02							
Naphthalene	7.35	0.44	0.60	ug/kg	15.0		49.0	30-160	0.85	30	
1-Methylnaphthalene	7.82	0.11	0.50	ug/kg	15.0		52.1	30-160	0.32	30	
2-Methylnaphthalene	7.85	0.13	0.50	ug/kg	15.0		52.3	30-160	0.26	30	
Acenaphthylene	5.25	0.06	0.50	ug/kg	15.0		35.0	30-160	7.47	30	
Acenaphthene	7.80	0.09	0.50	ug/kg	15.0		52.0	30-160	0.87	30	
Dibenzofuran	7.96	0.13	0.50	ug/kg	15.0		53.1	30-160	1.64	30	
Fluorene	8.52	0.07	0.50	ug/kg	15.0		56.8	30-160	1.75	30	
Phenanthrene	9.22	0.11	0.50	ug/kg	15.0		61.5	30-160	0.19	30	B
Anthracene	9.34	0.07	0.50	ug/kg	15.0		62.3	30-160	1.01	30	
Fluoranthene	11.7	0.08	0.50	ug/kg	15.0		77.8	30-160	5.22	30	B
Pyrene	12.1	0.09	0.50	ug/kg	15.0		80.7	30-160	4.95	30	B
Benzo(a)anthracene	11.5	0.07	0.50	ug/kg	15.0		77.0	30-160	7.38	30	
Chrysene	10.6	0.07	0.50	ug/kg	15.0		70.9	30-160	6.06	30	
Benzo(b)fluoranthene	10.3	0.07	0.50	ug/kg	15.0		68.9	30-160	6.97	30	
Benzo(k)fluoranthene	10.9	0.10	0.50	ug/kg	15.0		73.0	30-160	11.60	30	
Benzo(j)fluoranthene	8.82	0.10	0.50	ug/kg	15.0		58.8	30-160	4.07	30	
Benzo(a)pyrene	8.82	0.09	0.50	ug/kg	15.0		58.8	30-160	8.01	30	
Indeno(1,2,3-cd)pyrene	10.1	0.09	0.50	ug/kg	15.0		67.4	30-160	7.89	30	
Dibenzo(a,h)anthracene	10.4	0.11	0.50	ug/kg	15.0		69.3	30-160	6.90	30	
Benzo(g,h,i)perylene	10.8	0.09	0.50	ug/kg	15.0		71.9	30-160	6.56	30	
Surrogate: 2-Methylnaphthalene-d10	7.86			ug/kg	*15.0*		*52.4*	*30-160*			
Surrogate: Dibenzo[a,h]anthracene-d14	10.2			ug/kg	*15.0*		*67.8*	*30-160*			
Surrogate: Fluoranthene-d10	13.5			ug/kg	*15.0*		*90.0*	*30-160*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0445 - EPA 8270E-SIM

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0454 - EPA 8270E-SIM

Instrument: NT18 Analyst: RJL

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0454-BLK1)				Prepared: 18-Sep-2023 Analyzed: 28-Sep-2023 11:15							
Naphthalene	ND	0.006	0.010	ug/L							U
2-Methylnaphthalene	ND	0.007	0.010	ug/L							U
1-Methylnaphthalene	ND	0.008	0.010	ug/L							U
Acenaphthylene	ND	0.005	0.010	ug/L							U
Acenaphthene	ND	0.004	0.010	ug/L							U
Dibenzofuran	ND	0.006	0.010	ug/L							U
Fluorene	ND	0.004	0.010	ug/L							U
Phenanthrene	ND	0.005	0.010	ug/L							U
Anthracene	ND	0.005	0.010	ug/L							U
Carbazole	ND	0.005	0.010	ug/L							U
Fluoranthene	ND	0.006	0.010	ug/L							U
Pyrene	ND	0.008	0.010	ug/L							U
Benzo(a)anthracene	ND	0.006	0.010	ug/L							U
Chrysene	ND	0.008	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.008	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.005	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.017	0.020	ug/L							U
Benzo(a)pyrene	ND	0.005	0.010	ug/L							U
Perylene	ND	0.004	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.008	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.008	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.009	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.144			ug/L	*0.300*		*47.9*	*42-120*			
Surrogate: Dibenzo[a,h]anthracene-d14	0.0888			ug/L	*0.300*		*29.6*	*29-120*			
Surrogate: Fluoranthene-d10	0.202			ug/L	*0.300*		*67.4*	*57-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0454 - EPA 8270E-SIM

Instrument: NT18 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0454-BLK2)				Prepared: 18-Sep-2023 Analyzed: 28-Sep-2023 18:07							
Naphthalene	ND	0.006	0.010	ug/L							U
2-Methylnaphthalene	ND	0.007	0.010	ug/L							U
1-Methylnaphthalene	ND	0.008	0.010	ug/L							U
Acenaphthylene	ND	0.005	0.010	ug/L							U
Acenaphthene	ND	0.004	0.010	ug/L							U
Dibenzofuran	ND	0.006	0.010	ug/L							U
Fluorene	ND	0.004	0.010	ug/L							U
Phenanthrene	ND	0.005	0.010	ug/L							U
Anthracene	ND	0.005	0.010	ug/L							U
Carbazole	ND	0.005	0.010	ug/L							U
Fluoranthene	ND	0.006	0.010	ug/L							U
Pyrene	ND	0.008	0.010	ug/L							U
Benzo(a)anthracene	ND	0.006	0.010	ug/L							U
Chrysene	ND	0.008	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.008	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.005	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.017	0.020	ug/L							U
Benzo(a)pyrene	ND	0.005	0.010	ug/L							U
Perylene	ND	0.004	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.008	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.008	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.009	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.147			ug/L	*0.300*		*49.0*	*42-120*			
Surrogate: Dibenzo[a,h]anthracene-d14	0.0997			ug/L	*0.300*		*33.2*	*29-120*			
Surrogate: Fluoranthene-d10	0.199			ug/L	*0.300*		*66.2*	*57-120*			*Q*

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0454 - EPA 8270E-SIM

Instrument: NT18 Analyst: RJL

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0454-BS1)					Prepared: 18-Sep-2023 Analyzed: 28-Sep-2023 11:47						
Naphthalene	0.249	0.006	0.010	ug/L	0.300		83.1	37-120			
2-Methylnaphthalene	0.256	0.007	0.010	ug/L	0.300		85.3	37-120			
1-Methylnaphthalene	0.279	0.008	0.010	ug/L	0.300		93.0	29-120			
Acenaphthylene	0.285	0.005	0.010	ug/L	0.300		94.9	41-120			
Acenaphthene	0.257	0.004	0.010	ug/L	0.300		85.7	41-120			
Dibenzofuran	0.251	0.006	0.010	ug/L	0.300		83.8	38-120			
Fluorene	0.293	0.004	0.010	ug/L	0.300		97.5	43-120			
Phenanthrene	0.288	0.005	0.010	ug/L	0.300		96.1	41-120			
Anthracene	0.291	0.005	0.010	ug/L	0.300		97.0	40-120			
Carbazole	0.315	0.005	0.010	ug/L	0.300		105	30-160			
Fluoranthene	0.267	0.006	0.010	ug/L	0.300		89.1	45-120			
Pyrene	0.285	0.008	0.010	ug/L	0.300		94.9	41-120			
Benzo(a)anthracene	0.312	0.006	0.010	ug/L	0.300		104	42-120			
Chrysene	0.299	0.008	0.010	ug/L	0.300		99.7	44-120			
Benzo(b)fluoranthene	0.305	0.005	0.010	ug/L	0.300		102	44-120			
Benzo(k)fluoranthene	0.298	0.008	0.010	ug/L	0.300		99.2	50-120			
Benzo(j)fluoranthene	0.298	0.005	0.010	ug/L	0.300		99.5	39-160			
Benzofluoranthenes, Total	0.901	0.017	0.020	ug/L	0.900		100	46-120			
Benzo(a)pyrene	0.228	0.005	0.010	ug/L	0.300		76.1	35-120			
Perylene	0.183	0.004	0.010	ug/L	0.300		60.9	30-160			
Indeno(1,2,3-cd)pyrene	0.227	0.008	0.010	ug/L	0.300		75.6	37-120			
Dibenzo(a,h)anthracene	0.211	0.008	0.010	ug/L	0.300		70.3	34-120			
Benzo(g,h,i)perylene	0.257	0.009	0.010	ug/L	0.300		85.7	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.168			ug/L	*0.300*		*56.1*	*42-120*			
Surrogate: Dibenzo[a,h]anthracene-d14	0.115			ug/L	*0.300*		*38.2*	*29-120*			
Surrogate: Fluoranthene-d10	0.214			ug/L	*0.300*		*71.5*	*57-120*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BLI0454 - EPA 8270E-SIM

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0435 - NWTPH-Dx

Instrument: FID4 Analyst: AA/NRB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0435-BLK1)			Prepared: 15-Sep-2023 Analyzed: 22-Sep-2023 22:16							
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
Surrogate: o-Terphenyl	0.202		mg/L	*0.225*		*90.0*	*50-150*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0435 - NWTPH-Dx

Instrument: FID4 Analyst: AA/NRB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0435-BS1)				Prepared: 15-Sep-2023 Analyzed: 22-Sep-2023 22:36						
Diesel Range Organics (C12-C24)	2.94	0.100	mg/L	3.00		98.0	56-120			
Surrogate: o-Terphenyl	0.225		mg/L	*0.225*		*100*	*50-150*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0435 - NWTPH-Dx

Instrument: FID4 Analyst: AA/NRB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0435-BSD1)				Prepared: 15-Sep-2023 Analyzed: 22-Sep-2023 22:56						
Diesel Range Organics (C12-C24)	2.67	0.100	mg/L	3.00		89.0	56-120	9.67	30	
Surrogate: o-Terphenyl	0.201		mg/L	*0.225*		*89.4*	*50-150*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0435 - NWTPH-Dx

Petroleum Hydrocarbons - Quality Control

Batch BLI0448 - NWTPH-Dx

Instrument: FID4 Analyst: AA/NRB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0448-BLK1)			Prepared: 15-Sep-2023 Analyzed: 25-Sep-2023 17:28							
Diesel Range Organics (C12-C24)	ND	5.00	mg/kg							U
Motor Oil Range Organics (C24-C38)	ND	10.0	mg/kg							U
Surrogate: o-Terphenyl	9.44		mg/kg	*11.3*		*83.9*	*50-150*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0448 - NWTPH-Dx

Instrument: FID4 Analyst: AA/NRB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0448-BS1)				Prepared: 15-Sep-2023 Analyzed: 25-Sep-2023 17:48						
Diesel Range Organics (C12-C24)	62.2	5.00	mg/kg	150		41.5	63-120			*
Surrogate: o-Terphenyl	5.08		mg/kg	*11.3*		*45.2*	*50-150*			*

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0448 - NWTPH-Dx

Instrument: FID4 Analyst: AA/NRB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BLI0448-BSD1)				Prepared: 15-Sep-2023 Analyzed: 25-Sep-2023 18:08						
Diesel Range Organics (C12-C24)	134	5.00	mg/kg	150		89.4	63-120	73.20	30	*
Surrogate: o-Terphenyl	10.5		mg/kg	*11.3*		*93.4*	*50-150*			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BLI0448 - NWTPH-Dx

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BLI0424 - EPA 6010D

Instrument: ICP3 Analyst: DOE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0424-BLK1)				Prepared: 15-Sep-2023 Analyzed: 18-Sep-2023 09:53							
Barium	ND	0.260	0.600	mg/kg							U
Lead	ND	0.240	2.00	mg/kg							U
LCS (BLI0424-BS1)				Prepared: 15-Sep-2023 Analyzed: 18-Sep-2023 09:55							
Barium	196	0.260	0.600	mg/kg	200		97.8	80-120			
Lead	198	0.240	2.00	mg/kg	200		99.1	80-120			
Duplicate (BLI0424-DUP1)		**Source: 23I0284-01**		Prepared: 15-Sep-2023 Analyzed: 18-Sep-2023 10:08							
Barium	56.1	0.306	0.705	mg/kg		47.4			16.70	20	
Lead	2.55	0.282	2.35	mg/kg		2.72			6.49	20	
Matrix Spike (BLI0424-MS1)		**Source: 23I0284-01**		Prepared: 15-Sep-2023 Analyzed: 18-Sep-2023 10:11							
Barium	284	0.306	0.705	mg/kg	235	47.4	101	75-125			
Lead	230	0.282	2.35	mg/kg	235	2.72	96.7	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BLI0443 - EPA 200.8 UCT-KED

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0443-BLK1)				Prepared: 15-Sep-2023 Analyzed: 15-Sep-2023 18:03							
Arsenic	75a	ND	0.200	ug/L							U
Selenium	78	ND	0.500	ug/L							U
LCS (BLI0443-BS1)				Prepared: 15-Sep-2023 Analyzed: 15-Sep-2023 18:08							
Arsenic	75a	24.7	0.200	ug/L	25.0		98.7	80-120			
Selenium	78	81.3	0.500	ug/L	80.0		102	80-120			

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0443-BLK2)					Prepared: 15-Sep-2023 Analyzed: 19-Sep-2023 01:51							
Silver	107	ND	0.0220	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
LCS (BLI0443-BS2)					Prepared: 15-Sep-2023 Analyzed: 19-Sep-2023 01:55							
Silver	107	24.8	0.0220	0.200	ug/L	25.0		99.2	80-120			
Cadmium	111	24.2	0.0300	0.100	ug/L	25.0		97.0	80-120			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BLI0455 - EPA 200.8

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0455-BLK1)					Prepared: 19-Sep-2023 Analyzed: 20-Sep-2023 17:24							
Silver	107	ND	0.02	0.20	mg/kg							U
Arsenic	75a	ND	0.04	0.20	mg/kg							U
Cadmium	111	ND	0.03	0.10	mg/kg							U
Selenium	78	ND	0.18	0.50	mg/kg							U
LCS (BLI0455-BS1)					Prepared: 19-Sep-2023 Analyzed: 20-Sep-2023 17:29							
Silver	107	24.1	0.02	0.20	mg/kg	25.0		96.5	80-120			
Arsenic	75a	23.4	0.04	0.20	mg/kg	25.0		93.5	80-120			
Cadmium	111	23.6	0.03	0.10	mg/kg	25.0		94.5	80-120			
Selenium	78	78.9	0.18	0.50	mg/kg	80.0		98.6	80-120			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BLI0456 - EPA 7471B

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0456-BLK1)				Prepared: 20-Sep-2023 Analyzed: 26-Sep-2023 14:23							
Mercury	ND	0.00525	0.0250	mg/kg							U
LCS (BLI0456-BS1)				Prepared: 20-Sep-2023 Analyzed: 26-Sep-2023 14:25							
Mercury	0.491	0.00525	0.0250	mg/kg	0.500		98.1	80-120			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BLI0493 - EPA 6010D

Instrument: ICP3 Analyst: DOE

QC Sample/Analyte	Result		Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0493-BLK1)				Prepared: 19-Sep-2023 Analyzed: 20-Sep-2023 08:49							
Lead	ND		0.0200	mg/L							U
Blank (BLI0493-BLK2)				Prepared: 19-Sep-2023 Analyzed: 21-Sep-2023 08:34							
Barium	ND	0.0026	0.0060	mg/L							U
LCS (BLI0493-BS1)				Prepared: 19-Sep-2023 Analyzed: 20-Sep-2023 08:51							
Lead	1.93		0.0200	mg/L	2.00		96.5	80-120			
LCS (BLI0493-BS2)				Prepared: 19-Sep-2023 Analyzed: 21-Sep-2023 08:37							
Barium	1.91	0.0026	0.0060	mg/L	2.00		95.7	80-120			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BLI0541 - EPA 7470A

Instrument: HYDRA Analyst: ml

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BLI0541-BLK1)				Prepared: 19-Sep-2023 Analyzed: 20-Sep-2023 12:20							
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BLI0541-BS1)				Prepared: 19-Sep-2023 Analyzed: 20-Sep-2023 12:22							
Mercury	0.00190	0.000013	0.000100	mg/L	0.00200		94.8	80-120			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Analysis by: Analytical Resources, LLC

Wet Chemistry - Quality Control

Batch BLI0583 - EPA 9045D

Instrument: Accumet AB150 Analyst: SRB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BLI0583-BS1)				Prepared: 20-Sep-2023 Analyzed: 20-Sep-2023 15:22							
pH	7.02	0.01	0.01	pH Units	7.00		100	99.2-100.8			

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Certified Analyses included in this Report

Analyte	Certifications
EPA 200.8 in Water	
Silver-107	NELAP,WADOE
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Silver-107	NELAP,WADOE
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
EPA 200.8 in Solid	
Silver-107	NELAP,WADOE
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Silver-107	NELAP,WADOE
EPA 200.8 UCT-KED in Solid	
Arsenic-75a	NELAP,WADOE
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Cadmium-111	NELAP,WADOE
Cadmium-111	NELAP,WADOE,WA-DW,DoD-ELAP
Cadmium-111	NELAP,WADOE,WA-DW,DoD-ELAP
Cadmium-111	NELAP,WADOE
Selenium-78	NELAP,WADOE,WA-DW,DoD-ELAP
Selenium-78	NELAP,WADOE
Selenium-78	NELAP,WADOE,WA-DW,DoD-ELAP
Selenium-78	NELAP,WADOE
EPA 200.8 UCT-KED in Water	
Arsenic-75a	NELAP,WADOE
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE
Cadmium-111	NELAP,WADOE
Cadmium-111	NELAP,WADOE,WA-DW,DoD-ELAP

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Cadmium-111	NELAP,WADOE
Cadmium-111	NELAP,WADOE,WA-DW,DoD-ELAP
Selenium-78	NELAP,WADOE
Selenium-78	NELAP,WADOE,WA-DW,DoD-ELAP
Selenium-78	NELAP,WADOE
Selenium-78	NELAP,WADOE,WA-DW,DoD-ELAP
EPA 6010D in Solid	
Barium	NELAP,WADOE,ADEC,DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP,ADEC
Barium	NELAP,WADOE,ADEC,DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP,ADEC
Lead	NELAP,WADOE,DoD-ELAP,ADEC
Lead	WADOE,NELAP,DoD-ELAP,ADEC
Lead	NELAP,WADOE,DoD-ELAP,ADEC
Lead	WADOE,NELAP,DoD-ELAP,ADEC
EPA 6010D in Water	
Barium	NELAP,WADOE,ADEC,DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP,ADEC
Barium	NELAP,WADOE,ADEC,DoD-ELAP
Barium	WADOE,NELAP,DoD-ELAP,ADEC
Lead	WADOE,NELAP,DoD-ELAP,ADEC
Lead	NELAP,WADOE,DoD-ELAP,ADEC
Lead	WADOE,NELAP,DoD-ELAP,ADEC
Lead	NELAP,WADOE,DoD-ELAP,ADEC
EPA 7470A in Water	
Mercury	WADOE,NELAP,DoD-ELAP
EPA 7471B in Solid	
Mercury	WADOE,NELAP,DoD-ELAP
EPA 8260D in Solid	
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	WADOE,DoD-ELAP,NELAP,ADEC
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	WADOE,DoD-ELAP,NELAP,ADEC

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	WADOE,DoD-ELAP,NELAP,ADEC
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	WADOE,DoD-ELAP,NELAP,ADEC
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	WADOE,DoD-ELAP,NELAP,ADEC
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	WADOE,DoD-ELAP,NELAP,ADEC
m,p-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
Xylenes, total	WADOE
Xylenes, total	WADOE
4-Bromofluorobenzene	WADOE
4-Bromofluorobenzene	WADOE

EPA 8260D in Solid

Benzene	WADOE,DoD-ELAP,NELAP,ADEC
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	WADOE,DoD-ELAP,NELAP,ADEC
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	WADOE,DoD-ELAP,NELAP,ADEC
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	WADOE,DoD-ELAP,NELAP,ADEC
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	WADOE,DoD-ELAP,NELAP,ADEC
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	WADOE,DoD-ELAP,NELAP,ADEC
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
m,p-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	WADOE,DoD-ELAP,NELAP,ADEC
EPA 8270E-SIM in Water	
Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(j)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Perylene	ADEC,NELAP
Indeno(1,2,3-cd)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzo(a,h)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(g,h,i)perylene	ADEC,DoD-ELAP,NELAP,WADOE
EPA 9045D in Solid	
pH	WADOE,DoD-ELAP,NELAP

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

NWTPH-Dx in Solid

Diesel Range Organics (C12-C2	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C12-C2	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-	DoD-ELAP,NELAP,WADOE

NWTPH-Dx in Solid

Diesel Range Organics (C12-C2	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C12-C2	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-N	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-N	DoD-ELAP
Gasoline Range Organics (Tol-N	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-N	DoD-ELAP

NWTPHg in Solid

Gasoline Range Organics (Tol-N	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-N	DoD-ELAP
Gasoline Range Organics (Tol-N	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-N	DoD-ELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2025
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program, PJLA Testing	66169	02/28/2025
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2024

Mott MacDonald	Project: Tesoro/ Andeavo Solids	
1601 5th Avenue Suite 800	Project Number: Tesoro	**Reported:**
Seattle WA, 98101	Project Manager: Travis Klaas	24-Oct-2023 14:30

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is <=5 times the reporting limit and the replicate control limit defaults to +/- RL instead of 20% RPD
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
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
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

APPENDIX D -
ALL4 2023 OWS ENVIRONMENTAL RATING EVALUATION REPORT

February 20, 2024

Ms. Shannon Logan
Marathon Anacortes Refinery
10200 March's Point Road
Anacortes, WA 98221

Re: Environmental Rating of 2023 Oily Water Sewer Video Inspections

Dear Ms. Logan:

Video inspections of the Oily Water Sewer (OWS) main trunk lines at Tesoro Refining & Marketing Company LLC Marathon Anacortes Refinery (Marathon Anacortes Refinery) are required to be conducted under the terms of Agreed Order 16299.

Several OWS segments were video inspected by BAI Environmental Services (BAI) in August 2022 and July 2023. The inspections were completed in general accordance with the National Association of Sewer Service Compliance (NASSCO) Pipeline Assessment Certification Program (PACP). Each sewer defect observed during the video inspections was assigned a NASSCO code by BAI.

ALL4 conducted an Environmental Rating (ER) evaluation for the NASSCO rated OWS video inspections. Each NASSCO code was reviewed and assigned a corresponding ER value from a scale of 1 to 5, in a similar fashion to the 2022 Environmental Rating. A definition of each Environmental Rating value is provided in Table 1. The following sewer segment video inspections were reviewed:

- Manhole F-7 to manhole F-8
- Manhole F-9 to manhole F-10
- Manhole F-10 to manhole F-11
- Manhole F-11 to manhole F-12
- Manhole F-12 to manhole F-12A
- Manhole F-12A to manhole F-14

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A map of the OWS segments included in this ER evaluation is provided as Figure 2. The review of the OWS video inspections did not reveal any ERs of 4 or 5. Tables showing all assigned NASSCO codes and their associated Environmental Rating are provided in Tables 2-7.

The ER evaluation based on review of the BAI video did not yield any ERs of 4 or 5, however, there was a confirmed release from the main trunk line identified between manholes F-11 and F-12 in November 2023. The location of the confirmed release is identified as Area of Concern-2 (AOC-2) and is shown on Figure 3. The video inspection from manhole F-11 to manhole F-12 was abandoned at 237.7 ft. due to an obstruction in the camera's pathway. It is probable that an ER of 5 exists near the location of the obstruction/blockage because of the nearby release discovered at AOC-2.

Per the IRP, defects that are identified with an ER of 5 are considered confirmed releases. Site investigation activities should be initiated at AOC-2 to determine the extent of the release. Repairs to the OWS at the location of AOC-2 were initiated in 2023 and are ongoing.

Deviations from the Investigation and Response Plan

Per the Investigation and Response Plan (IRP), the OWS main trunk line segment from manhole F-8 to F-9 should have been inspected in 2023, however, that segment was not video inspected by BAI in 2023. That sewer segment should be included in a future video inspection to remain in compliance with the Agreed Order.

Limitations for the ERs of three sewer segments should be noted:

- Survey of sewer segment F-9 to F-10 was abandoned at 365.9 ft. due to a high-water level.
- Survey of sewer segment F-11 to F-12 was abandoned at 237.7 ft. due to an obstruction in the camera's pathway.
- Survey of sewer segment F-12 to F-12A was abandoned at 200.9 ft. due to a high-water level.

Inspection of these sewer segments should be reattempted to complete each survey.

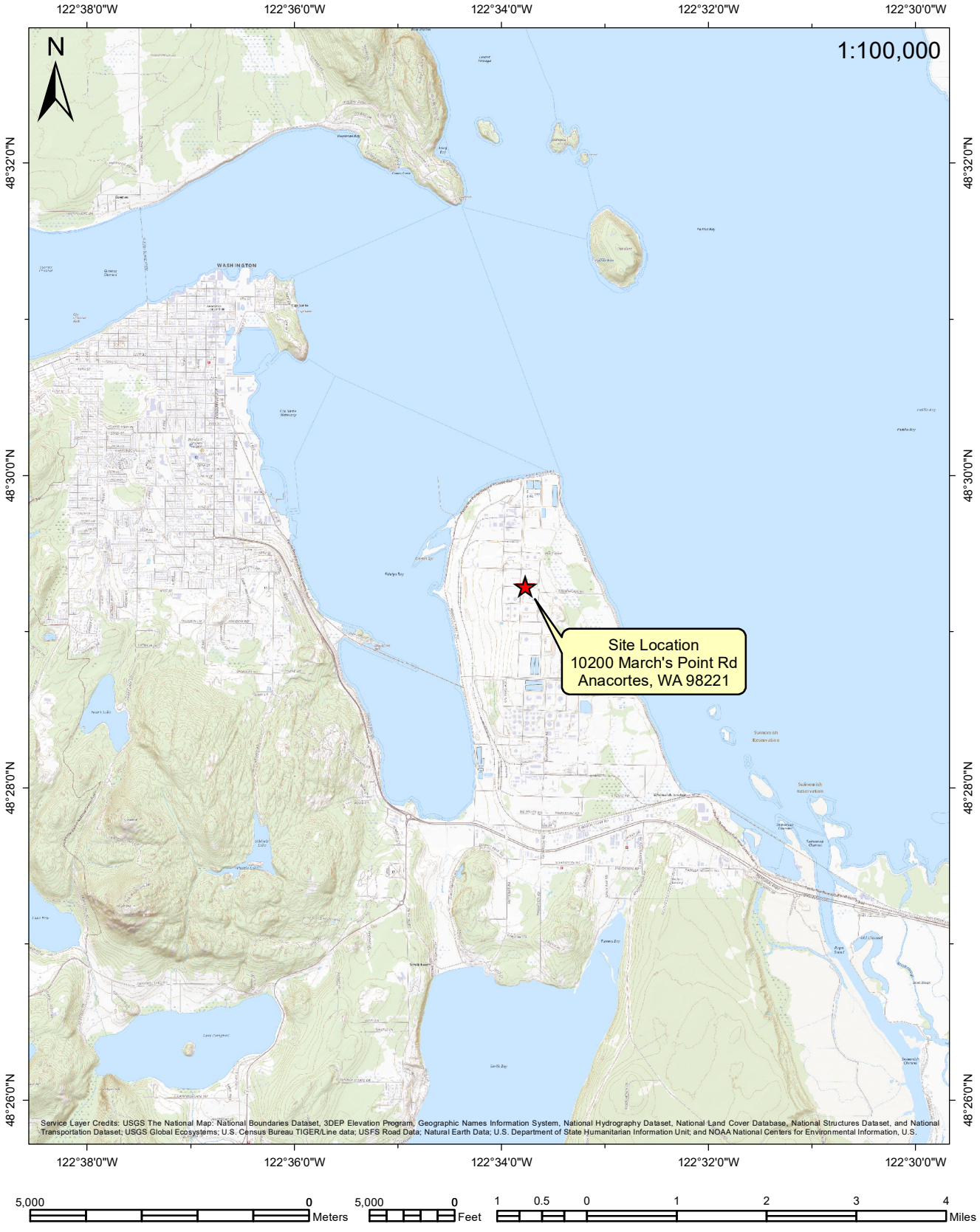
We appreciate the opportunity to assist Marathon with this project. If you have any questions about this report, please contact me at 360-752-9571 or elibolt@all4inc.com

Sincerely,

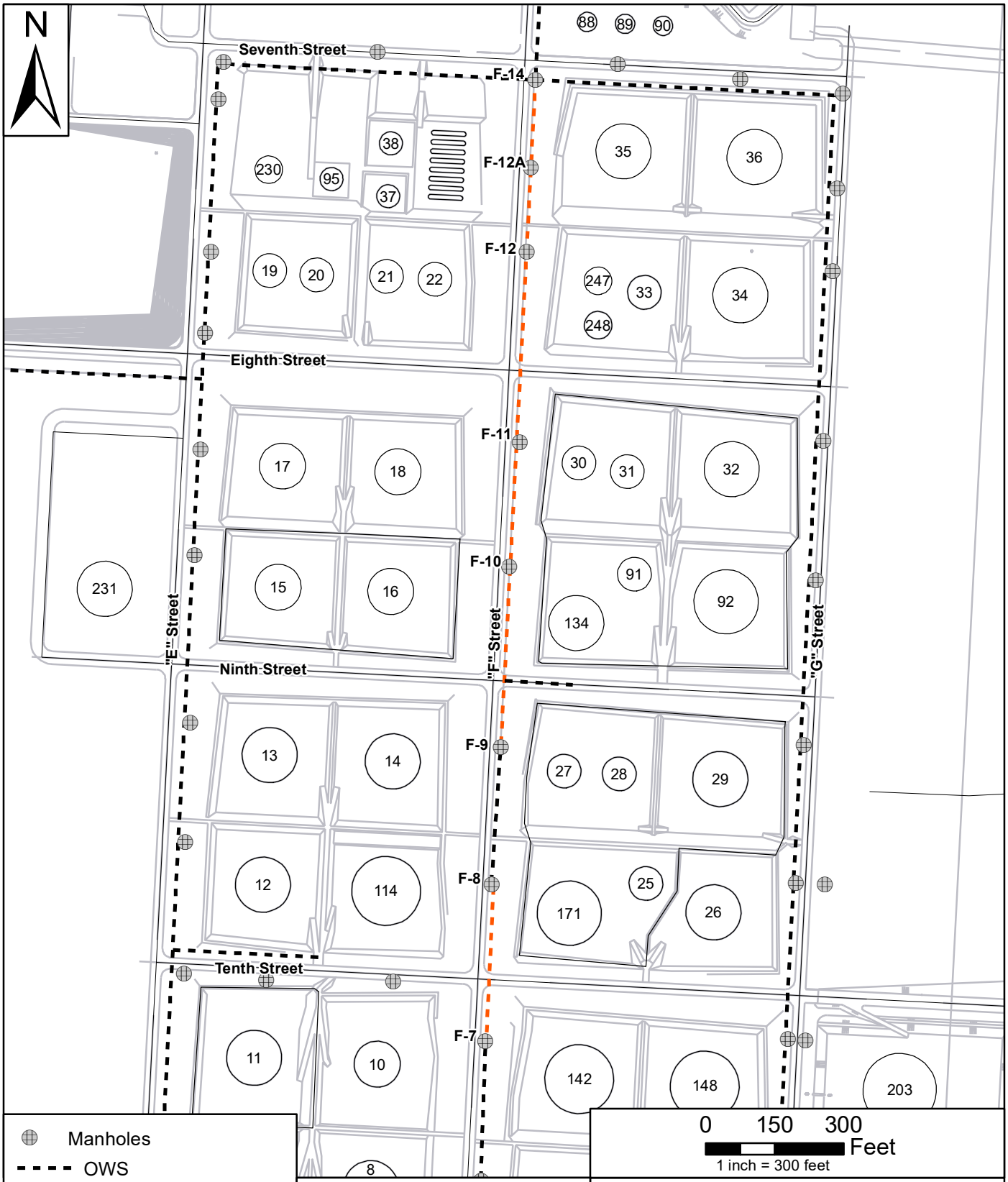
Eric Libolt
Professional Engineer #51580

cc: Joseph Sarr, Marathon Anacortes Refinery
Olana Costa, ALL4 LLC

Attachments:
Figure 1. Site Location Map
Figure 2. OWS Video Inspection Map
Figure 3. Area of Concern-2 Location Map
Table 1. Oily Water Sewer Environmental Rating Scale
Table 2. 2022 OWS Environmental Rating: F-7 to F-8
Table 3. 2023 OWS Environmental Rating: F-9 to F-10
Table 4. 2023 OWS Environmental Rating: F-10 to F-11
Table 5. 2023 OWS Environmental Rating: F-11 to F-12
Table 6. 2023 OWS Environmental Rating: F-12 to F-12A
Table 7. 2023 OWS Environmental Rating: F-12A to F-14
Table 8. NASSCO Code Key



Prepared for:	Prepared by:	Site Location Map	
MARATHON	ALL4	Environmental Rating Evaluation 2/14/2024	Figure 1



Manholes

OWS

OWS segment included in ER evaluation

0 150 300 Feet

1 inch = 300 feet

All data are approximate and should be used for relative location reference only.

OWS Video Inspection Map

Prepared for:

MARATHON

Prepared by:

ALL4

10200 March's Point Rd
Anacortes, WA 98221

Environmental Rating Evaluation

2/14/2024

Figure 2

Manhole

Blockage in OWS

Investigation Area

Oily Water Sewer

0 100 200 Feet

1 inch = 200 feet

All data are approximate and should be used for relative location reference only.

Area of Concern-2 Location Map

Prepared for: MARATHON

Prepared by: ALL4

10200 March's Point Rd
Anacortes, WA 98221

Environmental Rating Evaluation

2/14/2024

Figure 3

Table 1
Oily Water Sewer Environmental Rating Scale
Marathon Anacortes Refinery

Environmental Rating (ER)	Characteristic / Example	Action and Documentation
5	Significant structural defect with confirmed release. Examples: Large holes at or below the segment/manhole flow line and above groundwater table; completely separated joints with exposed surrounding soil above groundwater table; collapsed pipe sections.	Initial investigation confirmed soil or groundwater exceedance of cleanup levels specified in section 2.1 of IRP. Confirmed release from OWS will be reported to Ecology 90 days after discovery. Conduct site characterization and schedule for high priority mitigation effort (repair, ongoing monitoring for inaccessible sewers, etc.) If soil surrounding significant defect appears impacted due to a potential release from the OWS, then immediate response action will be initiated to stop the source of the potential release and begin clean-up activities.
4	Significant structural defect with potential for release. Examples: Same as ER = 5	Conduct initial release investigation involving the collection of soil and/or shallow groundwater sample(s). Groundwater samples will be collected only if the potential release occurred at or below the shallow groundwater table elevation. Increase to ER=5 if soil or groundwater concentrations exceed cleanup levels specified in Section 2.1 of IRP. Schedule for moderate priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
3	Moderate structural defect. Examples: Significant fractures/cracks at or below the pipe/manhole flow line; groundwater infiltration at defect; significant corrosion. Defects that pose a higher risk for future potential release or structural failure.	Document in the Refinery record. Schedule for low priority mitigation effort (primarily repair based on Refinery operational needs and accessibility or reinspection to monitor defect condition).
2	Small to moderate structural defect. Examples: Moderate fractures/cracks above the pipe/manhole flow line; joint improperly seated; pipe reinforcement visible, moderate corrosion in pipe.	Document in Refinery Record.
1	Small structural defect. Examples: Hairline cracks; minor corrosion/deterioration of pipe/manhole material; visible aggregate; small offset joint; missing sealing rings.	Document in Refinery Record.

Table 2
2022 OWS Environmental Rating: F-7 to F-8
Marathon Anacortes Refinery

Distance Between Upstream (F-7) and Downstream (F-8) Manholes (ft)	NASSCO Code	Comments	Environmental Rating
1.1	AMH	Manhole F-7	NA
1.1	CL		1
1.1	FS		1
6.6	CS		1
13.3	CL		2
13.3	CL		2
20.4	CL		2
23.8	CS		2
30.4	CS		1
37.6	CM		2
44.7	CC		2
55.3	CL		3
78.9	JOM		3
90.4	CS		1
104.1	CL		1
108	CL		1
111.4	CS		1
121.7	FM		3
132.2	CL		1
132.2	CL		1
139	CL		1
149.4	FM		2
152.7	CH		3
152.7	IDJ		3
152.7	IDJ		3
152.7	B		3
159.7	DAZ	Oily Deposit	1
163.5	CM		2
164.6	DAZ	Oily Deposit	2
167.1	OBJ	Unknown Object	2
177.3	FM	Assoc. IDJ	3
188.3	IRJ		3
188.3	CH	Repeated	3
191.2	IDJ		3
194.8	CS		2
198.3	CM		2
202.2	IDJ		3
202.2	CL		3
202.2	IDJ		3
202.2	CL		3
205.5	IDJ		3
205.5	CL		3
205.5	IDJ		3
205.5	FL		3
212.1	CS		2
212.4	CL		3
215.5	CL		2
219.5	CL		1
222.9	B		3
230.0	CC		1
236.8	CL		1
243.9	CS		2
258.0	CL		1
264.9	CL		1
272.0	SSS		2
279.1	CL		1
282.1	CM		2
282.1	FS		2
292.9	CL		1
306.9	CL		1
306.9	FL		1
310.6	CS		1
335.8	CM		3
335.8	B	Up to joint	3
339.5	FS		3
339.8	MWL		3
339.8	ADP		NA
340.6	AEP	MH F-8	NA

Table 3
2023 OWS Environmental Rating: F-9 to F-10
Marathon Anacortes Refinery

Distance Between Upstream (F-9) and Downstream (F-10) Manholes (ft)	NASSCO Code	Comments	Environmental Rating
0.0	AMH	Manhole F-9	NA
0.0	MWL		NA
0.0	IDB		3
0.0	IDB		3
0.0	DAZ	CARBON DEPOSITS	1
4.5	MWL		NA
5.9	JOM		2
22.3	JOM		2
23.8	OBZ	DETACHED CARBON	1
30.2	JOM		2
33.3	DAZ	CARBON DEPOSITS	NA
34.6	MWM	STAINING	NA
47.3	CM		3
50.6	CL		2
50.6	CS		2
54.2	JOM		2
67.8	CS		2
78.3	CS		2
79.7	TBI		3
82.2	MWL		NA
82.3	CM		3
84.8	MWL		NA
88.8	CL		2
95.3	CL		3
95.9	B		3
100.3	CL		3
106.6	CL		2
151.1	CS		1
154.2	CM		2
154.2	IDJ		3
161.8	TF		3
164.4	FM		3
171.8	CS		1
176.1	JOM		2
188.4	CS		2
192.0	CS		2
195.9	CL		2
202.8	CS		2
207.0	MWL		NA
214.5	JOL	CARBON BUILD UP	3
218.3	MGO	VIDEO OUT OF FOCUS	NA
252.6	MGO	VIDEO IN FOCUS	NA
257.3	CC		2
270.9	FM		3
291.1	MWL		NA
299.3	MWL		NA
316.9	DAZ	CARBON DEPOSIT	1
323.1	CS		2
340.2	MWL		NA
354.3	MWL		NA
365.9	MWM	STAINING	NA
365.9	MCU		NA
365.9	MSA	HIGH WATER LEVEL	NA

Table 4
2023 OWS Environmental Rating: F-10 to F-11
Marathon Anacortes Refinery

Distance Between Upstream (F-10) and Downstream (F-11) Manholes (ft)	NASSCO Code	Comments	Environmental Rating
0.0	AMH	Manhole F-10	NA
0.0	MWL		NA
0.0	DAZ	OILY DEPOSITS	1
0.0	JOM		2
12.0	JOM		2
68.1	CC		2
127.3	MWL		NA
128.4	DAZ	CARBON DEPOSIT	1
128.4	DAZ	CARBON DEPOSIT	1
128.4	JOM		2
150.6	DAZ	CARBON DEPOSIT	1
150.6	DAZ	CARBON DEPOSIT	1
169.3	MWL		NA
195.5	CC		2
210.2	DAZ	CARBON DEPOSIT	1
210.2	DAZ	CARBON DEPOSIT	1
221.6	DAZ	CARBON DEPOSIT	1
221.6	DAZ	CARBON DEPOSIT	1
227.3	CC		2
231.3	DAZ	CARBON DEPOSIT	1
238.2	DAZ	CARBON DEPOSIT	1
242.9	DAZ	CARBON DEPOSIT	1
248.5	DAZ	CARBON DEPOSIT	1
252.8	JOM		2
254.9	MWL		NA
261.8	DAZ	OILY DEPOSITS	1
261.8	JOL		3
261.8	B		3
261.8	AMH	Manhole F-11	NA

Table 5
2023 OWS Environmental Rating: F-11 to F-12
Marathon Anacortes Refinery

Distance Between Upstream (F-11) and Downstream (F-12) Manholes (ft)	NASSCO Code	Comments	Environmental Rating
0.0	AMH	Manhole F-11	NA
0.0	MWL		NA
0.0	FC		3
0.0	IDJ		3
0.0	MWM		NA
0.1	JOM		2
1.9	MWL		NA
6.0	IDJ		3
9.6	DAZ	CARBON DEPOSIT	1
9.6	DAZ	CARBON DEPOSIT	1
53.8	IDJ		3
64.1	IDJ		3
75.3	IGJ		3
75.3	IDJ		3
75.3	CM		3
83.1	MWLS		3
96.5	IDJ		3
108.4	OBZ	CARBON OBJECT	1
138.7	IDJ		3
141.4	IDJ		3
148.5	IDJ		3
206.0	IDJ		3
209.8	IDJ		3
226.8	MWLS		3
232.7	CM		3
232.7	IDJ		3
237.6	IDJ		3
237.6	CM		3
237.7	JOM		3
237.7	MSA	CAMERA STUCK	5

Table 6
2023 OWS Environmental Rating: F-12 to F-12A
Marathon Anacortes Refinery

Distance Between Upstream (F-12) and Downstream (F-12A) Manholes (ft)	NASSCO Code	Comments	Environmental Rating
0.0	AMH	Manhole F-12	NA
0.0	MWL		NA
1.5	MWM		NA
35.9	DAZ	CARBON DEPOSIT	1
42.7	JOM		2
67.8	DAZ	CARBON DEPOSIT	1
82.7	DAZ	CARBON DEPOSIT	1
112.7	CS		2
127.0	IDJ		3
133.5	DAZ		1
162.1	CM		2
179.8	DAZ	CARBON DEPOSIT	1
196.5	RFB		2
199.0	RFB		2
199.0	CM		2
200.9	JOL		3
200.9	MSA	HIGH WATER LEVEL	NA

Table 7

2023 OWS Environmental Rating: F-12A to F-14

Marathon Anacortes Refinery

Distance Between Upstream (F-12A) and Downstream (F-14) Manholes (ft)	NASSCO Code	Comments	Environmental Rating
0.0	AMH	Manhole F-12A	NA
0.0	MWL		NA
0.0	MWM		NA
28.1	DAZ	POSSIBLE ROOTS	1
45.1	SSS		1
69.8	DAZ	CARBON DEPOSIT	1
94.3	DAZ	POSSIBLE CLAY	1
98.2	DAZ	CARBON DEPOSIT	1
100.4	JOM		2
103.0	CC		2
130.2	DAZ	CARBON DEPOSIT	1
133.8	DAZ	CARBON DEPOSIT	1
138.3	DAZ	CARBON DEPOSIT	1
147.2	DAZ	CARBON DEPOSIT	1
151.7	DAZ	CARBON DEPOSIT	1
157.9	CC		3
160.9	DAZ	CARBON DEPOSIT	1
169.4	RFJ		1
176.7	RFJ		1
179.2	SSS		1
179.2	RFJ		1
179.2	CC		2
184.2	RFJ		1
198.5	MWL		NA
204.7	FM		3
204.7	AMH	Manhole F-14	NA

Table 8

NASSCO Code Key

Marathon Anacortes Refinery

Code	Key
AMH	Access Point Manhole
MWL	Miscellaneous Water Level
MWM	Miscellaneous Water Mark
DAZ	Deposits Attached Other
SSS	Surface Damage Surface Spalling
JOM	Joint Offset Medium
CC	Crack Circumferential
RFJ	Roots Fine Joint
FM	Fracture Multiple
CS	Crack Spiral
CM	Crack Multiple
RFB	Roots Fine Barrel
JOL	Joint Offset Large
IDJ	Infiltration Dripper Joint
FC	Fracture Circumferential
MWLS	Miscellaneous Water Level Sag
OBZ	Obstruction Other
IGJ	Infiltration Gusher Joint
B	Broken
IDB	Infiltration Dripper Barrel
CL	Crack Longitudal
TBI	Tap Break-In Intruding
TF	Tap Factory
FM	Fracture Multiple
MGO	Miscelaneous General Observation
MCU	Miscellaneous Camera Underwater
MSA	Miscellaneous Survey Abandoned