MOTT MACDONALD

Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan Anacortes, Washington

May 2022

Mott MacDonald
2377 Eastlake Avenue East
Seattle
WA 98102
United States of America

mottmac.com

Neil Norcross
Tesoro Refining and
Marketing Company
P.O. Box 700
West March Point Road
Anacortes, Washington
98221

Marathon Anacortes Refinery Oily Water Sewer Investigation and Response Plan Anacortes, Washington

May 2022

Contents

Tables

Figures

1 Introduction and Oily Water Sewer Description

Section 1 of this document describes the existing oily water sewer (OWS) system and maintenance as the basis of the Oily Water Sewer Investigation and Response Plan. Section 2 then presents the Investigation and Response Plan in accordance with Agreed Order DE 16299 (AO) between Tesoro Refining & Marketing Company LLC Marathon Anacortes Refinery and the Washington Department of Ecology (Ecology). Section 3 describes the annual progress and 10-year review reporting also in accordance with the AO. Section 4 lists the references for this document.

1.1 Existing Sewer Description and Maintenance

1.1.1 System Description

Figure 1 provides a map of the main trunk lines of the OWS. The oily water sewer system draws inputs from all major zones of the refinery including the Process Units, Tank Farm, Boiler House, Shops, Bundle Pad, Crude Railcar Unloading Facility and Truck Rack. The volumetric input and timing of inputs to the OWS from refining zones are under engineering controls and can be routed to maintenance drop-out storage. Inputs to the sewers from the Tank Farm involve passive drainage, with flow rates influenced by precipitation. The sewer primarily operates via gravity flow and is only partially filled or essentially empty during normal operation. The liquid inside the main sewer trunk lines, conveying material from the Tank Farm and under the main refinery infrastructure, is not pressurized. The portion of the sewer system installed at the Truck Rack is a modernized system, with vitrified clay pipes replaced by steel. The Truck Rack portion of the sewer is pressurized until it joins the refinery sewer system at the Zone A trunk line. The Crude Railcar Unloading Facility also connects to the refinery sewers via a pressurized steel line. The pressurized line discharges to the unpressurized gravity flow refinery trunk line at Tank 280.

The primary inputs to the OWS are water, heavy oils, asphaltenes, and gasoline range hydrocarbons. The sewer line conveys influent to an American Petroleum Institute (API) oil-water separator unit at the north end of the refinery, where hydrocarbons and water are separated, skimming oil for further processing. The remaining wastewater is delivered to an onsite treatment facility for biological degradation of residual hydrocarbons. The volume of skimmed hydrocarbons is monitored so as to appropriately time transfer from temporary to longer-term storage tanks.

1.1.2 Current Maintenance and Inspection on Major Trunk and Individual Drain Systems

Current annual system inspections include system-wide checks for blocked valves, faults in vault seals, and the saturation of water seals (p-traps). Given the large size and buried position of OWS, the sewer has been monitored on a “find it, fix it” basis.

2 2022 Investigation and Response Plan

2.1 Contaminants of Potential Concern

Based on site history and previous sampling and per Agreed Order DE 16299, Contaminants of Potential Concern (COPCs) associated with material conveyed in OWS are:

- Petroleum Hydrocarbons (Gasoline [TPH-G] and Diesel Range [TPH-D])
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)
- Polycyclic Aromatic Hydrocarbons (PAHs)
- Metals (Arsenic, Barium, Cadmium, Lead, Mercury, Selenium, and Silver)

2.1.1 Cleanup Levels

Cleanup levels will be based on Model Toxics Control Act (MTCA) Method A cleanup levels for industrial soil and Method C groundwater and soil or groundwater protective of surface water (marine). U.S. Environmental Protection Agency (EPA) or Washington State (Northwest Total Petroleum Hydrocarbons) analytical methods for COPCs will apply.

2.2 Investigation and Response Plan

The following describes the procedures and methods to inspect the internal integrity of the OWS over the next 10 years from 2022 through November 1, 2031. Figure 2 provides the proposed OWS Integrity Testing Schedule. Please note that Figure 2 is an estimated plan, and that actual investigation sections and timing may vary, but will meet the requirements specified in the AO. Due to the construction of the OWS, the appropriate methods are primarily limited to video camera survey with potential use of tracers. The OWS lines at the Truck Rack and Crude Oil Unit Railcar Unloading Facility (CROF) potentially will use hydrostatic testing in addition to cameras, tracers, or a combination of these methods.

2.2.1 Internal Integrity Testing Procedures

The internal integrity of the main trunk lines of the OWS will be primarily monitored using video surveys of the sewer as shown on Figure 2. Figure 2 also provides a proposed schedule for inspection of each section of the OWS. As mentioned, this is an estimated plan and actual investigation sections and timing may vary but will meet the requirements specified in the AO. An experienced contractor will conduct the surveys and report to Tesoro. The sewer will be inspected in general accordance with the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP).

In order to conduct camera inspections of the OWS trunk lines, the sewers will be cleaned and bypassed, if needed, prior to inspection. Sewer cleaning may involve using high pressure water or other methods to flush solids from the sewer lines.

Bypassing sewer lines, if needed, allows the camera to fully inspect the internal integrity of the lines as the normal sewer flow is pumped around the sewer segment being inspected. Bypassing involves temporarily blocking the sewer flow using a plug or other means and pumping the oily water through temporary pipes to a downstream location.

The two pressurized lines, truck rack, and CROF may be inspected using hydrostatic testing to identify possible leaks. As noted above, other methods may be used as well at these locations.

Results of video surveys, hydrotesting, and visual inspection will be documented for annual reporting. Documentation will include inspection dates and findings, the location of any identified release, the cause of a release or threatened release, any corrective actions or interim measure taken or planned, and any areas where soil or groundwater contamination is left in place. Reporting of the integrity testing results and other steps taken as necessary will occur in the Annual Progress Report (Section 3) by April 1st of each year following the implementation of the Investigation and Response Plan.

2.2.2 Release Determination and Monitoring

Where integrity testing identifies potential leaks in the OWS, the possible release to the environment will be investigated and monitored in accordance with sampling design recommendations in Ecology's 2016 Guidance for the Remediation of Petroleum Contaminated Sites (the Guidance).

In summary, the procedures are:

1. Review existing groundwater data from nearby groundwater wells to identify evidence of a release, as well as to describe the expected subsurface hydrogeologic setting.
2. Perform initial soil sampling near the area where integrity issues in the OWS have been identified by video survey or hydrostatic testing.
3. If a release is confirmed during the initial soil sampling, evaluate the nature and extent of soil contamination.
4. If the soil investigation indicates that contamination may have migrated to groundwater, evaluate the nature and extent of groundwater contamination.

2.2.2.1 Existing Groundwater Monitoring Data Review

Once integrity testing identifies a potential leak, we will examine the existing groundwater data to identify potential contamination at nearby existing wells. These data will be reported as appropriate with the next step in determining whether a release to the environment has occurred.

Tesoro's existing perimeter monitoring program will provide groundwater monitoring data and may be used to inform a possible release from the OWS. A network of 44 active monitoring wells provides good coverage for measuring the impacts of the OWS on the shallow groundwater. The positions of these wells are shown in Figure 1 and Table 1 provides the monitoring well elevations, depths, and screened intervals.

The "G"-Street trunk line of the oily water sewer runs north for approximately 4500 feet. Seven monitoring wells comprise a downgradient transect running parallel with the buried "G"-Street trunk line. These wells are within 150 feet of the buried sewer line and spaced 500 to 1000 feet apart. Monitoring wells 82-21, 82-23, 83-5, and 83-6 are screened at shallow depths ranging from 2-20 feet below ground surface (bgs). Monitoring wells 06-1, 82-12, 82-22 are screened at intermediate depths 20 to 40 feet bgs. Additional wells 06-2, 09-1, and 06-4 are situated 400 to 500 feet further downgradient of the southern reach of the "G"-Street trunk line.

Six monitoring wells comprise a transect parallel to the 4800 feet long "F"-Street trunk line. These wells are placed within 150 feet, on the downgradient side, of the "F"-Street sewer. They are spaced 500 to 1000 feet apart. Wells 82-24, 82-25, 82-26, 94-1 screen shallow intervals between 2 to 15 feet bgs. Wells 92-6 and 92-P7 screen deeper intervals between 23 to 44 feet bgs.

The “E”-Street SWMU-12 trunk line is approximately 2500 feet long. A set of three monitoring wells (82-27, 83-8, 14-1) are within 150 feet of this trunk line. These wells screen groundwater intervals 15 to 30 feet bgs. A set of wells in the interior of the Tank Farm, screening shallow and intermediate intervals, have also been part of OWS groundwater sampling efforts (92-5, 92-6, 92-7, 92-P5, 92-P4, 01-3, 01-1).

Wells 92-17 and 92-16 are located at intermediate intervals underlying the portion of OWS at the Truck Rack. Additional wells (listed from west to east: 82-12, 97-1, 82-14, 92-19, 92-14, 94-3, 92-11D/B, 92-8S, 92-8D, 92-82, 92-9S, 92-9D, 02-2) form a set of perimeter monitoring wells that generally screen shallow geologic units or the uppermost water-bearing unit. These wells are not in close proximity to the OWS sewer lines; however, they monitor groundwater quality between the OWS and Fidalgo and Padilla Bays.

2.2.2.2 Initial Investigation Near the Area of Possible OWS Integrity Issue

Based on the results of the video survey or hydrostatic testing, an area of possible release will be identified. In response, Tesoro will perform an initial investigation:

1. Collect one or more samples of soil proximate to and below the elevation of the potential release using one of the following methods as appropriate for the case-specific circumstances:
    a. Test pit using backhoe
    b. Boring using direct-push, hand auger, power auger
2. Screen soil sample(s) for the presence of petroleum hydrocarbons using one or more of the following methods:
    a. Visual and olfactory evidence
    b. Photoionization detector (PID), organic vapor analyzer (OVA), or similar technology
    c. Sheen test
    d. Field fluorescence or similar technology

If field screening suggests that a release has occurred, then a sample of soil will be collected from the most concentrated area for laboratory analysis to verify the field screening results. If the analytical results from the screening sample exceed MTCA Method A industrial and/or Method C soil clean-up levels for one or more contaminants, then additional soil sampling will be conducted to evaluate nature and extent as discussed below. If soil cleanup levels are not exceeded, no additional sampling will be pursued, and reporting will occur.

2.2.2.3 Soil Investigation to Evaluate the Nature and Extent of Soil Contamination

A site characterization to evaluate the nature and extent of soil contamination will be initiated if the initial investigation confirms a release from the OWS. The primary objective of the characterization will be to gain information of sufficient abundance and quality to inform interim action decision-making.

To the extent practicable from health, safety, and access perspectives, samples of soil will be collected from test pits or borings (as previously described) consistent with the conceptual site model and sampling and analysis considerations described in the Guidance. Tesoro will prepare an abbreviated sampling and analysis Sampling and Analysis Plan (SAP) for soil characterization. The SAP will identify approximate locations of soil samples horizontally and vertically, sample collection methods, contaminants of concern to be analyzed, analytical methods, and quality assurance/quality control (QA/QC) requirements. The SAP will include contaminants known or suspected of being present in the wastewater conveyed by the specific section of OWS piping, including “other site contaminants” such as per- and polyfluoroalkyl

substances (PFAS) if appropriate for the particular section of piping. The SAP and any adjustments to the SAP made in the field will be retained as part of the project record.

2.2.2.4 Groundwater Investigation to Evaluate the Nature and Extent of Groundwater Contamination

Evidence of possible groundwater contamination may be obtained during the soil characterization or during a separate investigation specific to groundwater. An opportunity may arise during the soil investigation to assess whether groundwater has been impacted by a release from the OWS. Where feasible, for example, a groundwater sample may be collected directly from an open test pit or soil boring using a bailer, peristaltic pump, or other EPA-approved sampling methodology. These samples may be subject to false positives due to the presence of soil particles in samples.

If groundwater cannot be sampled during the soil investigation, one or more temporary or permanent monitoring wells may will be constructed, developed, and sampled in accordance with Washington Administrative Code (WAC) 173-160. New wells will be located within or slightly downgradient of the release site considering access restrictions and proximity to refinery process structures/equipment. Monitoring wells will be constructed with the screen set in the upper-most water bearing unit. Groundwater samples will be analyzed at a state-certified laboratory for contaminants of concern discovered during the soil characterization work.

Tesoro will prepare an abbreviated Groundwater Sampling and Analysis Plan (GSAP) for the groundwater investigation. The GSAP will specify sample locations, sampling method(s), contaminants of concern to be analyzed, analytical methods and QA/QC requirements. The GSAP will include contaminants known or suspected of being present in the wastewater conveyed by the specific section of OWS piping, including “other site contaminants” such as PFAS if appropriate for the particular section of OWS piping. Both filtered and unfiltered samples will be collected and prepared for analysis by the laboratory. The GSAP (and any adjustments to the plan made in the field) will be retained as part of the project record.

2.2.3 Interim Action Work Plan

In accordance with the Agreed Order, the following timeframes apply for work plan submittals to Ecology:

- Within 60 days of completing the site characterization and before initiating a presumptive interim action;
- Within 120 days of completing the site characterization and before initiating a non-presumptive interim action.

The work plan for a presumptive interim action will include the following information:

- Results of the site characterization;
- A site-specific description of the presumptive interim action Tesoro intends to implement;
- Procedures for remediation of contaminated soil and contaminated groundwater; and
- The schedule for implementing the presumptive interim action.

Ecology pre-approval of the work plan and interim action is not necessary for a presumptive interim action. If Tesoro chooses to implement a non-presumptive interim action, the work plan will provide the following information as required by WAC 173-340-430(7):

- Details regarding the interim action that will be implemented, such as site description, conceptual site model, and site characterization results;
- Sampling and analysis plan;
- Evaluation of cleanup standards;
- Description of interim action;
- Proposed schedule for implementing the interim action;
- Compliance monitoring; and
- Description of the reporting and documentation required during the interim action.

2.2.4 Procedures Following a Release

If the results of the groundwater and soil sampling confirm a release of hazardous substances from the OWS, the event must be reported in accordance with WAC 173-340-300(2), including providing written notification to Ecology within 90 days of discovery, the location and circumstances of release, and any remedial actions planned, completed, or underway.

If a release of hazardous material from the OWS into the environment is detected, a series of repair, mitigation, and communication procedures are initiated. Each are discussed in detail below. As noted in Section 2.2.1, documentation of soil and groundwater sampling will include the location of any identified release, investigation and sampling dates, any corrective actions or interim measures taken or planned, and any areas where soil or groundwater contamination is left in place.

2.2.4.1 Repairs

If needed, most sections of OWS can be excavated for inspection following the initial testing. Those regions of OWS under concrete in the heavy industrial zones of the refinery require additional engineering and planning to support excavation.

If a release from the OWS is confirmed through the investigations described above, Tesoro will initiate repairs to the OWS as needed to eliminate the source of the release. Any OWS piping that is found to have leaked will require repair.

Repairs to OWS could include several options including:

- Replacement
- Line abandonment
- External encasement or patching of sewer line at the release location
- In situ repair methods including liner installation or grouting

Inaccessible sewers may not be able to be repaired due to the presence of structures or utilities at the release location. Release mitigation measures, including ongoing monitoring, will be put in place for inaccessible sewers. The mitigation measures will include measures to assess and prevent the migration of soil and groundwater contamination.

2.2.4.2 Contamination in Inaccessible Areas

Part of OWS underlies active industrial infrastructure. Thus, a release could potentially occur in an area inaccessible to drilling equipment or where immediate access is limited. If a release is suspected in an inaccessible area, groundwater monitoring in surrounding native material will be used to determine whether contamination present in the OWS backfill presents a risk to groundwater or surface water via a groundwater transport pathway. In the event of a suspected release in an inaccessible area, the impacted soil and free product will be removed to the extent

possible, and new downgradient monitoring wells may be installed as needed. Monitoring and necessary cleanup will be continued until cleanup levels are achieved.

Tesoro will also maintain records (including figures or maps, as appropriate) showing the estimated extent of contamination exceeding cleanup levels where remedial actions are incomplete because of inaccessibility. If refinery capital projects enable inaccessible contamination to be accessed, then Tesoro will complete remedial actions to the extent feasible and consistent with the interim action work plan prepared for the specific release. Such supplemental actions will be documented and reported to Ecology in the annual report. Longer term (e.g., if and when the refinery closes), any remaining contamination from OWS releases will be addressed similarly.

Tools for managing the risk of contaminant migration are described in previous sections. In particular, the interim action workplans will identify and discuss the occurrence and potential risks posed by residual/inaccessible contamination. Depending on the circumstances groundwater monitoring may or may not be necessary. If necessary, an environmental covenant may be instituted as an institutional control measure where additional cleanup actions are deemed impracticable.

As detailed in Section 3, a 10-Year Review will be reported 180 days prior to November 1, 2031, that provides information on inaccessible soil and groundwater contamination.

3 Annual Progress Report and 10-Year Review

Reporting of the OWS integrity testing results will occur in the Annual Progress Report by April 1st of each year following the implementation of the Investigation and Response Plan. The Annual Progress Report will include:

1. Deviations from the Investigation and Response Plan.

2. The findings of the sewer assessment including an assessment of the general condition of the OWS system components, the location and description of any problems identified and their cause, and a description of actions taken or planned to repair or maintain system components based on the results of the testing.

3. Information on the nature and extent of releases identified including the characteristics of the release, sampling results, how soil and groundwater quality was evaluated, and information on the extent of soil and groundwater impacts.

4. Description of the corrective actions or interim measures taken or planned to remediate soil or groundwater, including the volume and disposition of contaminated soil removed, and measures taken to monitor or remediate groundwater.

5. Areas that were determined to be inaccessible and where contaminated soil or groundwater was left in place.

6. A discussion of the geology/hydrogeology in the area of any releases and how these characteristics may influence the migration of contaminants.

7. Measures to assess and prevent the risk of migration of contamination until a final remedy is implemented, including the elements of a groundwater monitoring program (number and location of wells, parameters monitored, and frequency of monitoring).

8. A review of areas that were previously determined to be inaccessible to determine if they have become accessible in the last year, together with proposed timing and approach for remediation of the area(s). Tesoro shall submit a work plan for Ecology review and approval prior to initiating remedial action for a previously inaccessible area.

9. No later than 180 days prior to the November 1, 2031, Tesoro shall submit a report that provides information on soil and groundwater contamination related to releases from the OWS in inaccessible areas. Tesoro must also provide substantive responses to each of the following EPA criteria in the reports to justify a remedy deferral for these areas.

    - There are safety and/or physical limitations that cannot be overcome by engineering or scheduling considerations.
    - The deferred operating area is not an operating hazardous waste unit/area.
    - Human exposures are under control and migration of contaminated groundwater is under control and will remain under control.

- There is no ongoing release contributing to the contamination, the contamination is not being allowed to migrate outside of the operating footprint, and there is no off-site contamination from the release.
- The extent of contamination has been delineated, a remedial action for the deferred area has been identified, and financial assurance is in place. Tesoro shall provide estimated costs for construction/implementation, operation, and maintenance of the identified remedial actions for the deferred areas in the 10-year report. Tesoro shall provide financial assurance for these areas following Ecology's approval of the estimated costs in accordance with VIII.O. (Financial Assurance) of this Order.
- Necessary institutional controls are in place to prevent unacceptable exposures to the contamination and ensure protection of human health and the environment. Under this Order, institutional controls are measures undertaken to limit or prohibit activities that may interfere with the integrity of an interim action, may result in exposure to hazardous substances, or may contribute to migration of contaminated groundwater. These controls include administrative controls such as training or safety precautions, fencing, maintenance of ground cover or other barriers, and dust control.
- A deferral is only for a specified period of time and does not extend beyond the active life of the critical process or integral component that is the basis for the deferral. Ecology has determined that the specified period of time for a deferral is 10 years, at which time the deferral will be re-evaluated and extended as appropriate.

4 References

Department of Ecology, State of Washington, 2016. *Guidance for Remediation of Petroleum Contaminated Sites*. Toxic Cleanup Program Publication 10-09-057.

Kearney, A. T., and Science Application International Corporation (SAIC), 1988. *RCRA Facility Assessment, Shell Oil Company, Anacortes, Washington*.

National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP).

Olympus Environmental, Inc, 1995. *Interim Status Report: Hydrocarbon Release Assessment and Remediation. Olympic Pipe Line Shell Booster Station. Anacortes, Washington.* Submitted to: Olympic Pipe Line Company February 7, 1995.

Pacific Groundwater Group, 2015. SWMU 21 final phase II report for the Tesoro Marketing and Refining Company Anacortes, Washington. Final Draft submitted to Ecology January 29, 2015.

Pacific Groundwater Group, 1992b. *Shell Anacortes Refinery, Draft Preliminary Site I Geohydrologic Assessment Report*, dated May 11, 1992.

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. January 1995.

Table 1: SWMU 12 Groundwater Monitoring Network (Active Wells)

Well ID	MP Elevation ft	Depth (ft bmp)	Top of Screen (ft bmp)	Bottom of Screen (ft bmp)	Screen Length ft	Status
			Active Wells			
01-1	168.71	12.83	4.00	10.00	6.00	A
01-3	168.02	12.33	4.00	9.00	5.00	A
02-2	26.28	34.00	26.00	31.00	5.00	A
06-1	189.14	25.28	18.50	23.50	5.00	A
06-2	188.30	23.00	15.00	20.00	5.00	A
06-4	179.35	54.95	48.00	53.00	5.00	A
09-1	181.02	55.00	50.00	55.00	5.00	A
14-1	96.72	22.69	15.00	20.00	5.00	A
14-4	102.71	44.69	40.00	45.00	5.00	A
82-12	44.40	41.20	31.00	41.00	10.00	A
82-14	41.30	17.83	5.00	15.00	10.00	A
82-21	82.00	17.91	5.00	15.00	10.00	A
82-22	114.00	33.40	21.00	31.00	10.00	A
82-23	164.10	29.16	7.00	27.00	20.00	A
82-24	198.30	14.41	2.00	12.00	10.00	A
82-25	187.30	13.74	3.00	13.00	10.00	A
82-26	173.80	15.66	4.00	14.00	10.00	A
82-27	131.93	31.63	20.00	30.00	10.00	A
83-5	96.10	19.02	2.00	15.00	13.00	A
83-6	130.60	22.75	6.00	19.00	13.00	A
83-8	123.90	24.80	10.00	23.00	13.00	A
90-1	46.20	46.00	36.00	46.00	10.00	A
90-3	178.50	22.80	10.00	20.00	10.00	A
90-4	178.00	21.30	10.00	20.00	10.00	A
92-10S	40.20	18.90	13.50	15.50	2.00	A
92-11D/B	47.26	33.50	25.00	30.00	5.00	A
92-13	34.55	14.50	11.00	13.00	2.00	A
92-14	34.76	15.50	12.00	14.00	2.00	A
92-16	21.27	33.46	27.00	32.00	5.00	A
92-17	21.32	38.40	29.00	34.00	5.00	A
92-19	23.70	13.80	8.50	10.50	2.00	A
92-5	175.88	12.40	4.50	9.50	5.00	A
92-6	176.27	25.40	23.50	25.50	2.00	A
92-7	196.55	20.10	14.00	19.00	5.00	A
92-8D	14.20	30.30	21.50	26.50	5.00	A
92-8S	32.60	21.55	15.00	17.00	2.00	A
92-9D	20.51	33.60	25.00	30.00	5.00	A
92-9S	35.10	21.70	15.00	17.00	2.00	A
92-P4	128.75	29.44	21.00	26.00	5.00	A
92-P5	148.53	26.30	17.50	22.50	5.00	A
92-P7	133.42	46.10	42.00	44.00	2.00	A
94-1	157.98	14.15	9.00	11.00	2.00	A
94-3	72.23	17.00	9.00	17.50	8.50	A
97-1	49.17	50.47	--	--	--	A

bmp : below measuring point; A : active status well

Table 2: Soil and Groundwater Screening Levels for Contaminants of Potential Concern

	Analytes	Analytical Method	Groundwater Screening Level[3]	Units	Soil Screening Level (Unrestricted)	Soil Screening Level (Industrial)	Units	Toxicity Equivalency Factor
BTEX	Benzene	EPA 8021B	5	µg/liter	0.03	0.03	mg/kg	
	ethylbenzene	EPA 8021B	700	µg/liter	6	6	mg/kg	
	toluene	EPA 8021B	1000	µg/liter	7	7	mg/kg	
	xylene isomers	EPA 8021B	1000	µg/liter	9	9	mg/kg	
cPAHs[1]	benzo(a)anthracene	EPA 8270D SIM	0.1	µg/liter	0.1	2	mg/kg	0.1
	benzo(b)fluoranthene	EPA 8270D SIM						0.1
	benzo(a)pyrene	EPA 8270D SIM						0.1
	chrysene	EPA 8270D SIM						1
	dibenzo(a,h)anthracene	EPA 8270D SIM						0.01
	indeno(1,2,3-cd)pyrene	EPA 8270D SIM						0.1
	Total cPAH[2]		0.1	µg/liter	0.1	2	mg/kg	0.1
Petroleum Hydrocarbons	Gas Range Hydrocarbons	NWTPH-Gx	800	µg/liter	30	30	mg/kg	
	Diesel Range Hydrocarbons	NWTPH-Gx	500	µg/liter	2000	2000	mg/kg	
Metals	Arsenic							
	Barium							
	Cadmium							
	Lead							
	Mercury							
	Selenium							
	Silver							

[1]cPAHs (carcinogenic polycyclic aromatic hydrocarbons) analytes as defined by MTCA

[2]Mixtures of carcinogenic PAHs should be considered a single hazardous substance based on the toxicity equivalency factor methodology (173-340-708 8 e).

[3]MTCA Cleanup Levels Method A Groundwater and Soil (Tables 720-1, 740-1, 745-1)

Figure 1
Oily Water Sewer Map and Monitoring Wells

- Existing Well
- Inactive Well
- Decommissioned Well
- Gate
- Tanks
- Railroads
- Roads
- SWMU 21
- Oily Water Sewer (SWMU 12) Main Trunk Lines

0 Feet 500

N

Prevailing Wind Direction

K:\JANET\Tesoro\GIS\OilySewer_Map.mxd 5/23/2022

PgG
A Mott MacDonald Company

Wharf
"F" Street
"G" Street
"H" Street
Terra Drive
Main Gate
Gate 15
Third-Street
West-Third-St
Fourth-St
Fifth-St
Sixth-St
"6A" Street
Seventh-St
Eighth-St
Ninth-St
Tenth-St
Eleventh-St
Twelfth-St
Thirteenth-St
Fourteenth-St
"C" Street
"E" Street
Kavanaugh-Road
Contractors-Road
Gate 20
PSM Trailer
Gate 14
Truck Rack
Gate 16
Gate 16A
Gate 10
West Fence Line
Crude Oil Unit Railcar Offloading Facility
2A
2B
2C
2D
Flare
Flare
Flare
135
136
165
166
44
40
161
216
132
94
43
49
96
97
8
88
89
90
230?
95
38
37
35
36
19
20
21
22
247
33
34
248
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

Figure 2
Oily Water Sewer Integrity Testing Schedule

PgG
A Mott MacDonald Company

Gate
Tanks
Railroads
Roads

Projected Inspection Schedule
2022
2023
2024
2025
2026
2027
2028
2029
2030
2031

Prevailing Wind Direction

0 Feet 500

N

K:\JANET\Tesoro\GIS\OilySewer_Map_Inspection_Year.mxd 5/23/2022