

SALT LAKE CITY
DEPARTMENT OF PUBLIC UTILITIES
PERMIT BASIS DOCUMENT TEMPLATE

Industrial User Tesoro Refining and Marketing Company LLC
474 West 900 North, Salt Lake City, Utah, 84103
Salt Lake City Permit No. SLC-0024

Industrial User Permit

Pretreatment Program: The City of Salt Lake City
Industrial Pretreatment Program
474 West 900 North Salt Lake City, UT 84103

Treatment Works: Salt Lake City Water Reclamation Plant
2300 North 1365 West, Salt Lake City, UT 84116
NPDES Permit No. UT0021725

Permit Number: No. SLC-0024

Permit Expiration Date: December 31, 2011

Fed Point Source Category: Petroleum Refining 40 CFR 419 Subpart B Cracking, Section 419.25 PSES

Permit Basis Document

File Name: TesoroSaltLakeRefinery-PermitBasisDocument-121913

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The City of Salt Lake City

Date: December 19, 2013

1.0 Permit Boilerplates Used to Construct Permit

- Generic Sections 10-7-2013.docx
- Categorical SIU 07-06-11.docx

2.0 General Information

- Tesoro Refining and Marketing Company, LLC's (Tesoro) Wastewater Discharge Permit Application and Baseline Monitoring Report, for the Facility at 474 West 900 North, Salt Lake City, Utah ("Tesoro Salt Lake Refinery"), December 14, 2012.
- Salt Lake City, Industrial Pretreatment Program Inspection, August 9, 2012.
- Results of dye testing conducted at Tesoro November 29-30, 2012.
- Tesoro schematic drawing of Refinery Sewer System Drawing No. E-GEN-47 060 dated July 23, 1990 and last updated July 22, 2010.

3.0 Operations Conducted at the Industry and Wastewater Sources

3.1 Process Description

Tesoro's Salt Lake City Refinery is a petroleum refinery facility that refines crude oil delivered via pipeline through catalytic cracking, distillation, alkylation, and desulfurization to produce gasoline, jet and ultra-low sulfur diesel fuels, propane, and sulfur. According to information in Tesoro's December 2012 permit application and baseline monitoring report, the refinery first began operations in 1908. Tesoro also reports that the Salt Lake City refinery has a throughput processing capacity of 58,000 barrels per day of crude oil per day (prior to a planned 2013–2014 expansion to 62,000 barrels per day) and processed an average of 52,251 barrels per day in 2011.

The refinery site includes a crude oil receiving station, refining processing units, cooling towers, boilers, an on-site laboratory, a "storehouse", an equipment storage "rig shed", a mechanical shop, administrative office buildings and multiple bulk storage tanks for storing products and crude oil. The refinery facilities also include an industrial wastewater treatment plant (IWTP), flares for handling excess vapor and process upsets, lime pits, and catch basins. Support operations include fire suppression and ancillary utility water treatment, including ion exchange softening and reverse osmosis.

3.2 Facility SIC Code

The Tesoro Salt Lake City refinery is assigned the SIC code for the refining of crude oil into gasoline, distillate fuel oils and other petroleum products (SIC 2911).

3.3 Facility Wastewater Sources

The Tesoro Salt Lake City Refinery generates the following process-related and non-process wastewaters. The refinery production areas and storage tanks generate the majority of the refinery's process-related wastewaters. Floor cleaning and heavy equipment cleaning, and maintenance activities performed on-site also generate mop waters and can generate drainage and spills.

Process-related Wastewaters

- refinery drainage, condensates, and wash down
- crude desalter brines
- sour waters
- crude and other tank bottom draws
- process tail waters
- wash waters from heavy equipment maintenance and cleaning
- wash waters from tank and drum cleaning
- steam generation boiler blowdown
- cooling tower blowdown
- fire suppression system test waters
- RO system reject stream
- collected refinery storm water run-off
- recovered groundwater from wells

Non-process Wastewaters

- sanitary wastewater from restrooms, showers, break rooms and kitchen(s)

According to the 2012 permit application and MSDS sheets, the process-related wastewaters collected for delivery to the IWTP be expected to contain:

- Refinery Products and By-Products – free and emulsified oils, caustics, acids, suspended solid particulate material, dissolved inorganics, sulfides, ammonia, nitrogen compounds, phenolics, cumene, trace metals (molybdenum, cobalt, copper, nickel, antimony, aluminum) from catalysts and passivation, petrochemical components such as benzene, ethylbenzene, toluene, xylene (BTEX), and other volatile and semi-volatile organics, and various chemical processing and fuel additives.
- Cooling, Boilers, Condensate, and Water Treatment – additives and reagents including bisulfite oxygen and chlorine scavengers, biocides (glutaraldehyde), corrosion inhibitors (azole-based, nitrate/silicate/boron, phosphoric acid), DAF flocculant (cupric cationic polymer), cooling water treatment (methanol, acrylamide, non-ionic surfactant), boiler treatment (caustic, amines), and ammonium chloride coagulant.
- Cleaning, and Washdown – trace levels of grime, oils, and the cleaning agents used in floor cleaning, including surfactants.
- Fire suppression system testing or use waters – fluorosurfactants, polymers, and glycols.

3.4 Facility Wastewater Handling

Drawing E-GEN-47 060 Salt Lake City Refinery Sewer System shows the layout of the refinery processes and buildings and the sewer routing. Based on information from dye testing conducted in November 2012 and inspections, Tesoro refinery facility has thirteen sewer connections to the Salt Lake City domestic sewers.

Non-Domestic Refinery Discharge - According to the refinery's 2012 permit application, waters from the ammonia, sulfur recovery unit and phenol systems are diverted internally back to the desalter units. The majority of process-related wastewaters listed in Section 3.3 above are collected and routed to the on-site industrial wastewater treatment unit (IWTP) to remove oil and suspended solids prior to discharge through one sewer connection to the Salt Lake City sanitary sewer system. The IWTP is illustrated in drawing D-WWT-34-001 Waste Water Treatment Plant Process Flow Diagram dated May 10, 1991 and updated April 20, 1993. The IWTP comprises the following:

- Pre-separator belt skimming and coarse screening for removal of larger suspended solids,
- Palmer Bowlus type open-channel influent flume,
- American Petroleum Institute (API) oil water separator to remove free oil and solids,
- pH adjustment,
- Polymer flocculation,
- Dissolved air flotation (DAF) removal of suspended solids and oil removal
- Final mixed-media filtration and activated carbon (GAC).

The DAF effluent can be selectively routed either to filtration or diverted to an on-site tank in the case of failure to meet specifications or other operating upset condition. Treated effluent from the IWTP discharges to the municipal sanitary sewer via a single connection, an 18-inch diameter pipeline running to the 64-inch diameter on-site sewer main, permitted for process wastewater discharge as Outfall 001 in Tesoro's previous 2011 industrial discharge permit.

Other Non-Domestic Discharges - There are several process-related wastewater streams that are not routed to the IWTP, but rather to three other sewer connections to the domestic sewers, including:

- RO system reject streams and softener regeneration brines (1,800 to 3,600 gpd),
- Wastewater from floor drains in the north and south end of the Old Compressor Building, which houses a battery storage area and a dry chemical storage area,
- Wastewater from the on-site laboratory sinks and bottle washing equipment.

Domestic Only Discharges - The Tesoro refinery facility has nine sewer connections to the Salt Lake City sewer system handling domestic wastewater only.

Off-site Stormwater Drainage - The facility layout drawing also indicates one stormwater outfall from the east side of the refinery property, draining to grassy recessed area located in the northern portion of the refinery property that itself drains to the Salt Lake City municipal storm sewers.

4.0 Description and Regulation of Operation

Tesoro's Salt Lake City Refinery qualifies for regulation under 40 CFR 419 for existing source petroleum refining. The previous permit applied the Federal categorical standards and Salt Lake City local limits at the process discharge Outfall 001 into the Salt Lake City sewers. Monitoring is currently conducted at designated Monitoring Point 001, a spigot on the final discharge piping from the triple multimedia filter system.

The Federal petroleum refining standards define additional waste streams Federally-regulated process wastewaters. Therefore, the 2014 permit will apply the Federal categorical standards at

end-of-process to all streams considered as process wastewater discharges at internal outfalls into the plant sewers. Salt Lake City local limits will also now apply at the same outfall(s) into the sewer. These outfalls include:

- Internal Outfall 001 - Treated IWTP effluent
- Internal Outfall 002 - RO system reject and softener regeneration streams

Two smaller discharges identified through the dye test study of sewer connections will be eliminated under the terms of a compliance schedule in the permit. The smaller discharge of floor drainage from the Old Compressor Building will be eliminated through drain sealing. The smaller discharge of laboratory sink and bottle washing will be re-routed to the main in-plant sewers leading to the IWTP for discharge through Internal Outfall 001.

4.1 *Classification by Federal Point Source Category*

Tesoro's Salt Lake City Refinery qualifies for regulation under 40 CFR 419 for existing source petroleum refining. There are no other Federal point source categories that apply.

Facility Definition – The Tesoro Salt Lake City Refinery performs petroleum refining and support operations in multiple buildings that, because they are contiguous, are considered as one facility. The definition of "facility" comes from the Federal Clean Water Act regulations which define a "source" as not just a building under a single command, but as a building, structure, facility, or installation from which there is or may be a discharge of pollutants, 40 CFR 122.2. Other Federal regulations further refer to the regulated entity as a plant, user, industrial facility, or source, 40 CFR 433. Taken together a "facility" is defined by common function (petroleum refining) on a contiguous piece of property (excepting right-of-ways).

4.2 *Federal Petroleum Refining Standards*

Table 1 – Categorical Pretreatment Standards

40 CFR 419.25	Oil & Grease (HEM)	Ammonia as Nitrogen (N)
daily-maximum (mg/l)	100	100

Applicability - Under 40 CFR 419(B) and the supporting 1974 Development Document, the petroleum refining standards apply to the *total (non-domestic) refinery flow* to the municipal sewer system, including not just the production-related wastewaters, but also specifically the storm water runoff, and the non-contact boiler blowdown, cooling tower blowdown, and water preconditioning brines, generated by the facility within the processing areas. As a result, the petroleum refining standards apply to all of the process wastewater streams listed in Sections 3.3 and 3.4 of this Permit Basis Document.

Basis of Standards - The existing source standards were based on a model pretreatment system utilizing oil-water separation and ammonia steam stripping at facilities with some wastewater reuse and waste streams segregated by treatability. The best-available-technology (BAT) treatment standards were established through a study of refineries with the model treatment, at levels that

the refineries taken together were able to consistently achieve a compliance rate of approximately 98% (2 in 100 chance of violation).

Specifically, the oil and grease standard derives from the performance range found in an April 1974 United States Environmental Protection Agency (USEPA) study originally used in setting the standards. Pretreatment source standards were limited to oil and grease and ammonia because sulfides are stripped with the ammonia and the municipal publicly-owned treatment systems would be expected to treat the organic loadings.

New or Existing Sources - Tesoro Salt Lake Refinery qualifies as an existing source because it began operations in 1908 and was discharging to the sanitary sewer system by 1974, prior to the December 21, 1979 publication of the proposed rule for petroleum refining. Existing source petroleum refineries were required to comply by December 1, 1985.

4.3 Combined Federal Standards and Adjustments

Multiple Categories - The Federal categorical pretreatment standards must be adjusted to account for multiple Federal categories, if more than one applies. Only 40 CFR 419 applies at the Tesoro Salt Lake City Refinery.

Dilution - The Federal categorical pretreatment standards must be adjusted to account for dilution, if it exists, from non-contact waters and domestic sewage using the combined wastestream formula in 40 CFR 403.6 (d,e). This provision has the intent of ensuring best available technology treatment used in originally setting the technology-based Federal standards (or equivalent) is fully applied to the regulated waste streams. However, for the Federal petroleum refining standards in 40 CFR 419, both facility stormwater drainage, and the non-contact wastewaters of boiler blowdown and condensate, cooling tower blowdown, and water preconditioning tail waters, are all specifically listed in the *Development Document for Petroleum Refining Point Source Category* as part of the total refinery discharge, subject to regulation as process-related wastewaters. Therefore the Federal categorical standards apply without adjustment to the outfall for the IWTP. Additional process wastewater outfall and monitoring points will be designated in the new permit.

4.4 Federal Prohibitions

Dilution as a Substitute for Treatment - The Federal standards in 40 CFR 403.6 (d) prohibit "dilution as a substitute for treatment" in order to prevent compromising BAT model treatment with dilute wastestreams. For petroleum refining, there are no dilute non-domestic wastestreams that are not considered part of the Federally-regulated total refinery flow. Therefore this prohibition does not apply unless the monitoring points also register contributions of either domestic wastewaters or straight tap water.

Bypass Provisions - The Federal standards in 40 CFR 403.17 prohibit the bypassing of any on-site treatment necessary to comply with standards unless the bypass was unavoidable to prevent the loss of life, injury, or property damage, and there were no feasible alternatives. This provision explicitly prohibits bypasses that are the result of a lack of back-up equipment for normal downtimes or preventive maintenance. It also explicitly prohibits bypasses that could be prevented through wastewater retention or the procurement of auxiliary equipment. It specifically allows

bypasses that do not result in violations of the standards as long as there is prior notice and approval from the sewerage agency or State. The previous 2011 permit established the bypass provision against bypassing treatment necessary to comply, and the new 2014 permit will include this provision.

4.5 *Local Limits and National Prohibitions*

Local limits and the national prohibitions in 40 CFR 403.5 (a,b) are meant to express the limitations on non-domestic discharges necessary to protect the sewers, treatment plants and their receiving waters from adverse impacts. In particular, they prohibit discharges that can cause the pass-through of pollutants into the receiving waters or into reuse, the operational interference of the sewage treatment works, the contamination of the sewage sludge, sewer worker health and safety risks, fire or explosive risks, and corrosive damage to the sewers.

The national prohibitions apply nationwide to all non-domestic sewer discharges. The national prohibitions are instantaneous-maximums comparable to samples of any length. The Salt Lake City local limits apply to non-domestic discharges in the Salt Lake City service areas of the Salt Lake City Water Reclamation Plant. The local limits are daily-maximums also comparable to the average of any samples collected over a 24-hour period.

The pollutants regulated under the Salt Lake City local limits expected to be present in the final outfall discharges at levels with either an unknown or a reasonable potential to exceed the limits include pH, Biochemical Oxygen Demand (BOD), Chemical Oxygen Demand (COD), Total Suspended Solids (TSS), petroleum non-biodegradable oil and grease, arsenic, and molybdenum, based on the 2012 permit application and BMR for Tesoro Salt Lake Refinery.

5.0 *Description of the Outfall(s) and Monitoring Point(s)*

The Federally regulated discharges to the sewers will require four compliance sampling points, designated as Outfalls 001, 002, 003, and 004 associated with the following Monitoring Points:

- Monitoring Point 001 – Effluent discharge from the on-site industrial wastewater treatment plant into the pipeline leading to the municipal sewer main ,
- Monitoring Point 002 – Discharge for RO reject and softener regeneration brine streams in an open vault prior to the discharge to the sewers,

Federal standards apply end-of-process to all Federally-regulated discharges. The Federal standards are daily-maximums comparable to 24-hour composites, which can be replaced with grabs or manually-composited grabs representative of the sampling day's discharge. Monitoring Point 001 is a suitable end-of-process-after-treatment sample point representative of the day-to-day IWTP discharge. Monitoring Point 002 will need to be identified as an end-of-pipe sample point representative of day-to-day discharge of the Federally-regulated wastewaters.

Local limits and the national prohibitions apply end-of-pipe to non-domestic flows. Monitoring Point 001 is suitable as a monitoring location representative of the day-to-day non-domestic wastewater discharges for application of local limits. Monitoring Point 002 will need to be identified

as an end-of-pipe sample point representative of the day-to-day non-domestic wastewater discharges for application of local limits.

6.0 Effluent Limits

The Federal petroleum refining standards apply without adjustment to Monitoring Points 001, 002, 003 and 004. The Salt Lake City local limits and national prohibitions for also apply to the pollutants of concern (BOD, TSS, COD, arsenic, molybdenum, pH, and explosivity).

Table 2 – Permit Effluent Limits

Effluent Limitations @ Monitoring Points 001 and 002	Local Limits		Nat'l Prohib	Fed Stds
	Daily-Max	Inst-Max	Inst-Max	Daily-Max
BOD (mg/l)	10000	-	-	-
TSS (mg/l)	3000	-	-	-
COD (mg/l)	20000	-	-	-
Ammonia –N (mg/l)	-	-	-	100
Arsenic (mg/l)	0.2	-	-	-
Cadmium (mg/l)	0.7	-	-	-
Chromium (mg/l)	5.0	-	-	-
Copper (mg/l)	13.6	-	-	-
Lead (mg/l)	2.0	-	-	-
Mercury (mg/l)	0.2	-	-	-
Molybdenum (lbs/day @ WWTP)	16.0	-	-	-
Nickel (mg/l)	1.9	-	-	-
Selenium (mg/l)	1.0	-	-	-
Silver (mg/l)	5.0	-	-	-
Zinc (mg/l)	39.9	-	-	-
Biodegradable Oil & Grease (mg/l)	500	-	-	-
Petrol Non-biodeg Oil & Grease (mg/l) ⁽¹⁾	100	-	-	100
Temperature	<104°F	-	-	-
Closed Cup Flashpoint (°F)	-	-	<140°F	-
Lower Explosive Level (%) ⁽²⁾	-	5% - 10%	-	-
pH (s.u.)	-	6.0-10.5	<5.0	-

Note: (1) Petroleum Non-biodegradable Oil & Grease shall be measured using silica gel treated hexane extraction methodology (SGT-HEM)

(2) Lower Explosive Limit is 5% for two successive readings and 10% for any reading

7.0 Monitoring Requirements

Under the 40 CFR 403.12, categorical industrial users are required to monitor at least twice per year, with more frequent monitoring if necessary in order to ensure the sampling is representative of the discharge, the sampling day's operations, and the reporting period.

Monitoring Point 001 - The IWTP receives wastewaters of varying strengths and at varying flows and durations from multiple sources. In particular, the IWTP handles variability from significant intermittent contributions, including storm water drainage, crude and tank bottoms draws, and refinery wash down. The unquantifiable nature of the variability in both strength and flow, the past history of both violating oil and grease limits and causing pass-through, and the possibility of petroleum and fuel contamination, together support continuous monitoring for pH and LEL and the monthly monitoring for the other parameters of concern, as well as for turbidity as an indicator parameter of treatment efficiency. These monitoring frequencies for most of the pollutants were first proposed by Tesoro in the December 2010 Self-Monitoring Plan in response to an Administrative Order for violations of oil and grease limits and pass-through caused by spent caustics. These reasons for the monthly monitoring of the Federally-regulated pollutants (oil and grease, ammonia) also justify monthly monitoring for local limit pollutants of concern (BOD, COD, TSS, arsenic, molybdenum, and explosivity).

Monitoring Point 002 – Discharges of ion exchange regenerant and reverse osmosis reject would likely remain consistent in both wastewater quality and flow, but not in pH since ion exchange regeneration involves resin washing with strong acids and bases. Therefore, monitoring could be as low as the Federal minimum of twice per year for the Federally-regulated pollutants (oil and grease, ammonia) and TDS as an indicator of wastewater strength, but should be monthly for flow and pH.

8.0 Self-Monitoring

The 2014 permit will establish the following self-monitoring requirements. Salt Lake City intends to monitor for all parameters a minimum of twice per year to evaluate compliance.

Table 3 – Permit Self-Monitoring Requirements for Monitoring Point 001

Internal Outfall Monitoring Point 001	Self-Monitoring Point	Self-Monitoring Frequency	Sample Type
Flow Rate (gal/day)	001	Continuous	Effluent Metering
pH (s.u.)	001	Continuous	Effluent Metering
Lower Explosive Limit (%)	001	Continuous	Field Measurement
Ammonia-N (mg/l)	001	Once/month	24-hour Composite
BOD (mg/l)	001	Once/month	24-hour Composite
TSS (mg/l)	001	Once/month	24-hour Composite
COD (mg/l)	001	Once/month	24-hour Composite
Arsenic (mg/l)	001	Once/month	24-hour Composite
Molybdenum (mg/l)	001	Once/month	24-hour Composite
Oil & Grease, Petrol (mg/l)	001	Once/month	24-hour Manual Composite
Turbidity (NTU)	001	Once/month	24-hour Manual Composite
Closed-Cup Flashpoint (°F)	001	Once/month	Grab

Table 4 – Permit Self-Monitoring Requirements for Monitoring Point 002

Internal Outfall Monitoring Point 002	Self-Monitoring Point	Self-Monitoring Frequency	Sample Type
Flow Rate (gal/day)	002	Once/month	Estimate or Measurement
pH (s.u.)	002	Once/month	Field Grab
Ammonia-N (mg/l)	002	Once/six-months	Grab
Oil & Grease, Petrol (mg/l)	002	Once/six-months	Grab
Total Dissolved Solids (mg/l)	002	Once/six-months	Grab

9.0 TTO Monitoring

There are no toxic organics standards or limits that apply to the Tesoro discharge to the sewers.

10.0 Continuous Monitoring Requirements

Continuous monitoring of effluent pH and effluent flow are required for the IWTP discharge through Monitoring Point 001. Continuous measurement of the lower explosive limit will be required by a compliance schedule for the discharge through Monitoring Point 001.

11.0 Reporting Requirements

Quarterly reports with the self-monitoring results for monitored parameters are the responsibility of Tesoro Salt Lake City Refinery.

12.0 Special Reports Required

A slug control plan still is required as large quantities of chemicals are stored on-site.

13.0 Signatures

Permit Writer 

Date December 19, 2013

Pretreatment Compliance Coordinator _____

Date _____