APPENDIX 2-A: EXISTING PROGRAMS AND OPERATIONS

Page Intentionally Left Blank

APPENDIX 2-A: EXISTING PROGRAMS AND OPERATIONS

1. EXISTING OPERATIONS

The Tesoro Anacortes Refinery has a number of programs to assure safe and reliable operations and to prevent accidents from occurring. These programs are summarized in this appendix and described in more detail in the following plans:

- Wastewater Pollution Prevention Plan (Tesoro 2004)
- Oil Spill Contingency Plan (OSCP) (Tesoro 2016a)
- Spill Prevention Control and Countermeasure (SPCC) Plan (Tesoro 2012)
- Wharf Operations Manual (Tesoro 2016b)

These plans would be updated as necessary to incorporate the proposed project components and to facilitate integration of the proposed project with existing refinery operation and maintenance procedures.

1.1. GENERAL WHARF OPERATIONS

Crude oil is unloaded at the wharf and transferred to the refinery by pipeline. Petroleum products shipped via or handled at the wharf include:

- Alkylate
- Catalytically Cracked (CC) feed
- Crude oil
- Cutter stock
- Diesel
- Industrial fuel oil
- Jet A
- Gas oil
- Marine fuel oil
- Naphtha/CC naphtha
- Reformate
- Unleaded gasoline

Physical properties of these products are detailed in Safety Data Sheets which are maintained on file at the wharf and on the refinery computer system available 24 hours a day (Tesoro 2016b).

The transfer pipelines between the wharf and facilities at the refinery include pipelines for the following materials:

- 12- inch premium unleaded gasoline
- 12-inch regular unleaded gasoline
- 12-inch residuals
- 12-inch Jet A
- 16-inch crude oil/bunker fuel
- 16-inch crude oil
- 6-inch oily water
- 6-inch slops line
- 12-inch ballast water
- 10-inch ultra-low sulfur diesel

1.2. WHARF BERTHING AND TRANSFER OPERATIONS

Two main segments of the facility are the causeway structure (wharf approach structure) and the wharf structure proper. The causeway extends approximately 3,100 feet from the shoreline and consists of a 15-foot-wide roadway and open pipeway. The structure is constructed entirely of timber and has turnout points to facilitate traffic movement.

The wharf proper is constructed of timber with the exception of the dolphins, sumps, north manifold, and pipeway. The dolphins are concrete with pre-stressed concrete pilings and rubber fenders that absorb shock caused from the impact of vessels. The sumps at the loading and pumpout stations are made from reinforced concrete and the new north manifolds are constructed of steel. The pipeway on the wharf and the sumps are lined with grating to facilitate visual inspection.

The wharf head proper is 650 feet long by 65 feet wide, with a 28-foot-wide pipeway in the center. An aft mooring dolphin extends from a 193.5-foot finger pier to the west. Three breasting dolphins for tankers are spaced approximately 210 feet apart on the north side (i.e., outside) of the wharf. A forward mooring dolphin extends from a 140-foot long finger pier to the east.

The outside berth can accommodate tankers about 950 feet in length and 125,000 dead weight tonnage (DWT), with a draft suitable for at least 45 feet of water at mean lower low water (MLLW). The inside berth is limited by a distance of 357 feet from the centerline of the hose manifold to the bow fender dolphin. The inside berth can accommodate tankers up to about 680 feet in length and 50,000 DWT, with a draft suitable for at least 38 feet of water at MLLW. Deadweight tonnage is a measure of a vessel's weight carrying capacity, and does not include the weight of the ship itself.

Located midway on the wharf proper is the control house and personnel shelter. The lower floor of this two-story structure contains a pressurized electrical switch room, a foam tank for firefighting, a restroom, and a vessel crew waiting room. There is also a centrally located storeroom for life preservers, rope, and operating gear. Full vision of the wharf, causeway, and vessels secured to the wharf is available at all times from the specially designed, pressurized second floor. The second floor contains the operating equipment, storage, desks, and telephones necessary to manage wharf operations.

Drip containment at the wharf consists of a drip pan covering all working areas adjacent to the wharf manifolds and sump containment at the manifold proper. Oily water and ballast water reception facilities are located at the east end of the wharf manifolds on both the north and south loading manifolds. Ships arriving with ballast aboard or with wash tanks discharge oily water or ballast via an 8-inch or 6-inch hose or combination of both to the wharf. The material is then transferred through pipelines to a 50,000 bbl tank (Tank 161).

The wharf is equipped with a number of safety features to ensure safe navigation, fire prevention, and transfer operation. These features include proper navigation lights and a foghorn. Spill response equipment stored or stationed at the wharf or at an adjacent storage site includes booms, skimmers, sorbents, workboats, hand tools, and other spill response supplies.

Hours of operation of the facility are 24 hours per day, 365 per year. The wharf can load or unload two vessels simultaneously. When a vessel is at the wharf, there is one Wharf Operator per vessel at all times. Access to the wharf is by way of the main gate which has a watchman on duty at all times. For security reasons, the wharf is always staffed (24/7). The No. 1 Wharf Operator is the Person-In-Charge of transfer operations. If there is a second vessel, he is assisted by another qualified Wharf Operator, who is designated Person-In-Charge of the second vessel. The wharf is inspected three times during an 8-hour shift by the Logistics Operation's Supervisor, Security Guard, and/or Wharf Operator.

A ship using the inner or outer berth must use two tugs on docking and undocking. A barge using the inner berth must use a tug of sufficient power to safely dock the barge or must ask for the assistance of an additional tug. A barge using the outer berth must use two tugs on both docking and undocking to minimize hazards.

1.3. REFINERY OIL TRANSFERS

The refinery receives crude oil via the Kinder Morgan pipeline, rail, and the wharf. The Kinder Morgan pipeline deliveries occur approximately twice a week at a receiving volume of approximately 8,000 bbl per hour. Wharf crude deliveries occur approximately every 10 days via crude oil ships in the 75 to 125 DWT class. Discharge volumes of crude oil ships range from 18,000 (via hoses) and up to 30,000 bbl per hour (using marine loading arms). Crude oil is discharged to shore tanks which in turn are transferred to tanks located on the hill at approximately 10,000 bbl per hour for feed to the crude unit. The crude unit processes approximately 120,000 bbl per day of crude oil. Its products in turn are distributed to various tanks and process units.

Product ships range from 34,000 to 62,000 DWT and load approximately 240,000-275,000 bbl of gasoline, diesel, Jet A or intermediate products. These products are loaded from the refinery tanks to the shipping pumps located at the Logistics Control House area to wharf lines and loading manifold at the wharf.

Loading rate varies from 3,000 to 7,000 bbl per hour. Tank barges load and offload products such as gasoline, diesel, Jet A, marine fuel oil, decanted oil, and cat cracker feed. Cat cracker feed is discharged to shore tanks at approximately 5,000-10,000 bbl per hour and transferred to refinery tanks for processing in the Catalytic Cracking Unit (CCU). Products are loaded on barges in the same way ships are loaded.

The truck rack facility loads gasoline, diesel, and propane. Tesoro has rail facilities to load/offload petroleum-based feedstocks and products. The refinery also receives crude oil via the rail car off-loading facility (CROF) with an 11,000 bbl per hour offload rate.

1.4. STORAGE TANKS

Tanks in oil service store crude oil feed, intermediates, and products. Many other smaller tanks are present on site which store treatment chemicals, additives, wastewater, etc. Fail-safe operating features incorporated in petroleum bulk storage facilities include a centralized, continuously-manned computer system and full-time radio communications between tank farm

operators and the control room from which storage and transfer operations are directed. The tanks are equipped with an instrument system that continuously monitors the tank levels and generates a report of the tank levels every hour. The system gives audible alarms for high, high-high, low, and low-low levels, as well as flow rates into or out of an active tank. All alarms require acknowledgement by refinery personnel. Tank farm tanks are protected from corrosion by a cathodic system.

1.5. PIPELINES

Nearly all of the refinery piping is above ground allowing for routine and continuous monitoring for leaks or other abnormalities. The only piping that runs over water is that along the causeway and on the wharf. There are 10 oil lines going to the wharf ranging from 6' to 16' in length carrying crude oil, oil products, oily water, and ballast water. Each line contains an on-shore block valve approximately 400 feet south of the wharf proper (just south of the spill equipment building) to isolate the piping in the event of a leak. There is over water leak detection on these pipelines.

Pumps are located throughout the refinery. The cargo loading pumps are located near the main logistics control room, which is on the northern end of tank farm (near the center of the refinery).

1.6. RAIL CAR FACILITY

The rail car unloading facility can accommodate crude oil with a pump transfer rate of approximately 700 gallons per minute or about 10,000 bbl per hour. The unloading facility can accommodate one 100-car unit train of crude oil at a time. The fully loaded 100-car-unit train comes into the facility from the BNSF Railway main tracks. When unloading operations is complete (about 7 hours), the empty train is prepared for departure. The total turnaround time from arrival to departure is approximately 16 hours. Rail tank cars are bottom unloaded through heavy-duty 4-inch flexible rubber hoses connected to a dry-break quick-coupler adapter on each tank car. The risers from each unloading position would be connected to a 30-inch suction header below grade that is connected to four unloading pumps (3 operational and 1 installed standby). The pumps discharge to an 18-inch discharge header which can send crude oil to crude oil storage tanks in the existing tank farm. Upon completion of unloading, the pumps stop and then the drain lines and adapters are disconnected and the vacuum breaker and ground connections are removed.

The unloading operation takes place over a concrete pad. Any water or oil that drips on the pad would drain into a 400,000-gallon storage tank. The tank contents can be pumped to the refinery's wastewater treatment plant (WWTP).

1.7. TRUCK RACK FACILITY

The truck rack loading facility supplies propane, diesel, and gasoline to commercial trucks. There are 3 storage tanks containing: diesel (12,000 bbl), ethanol (12,000 bbl), and gasoline (20,000 bbl). There are also 4 smaller tanks holding additives located adjacent to the loading

area. The facility can accommodate 2 trucks loading diesel and gasoline simultaneously and another rack that can load propane. The facility is operational 24 hours per day.

The facility has automatic isolation valves between the loading area and the supply tanks. The loading area drains to a 10,000 gallon sump that is connected to an oil-water separator and then to the refinery's WWTP. Spills in the loading area would go to the WWTP.

1.8. SECONDARY CONTAINMENT

1.8.1. Tanks

Oil storage facilities at the refinery are protected by secondary containment systems earthen and reinforced concrete dikes, sewer systems, and impounding basins. If dike is earthen, it is covered with an asphaltic coating to prevent erosion and maintain integrity. These systems are designed to prevent oil from reaching navigable waters in the event of a primary containment system failure and are in accordance with the requirements of 40 CFR Part 112 and the National Fire Protection Association Code 30 (Flammable and Combustible Liquids Code).

Most of the larger tanks are in their own diked area, whereas many of the smaller tanks are in common areas. The volumetric capacity of the diked area is at least 100 percent of the volume of the largest tank in the diked area plus freeboard allowance for precipitation.

If a substantial amount of oil were to accumulate in diked tank areas, the flow from the tanks in that yard to the oily sewer can be stopped by closing a valve located outside of the containment.

Drain valves in the dikes are always kept closed except to drain any accumulation of tank area stormwater. Before stormwater is drained it is inspected (and analyzed, if necessary). Roof drains are closed when the dike drain valves are open to prevent escape of oil should a roof drain line develop leak. A limited number of drain valves are open at any one time, and they are periodically inspected while open. The status of each drain valve is indicated by an orange traffic cone by an open valve and by the drain valve position board in the main logistics control room.

In all storage situations, except for the four low elevation crude oil tanks (135, 136, 165, 166) and two high elevation crude oil tanks (1, 60), the refinery drainage system surrounds secondary containment dikes, supplying a tertiary containment capability in the wastewater holding ponds. For portable oil storage tanks, containment is provided to protect against spills to bare ground or waters of the state.

The rail offload facility has a secondary containment to hold the capacity of the largest rail tank car.

1.8.2. Piping

Because the refinery drainage is collected, nearly all leaks which could potentially develop on pipelines within the refinery (excluding those on the causeway and wharf) would be contained within the sewer system and retention ponds. Most of the piping, in the tank farm area and between the tank farm and wharf system, is located in trenches that run along the roads in the refinery.

1.8.3. Wharf

The wharf is provided with reinforced concrete sumps under each of the loading headers, each of the three marine loading arms (MLAs) and oily water pumpout area. In addition, there is a steel sump under the extended north wharf manifold and a steel sump west of the north hydraulic crane. Sumps are for the purpose of containing any leaking connections and for draining while disconnecting. Sumps are emptied prior to disconnecting hoses to minimize the chances of an overflow. High level warning lights with audible alarms at both the wharf and the main logistics control house alert operators when a sump should be pumped out. The sumps are inspected regularly during each shift. Drip pans are used whenever hoses must be connected or disconnected at any point other than over the sumps.

1.8.4. Containment Drainage

All diked areas associated with the tanks are equipped with drain valves that are so arranged that surface drainage is routed to either the stormwater or oily water sewer system during normal operations, and is subsequently recovered and/or treated at the WWTP as needed.

1.9. SURFACE DRAINAGE

The topography at the refinery and March Point in general controls the drainage and surface runoff at the facility. Drainage within the developed refinery property is routed to the WWTP via two principal sewer systems, the oily water sewer (OWS) and the stormwater sewer (SWS). The OWS is designed to accept drainage most likely to be oil contaminated (e.g., process water which has been in direct contact with petroleum products and also precipitation which falls within the immediate confines of a process area). The refinery storm sewer collects runoff which is inherently free of contaminants, including oil, originating as precipitation in non-process areas including the storage areas.

The refinery has impounding basins designed to act as secondary containment for oil and hazardous materials or substances from storage tanks and transfer lines. Accumulated oil can be recovered and the oily water can be pumped or drained to the OWS for treatment at the Effluent Plant.

Drainage from diked storage areas is controlled by manually operated, normally-closed gate valves. Rainwater is intermittently drained into the refinery stormwater sewer system after confirming that it is not contaminated with oil. Water from the diked areas around tankers 135, 136, 165, and 166 is pumped to the Waste Water Treatment Plant since these areas cannot be drained by gravity.

Drainage from the tank truck and tank car loading facilities and adjacent area is intercepted in a catchment basin (approximate capacity of 1 million gallons) near the western periphery of the refinery. From the basin, it is pumped automatically up into the OWS for gravity flow with process water to the WWTP.

At the WWTP, the OWS flow is routed through two parallel American Petroleum Institute (API) oil-water separators where the major portion of free-floating oil is removed for reprocessing.

From the oil-water separator, effluent passes through one of two primary clarifiers. If necessary at this point, up to 3.5 million gallons of wastewater may be diverted and stored in a diversion pond for future recycle through the oil-water separator. The water then goes to an activated sludge basin where a large portion of the organic contaminants are destroyed. Following biological treatment, the water passes through one of two secondary clarifiers and into retention and surge ponds in series (6.5 and 7 million gallons, respectively).

The segregated stormwater stream enters the WWTP via a separate storm flume equipped with an oil skimmer. The stormwater then enters the retention pond along with the water from the secondary clarifiers. The retention and surge ponds are also equipped with oil skimmers although oil is not routinely present in these ponds. Treated water is pumped into Fidalgo Bay from the surge pond under National Pollutant Discharge Elimination System (NPDES) Permit # WA 000076-1. If necessary, water in these ponds can be isolated and recycled to the oil-water separator for further treatment or it can be diverted to another holding basin for emergency storage (5 million gallons). Through routine visual observations and analytical testing, the operator of the WWTP detects contamination that may be indicative of a plant upset or spill.

Tesoro operates the refinery WWTP in accordance with the NPDES Waste Discharge Permit (NPDES Permit No. WA-000076-1). In accordance with the NPDS permit requirements, Tesoro has prepared a Wastewater Pollution Prevention Plan (Tesoro 2004) that identifies pollution prevention measures for sources of water pollutants. A pollution prevention progress report must be provided to the Washington State Department of Ecology (Ecology) every 2 years. In addition, the NPDES permit requires routine monitoring of wastewater discharge quality as well as periodic monitoring for specific toxic or polluting chemicals.

Sumps and other structures at the wharf are in place to ensure oil containing equipment and transfer operations have spill containment. The clean stormwater that does not contact oil containing equipment is not recovered.

1.10. LEAK DETECTION SYSTEM

The refinery has a pipeline leak detection system on all pipelines that are not contained within secondary containment. Pipelines in the tank farm or processing areas are all contained within dikes or treated oil water sewer systems. However, pipelines that service shore tanks and wharf facility are not contained by berm and drainage systems and are monitored by a pipeline leak detection system to meet provisions of state law. In addition, the three marine loading arms are pressure tested annually in the same manner as the rest of the over-water piping.

The leak detection monitoring system consists of flow meters and pressure transmitters on the pipelines at the wharf and at the head of the causeway or shore tanks. A total of 18 flow meters are installed to continuously detect and monitor flow in the pipelines and to alert refinery personnel immediately upon any anomaly. A leak detection computer system in the control house is operated and monitored continuously by refinery operations personnel. The leak detection system is equipped with a back-up computer that can be connected and placed in service should the primary computer fail. When the system detects a 90 percent leak probability, an alarm sounds in the control room. When an alarm sounds, operations would take action to

respond to the alarm, including transfer shutdown and investigation. If the system indicates a malfunction, the active transfer lines would be monitored visually until the system is functional. Transfer operations are manned by refinery personnel 100 percent of the time during transfer.

2. PROCESS SAFETY MANAGEMENT PROGRAM

The refinery has a process safety management program in place to assure safe and reliable operations and to prevent accidents from occurring. The program is required by regulations under the Occupational Safety and Health Administration (OSHA). The OSHA PSM program is administered by the Washington State Department of Labor and Industries under WAC 296-67.

2.1. EMPLOYEE PARTICIPATION

Refinery employees participate in all facets of process safety management and accident prevention. Examples of employee participation range from updating and compiling technical documents and chemical information to participating as a member of a process hazard analysis (PHA) team. Employees have access to all information created as part of the refinery accident prevention program. Specific ways that employees can be involved in the accident prevention program are documented in an employee participation plan that is maintained at the refinery and addresses each accident prevention program element. In addition, the refinery has committees that address both process safety and employee safety issues. These committees include teams that promote both process and personal safety and have members from various departments of the refinery, including operations, maintenance, safety, engineering, and refinery management. Finally, all employees have stop work obligation to immediately halt any activities they believe are unsafe.

2.2. PROCESS SAFETY INFORMATION

The refinery maintains a variety of technical documents to support safe operations of the processes. These documents address chemical properties and associated hazards, limits for key process parameters and specific chemical inventories, and equipment design basis/configuration information. Specific departments within the refinery are assigned responsibility for maintaining up-to-date process safety information. A table summarizing the reference documents and their location is readily available as part of the written employee participation plan to assist employees in locating any necessary process safety information.

Chemical-specific information, including exposure hazards and emergency response/exposure treatment considerations, is detailed in safety data sheets for every hazardous material used or produced at the refinery. This information is supplemented by documents that specifically address known corrosion concerns and any known hazards associated with the inadvertent mixing of chemicals.

For specific process areas, the refinery has documented safety-related limits for specific process parameters (e.g., temperature, level, composition) in a Master Alarm and Process Variable Database. The refinery ensures that the process is maintained within these limits using process

controls and monitoring instruments, highly trained personnel, and protective instrument systems (e.g., automated shutdown systems). The refinery also maintains numerous technical documents that provide information about the design and construction of process equipment. This information includes materials of construction, design pressure and temperature ratings, electrical rating of equipment, etc. This information, in combination with written procedures, trained personnel, and regulated inspection frequencies, provides a basis for establishing inspection and maintenance activities, as well as for evaluating proposed process and facility changes to ensure that safety features in the process are not compromised.

2.3. PROCESS HAZARD ANALYSIS

The refinery has a PHA program in place to ensure that hazards associated with the various processes are identified and controlled. Within this program, each process is systematically examined to identify potential hazards and ensure that proper controls are in place to manage these hazards. The refinery uses a combination of the hazard and operability (HAZOP) analysis technique and a checklist technique to perform these evaluations. HAZOP analysis is recognized as one of the most systematic and thorough hazard evaluation techniques. The analyses are conducted using a PHA team of people who have operating and maintenance experience as well as engineering expertise and is facilitated by a trained person that has expertise in the hazard assessment methodologies. This team identifies and evaluates hazards of the process as well as accident prevention and mitigation measures and makes recommendations for additional prevention and/or mitigation measures when necessary. Actions to be implemented in response to PHA team recommendations are tracked until they are complete. The hazard analysis results are reviewed and revalidated at least every five years to ensure that the process controls and/or process hazards have not deviated from the original design safety features.

2.4. OPERATING PROCEDURES

The refinery maintains written procedures that address various modes of process operations, such as unit startup, normal operations, temporary operations, emergency shutdown, emergency operation, normal shutdown, and initial startup of a new process. Operating procedures are in place for all process operations as well as all loading and unloading activities within the refinery and refinery wharf structure. These procedures are used as a reference by experienced operators and provide a basis for consistent training of new operators. These procedures are periodically reviewed, updated when changes are made that affect the process, certified annually as current and accurate.

2.5. TRAINING

To complement the written procedures for process operations, the refinery has a comprehensive training program for all employees involved in process operations. New refinery employees receive extensive training consisting of both classroom training and training with experienced refinery operations personnel. After the new employee demonstrates the knowledge and skill to safely perform the duties and tasks (e.g., through tests, skills demonstration), they are authorized to start working independently in a team environment with experienced employees available to

assist as needed. In addition, all operations personnel periodically receive refresher training on the operating procedures to ensure that their skills and knowledge are maintained at an acceptable level at least every 3 years.

2.6. CONTRACTORS

The refinery uses contractors to supplement its workforce during periods of increased maintenance or construction activities. Because some contractors work on or near process equipment, the refinery has procedures in place to ensure that contractors perform their work in a safe manner, have the appropriate knowledge and skills, are aware of the hazards in their workplace, understand what they should do in the event of an emergency, understand and follow site safety rules, and inform refinery personnel of any hazards that they find during their work. This is accomplished by providing contractors with a process safety overview training that is refreshed annually, information about safety and health hazards, emergency response plan requirements, and safe work practices prior to their beginning work. In addition, the refinery evaluates contractor safety programs and performance during the selection of a contractor. Refinery personnel periodically monitor contractor performance to ensure that contractors are fulfilling their safety obligations.

2.7. PRE-STARTUP SAFETY REVIEWS

The refinery conducts a pre-startup safety review (PSSR) for a new facility or facility modification that requires a change in the process safety information and prior to start-up of facilities after a maintenance turnaround that requires a change in the process safety information. The purpose of the PSSR is to ensure that safety features, procedures, personnel, and the equipment are appropriately prepared for startup prior to placing the equipment into service. This review provides an additional check to ensure construction is in accordance with the design specifications, that all supporting systems are operationally ready and all operations and maintenance procedures and training are complete prior to commissioning. The PSSR review team uses checklists to verify all aspects of readiness. A PSSR involves field verification of the construction and serves a quality assurance function by requiring verification that accident prevention program requirements are properly implemented.

2.8. MECHANICAL INTEGRITY

The refinery has practices and procedures to maintain the ongoing mechanical integrity of all refinery equipment. The basic aspects of this program include: conducting training for maintenance and inspection personnel, developing written procedures, performing inspections and tests, correcting identified deficiencies, and applying quality assurance measures. In combination, these activities form a system that maintains the mechanical integrity of the process equipment. Maintenance personnel receive training on an overview of the process, safety and health hazards, applicable maintenance procedures, emergency response plans, and applicable safe work practices to help ensure that they can perform their job in a safe manner. Inspections and tests are performed to help ensure that equipment functions as intended and to verify that equipment is within acceptable limits (e.g., proper wall thickness for pressure vessels). If a

deficiency is identified, employees would correct the deficiency before placing the equipment back into service.

2.9. SAFE WORK PRACTICES

The refinery has safe work practices in place to help ensure worker and process safety. Examples of these include control of the entry/presence/exit of support personnel, a lockout/tagout procedure to ensure isolation of energy sources for equipment undergoing maintenance, a procedure for safe removal of hazardous materials before process piping or equipment is opened, a permit and procedure to control spark-producing activities (i.e., hot work), and a permit and procedure to ensure that proper precautions are in place before entry into a confined space. These procedures (and others), along with training of personnel, form a system to help ensure that operations and maintenance activities are performed safely.

2.10. MANAGEMENT OF CHANGE

The refinery has a system to manage changes in the refinery processes. This system requires that changes to items such as process equipment, chemicals, technology (including process operating conditions), procedures, and other facility changes be properly reviewed and authorized before being implemented. All changes in the refinery are reviewed to ensure that proper controls are in place to manage any new hazards and verify that existing controls have not been compromised by the change. Impacted chemical hazard information, process operating limits, and equipment information, as well as procedures, are updated to incorporate these changes. In addition, operations and maintenance personnel are provided necessary training on the change.

2.11. INCIDENT INVESTIGATION

The refinery promptly investigates all near misses and incidents. An incident/near miss is an event or potential event that could have resulted in a fire/explosion, toxic gas release, property damage, environmental loss, or personal injury. The goal of each investigation is to determine the facts and develop corrective actions to prevent a recurrence of the incident or a similar incident. Corrective actions to be implemented in response to the investigation team's findings and recommendations are tracked until they are complete. The final resolution of each finding or recommendation is documented, and the investigation results are reviewed with all employees (including contractors) who could be impacted by the findings. Incident investigation and near miss reports are retained and reviewed as a component in process hazard analyses (PHAs).

2.12. COMPLIANCE AUDITS

To ensure the process safety management program is functioning properly, the refinery periodically conducts an internal audit to determine whether the procedures and practices are sufficiently robust and producing the desired outcomes. Compliance audits are conducted at least every three years. The audit team develops findings and recommended corrective actions. Corrective actions taken in response to the audit team's findings are tracked until they are complete.

2.13. EMERGENCY RESPONSE PROGRAM INFORMATION

The refinery maintains a written emergency response program, which is in place to protect worker and public safety as well as the environment. The program consists of procedures for responding to a release of a regulated substance, including the possibility of a fire or explosion if a flammable substance is accidentally released. The procedures address all aspects of emergency response, including proper first-aid and medical treatment for exposures, evacuation plans and accounting for personnel after an evacuation, and notification of local emergency response agencies and the public if a release occurs. In addition, the Tesoro Anacortes Refinery has procedures that address maintenance, inspection, and testing of emergency response equipment, as well as instructions that address the use of emergency response equipment. All employees receive training in these procedures, as necessary, to perform their specific emergency response duties. The emergency response program is updated when necessary based on modifications made to refinery processes or other refinery facilities. The emergency response program changes are administered through an approval process, which includes informing and/or training impacted personnel in the changes.

The overall emergency response program for the Tesoro Anacortes Refinery is coordinated with the Skagit County Local Emergency Planning Committee (LEPC) of the state of Washington. This coordination includes periodic meetings of the committee, which includes local industry representatives. In addition to periodic LEPC meetings, the Tesoro Anacortes Refinery conducts periodic emergency response drills that involve the LEPC and emergency response organizations, and the refinery provides annual refresher training to local emergency responders regarding the hazards of regulated substances in the refinery. The Tesoro Anacortes Refinery has around-the-clock communications capability with the emergency response officials, local government officials, and appropriate LEPC officials and emergency response organizations (e.g., fire department). This provides a means of notifying the public of an incident, if necessary, as well as quickly responding to an incident. In addition to coordinating with the LEPC, the Tesoro Anacortes Refinery, as a member of the March Point Community Awareness/Emergency Response (CAER) Group, has joined with other nearby chemical and refining companies to plan, work, and drill with local emergency responders and local authorities to improve our emergency response plans. The CAER Group also has taken an active role in communicating the hazards, prevention programs, and emergency response programs of the March Point industries with the local community. The refinery also participates in the Western States Petroleum Association (WSPA) Mutual Aid Agreement. If necessary, the refinery can call on participating WSPA members to help supply additional specialized emergency response equipment and resources.

2.14. CONTINUOUSLY IMPROVING SAFETY PERFORMANCE

The refinery has a program designed to continuously improve safety procedures, practices, and process equipment. As a component of this program, the refinery evaluates previous incidents and near misses that occur within the industry to identify safety improvement practices. The refinery applies a multi-level, multi-disciplined approach to surfacing safety improvement ideas by promoting an open safety culture that encourages safety issues to be raised and addressed on a daily basis. The refinery additionally reaches out to employees by conducting Process Safety

Culture surveys every three years to identify additional opportunities to improve the overall process safety programs at the refinery.

3. PREVENTIVE MEASURES AND INSPECTIONS

The refinery requires personnel training and implementation of plans, policies, and procedures (embedded controls) to maintain ongoing compliance with health, safety, and environmental requirements. Environmental controls in place at the refinery to manage material storage and use at the refinery are described in, but are not limited to, a Wastewater Pollution Prevention Plan (Tesoro 2004), construction stormwater pollution prevention plan (SWPPP) (specific to each construction project), a spill prevention, control and countermeasure (SPCC) Plan (Tesoro 2012), and a Wharf Operations Manual (Tesoro 2016b). These plans identify spill prevention and pollution prevention measures implemented at the refinery on an on-going basis. Embedded controls would also include ongoing monitoring of stormwater and wastewater discharge and reporting for regulatory permit compliance.

The potential for a piping rupture is minimized by the regular inspection of the overall system, including relief valves. The potential for overfilling a tank is minimized by a variety of safety features in the design and operation, including overfill alarms, tank level gauge sensors, and proper training of personnel. Catastrophic tank failure is the most severe form of spill event that can be reasonably anticipated. The likelihood of this type of spill event occurring is minimized by routine inspections and proper maintenance of the tank structure. Additionally, all tank areas drain to the refinery wastewater sewer system. The refinery conducts self-inspections on all tanks, secondary containment units, and response equipment at the refinery. This section describes procedures and checklists that are followed.

3.1. INSPECTION, TESTING AND MAINTENANCE – STORAGE TANKS

Petroleum storage tanks and transfer equipment, such as pumps and valves, are inspected and tested according to the applicable regulatory requirements and industry standards. Equipment exteriors are inspected on a regular basis. The interior of tanks and pumps are inspected during scheduled maintenance activities, when test results indicate a potential problem, or if a leak or malfunction occurs. Integrity testing of tanks and some pipelines is also conducted on a periodic basis and consists of either pressure or non-destructive testing. Storage tanks are pressure tested before a new tank is brought into service or before a tank that has undergone significant repair or modification is brought back into service. Examples of a significant repair are replacement of the floor or addition of new flanged connections. The tank is filled with water and observed for any leakage, especially in the area of the repair(s) or modification(s).

Oil and petroleum product storage tanks are inspected and tested in compliance with the standards provided in API 653, as well as procedures established by Tesoro. These procedures include both informal and formal inspections. In general, the tank exteriors and surrounding areas are visually inspected whenever oil is transferred in or out of the tank or water is drawn off the bottom. Operations personnel perform informal inspections (observations) of the tank exteriors during their normal daily activities within the tank farm. The containment dikes are

visually inspected on a quarterly basis for erosion, stability, and adequate protective surface coatings or materials. During the above inspections, any observed conditions that may be considered unsafe or potentially in need of repair would be expeditiously reported to the appropriate supervisor or qualified inspector, recorded in the operating records and repaired as needed.

3.2. EXTERNAL INSPECTIONS

Formal external inspections of storage tanks are conducted by qualified inspectors at intervals not exceeding five years. Tank may be in service during this inspection. External, in-service ultrasonic gauging (integrity testing) is conducted by qualified inspectors at various intervals based on their corrosion rate and in accordance with API 653, but not exceeding 15 years. Specifically, new tanks are ultrasonically tested within 90 days after being put in service to establish baseline thickness measurements. If only minimal corrosion is noted, subsequent ultrasonic tests would be scheduled on a maximum of 15-year interval until the corrosion rate increases, at which time the interval between inspections may be shortened accordingly. An inspection schedule is maintained by the Inspection Department and updated after each inspection with the associated findings.

3.3. INTERNAL INSPECTIONS

Internal inspection and ultrasonic testing are conducted by qualified personnel at intervals based upon corrosion rates and experience with similar service histories, in accordance with API. Operators do a walk-around Inspection of the tanks once a month. Preventative maintenance on storage tanks includes maintaining the exterior paint in good condition to minimize external corrosion of shell and roof. The floor of the tanks is inspected during internal inspection.

3.4. TESTING AND MAINTENANCE – PIPELINES

Inspection and testing of pipelines at the Facility vary considerably depending on the location and service of the pipeline. The inspection and testing program focuses on those areas where the consequences of a spill would be greatest, but are designed to comply with, at a minimum, USCG, Ecology, API, and Tesoro guidelines. Because of the immediate proximity to the water, the oil pipelines that carry feedstocks and products to and from the wharf over water are given the most attention. These lines run along the 0.6 mile causeway that connects the wharf to the rest of the refinery. They are pressure tested annually. They are tested at a pressure of 1.5 times the maximum allowable working pressure. During this time, a qualified inspector observes the entire line including flanges and valves to detect any leakage. Prior to testing, all flanges and valves are encased in secondary containment in the event of a leakage.

Pipelines within the refinery fence line, including those from the tanks to the wharf system, those between the production units, etc. are within the refinery drainage system. They are subject to informal inspection every day due to general traffic through the refinery by operators, maintenance personnel, etc. Periodically, thorough external inspections are conducted and wall

thickness is measured in selected spots to detect internal corrosion. Measurements are made at the same locations over time to detect longer-term trends and plan repair and/or replacement.

Valves and flanges are integral parts of any pipeline and are inspected during observation of the surrounding pipes. Pipelines are kept painted (or coated) to help prevent external corrosion.

Nearly all pipelines carrying oil are above ground. Whenever any underground piping is exposed, it is examined and repaired if necessary. In addition, the following preventative measures to ensure pipeline integrity are performed:

- Relief valves located on over-water pipeline relieve to a closed slops system and are pressure-tested annually.
- Loading arms are hydrostatically pressure-tested on an annual basis per USCG requirements at 1.5 times the maximum allowable working pressure.
- Loading arms at the wharf are inspected and tested annually.

Cargo hoses are tested annually per USCG requirements.

3.5. TESTING AND MAINTENANCE – TRANSFER OPERATIONS

The wharf oil suction and discharge hoses are subjected to the following inspection and testing:

- All newly acquired hoses are hydrostatically pressure-tested and vacuum tested before first use.
- All hoses are hydrostatically pressure-tested and vacuum tested annually.
- All hoses and flanges are visually inspected for internal damage prior to each transfer by the wharf operator.
- All hoses are X-rayed every 3 years on both ends and near the middle.

Elongation during pressure testing is also checked and compared to replacement criteria. As an extra precaution, hoses are replaced after 12 years of service even if no defects are found during inspection.

The integrity of the wharf system is maintained by regular inspection of the pilings and braces. The planning and execution is reviewed annually. A program of wrapping wood pilings with polyvinyl chloride exists to minimize damage by marine animals.

Automatic shutdown system for the wharf is tested annually to assure that is operating properly.

3.6. TRANSFER PIPELINES

Crude oil is received through Kinder Morgan Pipeline and oil products are distributed through Olympic Pipeline. The piping on refinery property that connects storage tanks to these pipelines are inspected and maintained as described below:

3.7. TANK TRUCK LOADING

The loading area is inspected daily for leakage or spills by refinery personnel prior to initial loading. Refinery personnel will audit the loading practices of truck drivers on a monthly basis to assure that they comply with safety and spill prevention procedures. Signs at the rack instruct drivers to report any spills, leaks, or equipment failures to the appropriate refinery personnel. A remote video camera continuously monitors activity at the loading rack.

3.8. RESPONSE EQUIPMENT INSPECTION

The refinery owns a large supply of emergency response equipment including approximately 4,000 feet of spill boom and three response boats. The equipment is routinely inspected and the following items area noted:

- Inventory (item and quantity)
- Storage location
- Accessibility (time to access and respond)
- Operational status/condition
- Actual use/testing (last test date and frequency of testing)
- Shelf life (present age, expected replacement date)

Oil spill cleanup material and emergency response equipment would be inventoried and tested by the refinery two times per year.

4. OIL SPILL RESPONSE

Tesoro maintains an Oil Spill Contingency Plan (OSCP, also referred to as the Facility Response Plan or FRP) that has been approved by the USCG, USEPA, and Ecology (Tesoro 2016a). This plan is updated and approved every 5 years. The purpose of the plan is to ensure in the event of a spill, that there are established procedures to conduct a response, sufficient equipment is available, and that personnel are properly trained. In addition to the OSCP, Tesoro also maintains a Spill Prevention, Control and Countermeasures (SPCC) Plan (Tesoro 2012) which focuses on prevention preparedness and response to oil spills. Federal and WA State requirements also require an Operations Manual and control information in their operations manual (33 CFR 154.300,WAC 173-180-405-440), referred to at the refinery as the Wharf Operations Manual (Tesoro 2016b). This manual describes the facility and process for the transfer of oil or other hazardous materials to or from a marine vessel including oil handling equipment, maintenance, procedures, and operator training.

The effective management of personnel and resources during a spill event is integral to the overall success of the response effort. The refinery has developed its' oil spill response organization to be consistent with the NIMS Incident Command System, which provides the structure for effective management of spill response resources. The components of organization would be activated and mobilized in accordance with the size and complexity of the incident.

The refinery's spill response organization consists of a large workforce of trained spill response personnel organized as follows:

- Initial Response Team. This team is trained annually on initiating a response that includes making notifications and deploying refinery owned equipment.
- Marine Spill Brigade. These personnel would supplement any initial response and can deploy equipment away from the refinery.
- Incident Management Team. Approximately 50 refinery personnel are trained members of the Incident Management Team and can be called to support a response as needed.

The refinery also maintains spill response contracts with Marine Spill Response Corporation and Global Diving and Salvage. Both of these companies maintain personnel and equipment in Anacortes that are available 24 hours a day, 7 days a week and would be called out in the event of a spill. See Table 4-1 for a summary of spill response personnel.

Table 4-1: Summary of Trained Oil Spill Response Personnel

Response Team Organization	Personnel Trained each year (avg.)	Personnel On-site (avg.)
Incident Response Team	50	10-15, at all times
Marine Spill Brigade	25	Normal work hours: 15-25 After hours: callout availability
Incident Management Team	50	Normal work hours: 35-50 After hours: call-out availability

The Incident Management Team is responsible for:

- Local planning and preparation activities to enable safe and effective response actions
- Providing first and sustained response to a spill originating from the refinery

Initial deployment of equipment and personnel at the spill site would occur within 30 minutes of discovery given suitable safety conditions. During normal business hours, the local-Incident Management Team would organize immediately; during off hours, the Incident Management Team could be mobilized within one hour or less.

In order to be prepared for a potential spill, the refinery participates in the National Preparedness for Response Exercise Program. The program is designed to satisfy the exercise requirements of the USEPA and USCG. Additionally, Tesoro completes the Ecology's drill program as outlined in WAC 173-182-700 and 710. The refinery meets all applicable drill components established in the Spill Drill Evaluation Checklist in the Ecology's Publication #12-08-002/March 2012. During each triennial cycle, all 15 components of the OSCP must be exercised at least once. The 15 components are summarized in Table 4-2.

Table 4-2: Response Plan Core Components

Core Components	Description
Notifications	Test the notifications procedures identified in the Area Contingency Plan and the associated Responsible Party Response Plan.
Staff Mobilization	Demonstrate the ability to assemble the spill response organization identified in the Area Contingency Plan and the associated Responsible Party Response Plan
Ability to Operate Within the Response Management System Described in the Plan: • Unified Command • Response Management System	Demonstrate the ability of the spill response organization to work within a unified command. Demonstrate the ability of the response organization to operate within the framework of the response management system identified in their respective plans.
Discharge Control	Demonstrate the ability of the spill response organization to control and stop the discharge at the source.
Assessment	Demonstrate the ability of the response organization to provide initial assessment of the discharge and provide continuing assessments of the effectiveness of the tactical operations.
Containment	Demonstrate the ability of the spill response organization to contain the discharge at the source or in various locations for recovery operations.
Recovery	Demonstrate the ability of the spill response organization to recover the discharged product.
Protection	Demonstrate the ability of the spill response team organization to protect the environmentally and economically sensitive areas identified in the Area Contingency Plan and the respective industry response plan.
Disposal	Demonstrate the ability of the spill response organization to dispose of the recovered material and contaminated debris.
Communications	Demonstrate the ability to establish an effective communications system for the spill response organization.
Transportation	Demonstrate the ability to establish multi-mode transportation both for execution of the discharge and support functions.
Personnel	Support Demonstrate the ability to provide the necessary support of all personnel associated with response.
Equipment Maintenance and Support	Demonstrate the ability to maintain and support all equipment associated with the response.
Procurement	Demonstrate the ability to establish and effective procurement system.
Documentation	Demonstrate the ability of the spill response organization to document all operational and support aspects

The specific exercises are summarized in Table 4-3.

Table 4-3: Spill Response Exercises

Exercise Type	Exercise Characteristics
Facility Notifications	• Conducted quarterly • Refinery initiates mock spill notification to the Incident Management Team • Refinery documents time/date of notification, name and phone number of individual contacted
Equipment Deployment	• Conducted semiannually • Response contractors listed in OSCP (Tesoro 2016a) must participate in annual deployment exercise • Scheduled with Ecology at least 30 days in advance • Document exercise
GRP Deployment	• Conducted twice triennially • Response contractors listed in OSCP must participate in annual deployment exercise

Exercise Type	Exercise Characteristics
	• Document exercise
Wildlife Deployment Drill	• Conducted once triennially • Response contractors listed in OSCP must participate in annual deployment exercise • Scheduled with Ecology at least 30 days in advance • Document exercise
Incident Management Team Tabletop	• Conducted annually • Tests Incident Management Team's response activities/responsibilities • Documents plan's effectiveness • Must exercise worst-case discharge scenario once every three years • Must test all plan components at least once every three years • Must be scheduled with Ecology at least 60 days in advance, except the • Worst-case discharge scenario at least 90 days in advance • Document exercise
Unannounced	• The refinery would either participate in unannounced tabletop exercise or a refinery • Equipment deployment exercise on an annual basis, if selected
Area	• The refinery would participate in a minimum of one area exercise per six-year period
Drill Program Evaluation Procedures	• The refinery conducts post-exercise meetings to discuss positive items, areas for improvement and to develop action item checklist to be implemented later
Records of Drills	• The refinery maintains drill exercise records for five years following completion of each exercise • Records would be made available to Ecology, USEPA, USCG and other applicable agencies upon request • The refinery would verify appropriate records are kept for each spill response contractor listed in Plan as required by National Preparedness for Response Exercise Program guidelines (annual equipment deployment drill, triennial unannounced drill, etc.)

Tesoro is responsible for the initial response to a release by any marine vessel (including vessels associated with the proposed project) at their wharf and would mobilize emergency response resources. The refinery manager or another Tesoro representative would serve as the Incident Commander for the response until the representative is relieved, in the event that another party is determined to be responsible for leading the overall incident response.

A spill response along the shipping lanes or at the wharf would be coordinated using area specific Geographic Response Plans (GRPs) that guide oil spill response in Washington, Oregon, and Idaho. Each GRP is written for a specific area (for example a river, a lake, or section of Puget Sound), and includes tactical response strategies tailored to a particular shore or waterway at risk of injury from oil. GRPs have two main objectives:

- Identify sensitive natural, cultural or significant economic resources at risk of injury from oil spills.
- Describe and prioritize response strategies in an effort to reduce injury to sensitive natural, cultural, and certain economic resources at risk from oil spills.

Ecology partners with Oregon Department of Environmental Quality (OR-DEQ), the U.S. Coast Guard (USCG), and the U.S. Environmental Protection Agency (USEPA) for GRP development.

The GRP constitutes the federal and state on-scene coordinators' orders during the response to an oil spill. The plan prioritizes tactical response strategies based on locations where spills might

occur and the proximity of those locations to natural, cultural, and economic resources at risk of injury. By using this document it's hoped that immediate and proper action can be taken to reduce spilled oil's impact on sensitive resources within the planning area.

As an additional safety measure, the Washington State Pilotage Act under Revised Code of Washington (RCW 88.16.170) prevents tankers greater than 125,000 deadweight tons from entering the Puget Sound and adjacent waters beyond a line extending from Discovery Island light (near Victoria, British Columbia) south to New Dungeness light (near Port Angeles, Washington). Tankers over 40,000 gross tons must have an escort tug(s) with 5 percent horsepower ratio to that of the escorted tanker.

5. HISTORIC ENVIRONMENTAL AND SAFETY INCIDENTS

Since 2010 there has been one significant safety-related incident, as well as one environmental violation resulting in a settlement at the Tesoro Anacortes Refinery. These are briefly discussed below.

5.1. HEAT EXCHANGER EXPLOSION RESULTING IN CASUALTIES

On April 2, 2010, a heat exchanger ruptured after a maintenance restart, causing an explosion and an ensuing fire that left seven Tesoro workers fatally burned. The fire burned for more than 3 hours and resulted in a seven month shut-down of the refinery. According to a the report released by the U.S. Chemical Safety and Hazard Investigation Board (CSB), the rupture of the heat exchanger was caused by a High Temperature Hydrogen Attack, a damage mechanism that creates fissures and cracking of carbon steel equipment that has been exposed to hydrogen at high temperatures and pressures (CSB 2014). As a result of the incident, the CSB recommended that the state of Washington develop more rigorous requirements for process safety management and oversight, and for Tesoro to develop and implement a plan to meet these requirements. These requirements included, among others, improvements to the PHA (the updated program is discussed in Section 2.3), the Integrity Operating Window, and the damage mechanism hazard review programs and cross-linking among these three programs. The goal of the improvements, including cross-linking between programs, was to ensure all identified hazards are effectively managed (CSB 2014).

5.2. CLEAN AIR ACT VIOLATION AND SETTLEMENT

On September 28, 2016, the USEPA entered a settlement agreement with Tesoro for Clean Air Act (CAA) violations at several of its facilities across the country. The Anacortes refinery was required under the settlement to complete a third-party audit of its benzene-containing waste streams and correct issues identified.

6. REFERENCES

CSB (U.S. Chemical Safety and Hazard Investigation Board). 2014. *Investigation Report: Catastrophic Rupture of Heat Exchanger (Seven Fatalities).* Report 2010-08-I-WA. Anacortes, WA: Tesoro Anacortes Refinery. Accessed: December 2016. Retrieved from: http://www.csb.gov/assets/1/7/Tesoro_Anacortes_2014-May-01.pdf

Tesoro (Tesoro Refining & Marketing Company LLC). 2004. *Anacortes Refinery Wastewater Pollution Prevention Plan*. Tesoro Refining and Marketing Company. October 25, 2004.

_____. 2012. *Anacortes Refinery Spill Prevention Control and Countermeasure Plan*. July 27, 2012.

_____. 2016a. *Oil Spill Contingency Plan, Revision 10*. February 2016. First approved July 10, 2013.

_____. 2016b. *Zone C Wharf Operator Training Manual* (W*harf Operations Manual*). March 2, 2016.

Page Intentionally Left Blank