Attachment B

POST-CLOSURE PART B PERMIT APPLICATION

Effective: _____, 2017

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Acronyms and Abbreviations

~	approximately
ADEC	Alaska Department of Environmental Conservation
AOC	area of concern
API	American Petroleum Institute
BTEX	benzene, toluene, ethylbenzene, xylenes
CAPP	corrective action program plan
CFR	Code of Federal Regulations
CPI	coalescing plate interceptor
DAF	dissolved air flotation
EP	extraction procedure
EPA	U.S. Environmental Protection Agency
LPG	liquid petroleum gas
NPDES	national pollutant discharge elimination system
OWSS	oily water sewer system
RCRA	Resource Conservation and Recovery Act
SPCC	spill prevention, control, and countermeasure
SWMU	solid waste management unit
Tesoro	Tesoro Alaska Company LLC
TSDF	treatment, storage, and disposal facility
Trihydro	Trihydro Corporation
UTAMP	Unocal Tesoro Ambient Monitoring Program

B-1.0 ORGANIZATION OF PART B APPLICATION

This Part B application for a post-closure RCRA Permit is organized following the requirements of 40 CFR §270.28 (Part B information requirements for post-closure permits). An effort has been made to avoid duplicating information specifically required for the Part B application inn §270.28 that is also contained in the surface impoundment Post-Closure Plan in Section B-7.0. Information that applies to the Tesoro refinery in general is explained under the §270.28 condition, and information that applies solely to the surface impoundments is contained in the post-closure care plan in Section B-7.0.

B-2.0 GENERAL DESCRIPTION OF REFINERY, REGULATED UNITS, SWMU, AND AREAS OF CONCERN (40 CFR §270.14(B)(1))

B-2.1 TESORO ALASKA KENAI REFINERY

B-2.1.1 Facility Owner and Operator

Owner: Tesoro Alaska Company LLC (Tesoro)
Address: 54741 Tesoro Road
Kenai, Alaska 99611
Telephone: (907) 776-8191

Operator: Tesoro Alaska Company
Address: 54741 Tesoro Road
Kenai, Alaska 99611
Telephone: (907) 776-8191

EPA/State of Alaska Identifier: AKD 04867 9682

B-2.1.2 Facility Location, Surface Water Drainage, and Climate

The Tesoro Alaska refinery is located in the northwest portion of the Kenai Peninsula eleven miles north of the City of Kenai, on the east side of the Kenai Spur Highway, approximately one mile inland from Cook Inlet (Figure B-1). The refinery's physical address is 54741 Tesoro Road, Kenai Peninsula Borough, Kenai, Alaska. The facility latitude and longitude at the refinery Administration Building are: 60° 41' 12" N and 151° 22' 3" W (1927 North American Datum), respectively and the site is located in Section 22, T7N, R12W, Seward Meridian.

The refinery is in an area of gently rolling hills on the eastern shore of southern Alaska's Cook Inlet. Surface elevations range from 150 feet above mean sea level on the northeast portion of the facility to about 85 feet above mean sea level on the southwest. The area is forested and contains numerous small lakes and wetlands.

There is no significant drainage pattern on the Tesoro property. Precipitation falls onto either secondary containment diked areas or non-diked areas of the refinery. Secondary containment dikes surround both crude oil and refined products bulk storage tanks. The dikes are between ten and 12 feet high and composed of compacted soils covered with gravel. The dikes are designed to contain at least 110% of the volume of the largest tank within the enclosure. The secondary containment portion of the tank farm is lined with a native soil/bentonite clay mixture. Precipitation from these areas is periodically allowed to flow to infiltration galleries during daylight hours and under constant supervision by an operator.

Precipitation that falls outside of the diked areas of the refinery drains to either paved or unpaved surfaces. Grading, curbs, and storm sewers to the oily water sewer system (OWSS) direct the precipitation that falls onto the paved surfaces. The precipitation that falls onto the unpaved surfaces of the refinery and outside of tank secondary containment either percolates into the soil or runs off through incipient drainage.

Considering the very porous nature of the glacial outwash soils, the vegetative cover, the relatively low topographic relief, and the lack of well-developed natural drainage systems in the area, it is unlikely that a

significant amount of precipitation from snowmelt and rain leaves the site as surface runoff. Anderson and Jones[1] describe the soils in the vicinity as having good infiltration capacity.

Should surface runoff occur at the site, runoff would be controlled by natural and artificial grading and the poorly developed incipient on-site drainage system. The majority of the refinery grades to the west towards two small, closed-basin, boggy areas to the southwest and west of the refinery. These water bodies are representative of the immature, poorly developed drainage system characterizing much of the Kenai Lowlands. The boggy areas are perched above less permeable peat, silts, and clays and do not drain by surface water runoff. Discharge from the boggy areas occurs either laterally into permeable soils or downward through less permeable peats and silts. The Kenai Spur Road was constructed above natural grade west of the boggy areas and also blocks any further off-site westward drainage.

An exception to the refinery's general western grade occurs in the area of the closed surface impoundments. Most of the possible runoff in the surface impoundment area is controlled by the predominant western grade of the refinery. Some runoff, should runoff ever occur, could flow to the east via a poorly developed system of incipient drainage, and some could flow to topographically closed basins east and southeast of the surface impoundments.

The coastal areas along the Kenai Peninsula are influenced by a transitional sub-arctic climate characterized by cool, dry summers and wet, cold winters. Average temperatures are about 20° F in January and 55° F in August. Typical diurnal precipitation range is approximately 18.8 inches, with the majority of the rainfall occurring during winter and spring months. During much of the year, the ground is frozen. Precipitation during the winter months is stored as snow and is not available for lake, stream or aquifer recharge until spring.

B-2.1.3 Refinery Production Processes

The refinery began operation at the site in 1969. The facility covers an area of approximately 350 acres and has the capacity to process crude petroleum at a rate of 72,000 barrels per day. Primary products of the refinery include gasoline and diesel fuels, jet fuels, residual heating oil, sulfur, asphalt (seasonal) and liquefied petroleum gas (LPG). Crude oil feedstock for the refinery is received via pipeline and from a tanker receiving dock in Cook Inlet. Most of the refinery commercial products are for consumption in Alaska.

Crude oil stored in bulk storage tanks is pumped to a crude oil surge tank and then to the Crude Unit where it is heated and desalted using wash water (Figure B-3). The wash water removes salt from the crude oil and is separated from the oil in the desalter vessels. This separated water is then discharged to the OWSS. The desalted crude is heated and flashed into the crude distillation tower, where it is separated into fuel gas, propane, butane, light and heavy naphtha fractions that will be further processed into gasoline blending components, Jet-A fuel, #2 diesel fuels, atmospheric light gas oils and atmospheric residual crude oil. . The atmospheric residual crude oil fraction is fed to the vacuum unit where it is converted to light vacuum gas oil, heavy vacuum gas oil, fuel gas, and vacuum bottoms. Gas oil from the crude unit and light vacuum gas oil from the vacuum unit is fed to the hydrocracker where heavy straight chain hydrocarbons are broken into smaller straight chain molecules (light and heavy hydrocracked naphtha fractions that will be further processed into

[1] Anderson, G.S, and Jones, S.H., 1972, Water Resources of the Kenai – Soldotna Area, Alaska: U.S. Geological Survey Open File Report, No. 81.

gasoline blending components, diesel, Jet A and LPG products). The heavy straight run naphtha fraction from the crude unit and heavy hydrocracked naphtha from the hydrocracker unit are fed to the reformer unit. In the reformer, a catalytic process is used to produce a high-octane fuel to be used as a gasoline blending component as well as fuel gas, propane-butane mixture, and hydrogen.

Light straight run naphtha from the crude unit is piped to the isomerization unit, where in the presence of hydrogen, heat, and catalyst, higher octane isomers, a higher octane blending component of the same compound, are produced. The isomerate product is used to make unleaded and super-unleaded gasoline.

Light hydrocracked naphtha from the hydrocracker unit is used as a gasoline blending component. The vacuum tower bottom product is either sold as asphalt or blended with a lower viscosity product for use as marine fuel oil.

Refinery fuel gas produced from the crude unit, naptha reformer unit and hydrocracking unit is treated to remove hydrogen sulfide and mixed with natural gas to fire heaters and boilers in the refinery co-generation complex.

The hydrogen plant converts natural gas in the presence of heat and a catalyst into hydrogen and carbon monoxide. The hydrogen is used as a feed stream to the hydrocracker and other units. The carbon monoxide is separated and used as fuel for the hydrogen heater.

The sulfur plant converts hydrogen sulfide gas removed from the process and product streams to 99.5 percent elemental sulfur.

B-2.1.4 Refinery Waste Generation Processes

Crude unit desalters separate oil and water by an electrically enhanced gravitation settling process. Two waste streams result from this procedure: salty water and sludge. Sludge from the desalter vessels is removed and transported from the refinery for treatment and disposal in a licensed off-site facility. The dewatered crude is piped to main distillation units for refining. The salty water, containing low concentrations of oil, is piped to the API separator via the OWSS.

Salt deposition in the Hydrocracker Unit is prevented by injection of a wash water stream. This stream is stripped of any absorbed hydrogen sulfide and ammonia in the Sour Water Stripping Unit and sent to the Sulfur Recovery Unit for further processing. The stream stripped water is sent to the OWSS for further processing.

A wastewater treatment system receives process wastewaters from throughout the facility as well as storm water that falls in process areas. The refinery wastewater stream may contain emulsified, free, and dissolved oil. Wastewater is initially routed to a covered oil-water separator (API separator), which is a chamber designed to slow wastewater flow so oil, water, and heavier material will separate by density. In this manner, globules of free oil will rise to the water surface to be removed by skimming or other mechanical means and returned to the refining process. Settable solids (sludges) from the API separator are periodically collected and removed. API separator sludges are a listed hazardous waste (K051) per 40 CFR §261.32. Sludges removed from the

separator are stored in drums and transported off-site to an EPA permitted treatment, storage, and disposal facility (TSDF), managed according to 40 CFR §262.

Wastewater from the API separator enters the coalescing plate interceptor (CPI). The CPI provides another step for removing oil by routing water through a series of baffle plates that collect suspended oil droplets that rise through the coalescing plates and are pushed by the water flow toward an oil skimming sump. Sludge generated from the CPI is listed hazardous waste (F038) per 40 CFR §261.31. Sludges are removed on an as-needed basis, stored in drums, and transported off-site to a permitted TSDF.

Wastewater from the CPI enters the dissolved air floatation (DAF) tank. Before entering the DAF tank, flow is equalized and the wastewater is aggressively aerated. The DAF system acts to further separate oil and water fractions by introducing air into the wastewater and emulsifying the oil fraction. Emulsified oil is lighter than the water and forms floats. The float oils are periodically skimmed from the tank and piped to the crude unit for refining.

Settled solids and sludges that might be collected from intermediate tanks or units associated with the gravitational separation systems (e.g., in-line surge tanks, traps, sewers or sumps) are a listed hazardous waste (F037) per 40 CFR §261.31. Settled solids and sludges collected from physical or chemical separation, including the DAF tank outfall sump, are considered a listed hazardous waste (F038) per 40 CFR §261.31. Sludges such as F037 and F038 are not stored at the refinery for greater than 90 days and are managed in accordance with 40 CFR §262.

Waste water effluent from the API-CPI-DAF system is piped to an equilibration tank, then routed to a rotating biological contactor, and finally to additional aeration/settling ponds before being discharged through the refinery's NPDES discharge point.

Heat exchanger bundle cleaning liquids are discharged to the refinery oil recovery sewer prior to the API separator. Heat exchanger bundle solids generated during intermittent maintenance are collected and managed as hazardous wastes (K050) per 40 CFR §261.32. Heat exchanger cleaning solids are generated on an occasional basis by the refinery, usually every two years. They are not kept on-site for greater than 90 days, and are managed in accordance with 40 CFR §262.

Spent hydrotreating catalysts from petroleum refining operations are listed hazardous waste (K171) per 40 CFR §26.132. These spent catalysts are generated on an occasional basis by the refinery and not kept on-site for greater than 90 days and are managed in accordance with 40 CFR §262.

Oil storage tanks reduce product flow and also allow for gravity separation of settable material. Crude oil storage tank sediments from petroleum refining operations are listed hazardous waste (K169) per 40 CFR §261.32. These tank sediments are generated on an occasional basis by the refinery and not kept on-site for greater than 90 days.

Miscellaneous characteristic hazardous wastes are also routinely generated at the refinery. Examples include incidental clean-up wastes from *de-minimis* spills, reactive sulfide containing inorganic wastes from refinery

cracking, solids from non-leaded fuel storage tanks, spent sandblasting beads, and spent filter clay absorbent. Examples of typical characteristic hazardous waste generated at the facility and their associated waste codes are presented in Table B-1.

B-2.2 CLOSED SURFACE IMPOUNDMENTS (SI) REGULATED UNITS

B-2.2.1 Description of Surface Impoundments

The location of three surface impoundments that were formerly used at the Tesoro Alaska refinery are shown on Figure B-2. Each impoundment was constructed by excavating native site materials (predominantly sand and gravels) below grade. Tesoro stopped using the impoundments for waste disposal in 1980. Each of the surface impoundment pits have been closed in accordance with 40 CFR §265 subparts G (Closure and Post Closure) and K (Surface Impoundments). The following paragraphs provide brief descriptions of the three surface impoundments, designated as Pits 1, 2, and 3.

Pit 1 was originally constructed in the mid-1970s. The wastes in the pit were removed and the pit was closed in September 1981. Pit 1 was circular in outline with a diameter of approximately 80 feet and a depth ranging from 8 to 12 feet. Assuming a depth of 12 feet and side slopes approaching 1:1, the maximum capacity of the pit was approximately 1,630 cubic yards (cy). Approximately 400 barrels (16,800 gallons) of liquid or semi-liquid and 720 cy of sludge and underlying soil were removed from the pit in 1981. The sludge and soil were solidified and placed in Pit 2 as part of closure activities. Pit 1 was then backfilled with clean local fill material (sand and gravel).

Pit 2 was originally constructed in the mid-1970s and is the only surface impoundment at the Tesoro Alaska refinery that contains treated hazardous waste. The pit is approximately 12 feet deep with surface dimensions of 100 feet by 125 feet. With 2:1 side slopes, the maximum capacity of the impoundment is approximately 3,500 cy. Pit 2 contained approximately 1,500 cy of waste. Pit 2 also received 720 cy of waste material from Pit 1 and approximately 350 cy of waste material from Pit 3. The amount of stabilized, treated waste in Pit 2 after closure is approximately 3,000 cy (the solidification procedure created an approximate 10% increase in waste volume).

Pit 3 was originally constructed in 1979. The wastes placed in Pit 3 were removed and the pit was closed in September 1981. It had surface dimensions of approximately 340 feet by 30 feet and a depth ranging from 10 to 12 feet. The pit had a maximum capacity of approximately 1,800 cy (assuming side slopes of 2:1), however, less than 50 cy of waste were placed in Pit 3 during the active life of the impoundment. This waste, along with approximately one foot of underlying soil, totaled approximately 350 cy and was treated and disposed in Pit 2.

B-2.2.2 Description of Impoundment Wastes

The impoundments were primarily used for the disposal of API separator sludges, tank bottoms and miscellaneous oily wastes from the refinery. Some drilling mud remnants mixed with crude oil were also placed in the surface impoundments.

Representative bulk samples of sludge were obtained in 1980 from various process points within the refinery, including a sample from the crude petroleum storage tank, the API separator, and four samples from

impoundment Pit 2. The objective of the sampling was to characterize the wastes in the impoundments. Samples were analyzed for volatile organic compounds; base, neutral, and acid extractable organics; and 13 metals. Results of these analyses are presented in Table B-2.

In addition to the 1980 sampling, a sludge sample was obtained from Pit 2 in 1984 and submitted for extraction procedure (EP) toxicity testing and analysis of RCRA metals and ignitability. The results of analyses of these samples are presented in Table B-3.

The Phase I RCRA regulations that identified and listed various hazardous wastes were promulgated in May 1980. Prior to this time, oily wastes generated at the refinery were not necessarily differentiated or categorized under EPA listed and characteristic waste definitions. At the time wastes were disposed in the surface impoundments, the applicable listed waste types specified in 40 CFR 261.30 for the impoundments were API separator sludge (K051) and leaded tank bottoms (K052). These are the only waste types defined in the refinery records. Since 1980, additional listed and characteristic waste types have been added to 40 CFR 261.20 and 261.30. Other wastes that may have been placed in the impoundments that are now listed hazardous waste include: slope oil emulsion solids (K049), heat exchanger bundle solids (K050), primary oil/water/solids separation sludge (F037), secondary (emulsified) oil/water/solids separation sludge (F038), and crude oil storage tank sediments (K169).

B-2.3 SOLID WASTE MANAGEMENT UNITS (SWMUS)

B-2.3.1 Oily Water Sewer System (OWSS) SWMU

The oily water sewer system (OWSS), installed when the refinery was originally built, conveys waste hydrocarbon materials and wastewater generated in the refinery process units, bulk storage tanks, and laboratory through a network of underground steel pipes to the API separator (Figure B-4). The system includes a series of seal boxes that provide flow control and lift stations that pump the wastewater through the piping. The original seal boxes had flush-grade entries and below-grade chambers. The below-grade chambers were constructed of three pre-cast concrete sections grouted together, and the wastewater inlet and outlet pipes were also grouted into the chamber.

Inspections conducted during the spring of 1987 identified leaks around the inlet and outlet pipes and between the grouted sections of eleven seal box chambers. All of the seal boxes, except seal box 7-11 and those in the process units, were replaced between August and October 1987 with 0.50-inch thick steel chambers. The inflow and outflow pipe connections were welded into the new steel seal boxes. The new seal boxes were coated to prevent corrosion on the inside and outside using epoxies. The seal boxes located under the refinery process units could not be excavated or replaced. These seal boxes and seal box 7-11 were rebuilt by grouting and coating the inside with a sealant.

The OWSS leaks are believed to be the majority source of a groundwater plume underlying the western part of the refinery and extending onto properties west of the refinery. This plume is described in additional detail in the Permit Application Attachment D (*2017 Corrective Action Program Plan)*.

B-2.3.2 Pipeline Valve Control Box SWMU

The pipeline control valve box is located in the southwestern portion of the refinery (Figure B-4) and is used to control product delivery to the ConocoPhillips and Kenai Pipeline loading docks and the Nikiski Terminal.

The valve box was investigated during the 1991 RCRA Facility Investigation[2] and the 1992 Supplemental RFI[3] and one soil sample was collected during modifications to the valve box in 2005. A description of the spill area and the results of these investigations are summarized in a report submitted to EPA[4] and ADEC[5]. The investigations show that the only contaminant of concern is diesel-range organics (DRO) which is only regulated by ADEC.

B-2.4 AREAS OF CONCERN

B-2.4.1 Tank 40 Spill Area

The Tank 40 spill (Figure B-4) occurred on September 14, 1988 when a line valve was inadvertently left open during a fuel transfer between Tank 42 and Tank 94 (Tank 40 is tied into the transfer line connecting Tank 42 and Tank 94)[6]. An estimated 6,700 gallons of JP-4 fuel were released into a 2,400 square-foot area in the diked area surrounding Tank 40 (Figure B-5). Tesoro excavated ~1,500 cy of soil from the spill area (up to depths of 14 feet) but was not able to completely remove all of the contaminated soil without jeopardizing the structural integrity of Tank 40 and associated pipelines. Three borings drilled to assess the vertical extent of contamination found that soil contamination extends below the excavation zone to the water table (~45 feet below ground level). An estimated 2,800 cy of potentially contaminated soil remain in place. The Tank 40 secondary containment floor and dike walls are now lined with a low-permeability grout-soil mixture.

B-2.4.2 Tank 04A Spill Area

The Tank 04A spill (Figure B-4) occurred on May 31, 1990 when recovered oils from the dissolved air flotation (DAF) and API systems overflowed the tank[7]. The spill spread over a surface of ~1,040 square feet. Tesoro recovered ~135 barrels of the spilled oil using a vacuum truck and excavated the upper two to three feet of gravel fill in the spill area (~100 cy). Tesoro was not able to completely remove all of the contaminated soil without jeopardizing the integrity of the storage tanks and pipelines. Two soil borings, seven monitoring wells, and one gas detection tube were drilled in the area to assess the vertical and horizontal extents of contamination, and an in-situ biotreatment system was operated for a short period of time. Analytical results from the investigation show that both petroleum hydrocarbons and chlorinated solvents are present in the soil and extend to the water table. An estimated 2,300 cy of potentially contaminated soil remain in place. The Tank 04A secondary containment floor and dike walls are now lined with a low-permeability grout-soil mixture.

[2] Environmental Strategies Corporation (ESC), 1991, *RCRA Facility Investigation*, prepared for Tesoro Alaska Petroleum Company, Draft Report, November 5, 1991.
[3] Dames & Moore, 1992, *Supplemental RCRA Facility Investigation Report*, prepared for Tesoro Alaska Petroleum Company, 1992.
[4] Kent & Sullivan, Inc., 2005, *Re-Evaluation of Pipeline Valve Control Box Solid Waste Management Unit (SWMU)*, prepared for Tesoro Alaska Petroleum Company, December 9, 2005.
[5] Kent & Sullivan, Inc., 2006, *Re-Evaluatio of the Pipeline Valve Control Box*, prepared for Tesoro Alaska Company, April 27, 2006.
[6] Dames & Moore, 1992, *Supplemental RCRA Facility Investigation Report 1992*, submitted to Tesoro Alaska Company.
[7] Dames & Moore, 1992, *Supplemental RCRA Facility Investigation Report 1992*, submitted to Tesoro Alaska Company.

B-3.0 SECURITY PROCEDURES AND EQUIPMENT REQUIRED BY §264.14 (40 CFR §270.14(B)(4))

Refinery security measures are detailed in a controlled document with restricted publication for security purposes. Tesoro employs security measures to protect refinery personnel and assets and to prevent entry by unauthorized personnel to the refinery, including the closed surface impoundments. The refinery uses the five primary security systems listed below.

- **Fencing**. A six-foot chain link fence topped with strands of barbed wire surrounds the refinery's entire process and storage tank area. Gates other than the main gate are secured with locks when not in use and continuously staffed when open.

- **Security guards**. Security guards attend the main entrance and patrol the refinery 24 hours a day, seven days a week.

- **Surveillance cameras**. Tesoro personnel monitor surveillance cameras 24 hours a day, seven days a week. The cameras are remote-controlled and oversee the entire plant area.

- **Electronic gate access**. Tesoro uses an electronic access control system inside the security-manned main gate to restrict access to the refinery and to track vehicles and personnel that enter.

- **Warning signs**. Signs are posted at each fence gate and at other locations with the warning "RESTRICTED AREA – NO ADMITTANCE WITHOUT AUTHORIZATION – MAY RESULT IN DISIPLINARY ACTION". The signs are legible from a distance of 25 feet and are visible from all angles of approach.

B-4.0 GENERAL INSPECTION SCHEDULE REQUIRED BY §264.15() (40 CFR §270.14(B)(5))

The inspection schedule for the closed surface impoundments is included in the post-closure care plan described under Section B-7.0.

B-5.0 JUSTIFICATION FOR A WAIVER FROM THE PREPAREDNESS AND PREVENTION REQUIREMENTS OF §264 SUBPART C (40 CFR §270.14(B)(6))

Tesoro does not request a waiver. Tesoro maintains two documents that include the §264 requirements, including the *Tesoro Refinery RCRA Contingency Plan* (maintained by the refinery's Health, Safety and Environmental Department) and the *Tesoro Refinery Oil Spill Prevention, Control, and Countermeasure (SPCC) Plan* (maintained by the refinery's Contingency Planning personnel). These documents are available to EPA for review upon request.

B-6.0 FACILITY LOCATION INFORMATION (40 CFR §270.14(B)(11))

B-6.1 REFINERY ELECTION DISTRICT

The Tesoro refinery is located in the Kenai Peninsula Borough election district.

B-6.2 APPLICABILITY OF SEISMIC STANDARDS

The seismic standards do not apply to the Tesoro refinery because it is not a new facility, although the Kenai Peninsula Borough (formerly Kenai-Cook Inlet) election district is listed in Appendix VI of Part §264.

B-6.3 100-YEAR FLOODPLAIN LOCATION

Figure B-5 shows The Tesoro Alaska refinery and the 100-year floodplain area as defined by the National Flood Insurance Program on the Insurance Rate Map for the Kenai Peninsula.

A Flood Insurance Rate Map for the eastern portion of the refinery has yet to be constructed. However, it appears that the criteria used to define the 100-year floodplain area can be extrapolated east of the unmapped area.

The 100-year floodplain surrounding Bernice Lake (north of the refinery) occurs approximately 20 feet in elevation above the lake surface which corresponds to an elevation of ~114 feet. This level appears to be consistently used for flood hazard evaluations for lakes throughout the mapped area.

The eastern Tesoro property boundary bisects a small, un-named lake (Figure B-2). The area enclosed by the 114-elevation contour includes land within the refinery property boundary, but this area is east and topographically lower than the refinery and the closed surface impoundments. An above-grade road separates the area enclosed by the contour (inferred 100-year floodplain) from the eastern portion of the refinery. Figure B-2 shows both the mapped 100-year floodplain and the inferred 100-year floodplain. Appendix B-1 contains a letter from the U.S. Army Engineer, Anchorage Office Flood Plan Management Service corroborating the inferred 100-year flood plain.

B-6.4 APPLICABILITY OF FLOODPLAIN STANDARDS

The 100-year floodplain standards do not apply because the refinery plant and regulated units are outside the 100-year floodplain.

B-7.0 CLOSURE AND POST-CLOSURE PLAN REQUIRED BY §264.112 AND §264.118 (40 CFR §270.14(B)(13))

B-7.1 SURFACE IMPOUNDMENT CLOSURE PLAN

The surface impoundment closure plan was submitted to EPA in February 1988[8] and approved by EPA on March 22, 1989. Appendix B-2 contains a copy of EPA's approval letter.

B-7.2 SURFACE IMPOUNDMENT POST-CLOSURE CARE PLAN

This Surface Impoundment Post-Closure Care Plan (Post-Closure Plan) identifies the activities that will be conducted to ensure the integrity and security of the closed surface impoundments. Post-closure care for the surface impoundments began immediately after Tesoro received closure approval from the EPA Region 10 office. Regulations require that post-closure care of the facility be continued for 30 years after the date of closure (October 24, 1989) or for the period specified by the EPA Regional Administrator. Post-closure care consists of maintenance, monitoring, inspections and record-keeping. A copy of the approved Post-Closure Plan, and any subsequent revisions, will be kept at the refinery until the post-closure period is complete.

B-7.2.1 Post-Closure Use of Impoundment Sites

There are no plans to use the closed impoundments. The peripheral area is available for refinery expansion, but post-closure use of the closed surface impoundments area is restricted by the following conditions:

> The integrity of each cap and final cover (containment system, including cap and drainage) must not be disturbed in any manner; and the function of the monitoring system (groundwater wells) must not be hindered. The Regional Administrator may require continuation of security measures beyond the post-closure care period if hazardous wastes remain exposed or access by the public or domestic livestock pose a hazard to human health.

B-7.2.2 Post-Closure Inspections

The post-closure inspections for the surface impoundments began immediately after Tesoro received closure approval from the EPA Region 10 office. The period of post-closure care (as specified in 40 CFR §265.117(a) began on October 24, 1989 as specified by EPA, Region 10 and the Alaska Department of Environmental Conservation[9] (ADEC). For the purpose of this inspection plan, the post-closure period is 30 years from date of Closure and extended 30 years from the initial post-closure period. Inspections are conducted weekly and are documented by means of a standardized inspection log (Table B-4). The inspection and monitoring frequency is presented in Table B-5.

B-7.2.2.1 Erosion, Subsidence and Vegetative Cover Inspections

The majority of the routine inspection activities for the closed surface impoundments are directed at maintaining the integrity of the impoundment cover. The closed surface impoundments will be inspected for subsidence, erosion, frost heaving, and shrubs, bushes, and herbaceous vegetation other than the established

[8] Radian Corporation, 1988, *Closure/Post-Closure Plan for Surface Impoundments at the Tesoro Alaska Kenai Refinery,* submitted to Tesoro Petroleum Corporation, February 1988.
[9] ADEC no longer administers the RCRA program.

vegetative cover. Repair activities will be documented in the inspection logs and transferred to the facility operating record.

B-7.2.2.2 Monitoring Well Inspections

Groundwater monitoring wells surrounding the closed surface impoundments will be inspected whenever they are gauged or sampled. Inspections will be performed to ensure that:

- Wells are locked if outside the secured areas of the facility
- The protective casings or surface pads are free of significant damage
- Identification markings, labels, or tags are legible
- The well casings are not cracked
- The well aprons, if present, are structurally sound and not in need of repair
- The earth or cement surrounding the wells is adequately sloped away from the protective casings to accommodate drainage.

Potential problems with well integrity will be discovered when the well is sampled. If the well casing has slipped or an obstruction has lodged in the well, the sampler will not be able to fully drop the bailer or pump into the screened interval. Marked increases in purge water turbidity also may signal problems with the well integrity.

B-7.2.3 Post-Closure Maintenance and Corrective Measures

B-7.2.3.1 Surface Impoundment Cap Maintenance

Vegetative Cover. The grass cover will be maintained by regular mowing, watering and fertilizing. Herbaceous vegetation such as shrubs, bushes, and trees will be removed to prevent roots from puncturing the underlying liner. Tesoro will reseed bare areas if necessary using standard lawn maintenance techniques. Tesoro will not use herbicides or pesticides to facilitate grass growth.

Erosion Damage. The surface impoundment caps will be routinely inspected for erosion. Erosion damage will be repaired as soon as practicable by appropriate means such as re-grading or filling with clean soil. Persistent erosion pathways will be evaluated for permanent engineering controls. However, significant erosion has not been observed during the past 25 years of impoundment post-closure care, and is not anticipated due to low annual precipitation, low surface gradients, and a well-established grass cover.

Surface water drainage will follow the path of sloped cap surfaces. No underground pipes or lined ditches are used for draining the closed surface impoundments. Therefore, regular maintenance and inspection of the vegetative cover will ensure that the drainage paths are not obstructed.

Subsidence, Settlement, and Displacement. A vegetative cover and a double liner cap are set over the solidified wastes. No maintenance is required for the impoundment cap liners. Solidified waste in the impoundment has a compressive strength greater than 50 pounds per square inch. Any minor settlement and subsidence will be corrected in the same manner as any damage resulting from erosion. Repair activities will be documented in the inspection logs and the facility operating record.

B-7.2.3.2 Surveyed Benchmark Maintenance

Tesoro uses three surveyed benchmarks and four aluminum cap benchmarks for surveying in the surface impoundment area. These benchmarks are maintained annually by clearing vegetation and inspecting for cap marking legibility. The benchmarks are part of a refinery-wide benchmark system and are used for all construction and leveling jobs and other projects requiring exact elevations and locations. For this reason, the benchmark system and any problems with cap legibility or benchmark foundations would be readily apparent. Tesoro contracts with a licensed surveying and engineering firm for all surveying. This firm would be contacted to replace benchmarks and/or return them to proper elevation and location should the need ever arise.

B-7.2.3.3 Monitoring Well Maintenance

Monitoring wells are maintained and sampled in the vicinity of the closed surface impoundments as required to evaluate the integrity of the closed surface impoundments and monitor the progress of corrective action. The corrective action program is detailed in the RCRA Post-Closure Permit Application Attachment D, and the sampling and analysis program is described in the RCRA Post-Closure Permit Application Attachment C.

Monitoring well problems discovered during inspections or sampling events will be addressed in a timely manner. If well identification markings, labels or tags are illegible, such markings will be replaced upon discovery. If a well outside security fencing is found to be unlocked or the lock is in poor condition, a replacement lock will be installed upon discovery. If the well apron (if present) is significantly cracked, repairs will be initiated and completed prior to the next sampling or measurement event. More substantial repairs (e.g., replacing well casings, dislodging obstruction in the well, or re-drilling the well) will be initiated within two weeks after discovery. Such substantial repairs are subject to contractor availability and weather conditions in Alaska.

Replacement wells will be constructed within approximately five feet of the original well. The unusable well will be abandoned by removing the protective casing and pad, pulling or cutting the PVC casing several inches below the ground level, and plugging the well from the bottom to top with bentonite grout. A professional geologist will supervise construction of the new well and abandoning the old. The replacement well will be re-surveyed to accuracies of 0.01-foot elevation and within 1 foot of true north and east coordinates.

B-7.2.4 Security System Maintenance and Corrective Measures

The closed surface impoundments are within the fenced area of the refinery. The chain link and barbed wire fence surrounding the Tesoro refinery will be maintained throughout the life of the refinery and the closed surface impoundment inspection period.

If fencing is found to be damaged or otherwise inadequate to prevent the entry of unauthorized personnel, repairs or replacements of the damaged area will be performed upon discovery. If such repairs or replacements cannot be quickly performed, interim steps to prevent unauthorized entries, such as temporary repairs or the use of temporary fencing, will be taken. Fencing that has sustained minor damage (i.e., corrosion damage or other damage that does not affect the ability of the fencing to prevent unauthorized entry of personnel) will be repaired or replaced before damage progresses.

B-7.2.5 Record Keeping

Inspection logs will be maintained for the surface impoundment system. The inspection log documents each inspection and acts as a case history for a particular item. Records of inspections are kept at the Tesoro refinery for at least three years from the date of inspection.

B-7.2.6 Inspector Training and Qualifications

Any person conducting work pursuant to this Permit who will encounter, or has the reasonable potential to encounter, hazardous waste is required to be trained in accordance with the Occupational Safety and Health Administration (OSHA) requirements contained in 29 CFR 1910.120 (HAZWOPER) and to receive eight hours of refresher training annually. Tesoro's Environmental and Health &Safety Department monitors employee training records to ensure that employees have been appropriately trained to perform their assigned duties and functions in a safe manner so as not to endanger themselves or other employees.

B-7.2.7 Post-Closure Plan Amendments

Written requests to amend the Post-Closure Plan may be submitted at any time during the post-closure care period. The Regional Administrator must authorize requests for changes in operating plans or design to the closed surface impoundments, and requests must be in accordance to 40 CFR §124 and §270. Such requests for modification of the Post-Closure Plan will be made at least 60 days prior to implementing the changes or no later than 60 days after an unexpected event has occurred which affects the Post-Closure Plan.

B-8.0 NOTICES AND DOCUMENTATION (40 CFR 270.14(B)(14))

B-8.1 RECORDS TO LOCAL LAND USE AUTHORITY

Appendix B-3 contains copies of the following legal notices and submittals:

1. Notification of the type, quantity, and locations of hazardous waste disposed at the Tesoro Refinery. These notices were sent to the local land use authority and the EPA Regional Administrator (see Survey of Record and Engineering Drawing and cover letter to the Kenai Peninsula Planning Director dated October 17, 1989 and to EPA Regional 10, dated October 20, 1989) per 40 CFR 264.119(a).

2. Record on the property deed that notifies, in perpetuity, that the land has been used for hazardous waste management and its use is restricted (see copy of deed restrictions dated October 18, 1989) per CFR 264.119(b)(1)(i) and (ii).

3. Survey plat and record of the type, quantity and location of hazardous waste (see Survey of Record and Engineering Drawing) filed with the local land use authority and the EPA Regional Administrator per 40 CFR 119(b)(1)(iii).

4. A certification letter signed within 60 days of closure from the operator to the Regional Administrator that the notifications specified above have been placed (see October 20, 1989 letter from Tesoro to EPA Region 10) per 40 CFR 264.119(b)(2).

B-8.2 CERTIFICATION OF COMPLETION OF POST-CLOSURE CARE

No later than 60 days after the completion of the post-closure care period, Tesoro will submit certification to EPA Region 10 that activities performed during the post-closure period were in accordance with the approved Post-Closure Plan in Section B-7.2 above (40 CFR §264.120). Tesoro and an independent registered professional engineer will sign the certification. The independent registered professional engineer will inspect the closed impoundments twice during the last two years of the post-closure care period. The registered independent professional engineer will visually assess the closed impoundments for settling, any erosive drainage patterns, and sustaining vegetative cover. Should, in the judgment of the professional engineer, re-surveying of the impoundments be needed to verify that settling or subsidence of the cap has not occurred, the professional engineer will perform a survey. The registered independent professional engineer will also review the maintenance and inspection records of the impoundments prior to the final inspection. Documentation supporting the registered independent professional engineer's certification will be submitted to the regulatory agency(s) upon request.

B-9.0 POST-CLOSURE CARE COST ESTIMATE (40 CFR §270.14(B)(16))

B-9.1 POST-CLOSURE COST ESTIMATE TABLES

Post-closure care cost estimates are based on a third party performing the maintenance and monitoring requirements discussed in Section B-7.2 above. The post-closure care period is assumed to be 30 years, however this time may be extended by the Regional Administrator. The initial post-closure care period will end during this permit cycle (October 20, 2019). It is anticipated EPA will extend the post-closure care period 30 years. The third party performing post-closure care must have health and safety trained personnel, as specified by 29 CFR §1910.120(e).

For estimating the annual groundwater monitoring costs for the post-closure period, the following assumptions are made:

1. The groundwater monitoring will be conducted at the wells, frequency, and analytical methods identified in the RCRA Post-Closure Permit Application Attachments C and D
2. Quality control samples will be collected as identified in the RCRA Post-Closure Permit Application Attachment C
3. Samples and sampling records will be collected in accordance with protocols established in the RCRA Post-Closure Permit Application Attachment C

Table B-6 summarizes the total anticipated post-closure cost estimate for the surface impoundment system. Tables B-6a through B-6d provide additional detail for the anticipated costs associated with the surface impoundment maintenance and groundwater sampling and analysis.

B-9.2 POST-CLOSURE COST ESTIMATE ADJUSTMENTS

Tesoro will adjust the closure cost estimate in Table B-6 within 60 calendar days after the close of the Tesoro's fiscal year during the post-closure period. The adjustments may be made by recalculating the closure cost estimate in current dollars, or by using an inflation factor[10].

In addition, Tesoro will revise the post-closure cost estimate no later than 30 days after a revision to the Section B-7.2 above Post-Closure Plan increases the cost of the post-closure maintenance or monitoring. The revised cost estimate will be kept on file at the refinery.

B-9.3 FINANCIAL ASSURANCE MECHANISM FOR POST-CLOSURE CARE

The financial assurance for post-closure care for Tesoro's closed surface impoundments is a Post-Closure Trust Fund per 40 CFR §264.145(a). A copy of the trust agreement, with wording identical to that specified in 40 CFR §264.151(a)(1), is presented in Appendix B-5 and the most recent Trust financial statement.

If, during the life of the facility, the value of the post-closure trust fund is greater than the total post-closure cost estimate, Tesoro may submit a written request to the EPA Regional Administrator for release of the excess amount. Similarly, if the value of the post-closure fund is less than the total post-closure estimate, Tesoro will

[10] The inflation factor is derived from the most recent implicit price deflator for gross national product and the implicit price deflator for gross national product from the previous year, per 40 CFR §264.114(b).

make deposits to the post-closure funds so that the total value equals the new post-closure cost estimate. Such a deposit would occur within 60 days of the post-closure cost estimate revision.

Tesoro will submit a similar request to the EPA Regional Administrator if it desires to substitute another approved financial assurance mechanism for the post-closure trust fund. Tesoro may also supplement the existing financial assurance mechanism with another approved financial assurance mechanism should that need arise.

B-10.0 PROOF OF COVERAGE BY STATE FINANCIAL MECHANISM (40 CFR §270.14(B)(18))

Not applicable in Alaska.

B-11.0 TOPOGRAPHIC MAP (40 CFR §270.14(B)(19))

Figure B-1 is a 7½-minute U.S. Geological Survey topographic map of the refinery and the area within at least 1,000 feet of the refinery. This map shows the refinery property line and locations of surface water bodies. Figure B-2 is a detailed topographic map of the refinery with two-foot elevation contours. This map shows the location of the three closed surface impoundments, the refinery fence and gates, the locations of injection and recovery wells of the groundwater treatment system, the locations of the drum storage area, the API separator, wastewater treatment ponds numbers 2, 3, and 4, and major buildings and internal roads. Figure B-6 shows the land use within at least 1,000 feet of the refinery.

Run-on and drainage at the refinery is controlled by dikes that surround the bulk storage tanks and by the OWSS. Figure B-2 show the location of the dikes around the tanks. The refinery does not have a sanitary sewer system. Each building within the facility is serviced by individual septic tanks and leach fields. Attachment D to the RCRA Post-Closure Permit Application discusses the groundwater hydrogeology below the refinery and contains maps for each corrective measure showing the locations of the associated points of compliance, groundwater monitoring wells, and groundwater flow directions.

Figure B-2 includes a wind rose diagram for the refinery gathered by Sabio Engineering in 1995 under the Unocal Tesoro Ambient Monitoring Program (UTAMP) from a station located southeast of the refinery[11].

[11] John Pinsonnault, with Stepman, Pinsonnault & Associates Inc., 2005, personal communication.

B-12.0 SUMMARY OF GROUNDWATER MONITORING DATA (40 CFR §270.14(C)(1))

Groundwater monitoring data are reported quarterly as part of Tesoro's monitoring program.

B-13.0 GENERAL AQUIFER DESCRIPTION (40 CFR §270.14(C)(2))

See Tesoro's RCRA Post-Closure Permit Application, Attachment D (*2017 Corrective Action Program Pla*n).

B-14.0 POINTS OF COMPLIANCE, GROUNDWATER MONITORING WELL LOCATIONS (40 CFR §270.14(C)(3))

See Tesoro's RCRA Post-Closure Permit Application, Attachment D (2017 Corrective Action Program Plan).

B-15.0 PLUME DESCRIPTION (40 CFR §270.14(C)(4))

See Tesoro's RCRA Post-Closure Permit Application, Attachment D (2017 Corrective Action Program Plan).

B-16.0 GROUNDWATER MONITORING PLAN PER §264.97 (40 CFR §270.14(C)(5))

See Tesoro's RCRA Post-Closure Permit Application, Attachment D (*2017 Corrective Action Program Plan*).

B-17.0 DETECTION MONITORING PROGRAM (40 CFR §270.14(C)(6))

Not applicable.

B-18.0 GROUNDWATER COMPLIANCE MONITORING PLAN (40 CFR §270.14(C)(7))

Not applicable.

B-19.0 CORRECTIVE ACTION PLAN (40 CFR §270.14(C)(8))

See Tesoro's RCRA Post-Closure Permit Application, Attachment D (*2017 Corrective Action Program Plan*).

B-20.0 INFORMATION REQUIRED FOR SOLID WASTE MANAGEMENT UNITS (SWMUS) (40 CFR §270.14(D))

This information is contained in Section B-2.0.