FACT SHEET

PUBLIC COMMENT ISSUANCE DATE: FEBRUARY 8, 2012

PUBLIC COMMENT EXPIRATION DATE: MARCH 9, 2012

TECHNICAL CONTACT:

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The U.S. Environmental Protection Agency (EPA) plans to reissue,
a National Pollutant Discharge Elimination System (NPDES) permit to the following facility
pursuant to the provisions of the Clean Water Act, 33 U.S.C. §1251 et seq:

ALYESKA PIPELINE SERVICE CO.
VALDEZ MARINE TERMINAL (AK-002324-8)

EPA PROPOSES NPDES PERMIT REISSUANCE

EPA proposes to reissue an NPDES permit to the facility referenced above. The permit places conditions on the discharge of pollutants from the Valdez Marine Terminal Ballast Water Treatment Plant to Port Valdez at 61°05'26"N latitude, 146°23'08"W longitude (Outfall 001) and 61° 05' 14"N latitude and 146° 23' 24"W longitude (Outfall 002). In order to ensure protection of water quality and human health, the permit places limits on the types and amounts of pollutants that can be discharged and places other conditions on the facility.

This Fact Sheet includes:

- information on public comment, public hearings and appeal procedures
- a description of the facility and proposed discharge
- a listing of proposed effluent limitations, and other conditions for the facility
- a map and description of the discharge location
- technical material supporting the conditions in the draft permit

401 CERTIFICATION FOR FACILITIES THAT DISCHARGE TO STATE WATERS

EPA requested that the Alaska Department of Environmental Conservation (ADEC), under section 401 of the Clean Water Act, certify the NPDES permit for the facility listed above. ADEC may, as a condition of certification, require that the permit include more stringent limitations or monitoring requirements needed to comply with the Clean Water Act or State law. EPA is required to include any such limitation or requirement in the final permit pursuant to Section 401(d) of the Clean Water Act. A draft 401 certification has been issued concurrently with this proposed permit. Comments regarding this certification should be directed to:

MR. MARC BENTLEY
Alaska Department of Environmental Conservation
Division of Water
555 Cordova Street
Anchorage, Alaska 99501-2617
E-mail: marc.bentley@alaska.gov

PUBLIC COMMENT

EPA will consider all substantive comments on the draft NPDES permit and fact sheet before reissuing the final NPDES permit. Persons wishing to comment on, or request a public hearing for, the proposed permit action may do so in writing by the expiration date of the public notice period. A request for a public hearing must state the nature of the issues to be raised as well as the requester's name, address, and telephone number. All comments should include name, address, phone number, a concise statement of basis of comment and relevant facts upon which it is based. All written comments should be addressed to:

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After the Public Notice period has ended and the public comments have been considered, EPA Region 10's Director of the Office of Water and Watersheds will make a final decision regarding permit reissuance. If no substantive comments are received, the conditions in the proposed permit will become final and the permit will become effective upon issuance. If substantive comments are received, EPA will respond to the comments and the permit will become effective 30 days after its issuance date, unless an appeal is submitted to the Environmental Appeals Board within 30 days.

Persons wishing to comment on the draft CWA § 401 certification should submit written comments by the public notice expiration date to the ADEC contact listed above.

DOCUMENTS ARE AVAILABLE FOR REVIEW

Pursuant to 40 CFR § 124.9, the Administrative Record for this draft NPDES permit, which consists of the Draft Permit, Fact Sheet, and the documents referenced in this Fact Sheet, is available upon request by contacting Erin Seyfried at (206) 553-1448 or seyfried.erin@epa.gov.

The Draft NPDES Permit, Fact Sheet and Draft DEC Clean Water Act Section 401 Certification can be reviewed or obtained by visiting or contacting the EPA's Regional Office in Seattle or the Anchorage Operations Office in Alaska between 8:30 a.m. and 4:00 p.m., Monday through Friday (see address below). The draft permit, fact sheet, and other information can also be found by visiting the Region 10 website at "www.epa.gov/R10earth/waterpermits.htm".

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I. APPLICANT

This fact sheet provides background information on the draft NPDES permit for the ballast water treatment plant identified below. When issued, the permit will provide Clean Water Act (CWA) authorization for wastewater discharge to Port Valdez.

Applicant:

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Anchorage, Alaska 99519

Facility Contact:

Dave Connor
Environmental Systems Coordinator
Alyeska Pipeline Service Co.
P.O. Box 196660
Anchorage, AK, 99512
Phone: (907) 787-8806

II. BACKGROUND INFORMATION

A. FACILITY OVERVIEW

Alyeska Pipeline Service Co. ("Alyeska") is the operator of the Valdez Marine Terminal ("the facility"). The facility is located at the southern terminus of the Trans Alaska Pipeline System (Figure A-1, Appendix A). The pipeline transports crude oil produced on the North Slope to Port Valdez. Oil is temporarily stored on land prior to transfer to tankers, which moor at one of the terminal's berths. Historically, the major discharges from this facility were from ballast water carried by the tankers for added stability as they travel northwards, without cargo, to Valdez. The tankers arrived in the Port of Valdez loaded with water that was contaminated with residual oil, this water was off-loaded to the ballast water treatment facility (BWTF) and the tankers were then loaded with oil for transport to refineries.

The overall purpose of the BWTF is to recover oil from ballast water and to treat facility wastewater prior to discharge. Crude oil primarily consists of alkanes (saturated hydrocarbons, linear or branched), cycloalkanes (one or more carbon ring), and various aromatic hydrocarbons (one or more planar six-carbon rings). Aromatic hydrocarbons include benzene, toluene, ethylbenzene, and xylene (BTEX). They are among the most acutely toxic components of crude oil and among the most water soluble aromatic hydrocarbons. BTEX is the primary

pollutant driving wastewater treatment at the BWTF. Aromatic hydrocarbons containing multiple rings are called polynuclear or polycyclic aromatic hydrocarbons (PAHs); they are much less water soluble as compared to BTEX, and are present in much lower concentrations in the BWTF effluent.

The proposed permit reflects major changes in BWTF operations and flows. As required by the Oil Prevention Act of 1990 (OPA 90), the tanker fleet has been largely converted to segregated ballast systems, which drastically reduced the amount of off-loaded ballast water requiring treatment. Additionally, reduced crude production on the North Slope has resulted in fewer vessel loadings, further reducing the average daily ballast water receipts to the facility. This reduction in ballast water flow to the facility has resulted in a significant change to the wastewater composition that is treated by the BWTF, now primarily consisting of runoff from rainfall and snowmelt, crude oil storage draws, and miscellaneous site process wastewaters.

The facility operates in accordance with the EPA's NPDES permit AK-002324-8. The original NPDES permit for this facility was issued in December 1974 and became effective in January 1981. The permit was reissued in August 1980, May 1989, May 1997 and in August 2004. The most recent permit expired on July 31, 2009. On January 30, 2009, Alyeska submitted a timely and complete application for renewal of the permit, and has been operating under an administrative extension.

The facility operations include two continuous discharges into Port Valdez. The discharges are from the BWTF, which discharges through Outfall 001, and a sanitary and domestic wastewater from the sewage treatment plant (STP), which discharges through Outfall 002.

B. PROCESS DESCRIPTION

1. OUTFALL 001: BALLAST WATER TREATMENT FACILITY

Historically, the BWTF was designed to treat a maximum of 30 million gallons per day (MGD) of ballast water and other wastewater from the Valdez Marine Terminal operations. However, in recent years, due to the conversion of the tanker fleet to segregated ballast systems, the facility has been reconfigured to accommodate the reduced flow rates and subsequently reduced organic loadings so as to maintain wastewater treatment efficiency. The BWTF is currently designed to treat a maximum daily flow of 10.1 MGD and an average monthly flow of 5.54 MGD. The operation of the BWTF results in one continuous discharge through Outfall 001.

As noted above, the overall objective of the BWTF is to recover oil from ballast water and to treat runoff from rainfall and snowmelt, crude storage

draws, and miscellaneous site process wastewaters prior to discharge. The BWTF treatment process includes ballast water storage tanks and gravity separation (90s tanks), dissolved air flotation (DAF) cells, shallow-tray air strippers, biological treatment tanks (BTTs), and packed-tower air strippers.

The 90s tanks provide primary gravity separation of solids and free-phase oil. Due to their capacity, they also provide the ability to contain spills or to equalize flow variations. Each 90s tank receives influent from the terminal industrial wastewater sewer system and ship ballast water. The maximum rate for filling a tank is 60,000 barrels (bbls) per hour (62 MGD). This rate is based on the capacity of the BWTF low pressure vapor piping in the vapor control system. The 90s tanks are 250 feet in diameter and 53.5 feet high, they have a maximum fill volume of 430,000 bbls (14 million gallons) and a maximum fill height of 49.7 feet. Each 90s tank is also equipped with a vapor collection system.

After primary sedimentation in the 90s tanks, trace amounts of oil and other contaminants remain entrained in the water. Flocculation and DAF treatment processes are then used to further reduce free-phase separable and dissolved hydrocarbons in the wastestream. A polymer is injected into the charge stream, in the DAF inlet chamber, which facilitates floc formation by bonding with oils and other particulates. As the wastewater enters the covered DAF cells, it mixes with micro-bubbles of air, which adhere to the suspended flocs and cause the flocs to float to the surface of the water. There are currently two (2) operating covered DAF cells, each of which measures 24 feet wide, 112 feet long and 12 feet deep. Each DAF cell consists of an inlet chamber and a flotation tank. Both cells end at the outlet channel, which provides a point for nutrient addition and a series of over-and-under weirs prior to (optional) processing through shallow tray air strippers and ultimately biological treatment.

Four new 7-tray air stripper units were installed to remove soluble hydrocarbons in the wastewater stream from the DAF units on an as-needed basis. These shallow tray air strippers are a modular component and can be operated independently or in conjunction with biological treatment. Each air stripper unit has a normal design operating envelope of 500 – 1,100 gallons per minute (gpm), and the system of three strippers operating in parallel has a maximum design upper limit of 3,850 gpm. A fourth stripper is available as a spare for maintenance outages. The stripper offgas will be collected and routed to a Recuperative Thermal Oxidizer (RTO) for destruction of hydrocarbons.

The BTTs biologically degrade residual levels of dissolved hydrocarbons and other organic wastes still in the waste stream. Nutrient enriched water from the DAF cells and 7-tray air strippers enters the aeration basins (BTTs)

through a splitter box. Influent diffusers release the water evenly across the head of the tank. As the water flows through the tanks it is mixed and aerated to promote optimum conditions for the microbial oxidation of remaining hydrocarbons prior to discharge to Port Valdez through Outfall 001. Each tank has a hydraulic capacity of 5.5 million gallons. Projections indicate that the existing aeration basins may be subject to episodic performance variation due to starvation (i.e. low carbon loading for biomass) or low temperature related causes. During these events, the supplemental 7-tray air strippers will be used to treat DAF effluent.

The auxiliary packed-tower air strippers are used to further reduce BTEX (benzene, toluene, ethylbenzene, xylene) concentrations in the BTT effluent prior to discharge through Outfall 001. Forced air is released upward through the cells as the water falls over specially designed plastic media. The media breaks up the water mass into small droplets creating more water-air interface, which facilitates removal of BTEX from the wastewater.

The oily wastestream recovered during the treatment process is a mixture of recovered oil and entrained wastewater. It is returned to the oil recovery system for further oil/water separation. The recovered crude oil tanks (80s Tanks) enable gravity separation of the wastewater from the recoverable oil. The separated wastewater is then routed back to the 90s tanks for treatment through the BWTF. The recovered oil in the 80s tanks is then routed to the facility's oil transfer system for loading onto tankers.

The discharge for Outfall 001 is through a high-density polyethylene pipe that terminates 356 meters (m) offshore into Port Valdez in 62m – 82m of water (depth of first and last port, respectively) with a 63m long multiport diffuser. The distance of the first diffuser port from the shore is approximately 250m. The diffuser consists of ten 10-cm diameter ports (section closest to shore) and ten 13-cm diameter ports (section farthest from shore). Ports one (1) through eight (8) and ports ten (10) through nineteen (19) are spaced 3.1 m apart on alternating sides of the diffuser section pipe. Ports eight (8) and nine (9) are 5.49 m apart, ports nine (9) and ten (10) are 1.2 m apart, and ports nineteen (19) and twenty (20) are 5.49m apart. All ports are oriented 45-degrees from the horizontal in the vertical direction and oriented horizontally into and away from the prevailing current in an alternating fashion.

2. OUTFALL 002: SEWAGE TREATMENT PLANT

The facility operates a small activated sludge sequencing batch reactor (SBR) sanitary waste treatment process, which discharges through Outfall 002. The sewage treatment plant (STP) is designed to treat 10,000 gallons per day (gpd) and is subject to secondary wastewater treatment requirements. The

SBR is a fill-and draw activated sludge system in which wastewater is added to a single "batch" reactor, treated to remove undesirable components, and then discharged. Equalization, aeration, and clarification can all be achieved using a single batch reactor.

Wastewater enters a partially filled reactor, containing biomass, which is acclimated to the wastewater constituents during preceding cycles. Once the reactor is full, it behaves like a conventional activated sludge system, but without a continuous influent or effluent flow. The aeration and mixing discontinues once the biological reactions are completed, the biomass settles, and the treated supernatant is removed. Excess biomass can be wasted at any time during the cycle. Frequent wasting results in holding the mass ratio of influent substrate to biomass nearly constant from cycle to cycle.

The discharge for Outfall 002 is through a single-port diffuser into 12m of water.

C. COMPLIANCE HISTORY

A review of the discharge monitoring reports (DMRs) since the issuance of the current permit shows that the facility has maintained a record of full compliance with the terms of the existing permit. Compliance with BTEX, flow, pH and TSS limits for Outfall 001 has been absolute since the reissuance in 2004.

The sanitary wastewater discharge (Outfall 002) has generally been in compliance with the permit limitations. There have been 3 exceedances of both the monthly average and weekly average BOD_5 limits (30 mg/L and 45 mg/L, respectively) and 1 exceedance of the maximum daily TSS limit (60 mg/L) at 83.3 mg/L. All other monitoring results are in compliance with the permit requirements.

III. RECEIVING WATER

A. NATURE OF PORT VALDEZ

Port Valdez is a fjord that extends eastward from Valdez Narrows, which is regarded as the delineation between Port Valdez and the Valdez Arm. Port Valdez is about 5 kilometers (km) wide by 18 km in length, with steeps sides on the north and south and a nearly horizontal bottom at a depth of about 240 m over three-quarters of its length. The maximum depth of Port Valdez is 247 m, while the overall mean depth is about 180 m.

Surface water temperatures of Port Valdez range from -1.2°C in the winter to 16°C in the summer. Port Valdez does not ice over. During spring and summer snowmelt, the Port receives increased freshwater runoff and sediment loads from glacial rivers and streams.

Bottom substrate in the vicinity of the outfall consists primarily of silts and clay with a relatively small proportion of sand. This substrate has been found to have relatively low total organic carbon content as a result of the high natural sediment input, moderate productivity, and pelagic recycling of organic matter typical of this Alaskan fjord.

B. WATER QUALITY STANDARDS

Section 301(b)(1)(C) of the Clean Water Act (CWA) requires that NPDES permits contain effluent limits necessary to meet water quality standards. A State's water quality standards are composed of use classifications, numeric and/or narrative water quality criteria, and an anti-degradation policy. The use classification system designates the beneficial uses (such as cold water biota, contact recreation, etc…) that each water body is expected to achieve. The numeric and/or narrative water quality criteria are the criteria deemed necessary by the State to support the beneficial use classification of each water body. The anti-degradation policy represents a three-tiered approach to maintain and protect various levels of water quality and uses.

Port Valdez is classified by the Alaska Water Quality Standards (AWQS) as Classes II A(I)(ii)(iii), C and D. The waters are designated for all uses; i.e., aquaculture, seafood processing, and industrial water supply, water contact and secondary recreation, growth and propagation of fish, shellfish, aquatic life and wildlife and harvesting for consumption of raw mollusks or other raw aquatic life.

IV. EFFLUENT LIMITATIONS

A. BASIS FOR PERMIT EFFLUENT LIMITS

In general, the CWA requires that the limits for a particular pollutant be the more stringent of either technology-based effluent limits or water quality-based effluent limits. Technology-based limits are set according to the level of treatment that is achievable using available technology. A water quality-based effluent limit is designed to ensure that the water quality standards of a waterbody are being met and they may be more stringent than technology-based effluent limits. The basis for the proposed effluent limits in the draft permit is provided in Appendix B.

The CWA prohibits the discharge of pollutants to waters of the United States without an NPDES permit unless such a discharge is otherwise authorized by the CWA. The NPDES permit is the mechanism used to implement technology and water quality-based effluent limitations and other requirements including monitoring and reporting. NPDES permits are developed in accordance with various statutory and regulatory authorities established pursuant to the CWA. The regulations governing the EPA NPDES permit program are generally found at 40 CFR parts 122, 124, 125, and 136.

EPA first determines which technology-based limits apply to the discharges in accordance with applicable national effluent guidelines and standards. EPA further determines which water quality-based limits apply to the discharges based upon an assessment of the pollutants discharged and a review of state water quality standards. Monitoring requirements must also be included in the permit to determine compliance with effluent limitations. Effluent and ambient monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on receiving water quality.

B. PROPOSED EFFLUENT LIMITATIONS AND MONITORING REQUIREMENTS

1. OUTFALL 001 – BWTF

The following summarizes the proposed effluent limitations that are in the draft permit (Table 1) for Outfall 001 and provides a basis for the changes from the previous NPDES permit. These limits continue those from the expired permit, with some modifications to: (1) ensure consistency with current EPA permit practices and other NPDES permits; (2) respond to changes in facility operations (e.g., BWTF renovation projects); and (3) respond to effluent and environmental monitoring data.

TABLE 1: *Ballast Water Treatment Facility Effluent Limitations (Outfall 001)*

PARAMETER	AVERAGE MONTHLY LIMIT	MAXIMUM DAILY LIMIT	SAMPLING METHOD AND FREQUENCY	REPORTED VALUES
Flow	5.54 MGD	10.1 MGD	Calculation or Meter; Continuous	Average Monthly and Maximum Daily; *MGD*
pH	6.0 s.u. – 8.5 s.u. at all times		Meter; Continuous	Minimum and Maximum Values, Exceedances; *s.u.*
Total Suspended Solids (TSS)[1]	25 *mg/L*	40 *mg/L*	24-hour Composite; 3/week	Average Monthly and Maximum Daily; *mg/L*
	2.1 *kg/day*	3.4 *kg/day*		
Total Suspended Solids (TSS)[2]	--	170 *mg/L*		
		14.3 *kg/day*		
Total Aromatic Hydrocarbons (TAH)[3]	0.21 *mg/L*	0.73 *mg/L*	Grab; Weekly	Average Monthly and Maximum Daily; *mg/L*
	17.4 *lb/day*	61.1 *lb/day*		Average Monthly and Maximum Daily; *lb/day*

NOTES: [1]TSS measured on the day of and the day after air stripper activation shall not be included in the calculation of the monthly average or maximum daily.
[2] On day of and day after air stripper activation. The Permittee shall submit with the DMR a monthly air stripper activity report, which identifies the dates and times of stripper activation and deactivation.

[3]Total aromatic hydrocarbons (TAH) shall be determined by summing the concentrations of the isomers: benzene, toluene, ethylbenzene and xylene. Each aforementioned component shall be separately quantified by the methods given in 40 CFR Part 136 or other EPA-approved methods (such as EPA Method 602 (plus xylenes) or EPA Method 624).

SUMMARY OF EFFLUENT LIMITS FOR OUTFALL 001

- The limits on a maximum daily flow of 10.1 MGD and an average monthly flow of 5.54 MGD are new requirements. The revised permitted flow reflects the major facility modifications that have occurred since the last permit issuance.
- The pH must be between 6.0 to 8.5 standard units. This is retained from the previous permit.
- The average monthly limits and maximum daily limits of 25 mg/L and 40 mg/L for TSS (excluding a 24-hour composite sample on the day of and the day after air-stripper activation) and 170 mg/L for TSS measure on the day of and the day after air-stripper activation are retained from the previous permit.
- The average monthly limits and maximum daily limits of 0.21 mg/L and 0.73 mg/L for TAH are included in the proposed permit. The previous permits contained BTEX effluent limits; however, Alaska Water Quality Standards (AWQS) have numeric criteria for TAH (10µg/L). According to AWQS, TAH is defined as the sum of benzene, toluene, ethylbenzene and xylene (BTEX; 18 AAC 70.990.60). These limits are more stringent and are new requirements.
- The Permittee must not discharge any floating solids, debris, sludge, deposits, foam, scum or other residues that cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.
- The Permittee must not discharge any petroleum hydrocarbons or oils and grease that cause a sheen, film or discoloration on the surface of the water or adjoining shorelines.

2. OUTFALL 002 - SANITARY WASTES

The following summarizes the proposed effluent limitations that are in the draft permit (Table 2) for Outfall 002 and provides a basis for the changes from the previous NPDES permit. Outfall 002 is a domestic sanitary waste discharge, which is subject to secondary treatment requirements. These limits continue those from the expired permit, with some modifications to: (1) ensure consistency with current EPA permit practices and other NPDES

permits; and (2) respond to effluent and environmental monitoring data.

TABLE 2: *Sewage Treatment Plant Effluent Limitations and Monitoring Requirements (Outfall 002)*

Parameter	Maximum Daily Limit	Weekly Average Limit	Monthly Average Limit	Sampling Method and Frequency	Reported Values
Flow	10,000 *gpd*	--	Report	Calculation or Meter; Continuous	Maximum Daily and Average Monthly; *gpd*
pH	6.0 *s.u.* – 9.0 *s.u.* at all times			Grab or Meter; 2/Day or Continuous	Maximum and Minimum values; *s.u.*
Total Suspended Solids (TSS)	60 *mg/L*	45 *mg/L*	30 *mg/L*	Grab; Monthly	Maximum Daily, Weekly and Monthly Averages; *mg/L*
	5 *lb/day*[1]	3.8 *lb/day*[1]	2.5 *lb/day*[1]		
Biological Oxygen Demand (BOD_5)	60 *mg/L*	45 *mg/L*	30 *mg/L*		
	5 *lb/day*[1]	3.8 *lb/day*[1]	2.5 *lb/day*[1]		
Fecal Coliform Bacteria[5]	43 FC/100mL[4]	--	14 FC/100mL[2]	Grab; Monthly	Maximum Daily, Weekly and Monthly Averages; *#FC/100 mL*
Total Residual Chlorine (TRC)[3]	0.73 *mg/L*	--	0.5 *mg/L*	Grab; Monthly	Maximum Daily and Average Monthly; *mg/L*
	0.061 *lb/day*[1]	--	0.042 *lb/day*[1]		
Enterococci[5]	276 cfu /100mL[4]	--	35 cfu/100mL[2]	Grab; Monthly	Maximum Daily and Monthly Average; *#cfu /100mL*

NOTES:
[1] Loading (*lb/day*) = Concentration (*mg/L*) * Flow (MGD) * 8.34 (conversion factor)
[2] The Permittee must report the geometric mean fecal coliform concentration. If any value used to calculate the geometric mean is less than 1, the Permittee must round that value up to 1 for purposes of calculating the geometric mean
[3] Applicable when chlorine is used for disinfection.
[4] Instantaneous maximum limit
[5] The Permittee shall achieve compliance with these effluent limitations within 36 months after the effective date of this permit in accordance with the schedule of compliance in Section IV.D.9 of the Fact Sheet.

SUMMARY OF EFFLUENT LIMITS FOR OUTFALL 002

- The limit on a maximum daily flow of 10,000 gpd is retained from the previous permit.
- The pH must be between 6.0 to 9.0 standard units. This is retained from the previous permit.
- The maximum daily, weekly average and average monthly limits of 60mg/L, 45mg/L and 30mg/L (respectively) for TSS and BOD5 are retained from the previous permit.
- The maximum daily, average monthly limits of 43 FC/100mL and 14 FC/100mL for fecal coliform are new requirements.

- The maximum daily and average monthly limits of 276 cfu/100mL and 35 cfu/100mL (respectively) for Enterococci are new requirements. These limits are included in the proposed permit to protect the designated use of contact recreation.
- The discharge shall not, alone or in combination with other substances, cause a film, sheen or discoloration on the surface of the receiving water or adjoining shorelines.
- There shall be no discharge of floating solids, garbage, grease, or foam.

C. TECHNOLOGY – BASED EVALUATION

Section 301 of the Clean Water Act requires particular categories of industrial dischargers to meet technology-based effluent limitation guidelines. The intent of a technology-based effluent limitation is to require a minimum level of treatment for industrial and municipal point sources across the country based on currently available treatment technologies while allowing a discharger to choose and use any available pollution control technique to meet the limitations.

The Alyeska Valdez Marine Terminal can be considered to be an industrial type classified as a "shore-reception facility." EPA has not established national effluent guidelines for discharges from ballast water treatment facilities in this industrial category. Where EPA has not yet developed guidelines for a particular industry, EPA can establish permit limitations using Best Professional Judgment (BPJ) and Best Available Technology (BAT; 40 CFR §§ 122.43, 122.44 and 125.3).

In evaluating 40 CFR §125.3, as applicable to a BPJ/BAT determination for Alyeska's BWTF and STP, EPA considered the information submitted by the facility in its discharge monitoring reports and other monitoring reports, the NPDES permit application, the Mixing Zone Application and amendment, the results of the environmental monitoring in Port Valdez, and the fact that the treatment system has undergone significant upgrades recently. As discussed in Section II.C of this fact sheet, Alyeska has generally achieved compliance with previous permit limits. In addition, EPA recognizes that the treatment system has undergone extensive modifications to ensure that the facility is able to comply with BTEX limits as a result of a significant decrease in wastewater loading to the BWTF. Furthermore, evaluating the facility's monitoring of its STP effluents (Outfall 002) and its receiving waters, technology-based limits are justified for BOD5, TSS, and total residual chlorine (Outfall 002).

1. BOD_5 AND TSS

The mass limits for BOD5 and TSS in Outfall 002 were based on the technology-based concentration limits, and the maximum effluent flow rate as stated in the permit application. The BOD5 and TSS limits for Outfall 002

are based on the State of Alaska's treatment standards for sewage, which are being applied here under the authority of Section 301(b)(1)(C) of the Clean Water Act. The authorized mass discharges of BOD5 and TSS are very small and will not result in dissolved oxygen depletion, or violations of Alaska's water quality standards for sediment or turbidity in the receiving water.

The regulations at 40 CFR §122.45(f)(1) require that all permit limits, standards, or prohibitions be expressed in terms of mass units (e.g., pounds, kilograms, grams). While the regulations require that limitations be expressed in terms of mass, a provision is included at 40 CFR §122.45(f)(2) that allows limits to be expressed in additional units (e.g., concentration units). Where limits are expressed in terms of both mass and concentration, the Permittee must comply with both the mass and concentration effluent limits.

It has been determined that the limits for BOD5 and TSS in the sanitary discharge (Outfall 002) require both mass and concentration effluent limitations. Since the treatment requirements for BOD5 and TSS for Outfall 002 are expressed as concentration, effluent limits for mass-based limits are calculated by multiplying the concentration limit (in mg/L) by the estimated discharge flow (in MGD) and a conversion factor of 8.34 to obtain a limitation in units of pounds per day (*lbs/day*).

2. TOTAL RESIDUAL CHLORINE (TRC)

The technology of disinfection, usually chlorination (with or without dechlorination) or ultraviolet radiation, is widely used in secondary wastewater treatment facilities throughout the country and the world. It easily achieves the fecal coliform bacteria limits proposed in this permit at a cost that is borne by the vast majority of POTWs and other secondary wastewater treatment works. Fecal coliform bacteria is an indicator of bacteriological contamination, which presents a probable detriment to human health and wildlife, including threatened and endangered species, in the area. Therefore, requiring disinfection that is widely used in similar facilities does not represent an unusual economic burden compared to the benefits of fostering a healthy environment both for humans and wildlife.

The facility could implement chlorination, potentially coupled with dechlorination because of the low chlorine limit proposed in this permit. UV disinfection is also a technology that may be installed.

The Alaska water quality criteria for chlorine are found in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2002). The aquatic life water quality criteria

for chlorine are an acute criterion of 13 µg/L (0.013 mg/L) and a chronic criterion of 7.5 µg/L (0.0075 mg/L).

The technology-based effluent limits for this discharge are equal to an average monthly limit of 0.73 mg/L, and an average monthly limit of 0.5 mg/L (Appendix B). Assuming ADEC authorizes Alyeska with a 600:1 dilution for TRC, the calculated WQBELs for would be 2.3 *mg/L* and 7.35 *mg/L* for the monthly average and maximum daily limits, respectively. These values are less stringent than the technology based effluent limits. Therefore, EPA believes the limits will not result in a lowering of water quality. Technology-based effluent limits have been included in the proposed permit.

D. WATER QUALITY – BASED EVALUATION

Section 301(b)(1)(C) of the CWA requires the development of limitations in permits necessary to meet water quality standards by July 1, 1977. Discharges to State or Tribal waters must also comply with limitations imposed by the State or Tribe as part of its certification of NPDES permits under section 401 of the CWA. Federal regulations at 40 CFR §122.4(d) prohibit the issuance of an NPDES permit that does not ensure compliance with the water quality standards of all affected States. The NPDES regulation (40 CFR §122.44(d)(1)) implementing Section 301(b)(1)(C) of the CWA requires that permits include limits for all pollutants or parameters which are or may be discharged at a level which will cause, have the reasonable potential to cause, or contribute to an excursion above any State or Tribal water quality standard, including narrative criteria for water quality, and that the level of water quality to be achieved by limits on point sources is derived from and complies with all applicable water quality standards.

The regulations require the permitting authority to make this evaluation using procedures which account for existing controls on point and nonpoint sources of pollution, the variability of the pollutant in the effluent, species sensitivity (for toxicity), and where appropriate, dilution in the receiving water. The limits must be stringent enough to ensure that water quality standards are met, and must be consistent with any applicable wasteload allocation.

Prior to reissuing the final permit for this facility, EPA will review the State's antidegradation analysis contained in the draft CWA § 401 Certification. The State's antidegradation policy is located at 18 AAC 70.015. ADEC determined, in accordance with its interim antidegradation implementation methods that the limits in the draft permit are consistent with the State's antidegradation policy; that the draft permit is protective of State water quality standards and the water quality of the receiving water; and that the draft permit will not result in a reduction of water quality in receiving waters.

1. REASONABLE POTENTIAL ANALYSIS

When evaluating the effluent to determine if water quality-based effluent limits are needed, based on numeric criteria, EPA projects the receiving water concentration (downstream of where the effluent enters the receiving water) for each pollutant of concern. EPA uses the concentration of the pollutant in the effluent and receiving water and, if appropriate, the dilution available from the receiving water, to project the receiving water concentration. If the projected concentration of the pollutant in the receiving water exceeds the numeric criterion for that specific chemical, then the discharge has the reasonable potential to cause or contribute to an exceedance of the applicable water quality standard, and a water quality-based effluent limit (WQBEL) is required.

Sometimes it is appropriate to allow a small area of the receiving water to provide dilution of the effluent. These areas are called mixing zones. Mixing zone allowances will increase the mass loadings of the pollutant to the water body and will decrease treatment requirements. Mixing zones can be used only when there is adequate receiving water flow volume and when the receiving water meets the criteria necessary to protect the designated uses of the water body. Mixing zones must be authorized by ADEC. Alyeska has requested a 50-meter mixing zone for Outfall 001 and a 10-meter mixing zone for Outfall 002 (see Section IV.E.).

2. PROCEDURE FOR DERIVING WQBELS

The first step in developing a water quality-based effluent limit (WQBEL) is to develop a wasteload allocation (WLA) for the pollutant. A wasteload allocation is the concentration or loading of a pollutant that the permittee may discharge without causing or contributing to an exceedance of water quality standards in the receiving water.

In cases where a mixing zone is not authorized, either because the receiving water already exceeds the criterion, the receiving water flow is too low to provide dilution, or the State does not authorize one, the criterion becomes the WLA. Establishing the criterion as the wasteload allocation ensures that the permittee will not cause or contribute to an exceedance of the criterion. The following discussion details the specific water quality-based effluent limits in the draft permit.

Once a WLA is developed, EPA calculates effluent limits which are protective of the WLA using statistical procedures described in Appendix B.

3. FACILITY-SPECIFIC WATER QUALITY-BASED LIMITS

Water quality-based effluent limits (WQBELs) are derived from the AWQSs to protect the water quality and beneficial uses of Alaskan waters. Since Port Valdez is protected for all uses, the most stringent State standard for each pollutant regulated under the AWQS is utilized in determining water quality-based limits within an NPDES permit. Based upon the facility's monitoring of its effluents and its receiving waters, water quality-based limits are justified for TAH (Outfall 001), fecal coliform and *Enterococci* (Outfall 002), and pH (Outfall 001 and Outfall 002).

4. RESIDUES

AWQS states that an effluent discharge "may not, alone or in combination with other substances or wastes, make the (receiving) water unfit or unsafe for the use; cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines, cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines." The permit contains a general prohibition that states the discharge of floating solids and visible foam in other than trace amounts is prohibited.

5. TOTAL AQUEOUS HYDROCARBONS (TAQH)

No limits are proposed for TAqH for this permit reissuance, however, the monthly monitoring requirement for TAqH will remain in effect. Using reasonable potential analysis and data collected from January, 2004 through August, 2011, EPA determined the effluent TAqH limits were not necessary to meet water quality standards at the edge of the 50-meter chronic mixing zone. The maximum daily value measured during the existing permit was 1.8µg/L and a mean value of 0.9µg/L. EPA finds that there is no reasonable potential for TAqH to exceed the criterion (15µg/L) at the edge of the mixing zone and effluent limitations are not needed (Appendix B Part A.5). The draft permit retains the monthly effluent monitoring requirement for TAqH.

6. TOTAL AROMATIC HYDROCARBONS (TAH)

The draft permit contains TAH limits that are a result of EPA's review of BTEX daily monitoring data. Using procedures in EPA's Technical Support Document (TSD), EPA determined the effluent TAH limits necessary to meet water quality standards at the edge of the chronic mixing zone. Because there is only one criterion for TAH, for this determination it is appropriate to use only the chronic mixing zone (TSD, pg 103). An average monthly limit of 0.21 mg/L and a maximum daily limit of 0.73 mg/L would

be necessary to ensure that the TAH criterion is achieved at the edge of the mixing zone.

EPA determined the WQBELs for TAH by using a BTEX effluent data set consisting of 514 samples taken between January 1, 2004 and September 28, 2011. The maximum concentration measured was 0.55 mg/L and the mean value was 0.01 mg/L. Using the data set, a strict evaluation of the 95th and 99th percentiles resulted in above referenced permit limits. Additionally, imposing these new limits on the existing daily BTEX data set resulted in zero exceedances of the proposed Maximum Daily Limit.

7. FECAL COLIFORM

Fecal coliform are a type of bacteria that are found in the intestines and fecal matter of human beings and warm-blooded animals. Discharges of treated sanitary wastewater (human wastes) are likely to contain fecal coliform, unless disinfected. The discharge from Outfall 002 has the reasonable potential to cause or contribute to excursions above Alaska's water quality standards for fecal coliform and an effluent limit must be imposed (Appendix B).

The most stringent water quality criterion for fecal coliform in Alaska State waters is for protection of the use of human consumption of raw mollusks and other raw aquatic life. The Alaska water quality criterion for fecal coliform (18 AAC 70.020(b)) in marine waters reads as follows: "Based on a 5-tube decimal dilution test, the fecal coliform median MPN may not exceed 14 FC/100 mL, and not more than 10% of the samples may exceed a fecal coliform median MPN of 43 FC/100 mL."

The draft permit includes end-of-pipe WQBELs of 14 FC/100mL as a monthly geometric mean and 43 FC/100mL as an instantaneous maximum daily value. These limits are achievable with standard disinfection technologies, such as chlorination/dechlorination and ultraviolet disinfection.

8. ENTEROCOCCI

The water quality criteria for *Enterococci* for marine coastal recreation waters in Alaska were promulgated by EPA in 40 CFR §131.41. The criteria are a geometric mean of 35 per 100 ml and a single sample maximum of 276 per 100 ml.

9. pH

The pH must be between 6.0 and 9.0 standard units (*s.u.*). Monitoring data for Outfall 001 indicates that the effluent ranges from a low of 6.1 to a high of 8.0, which is within the acceptable range. Furthermore, the 50-meter

mixing zone requested by Alyeska will provide the dilution necessary for the effluent to meet the water quality standards of 6.5 to 8.5.

10. COMPLIANCE SCHEDULE

The Permittee must achieve compliance with the fecal coliform bacteria and *Enterococci* effluent limitations in Table 2 of the Fact Sheet. The Permittee shall install and operate a disinfection treatment process for sanitary wastewater discharges through Outfall 002.

Until compliance with the effluent limits is achieved, the Permittee is required to implement the following steps and procedures:

a) Within 18 months of the effective date of this permit, the Permittee shall conduct and complete a study and decide on the course of action that the Permittee will take to meet the fecal coliform bacteria and *Enterococci* effluent limitations for Outfall 002. EPA and ADEC must be notified in writing within the 18- month time frame of the results of the study and final decision.

b) Within 24 months of the effective date of this permit, the Permittee shall design and obtain plan approval from ADEC for any additions or modifications to the facility needed to install and operate the chosen disinfection treatment process.

c) Within 36 months of the effective date of the permit, the Permittee shall construct and have operational any additions and/or modifications to the facility needed to install and operate the chosen disinfection treatment process.

d) Within 36 months of the effective date of the permit (INSERT DATE), the Permittee shall achieve compliance with the fecal coliform bacteria and *Enterococci* effluent limitations in Section IV.B.1., Table 2.

e) Reports of compliance or noncompliance with, or any progress reports on, interim and final requirements contained in the compliance schedule of this permit (Parts I.E.2.(d)(i)-(iv)) shall be submitted in writing to EPA and ADEC no later than 14 days following each schedule date (40 CFR 122.41(l)(5)).

Until the disinfection system is completed, the Permittee shall submit a semi-annual Report of Progress to EPA and ADEC, which outlines the progress made toward reaching compliance with the fecal coliform bacteria and *Enterococci* effluent limits. The first semi-annual Report of Progress is due within six months of the effective date of the permit and six months thereafter, until compliance with the permit effluent limits is achieved. See

also Part II.I, "Compliance Schedules." At a minimum, the semi-annual report must include:

a) An assessment of the previous year's fecal coliform bacteria, *Enterococci* and chlorine data (if applicable) and a comparison to the effluent limitations.

b) A report on progress made towards meeting the effluent limitations.

c) Further actions and milestones targeted for the upcoming six months.

E. MIXING ZONES

The State of Alaska Department of Environmental Conservation (ADEC) can authorize a number of site-specific conditions to the Alaska Water Quality Standards (AWQS). Exemptions to Statewide Standards include a mixing zone wherein AWQS may be exceeded (18 AAC § 70.240).

In the case of this permit, Alyeska has applied for a 50-meter mixing zone around Outfall 001 for total aromatic hydrocarbons (TAH), total aqueous hydrocarbons (TAqH), ammonia-nitrogen, total zinc, total suspended solids, pH and chronic whole effluent toxicity. The mixing zone is defined as the area of a 50 meter radius circle, centered at the discharge point (Outfall 001), from the sea floor to the surface. The top boundary shall be, at all times, 14 meters below the receiving water surface. The mixing zone shall extend to the bottom of the water column, but shall exclude the bottom sediments which shall remain subject to protection under AWQS.

Table 3 summarizes the dilution factors requested by Alyeska in their mixing zone application. All water quality standards must be met outside the designated mixing zone boundary. ADEC has indicated that it will grant the mixing zone request in its draft Clean Water Act Section 401 certification of the NPDES permit. If the mixing zone changes in the final certification for the permit, then EPA will reevaluate the water quality assessments.

TABLE 3: *Outfall 001 dilution factors*

PARAMETER		DILUTION FACTOR
Total Aromatic Hydrocarbons	Acute	--
	Chronic	56:1
Total Aqueous Hydrocarbons	Acute	--
	Chronic	37:1
Ammonia-nitrogen	Acute	--
	Chronic	4.3:1
Total Zinc	Acute	3.5:1
	Chronic	3.9:1
Whole Effluent Toxicity	Acute	3.7:1
	Chronic	9.6:1

Alyeska has also applied for a 10-meter mixing zone around Outfall 002 (dilution factor = 600:1) for pH. The mixing zone is defined as a cylinder with a radius of 10 meters centered on the outfall, rising vertically to the receiving water surface. The mixing zone will extend from the marine bottom to the receiving water surface. This mixing zone is not designed for acute life criteria.

All water quality criteria must be met outside the designated mixing zone boundary. ADEC has indicated that it will grant the mixing zone requests in its draft Clean Water Act Section 401 certification of the NPDES permit.

V. MONITORING AND REPORTING REQUIREMENTS

A. BASIS FOR EFFLUENT AND SURFACE WATER MONITORING

Section 308 of the CWA and federal regulations under 40 CFR § 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be required to gather effluent and/or surface water data to determine if additional effluent limitations are required and/or to monitor effluent impacts on receiving water quality. The Permittee is responsible for conducting the monitoring and for reporting results on Discharge Monitoring Reports (DMRs) to the EPA. Table presents the proposed monitoring requirements based on the minimum sampling necessary to adequately monitor the facility's performance.

Sampling of bypass and upset. The proposed permit requires sampling whenever a bypass, spill, or non-routine discharge of pollutants occurs, if such a discharge could cause a violation of an effluent limit.

B. EFFLUENT MONITORING

Monitoring frequencies are based on the nature and effect of the pollutant, as well as a determination of the minimum sampling necessary to adequately monitor the facility's performance. The Permittee has the option of taking more frequent samples than are required under the permit. These samples can be used for averaging if they are conducted using EPA approved test methods (generally found in 40 CFR 136) and if the Method Detection Limits (MDLs) are less than the effluent limits.

Table 4 and Table 5 present the monitoring requirements for the facility covered under this draft permit. The sampling location must be after the last treatment unit and prior to discharge to the receiving water. If no discharge occurs during the reporting period, "no discharge" shall be reported on the DMR.

TABLE 4: *BWTF Monitoring Requirements (Outfall 001)*

PARAMETER	SAMPLING METHOD	FREQUENCY	REPORTED VALUES
Flow	Meter	Continuous	Average Monthly and Maximum Daily; *MGD*
pH	Meter	Continuous	Maximum, Minimum and all exceedances; *s.u.*
Total Suspended Solids (TSS)[1]	24-hour Composite	3/week (and on the day of and day after stripper activation)	Average Monthly and Maximum Daily; *mg/L*
TAH [2]	Grab, Meter	Weekly	Average Monthly and Maximum Daily; *mg/L*
Total Aqueous Hydrocarbons (TAqH)[3]	Grab	Monthly	Concentration; *mg/L*
Total Recoverable Oil and Grease	Grab	Monthly	Concentration; *mg/L*
Density	Grab, Meter	Monthly	Monthly Average and Maximum Daily; *sigma t*
Dissolved Inorganic Phosphorus	Grab	Quarterly	Concentration; *mg/L as P*

Ammonia	Grab	Quarterly	Concentration; *mg/L as N*
Total Recoverable Zinc	24-hour Composite	Twice per year	Concentration; *mg/L*
Chronic Whole Effluent Toxicity (WET)[4]	24-hour composite	Quarterly	Report; TU_C
Acute Whole Effluent Toxicity (WET)[5]	24-hour Composite	Quarterly	Report; TU_A

NOTES: [1]A minimum of three TSS samples shall be analyzed per week. If the strippers are activated then the effluent samples collected on the day of and the day after stripper activation shall also be analyzed for TSS. TSS samples associated with stripper activation may satisfy the three times per week measurement frequency monitoring requirements. The Permittee shall submit with the DMR a monthly air stripper activity report, which identifies the dates and times of stripper activation and deactivation.

[2] Total aromatic hydrocarbons (TAH) shall be determined by summing the concentrations of the isomers: benzene, toluene, ethylebenzene and xylene. Each aforementioned component shall be separately quantified by the methods given in 40 CFR Part 136 or other EPA-approved methods, and the total reported as TAH on the DMR.

[3]Total aqueous hydrocarbons (TAqH) shall be determined using a combination of (a) EPA Method 602 (plus xylenes) or EPA Method 624 to quantify monoaromatic hydrocarbons and to measure TAH; and (b) EPA Method 610 or EPA Method 625 to quantify polynuclear aromatic hydrocarbons (PAHs).

[4] Quarterly sublethal (chronic) WET testing using: 1) echinoderm gametes of either the purple sea urchin or the sand dollar; and 2) a topsmelt larval growth and survival test

[5] Quarterly lethal (acute) WET testing using the mysid (*Americamysis bahia*).

- Whole effluent toxicity (WET) monitoring is required quarterly for sublethal (chronic) and lethal (acute) testing. The previous permit required two invertebrate tests for chronic toxicity monitoring; however, the proposed permit has removed the embryo-larval test and includes a vertebrate test (Topsmelt) as the second chronic toxicity test. In addition, the proposed permit has increased acute toxicity monitoring due to the significant change in the mixing zone size, and to account for changes in the Environmental Monitoring Program. These are new requirements.
- The monthly monitoring requirement for TAqH is retained from the previous permit.
- The monthly monitoring requirement for total recoverable oil and grease is retained from the previous permit.
- The monthly monitoring requirement for density is retained from the previous permit.

- The quarterly monitoring requirement for dissolved inorganic phosphorus is retained from the previous permit.
- The quarterly monitoring requirement for ammonia is retained from the previous permit.
- The twice-per-year monitoring requirement for total recoverable oil and grease is retained from the previous permit.

TABLE 5: *STP Monitoring Requirements (Outfall 002)*

PARAMETER	SAMPLING METHOD	FREQUENCY	UNITS
Flow Rate	Meter	Continuous	*gpd*
pH	Meter	Continuous	*s.u.*
BOD_5	Grab	Monthly	*mg/L*
TSS	Grab	Monthly	*mg/L*
Fecal Coliform Bacteria	Grab	Monthly	*#FC/100mL*
Enterococci	Grab	Monthly	*cfu/100mL*
TRC	Grab	Monthly	*mg/L*

NOTES:

[1] A minimum of three TSS samples shall be analyzed per week. If the strippers are activated then the effluent samples collected on the day of and the day after stripper activation shall also be analyzed for TSS. TSS samples associated with stripper activation may satisfy the three times per week measurement frequency monitoring requirements. The Permittee shall submit with the DMR a monthly air stripper activity report, which identifies the dates and times of stripper activation and deactivation.

[2] Sum of the concentrations of the isomers: benzene, toluene, ethylbenzene and xylene. Each aforementioned component shall be separately quantified by the methods given in 40 CFR Part 136 or other EPA-approved methods, and the total reported as BETX on the DMR.

[3] Total aqueous hydrocarbons (TAqH) shall be determined using a combination of (a) EPA Method 602 (plus xylenes) or EPA Method 624 to quantify monoaromatic hydrocarbons and to measure TAH; and (b) EPA Method 610 or EPA Method 625 to quantify polynuclear aromatic hydrocarbons (PAHs). [4] Quarterly sublethal (chronic) WET testing using: 1) echinoderm gametes of either the purple sea urchin or the sand dollar; and 2) a topsmelt larval growth and survival test.

[5] Quarterly lethal (acute) WET testing using the mysid (*Americamysis bahia*).

C. ENVIRONMENTAL MONITORING PROGRAM

The 2004 permit required annual environmental monitoring that included the following components: (1) benthic abundance and community structure monitoring and (2) sediment hydrocarbon monitoring. Alyeska performed the required environmental monitoring and submitted numerous annual and supplemental reports. The monitoring conducted pursuant to the previous permits is summarized below.

1. SUBTIDAL BENTHIC STUDIES

The spatial and temporal distributions of benthic infauna have been monitored in the vicinity of the discharge from Outfall 001 since 1971. Fluctuations in the number of taxa, biomass, and abundance of benthic infauna have been observed in Port Valdez (Annual Report, 2011). However, overall patterns of change in the sediments proximal to the diffusers indicate that effects from BWTF effluent have been negligible on benthic infauna relative to effects seen elsewhere. The benthic community in Port Valdez demonstrates annual faunal variations that are mainly attributed to larger trends (i.e., geological events), sedimentation events (i.e., glacial deposition), and changes in carbon availability as substrate for benthic organisms (i.e., phytoplankton and salmon carcass decomposition, and sediment hydrocarbon concentration). Variations in faunal communities are presumed to largely reflect responses to a variable flux of carbon to the benthos within the entire fjord, natural and climatic variability, and physical gradients.

As concluded in previous reports (Feder and Shaw 2000; Feder 2003 and 2004; Blanchard 2005 and 2006), recent data for Port Valdez suggests that effluent from the BWTF does not negatively impact deep-basin benthic organisms and slightly influences fauna at shallow mixing zone stations. However, the effects on the benthic organisms at the shallow mixing zone stations were minor and the communities were robust (Blanchard *et al.*, 2003, 2004, 2006, and 2007; 2010 Annual Data Report). Effects at these mixing zone stations are indicated by statistically lower abundance, total biomass, and number of taxa present, in comparison to reference stations. Some of the observed differences in faunal abundance and biomass may be indicative of sediment compaction and/or biological interactions.

2. SEDIMENT HYDROCARBON MONITORING

Sediment hydrocarbon monitoring has been conducted to determine the fate, concentrations, and impacts of petroleum hydrocarbons in the sediments below the mixing zone and within Port Valdez. The monitoring has revealed a spatial gradient in sediment hydrocarbon concentrations with relatively

higher concentrations measured in shallow near-field areas, especially at the station nearest Outfall 001. Concentrations of hydrocarbons at the outfall have not been measured at a level that is recognized as harmful to benthic organisms or of significant risk to human health (Feder and Shaw, 2010). In fact, results have indicated that PAH concentrations in sediments have declined since 1989 and currently there appears to be a low risk of PAH-caused toxicity and mortality to infauna. Furthermore, geochemical interpretations indicate that PAH samples taken far from the facility likely have sources other than effluent discharge from the BWTF.

3. ENVIRONMENTAL MONITORING REQUIREMENTS

The following discussion addresses the basis and rationale for the environmental monitoring requirements in Alyeska's draft NPDES permit. Like the existing permit, the requirements have been structured in accordance with the primary exposure pathways for pollutants discharged from the BWTF: the water column and the sediments.

The BWTF and sanitary waste discharges from the Alyeska marine terminal authorized by this permit are only a subset of many potential human influences to the environmental quality of Port Valdez. Other influences include, but are not limited to, the following: oil spills, the small boat harbor, the hatchery, the seafood processors, storm water runoff from the city of Valdez and environs, tanker discharges, commercial/recreational boats, and the Valdez POTW.

The environmental monitoring requirements in this draft permit for the BWTF are intended to assess the impacts of the permitted discharges only, and not the aforementioned list of environmental influences. Given the relative discharge flows and nature of the discharges, the BWTF is expected to have significantly greater influence on the environmental quality of Port Valdez than the sanitary waste discharge (Outfall 002). The BWTF discharge is therefore the focus of the monitoring program.

The following continue to be the objectives of the environmental monitoring program for the draft NPDES permit:

- Early detection and warning of any significant adverse effects due to the BWTF discharge,
- Ensure compliance with Alaska Water Quality Standards,
- Determine statistically significant and ecologically significant changes in the sediment hydrocarbon concentrations over time and distance due to the BWTF discharge,
- Determine whether changes to the monitoring program are warranted, and

- Gather information for permit renewal/future regulatory decisions (e.g., trends, exceedances of benchmarks or criteria, etc.).

The Subtidal Benthic Studies are no longer a primary requirement of the NPDES permit. While these studies have provided significant data correlating hydrocarbon concentrations and community structure, there has also been sufficient data indicating that the BWTF effluent has a negligible impact on benthic organism proximal to the diffusers. Furthermore, researchers have indicated that other environmental perturbations may have just as significant an impact on benthic communities as do changes in hydrocarbon concentrations.

EPA is removing this objective as a requirement for the NPDES Permit Environmental Monitoring Program.

4. QUESTIONS AND HYPOTHESES

Identified below are the questions and hypotheses for both the water column and sediment pathways developed for the 2004 permit issuance. The hypotheses have been modified to be relevant to this permit reissuance. Monitoring tools to address the hypotheses are detailed in the next section.

A. Exposure by the Water Column

1. *Overarching Water Question:* Do contaminants discharged in the BWTF effluent bioaccumulate, concentrate, or persist in the water column at levels causing statistically significant unacceptable adverse effects?

2. *Water Hypotheses.*

   a) **Hypothesis W1:** Contaminants in the effluent are not exceeding levels protective of the environment outside of the acute mixing zone for lethality to passing organisms and outside the chronic mixing zone for chronic effects.

   b) **Hypothesis W2:** Effluent toxicity is not adversely impacting survival, growth or reproduction of aquatic organisms outside the mixing zone in the fjord as a whole.

   c) **Hypothesis W3:** Effluent contaminants in the water column do not bioaccumulate, concentrate, or persist in members of the food web at significantly adverse levels.

B. Exposure by Sediments

1. *Overarching Sediment Question:* Do contaminants discharged in the BWTF effluent bioaccumulate, concentrate, or persist in sediments at levels causing statistically significant unacceptable

adverse effects?

2. *Sediment Hypotheses.*

a) **Hypothesis S1:** Petroleum concentrations in the sediment are not increasing.

b) **Hypothesis S2:** Sediment toxicity is not adversely impacting survival, growth or reproduction of aquatic life including benthic infauna.

c) **Hypothesis S3:** Sediments are not toxic beneath the mixing zone.

5. MONITORING TOOLS

The following discussion explores each of the monitoring tools and elaborates on the changes proposed in the draft permit.

A. Effluent Chemistry and Effluent Toxicity

To assess exposure via the water column and to address the applicable objectives (above) and hypotheses W1 and W2, the draft permit continues to require that the Permittee quantitatively assess whether the water quality standards for the monitored chemical parameters and effluent toxicity are being met at the edge of the mixing zone on an annual basis. The review should also ensure that acute criteria are met at the edge of the initial zone of dilution. This requirement does not require additional data collection, but will require a review of existing data and comparison of estimated concentrations at the edge of the mixing zone to the applicable water quality standards. The presumption is that meeting water quality criteria will protect the organisms in Port Valdez for those contaminants for which water quality criteria exist.

B. Sediment Chemistry

This monitoring has been required in the previous NPDES permit and has proved to be a useful monitoring tool. The monitoring of sediment chemistry is proposed in the draft permit to evaluate changes in sediment petroleum concentrations. Sediment samples shall be analyzed for polynuclear aromatic hydrocarbons (PAH) and total organic carbon (TOC). Hydrocarbon analyses shall be performed using GC/MS methods.

Historical monitoring of sediment hydrocarbon concentrations indicate that concentrations of polynuclear aromatic hydrocarbons (PAH) in sediments have declined since 1989 and currently there appears to be

low risk for sediment-dwelling animals from PAH-caused toxicity and mortality (Blanchard *et al.*, 2011). Furthermore, it was concluded that the influence of hydrocarbons on fauna near Outfall 001 diffusers is minimal, while environmental factors (e.g. sediment characteristics, variable annual phytoplankton, flux to the bottom, and grazing zooplankton levels) including climatic variability were driving faunal communities.

Sediment hydrocarbon monitoring prior to the 2004 permit involved collection and analysis of three replicates from each station. Three samples were collected from each station and all three replicates were only analyzed for the stations closest to the treated ballast water diffuser. At the remaining stations, one replicate was analyzed and the results were compared to a trigger value. If the measured concentration exceeded the trigger value, the remaining two replicates were then analyzed. This tiered strategy is proposed for continuation under the reissued permit. At stations D25, D33, 143, and 145, the stations closest to the diffuser, all three replicates must be analyzed. The trigger value for the remaining stations will continue to be the 95 percentile of the data collected from 1989 through 1995. This strategy focuses a major portion of the effort close to the diffuser.

6. MONITORING STATIONS

The sampling stations used in the annual environmental monitoring program are:

Diffuser Stations:	D33
Nearfield Shallow Stations:	D25, D51, D69, 80, 82, 143, 145
Near-field Deep Stations:	D73, D77, 16
Far-field Deep Stations:	11, 40, 50

The depth and latitude/longitude coordinates of the stations are included in Table 5 of the Permit.

D. WHOLE EFFLUENT TOXICITY (WET) TESTING

1. OUTFALL 001 – BWTF

WET testing from 2004 – 2009 on Outfall 001 showed that all but eight (8) of the forty-six (46) chronic toxicity tests exhibited no effect concentrations varying from 50% to 100% effluent. The acute toxicity results show that only one of the seven tests conducted during this period showed any acute toxicity (January 2006). This sample had a TU_A of 1.11 units, which would require a dilution of 3.7:1 to achieve the acute WET standard of 0.3 TU_A.

The toxicity tests demonstrate that the Alyeska BWTF effluent exhibits relatively low toxicity, with the no effect concentrations varying between 50% - 100% effluent. A summary of the analyses conducted since permit reissuance is provided in Table A-2 of Appendix A.

After evaluating the dilution factors proposed by ADEC, EPA has determined that discharges from Outfall 001 do not have reasonable potential to cause or contribute to exceedances of AWQS for WET. Therefore, no permit limits for acute or chronic WET have been developed for this permit reissuance. However, to ensure that Alaska water quality standards for WET are being met at the edge of the significantly re-sized mixing zones, the draft permit requires ongoing WET monitoring for Outfall 001.

EPA is requiring the Permittee to continue to conduct quarterly (i.e., four times per year, every three months) short-term chronic toxicity tests on Outfall 001. However, rather than requiring two invertebrate tests (i.e., the echinoderm fertilization test and bivalve test), EPA is replacing the quarterly bivalve test with a quarterly test using a vertebrate species, the topsmelt. As the more sensitive of the two invertebrate tests, the echinoderm fertilization test will be retained. ADEC has authorized a mixing zone for chronic toxicity with a dilution factor of 9.6:1, the receiving water concentration for chronic toxicity is 10.4% effluent. Applying Alaska's water quality criteria for chronic toxicity, 1.0 TU_C, results in an end-of-pipe chronic toxicity trigger of 9.6 TU_C.

EPA is replacing the annual acute toxicity test with a quarterly toxicity test using the same species and test method as the previous permit. ADEC has proposed to authorize a significantly smaller mixing zone for acute toxicity, thus more routine monitoring of this discharge is necessary to ensure that acute toxicity requirements are met at the edge of the mixing zone. ADEC has proposed a mixing zone for acute toxicity with a 3.7:1 dilution factor. Alaska does not have numeric water quality criteria for acute toxicity and, therefore, EPA applied the nationally recommended criteria of 0.3 TU_A to establish acute toxicity triggers and limits. Applying the national acute toxicity criteria results in a receiving water concentration of 90% effluent and an end-of-pipe acute toxicity trigger of 1.1 TU_A.

2. OUTFALL 002 – SANITARY WASTES

WET data is not available for Outfall 002. Discharges from Outfall 002 consist of small volumes (i.e., 10,000 gpd) of sanitary wastewater. The facility does not have any significant industrial users or indirect dischargers and the wastewater is primarily composed of organic matter and nutrients associated with human waste. The facility has a good record of compliance, with only 4 permit limit exceedances for BOD_5 and TSS, both conventional

non-toxic pollutants. In addition, the small discharge volume from Outfall 002 results in very rapid and complete mixing around the outfall. Due to the small discharge volume, the lack of indirect dischargers or significant industrial users contributing toxic pollutants into the wastestream, and the significant amount of rapid mixing available in the receiving water, EPA has determined that discharges from Outfall 002 do not have reasonable potential to cause or contribute to violations of AWQS for WET. As a result, no WET monitoring will be required for this discharge.

VI. OTHER PERMIT CONDITIONS

A. QUALITY ASSURANCE PLAN (QAP)

Federal regulations at 40 CFR §122.41(e) require Permittees to properly operate and maintain their facilities, including "adequate laboratory controls and appropriate quality assurance procedures." To implement this requirement, the draft permit requires that the Permittee develop or update a Quality Assurance Plan (QAP) to ensure that the monitoring data submitted is complete, accurate, and representative of the environmental or effluent condition. The QAP must contain standard operating procedures that the Permittee must follow for collecting, handling, storing and shipping samples for laboratory analysis and data reporting. The facility is required to prepare (or update) a Quality Assurance Plan (QAP) within 90 days of the effective date of the final permit. The QAP shall be prepared in accordance with EPA guidance documents, EPA QA/R-5 (EPA Requirements for Quality Assurance Project Plans) and EPA QA/G-5 (Guidance for Quality Assurance Project Plans). The QAP must be retained on site and made available to EPA and ADEC upon request. Annual verification of QA implementation is required and can be satisfied by a letter from the Permittee attaching verification letters from in-house and contracted laboratories.

B. BEST MANAGEMENT PRACTICES PLAN (BMP)

Pursuant to Section 402(a)(1) of the Clean Water Act, development and implementation of BMP Plans may be included as a condition in NPDES permits. Section 402(a)(1) authorizes EPA to include miscellaneous requirements in permits on a case-by-case basis, which are deemed necessary to carry out the provisions of the Act. BMPs, in addition to numerical effluent limitations, are required to control or abate the discharge of pollutants in accordance with 40 CFR §122.44(k). The BMP Plan requirement has also been incorporated into this permit in accordance with EPA BMP guidance (EPA, 1993). The requirements are also reflective of the pollution prevention provisions present in the AWQS at 18 AAC 70.015(2)(D). This provision is part of the antidegradation policy and requires that "methods of pollution prevention, control, and treatment" should be applied to "wastes and other substances to be discharged."

The draft permit requires the development and implementation of a BMP Plan, which prevents or minimizes the generation and potential release of pollutants from the facility to the waters of the United States through best management practices. This includes, but is not limited to, material storage areas, site runoff, storm water, in-plant transfer, process and material handling areas, loading or unloading operations, spillage or leaks, sludge and waste disposal, or drainage from raw material storage. The BMP Plan should incorporate elements of pollution prevention as set forth in the Pollution Prevention Act of 1990. (42 U.S.C. 13101).

The BMP Plan must be amended whenever there is a change in the facility or in the operation of the facility which materially increases the potential for an increased discharge of pollutants. The BMP Plan will become an enforceable condition of the permit; a violation of the BMP Plan is a violation of the permit. The BMP Plan shall continue to address the standard components of BMP Plans and shall also:

1. Be documented in narrative form, and shall include any necessary plot plans, drawings or maps, and shall be developed in accordance with good engineering practices.
2. Ensure that the requirements of the BMP Plan are considered as part of planned facility modifications, and that construction and supervisory personnel are aware of and take into account possible spills or releases of pollutants during construction.
3. Require an annual BMP Plan review by the responsible manager and the BMP Committee. The Plan shall also require an annual statement that the above reviews have been completed and that the BMP Plan fulfills the requirements set forth in this permit. The statement shall be certified by the dated signatures of each BMP Committee member. This statement shall be submitted to EPA and ADEC on or before June 15th of each year of operation under this permit after the initial BMP submittal.
4. Establish specific best management practices to for each component or system capable of generating or causing a release of significant amounts of pollutants, and identifying specific preventative or remedial measures to be implemented.
5. Continue to ensure proper management of solid and hazardous waste in accordance with regulations promulgated under the Resource Conservation and Recovery Act (RCRA) and the Alaska Solid Waste Management (ASWM) Regulations (18 AAC 60). Management practices required under RCRA and ASWM regulations shall be referenced in the BMP Plan.
6. Continue to reflect requirements for Spill Prevention, Control, and Countermeasure plans under Section 311 of the Act and 40 CFR Part 112 and may incorporate any part of such plans into the BMP Plan by reference.

7. Continue to reflect appropriate storm water controls to eliminate, to the extent practicable, the contamination of storm water runoff at the Valdez Marine Terminal through the development and implementation of storm water pollution prevention practices. Monitoring of storm water discharges shall meet the minimum monitoring requirements of 40 CFR 122.44(i)(4)(i, ii, and iii). If the evaluation required by 40 CFR 122.44(i)(4)(i) identifies that additional measures are necessary to reduce pollutant loading, then the storm water pollution prevention practices shall be amended within six months to appropriately reduce pollutant loading. The term "storm water" as used in this paragraph is given the meaning of "storm water" associated with industrial activity as defined in 40 CFR 122.26(b)(14).

8. Continue to address the following specific BMP requirements:

a) *BTT Monitoring.* Dissolved oxygen shall be continuously monitored in the BTTs and temperature shall be continuously monitored at the effluent sampling location. Analytical results shall be made available to the EPA and/or ADEC upon request.

b) *Construction/Maintenance Activities.* The Permittee shall develop and update provisions in the BMP Plan to maximize the collection and minimize the discharge of wastes generated during construction and/or maintenance activities from the berths, Valdez Marine Terminal docks, main firewater pump house, boat launches, and navigational/mooring buoys. Activities covered shall include, but are not limited to, surface preparation, hydro blasting, cleaning, demolition, metal cutting, and welding. The Permittee shall develop best management practices within the BMP Plan to minimize to the extent technically and economically feasible the discharge of construction and maintenance wastes. The Permittee shall notify EPA and ADEC, in writing, of the expected dates of the activity at least 15 days prior to project startup

c) *Valdez Marine Terminal Fire Water System Discharges.* The Permittee shall develop and update BMPs to limit, manage, and control the discharges from the jockey pump, firewater pump testing and maintenance, berth fire foam system testing, and hydrant testing and maintenance. The BMPs shall to the extent possible, (1) direct discharges to the oily water sewer system, (2) minimize fire water discharges during snowless conditions, (3) minimize discharges into No Name and Dayville Creeks, (4) discharge when the ground surface is covered with snow and/or ice, and (5) minimize floating residue from the berth fire foam testing system.

d) *Coagulants and Other Treatment Chemicals.* The Permittee shall insure that the BMP Plan addresses coagulants and other treatment chemical in the "Description of Influents."

e) *Air Stripper Media Maintenance Practices.* The Permittee shall develop

and update provisions in the BMP Plan to prevent the discharge of air stripper media.

The proposed permit also includes a requirement under the pollution prevention report for the Permittee to analyze the overall facility changes identified within this fact sheet and the potential effects on the efficiency of the design and operation of the current treatment process. The pollution prevention report is required to be submitted to EPA and DEC one year after the effective date of the permit.

C. ADDITIONAL PERMIT PROVISIONS

In addition to facility specific requirements, most of sections II, III, IV and V of the draft permit contain standard regulatory language that must be included in all NPDES permits. Because they are federal regulations, they cannot be challenged in the context of an NPDES permit action. The standard regulatory language covers requirements such as monitoring, recording, and reporting requirements, compliance responsibilities, and other general requirements.

VII. OTHER LEGAL REQUIREMENTS

A. STATE WATER QUALITY STANDARDS AND CERTIFICATION

Section 401 of the CWA requires EPA to seek State certification before issuing a final permit. As a result of the certification, the State may require more stringent permit conditions or additional monitoring requirements to ensure that the permit complies with State water quality standards or other applicable State law requirements. EPA obtained ADEC's draft certification on January 27, 2012. The draft certification contained authorizations for a 50-meter mixing zone around Outfall 001 and a 10-meter mixing zone around Outfall 002, which EPA has included in the proposed permit.

In accordance with 40 CFR §124.10(c)(1), public notice of the draft permit has been provided to the State agencies having jurisdiction over fish, shellfish and wildlife resources.

B. ENDANGERED SPECIES ACT

Pursuant to 40 C.F.R. § 122.49(c), the following effect determinations (Table 6) are made based on the Biological Evaluation (BE) EPA developed to assist with consultations with the U.S. Fish and Wildlife Service (USFWS) and National Marine Fisheries Service (NMFS) for the proposed permit action in accordance with the Endangered Species Act (ESA) Section 7.

TABLE 6: *Summary of ESA Effect Determinations*

SPECIES	ESA STATUS	JURISDICTIONAL AGENCY	CRITICAL HABITAT	EFFECT DETERMINATION
Kittlitz's Murrelet (*Brachyramphus brevirostris*)	Candidate	Alaska	Not Designated	**NLAA[1]**
Humpback Whale (*Megaptera noveangliae*)	Endangered	Central/Western North Pacific	Not Designated	**NLAA[1]**
Steller Sea Lion (*Eumetopias jubatus*)	Endangered Threatened	Western (West of 144°W Longitude) Eastern (East of 144°W longitude)	Western (West of 144 W Longitude)	**NLAA[1]**

[1] May affect, but are not likely to adversely affect

EPA is requesting concurrence from USFWS and NMFS on the determinations and will consider their comments in the final permit decisions.

C. ESSENTIAL FISH HABITAT

Under the Magnuson-Stevens Fishery Conservation and Management Act, NMFS and various fisheries management councils must identify and protect "essential fish habitat" (EFH) for species managed under the Act. The EFH regulations define an *adverse effect* as any impact that reduces quality and/or quantity of EFH and may include direct (e.g. contamination or physical disruption), indirect (e.g. loss of prey, reduction in species fecundity), site-specific, or habitat wide impacts, including individual, cumulative, or synergistic consequences of actions.

EPA's assessment of EFH includes a listing of EFH species in the facility area, characterization of the discharge, and evaluation of potential effects. EPA has identified the following EFH species in Port Valdez: salmon (pink, chum, sockeye, chinook, and coho), herring, halibut, Tanner crab, Dungeness crab, spot shrimp, coon-striped shrimp, and several species of rock fish. The facility activity, receiving water characteristics, and the discharge composition were described in §§ I – IV of this fact sheet. As discussed previously, the requirements of the draft permit, including the effluent limitations, were developed to protect water quality in accordance with state water quality standards. The standards protect the beneficial uses of Port Valdez, including all life stages of aquatic life. During development of the draft permit limitations, the basic elements of ecological risk were evaluated: effluent characterization including toxicity evaluations, exposure assessment, transport of pollutants, effluent and transport variability, and effluent and environmental monitoring results. EPA has determined that the discharges authorized under this permit will not adversely affect EFH.

D. POLLUTION PREVENTION ACT

It is national policy that, whenever feasible, pollution should be prevented or reduced at the source, that pollution which cannot be prevented should be recycled in an environmentally safe manner, and that disposal or release into the environment should be employed only as a last resort and should be conducted in an environmentally safe manner. The Permittee will discharge at the facility in accordance with best management practices which will address the provisions of the Pollution Prevention Act.

E. OIL SPILL REQUIREMENTS

Section 311 of the Clean Water Act prohibits the discharge of oil and hazardous materials in harmful quantities. Discharges specifically authorized by the draft permit are excluded from the provisions of Section 311 because these discharges are limited to amounts and concentrations which are deemed to be protective of State water quality standards. However, the permit does not preclude the institution of legal action or relieve the Permittee from any responsibilities, liabilities, or penalties for other unauthorized discharges of pollutants which are covered by Section 311 of the Act.

VIII. MODIFICATION OF PERMIT LIMITS OR OTHER CONDITIONS

When EPA receives information that demonstrates the existence of reasonable cause to modify a permit in accordance with 40 CFR § 122.62(a), EPA may modify the permit. "Reasonable cause" includes alterations or additions to the facility or activity, new federal regulations or standards, new state water quality standards, the completion or modification of total maximum daily loads or wasteload allocations for the receiving water of the facility (also, see 40 CFR § 122.44(d)((1)(vii)(B)), failure of the permit to protect state water quality standards, a change in a Permittee's qualification for net limits, any relevant compliance schedule, the need to incorporate or revise a pretreatment or land application plan, when pollutants which are not limited in the permit exceed the level which can be achieved by technology-based treatment, the correction of technical mistakes and legal misinterpretations of law made in determining permit conditions, and the receipt of new information relevant to the determination of permit conditions. Minor modifications to a permit may be made by EPA with the consent of a Permittee in order to correct typographical errors, change an interim compliance schedule, allow for a change in ownership, change a construction schedule, or delete an outfall. Pursuant to 40 CFR § 122.63, such minor modifications may be made without public notice and review.

IX. PERMIT EXPIRATION

The permit will expire five years from its effective date. In accordance with 40 CFR § 122.6(a), the conditions of an expired permit continue in force under 5 U.S.C. § 558(c) until the effective date of a new permit, when a Permittee submits an application for

permit reissuance 180 days before the expiration of the permit. Permits which are continued remain fully effective and enforceable.

X. LIST OF ACRONYMS AND DEFINITIONS

§ means section or subsection.

AAC means Alaska Administrative Code.

ADEC means Alaska Department of Environmental Conservation.

Average monthly discharge limitation means the average of "daily discharges" over a monitoring month, calculated as the sum of all daily discharges measured during a monitoring month divided by the number of daily discharges measured during that month. It may also be referred to as the "monthly average discharge."

AWQS means Alaska Water Quality Standards.

Best management practices ("BMPs") means schedules of activities, prohibitions of practices, maintenance procedures, and other management practices to prevent or reduce the pollution of "waters of the United States." BMPs also include treatment requirements, operating procedures, and practices to control plant site runoff, spillage or leaks, sludge or waste disposal, or drainage from raw material storage.

BPJ means Best Professional Judgment as described within 40 CFR §§ 122.43, 122.44 and 125.3.

Bypass means the intentional diversion of waste streams from any portion of a treatment facility.

ºC means degrees Celsius.

CPA means ConocoPhillips Alaska, Inc.

CFR means Code of Federal Regulations.

CV means coefficient of variation.

CWA means the Clean Water Act, (formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972) Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483 and Public Law 97-117, 33 U.S.C. 1251 et seq.

Daily discharge means the discharge of a pollutant measured during a calendar day or any 24-hour period that reasonably represents the calendar day for purposes of sampling. For pollutants with limitations expressed in units of mass, the "daily discharge" is calculated as the total mass of the pollutant discharged over the day. For pollutants with limitations expressed in other units of measurement, the "daily discharge" is calculated as the average measurement of the pollutant over the day.

Daily maximum discharge means the highest allowable "daily discharge" and is also referred to as the "maximum daily discharge."

Discharge of a pollutant means any addition of any "pollutant" or combination of pollutants to "waters of the United States" from any "point source" or any addition of any pollutant or combination of pollutants to the waters of the "contiguous zone" or the ocean

from any point source other than a vessel or other floating craft which is being used as a means of transportation.

Discharge Monitoring Report ("DMR") means the EPA uniform national form, including any subsequent additions, revisions, or modifications for the reporting of self-monitoring results by permittees. DMRs must be used by "approved States" as well as by EPA.

Effluent limitation means any restriction imposed by the Director on quantities, discharge rates, and concentrations of "pollutants" which are "discharged" from "point sources" into "waters of the United States," the waters of the "contiguous zone," or the ocean.

EPA means U.S. Environmental Protection Agency.

ESA means the Endangered Species Act.

ºF means degrees Fahrenheit.

Facility or activity means any NPDES "point source" or any other facility or activity (including land or appurtenances thereto) that is subject to regulation under the NPDES program.

gpd means gallons per day.

gpm means gallons per minute.

LTA means longterm average.

MA/NLAA means "may affect, but not likely to adversely affect".

Maximum means the highest measured discharge or pollutant in a waste stream during the time period of interest.

Maximum daily discharge limitation means the highest allowable "daily discharge."

MDL means Method Detection Limit.

MGD means million gallons per day.

mg/L means milligrams per liter.

Mixing zone means the zone of dilution authorized by the Alaska Department of Environmental Conservation under 18 AAC 70.240 wherein pollutant concentrations may exceed the criteria of the AWQSs for the proscribed pollutants.

ML means the minimum level of detection, which is defined as the lowest concentration that gives recognizable signals and an acceptable calibration point for laboratory analysis.

MLLW means mean lower low water.

NMFS means National Marine Fisheries Service.

National Pollutant Discharge Elimination System ("NPDES") means the national program for issuing, modifying, revoking and reissuing, terminating, monitoring and enforcing permits, and imposing and enforcing pretreatment requirements, under sections 307, 402, 318, and 405 of CWA.

O&M means Operation and Maintenance.

OWW means EPA Region 10's Office of Water and Watersheds.

Point source means any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.

Pollutant means dredged spoil, solid waste, incinerator residue, filter backwash, sewage, garbage, sewage sludge, munitions, chemical wastes, biological materials, radioactive materials, heat, wrecked or discarded equipment, rock, sand, cellar dirt, and industrial, municipal, and agricultural waste discharged into water.

Process wastewater means any water which, during manufacturing or processing, comes into direct contact with or results from the production or use of any raw material, intermediate product, finished product, byproduct, or waste product.

QAP means Quality Assurance Plan.

RWC means receiving water concentration, which is the inverse of the dilution factor.

Technology-based effluent limit means a permit limit or condition based upon EPA's technology-based effluent limitation guidelines or EPA's best professional judgment.

TRC means Total Residual Chlorine.

TSD means Technical Support Document.

USFWS means U.S. Fish and Wildlife Service.

µg/L means micrograms per liter.

Upset means an exceptional incident in which there is unintentional and temporary noncompliance with permit effluent limitations because of factors beyond the reasonable control of the permittee. An upset does not include noncompliance to the extent caused by operational error, improperly designed treatment facilities, inadequate treatment facilities, lack of preventive maintenance, or careless or improper operation.

Water quality-based effluent limit (WQBEL) means a permit limit derived from a state water quality standard or an appropriate national water quality criteria.

WET means Whole Effluent Toxicity.

WLA means wasteload allocation.

WQBEL means water-quality-based effluent limitation.

APPENDIX A. FACILITY INFORMATION

TABLE A-1: ALYESKA PIPELINE SERVICE CO. (VALDEZ MARINE TERMINAL)	
NPDES Permit Number	AK-002324-8
Mailing Address	P.O. Box 196660 Anchorage, Alaska 99508
Facility Background	EPA issued NPDES permit no. AK-002324-8 to Alyeska Pipeline Service Co. (Alyeska) for the Ballast Water Treatment Plant (BWTP) on December 30, 1974, and reissued the permit in August 1980, May 1989, May 1997 and June 2004. The 1989 and 1997 permits included domestic wastewater discharges from the facility. Alyeska submitted timely and complete Forms 1 and 2C to EPA Region 10 on January 30, 2009, in application for renewal of the permit.
Facility Location	The Alyeska BWTP is located near Jackson Point (a subarctic fjord) on the Prince William Sound in Valdez, Alaska. Outfall 001, which discharges treated ballast water and other operational wastes, is located at 61° 05' 26" N and 146° 23' 08" W. Outfall 002, which discharges treated domestic sewage is located at 61° 05' 14" N and 146° 23' 24" W.
FACILITY INFORMATION	
Treatment Train	Gravity Separation, Dissolved Air Flotation, Shallow Tray Air Strippers, Biological Treatment, Packed-Tower Air Strippers, Chemical Injection (for coagulation, biocide treatment and disinfection) and Oil Recovery
Design Flow	Maximum Daily = 10.1 MGD; Max Monthly Flow = 5.54 MGD
Outfall Location	The ballast water treatment plant discharges a treated wastestream through a 1,100 foot long outfall pipe (Outfall 00: 61° 05' 26" N and 146° 23' 08" W) into approximately 62 - 82 meters of water. The domestic wastewater plant discharges a treated wastestream through a single outfall pipe (Outfall 002: 61° 05' 14" N and 146° 23' 24" W) into approximately 12 meters of water.
RECEIVING WATER INFORMATION	
Receiving Water	Port Valdez (arm of Prince William Sound)
Beneficial Uses	Port Valdez is classified by the Alaska Water Quality Standards (AWQSs) as Classes II A(i)(ii)(iii), B(i)(ii), C and D for use in aquaculture, seafood processing and industrial water supply, water contact and secondary recreation, growth and propagation of fish, shellfish, aquatic life and wildlife, and harvesting for consumption of raw mollusks or other raw aquatic life.
ESA Listed Species	Kittlitz's Murrelet (*Brachyramphus brevirostris*), Humpback Whale (*Megaptera noveangliae*), Steller Sea Lion (*Eumetopias jubatus*)

TABLE A-2: *Summary of WET Test for the BWTF (2002 – 2009)*

TEST DATE	TEST ORGANISM AND TYPE OF TOXICITY TEST	NOEC	LOEC	IC_{25} OR LC_{25}	IC_{50} OR LC_{50}	TU_C OR TU_A
Jan-02[1]	*Mysidopsis bahia, Acute*	100	100	100	1.00	0.03
Jan-02	*S. purpuratus, Chronic*	100	100	100	1.00	<1.0
April-02	*S. purpuratus, Chronic*	50	100	100	1.00	<1.0
Jul-02	*D. excentricus, Chronic*	100	100	100	1.00	<1.0
Oct-02	*D. excentricus, Chronic*	6.25	12.5	48.9	2.04	<1.0
Jan-03[1]	*Mysidopsis bahia, Acute*	100	100	100	1.00	0.03
Jan-03	*S. purpuratus, Chronic*	100	100	100	1.00	<1.0
Apr-03	*S. purpuratus, Chronic*	100	100	100	1.00	<1.0
Jul-03	*S. purpuratus, Chronic*	100	100	100	1.00	<1.0
Nov-03	*S. purpuratus, Chronic*	100	100	100	1.00	<1.0
Jan-04[1]	*Mysidopsis bahia, Acute*	100	100	100	1.00	0.03
Jan-04	*S. purpuratus, Chronic*	100	100	100	1.00	<1.0
May-04	*S. purpuratus, Chronic*	80	>80	80	1.25	<1.0
Sep-04	*D. excentricus, Chronic*	90	>90	90	1.11	<1.0
Dec-04	*S. purpuratus, Chronic*	90	>90	90	1.11	<1.0
Jan-05[1]	*Mysidopsis bahia, Acute*	100	100	100	1.00	0.03
Jan-05	*S. purpuratus, Chronic*	80	>80	80	1.25	<1.0
May-05	*D. excentricus, Chronic*	6.25	12.5	10.43	9.59	<1.0
May-05	Bivalve larvae	80	>80	>80	1.25	<1.0
May-05	*Mytillis spp.*	80	>80	80	1.25	<1.0
Jul-05	*S. purpuratus, Chronic*	95	>95	95	1.05	<1.0
Oct-05	*S. purpuratus, Chronic*	90	>90	90	1.11	<1.0
Oct-05	*Mytillis spp.*	90	>90	90	1.11	<1.0
Jan-06[1]	*Mysidopsis bahia, Acute*	90	>90	90.00	1.11	0.03
Jan-06	*S. purpuratus, Chronic*	90	>90	>90	1.11	<1.0
Apr-06	*S. purpuratus, Chronic*	50	>85	>85	1.2	<1.0
Apr-06	Bivalve survival	85	>85	>85	1.2	<1.0
Sep-06	*D. excentricus, Chronic*	6.25	12.5	24.59	4.0	<1.0
Sep-06	Bivalve survival	85	>85	>85	1.2	<1.0
Nov-06	*D. excentricus, Chronic*	>90	>90	>90	1.10	<1.0
Nov-06	Bivalve survival	90	90	>90	1.10	<1.0
Jan-07[1]	*Mysidopsis bahia, Acute*	50.00	100	100	1.00	0.03
Jan-07	*S. purpuratus, Chronic*	90	>90	>90	1.10	<1.0
Jan-07	Bivalve survival	25	50	68.4	1.5	<1.0
Apr-07	*S. purpuratus, Chronic*	75	>75	>75	1.3	<1.0
Apr-07	Bivalve survival	80	>80	>80	1.25	<1.0
Apr-07	Bivalve development	80	>80	>80	1.25	<1.0
Jul-07	*D. excentricus, Chronic*	25	85	52	1.9	<1.0
Jul-07	Bivalve survival	90	>90	>90	1.10	<1.0
Jul-07	Bivalve development	50	90	>90	1.10	<1.0
Nov-07	Bivalve development	50	90	90.2	1.11	<1.0
Nov-07	Bivalve survival	90	>90	>90	1.10	<1.0
Feb-08[1]	*Mysidopsis bahia, Acute*	100	100	100	1.00	0.03
Feb-08	*S. purpuratus, Chronic*	6.25	12.5	>90	1.10	<1.0
Apr-08	*S. purpuratus, Chronic*	50	80	>80	1.30	<1.0
Apr-08	Bivalve survival	85	>85	>85	1.20	<1.0
Apr-08	Bivalve development	85	>85	>85	1.2	<1.0
Jul-08	*S. purpuratus, Chronic*	12.5	25	>70	1.4	<1.0

Jul-08	Bivalve development	12.5	25	55.4	1.8	<1.0
Jul-08	Bivalve survival	80	>80	>80	1.25	<1.0
Oct-08	*S. purpuratus, Chronic*	>80	>80	>80	<1.25	<1.0
Oct-08	Bivalve development	80	>80	>80	1.25	<1.0
Oct-08	Bivalve survival	80	>80	>80	1.25	<1.0
Jan-09	Bivalve development	85	>85	>85	<1.00	<1.0
Jan-09	Bivalve survival	85	>85	>85	<1.00	<1.0
Jan-09[1]	*Mysidopsis bahia, Acute*	100	>100	>100	<1.00	0.03

NOTES: [1]Acute WET test

NOEC means no observed effect concentration. *LOEC* means lowest observed effect concentration. *IC*, inhibition concentration, is a point estimate of the toxicant concentration that would cause a given percent in a nonlethal biological measurement of the test organisms, such as reproduction or growth. *LC*, lethal concentration, is the point estimate of the toxicant concentration that would be lethal to a given percentage of the test organisms during a specific period. *TU*, toxic unit, is a measure of acute or chronic toxicity.

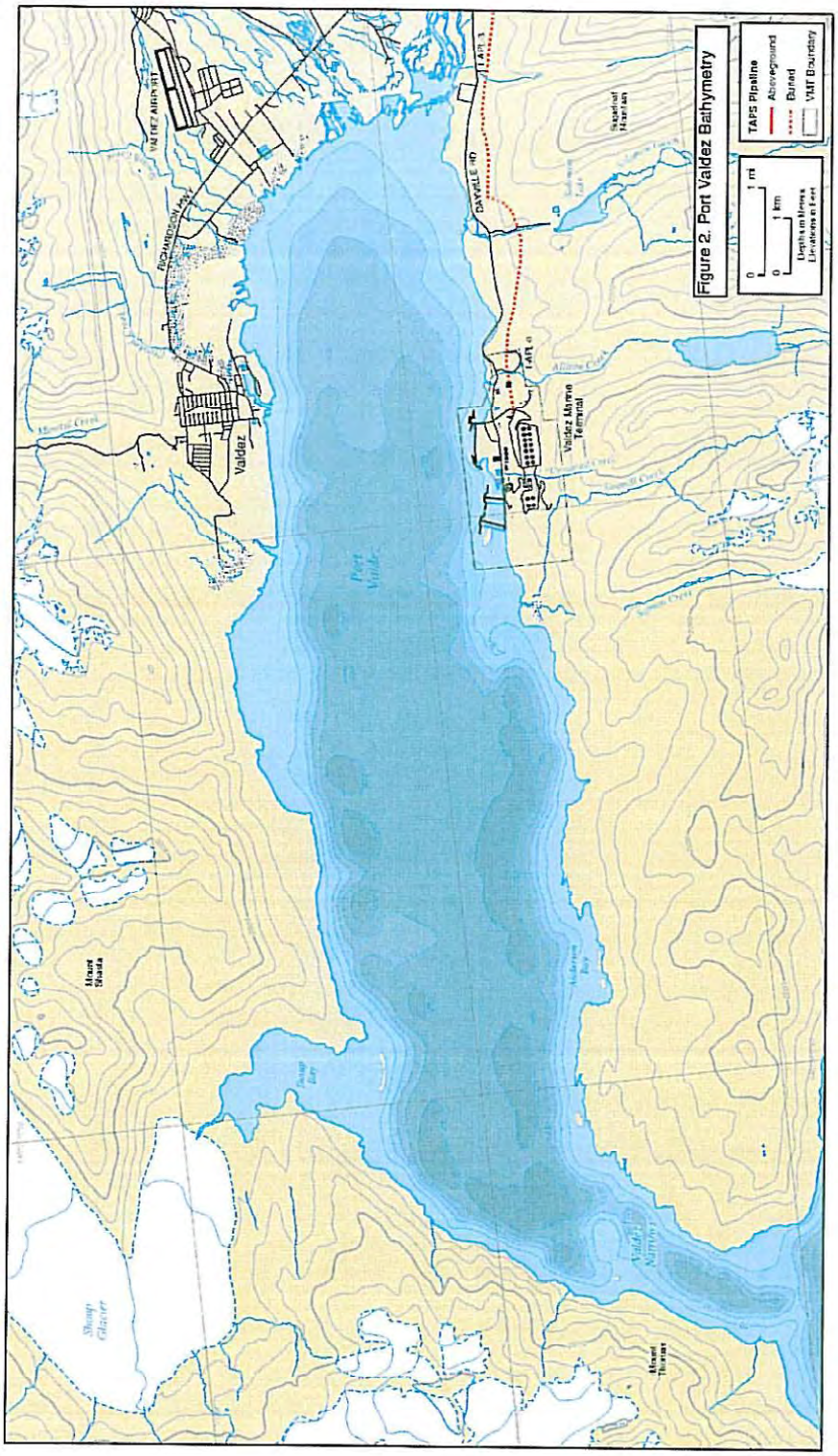

FIGURE A-1: *Location of Alyeska Pipeline Service Co. – Valdez Marine Terminal and bathymetry of Port Valdez.*

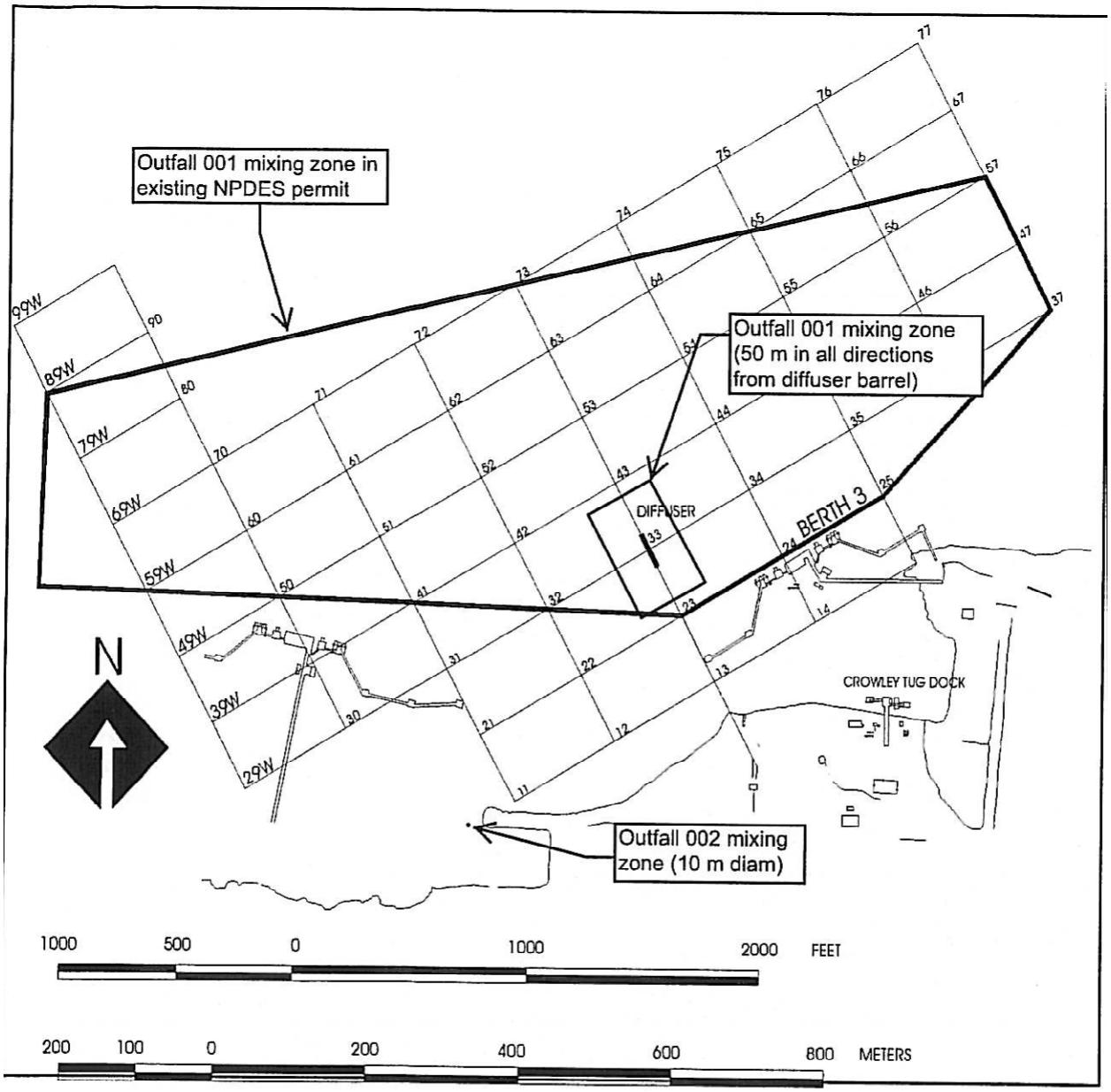

FIGURE A-2: *Comparison of 2004 Mixing Zone Boundary and the requested 2011 Mixing Zone Boundary for Outfall 001.*

APPENDIX B. BASIS FOR WATER QUALITY BASED EFFLUENT LIMITATIONS

TABLE B-1: *Applicable Alaska Water Quality Standards*

OUTFALL	POLLUTANT PARAMETER	CRITERIA
001	Total Aromatic Hydrocarbons	10 µg/L
001, 002	pH	6.5 – 8.5[1]
002	Fecal Coliform	43 FC/100mL *and* 14 FC/100mL[2]
002	*Enterococci*	35 cfu/100mL[3] *and* 276 cfu/100mL[4]
002	Total Residual Chlorine	7.5 µg/L (acute) *and* 13 µg/L (chronic)

Notes: [1]May not vary more than 0.1 pH unit from natural conditions
[2]Fecal Coliform counts shall not exceed a median most probable number (MPN) of 14 fecal coliform (FC)/100 ml and not have more than 10 percent of all samples obtained for calculating the MPN value exceeding 43 FC/100 mL
[3]Geometric Mean
[4]Instantaneous, single sample maximum

In addition to the numeric criteria, above, the most stringent narrative criteria based on the beneficial uses for Port Valdez are summarized in the following paragraphs:

1. **Residues.** Floating solids, debris, sludge, deposits, foam, scum, or other residues may not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use; cause acute or chronic problem levels as determined by bioassay or other appropriate methods; cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines.

2. **Odor or Taste to Fish or Aquatic Organisms.** Substances may not be present in concentrations that individually or in combination impart undesirable odor or taste to fish or other aquatic organisms based on bioassay or organoleptic tests.

A. REASONABLE POTENTIAL EVALUATION

1. Determination of Reasonable Potential

To determine if there is "reasonable potential" to cause or contribute to an exceedance of water quality criteria for a given pollutant (and therefore whether a water quality-based effluent limit is needed), for each pollutant present in a discharge, EPA compares the maximum projected receiving water concentration to the criteria for that pollutant. If the projected receiving water concentration exceeds the criteria, there is "reasonable potential," and a limit must be included in the permit. EPA uses the recommendations in Chapter 3 of the TSD (EPA, 1991) to conduct this "reasonable potential" analysis.

2. Reasonable Potential Evaluation Procedure with Numeric Criteria

a) Because the effluent discharges are to a marine environment, the appropriate steady-state mixing model to calculate the minimum dilution at critical conditions is:

$$C_D \times (V_D + V_E) = (C_{E_MAX} \times V_E) + (C_U \times V_D),$$

where, C_D is the projected receiving water concentration, V_D is the volume of the receiving water used for mixing (i.e., the mixing zone dilution), C_{E_MAX} is the maximum effluent concentration, V_E is the estimated volume of effluent discharged, and C_U is the existing receiving water concentration prior to effluent discharge.

The predicted receiving water concentration (C_D) can be calculated by rearranging the basic mass balance equation, as follows:

$$C_D = \frac{(C_{E_MAX} \times V_E) + (C_U \times V_D)}{V_D + V_E}$$

If C_U is equal to 0, the equation becomes

$$C_D = \frac{C_{E_MAX} \times V_E}{V_D + V_E}$$

The equation above can be simplified by introducing the dilution factor (DF):

$$DF = (V_D + V_E)/V_E$$

The dilution factor is determined from computer modeling performed by the applicant and confirmed by ADEC.

b) The criterion is then compared to the maximum projected receiving water concentration to determine the need for a water-quality-based effluent limitation (WQBEL). If the projected receiving water concentration is equal to or greater than the criterion, then a WQBEL for that pollutant must be incorporated into the permit.

When determining the projected receiving water concentration, the TSD recommends using the maximum *projected* effluent concentration. To determine the maximum projected effluent concentration (C_E), EPA has developed a statistical approach to better characterize the effects of effluent variability. The approach combines knowledge of effluent variability as estimated by a coefficient of variation (CV) (standard deviation/mean) with the uncertainty due to a limited number of data to project an estimated maximum concentration for the effluent. Once the CV for a parameter has been calculated, the reasonable potential multiplier used to derive the maximum projected effluent concentration (C_E) can be

calculated using the method provided in Section 3.3.2 of EPA's TSD. The maximum projected effluent concentration (C_E) for the effluent is equal to the highest observed value of the data set (C_{E_MAX}) multiplied by the reasonable potential multiplier (RPM).

Using the reasonable potential multiplier (RPM) the maximum projected effluent concentration (C_E) can be calculated:

$$C_E = RPM \times C_{E_MAX}$$

3. Reasonable Potential Evaluation Procedure with Narrative Criteria.

EPA must establish levels that are protective of the narrative criteria (40 CFR 122.44(d)(1)(vi)) in the absence of State numeric criteria and when there is reasonable potential for the discharge to cause or contribute to an excursion that results in the violation of the narrative water quality standard. In order to determine this, EPA must use the best information available to characterize the conditions of the receiving water body and the point source discharge (effluent).

4. Reasonable Potential Analysis for *Total Aromatic Hydrocarbons (TAH)*.

The draft permit contains TAH limits that are a result of EPA's review of BTEX daily monitoring data. EPA determined the water quality based effluent limits (WQBELs) for TAH by using a BETX effluent data set consisting of 514 samples taken between January 1, 2004 and September 28, 2011. The maximum concentration measured was 0.55 *mg/L* and, mean value was 0.01 *mg/*L and coefficient of variation (CV) was 5.33. This analysis yielded a reasonable potential multiplier of 13.3.

Using the reasonable potential multiplier (RPM), the maximum projected effluent concentration (C_E) can be calculated:

$$C_E = RPM \times C_{E_MAX} = 13.3 \text{ x } 0.55 = 7.31 \ mg/L$$

Using the reasonable potential multiplier (RPM), the maximum projected effluent concentration (C_E) and the dilution factor (DF), the projected receiving water concentration (C_D) can be calculated:

$$C_D = C_E \times (1/DF)$$

$$C_D = 7.31 \times (1/56)$$

$$C_D = 0.13 \ mg/L$$

The AWQS criterion for TAH is 0.01 *mg/L*; the Outfall 001 effluent has the reasonable potential to exceed water quality criterion for TAH.

5. Reasonable Potential Analysis for *Total Aqueous Hydrocarbons (TAqH)*.

The draft permit continues to require TAqH monitoring. EPA determined that water quality based effluent limits (WQBELs) were not necessary for TAqH by using the TAqH effluent data set consisting of 91 samples taken between January 1, 2004 and September 28, 2011. The maximum concentration

measured was 0.018 *mg/L* and, mean value was 0.006 *mg/L* and coefficient of variation (CV) was 0.68. This analysis yielded a reasonable potential multiplier of 4.87.

Using the reasonable potential multiplier (RPM) the maximum projected effluent concentration (C_E) can be calculated:

$$C_E = RPM \times C_{E_MAX} = 4.87 \text{ x } 0.018 = 0.088 \textit{ mg/L}$$

Using the reasonable potential multiplier (RPM), the maximum projected effluent concentration (C_E) and the dilution factor (DF), the projected receiving water concentration (C_D) can be calculated:

$$C_D = C_E \times (1/DF)$$

$$C_D = 0.088 \times (1/56)$$

$$C_D = 0.0016 \textit{ mg/L}$$

The AWQS criterion for TAqH is 0.015 *mg/L*; the Outfall 001 effluent does not have the reasonable potential to exceed water quality criterion for TAqH.

6. Reasonable Potential Analysis for *Fecal Coliform Bacteria*.

Fecal coliform are a type of bacteria that are found in the intestines and fecal matter of human beings and warm-blooded animals. Discharges of treated sanitary wastewater (human wastes) are likely to contain fecal coliform, unless disinfected. The most stringent Alaska water quality standard for marine water uses, that for protecting water quality for harvesting for consumption of raw mollusks or other raw aquatic life, requires that the fecal coliform levels shall both not exceed a median most probable number (MPN) of 14 fecal coliform (FC)/100 mL and not have more than 10 percent of all samples obtained for calculating the MPN value exceeding 43 FC/100 mL. (18 AAC §70.020(b)(14)).

Between January 2004 and July 2011, fecal coliform levels in the plant effluent ranged as high as 294,000 colonies/100 mL and averaged 3,149 colonies/100 mL (geometric mean). Due to high variability in the data, the calculated CV=18.5, which resulted in a RPM of 14.7.

Using the reasonable potential multiplier (RPM) the maximum projected effluent concentration (C_E) can be calculated:

$$C_E = RPM \times C_{E_MAX} = 14.7 \text{ x } 294{,}000 \text{ FC} = 4{,}315{,}900 \text{ FC/100mL}$$

The projected effluent concentration is significantly larger that AWQS criteria for the instantaneous maximum (43 FC/100mL). As a result, the facility shows reasonable potential to cause or contribute to excursions above Alaska's water quality standards for fecal coliform bacteria and an effluent limit must be imposed.

7. Reasonable Potential Analysis for *Total Residual Chlorine (TRC)*.

The draft permit includes TRC limits for Outfall 002. Evaluating the technology-based effluent limits for TRC, EPA will implement the 0.5 mg/L technology-based effluent limit as an average monthly limit. A maximum daily limit can be calculated using Table 5-3 of the Technical Support Document for Water Quality-based Toxics Control (EPA/505/2-90-001), which provides ratios between average monthly and maximum daily limits. Assuming a sampling frequency of once per month and a coefficient of variation of 0.6, and using the 95th percentile probability basis for the average monthly limit and the 99th percentile probability basis for the maximum daily limit, the ratio between the average monthly limit and the maximum daily limit is 1.46:1. Therefore, the technology-based maximum daily limit for TRC is 0.5 × 1.46 = 0.73 mg/L.

Setting the maximum daily limit for TRC equal to maximum projected effluent concentration (CE) and using the dilution factor (DF), the projected receiving water concentration (CD) can be calculated:

$$CD = CE \times (1/DF)$$

$$CD = 0.73 \times (1/600)$$

$$CD = 0.00012 \text{ mg/L}$$

The AWQS acute and chronic criterions for TRC are 0.013mg/L and 0.0075 mg/L, respectively; the Outfall 002 effluent does not have the reasonable potential to exceed water quality criterion for TRC.

B. WATER QUALITY-BASED PERMIT LIMIT DERIVATION

In the event that EPA determines a water quality-based limit is required for a pollutant, the first step in developing the permit limit is development of a wasteload allocation (WLA) for the pollutant. A WLA is the concentration (or loading) of a pollutant that may be discharged without causing or contributing to an exceedence of water quality standards in the receiving water. The WLAs and permit limits are derived based on guidance in the TSD (EPA, 1991). The WLAs are then converted to long-term average concentrations (LTAs) and compared. The most stringent LTA concentration for each parameter is converted to effluent limits.

1. Mixing Zones for Outfall 001

For this reissuance of the permit, ADEC has authorized acute and chronic mixing zones for Outfall 001, providing dilution ratios of 3.7:1 and 56:1, respectively. If ADEC certifies mixing zones with different dilution ratios, or denies a mixing zone, EPA will recalculate the water quality-based effluent limits for TAH.

2. Mixing Zones for Outfall 002

For this reissuance of the permit, ADEC has authorized a mixing zone for Outfall 002, providing a dilution ratio of 600:1. If ADEC certifies a mixing zone with

different dilution ratios, or denies a mixing zone, EPA will recalculate the water quality-based effluent limits.

3. Total Aromatic Hydrocarbons (TAH; Outfall 001)

The Alaska water quality standard for TAH for protection of aquatic life in marine water is 10 *µg/L*. The resulting Reasonable Potential Analysis (see summary calculations in Section A.4. of this Appendix) indicated that WQBELs are necessary for TAH.

Using procedures in the TSD, EPA determined the effluent TAH limits necessary to meet water quality standards at the edge of the preliminarily determined chronic mixing zone. For this determination it is appropriate to use only the chronic mixing zone (TSD, page 103). A strict evaluation of the 95th and 99th percentiles for determining the Wasteload Allocation (WLA) and Long-Term Average (LTA), respectively, results in the following permit limits:

(1) WLA = (DF×WQC) = 56 × 0.010 *mg/L* = 0.56 *mg/L*

(2) $LTA_{Chronic} = WLA_C \times e^{[0.5\sigma_4^2 - z\sigma_4]} = 0.056$ *mg/L*

Where: $\sigma_n^2 = \ln(CV^2/n+1)$

z = 2.326 for 99th percentile probability basis

(3) $AML = LTA \times e^{[z\sigma_n - 0.5\sigma_n^2]} =$ <u>0.21 *mg/L*</u>

Where: $\sigma_n^2 = \ln(CV^2/n+1)$

z = 1.645 for 95th percentile probability basis

(4) $MDL = LTA \times e^{[z\sigma - 0.5\sigma^2]} =$ <u>0.73 *mg/L*</u>

Where: $\sigma_n^2 = \ln(CV^2/n+1)$

z = 2.326 for 99th percentile probability basis

These proposed limits would ensure that the TAH standard is achieved at the edge of the mixing zone. Additionally, imposing these new limits on the existing daily BETX data set resulted in *zero* exceedances of the proposed Maximum Daily Limit.

4. Fecal Coliform Bacteria (Outfall 002)

The most stringent water quality criterion for fecal coliform in Alaska waters is for protection of the use of human consumption of raw mollusks and other raw aquatic life. The criterion is a median of 14 fecal coliform (FC)/100 mL, with the additional restriction that no more than 10% of the samples may exceed 43 FC/ 100 mL (18 AAC 70.020(b)).

No mixing zone is authorized for fecal coliform bacteria for Outfall 002. In cases where a mixing zone is not authorized, the wasteload allocations

(WLAs) are equal to the water quality criteria.

There are two water quality criteria values, therefore, two WLAs must be calculated and expressed as water quality-based effluent limits, as follows:

(1) $WLA_{geometric}$ = WQC = 14 FC/100mL

(2) WLA_{Max}= WQC = 43 FC/100mL

It would be protective of the water quality criteria to express the geometric mean WLA in the permit as a monthly geometric mean effluent limitation, and to express the WLA based on the single sample maximum criterion as an instantaneous maximum limit. Therefore, the water quality-based effluent limits for fecal coliform bacteria are:

(3) Monthly Geometric Mean Limit: **14 FC/100 ml**

(4) Instantaneous Maximum Limit: **43 FC/100 ml**

There are no technology-based effluent guidelines for secondary wastewater treatment facilities for fecal coliform bacteria. In the absence of such guidelines, Section 402(a)(1) of the CWA authorizes the Administrator to issue a permit containing "such conditions as the Administrator determines are necessary to carry out the provisions of the Act." In such cases, technology-based limits are developed using Best Professional Judgment (BPJ) under 40 CFR §125.3. The BPJ analysis follows:

a) *Best Professional Judgment (BPJ) Determination*

i. The technology of disinfection, usually chlorination (with or without dechlorination) or ultraviolet radiation, is widely used in secondary wastewater treatment facilities throughout the country and the world. It can achieve the fecal coliform bacteria limits proposed in this permit at a cost that is borne by the vast majority of POTWs and other secondary treatment works. Fecal coliform bacteria is an indicator of bacteriological contamination, which presents a probable detriment to human health and wildlife, including threatened and endangered species, in the area. Therefore, requiring disinfection that is widely used in similar facilities does not represent an unusual economic burden compared to the benefits of fostering a healthy environment both for humans and wildlife.

ii. The facility could implement chlorination, potentially coupled with dechlorination because of the low chlorine limit proposed in this permit. UV disinfection is also a technology that may be installed successfully.

b) *Choice of technology-based limit*

iii. A technology-based limit for fecal coliform (FC) was promulgated in the 1973 secondary treatment effluent limitations at 40 CFR §133.102(c): 200 FC/100 ml as a monthly geometric mean and 400

FC/100 ml as a weekly geometric mean. The basis for applying this technology-based limit to POTW effluents was the large number of organisms that accompany fecal coliform in typical domestic wastewater, organisms that may cause plant, animal, or human diseases.

Though later rescinded as part of the secondary treatment effluent limitations, the same limits have been applied widely across the country to secondary treatment effluents. This wide experience has shown that these limits are technologically and economically achievable using standard disinfection technology in POTWs.

iv. Alaska defines *disinfection* in terms of technology-based standards as producing an effluent with limits of 200 FC/100 ml (30 day average), and 400 FC/100 ml (7 day average).

Since the technology-based effluent limits for fecal coliform bacteria are less stringent than the water quality-based limits, the water quality-based effluent limits are the limits that appear in the permit.

5. Enterococci (Outfall 002)

The water quality criteria for Enterococci for marine waters in Alaska were promulgated by EPA in 40 CFR 131.41. The criteria are a geometric mean of 35 cfu/100 mL and a single sample maximum of 276 cfu/100 mL.

No mixing zone is authorized for Enterococci for Outfall 002. In cases where a mixing zone is not authorized, the wasteload allocations (WLAs) are equal to the water quality criteria.

Similar to fecal coliform, there are two water quality criteria values. Therefore, two WLAs must be calculated and expressed as water quality-based effluent limits, as follows:

(1) $WLA_{geometric} = WQC = 35cfu/100mL$

(2) $WLA_{Max} = WQC = 276\ cfu/100mL$

Again, it would be protective of the water quality criteria to express the geometric mean WLA in the permit as a monthly geometric mean effluent limitation, and to express the WLA based on the single sample maximum criterion as an instantaneous maximum limit. Therefore, the water quality-based effluent limits for *Enterococci* are:

(3) Monthly Geometric Mean Limit: **35 cfu/100 ml**

(4) Instantaneous Maximum Limit: **276 cfu/100 ml**

6. pH

The draft permit incorporates the pH range of 6.0 to 8.5 standard units for Outfall 001 and 6.0 – 9.0 standard units for Outfall 002.

7. Residues

The draft permit prohibits any discharge of floating solids, debris, sludge, deposits, foam, scum, or other residues of any kind in concentrations causing nuisance, objectionable, or detrimental conditions or that make the water unfit or unsafe for the use.

APPENDIX C. REFERENCES

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