



# FACT SHEET

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PUBLIC COMMENT EXPIRATION DATE:           NOVEMBER 29, 2010

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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:

**B.P. EXPLORATION (ALASKA), INC.  
PRUDHOE BAY SEAWATER TREATMENT PLANT (AK-002984-0)**

**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 Prudhoe Bay Seawater Treatment Plant to Stefansson Sound of the Beaufort Sea, off Alaska's North Slope at 70°24'43"N latitude, 148°33'31"W longitude. 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  
Email: [marc.bentley@alaska.gov](mailto:marc.bentley@alaska.gov)

#### **ALASKA COASTAL MANAGEMENT PROGRAM**

On August 31, 2010, the Alaska Department of Natural Resources' (ADNR) Division of Coastal and Ocean Management determined that the reissuance of this NPDES permit does not require further review for consistency with the Alaska Coastal Management Program (ACMP) under 15 CFR 930 since the modification would not cause coastal impacts substantially different from those previously reviewed.

#### **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 Alaska Department of Environmental Conservation (ADEC) contact listed above.

**DOCUMENTS ARE AVAILABLE FOR REVIEW**

The draft NPDES permit, fact sheet and related documents can be reviewed or obtained by visiting or contacting the EPA's Regional Office in Seattle 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](http://www.epa.gov/R10earth/waterpermits.htm)".

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**TABLE OF CONTENTS**

**I. APPLICANT ..... 5**

**II. BACKGROUND INFORMATION ..... 5**

    A. FACILITY OVERVIEW ..... 5

    B. PROCESS DESCRIPTION ..... 6

**III. RECEIVING WATER..... 7**

    A. NATURE OF STEFANSSON SOUND..... 7

    B. WATER QUALITY STANDARDS..... 7

    C. ISSUES OF SITE-SPECIFIC INTEREST..... 7

**IV. EFFLUENT LIMITATIONS ..... 9**

    A. BASIS FOR PERMIT EFFLUENT LIMITS ..... 9

    B. PROPOSED EFFLUENT LIMITATIONS ..... 10

    C. TECHNOLOGY – BASED EVALUATION ..... 11

    D. MIXING ZONE AND OTHER VARIANCES TO STATE WATER QUALITY STANDARDS ..... 12

    E. WATER QUALITY – BASED EVALUATION ..... 12

**V. MONITORING AND REPORTING REQUIREMENTS..... 14**

    A. BASIS FOR EFFLUENT AND SURFACE WATER MONITORING..... 14

    B. EFFLUENT MONITORING ..... 15

    C. MINIMUM DETECTION LEVELS ..... 15

    D. SURFACE WATER MONITORING..... 16

    E. WHOLE EFFLUENT TOXICITY (WET) TESTING..... 16

**VI. OTHER PERMIT CONDITIONS..... 17**

    A. QUALITY ASSURANCE PLAN (QAP)..... 17

    B. BEST MANAGEMENT PLAN (BMP)..... 17

    C. BASIS FOR ANNUAL REPORT..... 18

    D. ADDITIONAL PERMIT PROVISIONS ..... 18

**VII. OTHER LEGAL REQUIREMENTS ..... 18**

    A. STATE WATER QUALITY STANDARDS AND CERTIFICATION ..... 18

    B. ENDANGERED SPECIES ACT ..... 19

    C. ESSENTIAL FISH HABITAT..... 19

    D. COASTAL ZONE MANAGEMENT ACT ..... 19

    E. POLLUTION PREVENTION ACT..... 20

    F. OIL SPILL REQUIREMENTS..... 20

**VIII. MODIFICATION OF PERMIT LIMITS OR OTHER CONDITIONS..... 20**

**IX. PERMIT EXPIRATION..... 21**

**X. LIST OF ACRONYMS AND DEFINITIONS..... 22**

**APPENDIX A. FACILITY INFORMATION ..... 25**

**APPENDIX B. BASIS FOR WATER QUALITY BASED EFFLUENT LIMITATIONS ..... 27**

    A. REASONABLE POTENTIAL EVALUATION ..... 27

    B. WATER QUALITY-BASED PERMIT LIMIT DERIVATION ..... 29

**APPENDIX C. REASONABLE POTENTIAL DETERMINATION..... 30**

**APPENDIX D. REFERENCES..... 31**

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## I. APPLICANT

This fact sheet provides background information on the draft NPDES permit for the seawater treatment plant identified below. When issued, the permit will provide Clean Water Act (CWA) authorization for wastewater discharge to the Beaufort Sea of the North Slope of Alaska.

### Applicant:

BP Exploration (Alaska) Inc.  
P.O. Box 196612  
900 East Benson Boulevard  
Anchorage, Alaska 9950 Harbor View

### Facility Contact:

Tom Barrett  
Water Quality Compliance Authority  
B.P Exploration (Alaska) Inc.  
P.O. Box 196612  
Anchorage, AK, 99519-6612  
Phone: (907) 561-5111

## II. BACKGROUND INFORMATION

### A. FACILITY OVERVIEW

BP Exploration (Alaska) Inc. (BPXA) is the operator of the Prudhoe Bay Seawater Treatment Plant (“the facility”). The facility is located at the terminus of the West Dock Causeway, which is on the mainland shoreline at the eastern end of Stefansson Sound in the Beaufort Sea and immediately west of Prudhoe Bay (Figure A-1, Appendix A).

BPXA acquired ownership of the facility from ARCO Alaska, Inc. on July 1, 2000. The STP operates in accordance with the U.S. Environmental Protection Agency’s (EPA) NPDES permit AK-002984-0. The original NPDES permit for this facility was issued in December 1980 and became effective in January 1981. The permit was reissued in October 1986, December 1992, and in March 2000. On November 29, 2004, BPXA submitted a timely and complete application for renewal of the permit, and has been operating under an administrative extension.

The original facility operations included three continuous discharges into Stefansson Sound. The discharges were from the strainer/filter backwash system that discharged through Outfall 001A, the marine life return system (MLRS) that discharged through Outfall 002, and a sanitary and domestic wastewater that

discharged through Outfall 001B. The MLRS was decommissioned after studies showed that biological organisms were not negatively impacted by the facility's intake. This process stream will remain non-operational at the facility. In addition, the domestic and sanitary wastewater discharge was also discontinued at the facility and is currently pumped to a seawater injection plant (SIP) for waterflood.

## **B. PROCESS DESCRIPTION**

The Prudhoe Bay Seawater Treatment Plant is designed to treat a maximum of 25,000,000 gallons per day (gpd) of seawater. However, the daily maximum discharge for the facility is 12,400,000 gpd. The operation of the facility results in one continuous discharge through Outfall 001, while all other flows are disposed of through underground injection.

The overall purpose of the STP is to provide treated seawater for injection into the petroleum reservoir to maintain formation pressures and allow secondary oil recovery from production wells. It also provides water for the Grind and Inject facility (Class II Underground Injection Control (UIC)).

Particulates are removed from the seawater through a filter feed strainer system, which is continuously backwashed. Strainer backwash is heated prior to discharge through Outfall 001. This is the only effluent to be routinely discharged through the main outfall (Outfall 001); effluents from other processes at the facility are sent to the SIP for underground injection.

The STP processes include the sporadic use of disinfectants (hypochlorite) to mitigate corrosion and the production of hydrogen sulfide due to microbial activities. The disinfectants are applied in-line between the filter feed strainers and the media filters. No other chemical agents are applied upstream of the recycle lines

Water clarifying agents and organic biocides, authorized under the previous permit, have not recently been used in areas of the STP that could result in their discharge through the main outfall. Currently, biocides are in use downstream of all waste and recycle streams, which mitigate the potential for discharge through Outfall 001, these flows are directed to the SIP.

The discharge for Outfall 001 is through a buried line that is oriented in a due north direction that terminates 340 m offshore of the shoreline and the end of the West Dock Causeway in 4.0 – 4.5 m of water with a 210 ft (64 m) long multiport diffuser. The diffuser consists of 22 ports that are spaced 10 ft (3.05 m) apart with 4 inch (11.43 cm) diameter nozzles and 1-ft (0.305 m) risers that are oriented 20-degrees from the horizontal in the vertical direction and oriented horizontally into and away from the prevailing current in an alternating fashion.

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### **III. RECEIVING WATER**

#### **A. NATURE OF STEFANSSON SOUND**

Within Stefansson Sound, the relatively shallow shelf depths act as a mixing basin. The clearer, generally colder and more saline ocean waters interact with the more turbid, sediment-bearing, fresher inflows from the Sagavanirktok, Kadleroshilik, Shaviovik, and other rivers.

Stefansson Sound is similar to numerous other coastal embayment and barrier island systems in the Arctic Ocean in that at least two distinct seasonal changes occur each year. For three to four months of each year, the nearshore waters are essentially ice-free and the dynamic processes associated with wind and waves attain their highest levels of activity. Between mid-September and mid-October, freeze-up of the waters usually begins in the lagoons, inlets and bay as the water temperature drops to about -1.8oC. By late spring (March to April), the ice layer has usually achieved its maximum thickness. Ice melt in the ocean and nearshore lagoons usually starts in early June. On average, the nearshore waters are open by late July or early August, with pack ice laying approximately 6 – 15 miles offshore. The transition period between open-water and ice-cover is characterized by broken and mobile ice flows, which scour and grind the nearshore waters to depths of 12 to 20 feet MLLW.

#### **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.

The Beaufort Sea 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.

#### **C. ISSUES OF SITE-SPECIFIC INTEREST**

Arctic marine waters are characterized by fewer species, with larger numbers of

individuals per species than in temperate waters. Shorter food chains, or less complex food webs, exist. Because of this relative simplicity of food web composition, arctic marine systems have been deemed less diverse, and therefore more susceptible to disruption and fluctuation. While large fluctuations in community composition do occur, they are probably more related to the harsh realities of the physical environment of the shallow Arctic coast than to the intrinsic lack of biological diversity.

Phytoplankton has always been considered the base of the food web in the Arctic, with the implication that the massive bloom during the short open-water season sustains the communities throughout the year, or that most invertebrates are in a “resting stage” during the winter. However, recent work has found that terrestrial plant material eroded into the marine system is an important component of the food web base as well. Beyond the shallow inshore zone of ice scour, sessile, long-lived organisms such as kelps, sponges, mollusks and soft corals exist.

Distribution, abundance, and species diversity of the macroinvertebrates of the Beaufort Sea is strongly influenced by the physical-chemical environment. The following factors have been found to be particularly important to the macroinvertebrate community (Carey et al. (1974)):

- Sediment character and distribution
- Ice scouring out to the middle continental shelf
- Water and routes of organic material input to the sea floor
- Uniformly cold temperatures
- Stability of the overlying water column

Structurally, the macrofauna of the western Beaufort Sea is dominated by annelids, mollusks, and arthropods (infauna). Annelids are the most abundant group found and comprised from 32 to 87 percent of the total number of infauna collected. Mollusks and arthropods rank equally in abundance after annelids. The numerical density of macroinfauna increased across the continental shelf and down the upper continental slope to a depth of 700 meters.

Fish in Stefansson Sound can be classified into three general categories:

- Marine species living in the marine or brackish environment. Marine species in the Stefansson Sound region include Arctic cod, Arctic flounder, Pacific sand lance, slender eel blenny, snailfish, capelin, and four-horn sculpin. Of these, only the Arctic cod and four-horn sculpin have been captured in large numbers.
- Freshwater species, which occasionally move into Stefansson Sound when salinity is low, may live in the plumes of large rivers. However, such freshwater species do not occur in significant numbers.
- Anadromous species are freshwater forms that migrate to the sea in summer and return to freshwater to overwinter or spawn. Several species

of anadromous fishes have been taken from Stefansson Sound. Least and Arctic cisco and dolly char are considered to be “key” species. Both species of cisco prey mostly on mysids and amphipods. The diet of the dolly varden char in Stefansson Sound is dominated by amphipods, juvenile Arctic cod and mysids.

Approximately 60 fish have been reported in the Alaskan Beaufort Sea, as compared to over 300 in the Bering Sea and Gulf of Alaska. This relatively low diversity has been attributed to low temperature, low productivity, and severe ice conditions in the nearshore area during the winter period. Approximately 30 species occur in the nearshore areas, including 16 anadromous species. During the open-water period, anadromous species become concentrated in the warmer, less saline waters around the Sagavanirktok and other major river deltas for feeding, particularly within 100 meters of the shoreline. Certain anadromous fish, such as whitefish and least cisco, spawn in the Sagavanirktok River and do not appear to disperse far from their river of origin.

Marine mammals, which occur regularly in the Beaufort Sea, include the beluga whale, ringed seal, spotted seal, bearded seal, walrus, and polar bear. Species which occur occasionally or rarely include the harbor porpoise, killer whale, narwhal, and hooded seal. In general, these mammals occur in much greater concentrations in the western Beaufort Sea.

#### **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.

**B. PROPOSED EFFLUENT LIMITATIONS**

The following summarizes the proposed effluent limitations that are in the draft permit (Table 1) 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 for seawater treatment plants on the North Slope; (2) respond to changes in facility operations (e.g., intermittent use of biocides and chlorinating agents); and (3) respond to effluent and environmental monitoring data.

<b>TABLE 1: Effluent Limitations and Monitoring Requirements (Discharge 001)</b>				
<b>Parameter</b>	<b>Average Monthly Limit</b>	<b>Maximum Daily Limit</b>	<b>Sampling Method and Frequency</b>	<b>Reported Values</b>
<b>Flow</b>	--	12.4 MGD	Calculation or Meter; Daily	Average Monthly and Maximum Daily; <i>MGD</i>
<b>pH</b>	6.0 s.u. – 9.0 s.u. at all times		Grab or Meter; Weekly	Average Monthly and Maximum Daily; <i>s.u.</i>
<b>Total Residual Chlorine (TRC) – Open-Water Conditions</b>	150 µg/L	320 µg/L	Grab; Daily	Average Monthly and Maximum Daily; <i>µg/L</i>
<b>Total Residual Chlorine (TRC) – Under Ice Conditions</b>	50 µg/L	150 µg/L		
<b>Temperature – Open Water Conditions</b>	--	Not to exceed 16°C over ambient values	Recording or Meter; Daily	Maximum Daily; °C
<b>Temperature – Under Ice Conditions</b>	--	Not to exceed 17.3°C over ambient values		
<b>Ambient Temperature<sup>1</sup></b>	--	--	Recording or Meter; Daily	Maximum Daily; °C
<b>Whole Effluent Toxicity (WET)<sup>2</sup></b>	--	--	24-hour Composite; Quarterly	Report; <i>TU<sub>C</sub></i>

Notes: <sup>1</sup> Monitor outside the edge of the mixing zone. This sample can be taken at the seawater intake bay.

<sup>2</sup> Applicable when biotreatment is conducted upstream of the strainer system or when chlorination/dechlorination chemicals are used upstream of, or within, the strainer system or otherwise discharged through Outfall 001.

### **Outfall 001**

1. The limit on maximum flow of 12.4 MGD is retained from the previous permit.
2. The average monthly limits and maximum daily limits of 150µg/L and 320µg/L for open water conditions and 50 µg/L and 150 µg/L for under ice conditions, respectively, are retained from the previous permit.
3. The maximum daily temperature limits of “not to exceed 16°C above ambient for discharges in open-water conditions” and “not to exceed 17.3°C above ambient for discharges in under-ice conditions” are included in the proposed permit. The permit also requires monitoring of ambient temperature. These are new requirements.
4. Whole effluent toxicity (WET) monitoring is required quarterly when biotreatment activities are conducted upstream of the strainers or when chlorination/dechlorination chemicals are used upstream of, or within, the strainer system or otherwise discharged through Outfall 001. This is a new requirement.
5. The pH must be between 6.0 to 9.0 standard units. This is a new requirement.
6. There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water. This requirement is retained from the previous permit.

### **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. Where EPA has not yet developed guidelines for a particular industry, EPA can establish permit limitations using Best Professional Judgment (BPJ; 40 CFR §§ 122.43, 122.44 and 125.3).

EPA has not established national effluent guidelines for seawater treatment facilities.

**D. MIXING ZONE AND OTHER VARIANCES TO STATE WATER QUALITY STANDARDS**

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, BPXA has re-applied for a 100-meter mixing zone around Outfall 001 for pH, Turbidity, Temperature, Sediment, Total Residual Chlorine (TRC), Residues, Color, and WET. The mixing zone is defined as the area of a 100 meter radius circle, centered at the discharge point, from the sea floor to the surface. Table 2 summarizes the dilution factors requested by BPXA 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.

**TABLE 2:** *Outfall 001 dilution factors*

PARAMETER		DILUTION FACTOR
Temperature	Open Water	14.6:1
	Under Ice	16.3:1
TRC	Acute	8.2:1
	Chronic	12.3:1

**E. WATER QUALITY – BASED EVALUATION**

Water quality-based limits are derived from the AWQSs to protect the water quality and beneficial uses of Alaskan waters. The NPDES regulation at 40 CFR § 122.44(d)(1) 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 water quality standard, including state narrative criteria for water quality.” The limits must be stringent enough to ensure that State water quality standards are met. Since Stefansson Sound 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 BPXA’s monitoring of its effluents and its receiving waters, water quality-based limits are justified for flow, temperature, TRC, and pH.

Of these potential pollutants, there is no addition of turbidity, sediment, or residues in the concentration of these elements in the seawater treatment process which returns “dirty” seawater to the Beaufort Sea. 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 is applicable to Discharge 001 that states the discharge of floating solids and visible foam in other than trace amounts is prohibited.

AWQS for pH is that it may not be less than 6.5 nor greater than 8.5, and may not vary more than 0.2 pH unit from natural conditions.

There is a continuous addition of heat, TRC, and potentially coagulants, which establish the need for water quality-based permit limits. AWQS require that the temperature of a discharge may not exceed 15°C or cause the weekly average to increase by more than 1°C, and that normal daily temperature cycles may not be altered in amplitude or frequency. The AWQS for chlorine for protection of aquatic life in marine water is 7.5 µg/L as a four-day average (chronic) and 13 µg/L as a one-hour average (acute). State criteria for potentially toxic chemicals such as synthetic coagulants are that such substances shall not be present in concentrations which could be reasonably expected to cause toxic effects on aquatic life.

As presented in Table 1, water quality-based limits are imposed on flow, temperature, pH, and TRC for Outfall 001.

### **Outfall 001**

1. The limit on daily maximum flow of 12.4 MGD , established for Discharge 001, is retained from the previous permit. Monitoring data from January 2005 through December 2009 indicate that the average flow rate for the filter/strainer backwash system is 5.5 MGD, with a maximum daily flow of 9.9 MGD.
2. TRC concentrations for the monitoring period of January 2005 through December 2009 for Outfall 001 ranged from a daily minimum of 10 µg/L to a daily maximum of 120 µg/L, with no permit limit exceedances. As such, EPA is retaining the effluent limits from the previous permit.
3. The limit on maximum temperature, which shall not exceed 16°C above ambient for discharges in open-water conditions and not to exceed 17.3°C above ambient for discharges in under-ice conditions are included in the proposed permit for Discharge 001. The limits incorporate the dilution factors of 14.6:1 for open water conditions and 16.3:1 for discharges under ice conditions, as granted by ADEC’s 100-meter mixing zone for temperature. The permit also requires monitoring of ambient temperature.
4. 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 6.6 to a high of 8.7, which is within the acceptable range. Furthermore, the 100-meter mixing zone requested by BPXA will provide the dilution necessary for the effluent to meet the water quality standards of 6.5 to 8.5.

5. Whole Effluent Toxicity (WET) monitoring is required quarterly when biotreatment activities are conducted upstream of the filters or when clarifying agents are used.
6. There must be no discharge of any floating solids, visible foam in other than trace amounts, or oily wastes that produce a sheen on the surface of the receiving water.
7. The permit specified that organic biocides may be used to control sulfate-reducing bacteria. If strainer effluent containing such constituents is discharged through Outfall 001 the total quantity of organic biocides shall not exceed 50 gal. per treatment and no backwash discharge shall be made until forward flow has been resumed and an additional 5,000 bbl of uncontaminated seawater have passed through the treated filter. The types and quantities of the organic biocides must be reported in an annual report.

Four clarifying agents (Nalco 7607, Nalco 7768, Nalco 3332, and Chemlink 4835) were specifically approved for use at the BPXA Prudhoe Bay STP under the previous permit at applications of no more than 1 part per million (ppm). This requirement is not retained under the reissued permit. The permittee is required to report the type of clarifying agents used and the volumes of water treated in the monthly Discharge Monitoring Reports (DMRs). Quarterly WET testing requirements apply when clarifying agents are used at the facility.

Antidegradation of Water Quality: 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 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.

## **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 3 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 3 presents the monitoring requirements for the BPXA Prudhoe Bay STP 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.

<b>TABLE 3: Effluent Monitoring Requirements</b>				
<b>PARAMETER</b>	<b>UNITS</b>	<b>SAMPLE LOCATION</b>	<b>SAMPLE FREQUENCY</b>	<b>SAMPLE TYPE</b>
<b>FLOW</b>	MGD	Effluent	Daily (5/week)	Calculation or Meter
<b>TOTAL RESIDUAL CHLORINE</b>	mg/L	Effluent	Daily (5/week)	Grab
<b>PH</b>	s.u.	Effluent	Daily (5/week)	Meter or Grab
<b>TEMPERATURE</b>	°C	Effluent	Daily (5/week)	Meter or Grab
<b>WHOLE EFFLUENT TOXICITY<sup>1</sup></b>		Effluent	Quarterly (4/year)	24-hour composite
NOTES:				
1 Applicable when clarifying agents are used or when chlorination/dechlorination chemicals are used upstream of, or within, the strainer system or otherwise discharged through Outfall 001.				

**C. MINIMUM DETECTION LEVELS**

Water quality-based effluent limits (WQBELs) from the current permit have been incorporated into the draft permit to protect State water quality standards. The WQBEL for total residual chlorine falls below the capability of current analytical technology to detect and/or quantify the parameter. In order to determine

compliance with the limit for total residual chlorine, EPA is establishing the minimum level (ML) as the quantification level for use in laboratory analysis.

EPA believes that the use of the ML as an analytical chemistry performance standard provides an unambiguous and rational means to demonstrate that the best chemistry available at the time of permit issuance is being used.

The ML is defined as the lowest concentration that gives recognizable signals and an acceptable calibration point. It is the equivalent concentration of the lowest calibration standard analyzed by a specific analytical procedure, assuming that all the method specified sample weights, volumes and processing steps have been followed. MLs are analyte- and method-specific and are established during the development and validation of the method. The ML for total residual chlorine is 0.100 mg/L.

The effluent limit for Total Residual Chlorine (TRC) is not quantifiable using EPA approved analytical methods. EPA will use 0.100 mg/L (the Minimum Level, ML) as the compliance evaluation level for chlorine.

EPA has developed new guidance for reporting on the DMR when effluent limits are below detection, as follows:

For purposes of reporting Total Residual Chlorine on the DMR, if a value is less than the MDL (0.010 mg/L), the permittee must report “<0.010 mg/L” on the DMR. If the value is between the MDL and the ML (between 0.010 and 0.100 mg/L), the permittee must report “<0.100 mg/L” on the DMR. If a value is greater than or equal to the ML (0.100 mg/L), the permittee must report and use the actual value.

For purposes of calculating TRC averages, zero may be assigned for values less than the MDL, and 0.010 mg/L may be assigned for values between the MDL and ML. If the average value is less than the MDL, the permittee must report “<0.010 mg/L,” and if the average value is between the MDL and ML, the permittee must report “<0.100 mg/L.”

#### **D. SURFACE WATER MONITORING**

Surface water monitoring may be required 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 to EPA.

#### **E. WHOLE EFFLUENT TOXICITY (WET) TESTING**

EPA is requiring the permittee to conduct quarterly (i.e., four times per year, every three months) short-term chronic toxicity tests on effluent samples from Outfall

001 during quarters when biocides, and/or chlorination/dechlorination chemicals are used upstream of, or within, the strainer system. Toxicity testing is not required during quarters when no biocides, and/or chlorination/dechlorination chemicals are used. Since the use of chlorinating chemicals is the trigger for the WET testing requirements in the permit, ADEC has indicated it would authorize the same dilution mixing zone for chronic TRC and WET. Thus, the WET chronic toxicity trigger is 13.3 TU<sub>C</sub>, resulting in a receiving water concentration (RWC) of 7.5%.

## **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 IDEQ upon request.

### **B. BEST MANAGEMENT PLAN (BMP)**

The Clean Water Act and federal regulations authorize EPA to require best management practices, or BMPs, in NPDES permits (See 40 C.F.R. § 122.44(k)). BMPs are measures for controlling the generation of pollutants and their release to waterways. For many facilities, these measures are typically included in the facility Operation & Maintenance plans (O&M) plans. BMPs are important tools for waste minimization and pollution prevention. EPA encourages facilities to incorporate BMPs into their O&M plans and to revise them as new practices are developed. The permittee has promoted their control of pollutant discharges through the use of BMP plans in the past and will continue these practices into the future. The proposed permit requires the permittee to submit to EPA and ADEC, within 90 days of the effective date of the permit, a letter certifying that the BMP plan has been developed or updated and is being implemented at the Prudhoe Bay Seawater Treatment Facility .

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**C. BASIS FOR ANNUAL REPORT**

The proposed permit requires the permittee to complete and submit an annual report that summarizes the monthly use of any biocides and/or chlorination/dechlorination chemicals that are being used upstream of, or within, the strainer system or otherwise discharged through Outfall 001. The annual report will contain the type and quantity of chemicals used. The annual report also compiles effluent monitoring data and reports permit violations, upset conditions, by-pass conditions, plant or process changes, and corrective actions undertaken to improve wastewater treatment and pollution prevention at the facility for the previous year. The annual report provides a comprehensive record of wastewater discharge at the facility and must include an electronic spreadsheet containing all historical data and a comparison of monitoring results over time (to show any trends). The annual report must be assembled for the calendar year and submitted to EPA with the March DMR of the following calendar year. Title 40 of the Code of Federal Regulations provides the regulatory basis for this requirement at § 122.41 (“Conditions applicable to all permits”), §122.44(i) (“Monitoring requirements”), and §122.48 (“Requirements for recording and reporting of monitoring results”).

**D. 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 October 22, 2010. The draft certification contained authorization for a 100-meter mixing zone, 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, and over coastal zone management plans.

**B. ENDANGERED SPECIES ACT**

Pursuant to 40 C.F.R. § 122.49(c), the following effect determinations 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.

Species	ESA Status	Jurisdictional Agency	Critical Habitat	Effect Determinations
Bowhead Whale ( <i>Balaena mysticetus</i> )	Threatened	NMFS	No	MA/ NLAA <sup>1</sup>
Polar Bear ( <i>Ursus maritimus</i> )	Threatened	USFWS	Proposed	MA/ NLAA <sup>1</sup>
Spectacled eider ( <i>Somateria fischeri</i> )	Threatened	USFWS	Designated	MA/ NLAA <sup>1</sup>
Steller's eider ( <i>Polysticta stelleri</i> )	Threatened	USFWS	Designated	MA/ NLAA <sup>1</sup>
Yellow-billed Loon ( <i>Gavia adamsii</i> )	Candidate	USFWS	No	MA/ NLAA <sup>1</sup>
Kittlitz's murrelet ( <i>Brachyramphus brevirostris</i> )	Candidate	USFWS	No	<i>No Effect</i>

<sup>1</sup> 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” for species managed under the Act. EPA tentatively has determined that reissuance of this NPDES permit will *not adversely effect* essential fish habitat. Any comments received from the NMFS will be considered prior to reissuance of the final permit.

**D. COASTAL ZONE MANAGEMENT ACT**

The permittee has certified that the activities authorized by the draft permit are consistent with the Alaska Coastal Management Plan (ACMP). Pursuant to 40 CFR § 122.49(d), requirements for State coastal zone management review and approval must be satisfied before the permit may be issued. On August 31, 2010 the Alaska Department of Natural Resources (ADNR) Department of Division of

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Coastal and Ocean Management (DCOM) determined that the renewal of the NPDES permit does not require further review for consistency with ACMP)under 15 CFR 930 since the permit reissuance would not cause coastal impacts substantially different than those previously reviewed.

#### **E. 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.

#### **F. OIL SPILL REQUIREMENTS**

Section 311 of the Clean Water Act prohibits the discharge of oil and hazardous materials in harmful quantities. Discharges specifically controlled 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 toxic 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.

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**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.

BPXA means B.P. (Alaska) Exploration, Inc.

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

°C 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.

*°F* 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**

<b>B.P. EXPLORATION (ALASKA), INC. PRUDHOE BAY SEAWATER TREATMENT PLANT</b>	
NPDES Permit Number	AK-002894-0
Mailing Address	P.O. Box 196612 900 East Benson Boulevard Anchorage, Alaska 99510
Facility Background	EPA issued NPDES permit no. AK-002984-0 to ARCO (Alaska), Inc. for the STP in December of 1980, and reissued this permit on September 30, 1986 and December 31, 1992. The permit expired on December 31, 1997, and was administratively extended until the permit was reissued on April 24, 2000. BPXA acquired ownership of the STP from ARCO (Alaska), Inc. on July 1, 2000 and BPXA submitted timely and complete Forms 1 and 2C to EPA Region 10 on November 29, 2004, in application for renewal of the permit. It was noted in the application that former Discharges 001B (sanitary wastewater) and 002 (marine life return system) have both been discontinued..
Facility Location	The Prudhoe Bay STP is physically located at the terminus of a 2.5 mile, gravel-filled causeway extending into Stefansson Sound of the Beaufort Sea at Latitude 70° 24' 43" N, Longitude 148° 31' 33" W.
<b>FACILITY INFORMATION</b>	
Treatment Train	Strainer/Filter Backwash System with biocide treatment and disinfection
Design Flow	12.4 MGD
Outfall Location	The strainer/filter backwash discharges through a single outfall pipe into approximately 15 feet of water, 1,110 feet north of the STP. In the winter, the depth of free water under ice is reduced to a minimum of about eight (8) feet. The effluent discharged is seawater containing natural particulates, spent water clarifying agents, and intermittent trace amounts of TRC.
<b>RECEIVING WATER INFORMATION</b>	
Receiving Water	Stefansson Sound of the Beaufort Sea
Beneficial Uses	The Beaufort Sea 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	Bowhead Whale, Polar Bear, Spectacled eider, Stellar's eider, Kittlitz's murrelet (candidate species), and Yellow-billed loon (candidate species)



**APPENDIX B. BASIS FOR WATER QUALITY BASED EFFLUENT LIMITATIONS**

<b>TABLE B-1: <i>Applicable Alaska Water Quality Standards</i></b>			
<b>DISCHARGE</b>	<b>POLLUTANT PARAMETER</b>	<b>CRITERIA</b>	
		<b>Aquatic Acute</b>	<b>Aquatic Chronic</b>
001	Total Residual Chlorine	13.0 µg/L	7.5 µg/L
001	pH	6.5 - 8.5 <sup>1</sup>	
001	Temperature	not to exceed 15°C or cause the weekly average to increase by more than 1°C	
<b>Footnotes:</b> <sup>1</sup> May not vary more than 0.1 pH unit from natural conditions.			

In addition to the numeric criteria, above, the most stringent narrative criteria based on the beneficial uses for the Beaufort Sea and Stefansson Sound 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:

$$C_d \times (V_d + V_e) = (C_e \times V_e) + (C_u \times V_d),$$

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),  $C_e$  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:

$$C_d = \frac{(C_e \times V_e) + (C_u \times V_d)}{V_d + V_e}$$

where the ratio of the effluent volume to the receiving water volume ( $V_e \div V_d$ ) is the dilution ratio. The dilution ratio is determined from computer modeling performed by the applicant and confirmed by ADEC.

If  $C_u$  is equal to 0, the equation becomes

$$C_d = \frac{C_e \times V_e}{V_d + V_e}$$

- 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.

## 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 Residual Chlorine.

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 concentration ( $C_e$ ) for the effluent is equal to the highest observed value of the data set multiplied by the reasonable potential multiplier.

## **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. Total Residual Chlorine**

The Alaska water quality standard for chlorine for protection of aquatic life in marine water is 7.5  $\mu\text{g/L}$  as a four-day average and 13  $\mu\text{g/L}$  as a one-hour average. The resulting WQBELs (see summary calculations in Table C- 1, Appendix C) indicate that WQBELs are necessary for TRC.

### **2. pH**

The draft permit incorporates the pH range of 6.0 to 9.0 standard units.

### **3. 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. REASONABLE POTENTIAL DETERMINATION**

<b>TABLE C- 1: Reasonable Potential Analysis for TRC</b>	
<b>Facility</b>	<b>BPXA Prudhoe Bay STP</b>
Coefficient of Variation (CV)	0.842
Calculated Reasonable Potential Multiplier	6.4
Maximum Effluent Concentration (mg/L)	0.12
Maximum Projected Effluent Concentrations, CE (mg/L)	0.12
Dilution Ratio, VE/VD	16.3
Background Concentration, CU (mg/L)	0
Projected Receiving Water Concentration, CD (mg/L)	0.05
Criterion (mg/L)	0.0075
Is CD > Criterion?	yes
Reasonable Potential to exceed?	yes

The reasonable potential calculation indicates that the projected receiving water concentration ( $C_D$ ) would be greater than the water quality criterion. Therefore, the calculation indicates that the facility does have the reasonable potential to exceed the water quality standard and a water quality-based effluent limit is required for this facility.

## **APPENDIX D. REFERENCES**

- Alaska Department of Environmental Conservation, 2003. Water Quality Standards. 18 AAC 70.
- Alaska Department of Environmental Conservation, 2006. Oil and Other Hazardous Substances Pollution Control. 18 AAC 75.
- Alaska Department of Environmental Conservation, 2006. Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances.
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