



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

FACT SHEET

Date: March 12, 2009

NPDES Permit No.: AK-003866-1

**The U.S. Environmental Protection Agency (EPA) Plans to
Reissue a National Pollutant Discharge Elimination System (NPDES) Permit
to:**

BP Exploration (Alaska), Inc.
900 East Benson Boulevard
P.O. Box 196612
Anchorage, Alaska 99519-6612

EPA Proposes To Reissue NPDES Permit

EPA proposes to reissue NPDES permit to BP Exploration (Alaska), Inc. The proposed permit sets conditions on the discharge of pollutants from the **Endicott Operations (Endicott)** to Stefansson Sound off Alaska's North Slope at latitude 70°21'09" north, longitude 147°57'25" west. 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 hearing, and appeal procedures
- a description of the Endicott Operations
- a description of the Liberty Development Project, which will send its sanitary and domestic wastes to the Endicott waste water treatment plant for treatment and disposal
- a description of the proposed discharges, including a map and description of the discharge locations
- a listing of proposed effluent limitations and other conditions
- technical material supporting the conditions of the permit

Alaska State Certification

EPA requested that the Alaska Department of Environmental Conservation (ADEC) certify the NPDES permit for this facility, under Section 401 of the Clean Water Act. 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:

Shawn Stokes
Alaska Department of Environmental Conservation
Division of Water
555 Cordova Street
Anchorage, Alaska 99501-2617
Email: shawn.stokes@alaska.gov

Alaska Coastal Management Program

On October 23, 2007, the Alaska Department of Natural Resources (ADNR) Department of Division of Coastal and Ocean Management (DCOM) determined that the renewal of the 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 than those previously reviewed.

National Environmental Policy Act (NEPA)

In compliance with the Council on Environmental Quality's (CEQ) NEPA requirements at 40 CFR Parts 1500-1508 and EPA's NEPA implementing regulations at 40 CFR Part 6, EPA has prepared an Environmental Assessment (EA) to evaluate the potential environmental impacts associated with EPA's proposal to authorize the domestic and sanitary discharges from the Liberty Development Project under the Endicott NPDES permit. Based on the EA and consideration of proposed permit conditions, EPA has preliminarily concluded that the proposed discharges from the Liberty Project will not result in a significant effect on the environment. Pursuant to 40 CFR Part 6.206(a) a preliminary Finding of No Significant Impacts (FONSI) has been prepared.

Public Comment

EPA will consider all substantive comments on the draft NPDES permit, fact sheet, EA, and preliminary FONSI 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 public hearings 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:

Hanh Shaw
USEPA, Region 10
1200 Sixth Avenue Suite 900, OWW-130
Seattle, WA 98101
Fax: (206) 553-0165
E-mail: shaw.hanh@epa.gov

After the Public Notice period has ended and the public comments have been considered, EPA Region 10's Office of Water and Watersheds Director 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 draft State Certification should submit written comments by the public notice expiration date to the ADEC contact listed above.

Documents Are Available for Review

The proposed NPDES permit, fact sheet, EA, preliminary FONSI, and related documents can be reviewed at EPA's Regional Office in Seattle between 9:00 a.m. and 4:00 p.m., Monday through Friday at the addresses below. The documents can also be found by visiting the Region 10 NPDES website at <http://epa.gov/R10earth/waterpermits.htm>.

U.S. EPA: Seattle Office
1200 6th Ave, Suite 900
Seattle, WA 98101
(206) 553-0171 or (206) 553-6251

U.S. EPA: Anchorage Office
222 West 7th Avenue, #19
Anchorage, AK 99513
(907) 271-5083

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I. APPLICANT

This fact sheet provides information on the draft National Pollutant Discharge Elimination System (NPDES) permit reissuance for:

Mailing Address:

BP Exploration (Alaska), Inc. (BPXA)
900 East Benson Boulevard
P.O. Box 196612
Anchorage, Alaska 99519-6612

Physical Location:

Endicott Main Production Island (MPI)
Lat = 70 Deg 21 Min 11.0 Sec
Long = -147 Deg 57 Min 38.6 Sec

Facility Contact:

Tom Barrett
BP Exploration (Alaska) Inc.
P.O. Box 196612
900 East Benson Blvd
Anchorage, AK 99519-6612
Phone: (907) 564-4130
Fax: (907)564-5020

II FACILITY INFORMATION

A. Endicott Operations

1. Facility Location and Description

BP Exploration (Alaska), Inc. (BPXA) is the operator of Endicott Operations (Endicott) on Alaska's North Slope. Endicott consists of an offshore oil production facility, a seawater treatment plant, a desalination plant, and a wastewater treatment plant located approximately three (3) miles offshore on an artificial island/causeway complex approximately three (3) miles offshore of the Sagavanirktok River Delta in Stefansson Sound of the Beaufort Sea. Endicott operates in accordance with the U.S. Environmental Protection Agency (EPA) NPDES permit AK-003866-1. The original NPDES permit for this facility was issued in January 1986 (to Standard Alaska Production Company), and reissued on November 22, 1991 (to BPXA). The permit expired on December 23, 1996, and was administratively extended until the permit was reissued to BPXA on April 11, 2000. The 2000 permit expired on April 11, 2005. BPXA submitted timely and complete Forms 1 and 2C to EPA Region 10 on November 11, 2004, in an application for renewal of the permit. The permit was again administratively extended pending reissuance of this proposed permit.

Endicott includes a seawater treatment plant (STP) and a potable water (POW) unit (desalination plant), both of which send effluent to the combined wastewater discharge (Discharge 001); a wastewater treatment plant (WWTP, Discharge 001A), which also sends effluent to the combined wastewater discharge; and a continuous

flush system (formerly the marine life return system, Discharge 002). Presently the POW unit is not operating, however, BPXA is retaining the option to operate the system and discharge associated reject water through outfall 001. Detailed descriptions of each outfall are provided below.

In addition to these flows, the fire distribution system at Endicott was previously permitted for discharge to surface waters (Discharge 003). However, firewater at Endicott does not actually flow to Discharge 003. Instead, it generally dispersed onto the facility's gravel pad where it may percolate or run off into the Beaufort Sea or evaporate to the atmosphere. This flow is covered by EPA's North Slope General NPDES Permit (AKG-33-0063). Fire water authorization for Endicott was provided by EPA on February 19, 2004 and will not be included in this permit.

The addition of a low salinity waterflood project (*LoSal*TM) Seawater Processing Unit is currently in the planning phase, and is expected to be implemented by 2010. This *LoSal*TM Seawater Processing Unit will consist of microfiltration and reverse osmosis processes that will enhance the performance of the current STP.

2. Process Description

The Endicott operations include drilling and production and waterflood injection, with the drilling muds and cuttings disposed downhole. The STP is a key component of the waterflood project, designed for enhanced oil recovery from the Endicott reservoir. Treated seawater is injected into the oil production zone of the hydrocarbon reservoir to maintain reservoir pressure and "sweep" oil to the producing wells. It is estimated that this technique will result in an increased recovery of more than fifty (50) million barrels (MMbbl) of oil field-wide over the life of the field.

The overall function of the STP is to filter, warm, deoxygenate, and distribute necessary volumes of waterflood source seawater from Stefansson Sound to the seawater injection plant. The STP was originally designed and built to produce approximately 6.3 million gallons per day (MGD) for use in reservoir waterflood management.

B. Liberty Project

1. Background

Previously, in February 1998, BPXA submitted a DPP that proposed to develop Liberty from a gravel island constructed on the Outer Continental Shelf (OCS). At that time, the proposed project included a manmade offshore gravel island, processing facilities located on the island, and offshore buried pipeline, and an elevated onshore pipeline that would connect the island facilities to an onshore common carrier pipeline. Since 2002, the project design and scope has evolved from the offshore standalone development in the OCS to expansion of the SDI and the use of existing infrastructure to the extent feasible.

In April 2007, BPXA submitted a Development and Production Plan (DPP) to the U.S. Minerals Management Service (MMS) for the Liberty Satellite Drilling Island (SDI) Project (Liberty). The DPP proposed to develop the offshore Liberty leases

from an expansion of gravel at the Endicott SDI. Oil and gas processing and separation activities will occur at the existing Endicott facilities. On October 15, 2007, BPXA submitted a modification to the April 2007 DPP. The modification outlined redesign of the gravel mine site, which is adjacent to the existing Duck Island Mine Site; upgrade of the Sagavanirktok River bridge superstructure, versus replacement of the entire bridge; and the bridge design basis/preliminary construction plan.

In October 2007, MMS issued an Environmental Assessment (EA) titled *Liberty Development and Production Plan Ultra Extended Reach Drilling from Endicott – Satellite Drilling Island (SDI)*. On January 3, 2008, MMS approved the DPP. The U.S. Army Corps of Engineers issued its CWA Section 404 permit and Record of Decision (ROD) for Liberty on February 29, 2008.

Liberty is an oil and gas exploration, development and production activity. EPA has determined that Liberty is a new source pursuant to 40 CFR Parts 122.2 and 122.29 and, thus, is subject to new source performance standards at 40 CFR Part 435, Oil and Gas Extraction Point Source Category. A new source is subject to compliance with the requirements of the National Environmental Policy Act (NEPA) prior to EPA taking final permit action. EPA proposes to authorize coverage for sanitary and domestic wastewater discharges from Liberty through reissuance of the Endicott NPDES permit.

As such, EPA has developed an Environmental Assessment (EA) pursuant to the Council on Environmental Quality (CEQ) NEPA regulations at 40 CFR Parts 1500-1508 and EPA's NEPA implementing regulations at 40 CFR Part 6. See Part X.G., below.

2. Facility Location and Description

The Liberty reservoir is located about 5.5 miles (mi) offshore in about 20 feet (ft) of water and approximately 5 to 8 mi east of the existing Endicott SDI. To take advantage of the infrastructure at Endicott, BPXA has elected to drill the ultra-extended-reach drilling (uERD) wells from the SDI. To do this, BPXA will expand the Endicott island approximately 20 acres to support Liberty drilling. Liberty is one of the largest undeveloped light-oil reservoirs near North Slope infrastructure. BPXA estimates that Liberty could recover approximately 105 MMbbbl of hydrocarbons by waterflooding and using the *LoSal*[™] enhanced oil recovery (EOR) process.

The development drilling program will include one to four producing wells and one or two water injection wells. No well test flaring is planned for this drilling program. Production from Liberty will be sent by the existing Endicott production flowline system from the SDI to the Endicott Main Production Island (MPI) for processing. The oil would then be transported to the Trans-Alaska Pipeline (TAPS) via the existing Endicott sales-oil pipeline. Produced gas will be used for fuel gas and artificial lift for Liberty, with the balance being reinjected into the Endicott reservoir for enhanced oil recovery. Water for waterflooding will be provided via the existing produced-water injection system available at the SDI. This supply will be augmented by treated seawater if needed from the Endicott Seawater Treatment Plant. The

*LoSal*TM EOR process will be employed during a portion of the flood and will be supplied by a *LoSal*TM facility constructed on the MPI.

Associated onshore facilities to support this project will include upgrade of the existing West Sagavanirktok River Bridge, ice road construction, and development of a new permitted mine site adjacent to the Endicott Road to provide gravel for expanding the SDI. Existing North Slope infrastructure also will be used to support the project.

III PROPOSED DISCHARGES

A. Endicott Operations

1. Combined Wastewater Discharge (Discharge 001)

This outfall consists of streams from the STP and the POW unit that are commingled prior to discharge through the main outfall (Discharge 001). Both of these streams may be intermittent. The STP may not be operating if enough produced water exists in a reservoir and the addition of waterflood is not necessary for enhanced oil recovery. The POW unit may not be in operation if potable water is being hauled by truck from another potable water plant on the North Slope. In addition, the *LoSal*TM Seawater Processing Unit is in the planning phase and is expected to be part of the STP. While these wastestreams will be commingled and discharged via the same outfall, each wastestream is discussed separately below.

The use of water clarifying agents on the incoming seawater prior to further processing at the STP or the POW unit is sometimes necessitated by the high suspended sediment loads seen in the Beaufort Sea in the vicinity of the Sagavanirktok River Delta, particularly during spring breakup and summer conditions.

a. Strainer/Filter Systems Backwash from STP

The current STP facility provides treated seawater that is used for injection into the petroleum reservoir to maintain formation pressures and allow enhanced oil recovery (EOR) from production wells. Effluent from the STP that is discharged from Discharge 001 consists of a continuous flow of seawater and naturally-occurring particulate from the backwash of the strainer/mixed media filter systems that are used to remove particulate from the seawater. Backwash residues from the strainer system are unheated; backwash residues from the mixed media filters have been subject to warming. Disinfection (injection of chlorine) is used after straining but prior to the filters to prevent biofouling. No other chemical or additives are used treat the seawater at process locations upstream of the filter backwash line.

When the STP is in operation, an estimated maximum continuous flow approximately 6,300,000 gallons per day (gpd) may be discharged through Discharge 001. The projected volume includes increased discharges from the *LoSal*TM Seawater Processing Unit projected to be in place at Endicott in 2010.

A heated seawater line flows from downstream of the strainer system back to the intake basin or to the Continuous Flush System (Discharge 002). There is no use of seawater for cooling equipment (i.e., no process cooling water) at the facility. The filter feed strainers are continuously backwashed with the backwash residues going directly to the main outfall (Discharge 001).

The media filters are backwashed as needed based on differential pressure, suspended solids concentrations, and filtering rates. This process includes the use of disinfection as needed to prevent biofouling. When necessary, sodium hypochlorite injection is used between the filter feed strainers and the media filters to prevent biological (bacterial) growth in the system. A dechlorinating agent (such as sodium sulfite) is used as needed on the main outfall line downstream of both the strainer and filter backwash lines to reduce residual chlorine prior to discharge through the main outfall.

Other additives and chemicals currently needed to prepare the seawater for injection, such as oxygen scavengers, antifoamers, corrosion inhibitors, and disinfection agents, are used downstream of the existing strainer/filter systems and their backwash lines. Because of where they are currently used in the flow process, these agents cannot recycle to the intake basin nor be discharged through the main outfall. With the implementation of the *LoSal*TM Seawater Processing unit, chemical additives will be handled as described below.

The use of organic biocides is allowed in the existing permit, with requirements in place to prohibit discharge of these agents through the backwash systems. At present, organic biocides are used downstream of any process areas that could flow to the main outfall. With the implementation of the *LoSal*TM Seawater Processing unit, biocide use will be closely controlled through the use of positive isolation from the process as well as the outfall, and all biocide wastes will be collected for disposal as described below.

b. *LoSal*TM Seawater Processing Unit

The Endicott *LoSal*TM process will consist of Microfiltration (MF) and Reverse Osmosis (RO) processing technology to produce a product stream of low salinity water from treated seawater coming from the existing STP as described below. Treated water from the existing STP multimedia filters will be heated and then processed through the *LoSal*TM module prior to injection for EOR. The *LoSal*TM process will produce 1,460 gallons per minute (gpm, or 2,102,400 gpd) of low salinity water from a feed stream of 4,085 gpm (5,882,400 gpd) of treated seawater; the balance of 2,625 gpm (3,780,000 gpd) will be discharged via the main outfall (Discharge 001). The *LoSal*TM process waste streams are of three general categories: MF continuous backwash, RO brine concentrate, and batch discharge of dechlorinated and neutralized wastewater from MF/RO cleaning operations.

The MF package consists of 4 banks of 40 each MF vessels. Each bank will be backwashed automatically for 1 minute every fifteen minutes. No special cleaning chemicals will be added for the backwashing cycle. The backwash will remove

the particulate matter that accumulates in the MF cartridges. The RO membranes will produce a brine reject stream with a flow of roughly 50% of the feed stream and a total dissolved solids (TDS) concentration of 1,800-60,000 milligrams per liter (mg/l) depending on the seawater intake quality as influenced by seasonal conditions.

Twice per day, each of the four banks of MF vessels will be treated with a concentrated hypochlorite solution for disinfection. Following the disinfection treatment, the solution will be discharged into a neutralization tank to be dechlorinated prior to discharge to the main outfall.

Once per month, a deep cleansing of the MF and RO vessels with an acidic inorganic descaling solution will be carried out. This solution will be discharged to the neutralization tank and treated prior to discharge to the main outfall. Once per month, the RO membranes will be treated with an organo-bromine biocide solution. Prior to treatment, the selected bank of RO vessels will be positively isolated from the process and the outfall, then completely flushed to the spent biocide tank for disposal. This wastestream will not be discharged to the sea.

c. Potable Water System (POW)

Effluent from the POW unit is intermittent and primarily consists of brine produced by the RO desalination filters during the making of potable water for use in the living quarters and as utility water. Desalination effluent is brine with approximately twice the concentration of naturally occurring minerals and salts in the ambient seawater. Brine output averages 20,000 gpd (maximum 40,000 gpd) when the RO unit is in use. Backwash flows mix with the brine and with STP effluent before being discharged through the main outfall (Discharge 001). Prior to entering the RO unit, the seawater is heated and may also be treated with coagulants, scale inhibitors, and antifoam agents.

Closed-loop heat exchangers are used to heat seawater entering the POW system before it flows to the flocculation tank. Coagulant is applied to the seawater as it flows to the flocculation tank. Backwash from the flocculation tank may contain trace amounts of coagulant. Backwash from the primary filters used downstream of the flocculation tank is also mixed with brine from the RO unit before it commingles with the STP effluent to be discharged through the main outfall. Scale inhibitor and antifoamer agents are injected into the seawater downstream of the primary filters as it is pumped to the RO unit. High salinity brine flows from the RO unit to the main outfall. The addition of all other chemicals (corrosion inhibitor, disinfection agent, pH buffering agents) occurs downstream of the RO unit. All chemicals used in this process downstream of the RO unit are NSF-approved for use in drinking water.

2. Sanitary and Domestic Wastewater (Discharge 001A)

The wastewater treatment plant (WWTP) handles an average flow of 11,500 gpd and a maximum of 30,000 gpd of domestic and sanitary wastewater from the living quarters at the Endicott facility. At present, the treated wastewater is discharged through the main outfall along with effluents from the STP and the POW unit

(Discharge 001). However, BPXA plans to inject the treated wastewater from the WWTP to Class II Enhanced Oil Recovery (EOR) in the near future, but will keep Discharge 001 for the WWTP discharges as an alternative to injection. Therefore, discharges from Discharge 001 will continue to be authorized by the permit.

Sanitary wastes are initially processed in the WWTP using rotary screens. Solids from the rotary screens are trucked to the North Slope Borough Solid Waste Landfill under the State of Alaska Permit 0231-BA006 (Oxbow Landfill). Screened wastewater then flows into an equalization basin, an aeration tank, and into a clarifier tank. After settling, treated sludge is trucked to the Class I Underground Injection Control (UIC) at Pad 3 for disposal under EPA Permit AK-11004-A.

The clarified wastewater flows to a disinfection tank, where a chlorinated disinfection agent such as calcium hypochlorite feeds into the system. Dechlorination using a bionutralizer (e.g., sodium sulfite) takes place before the effluent is discharged to the main outfall. Use of a bionutralizer allows for the removal of chlorine without the addition of biochemical oxygen demand (BOD). A small batch process alternate system is available for treating backwash flows from the primary clarifier/filter tank through a secondary equalization basin, aeration chamber, and clarification tanks. The treated backwash waste then re-enters the system.

3. Continuous Flush System (Discharge 002)

A flow with an average rate of approximately 2,900,000 gpd (maximum 3,500,000 gpd) will be drawn through the Continuous Flush System as needed to minimize ice formation and debris accumulation in the intake basin. Intake seawater is typically heated for freeze protection. This process was originally designed to be a marine life bypass. However, in practice it has been used instead to prevent algae (kelps) and debris from accumulating in the intake basin and as freeze protection. There is no use of continuous flush seawater for cooling equipment (i.e., no process cooling water). No chlorination or other chemical treatment is used from this process stream. The continuous flush system wastewater will be discharged through Discharge 002.

4. Firewater Distribution System (Formerly Discharge 003)

As discussed above, this discharge is covered by EPA's North Slope General NPDES Permit (AKG-33-0063). Therefore, discharges from Discharge 003 will not be authorized under this proposed permit.

B. Liberty Development Project

1. Nature and Amount of Discharge

Approximately 5,000 gpd (average flow) of domestic and sanitary wastewater is expected to be generated from the construction/rig camp associated with BPXA's Liberty Development Project which is planned to be located within the Endicott Development Area. The camp will begin operation in August 2009. From August 2009 through February of 2010, the camp is anticipated to be at capacity (160 workers). Starting in January 2010, the headcount is expected to drop to approximately 100 workers to support the Liberty drilling program. During the

drilling program, additional bed space may be used to support construction activities. Based on these numbers, BPXA estimates the generated wastewater stream of 5,000 gpd on average with 10,000 gpd as a maximum from the Liberty camp during construction of the project.

Domestic and sanitary wastes will be held in storage tanks. These tanks will be emptied and trucked to the Endicott wastewater treatment plant for treatment and disposal. The wastes associated with Liberty are consistent with the domestic and sanitary wastes currently treated and discharged at Endicott. Further, the volumes of wastes from Liberty combined with the current volumes treated by the Endicott facility are within the treatment plant design capacity of 75,000 gpd.

IV RECEIVING WATER

A. Nature of Stefansson Sound and the Beaufort Sea

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, Shavirovik, 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. Some time 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 -1.8°C . By late spring (March to April), the ice layer has usually achieved its maximum thickness of approximately six feet. Occasionally, the ice layer may be as thick as nine feet. 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 ft MLLW.

B. Beneficial Uses of Stefansson Sound and the Beaufort Sea

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 of 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:

- 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

Carey et al. (1974).

Structurally, the macrofauna of the western Beaufort Sea is dominated by annelids, mollusks, and arthropods. 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. Numerical density of macroinfauna increase 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 live 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 varden char are considered to be "key" species. Both species of cisco prey mostly on mysids and amphipods. The diet of dolly

warden char in Stefansson is dominated by amphipods, juvenile Arctic cod, and mysids.

Approximately 60 fish species 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 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, and hooded seal. In general, these mammals occur in much greater concentrations in the western Beaufort Sea.

V EFFLUENT LIMITATIONS

A. Basis for Permit Effluent Limits

In general, the Clean Water Act requires that the limits for a particular pollutant be the more stringent of either technology-based limits or water quality-based 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.

B. Summary of Proposed Effluent Limitations

The following and Table 1 summarizes the proposed effluent limits that are in the draft permit and provides a basis for the changes from the previous NPDES permit.

1. Discharge 001, which consists of commingled streams from the STP, the POW unit, and the *LoSal*TM Seawater Processing Unit, are intermittent. The flow limit for this discharge is increased from 3.0 MGD to 6.3 MGD to include the additional discharges from the *LoSal*TM unit.
2. Maximum daily flow limits are also included for Discharges 001A and 002.
3. Whole effluent toxicity (WET) monitoring is required annually for Discharge 001 when clarifying agents are used.
4. The pH must be between 6.5 to 8.5 standard units for Discharge 001A.
5. Chlorine
 - For discharge 001, the total residual chlorine (TRC) concentration limit is

0.125 mg/L average monthly and 0.250 mg/L maximum daily.

- For discharge 001A, the TRC limit is 0.5 mg/L average monthly and 1.0 mg/L maximum daily.
6. Temperature is limited at end of pipe and ambient temperature must be recorded at the edge of the mixing zone for Discharge 001.
 7. BOD₅, total suspended solids (TSS), and fecal coliform bacteria (FC) is limited for Discharge 001A.
 8. 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.

**TABLE 1
SUMMARY OF PROPOSED EFFLUENT LIMITATIONS**

Parameter	Average Monthly	Maximum Daily
Discharge 001 – Combined wastewater from Seawater Treatment Plant, Potable Water Unit, and LoSal Seawater Processing Unit		
Flow	No limit	6.3 MGD
TRC	0.125 mg/L	0.250 mg/L
pH	No limit	No limit
Temperature	No limit	Not to exceed 15°C above ambient
WET	See Part I.G. of the permit	See Part I.G. of the permit
Discharge 001A – Sanitary Wastewater		
Flow	No limit	40,000 GPD
TSS	30 mg/L; at least 85% removal	60 mg/L
	10 lbs/day	20 lbs/day
BOD ₅	30 mg/L; at least 85% removal	60 mg/L
	10 lbs/day	20 lbs/day
Fecal coliform (FC)	200 FC/100 mL	400 FC/100 mL
TRC	0.5 mg/L	1.0 mg/L
pH	No limit	No more than 8.5, no less than 6.5
Discharge 002 – Continuous Flush System		
Flow	No limit	2.9 MGD
Temperature	No limit	No limit

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).

The permittee provides secondary treatment for sanitary wastewater. EPA established technology-based limits for the facility's sanitary wastewater (Discharge 001A) in the past permits for Endicott. The technology-based limits were established pursuant to 40 CFR Part 133. Secondary treatment uses filtration and biological treatment to control pollutant discharges.

The Secondary Treatment requirements are contained in the state of Alaska's Wastewater Disposal Regulations in 18 AAC 72 specifically in 18 AAC 72.040 and 18 AAC 72.990(64) requiring that Biochemical Oxygen Demand (BOD₅) meet a 7 day average of 45 mg/L, a 30 day average of 30 mg/L and the arithmetic mean of the values for effluent samples collected in a 24-hour period does not exceed 60 mg/L, Total Suspended Solids (TSS) meet a 7 day average of 45 mg/L, a 30 day average of 30 mg/L and the arithmetic mean of the values for effluent samples collected in a 24-hour period does not exceed 60 mg/L, the percent removal of each during treatment shall be greater than 85%, and pH levels be maintained between 6 and 9 standard units.

Under 40 CFR 122.45(f), permits must contain mass-based limitations. The concentration requirements of TSS and BOD₅ for Discharge 001A were converted to mass limits by multiplying them by the maximum daily flow (40,000 GPD) and a conversion factor of 8.34. Based on this calculation, the monthly average and daily maximum loadings in the draft permit are 10 and 20 pounds per day (lbs/day), respectively.

For Discharge 001A, a technology-based average monthly chlorine effluent limitation of 0.5 mg/l for wastewater treatment plants is derived from standard operating practices. The Water Pollution Control Federation's *Chlorination of Wastewater (1976)* states that a properly designed and maintained wastewater treatment plant can achieve adequate disinfection if a 0.5 mg/l chlorine residual is maintained after 15 minutes of contact time. A treatment plant that provides adequate chlorination contact time can meet the 0.5 mg/l limit on a monthly average basis. In addition to average monthly limits (AMLs), NPDES regulations require effluent limits for publicly owned treatment works (POTWs) to be expressed as average weekly limits (AWLs) unless impracticable. The MDL is derived by multiplying the AML by 2, resulting in an MDL for chlorine of 1.0 mg/l.

For fecal coliform bacteria, the facility has demonstrated that it can meet 200 FC/100mL average monthly and 400 FC/100mL maximum daily limits. Therefore, EPA is setting a best professional judgment (BPJ) limit based on past performance equal to 200 FC/100mL and 400 FC/100mL, which are more restrictive than the

water quality-based limits.

EPA has not established national effluent guidelines for either seawater treatment or marine life return systems.

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 addition, ADEC may exercise enforcement discretion in determining whether to initiate an enforcement action on a water quality violation (18 AAC § 70.900).

In the case of this permit, BPXA has reapplied for a mixing zone of 100-meter for Discharge 001, which includes discharge from Discharge 001A, for Salinity (dissolved inorganic substances), Fecal Coliform Bacteria, pH, Turbidity, Temperature, Toxic and other Deleterious Organic and Inorganic Substances (including Total Residual Chlorine), Sediment, Residues, and Whole Effluent Toxicity. With the exception of salinity, these parameters are the same as those for which a mixing zone was previously granted in the existing NPDES permit for the Endicott Operations. 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. The mixing zone will provide a minimum dilution of 40:1 at the outside edge of the mixing zone. All water quality standards must be met outside the designated mixing zone boundary.

With the potential inclusion of the *LoSal*TM project, temperature was found to be the main limiting pollutant that required the highest dilution. However, the existing 100-meter mixing zone was found to be adequate by ADEC for the pollutants listed above to meet AWQS at the mixing zone boundary. Additionally, a mixing zone for salinity was requested by BPXA to accommodate the dilution requirements that will be necessary for the potential inclusion of the *LoSal*TM unit in Discharge 001.

ADEC has indicated that it will continue these variances in its State Clean Water Act Section 401 certification (401 certification) of the NPDES permit. The draft 401 certification is included in Appendix D.

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. Fecal Coliform Bacteria, pH, Turbidity,

Temperature, Total Residual Chlorine, Residues, and Sediment are potential pollutants discharged at the facility.

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. Monitoring data indicates that the effluent pH ranges from a low of 7.0 to a high of 8.39, which is within the acceptable range.

Of the potential pollutants, there is a continuous addition of heat, TRC, and fecal coliform bacteria, 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 and 13 µg/L as a one-hour average. AWQS for fecal coliform bacteria are based on a 5-tube decimal dilution test, the fecal coliform median MPN and may not exceed 14 FC/100mL, nor may more than 10% of the samples exceed a fecal coliform median MPN of 43 FC/100mL. 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 the above table, water quality-based limits are imposed on flow, temperature, fecal coliform bacteria, pH, and TRC. These limits continue from the expired permit to ensure consistency with current EPA permit practices and other NPDES permits for seawater treatment plants on the North Slope and which respond both to changes in facility operations (e.g., dechlorination) and to effluent and environmental monitoring data.

- The limits on daily maximum flow are established for Discharges 001, 001A, and 002. The limits are based on historical data and predicted future operation conditions.
- The limit on maximum temperature which shall not exceed 15°C above ambient is applied to Discharge 001. The instantaneous maximum temperature difference provides a more realistic and practicable parameter for controlling effluent temperature. The facility’s record of effluent monitoring demonstrates that this temperature limit is achievable. Temperature is required to be monitored for Discharge 001.

- The pH must be between 6.5 and 8.5 standard units (s.u.) for the discharges from Discharges 001 and 001A.
- The fecal coliform bacteria limits in the expired permit are retained in the draft permit. The AML and MDL retained are 200 FC and 400 FC (colonies per 100 mL), respectively. As noted above, the AWQS for fecal coliform are 14 FC/100mL (acute) and 43 FC/100mL (chronic). When the dilution factor of 40 is applied, the limits would be 560 FC/100ml and 1720 FC/100mL, respectively. However, the facility's record of effluent monitoring demonstrates that the retained limits on the discharge of fecal coliform bacteria are achievable (see BPJ discussion in Section V.C, above). The fecal coliform limit is applicable to Discharge 001A.
- Four clarifying agents (Nalco 7607, 7768, 3332, and Chemlink 4835) are specifically approved in the previous permit for use at Endicott at applications of no more than 1 part per million (ppm) for Discharge 001. This requirement is not retained under the reissued permit. Rather, the permittee is required to report the type of clarifying agents used and the volumes of water treated in the monthly DMRs. Annual WET testing requirements apply when clarifying agents are used.
- The permit specified that organic biocides may be used to control sulfate-reducing bacteria, however, the discharge of biocide wastes are prohibited under the permit.

EPA has reviewed the State's draft 401 certification and determined that the conclusions set forth in the certification are correct and that the Alaska water quality criteria will be met at the edge of the 100-meter mixing zone.

Antidegradation of Water Quality. In proposing to reissue this permit, EPA has reviewed the State's antidegradation analysis contained in the draft 401 certification. The State's antidegradation policy at 18 AAC 70.015 states, in part, that in Alaska: "the existing water uses and the level of water quality necessary to protect the existing uses must be maintained and protected (and), if the quality of a water exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water, that quality must be maintained and protected unless the department (ADEC)... allows the reduction in water quality...". ADEC has certified that the limits in the draft permit are consistent with and protective of the State water quality standards and the water quality of the receiving water. ADEC has also determined that draft permit is consistent with the State's antidegradation policy.

VI MONITORING REQUIREMENTS

A. Summary of Effluent Monitoring

The Clean Water Act requires that monitoring shall be included in permits to determine compliance with effluent limitations. Monitoring may also be required to gather data for future effluent limitations or to monitor effluent impacts on the receiving water. The permittee will be responsible for conducting the monitoring and for reporting the results to EPA. Table 2 presents the proposed monitoring requirements based on the minimum sampling necessary to adequately monitor the facility's performance. For comparison purposes, the table also shows the monitoring requirements in the past permit.

Monitoring of Discharge 002 is required only during periods of discharge to surface waters lasting at least 24 hours. Since the marine life return system does not operate year-round, the permit does not require effluent sampling and analyses during periods of zero discharge.

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.

Parameter, Discharge no.	Past Sample Type and Frequency	Proposed Sample Type and Frequency
Discharge 001		
Flow	Calculation or meter, daily	Calculation or meter, daily
TRC	Grab, daily	Grab, daily
pH	Meter or grab, weekly	Meter or grab, weekly
Temperature	Recording or meter, daily	Recording or meter, daily
WET	24-hour composite	Annual ¹
Discharge 001A		
Flow	Recording or meter, daily	Calculation or meter, daily ²
TSS	Grab, weekly ²	Grab, weekly ^{2,3}
BOD ₅	Grab, weekly ²	Grab, weekly ^{2,3}
Fecal coliform	Grab, weekly ²	Grab, weekly ^{2,3}
TRC	Grab, daily ²	Grab, daily ²
pH	Meter or grab, daily ²	Meter or grab, daily ²
Discharge 002		
Flow	Calculation or meter, daily ²	Calculation or meter, daily ²
Temperature	3/week or more ²	3/week or more ²

Notes: ¹ Applicable when clarifying agents are used.

² Monitoring and reporting are required during periods of discharge only.

³ After consultation with EPA and ADEC, the sampling frequency may decrease from weekly to monthly if, after one year, this discharge has been in full compliance with the permit limitations for six consecutive months.

B. Basis for Effluent and Surface Water Monitoring

Section 308 of the CWA and federal regulation 40 CFR 122.44(i) require monitoring in permits to determine compliance with effluent limitations. Monitoring may also be

required to gather effluent and 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 to EPA.

C. 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. Permittees have 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).

VII BASIS FOR BEST MANAGEMENT PRACTICES PLAN

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 continue the BMP plan at Endicott.

VIII 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 accurate and to explain data anomalies if they occur. The QAP must include standard operating procedures that the permittee must follow for collecting, handling, storing, and shipping samples, for laboratory analysis, and for data reporting. The draft permit requires the permittee to submit to EPA within 120 days of the effective date of the permit its certification that the QAP has been developed or updated and is being implemented.

IX BASIS FOR ANNUAL REPORT

The proposed permit requires the permittee to complete and submit an annual report which summarizes the monthly use of any biocides and clarifying agents used in the Combined Wastewater Discharge (Discharge 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. The annual report provides a comprehensive record of wastewater discharge at the facility and supports improved understanding and management of the discharges and discussion of these discharges by the permittee and government representatives. 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 sections 122.41 (“Conditions applicable to all permits”), 122.44(i) (“Monitoring requirements”), and 122.48 (“Requirements for recording and reporting of monitoring results”).

X PERMIT CONDITIONS FOR COMPLIANCE, RECORDING, REPORTING, AND OTHER GENERAL PROVISIONS

In addition to facility-specific requirements, most of sections II, III, IV, and V of the draft permit contain standard regulatory language. Standard regulatory language applies to all permittees and must be included in NPDES permits. Because they are regulations, standard regulatory language 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.

XI 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 February 9, 2009. 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 CFR § 122.49(c), EPA has concluded that the localized effluent discharges authorized by the permit will have no effect on the continued existence of any endangered or threatened species and will not adversely affect their critical habitat. Endangered species found in the vicinity of these discharges include bowhead, polar bears, and spectacled eiders.

The draft permit and fact sheet for the Endicott Project, and Environmental Assessment (EA) and preliminary Finding of No Significant Impacts (FONSI) for the Liberty Development Project, were submitted to the U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) for review at the time of public notice. EPA has determined that the reissuance of the permit, which in addition to authorizing discharges from the Endicott facility, authorizes the sanitary and domestic discharges from the Liberty Development Project through the Endicott wastewater treatment plant, would not adversely affect listed threatened or endangered species and candidate species. EPA is requesting concurrence from

USFWS and NMFS on this determination and will consider their comments in the final permit decisions.

C. Magnuson-Stevens Fishery Conservation and Management Act (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 have **no effect** on essential fish habitat. Any comments received from the NOAA Fisheries regarding the finding of **no effect** 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 October 23, 2007, the Alaska Department of Natural Resources (ADNR) Department of Division of 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.

G. National Environmental Policy Act

In compliance with CEQ’s NEPA requirements at 40 CFR Parts 1500-1508 and EPA’s NEPA implementing regulations at 40 CFR Part 6, EPA has prepared an EA to evaluate the potential environmental impacts associated with EPA’s proposal to authorize the domestic and sanitary discharges from the Liberty Development Project under the Endicott NPDES permit. Based on the EA and consideration of proposed

permit conditions, EPA has preliminarily concluded that the proposed discharges from the Liberty Project will not result in a significant effect on the environment. Pursuant to 40 CFR Part 6.206(a) a preliminary Finding of No Significant Impacts (FONSI) has been prepared.

XII 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.

XIII 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.

XIV GLOSSARY OF TERMS AND ACRONYMS

§ means section or subsection.

AAC means Alaska Administrative Code.

ADEC means Alaska Department of Environmental Conservation.

Average monthly discharge 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.

BOD₅ means five-day biochemical oxygen demand.

BPJ means Best Professional Judgement.

BPXA means BP Exploration (Alaska), Inc.

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

°C means degrees Celsius.

CEQ means Council on Environmental Quality.

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.

DPP means Development and Production Plan.

EA means Environmental Assessment.

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.

EOR means Enhanced Oil Recovery.

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.

FC means Fecal Coliform.

gpd means gallons per day.

gpm means gallons per minute.

lb means pound.

LoSalTM means low salinity waterflood project.

LTA means longterm average.

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 Maximum Daily Limit.

MF means Microfiltration.

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.

MLLW means mean lower low water.

MMbbl means million barrels.

MMS means Minerals Management Service.

MPN means most probable number.

NEPA means National Environmental Policy Act.

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.

OCS means Outer Continental Shelf.

O&M means Operation and Maintenance.

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

P.L. means (U.S.) Public Law.

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.

POW means Potable Water System.

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.

RO means reverse osmosis.

ROD means Record of Decision.

Sanitary wastes means human body waste discharged from toilets and urinals.

SDI means Satellite Drilling Island.

Severe property damage means substantial physical damage to property, damage to the treatment facilities which causes them to become inoperable, or substantial and permanent loss of natural resources which can reasonably be expected to occur in the absence of a bypass. Severe property damage does not mean economic loss caused by delays in production.

Sewage means human body wastes and the wastes from toilets and other receptacles intended to receive or retain body wastes.

STP means seawater treatment plant.

Technology-based 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.

TSS means total suspended solids.

uERD means ultra-extended reach drilling.

USFWS means U.S. Fish and Wildlife Service.

$\mu\text{g/L}$ 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 limit means a permit limit derived from a state water quality standard or an appropriate national water quality criteria.

Waters of the United States or waters of the U.S. means:

- (a) All waters which are currently used, were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide;
- (b) All interstate waters, including interstate wetlands;

(c) All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds the use, degradation, or destruction of which would affect or could affect interstate or foreign commerce including any such waters:

- (1) Which are or could be used by interstate or foreign travelers for recreational or other purposes;
- (2) From which fish or shellfish are or could be taken and sold in interstate or foreign commerce; or
- (3) Which are used or could be used for industrial purposes by industries in interstate commerce;

(d) All impoundments of waters otherwise defined as waters of the United States under this definition;

(e) Tributaries of waters identified in paragraphs (a) through (d) of this definition;

(f) The territorial sea; and

(g) Wetlands adjacent to waters (other than waters that are themselves wetlands) identified in paragraphs (a) through (f) of this definition.

WET means Whole Effluent Toxicity.

WLA means wasteload allocation.

WQBEL means water-quality-based effluent limitation.

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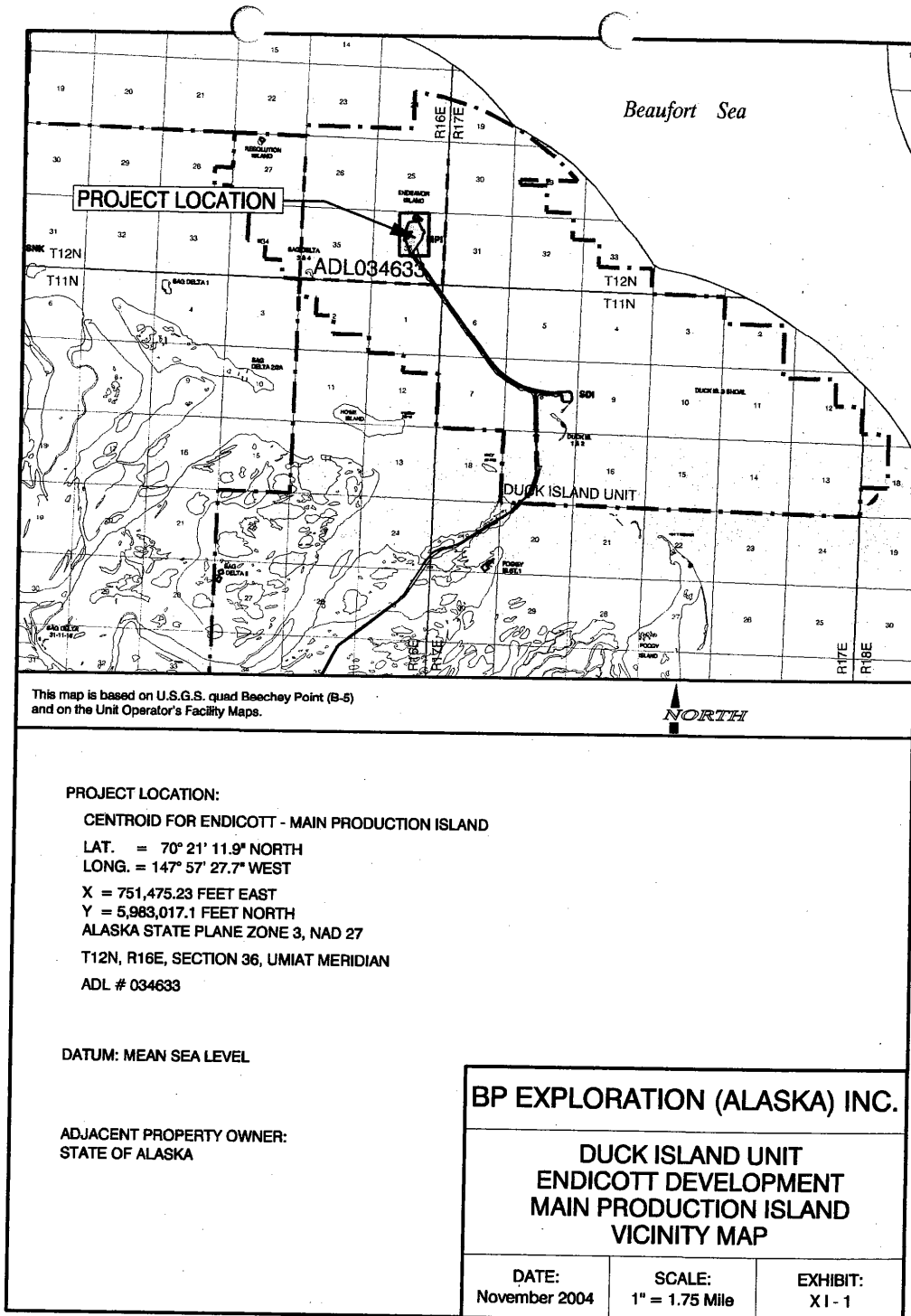
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APPENDIX A – MAPS

Figure A-1: Location of the BPXA, Endicott Operation



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APPENDIX B
Basis for Water Quality-based Effluent Limitations

Table B-1. Applicable Alaska Water Quality Standards			
DISCHARGE	POLLUTANT PARAMETER	CRITERIA	
		Acute	Chronic
Sanitary Waste	Total Residual Chlorine	13.0 µg/L	7.5 µg/L
	Fecal Coliform Bacteria ¹	14 FC/100 mL	43 FC/100 mL
All	pH	6.5 - 8.5 ²	
<p><u>Footnotes:</u></p> <p>1 Based on the median most probable number (MPN) from a 5-tube decimal dilution test.</p> <p>2 May not vary more than 0.1 pH unit from natural conditions.</p>			

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.

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:

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

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:

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

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 ADEC.

If C_u is equal to 0, the equation becomes

$$C_d = C_e \times V_e \div V_d.$$

- 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.

An exception for bacteria where the WLAs are directly applied as the WQBEL (i.e., the acute WLA is the maximum daily limit and the chronic WLA is the average monthly limit). In this case, the projected receiving water concentration must be greater than the criterion before a WQBEL is necessary for that pollutant.

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, EPA's Technical Support Document for Water Quality-based Toxics Controls (1991) 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 CVs for each parameter have 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.

Zero is assumed for the background concentration of chlorine. Additionally, the permit proposes a dilution ratio (volume receiving water: volume effluent) of 40 for the Endicott Operations. This dilution ratio corresponds to the dilution requirement for temperature, which is the most restrictive water quality criterion. The dilution ratio is used to calculate the projected receiving water concentration (C_d).

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. EPA has used a value of 0.6 for the coefficient of variation (CV) in the statistical calculations for WQBELs. A CV of 0.6 is a conservative estimate that assumes relatively high variability in the final permit limit.

The resulting WQBELs (see calculations in Appendix C) indicate that no WQBELs are necessary for TRC.

2. pH

The draft permit incorporates the more stringent water quality-based pH range of 6.5 to 8.5 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.

4. Fecal Coliform Bacteria

The draft permit incorporates limits of 200 FC/100mL average monthly and 400 FC/100mL maximum daily limits, which are more stringent than the WQBEL when the dilution factor of 40 is applied.

**APPENDIX C
CALCULATIONS**

Summary of Reasonable Potential Calculations

Table C-1. Reasonable Potential Analysis for Total Residual Chlorine	
Facility	BPXA Endicott Operations
Coefficient of Variation (CV)	0.000
Calculated Reasonable Potential Multiplier	1.00
Maximum Effluent Concentration, mg/L	0.020
Maximum Projected Effluent Concentration (C_e), mg/L	0.020
Dilution Ratio (V_e/V_d)	40
Background Concentration (C_u), mg/L	0
Projected Receiving Water Concentration (C_d), mg/L	0.0005
Criterion, mg/L	0.0075
Is $C_d >$ Criterion?	No
Reasonable potential to exceed?	No

The reasonable potential calculation indicates that the projected receiving water concentration (C_d) would not be greater than the water quality criterion. Since this calculation indicates that the Endicott Operations do not have a reasonable potential to exceed the water quality standard, a water quality-based effluent limit is not required for this facility.