RESPONSE TO COMMENTS

on the Draft NPDES Permit and Fact Sheet for BP Exploration (Alaska), Inc. Endicott Operations

NPDES Permit Number AK-003866-1

And

Environmental Assessment and Preliminary Finding of No Significant Impact

for the Liberty Development Project

August 2009

Background

On March 12, 2009, the U.S. Environmental Protection Agency, Region 10 (EPA) issued a draft National Pollutant Discharge Elimination System (NPDES) permit for the Endicott Operations (Endicott) for public review and comment. Endicott is owned and operated by BP Exploration (Alaska), Inc. (BPXA). The draft permit proposed to authorize coverage for the following discharges from Endicott: Discharge 001 (combined treated wastewater from the seawater treatment plant, potable water unit, and *LoSal*™ seawater processing unit); Discharge 001A (sanitary and domestic wastewater); and Discharge 002 (continuous flush system).

EPA also proposed to authorize sanitary and domestic wastewater discharges from the Liberty Development Project (Liberty). Liberty is an extended-reach drilling program that will be located at the Endicott Satellite Drilling Island (SDI). Oil and gas processing and separation activities will occur at the existing Endicott facilities. Although Liberty is located on the Endicott Development Area, the sanitary and domestic wastewater discharges are considered "new sources" pursuant to 40 CFR Parts 122.2 and 122.29 and, thus, are subject to new source performance standards at 40 CFR Part 435, Oil and Gas Extraction Point Source Category. As such, EPA also issued for public review an Environmental Assessment (EA) and preliminary Finding of No Significant Impact (FONSI) pursuant to the Council on Environmental Quality (CEQ) National Environmental Policy Act (NEPA) regulations at 40 CFR Parts 1500-1508 and EPA's NEPA implementing regulations at 40 CFR Part 6.

The public comment period ended on April 13, 2009. EPA received comments on the documents from the permittee (BPXA), the Inupiat Community of the Arctic Slope (ICAS), and the North Slope Borough.

Response to Comments Received During the Public Comment Period

I. General Comment

Comment I.1
The Inupiat Community of the Arctic Slope (ICAS) adopted Resolution #2009-09 opposing any discharge of pollutants into the Arctic Ocean, including the Beaufort and Chukchi Seas. ICAS members depend on the Arctic Ocean and adjacent coastal areas for subsistence, community well being, and cultural traditions and identity. The Arctic Ocean supports a large number of animals, including the bowhead whale, ice seals, walrus, and beluga that are critical to the traditional way of life of ICAS members. There is little Western science about the effects of industrial human activities, including oil and gas leasing, exploration, and development on species that inhabit the Arctic Ocean.

The federal government must impose a time out to obtain sufficient baseline information for all species and habitats that comprise the Beaufort and Chukchi Sea ecosystems and to evaluate the direct, indirect, and cumulative effects of oil and gas activities on these ecosystems and associated traditional lifestyles. Any assessment must fully include the effects of global warming on sea ice, coastlines, marine resources, and subsistence uses.

ICAS supports a moratorium on all oil and gas activities in the Beaufort and Chukchi Seas.

Response I.1
The Department of Interior Minerals Management Service (MMS), the federal agency with authority to approve oil and gas activities in the Outer Continental Shelf (OCS), developed an EA, entitled, *Liberty Development and Production Plan Ultra Extended Reach Drilling from Endicott Satellite Drilling Island (SDI) Environmental Assessment* (October 2007), which evaluated the potential direct, indirect, and cumulative effects of the proposed Liberty Project. In November 2007, MMS approved the development of Liberty and issued a FONSI.

EPA does not have the statutory authority to impose a moratorium on oil and gas activities in the Beaufort and/or Chukchi seas. EPA has regulatory authority for the NPDES discharges from oil and gas facilities. EPA's NPDES permitting authority is limited to issuing permits based on permit applications received. The applicant must demonstrate that it is feasible to meet permit limits (40 CFR 122.4(a) and (d)). On November 11, 2004, BPXA reapplied for an NPDES permit to discharge wastewater from the Endicott operations, and sanitary and domestic waste water from Liberty. Additional information were submitted to EPA on December 5, 2005, March 17, 2008, March 18, 2008, and September 22, 2008. BPXA has demonstrated that the treatment system at Endicott will meet permit limits and those limitations and monitoring requirements begin on page 4 of the permit.

EPA also consulted with the National Marine Fisheries Service (NMFS) and the U.S. Fish and Wildlife Service (USFWS) during development of the permit and EA pursuant to the requirements of the Endangered Species Act (ESA). On March 6, 2009 and April 7, 2009, EPA

received concurrence letters from NMFS and USFWS, respectively, regarding its determination that the proposed action is *Not Likely to Adversely Affect* listed species [1 and 2].

II. Fact Sheet

Comment II.1
Section II.A.1. First paragraph: Recommend changing permit reference from AK-00866-1 to AK-003866-1.

Response II.1
The fact sheet reference was incorrect as noted by the comment. The permit number referenced in the fact sheet should be AK-003866-1.

Comment II.2
Section II.A.1. Second paragraph: For clarity, the potable water unit is not currently operating, but BPXA is retaining the option to operate the system and discharge associated reject water through the permitted outfall.

Response II.2
EPA appreciates the clarification.

III. Permit

Comment III.1
Page 4, I.Table 1. The maximum daily temperature difference of 15^{o}C above ambient should be raised to 40^{o}C above ambient to accommodate the potential warm water discharges from LoSal^{TM}. As shown in the modeling reports that were submitted to EPA and the Alaska Department of Environmental Conservation (ADEC), the Alaska Water Quality Standards (AWQS) for temperature of not exceeding a 1^{o}C temperature alteration would still be met at the mixing zone boundary based on a dilution of 40:1. The existing Endicott NPDES permit has no effluent limit for temperature.

Response III.1
The AWQS require that the temperature of a discharge may not exceed 15ºC or cause the weekly average to increase by more than 1ºC and that normal daily temperature cycles may not be altered in amplitude or frequency. On September 22, 2008, BPXA submitted modeling data to ADEC which demonstrated that with a 40:1 dilution, AWQS for temperature would be met at the edge of mixing zone. On August 4, 2009, ADEC authorized its Clean Water Act (CWA) Section 401 certification the 40:1 dilution and 100 meter mixing zone for the Endicott discharges. BPXA's ability to comply with AWQS is further clarified in a letter to EPA, dated May 21, 2009.

EPA has revised Table 1 of the permit to include maximum daily temperature difference of 40^{o}C above ambient for Discharge 001.

Comment III.2
Page 4, I.Table 1. Note 1 requires monitoring of ambient temperature to be performed outside the edge of the mixing zone. This requirement is unrealistic given that the location of the discharge is ice covered for 8-9 months of each year, which would make maintenance of sampling equipment impossible. If the temperature differential requirement is kept in the Endicott permit, then the location of the ambient monitoring should be moved to the seawater intake bay so that the equipment can be serviced and maintained to allow consistent temperature monitoring.

Response III.2
EPA did not intend for this requirement to cause equipment problems or interruptions in monitoring. EPA has revised footnote 1 in Table 1 to clarify that the "edge of the mixing zone" sample can be taken at the seawater intake bay.

Comment III.3
Page 4, I.Table 1. BPXA realizes that monitoring of total residual chlorine (TRC) is probably necessary since chlorination chemicals are sometimes used in the seawater treatment process, however, their use is intermittent. Sodium hypochlorite injection is used as disinfection between the strainer and media filters to prevent biofouling, and is followed by dechlorination downstream of both the filters and strainers. BPXA suggests daily monitoring of TRC only on those days when chlorination chemicals are being utilized in the seawater treatment process. In addition, due to natural seawater interferences associated with the analytical method for TRC, BPXA requests that EPA consider removing average daily and maximum monthly TRC limits from Table 1, but retaining TRC as a report-only field.

Response III.3
EPA will continue to require monitoring of TRC in the permit, however, we have added a footnote to indicate that TRC monitoring is only required when chlorination chemicals are used in the seawater treatment process. The TRC limit has not been removed as requested because Discharge 001 is a continuous discharge. Therefore, pursuant to 40 CFR 122.45(d)(1), maximum daily and average monthly effluent limits are required.

Comment III.4
Page 5, I.Table 2. BPXA requests that EPA consider historical monitoring results and revise Table 2 to decrease the monitoring frequency for total suspended solids (TSS), biochemical oxygen demand (BOD) and fecal coliform from weekly to monthly as compliance with permit limits has already been adequately demonstrated over the past nine years. Footnote 4 on Table 2 of the draft permit notes that the sampling frequency may decrease from weekly to monthly if, after one year, the discharge has been in full compliance with the permit limitations for six consecutive months. Using that rationale, BPXA maintains we have met that criterion during the previous six months.

Response III.4
While BPXA has demonstrated a good compliance history over the last nine years, this permit renewal includes EPA's authorization of the sanitary and domestic waste discharges from the Liberty Development Project. The discharges from Liberty will generate approximately 5,000-10,000 gallons per day (gpd) in flow. With this change in the permit, EPA disagrees with

BPXA's comment that the previous six months' data are applicable to this decision. EPA is retaining the language from the draft permit.

Comment III.5
Page 6, I.B.3. Since some effluent streams are commingled (e.g., 001 and 001A), BPXA suggests rewording this sentence to, "The permittee must collect all effluent samples from the effluent stream after the last treatment prior to either discharge into the receiving waters or where commingled with other permitted waste streams."

Response III.5
EPA has revised the sentence as suggested.

Comment III.6
Page 6, I.D.2. BPXA appreciates the flexibility this provides in comparison to the listed clarifying agents as limited in the current NPDES permit.

Response III.6
Comment noted.

Comment III.7
Page 6, I.D.5. This section includes a new visual monitoring requirement that is not in the current NPDES permit. This requirement is unrealistic as the location of the discharge is ice-covered for approximately 9 months each year and for the other 3 months, wind waves and distance would preclude seeing anything from the shoreline. The diffuser is located on the seabed approximately 150 meters offshore which makes observation at that distance nearly impossible. BPXA suggests removing the last sentence from this section as existing monitoring of the various effluent streams plus the past 9 years of effluent data has adequately demonstrated that the discharge is not degrading the marine environment.

Response III.7
EPA has removed the last sentence as suggested.

Comment III.8
Page 7, I.G. BPXA requests using an alternative approach to Whole Effluent Toxicity (WET) testing where coagulants and flocculants are addressed through the Best Management Practices (BMP) Plan. The BMP Plan would include review of the product MSDS toxicological and ecological information and selecting a dose rate that is safely below the Lethal Concentration 50 for the most representative organisms. This step would be included with permit condition I.D.2. where the optimum application dose is analyzed.

Response III.8
EPA disagrees with this comment (see Response III.9, below). WET testing is utilized to assess and protect against impacts upon water quality and designated uses caused by the aggregate toxic effect of the discharge of pollutants. Staying below an appropriate LC_{50} for a particular pollutant will account for the toxicity of that pollutant alone but not the potential toxicity caused by a combination of pollutants. EPA has retained the WET testing requirements in the permit.

Comment III.9
Page 7, I.G.1. The WET test requires annual testing to be performed at the time when clarifying agents are estimated to be present at maximum concentrations in the effluent for the year. Since this requirement of monitoring at maximum concentration can only be determined in hindsight, we suggest that the testing be performed during a typical planned first annual use of the water clarifying agents. Section D.2. requires that BPXA determine the optimum application dose for water clarifying agents, with the optimum dose being the highest dose that BPXA would use as there would be no advantage of dosing at higher concentrations.

Response III.9
The first sentence of Section I. G.1. has been revised to say, "An effluent sample shall be taken annually from a suitable sampling point during a typical planned first annual use of water clarifying agents. Toxicity testing must be conducted…"

Comment III.10
Page 8, I.G.1. Please remove the last sentence since receiving water monitoring is not required by the draft permit.

Response III.10
The commenter is correct that receiving water monitoring is not required by the permit. EPA has removed the last sentence which states "The effluent collected for toxicity testing must be collected at the same time as the receiving water surface water monitoring."

Comment III.11
Page 8, G.2.a. and G.2.b. WET testing in NPDES permits on the West Coast are typically confined to only a single invertebrate species. BPXA requests that either the mysid or bivalve larvae WET testing be removed from the permit.

Response III.11
EPA has removed the requirement for mysid bioassay. The permit has been revised to require the following invertebrate testing:

> "Invertebrate: The permittee must conduct tests with a bivalve species, Pacific Oyster *(Crassostrea gigas)* or mussel *(Mytilus sp.)* (larval development test). Chronic toxicity must be estimated as specified in *Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Water to West Coast marine and Estuarine Organisms* (EPA/600/R-95/136)."

Comment III.12
Page 8, G.2.c. BPXA suggests changing the vertebrate species from inland silverside *(Menidia beryllina)* to topsmelt *(Atherinops affinis)*. The topsmelt is a much more common species that is utilized on the West Coast for NPDES permit monitoring with detailed methods described in the West Coast Manual (EPA-600-R-95-136).

Response III.12
EPA has revised the vertebrate species to topsmelt. The following requirement is contained in the permit:

> "Vertebrate (survival and growth): Topsmelt *(Atherinops affinis)*. In the event that topsmelt is not available, inland silverside *(Menidia beryllina)* may be used as a substitute. The permittee shall document the substitute species in the next Discharge Monitoring Report (DMR)."

Comment III.13
Page 9, G.9. Accelerated Testing. BPXA requests that the wording in the permit be clarified in that accelerated testing only be performed on those species that triggered the accelerated testing and not required to be performed on all species.

Response III.13
The permit has been revised to clarify that accelerated testing shall be performed on the species that triggers the accelerated testing requirement.

Comment III.14
Page 9, G.9. Accelerated Testing. Records indicate that use of clarifiers is limited to a short duration, possibly less than the time interval from the first use of a clarifying agent to the reported results of a WET test. BPXA recommends the permit be revised to address the situation where no clarifying agents are in use at such time an accelerated testing is triggered.

Response III.14
EPA has revised the permit to allow for flexibility of accelerated testing due to the short-term intermittent use of clarifying agents.

Comment III.15
Page 10, I.G.12.a. "The permittee shall submit the results of the toxicity tests with the Discharge Monitoring Reports (DMR) for the month in which the tests are conducted." This requirement is not possible to meet if testing is conducted late in the calendar month as two of three species are 7 day tests and the reports would not have been completed by the laboratory. BPXA suggests changing the wording to: "The permittee shall submit the results of the toxicity tests with the Discharge Monitoring Reports (DMR) for the month following the month in which the results are received."

Response III.15
EPA agrees with the comment and has revised the permit as suggested.

Comment III.16
Page 12, Section III.B. BPXA requests that submittal of DMRs continue to be conducted on an annual basis, rather than a monthly basis as described in Section III.B. BPXA has operated the facility under the existing permit since April 2000, with a good history of compliance. During this permit timeframe BPXA has reviewed data on a continuous basis and submitted notices of potential non-compliance in a timely manner. Based on the long history of compliance with

permit requirements, BPXA requests that submittal of discharge monitoring reports be conducted on an annual basis.

Response III.16
The previous permit did not require BPXA to report all violations prior to submittal of the annual DMR so EPA could be unaware of ongoing violations and be unable to resolve compliance issues in a timely manner. Due to this reason and the addition of sanitary and domestic wastewater discharges from the Liberty project and discharges from *LoSal*™, EPA is retaining the requirement for monthly reporting in the final permit.

IV. Environmental Assessment (EA) and Finding of No Significant Impact (FONSI)

Comment IV.1
The North Slope Borough stated that after review of the proposed NPDES permit, Draft 401 Certification, and the Draft Environmental Assessment (EA) and Preliminary Finding of No Significant Impact (FONSI), they strongly favor the alternatives which entirely avoid effluent discharge into the marine environment. The commenter goes on to state that it is clear that many of the biological species that have the potential to be impacted by the proposed discharge are critical to the North Slope subsistence harvest which also provides spiritual and cultural affirmation and is crucial for passing skills, knowledge and values from one generation to the next, thus ensuring an vibrant and continuing Inupiat culture. The commenter does not support the proposed action (Alternative A-1) because it would allow discharge into marine waters containing known fish, bird, and marine mammal habitat, and therefore recommends the selection of either Alternative A-2, A-3, B, or B-2.

Response IV.1
Under Alternative A, there are three viable options to BPXA for the disposal of Liberty sanitary and domestic wastewater (S/D wastewater). Only Alternative A-1 would involve a discharge into the marine environment. Alternative A-2 and A-3 both involve the use of existing North Slope facilities—the Prudhoe Bay Operations Center (PBOC) and the North Slope Borough Service Area 10 (SA-10)—which currently discharge to freshwater lakes. Alternatives B-1 and B-2 involve the injection of Liberty S/D wastewater into the Alaska Oil and Gas Conservation Commission (AOGCC)-permitted Class I/II Underground Injection Control Wells. BPXA may utilize any, all, or a combination of these Alternatives for the disposal of Liberty S/D wastewater. EPA's selection of the proposed action alternative (i.e., authorizing the discharge of Liberty S/D wastewater at the Endicott Production Facility under the Endicott NPDES permit), does not preclude BPXA's use of any of the other viable alternatives identified in the EA and preliminary FONSI.

Alternative A-1 involves the use of the existing, currently permitted wastewater treatment facility at the Endicott Production Facility for the disposal of Liberty S/D wastewater. The wastewater treatment plant at the Endicott Production Facility currently provides secondary treatment of sanitary and domestic wastewater from the living quarters at Endicott. EPA does not believe that the discharge of an additional 5,000-10,000 gallons per day of treated S/D wastewater will result in a significant adverse effect on the marine environment or the

subsistence resources, culture, and lifestyle of the North Slope communities, as explained in the EA. Similar to the existing discharge at the Endicott wastewater treatment facility, the Liberty S/D wastewater will be required to undergo secondary treatment prior to discharge and must meet all applicable effluent limitations, monitoring requirements and special conditions contained in the permit.

Comment IV.2

The commenter states that given the presence of ringed and bearded seals in the Liberty project area it is likely that the seals will come into contact with the effluent discharge under Alternative A-1. The commenter continues by stating that concerns exist regarding the exposure of marine mammal species to zoonotic fecal pathogens, such as *Giardia* and *Cryptosporidium* and that sewage treatment cannot be relied on to completely remove the oocysts from the effluent wastes to which these species would be exposed. The commenter goes on to state that ringed and bearded seals are subsistence species and represent a critical component of the dietary health and food security of the majority of Inupiat residents on the North Slope, and that while the State of Alaska attempts to address discharge impacts associated with the proposed action by requiring a mixing zone…the use of a mixing zone will not eliminate the potential for effluent discharge contact with ringed and bearded seals.

Response IV.2

EPA agrees with the commenter that ringed and bearded seals have the potential to come into contact with the effluent discharge authorized under Alternative A-1. However, as stated in Section 3.7 of the Environmental Assessment, the size of the proposed mixing zone is negligible in comparison to the overall habitat available to ringed and bearded seals and EPA does not believe that the discharge of an additional 5,000-10,000 gallons per day from an existing wastewater treatment plant will result in a significant adverse effect on these marine mammals.

Giardia and *Cryptosporidium* are recognized worldwide as common causes of infectious gastroenteritis and have been detected in surface waters throughout the world. *Giardia* and *Cryptosporidium* have been detected in rivers, streams, lakes, treated and untreated drinking water, and swimming pools in both rural and urban environments on all six continents. *Giardia* and *Cryptosporidium* are naturally occurring pathogens and have been detected in wild populations of both marine and terrestrial mammals including muskoxen from the Canadian Arctic [3], northern Alaskan caribou [4], North Atlantic right whales from the Bay of Fundy, Canada [5] , and northern Alaskan ringed seals [5]. While anthropozoonotic transmission has been suspected as a source of contamination in wildlife [3, 6], this is only one potential pathway for the transmission of these pathogens through the environment. EPA believes that the anthropogenic contribution of these pathogens into the marine environment from oil and gas activities is minimal as any infected individuals would likely be transported to medical facilities upon becoming aware of their malady, thereby removing the host victim from the area.

National standards currently do not exist for the removal of *Giardia* and *Cryptosporidium* from wastewater effluent; therefore EPA must rely upon the effluent limitation guidelines promulgated under the new source performance standards (NSPS) for the Oil and Gas Extraction Point Source Category at 40 Code of Federal Regulations (CFR) Part 435 as well as any more stringent requirements necessary to ensure that water quality standards are met.

Comment IV.3
The commenter noted that, as identified in the Environmental Assessment, the "...boulder patch community is clearly the richest and most diverse biological community yet discovered in the Alaskan Beaufort Sea." The commenter states that the addition of total suspended solids (TSS) from the S/D wastewater discharge…has the potential to impact photosynthetic species associated with the boulder patch and that given this potential, effluent discharge should be avoided.

Response IV.3
As identified in the Environmental Assessment, the boulder patch community is approximately 0.75-miles away from the point of discharge and the wastewater is expected to rapidly disperse and dilute with the currents of Stefansson Sound. The boulder patch community has evolved under the influence of nearby river systems, including the Sagavanirktok, which annually flush massive quantities of suspended sediments and solids into Stefansson Sound. In addition, the prevailing westerly current in the area would direct any potential TSS away from the boulder patch community.

EPA does not believe that the contribution of TSS from the discharge of S/D wastewater associated with the Liberty project will adversely affect the boulder patch community. The negligible contribution of TSS from the S/D wastewater is not expected to impact the overall TSS concentrations in the area around the boulder patch community.

Comment IV.4
The commenter states that more than 70 species of bird may occur in the Liberty project area and that many of these species are subsistence resources that would be exposed to effluent discharge. The commenter continues by stating that while the environmental assessment concludes that the birds will not be significantly impacted….varying levels of direct exposure to effluent is implied by the stated occurrence of these birds species. The commenter continues by stating that while the EA concludes that adverse impacts [to spectacled and Steller's eiders] are unlikely, the alternatives which support zero discharge would be preferable in minimizing potential harm to these species. The commenter concludes that the EA fails to identify potential impacts (or the absence of impacts) to the yellow-billed loon and recommends the inclusion of an analysis of potential impacts to the yellow-billed loon in the final agency action.

Response IV.4
EPA acknowledges that bird species found in the Liberty project area have the potential to come into contact with the effluent discharge. However, as identified in the EA, any potential exposure would be unlikely and minimal given that the size of the mixing zone is negligible in relation to these species' overall habitat. EPA does not believe that the discharge of S/D wastewater associated with the Liberty project will result in a significant adverse effect on bird species in the area. In regards to spectacled and Steller's eiders, the U.S. Fish and Wildlife Service has determined that, "given their limited use of the project area, and the circulation and currents in the area which will rapidly disperse and dilute discharges effluents," the discharge of Liberty S/D wastewater is *not likely to adversely affect* these ESA-listed species [2].

Additionally, since the primary breeding ground and distribution range of Kittlitz's murrelet occurs in Southeast Alaska, well outside of the Liberty project area, EPA has determined that there will be *no effect* on this species. EPA agrees that an analysis of the potential impacts to the yellow-billed loon should be included in the EA. The EA has been revised accordingly.

Comment IV.5

The commenter states that while it is unlikely that migratory bowhead whales will come in close vicinity of Liberty, the *perceived* effects of discharged sewage are very damaging and may result in food insecurity issues, leading to reluctance to hunt or eat this species. The commenter continues by stating that concerns exist regarding the exposure of subsistence species to *Giardia and Cryptosporidium* and that sewage treatment cannot be relied on to completely remove the oocysts from the effluent. The commenter concludes that recent results have shown these zoonoses in bowhead whale feces and that though [bowhead whales] are not in the localized area of the effluent mixing zone, the possibility exists for exposure.

Response IV.5

Due to the migratory patterns of the bowhead, EPA believes that the possibility for bowhead whales to be exposed to the effluent discharge is extremely negligible. Therefore, EPA has determined that the discharge of S/D wastewater associated with the Liberty project will have *no effect* on the bowhead whale and the National Marine Fisheries Service concurs with this determination [1]. In an effort to address the perceived impacts of the effluent discharge on bowhead whales in the subsistence communities of the North Slope, EPA has been in ongoing Government-to-Government consultation with the Inupait Community of the Arctic Slope (ICAS), a regional Tribal government representing many North Slope communities. As a part of the consultation process, EPA has held several conference calls with ICAS and has distributed draft copies of the proposed NPDES permit and NEPA documents to the North Slope communities for review and comment.

Regarding the comment relating to *Giardia* and *Cryptosporidium,* please refer to Response IV.2 above. In short, EPA does not believe that the anthropogenic contribution of *Giardia* and/or *Cryptosporidium* pathogens into the marine environment as a result of oil and gas activities is significant. Additionally, due to the large amount of dilution and mixing that occurs in the area, coupled with the fact that bowhead whales typically migrate at least 18-20 km offshore, EPA believes that the potential for bowhead whales to come into contact with the discharged effluent is extremely negligible.

Comment IV.6

The commenter states that polar bears are a subsistence species that would be exposed to effluent discharge and that the perception that this subsistence food has been contaminated by effluent discharges may result in food insecurity issues, leading to reluctance to hunt or eat this species. The commenter continues by stating that the NSB-Department of Fish and Wildlife does not agree [that polar bears will have minimal exposure to the mixing zone and associated effluents], and feels additional data is needed to make this assumption and additionally, concerns exist regarding the exposure of subsistence species to zoonotic fecal pathogens, such as *Giardia* and *Cryptosporidium* and that sewage treatment cannot be relied on to completely remove the oocysts from the effluent wastes.

Response IV.6
EPA agrees that polar bears have the potential to come into contact with the effluent discharge. However, given their very large range individual bears are unlikely to spend much time in or near the discharge area. Additionally, given the strong currents and rapid dilution and dispersion of the discharged effluent, EPA believes that the potential for polar bears to come into direct contact with the discharged effluent is negligible. Therefore, EPA has determined that the discharge of S/D wastewater associated with the Liberty project *may affect* but is *not likely to adversely affect* the polar bear. The U.S. Fish and Wildlife Service concurs with this determination [2].

Regarding the comment relating to *Giardia* and *Cryptosporidium,* please refer to Response IV.2 above. In short, EPA does not believe that the anthropogenic contribution of *Giardia* and/or *Cryptosporidium* pathogens into the marine environment as a result of oil and gas activities is significant. Additionally, due to the large amount of dilution and mixing that occurs in the area, coupled with the fact that polar bear "ranges are very large and individual bears are unlikely to spend much time in, or close to, the discharge area" [2], EPA believes that the potential for polar bears to come into contact with the discharged effluent is negligible.

V. References

1. Mecum RD. March 6, 2009. ESA Section 7 concurrence letter from the National Marine Fisheries Service to the U.S. EPA

2. Swem T. April 7, 2009. ESA Section 7 concurrence letter from the U.S. Fish and Wildlife Service to the U.S. EPA

3. Kutz SJ, Thompson RCA, Polley L, Kandola K, Nagy J, Wielinga, Elkin BT. 2008. *Giardia* assemblage A: human genotype in muskoxen in the Canadian Arctic. *Parasites and Vectors* 1:32

4. Siefker C, Rickard LG, Pharr GT, Simmons JS, O'Hara TM. 2002. Molecular characterization of *Cryptosporidium* sp. isolated from northern Alaskan caribou (*Rangifer tarandus*). *Journal of Parisitology* 88(1): 213-216

5. Hughes-Hanks JM, Rickard LG, Panuska C, Saucier JR, O'Hara TM, Dehn L, Rolland RM. 2005. Prevalence of *Cryptosporidium* spp. and *Giardia* spp. in five marine mammal species. *Journal of Parisitology* 91(5): 1225-1228

6. Morgan UM, Xiao L, Hill BD, O'Donoghue P, Limor J, Lal A, Thompson RCA. 2000. Detection of the *Cryptosporidium parvum* "Human" Genotype in a Dugong (*Dugong dugong*). *Journal of Parisitology* 86(6): 1352-1354