RECORD OF DECISION

by the

U.S. Environmental Protection Agency
Region 10

for the

Red Dog Mine Extension Aqqaluk Project

I. DECISION TO BE MADE

This Record of Decision (ROD) documents the decision by the U.S. Environmental Protection Agency (EPA) Region 10 to reissue a National Pollutant Discharge Elimination System (NPDES) permit for discharges of wastewater and storm water from the Red Dog Mine activities to waters of the U.S. This project is considered a new source and, in accordance with Section 511(c)(1) of the Clean Water Act (CWA), is subject to the provisions of the National Environmental Policy Act (NEPA).

This ROD is issued pursuant to the Council on Environmental Quality (CEQ) NEPA regulations at 40 CFR Parts 1500-1508, and EPA's NEPA environmental review procedures at 40 CFR Part 6. EPA's decision to reissue the NPDES permit is based upon the analyses included within the Red Dog Mine Extension Aqqaluk Project Final Supplemental Environmental Impact Statement (Final SEIS), dated October 2009. The Notice of Availability of the Final SEIS was published by EPA on October 9, 2009. The 30-day waiting period on the Final SEIS ended on November 9, 2009. Four comment letters were received by EPA on the Final SEIS. The response to these comments is included in Appendix B of this ROD.

II. INTRODUCTION

The Red Dog Mine is an active open pit zinc and lead mine and mill, located in northwestern Alaska, approximately 46 miles inland from the coast of the Chukchi Sea, and 82 miles north of Kotzebue (Appendix A, Figure 1). The mine site facilities are on private land owned by the NANA Regional Corporation (NANA). Some of the support facilities for the mine are located on both state and NANA lands. Teck Alaska Incorporated (Teck) operates the mine under a 1982 Operating Agreement with NANA, and has been mining and processing ore from the Red Dog Mine Main Deposit since 1989.

Prior to mine development, in the early 1980s, Teck first submitted an application to EPA for a CWA Section 402 NPDES permit for the discharge of mining related wastewaters from the Red Dog Mine. The EPA and the U.S. Department of the Interior developed an Environmental Impact Statement (EIS) to evaluate the potential environmental impacts of the proposed Red Dog Mine and support operations. The final EIS was issued in 1984 and EPA issued the first NPDES permit in 1985. The purpose and need for the federal actions covered by this SEIS are to act on permit applications and new information that Teck submitted to EPA under CWA Section 402

(NPDES) and to the Army Corps of Engineers (Corps) under CWA Section 404, seeking federal authorization for certain discharges and activities in connection with ongoing and future mining operations at the Red Dog Mine, including development of the Aqqaluk Deposit. More information on the NPDES permitting history of the Red Dog Mine is provided in the Final SEIS.

The Red Dog Mine Main Deposit is expected to be mined out between 2011 and 2012. Teck proposes to begin developing and mining the Aqqaluk Deposit in 2010, to ensure stable continuing operations through 2031. The Final SEIS supplements the 1984 EIS in evaluating the environmental effects associated with development of the Aqqaluk Deposit while considering the effects of activities that have occurred since the 1984 EIS was finalized. The Final SEIS also identifies measures to mitigate adverse impacts.

Following is a summary of the current Red Dog Mine operations and Teck's plan to develop the Aqqaluk Deposit. More detailed information is provided in the Final SEIS.

The Red Dog Mine includes an open pit mine, a mill for processing ore, a tailings impoundment, waste rock storage areas, and support facilities (Appendix A, Figure 2). The processed ore (lead and zinc concentrates) is transported from the mine facilities via the 52-mile DeLong Mountain Regional Transportation System (DMTS) haul road to the DMTS port facility located on the Chukchi Sea. Lead and zinc concentrates are stored in concentrate storage buildings at the DMTS port and shipped, during open water conditions, to markets in North America, Europe, and Asia. The Red Dog Mine Extension Aqqaluk Project (Aqqaluk Project) encompasses the activities required to develop and mine the Aqqaluk Deposit, which is a lead zinc ore deposit located adjacent to the Red Dog Main Deposit. The Aqqaluk Project includes mining ore from the Aqqaluk Deposit via the same open pit techniques currently used for the Red Dog Main Pit. Waste rock from the Aqqaluk Deposit would be disposed in the mined out Red Dog Main Pit. Aqqaluk ore would be processed at the existing mill with tailings disposed in the existing tailings impoundment. Wastewater from the tailings impoundment would be treated prior to discharge to Middle Fork Red Dog Creek. As per current operations, concentrates would be transported by trucks to the port site for storage and shipping off site.

The mining rate for the Aqqaluk Deposit would be the same as the existing mining rate, roughly 10,000 tons/day, and at this rate the Aqqaluk pit would be mined out in about 20 years (2031). The Aqqaluk Deposit is projected to produce approximately 61.4 million tons of ore and 94.7 million tons of waste rock. The Aqqaluk pit is expected to be approximately 435 feet deep (below Middle Fork Red Dog Creek).

Under Teck's current closure plan, the waste rock dump would be covered, a water cover would be maintained over the tailings impoundment, and the Aqqaluk pit would be allowed to fill with water. Treatment of wastewater from tailings impoundment seepage and the Aqqaluk pit would occur in perpetuity.

EPA Region 10 is the lead federal agency responsible for preparation of the Final SEIS. The cooperating agencies that participated in the SEIS process include the Corps, National Park

Service (NPS), the State of Alaska (Department of Natural Resources [ADNR] as lead for the State), the Northwest Arctic Borough, and the tribal governments representing the Native communities of Buckland, Kiana, Kivalina, Kobuk, Kotzebue, Noatak, Noorvik, Selawik, and Shungnak. The tribal governments authorized the Maniilaq Association to represent their cooperating agency interests and responsibilities.

III. DESCRIPTION OF PROJECT ALTERNATIVES

NEPA requires that an SEIS consider alternatives to the proposed action that address issues identified during the scoping process. The following is a brief summary of the No Action Alternative (Alternative A) and the three action alternatives (alternatives B, C, and D) considered in detail in the Final SEIS. Each alternative consists of a number of components, e.g., wastewater outfall location, concentrate transport, etc. The components of each alternative are compared and summarized in Table 1 (Appendix A). Further detailed information on the project alternatives may be found in the Final SEIS.

A. Alternative A - No Action Alternative

As required by NEPA, a no action alternative was considered for comparison with the action alternatives to determine and compare impacts (40 CFR §1502.14). The no action alternative represents no reissued NPDES permit for the Red Dog Mine and no new Section 404 permits associated with development of the Aqqaluk Project. The no action alternative includes continued mining in the Main Pit until the projected closure date of 2012 but does not include development of the Aqqaluk Project. The facility would continue to operate under the 1998 NPDES permit, which is the currently the effective permit under the CWA. In order to meet the total dissolved solids (TDS) wastewater discharge limitations in the 1998 permit, the wastewater treatment system would need to be modified to include pre-treatment followed by reverse osmosis treatment. The treated wastewater discharge would continue to be to Middle Fork Red Dog Creek.

The mine site would be reclaimed beginning in 2012 following the current closure plan. At mine closure, a shallow (two-foot) layer of water would be maintained over the tailings. Seepage from the waste rock dump and tailings impoundment would be pumped to the Main Pit. Water in both the Main Pit and tailings impoundment would be treated and discharged to Middle Fork Red Dog Creek. Wastewater treatment and discharge would continue in perpetuity at approximately 1.5 billion gallons annually to Middle Fork Red Dog Creek, similar to the existing discharge volume.

B. Alternative B - Applicant's Proposed Project

The proposed action alternative includes reissuing the Red Dog Mine NPDES permit and issuing a Section 404 permit for fill placement associated with development of the Aqqaluk Project. Stripping of waste material overlying the Aqqaluk Deposit would begin in 2010. Mining operations in the Main Pit would be completed while developing the initial stages of the Aqqaluk

Deposit. After the Main Deposit was mined out, waste rock removed from the Aqqaluk Deposit would be placed in the Main Pit. Ore from the Aqqaluk Deposit would be processed in the existing mill and concentrates would continue to be transported to the port site via trucks along the DMTS road. Mill tailings would be placed in the existing impoundment. The height of the tailings impoundment would be raised 16 feet to a final height of 208 feet in order to hold the additional tailings. Wastewater from the tailings impoundment would be treated via the existing high density sludge process to reduce metals concentrations with additional treatment (e.g., barium hydroxide precipitation), as necessary, to reduce TDS levels in the discharge. The wastewater discharge location would remain in Middle Fork Red Dog Creek. All other activities would continue to occur consistent with current operations for the life of the operation with final closure occurring in 2031.

At mine closure, the approved reclamation and closure plan would be implemented. This includes regrading the waste rock dump to a 3:1 slope and covering it with an engineered soil cover. The tailings impoundment would be managed to keep a shallow layer of water over the tailings. Seepage from mine facilities including waste rock dump and tailings impoundment would be pumped to the Aqqaluk Pit and water in both the Aqqaluk Pit and tailings impoundment would be treated and discharged to Middle Fork Red Dog Creek. Wastewater treatment and discharge would need to continue in perpetuity. Figure 3 (Appendix A) depicts Alternative B following closure.

C. Alternative C – Concentrate and Wastewater Pipelines

Under Alternative C, Aqqaluk mining, ore processing, and tailings disposal operations would be the same as Alternative B. Alternative C differs from Alternative B in four regards: (1) concentrates would be transported to the port site via a slurry pipeline, (2) wastewater would be transported by a separate pipeline and discharged to the Chukchi Sea, (3) diesel would be transported to the mine site via a pipeline, and (4) some closure aspects are different.

Under Alternative C, instead of using haul trucks, zinc and lead concentrates would be transported from the mill to the port through a 52-mile slurry pipeline. Filter presses at the port would separate the concentrate from wastewater. The concentrates would be stored in the existing concentrate storage buildings at the port site. Concentrate wastewater would be treated via lime precipitation to reduce metals concentrations. Wastewater from the tailings impoundment water treatment facility would also be transported to the port site via a separate pipeline. The treated concentrate wastewater and tailings wastewater would be combined at the port site and discharged to the Chukchi Sea, thereby eliminating the current outfall in Middle Fork Red Dog Creek. Alternative C also includes a third pipeline to carry diesel fuel from the port to the mine. All pipelines would be buried in a berm built adjacent to the DMTS. CWA Section 404 permits would be needed to construct the pipeline berm and the outfall structure. An NPDES permit would be needed to authorize the discharge to the Chukchi Sea.

The filter plant and diesel pump would require approximately three megawatts of additional power. While additional generators would need to be installed, the increased energy demand would be supplemented with installation of a 100 kilowatt (kW) wind turbine.

The closure scenario under Alternative C is different from Alternative B and is designed to minimize long-term wastewater treatment needs. Closure would include regrading the waste rock dump to a 5:1 slope with excess material moved back into the Aqqaluk Pit beginning in 2031. A synthetic liner would be installed over the dump to minimize long-term seepage. Water remaining over the tailings would be drawn down and a dry cover, including a synthetic liner, would be placed over the tailings. All pipelines would be removed, at closure, including the wastewater discharge to the Chukchi Sea. Wastewater (from the Aqqaluk pit and site seepage) would still be generated after closure that would be treated in perpetuity and discharged into Middle Fork Red Dog Creek.

D. Alternative D – Wastewater Pipeline and Additional Measures

Alternative D differs from Alternative B in the three regards: (1) similar to Alternative C, wastewater would be transmitted via a pipeline and discharged to the Chukchi Sea instead of Red Dog Creek; (2) year around truck washes would be installed at both ends of the DMTS road; and, (3) the road and port would be closed at certain times of the year to minimize subsistence impacts.

Under Alternative D, a wastewater pipeline would transport treated wastewater from the tailings impoundment treatment plant to the Chukchi Sea. Haul trucks would carry concentrates from the mine to the port, per current operations, although year-round vehicle washes would be added at each end of the road to reduce fugitive dust. To address subsistence concerns, the DMTS road would be closed in the fall during the caribou migration and the port site would be opened in summer only after the June migration of beluga whales is completed.

Reclamation and closure of the mine facilities would be the same as described in Alternative B. However, rather than discharging treated wastewater to Middle Fork Red Dog Creek (as would occur under Alternative B) the wastewater pipeline and discharge to the Chukchi Sea under Alternative D would remain for as long as the need for water treatment remained.

IV. THE ENVIRONMENTALLY PREFERABLE AND PREFERRED ALTERNATIVES

This section of the ROD discusses "the alternative or alternatives which were considered (by EPA) to be environmentally preferable" (40 CFR § 1505.2 (b)) and the Preferred Alternative. The Environmentally Preferable Alternative ordinarily, "means the alternative that causes the least damage to the biological and physical environment; it also means the alternative which best protects, preserves, and enhances historic, cultural, and natural resources" (CEQ, 1981: Forty most asked questions, no. 6a). The Environmentally Preferable Alternative can be the same as the agency's Preferred Alternative or differ, depending on the analysis in the Final SEIS. The CEQ Forty most asked questions defines the preferred alternative as "the alternative which the agency believes would fulfill its statutory mission and responsibilities, giving consideration to

economic, environmental, technical and other factors."

The sections below identify the Environmentally Preferable Alternative and the Preferred Alternative. These alternatives were determined based on the impact analysis in the Final SEIS, which compared impacts of the four alternatives across a broad range of resources. Table 2 (Appendix A) summarizes the results of the impact analysis for each alternative. See Chapter 3 of the Final SEIS for details of the impact analysis.

A. Environmentally Preferable Alternative

EPA has identified an Environmentally Preferable Alternative that consists of components of both alternatives C and B. Specifically, the three pipelines under Alternative C and the Alternative B closure plan is the Environmentally Preferable Alternative. EPA has determined that the environmental benefits associated with the Alternative C pipelines outweigh the impacts on wetlands from construction of the pipeline bench. Much of these wetlands are already contaminated due to past and to ongoing fugitive dust emissions from the DMTS.

The concentrate pipeline described under Alternative C would eliminate concentrate truck traffic on the DMTS road and, therefore, reduce fugitive dust emissions and future dust-related effects on soils, vegetation, and wetlands along the DMTS road. Elimination of concentrate truck traffic would also reduce effects on caribou movement caused by truck traffic and would likely have a positive effect on Kivalina's subsistence harvest of caribou. Elimination of truck traffic would also reduce the potential for caribou mortality as well as the ecological risk to ptarmigan and small mammals identified in the DMTS risk assessment.

Moving the wastewater discharge from Red Dog Creek to the Chukchi Sea will allow Teck to discharge more wastewater and better maintain the site-wide water balance. It will also reduce TDS levels in Red Dog Creek and the downstream drainages. However, moving the discharge would have adverse impacts on water quality and aquatic life in Red Dog Creek. This is because the treated effluent has a diluting effect on the naturally high metals levels in Red Dog Creek. The dilution would be lost if the discharge is moved and as a result metals levels in Red Dog Creek would increase. The exact magnitude of these effects cannot be quantified, however conditions would be better than pre-mining conditions and impacts are not expected to extend to Ikalukrok Creek due to the larger water volume in Ikalukrok Creek which would result in diluted metals levels.

Under Alternative D, the use of year around truck washes would only eliminate some of the current dust emissions associated with truck transport of concentrate. The concentrate pipeline under Alternative C, however, would eliminate dust emissions to a much greater extent.

Alternative D includes closure of the port and road during beluga and caribou migration times, respectively. Although road closure could reduce impacts on caribou and therefore on Kivalina's caribou subsistence harvest, the concentrate pipeline of Alternative C, which eliminates all concentrate truck traffic, would be more effective in this regard and is therefore environmentally preferable.

EPA believes that the closure plan under Alternative B is environmentally preferable to the dry closure plan developed under Alternative C. While dry closure of the tailings impoundment could reduce the volume of water requiring long-term treatment, wet closure of the impoundment may lead to improved water quality because maintaining a water cover over the tailings will reduce metals release from the tailings. In addition, dry closure poses specific technical challenges, including a long and uncertain tailings compaction time and difficulty in maintaining a dry cover in the tailings basin.

B. Preferred Alternative

The determination of the Preferred Alternative takes into account other factors beyond environmental impacts, including an agency's statutory mission and responsibilities, giving consideration to economic, environmental, technical and other factors. In this case, EPA's responsibility is to approve or deny Teck's application for reissuance of its NPDES permit for the discharge to Middle Fork Red Dog Creek. Through the SEIS analysis, EPA has determined that Teck can meet the limits in the NPDES permit that was developed based on Teck's permit reissuance application (which is Alternative B in the SEIS). Therefore EPA has identified Alternative B as the Preferred Alternative. Even though EPA identified the concentrate, diesel, and wastewater pipelines as environmentally preferable, EPA does not have the authority to require Teck to construct these pipelines as part of this NPDES permit action. The closure plan under Alternative B was determined to be environmentally preferable and is a component of the Preferred Alternative.

Alternative A is not the Preferred Alternative since it would have broad, adverse economic and social impacts that outweigh the reduced environmental effects associated with ceasing mining in 2012. In addition, these effects could have negative impacts on human health in the Northwest Arctic Borough.

V. EPA DECISION AND FACTORS CONSIDERED IN THE DECISION

In addition to identifying the Environmentally Preferable Alternative, CEQ's NEPA implementing regulations require agencies in the Record of Decision to state the decision that was made by the federal agency. EPA's action with regard to the Red Dog Mine Aqqaluk Project involves the reissuance of an NPDES permit. The permit sets conditions on the discharge of pollutants from the Red Dog mine tailings impoundment to Middle Fork Red Dog Creek via Outfall 001 and authorizes the discharge of storm water from the Red Dog Mine to the tundra.

The discharge from Outfall 001 is subject to the New Source Performance Standards (NSPS) promulgated by EPA under Subpart J of the Ore Mining and Dressing Effluent Guidelines (ELGs) (40 CFR§ 440.104). The discharge also needs to comply with effluent limits developed based on State water quality standards protective of the receiving waters. Analysis presented in the Final SEIS indicates that the discharge would comply with effluent limits and

falls within the allowable net precipitation annual discharge volume established in the NPDES permit and required by the ELGs.

EPA issued a Notice of Intent (NOI) to prepare the SEIS for the Red Dog Mine Aqqaluk Project in the Federal Register on August 31, 2007. This initiated the scoping process required under NEPA. EPA held public scoping meetings on October 2 through October 5, 2007 in Anchorage, Kotzebue, Noatak, and Kivalina. The purpose of the scoping meetings was to explain the Aqqaluk Project and the NEPA process and to listen and record the public's comments on the project and respond to the public's requests for background information needed to fully understand the project description and proposed scope of the SEIS. The scoping period ended on October 15, 2007. Comments received during scoping were used to develop the scope of the SEIS and identify significant issues that needed to be evaluated.

The public comment period on the Draft SEIS was held concurrent with the public comment period on the Draft NPDES permit. The 60-day public review period was from December 5, 2008 until February 3, 2009. EPA held public meetings and hearings on the Draft SEIS and Draft NPDES permit on January 12 through 15, 2009 in Kivalina, Noatak, Kotzebue, and Anchorage. Numerous comments were received on the Draft SEIS and on the Draft NPDES permit. The Final SEIS includes an appendix (Appendix H) with responses to comments on the Draft SEIS. The comments on the Draft NPDES permit were responded to in a separate Response to Comments document, which describes changes made to the Final NPDES permit based on the comments received. The Final NPDES permit and NPDES Permit Response to Comments are attached to this ROD (Appendix C). In addition, EPA received four comment letters on the Final EIS. Responses to these comments are included in Appendix B.

A. Receiving Waters

The Middle Fork Red Dog Creek is protected in the Alaska Water Quality Standards (WQS) for freshwater Class (1)(A)(iv) for industrial water supply use from the headwaters to the terminus of the Red Dog Mine water management system. Lower Middle Fork Red Dog Creek from the terminus of the Red Dog Mine water management system to the confluence with North Fork Red Dog Creek is protected in the WQS for freshwater Classes (1)(A)(iv) for industrial water supply, (1)(B)(i) for contact recreation, wading only and (1)(B)(ii) for secondary recreation (except fishing). The main stem of Red Dog creek from the confluence of the Middle and North Forks to Ikalukrok Creek is protected in the WQS for freshwater Classes (1)(A)(iv) for industrial water supply, (1)(B)(i) for contact recreation, wading only, (1)(B)(ii) for secondary recreation, and (1)(C) for growth and propagation of fish, shellfish, other aquatic life, and wildlife.

Downstream of Red Dog Creek is Ikalukrok Creek. Ikalukrok Creek from its confluence with Red Dog Creek to the Wulik River is protected in the WQS freshwater Classes (1)(A)(iv) for industrial water supply, (1)(B)(i) for contact recreation, wading only, (1)(B)(ii) for secondary recreation, and (1)(C) for growth and propagation of fish, shellfish, other aquatic life, and wildlife.

The water quality parameters that could be affected by the discharge from the Red Dog mine site include metals, solids, cyanide, and pH. These are common potential water quality parameters of concern in treated mine water discharges.

B. Description of Discharge

Outfall 001 consists of treated water from the tailings impoundment. The tailings impoundment at the Red Dog Mine receives water from a variety of sources. These sources include: water associated with the tailings from the milling process which includes small amounts of the chemical reagents used in ore processing; domestic wastewater, assay laboratory, filter press discharge, thickener overflows, and heavy equipment washing water carried by the gravity line from the mill/housing area; truck wash water; waste rock dump seepage; overburden pumpback; SAG mill conveyor wet scrubber system, natural gas produced water; filter cloths which are buried with the tailings; soil cement used on the exposed tailings beach; seepage pumpback; blasting agents; secondary containment water; water used as dust suppressant that may contain small amounts of methanol; snow dump; mine sump water; sand filter backwash and sand deposited on the tailings beach; and Port wastewaters hauled to the mine site such as regeneration solution from the ion exchange treatment process at the Port.

Tailings pond water, often called reclaim water, is pumped by floating barge pumps in the tailings pond to two different water treatment plants at the mill facility. Water treatment plant 1 (WTP-1) operates year-round at a nominal rate of 6,000 gallons per minute (gpm) and provides the mill with treated water for processing. Water treatment plant 2 (WTP-2) is seasonally operated and treats reclaim water for discharge at Outfall 001 at a maximum capacity of 14,500 gpm. WTP-2 also has the ability to provide water to the mill when needed.

At WTP-2, reclaim water is first treated in the pipeline with sodium sulfide and mixed in an in-line mixer. The sulfide reacts with the dissolved cadmium in the reclaim water to form insoluble cadmium sulfide, which is stable throughout the remainder of the treatment process. Reclaim water then flows into a rapid mix tank where reacted lime (calcium hydroxide) and recycled sludge are added to adjust the pH to approximately 10.3 standard units (s.u.). From the rapid mix tank the solution gravity flows into a lime reactor.

The significant chemical reaction occurring in the lime reactor is precipitation, altering the form of an ion from a dissolved state to a solid state, of soluble metals as insoluble metal-hydroxides. Teck has proposed using barium hydroxide rather than calcium hydroxide for this treatment step, as needed, to discharge more wastewater to maintain the water balance in the tailings impoundment. The precipitated solids are maintained in suspension and flocculent is added, coalescing the smaller particles into larger solids. The flocculent is allowed to react in the agitated floc mix tank. From the floc mix tank, the wastewater flows into a clarifier where the solids are allowed to settle by gravity and separate from the water. Settled solids (sludge) are removed through the “underflow” and the treated water leaves the clarifier through the “overflow”. The majority of the underflow solids are recycled back to the beginning to the treatment process to a lime/sludge mix tank where the solids are mixed with lime. Product in the lime/sludge mix tank is then fed into the rapid mix tank with the raw reclaim water from the

tailings impoundment.

Clarifier overflow water flows to sand filters which remove any residual solids not settled out of solution in the clarifier. From the sand filters, automated pH and turbidity meters take final measurements. If the pH is within permit limits and the range established which ensures effective treatment and the turbidity is within an established range which indicates that effective suspended solids removal has been accomplished, the water is discharged via Outfall 001 to Middle Fork Red Dog Creek. If the pH and turbidity are not within the prescribed range, the filtered water is discharged back into the tailings impoundment.

Water treatment plant 3 (WTP-3) was constructed during the winter/spring of 2004/2005 and began operating in 2006. The plant treats seepage and runoff from the Main Waste Stockpile and Mine Sump before it enters the tailings impoundment. Over time, the operation of WTP-3 is intended to help control TDS and sulfate levels in the tailings impoundment. Like WTPs-1 and 2, WTP-3 uses a lime precipitation process for metals removal.

The volume of effluent discharged varies with precipitation and the amount of mine drainage and seepage entering into the impoundment. Effluent discharge volumes range from 0.2 billion gallons (bgal) per year (1993) to 1.5 bgal per year in 1999 and 2005.

Section 304(e) of the CWA requires EPA to include conditions in the NPDES permit that require the permittee to develop a Best Management Practices (BMP) Plan and/or Stormwater Pollution Prevention Plan (SWPPP) to control potential discharges such as runoff, spillage, and leaks. The NPDES permit requires a Site Management Pollution Prevention Plan (SMPPP) that combines general BMP Plan requirements with SWPPP requirements to control the discharge of toxic or hazardous pollutants by way of plant runoff, spillage or leaks, sludge or waste disposal, and drainage from raw material storage at the mine site itself. The SMPPP should recognize the hazardous nature of various substances used and produced by the facility and the way such substances may be accidentally dispersed. The intent of the SMPPP is to ensure that the facility and any ancillary activities, such as drilling pads, control storm water discharges.

C. Endangered Species Act

EPA determined that there were no threatened and endangered species listed under the Endangered Species Act in the vicinity of the discharges from the mine site authorized under the NPDES permit. During an earlier permit issuance (the 2007 NPDES permit, which EPA withdrew), the U.S. Fish and Wildlife Service (USFWS) and the NOAA National Marine Fisheries Service (NOAA) sent letters to EPA stating that there were no threatened or endangered species listed under their jurisdiction in the project area (USFWS letter dated September 21, 2005 and NOAA letter dated September 28, 2005). Since that time, the polar bear has been listed as threatened. Polar bears have been occasionally observed at the port site during the winter, but have not been reported to remain near the port facilities. Since the port does not operate in the winter, EPA determined in the Final SEIS that there would be no impact on the polar bear.

There would be no impact from the NPDES discharge to threatened and endangered species since there are no listed species in the area of discharge. NOAA concurred with this determination in a November 2, 2009 email from Amy Cox, NOAA, to Cindi Godsey, EPA. USFWS concurred with this determination in a November 3, 2009 email from Nora Rojek, USFWS.

D. Essential Fish Habitat (EFH)

EPA consulted with NMFS pursuant to Section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and determined that issuance of the permit is not likely to have an adverse effect on EFH in the vicinity of the discharge. Effluent limitations have been incorporated into the permit based on criteria considered to be protective of overall water quality in Red Dog Creek based on the designated uses of the Creek. Teck has constructed a weir as a barrier to fish passage to prevent fish from coming into contact with the discharge.

E. National Historic Preservation Act (NHPA)

EPA, in coordination with the Corps, initiated consultation with the Alaska State Historic Preservation Officer (SHPO) regarding two cultural resources sites near the Aqqaluk pit (September 16, 2009 letter to Judith Bittner, SHPO, from Patty McGrath, EPA). EPA determined that there would be no adverse effect to these sites under Section 106 of the NHPA with regard to the agencies' issuance of CWA permits for the proposed Aqqaluk Extension Project. This determination was based on the analysis of impacts to cultural resources in the Final SEIS and also on the measures and operational controls included in Teck's Red Dog Mine Cultural Resources Protection Plan (CRPP) for Alaska Heritage Resource Survey Sites DEL-163 and DEL-337 (July 12, 2009). SHPO responded to EPA's determination by requesting that the site conditions of DEL-163 and DEL-337 be monitored annually and that three specific conditions and clarifications be incorporated into the CRPP as stipulations for these sites. The conditions are related to professional qualifications and SHPO consultation and procedures regarding inadvertent finds. SHPO stated that they concur with EPA's finding so long as these stipulations are included in the CRPP and implemented (October 21, 2009 letter to Patty McGrath, EPA, from Judith Bittner, SHPO). Teck revised it's CRPP to include SHPO's stipulations. On November 30, 2009, EPA submitted the revised CRPP to SHPO, which concluded NHPA consultation.

F. Tribal Consultation

Pursuant to Executive Order 13175 (Consultation and Coordination with Indian Tribal Governments), EPA undertook a concerted effort by contacting the tribal governments (Indian Reorganization Act [IRA] council and traditional councils) of each Native village in the NWAB to determine if the tribal governments were interested in engaging in government-to-government consultation and/or participation as a cooperating agency in developing the SEIS. EPA considered that each of the 11 villages (IRA Council: Buckland, Deering, Kivalina, Kotzebue,

Noatak, Noorvik, Selawik, Shugnak; traditional council: Ambler, Kiana, Kobuk) within the NWAB could potentially be affected by the proposed action. Nine of the tribal village participated as cooperating agencies

The Kivalina IRA Council was the only tribe that originally responded to request government-to-government consultation. EPA, NPS, and the Corps met with the Kivalina IRA Council on October 5, 2007, before the Kivalina public scoping meeting and on January 12, 2009, before the Kivalina public meeting on the draft SEIS and draft NPDES permit. Comments received during the meetings were used to develop the significant issues and alternatives for evaluation in the SEIS.

Following issuance of the draft SEIS, the Point Hope IRA Council requested government-to-government consultation in a comment letter on the draft SEIS and draft NPDES permit submitted on its behalf by Trustees for Alaska. EPA responded by letter and email agreeing to a consultation meeting and requested that the Council contact EPA regarding possible meeting dates. In June 2009, EPA was sent an email by the Point Hope IGAP coordinator requesting EPA's attendance at a meeting in two days. EPA was unable to attend the meeting and requested that EPA and the Point Hope Council work together to set up another date. To date there has been no response to that communication.

VI. MITIGATION MEASURES, RECLAMATION, AND MONITORING

Teck implements mitigation measures and monitoring as part of its ongoing management of the Red Dog Mine. During the analysis in the SEIS, EPA recommended additional mitigation and monitoring measures. See Section 2.5 and Chapter 3 of the Final SEIS.

A. Mitigation Measures

CEQ NEPA implementing regulations require that agencies identify in the ROD whether all practical means to avoid or minimize environmental harm from the alternative selected have been adopted, and if not, why not. 40 CFR § 1505.2(c). The regulations further state that a monitoring program shall be adopted and summarized where applicable for any mitigation. Mitigation measures are the practical means to avoid, minimize, and reduce impacts, and compensate for unavoidable impacts by replacing or providing substitute resources or environments.

Teck has built into its project many mitigation measures that have been taken into account in assessing the environmental consequences of the alternatives. Additional mitigation measures were identified in the SEIS analysis. These measures and a summary of whether/how they can be implemented is provided in Table 3 (Appendix A). EPA recommends that other agencies require, or Teck voluntarily, implement mitigation measures that cannot be required by the NPDES permit.

B. Reclamation

The overall goal of Red Dog Mine closure and reclamation is to return disturbed land to the post-mining land use designated by the land owner, primarily NANA. Under all alternatives, including the preferred alternative, long-term treatment and discharge of wastewater will be required. The reclamation and closure plan was described above under Alternative B and is described in more detail in the Final SEIS and in Teck's Red Dog Mine Closure and Reclamation Plan (the Closure Plan). The Closure Plan was approved by the State of Alaska on December 2, 2009. The Closure Plan, including the level of financial assurance will be reviewed and subject to modification every five years or at any time that the State determines that the financial assurance amount is not adequate. Currently the State has required $305.15 million in financial assurance to cover reclamation and closure, including long-term water treatment.

C. Monitoring

Teck has an ongoing environmental monitoring program to gather data and determine compliance with federal and state authorizations and approvals. Additional monitoring measures were identified in the SEIS analysis. These monitoring measures and a summary of whether/how they can be implemented is provided in Table 4 (Appendix A). EPA recommends that other agencies require, or Teck voluntarily, implement monitoring measures that cannot be required by the NPDES permit.

The following testing and monitoring will be required specifically in the NPDES permit. The attached permit (Appendix C) provides specific parameters and details of the monitoring program.

<u>Outfall 001</u>

The NPDES permit requires monitoring of metals, TSS, cyanide, fecal coliform, ammonia, and pH on a weekly or monthly basis (depending upon the parameter) in order to determine compliance with the effluent limits in the permit. Additional monitoring for other parameters is required to assess the characteristics of the effluent and to determine whether permit limits may be needed in the future. The permit also requires that effluent flow be monitored to determine compliance with TDS limits and cumulative volume of discharge be monitored to determine compliance with the volume limit, which is based on the ELGs.

<u>Whole Effluent Toxicity (WET) Requirements</u>

Chronic WET testing is included in the permit on a monthly basis. The testing will occur at Outfall 001 so that the full effects of the discharge into Red Dog Creek can be determined. If WET testing indicates that WET limits are exceeded, then Teck is required to conduct a Toxicity Reduction Evaluation to reduce the toxicity and potentially a Toxicity Identification Evaluation to identify the cause of toxicity.

<u>Surface Water Ambient Monitoring</u>

The permit requires monitoring of flow and conductivity in Red Dog Creek and

Ikalukrok Creek in order to determine compliance with instream TDS limits. The permit requires monitoring for metals, cyanide, pH, ammonia, temperature, TDS, and turbidity at two locations in Ikalukrok Creek (downstream edges of the TDS mixing zone and further downstream), in Red Dog Creek (downstream edge of the TDS, ammonia, and cyanide mixing zone), in North Fork Red Dog Creek, and in the Middle Fork Red Dog Creek upstream of Outfall 001. The permit also requires ongoing bioassesment monitoring in the North Fork Red Dog Creek, Main Stem Red Dog Creek, and Ikalukrok Creek.

TDS Management Plan

The permit requires Teck to prepare and implement a TDS Management Plan to include information on actions that will be taken to provide enhanced treatment for TDS and/or source control. The purpose of preparing and implementing the TDS Management Plan is to ensure that the permittee will be able to discharge through Outfall 001 a sufficient volume of wastewater in compliance with the TDS effluent limits to maintain a safe water level behind the tailings impoundment dam.

Site Management Pollution Prevention Plan

The NPDES permit requires the permittee to develop and implement a Site Management Pollution Prevention Plan (SMPPP). The SMPPP will be used to prevent and minimize the potential for the release of pollutants from the site into waters of the U.S. The SMPPP must establish specific Best Management Practices (BMPs) to control the discharge of toxics or hazardous pollutants by way of spillage or leaks, sludge or waste disposal, and drainage from raw material storage. The SMPPP must be amended whenever there is a change in the facility or in the operation of the facility which materially increases the potential for an increased discharge of pollutants.

VII. CONCLUSION

Based on the findings of the Final SEIS, EPA has selected Alternative B as the Preferred Alternative and has developed a final NPDES permit for treated wastewater discharge from tailings impoundment (Outfall 001) to Middle Fork Red Dog Creek and for storm water to the tundra. The final NPDES permit is attached as Appendix C.

Further information regarding this Record of Decision may be obtained by contacting:

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Signed,

/s/
Michael A. Bussell
Director, Office of Water and Watersheds

Date: January 8, 2010

APPENDIX A

TABLES AND FIGURES

Figure 1: General Project Area
Figure 2: Existing Facilities and Aqqaluk Deposit
Figure 3: Alternative B after Closure

Table 1: Comparison of Alternatives
Table 2: Summary of Potential Impacts of Each Alternative by Resource
Table 3: Mitigation Measures by Resource
Table 4: Selected Monitoring by Resource

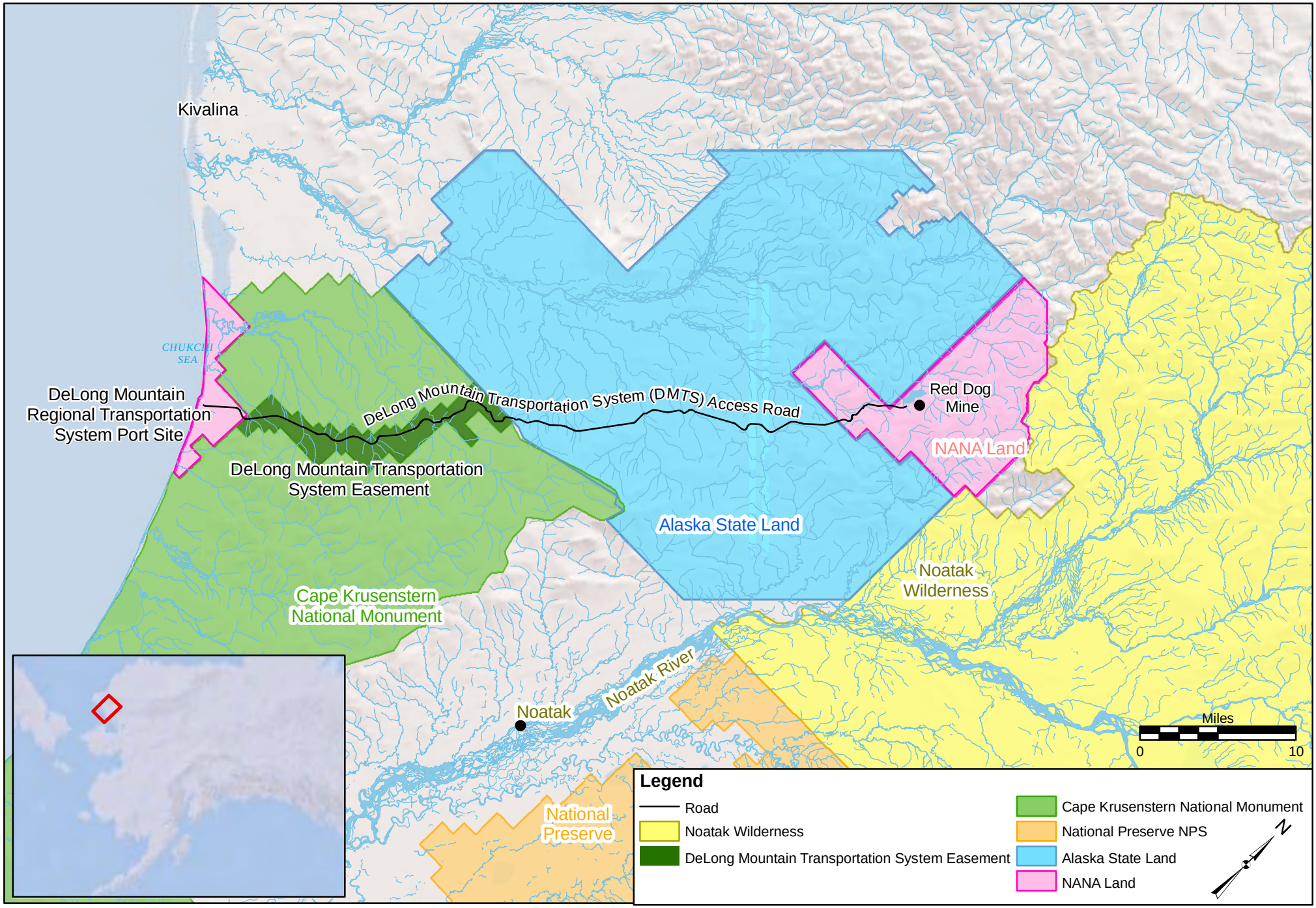

FIGURE 1

GENERAL PROJECT AREA

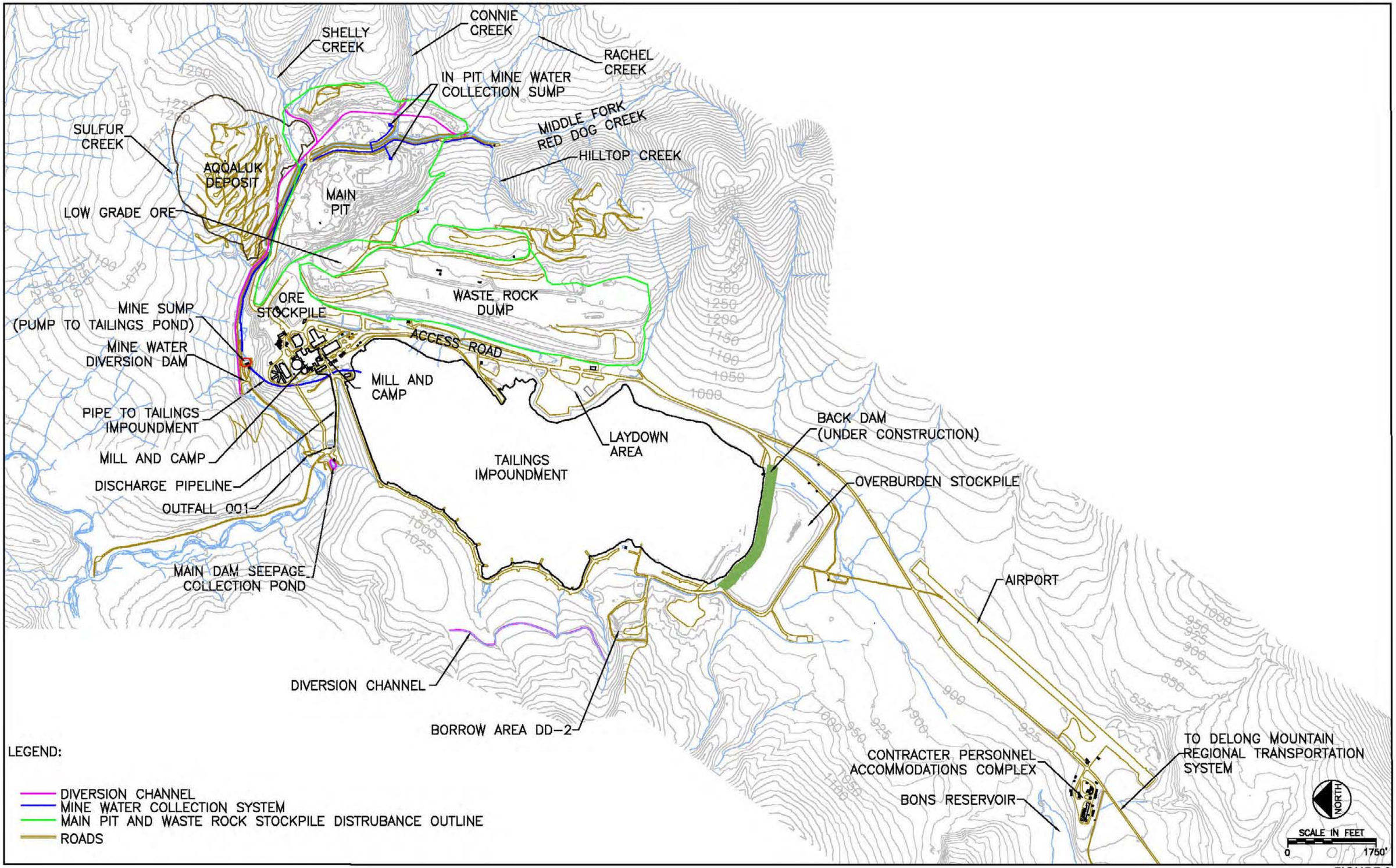

FIGURE 2
EXISTING FACILITIES AND AQQALUK DEPOSIT

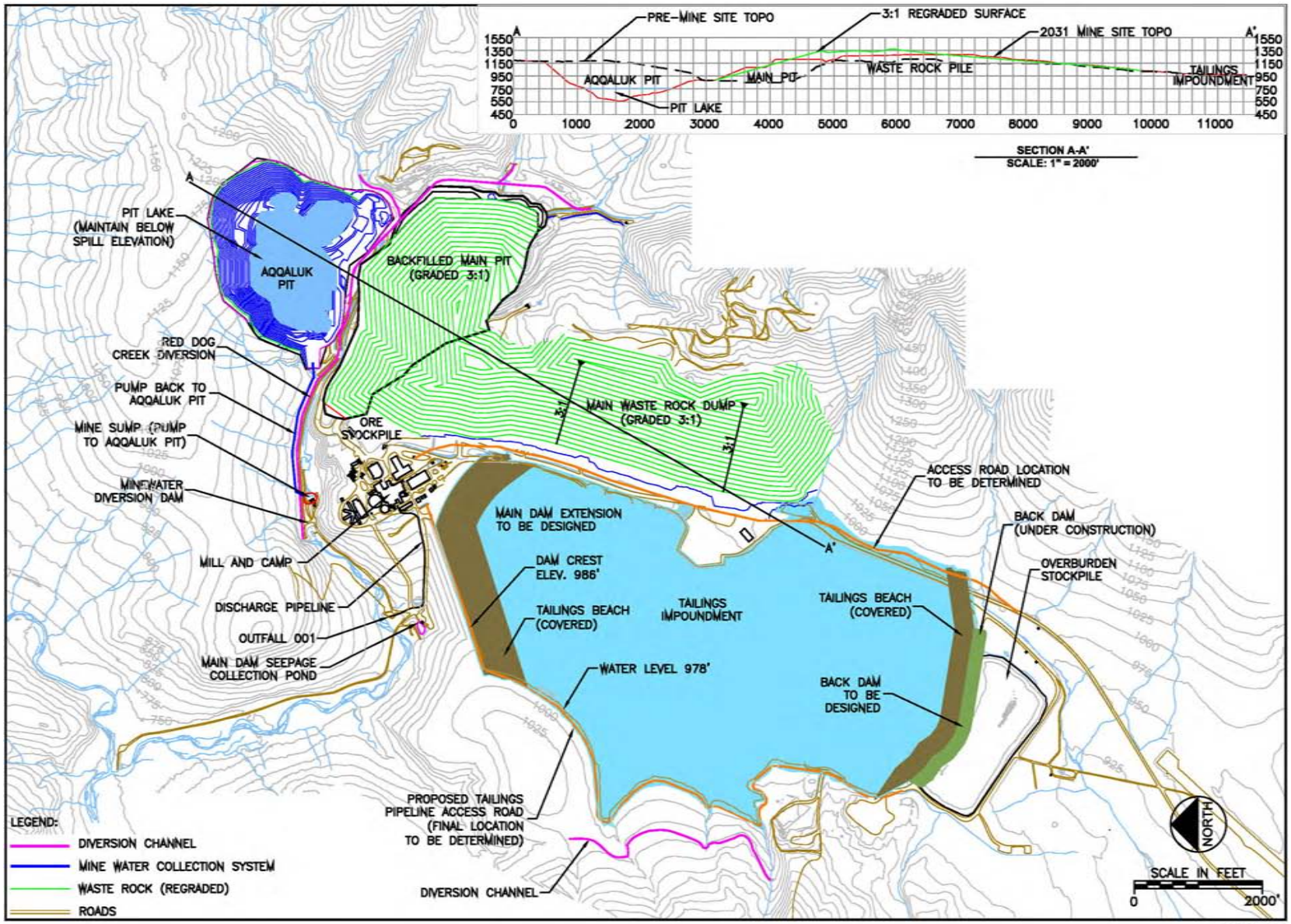

FIGURE 3
ALTERNATIVE B - AFTER CLOSURE 2031

Table 1 Comparison of Alternatives

Component	Alternative A No Action	Alternative B Proposed Action	Alternative C Concentrate and Wastewater Pipelines	Alternative D Wastewater Pipeline and Additional Measures
Mining Method	No Aqqaluk Project.	Aqqaluk Open Pit.	Same as Alternative B.	Same as Alternative B.
Waste Rock Disposal	Waste rock dump.	Waste rock dump/Main Pit backfilled with Aqqaluk Pit waste rock.	Main Pit backfilled with Aqqaluk Pit waste rock/Aqqaluk Pit partially backfilled from existing waste rock dump.	Same as Alternative B.
Wastewater Treatment	Aluminum or barium hydroxide pretreatment, followed by reverse osmosis.	Existing high-density sludge/lime precipitation plus, as needed, barium hydroxide precipitation.	Existing high-density sludge/lime precipitation for mine. Barium hydroxide precipitation or other enhanced TDS treatment not needed. New sludge/lime system at port (different water quality permit limits for marine outfall).	Existing high-density sludge/lime precipitation for mine. Barium hydroxide precipitation or other enhanced TDS treatment not needed.
Wastewater Outfall Location	Red Dog Creek.	Same as Alternative A.	Chukchi Sea during operations. Red Dog Creek after closure.	Chukchi Sea.
Concentrate Transport	Concentrate truck.	Same as Alternative A (longer duration).	Slurry pipeline.	Same as Alternative B (plus truck washes).
Power	Additional 10 megawatts of power demand for wastewater treatment.	No change from existing operations.	Additional three megawatts of power at port for filter presses and pumps (supplemented with wind power).	No change from existing operations.
Subsistence Closures	None.	None.	None.	Late opening of port (July 1) and closure of DMTS road in fall.
New Construction	New water treatment plant and generator.	Aqqaluk Pit Development.	Same as Alternative B plus new pipeline bench incorporated into the DMTS road.	Same as Alternative C plus truck washes at contractor PAC and port site CSBs.
Fugitive Dust Control	Per draft fugitive dust risk management plan.	Per draft fugitive dust risk management plan.	Per draft fugitive dust risk management plan. Pipeline would eliminate concentrate truck and fuel truck traffic.	Per draft fugitive dust risk management plan plus enhanced truck washes.

Component	Alternative A No Action	Alternative B Proposed Action	Alternative C Concentrate and Wastewater Pipelines	Alternative D Wastewater Pipeline and Additional Measures
Reclamation/ Closure	Pit lake in Main Pit (below 850 feet); wet cover over tailings; soil cover over waste rock dumps (3:1 [horizontal:vertical] grading). Long-term wastewater treatment required.	Main Pit backfilled; pit lake in Aqqaluk Pit; wet cover over tailings; soil cover over waste rock dumps (3:1 grading) (oxide ore stockpile and waste rock dump ½ reclaimed by 2017, fully reclaimed by 2020). Long-term wastewater treatment required.	Main pit backfilled; partial backfill Aqqaluk Pit; geosynthetic dry liner cover over tailings impoundment and waste rock dump (regraded waste rock dump to 5:1). Long-term wastewater treatment required.	Same as Alternative B except continued wastewater pipeline and discharge to the Chukchi Sea. Long-term wastewater treatment required.

Table 2 Summary of Potential Impacts of Each Alternative by Resource

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
Air quality	Stack and fugitive emissions	Higher stack emissions due to 10MW generator for reverse osmosis system; will continue to be required after closure. Duration of fugitive emissions minimized after end of mining in 2011.	Stack emissions comply with all Federal and State air quality standards. Fugitive dust emissions along DMTS road continue at current levels through 2031, unless controls implemented through the draft fugitive dust risk management plan. Elevated metals levels in soils extend >50 miles.	Same stack emissions as Alternative B. Fugitive dust emissions associated with DMTS road traffic largely eliminated by pipeline construction. Additional fugitive dust emissions associated with the dry cover over the tailings impoundment and cover material stockpiles	Same stack emissions as Alternative B. Fugitive dust emissions associated with DMTS road greater than Alternative C but less than Alternative B.
Geochemistry	Acid rock drainage and metal loadings	Acid drainage will continue during operations. After closure, wet cover over tailings should minimize acid generation potential and could lead to reduced wastewater treatment requirements over long term.	Same as Alternative A for acid generation potential although a larger volume of source material. Metals loadings from fugitive dust emissions continue through 2031 with increased metals concentrations in downwind soils and plants.	Dry closure of waste rock and tailings impoundment would reduce flow volumes requiring treatment but acid generation expected over long term. Metals loadings to soils and plants from fugitive dust emissions along DMTS road greatly reduced.	Same as Alternative A for acid generation. Metals loadings from fugitive dust emissions along DMTS road reduced more than Alternative B, but less than alternatives A and C.
Geotechnical stability	Probability of failure	Risk of failure of tailings dam low. However, long-term concerns due to the level of the phreatic surface and dam design below proposed safety factor. ADNR will implement mitigation measures during final dam design to remedy concerns and ensure long-term stability. Stability of waste rock pile also ensured through permitting and ongoing oversight by ADNR.	Same as Alternative A.	Same as Alternative A.	Same as Alternative A.

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
Water Resources – Surface Water	Stream flow	No changes from current conditions.	Stream flow in Red Dog Creek may be slightly greater than current conditions since additional wastewater can be discharge during times when barium hydroxide is used to lower TDS in the effluent and increase discharge rates.	Changing to marine discharge reduces stream flow in Main Stem Red Dog Creek by 18 to 38 percent during operations. In Ikalukrok Creek average flows would be reduced by less than 5 percent below the confluence with Red Dog Creek.	Same as Alternative C except stream flow reductions continue after closure.
	Water Quality	TDS levels in Main Stem Red Dog Creek reduced to below 172 mg/L. Lower TDS levels in Ikalukrok Creek. No change at Kivalina water supply intake; meets drinking water standards. For metals and cyanide; no change from current conditions.	No change from current conditions for metals, cyanide, and TDS Kivalina water supply intake meets drinking water standards. For DMTS streams, no water quality impacts identified, although additional monitoring is warranted.	Change to marine discharge during operations will decrease TDS concentrations to below water quality standard levels in Red Dog Creek. Lower TDS levels in Ikalukrok Creek. No detectable change in metals or TDS concentrations at Kivalina's water supply. Metals levels in Main Stem Red Dog Creek, which are already above aquatic life standards, will increase, although levels will be lower than pre-mining conditions. Small (less than 10 feet) marine mixing zone around the Chukchi Sea discharge. After closure, same as alternative B. Reduced risk of metal loadings to DMTS streams from dust as compared to other alternatives.	Same as Alternative C during operations; effects continue after closure. Risk of metals loadings from dust along DMTS lower than Alternative B but higher than Alternative C.
	Spills	Spill risk associated with vehicle transport greater than Alternative C but lower than alternatives B and D considering the shorter duration of operations.	Similar to Alternative A, except longer duration of risk.	Lower risk of a truck transport related spill with pipeline. However, a pipeline rupture could have impacts, depending upon location and duration.	Similar to Alternative B.

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
	Water Management	Reverse osmosis treatment system needed until closure and in perpetuity to meet TDS limits. At closure, tailings impoundment and Main Pit used for water management. Water discharge would continue in perpetuity.	Continued use of existing water management and treatment systems with addition of enhanced treatment (barium precipitation) to reduce TDS levels and maintain water balance, as needed. Wet closure involves water management in the Aqqaluk Pit and tailings impoundment. Water quality in tailings impoundment expected to improve over the long term although perpetual treatment and discharge still expected.	Continued use of existing water management system and treatment of tailings impoundment wastewater, except the wastewater would be piped to the port site, combined with treated concentrate wastewater and discharged to the Chukchi Sea. A new treatment plant would be built at the port site for treatment of concentrate wastewater. After dry closure of the tailings impoundment, the wastewater pipeline would be removed with contaminated water managed in the Aqqaluk Pit. Reduced volume of water (compared to other alternatives) would require treatment in perpetuity.	Same as Alternative C during operations with pipeline to ocean; pipeline maintained after closure. Closure plan for impoundment, pits and waste rock stockpiles same as Alternative B.
Water Resources -Groundwater	Groundwater hydrology and quality	Limited and localized impacts on ground water, including loss of permafrost. Pit lake created in Main Pit.	Similar to Alternative A, except Main Pit backfilled and pit lake forms in Aqqaluk Pit.	Same as Alternative B, although permafrost could be restored more quickly under tailings impoundment (with dry closure).	Same as Alternative B.
Vegetation	Acres of Disturbance	28 acres of new disturbance associated with the expansion of the waste rock dump and roads/ditches. Reclamation begins in 2011, including revegetation where practicable.	406.5 acres of new disturbance associated with developing Aqqaluk Deposit including tailings impoundment expansion and new roads/ditches. Closure in 2031, although ongoing reclamation of main waste rock dump when backfilling begins.	Similar to Alternative B with 145 acres of additional disturbance associated with pipeline bench, reclaimed after closure. Stockpiles for the tailings impoundment cover material would affect 80 acres until reclamation was completed.	Similar to Alternative C, except pipeline bench remains after closure. No additional stockpiles would be required for reclamation.
	Dust impacts	Fugitive dust emissions and vegetation impacts, primarily to mosses and lichens, would continue at current levels through 2011.	At mine site, additional dust impacts (changes in species composition/cover) from Aqqaluk Pit development. Along DMTS road, emissions and effects	Same as Alternative B at mine site. Along DMTS road, fugitive emissions greatly reduced by concentrate pipeline. Future metals loadings lowered but effects on previously impacted	Similar to Alternative B except some reductions in fugitive emissions and metal loadings along DMTS road resulting from truck washes.

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
			continue through 2031.	vegetation uncertain.	
Wetlands	Acres and Types Disturbed	No impacts beyond currently permitted levels.	Additional 144.9 acres disturbed at mine site. No additional impacts along DMTS road. Loss of function and value minor at regional level.	Same as Alternative B at mine site. 125.5 acres of additional wetlands disturbed by pipeline bench – function may already be affected by fugitive dust. Some level of function would be recovered after closure.	Same as Alternative B at mine site. Same as Alternative C along DMTS road except pipeline bench remains after closure.
Wildlife	Impacts	No impacts beyond current levels, some risk from dust emissions to ptarmigan and small mammals. Localized impacts on beluga whale movements and caribou migration.	Similar in magnitude to Alternative A except longer duration of operational impacts.	Lower risk to ptarmigan and small mammals from reduced dust emissions as compared to alternatives B and D. Reduced caribou mortality as compared to alternatives B and D due to elimination of truck traffic as well as less impact on caribou migration. Localized impacts to beluga due to port activities similar to Alternative B. No impacts to marine mammals from wastewater discharge.	Risk to ptarmigans and small mammals from fugitive dust emissions lower than Alternative B but higher than Alternative C. Impacts on caribou migration and beluga whale movement reduced by road closure and delayed port opening. Caribou migration impact lower than Alternative B, but not as low as Alternative C. Beluga movement impact lower then other action alternatives. No impacts to marine mammals from wastewater discharge.
Aquatic Resources	Freshwater	No change from current conditions. Lowered TDS levels in the discharge will not have an affect on aquatic life. Metals concentrations and arctic grayling spawning in Red Dog Creek are improved compared to pre-mining conditions. Based on current data, no change from current conditions in streams along DMTS road, although	Same as Alternative A. The difference in TDS levels between alternatives would not result in effects on aquatic life downstream. Metals concentrations and arctic grayling spawning in Red Dog Creek are improved compared to pre-mining conditions. Based on current data, no change from current conditions in streams along	Removal of discharge from Red Dog Creek would result in impacts to aquatic life during operations because of increased metal loadings and reduced flow. Water quality will be better than pre-mining conditions but worse than current conditions (except for reduction in TDS levels). No changes in Ikalukrok Creek or Wulik River. No impacts on DMTS road	Same as Alternative C except impacts to Red Dog Creek from the loss of dilution from the outfall would continue after closure. Impacts on aquatic life in DMTS streams the similar to Alternative B although less risk of exposure to concentrate within fugitive dust.

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
		additional monitoring is warranted.	DMTS road, although additional monitoring is warranted.	observed in fish monitoring, but sporadic tissue concentrations above effects levels warrant future monitoring. Any future impacts due to truck traffic less under Alternative C than other alternatives.	
	Marine	No discharges from mining operations and no impacts beyond current conditions.	Same as Alternative A.	Short-term, adverse impacts on algae, invertebrates, and fish during pipeline construction and removal. Construction should be timed to avoid fish migration periods (through Corps' Section 10 permit). Because of limited mixing zone size (10 feet around outfall) and discharge would meet marine water quality standards at edge of mixing zone; no impacts from marine discharge.	Same as Alternative C.
Land Use and Recreation	Land Use	Site reclamation begins in 2011.	Site reclamation begins in 2031.	Similar to Alternative B.	Similar to Alternative B.
	Recreation	No direct impacts on recreational use because of limited access to site. Some visual impacts to hikers and recreationists flying over site on way to destinations.	Similar to Alternative A although development of the Aqqaluk Pit would result in additional disturbance.	Similar to Alternative B, although pipeline bench could slightly increase visual effects.	Similar to Alternative C.

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
Health	Public Health	Existing operations affect presence of caribou and beluga whale in vicinity of Kivalina with some reduction in harvest levels. Harvest change could affect diet and health; therefore, a diet survey is recommended. Adverse impacts related to employment and income could occur with mine closure in 2011. Some benefits from reduced impacts on subsistence, less employee separation, and potential for reduced spread of infectious disease. Effects of contaminant exposure are limited under all alternatives.	Allows for continued mining through 2031 and associated economic and employment benefits with more time to plan for eventual mine closure. Continued effects of dust emissions on some subsistence resources to users in Kivalina. Mine activities have similar effect on subsistence in Kivalina as under current conditions but extend through 2031.	Similar to Alternative B, except subsistence impacts are reduced by lower dust emissions and elimination of concentrate truck traffic (less displacement of caribou).	Similar to Alternative C, although less reduction in dust emissions, subsistence benefits associated with road closure during caribou migration and delayed port opening during whale movement.
	Industrial Health	Current accident rates and worker exposure would continue through 2011. Teck would continue to implement and refine, as necessary, its health and safety program to prevent exposure and monitor worker health.	Current accident rates and worker exposure would continue through 2031. Teck would continue to implement and refine, as necessary, its health and safety program to prevent exposure and monitor worker health.	Similar to Alternative B, except reduced exposure to the contaminants in dust from workers associated with concentrate transport (minor effect).	Similar to Alternative B.
Subsistence	Land Mammals	Mine has not caused effects on overall caribou migration patterns, but localized changes primarily from mine activities (including the DMTS road) have occurred and subsistence harvest has decreased. Such impacts should be greatly decreased after closure with traffic reductions. Effects mitigated by management practices to stop traffic when large-scale caribou herd movement has	Similar in magnitude to Alternative A, except operational impacts would continue through 2031.	Construction of the concentrate pipelines would substantially reduce truck traffic and thereby lessen impacts on caribou and subsistence harvest in terms of displacement.	Closure of the road during the caribou migration may lessen impacts (though not as much as Alternative C) on subsistence by reducing localized displacement of caribou.

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
		right-of-way.			
	Marine Mammals	Localized displacement of beluga whales at port site could be contributing to reduced harvests by Kivalina residents. Impacts from port activity would be eliminated after closure in 2011.	Similar in magnitude to Alternative A except operational impacts continue through 2031.	Similar to Alternative B in terms of port site activity displacing beluga whales. Impacts from construction of the discharge pipeline outfall could be minimized by timing restrictions. Discharge should not affect marine mammals.	Impacts to whale movement and subsistence reduced by closing the port during the annual June beluga whale migration. Impacts related to construction of marine outfall is the same as Alternative C.
	Fugitive Dust	No actual risk identified but perceived contamination of berries leading to changes in use areas and reduced harvest from pre-mining conditions.	Same as Alternative A in magnitude except fugitive emissions continue through 2031.	Reduced fugitive emissions since traffic would be eliminated due to concentrate pipeline could lead to increase in berry harvest and less concern about dust contamination of other resources.	Less dust emissions than alternatives A and B, but more than C. Effects on subsistence uncertain.
Cultural Resources	Effects on historic properties	At mine site, up to 17 sites have been affected by existing activities or will be affected by additional operations through 2011. No sites identified along DMTS road. All effects mitigated by *Integrated Plan for the Management of Cultural Resources in the Red Mine Project Areas, 2006 (Integrated Plan)*.	Development of Aqqaluk Pit could impact 2 additional sites, direct and indirect effects mitigated by *Integrated Plan*.	Similar to Alternative B.	Similar to Alternative B.
Transportation	Traffic	Marine and DMTS road traffic continues at current levels through 2011.	Same traffic levels as Alternative A except operational impacts extend through 2031.	Traffic along DMTS road greatly reduced by concentrate pipeline (36 fewer round trips per day by concentrate trucks). Number of diesel fuel trucks also reduced. Traffic greatly reduced compared to alternatives B and C.	Same as Alternative B except reduced fugitive emissions from truck traffic. Also, although same number of trips, traffic frequency per month differs from Alternative B due to road closure during caribou migration.
Noise	Effects on recreational users and wildlife	Infrequent (once per day) blasting would be the primary impact. Could affect	Similar in magnitude to Alternative A except operational effects occur	Similar to Alternative B except pipeline noise would be less than truck traffic on DMTS	Similar to Alternative B except (1) limited noise disturbance along DMTS

Resource	Impact	Alternative A	Alternative B	Alternative C	Alternative D
		the limited number of recreational users and subsistence activities. Noise levels greatly reduced after closure in 2011.	through 2031.	road. Some additional blasting would occur in material borrow sites during bench construction. The additional facilities at the port would result in only a minimal increase in noise levels.	road during caribou migration; and (2) reduced noise at port during high subsistence harvest period for marine mammals.
Socioeconomic Resources	Effects on employment and revenues	Mining would end in 2011 with the reduction from 543 full- and part-time jobs to about 25 required for post-closure activities, including loss of 103 NWAB jobs. Payroll would be reduced from $45.8 million annually to approximately $2 million, including $8.3 million paid to NWAB residents. NANA businesses would forgo $71.3 million in revenue, other businesses would forgo $29 million, and the NWAB would forgo $8 million annually in PILT.	Economic effects of closure described under Alternative A would be delayed until 2031.	Similar to Alternative B, except that approximately $72 million of NANA royalty payments would be directed instead to pipeline construction costs and approximately 40 transportation-related jobs would be eliminated.	Similar to Alternative B except that approximately $22 million of NANA royalty payments would be directed instead to the costs of implementing dust control measures and wastewater pipeline.

Table 3 Mitigation Measures by Resource

Resource	Measure	Section	Comment	Authority [a] / Likelihood of Implementation
Air	Install truck washes at both ends of the DMTS road.	3.2.4	Applicable to alternatives A and B (included as part of Alternative D).	None / Under evaluation as part of the draft fugitive dust risk management plan; likelihood of implementation uncertain.
Geotechnical Stability	Evaluate dam design prior to final raise to address potential long-term stability concerns.	3.4.2.5	All alternatives.	ADNR's Dam Safety Program / Reviews of dam raises would be conducted under all alternatives.
Water Resources	Use BMPs (e.g., silt fences) at road crossings during construction of pipeline bench to minimize sediment input at DMTS road/pipeline bench stream crossings.	3.5.3.3 and 3.5.3.4	Alternatives C and D.	NPDES Permit (Storm water) / Measure would be required for construction under all alternatives.
	Develop long-term TDS management plan.	3.5.3.2	Applicable to alternatives A and B and included in the draft NPDES permit. Additional TDS control would not be necessary with a marine outfall.	Red Dog Mine NPDES Permit / Included under alternatives A and B; unnecessary with marine discharge (alternatives C and D).
Wetlands	Develop mitigation plan for wetlands loss associated with development of Aqqaluk Deposit and fill to raise tailings dam.	3.8.3.3	Applicable to alternatives B, C, and D.	Section 404 Permit / Mitigation required under Corps regulations. Extent of proposed mitigation for Aqqaluk impacts disclosed in the SEIS although specific mitigation plans for dam raises would be determined in the future.
Wildlife	Continue to implement a hazing program to keep wildlife from using the tailings impoundment and Aqqaluk Pit lake.	3.9.3.2, 3.9.3.3, 3.9.3.3, and 3.9.3.4	All alternatives (applies to tailings impoundment only under Alternative A and Aqqaluk Pit lake under Alternative C).	None / Teck has committed to continuing the current hazing program being implemented voluntarily and will reevaluate the need at closure.
	Construction of marine outfall should avoid conflict with marine mammal use of the area.	3.9.3.4	Applies to alternatives C and D.	Sections 10 and 404 permits / Would be required for construction of the marine outfall under either alternative.
	Construction of pipeline bench should avoid major migratory movements of caribou.	3.9.3.4	Applies to alternatives C and D.	Section 404 Permit / Would be required for construction of the pipeline bench under either alternative.

Resource	Measure	Section	Comment	Authority [a] / Likelihood of Implementation
Subsistence	The Subsistence Committee should re-examine its procedures on minimizing the mine's effect on subsistence resources.	3.12.3.1	Applies to all alternatives.	None / Likelihood of implementation unknown. Function and responsibilities of the Subsistence Committee are established in an agreement between Teck and NANA.
	Have an "independent observer" party (not truck drivers) be responsible for determining when traffic should stop because of the proximity of caribou to the DMTS road.	3.12.3.1	Applies to alternatives A, B, and D.	None / Unlikely to be implemented as Teck has indicated it will not undertake the use of independent observers. Teck will develop additional documentation of caribou-related road closures in the future.
	Communicate how subsistence is addressed in existing company leave policy.	3.12.2.7	Applies to all alternatives.	None / Likely to be implemented as Teck has committed to reviewing its existing policy including how it is communicated to its workers within the region.
Socioeconomics	Initiate a regional long-term economic planning process to promote economic stability in the region beyond the closure of the Red Dog Mine.	3.17.4.1	Applies to all alternatives and should involve community input.	None / The NWAB has an Economic Development Commission that includes Teck as a formal member. This commission may meet the long-term planning needs identified in the socioeconomics section.

[a] "None" means that EPA and the cooperating agencies have not identified a regulatory authority or permit under their jurisdiction that can be utilized to require the monitoring.

Table 4 Selected Monitoring by Resource

Resource	Measure	Section	Comment	Authority [a] / Likelihood of Implementation [b]
Air	Implement operational monitoring program to evaluate effectiveness of dust control measures.	3.2.3.1	Applicable to all alternatives.	ADEC-Teck MOU / A specific Dust Emissions Reduction Plan is to be incorporated into the fugitive dust risk management plan to address operational monitoring.
Geochemistry	Monitor changes in mobility and migration of metals from oxidation or other changes in forms of minerals.	3.3.2.4	Applicable to all alternatives.	ADEC-Teck MOU / Based on comments from Teck, the Terrestrial Monitoring Plan to be incorporated into the fugitive dust risk management plan will include monitoring of vegetation tissue (see below under Vegetation).
Surface Water	Monitor water quality in streams at DMTS crossings to determine if DMTS is impacting water quality.	3.5.2.2	Applicable to Alternatives A, B, and D.	ADEC-Teck MOU / Per Teck, monitoring for metals in DMTS streams will be part of the Operational Monitoring Plan to be developed under the fugitive dust risk management plan.
	Monitor Red Dog Creek and Ikalukrok Creek for changes in water quality from relocation of Outfall 001 from Red Dog Creek to the Chukchi Sea.	3.5.3.3	Applicable to Alternatives C and D.	ADEC Waste Management Permit / Monitoring to be conducted under ADEC's Waste Management Permit.
Groundwater	Assess capability of existing meteorological, groundwater and permafrost monitoring system to detect changes due to climate change. Modify the plan, if needed, so that changes in the relationship between permafrost and groundwater behavior can be detected.	3.6.3.1 and 3.6.3.2	Applicable to all alternatives.	ADEC Waste Management Permit / The existing plan will be reviewed and modified periodically under the ADEC's Waste Management Permit.

Resource	Measure	Section	Comment	Authority [a] / Likelihood of Implementation [b]
Vegetation	Develop and implement monitoring plan to determine whether dust deposition from the Red Dog Mine is occurring within Noatak National Preserve.	3.7.2	Applicable to all alternatives.	None / Teck does not currently plan to conduct this monitoring.
	Monitor for changes in mobility and availability for the uptake of metals in tundra and underlying soils.	3.7.2	Applicable to all alternatives.	ADEC-Teck MOU / Per Teck, monitoring will be included in the Terrestrial Monitoring Plan to be developed under the fugitive dust risk management plan and will consist of monitoring vegetation tissue concentrations and plant community parameters.
	Monitor tissue concentrations in shrubs, herbaceous plants, mosses and lichens to track rate of changes (data collected at regular intervals).	3.7.2	Applicable to all alternatives.	ADEC-Teck MOU / Per Teck, this will be included in the Terrestrial Monitoring Plan to be developed under the draft fugitive dust risk management plan.
	Monitor composition of shrub, herbaceous, moss, and lichen communities to evaluate community health and identify changes in community composition.	3.7.2	Applicable to all alternatives.	ADEC-Teck MOU / Per Teck, this will be included in the Terrestrial Monitoring Plan to be developed under the fugitive dust risk management plan.
	Monitor remediated or reclaimed areas to ensure long-term effectiveness (at rollover sites and sites covered in the DMTS risk assessment).	3.7.3.1	Applicable to all alternatives.	ADEC-Teck MOU / Per Teck, monitoring of remediated/reclaimed sites will be included in the Remediation Plan to be developed under the fugitive dust risk management plan.
Wildlife	Monitor health of local populations of voles, shrews, and ptarmigan.	3.9.2.1	Applicable to all alternatives.	ADEC-Teck MOU / ADEC has suggested this be included in the fugitive dust risk management plan to supplement vegetation tissue monitoring data identified above. Uncertain if it will be included in the final fugitive dust risk management plan.
	Develop turbine-related mortality monitoring plan for birds.	3.9.3.4	Applicable to Alternative C — applicable to the wind turbine at the port.	None / No regulatory authority to require this, but commonly undertaken to advance database on effects to bird populations.
Aquatic Resources	Monitor Red Dog Creek and Ikalukrok Creek for changes in fish habitat based on changes from relocation of Outfall 001 from Red Dog Creek to the Chukchi Sea.	3.10.3.4	Applicable to Alternatives C and D.	ADEC Waste Management Permit / Some monitoring to be conducted under ADEC's Waste Management Permit.
	Monitor health of local populations of fish at DMTS road crossings that tend to be resident in the area (e.g., slimy sculpin).	3.10.3.2	Applicable to all alternatives.	ADEC-Teck MOU / Per Teck, monitoring of DMTS creeks will be included as part of the Operational Monitoring Plan to be developed under the fugitive dust risk management plan.

Resource	Measure	Section	Comment	Authority [a] / Likelihood of Implementation [b]
Health	Characterize the current nutritional health baseline by conducting a dietary survey to quantify the contribution of subsistence resources to the diet of residents of Kivalina.	3.13.2	Applicable to all alternatives. Data could be reviewed by Stakeholder Participatory Monitoring and Review Committee (see below).	None / No regulatory authority to require this and Teck has indicated that they will not fund such a study. Therefore, implementation is unlikely.
	Monitor metals concentrations in caribou to reduce uncertainty in the DMTS risk assessment regarding safe consumption levels. Recommend safe levels of consumption based on study results.	3.13.2	Applicable to all alternatives.	ADEC-Teck MOU / According to Teck, caribou tissue monitoring for metals will be conducted under the Monitoring Plan to be developed under the fugitive dust risk management plan.
	Form a Stakeholder Participatory Monitoring and Review Committee to coordinate and collaborate on ongoing health efforts and initiatives in the area, including those related to mining.	3.13.3	Applies to all alternatives although not driven solely by concerns related to operations at the Red Dog Mine.	None / No regulatory authority to require this and Teck has indicated they will not form the Stakeholder Committee. Teck is willing to expand the existing Ikayuqtit Team to include other groups. However, uncertain that this will address the health concerns.

[a] "None" means that EPA and the cooperating agencies have not identified a regulatory authority or permit under its jurisdiction that can be utilized to require the monitoring.

[b] – Based on comments and a letter from Teck, some of the monitoring measures will be included in implementation plans developed under the fugitive dust risk management plan (which was developed per the ADEC-Teck MOU). However, until the implementation plans are finalized and approved by ADEC, the likelihood that these measures will be implemented as described in the SEIS is uncertain.

APPENDIX B

RESPONSE TO COMMENTS ON FINAL SEIS

FINAL SEIS COMMENT RESPONSES

Below are responses to comments received on the Final SEIS. The comment letters follow the responses.

Center for Race Poverty and the Environment (CRPE)

November 6, 2009 letter from Brent Newell (BN), CRPE, to Patty McGrath, EPA, Cindi Godsey, EPA, and Hanh Shaw, EPA. Letter included three exhibits.

Response to Comment ID: BN.01

Comment noted. The term "Kivalina residents" as used in the comment letter only applies to the six clients of the Center for Race Poverty and the Environment who live in Kivalina.

Response to Comment ID: BN.02

EPA is responding to a specific NPDES permit application submitted by Teck for continued discharge to Red Dog Creek, including development of the Aqqaluk Deposit. For this action, EPA has the authority to either deny the application (as specified in the no action alternative) or issue a permit in response to the application. EPA has decided to reissue the permit for the Red Dog Mine since the analysis in the SEIS and draft NPDES permit Fact Sheet indicates that Teck can meet the limits and conditions in the reissued permit. It is true that EPA can include requirements in the reissued NPDES permit for the proposed discharge that would ensure compliance with the applicable provisions of the Clean Water Act (CWA). In the final permit, EPA has done so by requiring development and implementation of a TDS management plan. In addition, as certified by the State of Alaska, the permit complies with state water quality standards. It is not within EPA's authority to require construction of a pipeline and a separate marine discharge. This would be a separate permitting action in response to an application provided by Teck.

The comment is correct that Teck agreed to build a wastewater discharge pipeline in the consent decree in *Adams v. Teck Cominco*. However, as EPA understands the consent decree schedule, Teck agreed to submit an NPDES application to change the outfall location only after the NPDES permit is reissued and effective for the current discharge location to Main Stem Red Dog Creek. EPA notes that some of the commenters identified as "Kivalina residents" in the current letter were parties to the consent decree and agreed to that specific schedule. Moreover, it is important to recognize that certain elements of the pipeline alternative are beyond EPA's authority, e.g., subject to permitting by the Corps of Engineers under Section 404 of the CWA and authorization to construct the pipeline through National Park Service lands. See also response to comment 7.042 in Appendix H of the FSEIS.

Response to Comment ID: BN.03

The analysis in the Final SEIS determined that the treatment proposed under the Preferred Alternative (metals precipitation and filtration, with barium hydroxide as needed) would produce an effluent that meets the limits in the reissued NPDES permit. See Section 3.5 of the Final SEIS. Therefore, there is no need to require more advanced treatment such as reverse osmosis or continous use of barium hydroxide or aluminum hydroxide. The CWA requires that the treatment technology be able to achieve limits based on compliance with technology-based effluent limitation guidelines and state water quality standards. The technology-based effluent limitation guidelines that apply to the Red Dog Mine were described in the Fact Sheet for the draft NPDES permit. These guidelines were developed based upon treatment in a tailings pond with added

active water treatment, if necessary. The ELGs do not specify the treatment technology that is required.

The comment is correct that reverse osmosis treatment could result in meeting the TDS limits in the 1998 permit. However, the TDS limits have increased in the reissued permits (since the TDS water quality standard has changed), therefore reverse osmosis treatment is not necessary and EPA has no need to require it.

Response to Comment ID: BN.04

The Final SEIS evaluates the impacts of the discharge associated with Alternative B (the Preferred Alternative) on the water quality of receiving waters and on aquatic resources and subsistence. The Final SEIS concluded that there would not be impacts to the Kivalina drinking water supply or subsistence resources as a result of the NPDES discharge. The commenter provides no information to support its assertion that the permit limits would result in these impacts.

Response to Comment ID: BN.05

Standard practice under NEPA is to use information currently available. Since the same equipment is currently in use as was modeled in ADEC's air quality analysis, there is no reason to expect that under normal operating conditions, another round of modeling would result in substantative differences. See below for responses to specific comments related to the air analysis.

Response to Comment ID: BN.06

Table 3.2-1 in the draft and final SEIS specifically presents the national and Alaska air quality standards (NAAQS/AAAQS), including the primary and secondary standards for $PM_{2.5}$ of 35 $\mu g/m^3$ over a 24-hour averaging period and 15 $\mu g/m^3$ over an annual averaging period. Table 3.2-6, summarizes air quality modeling results and includes a column identifying NAAQS/AAAQS. Table 3.2-6 contains an editorial error reporting 65 $\mu g/m^3$ as the $PM_{2.5}$ standard instead of the correct standard that was identifed in Table 3.2-1. The commenter is correct that the 24-hour $PM_{2.5}$ is 35 $\mu g/m^3$. The commenter is incorrect that this error was intentional.

Response to Comment ID: BN.07

The proposed 1-hour average NO_2 National Ambient Air Quality Standard (NAAQS) was published in the Federal Register on July 15, 2009. This is only a proposed standard and has not been finalized. As indicated by the voluminous documents cited by the commenter, the concerns driving the proposed 1-hour average NO_2 NAAQS revolve around highly populated urban areas and particularly areas experiencing large traffic volumes, since high concentrations of NO_2 are strongly associated with mobile source emissions. The Village of Kivalina is located over 15 miles from the port site and over 60 miles from the mine. Although the proposed NAAQS revision was not considered in the analysis, it is highly unlikely that the traffic volume on the 52-mile DMTS (approximately 50 vehicles per day) would contribute to significant 1-hour average NO_2 impacts. Other NO_X sources exist, including electric power generators at the mine and port, although these are again unlikely to create significant NO_2 concentrations that would have deleterious effects on the ecosystem or health of residents of the Village of Kivalina due to the distance between the village and the sources. Modeling of NO_X emissions sources has demonstrated that the impacts are well below the current NAAQS. See Section 3.2 of the SEIS.

Response to Comment ID: BN.08

The analysis of air impacts takes the requisite hard look at the effects of emissions and does not violate NEPA. Lead emissions were calculated and its impacts were modeled. Table 3.2-6 summarizes the modeling results for lead which indicate that the maximum impact is 13 percent of the recently revised NAAQS (rolling 3-month average concentration of 0.15 $\mu g/m^3$). Moreover, as noted in Section 3.2.2 of the SEIS, lead concentrations have been measured recently in Noatak and Kivalina. Results from the 1-year monitoring program show that the maximum 3-month average lead concentration is only 5 percent of the NAAQS.

Toxic Release Inventory data reported to EPA and reviewed in developing the SEIS indicate that emissions of nickel and arsenic are negligible. Cadmium was considered in the analysis of fugitive dust emissions but was not discussed in detail in the SEIS because the cadmium component of fugitive dust emissions was orders of magnitude less than that of zinc or lead (TRI data from 2007 indicate 92 pounds of cadmium in fugitive dust released from the mine compared to 23,006 pounds of zinc and 9,191 pounds of lead).

Zinc is not a HAP or a specifically regulated air pollutant, so calculating its emissions provides no basis for comparison in the context of the air impacts analysis. The presence of zinc in the environment as a result of fugitive dust is addressed for other resources (surface water, aquatic resources, wildlife, health, etc.) within the SEIS.

Emissions of nitric oxide (NO) were indeed calculated (NO is a constituent of NO_x; see NO_x emissions in Table 3.2-7). NO_X emissions were modeled and the impacts are presented as NO_2 in Table 3.2-7.

See response to comment BN.10 regarding analysis of $PM_{2.5}$ concentrations.

Response to Comment ID: BN.09

The discussion of lead emissions in the SEIS is adequate for NEPA purposes. Lead emissions were calculated and its impacts were modeled. Table 3.2-6 summarizes the modeling results for lead, which indicate that the maximum impact is 13% of the recently revised NAAQS (rolling 3-month average concentration of 0.15 $\mu g/m^3$). Moreover, as noted in Section 3.2.2 of the SEIS, lead concentrations have been measured recently in Noatak and Kivalina. Results from the 1-year monitoring program show that the maximum 3-month average lead concentration is only 5% of the NAAQS.

Response to Comment ID: BN.10

EPA recognizes the issue raised by the commenter and understands that there are differences between PM_{10} and $PM_{2.5}$. However, the air quality analysis in the Final SEIS was prepared with the best information available at the time for the mine.

Review of the PM_{10} dispersion modeling that has been conducted for the Red Dog Mine indicates that the maximum PM_{10} impacts occur near the southern boundary of the facility, near where the haul road exits the facility, 3 to 4 km southwest of the mill complex (Hoefler 1998). Thus, the highest predicted PM_{10} impacts are due to fugitive dust emissions generated by haul road traffic. The vast majority of fugitive dust emissions generated by truck traffic is larger than $PM_{2.5}$. In fact, the particle size distribution indicates that 88.4% of the particulate matter is larger than 2.5

microns. Because the maximum predicted PM_{10} impacts are due to fugitive dust sources with particulate emissions that are larger than $PM_{2.5}$, in EPA's judgment the $PM_{2.5}$ impact would be considerably smaller than the PM_{10} impact, to the extent that the $PM_{2.5}$ NAAQS would not be exceeded. Based on these factors, the estimated $PM_{2.5}$ concentration would be about 6.4 $\mu g/m^3$ (0.116 x 55 $\mu g/m^3$) which is much less than the NAAQS of 35 $\mu g/m^3$. So, it is highly unlikely that the $PM_{2.5}$ NAAQS is exceeded.

Moreover, both the 24-hour and annual average modeled PM_{10} impacts of 24.5 $\mu g/m^3$ and 6.0 $\mu g/m^3$, respectively, are less than the $PM_{2.5}$ NAAQS of 35 $\mu g/m^3$ and 15 $\mu g/m^3$, respectively. In addition, modeling has demonstrated that the ambient impacts decrease rapidly with distance to the degree that the impacts are minimal within a few kilometers outside the facility boundary. Therefore, the particulate impact from the facility would be insignificant at Kivalina, which is located approximately 80 km from the mining operations.

The State of Alaska has proposed to adopt the federal $PM_{2.5}$ standard, although this has not yet been finalized. After adoption, the State will need to define appropriate implementation and permitting procedures that would apply to future air permitting actions at the Red Dog Mine. The mine would therefore be required to demonstrate compliance with the standard at the facility boundary, including, as appropriate, conducting dispersion modeling. If predicted levels exceeded the standard, additional control measures could be needed. EPA believes the analysis performed in the SEIS is reasonable based on the PM_{10} data and what is known about the emissions sources. $PM_{2.5}$ emissions modeling may be conducted in the future under ADEC's air permit.

U.S. Environmental Protection Agency (EPA) 1996. Letter from John S. Seitz, EPA OAQPS, to the Honorable Alan K. Simpson, U.S. Senate, of June 26, 1996.

Hoefler Consulting Group (Hoefler) 1998. Cominco Alaska Inc. – Red Dog Mine Production Rate Increase: Application for an AQC Construction Permit with PSD Review. June 26.

Response to Comment ID: BN.11

Emissions of nitric dioxide (NO_2) were indeed calculated (NO_2 is a constituent of NO_X; see NO_x emissions in Table 3.2-7). NO_x emissions for the proposed action and alternatives were modeled and the impacts are presented as NO_2 in Table 3.2-9 and discussed in the SEIS.

Response to Comment ID: BN.12

EPA has determined that the Northwest Arctic Borough is "unclassifiable/attainment" for $PM_{2.5}$, thus indicating that EPA has determined no public health risk exists within the Northwest Arctic Borough (including Kivalina) with respect to $PM_{2.5}$. See response to comment BN.10 above regarding the SEIS analysis of $PM_{2.5}$.

Response to Comment ID: BN.13

As documented in Section 3.5.2.2 of the Final SEIS, the samples collected at the Kivalina drinking water tank meet applicable human health standards. As further indicated in Section 3.5.3.2 of the Final SEIS, under Alternative B, the concentrations of metals and TDS would not change from current conditions at Kivalina's intake. The validity of the samples collected and analyzed by Teck is certified by the company under penalties of law for misreporting. Finally, the data reported for the Kivalina tank are generally consistent with upstream water quality for the Wulik River collected throughout the operating life of the mine.

EPA determined that it was not necessary (nor is it required) to perform the independent sampling and analysis of Kivalina's drinking water intake as suggested by the commenter since there is no information to suggest that Teck's sampling was inadequate.

Response to Comment ID: BN.14

EPA appreciates the information provided by the commenter. However, these data represent a single sample of an unspecified "white/gray" material in the intake. No documentation is provided to support the conclusion that this material originates from the Red Dog Mine discharge nor do the solids data necessarily correlate to water quality at the intake, which has consistently met applicable drinking water standards. In addition, there is no information provided to describe how the reverse osmosis unit from which the sample came was used. It is our understanding that some residents recycle the reverse osmosis brine back into the intake containers instead of disposing of the brine. This practice could result in precipitation of solids when mixed with the rest of the intake water.

As documented in the data presented in Section 3.5.2.2 of the Final SEIS, the minerals found in the solids sample occur naturally throughout the Wulik River watershed. The findings in the Final SEIS are based on a long record of data collection in the receiving waters and show that the discharge will not adversely affect the village drinking water supply. See also response to Comment BN.13.

Response to Comment ID: BN.15

The SEIS cited the human health and ecological risk assessment, which was drafted by Exponent for Teck and reviewed by the Alaska Department of Conservation as well as stakeholders in the region. Contrary to the commenter's interpretation, the risk assessment evaluated contamination from a range of sources, including water borne exposure, not simply "metals associated with the DTMS [sic] only."

Because surface water quality standards are not exceeded in the Wulik River (see Section 3.5 of the SEIS) and the discharge is greatly diluted by the time it reaches the Wulik River, the SEIS did not identify a concern that Wulik River fish are contaminated or identify a need to sample fish in the Wulik River

Response to Comment ID: BN.16

EPA identified two weaknesses with the Teck's human health risk assessment:

1) We believe that there was uncertainty due to the low numbers of caribou collected for tissue analysis.

2) We expresssed dissatisfaction that the risk assessment relied upon estimates of exposure solely from the DMTS rather than the actual exposures that reflect what people actually consume. These issues are described on page 3-251 of the SEIS. In response to these uncertainties, EPA did not perfrom its own quantitatve analysis of risk, rather we stated that risks would be higher by an order of magnitude, but the relative contribution from the DMTS is unknown.

We believe that additional analyses are needed, but these analyses require collection of additional caribou tissue data. EPA has identified the need to conduct this additional monitoring (SEIS Table 2.5-2). Teck has agreed to perform this monitoring under it's Memorandum of

Understanding with ADEC. EPA has requested that ADEC enforce the additional caribou tissue sampling and analysis (December 16, 2008 letter to Rich Sundet, ADEC, from Patty McGrath, EPA).

However, despite uncertainties in the data and analysis, EPA does not suggest that caribou consumption should be avoided.

Response to Comment ID: BN.17

The SEIS discusses the effects of the operation on both caribou and fish in the subsistence discussion (sections 3.12.2.2, 3.12.2.5 and 3.12.3) and in the health section (section 3.13). Environmental justice is discussed in Section 3.18. We believe these discussions comply with EPA's NEPA and environmental justice guidance on evaluating impacts. The commenter fails to provide specific details on why they perecive these analyses violate NEPA or EPA's guidance.

Response to Comment ID: BN.18

The SEIS does not dismiss lead exposure. Rather, the SEIS provides the results of blood lead level (BLL) monitoring of Kivalina residents (pages 3-248 and 3-249 and Table 3.13-3). Please note that Table 3.13-3 compares the 2000 national average blood lead level of 1-5 year olds as 1.70 µg/dL with 1990 Kivilina 1-5 year olds, but in 1990 the national blood lead average was approximately double the 2000 level (Muntner, Menke, DeSalvo, Rabito & Batuman, 2005; United States. Environmental Protection Agency. Office of Children's Health Protection. & National Center for Environmental Economics (U.S.), 2003). We recognize that there is not baseline BLLs to compare with current BLLs. However, the BLLs are more similar to national averages than as stated in the SEIS. In addition, we reviewed Teck's human health risk assessment BLL estimates and agreed that Teck used the appropriate methodolgy and the results were well below EPA's current target level. The SEIS states that the target level of concern (10 µg/dl) may be revised downward and that there may be no safe level of blood lead. Therefore, there is some risk to Kivalina residents, but the SEIS analysis did not show that the risk was greater than that of the general population or attributable to the Red Dog Mine. We have encouraged Teck and other agencies to form a Stakeholder Participatory Monitoring and Review Committee (see Table 2.5-2) that could be used to monitor BLLs.

Muntner P, Menke A, DeSalvo KB, Rabito FA, Batuman V (2005) Continued decline in blood lead levels among adults in the United States: the National Health and Nutrition Examination Surveys. *Archives of internal medicine* **165:** 2155-61
http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Citation&list_uids=16217007

United States. Environmental Protection Agency. Office of Children's Health Protection., National Center for Environmental Economics (U.S.) (2003) *America's children and the environment : measures of contaminants, body burdens and illnesses*, 2nd edn. [Washington, D.C.?]: Office of Children's Health Protection National Center for Environmental Economics
http://yosemite.epa.gov/ochp/ochpweb.nsf/content/publications.htm

Response to Comment ID: BN-19

See response to comment BN.18.

Response to Comment ID: BN-20

EPA has evaluated a full range of alternatives and given the requisite hard look at a full range of resources, including subsistence, water quality, wildlife, and public health in the SEIS as required by NEPA. EPA has made a concerted effort to include and address in the SEIS the concerns raised by Kivalina residents during the scoping and SEIS meetings. In addition, the Kivalina IRA council participated as a cooperating agency, through the Maniilaq Association, and has had numerous opportunities to raise these issues from the beginning of the SEIS process.

Trustees for Alaska (Trustees)
November 9, 2009 letter from Carl Johnson (CJ), Trustees, to Patty McGrath, EPA, Cindi Godsey, EPA, and Tim Pilon, ADEC.

Response to Comment ID: CJ.01

EPA does not believe that the Native Village of Point Hope is directly impacted by the Red Dog Mine. See response to comment 42.011 in Appendix H of the Final SEIS. Nevertheless, in response to comments from Trustees on the Draft SEIS, EPA offered government-to-government consultation with the Native Village of Point Hope via letter and email on February 25, 2009. On June 3, 2009 the Point Hope Indian General Assistance Program coordinator sent an email requesting EPA's attendance at a meeting two days later. EPA was unable to attend the meeting and requested via phone (June 5) and email (July 17, 2009) that Point Hope provide alternate dates. To date there has been no response to that communication. EPA responded to each communication from Point Hope and disagrees that there has been a lack of follow-through. EPA has been and remains open to meeting with Point Hope via conference call.

Response to Comment ID: CJ.02

Responses to comments on the draft NPDES permit will be released with the final permit.

Response to Comment ID: CJ.03

NEPA does not list the six items noted in the comment as requirements that must be met on a project by project basis but rather overarching objectives of the legislation. NEPA's preceeding section recognizes the need " to create and maintain conditions under which man and nature can exist in productive harmony, and fulfill the social, economic, and other requirements of present and future generations of Americans." 42 U.S.C. § 4331(a). In addition, Council on Environmental Quality regulations include economic and technical considerations and agency statutory missions as relevant factors in determining a preference among alternatives. 40 C.F.R. 1505.2(b). In identifying the environmentally preferable alternative, EPA considered the complexity and limitations of how an operation like the Red Dog Mine may exist in "productive harmony" with nature and also the importance of the operation in fulfilling economic needs, which in turn support social needs of the region's residents.

We respectfully disagree that the no action alternative would create less risk to health and safety. The abrupt loss of income that would be experienced by the borough, Teck employees and NANA shareholders could have significant impacts on health and available medical and social services. Contrary to the implication in the comment, in general the subsistence lifestyle has continued through the operation of the mine to date and there is no indication that the future level of subsistence activity, except for caribou and beluga harvested by Kivalina, would increase or decrease under *any* of the alternatives (see Section 3.12). The environmentally preferable alternative could reduce impacts on Kivalina's harvest of caribou, as could the no action

alternative (Alternative A). The environmental aspects of the no action alternative would allow a 20-year head start on the process of mine closure and revegetation of the site compared to the other alternatives; however, in this case EPA has determined that Alternative C and its economic benefits that would indirectly maintain health and social aspects within the borough outweigh the environmental benefits gained under the no action alternative.

Response to Comment ID: CJ.04

The health impact analysis was drafted by health professionals intimately familiar with Native health issues in Alaska and the Maniilaq region using information that was available. Maniilaq represented the cooperating agency interest and responsibilities for nine of the Native communities within the region and played a major role in developing the public health analysis. Section 1.5 of the SEIS describes the significant issues that were raised during the SEIS scoping process. Significant health concerns were not discussed in oral and written comments received during the scoping process. Nevertheless, the SEIS includes a detailed, separate section on impacts to public health. See Section 3.13. Responses to Trustees' more specific comments on the health analysis are provided below.

Response to Comment ID: CJ.05

EPA agrees that there is a lack of baseline health data from the original EIS and it is not possible to construct that data base. Therefore, EPA utilized the existing data that was available, including information from the risk assessment, as well as from a variety of other sources, including the Alaska Department of Health and Social Services (ADHSS) and the Maniilaq Association. The health assessment addressed a wide range of potential sources of effects and includes ADHSS studies on heavy metals exposure, blood lead epidemiology, diabetes, and fetal alcohol syndrome. Overall, the evaluation included a range of issues including subsistence and health, social and psychological health (including injury), cancer, and pulmonary disease, in addition to the potential exposure to environmental contaminants. Also see response to Comment ID CJ.07.

Response to Comment ID: CJ.06

The statement quoted is true; no blood lead levels were collected prior to opening of the mine. However, the commenter overlooked the discussion immediately preceding the quoted SEIS statement. A discussion of biological monitoring of community members for lead is included on pages 3-248 and 3-249 of the Final SEIS. Table 3.13-3 of this section includes an assessment and comparison of blood lead levels based on data collected in 1990, 2004, and 2006.

Response to Comment ID: CJ.07

A report by the Alaska Division of Public Health noted that portions of the ACAT-funded study referenced in the comment contained errors of fact and incorrectly interpreted previous studies and recommendations (Alaska Community Action on Toxics' (ACAT) report: "*Red Dog and Subsistence. Analysis of Reports on Elevated Levels of Heavy Metals in Plants Used for Subsistence near Red Dog Mine, Alaska*" Evaluation and Response, Alaska Division of Public Health. July 19, 2004. Scott Arnold, Ph.D. and John P. Middaugh, M.D.). While the ACAT study was reviewed in the development of the SEIS analysis, it was not included as a reference. However, the SEIS does recognize that EPA's current target blood lead level (BLL) of 10 ug/dl may be revised downward in the future since "no level has yet been found that does not correlate with adverse health outcomes." See page 3-250 of the Final SEIS.

Response to Comment ID: CJ.08

Under current exposure scenarios, the human health risk assessment conducted by Teck determined that risks were below levels of concern. That does not mean that there is absolutely no risk to a particullar individual, rather that we do not expect that there are adverse public health effects overall.

Response to Comment ID: CJ.09

The SEIS makes no effort to downplay the magnitude and extent of environmental contamination resulting from mining operations within the areas surrounding the mine, port and road as reflected in the lengthy discussions under the air, aquatic resources, vegetation, wildlife, and subsistence resource sections. We agree with the comment that there is an ecological risk to some wildlife. These impacts are fully disclosed in the SEIS and were a factor in EPA's identification of the environmentally preferable alternative.

The health assessment includes an analysis on the effects of exposure from environmental contaminants. The reference to the toxic release inventory data is misleading since even the ACAT document acknowledges that "by far most releases are from waste rock and tailings solids," so while these "releases" are reported, they are not uncontrolled but instead are addressed as part of the discussion of mine waste disposal. EPA reviewed each of the documents cited in developing the SEIS and the SEIS includes two of these documents as references. The discussions in the SEIS are not intended to be exhaustive in terms of the sources and fate of contaminants. The SEIS discloses the fact that the contamination exists and characterizes its nature and distribution. The SEIS describes the existing effects of contamination, including the potential risks to wildlife (e.g. voles and ptarmigan) living in the immediate vicinity of the road, as well as those that would be anticipated should the proposed action or alternatives be implemented. In doing so, EPA takes the necessary "hard look" required by NEPA.

Response to Comment ID: CJ.10

The SEIS cites CDC data because it is the data currently available. To our knowledge, there are no local studies of the specific sources of cadmium in residents. Since the Maniilaq Association, the local health provider, represented the interests of a number of tribal entities in the region and played a key role in development of the health impact assessment, EPA assumes that had such a study been available, it would have been included.

Response to Comment ID: CJ.11

The commenter misread the discussion of socioeconomic effects, although the economic benefit of the operation is not trivial. The Northwest Arctic Borough (NWAB) has received payments in lieu of taxes since operations at the mine began. Those payments support various NWAB programs, including the local school district. The commenter mischaracterizes the quoted statement in the SEIS, which spoke specifically about the installation of water and sewer infrastructure within the villages.

Response to Comment ID: CJ.12

Discharges under Alternative C would occur under the authorization of an NPDES permit. Teck does not plan to apply for the marine discharge NPDES permit until after the NPDES permit for the Middle Fork Red Dog Creek outfall is reissued. However, EPA evaluated the impacts of the marine discharge as part of Alternative C in the SEIS. Under Alternative C and any permit issued for the marine discharge, Alaska water quality standards would be achieved, although a small mixing zone of approximately 10 feet on a side may be required. Point Hope is more than 80

miles from where the outfall may be located at the port site. Marine mammals generally do not come in close contact with the port site. Even if marine mammals did enter into the mixing zone, their presence would be of an extremely short duration. SEIS sections 3.9 and 3.10 provide an analysis of impacts of a potential marine discharge on marine mammals and fish and concluded that there would be no adverse effect on marine mammals or fish in the vicinity of the outfall. Therefore, by extension, there would be no adverse effect on the health or subsistence activities of the residents of Point Hope.

Response to Comment ID: CJ.13

Health data at the village and regional level is limited by the small size of the populations and by federal privacy laws. The public health impact assessment was developed by health professionals under contract to the Maniilaq Association (the local health provider) and employed the most relevant data that could be obtained on a local, regional, and statewide basis. The commenter provides no suggestion or specific information as to what data they believe to be available or the additional analyses they believe could have been undertaken.

Response to Comment ID: CJ.14

We disagree with this comment. EPA required the collection of additional subsistence data and traditional knowledge to support the detailed subsistence analysis in the SEIS. The SEIS considers subsistence and socioeconomics along with the full range of other resources in support of the decision-making process. The SEIS documents that subsistence harvests have continued to occur through the mine's operation. While the analysis concludes that there have been likely effects from the mine on Kivalina's harvest of caribou and beluga, there is no indication that the mine is affecting subsistence harvest levels regionally or that the continued operation of the mine would result in "the end of the subsistence way of life in the area." See also response to comment JH.04.

Response to Comment ID: CJ.15

The commenter misinterprets the discussion of subsistence within the SEIS. As noted in previous responses, subsistence harvests, even by employees of the mine, have continued and are expected to continue into the future. The SEIS does not acknowledge the "likely adverse impacts on the subsistence way of life and culture of the Inupiaq people." Rather, it notes that localized effects on the harvests of caribou and beluga whale have likely occurred to the residents of Kivalina. While most residents of Kivalina are Inupiat, the SEIS does not conclude that operations at the Red Dog Mine would affect the Inupiaq people as a whole. Further, the initial projected life of the mine considered in the 1984 EIS was through 2031; therefore, the current proposal does not represent an extension of mining activities. Rather, closure of the mine under Alternative A would represent an early closure in terms of the initially anticipated duration of activities. Contrary to the implication in the comment EPA is meeting its responsibilities under Section 101 of NEPA. The subsistence impacts to Kivalina were one of the main reasons that EPA identified Alternative C as environmentally preferable.

Response to Comment ID: CJ-16

The commenter uses the response to Comment 7.021 out of context where EPA actually notes that these species were not considered in the *risk assessment* (emphasis added). The risk assessment process was a non-federal action conducted through the Alaska Department of Environmental Conservation as a separate process outside the NEPA process. Threatened and endangered species were identified by EPA and were considered in the SEIS analysis in sections

3.9.2.7 and 3.9.3. The SEIS determined that no adverse effects to threatened or endangered species would be expected. Section V.C. of the Record of Decision documents EPA's determination of no adverse effect and the concurrence of the U.S. Fish and Wildlife Service and National Marine Fisheries Service with this determination.

Response to Comment ID: CJ.17

The SEIS reflects the available "facts" regarding road and port operations and the possibilities for and feasibility of mitigation. Kivalina residents suggested that the port remain closed until beluga whales have passed the port facility in June and July and that the road remain closed through the entire fall caribou migration season. These closures are included in Alternative D. At the same time Teck states that they only proceed with shipping operations after the Subsistence Committee notifies them that whale hunting is finished for the year. EPA has not been able to determine the effectiveness of the Subsistence Committee and suggested that its procedures be reviewed (SEIS Section 3.12). Although Teck's policy is to close the road when caribou are within 300 feet of the road, it is uncertain how consistently this policy is implemented or whether or not it is effective. That is why EPA included closure through the entire fall caribou migration season, rather than sporadic closure. As discussed in the SEIS, while a fall closure would be more effective in terms of reducing impacts to caribou, implementing this would create economical and logistical hardships. Closing the road for any extended period of time (e.g. a month) would require, at a minimum, additional concentrate storage capacity and increased traffic on the road when it was open to traffic.

Response to Comment ID: CJ.18

The subsistence section in the SEIS (Section 3.12) provides a great deal of information regarding subsistence resources. Appendix D (Subsistence) further provides an expanded discussion of subsistence resources within the area. The public is therefore well informed regarding subsistence resources. The NEPA process requires that these impacts be disclosed and mitigation measures identified. The SEIS discloses the effects of existing operations as well as the effects of the proposed action and alternatives on subsistence resources. Protection of subsistence resources was a key factor in EPA's identification of the environmentally preferable alternative. As noted in the text, EPA's authority under the NPDES program limits the extent of mitigation that may be required as an outcome of the NEPA process. However, EPA encourages both the agencies with broader authorities to protect subsistence resources and Teck to implement appropriate mitigation measures.

Response to Comment ID: CJ.19

We disagree that the SEIS analysis of caribou, migratory water fowl, musk oxen, and wolverines is inadequate. Section 3.9.2.2 discusses caribou (Western Arctic Herd [WAH]) in detail. The population of the WAH has increased substantially since pre-mine numbers and has continued to use the same general migration pattern. While the road appears to have caused some local effects on when and where the caribou actually cross, there is no evidence that the general pattern of migration has been affected or will be affected in the future. The effects on migratory birds are discussed in Section 3.9.2.4. Wolverines and musk oxen are discussed in Section 3.9.2.2. The comparative impacts of the alternatives on all of these species is discussed in Section 3.9.3. The comment does not provide specific information or data to substantiate the claim that detailed analysis of wildlife in Section 3.9 is insufficient. The comment cites some pages of the SEIS (3-121 and 3-123), but it is not clear if this citation is a comment or a statement.

Response to Comment ID: CJ.20

NEPA requires that effects of the proposed action and alternatives be disclosed and analyzed. The effects on wildlife, including mitigation in the form of hazing and other best management practices have been disclosed and analyzed. EPA accepts that personnel may not be available to implement hazing practices 24 hours a day, seven days a week; however, we are confident that the measures Teck proposes will not result in population-level effects to any species in the vicinity of the operation.

The commenter is correct in their assessment of subsistence-related mitigation measures under Alternative B. However, the nature of most of the subsistence-related effects (those resulting from port and road traffic) makes it unlikely that the effects would continue to occur once operations cease.

Response to Comment ID: CJ.21

Traditional knowledge gained from interviews in Noatak and Kivalina formed the basis for much of the resource change characterizations and impact analysis in the subsistence section of the SEIS. For an example of the level of detailed traditional knowledge considered in the analysis, see pages 45 through 51 of Appendix D. Observations of caribou changes from traditional knowledge interviews formed the basis for the SEIS conclusion that the cause of the resource changes associated with Kivalina was road-related activities. Other resources were described similarly based on the level of response from interviewees. The subsistence technical report discusses the methodology employed in data collection in greater detail (Stephen R. Braund & Associates, 2009. *Subsistence Use Areas and Traditional Knowledge Study for Kivalina and Noatak, Alaska.* Prepared for Tetra Tech, Teck Cominco Alaska Incorporated, and U.S. Environmental Protection Agency Region 10. Anchorage, Alaska).

Response to Comment ID: CJ.22

It is unclear what analyses the commenter would suggest be quantified. EPA considered the current literature on global climate change in developing the cumulative effects discussion. We acknowledged that global climate change is occurring and that impacts are experienced more intensely in the arctic region. The SEIS then describes the cumulative impacts of climate change across applicable resource areas such as geotechnical stability, water resources, vegetation, etc. (see SEIS section 3.19). In terms of cumulative effects, the data do not support a quantitative analysis. A quantitative analysis would be a gross estimate given the current information. For example, quantifying the nature or extent of changes to particular vegetation communities or wetland types as a result of climate change during the life of the project would be speculative at best. Equally speculative would be quantifying the changes in the water balance at the site resulting solely from climate change. While the literature provides some generalizations as to specific areas of the United States (e.g., Alaska experiencing longer, warmer summers or increases in the areas exhibiting discontinuous permafrost) these generalized effects do not lend themselves to quantifiable changes in terms of cumulative effects. Rather we included a qualitative discussion of impacts and uncertainties. For certain resources, we identified monitoring that should occur to identify potential changes due to climate change.

Response to Comment ID: CJ.23

As documented in the Record of Decision, , EPA is reissuing the NPDES permit for the Red Dog Mine consistent with Alternative B, which includes limits and conditions based on Clean Water Act requirements, including effluent limits based on current state water quality standards. As described in the SEIS, the draft permit Fact Sheet, and responses to comments on the draft permit,

some of these standards have changed, including the standard for TDS. The analysis in the SEIS and Fact Sheet demonstrates that Teck can meet the TDS limits in the reissued permit.

Response to Comment ID: CJ.24

The effects of previous wastewater discharges in violation of NPDES permit limits have been included in the impact analysis since the data used (e.g., water quality and fish counts downstream of the outfall) represent the full range of conditions downstream of the discharge point. In predicting the effects of the proposed action and alternatives, the impact analysis demonstrates that permit limits will be met by describing the capability of the proposed treatment technologies. In addition, EPA has required that Teck develop a TDS management plan. Using this approach, EPA has provided the requisite hard look at the effects of the continued operation of the Red Dog Mine.

Northern Alaska Environmental Center (NAEC)
November 9, 2009 letter from Brook Brisson (BB), NAEC, to Patty McGrath, EPA, Cindi Godsey, EPA, and Tim Pilon, ADEC.

Response to Comment ID: BB.01

Comment noted. See the responses to the comments previously filed by NAEC in Appendix H of the Final SEIS. See the response to comments submitted by Trustees for Alaska.

Response to Comment ID: BB.02

NEPA requires that the analysis consider a range of alternatives. Contrary to the comment, NEPA does not include a requirement that all alternatives be within the lead agencies' jurisdiction. In fact, the Council of Environmental Quality's *NEPA's Forty Most Asked Questions* clearly states "An alternative that is outside the legal jurisdiction of the lead agency must still be analyzed in the EIS if it is reasonable" (see Question #2b). EPA considered a reasonable range of alternatives given the fact that the Red Dog Mine is already an operating mine. See also response to comment 31.014 in Appendix H of the Final SEIS.

Response to Comment ID: BB.03

Section 2.2.1 of the SEIS describes components of the no action alternative (Alternative A). Alternative A assumes no action, which means no reissuance of the NPDES permit. Therefore the 1998 permit limits would continue to be in effect (see SEIS Section 2.3.6.1). In order to meet the TDS limits in the 1998 permit, Alternative A included, as suggested in the comment, "the wastewater treatment system would need to be modified to include pre-treatment by barium or aluminum precipitation followed by reverse osmosis". Although under Alternative A the NPDES permit would not be reissued, the 1998 permit would by definition be administratively extended, achieving the same result as reissuance of a permit with those same effluent limitations. Therefore, a separate analysis of issuing a new permit with the same limitations as the 1998 permit was unnecessary since the effects analyses are essentially covered by Alternative A.

Maniilaq Association (Maniilaq)
November 9, 2009 email attachment from Jackie Hill (JH), Maniilaq Association (Maniilaq), to Patty McGrath, EPA.

Response to Comment ID: JH.01

Impacts to Kotzebue subsistence resources were not excluded from the SEIS, rather the analysis simply made use of existing data for Kotzebue. Additional data was not collected for Kotzebue due to Kotzebue's distance from the mine, lack of scoping comments suggesting that Kotzebue residents were concerned about subsistence impacts, and Kotzebue's relatively large community (in relation to Kivalina and Noatak) that would make it difficult to determine whether impacts were caused by the mine. The figure on SEIS page 3-188 (Figure 3.26: 1995-2004 Partial Subsistence Use Areas Kotzebue, All Resources) depicts a partial view of subsistence use areas and as noted in the figure, "These maps…do NOT represent a comprehensive description of Kotzebue subsistence activities."

The SEIS determined that the mine has impacted some of Kivalina's subsistence resources, but not Noatak's subsistence resources. Since Kotzebue is even further from the mine than Noatak, EPA does not believe that additional analysis is warranted regarding Kotzebue subsistence use.

Response to Comment ID: JH.02

As discussed in Section VI.A. of the Record of Decision, EPA's authority to require mitigation is limited to the measures that can be incorporated, under the CWA, into the NPDES permit. These measures do not include mitigation for subsistence impacts. As the commenter is aware, the cooperating agencies held numerous discussions regarding mitigation and relevant agency authorities. EPA strongly encouraged those agencies with authority to adopt the mitigation and monitoring measures identified in the SEIS. Maniilaq and the National Park Service were present during those discussions, yet neither of these entities or the other cooperating agencies determined that they had authority to require mitigation measures related to subsistence. We suggest that Maniilaq work directly with the NPS, NWAB, State, and Teck to encourage these entities to adopt the measures identified in Section 2.5 of the SEIS. Even though the SEIS process has been completed, the analysis and conclusions of the SEIS can still serve as an important source of information for other agencies and the Applicant to make environmental improvements at the Red Dog Mine and in development of the Aqqaluk ore deposit.

Response to Comment ID: JH.03

The mitigation measures identified in Section 2.5 of the SEIS are a result of the SEIS analysis and numerous discussions with the cooperating agencies. Maniilaq was a participant in this process, which included meetings focused on mitigation. As discussed in response to the above comment, EPA's authority to require mitigation is limited. In addition, Maniilaq suggests that additional mitigation is called for, but does not provide any specificity as to what those measures are or should include.

Response to Comment ID: JH.04

We respectfully disagree with the commenter's assertion that the quoted text of the Final SEIS is erroneous. While the SEIS concluded that the mine has had an impact on Kivalina's harvest of caribou and beluga, due to lack of dietary baseline data we were not able to analyze whether or not this contributed toward large scale dietary changes. A dietary survey was recommended in the SEIS (Section 2.5) for Kivalina to establish a baseline upon which potential future impacts can be compared.

In terms of large scale changes, Section 3.12.2.1 of the SEIS summarized harvest trends noting that after considering the variability in the harvest data, harvests (of "all resources") in 2007 were not significantly lower than all resources harvest levels in 1992. In turn, the 1992 data are within

the range of variability of data collected in 1965, 1982, and 1983. The correlation between harvest levels and consumption are not well established but it is not unusual within a NEPA analysis to use surrogates, such as using patterns in per capita harvest levels to provide an indication of consumption levels. The relationship between harvest data, consumption, diet, and health are additional steps removed from the information that is currently available. Based on this information and the SEIS analysis, EPA stands by the findings in the quoted text.

Response to Comment ID: JH.05

Please note the response to the preceding comment. EPA's selection of the environmentally preferable alternative was in part based on minimizing effects on subsistence, which extends beyond diet and health into social, cultural, and environmental justice issues. While we believe that the subsistence analysis provides indications that mine-related activities have likely affected some subsistence resources, the data does not support the contention that substantial reductions in harvest levels have occurred. Again, if harvest levels are a surrogate for consumption, the data do not indicate that large scale consumption has been affected, although some resources may be – this can result from the switch from one subsistence resource (e.g. beluga whale) to another (e.g. Dolly Varden char). The SEIS concluded that a dietary survey should be conducted for the affected community (Kivalina), but the SEIS analysis did not indicate that there were subsistence impacts to other communities or other resources other than caribou and beluga harvested by Kivalina residents.

The four criteria identified in the comment apply to "reasonably foreseeable significant adverse effects." Based on the preceding discussion and information currently available, including the health analyses conducted in Section 3.13 of the SEIS (toward which Maniilaq significantly contributed), EPA does not believe that operations at the Red Dog Mine and the proposed action and alternatives meet the threshold of producing reasonably foreseeable significant adverse effects on health or diet. While health professionals may perceive that a pattern of diminished subsistence harvests could potentially cause "catastrophic" health consequences. The analysis in the SEIS does not show a link between diminished harvest levels and potential changes in diet as a result of mine operations. The commenter provides no specific information or data to change this conclusion.

APPENDIX C

FINAL NPDES PERMIT
AND NPDES PERMIT RESPONSE TO COMMENTS