

**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