

STATE OF ALASKA

**DEPARTMENT OF ENVIRONMENTAL CONSERVATION
DIVISION OF WATER
WASTEWATER DISCHARGE PROGRAM**

SARAH PALIN, GOVERNOR

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June 2009

File #104.62.001

DRAFT

**Certified Mail # _____
Return Receipt Requested**

Mike Bonneau
Teck Alaska, Incorporated
3105 Lakeshore Dr.
Building A, Suite 101
Anchorage, Alaska 99517

Subject: Draft Waste Management Permit No. 0132-BA002, Red Dog Mine

Dear Mr. Bonneau:

Alaska Department of Environmental Conservation has completed its evaluation of your Waste Management Permit application for the disposal of wastes from the Red Dog Mine, as detailed in your application materials and in the attached permit. The attached permit covers disposal of waste to the Tailings Area; inert and camp solid waste landfill facilities; the Waste Rock and Ore stockpiles; the Main, Aqqaluk, and Qanaiyaq mine pits; and groundwater and surface water collection, treatment, and monitoring systems at the Red Dog Mine. In addition to the disposal of wastes listed above, this permit covers hazardous chemical storage and containment, reclamation and closure activities related to all the facilities, and financial responsibility.

The attached permit is issued under the provisions of Alaska Statute 46.03, and the Alaska Administrative Code (AAC), 18 AAC 15, 18 AAC 60, 18 AAC 70, and 18 AAC 72 and other applicable state laws and regulations. The attached permit incorporates Teck's January 8, 2009 Waste Management Permit Application, May 2009 Waste Management / Reclamation and Closure Monitoring Plan, May 2009 Closure and Reclamation Plan, and project documents found in appendix A. Please review the conditions and stipulations in this permit and ensure that they are all understood. This permit is effective _____, 2009, and expires after _____, 2014. It rescinds solid waste permits SWZA016-12 and SW3A010-13.

Any person who disagrees with this decision may request an adjudicatory hearing in accordance with 18 AAC 15.195 - 18 AAC 15.340 or an informal review by the Division Director in accordance with 18 AAC 15.185. An informal review request must be delivered to the Director of the Division of Water, 555 Cordova Street, Anchorage, AK 99501, within 15 days of receipt of the permit decision. An adjudicatory hearing request must be delivered to the Commissioner of the Department of Environmental Conservation, 555 Cordova Street, Anchorage, Alaska 99501, within

30 days of the permit decision. If a hearing is not requested within 30 days, the right to appeal is waived.

Sincerely,

DRAFT

Sharmon Stambaugh
Wastewater Discharge Program Manager

Enclosure: Waste Management Permit No. 0132-BA002, Red Dog Mine

cc: Gary Coulter, Teck
Wayne Hall, Teck
Jeff Clark, Teck
Allan Nakanishi, ADEC, Anchorage
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STATE OF ALASKA
DEPARTMENT OF ENVIRONMENTAL CONSERVATION
555 CORDOVA STREET
ANCHORAGE, AK 99501

WASTE MANAGEMENT PERMIT

for\

Red Dog Mine

Permit No. 0132-BA002

Date: _____, 2009

This Waste Management Permit is issued to Teck Alaska, Incorporated, 3105 Lakeshore Dr., Building A, Suite 101, Anchorage, Alaska 99517 for the disposal of wastes from the Red Dog Mine as defined in permit Section 1. The Red Dog Mine facilities are located 82 miles north of Kotzebue, Alaska at Latitude 68° 04' 17" N and, Longitude 162° 51' 05" W. This permit is issued under the provisions of Alaska Statutes (AS) 46.03, and the Alaska Administrative Code (AAC), 18 AAC 15, 18 AAC 60, 18 AAC 70, and 18 AAC 72, as amended or revised, and other applicable state laws and regulations. This permit is effective _____, 2009, and expires after _____, 2014. This permit may be terminated or modified in accordance with AS 46.03.120.

This permit is subject to the conditions and stipulations contained in Sections 1 - 6. This permit incorporates by reference Teck's Red Dog Mine January 8, 2009 Waste Management Permit Application, May 2009 Waste Management / Reclamation and Closure Monitoring Plan, May 2009 Closure and Reclamation Plan, and project documents found in appendix A. Changes to the documents incorporated herein must be approved by the department if they affect this permit. If the department approves the changes, they become part of this permit.

The department requires the permittee to conduct water treatment, site maintenance, monitoring and reporting after closure until active water treatment is no longer required and the water quality standards are met. The permittee shall assess the conditions at the facility and respond accordingly throughout the post-closure care period. At the end of the post-closure period, the department will determine whether post-closure care and monitoring should be extended, based upon the information collected by that time.

DRAFT

Sharmon Stambaugh
Wastewater Discharge Program Manager

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1 SPECIFIC PERMIT CONDITIONS

1.1 PERMIT COVERAGE

- 1.1.1 This permit covers disposal of waste to the Tailings Area; inert and camp solid waste landfill facilities; the Waste Rock and Ore stockpiles; the Main, Aqqaluk, and Qanaiyaq mine pits; and groundwater and surface water collection, treatment, and monitoring systems within the boundary of the area designated in Figure 1 (Section 5) at the Red Dog Mine. In addition to the disposal of wastes listed above, this permit covers hazardous chemical storage and containment, reclamation and closure activities related to all the facilities, and financial responsibility. This permit also covers monitoring requirements for the mine pits, waste rock, and ore stockpiles; characterization of acid rock drainage; and seepage collection systems. Additionally, this permit covers reclamation and closure activities of the tailings, waste rock, and mine pits, including disposal to the mine pits as approved by the department. This permit does not cover discharge of treated wastewater through outfall 001. That wastewater discharge is covered under State of Alaska certified NPDES Permit No. AK-003865-2.
- 1.1.2 This permit authorizes disposal of approximately 87.1 million tons or 68.4 million cubic yards of tailings at approximately 94.3 pounds per cubic foot into the tailings area covering 650 acres; disposal of 62 million tons or 31 million cubic yards of waste rock into the main waste stockpile covering 275 acres; and disposal 104 million tons or 55 million cubic yards into the Main Pit stockpile (backfilled Main Pit) covering 150 acres by the time the mine is anticipated to close in 2031.
- 1.1.3 In addition to the stipulations in this permit, the permittee shall adhere to the requirements of 18 AAC 60 Solid Waste Management Regulations as applicable, 18 AAC 70 Alaska Water Quality Standards, and 18 AAC 72.500 – 72.600 Non-Domestic Wastewater Disposal. The permittee shall also adhere to the requirements of Red Dog Project’s Monitoring Plan, Closure and Reclamation Plan, and supporting documents (see appendix A) approved by the department. When the terms of this permit differ from the terms of the project documents (listed in appendix A), the most recent term, approved in writing by the department, is controlling. If there is doubt as to which of the conflicting terms is newer, this permit shall control. The project documents must also be updated within 90 days from the date of issuance of this permit incorporating any changes necessary to be consistent with the terms of this permit.
- 1.1.4 During the period beginning on the effective date of this permit and lasting through the expiration date, the permittee is authorized to dispose of wastes as specified in this permit to the tailings area; inert solid waste landfill facilities; the waste rock and ore stockpiles; and the Main, Aqqaluk, and Qanaiyaq mine pits; at the Red Dog Mine, which are considered to be part of the treatment works. Under 18 AAC 70.010(c), water quality standards contained in 18 AAC 70 do not apply to a treatment works. Discharge of water to the mine pits at closure is allowed for storage before treatment and discharge under NPDES Permit No. AK-003865-2.

1.2 LIMITATIONS

- 1.2.1 The waste materials permitted under this section are limited to mine tailings, waste rock, inert wastes in the landfill, and other wastes meeting the conditions in this permit. This permit also requires collection of seepage and runoff below the main dam, back dam, and mine water diversion dam, as well as disposal of sludge produced from mine water and domestic wastewater treatment.
- 1.2.2 The following materials shall not be disposed into the inert solid waste landfill, the tailings area, or the mine pits unless otherwise provided or approved in writing by the department:
- 1.2.2.1 Hazardous wastes, as defined by 40 C.F.R. Part 261, and radioactive material, explosives, strong acids, untreated pathogenic waste, glycol, solvents, oily wastes, waste oil, greases, paints, chemical wastes, transformers, and packing material or associated equipment; however, this prohibition does not preclude disposal of Bevill excluded waste, natural minerals found in mine rock or residual wastes included as byproducts of the beneficiation process which may be discarded into the tailing area or mine pits, as long as they are in quantities that would not cause significant impact on mine closure, reclamation, or water quality; or
 - 1.2.2.2 Contaminated soils, spill boom, liners used for the containment of spilled materials, chemicals used in the cleanup of spills or other chemicals used in the beneficiation process unless approved under Section 1.2.6.
- 1.2.3 Wash water from the maintenance shops and truck wash may go into the tailings area. Oily water must go through an oil/water separator and the treated water may not have a sheen prior to entering the tailings area. Dry methods of cleanup shall be used for initial cleanup of oil spills in the maintenance shops.
- 1.2.4 Activities at the site which will cause a greater amount of waste material to be treated and disposed of, above that contemplated in this section of the permit, are prohibited without the prior approval by the department.
- 1.2.5 If monitoring as specified in Section 1.6 is required, the water in the groundwater monitoring wells must not show a statistically significant increase, according to 18 AAC 60.830(h), in concentration above the background quality. When a statistically significant increase above the background quality is detected, corrective action outlined in Section 1.10 must be implemented.
- 1.2.6 The limitations in Section 1.2 and Section 1.5 do not preclude, and authorization is hereby given for, disposal of non-hazardous incidental wastes such as (i) settled

solids from sumps, ditches, and degritting basins; (ii) incinerator ash and residue; (iii) ash from combustion of scrap wood material; (iv) iron (drill steel, balls, empty cans, etc.); (v) empty plastic and glass containers; (vi) inert domestic waste; (vii) construction debris; (viii) tires; (ix) spill cleanup debris approved by the department including mill remediated residual ore and soil; (x) non-terne plated used oil filters that have been gravity hot-drained; and (xi) such other material as would otherwise be disposed of in a inert solid waste landfill facility without special handling.

1.2.7 As treatment works, water may be disposed of to the mine pits at closure provided that the following requirements are satisfied, and the department determines that there will be insignificant impact on long term water quality.

1.2.7.1 Samples from each water source proposed to be discharged to a pit shall be collected at the frequency prescribed in the department-approved Monitoring Plan in Section 1.6.1, and shall be analyzed for Analytical Profile I constituents in the Red Dog Mine Monitoring Plan.

1.2.7.2 As part of annual reporting required in Section 1.9.2, submit the sample results from Section 1.2.7.1 above to the department for review and to gain department approval for the next year's discharge to each pit.

1.2.8 The department may set or modify permit conditions based on monitoring results or changes in facility processes in accordance with permit amendment or modification procedures.

1.2.9 Seepage and runoff collected from the main dam, back dam, mine water diversion dam, and waste rock piles may be disposed of into a treatment works.

1.3 SITE MAINTENANCE

1.3.1 For changes that may have a significant impact on mine closure, reclamation, or water quality, information on engineering changes to the mill, new waste treatment processes, changes to solid waste disposal facilities, changes to the seepage collection systems, and the addition of new waste streams that discharge into the tailings area or pits must be submitted to the department and approval must be obtained prior to any such changes or discharges.

1.3.2 The permittee shall provide and maintain secondary containment for all mill reagent and water treatment chemical piping and chemical mix tanks containing hazardous or toxic materials. Secondary containment is considered to be 110% of the largest tank within a containment area or the total volume of manifolded tanks. The permittee must design and install secondary containment structures in a manner that ensures spills will not escape from the structures. To prevent such

discharges, facilities shall be maintained in good working condition at all times by the permittee. Any variation from this condition must be approved by the department.

- 1.3.3 The permittee shall design all mill reagent and water treatment chemical piping and chemical mix tanks to allow for routine inspections for leaks. Mill reagent piping outside of the mill building must not be buried unless secondary containment is used that provides the ability to inspect for leaks.
- 1.3.4 The permittee shall develop the site in accordance with the plans submitted by the applicant as required by this permit and approved by the department, and approved amendments to those plans.

1.4 SITE CONSTRUCTION AND OPERATION

- 1.4.1 The permittee shall construct and maintain seepage collection systems below the main dam, back dam, and mine water diversion dam in accordance with plans approved by the department. These seepage collection systems shall be constructed and maintained such that all seepage and runoff water from these areas will be captured and pumped back to the tailings area or to one of the mine pits as approved in the Closure and Reclamation Plan. The seepage and runoff collection systems shall be operated to ensure that the Red Dog Mine operates as a zero discharge facility except for the discharge permitted under Permit No. AK-003865-2.
- 1.4.2 The freeboard of the tailings area dams shall be maintained to minimize overtopping as indicated in the Red Dog Project's Operation, Maintenance and Emergency Action Manual approved by Alaska Department of Natural Resources (ADNR), Division of Mining, Land and Water, Dam Safety and Construction Unit.
- 1.4.3 The permittee shall ensure that wastes are deposited into the tailings area, pits, and waste rock disposal areas in a manner that will not damage or otherwise jeopardize the integrity of the containment of the those areas.
- 1.4.4 The permittee shall take reasonable measures to control dust and particulates that may occur from the tailings area, waste rock disposal areas, crushers, loading facilities, and mine pits, roads, or other mine components by wetting or other effective measures as required by the facility's Title V permit (AQ290TVP01 or subsequent permits) and 18 AAC 50.346(c).
- 1.4.5 The permittee shall not dispose of waste materials in quantities exceeding the design capacity of the disposal facilities.
- 1.4.6 The permittee shall control and treat surface water, groundwater, and seepage as necessary to prevent off-site water quality exceedances in waters of the State.

- 1.4.7 The permittee shall notify the department in writing at least 15 days before the introduction of a new chemical into the process or waste treatment streams that may have a significant impact on mine closure, reclamation, or water quality. Material Safety Data Sheets on new chemicals must be forwarded to the department at time of notification and maintained on-site. Introduction of these new chemicals into the process requires written department approval.
- 1.4.8 For nondomestic wastewater system plan review under 18 AAC 72.600, the permittee shall:
 - 1.4.8.1 Submit plans to the department, at least 60 days before construction of the modification, and receive department approval of any changes that will significantly modify the quality or quantity of a discharge, the operation of a waste treatment component, or the disposal facilities;
 - 1.4.8.2 Notify the department in writing at least 15 days before the introduction of new process solutions into an existing process or waste treatment component that has been significantly modified; and
 - 1.4.8.3 Submit to the department within 90 days after completing construction of a significant modification to an existing process component:
 - 1.4.8.3.1 As-built drawings of the process component(s) which show any changes of those aspects that would affect performance of that process component as required in 18 AAC 72.600,
 - 1.4.8.3.2 A summary of the quality control activities that were carried out during construction, and
 - 1.4.8.3.3 The revised operating plans that reflect modifications made during construction.
- 1.4.9 The permittee shall notify the department of an unpermitted discharge of any hazardous substance at the facility in conformance with 18 AAC 75 Article 3. Reportable spills include unplanned discharges of process chemicals which would violate limitations in this permit.
- 1.4.10 Implement a program to minimize the likelihood that any area containing contaminated water within the facility boundary becomes attractive to waterfowl, shorebirds, or other wildlife. Any wildlife casualties shall be reported to the

department and to the appropriate State and federal agencies.

- 1.4.11 Implement progressive reclamation as outlined in Supporting Document B2, Plan of Operations for Waste Rock Management, September 2007, as approved by this department.

1.5 INERT SOLID WASTE LANDFILLS

- 1.5.1 The permittee shall comply with the designs and plans in the renewal applications for the Main Waste Stockpile and the Old Mine Landfills dated May 22, 2007 and September 30, 2008, respectively, which include standard operating procedures, current operations plan, site plans, and closure plan, as well as the following permit conditions. Additional modifications may be requested, but must be authorized by the department, before that modification is effective.
- 1.5.2 Ensure that all operations will accommodate the waste volume and are done in a manner that will facilitate closure when the landfill is closed.
- 1.5.3 The permittee shall erect and maintain signs that:
- 1.5.3.1 Include the following information legibly printed:

Facility Identification,
Owner/Operator Name,
Conditions for Use, and
Emergency Phone Numbers;
 - 1.5.3.2 Are readily visible in the facility directing users to the various disposal areas and pertinent rules; and
 - 1.5.3.3 List items not to be disposed of at the site such as acids, corrosives, solvents, oily wastes, asbestos waste, explosives, radioactive wastes, pathogenic wastes (which have not been sterilized or incinerated), and hazardous wastes.
- 1.5.4 Ensure that surface water runoff from outside the facility does not flow onto the facility, and over, into or through uncovered or covered solid wastes by constructing and maintaining diversion structures such as ditches or berms as needed except as authorized in the closure plan approval by the department on February 23, 2007, for the Old Mine Landfill, formerly permit SW3A010-1.
- 1.5.5 Ensure that the site is managed in such a way as to prevent attracting wildlife to the facility. Wastes will be stored in suitable containers prior to incineration, open burning, or placement in the disposal cell to reduce wildlife attraction.
- 1.5.6 Construct solid waste disposal areas and maintain them in a manner that will allow

for construction of a fence, if necessary, to control wildlife access. When, in the judgment of the Department of Fish and Game, attraction of wildlife to a site becomes significant, a fence will be constructed around the solid waste disposal area. The fence must meet specifications to be agreed upon by Teck Alaska, the Department of Fish and Game, and the department to effectively exclude carnivores.

- 1.5.7 Ensure that a minimum ten-foot separation distance is maintained between the bottom of the waste disposal trench and the high groundwater level or at least two feet above the natural ground surface with the closure exception noted in Section 1.5.4.
- 1.5.8 The permittee shall comply with the following conditions at an inert solid waste landfill:
 - 1.5.8.1 Prohibit disposal of hazardous and other wastes as listed in Section 1.2.2.1 unless written permission is obtained from the department,
 - 1.5.8.2 Prohibit disposal uncombusted household waste,
 - 1.5.8.3 Ensure that only ash or incinerator residual waste and inert waste as needed are disposed at these sites. Putrescible wastes may not be disposed of at these sites.
 - 1.5.8.4 Prohibit the disposal of sewage sludge under Section 1.2.1 unless it is deposited into a separate trench and handled in accordance with 18 AAC 60.470 as if the trench was a sewage solids monofill. Requisite monitoring under 18 AAC 60.470(j) applies,
 - 1.5.8.5 Prohibit disposal of chemical containers unless empty under 18 AAC 60.260(b), or triple-rinsed if required under 40 CFR 261.7.
 - 1.5.8.6 Prohibit discharge of firearms at the facility other than for use in wildlife hazing activities,
 - 1.5.8.7 Prohibit disposal of lead-acid vehicle batteries at the landfill site. Temporary storage in leak-proof, covered containers prior to transport to an acceptable recycle or disposal site is permitted.
 - 1.5.8.8 Prohibit regular disposal of economically salvageable or recyclable materials, including, but not limited to, prefabricated buildings, vehicles, drums, tankage, major equipment components, and major scrap components.

- 1.5.8.9 Prohibit the disposal of regulated asbestos containing materials at this site.
- 1.5.9 The permittee shall operate an inert solid waste landfill in accordance with this permit and:
 - 1.5.9.1 Consolidate and compact all loose refuse and cover with a minimum of six inches of compacted soil weekly. More frequent cover may be necessary if blowing litter becomes a nuisance.
 - 1.5.9.2 Ensure the wastes placed in the disposal cell are compacted in four-foot increments.
 - 1.5.9.3 Apply at least 12 inches of intermediate soil cover to any portion of the landfill that will be inactive for a period of 90 days or more. The intermediate cover must be applied within seven days after the waste is last deposited in the inactive area, and graded to prevent water from ponding.
 - 1.5.9.4 Maintain a minimum separation of 50 feet between the designated portion of the landfill and any surface water drainage feature (e.g. swales, seasonal ponds) or the facility boundary.
 - 1.5.9.5 Ensure that the maximum landfill working face width shall not exceed 200 feet. The maximum height of the working face shall not exceed 10 feet.
 - 1.5.9.6 Ensure the working face is kept as small as practical to reduce the potential for windblown litter.
 - 1.5.9.7 Ensure that solid wastes are not placed in surface waters.
 - 1.5.9.8 Ensure waste, leachate, or eroded soil from the facility does not cause a violation of the water quality standards set out in 18 AAC 70.
 - 1.5.9.9 Ensure that used oils or oily wastes are managed in accordance with 40 CFR 279. Oil filters must be hot drained and crushed or incinerated prior to disposal.
 - 1.5.9.10 Ensure that non-salvageable drums have been emptied of fluids prior to crushing and burying. All fluids removed from the drums prior to their placement in the landfill shall be properly disposed of in accordance with all applicable state and federal laws, including but not limited to, RCRA, the Clean Water Act, the Clean Air Act, Title 46 of Alaska Statutes, and 18 AAC 60.

- 1.5.9.11 Maintain positive control of all persons who are within the landfill boundaries and that refuse will be deposited in approved locations. Dumping in unauthorized areas violates conditions of this permit and Alaska Administrative Codes.
 - 1.5.9.12 Collect all windblown and littered refuse from within the disposal site and along the entrance road and return it to the active disposal trench for burial. All littered wastes on lands within 500 feet of the site, whether windblown or dumped, shall be collected and disposed of at a frequency necessary to prevent this litter from becoming an aesthetic nuisance.
 - 1.5.9.13 The permittee shall close the inert solid waste landfill trenches within 60 days after waste is last deposited in that area, using a soil material at least 2 feet thick and graded to prevent water from ponding.
 - 1.5.9.14 The permittee shall control and treat surface water, groundwater and seepage as necessary to prevent off-site water quality exceedances, shall not place solid waste in water in the inert solid waste landfill facilities, and shall not allow solid waste to wash or blow away from the facility.
- 1.5.10 The permittee shall limit burning at the inert solid waste landfill and:
- 1.5.10.1 Prohibit open burning on the working face and immediately extinguish all fires that occur on the working face. Notify the Department of Environmental Conservation, Division of Environmental Health, Fairbanks, at 451-2108, if any fires occur on the working face.
 - 1.5.10.2 Prohibit items that generate black smoke from being burned, such as tires and plastics. Non-working face open burning shall comply with air quality regulations in 18 AAC 50 and all other applicable state and federal regulations.
 - 1.5.10.3 Ensure that open burning of wood, paper and paper products are kept at least 100 feet from the working face. Burning shall be done in a burn box, burn cage, or other means of ensuring controlled burning that prevents fires in the landfill area. Open burning requires that best combustion efficiency be achieved with no smoldering of wastes.
 - 1.5.10.4 Ensure an attendant is on duty during open burning operations at the landfill.
 - 1.5.10.5 Burn putrescible camp wastes in an incinerator complying with 18

AAC 50.040 (b). No more than one ton of ash may be placed in the landfill per day for the landfill to qualify as a Class III facility.

1.6 MONITORING - ALL MONITORING SHALL BE REPORTED ACCORDING TO SECTION 1.9

1.6.1 The Monitoring Plan submitted in May 2009 by Teck Alaska, Incorporated, and approved by the department, is incorporated into this permit. Under the 1997 consent decree between Cominco and U.S. EPA, permafrost and sub-permafrost groundwater monitoring associated with the Supplemental Environmental Project (SEP) shall not be amended absent approval by the department and U.S. EPA. The Monitoring Plan shall be incorporated by reference as part of this permit and contain monitoring procedures to include the following and must be updated within 90 days of permit issuance incorporating any changes necessary to be consistent with the terms of this permit. Otherwise, department –approved changes to project monitoring that do not result in increased detrimental environmental impacts will be included as amendments to the Monitoring Plan and do not require public notice.

1.6.1.1 Required monitoring locations listed below and associated frequencies described in Table 1 – 1 of the Monitoring Plan are included by reference in this permit:

- Bioassessment Program,
- Permafrost and Sub-permafrost Groundwater Monitoring
- Mine Water management,
- Waste Rock Management,
- Tailings Management,
- Inert Solid Waste Landfills,
- Mining and Milling Activities,
- Reclamation,
- Fugitive Dust,
- Wildlife,
- Pit lakes and spillways (when sampling is possible), and
- Water leaving the mine (when sampling is possible).

1.6.1.2 Weekly visual monitoring of the facilities for signs of damage or potential damage from settlement, ponding, leakage, thermal instability, frost action, erosion, thawing of the waste, or operations at the site. Visual monitoring shall be documented.

1.6.1.3 Monitoring of surface and groundwater, as required, near the site to ensure that Alaska Water Quality Standards are not exceeded and that sample results are valid.

1.6.1.4 Water quality and flow monitoring that accounts for process water

discharged to the tailings area, process water recycled to the mill, water entering the pits, and any water directed to the tailings impoundment or another water treatment works, and data necessary to maintain facility water and load balances.

- 1.6.1.5 Track the following water treatment quantities: water treated at Water Treatment Plant #2 (WTP2); discharge to Red Dog Creek; flocculant, lime, sodium sulfite, and other chemicals used in bulk at WTP2; flocculant, lime, and other chemicals used in bulk at Water Treatment Plant #3.
- 1.6.1.6 Wildlife monitoring and reporting is required in accordance with Section 1.4.10.
- 1.6.1.7 The permittee shall conduct monitoring at the inert solid waste landfill and shall:
 - 1.6.1.7.1 Visually monitor the site each month for signs of damage or potential damage from settlement, ponding, leakage, erosion, or operations at the site to ensure the active landfills are being operated according to the most recent department-approved landfill standard operating procedures. Record the inspection results and maintain them in the facility's operating record for review by department staff during inspections.
 - 1.6.1.7.2 Maintain a set of site development and use plans and submit an updated copy to the department showing current status before the permit anniversary date each year.
 - 1.6.1.7.3 Photograph the disposal site:
 - 1.6.1.7.3.1. As prepared for waste disposal,
 - 1.6.1.7.3.2. At least once per year during waste deposition,
 - 1.6.1.7.3.3. After final cover has been applied, and
 - 1.6.1.7.3.4. After revegetation during the summer following closure.
 - 1.6.1.7.4 Photographs taken under 1.6.1.7.3.1, 1.6.1.7.3.2 and 1.6.1.7.3.3, above should be submitted within 60 days of closure and photographs under 1.6.1.7.3.4 within one year of closure.
 - 1.6.1.7.5 Notify the department within 48 hours of any known monitoring data indicating that contamination may be coming from an inert

solid waste landfill. A written notice regarding the contamination shall follow within two weeks of the discovery.

- 1.6.2 A sample from the east or west Overburden Stockpile sump that exceeds Alaska Water Quality Standards for weak acid dissociable (WAD) cyanide shall be reported to the department as soon as possible, but no later than the end of the next week day. Re-sampling for sample confirmation shall be performed as soon as practical.
- 1.6.3 The permittee shall maintain a log of all wastes, disposed into the tailings area, pits, and waste rock disposal sites. The log shall include the dates of disposal, estimated amount of waste, a description of the waste, and any required sampling or analysis performed on the waste. A summary shall be included in quarterly reports required in Section 1.9.
- 1.6.4 Maintenance of inspection and sampling logs, and procedures for processing, consolidating, and reporting inspection and sampling data shall be in conformance with the most recent Monitoring Plan and QAPP submitted by Teck Alaska, Incorporated, as approved by the department.
- 1.6.5 Groundwater and surface water monitoring and corrective action shall be in accordance with Section 1.10, 18 AAC 60 Solid Waste Management Regulations, and the most recent Monitoring Plan and Quality Assurance Project Plan (QAPP) submitted by Teck Alaska, Incorporated, as approved by the department or modified by amendment to this permit.
- 1.6.6 The department may modify monitoring requirements, including the establishment of additional compliance points in response to trends showing changes in the concentration or load of parameters being monitored.
- 1.6.7 If the permittee monitors any influent, effluent, receiving water, air or solid waste characteristic identified in the Monitoring Plan, more frequently than required, the permittee shall notify the department that the additional monitoring has occurred in the next quarterly report after the monitoring has occurred. The results of such monitoring shall be available for inspection by the Commissioner or his/her representative at the project site, or other location proposed by the permittee and agreed upon by the department. The permittee shall provide copies of the results to the department upon request.

1.7 QUALITY ASSURANCE REQUIREMENTS

- 1.7.1 The Monitoring Plan submitted in May 2009 by Teck Alaska, Incorporated, and approved by the department includes a Quality Assurance Project Plan (QAPP). The permittee shall update and maintain the QAPP as follows:
- 1.7.2 Adhere to conditions in the department-approved Red Dog Mine Project QAPP

Quality Control and Quality Assurance Objectives sections. The QAPP will reflect the current sampling program for the mine facilities. Any significant changes in the QAPP procedures shall be submitted to the department for approval.

- 1.7.3 Ensure water compliance samples are analyzed by a laboratory that follows EPA-approved procedures, quality control requirements, reporting and documentation procedures. The QAPP, containing quality control procedures and criteria, analytical methods, detection limits and reporting requirements pertinent to the permittee's samples, shall be submitted to the department for approval and must be updated annually and whenever changes to methods occur.
- 1.7.4 Analyze collected samples using methods set out in EPA-600/4-79-020 Methods for Chemical Analysis of Water and Wastes; EPA-600/4-82-057 Methods for Organic Chemical Analysis of Municipal and Industrial Wastewater; Standard Methods for the Examination of Water and Wastewater (edition in effect at the time of sampling); or other methods approved by the department. Each result must be accompanied by a reference, such as the method number, to the method that was used to perform the analysis.
- 1.7.5 Conduct inspections of the dams in conformance with the Operations, Maintenance and Emergency Action Manual approved by ADNR, Division of Mining, Land and Water, Dam Safety and Construction Unit.

1.8 MODIFIED LIMITS

Site Specific Method Detection Limit (MDL) and Minimum Level of Quantification (ML) for WAD Cyanide Concentrations

- 1.8.1 During the life of this permit, a new or revised site specific MDL for WAD cyanide unique to a site specific water chemistry may be established in accordance with 18 AAC 70.020(c)(7) and EPA guidance document no. EPA-821-B-04-005 for a pollutant present in this discharge. Upon the effective date of the department-approved MDL, this permit is automatically modified to require reporting of measurements at or above the MDL.
- 1.8.2 During the life of this permit, a new or revised site specific ML for WAD cyanide unique to a site specific water chemistry may be established in accordance with 18 AAC 70.020(c)(7) and EPA guidance document no. EPA-821-B-04-005 for a pollutant present in this discharge. Upon the effective date of the department-approved ML, this permit is considered to be automatically modified for compliance purposes in accordance with the detection level specified in the ML. Exceedance of a ML shall be reported according to Section 1.9.1.
- 1.8.3 Values between the MDL and ML provide a margin of safety indicating increasing trends prior to any exceedances. Based on the rate and magnitude of a trend, the department may require corrective action according to Section 1.10.2 to prevent

environmental harm. When lab results are between the MDL and ML, the permittee shall verbally notify the department within 60 days of the end of the calendar quarter when it occurred and provide written notification within 7 days of verbal notice.

1.9 REPORTING

- 1.9.1 If a violation of Alaska Water Quality Standards is detected at a surface water or groundwater monitoring location, or if an exceedance of the limits set out in Sections 1.2 or 1.8 is detected, the permittee shall verbally notify the department no later than the end of the next State of Alaska working day after receipt of monitoring results, and shall conduct corrective actions according to Section 1.10.3.
- 1.9.2 For each year of sample collection and analysis, the permittee shall submit to the department quarterly monitoring reports, for a total of three quarterly reports each year and one annual monitoring report, which includes the fourth quarter monitoring data, summarizing the inspection and monitoring results set out in Section 1.6. All quarterly reports shall be submitted to the department no later than 60 days after the last day of the quarter. The annual report will be due annually by March 1st, summarize activities and data from the preceding calendar year, and discuss relevant plans for the upcoming year. Upon request, copies of the laboratory reports should be submitted to the department. Electronic copies of reports shall be submitted to the department using commercially available software or according to electronic reporting requirements established by the department.
- 1.9.3 Quarterly and annual reports required in Section 1.9.2 shall include information necessary to determine data validity, data variations and trends, and clearly identify any exceedance of limits contained in this permit and Alaska Water Quality Standards or criteria (see Section 1.1.3). All records and information which validate the QAPP, resulting from the monitoring activities required by this permit, including but not limited to all records of analyses performed, calibration and maintenance of instrumentation, and recordings from continuous monitoring instrumentation, shall be retained in Alaska for observation by the department for three years. Upon request from the department, the permittee shall submit certified copies of such records. The department may at its discretion perform field and laboratory audits of monitoring activities.
- 1.9.4 An annual meeting with the department will be held in conjunction with ADNR and open to the public in which the annual report required in Section 1.9.2 will be presented. The annual report shall be available to the department two weeks prior to the annual meeting.
- 1.9.5 The annual report required in Section 1.9.2 shall address the adequacy of the current version of the Red Dog Mine Closure and Reclamation Plan.

- 1.9.6 The annual report required in Section 1.9.2 shall also address the adequacy of the financial responsibility, including, but not limited to, inflation, significant changes in reclamation activity costs, and concurrent reclamation, expansion or other changes to the operation of the facility.
- 1.9.7 The permittee shall maintain an updated Closure and Reclamation Plan, showing site use and development plans, and shall provide the department with copies of any amendments to that Plan affecting the waste disposal operations authorized by the permit.
- 1.9.8 Notifications and reporting as required under this permit shall be submitted to the department at the following address:

Department of Environmental Conservation
Division of Water
610 University Avenue
Fairbanks, Alaska 99709-3643

Phone: (907) 451-2136

- 1.9.9 All reports submitted under this section must be signed by the facility's responsible corporate officer certifying the accuracy of information provided therein.
- 1.9.10 Knowingly making a false statement, by the permittee, the operator or other employees, including contractors, on any such report may result in the imposition of criminal penalties as provided for under AS 46.03.790.

1.10 CORRECTIVE ACTIONS

- 1.10.1 The permittee shall comply with 18 AAC 60.815 if the visual monitoring program required under any of the items listed in Section 1.6.1.1 discovers damage or potential damage to the waste disposal-related facility that could lead to water quality violations or harm wildlife species.
- 1.10.2 The permittee shall comply with 18 AAC 60.820-860 if a statistically significant increase above background groundwater quality or an exceedance of Alaska Water Quality Standards in any of the sampling locations is detected. Statistical significance shall be determined using one of the methods outlined in 18 AAC 60.830(h) and performance standards outlined in 18 AAC 60.830(i). The permittee shall comply with the notification requirements in 18 AAC 60.850(c) upon determination of a statistically significant increase above background groundwater quality.
- 1.10.3 After reporting a violation under Section 1.9.1, the permittee shall perform the following tasks.

- 1.10.3.1 Determine the extent of the exceedance.
- 1.10.3.2 In consultation with the department and documented in writing, implement a plan to determine the cause and source of the exceedance.
- 1.10.3.3 Submit to the department, within seven working days after an exceedance is verified by the permittee, a plan for corrective actions to prevent adverse environmental impacts and further exceedances of applicable Alaska Water Quality Standards or permit limits.
- 1.10.3.4 Implement the corrective action plan as approved by the department.

1.10.4 The permittee shall abide by any department-approved corrective action plan.

1.11 TEMPORARY CLOSURE

- 1.11.1 A temporary closure shall be defined as a suspension of mining, milling or processing activities for more than 90 days but less than five years. The length of time for a temporary closure may be extended beyond five years by written authorization from the department. If not already submitted, the permittee shall submit a conceptual temporary closure plan to the department within 90 days of issuance of this permit.
- 1.11.2 The permittee shall submit an update to the suspension study reflecting current conditions to the department no later than ten days after a temporary closure has been initiated. The permittee is encouraged to submit the specific plan immediately upon availability, and prior to commencement of the temporary closure if possible. The updated suspension study shall include the following:
 - 1.11.2.1 The procedures, methods, and schedule to be implemented for the treatment, disposal, and storage of process waters;
 - 1.11.2.2 The control of surface and groundwater drainage to and from the facility and the surrounding area;
 - 1.11.2.3 The control of erosion from the tailings area, pits, waste rock disposal areas, inert solid waste landfills, and any other disturbed areas within the facility boundary;
 - 1.11.2.4 The secure storage of chemicals during the period of closure;
 - 1.11.2.5 Procedures for continuing maintenance and monitoring of the dams including seepage collection and water balance; and

- 1.11.2.6 Procedures for maintaining containment of all water at the facility and providing continuing treatment of that water in accordance with NPDES Permit No. AK-003865-2.
- 1.11.3 The department shall have 15 days to review and approve or require modifications to the temporary closure plan.
- 1.11.4 Once a temporary closure plan has been approved, it becomes enforceable under the conditions of this permit and full implementation of the approved specific plan is required. The plan can be amended by submitting a revised plan to the department for approval.
- 1.11.5 During temporary closure of the site, the permittee shall:
 - 1.11.5.1 Continue pollution control activities associated with the tailings area, the pits, the inert solid waste landfill facilities, and the waste rock disposal sites including, but not limited to, dust control, maintenance of the drainage diversion structures, maintenance of all seepage control structures and processes, and maintenance of the dams including appropriate freeboard as specified by this permit or the temporary closure plan.
 - 1.11.5.2 Continue monitoring and reporting as required for all active portions of the mine.
 - 1.11.5.3 Complete reclamation and corrective action requirements as appropriate under the Closure and Reclamation Plan in light of the nature of the closure.
- 1.11.6 Written department approval is required before resuming operations after a period of temporary closure.

1.12 PERMANENT CLOSURE

- 1.12.1 Within 90 days of the decision that permanent cessation of mining, milling, or processing will occur, updated reclamation and monitoring plans must be submitted to the department for approval. The updated plans must address current conditions at the facility. The Closure and Reclamation Plan submitted as part of the application for this permit is approved. Future updates and changes to that plan must be approved in writing by this department.
- 1.12.2 Permanent closure of the site must be implemented and completed in accordance with the conditions of this permit and with the Plan of Operations and Closure and Reclamation Plan approved by the department and ADNR.
- 1.12.3 Permanent closure of the waste disposal facilities will be complete when the

following criteria are met:

- 1.12.3.1 A department-approved soil or water cover system is installed on the tailings area and drainage channels are constructed and stable;
- 1.12.3.2 The spillway of the tailing dam is constructed and stable;
- 1.12.3.3 A stable vegetative cover is established on the waste rock, backfilled pit areas, and other infrastructure or other facilities as prescribed in the most recent Closure and Reclamation Plan approved by the department and ADNR;
- 1.12.3.4 Except for the discharge permitted under NPDES Permit No. AK-003865-2, active water treatment is not required for any water discharged from the facilities, any surface water discharge from the mine site or facilities meets water quality criteria contained in the Alaska Water Quality Standards (18 AAC 70), and all groundwater discharge from any of the seepage collection systems meets Alaska Water Quality Standards (18 AAC 70) or does not exhibit a statistically significant increase above the background concentrations using methods described in 18 AAC 60.830 for the analysis of statistical significance.
- 1.12.3.5 All discharge of untreated pit lake water is prevented. Pit lake water may be treated and discharged under NPDES Permit No. AK-003865-2.
- 1.12.4 Permanent closure must be achieved prior to the cessation of any care and maintenance activities required by Section 1.11.5 and the approved temporary closure plan if a period of temporary closure immediately preceded commencement of permanent closure.
- 1.12.5 The permittee shall maintain the facility correcting any erosion or settlement of the dams (main, back, mine water diversion, and Bons Creek), tailings area, the pits, the inert solid waste landfill facilities, and the waste rock disposal sites that may impair water quality or otherwise threaten the environment, up until the time that this permit, or any successor permit, is transferred to another entity or terminated by the department.
- 1.12.6 Post-closure monitoring of the groundwater, surface water and visual monitoring for settlement and erosion shall occur according to the sampling schedule set out in the current Monitoring Plan approved by the department. This schedule and the parameters monitored may be modified by the department based on the monitoring results received.

- 1.12.7 Demolition debris disposal in the landfill, waste rock, pits, or tailings may be approved at the time of closure in accordance with a plan approved by the department at the time.

1.13 PROOF OF FINANCIAL RESPONSIBILITY

- 1.13.1 The permittee shall provide the department with proof of financial responsibility for closure of the facilities and post-closure monitoring. The proof of financial responsibility shall cover costs incurred for closure and post-closure site maintenance, water treatment, and monitoring of the tailings area, the pits, the inert solid waste landfill facilities, and the waste rock disposal sites and related infrastructure or other facilities, shall cover the activities set out in Section 3, and shall be in the amount shown in Section 3. The area covered by the financial responsibility required in this section is shown on the map attached as Figure 1 in Section 5.
- 1.13.2 Annually or during the renewal, modification or amendment of this permit, the department, in consultation with ADNR, will review and modify if appropriate, the financial responsibility requirements including adjustments for inflation, concurrent reclamation, and expansion or other changes to the operation of the facility. The permittee shall address the adequacy of the financial responsibility in the annual report required in Section 1.9.2.
- 1.13.3 The proof of financial responsibility may be in the form of a trust fund, surety bond, letter of credit, insurance, or any other mechanism approved by the department.
- 1.13.4 Approved proof of financial responsibility must remain available through the post-closure period as long as active water treatment is required, and may not be released until the department certifies in writing that closure of the facility and the required post-closure site maintenance, water treatment, and monitoring have been successfully concluded, or that another entity will assume financial responsibility and responsibility for permit compliance and post-closure monitoring.
- 1.13.5 It shall be the responsibility of the permittee to provide acceptable proof of financial responsibility by month/day/year or within 60 days of the date of this permit. The department will accept or reject said Offer of Proof as expeditiously as possible, but in no event later than 30 days after its receipt.
- 1.13.6 If the permittee is unable to provide proof of financial responsibility, which is acceptable to the department and is approved by the department in writing within the time period stated above, this permit will expire automatically at that time, notwithstanding any other approvals to the contrary, unless the department's failure to act is responsible for the delay in accepting or rejecting this proof.
- 1.13.7 If the permittee fails to comply with the terms and conditions of this permit, as written, renewed, modified or amended, and if the department concludes that such

failure may prevent, inhibit or delay satisfactory closure or post-closure monitoring of the disposal facility, then the department may exercise its rights under the approved mechanism for financial responsibility to access the funds and use them for appropriate closure and post-closure activities.

1.14 FACILITY AUDIT

- 1.14.1 The permittee shall conduct periodic audits for the purpose of reviewing performance under this permit and approvals, and the agencies' regulatory oversight of such performance, and to aid in updating the Closure and Reclamation Plan and associated closure and post closure monitoring cost estimate. The first audit shall occur in 2013 or prior to final closure if final closure occurs prior to 2013. Subsequent environmental audits shall occur every five years. Audits shall be timed so that the auditor's site visit occurs during the snow-free season, far enough in advance of the deadline for the permittee's submittal of an updated Closure and Reclamation Plan, and associated closure and post closure monitoring cost estimate, so that the results of the audit can be taken into account in that update and in the permit renewal process. In January of the audit year, the parties shall confer to discuss the minimum qualifications of and process for selecting an independent, third-party auditor, and the minimum requirements for the scope of the audit. The third party contractor and the scope of the audit should be mutually agreed upon by the department, ADNR, and the permittee, but in the event that agreement cannot be reached, the agencies retain the final contractor selection and scope of audit decisions. The purpose of the audit will be to verify: 1) permittee's compliance with the permit, 2) permittee's controls provide reasonable assurances that environmental objectives in the current Closure and Reclamation Plan, and relevant permits and approvals are being met, 3) the controls are functioning as intended, 4) that the permit conditions provide environmental protection as required, 5) both the facility management and regulatory oversight provide reasonable assurances that the facility and controls are functioning as intended, and 6) the adequacy of financial responsibility.

The audit results will be used by the permittee and the agencies to assist in updating, renewing, or issuing approvals and permits, in updating policies, plans, and procedures, in determining compliance with permits and approvals, and in evaluating the adequacy of the financial responsibility.

The scope of subsequent audits may be revised as mutually agreed upon prior to initiation of each audit, to address specific issues or objectives not previously identified in this permit; however, the agencies retain the final decision authority for the scope of subsequent audits. Identification of such issues or objectives may be accomplished through a joint permittee/agency meeting prior to the audit.

- 1.14.2 The audit will be an objective, systematic, documented review of the conditions, operations, and practices related to permit requirements and facility management conducted under this permit.

1.15 POLLUTION PREVENTION STRATEGY

- 1.15.1 During the life of the project the permittee is encouraged to implement pollution prevention practices at the facility. To implement pollution prevention, it is recommended that the permittee evaluate all physical and maintenance phases of the operation, including all process and waste treatment components, mechanical maintenance facilities, chemical storage and facility maintenance by doing:
- 1.15.1.1 An assessment of toxic chemicals used and hazardous wastes generated. This should include data on the types, amount, and hazardous constituents of toxic substances and hazardous waste streams;
- 1.15.1.2 A review of potential reduction options for toxic chemical use and hazardous waste generation;
- 1.15.1.3 An evaluation considering costs associated with the use of toxic chemicals and the generation of hazardous wastes including the:
- Cost of purchasing chemicals
 - Cost of disposal
 - Cost of storage
 - Cost of waste treatment
 - Cost of environmental compliance and liability
 - Use of the Alaska Materials Exchange to obtain raw chemicals;
- 1.15.1.4 An analysis of reduction options including equipment/technology modifications, process/procedure modifications, product reformulation/redesign, raw material substitution, improvements in housekeeping, maintenance, training, and inventory control, education, and conservation (energy, water, etc.), that identifies which options are technically and economically feasible; and
- 1.15.1.5 Numeric or performance reduction goals for chemicals used and waste generated.

2 GENERAL PERMIT CONDITIONS

2.1 ACCESS AND INSPECTION

The permittee shall allow the Commissioner or his/her representative access to the permitted facility at reasonable times to conduct scheduled or unscheduled inspections or tests to determine compliance with this permit, state laws, and regulations.

2.2 INFORMATION ACCESS

Except where protected from disclosure by applicable State or Federal law, all records and reports submitted in accordance with the terms of this permit shall be available for public inspection at the State of Alaska Department of Environmental Conservation, Fairbanks, Alaska.

2.3 CIVIL AND CRIMINAL LIABILITY

Nothing in this permit shall relieve the permittee from any potential civil or criminal liability for noncompliance with the permit or with applicable laws.

2.4 AVAILABILITY

The permittee shall post or maintain a copy of this permit available to the public at the facility.

2.5 ADVERSE IMPACT

The permittee shall take all necessary means to minimize any adverse impacts to the receiving waters or lands resulting from noncompliance with any limitation specified in this permit, including any additional monitoring needed to determine the nature and impact of the noncompliant activity. The permittee shall cleanup and restore all areas adversely impacted by the noncompliance.

2.6 CULTURAL OR PALEONTOLOGICAL RESOURCES

Should cultural or paleontological resources be discovered as a result of this activity, work, which would disturb such resources, is to be stopped, and the State Historic Preservation Office, Division of Parks and Outdoor Recreation, Department of Natural Resources (907-465-4563), is to be notified promptly.

2.7 APPLICATIONS FOR RENEWAL

In accordance with 18 AAC 15.100(d), an application for renewal or amendment of this permit must be made no later than 30 days before the expiration date of the permit or the planned effective date of the amendment.

2.8 OTHER LEGAL OBLIGATIONS

This permit does not relieve the permittee from the duty to obtain any other necessary permits from the department or from other local, state, or federal agencies, and to comply with the requirements contained in any such permits. All activities conducted and all plans implemented by the permittee pursuant to the terms of this permit shall comply with all applicable local, state, and federal laws and regulations.

2.9 TRANSFER OF OWNERSHIP

In the event of any change in control or ownership of the permitted facility, the permittee shall notify the succeeding owner or controller of the existence of this permit by letter, a copy of which shall be forwarded to the Director of the Division of Water. The original permittee remains responsible for permit compliance unless and until the succeeding owner or controller agrees in writing to assume such responsibility, and the department approves assignment of the permit. The department will not unreasonably withhold such approval.

As between the State and the permittee, no transfer of this permit shall relieve the permittee of any liability arising out of operations conducted prior to such transfer, regardless of whether such liability accrues before or after such transfer.

2.10 TOXIC POLLUTANTS

If during the life of this permit a new or revised toxic pollutant (including oil, grease, or solvents) concentration standard is established in accordance with 18 AAC 70 for a pollutant present in this discharge and that standard is more stringent than the limitation in this permit, then upon the effective date of the new rule, this permit is considered to be automatically modified in accordance with the new toxic pollutant concentration standard.

3 FINANCIAL RESPONSIBILITY FOR THE RED DOG MINE CLOSURE, MAINTENANCE AND POST-CLOSURE MONITORING COSTS

Alaska regulations (18 AAC 60 and 18 AAC 15) allow the department to require proof of financial responsibility for closure of the facility and post-closure monitoring. The total proof of financial responsibility for the life of this permit, unless modified sooner, shall be \$304,520,000. The total financial responsibility includes financial responsibility required by the department under 18 AAC 60, 18 AAC 15, and the Alaska Department of Natural Resources under Title 11 of the Alaska Administrative Code. The permittee can apply to have the amount of the financial responsibility adjusted during the life of the permit, if for example concurrent reclamation has been completed. The total financial responsibility is based on the information in the table below.

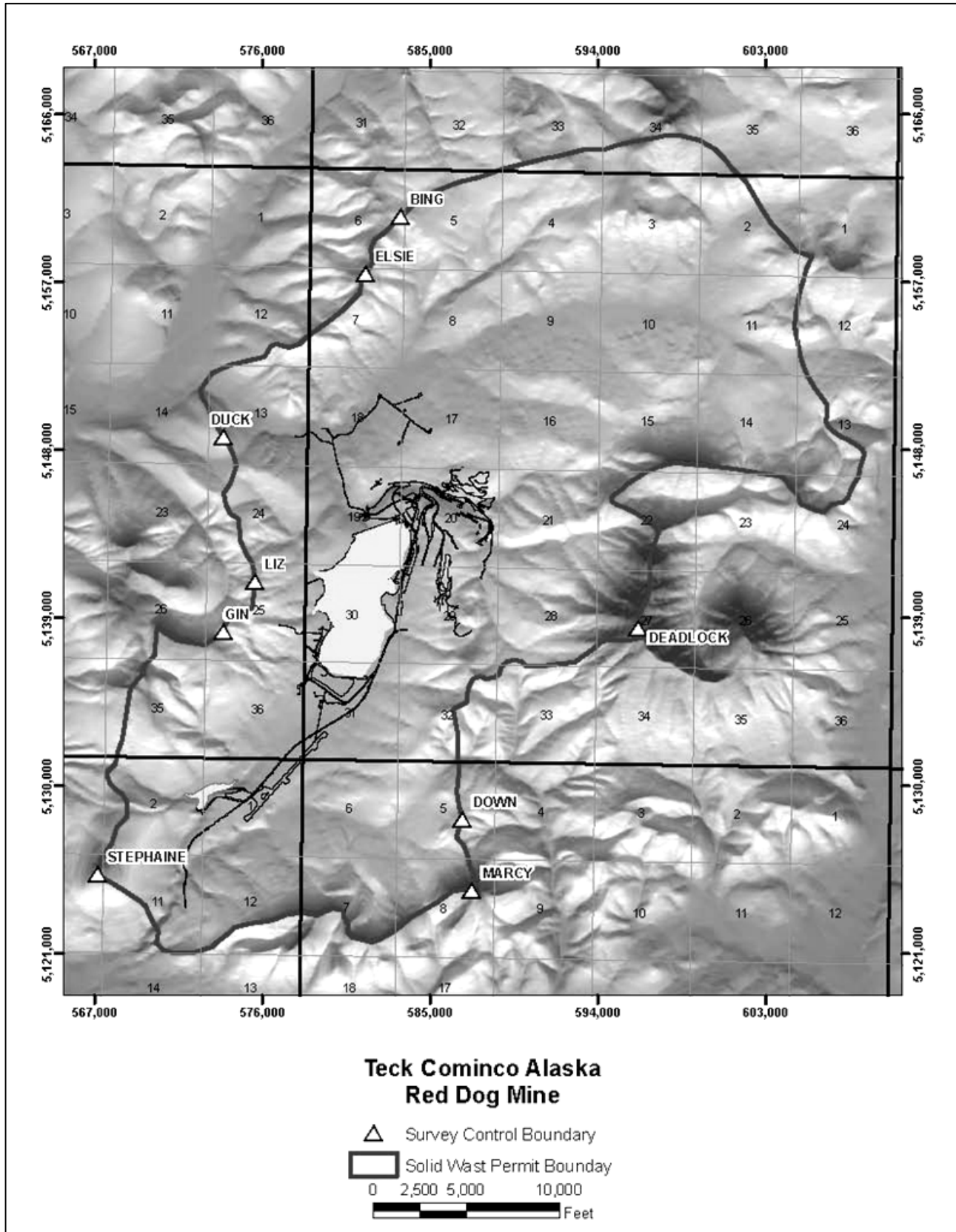
Premature Closure Scenario						
Years	Suspension	Closure Earthwork and other Reclamation	Closure Water Treatment	Post-Closure	Cash Flows	Net Present Value
<i>(after suspension of mining)</i>	<i>(site maintenance & ongoing water treatment)</i>			<i>(perpetual annual water treatment)</i>		<i>(at a 4.3% estimated real rate of return)</i>
1	\$13,290,000				\$13,290,000	\$304,520,000
2	\$13,290,000				\$13,290,000	
3	\$13,290,000				\$13,290,000	
4	\$13,290,000				\$13,290,000	
5	\$13,290,000				\$13,290,000	
6		\$25,500,000	\$7,850,000		\$33,350,000	
7		\$25,500,000	\$7,850,000		\$33,350,000	
8				\$10,540,000	\$255,656,279	
9 and thereafter				\$10,540,000	\$10,540,000	

Cash flow for year 8 equals the present value of an account that earns \$10,540,000 annually in perpetuity plus first year post-closure expenses of \$10,540,000.

4 GLOSSARY OF TERMS

AAC	Alaska Administrative Code
ADNR	Alaska Department of Natural Resources
CFR	Code of Federal Regulations
MDL	Method Detection Limit
ML	Minimum Level of Quantification
Permittee	Teck Alaska, Incorporated
QAPP	Quality Assurance Project Plan
Tailings area	Tailings Impoundment
WAD CN	Weak Acid Dissociable Cyanide

5 FACILITY BOUNDARY MAP



6 Appendix A - Project Documents

Closure and Reclamation Plan Supporting Documents

- Supporting Document A: Consultation & Property Description
 - A2 Legal Description of Property

- Supporting Document B: Plans of Operations
 - B1 Red Dog Mine Development Plan (TCAK, 2004)
 - B2 Plan of Operations for Waste Rock Management
 - B3 Plan of Operations for Tailings and Water Management

- Supporting Document C: Geotechnical
 - C1 Main Waste Stockpile Stability Assessments
 - C2 Drawings from updated Geotechnical Report (URS, 2008)
 - C3 Dam History Report, Red Dog Tailings Main Dam, Future Raises to Closure (URS, 2007)
 - C4 Preliminary Conceptual Design Report, Red Dog tailings Main Dam, Future Raises to Closure (URS, 2007)
 - C5 Stability Analysis for Future Raises to Closure, Tailings Main Dam (URS, 2007)
 - C6 Seepage Analysis Report, Red Dog Tailings Main Dam, Future Raises to Closure (URS, 2007)
 - C7 Drawings from Back Dam Investigation and Design (Golder Associates, 2006)
 - C8 Preliminary Spillway Design, Red Dog Tailings Main Dam, Ultimate Closure Configuration (URS, 2008)

- Supporting Document D: Geochemistry
 - D1 Consolidation of Studies on Geochemical Characterization of Waste Rock and Tailings (SRK, 2003)
 - D2 Supporting Geochemical Review and Interpretation (SRK, 2005)
 - D3 Aqqaluk Geochemistry – Supplemental Testing Program (SRK, 2007)
 - D4 Lime Requirements and Predicted Geochemical Changes

- Supporting Document E: Water Management
 - E1 Red Dog Water and Load Balance
 - E2 Flood Frequency Update for Middle Fork Red Dog Creek (Peratrovich, Nottingham & Drage Inc., 2002)
 - E3 Red Dog Creek Rediversion Design and Criteria and Plan (TCAK, 2004)
 - E4 Assessment of Water Treatment Methods Applicable for Closure
 - E5 Assessments of Methods for Managing Post-Closure Water Treatment Sludge

- Supporting Document F: Reclamation and Revegetation
 - F1 Mine Area Closure Options – Summary of the Cover Studies
 - F2 Evaluation of Borrow Sources
 - F3 Revegetation Plan for the Red Dog Mine (ABR, Inc., 2007)

- Supporting Document G: Demolition
 - Demolition Cost Estimates (Denison Environmental Services, 2004)

- Supporting Document H: Ecological Risks
 - Evaluation of Ecological Risk within the Ambient Air/Solid Waste Permit Boundary (Exponent, 2008)

- Supporting Document J: Cost Estimates
 - J1 Basis of Estimate -Closure Costs [Report]
 - J2 Basis of Estimate -Post Closure Costs [Report]
 - J3 Basis of Estimate -Suspension Costs [Report]
 - State of Alaska Department of Revenue Memorandum – Subject: Recommended 4.3% Real Rate of Return for Red Dog Mine Funds

Red Dog Mine, Monitoring Plan Supporting Documents

- Quality Assurance and Quality Control Plans
 - Water quality monitoring - “Quality Assurance Plan – for the Red Dog Mine Water Quality Monitoring Program, NPDES AK-003865-2”.
 - Biomonitoring program as described in Methods for Aquatic Life Monitoring to Satisfy Requirements under 1998 NPDES Permit, NPDES AK-003865-2, Red Dog Mine Site.
 - Geochemical monitoring – “Assay Laboratory Quality Assurance SOP”

- Supporting Document J: Cost Estimates – listed in detail under Closure and Reclamation Plan Supporting Documents

- Supplemental Environmental Projects
 - Long-Term Permafrost and Groundwater Monitoring Program
 - Red Dog Creek Fish Weir Construction and Maintenance

- Solid Waste Landfills – Standard Operating Procedures
 - Main Waste Stockpile Landfill under SWZA016-012
 - Old Mine Landfill under SW3A010-13

- Fugitive Dust Risk Management Plan, Red Dog Operations, Alaska (Exponent, 2008)

- Certificates of Approval to Operate a Dam – Operation and Maintenance Manuals
 - Red Dog Tailings Dam (Main Dam) - NID ID#AK00201
 - Red Dog Mine Water Diversion Dam (Mine sump) - NID ID#AK00260
 - Red Dog Water Supply Dam (Bons Dam) - NID ID#AK00200
 - Red Dog Tailings Back Dam - under construction – certificate to construct