Red Dog Mine
4th Quarter & Annual Report 2010 for State of Alaska
Waste Management Permit No. 0132-BA002
Reclamation Plan Approval F20099958
February 21, 2011

Teck

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Introduction

This report has been prepared to fulfill the quarterly reporting requirements of Red Dog Mine's obligations under the State of Alaska Waste Management Permit No. 0132-BA002 and the Red Dog Mine Reclamation Plan Approval F20099958.

This report covers the period December 2, 2009 through December 31, 2010 including quarterly data from October 1, 2010 through December 31, 2010.

The report addresses mine water management, waste rock management, tailings management, inert solid waste landfills, mining and milling activities, reclamation activities and wildlife interactions which occur throughout the reporting period.

When appropriate updated plans will be provided with the report and recommendations will be made to modify reporting requirements or the underlying permit conditions.

Biomonitoring Program

Annual Biomonitoring Report

Technical Report No. 11-01 by Al Ott and Bill Morris, titled "Aquatic Biomonitoring at Red Dog Mine, 2010 National Pollution Discharge Elimination System Permit (NPDES) No. AK-003865-2" is available on Fish & Game's website[1]. The report summarizes aquatic biomonitoring conducted at the Red Dog Mine during summer 2010 in both the Red Dog Creek Drainage and the Bons/Buddy Creek Drainages. Click the link to access the report.

Annual Summary of Biomonitoring Water Quality Sampling

Results of monthly samples of Biomonitoring water quality for the period can be found in attached electronic file, *Red Dog Biomonitoring Water Quality Analyses 2010.xlsx,* and in APPENDIX A, Biomonitoring Water Quality Sample Results for 2010. Biomonitoring water quality is analyzed using Water Quality Profile I from Table 2-7 of the Red Dog Mine Waste Management, Reclamation and Closure Monitoring Plan. The electronic file has a pivot chart with filters to allow the charting of any Profile I analyte for any biomonitoring station.

No unusual trends in the biomonitoring water chemistry were noted during the year other than the seasonal increase in metals due to deceasing water flows and increases or decreases related to freshet.

Permafrost and Sub-permafrost Groundwater Monitoring

Permafrost and Subsurface Temperature Monitoring

The 2010 Annual Data Report for the Long-Term Permafrost and Groundwater Monitoring Program for the Red Dog Mine has been prepared in accordance with the Long-Term Permafrost and Groundwater Monitoring Plan (2001) and the Five-Year Permafrost and Groundwater Data Analysis Report (2007). All data collected from site thermistors and piezometers monitored as part of the Program are presented in the report. The 2010 Annual Data Report for the Long-Term Permafrost and Groundwater Monitoring Program for the Red Dog Mine is included as APPENDIX G, 2010 Annual Data Report for the Long-Term Permafrost and Groundwater Monitoring Program for the Red Dog Mine.

Mine Water Management

Mine water flows

Table 1. Water Management Flows, shows the cumulative flows for each month in the reporting period and total flows for the 2010 calendar year.

[1] At: http://www.adfg.alaska.gov/index.cfm?adfg=habitat_publications.main, or;
http://www.adfg.alaska.gov/index.cfm?adfg=habitatresearch.reddog

Table 1. Water Management Flows

	Flow in gallons			
Location	**Oct-10**	**Nov-10**	**Dec-10**	**Total 2010**
Bon's Creek Total Flow	9,088,000	7,814,000	5,451,000	143,147,000
Mine Water Collection Sump Total Flow	24,917,000	15,387,000	9,612,000	219,933,000
Main Dam Seepage Pumpback	32,947,000	29,776,000	29,456,000	427,687,000
Reclaim Flow to Mill	279,524,000	281,232,000	309,559,000	3,507,115,000
WTP #1 Influent from Reclaim	0	0	44,544,000	362,604,000
WTP #1 Influent from Mine Water Collection	0	0	0	0
WTP #1 Influent from MWD	0	0	1,922,000	1,922,000
WTP #1 Clarifier Underflow Sludge To Tails	197,843	332,814	0	7,782,000
WTP #1 Effluent to Sandfilter/Discharge	0	0	0	6,960,000
WTP #2 Influent from Reclaim	0	0	0	1,752,400,000
WTP #2 Sludge Discharge To Tails	0	0	0	58,955,000
SandFilter Effluent Discharged to Red Dog Ck	0	0	0	803,440,000
WTP #3 Influent from MWD	0	0	0	11,898,000
WTP #3 Influent from Mine Water Collection	0	0	0	38,773,000
WTP #3 Total Effluent	0	0	0	97,038,000
East Overburden Sump	168,000	426,000	462,000	11,729,000
West Overburden Sump	1,047,800	297,000	177,000	10,588,000
Natural Gas Water	0	0	0	0

The server which records flow data had a catastrophic failure December 11 through December 14, 2010. Where data could not be recovered average flow data from before and after the failure was used to calculate the missing flows for the period. The flow meters on the reclaim barges were bypassed during the tie in to the new water pump system from October 14 to December 9, 2010. Flow values to the Mill for those days were estimated based on an average flow of 6,300 gpm. There were no unusual, non-seasonal changes in flows in the quarter.

Mine water quality

Results of monthly samples of mine water quality for the period can be found in attached electronic file, Red Dog Mine Water Quality Analyses qrt4 2010.xlsx, and in APPENDIX B, Mine Water Quality Sample Results 4th Quarter 2010. Mine water quality is analyzed using Water Quality Profile II from Table 2-7 of the Red Dog Mine Waste Management, Reclamation and Closure Monitoring Plan.

Seasonal changes in concentrations in mine water quality occur because of flushing of metals from waste stockpiles in the spring, rain events, drought periods and low flows in winter. Spring time flushing generally causes an increase in the very soluble metals. Rain events can have effects similar to spring time flushing depending on the magnitude of the event. Drought periods often cause the concentrations of metals in the streams to increase because of a reduction in dilution. Trending charts of any Profile II analyte and location can be plotted from the pivot chart tab of the electronic file.

Mine Water and Load Balance

A mine water balance is maintained at the Mine in GoldSim, a computer simulation program. A summary of annual flows and their loads for several chemical parameters are presented in an electronic file, Red Dog Mine 2010 Water and Mass Balance Estimates.xlsx.

The largest source of total dissolved solids (TDS) in the tailings impoundment water continues to be the Main Waste Stockpile. Red Dog has two major efforts underway to reduce the TDS entering the pond from the Main Waste Stockpile, our cover system plans for the Main Waste Stockpile and an investigation into improved methods of intercepting flows from the Main Waste Stockpile for treatment prior to the flow entering the tailings impoundment. See the attached 2010 TDS Management Plan Progress Report & Updated Management Plan for NPDES Permit AK-003865-2 in APPENDIX H, 2010 TDS Management Plan Progress Report & Updated Management Plan for NPDES Permit AK-003865-2.

Visual inspections of mine water systems
No unusual conditions were identified during visual inspections of mine water system during the quarter.

Regents Consumed in Water Treatment in 2010
Red Dog Mine Reclamation Plan Approval F20099958 requires the following be provided in the annual report.

- Total volume of water treated in WTP#2; - 1.752 billion gal
- Total quantity of flocculant used in WTP#2; - can't be separated from WTP1
- Total quantity of lime used in WTP#2; - can't be tracked separately from the other WTPs.
- Total quantity of sodium sulfide used in WTP#2; - can't be separated from WTP1
- Quantity of any other chemicals used in significant quantities in WTP#2; - barium hydroxide = 2,838 metric tonnes used
- Total quantity of flocculant used in WTP#3; - none.
- Total quantity of lime used in WTP#3; and, - can't be tracked separately from the other WTPs.
- Quantity of any other chemicals used in significant quantities in WTP#3. – none

Total lime used throughout season for WTP1, WTP2, and WTP3 = 4,790 metric tonnes. Total flocculent used throughout the season was 49 metric tonnes for WTP1 and WTP2, most of which is for WTP2. Total sodium sulfide used for the season was 470 metric tonnes, most of which was used for WTP2.

Fish weir inspections
The fall fish weir inspection was conducted on October 10, 2010. Minor settlement of the gabion baskets on the east, upstream side was noted but the settlement did not affect the performance of the weir.

Significant activities in mine water management
Construction of the water pump system was completed in the 4th quarter of 2010. The water pump system was necessary to pump water treatment plant effluent and sludge over the crest of the tailings impoundment dam into the impoundment now that the dam crest is higher than the base elevation of the Mill Site.

Changes to the Aqqaluk pit mining sequence resulting from the delay in the start of mining at Aqqaluk will require modifications to the temporary stormwater diversion structures prior to the 2011 freshet. The Red Dog stormwater plan will be modified to include those changes.

Research conducted in 2010 in water treatment included an investigation of reclaim treatment by Biosulfide-HDS and barium sulfide processes through various bench scale pilot plants. See the APPENDIX H, 2010 TDS Management Plan Progress Report & Updated Management Plan for NPDES Permit AK-003865-2.

Waste Rock Management

Quantities, placement locations and analysis of waste rock
As per Red Dog Mine Waste Management, Reclamation and Closure Monitoring Plan, Section 2.4 Waste Rock Management, the management of waste rock including quantities, locations and analysis of waste rock are reported in APPENDIX C, Waste Rock Production Summary 4th Quarter 2010.

Results of waste rock geochemical monitoring
Other than blast hole analyses, no additional geochemical monitoring was conducted on waste rock materials during the reporting period.

Visual inspections of waste rock facilities
No unacceptable mineralogy was noted in any of the stockpile inspections for this quarter.

Significant activities in waste rock management
Main Waste Stockpile
During the 4th quarter, 2,100,311 tonnes of "Other Waste" and "Most Reactive Waste" were taken to the Main Waste Stockpile. Material taken to the Main Waste Stockpile consisted of Ikalukrok, Siksikpuk, Kivalina, Okpikruak and mixed. Reclamation work has continued on the west facing slope of the Main Waste Stockpile.

Connie Creek
328 tonnes of "Other Waste", Ikalukrok Member material, was taken for road repair at the Connie Creek crossing area.

Phase 3
The Phase 3 site (Dam Construction Material site) was inspected and deemed suitable for Dam Construction Material. 38,622 tonnes of material from the Siksikpuk Formation and the Ikalukrok Member was taken to Phase 3 for storage.

Main Pit Ramp
5,412 tonnes of Other Waste, Ikalukrok material, was taken for road repair in the Canyon area of the Main Pit Ramp.

Main Pit Buttresses
30,750 tonnes of Siksikpuk, Ikalukrok, and Mixed material, was taken for the creation of a Safety Buttress in the North East, Central part of the Main Pit.

North Pit Final Dump
A final dump in the Main Pit was created on the Northwest part of the Main Pit. 202,310 tonnes of Ikalukrok, Siksikpuk, Kivalina, Okpikruak and mixed material has been placed here. The Waste type included "Most Reactive", and "Other Waste" types.

Tailings Management

Quantities and analysis of tailings
Table 2. Tailings Produced during the reporting period, shows the tonnes of tailings produced and the lead, zinc and iron content of the produced tailings for the quarter and the 2010 calendar year.

Table 2. Tailings Produced during the reporting period

		Analysis		
Month	Dry Tonnes Tailings	%Pb	%Zn	%Fe
Oct-2010	219,495	3.8	3.6	5.2
Nov-2010	144,202	3.0	3.9	4.8
Dec-2010	196,868	2.4	3.6	5.0
2010 Total	2,392,286	2.2	3.6	7.5

Tailings pond elevation
Table 3. Tailings Pond Water Elevation, shows the surveyed Tailings Pond water levels for the reporting period. During the period the freeboard of the tailings dam was 955 feet above Mean Sea Level (MSL) and the crest was 960 feet above MSL.

Table 3. Tailings Pond Water Elevation

Survey Date	Pond Level Feet above MSL
10/1/2010	954.46
10/10/2010	954.51
10/14/2010	954.54
10/21/2010	954.55
10/28/2010	954.85
11/4/2010	954.86
11/11/2010	954.97
11/25/2010	955.39
12/2/2010	955.46
12/9/2010	955.58
12/17/2010	955.57
12/23/2010	955.61

On November 16, 2010 Teck notified Dam Safety that the water level in the Tailings Pond was going to soon exceed the 955 foot elevation. The survey conducted on November 25, 2010 confirmed the elevation was in excess of the 955 foot elevation. Dam Safety placed additional monitoring conditions on Teck which will apply until such time as the crest is raised to the 965 foot elevation during the summer of 2011.

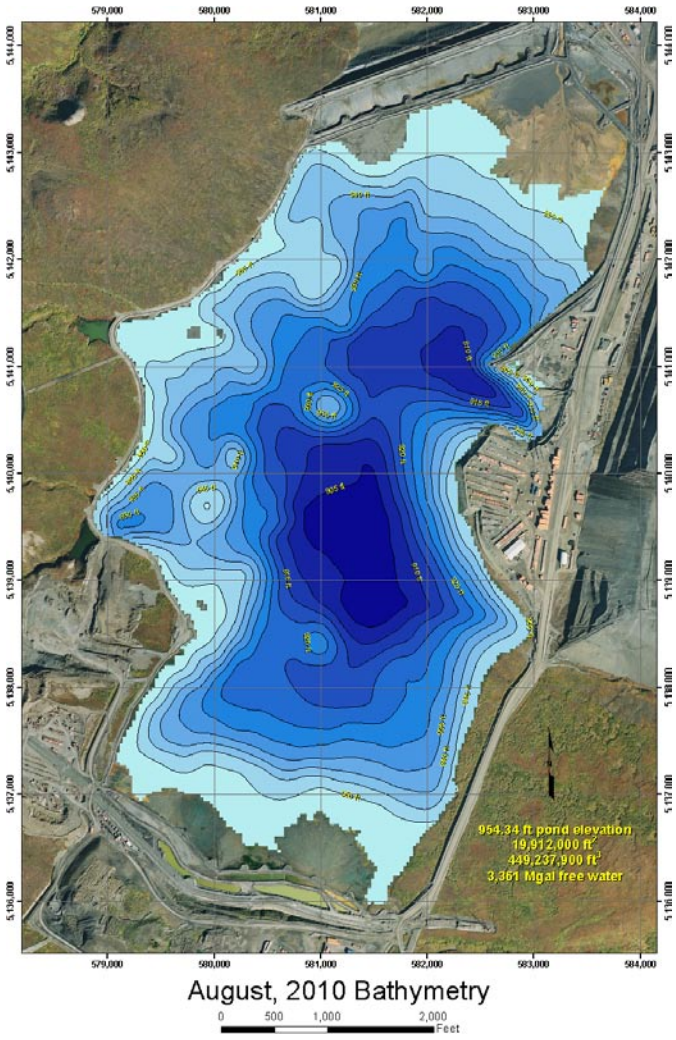
Geochemical
There were no additional, non-routine geochemical analyses conducted on tailings during the reporting period.

Visual inspections of tailings facilities
No unusual findings were observed during routine daily and weekly inspections of the tailings facility during the 4th quarter.

Significant activities in tailings management
Tailings were deposited into the northern portion of the impoundment via the floating tailings line during the quarter.

Bathymetry Survey
Data from the bathymetry survey performed in the 3rd quarter 2010 was received in the 4th quarter. Free water volume calculated from the survey was 3,361 Mgal, a drop of 49 million gallons from the 2008 survey. The bathymetry map is shown in Figure 1. August 2010 Bathymetry.

Figure 1. August 2010 Bathymetry



Inert Solid Waste Landfills

Red Dog operates two inert solid waste disposal areas at the mine site. One facility is located on the Main Waste Stockpile and is the primary inert solid waste disposal area. The second site is located just south of the incinerators along the shore of the tailings pond. Only incinerator waste is deposited at this location.

Quantities of inert solid waste

During the calendar year 2010, 2,493 metric tons of inert solid waste place in the Main Waste landfill according to survey volume calculation.

Visual inspections of the inert solid waste landfills

One or two ravens were noted present at the Main Waste landfill during two of the fourth quarter inspections. Food wrappers, oily rags and oily rubber gloves were noted as present at the landfill during the December inspection as were windblown cardboard boxes and bags along the entrance road. These findings were reported to the Environmental Coordinator and/or the Surface Crew Supervisor so corrective actions could be initiated.

Significant activities in inert solid waste landfills

There were no significant activities in the inert solid waste landfills during the quarter.

Mining and Milling Activities

Mining Activities

Ore was mined from both the Main Pit and the Aqqaluk Pit during the 4th quarter 2010. Table 4. Ore Mined During the Reporting Period, shows the tonnes of ore hauled to mill feed stockpiles each month during the reporting period and the 2010 calendar year total.

Table 4. Ore Mined During the Reporting Period

Date	Ore Mined, tonnes
Oct-2010	347,770
Nov-2010	265,088
Dec-2010	277,718
2010 Total	3,526,193

Milling Activities

Table 5. Ore Milled During the Reporting Period, shows the tonnes of ore fed to mill grinding each month during the reporting period and the 2010 calendar year total.

Table 5. Ore Milled During the Reporting Period

Date	Ore Milled, tonnes
Oct-2010	314,293
Nov-2010	215,670
Dec-2010	295,201
2010 Total	3,572,321

Significant activities in Mining and Milling

As the Main Pit approached its ultimate depth pit wall instabilities became more apparent in 2010. A number of buttresses were established beneath these zones to stabilized the pit walls. A consequence of the construction of these safety buttresses is that pit volume in the mined out Main Pit to be used for in-pit waste rock storage will be reduced.

Reclamation Activities

Area Disturbed and Reclaimed

In the calendar year 2010 an additional 32 acres were disturbed within the mine air permit boundary. The areas are listed in Table 6. Area Disturbed in 2010. Maps showing the disturbed areas at a scale of 1:2.400 are included in this report.

Table 6. Area Disturbed in 2010

Disturbed Area	**Acres**
Qanaiyaq drill hole sites and roads	5.9
Main Waste Stockpile	2.2
Overburden waste stockpile & pumpback facility	0.3
Oxide Stockpile	0.8
Tailings Pond rise	22.3
West tails pond pipe bench road	0.5
Total 2010 Disturbance	32.0

Reclamation Research

O'Kane Consultants Inc. reported the second year performance of the Oxide Stockpile cover system in the report in APPENDIX D, Oxide Stockpile Full-Scale Cover System 2009-10 Annual Performance Monitoring Report. All indications are that the cover system is performing as designed.

Reclamation Monitoring

A composite sample of grass growing on the Oxide Stockpile cover was collected in July was analyzed for metals uptake by analytical method: EPA 6020 and preparation method: EPA 3050. The results of the analysis are show below in Table 7. Grass Analysis Results, Oxide Stockpile. The results are similar to green leaf concentrations in forbs measured by ABR in the vicinity of the mine in 2007.

Table 7. Grass Analysis Results, Oxide Stockpile

Parameter	Result	Units
Aluminum	27.9	mg/kg
Cadmium	0.57	mg/kg
Iron	111	mg/kg
Lead	27.8	mg/kg
Manganese	24.7	mg/kg
Zinc	107	mg/kg

A runoff sample from the Oxide Stockpile collected during a heavy rain on July 21, 2010 was analyzed by EPA method 200.8, using EPA preparation 200.8 the results of which were received in the 4th quarter. Table 8. Runoff Water Analysis Results, Oxide Stockpile lists the results of those analyses.

Table 8. Runoff Water Analysis Results, Oxide Stockpile

Parameter	Result	Units
Aluminum, Dissolved	5.7	ug/L
Barium, Dissolved	16.8	ug/L
Cadmium, Dissolved	38.2	ug/L
Calcium, Dissolved	290,000	ug/L
Copper, Dissolved	1.6	ug/L
Iron, Dissolved	ND	ug/L
Lead, Dissolved	5.5	ug/L
Magnesium, Dissolved	16,800	ug/L
Manganese, Dissolved	342	ug/L
Potassium, Dissolved	1,240	ug/L
Sodium, Dissolved	501	ug/L
Thallium, Dissolved	0.5	ug/L
Zinc, Dissolved	2,800	ug/L
Acidity, Total	70	mg/L
Total Dissolved Solids	1,110	mg/L
Chloride,	2.4	mg/L
Sulfate,	652	mg/L
Nitrogen, Ammonia	0.24	mg/L
Cyanide, Dissociable	ND	ug/L

Calcium, magnesium and total dissolved solids are high because the material used in the Oxide Stockpile cover system is calcareous shale. The low value of measured acidity of 70 mg/L is also characteristic of runoff from an area with a calcareous formation and it appears to suggest that no acidic ARD water was detected in this sample. Zinc and cadmium are slightly elevated because samples of the Overburden Stockpile Kivalina Shale used for the test cover contain 1,600 mg/Kg zinc and 19 mg/Kg cadmium.

Significant reclamation activities
As of the end of 2010, 49.3 acres of the southern and western bench faces along the south and west sides of the dump were re-sloped to a 3:1 horizontal to vertical slope using D-9 and D-10 Caterpillar dozers. The re-sloped areas are not at their final landform and will be reshaped prior to construction of cover systems. During the quarter Teck purchased landform software to assist in development of more natural appearing and stable landforms on the waste rock stockpiles. Table 9. 2010 Re-sloping activities shows the equipment, labor and material quantities moved during the year and the remaining re-sloping to be done in 2011.

Table 9. 2010 Re-sloping activities

Equipment Hours	1720
Labor Hours	1892
Material Quantity (CY)	568,430
Area remaining to re-slope in 2011 (acres)	23

Dust

Dust monitoring activities
Dust monitoring activities during the 4th Quarter included routine Visible Emissions Evaluations as required by the Title V Operating Permit, regular dust fall jar analysis, and continuous data collection by the TEOMs at the Tailings Dam and PAC. Evaluations of new formulations of extreme low-temperature dust control products are currently in process; upon confirmation of minimal environmental and human health risks of each product, on-site testing will occur to determine applicability to site conditions, and effectiveness at reducing fugitive dusting from roadways and exposed areas.

Dust Impact Monitoring and Implementation Plans are attached as APPENDIX F, Dust Impact Monitoring and Implementation Plans.

Cedar Creek Associates performed a survey of vegetation monitoring sites around the Mine site in July and August 2010 to evaluate the effectiveness of dust control efforts as expressed by vegetation community health primarily through two key measures: 1) moss and lichen cover, and 2) vascular plant cover and composition. The Red Dog Mine 2010 Vegetation Monitoring Report is included in this report as APPENDIX I, Red Dog Mine 2010 Vegetation Monitoring.

Wildlife

Wildlife interactions
There were no wildlife interactions or casualties reported during the quarter.

Updates of Mine Plan
As a result of delays in opening the Aqqaluk Pit because of NPDES permit issues and changing World economic conditions, the 2007 mine plan on which the Waste Management Permit and Mine Reclamation Plan Approval were based, has changed. Mining companies continuously update their mine plans to maintain their competiveness in World markets. Teck is providing a copy of the latest addendum to the current 1 year Red Dog mine plan with this report as APPENDIX E, Red Dog One Year Mine Plan 2011. The new mine plan changes the sequence of mining and waste deposition but does not significantly change the overall tonnages of ore and waste that will be mined until closure in 2031 as identified in the Approved Reclamation and Closure Plan.

Financial Assurance

Teck does not feel that the changes from the 2007 mine plan to the current mine plan require substantive changes to the financial assurance for this year. Earthwork conducted as part of the re-sloping of the Main Waste Stockpile in 2010 will reduce the cost of Suspension and Premature Closure costs slightly. Tabulation of the volume moved in 2010 is included in Table 9. 2010 Re-sloping activities.

Recommendations for edits to the Red Dog Mine Waste Management, Reclamation and Closure Monitoring Plan

Teck would like to propose a modification of several terms in Table 2-6 of the Waste Management, Reclamation and Closure Monitoring Plan. A copy of Table 0-1: Waste Rock Segregation Criteria is shown below with the proposed edits.

Table 0-1: Waste Rock Segregation Criteria

Intended Use/Disposal Location	Allowable Rock Types	Analytical Criteria[1]
~~Dam~~ Construction Material	~~Siksikpuk Shale~~ Any rock type meeting engineering specifications and Analytical Criteria	Single blast hole assays not to exceed: 1% Zinc; or 1% Lead; or 3.5% Iron Average blast hole assays not to exceed: 0.5% Zinc; or 0.5% Lead; or 2.5% Iron
Cover Material	Kivalina Shale Okpikruak Shale	As above except Single blast hole assays not to exceed: Zinc = 0.2% Average blast hole assays not to exceed: Zinc = 0.1%
Most Reactive Waste Rock mined prior to the completion of mining in the Main Pit (individual loads will be dumped separately throughout the active Main Waste Stockpile)	All Mineralized rock units, particularly the Ikalukrok Formation	>10 % iron
Most Reactive Waste Rock (where possible placed below the minimum water level, otherwise placed above the maximum water level in the backfilled Main Pit)	All Mineralized rock units, particularly the Ikalukrok Formation	>6% sulfide Sulfur[2]
Other Waste Rock (for placement in unsaturated portions of the waste rock stockpiles)	All other units	Unclassified

Notes:
1. Analytical criteria are only to be applied to the allowable rock type (i.e. rock type has precedence)
2. Sulfur from sulfide minerals = (%Zn*0.5160) + (%Pb*0.1547) + (%Fe*1.1482)

Words to remove from the table are marked as strikethrough, words to add are underlined. The new row added to Table 2-6 is to allow for the disposal of the most reactive waste prior to completion of the Main Pit. When this waste is disposed of in large quantities it is known to spontaneously combust. Distributing the waste will prevent the rapid oxidation of iron sulfide minerals.

Closing

Please accept this as the 4th Quarter 2010 and 2010 Annual report for State of Alaska Waste Management Permit No. 0132-BA002 and Reclamation Plan Approval F20099958. If there are any questions, please contact Jeffrey Clark at (907) 426-9274 or myself at (907) 426-9127.

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.

Sincerely,
Teck Alaska Incorporated

Mike D.J. Bonneau, P. Eng.
General Manager

Cc Tim Pilon, ADEC, Fairbanks
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