f. For purposes of calculating monthly averages, zero may be assigned for values less than the MDL, the {numeric value of the MDL} may be assigned for values between the MDL and the ML. If the average value is less than the MDL, the permittee must report "less than {numeric value of the MDL}" and if the average value is less than the ML, the permittee must report "less than {numeric value of the ML}." If a value is equal to or greater than the ML, the permittee must report and use the actual value. The resulting average value must be compared to the effluent limitation to assess compliance.

g. The effluent limits for total residual chlorine are not quantifiable using EPA-approved analytical methods. The ML for total residual chlorine is 20 ug/L, which is the compliance evaluation level for this parameter.

h. Valid test results from split samples shall be reported on the DMR. For reporting an average on the DMR, individual valid results for each test from a split sample are averaged first to determine a sample value. That value is averaged with other sample results obtained in the reporting period and the average of all sample results reported. For reporting the maximum on the DMR, individual valid results for each test from a split sample are averaged first to determine a sample value. That value is compared to other sample results obtained in the reporting period and the maximum of all sample results reported. For the purposes of reporting, split samples are reported as a single sample regardless of the number of times it is split. All laboratories used shall be identified on the DMR attachment.

C. Other Requirements.

1. Mine drainage shall be:

   a. directed into the tailings impoundment; or

   b. otherwise retained unless and/or until it can be discharged through Outfall 001 in accordance with the permit limitations.

2. The mine drainage from the ore site (including commingled seeps) shall be collected by the Mine Drainage Collection System to the extent not retained in the pit. The water collected at the Mine Drainage Collection Dam shall be:

   a. pumped into the tailings impoundment; or

   b. retained until it can be treated or otherwise discharged in accordance with the permit terms and conditions.

3. When water in the Mine Drainage Collection Dam is pumped into the tailings impoundment, the pumped volume shall be recorded. The total volume pumped for each month shall be recorded and reported with the DMR for that month.

4. The permittee shall not discharge water in the Mine Drainage Collection System into Red Dog Creek except in compliance with this permit through authorized outfalls.

5. Water in the Seepage Pond and related seepages, at the base of the tailings impoundment dam, shall be pumped back into the tailings impoundment, pumped to the high density solids treatment facility, recycled through the mill, or reused as otherwise appropriate.

6. The permittee shall not discharge water in the Seepage Pond into Red Dog Creek except in compliance with this permit through authorized outfalls.

7. The permittee shall not discharge water in the tailings impoundment into Red Dog Creek except in compliance with this permit through authorized outfalls.

8. The permittee shall operate and maintain its retention structures (e.g., Mine Drainage Collection Dam, Seepage Pond and tailings impoundment) so as to prevent leaks to waters of the United States.

9. The permittee may use treated wastewater as a dust suppressant on roads, pads and airport runways within the jurisdiction of this permit. Best management practices shall be used to insure that all waters sprayed do not drain into waters of the U.S. The permittee shall not use untreated wastewater as a dust suppressant.

10. The permittee shall not use treated wastewater as a dust suppressant on the haul road to the port.

9. The permittee shall ensure that discharges from the Red Dog Mine do not cause downstream water quality problems, such as the exclusion of fish or fish kills in Ikalukrok Creek or the exclusion of fish migrating up the North Fork of Red Dog Creek.

D. Ambient Monitoring Requirements

1. The permittee shall collect samples at the ambient monitoring stations listed below (see Permit Part VI. Ambient Monitoring Sampling Stations).

   Station 150: downstream edge of the mixing zone in Ikalukrok Creek downstream of confluence with Red Dog Creek

   Station 160: downstream of Station 150 in Ikalukrok Creek

   Station 151: downstream edge of the mixing zone in Red Dog Creek

   Station 12: North Fork Red Dog Creek

   Station 140: Middle Fork Red Dog Creek upstream of the influence of Outfall 001

2. Ambient monitoring shall be conducted when there is flowing water (under ice or during open water conditions). For example, if there is flowing water at Station 151, but not at the other stations, the permittee shall sample at Station 151.

3. Ambient monitoring, outlined in this section, may be discontinued when the permittee has ceased discharging from Outfall 001 to Middle Fork Red Dog Creek for a period of 30 consecutive days. Ambient monitoring shall recommence when the permittee re-initiates a discharge from Outfall 001.

4. All ambient samples shall be grab samples.

5. Ambient monitoring results for Stations 150, 151 and 160 shall be submitted to EPA, ADEC, and OHMP with the monthly DMR. Other ambient monitoring results shall be submitted in the Annual Water Monitoring Summary Report required in Permit Part I.J

6. The following ambient monitoring shall be conducted:

TABLE 3 – Ambient Monitoring Requirements

Parameter[1]	Station 160[2]	Station 150[2]	Station 151[2]	Station 12[2]	Station 140[2]
Aluminum	2/month	—	2/month	2/month	2/month
Cadmium	2/month	—	2/month	2/month	2/month
Chromium	2/month	—	2/month	2/month	2/month
Copper	2/month	—	2/month	2/month	2/month
Cyanide[3], WAD, µg/L	—	—	2/month	—	—
Iron	2/month	—	2/month	2/month	2/month
Lead	2/month	—	2/month	2/month	2/month
Manganese	2/month	—	2/month	2/month	2/month
Nickel	2/month	—	2/month	2/month	2/month
Selenium	2/month	—	2/month	2/month	2/month
Zinc	2/month	—	2/month	2/month	2/month
Total ammonia as N, mg/L	2/month	—	2/month	2/month	2/month
Conductivity, µmhos/cm	2/month	—	2/month	2/month	2/month
Hardness, mg/L $CaCO_3$	2/month	—	2/month	2/month	2/month
Temperature, °Celsius	2/month	—	2/month	2/month	2/month
Total Dissolved Solids (TDS), mg/L	1/week	1/week	1/week	2/month	2/month
TDS Anions and Cations[4]	1/month	1/month	1/month	—	—
pH, standard units	2/month	—	2/month	2/month	2/month
Turbidity, NTU	—	—	—	2/month	2/month

TABLE 3 – Ambient Monitoring Requirements (continued)					
Whole Effluent Toxicity[5], TU_c	---	—	—	1/month	---

1. Monitoring for metals shall be in ug/L and total recoverable unless otherwise noted. For additional monitoring requirements for aluminum, cadmium, chromium, copper, cyanide, iron, lead, manganese, mercury, nickel, selenium, and zinc see section I.A.5.a. and b.
2. The permittee shall spread out the sample collection dates so that the samples collected are representative of the calendar month. To the extent practicable, ambient monitoring shall coincide with effluent monitoring. If weather, safety, shipping, and other environmental constraints prevent the permittee from collecting representative samples, the permittee shall document the condition which prevented the representative samples from being collected on the discharge monitoring reports.
3. The permittee shall notify ADEC and OHMP immediately by telephone when WAD cyanide concentrations exceed 3 ug/L.
4. This monitoring shall include carbonates, chlorides, sulfates, potassium, magnesium, calcium, and sodium. The carbonate analysis should be estimated based on direct measurement of alkalinity.
5. See Permit Part I.G. for additional testing requirements.

7. Streamflow shall be determined daily at Station 151. Streamflow shall be determined using standard methods recognized by the U.S. Geological Survey: gauging station data, discharge measurement, or estimation using all available information. Estimates must not be the sole means of determining flow at a site at all times; some discharge measurements shall be made for verification. The definition of "discharge measurement" is included in the definition section of this permit.

   Streamflow data and the methods used to determine streamflow shall be submitted to EPA and ADEC monthly with the DMR.

E. Precipitation and Evaporation Monitoring Requirements.

1. The permittee shall establish and maintain monitoring stations at the mine site to determine the net annual precipitation rate.

2. The precipitation and evaporation monitoring program shall begin on the effective date of this permit and end on the expiration date.

3. Precipitation (rain and snow) data shall be recorded daily. The permittee does not need to check the rain gauge on the days with no precipitation. However, the permittee shall record that the precipitation was zero on that day.

4. Evaporation data shall be recorded daily from June 1 to August 31 every year. Evaporation data shall be gathered earlier if the evaporation pan is not frozen. The permittee shall operate the evaporation pan properly to assure that the daily evaporation rate can be determined.

5. Spring snow pack readings shall be taken before spring melt each year. For snow pack readings, the measurement shall be reported with the Annual Report described in Permit Part I.J.

6. Records of precipitation and evaporation monitoring shall include:

   a. The date and time of readings;

   b. The name(s) of the individual(s) who performed the readings; and

   c. Signature(s) of the individual(s) who performed the readings.

7. The precipitation and evaporation monitoring records shall be kept on site and made available to EPA and ADEC upon request.

8. The total precipitation and total evaporation rates shall be reported with the Annual Report described in Permit Part I.J.

F. Bioassessment Program Requirements.

1. Bioassessment conditions required by the ADEC Certificate of Reasonable Assurance: Within 60 days of the effective date of the permit, the permittee shall submit for review and approval to ADEC and OHMP, an updated version of the Biomonitoring Plan – ADF&G Methods for Aquatic Life Monitoring to Satisfy requirements under 1998 NPDES Permit – submitted by Cominco Alaska, Inc., 1998, which was designed to detect possible aquatic community changes related to the mine effluent as follows:

TABLE 4 – Bioassessment Sites

Sample Site	Factors Measured
North Fork Red Dog Creek	Periphyton (as chlorophyll-a concentrations) Aquatic invertebrates: taxonomic richness and abundance Fish presence and use
Main Stem Red Dog Creek	Periphyton (as chlorophyll-a concentrations) Aquatic invertebrates: taxonomic richness and abundance Fish presence and use
Ikalukrok Creek	Periphyton (as chlorophyll-a concentrations) Aquatic invertebrates: taxonomic richness and abundance Fish presence and use

Upon approval, the permittee shall implement the plan annually.

2. The permittee shall submit annual reports which summarize the results of the bioassessment program to EPA and ADEC by March 1st of the next year with the Annual Water Monitoring Summary Report, see Permit Part I.J.

G. Whole Effluent Toxicity Testing

Toxicity tests shall be performed once per month on samples from the effluent.

1. Test Species and Methods:

   a. The permittee shall conduct short-term tests with the water flea, *Ceriodaphnia dubia* (survival and reproduction test).

b. The presence of chronic toxicity shall be estimated as specified in Short-Term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, most recent edition, EPA/600-4-91-002.

2. Quality Assurance

a. Toxicity tests shall include a control and at least 5 other dilutions that bracket the percent dilution offered by the mixing zone including 100% effluent.

b. If organisms are not cultured in-house, concurrent testing with reference toxicants shall be conducted. Where organisms are cultured in-house, monthly reference toxicant testing is sufficient.

c. If either the reference toxicant tests or the effluent tests do not meet all test acceptability criteria (TAC) as specified in the test methods manual, then the permittee must re-sample and re-test as soon as possible.

d. Reference toxicant test shall be conducted using the same test conditions as the effluent toxicity test (i.e., same test duration, etc.).

e. Control and dilution water shall be laboratory water. In no case shall water that has failed the TAC be used for dilution or control water.

f. Effluent Chemical Testing: Chemical specific testing for the parameters listed in Permit Part I.A.1. shall be performed on a split sample collected for WET testing. If the timing of sample collection for WET coincides with the sample collection required in Permit Part I.A.1., then the chemical analysis of the split sample will fulfill the requirements of Permit Part 1.A.1.

3. Preparation of Generic Workplan

The permittee shall prepare and submit to EPA a copy of the permittee's toxicity reduction evaluation (TRE) workplan within 30 days of the effective date of this permit. This plan shall describe the steps the permittee intends to follow in the event that the effluent exceeds the chronic toxicity limits, and must include at a minimum:

a. A description of the investigation and evaluation techniques that would be used to identify potential causes/sources of toxicity, effluent variability, treatment system efficiency;

b. A description of the facility's method of maximizing in-house treatment efficiency, good housekeeping practices, and list of all chemicals used in operation of the facility;

c. Identify who will conduct a toxicity identification evaluation (TIE) if one is necessary.

4. Reporting:

   a. Results of toxicity tests shall be reported on the DMR for the month in which the tests are conducted. Results shall be reported in chronic toxic units (TU_c), where $TU_c = 100/IC_{25}$.

   b. The full report shall be submitted by the end of the month following the month in which the DMR is submitted.

   c. The full report shall consist of:

      (1) the toxicity test results;

      (2) the dates of sample collection and initiation of each toxicity test;

      (3) the flow rate at the time of sample collection; and

      (4) the results of the effluent analysis for chemical parameters required for the outfall as defined in Permit Part I.A.1.

   d. Test results for chronic tests shall be reported according to the procedures described in EPA's Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters for Freshwater Organisms, Fourth Edition, most recent edition.

5. Chronic Toxicity Limits

   a. If chronic toxicity in the effluent exceeds:

      Maximum Daily Limit = 12.2 TU_c

      Average Monthly Limit = 9.7 TU_c

      Then, in accordance with the permittee's TRE workplan and, at a minimum, EPA manual EPA/600/2-88/00, the permittee shall initiate a TRE within fifteen (15) days of receipt of sample results of the exceedance.

   b. The permittee shall notify EPA and ADEC in writing within fifteen (15) days of receipt of the effluent WET results that exceed the chronic toxicity limits. Notification shall include the following:

      (1) The finding of the TRE or other investigation to identify the cause(s) of toxicity;

      (2) Actions taken or that will be taken to mitigate the impact of the discharge, to correct the noncompliance and to prevent the recurrence of toxicity;

      (3) Where corrective actions including a TRE have not been completed, an expeditious schedule under which corrective actions will be implemented.

6. TIE

   If chronic toxicity is detected in the effluent in any two of the toxicity tests conducted during the discharge season, then the permittee shall, in accordance with EPA acute and chronic manuals EPA/600/6-91/005F (Phase I), EPA/600/R-92/080 (Phase II), and EPA 600/R-92/081 (Phase III), initiate a TIE within fifteen (15) days.

H. Quality Assurance Requirements.

The permittee must develop a quality assurance plan (QAP) for all monitoring required by this permit. The plan must be submitted to ADEC for review within 60 days of the effective date of this permit and available to EPA upon request. The Plan must be implemented within 120 days of the effective date of this permit. Any existing QAPs may be modified for submittal under this section.

1. The QAP must be designed to assist in planning for the collection and analysis of effluent and receiving water samples in support of the permit and in explaining data anomalies when they occur.

2. Throughout all sample collection and analysis activities, the permittee must use the EPA-approved QA/QC and chain-of-custody procedures described in Requirements for Quality Assurance Project Plans (EPA/QA/R-5) and Guidance for Quality Assurance Project Plans (EPA/QA/G-5). The QAP must be prepared in the format that is specified in these documents.

3. At a minimum, the QAP must include the following:

   a) Details on the number of samples, type of sample containers, preservation of samples, holding times, analytical methods, analytical detection and quantitation limits for each target compound, type and number of quality assurance field samples, precision and accuracy requirements, sample preparation requirements, sample shipping methods, and laboratory data delivery requirements.

   b) Map(s) indicating the location of each sampling point.

   c) Qualification and training of personnel.

   d) Name(s), address(es) and telephone number(s) of the laboratories, used by or proposed to be used by the permittee.

4. The permittee must amend the QAP whenever there is a modification in sample collection, sample analysis, or other procedure addressed by the QAP.

5. Copies of the QAP must be kept on site and made available to EPA and/or ADEC upon request.

I. Site Management Pollution Prevention Plan Requirements

1. The permittee shall develop a site management pollution prevention plan (the Plan) to prevent and minimize the potential for the release of pollutants from their property to waters of the U.S. within 90 days of the effective date of this permit. The Plan shall be signed in accordance with Permit Part IV.E. A notice of the Plan's completion and implementation shall be sent to EPA and ADEC. The Plan shall be retained on-site and be made available to EPA and ADEC upon request.

2. The Plan shall be consistent with the above objectives and the general guidance contained in the following publications:

   Best Management Practices Guidance Document, EPA, 1993.

   Storm Water Management Plans for Industrial Activities, EPA, 1992.

   Storm Water Management Plans for Construction Activities, EPA, 1992.

   The permittee shall establish specific best management practices to meet the objectives and shall address each component or system capable of generating or causing a release of pollutants. Moreover, the Plan shall include, at a minimum, the following items:

   a. Pollution Prevention Team. The Plan shall identify a specific individual or individuals within the facility organization as members of the Pollution Prevention Team. The pollution prevention team shall be responsible for developing the Plan and assisting the facility or plant manager in its implementation, maintenance, and revision. The Plan shall clearly identify who is responsible for the implementation of each condition of the Plan. The activities and responsibilities of the team shall address all aspects of the facility's discharges. In lieu of naming specific individuals as members of the pollution prevention team, the permittee may name the corporate position(s) responsible for developing and implementing the Plan.

   b. Description of Sources.

      (i) A site map indicating an outline of the portions of the drainage area of each point source that are within the facility boundaries, each existing structural control measure to reduce pollutants in storm water runoff, surface water bodies, locations where significant materials are exposed to precipitation, and the locations (if applicable) of the following activities and sites where such activities or sites are exposed to precipitation:

buildings	any disturbed area
camps	construction areas
airport	

      (ii) A site map indicating the flow direction of drainage.