

A memo, dated September 1, 2006, from Al Ott (OHMP) to Luke Boles (ADEC) states:

“Migration of fish (primarily Arctic grayling and Dolly Varden) into North Fork Red Dog Creek has been documented every year of our sample program. These fish move from overwintering habitats (most likely located in lower Ikalukrok Creek or the Wulik River) through both mixing zones (Ikalukrok Creek and the main stem of Red Dog Creek) and into North Fork Red Dog Creek during each spring breakup period. Movement later in the year also occurs, but our sampling for fish moving into North Fork Red Dog Creek focuses on the spring migration of Arctic grayling which occurs during and shortly after peak flows (i.e., breakup). Ample documentation exists that fish move through both mixing zones. We also have documented that Arctic grayling marked in Bons Pond have returned to North Fork Red Dog Creek. These Arctic grayling had to swim through the two mixing zones.”

The Response to Comments, which accompanied the final CWA § 401 Certification, explains that the mixing zones will not cause barriers to fish migration. Note that the mixing zone extends from the confluence with the North Fork to Station 151 where the aquatic life use applies. This use does not apply from the discharge to the confluence with the North Fork.

68. **Comment:** In the general text of its Certification (Fact Sheet, page 24), ADEC describes with particularity the mixing zones and the parameters that may be mixed in each zone. However, the Permit is less clear. ADEC cites three permit provisions related to mixing zones: Draft Permit sections I.A.1, I.A.7a, and I.C.1. Those provisions in the Draft Permit, however, are ambiguous and potentially incomplete, as described below.

Draft Permit I.A.1 (Table 1) makes no reference to mixing zones. Draft Permit I.A.7.a appears to establish a mixing zone only for TDS (TDS). However, the main stem Red Dog Creek mixing zone actually allows mixing of TDS, ammonia, and WAD cyanide.

It would be helpful if the permit itself were to clearly denote (i) which pollutants are subject to a mixing zone; and (ii) where that mixing zone applies in the receiving waters. Footnotes to Table 1 in the permit (Section A.1) could be used to clarify the status of the mixing zones. Additionally, the map on page 29 of the draft certification does not show the mixing zone for pH, which begins at Outfall 001.

We encourage ADEC to work with EPA to improve the clarity of the 401 certification, the permit, and the EPA decision document (Record of Decision) with respect to the mixing zone authorizations.

**Response:** The purpose of Table 1 is simply to present the effluent limits. There is no reason to identify mixing zones since this information is contained in the CWA § 401 certification. In addition, the rationales for the

limits, including the mixing zones are described in the Fact Sheet. Permit Part I.A.7.a. has been deleted because it does not refer to specific permit requirements. Permit Part I.C.1. has been changed to be consistent with the pH requirements in the CWA § 401 Certification.

69. **Comment:** Teck encourages the department to address the requirements set forth in 18 AAC 70.240 and 70.250 in a more structured manner. Although the department's existing analysis is legally sufficient, it would benefit from a more systematic analysis of the requirements under these two regulations as applied to each of the parameters (TDS, ammonia, cyanide, and pH) for which a mixing zone has been authorized. For example, specific findings should be made that "designated and existing uses of the waterbody as a whole will be maintained and protected." We encourage the department to develop rationale that better tracks the language of the mixing zone regulations.

**Response:** This comment refers to the draft CWA § 401 Certification and should be addressed by ADEC. EPA notes that it does not issue a revised Fact Sheet with the Final Permit.

70. **Comment:** In the second sentence under the "Rationale" section at the top of page 27, the department references the "2003 Certification." Because the 2003 permit never came into effect (according to EPA), we recommend that the department delete reference to the 2003 Certification in order to avoid confusion. The revised Rationale statement should read:

Rationale: In 1999, the department changed the WQC under 18 AAC 70.020(b) (Note 12) for inorganic dissolved solids, regulated as TDS. This criterion is in effect in Ikalukrok Creek for the areas listed above.

**Response:** This comment refers to the draft CWA § 401 Certification and should be addressed by ADEC. EPA notes that it does not issue a revised Fact Sheet with the Final Permit.

71. **Comment:** [T]he permit violates the Magnuson-Stevens Act because the mixing zones for cyanide, TDS and ammonia will disrupt essential fish habitat in the Mainstem of Red Dog Creek. The concentrations of cyanide, TDS and ammonia will be allowed to be above the aquatic life criteria in the mixing zones.

The mixing zones for TDS, cyanide and ammonia will create a barrier between the mainstem of Red Dog Creek and the North Fork of Red Dog Creek where fish do spawn. Both ammonia and cyanide degrade naturally. Warm temperatures, sunlight, and oxygenated water help speed the degradation process. Although they ultimately degrade naturally into relatively harmless compounds, they are very toxic to fish and aquatic organisms when present. The mixing zones extend across the mouth of the North Fork of Red Dog Creek. The North Fork is excellent fish habitat. Grayling are known to migrate in and out of the

North Fork, and to use it for spawning. Both the present ADEC mixing zone regulations, and the mixing zone regulations proposed under the Murkowski administration in 2004 (still under consideration by EPA), prohibit 'barriers to migratory species or fish passage.' It is not apparent that either EPA in the NPDES Permit Fact Sheet, or ADEC in its 401 Certification of the mixing zone in the NPDES Permit, have evaluated the potential for cyanide and/or ammonia in the mixing zone to form a barrier to fish migration into the North Fork of Red Dog Creek. This is simply not legal.

**Response:** Section VII.B. of the Fact Sheet specifically describes compliance with the Magnuson-Stevens Act. As documented in Section 3.10 of the Final SEIS, there are no managed species (i.e., salmon) in the main stem of Red Dog Creek and, therefore, no essential fish habitat exists in the main stem. NMFS has been given the opportunity to comment on EPA's determination and has not made any recommendations regarding any permit requirements necessary to protect fish habitat. See Response #67, the CWA § 401 Certification, and Section 3.10 of the Final SEIS that demonstrates that the mixing zone is not expected to create barriers to fish migration.

72. **Comment:** Mixing zones are usually authorized based on a streamflow analysis of the 7Q10 low flow hydrologic event. However, there is no discussion in the Draft 401 certification of how the 1.5:1 (2.5X) dilution was determined, either by calculation or real-time monitoring, or whether this dilution factor will be applicable or effected at all times, even during low flow events.

**Response:** The draft CWA § 401 Certification states that "18 AAC 72.240(l) provides for determination of the flow available for dilution by either collecting actual flow data concurrent with the discharge or calculating the low flow of the receiving water. In this case, the Permittee applied for the mixing zones for ammonia and cyanide based on actual data comparing the ratio of the average daily flows at Station 10 in the Main Stem and the outfall from the tailings impoundment. The dilution factor of 2.5 represents the 5<sup>th</sup> percentile of the ratios for the period May 2003 through September 2005" (page 25 of the Fact Sheet). Similar language is included in the final CWA § 401 Certification. The authorized mixing zones are based on low flow conditions and will be protective of aquatic life for reasons stated in the CWA § 401 Certification.

73. **Comment:** The mixing zone for ammonia and WAD cyanide is based on legally flawed calculations and violates Alaska's mixing zone regulations (18 AAC 70.240-.270).

The length of the mixing zone is inaccurate (Draft 401 Certification, Fact Sheet, p. 24.). Outfall 001 is approximately one mile from the confluence of the Middle Fork and North Fork of Red Dog Creek. Thus, the mixing zone extends from Outfall 001 to Station 151, which is significantly longer

than 1,930 feet, in fact a mile longer, according to the map scale. At Outfall 001 the treatment plant effluent is physically 'mixed' with water flowing down the Middle Fork of Red Dog Creek. Then again at the junction of the Middle Fork with the North Fork, the contaminants TDS, cyanide and ammonia are again diluted with clean water from the North Fork of Red Dog Creek. This is beyond absurd. The mischaracterization of the length of this mixing zone makes it even more egregious.

**Response:** The regulations promulgated to carry out the CWA found at 40 CFR 131.13 allow the inclusion of mixing zones in State WQS.

In accordance with State Regulations 18 AAC 70.240 - 270, ADEC has the authority to designate mixing zones in permits or certifications. The authorized mixing zones will ensure that the WQS are met at all points outside of the mixing zones.

ADEC considered all aspects required in the Mixing Zone regulations including, but not limited to, the potential risk to aquatic life based on existing monitoring data of the effluent, and Ikalukrok Creek and main stem water quality. The State's CWA § 401 Certification found that the size of the mixing zones authorized for discharge are appropriate and provide reasonable assurance that the existing uses of Ikalukrok Creek and the main stem outside of the mixing zones are maintained and fully protected.

Finally, the mixing zone is the area in which applicable WQS may be exceeded as long as acutely toxic conditions are prevented. The aquatic life use designation and the associated WQS for TDS, cyanide, and ammonia only apply to the main stem of Red Dog Creek below the confluence with North Fork Red Dog Creek (aquatic life standards do not apply above the confluence). The mixing zone for these constituents, therefore, is correctly identified as the reach between the confluence and Station 151 and the cited length is accurate.

74. **Comment:** The controlling regulations [for mixing zones] are those from June 26, 2003. It is important that the department review Teck's mixing request against the requirements of the 2003 EPA-approved mixing zone regulations. The department should specifically state that it has reviewed each of these controlling regulations and make appropriate findings. To avoid any confusion, we suggest the department make clear to the public why it is relying on the 2003 mixing zone regulations (i.e., the 2003 version of the regulations are the most recent that have been approved by EPA).

Citations to the mixing zone regulations on pages 24-25 of the mixing zone discussion should be focused on the 2003 regulations, rather than the 2006 regulations.

**Response:** This comment refers to the draft CWA § 401 Certification and should be addressed by ADEC. EPA notes that it does not issue a revised Fact Sheet with the Final Permit.

75. **Comment:** Teck has analyzed relevant information for copper and nickel and believes that a mixing zone would be appropriate for these constituents. Teck is not requesting a mixing zone at this time, but reserves the right to do so at some future date.

A mixing zone in the main stem of Red Dog Creek, for calculating the water quality-based effluent limits for the aquatic life-based criteria for copper and nickel, is justified. Teck has monitored ambient water copper and nickel concentrations at Station 12 in the North Fork of Red Dog Creek for a number of years. The ambient data collected at this station indicates that the maximum copper and nickel concentrations in the North Fork of Red Dog Creek are substantially lower than the applicable aquatic life criteria that apply to the main stem of Red Dog Creek. A mixing zone, if requested, would be identical to the existing mixing zone for ammonia, cyanide, and TDS.

The dilution factor provided for ammonia and cyanide in the main stem is 2.5 (Fact Sheet page 25). This dilution factor is based on the 5th percentile of the ratio of the average daily flow in the mainstem to the average daily flows from Outfall 001. Teck asserts that this dilution factor, adjusted to account for the ambient concentrations of copper and nickel in the North Fork of Red Dog Creek flow, could be used to conduct the reasonable potential analysis (RPA) for these two metals. If reasonable potential were determined using the appropriate dilution factor, then Teck would request that the water quality-based effluent limits for copper and nickel be based on the calculated dilution factor for each of these metals.

Teck has analyzed relevant information for copper and nickel and believes that a mixing zone is appropriate for these constituents. Via this comment, however, Teck is not presently seeking approval of such a mixing zone; Teck does reserve the right to pursue this option at a future time, if necessary.

**Response:** Thank you for your comment. Mixing zones for copper and nickel have not been requested nor authorized in the Final Permit.

## Ammonia

76. **Comment:** The permit is proposing an ammonia standard up to 8.8 mg/l. Fish are sensitive to ammonia and, at a pH of 10.5, the unionized ammonia concentration in the discharge will result in a discharge which is likely to be fairly toxic to fish.

**Response:** As documented in Appendix C of the Fact Sheet, the ammonia criteria is based on the 95th percentile of pH data at the

boundary of the mixing zone rather than the discharge point where aquatic life uses do not apply. See Response #78 for further details on the derivation of the effluent limitations.

77. **Comment:** EPA made an error in its calculation of the monthly average permit limit for ammonia. It based the limit on 30 samples per month, whereas the correct number of samples is 4 per month. This error results in a monthly average limit for ammonia that is 11 percent lower than it should be.

The derivation of the permit limits for ammonia was provided in Appendix E of the Fact Sheet (pg. 53). The calculation of the average monthly limit (AML) is based on an equation that uses the number of samples collected during the month. EPA's calculation of the ammonia AML in Fact Sheet, Appendix E, uses a value of 30 samples per month, which is incorrect based on the proposed sampling frequency. The sampling frequency is 1/week (see Draft Permit, I.A.1) for ammonia, which totals 4 samples per month. By using an incorrect sample number, EPA set an AML for ammonia that is 11 percent too low.

Using the actual/permitted number of monthly samples in the derivation of permit limits is described in EPA's Technical Support Document for Water Quality-based Toxics Control (TSD). On page 107 of the TSD, EPA states, "Therefore, it is recommended that the actual planned frequency of monitoring normally be used to determine the value of n for calculating the AML." Where equations are provided in the TSD for calculating the AML, the value "n" is shown as the number of samples taken during the month. See TSD, pages 99, 103, 106, E-5, E-9.

**Response:** As documented in Appendix C of the Fact Sheet, use of 30 samples in the ammonia limit calculations is based on the more recent guidance presented in EPA's 1999 Update of Ambient Water Quality Criteria for Ammonia. This document was specifically referenced in the Fact Sheet.

78. **Comment:** EPA's calculation of the 30-day chronic ammonia standard used in developing the permit limits for ammonia is inconsistent with EPA policy, resulting in an unreasonably conservative standard and permit limits for ammonia that are overly restrictive.

In developing the Draft Permit limits for ammonia, EPA considered the most stringent of three WQS for ammonia (acute, 4-day chronic, 30-day chronic). Of the three standards, the 30-day chronic standard was the most restrictive and ultimately determined the ammonia permit limits.

The 30-day chronic ammonia standard is based on equations that incorporate the pH and temperature of the receiving water. The higher the pH and temperature, the lower, more restrictive the standard. Therefore, EPA selected the upper 95th percentile values of pH and temperature

measured at Station 151 (EPA previously used Station 10, see Response #28) in the main stem of Red Dog Creek from 2003 through 2007 to use in the equations (Fact Sheet, pp. 41-42, 53).

The 95th percentile values used by EPA were 8.0 for pH and 15.02°C for temperature. The 95th percentile of a set of data is the value that is exceeded only 5% of the time. Therefore, only 5% of the pH values were greater than 8.0 and only 5% of the temperature values were greater than 15.02°C. Stated another way, the pH would be expected to be higher than 8.0 only 5 out of every 100 days (and likewise for temperature).

The acute ammonia standard is calculated from an equation that includes the pH of the receiving water. As part of the derivation of the Draft Permit limits for ammonia, EPA calculated the acute ammonia standard (with salmonids present) based on the 95th percentile value of pH data at Station 151 on the main stem of Red Dog Creek, which EPA determined to be 8.0. The calculated ammonia standard with this pH value is 5.62 mg/L, which correlates to the value shown in Table VI of ADEC's "Alaska Water Quality Criteria Manual." In contrast, the value calculated by EPA in the Fact Sheet is 5.38 mg/L (Fact Sheet, pg. 53). As shown below, there are two errors in the equation used by EPA. Although the acute standard calculated by EPA is incorrect, it does not affect the ammonia permit limits because the 30-day chronic standard is the more restrictive. Nevertheless, it should be corrected for accuracy. The acute value shown in Table C-2 of the Fact Sheet should also be corrected.

Because the 30-day chronic standard represents average conditions over 30 days, it should be based on average pH and temperature. The Station 151 pH and temperature data used by EPA for the 30-day chronic standard, however, are daily values, not averages. By using a daily 95th percentile for pH and temperature to calculate the 30-day chronic standard, EPA is effectively saying that such high pH and high temperature conditions persist for 30 days, which is extremely unlikely and not supported by the available data. Using daily values to calculate an average-based chronic standard is not only technically inappropriate because it violates the fundamental statistical principals (described in the TSD), but, as discussed below, it is more restrictive than the approach outlined in EPA guidance.

In EPA's TSD, EPA recommends that excursions from WQS be limited to one in a three-year period (TSD, pg. 36). For a 30-day chronic standard, this could be interpreted as one month out of 36. In the case of Red Dog Mine, however, because it discharges typically only six months each year (May through October), this would be one month out of 18.

EPA did not provide (in the Fact Sheet) the Station 151 pH and temperature data used to calculate the 95th percentile values. However, for the 2007 permit, EPA provided data from 2001 through 2005 when it used the data from Station 10. Because the 95th percentile values for the

Station 10 data set (pH – 7.9, temperature –14.48 °C) are close to the Station 151 data for 2003 – 2007 (pH – 8.0, temperature – 15.02 °C), the 2001-2005 data can be used to estimate the probability that the monthly average pH and temperature would be greater than their 95th percentile daily values over a 3-year period. That probability is only 1 in 131 (0.76%). That is, during only one month out of every 131, would one expect the average pH and temperature to be that high at the same time. Thus, the proposed 30-day chronic ammonia standard calculated by EPA is over 7 times (131 divided by 18) more restrictive than the calculation that should result from application of EPA's TSD guidance.

A more statistically supportable approach for calculating the 30-day chronic standard would be to use the 95<sup>th</sup> percentile of the monthly averages of pH and temperature. Using the 2001-2005 Station 10 data, the probability of exceeding the 30-day standard based on the 95th percentile of the averages is one month out of 22, which is reasonably close, but still higher than the EPA TSD guidance of 1 in 18. If the 95th percentiles of the monthly averages are used, the 30-day chronic standard still determines the Final Permit limits, and these limits would be 12.3 mg/L for the daily maximum and 8.8 mg/L for the average monthly limit (note: this average monthly limit includes the correction for a sampling frequency of once per week, as explained in the preceding comment).

**Response:** In conducting the RPA, EPA used methodology consistent with the TSD for all pollutants except ammonia. The TSD does recommend that, for the ammonia criteria that were in effect at the time, the highest temperature and pH be utilized in determining the criteria (page 97). As noted above in Response #77 and as documented in Appendix C of the Fact Sheet, EPA's ammonia limit calculations are based on the more recent guidance presented in EPA's 1999 Update of Ambient Water Quality Criteria for Ammonia. This document was specifically referenced in the Fact Sheet and represents more recent guidance than the 1991 TSD. In addition, the Federal Register notice for the 1999 Update does not specify what statistical measure of temperature and pH to use. EPA was conservative in the selection of the 95<sup>th</sup> percentile because of the different sampling requirements, the downstream data set does not contain instream values that correspond to the maximum effluent values. As a result, the maximum effect of the effluent on the downstream values cannot directly be determined.

- + May 27, 2003 effluent measure 10.2 – next ambient ammonia not taken until June 5, 2003
- + August 21, 2005, effluent measure 10.7 – next ambient ammonia not taken until September 7, 2005

The pH and temperature data used to determine the WQS are included in Attachment A. The temperature data set used in the Draft Permit contained several pre-2003 values, these have been removed from the data set in Attachment A. Although the statistics on this data set are



slightly different, the final permit limitations do not change since the difference is negligible in the calculations. See also Response #82.

EPA does not issue revised Fact Sheets with Final Permits. However, the commenter is correct that the acute criterion for ammonia is 5.62 mg/L. Note this does not affect the effluent limits in the Final Permit since they are derived from the chronic criterion.

## Permit Conditions

79. **Comment:** The new permit deletes several important conditions from the current permit, including I.C.11 on discharge during winter, I.C.14 and I.G.7 on the reopener, and I.C.15 on unauthorized discharge. The deletion of I.C.15 on unauthorized discharge, coupled with new permit condition II.1, gives Teck a permit shield for any unauthorized discharge. This is considerably less protective of the environment and human health than the present permit, which allows federal enforcement of unauthorized discharges.

**Response:** EPA respectfully disagrees with the commenter. Nothing in the Final Permit provides a shield for discharges not authorized by the permit. Such discharges are illegal under the CWA and federal regulations. Note further, that Permit Part I. "authorizes the discharge of only those pollutants resulting from facility processes, waste streams, and operations that have been clearly identified in the permit application process."

The Final Permit contains a re-opener provision in Permit Part IV.K. See Response #29 related to winter discharges, which are not allowed in the Final Permit.

80. **Comment:** [T]he QAPP condition in the current permit, I.I.1, is considerably more detailed and protective than the new condition. Additionally, the certification, data verification, and archiving conditions (conditions I.G.4, 5, 6, 7, 8, 9, 10 and 11) have been deleted without cause or explanation. These are conditions that play an important role in protecting the public, and their deletion significantly weakens the renewed permit. These deletions appear to be backsliding, as are all other permit condition deletions.

Conditions I.C.6 and I.C.7 are considerably less protective of human health and the environment than the current permit and appears to be backsliding. All of the data should be available each month in the DMRs.

**Response:** The change in the permit language is based on updated language that occurs from time to time in permit development. While the language in the draft Permit was changed from the previous permit, it is important to note that the underlying Quality Assurance Plan (QAP) Requirements have not been changed, including QAP development and

submittal requirements. Note that both permits require that the permittee's plan follow the detailed procedures described in the Requirements for Quality Project Plans, EPA QA/R-5 and Guidance and Guidance on Quality Assurance Project Plans, EPA QA/G-5. The language in the Final permit remains the same as the draft.

Since the information required by Permit Part I.C.6. is not required for monthly compliance purposes, EPA believes it is appropriate to submit the data with the annual monitoring reports. EPA and the State generally review this information on an annual basis along with all of the other data collected during each discharge season. The information gathered under Permit Part I.C.7. is required to be submitted with the monthly DMRs.

Finally, Conditions I.C.6 and I.C.7 include requirements for monitoring numerous parameters and using specified methodologies. The commenter has not provided sufficient information on how it believes these conditions are “considerably less protective of human health” for EPA to provide a response.

81. **Comment:** The renewed permit drops condition I.G, which is even more necessary since there has been precipitate noticed along the Red Dog Creek downstream of the Outfall 001 in recent years. Ott and Morris 2005. This condition should be restored.

**Response:** The Precipitate Study was included in the previous permit as a requirement of the State’s CWA § 401 Certification. Teck complied with the study requirements and the work was subject to review by ADEC and the Alaska Department of Fish and Game (ADF&G). The CWA § 401 Certification for this permit issuance does not include continuation of the Study and therefore, it is not included in the Final Permit.

82. **Comment:** The Permit is legally flawed because it allows backsliding in violation of section 402(o) of the CWA and violates Alaska state anti-degradation regulations.

The Permit allows backsliding for the selenium, lead, zinc, cyanide, and ammonia effluent limits. The State has not promulgated an implementation plan for its antidegradation policy. As a result, the State cannot make the determination that the relaxed effluent limits and mixing zones comply with Alaska’s ADP, and the exception that would allow backsliding does not apply.

**Response:** See Response #39 on antidegradation. The CWA’s anti-backsliding provision, Section 402(o), contains several exceptions under which a reissued permit may include less stringent effluent limitations, provided they do not result in violations of state WQS.

Section 402(o)(2) includes an exception for new information that applies to effluent limitations for lead and selenium. Effluent limitations for lead and

selenium are both more stringent (selenium AMEL; lead MDEL) and less stringent (selenium MDEL; lead AMEL) than the 1998 permit. Importantly, however, both WQS/wasteload allocations used in determining the effluent limitations are the same as those used in the 1998 permit with the limitations being slightly different because of the statistical variability within the current data sets. The limitations appropriately are based on the more current data, which is most predictive of future discharges. The current data sets and the observed statistical variability constitutes new information that falls within the anti-backsliding exception set forth in CWA § 402(o)(2)(B)(i).

As discussed in the Fact Sheet, these limits are protective of the downstream designated uses and will ensure compliance with the WQS. In compliance with CWA 402(0)(2)(B), the wasteload allocations (water quality-based) associated with the changed limits remained the same (were not revised) nor were alternative grounds used in translating the water quality standards into effluent limitations. The State's CWA § 401 Certification considers these changes to be minor, resulting from statistical variability in the datasets used to calculate final effluent limitations. Furthermore, ADEC does not believe the modified effluent limitations will affect lead and selenium levels in the receiving water and therefore will not cause degradation.

In addition, Section 402(o)(1) allows for backsliding from water-quality based effluent limitations if the requirements of CWA § 303(d)(4) are met. Under CWA § 303(d)(4)(B), which applies to attainment waters, water-quality based effluent limitations may be relaxed provided doing so is consistent with the State's antidegradation policy. As noted in Response #39, the CWA § 401 Certification includes an analysis based on the requirements of 18 AAC 70.015 and 40 CFR 131.12, which determined that the changes to effluent limitations for cyanide, zinc, lead, selenium, and ammonia are consistent with the antidegradation policy and will not violate applicable state water quality standards.

For ammonia, backsliding requirements do not apply since the previous permit did not include effluent limits for ammonia.

Other responses (see, e.g., Response #'s 49, 52 and 82) address specific changes in effluent limitations in the permit.

83. **Comment:** NPDES permits have been issued for the Red Dog facilities since 1985. Mining began in 1988, and the mill became operational in 1989. The scale of the operations and the volumes of waste produced and discharged have expanded throughout the life of the mine. Approximately 2.4 billion gallons of treated effluent was released into Red Dog Creek. Nevertheless, it appears that the specific permit standards have gotten progressively weaker.

**Response:** The Final Permit cannot be compared to permits issued in 1998 without also providing the proper context in which each permit was developed. During permit reissuance, the NPDES program can incorporate new data, methods, or standards that may result in permit conditions that differ from the previous permit, provided that any changes comply with all applicable WQS and policies.

84. **Comment:** Under Section 124.55(b), EPA is allowed to modify the permit *only* to make it “consistent with the more stringent conditions which are based upon State law identified in such certification.” (emphasis added). EPA may modify a permit to reflect a change in the State certification of an NPDES permit. See 40 C.F.R. 122.62(a)(3)(iii) . . . That authority, however, also is limited . . . In this case, the certifications contain significantly less stringent conditions than were imposed by the original permit. Accordingly, EPA cannot modify the permit to reflect those changes, but must retain the original, more stringent discharge restrictions.

**Response:** The regulations cited in this comment set forth certain circumstances under which EPA may modify permits prior to their expiration. One of the cited regulations addresses permit modifications based on regulation changes [40 CFR 122.62(a)(3)(iii)], and the other pertains specifically to State CWA § 401 certifications that are revised based on changes to state law or regulation or judicial action [40 CFR 124.55(b)]. Those provisions do not apply to this action because EPA is reissuing a permit, not modifying a permit during its term, and there has been no interim modification to the CWA § 401 Certification as contemplated by the regulations.

85. **Comment:** The new permit deletes condition IV.J on oil and hazardous substance liability. These deletions are not explained or justified, and make the permit weaker; they should be restored in the Final Permit. Likewise, the new condition IV.M is weaker than the existing permit condition, and the existing permit condition should be restored.

**Response:** The language cited by the commenter is part of the standard provisions that EPA includes in all permits based on 40 CFR 122. This language can change periodically but EPA does not change the language in existing individual permits until reissuance. The discussion in Permit Part IV.J. of the previous permit has been deleted but nothing in the Final Permit, the CWA, or other Federal regulations limits the Permittee’s oil and hazardous substance liability.

While EPA disagrees that the language in Part IV.I. of the draft Permit is weaker than Permit Part IV.M. of the previous permit, it could be viewed as less direct. EPA has replaced the draft language of Permit Part IV.I. with language that more clearly reflects the requirements of 40 CFR 122.61, Transfer of permits.

86. **Comment:** Teck adds numerous organic and other chemicals during the processing of the lead-zinc ores. The Proposed Permit fails to regulate the majority of these compounds by failing to set limits on any organic compounds, oils and greases, fuels, nitrates or sulfates.

**Response:** In developing the Final Permit, EPA conducted a detailed evaluation of the facility operations and the historical effluent monitoring data that has been collected by the Permittee. The Final Permit complies with the technology-based requirements in the effluent limitation guidelines and water quality-based effluent limitations are established for pollutants that have the reasonable potential to exceed a State water quality standard. Of specific note, the permit includes limits for total ammonia, which addresses potential effects of explosives use. Sulfate is also addressed through the water quality-based effluent limitations for TDS. The organic pollutants of concern in fuels and oil and grease are addressed by the years of monitoring that the Permittee has conducted for volatile and semi-volatile organic pollutants. This monitoring, which is continued at a reduced frequency in the Final Permit, has shown no organic pollutants at levels that approach the State's WQS. Finally, to address the overall potential toxic effects of the discharge on the receiving water (potentially from parameters that do not have WQS on which to base effluent limits), the permit includes chronic WET testing and limits.

87. **Comment:** Condition II.I is a license to pollute, especially in the context of the deletion of condition I.C.15. Condition I.C.15 should be restored to keep the proper balance in the permit toward the presumption that discharge of unpermitted substances is a permit violation. A good start would be to reinsert the sentence deleted from condition III.B.3 that states, "Except as provided in permit conditions in Part III.G, Bypass of Treatment Facilities and Part III.H, Upset Conditions, nothing in this permit shall be construed to relieve the Permittee of the civil or criminal penalties for non-compliance."

**Response:** The permit authorizes the regulated discharge of pollutants as required by the CWA. Section 301 states "Except as in compliance with this section and sections 302, 306, 307, 318, 402, and 404 of this Act, the discharge of any pollutant by any person shall be unlawful." The Draft Permit was public noticed to allow the discharge of pollutants into waters of the United States under Section 402 of the CWA. The deletion of Permit Part I.C.15. has no effect on the permit requirements because the introductory language for Permit Part I. specifically indicates that only the discharges authorized by the permit are allowed.

EPA assumes that the commenter was referring to the deleted last sentence of Permit Part III.B.2. in the previous permit since there was no Permit Part III.B.3. in the Draft Permit. This change represents modifications to EPA's standard permit language made since the previous permit was issued. This standard language is included in all permits issued by EPA Region 10. It does not have any effect on the applicability

of the listed civil and criminal penalties for non-compliance with permit requirements.

88. **Comment:** In the Fact Sheet, Section VI.D, the last sentence of this section states that the Site Management Pollution Prevention Plan (SMPPP) “must be amended whenever there is a change in the facility or in the operation of the facility which materially increases the potential for an increased discharge of pollutants.” This language is vague and overbroad. Paragraph I.H.7. of the Draft Permit (page 22) has different language, which is somewhat more specific, but still so broad as to be susceptible to subjective differences of opinion. This Draft Permit language calls for amendment to the SMPPP “whenever there is a change in design, construction, operation, or maintenance, which has an effect on the potential for the discharge of pollutants to the waters of the United States.” In each of these provisions, the language is broader than authorized by the CWA, Section 304(e).

To provide appropriate guidance to the Permittee on when to amend the SMPPP, and to more closely align the Permit and Fact Sheet with the CWA, Teck proposes that Permit Section I.H.7 and Fact Sheet Section VI.D be revised to state:

“The Permittee shall amend the Plan whenever there is a change in design, construction, operation, or maintenance of the facility, which, in the best professional judgment of Permittee, more likely than not has the potential to contribute significant amounts of toxic or hazardous pollutants to navigable waters.”

**Response:** No change made in the Final Permit. EPA believes that the permit language is appropriate under the CWA and, importantly, ensures that SMPPPs are updated whenever the operator determines that there are changes that have an effect on the potential for the discharge of pollutants to the waters of the United States.

89. **Comment:** Treated Wastewater Dust Suppressant. (Ref: Draft Permit, I.B.10).

The “haul road to the port” is not defined. For purposes of this condition, Teck suggests defining “haul road to the port” as: “that portion of the DeLong Mountain Regional Transportation System (DMTS) Port Road south of its intersection with the Tailings Impoundment back-dam road turnout.”

**Response:** Change made as requested.

90. **Comment:** Current permit condition III.F on removed substances should be included in the Final Permit; it is inexplicably deleted in the renewed permit.

**Response:** The requirement from this permit part was moved to the section for Site Management Pollution Prevention Plan Requirements and can be found in Permit Part I.H.2.i.(ii).

91. **Comment:** The subjects confusingly discussed on page 31, sections 1 and 2 of the Proposed Permit should be incorporated into actual effluent limitations in Table 1.

EPA should provide technical justification for setting an informal antimony effluent limitation of 1 mg / L (1000 ug / L). Does the language on page 31 imply that an arsenic limitation [at Outfall 001] of 500 ug / L exists? This should be clarified, as should the names and limits for the other specific chemical constituents for which this language pertains [see Proposed Permit page 31, sections 1 and 2].

**Response:** EPA apologizes for any confusion. These are standard permit conditions that are required in all permits and are consistent with the specific requirements in 40 CFR 122.42(a). They are notification levels above which EPA must be notified but are not related to effluent limits included in Table 1. The process for establishing effluent limitations is described in Appendix C of the Fact Sheet.

92. **Comment:** In the "Parameter" column of Draft Permit, I.A.1, Table 1, "Barium" should be footnoted with "2" to indicate total recoverable analysis (as it is referenced in Table 1 of the Fact Sheet).

The footnote "4" to Organic Priority Pollutant Scan (sample frequency column) should be deleted as this footnote does not relate to this parameter.

**Response:** Changes made as requested in the Final Permit. Barium has been footnoted with a "2" as requested and the Organic Priority Pollutant Scan footnote has been changed to "5."

93. **Comment:** It is unrealistic to state that the permit duration is five years – this is another misleading statement found throughout the environmental review documents. The first permit was in effect for 13 years. It was issued in 1985 and ran until 1998 because it was "administratively extended" after it expired in 1990. The second permit, issued in 1998, expired in 2003, but is still in force today, six years later, making it now in effect for 11 years. One can only expect, given this history, that the present permit will be in effect for far longer than five years. This fact should be disclosed to the public. A suggested change would be to issue two-year permits, which would be administratively extended until they were renewed, so that the actual life of the permit was five years, as the EPA claims it is here. Two-year permits would be a far more nimble vehicle for responding to changing environmental or regulatory conditions.

**Response:** The Fact Sheet for the Draft Permit explains the history of the permit. The Final Permit duration remains 5 years, according to 40 CFR 122.46(a), which is the same duration as other individual permits under the CWA. As indicated in Section VII.D. of the Fact Sheet, permits may be administratively extended as long as the requirements of 40 CFR 122.6 are met. Note that the permit may be re-opened prior to permit expiration, in accordance with applicable procedural regulations, based on the need to address changes in environmental conditions, facility process or discharge characteristics, and/or regulatory requirements.

## Total Dissolved Solids

94. **Comment:** EPA does not discuss [Alaska's antidegradation policy] in either the NPDES permit or its SEIS. This approach represents a failure by EPA to ensure that all existing uses of Red Dog Creek are protected. Indeed, EPA in earlier documents has acknowledged that a 500 ppm TDS limit may not be protective of spawning Arctic grayling, and in this permit has proposed a 1500 ppm limit. Rather than acting proactively to avoid the harm that it had earlier identified (through the Steckoll and Brix studies, for example), EPA has approved the potentially harmful activities. The Brix study, done for Teck, does not support a 1500 ppm in-stream limit. EPA's approval of that limit in Alaska's certification contravenes the antidegradation requirement, which requires EPA to act positively to protect the spawning fish. Once it identified the potential effect on Arctic grayling, EPA should have refused to approve the permit renewal that might cause the impact.

**Response:** The basis for TDS limits in the draft and Final Permits is a TDS site-specific criterion (SSC) that was developed by ADEC, subject to public notice and comment in a separate process, and approved by EPA in 2006. As noted above, the site-specific criteria have been formally adopted by the State and approved by EPA according to the procedures specified in Alaska's water quality standards (WQS), including protection of aquatic life uses. They are, therefore, appropriately included in the CWA § 401 Certification and Final Permit. See Response #94 on antidegradation.

The SSC is based on studies of the biological impacts of the TDS observed in the effluent on arctic grayling which are found in the receiving water. Specifically, these studies have shown that the higher levels of TDS will not impact arctic grayling spawning. See also the discussion in Section 3.10.3.3 of the FSEIS that describes the basis for the TDS SSC.

95. **Comment:** The Permit renewal violates 33 U.S.C. §1342(o), as it contains effluent limitations which are less stringent than the comparable effluent limitations in the previous permit and Teck meets none of the exceptions found in §1342(o). For example, the previous discharge limit was 196 ppm TDS on a daily basis. That effluent limitation has been entirely removed from the permit, but the new TDS in-stream limitation will



allow TDS discharge from the outfall pipe in excess of 4,000 ppm – a significant jump up from 196 ppm. This is a clear violation of §1342(o).

**Response:** Clean Water Act Section 402(o)(1) allows for backsliding from water-quality based effluent limitations if the requirements of CWA § 303(d)(4) are met. Under CWA § 303(d)(4)(B), which applies to attainment waters, water-quality based effluent limitations may be relaxed provided doing so is consistent with the State's antidegradation policy. As noted above, the CWA § 401 Certification includes an analysis based on the requirements of 18 AAC 70.015 and 40 CFR 131.12, which determined that changes to effluent limitations are consistent with the antidegradation policy and will not violate applicable state water quality standards. See Response #39. TDS limitations are addressed in the State's antidegradation analysis.

96. **Comment:** In the modified permit from 2003, the TDS was required to be monitored twice per week at the end of the mixing zones; in this permit, that is reduced to once per week. This backsliding is not appropriate and not protective of the environment, particularly given the recentness of the imposition of the mixing zones.

**Response:** As noted in the Fact Sheet and in Response #22, EPA proposed to modify the permit in 2003 but the conditions were appealed and the changed conditions did not go into effect. The comparable requirement in the 1998 permit required ambient monitoring of TDS at the edge of the mixing zone twice per month. See 1998 Permit Part I.D.7 (Station 10). The Final Permit requires ambient monitoring of TDS at the edge of the mixing zone once per week - more frequently than the 1998 permit. See Permit Part I.A.7. Accordingly, to the extent backsliding requirements apply to changes in monitoring frequency; they are not an issue here.

In addition, EPA believes by applying the approach described in Part I.A.5.h of the Final Permit, the discharger will be able to ensure compliance with the TDS standards at the edges of the mixing zones in the main stem of Red Dog Creek and Ikalukrok Creek. This has been demonstrated through instream monitoring during the previous permit term. As a result, EPA has determined that once per week monitoring is appropriate at Stations 150, 151, and 160.

97. **Comment:** The Fish & Game TDS study may be underestimating the impact of TDS on aquatic organisms. The Fish & Game TDS study states that water samples are filtered through a 2.0 micrometer pore-size filter prior to being evaporated, dried and weighed to determine TDS (TDS) content. It is true that this is a standard analytical method, but it is an inappropriate method to be used at sampling stations in this permit. The effluent water discharged into the mainstem of Red Dog Creek by Teck is not filtered. Due to the addition of water treatment reagents and natural geochemical reactions, this water often contains significant concentrations

of particulate materials, some portion of which may contain constituents potentially toxic to aquatic organisms. Filtration of the TDS samples prior to “analysis” (drying and weighing) removes many of these particles resulting in lowered TDS concentrations. The fish and other aquatic organisms in Red Dog Creek are not being exposed to filtered waters. This analytical procedure, therefore, presents a misleading picture of the chemical conditions to which the aquatic organisms are being exposed. Once the mine’s effluent waters enter Red Dog Creek, the suspended and colloidal particles can easily be consumed by organisms. The particles may also dissolve, releasing some of their potentially-toxic constituents, such as metals, or metal cyanide forms. There is considerable debate and uncertainty amongst toxicologists about the toxicity of such particulates from mining wastes.

**Response:** The procedure described in the comment is the standard procedure for measuring TDS, consistent with Method 2540 C from Standard Methods for the Examination of Water and Wastewater and EPA Method 160.1. The particulates described by the commenter would not be captured in any standard TDS evaluation, but would be captured by measuring total suspended solids, which are also limited in the permit. Finally, the Final Permit includes WET limits and testing that consider the combined toxic effects of the discharge.

98. **Comment:** Conspicuously absent in the environmental review documents is any data on TDS concentrations at points below Station 10 during the discharge season. Such data is crucial, and could help ADEC and the public determine if those TDS concentrations already found as a result of Teck’s discharges could affect salmon, grayling, Dolly Varden, and aquatic invertebrates (fish food). The data that is available is troubling. The 2001 Aquatic Biomonitoring study, at Page 41, Figure 36, shows that the reported maximum zinc concentrations at station 10 were between about 1000 and 1800 micrograms per liter during 1999 to 2001. Such zinc concentrations are routinely considered to be extremely toxic to cold water fishes. Yet, EPA proposes to raise Teck’s zinc limits. It is true that the U.S. EPA has traditionally allowed higher zinc concentrations in waters with elevated hardness. However, has it been empirically demonstrated, via detailed toxicity testing, that Red Dog effluents with zinc concentrations between 1000 and 1800 micrograms per liter are truly non-toxic to local fish? Or, has this only been assumed because of the use of the Hardness - Toxicity equations presented in documents such as the “Gold Book” (Quality Criteria for Water 1986, U.S. EPA 440/ 5-86-001)?

Most troubling, however, is ADEC’s rush to change the TDS limits after the study funded by the Alaska Technology and Science Foundation and Teck, and prepared by the University of Alaska at Juneau, determined that levels of TDS far below 1500 ppm were toxic to salmonid reproduction.

**Response:** In the Draft and Final permits, EPA has applied the currently applicable WQS (as further documented in the CWA § 401 Certification).

Moreover, Section 3.10 of the Final SEIS fully describes the effects of TDS on the specific species in Red Dog and Ikalukrok creeks. This includes the most recent studies of impacts on fertilization and early life stages. Note also that the Final SEIS discusses TDS levels as well as aquatic life conditions downstream of the Red Dog Creek confluence in Ikalukrok Creek and the Wulik River during the discharge season. The Final Permit requires TDS monitoring at Stations 150 and 160, which are downstream of Station 151 (and Station 10).

The zinc limits in the permit are significantly more stringent than the levels cited by the commenter. It is important to recognize that levels of zinc at Station 140 upstream of the influence of the Red Dog Mine have been measured as high as 42,700 ug/L, see Table 3.5-7 in the Final SEIS. This reflects the natural mineralization in the stream and is true not only for zinc but other metals. Therefore, the elevated levels at Station 10 reflect the influence of natural conditions, not the Red Dog Mine effluent, which actually lowers instream zinc concentration levels.

99. **Comment:** Teck has claimed that the “data we have for Stations 10 and 7 demonstrate that when TDS is at or below 1500 mg/l at Station 10, it does not exceed 500 mg/l at Station 7, except on rare occasions in late September.” This is simply not the case. Teck violated the TDS limit of 500 mg/l at Station 7 (located on Ikalukrok Creek several miles downstream from the confluence with main stem Red Dog Creek) on the following dates: July 27, 1999; July 25, 2001; August 27, 28, 29, 2001. None of these violations are the “rare” late September occasions of high TDS at Station 7. Moreover, none of these violations occurred when TDS exceeded 1500 mg/l at Station 10. This data demonstrate that even if Teck complied with the 1500 mg/l proposed standard on Red Dog Creek, waters downstream in Ikalukrok Creek could exceed 500 mg/l. TDS concentrations at this level harm salmon spawning habitat, and are occurring at times when chum salmon and Dolly Varden are spawning in Ikalukrok Creek. Put simply, allowing Teck to pollute so that concentrations of TDS can rise to 1500 mg/L in stream means that spawning fish will be affected at downstream locations; because of this impact, the proposed change to TDS standards must be rejected.

**Response:** The Final Permit reflects the currently applicable WQS as documented in the CWA § 401 Certification. This includes requiring demonstration that TDS levels are below 500 mg/L after July 25<sup>th</sup> of each year at Station 160 where spawning occurs in Ikalukrok Creek. The permit does not require that TDS levels be below 500 mg/L at Station 7, which is located between Stations 150 and 160 on Ikalukrok Creek. See Response #94 regarding the SSC of 1500 mg/L for TDS.

100. **Comment:** The term “highest measured effluent values” is not clearly defined. One commenter suggests that the value used in the calculation be the highest TDS value measured in the current and previous year’s