discharge season. Another commenter suggests the highest value over the life of the facility.

Response: The highest effluent value represents the maximum value reported for the effluent during the 5 years preceding the current discharge season. This has been clarified Permit Part I.A.7.c. Based on review of the variability in TDS levels in the effluent, EPA is confident that the approach of using 110% of the maximum value (10% above the maximum) over the previous 5 years represents the highest potential concentration in the effluent and will ensure instream compliance with WQS at all times. See Response #101.

101. **Comment:** Because the TDS concentration in the effluent is only monitored once per week, the use of the 110% of the highest effluent value could result in spikes of TDS not being captured by the modeling.

Response: Review of the variability in TDS levels in the effluent shows that the maximum value of 240 samples taken over 5 years was 4270 mg/L. The coefficient of variation is 0.08. EPA used the reasonable potential equations from Appendix C of the Fact Sheet to determine the maximum expected effluent value which is 4357 mg/L. For this 5 year period, the 110% value would be 4697 mg/L which encompasses the maximum value expected from the data collected. EPA is confident that the approach using 110% of the maximum value will incorporate possible TDS spikes noted by the commenter.

102. **Comment:** The 2001 Aquatic Biomonitoring study, at page 39, states that the waters at station 10 rapidly return to background concentrations for TDS, about 150 mg/L, during periods of no mine discharge. This reinforces the notion that the proposed TDS standard of 1500 mg/L is roughly ten times background – the concentrations under which the local aquatic organisms evolved. Baseline data from 1982-83, before the mine began discharge, reveal that the median TDS concentrations in 11 samples was 198 mg/L (the maximum, 876 mg/L is about half of the new proposed standard; the minimum was 9 mg/L).The raising of the TDS concentrations allowed downstream of the discharge, is not protective of the environment.

Response: EPA agrees that TDS levels in the stream are elevated in comparison to pre-mining data. However, the TDS limit is based on an EPA approved SSC. Comments on the SSC should have been submitted during the SSC comment period. Teck has already been discharging at a level that meets the 1500 mg/l SSC in-stream. Therefore, the change in the TDS requirements will not affect the quality of the discharge and will not lead to increased TDS levels in the stream. While aquatic life conditions vary somewhat on a year-to-year basis, the current conditions are consistently improved over pre-mining conditions. This includes both fish and periphyton levels (see Section 3.10 of the Final SEIS). EPA, therefore, disagrees with the commenter that the TDS limits in the permit

are not protective of the aquatic environment. Finally, as documented in the CWA § 401 Certification, the limits are consistent with the State WQS that are protective of aquatic life. Note that the site-specific criterion development for TDS was based on studies that considered toxicity of TDS on early stages of Arctic grayling; it was not developed based on natural conditions.

103. **Comment:** The enforceable portions of the permit have narrowed such that they are now focused on the release of TDS, which is seldom the focus of NPDES permits at other comparable metal mines. The 1998 NPDES permit had a TDS limitation of 170 mg/L (monthly average), which was based on actual baseline (pre-mining) data from the area. The proposed NPDES permit calls for complete elimination of an limitation on TDS at Outfall 001.

The TDS limits found in the present 1998 NPDES permit should be retained.

Response: The Fact Sheet describes in detail the rationale for the revised TDS limits that reflect the changes in the WQS based on the SSC. See Response #94. The SSC requires the facility to meet an instream limitation rather than an end-of-pipe limitation. The in-stream concentrations are controlled by a number of factors including TDS concentrations and flows in both the effluent and the receiving water. This control process restricts the effluent to flow volumes to ensure the attainment of protective TDS concentrations in the receiving waters.

EPA has imposed other requirements on the Red Dog Mine to address this issue including a TDS Management Plan (Permit Part I.A.7.f.) and additional treatment of waste streams high in TDS. The measures identified in the TDS Management Plan are expected to be a more effective means of addressing the generally increasing TDS levels than an end-of-pipe limit. It should be possible to identify the sources of TDS in the wastewater and reduce the amount of TDS entering the wastewater impoundment in the first place. While undertaking those efforts, the receiving waters are protected by the calculated flow limits described in the preceding paragraph.

The Final Permit also has numerous enforceable effluent limits and requirements beyond those applicable to TDS.

104. **Comment:** The permit should require the TDS plan to be issued and approved by EPA before the permit is issued – this type of after-the-fact planning does not protect the environment or the people of Kivalina. The plan should be made available to the public for public comment.

Response: EPA appreciates the comment but does not believe it is necessary to provide for public comment on the TDS Management Plan. In addition, EPA cannot require compliance with a specific permit

condition, such as the TDS Management Plan, before the Final Permit becomes effective. Importantly, as described in the Fact Sheet, the near-term proposed use of barium hydroxide will provide for compliance with the TDS limits. The TDS Management Plan is intended to ensure compliance over the long-term and may include a combination of treatment and source control measures. Regardless of plan submission requirements, Teck is required to comply with the TDS limits in the permit.

105. **Comment:** The instream TDS limitation is not supported by any evidence. Even the Brix and Grosell (2005) study, when read most expansively, would support only a limitation of 1,357 mg/L. Brix and Grosell (2005) did not determine that 1,500 mg/L will be protective of Arctic grayling during all life history phases including the fertilization to egg hardening phase. That study determined that the no observable effects concentration was as low as 132 mg/L, and the lowest observable effect concentration was as low as 254 mg/L. The 1,500 mg/L is not protective of spawning grayling. EPA cannot throw out half the data on TDS toxicity.

    EPA appears to have reached a predetermined conclusion and is desperately trying to assemble evidence to support it; unfortunately, such evidence does not exist. The SEIS's statements to the effect that fish surveys indicate that the present level of TDS is not having a negative impact on fish populations are similarly without foundation, as the fish levels are below those of baseline (when there was less TDS) and no studies have been done during a discharge year when TDS levels were lower than they are presently.

    Response: In developing the permit, EPA included TDS limits based on the State's applicable WQS. With EPA approval, the State has determined that these standards are protective of downstream aquatic life. The Final SEIS fully describes the effects of the TDS levels on the specific species found in the Red Dog and Ikalukrok creeks and the Wulik River. Based on the discussion in Section 3.10 of the Final SEIS, the biological surveys conducted each year consistently show that current aquatic life conditions are better than pre-mining conditions (when lower TDS levels were observed).

106. **Comment:** The permit is being proposed on the basis of the Final SEIS that found no significant impacts from increasing the discharge limits for TDS. In doing this analysis, the Final SEIS stated that no additional impacts were expected on aquatic invertebrate community. This is in spite of the fact that Teck's WET analyses and subsequent testing have attributed at least 50% of the toxicity in their effluent to TDS. The other half of the cause of toxicity has never been demonstrated. This testing has shown that the discharge has the potential to affect aquatic communities in the receiving stream. To allow increased TDS limits is in conflict with the findings of previous WET testing.

The removal of the effluent limitation for TDS is startling in that Brix (2005) determined that TDS made up half of the toxicity in the Teck effluent, and that source of the other half of the toxicity was not yet determined. More recent representations by Teck to EPA are that TDS makes up all of the effluent toxicity. See CRPE Exhibit 23, June 2005 DMR, at 3 ("all of the effluent toxicity can be attributed to TDS"). The removal of the TDS effluent limitation, and the significant elevation in the TDS in-stream limitation during grayling spawning season, are not supported by the evidence and are directly contradicted by Teck's own submissions to EPA.

Response: The commenter is correct that TDS has been identified as a source of toxicity observed in some of the WET tests. The laboratory tests are designed to measure the effect on a specific species for which there is test methodology. The Final Permit limits are based on the TDS site-specific criterion, developed from the studies of the biological impacts of the TDS observed in the Permittee's effluent on arctic grayling which are found in the receiving water, see Section 3.10 of the Final SEIS. Specifically, these studies have shown that compliance with the TDS limits will not impact arctic grayling spawning. In addition, the WET limits in the Final Permit are unchanged from the previous permit.

107. **Comment:** On page 34, the first bullet should reference the 1998 permit limits and state that the proposed permit would relax those limits. We suggest the following language in lieu of the first bullet on page 34:

For TDS, the permit includes a less stringent limit than the 1998 permit limits of 170 mg/L (monthly average) and 196 mg/L (daily maximum). The new proposed limits are based on site-specific criterion (SSC) adopted subsequent to the 1998 permit. This permit includes an in-stream TDS limit of 1,500 mg/L based on SSC established in the main stem Red Dog Creek. The SSC was adopted in 18 AAC 70.236(b)(5) and has been approved by EPA.

Response: These comments refer to the draft CWA Section Certification and should be addressed by ADEC. EPA notes that it does not issue a revised Fact Sheet with the Final Permit.

108. **Comment:** On page 35, the third paragraph should be clarified to emphasize that the department finds the new TDS limits to be protective of "existing uses." We suggest the following revision:

The TDS SSC demonstrated the 1,500 mg/L is scientifically defensible and protective of designated water uses. The TDS SSC was approved by EPA on April 21, 2006. The department further finds that the TDS limits will be protective of existing uses, as shown in condition 1 of the certification.

Response: These comments refer 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.

109. **Comment:** The first two sentences in paragraph 3 on page 25 reference the 2003 permit. EPA has indicated that the 2003 permit is not in effect; therefore, it should not be referenced. Teck recommends deletion of the first two sentences and insertion of the following:

For TDS, the water quality within the mixing zone is unchanged from levels authorized by ADEC under compliance orders by consent. Because no spawning occurs within the mixing zone, the levels of TDS authorized in the stream during the spawning period will be the same as that authorized for the non-spawning period.

Response: These comments refer 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.

110. **Comment:** Ikalukrok Creek provides essential spawning habitat for grayling, chum salmon, and coho salmon. EPA and ADEC must place a high priority on maintaining quality spawning habitat for sources of subsistence fishing. The proposed water quality standard for TDS does not protect spawning habitat.

All of the spawning by these fish is threatened by Teck's ongoing discharges, and will continue to be threatened if the TDS standard is raised. Further, the young fish – including juvenile Dolly Varden and young-of-the-year Arctic grayling – use the Red Dog Creek in the summer months. Fish & Game reports that the presence of 4-day-old fish suggest that Arctic grayling spawned in the Mainstem of Red Dog Creek just below the entrance of the North Fork of Red Dog Creek.

Response: In 1999, the State changed the WQS under 18 AAC 70.020(b)(Note 12) for inorganic dissolved solids, regulated as TDS. The following language is included in the CWA § 401 Certification and this criterion is in effect in Ikalukrok Creek for the areas listed above:

"TDS (TDS) in concentrations up to 1000 mg/L in Ikalukrok Creek are in effect from the confluence of Ikalukrok Creek with the main stem to the Wulik River, except during chum salmon and/or Dolly Varden spawning in Ikalukrok Creek, when the aquatic life criterion of 500 mg/L will apply at Station 160."

The Final Permit and CWA § 401 Certification reflect these requirements, including protecting spawning after July 25th of each year below Station 160 where spawning is documented in Ikalukrok Creek. As documented in Section 3.10 of the Final SEIS, aquatic life conditions throughout the

receiving waters, including spawning activities, have improved compared to pre-mining conditions.

111. **Comment:** Teck has the burden of showing that the proposed WQS will have no adverse effect on aquatic life. EPA, ADEC and Teck Alaska have not demonstrated in any reasonable fashion that the discharge of effluents containing TDS concentrations of 1500 mg/L are not toxic to various forms of aquatic life; absent from available documents for public review are data and analysis by Teck (or anyone else) which demonstrates no adverse effect on aquatic life.

The proposed TDS level of 1500 mg/L is demonstrably harmful to aquatic organisms. Rather than there being no adverse impact on aquatic life, just the opposite is true, as ADEC well knows. An Alaska Department of Fish & Game literature review documents harm to aquatic life when TDS levels are in the range contemplated by the proposed WQS revisions. The information presented in the Fish & Game TDS study shows quite clearly that some waters containing TDS concentrations less than 1500 mg/L can be toxic to fish and other aquatic organisms (many of which are fish food). Indications of the potential for acute and chronic toxicity are best seen in the summary tables presented on pages 6 through 16 of that report. It is clearly unreasonable and technically indefensible to use the results of this literature survey to support an increase in the TDS concentrations allowed downstream of Outfall 001.

Response: The Final Permit reflects the currently applicable WQS as documented in the State's CWA § 401 Certification. Comments on the protectiveness of the WQS should have been submitted during the comment period for adoption of the WQS. See Response #94 regarding the SSC for TDS.

As discussed in Section 3.10 of the Final SEIS, water quality and aquatic life conditions in the main stem of Red Dog Creek have improved from pre-mining conditions, particularly during the past five years. This has led to increased fish passage and usage of the Red Dog Creek watershed.

112. **Comment:** [T]he use of a TDS standard at monitoring stations 10 and 151 masks most of the potential toxicity of these discharges. Simply determining TDS or Total Solids, by whatever method, will reveal almost nothing about the actual or potential chemical toxicity of the discharged waters. The release of waters containing elevated TDS concentrations can impair other potential water uses in addition to aquatic life uses. Such waters may require some form of additional treatment prior to use.

Response: The effluent limits in the Final Permit reflect the most stringent WQS for protection of all designated uses of the entire water body. This is documented in the State's CWA § 401 Certification of the Final Permit. EPA assumes that the commenter may be referring to the downstream use of the Wulik River as a drinking water supply for Kivalina.

The Final SEIS shows that levels of TDS in the Wulik River are well below EPA's recommended secondary drinking water standard (based on taste and odor) and the WQS applicable to the drinking water use of 500 ug/L. Finally, as noted in Response #106 the WET limits in the Final Permit which address the potential overall toxicity of the discharge, are unchanged from the previous permit.

Whole Effluent Toxicity

113. **Comment:** Teck requests that "chronic toxicity" be clearly defined in Draft Permit, Section I.F.6, regarding conditions that trigger the TIE requirement. Presumably, the term refers to a TUc result greater than the MDL and/or AML (as in the toxicity reduction evaluation (TRE) trigger in Draft Permit, Section I.F.5.a). Nevertheless, the meaning of the phrase "if chronic toxicity is detected in the effluent" is ambiguous as presented in this section and could arguably be interpreted as meaning chronic toxicity at any level, i.e., any sample with a TUc>1.0.

    Further, the requirement to initiate a TIE if toxicity (presumably, TUc results greater than the MDL and/or AML) is detected in the effluent in any two of the toxicity tests conducted during a discharge season is excessive. Teck suggests the following change to this provision as an appropriate threshold for triggering TIE:

    "If chronic toxicity is detected in the effluent in any two consecutive toxicity tests conducted during the discharge season, then the Permittee shall … initiate a TIE within fifteen (15) days."

    The Fact Sheet and EPA's TSD do not provide any basis to require a TIE for "any" level of chronic toxicity in this effluent, especially considering the ambient pre-mine toxicity levels in Red Dog Creek. In fact, earlier in these comments and in its appeal to the EAB,Teck has shown the chronic WET limits in the proposed permit are incorrectly calculated and should be increased. Because the ambient toxicity is high due to natural conditions, Teck strongly opposes any permit provision that would require a TIE to be performed if effluent chronic toxicity values are less than the AML/MDL values in Draft Permit, Section I.F.5.a.

    Response: The language in the Final Permit has been revised to clarify that 2 exceedances of WET limits during a season trigger the TIE. EPA has determined that it is appropriate to retain the requirement to conduct a TIE if any 2 samples during the discharge season exceed the WET limits.

114. **Comment:** EPA erred in including the proposed TUc limits for WET. (Ref: Draft Permit, I.A.1, Table 1).

    In its April 11, 2007 Petition to the Environmental Appeals Board (EAB), Teck outlined the reasons why the effluent limits for whole effluent toxicity (WET) expressed as chronic toxicity units (TUc) should be removed from

the permit altogether or, at a minimum, be adjusted to reflect actual water balancing. Teck proposed that correctly adjusted limits should be as follows:

Monthly Average 11.2 TUc (9.7 is EPA's proposed limit)
Daily Maximum 17.6 TUc (12.2 is EPA's proposed limit)

Teck attached, and incorporated by reference, the analysis, reasoning and arguments provided in the April 2007 EAB Petition and requests these changes to the Draft Permit. The issues included in the EAB Petition address the reasonable potential that the mine drainage could make receiving waters more toxic to aquatic life, that inputs to the 1998 model were flawed, and that the criterion developed from the model is not a site-specific criterion.

Response: Reasonable potential to violate the criterion has been shown whether the criterion is the one EPA utilized in developing permit limitations or the criterion currently requested by Teck. EPA notes that in October 2008, Teck reported a WET exceedence on their Discharge Monitoring Report of 15.1 TU_C which is well above the criterion of 14.5 TU_C that Teck used to calculate its currently requested limits. As a result, inclusion of WET limits is justified.

The WET limits of the 1998 permit were not challenged and EPA finds no basis to alter those limits. EPA notes that ADEC did not propose including a new WET criterion in the final 2009 CWA § 401 Certification, nor was any new criterion evaluated according to the anti-degradation regulations found at 18 AAC 70.015.

Although Teck argues in its 2007 EAB Petition that the resubmitted water balance is more accurate, there is still uncertainty about the incremental flows into the impoundment at any given time. The newer water balance uses the addition of Bons Creek water into the Red Dog system so it is not an accurate depiction of the natural condition.

115. **Comment:** It is unclear how the Permittee is meant to comply with the requirement to report "the [effluent] flow rate at the time of sample collection." WET samples are 24-hour composite samples and the effluent flow rate may vary during the collection period (the composite sampler is programmed to collect flow-weighted aliquots during the 24-hour sampling period). Accordingly, this requirement should be clarified or eliminated.

Response: Permit Part I.F.4.c.(3) has been clarified to indicate that the range of effluent flows during the sampling period should be reported.

116. **Comment:** The WET test must include 7 dilutions to be valid.

Response: Standard protocol is to conduct testing with 5 dilutions and a control. More dilutions would provide better accuracy and may be a benefit to the Permittee but are not required.

117. **Comment:** Teck's previous work has shown that TDS accounts for 50% of the toxicity demonstrated in its effluent. Another 50% was attributed to as yet, unidentified toxicants. The extensive mixing zones being proposed are an indication of the chemical loading being input into the receiving waters below the Red Dog Mine. This loading has to be accounted for when considering the impacts of this discharge on the environment.

Response: Whenever toxicity has been observed in the effluent, Teck has followed the steps required by the permit to identify the source of the toxicity. As noted in the responses to a number of other comments and in Section 3.10 of the Final SEIS, aquatic life conditions in Red Dog Creek have improved compared to pre-mining conditions. The discharge will not change under the Final Permit and the State has certified that the permit requirements, including mixing zones will be protective of aquatic life in main stem Red Dog Creek.

Fact Sheet

118. **Comment:** First paragraph, page 5 of the Fact Sheet: the mine is 82 miles north of Kotzebue (not 90).

Response: EPA acknowledges the correction made by the commenter. EPA does not issue a revised Fact Sheet with the Final Permit.

119. **Comment:** References. (Ref: Fact Sheet, Section VIII).

The referenced “Letter dated April 18, 2008 from John B. Knapp, Teck, to Michael F. Gearheard, EPA, proposing an alternative waterwater [sic] treatment ….” should be corrected to read,

“… alternative wastewater treatment …”

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the information provided by the commenter is accurate with respect to clarifying the reference in the Fact Sheet.

120. **Comment:** Fourth paragraph, page 6 of the Fact Sheet states:

“The current dam crest is at elevation 955 feet. The pond elevation is at 950 feet. Upstream (south) of the dam, the impoundment is 8,000 feet long and 2,600 feet wide at its widest point. It is bounded on the south end by the Overburden Stockpile built on the divide between the South Fork of Red Dog Creek and Bons Creek. The impoundment has an ultimate

capacity of approximately 39.3 million cubic yards (cy) of tailings,assuming that the tailings remain covered by water."

The source and date of the site-specific information in this paragraph should be cited. Alternatively, the source and date of the site-specific information in this paragraph should be updated to reflect current data with the source and date cited.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, as documented in the Final SEIS, the main dam is currently being raised to an elevation of 970 feet, which corresponds to a total height of 192 feet. To accommodate the additional tailings volume associated with developing the Aqqaluk Deposit (i.e., a total volume of 69 million cubic yards), the main dam would need to be raised 16 additional feet to an elevation of 986 feet (208 feet tall at its maximum). The width (2,600 feet) and length (8,000 feet) are approximate values estimated from figures included in the Environmental Information Document for the Aqqaluk Extension (Teck 2007).

121. **Comment:** On page 17 of the Fact Sheet, Section VII.B, while describing protection of Essential Fish Habitat, EPA notes that fish do not come into contact with the discharge at the outfall because "there is also a barrier to fish passage." Teck presumes that EPA is referencing the rock gabion weir (installed to prevent migration of fish into the Middle Fork of Red Dog Creek) that is located immediately above the confluence with the North Fork of Red Dog Creek. Teck requests that EPA clarify that it isreferencing this structure.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, it is correct that the Fact Sheet referenced the weir described in the comment, which creates a barrier to fish passage above the confluence with North Fork Red Dog Creek.

122. **Comment:** The last paragraph, page 7 (Fact Sheet, Section IV.A) says:

"Although there is a discharge of domestic wastewater to the impoundment, these cannot be separated out for coverage under the GP. Instead, this discharge will have an internal wastestream monitoring point to determine compliance with the technology-based limits for domestic wastewater described in Appendix C."

Teck requests this paragraph be deleted as the matter is not addressed in Appendix C of the Fact Sheet.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the commenter is correct that the cited language is inaccurate, there is no internal monitoring point for domestic wastewater and no technology-based limits for this wastewater are included in the permit. The Final Permit does include fecal coliform limits at Outfall 001

as well as monitoring for biochemical oxygen demand and total residual chlorine.

123. **Comment:** Tailings Impoundment Sources. (Ref: Fact Sheet, Section V).

In the first paragraph, page 8 of the Fact Sheet, "CSB air scrubber" is listed as a potential water source for the Tailings Impoundment. However, the CSB has never been equipped with a scrubber system although it was recently equipped with a bag-house dust control system (which does not generate a water wastestream). The "CSB air scrubber" should be removed from the list of potential sources. The (only) wet-scrubber system in the Red Dog Mine facility is the SAG mill conveyer wet-scrubber system which could be listed as a potential source of water to the Tailings Impoundment.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the information provided by the commenter is accurate with respect to clarifying the language in the Fact Sheet.

124. **Comment:** Sand Filters. (Ref: Fact Sheet, Section V).
In the second paragraph, page 9 of the Fact Sheet, reference is made to "three sand filters operated in parallel." There are actually four (4) filter tanks, each equipped with three (3) independent filter chambers, for a total of twelve (12) independent filter chambers. Piping and valves exists to allow use of a single chamber (1) or up to twelve (12) of the filters in parallel - in virtually any configuration - depending upon discharge rate demand. At any one time, this results in the use of one of a large number of possible filter setup configurations.

Teck recommends the sentence be changed to read as follows:

"Clarifier overflow water then gravity flows to the sand filters."

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the information provided by the commenter is accurate with respect to clarifying the language in the Fact Sheet.

125. **Comment:** At page 11 of the Fact Sheet, Section VI.B.3, the last sentence of the section incorrectly references Part I.I as the location of the SMPPP requirements. This should be changed to reference Part I.H.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the information provided by the commenter is accurate with respect to correcting the reference in the Fact Sheet.

126. **Comment:** Third paragraph, page 5 of the Fact Sheet states:

"Mine production at Red Dog Mine involves the stripping and stockpiling of ore, waste (i.e., rock with sub-economic value), and overburden/topsoil.

Mill production involves crushing, grinding and processing to produce mineral concentrates. Based on the approved mine plan, the Red Dog Mine main pit is expected to remain in production until 2012. The mine produces approximately 9,000 tones [sic] of ore per day. Teck is currently in the process of obtaining approvals to expand the mine into a second pit, Aqqaluk, which would allow for continued mining through 2031."

Without mining Aqqaluk, the main pit will be exhausted in 2011. The meaning of the term "approved mine plan" (Fact Sheet, p. 5), is unclear and should be defined. The Fact Sheet further notes on page 5 that Teck is "obtaining approvals" to expand the mine into Aqqaluk. This language suggests that multiple approvals are required to commence mining in the Aqqaluk area. The only prerequisite for mining the Aqqaluk area is to obtain a Section 404 permit from the Corps of Engineers (to the extent the excavation of jurisdictional wetlands in the Aqqaluk area would require a permit). There is nothing to suggest that the incremental water resulting from Aqqaluk stripping and mining activities could not be covered under the existing NPDES permit. We request the following change to the Fact Sheet: "Teck has sought a renewal of its NPDES permit and, additionally, will be seeking approval from the Corps of Engineers to excavate wetlands in the Aqqaluk area to allow for expansion of mining into that area. Both actions are being evaluated under a Supplemental Environmental Impact Statement."

Response: EPA does not issue a revised Fact Sheet with the Final Permit. EPA disagrees with the commenter because, as part of the permit reissuance process, EPA has considered whether development of the Aqqaluk Deposit would change the nature of the discharge and necessitate new or revised permit conditions. This evaluation was part of the Red Dog Mine – Aqqaluk SEIS analysis. The NEPA process is not complete until EPA issues its Record of Decision and reissues the NPDES permit which will specifically authorize such discharges.

127. **Comment:** Water Quality-Based Evaluation. (Ref: Fact Sheet, Appendix C, I.B).

After discussing Water Quality Based Effluent Limits (WQBELs) and the regulation that triggers whether such limits are necessary, ADEC states:

"The water quality parameters that may be affected by the discharge are metals, cyanide, ammonia, pH, dissolved solids and turbidity" (Fact Sheet, page 38).

This appears to Teck to be a misstatement of the required analysis. A more accurate statement would be:

"The discharge water parameters that have a reasonable potential to cause or contribute to an excursion above any water quality standard are metals, cyanide, ammonia, pH, dissolved solids, and turbidity."

Response: EPA does not issue a revised Fact Sheet with the Final Permit. EPA notes, however, that the regulatory standard stated by the commenter is specifically referenced twice in the preceding paragraphs in the same context and in the same section of the Fact Sheet. Although the information provided by the commenter is accurate, no clarification appears necessary.

128. **Comment:** In the first sentence, first complete paragraph, page 38 of the Fact Sheet, 40 CFR §440.104(b) is cited with reference to "gold" ore. This citation should be corrected to reference "zinc" ore.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the information provided by the commenter is accurate with respect to clarifying the language in the Fact Sheet.

129. **Comment:** On page 37 of the Fact Sheet, EPA says that the pH range of 6.0 – 10.5 included in the previous permit is now included in the Draft Permit. This sentence should be amended to reflect the correct pH range, 6.5 – 10.5, that is proposed in the Draft Permit.

Response: EPA does not issue a revised Fact Sheet with the Final Permit. However, the information provided by the commenter is accurate with respect to clarifying the pH range.

Attachment A
Temperature & pH Data for Ammonia

The pH and temperature data, below, were collected over the 5 year period from 2003 to 2007.

pH, s.u.			
8.5	7.5	7.5	7.6
8.4	7.6	7.5	7.4
7.6	7.7	7.6	7.6
6.8	7.5	7.5	7.5
7.8	7.1	7.6	7.5
7.5	7.3	7.4	6.1
7.9	7.3	7.6	7.9
7.5	6.8	7.4	8
7.8	6.8	7.3	6.9
7.4	7.3	7	7.3
7.2	6.1	7.7	7.8
7.4	6.7	7.4	8.4
1.7	7.1	7.2	8.2
7.4	7	7.8	6.5
7.2	7.1	7.7	8
8	7.1	7.6	7.9
7.2	8	7.3	7.8
8	7.5	7.7	7.8
6.5	7.3	7.6	6.7
7.5	7.4	8.1	7.7
7.8	6.8	7.8	7.4
8	7	8.1	7.8
8	6.5	7.6	7.7
7.9	7.1	7.3	7.7
7.9	7.3	7.8	7.4
7.8	7.4	6.7	7.6
7.7	7.4	7.8	7.7
7.6	7.2	6.8	7.8
7.6	7.7	7.1	7.6
8	7.2	7	7
7.8	7.1	7.6	7.8
7.2	6.9	7.6	8
7.7	7.2	7.4	7.9
7.6	7.8	7.7	7.5
7.8	7.8	7.6	7.5
7.8	6.7	7.5	7.7
7.6	7.8	7.9	7.8
7.3	7.8	6.8	7.9
7.6	7.9	7	7.8
7.1	7.9	7.8	7.8
7.3	7.7	7.2	7.6
7.7	6.6	7.7	7.6
7.8	7	6.7	7.5
7.7	6.8	7.1	7.5

Temperature, °C			
8.1	-0.1	0.08	0.2
10	-0.11	-0.03	0.03
4.7	-0.11	-0.11	0
6.7	-0.11	-0.11	0.03
3.5	-0.11	-0.1	0.04
5.9	0.04	-0.11	0.4
5.3	0.08	7.1	2.9
0.9	1.9	0.05	1
0.3	2.7	0.1	6.5
0.2	0.9	0.09	5.5
0.2	1.7	0.9	9.2
0.5	1.7	0.3	9.7
0.5	1.4	0.7	9.8
0.8	1.2	0.4	7.8
2.3	5	3.5	12.6
7.8	4.8	1	11.1
8.1	11.4	2.2	11.9
8.7	7.4	3.2	13
9.1	7.6	4.2	13.2
16.8	15.7	3.9	19.7
10.5	13.8	5	18.8
11.5	10.3	5.2	19.2
11.5	9.4	5	15.4
7.1	12.8	6.7	15.8
16	9.9	11.1	12.2
13.2	14.9	7.2	15.9
8.6	12.8	8.7	17.1
9.8	11.5	5.3	12.4
10.1	13	6	10.2
10.2	13.1	8.9	13.1
15	11.3	7.9	11.9
10.6	10.9	9.7	14.2
13.1	7.8	6	7.1
10.3	9.7	7.2	8.1
11.4	8.2	15.9	8.1
10.6	8.6	9.2	5.4
6.9	8.9	5.7	7.3
7.4	6.7	10.2	9.5
8.6	8.8	5	7.5
6.9	8.5	8.8	6.7
7.9	2.1	7.6	4.3
5.8	4.6	6.9	4.5
6.5	6.4	7.9	2.2
6.3	5.5	7.5	0.03

pH			
7.8	7.4	7.4	7.5
7.7	6.8	7.8	7.6
7.6	7.1	7.7	7.5
7.5	7.6	7.9	7.4
7.3	7.7	7.9	7.3
7.8	7.3	7.5	6.2
7.8	7.5	7.6	7.4
7.8	7.4	7.7	7.7
7.4	7.5	7.6	8.2
7.5			

Minimum	1.7
Maximum	8.50
95th %-tile	8.00
90th %-tile	7.90

Temperature			
7.5	6.5	5.4	0.03
5.8	5.8	5.3	0.04
2.5	3.8	3.9	0.04
2.7	5.3	4.4	0.05
-0.12	1	3.3	0.06
-0.02	0	0.9	0.06
0.01	0	0.02	0.06
0.02	-0.11	0.01	0.07
-0.12	-0.1	0.04	0.08

Minimum	-0.12
Maximum	19.7
95th %-tile	15.18
90th %-tile	12.98

Attachment B
Zinc Effluent Limitation Calculations

Acute	Chronic SSC	Chronic state-wide
$e^{0.8473(\ln \text{Hardness}) + 0.884}$	210	$e^{0.8473(\ln \text{Hardness}) + 0.884}$
Hardness = 260		
269.23		269.23
LTA = WLA * $e^{[0.5\sigma 2 - z\sigma]}$ where, z = 2.326 for 99th %-tile probability basis (per the TSD) CV = 0.43 $\sigma^2 = \ln(CV^2 + 1) = \ln[(0.43)^2 + 1]$ $= 0.1697$ $\sigma = 0.4119$ $e^{[(0.5*0.1697) - (2.326*0.4119)]} = 0.418$ LTA = 269.23 * 0.418 = 112.43	LTA = WLA * $e^{[0.5\sigma 2 - z\sigma]}$ where, z = 2.326 for 99th %-tile probability basis (per the TSD) CV = 0.43 $\sigma^2 = \ln(CV^2/4 + 1) = \ln[(0.43)^2/4) + 1]$ $= 0.0452$ $\sigma = 0.2126$ $e^{[(0.5*0.0452) - (2.326*0.2126)]} = 0.624$ LTA = 210 * 0.624 = 131.04	LTA = WLA * $e^{[0.5\sigma 2 - z\sigma]}$ where, z = 2.326 for 99th %-tile probability basis (per the TSD) CV = 0.43 $\sigma^2 = \ln(CV^2/4 + 1) = \ln[(0.43)^2/4) + 1]$ $= 0.0452$ $\sigma = 0.2126$ $e^{[(0.5*0.0452) - (2.326*0.2126)]} = 0.624$ LTA = 269.23 * 0.624 = 168.0
Most stringent LTA is the acute: LTA = 112.43		

Maximum Daily Limitation (MDL)	Average Monthly Limitation (AML)
MDL = LTA * $e^{(z\sigma - 0.5\sigma 2)}$ z = 2.326 for 99th %-tile probability basis (per the TSD) CV = 0.43 $\sigma^2 = \ln(CV^2 + 1) = \ln[(0.43)^2 + 1] = 0.1697$ $\sigma = 0.4119$ $e^{(z\sigma - 0.5\sigma 2)} = e^{[2.326*0.4119 - 0.5*0.1697]} = 2.39$ MDL = 112.43 * 2.39 = 269.2	AML = LTA * $e^{(z\sigma - 0.5\sigma 2)}$ z = 1.645 for 95th %-tile probability basis (per the TSD) CV = 0.43 $\sigma^2 = \ln(CV^2/4 + 1) = \ln[(0.43)^2/4) + 1] = 0.0452$ $\sigma = 0.2126$ $e^{(z\sigma - 0.5\sigma 2)} = e^{[1.645*0.2126 - 0.5*0.0452]} = 1.39$ AML = 112.43 * 1.39 = 155.9