AK-003865-2
Response to Comments
Teck Cominco Alaska Incorporated
Red Dog Mine

U.S. EPA, Region 10
March 2007

Prepared by:
Cindi Godsey, EPA
and
Hanh Shaw, EPA

with the assistance of:
Ronald Rimelman, Tetra Tech, Inc.

Table of Contents

Introduction

EPA prepared a preliminary draft permit and draft fact sheet which were sent to area Tribes on November 8, 2005. On December 8, 2005, EPA met with the Native Village of Kivalina to present potential changes to the draft permit. These documents were also sent to the Alaska Department of Environmental Conservation (ADEC) so a draft §401 Certification could be prepared to accompany the draft permit.

EPA public noticed the draft permit in the Anchorage Daily News and the Arctic Sounder on February 6, 2006. The comment period was scheduled to end on March 6, 2006, but EPA received requests to extend the comment period. The extension of the public comment period to March 27, 2006, was published in the Anchorage Daily News on March 2, 2006, and in the Arctic Sounder on March 9, 2006. Letters, dated February 24, 2006, were sent to area Tribes informing them of the extension.

An e-mail received on March 27, 2006, from the National Marine Fisheries Service (NMFS) states that they have reviewed the draft permit and fact sheet and find that the described action will not result in any adverse effect to essential fish habitat (EFH). NMFS had no objection to the permit reissiuance.

On September 14, 2006, EPA sent e-mail messages to USFWS and NMFS to request any updates to the ESA listings that may have an effect on their previous determinations. On September 14, 2006, USFWS responded that there were no additions that affect their determination. On September 14, 2006, NMFS responded that no additions affected their previous determination.

On February 12, 2007, the Alaska Department of Environmental Conservation (ADEC) issued a Certificate of Reasonable Assurance under §401 of the Clean Water Act. EPA adopted all but one of the included conditions. For further information on the WET limitations included in the final permit. Please see Comment 136.

On February 27, 2007, EPA approved the use of the site specific criteria (SSC) for cadmium based on the natural condition. The SSC was proposed through the draft certification of the draft permit which was available for public comment from February 6, 2006 through March 27, 2006.

EPA incorporated the 2005 monitoring data into the calculations for the permit limitations using the most current 5 years of data (2001 – 2005). This may have resulted in more or less stringent limitations than presented in the draft permit mainly due to changes in the variability of the data set. Also, EPA miscalculated the limitations for zinc in the fact sheet using only the chronic criteria (as if the state-wide criteria applied as a single site specific criteria). The corrected calculations are shown in the Attachments A and B to this document.

Comments were received from the Center for Race, Poverty & the Environment (CRPE), Trustees for Alaska, NANA Regional Corporation, Inc., Robert E. Moran, Teck Cominco

Alaska, Inc. (TCAK), and James Booth. The following presents a detailed summary of the comments received on the draft NPDES permit and associated Environmental Assessment, and EPA's responses.

General Comments

1. Comment: The permit should be denied.

   Response: EPA may deny or terminate permits only under certain circumstances. This comment does not present any justification for denying the permit.

2. Comment: EPA violated its own notice regulations when it commenced the public comment period for the permit. The commenter had requested to be placed on the mailing list but did not receive a notice or the documents when available.

   Response: EPA apologizes for this administrative oversight. In this case, the oversight caused no harm because the commenter's clients did receive the notice and the related documents at the start of the comment period so no new public notice or comment period was necessary.

3. Comment: EPA did not re-notice the extension of the comment period based on information contained on the permits website.

   Response: The extension of the public notice was published in the Anchorage Daily News on March 2, 2006, and in the Arctic Sounder on March 9, 2006. EPA regrets that this information did not appear on its website and, while the inclusion of information on the website is a useful communication tool, it is not a regulatory requirement. The commenter's clients also received a letter, dated February 24, 2006, announcing the extension. The letter was received in Kivalina on March 1, 2006.

4. Comment: CRPE requests a new notice and comment period.

   Response: EPA believes that the 51-day comment period was adequate.

5. Comment: Stating that permits are written for 5-year terms is misleading because permits are not always renewed as they expire. This fact should be disclosed to the public.

   Response: Page 17 of the Fact Sheet, Permit Part VII.D. states "This permit will expire five years from the effective date of the permit. Permits may be administratively extended under 40 CFR 122.6 if all the requirements of that regulation are met."

6. Comment: The draft permit is unclear because it includes discussion of numerous speculative options so it is difficult to tell what will be in the final permit.

Response: Draft permits are designed to present the intent of the agency to regulate a discharge. There are times, such as with this permit, where the regulations and/or water quality standards are in flux. In this case, a TDS site-specific criterion had been proposed by ADEC but had not been finalized or approved by EPA. Also, the cadmium site-specific criterion was proposed in the draft §401 Certification but still needs EPA approval to be applicable. It would not have been prudent to public notice the draft permit with only one scenario. This would withhold information from the public, information that could cause changes from the draft to final permit that were not advanced to the public. So EPA decided to include two scenarios for each of the above mentioned parameters and described in the Fact Sheet under what conditions each would be included or not included in the final permit in order to provide full notice and opportunity to comment on EPA's decision.

7. Comment: The draft permit is too long. Much of the text would have been more understandable had it been summarized in additional tables.

Response: Much of the permit language is required by regulation to be included or cited in the permit. EPA Region 10 prefers to include the language rather than cite the regulations to give the permittees as well as interested parties all the requirements in one package rather than needing a copy of the Code of Federal Regulations (CFR) to determine what the requirements are.

8. Comment: The permit is inconsistent because Permit Part I.C.11. states that "The permittee shall ensure that operations at Red Dog Mine do not cause downstream water quality problems, such as exclusion of fish or fish kills in the Ikalukrok Creek or the exclusion of fish migrating up the NF of Red Dog Creek" yet the permit allows a mixing zone that could be a barrier to fish passage.

Response: As discussed throughout the environmental assessment (EA), water quality and aquatic life conditions in Mainstem 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. The only change in the mixing zone in the final permit from the previous permit is the 1500 mg/L allowed instream TDS concentration during the artic grayling spawning period (increased from 500 mg/L). During non-spawning periods, the instream limit of 1500 mg/L is retained from the previous permit during which no barriers to fish passage have been observed. The revised mixing zone, therefore, is not expected to create barriers to fish passage. See also the State's final §401 Certification for the final permit.

9. Comment: The permit renewal violates 40 CFR 122.62 (a)(3)(iii) because EPA has limited authority to modify a permit to reflect a change in the State §401 Certification of

an NPDES permit based on 40 CFR 124.55(b). EPA cannot modify a permit to reflect changes, but must retain the original, more stringent discharge restrictions.

Response: The regulations cited in this comment set forth some of the limited 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 to revised State 401 certifications (40 CFR 124.55(b)). Those provisions do not apply here because EPA is reissuing an expired permit, not modifying a permit during its term.

10. Comment: The draft NPDES permit is essentially a license to pollute, Permit Part II.I., especially with the deletion of Permit Part I.C.15. The deleted sentence from Permit Part III.B.3. should be reinstated.

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 Part III.B.2 in the previous permit since there was no Part III.B.3. 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 is does not have any effect on the applicability of the listed civil and criminal penalties for non-compliance with permit requirements.

11. Comment: Cover Sheet. The applicant's correct name is "Teck Cominco Alaska Incorporated".

Response: The suggested change has been made in the final permit.

12. Comment: Table of Contents. Section I.G.W has some spacing problems.

Response: The suggested change has been made in the final permit.

13. Comment: In Permit Part I.H. on page 21 and throughout the remainder of the document, there are references to "insert state agency". Should this be ADEC?

Response: The cited language has been replaced with ADEC throughout the final permit.

14. Comment: Page 28, Permit Part I.J. A parenthetical states "(to who any trends)." Should this be (to show any trends)?

Response: The requested change has been made throughout the final permit.

15. Comment: The draft permit is legally inadequate. Specific permit standards have gotten progressively weaker.

Response: EPA will provide responses to specific, substantive comments but these comments are too broad and unspecific to merit a response.

16. Comment: The subjects confusingly discussed in Permit Part II.I.1. and 2. should be incorporated into actual effluent limitations in Table 1. EPA should provide technical justification for setting an informal antimony limit of 1 mg/L. Clarification on other numeric limitations and chemical constituents should be provided.

Response: The provisions found in these permit parts are not limitations but notification requirements. These provisions are included in the permit according to 40 CFR 122.42(a).

17. Comment: The current permit requires the submittal of the DMRs by the 15th day of the following month. The draft permit requires submittal of the DMRs by the 10th day of the following month. TCAK requests that the DMRs be submitted by the 20th day of the following month. Given the remoteness of the mine and the sampling frequency required by the draft permit, this revision of the reporting requirements is justifiable.

Because the nearest post office is over 100 miles away, and the mine cannot postmark letters, it may sometimes be impossible to comply with this reporting requirement. Weather can prevent the shipment of mail from the mine for as long as 10 days or more.

TCAK has been faxing the signed and certified DMR cover letters to the compliance officer, following guidance from EPA. TCAK wishes to continue this reporting practice for the renewed permit. TCAK does not believe that it is possible to achieve consistent compliance with Permit Part II.B. as written, regardless of the DMR due date. Therefore, TCAK requests that the permit specifically authorize facsimile transmittal of the DMR cover letters within a specified time period (20th) following the month sampled, with a postmarked copy to be provided as soon as practicable.

Response: EPA intended to change the required date for DMR submission but the boilerplate language was modified just prior to publication and this error was not caught. This mistake has been rectified in the final permit. Also, EPA has included a requirement authorizing a facsimile of the cover letter and a certification that the DMR is complete that will show compliance with this reporting requirement if the mailed report is delayed.

18. Comment: Explain changes in requirements in Permit Part I.D.2., if any.

Response: The change in the Station number for the example was not intended to change the requirement of this permit part.

19. Comment: There is no justification for removing the prohibition against unauthorized discharges and the reporting of those discharges (1998 Permit Part I.C.15.).

Response: Permit Part I states "This permit 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" and replaces the 1998 cited permit part. The reporting requirements of Permit Part II apply whether it is stated here or not.

20. Comment: Provision I.C.11 should be deleted from the permit or reworded because it is vague, beyond the scope of the Clean Water Act, is without equivalent precedent in other Region 10 mining permits. It implies that this permit process is inadequate to meet the requirements of the Clean Water Act.

The draft permit provision I.C.11 on page 14 states as follows:

> *"I.C.11. The permittee shall ensure that operations at 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."*

First, this permit can only regulate discharges that require NPDES permits under the CWA. The broad language here would include "downstream water quality problems" that are not related to regulation by NPDES permits as authorized by the CWA. Only discharges of pollutants as those terms are CWA defined are regulated by an NPDES permit. There are other regulatory programs that address non-discharge related threats to water resources, such as the Clean Air Act or RCRA.

Second, the term "problems" is vague and TCAK does not have fair notice of what is meant by this provision. There are no EPA Office of Water or Region 10 guidance documents that would explain to a permittee what its obligations are when a permit provision says don't cause any downstream water quality "problems."

Third, there is a permit shield that generally applies when an NPDES permittee receives a permit. The concept of the permit shield is that the permittee and the agency have spelled out the requirements with the permit limits and conditions. The permittee is then given a shield from requirements not spelled out in the permit. The proposed provision in this draft permit negates the permit shield TCAK is entitled to, because any "problem" is automatically a violation of the permit. This is impermissible.

Fourth, the discussion of fish kills or fish exclusion is contrary to the terms of this permit. TCAK has spent hundreds of thousands of dollars to obtain agency concurrence that appropriate permit limits have been developed and set to protect fish and fish migration. Studies of spawning, bioassessments, site-specific criteria, limitations on the time of discharge, etc., all have been exhaustively completed and negotiated so that

appropriate permit terms (of which TCAK as the permittee has fair notice) have been created and proposed in this permit process. The prevention of fish kills and the issue of fish exclusion have been extensively addressed throughout this permit process. To now state that all of that effort, all of these limits, and all of this monitoring is insufficient and that some other vague method of predicting if these other "problems" should be divined by the permittee is simply unfair and beyond the scope of this permit.

Finally, this provision is an open invitation for outside parties to file a CWA lawsuit based on their own assessment of what constitutes a water quality "problem." There is already a history of third party litigation over the current NPDES permit, and a vague provision such as this is inappropriate.

For all of these reasons, this provision must be deleted from the draft permit. In the alternative, if EPA is not inclined to delete the provision, then it should be modified as follows to make it consistent with the scope of an NPDES permit:

> *I.C.11. Discharges from operations at Red Dog Mine shall 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*.

Response: This provision was a condition of the previous permit and has been retained in the final permit. Removal of this provision would be less stringent than the previous permit and would constitute back-sliding under 40 CFR 122.44(l). EPA concurs with the discharger the provision should only be limited to potential water quality problems associated with discharges from the facility and EPA has included the discharger's suggested revision in the final permit.

21. Comment: The deletion of Permit Part I.C.15. coupled with II.1. [not a correct citation in the permit but likely meant II.I.] gives TCAK a permit shield for any unauthorized discharge which is considerably less protective of the environment and human health than the 1998 permit.

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 indicates that the "permit 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."

22. Comment: Permit Part II.I is a license to pollute especially with the deletion of Permit Part I.C.15. Deleted sentence from Permit Part III.B.3 should be reinstated.

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 generally changes periodically but EPA does not change the language on a permit-by-permit basis. EPA respectfully disagrees with the commenter that Permit Part II.I is a license to pollutant. This part is a required condition of the permit as specified in 40 CFR Part

122.42(a). Permit Part I.C.15 of the previous permit has not been included in the final permit. The final permit, however, requires all of the same non-compliance reporting included in the previous permit and does not allow discharges not authorized by the permit. Permit Part I specifically prohibits any discharges not described in the discharger's permit application. With respect to Permit Part III.B.3, EPA assumes the commenter is referring to the language in the previous permit about relieving the permittee of the civil and criminal penalties. While this sentence was deleted, there is nothing in the final permit that provides exceptions to the penalties described in Permit Part III.B. Otherwise, this part has not been changed from the previous permit except to add more stringent penalties for repeated violations.

23. Comment: The deletion of Permit Parts IV.I. and IV.J makes the permit weaker and they should be restored. Likewise, Permit Part IV.M. is weaker than the proposed condition and the previous version should be retained.

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 generally changes periodically but EPA does not change the language on a permit-by-permit basis. Permit Part IV.I from the previous permit is addressed in Permit Part IV.F of the draft and final permits. The discussion in Permit Part IV.J. of the previous permit has been deleted but nothing in the final permit or the CWA or other Federal regulations limits the discharger's oil and hazardous substance liability. EPA respectfully disagrees that the language in IV.I of the final permit is weaker than Permit Part IV.M of the previous permit.

Ambient & Biomonitoring

24. Comment: Pages 15-16, Table 4. In footnote 1, the referenced permit parts should be I.A.5.a and b. Footnote 1 should be added to WAD cyanide on page 15.

Footnote 3 referring to Permit Part I.A.6 should be deleted because this reference has changed and moved to footnote 1. With this footnote deleted, footnotes 4 – 6 should be renumbered 3 -5. The footnote number for WAD cyanide on page 15 should be changed to 3. The footnote number for TDS anions and cations on page 15 should be changed to 4. The footnote number for Whole Effluent Toxicity on page 16 should be changed to 5.

Response: Footnote 1 has been revised in the final permit to reflect the commenter's comments. Footnote 3 has been deleted.

25. Comment: EPA should defer to the ADEC's well-reasoned and persuasive rationale in the State §401 Certification on the appropriate level of monitoring required to reasonably demonstrate compliance with State water quality standards. For EPA to override the requirements in the State §401 Certification, some form of justification must be provided.

According to the fact sheet, 40 CFR 122.48(b) and section 308 of the Clean Water Act, EPA has reasonably broad authority to require monitoring in an NPDES permit. However, the monitoring must be justified by one of the following three categories:

1. demonstrate compliance with effluent limits;
2. assure that State water quality standards are met; and
3. provide information for future permitting.

Compliance with effluent limits is achieved through Outfall monitoring, with the exception of TDS, which is actually demonstrated through limiting flow at end-of-pipe. Since State water quality standards are met at end-of-pipe, with the exception of TDS, ammonia and cyanide, no downstream monitoring should be needed for assurance that state water quality standards are met other than for TDS, ammonia and weak acid dissociable (WAD) cyanide. With the exception of TDS, TCAK is unaware that data for any other parameters, including flow rates from anywhere other than Red Dog Creek, was used to develop this draft permit. Further, with 7 years of intensive ambient monitoring, additional intensive monitoring could not be justified for a future permit, particularly since it was not used in this permit. Please provide some form of justification for each parameter at each location in the ambient monitoring section in excess of what is required in the draft State §401 Certification.

Response: In the final permit, the pollutants and locations for ambient monitoring are consistent with the final State 401 certification.

26. Comment: Ambient monitoring should be discontinued when discharge has been discontinued for the season. Permit Part A.D.3. states that ambient monitoring can be discontinued 30-days after discharge from Outfall 001 has ceased. Discharge is discontinued when freezing conditions prevent accurate monitoring of in-stream TDS levels. This coincides with dramatic decreases in stream flow used for TDS dilution. Requiring monitoring 30-days after these conditions are occurring is very excessive, burdensome, costly and needless.

Further, these sampling events during the freeze crystallization process bias the entire monitoring station's data set. Organizations familiar with this phenomena and/or the Red Dog mine data set, are careful to exclude these data when evaluating the area's water quality, including potential impacts from the discharge. For example, when ADF&G compiled the water quality data for the annual bioassessments, they specifically excluded any water quality data collected when water temperatures were at or near 0° Celsius, specifically the post discharge season data.

Response: As discussed in the Draft Permit (Permit Part 1.D.2.), when flowing water is present at a given monitoring station, monitoring should be conducted. Thus, if the discharge is terminated and flowing water is not present at a given station sooner than 30-days following termination of discharge, no monitoring samples are required to be collected at that station. However, if flowing water is present, monitoring is required up to 30-days following the termination of discharge. EPA has determined that the collection of such samples are necessary to document in-stream conditions under post-discharge conditions. If TCAK believes that samples collected under certain post-

discharge conditions (e.g., sub-zero temperatures) bias the TDS data-set, such an argument can be made and supported with appropriate evidence in the annual water monitoring report required by the final permit.

27. Comment: The conditions in Permit Parts I.D.6. and 7 are considerably less protective of human health and the environment than the current permit and appear to be backsliding.

Response: EPA respectfully disagrees that the changes to I.D.6 and I.D.7 are less protective of human health and the environment. In both cases, none of the proposed changes in ambient monitoring requirements will cause greater impacts from the facility's discharges. In addition, the ambient monitoring changes are not subject to anti-backsliding requirements. Under 40 CFR 122.44(l), anti-backsliding requirements apply in reissued permits when an effluent limitation, standard, or other condition of the permit is made less "stringent." Changing the ambient, monitoring-only, requirements does not affect the "stringency" of the permit. This interpretation of anti-backsliding requirements is applied in all permits reissued by EPA Region 10.

28. Comment: The deletion of biomonitoring and ambient monitoring means that an important source of information on the mine's environmental impacts will be lost. Such information is critical to determine the impact of offsite pollution such as that along the haul road. Biomonitoring requirements should be retained in the NPDES permit. Pg 19-20

Response: ADEC stated in the draft §401 Certification that this Permit Part was duplicative of the biomonitoring requirements of Permit Part I.F.2. Since these requirements were included in 1998 as a requirement of State §401 Certification, EPA has deferred interpretation of these requirements to ADEC and has removed this section. The potential environmental impacts of the haul road are covered under the NPDES permit for the port site, AK-004064-9. This permit does include a prohibition on the use of mine water on the haul road.

29. Comment: There is no reason given for the removal of the bioassessment program requirements (1998 Permit Part I.F.1.).

Response: ADEC stated in the §401 Certification for the draft permit that this Permit Part was duplicative of Permit Part I.F.2. Since these requirements were included in the 1998 permit as a requirement of State §401 Certification, EPA has deferred interpretation of these requirements to ADEC and has removed this section.

30. Comment: The biomonitoring for benthic invertebrates has been dropped. This is backsliding and a failure to protect the environment. EPA should not scale back on the ambient monitoring requirements.

Anti-backsliding should apply to monitoring requirements and the removal of ambient and biological monitoring requirements violates 33 U.S.C. § 1342(o)(1).

Response: Under 40 CFR 122.44(l), anti-backsliding requirements apply in reissued permits when an effluent limitation, standard, or other condition of the permit is made less "stringent." Changing the ambient, monitoring-only, requirements does not affect the "stringency" of the permit. This interpretation of anti-backsliding requirements is applied in all permits reissued by EPA Region 10.

Effluent Characteristics

31. Comment: TCAK requests that the limits for fecal coliform be removed from the permit based on a finding of no reasonable potential to exceed the water quality criteria for bacteria, based on the TSD methodology. Further, given the difference between the proposed effluent limits and the available monitoring data, monitoring for fecal coliform should be removed from the renewed permit. Since 2000, 17 FC samples have been analyzed. Fifteen of the samples were reported at 0 colony forming units (cfu)/100 milliliter (ml). The remaining two samples were reported at 1 cfu/100 ml.

    Response: EPA does not generally conduct reasonable potential analyses for fecal coliform. But rather, as a matter of practice, EPA and ADEC include fecal coliform limits in all NPDES permits for facilities that discharge domestic wastewater. These limits are intended to ensure adequate treatment of domestic wastewater prior to discharge. EPA has recognized the low levels of fecal coliform in the effluent by retaining the monitoring frequency of once every 2 months.

32. Comment: There are no technical details that justify a Finding of No Significant Impact (FONSI) given that the mine has been discharging a minimum of 2.418 billion gallons per year from Outfall 001.

    Response: While this comment is on the FONSI, it was included in a section of specific inadequacies of the permit and EPA feels the need to correct a misassumption. The facility's discharge is limited to a maximum of 2.418 billion gallons per year.

33. Comment: EPA should encourage TCAK's discharges of its high quality effluent that achieves WQBELs, as these discharges improve receiving stream quality and enhance the resident biotic community. This annual flow draft permit condition does not have a sound environmental basis, as there is no environmental need to restrict the flow of discharges that meet the WQBELs. TCAK discharges have been documented to improve the water quality in the receiving stream and TCAK discharges have dramatically enhanced the viability and vigor of the resident aquatic community.

    TCAK should not have a flow limit because it meets the requirements of 40 CFR 440 Subpart L. Even if the Subpart L storm exemption were not met, it does not make sense to apply a Subpart J limitation as an annual discharge flow limitation with an

annual “use it or lose it” proposition. The goal of the Subpart J TBEL was to assure a minimum holding capacity on the part of a mine by allowing only net precipitation to be discharged. This requirement resulted in a facility’s need to design and implement a holding capacity that would store the amount of water equivalent to the annual net precipitation, and EPA’s effluent guidelines were based on the understanding that once that amount of water retention was provided in the system, the permittee should be allowed to discharge any excess water (assuming numeric TBEL and WQBEL effluent limitations are met). The Subpart J TBEL regulations do not set a time limitation on when that allowable discharge may occur.

Given the limitations on when discharges can be made (including restrictions to free flow periods in Red Dog Creek), it is even more critical to provide TCAK with discharge flexibility that can be accumulated over time.

Response: The fact that effluent quality may be improving the quality of the receiving water does not give EPA Region 10 the regulatory authority to allow a variance from the no-net-discharge requirements in the effluent limitation guidelines. In addition, 40 CFR 440.102(d)(2) explicitly states that the exemption from the no discharge requirement is allowed on annual basis, i.e., “the volume of water equivalent to the difference between annual precipitation falling on the treatment facility and the drainage area contributing surface runoff to the treatment facility and annual evaporation may be discharged.” EPA, therefore, believes it must retain the annual flow limit from the previous permit. Finally, despite the site-specific factors described in the comment, the discharger has been able to comply with the flow limit since issuance of the previous permit.

34. Comment: The draft permit includes a provision in I.A.2 that states “[t]he maximum cumulative volume discharged from Outfall 001 shall not exceed 2.418 billion gallons from January 1 through December 31 every year.” TCAK requests deletion of this draft permit provision. The basis of the volume limitation appears to be derived from the Ore Mining and Dressing Point Source Category Subpart J Effluent Limitations Guidelines (ELG), which initially allow discharges only to the extent evaporation exceeds precipitation, as set forth in 40 CFR Part 440. Because the design storm capacity exemption of 40 CFR 440 Subpart L is now achieved by TCAK’s tailings impoundment, there is no longer a regulatory need for this Subpart J annual flow limitation.

The design storm amount that TCAK would have to retain to qualify for the storm exemption would not exceed 81 million gallons (1.8 inch rain event over 72 million ft^2 catchments). TCAK’s tailings impoundment is currently holding approximately 4 billion gallons, and thus is clearly in excess of the design holding capacity that qualifies it for Subpart L relief from all Subpart J requirements that could create a flow limitation. As a result, any type of Subpart J derived annual volume limit on flow is not justified.

A review of seven other individual NPDES permits developed and issued by Region 10 to other mining facilities covered by Part 440 shows that these other facilities do not appear to have these types of annual flow limitations.

Response: EPA does not know which 7 permits were reviewed but the other 3 major mines in Alaska permitted by EPA contain flow limits. At 40 CFR 440.102(d)(2), the

effluent limitation guidelines specifically allow an exemption from the no discharge requirement for the volume of water that exceeds the difference between the precipitation falling on and evaporation from the tailings facility (plus any additional wastewater managed in the tailings impoundment that is not subject to the no discharge requirement). EPA, therefore, believes it is appropriate to establish a seasonal, maximum flow limit on the discharge to ensure compliance with this requirement. In addition, the flow limit is retained from the previous permit and any removal would be subject to back-sliding requirements. Finally, other types of tailings impoundments that are designed to meet the no discharge requirement are operated such that they only discharge when the volume of precipitation exceeds the capacity of the unit. The tailings impoundment at Red Dog operates as a continuous discharge facility and, therefore, EPA believes that the only way to ensure compliance with the effluent limitation guidelines is to include a flow limit in the final permit.

35. Comment: Because there is no mixing zone available, EPA should calculate all hardness dependent metals criteria based on the lower 5th percentile of the effluent hardness at Red Dog Mine for use in setting water quality-based effluent limits. The requested approach is protective of water quality, is consistent with permitting decisions made by EPA elsewhere in Region 10.

The hardness-dependent criteria for metals such as copper and zinc are designed so that once an effluent has achieved compliance with the criteria, the effluent cannot cause any downstream excursions above the criteria. In other words, the effluent only has to demonstrate compliance with the criteria once, and it can be assured that all points downstream have been protected from the metals in the effluent.

Response: EPA has calculated the hardness-dependant metals criteria based on the lower 5^{th} percentile hardness at the downstream edge of the mixing zone. This is the compliance location for the metals criteria so it is appropriate to use the instream hardness because the aquatic life criteria do not apply to the waterbody at the outfall but at a point downstream. EPA acknowledges that there are a few permits for which effluent hardness has been used. However, as a matter of general policy, particularly for mining projects such as the Pogo, Kensington, Beartrack, and Grouse Creek mines, instream hardness and in several cases upstream hardness was used in determining hardness-dependant criteria.

36. Comment: There is no reason to allow TCAK to calculate rather than measure hardness.

Response: The final permit requires the permittee to monitor for TDS anions and cations on a weekly basis. The measured values for magnesium and calcium cations can be used to accurately calculate the effluent hardness on a monthly basis as required by the final permit. Hardness monitoring is also included in ambient monitoring requirements; these data are used in determining hardness-dependent water quality standards. Please see the response to Comment No. 121.

Metals & Cyanide

37. Comment: EPA should retain the 1998 permit's effluent limitations and monitoring for nickel, silver, TDS, total cyanide, and hardness because no support or analysis was offered for the removal of most of these analytes.

Response: The 1998 permit did not contain effluent limits for nickel, silver, or hardness. The Fact Sheet on page 15 stated that no reasonable potential was found for nickel or silver to violate the water quality standards so the monitoring was being removed from the permit (item 7). Table C-4 contains the reasonable potential analysis showing that the maximum projected effluent for neither parameter would exceed the water quality standards shown in Table C-3.

Measured hardness was replaced in the permit by a calculated hardness. This method is acceptable and utilizes parameters already measured in the effluent. This was explained in item 6 on page 15 of the Fact Sheet.

The water quality standard for cyanide was changed in 2004 when EPA approved the revisions to the State's standards. The measure for cyanide changed from total cyanide to WAD cyanide to better correlate with the criterion which was promulgated as a free cyanide level. Since EPA approved the use of this new standard, it was utilized to calculate the effluent limits for cyanide. During this process, EPA determined from the data collected during the previous permit cycle for WAD cyanide in conjunction with the mixing zone proposed by ADEC, there is no reasonable potential for WAD cyanide to violate the standard. Monitoring for WAD cyanide is included in the permit.

The Alaska water quality standards allow a change based on site-specific criteria. In 2005, ADEC proposed a change to the TDS criterion based on site-specific information. The limits contained in the permit are based on the site-specific criterion which EPA approved on April 21, 2006.

38. Comment: This comment constitutes both a recommendation to EPA for the draft permit and a request to ADEC to include the recommendation from this comment in the final §401 Certification. It is similar to the comment for aluminum, with the exception that the state has already adopted a new chronic criterion for mercury. The new criterion that the state adopted is identical to EPA's new national recommended criterion. However, EPA Region 10 has not yet approved the state's new mercury criteria.

For reasons similar to those described for aluminum above, EPA should include a footnote for the mercury limits, and ADEC should endorse inclusion of the footnote in the §401 Certification of the final permit. The footnote should state:

> *The state has changed its freshwater chronic mercury criterion to equal EPA's national recommended criterion. When EPA approves this change, then the limit and monitoring requirement for mercury no longer applies.

Response: As noted by the commenter, EPA has not approved revisions to the state's chronic mercury criterion. The final permit limits, which were retained from the

previous permit, are based on the currently approved criterion. Although mercury has not been detected in the effluent during the past 5 years (detection limits have generally been higher than the permit limits), its inclusion in the Effluent Limitation Guidelines requires it to be limited in the permit.

Any modifications to the permit limits based on possible future approvals are speculative at this time. Even if the revised criterion was approved, proposed permit limit modifications would have to include both anti-backsliding and anti-degradation analyses. The final permit, therefore, does not include the "footnote" requested by the commenter.

39. Comment: Mercury limits in the draft renewed permit are significantly more restrictive than what is needed for the protection of human health and the environment. TCAK understands the regulations requiring that effluent limits be based on state water quality criteria that have been approved by EPA. However, TCAK wants to go on record concerning the mercury limits imposed in the draft permit. The statewide aquatic life criteria for mercury were promulgated by the ADEC through a public process in 2003. Despite the state adopting the national numeric criteria for mercury, in 2004 EPA declined approval of its own criterion for use in the state of Alaska. This is the same criterion that was approved nationally through extensive technical and peer review, a public process, notification in the Federal Register, publication in EPA's "Recommended Water Quality Criteria" and has been implemented in states and NPDES permits throughout the country. However, through EPA Region 10's non-public administrative technical evaluation, without peer review, this criterion was determined not to be appropriate for the State of Alaska, despite the people of Alaska's clear voice to the contrary. Consequently, Alaska dischargers such as the Red Dog Mine are required to meet effluent limitations for mercury that are 65 times more restrictive than other point sources throughout the country including dischargers in states with waters actively supporting various species of salmonids. EPA has remained silent for the past two years with regard to clarifying the lack of technical justification for its own criterion provided when it declined to approve the State's implementation of the federal criterion.

Response: See the response to Comment No. 38. The final permit limits are based on Alaska's currently EPA approved water quality standards for mercury.

40. Comment: Though the draft permit does contain limitations on aluminum, iron, lead, copper, selenium, zinc, ammonia and pH, these limitations are extremely high when compared to their respective aquatic life criteria.

Response: Although there are no limitations for aluminum and iron in the draft permit, all of the listed constituents were evaluated using the aquatic life criteria. The only listed constituent utilizing a mixing zone is ammonia. Appendix D of the Fact Sheet describes the procedures used to develop average monthly and daily maximum effluent limits from acute and chronic aquatic life criteria. The actual limitations may seem high but EPA uses conservative statistical procedures to convert criterion with a 4-day or 1-

hour exposure over a 3 year period into monthly average and daily maximum effluent limitations.

41. Comment: EPA includes two cadmium effluent limitations, labeling one proposed. This makes it unclear what will be included in the permit, the recommendation is the more stringent since EPA presents no evidence of argument for the second, less protective effluent limitation.

Response: Table C-3 of the Fact Sheet lists the applicable water quality standards that EPA utilized in developing effluent limitations. When ADEC issued their §401 Certification for the draft permit, a site-specific criterion was proposed for cadmium based on the natural condition of the waterbody. Since this proposed criterion had to go through public comment as well as EPA approval, no assumption could be made on which criteria would be applicable when the final permit was issued. So that the public had notice and opportunity to comment on both possible sets of permit limits, EPA presented both and stated in the Fact Sheet that

> "A permit must be issued using the water quality standards in effect at the time of issuance. Table C-3 also contains the water quality standards that ADEC has proposed. These standards may be adopted by ADEC and approved by EPA before the Red Dog permit is finalized. Permit limitations have been calculated using the new standards as well as those currently in effect."

The effluent limits in the final permit are based on the SSC which EPA approved on February 27, 2007.

42. Comment: The monitoring frequencies specified in the draft permit (Permit Part I.A.1. Table 1.) for zinc and total suspended solids (TSS) are overly burdensome and should be reduced. TCAK understands that the permit must contain limits on the mine effluent for zinc and TSS as they are effluent limitation guideline parameters in 40 CFR Part 440. However, because there is no reasonable potential for the effluent to exceed water quality standards for zinc and TSS, the monitoring frequency should be reduced. Despite Red Dog Mine being a zinc mine, available data indicate that there is no significant variation of zinc and TSS in the treated effluent that justifies the proposed weekly monitoring.

Response: EPA concurs with the commenter's assertion that from 2000-2006, zinc and TSS have not been detected in the effluent at levels above the draft permit limits. The monitoring frequency for zinc has, therefore, been reduced to monthly. Since the primary purpose of the tailings impoundment is to provide settling, EPA believes that it is reasonable to require weekly TSS monitoring to measure settling performance. EPA assumes that this will be done in conjunction with weekly monitoring for other parameters.

43. Comment: Since it is well known that hexavalent chromium does not occur naturally in any significant quantities, TCAK objects to the continued monitoring of total chromium

in the effluent or at any ambient monitoring stations, especially at a once per week frequency. TCAK has sampled Outfall 001 for total chromium 111 times since 2001. Seventy-two (72) of those samples contained non-detectable amounts of chromium. The maximum concentration in the 38 samples with detectable amounts of total chromium was 5.68 µg/L.

Chrome III (the lower oxidation state) is the predominant naturally occurring form, such as in ore deposits, and chromium VI (the higher oxidation state) is a man-made form of chromium used in industries such as electroplating. The mine does not use any chemicals that contain chrome VI, and none of the mining processes can oxidize chrome III to chrome VI. Therefore, the vast majority of the total chromium in the Red Dog Mine effluent samples is chromium III with very little to no chromium VI present.

From October 2005 through February 2006, TCAK analyzed 13 samples from water treatment plant 1 (WTP-1) for total and hexavalent chromium. WTP-1 effluent has very similar characteristics to the mine effluent with regards to speciated chromium. Of the 13 WTP-1 samples, all had non-detectable amounts of chromium VI, 10 had non-detectable amounts of total chromium, and three had detectable amounts of total chromium at levels < 0.5 ppb.

The 111 Outfall 001 samples collected over a 5-year period show that the level of total chromium in the effluent is roughly half of the most restrictive fresh water quality criterion for chromium species, which is for chromium VI. Because chromium VI is a very small fraction of the total chromium in the effluent, there is no justification for weekly monitoring of total chromium in the effluent. In fact, given that there are no detectable amounts of hexavalent chromium in the effluent, there is no need for any monitoring of total chromium.

Response: EPA concurs with the commenter that historic effluent data show that there is not reasonable potential for chromium to exceed the most stringent water quality criteria. Because of the nature of the effluent and the fact that total chromium has been detected, monthly monitoring for total chromium is included in the final permit.

44. Comment: Table C-5 on page 57 in Appendix C of the Fact Sheet indicates that when the proposed NCBSSC for cadmium is applied, the water quality-based maximum daily and average monthly limits are 6.30 and 2.95 µg/L respectively. TCAK cannot reproduce these limits based on the NCBSSC in the State's §401 Certification. The preliminary draft permit shows these limits as 4.3 and 2.0 µg/L, respectively. TCAK can reproduce these limits. TCAK requests that EPA check the calculations to validate that the correct limits are included in the permit.

Response: EPA acknowledges that the cadmium limits in the draft permit (as well as the limits in the preliminary draft permit cited by the commenter) were calculated incorrectly. The corrected limits have been included in the final permit. Attachment A to this response to comments document provides a spreadsheet that shows how all of the water quality-based effluent limitations were calculated.

45. Comment: This comment is a recommendation to EPA for the draft permit, a request to ADEC to include the recommendation from this comment in the final §401 Certification, and a request to ADEC to undertake rulemaking to delete the chronic freshwater aluminum criterion from the state's water quality standards manual.

The need for water quality-based aluminum limits is driven by the state's chronic aluminum criterion of 87 µg/L. The state adopted EPA's chronic criterion without critically examining the basis for the criterion, and EPA subsequently approved it. Recent permitting decisions have determined a need for WQBELs for aluminum in NPDES permits, driven by the chronic criterion. The permit limit requirement led TCAK to more closely evaluate the criterion itself.

TCAK believes that the chronic aluminum criterion is not supported by EPA's own science and further, that the state would be justified in eliminating the chronic criterion from its water quality standards. This action would make the Alaska water quality standards consistent with those of many other states, which have either adopted no criteria for aluminum or only an acute criterion for this metal.

Because of this reasonable possibility, TCAK proposes that the permit include a simple, self-implementing provision to inactivate the aluminum limit and monitoring requirement in the event that the state eliminates or changes its chronic aluminum criterion such that a limit would no longer be needed. ADEC would have to adopt the change and the change would have to be approved by EPA before the provision would be triggered. This approach is recommended to save the work of reopening a permit to make a later change, and to also avoid having a prolonged period of having to comply with a limit after the basis for the limit is removed. This permit condition could be incorporated as a footnote for aluminum in table 1 on page 5 and in table 4 on page 15.

Response: There is no rationale for including the commenter's proposed language in the permit since EPA is not aware of any state plans to propose modifications to the chronic aluminum criterion. Any modifications to the permit limits based on possible future approvals are speculative at this time. Even if the revised criterion was approved, proposed permit limit modifications would have to include both anti-backsliding and anti-degradation analyses. The final permit, therefore, does not include the "footnote" requested by the commenter. The final permit limits, therefore, are based on the current criterion.

46. Comment: EPA allowed backsliding of several water quality-based effluent limits in the draft permit based on the CWA 303(d)(4)(B) exemption, provided that the relaxed limits are consistent with the state antidegradation policy. However, as when EPA approved the NCBSSC for zinc in the current permit that is applicable to the same location, the same pre-mining data set, the same methodology, and nearly the exact supporting documentation (draft §401 Certification) as the proposed cadmium NCBSSC, the water quality standards rule at 40 CFR 131.5(a)(2) requires that EPA approve a state water quality criterion only if the criterion is protective of all downstream designated uses.

In Ikalukrok Creek the existing aquatic life use is less than the designated aquatic life use. Therefore, EPA approval of the NCBSSC for cadmium is also certification that the criterion is consistent with the state antidegradation policy and backsliding of effluent limits calculated from the criterion is allowable. Furthermore, Appendix A in the State §401 Certification to the draft permit provides ample information demonstrating that the criterion is protective of designated and existing uses in all receiving streams designated for aquatic life use and the state has certified the criterion as being consistent with its antidegradation policy. TCAK requests that the maximum daily limit for cadmium be set at 4.3 µg/L.

Response: The final daily maximum limit in the permit is set at 3.5 ug/L as calculated from the EPA-approved site-specific criterion for cadmium of 2 ug/l.

47. Comment: The cyanide monitoring section from the 1998 permit has been removed without reason.

Response: This section of the 1998 permit, Permit Part I.A.6., describes how total cyanide samples were to be analyzed because of the potential for matrix interferences. The potential for interference is not an issue with the analysis for WAD cyanide. This section was removed because total cyanide analysis is not required in the permit.

48. Comment: Outfall 001 should be analyzed for both WAD and Total Cyanide and also for cyanate and thiocyanate once per week as noted in the proposed permit documentation.

Response: Consistent with Alaska's water quality standards effluent monitoring for WAD cyanide is required in the final permit. EPA is not aware of the references to cyanate and thiocyanate cited by the commenter and EPA does not believe there is a purpose to require such monitoring in the permit.

49. Comment: Since there is no cyanide monitoring at Stations 2, 73, 160 or 10 in the new permit, how can EPA determine whether the removal of the cyanide effluent limitation will not have any impact downstream.

Response: This will be shown by compliance with the water quality standards at the edge of the mixing zone measured at Station 151.

50. Comment: Ambient monitoring for cyanide should not be removed from the permit so that the residents of Kivalina who drink the water will know the concentrations of cyanide as it moves downstream.

There is no justification for the decreased ambient monitoring frequency for cyanide.

There is no support for deleting the total cyanide ambient monitoring.

Response: Alaska's drinking water standard for cyanide is based on "free" cyanide, which is measured as WAD cyanide rather than total cyanide. Ambient monitoring for

total cyanide, therefore, was removed from the permit since it is no longer the measure of compliance with the applicable standard. The permit contains ambient monitoring for WAD cyanide at the edge of the mixing zone at Station 151. In addition, from 2001 through 2005, no effluent value approached the drinking water standard of 200 ug/L.

51. Comment: EPA removed enforceable effluent limitations for any form of cyanide with no technical justification.

Response: EPA provided justification on page 55 of the Fact Sheet:

> ". . . there is no reasonable potential for the effluent to exceed the applicable criteria, and no limit is necessary. Monitoring shall remain in the permit on a weekly basis. Ambient monitoring for WAD cyanide has also been added to Station 151."

Mine Drainage & Storm Water

52. Comment: TCAK does not contest that, if the precipitation flow from its overburden areas is commingled with mine drainage, it then must be handled as mine drainage. If this is the intent of I.C.2, TCAK requests that the provision be rewritten as follows:

> I.C.2. Precipitation falling on the overburden stockpile that is directed into the tailings impoundment shall be handled as mine drainage and shall not be discharged except in accordance with the permit limits for process wastewater discharges.

Response: The referenced section has been deleted from the final permit consistent with the revised definition of storm water as discussed in the response to comment No. 56. Note that storm water runoff from the overburden stockpile must be discharge through an NPDES-permitted outfall.

53. Comment: The draft permit requires TCAK to capture flows that are not subject to the effluent limitations guidelines, which increases the probability that the maximum flow limit will become problematic in the future.

In the draft permit, EPA requires TCAK to capture flows that are not subject to the ore mining and dressing limitations, thus subjecting the mine to the 440 limitations for additional flows that impinge upon the storage capacity of the tailings pond. For example, the draft permit changes the regulatory definition of "mine drainage" from the Part 440 definition by adding "seeps from the ore" to the definition of mine drainage at page 40 of the draft permit. Then, the draft permit requires (at I.C.3) that "[m]ine seepage from the ore site shall be collected" and then "pumped into the tailings impoundment" or otherwise "retained until it can be treated." In addition, in the definition of "stormwater" in the draft permit at pages 40-41, Region 10 is excluding traditional industrial stormwater (not subject to Part 440 flow limitations) from the definition and then seeks to place such stormwater into the category of "mine drainage"

by requiring such stormwater in I.C.2 that "[t]he permittee shall ensure that precipitation falling on the overburden stock pile shall be directed into the tailings impoundment."

Response: Please see the responses to Comment Nos. 54, 55, 56, 98, and 99.

54. Comment: The definition of mine drainage must be modified to make it consistent with the Part 440 definition. "Mine drainage" is a term of art, defined at 40 C.F.R. 440.132(h) as "any water drained, pumped or siphoned from a mine." This specific term has a specific purpose, for all mine drainage (as defined) is subject to the TBEL limitations in Part 440. The draft permit seeks to modify the Part 440 scope of coverage by changing the definition in the ELG. This is not permissible, as there is no legal basis for this. The last five words "including seeps from the ore" must be stricken from the definition of mine drainage and the definition must be made consistent with the Part 440 regulations.

The receiving stream, Red Dog Creek, always has been contaminated by seeps and flow of streams across the high-grade natural ore deposits in the general area. The natural seeps and stream flows across the ore body have caused the well-documented natural contamination of the stream. Red Dog Mine operations have minimized the impact of such natural ore seeps and stream flows on Red Dog and Ikalukrok Creeks by collecting and treating many of them. However, there is nothing in the NPDES permit program that authorizes EPA to require a company, once it starts mining in an area, to undertake a commitment to remove all pre-existing, naturally occurring hydrologic contamination of the receiving stream from ore bodies that have existed for thousands of years.

It is also unfair to include seeps from ore in the Red Dog Mine area as "mine drainage" because such seeps were not within the 1978 and 1982 cost calculations and regulatory development documents for determining the cost of complying with the Part 440 regulations, and thus could not be required by Part 440. Any naturally occurring seeps and leaks are not the responsibility of TCAK unless such seeps and leaks are commingled with mine drainage.

Response: EPA concurs with the commenter and has modified the definition of mine drainage to reflect the regulatory definition in 40 CFR 440.132(h). Note that this definition includes any water drained, pumped, or siphoned from the active mine area, which would include seeps into the mine . Please also see the response to Comment No. 98.

55. Comment: The provision at I.C.1 requiring mine drainage to be directed into the tailings impoundment or retained until treated should be modified. NPDES permit limits on the discharge of process wastewater (Part 440 wastewater) are based on TBELs and WQBELs. So long as the TBELs and WQBELs are met, then the discharge is legal. If for some reason mine drainage from a particular area can meet TBELs and WQBELs for discharge without first being directed into the tailings impoundment or retained until treated, discharge should be permissible.

Currently, the draft permit provides as follows:

"I.C.1. Mine drainage shall be:
a. directed into the tailings impoundment; or
b. retained until it can be treated."

Because the real concern is that mine drainage not be discharged unless it meets applicable effluent limitations (in this case, primarily WQBELs), TCAK suggests that the following language be substituted in this provision:

I.C.1. Mine drainage shall be:

a. directed into the tailings impoundment; or

b. otherwise retained unless and/or until it can be discharged in accordance with the permit limitations set forth herein.

Response: EPA concurs with the comment that the mine drainage does not have to be treated if can it can otherwise meet the effluent limitations. It must, however, be discharged through Outfall 001 as the discharger requested in its permit application. EPA has, therefore, included the commenter's proposed language in the final permit with one addition, i.e., Permit Part I.C.1.b is changed to "otherwise retained unless and/or until it can be discharged **through Outfall 001** in accordance with the permit limitations."

56. Comment: The definition of storm water in the permit should be made consistent with the law and regulations. The second sentence in the draft permit definition of storm water on pages 40-41 states that:

"Runoff from waste rock piles, ore and sub-ore piles, spent ore piles, overburden, unreclaimed disturbed areas and other active mining areas constitutes 'mine drainage,' not storm water."

The draft permit thus is excluding traditional industrial storm water (not subject to 40 CFR Part 440 flow limitations and instead regulated under 40 CFR 122.26) from the definition of storm water. EPA seeks to place such storm water into the category of "mine drainage" by requiring in I.C.2 that "[t]he permittee shall ensure that precipitation falling on the overburden stock pile shall be directed into the tailings impoundment."

This draft permit requirement that TCAK convert 40 CFR 122.26(b)(14) industrial storm water into mine drainage directly contradicts EPA Headquarters' policy and the regulations.

TCAK has been directing all of its overburden runoff to the tailings pond and will continue to do so for the duration of this permit, thus discharging it in accordance with mine drainage. At some point however, overburden piles could be reclaimed such that stormwater would be suitable for discharge under an industrial stormwater program. TCAK desires the flexibility to use such a program when appropriate and in compliance with stream quality standards.

Response: EPA agrees with the commenter that the draft permit's definition of storm water is incorrect and inconsistent with EPA's modification to the storm water multi-

sector permit for industrial activities (FR Volume 63, Number 152, pages 42533-42548). The draft permit language used the language from the previous permit which was issued just prior to the effective date of the new definition. EPA apologizes for this oversight. The second sentence of the definition has been removed from the final permit. Runoff from waste rock and overburden piles is storm water runoff unless it is combined with mine drainage as defined in 40 CFR Part 440. If TCAK proposes to discharge runoff from overburden or waste rock piles separately, it would have to first obtain coverage for the discharge under an individual or general storm water discharge permit.

Minimum Levels

57. Comment: Permit Part I.A.5.d – Please define MDL and ML in the permit. An MDL is the analytical level at which it can be determined with statistical validity (99% confidence level) that a specific constituent is present in a sample at a concentration greater than zero (*see* 40 CFR 136, Appendix B). An ML is the concentration at which an analytical method can quantify, within a specified degree of statistical confidence, the reported concentration of a specific constituent in a sample.

The fact sheet at page 16 states, "All requested MDLs are below the effluent limitations for parameters that are limited in the draft permit. As such, there are no Minimum Levels designated as compliance levels in the draft permit." This statement is contrary to the intent of the language in Permit Part I.A.5.d., which identifies the interval between the MDL and ML as a region where reported values have a statistical level of uncertainty such that their reliability is insufficient to determine compliance.

The "requested" MDL and existing permit MDL for selenium are the same (i.e., both are 2 µg/L). However, the ML compliance evaluation level of 6 µg/L has been removed from the draft permit without any change to the MDL. As a rule of thumb according to EPA, the ML is 3.3 times the MDL. This criterion supports including an ML (compliance evaluation level) of 6 µg/L in the draft permit, which is the same ML Compliance Evaluation Level as that in the current permit.

Furthermore, the draft permit indicates that the AML for selenium is 4.23 µg/L, which is less than 6 µg/L. EPA's laboratory cannot achieve an MDL, let alone an ML, at levels two times greater than the current effluent limits for selenium. TCAK's contract laboratories can do better than this, but their performance does not justify the removal of the compliance evaluation level (ML) for selenium in the draft permit. TCAK requests that the ML of 6 µg/L for selenium be included the final NPDES permit.

Response: EPA has removed the method detection limits from the final permit. Instead, the final permit requires that the discharger use EPA-approved methods that have MLs lower than the effluent limitations included in the permit, wherever possible. The following table summarizes the standard methods available for the pollutants in the final permit and their MLs. Specifically, for selenium, EPA standard method 200.9 can be used with an ML of 1.9 ug/L.

Methods Table				
Parameter	Lowest limit/target (in ug/L unless otherwise noted)	Method[1,2]	Method Detection Limit (MDL)	Minimum Level (ML)
Aluminum	55.20	200.7	20	50
		200.8 (scan)	1.0	3.2
		200.8 (sims)	1.7	5.4
Ammonia	6.8 mg/L	350.1	NA	10
Cadmium	2.00	200.8 (sims)	0.03	0.1
Copper	17.15	200.8 (scan)	0.5	1.6
		200.8 (sims)	0.2	0.6
Chromium, Total		200.7	4.0	10
		200.8 (scan)	0.9	2.9
		200.8 (sims)	0.08	0.25
		200.9	0.1	0.3
Chromium VI		218.4	8	10
Cyanide		4500 CN-I		10
Iron		200.7	30	100
Lead	8.78	200.8 (sims)	0.05	0.16
Manganese		200.7	1	10
		200.8 (scan)	0.1	2.9
		200.8 (sims)	0.02	0.25
		200.9	0.3	0.3
Mercury	0.01	1631	0.2 ng/L	0.5 ng/L
Selenium	4.23	200.9	0.6	1.9
Tot. Res. Chlorine		4500 C, G, 330.5		20
Zinc	237.11	200.7	2	5
		200.8 (scan)	1.8	5.7
		200.8 (sims)	0.1	0.3

1 - There may also be methods for individual parameters that measure to the necessary levels. Any method approved in 40 CFR Part 136 may be utilized.
2 - Method 200.8 has not been included in 40 CFR Part 136 but has been proposed for inclusion. The permittee may request the use of this method through the Alternate Test Procedures (ATP) process outlined in 40 CFR 136.4.

58. Comment: Permit Part I.A.5.b. Table 2. – While the Fact Sheet correctly states that TCAK requested the MDLs specified in the draft permit, TCAK is not clear as to whether EPA is proposing to include these MDLs in the final permit, or will continue with the current permit MDLs. Assuming that EPA is proposing these new MDLs, it should have been clarified in the Fact Sheet that these MDLs can consistently and reliably be achieved by contract laboratories that are experienced in analyzing the complex mine effluent matrix.

Response: See the response to Comment No. 57.

59. Comment: Permit Part I.D.5.d – Since the MDL for weak acid dissociable (WAD) cyanide is the same as for total cyanide in the current permit, TCAK requests a 9 µg/L ML (compliance evaluation level) for WAD cyanide be included in the permit, if for any reason cyanide limits below the ML concentration are imposed in the renewed permit.

Response: See the response to Comment No. 57. The final permit requires that the discharger use EPA-approved methods that have MLs that will demonstrate compliance with permit limits, wherever possible. On November 16, 2005, EPA approved use of standard method 4500 CN-I for WAD cyanide. The ML of 10 ug/L for this method is included in the final permit (see the table in the response to Comment No. 57).

60. Comment: Table 3 presents the limits for Outfall 002, which include limits for total residual chlorine (TRC). The requested MDL for TRC is 100 ug/L. Therefore the specified method in footnote 3 cannot quantify TRC at the permit limit concentrations. Having a compliance evaluation level of 100 ug/L is consistent with the general permit AKG-57-0000 for small sewage treatment plants (STP) identical in size to the ConPAC STP discharging to Outfall 002.

Response: See the Response to Comment No. 57 . The final permit requires that the discharger use EPA-approved methods that have MLs that will demonstrate compliance with permit limits, wherever possible. EPA recognizes that the ML for total residual chlorine is 20 ug/L for Methods 4500-Cl E and G from Standard Methods for the Examination of Water and Wastewater, 18th or subsequent Edition(s) and Method 330.5 from U.S. E.P.A Manual of Methods of Analysis of Water and Wastes.

61. Comment: Why is Permit Part I.A.5.d. in the permit since there are no Minimum Levels (MLs) contained in the permit?

Response: No MLs were included in the draft permit as compliance levels but there is potential for the chemical analysis of the effluent to be lower than a method's ML or method detection limit. This Permit Part describes the method to use these numbers to report the results.

Monitoring, Sampling & Reporting

62. Comment: The monitoring frequencies specified in the draft permit (Permit Part I.A.1. Table 1.) for zinc and total suspended solids (TSS) are overly burdensome and should be reduced. TCAK understands that the permit must contain limits on the mine effluent for zinc and TSS as they are effluent limitation guideline parameters in 40 CFR Part 440. However, because there is no reasonable potential for the effluent to exceed water quality standards for zinc and TSS, the monitoring frequency should be reduced. Despite Red Dog Mine being a zinc mine, available data indicate that there is no significant variation of zinc and TSS in the treated effluent that justifies the proposed weekly monitoring.

Response: EPA concurs with the commenter's assertion that from 2000-2006, zinc and TSS have not been detected in the effluent at levels above the draft permit limits. The monitoring frequency for zinc has, therefore, been reduced to monthly. Since the primary purpose of the tailings impoundment is to provide settling, EPA believes that it is reasonable to require weekly TSS monitoring to measure settling performance. EPA assumes that this will be done in conjunction with weekly monitoring for other parameters.

63. Comment: The proposed monitoring frequency for organic priority pollutant scans (OPPS) is overly burdensome, based on the almost total absence of such pollutants in the Red Dog Mine effluent. Since the effective date of the current permit, TCAK has conducted 24 Organic Priority Pollutant Scans (OPPS). The results can be summarized by stating that there are approximately 2000 non-detect results for the organic constituents in an OPPS. In all the OPPS conducted, there have been two (2) values measured that were above the method reporting limits. Neither of these constituents has water quality standards or were reported at a level of concern. As explained in the application addendum, neither of these chemicals is used at Red Dog Mine and they are both extremely common laboratory cross-contaminants.

Response: EPA has reviewed the organic priority pollutant data and concurs with the commenter that these compounds have generally not been found in the discharge nor would they be expected to be found based on facility operations. The final permit, therefore, reduces the monitoring frequency to once annually.

64. Comment: The analytes for organic priority pollutants analyses should be defined in the permit (Permit Part I.A.1. Table 1.), if EPA declines to delete the OPPS monitoring requirement. EPA should define, reference and/or provide a list of analytes for the required "Organic Priority Pollutant Scan". If the scan contains analytes for constituents that are not used and have no potential to be present at the Red Dog Mine, such as PCB and pesticides, TCAK requests that EPA specify in the permit that these compounds are not required to be analyzed in the event that EPA does not remove the OPPS monitoring requirement as requested by TCAK.

Response: The discharger should include the following pollutants listed in Section V., Part C of EPA's Permit Application Form 2C: (1) 1V-31V – volatile compounds, (2) 1A-11A – acid fraction compounds, and (3) 1B-46B- base/neutral compounds. This does not include any pesticide or PCB compounds. EPA's Form 2C can be found at .

65. Comment: Please remove the requirement to record and report the total volume pumped from the "Dirty Water Sump" in each DMR. Management and handling of mine drainage internal to the operation, not affecting the characteristics of the permitted Outfall is beyond the authority of a NPDES permit. Monitoring of internal mine drainage flows should also be beyond NPDES authority. However, even if it isn't, this monitoring is not necessary to determine compliance with Outfall limits or State water quality standards, nor was it used in development of this draft permit. There is no anticipation

that these flows will significantly change over time, therefore the existing data set should be sufficient. If for whatever reason this requirement is retained, please change the reporting frequency to the annual report and not the monthly DMRs.

Response: EPA disagrees with the commenter about deleting the requirement to report the referenced flows. As the mine continues to be developed, the volume of water in the sump (and the pumped volume) could vary with surface area and ground water inflows. This information may be used to support future permit reissuance in determining water management and treatment capacity requirements and effluent flow limits. Monthly flow data are not needed, however, and the final permit only requires submittal of the total annual volume of water pumped from the sump during each discharge season.

66. Comment: The Fact Sheet (page 12) provides no justification for continuing the monitoring at Stations 2, 9, and 20, contrary to ADEC's §401 Certification recommendations to remove monitoring for these stations. Station 2, which is located on the Wulik River, is extremely remote from the mine and historic data from this station has never shown any measurable effects of the mine discharge. To the best of TCAK's knowledge, EPA, ADEC, and OHMP have never used the Station 2 monitoring for stream flow data for any evaluations of the mine discharge. Station 9 is located in Ikalukrok Creek upstream of the confluence with Red Dog Creek. Monitoring at this station has provided data on the background water quality in the creek before it mixes with the mine effluent that is present in Red Dog Creek (when the mine is discharging). Station 9 data, while useful before there was an extensive record of water quality at Station 150 (at the end of the Ikalukrok Creek-Red Dog Creek mixing zone) and Station 160, no longer contributes any value to assessing compliance of Ikalukrok Creek with applicable water quality standards and designated uses. Further, no Station 9 data were used to develop the draft permit. Therefore, there is no basis for continuing monitoring at Station 9, and TCAK requests that it be deleted from the NPDES permit. Station 20, which is located in Middle Fork Red Dog Creek upstream of the confluence with North Fork Red Dog Creek, monitors the Outfall 001 effluent mixed with flows from the Middle Fork tributaries. Because the permit limits at Outfall 001 are protective of the designated uses in the Middle Fork (i.e., 100% effluent achieves the applicable water quality criteria), monitoring at Station 20 is not needed to demonstrate compliance with the designated uses and associated water quality standards.

Response: In its §401 Certification for the draft permit, ADEC found that ambient monitoring requirements at stations 2, 9, and 20 are unnecessary to determine whether effluent treatment and the size of the mixing zone are adequate to protect all existing uses in the receiving water. EPA has considered TCAK's request and ADEC's §401 Certification and agrees that compliance with the permit can be demonstrated with fewer monitoring points. EPA concurs with ADEC's assessment and has eliminated monitoring requirements for these three stations.

67. Comment: Flow monitoring at stations 2, 8, 9, 12 and 140 should be deleted from the permit. As indicated in the previous comment, ADEC's §401 Certification recommended deleting stream flow monitoring at Stations 2, 8, 9, 10, 12 and 140 from

the NPDES permit. The rationale for deleting stream flow monitoring at these five stations is that the data are not used or needed to assess compliance with water quality standards, there is a long historic record of flows from previous permit monitoring requirements, and the resources required to perform this flow monitoring are extensive. Data from Stations 2 and 9 are not used for any assessment of compliance with the water quality standards, and require the commitment of extensive resources by TCAK. Station 8 is located within the mixing zone of Red Dog Creek and Ikalukrok Creek and is irrelevant for compliance purposes. Station 12, located on North Fork Red Dog Creek, provides stream flow data upstream of its confluence with Red Dog Creek. As with Station 9 on Ikalukrok Creek, this station provided a historic database that may have been useful before there was a long historic record of mine discharges and their effect on stream flow and water quality in Red Dog Creek. Monitoring at Station 151, which is located at the end of the mixing zone for Red Dog Creek after its confluence with the North Fork of Red Dog Creek, provides all of the ambient water quality and flow data required to assess the compliance of Red Dog Creek with its designated uses and water quality criteria. Station 140, located on Middle Fork Red Dog Creek upstream of Outfall 001, does not provide any stream flow data that are useful for assessing compliance with water quality standards and designated uses. The volume of water discharged from Outfall 001 is controlled by TCAK using a specific conductivity-total dissolved solids (TDS) correlation developed from historic monitoring data (Permit Part I.A.8 in the current NPDES permit) in order to assure compliance with the water quality standards at Station 151 (edge of Red Dog Creek mixing zone), Station 150 (edge of mixing zone with Ikalukrok Creek), and Station 160 (downstream Ikalukrok Creek).

If for whatever reason flow monitoring at stations other than 151 and 160 are required by the permit, please acknowledge in the permit that there are certain times in the spring and fall that flow monitoring cannot be safely accomplished due to ice conditions. As ice forms, particularly on the smaller streams (all stations other than Station 2), stage monitoring equipment cannot function properly and the rating equations used to calculate flow rates based on stage become useless as the ice changes the channel cross-section morphology. Further it is unsafe for personnel to enter the stream to take direct flow measurements during those time periods. Therefore, it is impossible to provide accurate flow information during certain times of the spring and fall. There are no references in the permit to safety considerations other than footnote 2 in table 4, which only covers the sample collection required by table 4 and does not reference flow monitoring activities. Since the CWA is a strict liability act, without specific provisions in the permit, failure to collect any required monitoring data is technically a violation of the permit and subject to enforcement by EPA, ADEC or any citizen.

Further, if flow monitoring at locations other than Station 151 and 160 are required by the permit, please change the reporting frequency to the annual report and not the monthly DMRs.

Response: ADEC determined that eliminating streamflow measurements from stations 2, 8, 9, 10, 12 and 140 would still provide adequate evidence to determine whether effluent treatment and the size of the mixing zone are adequate to protect all existing uses in the receiving water. As noted in the previous response, EPA has eliminated monitoring requirements for Stations 2 and 9. EPA has determined that flow

data will not be required for stations 8, 10, and 12 as well. EPA has retained the flow requirement for Station 140 to maintain the historic record considering the exploration activities being conducted upstream.

68. Comment: It is irresponsible to discontinue the tributary monitoring especially since TCAK is embarking on exploration in this area. There is no way of knowing how much pollution is the result of natural mineralization and how much is being added by TCAK.

Response: Exploration activities are being conducted north of the tributaries. Monitoring requirements for Station 140 are being retained to determine the effect of mining in the Middle Fork of Red Dog Creek.

69. Comment: There is no support for changing the ambient monitoring from Station 10 to Station 151. This change will make comparisons to historic ambient monitoring difficult.

Response: Station 10 is downstream of Station 151 and is not necessary to demonstrate compliance with any permit requirements as noted in the previous comment responses. Station 151 is the compliance point for Mixing Zone 1 and will contain the same flows that were sampled at Station 10. There is no reason at this time to use historic comparisons since compliance with permit limitations are determined at other stations.

70. Comment: All ambient monitoring data should be included in the monthly DMRs to alleviate a conflict between requirements in Permit Parts I.A.7.e.2., and I.D.6.

Response: Station 150 has been added to Permit Part I.D.6 to make it consistent with Permit Part I.A.7.e.2. requiring monthly submission of certain ambient data.

71. Comment: Station 160 is mentioned in the State §401 Certification but not in the draft permit.

Response: Station 160 is mentioned on pages 8, 9, 10, 11, 14, 15, and in Table 4 of the draft permit.

72. Comment: The tributary monitoring must be retained because Station 140 does not give an accurate assessment of background conditions.

Response: Please see the response to Comment No. 68.

73. Comment: Red Dog Mine is essentially self-monitoring. Considerable public confidence would be generated by developing a source of data independent from TCAK or their paid representatives such as the USGS.

Response: CWA Section 308(a)(4)(A) requires that permits contain self-monitoring requirements:

"the Administrator shall require the owner or operator of any point source to (i) establish and maintain such records, (ii) make such reports, (iii) install, use, and maintain such monitoring equipment or methods (including, where appropriate, biological monitoring methods), (iv) sample such effluents (in accordance with such methods, at such locations, at such intervals, and in such manner as the Administrator shall prescribe), and (v) provide such other information as he may reasonably require"

EPA supplements monitoring data through inspections as time, resources, and circumstances allow and has no authority to require other federal agencies to expend their resources to do the required permit monitoring.

74. Comment: Clarify the reporting of split samples because the method chosen in the draft permit would allow TCAK to repeatedly split samples to get lower values to average in with violative results.

Response: The purpose of split samples is generally to meet quality assurance requirements for laboratory analyses, not to get lower values to average in with "violative results." Since the split samples represent the same water, the results from each sample should generally be comparable. If they are not comparable, the permittee should investigate and address the sources of the differences as required by the Quality Assurance Project Plan (QAPP).

75. Comment: Permit Part II.B. should include the test procedures in the current permit.

Response: The language cited by the commenter is part of the standard provisions that EPA includes in all permits. This language generally changes periodically but EPA does not change the language on a permit-by-permit basis. The previous permit and final permit include the same requirement to use methods approved under 40 CFR Part 136.

76. Comment: Permit Part II.D. should include a section requiring the reporting of the increased frequency of testing in the monthly DMRs.

Response: Permit Part II.D. already requires this. It states "If the permittee monitors any pollutant more frequently than required by this permit, using test procedures approved under 40 CFR Part 136 or as specified in this permit, the permittee must include the results of this monitoring in the calculation and reporting of the data submitted in the DMR." The DMR form contains a column dedicated to reporting the frequency of analysis.

77. Comment: A commenter requested that monitoring be conducted by an independent party. This monitoring should include Outfall 001, and other strategic locations including field measurements of pH, water temperature and specific conductance throughout the

margins of the Red Dog facilities and along both banks of the local tributaries to define the possibilities of non-point source seepages from the site. Comparable surveys should be conducted during the winter months possibly using remote sensing techniques.

Response: EPA does not have the authority to require that an independent party conduct monitoring at the facility. Note that the discharger must certify the validity of its sampling results with each DMR submitted to EPA and EPA and the State conduct periodic NPDES compliance inspections at the site.

78. Comment: TCAK requests EPA to delete the second paragraph of Permit Part I.A. in its entirety. Without defining "free flow", this statement is overly vague and meaningless. This paragraph requires written notification to EPA within 24-hours of the initiation of discharge. What will EPA do with this information provided within 24-hours that it could not do if the information was provided in the DMR, which is required to be provided without any specific provisions in the permit? This compliance obligation imparts liability to the permittee without commensurate benefit to water quality, human health or the environment.

Item #5 in the State §401 Certification specifically indicates that the state does not require consultation prior to the initiation of discharge. The state recognizes that the mine will not commence discharge until there is sufficient stream flow such that the in-stream TDS limits can be achieved and instrumentation to monitor in-stream TDS levels as required by Permit Part I.A.7 can be effectively operated in the stream. The state has approved the initiation of discharge under the stream flow conditions in which discharge can actually be initiated.

Response: In the draft permit, EPA modified the previous permit language by only requiring written notification of discharge initiation rather than requiring EPA approval prior to discharging. Such notification is important to track facility operations and plan compliance monitoring activities. EPA further believes it is does not place an unreasonable burden or liability on the discharger to provide notification to EPA (e.g., via facsimile) within 24 hours of initiating discharges. Consistent with the final state 401 certification, the requirement to seek approval from ADEC and OHMP has been deleted. To address the comment regarding the "free flow" wording, EPA has revised the language in the final permit to only allow discharge after sufficient stream flow is available to demonstrate compliance with the TDS limits. As cited by the commenter, this is the specific intent of the requirement.

79. Comment: The data gathered in Permit Parts I.E.5. and 8. should be included in the monthly DMRs as is required by the current permit.

Response: Since the information required by these parts 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.

80. Comment: TCAK should be required to report detailed chemical analyses for both the untreated water entering the water treatment plant and the treated water being discharged from Outfall 001.

Response: The final permit includes all of the effluent and ambient monitoring necessary to determine compliance with permit limits. Influent monitoring is not required or necessary because it is irrelevant to determining permit compliance and effects on the receiving waters. TCAK may sample the influent to the treatment plant to ascertain treatment performance but the permit does not require this type of monitoring.

81. Comment: Permit Part I.D.5. is redundant. Permit Part II.E. already requires the date and time of all sampling conducted per the draft permit be recorded. Please delete Permit Part I.D.5.

Response: The final permit has been modified to delete Permit Part I.D.5.

82. Comment: Permit Part I.A.7.e. – Delete "… and the date and time of sample collection must be recorded" from the second sentence in this section. It is redundant to Permit Part II.E., which requires the date and time of all samples collected through requirements in the permit to be recorded.

Response: The final permit has been modified to delete the requested language from Permit Part I.A.7.e.

83. Comment: Permit Part I.A.5.a. – The November 16, 2005, alternative test procedure (ATP) approval letter from William Riley to R.G. Scott, approves the use of EPA Method 300 for all anion analyses identified in "The Determination of Inorganic Anions In Water by Ion Chromatography." TCAK does not understand why the draft permit limits the use of EPA Method 300 to chloride analyses. TCAK anticipates being able to use EPA Method 300 for, at a minimum, chloride and sulfate analyses. TCAK requests that the word "chloride" be replaced with "anions," similar to the way that the word "metals" is used for EPA method 200.8 in the same sentence.

Response: Consistent with the referenced November 16, 2005 letter, the final permit has been modified to allow the use of EPA Method 300 for all anion analyses.

84. Comment: Permit Part II.F. of the draft permit states that records of "original strip chart recordings for continuous monitoring instrumentation" must be retained. This statement assumes that strip charts are the only method used for recording the results of continuous monitoring. The requirement could also be interpreted to mean that digitized strip charts or scanned strip charts are not acceptable records for continuous monitoring data.

Modern continuous monitoring equipment typically records digital data to a local or off-site computer, where it is stored on magnetic or optical media. Digital data records are efficient and easily accessible, and should be encouraged. TCAK requests that EPA revise Permit Part II.F. to explicitly authorize electronic storage of continuous monitoring data. The revision should also allow strip charts to be digitized or scanned for records storage to meet the permit recordkeeping requirements.

Response: The draft permit language is standard language that EPA includes in all NPDES permits according to 40 CFR 122.41(j)(2) and it has not been changed in the final permit. EPA disagrees with the commenter that the section suggests that strip charts are the only method for recording the results of continuous monitoring. If strip charts are produced, they should be retained. If data are digitally recorded, the original data should be stored in electronic format.

85. Comment: Permit Parts I.A.5.e and I.B.3.g include a new provision on the handling of split sample results. When samples are split and valid test results are obtained from each, the results are to be averaged. TCAK agrees with this policy, but believes the wording in the draft permit is confusing.

The policy should state that the type of average should be appropriate for the parameter. For example, the average for fecal coliform results should be the logarithmic mean. TCAK's suggests the following rewording of the policy:

> *When split samples are analyzed, all results that are considered valid will be averaged and this average will be taken as the sample value for compliance calculations and reporting. A valid result is one from a sample that is representative of the discharge, and has been properly collected, preserved, and analyzed by methods specified in the permit. For example, if a sample collected on a given day is split into two samples and analyzed separately, the two analytical results (when valid) are averaged, and the average is the value reported for the daily discharge. If a split sample result is determined to be invalid, it will not be used in any average. Split samples are reported as a single, average value regardless of the number of times a sample is split. When determining the maximums and averages for the month, the daily values may be a mix of sample results from unsplit samples and averages from split samples. The type of average should be appropriate for the parameter. For example, for fecal coliform, the average shall be calculated as the logarithmic mean.*

TCAK also suggests that instead of having the same policy in two different sections of the permit (I.A. Outfall 001 Limitations and Monitoring Requirements, I.B. Construction Camp Site Requirements (Outfall 002)), that it be moved to Permit Part II. Monitoring, Recording and Reporting Requirements.

Response: EPA believes that the language included in the draft permit contains the methodology that is appropriate for the handling of split samples. No change has been made to this permit part.

While the methodology of handling split samples could be used for every sample no matter what the outfall and the requirement would be equally valid no matter where it appeared in the permit, the primary focus of the methodology has been for the samples collected for Outfall 001. As such, it is not inappropriate for this policy be included separately for this outfall.

86. Comment: Page 5, Table 1. The note for sample frequency for organic priority pollutant scans should read "see note 4."

Response: The suggested change has been made in the final permit.

Mixing Zones

87. Comment: Permit Part I.A.7.b. – Please insert "(Station 151)" at the end of the sentence just after "…. edge of the mixing zone in Mainstem Red Dog Creek", so that it is clear that Station 151 and the "edge of the mixing zone in Mainstem Red Dog Creek" are the same location. This is necessary because the current permit contains incorrect assumptions to the contrary, particularly at Station 150.

Response: As noted in the response to Comment No. 109, Permit Part I.A.7.b has been deleted in the final permit.

88. Comment: Permit Part I.A.7.a.(1) and (2) – When defining the distance downstream that the mixing zones extend, please insert the word "approximately" in front of the numeric distances. These distances are approximate since the point of confluence between two streams is a difficult point to define and changes based on stream stage and from year to year. The distances should be clearly identified as approximations so that they could never be construed as absolute distances.

Response: EPA agrees with the commenter and "approximately" has been added to the referenced sections. This language is consistent with the final State §401 Certification.

89. Comment: Allowing the mixing zones goes against EPA long-standing policy that dilution is not the solution to pollution.

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

90. Comment: Since there is no justification for the proposed mixing zone, the reasonable potential analysis is flawed and cannot justify the finding of no reasonable potential (RPA) for cyanide, iron, lead, nickel and silver. Effluent limitations are required for these toxic metals.

Response: For the listed parameters, the dilution proposed in the draft §401 Certification of the permit was used only in the RPA for cyanide. The RPA for the other listed parameters was presented in the Fact Sheet without benefit of a dilution factor (mixing zone) and, even so, no reasonable potential was found for these parameters to violate the criteria so no effluent limitations are required. If ADEC does not authorize a mixing zone in the final §401 Certification, the dilution will be factored out of the RPA for cyanide.

91. Comment: The permit violates the Magnuson-Stevens Act (MSA) because the mixing zones for cyanide, TDS and ammonia will disrupt essential fish habitat (EFH) in the Mainstem of Red Dog Creek.

Response: An e-mail, received on March 27, 2006, from the National Marine Fisheries Service (NMFS) states that they have reviewed the draft permit and fact sheet and find that the described action will not result in any adverse effect to EFH regulated under the MSA. NMFS had no objection to the permit reissuance.

Ammonia

92. Comment: If EPA decides to maintain a limit for ammonia in the permit, it should only be set for the daily maximum because there is no reasonable potential for the chronic criterion to be exceeded. The daily maximum limit directly controls compliance with the acute criterion, and TCAK believes they have already shown that there is no reasonable potential for the chronic criterion to be exceeded. TCAK realizes that the TSD presents the RPA and limit derivation process as two separate steps, and that when deriving limits, the more restrictive of the LTA-chronic and LTA-acute is used. However, the TSD could never have anticipated that the least restrictive criteria (acute) would demonstrate reasonable potential to exceed, while the more restrictive criteria (chronic) does not.

If limits need to be established for ammonia, the limits need to be set to protect for exceedances of that portion of the criteria that has reasonable potential to be exceeded (acute standard), not set based on a more conservative portion of the criteria (chronic standard) that has no reasonable potential to be exceeded; the LTA-acute should be used to set limits. Use of the LTA-chronic is unjustifiable and coupled with the exceptionally conservative static modeling assumptions results in overly restrictive limits that are inconsistent with 40 CFR 122.44(d)(1)(ii). There are no regulations or guidance documents that require the RPA to be applied to the entire criteria and that the acute and chronic portions of the criterion cannot be treated separately.

Response: In conducting the reasonable potential analysis (RPA) for ammonia and other pollutants at Red Dog, EPA used the methodology consistent with EPA's Technical Support Document for Water Quality-based Toxics Control (TSD). Red Dog performed its own RPA analysis using receiving water data and Monte Carlo simulations (document entitled "Teck Cominco Alaska Inc. (TCAK), Red Dog Mine,

RPA for Ammonia Using Monte Carlo Approach"). It is unclear why this approach was selected when it appears that sufficient ammonia, temperature, and pH data were available with which to perform a traditional RPA. Red Dog has provided no information indicating that EPA's RP analysis is erroneous, and the TSD does not describe or recommend the use of Monte Carlo simulations in reasonable potential analyses.

The Red Dog methodology is based on receiving water monitoring data, downstream of mixing with the effluent. The ammonia level measured at this location in the receiving water is a function of several variables (creek flow, creek ammonia concentration, effluent flow and, notably, effluent concentration). By only using downstream, mixed receiving water data, Red Dog does not estimate or account for the maximum potential effluent concentration - the effluent concentration is "buried" in the receiving water data (in fact, there is no effluent sampling information whatsoever in the Red Dog RPA document). The data set used in the Monte Carlo modeling may not account for the conditions on the ground when the maximum effluent concentrations occur. The traditional RP analysis is based on the measured maximum effluent concentration.

In addition, the state of Alaska has determined from the available information that the dilution of the Red Dog discharge can be as low as 2.5:1 and has set that dilution level as a constraint in its mixing zone authorization. Yet in the Red Dog RPA approach, there is no link between the dilution conditions during the time of sampling and this dilution constraint. The data set used in the Monte Carlo modeling may not account for the conditions on the ground when the minimum dilution is occurring. The traditional RP analysis, on the other hand, is based on a direct calculation using the minimum dilution constraint. The traditional calculation, in simplest terms, determines whether the worst case effluent could exceed a concentration of 2.5 times the water quality criterion. The Red Dog approach does not provide such a clear determination.

The traditional RPA approach provides a transparent link between the worst case effluent discharge concentration and the worst case dilution of that effluent in the receiving water. Red Dog does not point out any deficiencies in EPA's application of the traditional RPA approach. Therefore, EPA believes the traditional RPA approach is preferable to the approach proposed by Red Dog. EPA maintains that the results of the RPA for the draft permit are valid, and these results call for inclusion of an effluent limitation to ensure future compliance.

93. Comment: Best Management Practices (BMP) have proven to be extremely effective in the control of the ammonia concentration in the Red Dog Mine effluent. Once numeric effluent limits are attained there is no incentive for any on-going improvements in effluent quality. Management of effluent quality through BMPs would encourage improvements even below the numeric effluent limits. Since it is proven that BMPs can effectively control ammonia in the effluent, it may be more beneficial to require BMPs and not effluent limits in the case of ammonia. Both means of regulatory control are equally as enforceable, but implementation of numeric effluent limits effectively eliminates the opportunity to require comprehensive BMPs for ammonia control to below the effluent limits. The permit could require that the BMPs be approved by EPA,

at which time EPA could approve or reject any proposed management practices for the control of ammonia.

Response: Please see the response to Comment No. 92 and the fact sheet for EPA's rationale for retaining the ammonia limits in the final permit. EPA assumes that TCAK will continue to implement BMPs that target ammonia to ensure compliance with effluent limitations. These should be documented in the Site Management Pollution Prevention Plan required under Permit Part I.I. which requires the discharger to minimize the potential for release of pollutants from their property into waters of the U.S. The discharger, therefore, should undertake all reasonable measures to minimize ammonia discharges regardless of the effluent limitations.

94. Comment: Delete the ammonia limits from the permit. Analyses of the receiving water demonstrate that criteria are consistently met and the Monte Carlo analysis provided by TCAK clearly demonstrates that there is no reasonable potential to exceed the criteria.

Response: Please see the response to Comment No. 92.

95. Comment: Because the toxicity of ammonia depends on the pH and temperature of the receiving water, EPA should have done the reasonable potential analysis (RPA) for ammonia based on the natural variability of instream conditions using dynamic modeling. This approach is recommended by EPA in its guidelines for water quality based toxics control. EPA should redo its RPA for ammonia using dynamic modeling such as a Monte Carlo approach. EPA Region 10 has recognized the validity of this approach in other mining NPDES permits and should use it in this case.

ADEC's water quality standards regulation allows for an RPA approach that is based on real time instream mixing. Although ADEC has provided an explicit mixing zone dilution factor of 2.5 for ammonia (Fact Sheet, Appendix B, page 22), it does not by itself incorporate conditions of real time mixing, and additional evaluation is necessary. The real time mixing conditions are represented at Station 10 on Middle Fork Red Dog Creek, where aquatic life criteria are first applied. TCAK submitted an RPA for ammonia to EPA that included these conditions.

In the first RPA document, which was provided to EPA as a draft, TCAK presented a Monte Carlo simulation for the acute and chronic ammonia criteria based on 1,000 runs. This analysis demonstrated that there was no reasonable potential to exceed the chronic criterion; in fact, none of the averages predicted by the Monte Carlo simulation exceeded the chronic criterion. TCAK also concluded that there was no reasonable potential to exceed the acute ammonia criterion because the Monte Carlo simulations predicted that the criterion would be met greater than 99% of the time, which exceeded EPA's typical RPA standard of 99%. Even though the RPA met this standard, TCAK had been concerned about the data distribution used for pH because it generated overly high pH values, which had not been seen in actual measurements. Even though the upper values were much greater than any values actually measured, TCAK decided to provide the analysis to EPA as a draft. Even with the overly high pHs, the Monte

Carlo simulation predicted that exceeding the acute criterion would be a rare event, less than 0.1% of the time (only one run exceeded the criterion). EPA's comment on the draft RPA was that the acute ammonia criterion could not be exceeded more than one hour every three years, which, based on about six months of discharge every year for TCAK, is equal to a probability of less than 0.008% of the time [one hour out of 13,140 hours (3 years times 365 days, divided by 2, multiplied by 24 hours)]. This standard was not consistent with EPA's normal RPA target of 99%, but TCAK decided to revise the ammonia RPA with the higher target. The number of runs in the first draft RPA (1,000) was too small to be able to show one exceedance out of 13,140 runs, so TCAK did a second draft RPA based on 15,000 runs. While doing so, TCAK also pulled together additional pH data to better characterize its data distribution. The additional data showed more clearly that the upper pH values had been too high in the first RPA. TCAK also looked closer at the correlation between pH and ammonia and incorporated this correlation into the Monte Carlo simulation. This second RPA was provided to EPA also as a draft. The result of the second draft RPA was that the probability of exceeding the acute ammonia criterion was less than 0.008%. In fact, the RPA showed that the highest expected acute ammonia quotient (instream ammonia divided by the ammonia criterion) was 0.64, much less than the quotient limit of 1 (instream ammonia equals the criterion). To complete these comments, TCAK has finalized its RPA for ammonia and includes it as an attachment to the comments.

Response: Please see the response to Comment No. 92. Though not stated in the comment, EPA assumes that Red Dog refers to the Kensington Mine permit as a Region 10 mining permit where Monte Carlo simulations were used. In fact, the RPA for the Kensington Mine permit did not employ Monte Carlo simulations. For the Kensington Mine permit, the Monte Carlo simulations were used as part of both the NPDES permitting and NEPA processes to project whether the facility could comply with the effluent limitations. It was necessary in this unique case, because the Kensington tailings impoundment receives both mill effluent and substantial natural inflows from Upper Slate Creek. The Monte Carlo simulations were applied to estimate the "mixed" concentration at the point of discharge and then compared to the effluent limitations. This aspect of the Kensington permit is not comparable to the RPA for discharges from the Red Dog tailings impoundment.

96. Comment: Since the ammonia criteria are dependent on the pH and temperature of the receiving water, EPA should not have used the data for these parameters at the edge of the mixing zone but should have used effluent data from Outfall 001. It is also unclear what pH and temperature assumptions were used and whether those assumptions are valid.

Response: ADEC has proposed a mixing zone for ammonia so the water quality criteria do not apply at the discharge point but at the edge of the mixing zone. EPA used conservative assumptions (95th percentile) from data collected at the edge of the mixing zone to determine the values utilized in the criteria equations. The 95th percentile of the temperature data set is 14.48 °C. The 95th percentile of the pH data set is 7.9 standard units.

Permit Conditions

97. Comment: A reopener clause is required in the permit according to 40 CFR 122.44(b).

Response: EPA assumes that the commenter is referring to 40 CFR 122.44(c) rather than (b), which provides standards for sewage sludge use and disposal. 40 CFR 122.44(c) requires a reopener clause in a permit for any treatment works treating domestic sewage. The purpose of such a clause is to allow permit re-opening to incorporate new sewage sludge disposal requirements promulgated under CWA Section 405(b). Since the facility does treat domestic wastewater, a re-opener clause has been incorporated into the final permit.

98. Comment: Provisions in the draft permit defining "Dirty Water Ditch" and "Dirty Water Sump" at page 39 need to be rephrased as noted below.

Existing Language:

"V.H. "Dirty Water Ditch" is the collection channel for the ore body seeps.

V.I. "Dirty Water Sump" is the pit into which the Dirty Water Ditch flows.

I.C.3. Mine seepage from the ore site shall be collected by the Dirty Water Ditch. The water in the Dirty Water Sump shall be:

a. pumped into the tailings impoundment; or

b. retained until it can be treated.

I.C.4. When water in the Dirty Water Sump 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.

I.C.5. The permittee shall ensure that the water in the Dirty Water Sump does not leak into Red Dog Creek."

These provisions should be rephrased so that they achieve the legitimate objectives and requirements of the NPDES permit program which is to assure that mine drainage (including these commingled seeps from this active mining area) meets discharge limitations, without the use of more expansive terms than those authorized by the Clean Water Act NPDES program.

The draft permit language should be revised as follows to more accurately characterize the Red Dog Mine water management system and the NPDES permit requirements:

V.H. "Mine Drainage Collection System" is the collection channel (ditch) for the certain mine drainage, including any ore body seeps collected and commingled here. [page 39 of NPDES draft]

V.I. “Mine Drainage Collection Dam” is the dam and the impoundment it creates into which the Mine Drainage Collection System flows. [page 39 of NPDES draft]

I.C.3. 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 permit terms and conditions. [Page 13 of NPDES draft]

I.C.4. When water in the Mine Drainage Collection Dam impoundment 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. [Page 13 of NPDES draft]

I.C.5. The permittee shall not discharge water in the Mine Drainage Collection System into Red Dog Creek except in compliance with this permit. [Page 13 of NPDES draft]

Response: The permit language has been changed as follows:

V.H. “Mine Drainage Collection System” is the collection channel (ditch) for the mine drainage, including any ore body seeps collected and commingled here.

V.I. “Mine Drainage Collection Dam” is the dam and the impoundment it creates into which the Mine Drainage Collection System flows.

This section has been renumbered based on the removal of I.C.2. from the draft permit.

I.C.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 permit terms and conditions.

I.C.3. When water in the Mine Drainage Collection Dam impoundment 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.

I.C.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.

EPA has added Permit Part I.C.8. which reads:

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.

This Permit Part covers, in part, the more general requirement of the Best Management Practice included in Permit Part I.I.2.i.iii.

99. Comment: The provisions (I.C.6, I.C.7 and I.C.8) should similarly be modified. The same change in language is also appropriate with respect to the handling of water in I.C.6, I.C.7, and I.C.8. The draft permit language reads:

"I.C.6 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, or recycled through the mill.

I.C.7. The permittee shall ensure that water in the Seepage Pond does not leak into Red Dog Creek.

I.C.8. The permittee shall ensure that water in the tailings impoundment does not leak into Red Dog Creek. The permittee shall immediately pursue corrective actions if any water in the tailings impoundment leaks into Red Dog Creek."

For all of the reasons discussed in the previous section, it would be appropriate to modify these provisions as well. Suggested language is as follows:

I.C.6 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.

I.C.7. The permittee shall not discharge water in the Seepage Pond into Red Dog Creek except as authorized pursuant to this permit.

I.C.8. The permittee shall not discharge water in the tailings impoundment into Red Dog Creek except as authorized in this permit through authorized outfalls.

There is no indication of undue losses to groundwater at TCAK facilities. In fact, the opposite is the case. The water balances show an excess of buildup of water in the tailings pond, for example, as opposed to unexplained losses of water that would be consistent with significant subsurface losses.

Response: The permit has been revised based on the commenter's suggested changes with some slight rewording. Please see the response to Comment No. 98 related to regulation of subsurface discharges.

100. Comment: Permit Part I.A.2. Delete the "for example" sentence, the requirement is clear enough without an example.

Response: EPA believes that the example is helpful for all readers of the permit. Therefore, the example has been retained.

101. Comment: Removed Substances provision in 1998 Permit Part III.F. should be included in the reissued permit.

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

102. Comment: On page 26 of the draft permit are three conditions [I.I.2.i. (iii), (iv) and (v)] which are not appropriate NPDES permit conditions and they should be deleted. These provisions seek to take regulatory programs for activities such as dam safety (iii), solid and hazardous waste management (iv) and spill prevention control and countermeasures (SPCC) (v) and make them all part of the NPDES permit. There is no legal authority that permits an NPDES permitting agency to incorporate by reference other federal and state environmental laws and regulations and simply make them all into NPDES permit requirements. The NPDES permit is not intended to be a "belt and suspenders" permit that can require an NPDES permittee to identify its legal requirements under other laws and regulations, and then have them all folded into this one NPDES permit.

These provisions should be deleted. The Response to Comments can make it clear that the requirements still exist for TCAK, but are appropriately regulated under the other laws and regulations.

Response: Under 40 CFR 122.44(k), EPA has the authority to require best management practices (BMPs) to control or abate the discharge of pollutants. EPA implements these requirements by requiring dischargers to develop and implement BMP plans (or in this case, a site management pollution prevention plan). The above referenced provisions are required components of the plan. Condition (iii) does not reference other regulatory programs but rather requires the discharger to maintain the integrity of water control devices to ensure no unauthorized/uncontrolled discharges of pollutants. This is a BMP that is within EPA's authority. Conditions (iv) and (v), which cross-reference other statutory authorities, are within EPA's NPDES permitting authority because they will ensure proper application of BMPs as required by 40 CFR 122.44(k).

103. Comment: There is no discussion of the Precipitate Study nor any requirement included in the permit as a result of that study. The Precipitate study (Permit Part I.G. of the 1998 permit) should be restored.

Response: The Precipitate Study was included in the previous permit as a requirement of the State's § 401 Certification. The final § 401 Certification for this permit issuance did not include the Study. It is EPA's understanding that the State plans to include the Study as part of the Solid Waste Permit for the facility.

104. Comment: EPA should add monitoring and reporting for the various reagents that the mine uses.

Response: TCAK reported, in their reapplication package, the following list of reagents used at the Red Dog Mill: Nalco 937 Pulv Inhibitor, sodium cyanide, zinc sulphate monohydrate, sodium metabisulfite, sodium sulfide, calcium oxide, copper sulfate, UMSD200, diethylene glycol, methyl isobutyl carbinol (MIBC), potassium ethyl xanthate, potassium amyl xanthate, sodium ethyl xanthate, sodium butyl xanthate, Percol E10, Magnafloc 10, and sodium isobutyl xanthate.

The permit does not require monitoring the discharge for each of these reagents since analytical methods to monitor such reagents are limited and water quality standards are not available for the reagents. However, the monitoring that is required in the permit will monitor some of the constituents of these reagents, for example copper and zinc. The permit requires WET testing, which was included, in part, to evaluate whether the pollutants that are not being monitored or limited could be toxic to aquatic life. If the results of a WET test indicate that the effluent is toxic (i.e., exceeds the permit limits), then additional WET testing is required. If additional WET testing results in another exceedence of the limit, then an evaluation – a TRE - is required to determine the cause of the toxicity and prevent the recurrence of toxicity. Through the TRE it may be determined whether one or a combination of the reagents listed above is causing a toxicity problem.

105. Comment: TCAK adds numerous organic and other chemical during the process but the 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 all pollutants that have the 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 discharger 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 water quality standards. Finally, it is not practical to consider every individual chemical used at the Red Dog Mine. To address, therefore, the overall potential toxic effects of the discharge on the receiving water, the permit includes chronic WET testing.

106. Comment: There is no justification for the elimination of a significant portion of the Quality Assurance Requirements. The QAPP conditions found in Permit Part I.I.1. of

the 1998 permit are more detailed and protective than that in the draft permit. List other conditions These deletions appear to be backsliding (as are all other permit condition deletions).

Response: While the language in the final permit has been changed from the previous permit, the underlying Quality Assurance Requirements have not been changed, including QAPP development and submittal requirements. Note that both permits require that the permittee's QAPP 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.*

107. Comment: Two provisions in the draft permit relate to the use of wastewater for dust suppressant purposes, both of which should be modified. Currently, the draft permit states the following:

> *"I.C.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.*
>
> *I.C.10. The permittee shall not use treated wastewater as a dust suppressant on the haul road to the port."*

The provision in I.C.10 should be deleted altogether as the haul road to the port is not part of this NPDES permit. The haul road is covered by a separate NPDES permit and whatever requirements exist with respect to that facility need to be in that permit.

The last sentence in I.C.9 also should be modified to read as follows:

The permittee shall not use untreated wastewater as a dust suppressant, except in locations where the wastewater and any commingled storm water will be collected and handled as mine drainage (subject to all the requirements of this permit prior to any discharge of such mine drainage).

This change allows the use of reclaimed water and other untreated wastewater in the mine operational areas. From an economic and pollution prevention standpoint, this is entirely logical.

The Fact Sheet indicates that the prohibition of the use of untreated "mine water" is to prevent the transport of pollutants contained in untreated wastewater to sites that are not sloped towards the tailings impoundment. Given that nearly all of the mine drainage from the pit (untreated mine water) originates as precipitation that falls into the pit and subsequently accumulates "pollutants" from contact with pit rock, it appears overly conservative to assume that by prohibiting the reapplication of this same water to this same pit rock, transport of these pollutants would be minimized. Realistically, very little pit equipment, the assumed transporter of the pollutants, ever leaves the pit or a small area on the far edge of the mill pad.

From a pollution prevention standpoint, it makes no sense to prohibit TCAK from safely recycling mine drainage and reclaimed water where no prohibited discharge occurs. If this is not allowed, TCAK will have to treat the water before it is used for dust suppression, creating additional air pollution as energy is expended in such treatment, and more use of chemicals in the water treatment process. TCAK's other choice is to pull more fresh water for use as dust control in the mine operating area, thus converting even more water into mine drainage and contaminating more water with mine contaminants. Again, this makes no sense from a pollution prevention standpoint. Pollution prevention relies on recycling to reduce the volume of wastewater generated, and legitimate recycling of reclaimed water and mine drainage water in the mine area should be encouraged, not discouraged.

Response: EPA disagrees with the commenter regarding the prohibition in Permit Part I.C.9. This provision is meant to keep the untreated water from affecting areas whose water quality could be degraded, no matter how infrequently this would occur. EPA disagrees with the commenter regarding the prohibition in Permit Part I.C.10. This permit specifically addresses the management of wastewater from the mine and it is entirely appropriate to prohibit its use as a dust suppressant on the haul road to the port. Note that this prohibition is retained from the previous permit.

Total Dissolved Solids (TDS)

108. Comment: EPA employs a totally misleading and incorrect definition of TDS as a means to avoid focusing on the detailed chemical composition of the effluent.

Response: It is unclear what the commenter is referring to. TDS refers to dissolved organic substances as described in the State's water quality standards. In the final permit, EPA has addressed all of the individual pollutants as well as the whole effluent toxicity of the effluent to ensure protection of the designated uses of the receiving water.

109. Comment: Pages 7&8, Permit Part I.A.7. With the italicized section, it is difficult to understand how section b would meld into section d, and what would become section c if the TDS site-specific criterion is approved. Also, should section d.(1) been italicized? It has reference to a grayling spawning period. TCAK believes these to be typos and that EPA's intentions are somewhat obvious. However, if the obvious assumptions on how that section will come together in the final permit are incorrect, TCAK would request the opportunity to comment on this section without the confusing errors.

Response: The TDS site-specific criterion has been approved and incorporated into the final permit. The italicized language in the draft permit, therefore, has not been included in the draft permit. In addition, because it is duplicative of I.A.7.d.(1), Permit Part I.A.7.b has been deleted. Since these changes do not modify the original intent of the draft language, there is no need to provide additional opportunity to comment.

110. Comment: Permit Part I.A.7.e.(1) – please delete all but the first sentence of this provision. This language is similar to that in the current permit, in which there was a mistaken assumption that Station 151 was not located at the downstream edge of the mixing zone in Red Dog Creek and that Station 150 was not located at the downstream edge of the mixing zone in Ikalukrok Creek.

Since TDS limits do not apply at Station 160 until July 25th, sampling for TDS should not be required until July 25th. There is an extremely large TDS data set currently existing for Station 160. It certainly is not necessary to monitor TDS at Station 160 except for compliance purposes after July 25th.

Item #6 in the draft State §401 Certification calls for TDS monitoring at Station 150 at a frequency of once per month not once per week. ADEC has authorized this reduction in monitoring frequency based on 184 laboratory determinations of TDS at Station 150 since May 2001. The maximum observed TDS at Station 150 is 788 mg/L. The State recognizes that with the in-stream TDS limits at Station 151 specified in the draft permit, there is no potential for TDS to exceed the 1000 mg/L limit at Station 150 in Ikalukrok Creek. TCAK objects to once per week monitoring at Station 150 and requests that the monitoring requirement be deleted from the permit.

This section requires weekly monitoring of the effluent for TDS using grab samples. Table 1 in Permit Part I.A.1. requires weekly monitoring of the effluent for TDS using composite samples. These separate TDS monitoring requirements are excessive and TCAK objects to this redundant effluent monitoring. TCAK requests that the effluent monitoring requirements in Permit Part I.A.7.e.(1) be deleted.

Response: The language in Permit Part I.A.7.e.(1) has been revised in the final permit as requested by the commenter. EPA agrees that stations 150 and 151 are at the downstream edges of the mixing zones.

EPA disagrees with the commenter regarding sampling at Station 160 prior to July 25th. While the monitoring is not used for compliance purposes, it is important, along with biological data, to understand the effects of TDS on Ikalukrok Creek throughout the discharge season.

Based on the TDS site-specific criterion, the final permit allows for increased loadings of TDS to Mainstem Red Dog Creek. EPA, therefore, believes it is appropriate to retain the weekly monitoring requirement at Station 150 to measure downstream compliance under the revised permit limits. If monitoring data collected under this permit show that levels continue to be below 1,000 mg/L, EPA may consider future reductions in the monitoring frequency.

111. Comment: Permit Part I.A.7.g. STATION 151 – There is a simpler and more technically correct way to present the mass balance equations that are specified in the draft permit. If the expressions in (4) and (5) are substituted into the expression in (6) and algebraically reduced, the following simplified equivalent expression results:

$$Q_{allowable} = Q_E + (Q_{151(total)} (1500 - C_{151(total)})) / (C_E - 1500)$$

An attachment to these comments entitled “TDS Mass Balance Calculation - Control of Red Dog Mine Discharge” derives this equation and demonstrates that it is equivalent to the three equations in the permit. TCAK requests that (4) and (5) be deleted and the equation in (6) be replaced with the above equation. This provides the least complex presentation of the mass balance equation in its simplest terms and minimizes the potential for error associated with three separate equations.

The same equation should be applied to Station 160 with the appropriate adjustment of variable names and TDS limits.

Response: The commenter’s consolidated equations are correct and have been incorporated into the final permit.

112. Comment: Permit Part I.A.7.h. demonstrates that the linear regression analysis for the TDS-conductivity correlation was misunderstood. The section was added to the 2003 modified permit as part of a response to comments and demonstrates that the linear regression analysis of the conductivity-TDS database was misunderstood.

Permit Part I.A.7.h.(1) – This section indicates that Station 151 and the end of the mixing zone in Red Dog Creek are different locations. As stated in the previous comment, Station 151 is the end of the mixing zone. This section should be corrected.

Permit Part I.A.7.h.(1) and (3) – These data are already required to be reported in each DMR. This requirement should be deleted.

Permit Part I.A.7.h.(2) and (4) – This comparison is already required in Permit Part I.A.7.f. This requirement should be deleted.

When the “TDS/Conductivity correlation curves” are updated as new data are generated, the information used to calculate TDS concentrations (conductivity and temperature) at Stations 151 and 160 are compared to the TDS concentrations determined by laboratory analysis. The TDS/Conductivity correlation curve is a linear regression analysis of specific conductivity and laboratory measured TDS results, with the measured specific conductivity used as the independent variable (X) and the measured TDS used as the dependent variable (Y). The goodness of fit or correlation coefficient (R^2) is a measure of how well the linear model fits the measured data, or in other words, how accurately TCAK can predict the actual concentration of TDS given measurements of conductivity and temperature. Currently the R^2 for Station 151 is 0.9941. This means that TDS can be very accurately estimated from the measured conductivity and temperature data. The data required in Permit Part I.A.7.h. are provided in the DMR when the correlations are updated, as well as a statistical evaluation of the linear model (i.e. R^2). Each time the correlations are updated with new data, a chart similar to the one shown on Page 104 of the comment letter, as well as the tabular data used to generate the chart is submitted in that month’s DMR (for example, see October 2005 DMR).

TCAK already reports in its DMRs conductivity, temperature, stream flow, and calculated TDS measurements that are collected twice per day, in addition to measured weekly TDS laboratory results with corresponding measured conductivity and

temperature. TCAK objects to the redundant and unnecessary reporting requirements specified in this provision of the permit and requests that they be deleted.

Response: EPA does not believe that it is unreasonable to request that the discharger submit an annual summary report, describing the updated TDS/conductivity correlation and providing all of the data used to support the analysis. This allows EPA and the State to continue to efficiently verify the accuracy of the correlation on an annual basis. Continuing to make this demonstration is the responsibility of the discharger. The language in Permit Part I.A.7.h.(1) has been modified as requested to only require reporting at Station 151. In addition, EPA concurs that the language in Permit Part I.A.7.f is redundant and this section is not included in the final permit.

113. Comment: Allowing an increase in the TDS limits is in conflict with the findings of previous WET testing which attribute at least 50% of the toxicity in the effluent to TDS.

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 basis for the final permit limits is a TDS site-specific criterion, which can allow a higher water quality criterion for a limited stream segment, is based on studies of the biological impacts of the TDS observed in the discharger's effluent on the arctic grayling found in the receiving water. Specifically, these studies have shown that the higher levels of TDS will not impact artic grayling spawning.

114. Comment: The frequency of monitoring TDS was reduced from twice a week to once a week in the 1998 permit. There is concern that since effluent TDS is only monitored once per week, spikes may not be captured in using 110% of the highest effluent value. Also, a definition of "highest measured effluent value" is requested.

Response: The highest effluent value represents the maximum value reported for the effluent during the previous 5 years. This has been clarified in the final permit. Based on our review of the variability in TDS levels in the effluent, EPA is confident that the approach of using 110% of the maximum value, rather than just the maximum, will incorporate TDS spikes noted by the commenter.

115. Comment: The 1998 permit had a TDS limitation 176 mg/L but the draft permit calls for complete elimination of the limitation for TDS at Outfall 001.

Response: In 2003, EPA modified the 1998 permit to include an end-of-pipe TDS limitation of 3900 mg/L. That new limitation was not appealed with other portions of the modification, so it was the effluent limitation when the permit expired. One purpose for this effluent limitation in the modification was to have a reliable maximum effluent concentration to insert into the equations used to calculate the allowable discharge based on in-stream conditions. Since TCAK has exceeded this maximum value, using 3900 mg/L in those calculations is no longer protective. Also, TCAK had proposed to EPA (in a letter dated July 12, 2004, which was not considered to be an addendum to

the application) that they use Bons Creek water to dilute the effluent to meet the 3900 mg/L limit. Flow augmentation was never approved by EPA and is not authorized in this permit reissuance. The permit bases the calculations on an effluent concentration equal to 110% of the maximum effluent value (as defined in the final permit and the response to Comment No. 114), rather than 3,900 mg/L, so that the allowable discharge value will always be protective of the downstream requirements.

It is important to emphasize that the elimination of the 3,900 mg/L TDS limit will have no effect on the in-stream TDS concentrations. The in-stream concentrations are contolled by end-of-pipe values, discussed in the prior paragraph, that are calculated based on a number of factors including TDS concentrations and flows in both the effluent and the receiving water. This process restricts the effluent to flow volumes to ensure the attainment of protective TDS concentrations in the receiving waters, even if the effluent TDS concentration exceeds 3,900 mg/L.

Another purpose of the 3,900 mg/L TDS limit was to generally cap the increasing trend in TDS concentrations in the effluent. EPA has imposed other requirements on Red Dog Mine, which it is implementing, to address this issue including additional treatment of wastestreams high in TDS. These measures are expected to be more effective means of addressing the generally increasing TDS levels than an end-of-pipe limit because, for the flow volumes involved, there is no known treatment option for TDS removal that is practical. It may, however, 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 paragraphs.

116. Comment: Real-time monitoring at Station 160 is not needed or useful and is an overly burdensome requirement. There is no potential to exceed the in-stream TDS limits at Station 160, given the TDS limits specified at Station 151. This fact was demonstrated in the document “In-Stream Control of TDS at Red Dog Mine” and in the documents used by the state to approve the site-specific criterion for TDS in Mainstem Red Dog Creek. There is an additional year of data from 2005 to confirm the analysis presented in the attachment, wherein the 500 mg/L TDS limit at Station 160 was not exceeded when TDS was controlled at or below 1,500 mg/L at Station 151.

ADEC, in its §401 Certification of the draft permit, has required weekly sampling to ensure that the limit at Station 160 is not exceeded. TCAK requests that the requirements for real-time monitoring of TDS at Station 160 be removed from the permit. The response lag time to Station 160 makes it infeasible to control effluent flow based on the TDS concentration at that location since TDS is controlled at Station 151, as required by the draft permit. Maintenance of a remote real-time monitoring at station 160 is very resource intensive. Without valid justification, this requirement is overly burdensome and imparts liability to the permittee without commensurate benefit to water quality, human health or the environment.

Response: EPA has reviewed the data provided by the discharger and concurs with the finding that controlling the TDS levels at Station 151 should ensure compliance with the 500 mg/L limit at Station 160. EPA also acknowledges the difficulty of developing a

model that would correlate real-time monitoring data at Station 160 with allowable effluent flow given the extended lag time between the discharge point and this station. EPA, therefore, has deleted Station 160 from Permit Part I.A.5.h of the final permit. EPA has, however, retained weekly TDS monitoring at Station 160 to ensure compliance from July 25th through the end of the discharge season. Exceedance of the TDS standard is a violation of the permit. EPA may re-open the permit to re-incorporate real-time monitoring if future monitoring data show exceedances of the standard.

117. Comment: The monitoring frequency for TDS at the end of the mixing zones should not be reduced from twice per week to once per week because this backsliding is not appropriate nor protective of the environment particularly given the recentness of the imposition of the mixing zones (2003 modification).

Response: EPA believes by applying the approach described in Permit 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 Mainstem 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. Under CWA § 402(o) and 40 CFR 122.44(l), anti-backsliding requirements apply in reissued permits when an effluent limitation, standard, or other condition of the permit is made less "stringent." Changing monitoring frequencies does not affect the "stringency" of any effluent limit, standard or condition.

118. Comment: An objection was raised to the TDS site-specific criterion based on changes that will affect the fish's food source and those changes may be unacceptable to invertebrates and adult salmonids.

Response: Objections to site-specific criteria must be made in the standards promulgation and approval process. Permits must use the criteria in effect at the time of permit issuance.

119. Comment: It is unclear why the TDS/Conductivity correlation curves are no longer required to be updated twice per year (1998 Permit Part I.A.8.h.).

Response: Because of the extensive TDS and conductivity monitoring conducted under the previous permit, the relationship been the two parameters has been well-established and has not varied significantly with time. EPA, therefore, believes that it is reasonable to reduce the requirement to update the TDS/conductivity correlation to once per year.

120. Comment: Permit Part I.A.1. Table 1. footnote 3. – Defining analysis of "TDS cations and anions", footnote 3 states, "This monitoring shall include a standard and complete suite of those cations and anions contributing to TDS including, but not limited to, carbonates, chlorides, sulfates, potassium, magnesium, calcium, and sodium." The

permit should list the specific analytes required for “a standard and complete suite of those cations and anions…” The proposed language is too indefinite to constitute a permit requirement, because it could be misinterpreted to require analysis of all cations and anions in the wastewater, thus presenting a potential compliance issue.

TCAK recommends that the analysis of carbonates be changed to analysis for alkalinity, which is an approved method in 40 CFR 136. TCAK assumes when EPA refers to “the carbonate analysis,” it is referring to the calculation method for carbonate and bicarbonate alkalinity in SM 2320B. EPA should verify this assumption in the permit by explicitly identifying SM 2320B as the method that shall be used to measure carbonate and bicarbonate alkalinity.

Response: The footnote has been modified to say “This monitoring shall include carbonates, chlorides, sulfates, potassium, calcium, and sodium. The carbonate analysis should be estimated based on direct measurement of alkalinity.” The description of analytes is consistent with Section I.A.8.i. of the previous permit and the change to carbonate language addresses the comment.

121. Comment: TCAK requests that monitoring of calcium and magnesium once per week from composite effluent samples be removed from the permit and monthly monitoring of “TDS anions and cations” be from composite samples as required by regulations.

Permit Part I.A.1. Table 1. – This table requires the monitoring of calcium and magnesium once per week from composite samples and once per month from a grab sample (footnote #3). The fact sheet at page 15 indicates that TCAK requested the additional calcium and magnesium monitoring so that hardness can be calculated instead of measured. TCAK did not request this. In fact, TCAK’s request was to avoid exactly what the table in the draft permit is requiring. TCAK pointed out that requiring the determination of hardness as its own outfall parameter was redundant to requiring the determination of calcium and magnesium in the effluent as specified in Permit Part I.A.8. of the current permit. Seven years of TDS composition (major anions and cations) and hardness monitoring definitively demonstrate that the effluent composition of TDS and hardness are not variable and can easily be predicted through a correlation analysis based on monthly data. Further, EPA did not use any effluent hardness data in developing the draft permit. Even if it had used effluent hardness to determine effluent limits for hardness dependent metals criteria, given the level of hardness in the effluent, monthly hardness data is more than sufficient because of the low variability of effluent hardness.

TCAK objects to more frequent than monthly monitoring for any of the TDS-related constituents, including hardness. Permit Part I.A.4. can remain unchanged, although TCAK questions why EPA needs the minimum, maximum and average. This appears to be data reporting for data reporting sake because effluent hardness data are irrelevant in how the draft permit was developed.

Response: EPA concurs with the commenter that the separate monitoring for calcium and magnesium is unnecessary and has deleted it in the final permit. The TDS anion and cation sample type has been changed to 24-hour composite. Since effluent

hardness is not used in determining permit limits and hardness levels in the effluent have remained within a relatively narrow range since 2000, hardness monitoring has been included as a calculated value on a monthly basis in the final permit.

122. Comment: It is unclear why the analysis for carbonate, chlorides, sulfates, potassium, magnesium, calcium and sodium once per month has been removed (1998 Permit Part I.A.8.i.).

Response: The chemical-specific requirements have been replaced by the general requirement to monitor TDS anions and cations. This includes each of the chemicals listed in the comment as described in Table 1, Footnote 3 and Table 4, Footnote 5.

123. Comment: There is no timeline for the approval or disapproval of the TDS site-specific criterion so that the public does not know the actual limitation that EPA is proposing or requiring. The permit should not be finalized until the site-specific criterion is finalized.

Response: In the Fact Sheet text just below Table C-3, EPA stated that a permit must be issued using the water quality standards in effect at the time of issuance. This would be true whether a site-specific criterion was approved or not (if not, the site-specific criterion would not be used). EPA showed the effluent limitations based on the current water quality standards as well as the proposed water quality standards in the event that the site-specific criteria for TDS and/or cadmium were approved prior to final reissuance. The TDS SSC was approved on April 21, 2006, and the cadmium SSC was approved on September 27, 2006.

Whole Effluent Toxicity

124. Comment: Permit Part I.G.4.d, what is the "chronic manual chapter"? There does not appear to be any need for Permit Part I.G.4., please delete it from the permit.

Response: EPA believes that I.G.4.a-d is important because it describes the specific procedures for reporting chronic toxicity test results. This section has, therefore, been retained in the final permit. Permit Part I.G.4.d. has been revised to include the specific reference to EPA's Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms, Fourth Edition, October 2002. EPA-821-R-02-013.

125. Comment: In the event that WET limits are continued in the NPDES permit, TCAK requests that a mixing zone be established for WET. The 1998 NPDES permit limits for WET were established on the concept of not adding any toxicity to Red Dog Creek

above pre-mining toxicity. A mixing zone could only be justified if at the end of the mixing zone, toxicity did not exceed pre-mining levels at that same point.

A mixing zone for WET was not requested from ADEC because the mixing would be occurring in a reach of stream not designated for aquatic life use (i.e. Middle Fork Red Dog Creek). Therefore it was not anticipated that a formal mixing zone would be required by ADEC since it is assumed that the State water quality standard for toxicity only applies in streams designated for aquatic life use. The 1998 WET limit development estimated a natural toxicity for the sum of the flow components in Outfall 001. It was then assumed that all other flows (e.g. Middle Fork and North Fork Red Dog Creek and Ikalukrok Creek) had the same or lower toxicity than that that was present pre-mining and based on this assumption, the toxicity at all points downstream would be less than or equal to pre-mining toxicity. If it can be demonstrated that the toxicity of one of these flows has been reduced, a mixing zone with this flow and the effluent could change the WLA assigned to Outfall 001.

Through the ongoing isolation of the clean water tributaries from mineralized material and seeps since 1996, the overall toxicity of the Middle Fork Red Dog Creek has been greatly reduced. If a mixing zone were granted in the Middle Fork below Outfall 001, the reduction in toxicity in the upper Middle Fork could be reallocated to the effluent WLA. A conservative minimum dilution factor at Station 20 (Middle Fork below the Outfall) would be 75% effluent and 25% Middle Fork water. This would mean that as many as 6 TUc could be added to the effluent WLA and Station 20 would remain at or below its natural condition toxicity consistent with the state WET narrative criterion and the 1998 State Certification. Since the Middle Fork of Red Dog Creek is not designated for aquatic life uses, issuance of a mixing zone for WET does not conflict with the requirements of the Water Quality Standards. Similar to the 1998 state certification, if Station 20 is at or below its natural condition toxicity, all points downstream will also be at or below their respective natural condition toxicity. Therefore, TCAK requests a mixing zone based on 75% effluent.

Response: No basis exists to establish a WET mixing zone in Red Dog Creek, including the 75% effluent dilution requested by the commenter. To obtain a WET mixing zone, it would have to be demonstrated that there is currently assimilative capacity in Red Dog Creek. The effluent limitations for WET are based on a calculated value representing natural background conditions which was developed in the 1998 permit, because chronic toxicity is naturally above the water quality standard. There is, therefore, no assimilative capacity and a mixing zone cannot be authorized.

126. Comment: Whole Effluent Toxicity (WET) testing 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.

127. Comment: WET testing should be required twice a month so that useful toxicity data will be obtained during any one season.

Response: EPA believes that continuation of the monthly WET testing required by the previous permit is appropriate to determine compliance with the effluent limitations for Outfall 001. It is unclear how more frequent monitoring would yield more "useful toxicity data."

128. Comment: There is no justification for eliminating the definition of "no observed effect concentration (NOEC)."

Response: The measure of Whole Effluent Toxicity is calculated using the Inhibition Concentration (IC) rather than the NOEC. Since the NOEC is no longer used in any calculation, a definition is unnecessary.

129. Comment: WET limits for *Pimephales promelas* should be deleted from the permit because a reasonable potential analysis of historic WET monitoring data shows no reasonable potential that the effluent will be toxic to that organism. The historic WET test data collected over multiple years represents "new information," which makes removal of the total toxicity limits for this species acceptable pursuant to the antibacksliding provisions. Permit requirements related to total toxicity should be limited to *Ceriodaphnia dubia* (water flea) rather than the limits that are currently in place. TCAK is not recommending the removal of WET testing as a monitored parameter from the draft permit. TCAK is also willing to investigate alternate WET test species, but would oppose testing for compliance with a permit limit unless the alternate species is approved at 40 CFR 136.

Response: EPA concurs with the commenter that monitoring for *Pimephales promelas* from May 2000 through June 2006 has shown no toxicity values greater than 2 TUc which is well under the permit limits. It is clear from the data that *Ceriodaphnia dubia* is the more sensitive species for determining WET. As a result, monitoring and permit limits for *Pimephales promelas* have been deleted from the final permit.

130. Comment: Permit requirements related to total toxicity should be limited to monitoring whole effluent toxicity (WET) using *Pimephales promelas* (fathead minnow) and *Ceriodaphnia dubia* (water flea) rather than the limits that are currently in place. TCAK is not recommending the removal of WET testing as a monitored parameter from the draft permit. TCAK is also willing to investigate alternate WET test species, but would oppose testing for compliance with a permit limit unless the alternate species is approved at 40 CFR 136.

Response: The existing WET limits are based upon background toxicity (reconstructed for use in the 1998 permit) in the receiving system. Because the treated effluent has been determined to be less toxic than the ambient receiving water, it is not necessary to ensure that the effluent meet a 1.0 TU or less limit, using the test based on non-native species. However, it is necessary and appropriate to set WET limits to ensure that the treated effluent does not increase the instream toxicity in the receiving system and using a WET test with species for which reliable test protocols have been

developed is a reasonable way to measure toxicity changes even if the species are not native to the receiving waters. Thus, WET limits have been appropriately applied and should not be reduced to simply monitored parameters.

131. Comment: Based on extensive site-specific bioassessments and other studies, literature surveys, and TIE/TRE studies of the effluent from the Red Dog Mine, *C. dubia*, should be removed from the WET limitations portion of the mine NPDES permit because it is a poor predictor of risk to the aquatic invertebrate community in the receiving streams. That the chemical-specific limit of 1,500 mg/L for TDS appropriately protects that invertebrate community is supported by the invertebrate bioassessments performed in the receiving streams. Under a weight of the evidence approach, the *C. dubia* chronic toxicity test should not be included in the permit. *C. dubia* is an inappropriate WET test species for the Red Dog Mine effluent because of its sensitivity to total dissolved solids (TDS).

EPA guidance recommends that fresh water species not be used for WET testing of waters with TDS concentrations greater than 1,000 mg/L. Both C. dubia and P. promelas are fresh water species. The EPA methods manual for the chronic WET tests states that if the receiving water salinity is greater than 1,000 mg/L, the choice of WET test organisms should be based on state water quality standards and/or permit requirements. It also directs the user to the EPA's Technical Support Document for Water Quality-based Toxics Control (TSD) when effluent and receiving water salinity "requires special consideration." The TSD states the following regarding high salinity effluents and receiving water:

> "As a general rule, EPA recommends that freshwater organisms be used when the receiving water salinity is less than 1,000 mg/L, and that marine organisms be used when the receiving water salinity equals or exceeds 1,000 mg/L." (TSD, page 61)

The TSD also recommends that when a saline discharge is to a fresh receiving water, then freshwater species should be used in WET tests. However, this recommendation assumes that a mixing zone will be included in the determination of the critical in-stream dilution for the WET test. This is not the case for the Red Dog Mine, where the proposed WET limits are applied to the undiluted effluent at Outfall 001.

The flexibility to delete a non-predictive WET test for C. dubia is legally permissible under a recent court challenge to the validity of the WET methodology, and the judicious use of such flexibility by permitting authorities was a key holding in the decision not to strike down WET testing as a Part 136 methodology.

The results of the mock effluent testing are consistent with the scientific literature with respect to the toxicity of the common inorganic cations and anions that are found in the effluent. The WET limit in the draft permit for *C. dubia* is incapable of detecting toxicity in the Red Dog Mine effluent at levels below the natural condition toxicity.

The permitting regulation at 40 CFR 122.44(d)(1)(v) states that EPA is not required to include a WET limit in a permit when it is demonstrated that chemical-specific limits for the effluent are sufficient to attain State water quality standards.

Response: The fact that C. dubia is more sensitive to elevated concentrations of TDS than some other test organisms (e.g., Daphnia magna) does not make it inappropriate for use in testing an effluent with elevated concentrations of TDS. Similar to other toxins, elevated concentrations of TDS elicit a physiological response in C. dubia resulting in mortality, reduced fecundity, or both. EPA agrees that the TSD indicates that the toxicity of waters with salinity values in excess of 1,000 mg/L should be tested with marine or estuarine methods. However, increased salinity in marine and estuarine systems is not equivalent to elevated TDS in freshwater, inland systems, because the mix of ionic constituents of TDS in marine waters is completely different from the mix in freshwater systems generally, and in the Red Dog Creek system in particular. The use of marine or estuarine test species in high TDS freshwater systems would be inappropriate because it is unlikely that marine test species could survive in high TDS freshwater systems. Because Outfall 001 discharges to a freshwater system, albeit one with elevated TDS, use of C. dubia is appropriate. Further, EPA has acknowledged that the receiving waters exhibit background toxicity related to naturally high concentrations of TDS and other toxins and has issued WET limits which take ambient conditions into account. Thus, use of C. dubia is appropriate in that it is sensitive to increases in toxicity above that in ambient waters.

132. Comment: TCAK also opposes the triggering of resource intensive investigations (TRE/TIE) based on a single or even consecutive WET test results, as described in a later comment. Instead, TCAK proposes to conduct statistical analysis of a discharge season's WET test results versus previous year's test results as a basis for determining if more detailed studies of WET are required.

TCAK agrees with ADEC that the comprehensive biomonitoring program coupled with WET monitoring will be more than sufficient to ensure that the chemical-specific limits for the effluent are protecting the uses in Red Dog and Ikalukrok Creeks.

Response: While we agree that use of biomonitoring coupled with WET monitoring will increase confidence in the protective nature of TCAK's permit limits, it is necessary to evaluate WET results independently, see response to Comment No. 135. Further, because increases in toxicity can be related to temporally limited events (e.g., seasonal flow increases or decreases), waiting more than a short period can sometimes make it difficult to identify sources of potential toxins and take appropriate corrective actions. Therefore, it is necessary and appropriate that the existing TRE/TIE compliance schedule be followed. Waiting for an entire season of data to be collected before making a decision as to whether or not increases in toxicity have occurred would undercut the ability to identify the sources of the toxicity increases.

133. Comment: Natural conditions in Red Dog Creek and Ikalukrok Creek downstream of its confluence with Red Dog Creek were toxic to vertebrate and invertebrate species before the mine commenced operations. The existing and proposed permits do not adequately account for the pre-existing toxicity in the evaluation of the need for and the numeric value of WET limits.

The Alaska Department of Environmental Conservation (ADEC) has determined, as stated in its draft §401 Certification for the draft NPDES permit, that WET limits are not required to protect water quality and designated uses in the receiving waters for the following reasons:

> The methodology used in the 1998 NPDES permit to estimate natural toxicity in Red Dog Creek contained numerous assumptions and uncertainties that cannot be confirmed. ADEC believes that the effluent is less toxic than the natural condition of Red Dog Creek, although the reduced level of toxicity cannot be quantitatively reported (because there are no pre-mine data for WET). ADEC believes that the comprehensive biological monitoring of the stream that is required by the NPDES permit is more meaningful than WET testing.
>
> ADEC restates its position in the 1998 §401 Certification, that because aquatic life use is not a designated use at the point of discharge, its regulations relating to toxicity are not applicable to the discharge.
>
> ADEC states in the §401 Certification that annual biomonitoring has been conducted in Red Dog Creek and Ikalukrok Creek since 1990, and states that there have been "no observed negative effects to the ecosystems of Red Dog and Ikalukrok Creeks resulting from the effluent or mine related activities affecting Red Dog Creek."

Response: The WET limits proposed in the draft permit for this facility fully account for the ambient toxicity of the receiving system that naturally occurs. These limits have been tailored to allow the mine to discharge effluent that contains toxic concentrations of various compounds, but at limits that will not increase the background toxicity. Although aquatic life is not a designated use at the point of discharge, the state water quality criterion for toxicity applies downstream of the discharge point, and the permit must ensure that the discharge does not cause or contribute to exceedances of that criterion when it does apply downstream.

134. Comment: The EPA guidance on TIE/TREs suggests it now is entirely appropriate, as a matter of permitting, to remove the *C. dubia* chronic WET limit from the permit in a site-specific case such as at Red Dog Mine, if exhaustive and expensive TIE/TREs have already been performed and no toxicity is found. In the March 27, 2001 "Clarifications Regarding Toxicity Reduction and Identification Evaluations in the National Pollutant Discharge Elimination System Program," EPA headquarters guidance explicitly states:

> "Inconclusive TREs and TIEs
>
> In some rare instances, TREs and TIEs have been unsuccessful or inconclusive. EPA acknowledges that some permittees have aggressively pursued a TRE using highly qualified technical support, but have been unable to resolve the problem. EPA has demonstrated its intent for appropriate discretion and constructive resolution through its established record of working cooperatively with permittees in these cases."

Response: Whole effluent toxicity has been observed on numerous occasions in the effluent from this facility. Use of TIE/TRE processes is appropriate for instances in which the level of toxicity exceeds WET limits. The commentor seems to imply that a TIE/TRE is unsuccessful or inconclusive if the cause of the toxicity is found but the facility claims they are unable to resolve the problem. EPA Region 10 believes that unsuccessful or inconclusive means that there is no discernable cause for the toxicity even after extensive testing. To EPA's knowledge, the TIE/TREs conducted at the facility have not been unsuccessful or inconclusive. Continued use of *C. dubia* WET testing is appropriate for this discharge.

135. Comment: ADEC's decision on WET is entitled to substantial deference, and there is no substantive justification to overcome that State decision. ADEC has certified that state regulations do not require that a whole effluent toxicity limit be included in the renewed NPDES permit for the Red Dog Mine. ADEC asserts this position for a variety of reasons; one of the more notable reasons is that the effluent is less toxic than natural conditions. Evidence to support this assertion is the demonstration that the Mainstem Red Dog Creek, the first reach of receiving stream classified for aquatic life use, is less toxic now, with the mine effluent, than it was prior to mining. In the draft fact sheet for the proposed permit, EPA provides no explanation for their actions in requiring more restrictive permit provisions than ADEC specified as consistent with state regulations, which demand that the State also be protective of existing uses. Since the State provided ample justification for its actions and the draft Fact Sheet sets forth no substantive justification for rejecting the State's well-reasoned determination, the WET limit should be removed. By failing to provide any justification for overruling the State's §401 Certification or any justification for ignoring TCAK submittals, EPA has deprived TCAK of its right to comment on EPA's basis for its proposed permit decision. Because this justification has been requested to be provided in response to comments, and after the comment period closes, no comments or additions to the record can be supplied by anyone other than EPA, please ensure that the response to comments requesting justification of this permit decision is complete, thorough, definitive and without speculative interpretation of the pre-mining data (e.g. what if; second guessing of baseline report conclusions; etc.). Alternatively, TCAK requests that EPA reopen this particular decision for comment and allow additional information into the record after the justification is provided to the commenters.

Response: EPA maintains that use of WET limits is appropriate for regulation of the quality of water discharged into the receiving system. The Outfall 001 discharge contains a complex effluent (e.g., contains many compounds that may contribute to toxicity) and the receiving system and source waters are known to contain substantial ambient toxicity. A criterion was designed for the 1998 permit to mimic the natural condition, based on the information available about pre-mining conditions. Effluent data available demonstrates that the discharge has the reasonable potential to cause or contribute to an exceedance of the site-specific criterion. Further, given the complex effluent and the fact that the natural background toxicity in Red Dog Creek cannot be determined (as acknowledged by ADEC), there is no solid basis in the data for the argument that the effluent is less toxic than the natural condition in the creek. Because

of this, use of WET limits tailored to limit toxic excursions beyond those which may be expected to occur naturally is appropriate and necessary.

In addition, the draft permit limits are consistent with the previous permit limits. To remove such limits would require a demonstration that anti-backsliding requirements are met. EPA cannot make such a justification given that there continues to be reasonable potential that the effluent could cause or contribute to exceedances of the applicable water quality criterion for toxicity. The draft permit limits for C. dubia have been retained in the final permit.

136. Comment: The calculation of the WET limits in the current permit is based on certain water balance assumptions, i.e., flows of unknown origin that are now known to be incorrect. Correction of the water balance eliminates the need for assigning toxicity to an "unknown" source of flow.

The last paragraph in Permit Part I.B.8 on page 56 of Appendix C of the Fact Sheet states that the WET limit in the current permit is based on the natural background and that the natural background was based on the natural condition. However, in reviewing the derivation of the current WET limit in the July 22, 1998 State §401 Certification (incorporated into the record by reference), Appendix B Permit Part II.B.3 on page 6, it is clear that the water of "unknown origin" was arbitrarily assigned a toxicity level known to be protective of the receiving environment. This appears logical since if the flow is of an unknown origin, the toxicity level of that flow must also be unknown. However, a significant portion of the allocation of toxicity used to derive the current permit WET limit comes from an unknown origin with an unknown toxicity. It appears contrary for the fact sheet to the draft permit to now state that the current WET limit was based on "natural condition" and "natural background", because at the time that the limit was derived, an insufficient amount of data existed to accurately define the "natural condition" and "natural background" and "unknowns" had to be conservatively estimated.

As so often happens, with additional investigation and data collection, it is possible to make the "unknown" known. As discussed in previous comments, the origin of the water of "unknown origin" is from an underestimation of precipitation into the basin. Also as discussed in previous comments, there is no significant groundwater inflow into the treatment facility leaving direct precipitation and surface water flows as the natural condition source of water being discharged.

Permit Part I.B.8 on page 56 of Appendix C of the Fact Sheet refers to a document provided by TCAK entitled "WET Limit with Consideration to Updated Site-Wide Water balance." The premise in this document that the origin of natural condition inflows and subsequently the treated discharge from the tailings impoundment is proportional to precipitation was dismissed by EPA citing the water balance presented in Part I of Appendix C of the fact sheet. Previous comments have demonstrated that the water balance in the fact sheet is flawed and that indeed precipitation in the drainage basins drives the site-wide water balance both now and under natural conditions and that the origins of all flows are understood. Since this was the only fault identified by EPA in "WET Limit with Consideration to Updated Site-Wide Water balance", it is assumed that EPA agreed with the remainder of the document.

TCAK requests that EPA updates the WET limit WLA calculation to reflect the correct natural condition water balance provided in "WET Limit with Consideration to Updated Site-Wide Water balance". As this approach justifiably removes water of unknown origin, it must therefore be a better estimate of pre-mining flows, natural background toxicity and natural condition toxicity.

In the § 401 Certification, ADEC included a new water balance with new calculations providing the basis for a new WET criterion to be used to calculate effluent limitations that fall between the limitations proposed in the draft permit and the limitations requested by TCAK.

Response: EPA reviewed the supporting material provided by TCAK including the March 23, 2006 memorandum prepared by Geomatrix on the Red Dog tailings impoundment water balance. EPA acknowledges the validity of the issues raised by TCAK and Geomatrix regarding inconsistencies between actual and measured precipitation and evaporation rates. These inconsistencies have been well-documented at sites throughout the country.

The data and analyses provided to date, however, do not support a conclusive, site-specific determination of how to adjust the measured values to reflect actual conditions. Specifically, TCAK has not provided necessary documentation on why "snow pack depth at various areas in the watershed indicate snowfall may be under-measured at the meteorological station by 10-30%" or why "snow precipitation is under-measured by approximately 40%." Similarly, EPA does not have and cannot verify the "calibration assessments" that suggest a pan coefficient of 0.50 is appropriate for the tailings impoundment. These data need to be combined with more specific information on the basis for TCAK's determination of the relative natural and man-made inflows into the impoundment (as shown in Item II-A of the permit application).

EPA considered the information provided by ADEC in the Certification but determined that the proposed new, less stringent WET criterion cannot be used in the permit unless and until the State proposes and EPA approves it as a new site-specific crirerion (SSC). The draft Certification included with the draft permit did not propose an SSC for WET as it did for cadmium. The determination of a natural condition SSC requires a public process and approval by EPA before it can be used in a Clean Water Act action.

EPA would consider a future request for modifying the WET limits when all of the necessary supporting data are provided as part of the formal submission of an SSC, and the SSC approval process is complete. This could occur through a request for permit modification by TCAK or future permit reissuance. Note that any changes to the WET limits would have to meet federal anti-backsliding and State anti-degradation requirements.

137. Comment: The calculated WET limits in the draft permit are based on an incorrect water balance. The accurate water balance submitted by TCAK to EPA as a component of the NPDES permit application results in revised "natural background" TUc values that increase the proposed WET limits.

The July 22, 1998 State §401 Certification to the 1998 NPDES permit outlines the methodology used to determine the waste load allocation (WLA) for WET, which in turn was used to set permit limits for Outfall 001. The WLA was based on the interpretation of the state WET narrative criteria that a discharger could not impart one additional TUc to a receiving waterbody above naturally occurring toxicity. It was recognized that under natural conditions the water in the receiving streams, which is now discharged at Outfall 001, contained toxic pollutants in toxic amounts.

This State §401 Certification estimates the naturally occurring toxicity from the water now discharged at Outfall 001 through a flow-weighted average of the estimated toxicity for each flow component of Outfall 001. In 1998, the flow components to Outfall 001 and their relative flow volumes were as follows:

1. Middle Fork Red Dog Creek diversion - 0.3 billion gallons a year (bgy)
2. South Fork Red Dog Creek - 1.3 bgy
3. "Additional" water - 0.8 bgy
4. Total flow, 2.4 bgy

The 1998 State §401 Certification assigned a toxicity to each of the flow components from C. dubia bioassay data collected from 1994 to 1997.

1. The Middle Fork was assigned 35.2 TU_c based on the lower 5th percentile of WET data from Station 140.
2. The South Fork was assigned 6.1 TU_c based on the median of WET values from Stations 9 (Ikalukrok Creek) and Station 12 (North Fork Red Dog Creek).
3. The "additional" water was assigned 2.9 TU_c based on the lower 5th percentile of WET data from Station 9.
4. The WLA was then calculated using the following flow-weighted average:

   WLA = ((0.3 bgy X 35.2 TU_c) + (1.3 bgy X 6.1 TU_c) + (0.8 bgy X 2.9 TU_c)) / (2.4 bgy) = 8.7 TU_c

The 1998 NPDES permit required the collection of data including precipitation, evaporation and mine sump (diverted water from Middle Fork Red Dog Creek) flow rates to better define the site-wide water balance used in the calculation. All significant inflows of water into the tailings impoundment, the source of water for Outfall 001, are surface flows and therefore are proportional to precipitation. This proportionality holds for stored water as well as water accumulated throughout a current year. The origin of water stored and water entering the tailings impoundment and ultimately discharged at Outfall 001 is approximately 71% South Fork water and 29% diverted Middle Fork water. The “additional water” flow component to Outfall 001 was eliminated through the collection of hydrologic data as specified in the 1998 permit. Incorporating the improved water balance into the flow-weighted WLA calculation used in the 1998 State §401 Certification, the WLA becomes 14.5 TUc.

WLA = (0.29 X 35.2 TUc) + (0.71 X 6.1 TUc) = 14.5 TUc

It is not recommended that the assigned toxicities for stations 140, 12 and 9 be updated with new data for two reasons. First, the diversion of Hilltop Creek from the Middle Fork into the mine drainage system and improvements in the clean water bypass system

such as diversion of the tributaries through pipes, culverts and lined channels has dramatically decreased the toxicity of the Middle Fork. Second, naturally occurring seeps in the Upper Ikalukrok Creek drainage have significantly increased the toxicity at Station 9.

Permit limits for WET to be used in the reasonable potential analysis should be derived from the WLA of 14.5 TUc following EPA methods. If the reasonable potential analysis is performed with the correct water balance, then it demonstrates even more strongly that no WET limits are required to protect water quality in Red Dog Creek and Ikalukrok Creek.

Response: Please see the response to comment Nos. 138 and 139.

138. Comment: Permit Part I.G.4 requires that TCAK submit the full WET test report to EPA by the end of the month that the DMR is submitted. Nearly all of the information that is required to be submitted in the WET test report is required to be submitted in the monthly DMRs. However, providing the full WET report by the end of the month that the DMR containing the WET test results is submitted is problematic. The toxicology laboratories often do not provide these reports to TCAK in the time frame required by the permit.

The reports are lengthy and quite involved and are frequently delayed by analyses that are not required by the permit, but are necessary for the WET test reports. Therefore, the reporting time provision in the draft permit presents TCAK with potential compliance liability for a requirement over which it does not have complete control. An additional factor is that the Red Dog Mine does not have a post office. The reports from the toxicology laboratories have to be sent to the mine and then copied and mailed to EPA by transporting them by air to a U.S. post office. Given the fact that air transport weather delays can last for 10 days or more, this requirement is overly burdensome and should be revised.

Response: EPA acknowledges the difficulties cited by the commenter in compiling all of the information necessary for the full report on WET testing. Permit Part I.G.4.b of the final permit requires the discharger to submit the full report on WET testing by the end of the month following the month that the associated WET results are submitted in the DMR.

139. Comment: WET Monitoring at Stations 9 and 12 should not be required. Toxicity data from Stations 9, 140, and 12 were used in the 1998 State §401 Certification to estimate natural condition toxicity. EPA did not find it necessary to use the toxicity data collected at these background stations per the current permit, in the draft permit.

Response: Please see the response to comment No. 66. Monitoring at the two stations referenced by the commenter is not included in the final permit.

Winter Discharges

140. Comment: If winter discharges are prohibited, this should be a requirement of the permit.

Response: This comment is addressed by the requirement in Section I.A that there be no discharge from Outfall 001 until there is free flow of water in Main Stem Red Dog Creek. Note prior to beginning discharge, TCAK must consult with Alaska Department of Natural Resources, Office of Habitat Management and Permitting (OHMP) and Alaska Department of Environmental Conservation (ADEC). TCAK must also supply written notice documenting the start of discharge to EPA within 24 hours.

141. Comment: This is no justification for the removal of ambient monitoring for dissolved oxygen and hydrogen sulfide.

Response: The Fact Sheet (page 14) states: "This draft permit does not include any permit requirements that were related only to winter discharging (including Permit Parts I.C.11. and 12. and Notes 5 and 6 in the Table in Permit Part I.D.7. of the current permit)." Notes 5 and 6 of the Table indicate that the monitoring of these parameters was only required in the winter. Since winter discharges are now prohibited, see the response to Comment #124, the monitoring is not necessary.

Water Quality Issues

142. Comment: The permit is inconsistent because Permit Part I.C.11. states that "The permittee shall ensure that operations at Red Dog Mine do not cause downstream water quality problems, such as exclusion of fish or fish kills in the Ikalukrok Creek or the exclusion of fish migrating up the NF of Red Dog Creek" yet the permit allows a mixing zone that could be a barrier to fish passage.

Response: 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 Mainstem 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."

See also the State's final §401 Certification for the final permit.

143. Comment: There is no basis for allowing a pH level up to 10.5 standard units (s.u.). Such an elevated pH tends to increase the dissolved concentrations of numerous metals and metal-like chemical species such as arsenic, antimony, molybdenum, vanadium, nickel, thallium, uranium, manganese, and chromium.

Response: The regulation at 40 CFR 440.131(d) allows the technology-based pH level to exceed 9 s.u. to assist in treatment to remove metals. In this case, a pH range of 9.5 to 10.5 is necessary to optimize metals removal. The State §401 Certification indicates that the pH immediately upstream of the discharge ranges from 5.8 to 6.7. The pH stabilizes shortly after the discharge and the pH is approximately 7 at the mouth of Red Dog Creek, i.e., the mixing of basic discharge waters with acidic creek waters results in a slightly basic/neutral pH where fish occur. As a result, the State certified that the pH limits would be protective of aquatic life. Note also that the NPDES permit has been developed to ensure compliance with all applicable aquatic life water quality standards for metals.

144. Comment: EPA failed to address the effect of an effluent pH of 10.5 s.u. on the toxicity of ammonia to fish.

Response: The ammonia criteria are dependent on the pH and temperature of the receiving water. ADEC authorized a mixing zone for ammonia and these two parameters vary over time. EPA determined the pH and temperature used in calculating the effluent limitation based on data collected from 2001 – 2005 at the edge of the mixing zone, previously represented by Station 10. It is appropriate to use ambient data from the edge of the mixing zone, because that is where the ammonia criteria applies. EPA conservatively calculated the 95th percentile of the data set (temperature at 14.48°C and pH of 7.9 s.u.) to determine the criteria to be applied.

145. Comment: TCAK requests that the requirement to monitor for turbidity in the effluent be removed. Permit Part I.A.1. Table 1. – The draft permit requires turbidity monitoring of the treated mine effluent once per week. Turbidity data has been collected weekly for over 7 years. The fact sheet to the draft permit at page 54 states that the highest observed value of turbidity in the effluent is at least 12 times lower than the most restrictive water quality standard. The fact sheet states that EPA has no expectation that turbidity in the effluent could ever reach the most restrictive water quality standard, yet EPA continues to require weekly monitoring.

Response: EPA concurs with the commenter that turbidity has not been observed in the effluent at levels approaching the water quality standard. The impoundment, however, is operated as a settling system and, like TSS, turbidity provides a measure of

settling performance. As a result, turbidity monitoring has been retained in the final permit and the frequency has been reduced to once per month.

Fact Sheet

The following comments were made on the Fact Sheet. EPA does not issue a revised Fact Sheet with the final permit.

146. Comment: Page 8, (Fact Sheet) first paragraph, last sentence. Correction: WTP-2 also has the ability to provide process water to the mill when excess treated ~~was~~ water is available.

Response: The comment is correct.

147. Comment: Page 8, Fact Sheet, second paragraph, third sentence. Correction: Reclaim water then flows into a 6,500 cubic-foot (cu ft) rapid mix tank where reacted ~~line~~ lime and recycled solids are added to adjust the pH to approximately 10.3.

Response: The comment is correct.

148. Comment: Page 9, Table 1. (Fact Sheet) The permit section for TDS should be Permit Part I.A.7.

Response: The comment is correct.

149. Comment: Pages 12-13, Table 4. (Fact Sheet) In footnote 1, the referenced permit sections should be I.A.5.a and b. Footnote 1 should be added to WAD cyanide on page 12.

Footnote 3 referring to Permit Part I.A.6 should be deleted because this reference has changed and moved to footnote 1. With this footnote deleted, footnotes 4 – 6 should be renumbered 3 -5. The footnote number for WAD cyanide on page 12 should be changed to 3. The footnote number for TDS anions and cations on page 13 should be changed to 4. The footnote number for Whole Effluent Toxicity on page 13 should be changed to 5.

Response: The comment is correct.

150. Comment: Page 15, Table 2, Item 8. (Fact sheet) The requested MDL for total residual chlorine (TRC) should be 100 **ug/L**.

Response: The comment is correct.

151. Comment: Page 16, first paragraph. (Fact Sheet) Correction: With the exception of total residual chlorine (TRC), all requested MDLs are below the effluent limitations for parameters that are limited in the draft permit. A Minimum Level of 0.1 mg/L is designated as the compliance evaluation level for TRC. ~~As such~~ For all others, there are no Minimum Levels designated as compliance levels in the draft permit. This is considered a typo, because the limits for TRC at Outfall 002 are obviously less than the requested MDL.

Response: The comment is correct.

152. Comment: Page 45, last paragraph, last sentence. (Fact Sheet) Correction: The water quality parameters that may be affected by the discharge are metals, cyanide, pH, dissolved solids, ammonia, and turbidity.

Response: The comment is correct.

153. Comment: Page 49, Item b, first paragraph, second sentence. (Fact Sheet) Suggested change to clarify mixing zones in an RPA: This analysis compares the maximum projected effluent concentration (Ce) to the criteria (after adjustment for any mixing zone) for that pollutant.

Response: The comment is correct.

154. Comment: Page 53, Item 2, first paragraph, last sentence. (Fact Sheet) Correction: The levels of TDS proposed in this permit reissuance are ~~not~~ designed to prevent adverse effects to aquatic life.

Response: The comment is correct.

155. Comment: Page 60, first paragraph. (Fact Sheet) Suggested change to clarify that the effluent meets the technology-based effluent limits: ~~The effluent from outfall 001 has the reasonable potential to exceed the lead aquatic life standard based on the analysis of the technology-based limitation.~~ Technology-based limits for the effluent are greater than the water quality-based limitations. Therefore, water quality-based limitations are required.

Response: The comment is correct, although the language has essentially the same meaning as the fact sheet language, which in no way implies that the effluent could exceed the applicable technology-based limits.

156. Comment: Page 60, Step 4. (Fact Sheet) The CV in the example (0.59) appears to be incorrect. The CV, which is stated on page 59, is 0.64.

Response: The CV was recalculated using additional data from 2005 and is shown in the spreadsheet for calculation of water quality-based effluent limitations attached to this response to comments document.

Response to Comments on the Environmental Assessment

1. Comment: The EA makes numerous technically misleading statements in regards to TDS. The EA should change the given definition for TDS in both the permit and in the EA as well as eliminating the downplaying of TDS. The language used in the EA is clearly intended to divert attention from these less-than-favorable details, and place the focus totally on TDS. It is such disingenuous language that allows the FONSI to contend that "…the proposed NPDES permit will not result in a significant effect on the environment." Also the EA makes it sound like the TDS is a result of natural conditions.
Response: EPA respectfully disagrees that the EA contains misleading statements regarding TDS. Further, the EA clearly states that "[b]ecause of the mine effluent, the concentrations of TDS are substantially higher in Mainstem Red Dog Creek than upstream in North Fork Red Dog Creek. ADEC's §401 Certification of the permit, including the site-specific criteria provide a concurrence with EPA's finding that reissuance of the NPDES permit will not result in a significant effect on the environment.

2. Comment: The EA argues that the high TDS concentrations in the treated effluent are unavoidable as no alternative technologies exist. This is simply untrue as numerous forms of membrane technology are routinely used throughout the world to purify water.

   Response: The EA states that no alternative technologies exist, *to remove TDS from the wastewater at the volumes discharged by the facility* (emphasis added). EPA acknowledges that alternative technologies for removing TDS exist and are used in drinking water systems and other applications. As a practical matter, however, these systems are costly to operate in terms of dollars and energy and the technology is not widely applied to mining operations. They are typically employed to address site-specific water quality issues. In this case, the site-specific criterion is adequately protective of aquatic life to preclude the need to limit TDS further and require additional treatment.

3. Comment: The description of the Permit does not include the proposed mixing zone for ammonia or the NCBSSC for cadmium, and there is therefore no analysis whatsoever of those aspects of the permit. In addition, the whole premise of the EA is that the mine will operate in compliance with the Permit. As demonstrated by TCAK's discharge monitoring reports, the mine is often in violation. As a result, there must be an analysis of non-compliance operations.

Response: The mixing zone and site-specific criteria are decisions to be made by ADEC within the bounds of State water quality standards. These water quality standards are designed to be protective of aquatic life and beneficial uses in the water body; the approval of mixing zones or site-specific criteria do not require separate environmental impact analyses and are not part of the decision-making process under consideration in this EA.

All NEPA analyses are conducted under the assumption that dischargers will operate in compliance with their permit. Discharges outside permit limitations are a compliance issue rather than a NEPA issue.

4. Comment: The analysis of environmental consequences is wholly inadequate. In some cases, the analysis is merely a description of the modifications to the Permit. Example: There is no analysis of the actual impacts or the reasons why the relaxed zinc limit does not violate Alaska's ADP. Also much of the analysis of environmental consequences is conclusory statements that impacts are "not justified" but these statements too have no justification, as with the analysis of fish impacts on EA P. 25 or invertebrates EA P. 26.

   Response: The analysis does not need to consider the change in the zinc limit since it reflects a decision made by ADEC. ADEC determined the appropriateness of using the previously-approved, natural background-based site-specific criterion for Mainstem Red Dog Creek versus the state's currently applicable water quality criteria for zinc. ADEC found that the natural background-based site-specific criterion for zinc in Mainstem Red Dog Creek was not required to protect existing uses of the waterbody and approved removal of the zinc site-specific criterion. The applicable water quality criteria for zinc in the Mainstem Red Dog Creek was determined as required in 18 AAC 70.020(b) and the *Alaska Water Quality Criteria Manual* and forms the basis of the effluent limits in the NPDES permit. ADEC has further found that the change is consistent with the Antidegradation policy, specifically 18 AAC 70.015(a)(2). These decisions are outside the action under consideration in the EA. Further, the assumption is that approved water quality standards that are designed to protect aquatic life are in fact protective of aquatic life.

   EPA disagrees with the characterization of the discussion of potential impacts to fish. While the discussion regarding invertebrates is brief, consistency with water quality standards will ensure the protection of aquatic life, including invertebrates, resulting in the finding that no impacts would be expected.

5. Comment: The cumulative impacts analysis is inadequate. The EA states, "There are no foreseeable future discharges of metals, ammonia, cyanide, TDS, or high or low pH discharges into the Red Dog Creek and/or Ikalukrok Creek watersheds that would cumulatively impact the streams." EA p. 29. This statement is false. The Army Corps of Engineers project to construct temporary mine access roads and drill pads at the Aqqaluk Deposit will have negative impacts and must be addressed in the cumulative impacts section of a supplemental EIS.

Response: The Corps has issued a public notice for a permit that would allow placement of fill in approximately 88 acres of wetlands associated with the development of temporary access roads and drill pads. The roads and drill pads would be located within the Red Dog Creek drainage, northeast of the tailings impoundment. These facilities are associated with exploration of the Aqqaluk Deposit. While road construction could result in additional sediments within the Red Dog Creek, there would be no expectation for additional discharges of metals, ammonia, cyanide, TDS, or high or low pH discharges to Red Dog or Ikalukrok creeks. In terms of cumulative impacts, the exploration activities considered under the Corps public notice would have a negligible effect on water quality.

6. Comment: The mitigation measures do not contain any technology to remove cyanide from the discharge. The strategic application of a cheap and effective cyanide-kill process like the addition of ferrous sulfate could target the reduction not only of cyanide, but would also inhibit the release of ammonia, a breakdown product of the cyanide which is also a contaminant of concern in the discharge. This is a technology that is economical and should be employed by TCAK.

   Response: Under the NPDES program, EPA does not have the authority to require particular technologies for technology based water quality limits. As noted in the EA, TCAK continues to evaluate alternatives for cyanide destruction. Regardless, as documented in the permit fact sheet, the discharge does not have reasonable potential to cause exceedances of the water quality standard for cyanide.

7. Comment: The EA misleadingly states that “Most provisions in the Red Dog Mine’s draft permit renewal have already been assessed in previous NEPA documents.” EA at 6. An Environmental Impact Statement must be prepared for this project, as the last comprehensive environmental review took place in 1984. Since that time, there have been a number of developments in the region and at the mine that call into question the conditions described in the 1984 document – developments that have not been examined by any of the subsequent environmental review documents.

   Response: The EA includes new information developed since the 1984 EIS but EPA does not believe that there is a need to develop a supplemental EIS at this time. EPA developed the EA on the basis that baseline conditions have not changed substantially since the 1984 EIS. EPA reviewed recent data as appropriate in developing accurate descriptions of the affected environment for the applicable resources (Water Resources and Aquatic Resources). Supplemental data was also considered in conducting the impact analysis. This level of analysis is appropriate considering the nature and scope of the proposed action.

8. Comment: Climate change is a significant new circumstance since 1984. In the past 22 years, there has been a significant warming of the planet with demonstrable and dramatic effects in the arctic environment around the Red Dog mine. This climate change means there is more snowmelt, earlier, than anticipated by any environmental

review in the 1980's. It also means the discharge season may be longer than anticipated by earlier review, and that the facility may begin discharging during months such as April or November, leading to even greater pollution loads.

Perhaps as a result of climate change, the tailings pond at the mine site has filled significantly faster that anticipated, necessitating greater volumes of discharge. This is significant new information about an effect that has the potential to have a dramatically significant environmental impact.

Response: Trying to determine whether climate change is occurring within the project area and if so, the nature and extent of change is completely beyond the scope of a NEPA analysis. Further, EPA is unaware of the availability of "significant new information," that would be adequate to identify or characterize cause and effect relationships suggested by the commenter.

From a practical standpoint, the permit is reviewed when renewed on a 5-year cycle. If it became necessary to modify the discharge schedule in the permit, such a change can be accommodated within the permitting process. While pollutant loads could potentially increase in the future, discharges would still be governed by the permit limits based on levels protective of aquatic life and the other designated uses of the receiving waters.

9. Comment: TCAK's inability or unwillingness to abide by the permit imitations imposed in the 1985 and 1998 permits is significant new information since the 1984 EIS. Because TCAK is a habitual permit violator, it is critical that any environmental review examine the impact of projected future violations as well as the cumulative impact of these violations.

   Response: NEPA analyses are based on the assumption that a discharger will comply with the terms of the permit. Discharges outside permit limits are a compliance issue rather than a NEPA issue.

10. Comment: There is significant new information about the impact of TDS on salmonids and other fish species from the Stekoll and Brix studies.

    Response: The Brix and Stekoll studies were used in developing the EA. Consistent with NEPA, this new information was used to expand the knowledge base within the project's administrative record. Simply because new information is available does not necessarily warrant the development of a supplemental EIS. In this case, EPA determined that an EA is appropriate and adequate to address the proposed action.

11. Comment: Among the new impacts are cumulative impacts from other, already-announced mining activity in the near vicinity. For example, there is already proposed mining activity that the EPA knows about in the near vicinity of the Red Dog Mine. (http://www.poa.usace.army.mil/reg/PNNew.htm) EPA cannot piecemeal the

examination of the impacts of only this permit, separating it out from other, currently proposed, mining in the vicinity.

In City of Carmel-by-the-Sea v. U.S. Dep't. of Trans., 123 F.3d 1142 (9th Cir. 1997), the Court noted that an EIS must include a "useful analysis of the cumulative impacts of past, present and future projects." Id. At 1160. This requires "discussion of how [future] projects together with the proposed project will affect [the environment]." Id.

Response: EPA is aware of the Corps public notice for a Section 404 permit to conduct exploration activities associated with the Aqqaluk Deposit. As discussed in the response to EA Comment No. 5, EPA does not consider the exploration activities as contributing to cumulative effects in terms of the NPDES permit reissuance.

No formal application to expand mining operations has been submitted to the State, nor has TCAK submitted an application to modify the NPDES permit. While exploration activities are common within mine projects they do not consistently result in an expansion of mining operations. Without some indication such as new permit applications, EPA considers the possibility of an expansion as speculative and therefore not meeting the cumulative impact criteria as reasonably foreseeable.

12. Comment: All of this new information meets the standards of significance under NEPA. EPA's action meets seven of the ten factors listed by CEQ to judge the intensity or severity of the impact, while satisfying even one is enough to trigger the requirement of an EIS.

    Response: EPA respectfully disagrees that there is adequate cause to justify the development of a supplemental EIS in determining whether the NPDES permit should be reissued. New information has been incorporated into the EA as applicable and TCAK's exploration activities do not justify a reasonably foreseeable expansion of mining operations. While the discharger has exceeded TDS limitations in the past, this is a compliance issue rather than one to be addressed under a NEPA analysis. Further the new limitations for TDS will allow the discharger to discharge in compliance with the new permit while being protective of aquatic life in Red Dog and Ikalukrok creeks.

13. Comment: The EA and FONSI are inadequate and illegal under the National Environmental Policy Act. The EA is fundamentally flawed and does not accurately describe the project, the existing environment, or the effect of the permit modification. Further, it contains no evidence to support most of its conclusions. As such, it is not legal under NEPA.

    Response: EPA respectfully disagrees with these conclusions.

14. Comment: The EA states that it is, in part, "to respond to the EAB remand order." EA at 7. However, the EA does not respond to the EAB remand order, but instead discusses a series of conditional events. This has no place in a permit document, there

must be a stable, accurate project description and a stable permit for the public to review.

Response: The EA is not a permit document but rather has been prepared to satisfy NEPA requirements. The EA provides a detailed description and analysis of the proposed permit changes from the 1998 permit. The only "conditional" part of the analysis relates to EPA's approval of the TDS site-specific criteria. EPA believes that this was entirely appropriate because it was unclear whether the site-specific criteria would be approved when the draft permit was issued. Regardless, the EA clearly described the permit changes and potential effects under both site-specific criteria approval and denial scenarios.

15. Comment: EPA offers no evidence for its determination that there is no reasonable potential for the effluent to cause a cyanide exceedance outside the mixing zone. In fact, using the total cyanide results TCAK reported in recent DMRs (CRPE Exhibit 28, for example) yields results higher than those used by EPA in its calculations. Thus, EPA's determination is illegal.

    Response: The revised RPA spreadsheet, which incorporates the more recent effluent data cited by the commenter, is included as attachment to this response to comments document. Consistent with State water quality standards, the cyanide data used in the RPA represent free cyanide rather than total cyanide. The RPA shows no reasonable potential for cyanide.

16. Comment: The EA states "Weekly monitoring for cyanide *remains unchanged*." EA at 8. It also states, "Weekly monitoring [for cyanide] *remains the same*." EA at 21. We presume this refers to the continued use of the total cyanide method currently required in the permit (as described in the FONSI), although this method is not found in the permit and the following sentence in the EA confusingly states that the WAD cyanide method will be used. The permit must be modified to be congruent with the FONSI and the EA.

    Response: EPA apologizes for any inconsistency between the EA and the draft permit. As discussed in the response to Comment No. 48, the water quality standard is applied as free cyanide, which is best measured by the WAD cyanide method. This has been modified from the previous permit but the change is compliant with CWA and State water quality standard requirements and will ensure protection of designated uses.

17. Comment: The details in the Draft Permit are supposedly based on statements presented in the EA and FONSI. However, much of the language in the EA and FONSI reads more like a public relations or marketing piece promoting the mine project rather than a technical presentation of impartial information. The tone is disturbingly similar to that found in Environmental Impact Statements (EISs) prepared by a consultant paid by a mining company, not the US EPA. One is forced to ask: Who were the actual authors

of the EA and FONSI? The Draft Permit sheds no light on this as the authors are not identified.

Response: Thank you for your comment. The EA was authored by EPA.

18. Comment: The EA states, “decreases of metal loads at the source insure reduced loads and concentrations at all points downstream.” EA at 13. This is exactly the point of why the renewed permit’s raising the zinc daily maximum effluent limitation by 50% and the monthly average effluent limitation by 100% will ensure increased loads of zinc downstream, in violation of the anti-degradation and anti-backsliding regulations.

EPA’s raising of the monthly average effluent limit for copper is of concern as fish in the Wulik are showing higher levels of copper than before TCAK began discharging. EPA’s action is thus not protective of the environment.

The alternatives analysis in the EA is woefully inadequate, as noted above, and should consider the alternatives of not renewing the permit, and of renewing the permit while strengthening, rather than weakening, it.

Response: The permit limits for both copper and zinc ensure compliance with the state-wide water quality standards for protection of aquatic life at the point of discharge without mixing zones. The higher zinc limits are based on rescission of the site-specific criterion. As a result, the revised permit limits will have not any adverse effects on aquatic life in any of the receiving waters, including downstream in the Wulik River. The State §401 Certification of the final permit documents how the changes in the permit do not violate anti-degradation requirements and the increased limits are an allowable exception to anti-backsliding requirements under CWA Section 303(d)(4).

EPA believes that the alternatives evaluation in the environmental assessment is adequate and consistent with NEPA requirements. It is especially important to recognize that alternatives should serve to minimize or avoid potential environmental effects. EPA believes that a discharge would occur even if the permit were denied but carrying out this action would not serve to minimize or avoid potential environmental effects. In this case, the proposed action, reissuance of the NPDES permit with the revised permit conditions, complies with all applicable CWA and State requirements, is not expected to have any adverse impact on the environment compared to current permit requirements.

19. Comment: It is interesting that the alternatives analysis in the EA at 26 states that to comply with the existing permit conditions “would require additional technology controls or water management controls to lower TDS in the effluent discharge[.]” This is only the case because EPA has never enforced the 1998 permit, which TCAK violated every day of discharging from 1998 through June 15, 2004. The alternatives analysis does not discuss the potentially beneficial impacts to aquatic vertebrates of retaining the TDS and CN permit limitations. Its discussion of aquatic invertebrate communities and periphyton is not supported by any evidence or analysis whatsoever.

Response: In the final §401 Certification, the State has authorized mixing zones for both TDS and cyanide in compliance with State water quality standards, including anti-degradation requirements. The mixing zone requirements will ensure protection of aquatic life designated uses in the areas of the receiving waters where they apply. The EA specifically describes how application of the TDS site-specific criterion will not have any adverse effects on aquatic life compared to current permit conditions.

As indicated in the EA, additional treatment technologies are available to further reduce TDS and cyanide. These technologies, however, are not commonly applied to mining discharges and would be very costly and difficult to implement at the flow volumes discharged by TCAK. They are, therefore, not being used by EPA to establish technology-based permit limits based on best professional judgment. With respect to water quality, the State has determined that the mixing zones are as small as practicable, given that, as noted above, they ensure protection of aquatic life where uses apply in the receiving water.

20. Comment: While the EA states that "there are no data suggesting that these metals [iron and manganese] are coming from the Red Dog mine site," EA at 27, this ignores the sworn testimony of Kivalina residents who have repeatedly said that their drinking water changed its taste after the mine began discharging.

The "Relationship between short term and long term uses" section is woefully inadequate as it does not detail that mining will continue in the region long after 20 years, that the water treatment at the mine site – and thus effluent discharges at the mine site – will have to continue in perpetuity, and that few of the jobs provided by the mine go to the affected community of Kivalina.

Response: The EA does not ignore the testimony of Kivalina residents about the taste of drinking water. The EA clearly states that based on the data reviewed, it appears that the source of iron and manganese occurs within Ikalukrok Creek, upstream of the mine effluent (Red Dog Creek). It goes on to suggest that the change in taste *could be* the result of the sulfate or calcium from mine effluent.

EPA believes that the *Relationship Between Short and Long Term Uses* is accurate. Given the difficulty with predicting the future 20 years in advance we believe that using the company's estimate of a 20 year mine life depending on economic conditions as appropriate. The commenter is correct that the discharger may have to treat the mine effluent for an extended period after mining operations cease. Such treatment, however, would be required as needed to meet NPDES permit requirements, which will continue for as long as necessary to ensure protection of water quality and the designated uses of the receiving waters. In terms of employment, the mine does provide a number of jobs, providing at least some economic benefit to Kivalina residents. The testimony of Kivalina residents does not establish that iron and manganese are coming from the Red Dog Mine site because there is no evidence that those elements are the cause of any taste change observed.

21. Comment: The alternatives analysis in the EA, at 22, states “there is no known treatment of TDS,” which is absolutely false – as the EA itself discloses at 29 when it discusses Water Treatment Plant 3, which has been built, according to the EA, to reduce TDS. A true alternatives analysis that looked at the range of options for TDS control must be undertaken.

    Response: Please see the response to EA Comment Nos. 2 and 19 .

22. Comment: It does a great disservice to data collection to stop the use of Station 10, when there is 10 years of data at that point. Moving all the data collection to Station 151 will ensure that once again TCAK can argue that there is no comparable data over time, as it has repeatedly to argue for weaker permit limits. EPA should retain monitoring at Station 10.

    Response: After 10 years of monitoring, sufficient data has been collected to characterize conditions at Station 10 during mining operations. The primary purpose of the monitoring program is to demonstrate compliance with permit requirements. Monitoring at Station 151 serves to demonstrate compliance with permit limits and protection of designated uses outside of the mixing zone, while no specific permit requirements apply at Station 10.

Attachment A
Reasonable Potential Analysis

Reasonable Potential Analysis

Parameter(in ug/L otherwise noted)	Effluent Concentration	CV[1]	N= # of Samples	RPM	Maximum Projected Effluent Concentration	Reasonable Potential when compared with standards
Aluminum	210	1.808	62	2.82	593.2	Yes
Ammonia[3]	10.7	0.239	102	1.16	12.4	Yes
Cadmium[2]	100	0.801		1.0	100	Yes
Copper[2]	300	1.581	113	1.0	300	Yes
Cyanide[3]	6.9	0.475	123	1.27	8.8	No
Iron	<250	1.161	61	2.23	<620	No
Lead[2]	600	0.787	107	1.0	600	Yes
Mercury[2]	2	0.6		1.0	2	Yes
Nickel	51.9	1.013	107	1.65	85.9	No
Selenium	6.8	0.341	105	1.22	8.3	Yes
Silver	0.2	1.393	61	2.47	.5	No
Zinc[2]	1500	0.417	107	1.0	1500	Yes

1 - CV is defined as the Standard Deviation ÷ the Mean of a data set.

2 - Metals with technology-based effluent guidelines.

3 - TCAK has requested mixing zones for these parameters. The effluent would be diluted to 40% at the edge of the requested mixing zone.

	Percentile	z99	Number of Samples	Coefficient of Variation	sigma-sq	sigma	RPM - 99	Maximum Effluent	Projected Maximum
	(1-0.99)^(1/n)		n	CV	σ2=Ln(CV^2 + 1)	σ	C_{99} / C_X		RPM * Max Eff
Al	0.928414545	1.464	62	1.808	1.45134775	1.204719	2.824885	210	593.23
CN	0.963251818	1.79	123	0.475	0.203450918	0.4510553	1.273496	6.88	8.76
Fe	0.927284744	1.456	61	1.161	0.853530256	0.923867	2.233934	<250	<620
Ni	0.957874057	1.727	107	1.013	0.706146818	0.8403254	1.654262	51.9	85.86
Se	0.957089124	1.718	105	0.341	0.110002624	0.3316664	1.223424	6.8	8.32
Ag	0.927284744	1.456	61	1.393	1.078562291	1.0385385	2.468297	0.2	0.49
NH3	0.955855309	1.704	102	0.239	0.055549175	0.2356887	1.157889	10.7	12.39
							7.9765214	2.8236621	
							2.579071	2.0251901	
							5.5965456	2.5052418	
							4.9605843	2.9986692	
							2.0471628	1.6733065	
							6.5296901	2.645423	
							1.6827635	1.4533032	

This procedure is outlined in Section 3.3.2 of the

Technical Support Document for Water Quality-based Toxics Control (TSD)

C99 = exp(2.326*σ -0.5*σ^2) Cx = exp(z*σ -0.5*σ^2)

Compare Projected Maximum to the criteria to determine whether there is reasonable potential.

	Projected Maximum	Acute Criteria	Chronic Criteria	Reasonable Potential?	
Al	593.23	750	87	Yes	
CN	8.76	55	13	No	Mixing Zone Authorized
Fe	<620		1000	No	
Ni	85.86	1053	117	No	
Se	8.32	20	5	Yes	
Ag	0.49	21	*	No	
NH3	12.39	16.4	7	Yes	Mixing Zone Authorized

* There is no chronic criteria for silver

Attachment B
Permit Limit Calculations

Permit Limit Calculations

Parameter	Acute	Chronic	CV	LTA-acute	LTA-chronic	lower LTA	MDL	AML
Cd		2	0.801		0.87843793	0.878438	3.53	1.54
Cu	34.4	21.1	1.581	4.7639926	5.31953845	4.763993	34.40	11.76
Pb	275.5	10.7	0.787	69.734194	4.75730708	4.757307	18.79	8.26
Zn	269	269	0.417	114.83958	170.062737	114.8396	269.00	157.84
Al	750	87	1.808	94.025949	19.4315688	19.43157	155.00	51.40
NH3 - 10	16.4	7	0.239	9.7458733	6.33072002	6.33072	10.65	6.80
Se	20	5	0.341	9.7696189	3.42129951	3.4213	7.00	4.46
Hg	2.4	0.012	0.6	0.7705997	0.0063292	0.006329	0.02	0.01

Attachment C
Ammonia Criteria Calculations

Station 10

Date	pH	Temp (°C)
5/31/2001	6.99	1.1
6/3/2001	6.72	4.1
6/22/2001	7.63	12.8
6/26/2001	7.53	7.6
7/1/2001	7.49	14.5
7/9/2001	7.54	10.3
7/15/2001	7.4	14.1
7/22/2001	7.81	15.4
8/4/2001	8.06	6.3
8/6/2001	7.82	7.7
8/18/2001	7.64	8.6
8/23/2001		7.5
8/27/2001	7.83	10.8
9/12/2001	7.92	6.8
9/16/2001	7.9	2.6
9/23/2001		2.4
10/5/2001	7.78	3.2
10/10/2001	7.23	0.6
10/23/2001	7.15	0.6
10/27/2001	7.06	0.8
11/2/2001	7.05	3.1
11/7/2001	7.36	6
5/28/2002	6.64	2.9
6/2/2002	6.61	7.1
6/12/2002	6.88	6.5
6/17/2002	6.69	8
6/24/2002	7.25	7.4
7/1/2002	7.14	6.9
7/13/2002	7.16	12.3
7/18/2002	7.72	16.8
7/25/2002	7.03	15.7
8/2/2002	7.6	19.4
8/5/2002	7.59	10.9
8/12/2002	7.58	12.8
8/21/2002	7.21	4.4
8/26/2002	6.79	7.9
9/7/2002	7.37	4.5
9/13/2002	7.51	4.1
9/19/2002	7.78	2.1
9/24/2002	7.32	3.8

10/4/2002	7.23	1.5
10/7/2002	7.66	-0.1
10/22/2002	6.71	1.6
10/26/2002	7.37	0.1
10/27/2002		0.1
11/8/2002	6.35	0.1
5/9/2003	6.14	0.7
5/10/2003	6.14	0.7
5/12/2003	6.89	0.07
5/24/2003	7.18	0.17
5/28/2003	7.2	0.03
6/5/2003	7.21	1.45
6/8/2003	6.86	0.96
6/15/2003	7.89	10.6
6/25/2003	7.8	12.77
6/30/2003	7.69	8.43
7/3/2003	7.75	7.32
7/9/2003	7.8	9.15
7/10/2003	7.37	8.94
7/23/2003	7.74	9.91
7/28/2003	7.72	6.81
8/8/2003	8.03	7.9
8/12/2003	7.8	10.5
8/20/2003	7.02	9.27
8/24/2003	6.97	6.15
9/4/2003	7.57	5.95
9/8/2003	7.9	5.26
5/13/2004	7.47	0.01
5/15/2004	7.13	-0.098
5/17/2004	6.91	0.1
5/24/2004	7.24	1.07
6/2/2004	7.02	7.82
6/10/2004	7.48	8.79
6/14/2004	7.49	17.13
6/21/2004	7.51	9.44
7/2/2004	7.48	13.42
7/5/2004	7.67	9.26
7/11/2004	7.56	10.37
7/13/2004	8.02	10.2
7/18/2004	7.71	14.97
7/29/2004	7.68	13.36
8/3/2004	7.75	12.11
8/12/2004	7.52	6.95
8/15/2004	7.54	8.4
8/28/2004	7.54	5.4
9/1/2004	7.45	6.18
9/10/2004	7.62	6.16
9/17/2004	7.42	2.53

9/22/2004	7.38	-0.1
9/27/2004	7.81	0
9/29/2004	7.76	0.01
10/5/2004	7.31	-0.11
10/11/2004	7.46	-0.11
10/17/2004	7.4	-0.12
5/13/2005	6.9	0.03
5/17/2005	7.91	-0.12
5/22/2005	7.04	1.02
6/2/2005	7	1.07
6/5/2005	7.07	0.71
6/13/2005	6.99	4.94
6/20/2005	7.28	8.3
6/27/2005	7.1	12.5
7/3/2005	6.88	10.59
7/15/2005	7.19	9.46
7/17/2005	7.38	12.67
7/28/2005	7.77	13.09
8/1/2005	6.9	12.39
8/11/2005	6.82	9.42
8/15/2005	6.55	9.1
8/22/2005	6.64	8.48
8/28/2005	7.68	8.91
9/7/2005	7.27	0.77
9/12/2005	6.75	6.05
9/22/2005	7.62	5.27
9/25/2005	6.78	3.75
10/5/2005	7.52	-0.12
10/10/2005	7.5	0.11
10/11/2005	7.41	-0.12
10/16/2005	7.46	-0.11
10/21/2005	7.53	-0.12
10/24/2005	7.48	-0.11
10/30/2005	5.35	-0.13
min	5.35	-0.13
Max	8.06	19.4
95th%	7.90	14.48
90th%	7.80	12.80

Acute	6.543394				pH		Temp	
Chronic - 30	2.797661			2.85		7.9	14.48	14.52
Chronic -4	6.994153							
WLA-a	16.35849	Here is where the mixing zone is factored in - 2.5 dilution factor						
WLA-c	6.994153							
WLA-c4	17.48538							
LTA-a	9.721203	cv	0.239	var	0.055549175		stdev	0.235689

LTA-c	6.325432	cv	0.239	var	0.001902223	stdev	0.043614
LTA-c4	13.34955	cv	0.239	var	0.014179248	stdev	0.119077

min LTA	6.325432

MDL	10.64421
AML	6.789471