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

U.S. EPA, Region 10
December 2009

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EPA prepared a preliminary Draft Permit and Fact Sheet, which were sent to area Tribes prior to public notice of the Draft Permit. These preliminary documents were also sent to the Alaska Department of Environmental Conservation (ADEC) so the Clean Water Act (CWA) § 401 Certification could be prepared to accompany the Draft Permit.

EPA public noticed the Draft Permit and the Draft Supplemental Environmental Impact Statement (DSEIS) in the Anchorage Daily News and the Arctic Sounder on December 5, 2008. Public hearings on the Draft Permit and DSEIS were held in Kivalina on January 12, 2009, Noatak on January 13, 2009, Kotzebue on January, 14, 2009, and Anchorage on January 15, 2009. The comment period ended on February 3, 2009.

Comments on the Draft NPDES Permit were received from the Center for Race, Poverty & the Environment (CRPE), Northern Alaska Environmental Center (NAEC), Native Village of Kotzebue, Trustees for Alaska on behalf of the Native Village of Point Hope and on behalf of the Kivalina IRA Council and Becky Norton (a resident of Kivalina), Robert E. Moran, Teck Alaska, Inc. (Teck), Alaska Community Action on Toxics (ACAT), Keith Silver, and the Center for Science in Public Participation (CSP^2). The following presents a detailed summary of the comments received on the Draft Permit, and EPA's responses. Comments on the DSEIS and EPA's responses have been incorporated into the Final SEIS.

In emails dated November 2, 2009, EPA requested an updated species list from USFWS and NMFS.

On November 3, 2009, an e-mail from USFWS confirmed that no listed species occur in the project area.

On November 6, 2009, NMFS provided a letter stating that there would not be an adverse affect on living marine resources including EFH. An e-mail, received on November 10, 2009, clarified that this determination also applied to ESA.

EPA received the final CWA § 401 Certification and Response to Comments from the Alaska Department of Environmental Conservation (ADEC) on December 15, 2009.

General Comments

1. **Comment:** EPA should maintain jurisdiction over the Red Dog mine's permits and not delegate those permits to Alaska.

   Response: On October 31, 2008, EPA authorized ADEC to administer the NPDES program for the State of Alaska. ADEC is phasing the Program with different categories of discharges being phased in over a 3-year period. Mining permits will be transferred during the third phase, which, according to the current Memorandum of Agreement between EPA and ADEC, will occur in October 2010. EPA, therefore, is re-issuing the Final Permit at this time. Responsibility for future permit re-issuance is beyond the scope of this action.

2. **Comment:** EPA's demonstrated lack of commitment to enforcing the permit conditions it imposes should be factored into the new permit, and this is a central reason why the bio-monitoring and ambient monitoring provisions should be retained in the federal NPDES permit so that they can be enforced in federal court by members of the affected public like residents of Kivalina.

   Response: EPA regrets the commenter's perception that EPA is not committed to enforcing the permit conditions. The Fact Sheet documents the rationale for removing specific monitoring requirements. Please see the section on Ambient Monitoring for responses to specific issues relating to bio-monitoring and ambient monitoring.

3. **Comment:** The EPA did nothing to enforce these permit conditions, and in fact actively impeded the plaintiffs in the suit by relaxing Teck Alaska Incorporated (Teck)'s permit conditions during the pendency of the suit. The current permit must include an easier enforcement mechanism, and EPA must also enforce its own permit.

   Response: EPA respectfully disagrees with the commenter that the agency in any way impeded the public's ability to seek enforcement of specific permit conditions included in the current permit. The rationale for all proposed permit changes is documented in the Fact Sheet to the Draft Permit. It is unclear what the commenter means by "an easier enforcement mechanism." EPA remains committed to ensuring compliance with all permit conditions. Methods of enforcing the permit are addressed in Permit Part III., Compliance Responsibilities.

4. **Comment:** Although EPA has all of Teck's DMRs filed under the 1998 permit, and we incorporate them by reference here to document the repeat violations, those DMRs only paint part of the picture of Teck's refusal to abide by federal law and its permit conditions – and, sadly, of EPA's complete refusal to enforce any of the federal laws or permit conditions applicable to the facility.

Response: Comment noted. Please see Response #3.

5. **Comment:** The EPA and ADEC should reject the proposed § 401 Certification because (1) Teck has failed to demonstrate that the proposed site-specific criterion will have no adverse affect on the aquatic ecosystem; (2) the proposed site-specific criterion for Red Dog Creek does not ensure viable habitat downstream; and (3) Teck lacks the historical record to demonstrate it is able and willing to comply with the proposed site-specific criterion.

   Response: The site-specific criteria (SSC) have been formally adopted by the State and approved by EPA according to the procedures specified in Alaska's water quality standards (WQS), including protection of aquatic life uses. They are, therefore, appropriately included in the CWA § 401 Certification and Final Permit.

   As discussed in Section 3.10 of the Final SEIS, water quality and aquatic life conditions in the main stem of Red Dog Creek have improved from pre-mining conditions, particularly during the past five years. This has led to increased fish passage and usage of the Red Dog Creek watershed. No aspects of the Final Permit will affect the characteristics of the discharges, including TDS levels.

   EPA respectfully disagrees with the commenter that the Permittee has not demonstrated the ability to comply with the TDS or cadmium site-specific criteria. Review of the TDS data collected from May 2004 through August 2009 show that there has been only 1 exceedence out of 283 values collected at Station 151. This equates to a compliance rate of 99.996%. Section 3.5 of the Final SEIS anticipates future compliance with the TDS limits. In addition, EPA has included a requirement for a TDS Management Plan in the Final Permit. The levels of cadmium in the effluent from 2003 through 2007 showed a maximum value of 1.8 ug/L and a mean of 0.52 ug/L which are well within the effluent limitations of the Final Permit.

6. **Comment:** While water quality has improved in many cases since the passage of the Federal Water Pollution Control Act ("Clean Water Act" or "CWA"), these three goals [restore and maintain the chemical, physical, and biological integrity of the Nation's waters] have not been attained. Similarly, while water quality has somewhat improved in limited respects around Red Dog Mine, the Permit does not attain these three goals, and in many ways is significantly less stringent than current requirements. Thus, the Permit does not meet the goals or the letter of the Clean Water Act.

   Response: The comment is too general for EPA to provide a specific response. EPA asserts that the Final Permit complies with all applicable CWA requirements as documented in the Fact Sheet and addressed in the NEPA analysis.

7. **Comment:** The EPA's decision is not supported by substantial evidence, as it offers almost no support for any of the radical actions it is taking in removing effluent limitations and monitoring requirements and dramatically weakening the remaining effluent limitations. Not only is EPA's action not supported by any evidence, the evidence that does exist contradicts its actions in the Draft Permit. For example, studies demonstrate reduced fertilization rates in salmon at TDS concentrations as low as 250 ppm.

   Response: In the Draft and Final permits, EPA has applied the currently applicable WQS which is protective of aquatic life (as further documented in the CWA § 401 Certification). Moreover, Section 3.10 of the Final SEIS fully describes the effects of TDS on the specific species in the Red Dog Mine receiving waters. This includes the most recent studies on impacts on fertilization and early life stages that provided the basis for the TDS site-specific criterion.

8. **Comment:** Teck will likely not comply with the proposed water quality standard.

   Teck has repeatedly violated the terms and conditions of its mine site NPDES permit, discharging mine effluent in excess of the limits for total dissolved solids (TDS), cyanide, cadmium and other limitations. Teck was never able to comply with the effluent limitations for TDS in the 1998 permit. Instead, Teck obtained three compliance orders from U.S. EPA and ADEC to allow more time for Teck to comply. However, Teck has repeatedly violated even the terms of the relaxed TDS standards in the compliance orders, which are substantially identical to the proposed TDS revisions it seeks.

   Because Teck has not changed its method of treatment or discharge, these violations can be expected to continue in the coming discharge seasons. The predictability of Teck's violations makes the new TDS standard a mockery of the regulatory process: Teck has never complied with its 1998 permit limits for TDS to this point; rather than giving the company a free pass to continue to pollute the creeks and rivers that Kivalina residents rely on, ADEC should force Teck to clean up its act.

   Response: EPA acknowledges that Teck has violated the 1998 permit limit for TDS and other permit limits. EPA has taken several enforcement actions that were appropriate. The TDS limits in the Final Permit are based on the TDS site-specific criterion and are higher than the TDS limits in the 1998 permit. Based on long-term monitoring for the discharge, the analysis in the SEIS demonstrated that Teck will be able to comply with the new TDS limits (see also Response #5). With the addition of the TDS Management Plan (Permit Part I.A.7.f.), EPA believes that Teck will able to consistently comply with the limits included in the Final Permit and also better maintain the site-wide water balance.

9. **Comment:** Past US EPA-authored documents relating to the Red Dog Mine have described potential impacts to soils, vegetation, air quality, land use, and socioeconomics [EA, page 8], yet these impacts have been neglected in the present EA, FONSI and Proposed NPDES Permit. None of these documents provide technical details that justify a Finding of No Significant Impact given that the mine has been discharging a minimum of 2.418 billion gallons per year of effluent from Outfall 001, containing the associated chemical loads of numerous potentially toxic chemical constituents.

   Response: This comment is connected to a previous FONSI that is unrelated to the current permit action. EPA notes, however, that the facility's discharge is limited to a maximum of 2.418 billion gallons per year.

10. **Comment:** Significant changes authorized by the Permit result in unacceptable impacts to water quality. The continued protection and maintenance of water quality is of vital significance and importance for the health of present and future Alaskans, the quality of fish and shellfish harvested from State and federal waters, the marketing of fish and shellfish from Alaska, and the maintenance of wildlife throughout the state. The residents of Kivalina are particularly impacted by water quality changes that the dSEIS and Draft NPDES permit contemplate.

    Response: Thank you for your comment. As documented in the Final SEIS, the conditions of the new permit will not significantly change the characteristics of Teck's effluent. Therefore, receiving water conditions will be essentially unchanged from current conditions and the Final SEIS demonstrates that there has not been adverse impacts on water quality.

11. **Comment:** The deletion of the requirement for consultation with state and federal agencies on grayling spawning before discharge commences does not protect the grayling.

    Response: The State has not included notification or consultation requirements in its CWA § 401 Certification related to initiation of discharges and the grayling spawning period. The Final Permit does require that Teck notify EPA within 24 hours of initiating the discharge. Previous NPDES permits have not required consultation with other Federal agencies before discharges commence.

12. **Comment:** The NPDES permit should be reissued for the discharge of treated mine water into Red Dog creek. History has shown that this has protected the aquatic life of the stream and in fact has improved it. Prior to the development of Red Dog Mine by NANA and Teck-Cominco, Red Dog Creek supported almost no life. Now with the discharge from the mine, the treated mine water dilutes the naturally occurring mineralization of the creek to the point that the creek now sustains aquatic life that was not there before the mine.

Response: Thank you for your comment.

13. **Comment:** The Draft Permit is legally inadequate under the Clean Water Act and EPA's regulations. It also bears the unmistakable imprint of Teck's undue influence in the permitting process, both with EPA and with Alaska regulators.

    Response: This comment is too general for EPA to provide a response. EPA respectfully disagrees with the commenter that Teck has had an "undue influence" on EPA in the permitting process.

14. **Comment:** A series of emails between EPA and ADEC (submitted as CRPE Exhibits 28-32) demonstrate that EPA and ADEC are seeking the weakest possible permits with the least public input, all in an apparent effort to appease Teck. The picture these emails paint is not of regulators trying to protect the environment, but rather to weaken the permit and keep Teck happy. These emails demonstrate that EPA and the State negotiated the site-specific criteria to mesh with the permit limits they already had in mind, rather than seeking site-specific criteria that were determined by science or environmental need, that ADEC noted to EPA that it could change the final TDS certification with public notice, that the State was already planning a new Compliance Order by Consent in the event Teck could comply with its permit limitations, that the state has separated the TDS and Cadmium site-specific criteria to facilitate allowing Teck to violate its new permit, that the EPA has asked ADEC to withdraw its previous SSC for TDS of 500 ug/L, that the State negotiated using a lesser number of cadmium samples for the natural condition cadmium SSC, and that EPA actually wrote most of the State's cadmium SSC and sent it to the State (see Exhibit 28-32).

    Response: Thank you for your comment. This comment relates to the adoption of the SSC for cadmium and TDS, which are separate from this permit action. Comments on those actions should have been submitted during the criteria adoption comment period. EPA respectfully disagrees that it has worked with the Permittee to "weaken" any aspect of the permit.

15. **Comment:** There is nothing in the environmental review documents that documents when Teck reapplied for the permit renewal, and on information and belief, Teck did not reapply within the statutorily required time.

    Response: Section VII. of the Fact Sheet and Section 1.1 of the SEIS noted that Teck originally re-applied for permit re-issuance on February 23, 2003 (received by EPA on February 25). On March 15, 2008, Teck requested that the application be amended to include development of the Aqqaluk Extension Project. Teck has met all applicable permit application requirements since the application was due on March 1, 2003, 180 days prior to the expiration date of August 28, 2003.

16. **Comment:** As an initial matter, it should be noted that the process for public participation and consultation have not resulted in adequate consultation with the tribe and affected communities. The approach by EPA in this environmental review has been different than that which had been used in previous meetings and was confusing. The Native Village of Point Hope IRA Council requests that there be government-to-government consultation before the Red Dog SEIS is finalized and prior to NPDES authorization.

Response: EPA provided sufficient notice to the public regarding release of both the DSEIS and Draft NPDES Permit. Similar to other draft permits, public meetings on the DSEIS and Permit were noticed in the Anchorage Daily News and the Arctic Sounder on December 5, 2008. Meetings were held in Anchorage, Kotzebue, Kivalina, and Noatak in January 2009 consistent with NPDES regulations. The public meetings were not unusual or different, but rather standard practice in which an overview of the project is presented with a question and answer period followed by a formal comment period. EPA clearly explained the format of the meeting at numerous points through the presentation.

In response to Point Hope's request for government-to-government consultation, EPA sent a letter to the Point Hope IRA council stating that EPA would be happy to have a government-to-government consultation meeting (February 25, 2009 letter from Michael A. Bussell, Director EPA Region 10 Office of Water and Watersheds, to Caroline Cannon, President Native Village of Point Hope). EPA sent the letter via both mail and email to the IRA Council President and Tribal Administrator. On June 3, 2009, EPA received an email from Point Hope requesting attendance at a meeting on June 5. Due to the short notice and other commitments EPA was unable to attend but sent an email response requesting a coordinated effort with Point Hope to reschedule the meeting. EPA received no response to that email request.

17. **Comment:** Much of the Draft Permit organization and wording is so unclear that even a water quality specialist is frequently confused as to the intended meaning. It appears that the new Draft Permit is significantly less clearly worded and organized than past versions. Clearly, the issues presented in this Draft Permit were not intended to be understood by the average citizen.

The Draft Permit is 43 pages long. Much of it is composed of text which would have been much more understandable had it been summarized using additional tables.

Because the Draft Permit includes discussion of numerous speculative options, it is unclear what will actually be included in the Final Permit. As such, it is unnecessarily difficult for the public to comment meaningfully.

Response: EPA apologizes for any difficulties the commenter had in understanding the Draft Permit but the agency believes that the requirements are clearly described. While previous Draft Permits included potential options for different requirements, e.g., based on possible adoption of site-specific criteria, this Draft Permit included none of these options and it is unclear to what "speculative" requirements the commenter is referring.

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 simply citing the regulations. This gives 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. The permit follows a format that is consistent with other NPDES permits written by EPA Region 10.

18. **Comment:** Many of the permit provisions found in this revised permit were concocted years ago during the last round of permit renewal (that permit was issued, appealed and then withdrawn, in 2007). Then, and now, the EPA permit and the State Certification appear to be a concerted effort by EPA, ADEC and Teck to avoid any real enforceable limits in the permits. Teck has effectively lobbied the State to weaken its water quality criteria at every turn, with the express ambition of then using those weakened criteria to get weaker EPA permit limitations. See email from Mark Thompson to Luke Boles, November 22, 2005 (Exhibit 27, submitted under separate cover and incorporated here by reference).

Thompson repeatedly seeks weaker permit limitations from the state, which have apparently lead to weaker EPA permit conditions as well: Thompson writes, "EPA has retained the previous zinc limits that were based on natural conditions. Teck requests that the State not re-certify the natural condition zinc criteria and certify that implementation of the current state-wide criteria is consistent with the anti-degradation standards. This should pave the way for EPA to use the higher state-wide standard." What is remarkable are Teck's attempts to get rid of the zinc limits based on natural conditions, because this will allow it to pollute more, while at the same time requesting cadmium limits based on natural conditions, also to allow it to pollute more. Teck is consistently seeking the weakest limits possible, and EPA must reject this naked attempt to play the State off EPA and vice versa. The entire Thompson email is a demonstration that Teck had undue influence in the setting of the Alaska permit and certification limits, and thus in the setting (or more accurately, relaxing) of the EPA permit limitations.

Response: Thank you for your comment. EPA respectfully disagrees that Teck has had any undue influence in setting permit conditions. Please see Response #49 which addresses the change to the zinc and cadmium criteria.

19. **Comment:** The final NPDES Permit should reflect a corporate name change by the Permittee.

Teck Cominco Alaska Incorporated recently changed its name to Teck Alaska Incorporated. Please use "Teck Alaska Incorporated" as the full name of the company, or "Teck" when using an abbreviated form of the company name. The legal entity remains the same, as this is a corporate name change only. Teck has submitted its notification of name change to EPA, and requests that a Final NPDES Permit and related documents reflect this change.

Response: Change made as requested in the Final Permit.

20. **Comment:** There is a typographical error in the fifth paragraph on page 25. The reference to 18 AAC 72.240(l), should instead be 18 AAC 70.255(f) (June 26, 2003).

Response: These comments refer to the CWA § 401 Certification and should be addressed by ADEC. EPA notes that it does not issue a revised Fact Sheet with the Final Permit.

21. **Comment:** There is a typographical error in the fifth paragraph on page 25. The reference to 18 AAC 72.240(l), should instead be 18 AAC 70.255(f) (June 26, 2003).

Response: These comments refer to the CWA § 401 Certification and should be addressed by ADEC. EPA notes that it does not issue a revised Fact Sheet with the Final Permit.

22. **Comment:** Fact Sheet Section III, page 6, states that the conditions of the 2003 modification did not go into effect. Teck respectfully disagrees with EPA's interpretation and believes that all of the provisions of the 2003 modification went into effect with the exception of the limit applicable to the grayling spawning period. Teck requests that the second paragraph be modified to reflect that the provisions of the 2003 modification are in effect.

Response: As documented in a letter from EPA to Teck on November 17, 2008, the conditions of the 2003 modification to the NPDES permit did not go into effect. This is also described in Chapter 1 of the Final SEIS.

23. **Comment:** Monitoring Requirements. (Ref: Fact Sheet, Section VI.C).

EPA states that monitoring is included for zinc, mercury, and lead at Outfall 001 "solely on the basis of their inclusion in the Effluent Limitation Guidelines." Technically, the ELG's of 40 C.F.R. §§440.102 and 440.103 only apply to "existing sources." Heretofore, Red Dog Mine has been considered a "new source." If EPA is now treating Red Dog Mine as an existing source, it should expressly say so elsewhere in this Fact Sheet. If EPA is still treating Red Dog Mine as a new source, it should refer in this

part of the Fact Sheet to the "Effluent Limitations of the New Source Performance Standards" rather than "Effluent Limitation Guidelines."

Response: The Effluent Limitation Guidelines (ELGs) applicable to lead/zinc mines are found at 40 CFR 440 Subpart J. These ELGs contain requirements for both existing dischargers and new sources. Red Dog Mine is classified as a new source because mining commenced after the ELGs were promulgated. The New Source Performance Standards (NSPS), found at 40 CFR 440.104, are the part of the ELGs that apply to a new source lead/zinc mine such as Red Dog.

Ambient Monitoring

24. **Comment:** At pages 60 through 62 of its March 26, 2006 Comments to the 2006 Draft NPDES Permit (which was later issued and withdrawn), Teck questioned the justification for continuing monitoring at several "Stations" (locations in the field where regularly scheduled monitoring occurs). Specifically, at Page 62 of its Comments, Teck questioned the need for continued WET monitoring at Stations 9 and 12.

    In its 2007 Response to Comments on the 2006 Draft NPDES Permit ("2007 RTC"), EPA agreed to eliminate monitoring at Stations 9 and 12 (2007 RTC, #139, page 64: "Monitoring at the two stations referenced by the commenter is not included in the Final Permit") as well as Station 20. See 2007 RTC #66, page 29 ("ADEC found that ambient monitoring requirements at stations 2, 9 and 20 are unnecessary. EPA concurs with ADEC's assessment and has eliminated monitoring requirements for these three stations.").

    In the current Draft Permit, however, Section I.C.6, Table 2, requires Ambient Whole Effluent Toxicity monitoring once per month at Station 12. Teck believes that the rationale for eliminating this monitoring is still valid, and EPA should either eliminate this requirement based on its earlier assessment, or present any new or more current information to justify including this provision.

    Response: The commenter is correct and WET monitoring at Station 12 was inadvertently included in the Draft Permit. Sufficient, representative data were collected for this station to characterize the toxicity of the North Fork which is unaffected by the discharge from the mine. These data were used in determining the WET limits. Additional data collection is not necessary and WET monitoring at Station 12 has been removed from the Final Permit.

25. **Comment:** It deprives the public of significant information to not include the ambient monitoring results in the monthly DMR, as now allowed by condition I.C.5. Having the data available only once per year does not allow public accountability and diminishes the opportunities for the public to review the data and enforce the permit. All of the ambient monitoring

should be included in each monthly DMR. This is particularly the case for the testing at Station 12, which is "clean" water unpolluted by the mine discharge and offers a baseline of sorts.

Response: Monthly reporting is important for Stations 150, 151, and 160 because they are related to compliance with permit limits. Since the other monitoring stations are generally included to observe long-term trends in water quality rather than compliance with a specific limit, EPA believes that annual reporting of the collective data is appropriate. The annual reports submitted by Teck are available to the public.

26. **Comment:** "Ambient monitoring" is designed to end each year after the mine ceases discharging at the start of winter. ADEC's 2007 Section 401 Certification states that such monitoring may be discontinued "7 days after the Permittee has ceased discharging for the season." According to ADEC, this is adequate to capture any downstream effects while not placing unnecessary monitoring requirements on the Permittee.

EPA's Draft Permit would not allow monitoring to cease until after "30 consecutive days" without a discharge. Teck notes that generally:

"When a State certification specifically prescribes a permit condition or limitation that interprets one of the State's WQS less strictly than the Region might prefer, …the Region would have to provide a compelling reason for rejecting the State's interpretation of the standard."

In its 2007 Response to Comments (2007 RTC), EPA did not articulate a rationale for its conclusion that "EPA has determined that the collection of such samples [30 days of post-discharge monitoring] is necessary to document in-stream conditions under post-discharge conditions." Teck contends that the ADEC approach is sufficient to monitor the conclusion of the discharge season because it has been established that mine effluent reaches the Chukchi Sea in less than 6 days. Accordingly, there does not appear to be a nexus between the effluent conditions and the proposed permit condition.

Response: As discussed in the Draft Permit (Permit Part I.C.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 is necessary to document in-stream conditions under post-discharge conditions. Although ADEC may have included 7-day language in the 2007 CWA § 401 Certification, no such language was included in the Certification for this reissuance. If Teck 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:** Monitoring of the tributary streams above the mine that feed into the mine is discontinued entirely, so there is no way of determining how much of the pollution in the effluent is a result of natural mineralization flowing into the tailings pond and how much is being added by Teck. Given that Teck is embarking on further development of the mine's footprint through Aqqaluk, it appears particularly irresponsible to stop monitoring the tributaries at this point.

This obfuscation of the actual impacts of Teck is clearly by design, but it is also clearly not protective of human health or the environment.

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 by the mine, such as that along the haul road. It is disturbing that the biomonitoring studies are being removed from the permit requirements, particularly as the studies have demonstrated levels of copper in fish livers at levels consistently higher than baseline levels. The deletion of the biomonitoring requirements that are then being included in the state permit means that these requirements will no longer be federally enforceable, and given ADEC's inability or unwillingness to deny Teck almost any permit modification it requests, presage the end of all biomonitoring at the facility as that is surely what Teck will suggest next. Biomonitoring requirements should be retained in the NPDES permit.

Additionally, several important biomonitoring studies are proposed to be deleted entirely, not just moved to the state permit: the periphyton surveys at Stations 9, 7, and upstream and downstream of Dud Creek on Ikalukrok Creek (meaning all the surveys on Ikalukrok Creek), the metals studies of fish in the Wulik, and the studies for fish presence and use in Anxiety Ridge, Evaingiknuk Creek, and Buddy Creek.

It is shocking that EPA is simply deleting these important biomonitoring studies at a time when residents of Kivalina are expressing increased unease with the impacts of the mine on their subsistence resources. EPA cannot hide its head in the sand, and it cannot allow Teck to leave Kivalina residents completely in the dark as to the impacts of the mine on their subsistence resources. The reduction in biomonitoring, apparently spurred by the State's request, has Teck's fingerprints all over it.

Response: EPA believes that the monitoring that has been performed provides a long-term record of the background conditions throughout the watershed, including the tributaries. Ceasing monitoring in the tributaries will not have any effect on protection of water quality in the streams downstream of the NPDES discharge. Consistent with the 1998 permit, EPA has deferred the ambient biomonitoring requirements to the State

through the CWA § 401 Certification because they are directly related to ensuring implementation of the State's WQS and protection of designated uses. It should be noted that all of the 1998 monitoring requirements are incorporated into a broader program proposed in the State's Waste Management Permit.

The impacts of discharges from the haul road are not covered by this permit and, therefore, monitoring upstream and downstream of the haul road is not included in the Final Permit. The haul road and associated upstream and downstream issues are covered by the NPDES permit for the port site, AK-004064-9.

28. **Comment:** There is no support for changing the ambient monitoring from Station 10 to Station 151. Changing the monitoring location will make comparisons of ambient monitoring data from the 1990s and through 2005 with new monitoring data difficult. Both stations should be monitored.

There is no cyanide monitoring at all at Stations 2, 73, 160 or 10 in the new permit, which calls into question EPA's ability to determine, based on any evidence, that the removal of the cyanide effluent limitation will not have any impact downstream. The approach appears to be to remove any monitoring that might actually show impact downstream. Total cyanide monitoring should be conducted at Stations 2, 73, 160, 10 and 151.

Response: The basis for the change from Station 10 to Station 151 is to establish a monitoring location at the boundary of the mixing zone in the main stem of Red Dog Creek. Station 10 was established downstream of the discharge but is listed in the 1998 Permit as being at the mouth of Red Dog Creek. Being the closest site downstream of the discharge, the information was utilized as if the station were at the edge of the mixing zone. With the establishment of Station 151, shown on the map in Permit Part VI., at the edge of the mixing zone, there is no specific need for continued monitoring at Station 10.

The Final Permit includes effluent limitations for cyanide. Cyanide monitoring at Station 151 will allow verification that compliance with WQS is ensured so monitoring further downstream is not necessary. See Response #52 related to monitoring for total versus WAD cyanide.

29. **Comment:** There is no support for deleting the dissolved oxygen and hydrogen sulfide ambient monitoring requirements; there is no environmental analysis of the potential impacts of this permit change. There is no support for deleting the total cyanide ambient monitoring.

Response: Dissolved oxygen and hydrogen sulfide monitoring was only required during the winter. The Fact Sheet (VI.F.2.) states that discharges will not occur during the winter. Since the Final Permit only allows for discharges when water is free flowing in the receiving waters (See Permit Part I.A.), winter monitoring for hydrogen sulfide and dissolved oxygen is

not necessary. See Response #52 related to total versus WAD cyanide monitoring.

30. **Comment:** The biomonitoring for benthic invertebrates (current condition I.F.1.d) has been inexplicably dropped; again, this is backsliding, and a failure to protect the environment. Removing the biomonitoring means that there is no way to determine if there is actually an impact on the environment, making the permit considerably less protective.

    The deletion of significant biomonitoring/bioassessment requirements means that significant harm to the environment will go undetected and unreported, and the monitoring requirements will not be federally enforceable.

    Response: Permit Part I.F.1.d was previously included as required by the CWA § 401 Certification of the 1998 Permit. EPA has deferred interpretation of these requirements to ADEC and has removed this section since it is not required by the current CWA § 401 Certification.

    Under CWA Section 402(o), anti-backsliding requirements for reissued permits apply only to effluent limitations that are less stringent than comparable effluent limitations in previous permits. Because the commenter has not identified a less stringent effluent limitation, section 402(o) does not apply. Under 40 CFR 122.44(l)(1), less stringent "interim effluent limitations, standards, or conditions" are permitted upon reissuance if one of the causes for permit modification in 40 CFR 122.62 is met. Among other things, 40 CFR 122.62 allows for permit modification for new information. To the extent 40 CFR 122.44(l)(1) applies in this context, the CWA § 401 Certification for this reissuance provides new information that supports changes to the monitoring requirements. Note also that Permit Part I.E. includes invertebrate, periphyton, and fish monitoring at several locations.

31. **Comment:** At a minimum, waters at station 10 and Station 151 should be analyzed for the Total Solids content, which would include both the traditional TDS plus the suspended solids. Both the latest volume of Standard Methods For The Examination of Water and Wastewater (20 Edition, 1998)("Standard Methods") and the standard analytical methods document for the U.S. Geological Survey (Techniques of Water-Resources Investigations of the U.S.G.S., Chapt.A1, Methods For Determination of Inorganic Substances in Water and Fluvial Sediments, third edition, 1989, Book 5) contain methods that would be more suitable for these purposes. For example, see pages beginning on 2-54 in Standard Methods. Also, the detailed chemical composition of these solid fractions should be determined.

    Response: EPA does not believe that monitoring for total solids is necessary at Station 151. Total suspended solids are regulated at the discharge point and not in the ambient monitoring. The required ambient

monitoring for TDS should be sufficient to characterize the impacts of the discharge on the receiving waters and determine compliance with WQS. See Response #28 regarding monitoring at Station 151 rather than Station 10.

32. **Comment:** There is a conflict in the permit between the requirements in I.A.7.c.2 and I.D.6, as I.D.6 does not include Station 150's conductivity data in the DMRs. All the ambient monitoring data should be included in the DMRs to resolve this conflict.

Response: Table 2 has been changed to reflect the requirements of Permit Part I.A.7.b.2. (formerly Permit Part I.A.7.c.2.) to include weekly conductivity in conjunction with the required TDS monitoring.

Permit Part I.C.5. requires submittal of all data for Stations 150, 151, and 160 with the monthly DMRs.

33. **Comment:** In the first sentence of the first paragraph on page 28 of the Fact Sheet, the reference should be to existing uses and "designated uses." The first sentence should read:

The specified monitoring will provide evidence to the department that the effluent treatment and mixing zone sizes are adequate to protect all existing and designated uses in the receiving water.

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

34. **Comment:** Bioassessment Program Reporting. (Ref: Draft Permit, I.E.2).

The reference to the annual reporting date in Draft Permit, Section I.E.2, should be removed as it is redundant to the reference in Draft Permit, Section I.I, to a March 1 Annual Water Monitoring Summary Report. There is no need to have the date listed elsewhere in the permit as this could result in conflicting annual reporting dates if a future permit revision resulted in change to one section and not to the other.

Response: Permit Part I.E.2. has been changed to remove the redundancy.

35. **Comment:** Other Requirements or Changes from the Current Permit. (Ref: Fact Sheet, Section VI.F).

ADEC proposes removal of Bioassessment Monitoring requirements from this permit because aquatic and biomonitoring will be more fully addressed in the State of Alaska's Waste Management Permit. The State Waste Management Permit will be broader in scope than this NPDES Permit which is, by statute, limited to aqueous waste streams and focused

upon particular point sources. Biofauna and flora are impacted by a broader array of wastes and sources. Allowing biomonitoring to be part of overall waste management is consistent with the shifting regulatory approach to watershed management rather than isolated waste-stream management. For all these reasons, Teck supports ADEC's proposal to remove biomonitoring from this permit.

Response: In Section VI.F.3 of the Fact Sheet, EPA indicated that it was soliciting comment on whether bioassessment should be removed from the permit where duplication of the requirements of the State's Waste Management Permit may exist. The bioassessment requirements in Permit Part I.E. have been retained in the Final Permit.

36. **Comment:** The permit was modified in 2003 to allow for a higher TDS effluent limit and instream limit, and the results of aquatic biomonitoring in 2004 shows that over the past five years, 2004 was the year with the lowest density of invertebrates in the the main stem of Red Dog Creek at Station 10, in Ikalukrok Creek above Dudd Creek, in Ikalukrok Creek at Station 7. Ott and Morris 2005 (CRPE Exhibit 24). Further, Ott and Morris report that in 2004, no larval arctic grayling were found in the main stem of Red Dog Creek at Station 10, in Ikalukrok Creek above Dudd Creek, in Ikalukrok Creek at Station 7 in 2004 (Ott and Morris 2005, Exhibit 24).

Additional conclusions of the biomonitoring report are that periphyton is decreasing in Ikalukrok Creek, that maximum concentrations of iron, aluminum and lead were higher than pre-mining baseline conditions, and that maximum concentrations of cadmium and median concentrations of cadmium increased in 2004.

Response: See Response #22 pertaining to the 2003 permit modification. While aquatic life conditions vary somewhat on a year-to-year basis, the current conditions are consistently improved over pre-mining conditions. This includes both fish and periphyton levels (see Section 3.10 of the Final SEIS). EPA, therefore, disagrees with the commenter that the TDS limits in the permit are not protective of the aquatic environment.

With respect to metals, pre-mining conditions are represented by a limited dataset while conditions during mining have been monitored for 20 years. As a result, it is logical that a single value obtained during mining, representing a shorter duration than the limited data available pre-mining, may exceed pre-mining conditions. However, the data presented in Table 3.5-7 of the Final SEIS consistently show lower metals levels than pre-mining conditions in Red Dog Creek below Outfall 001. This corresponds to lower metals loadings to Ikalukrok Creek and the Wulik River from Red Dog Creek. Further evidence of improved water quality is provided by the aquatic life conditions cited above.

37. **Comment:** The proposed permit radically scales back the amount of bioassessment monitoring that will be required, including dropping all requirements for biomonitoring in Middle Fork Red Dog Creek, stations on Ikalukrok Creek, the Wulik River, Anxiety Ridge, Evaingiknuk Creek and Buddy Creek. This scaling back (or more appropriately backsliding) is neither explained or justified in any of the environmental review documents. It represents a disappointing capitulation to Teck and a complete failure by EPA to require permit limitations that are protective of the environment. It is not "duplicative" to require reporting the monitoring results in both the monthly DMRs under the federal permit and the annual waste permit report under Alaska regulations – having the reporting in the monthly DMRs not only gives a far more timely reporting to the public, but also makes any failure to report federally enforceable under the Clean Water Act. EPA should keep all biomonitoring reportable in the DMRs, rather than dramatically scaling back the bioassessment monitoring.

Response: The bioassessment requirements in the Final Permit are consistent with the State's CWA § 401 Certification and intended to assure that the conditions of the Final Permit are protective of aquatic life in the receiving water. EPA believes that it is appropriate to follow the State's recommendations since the State initially included bioassessment requirements in the CWA § 401 Certification of the 1998 Permit and has had the primary responsibility for reviewing the bioassessment data collected to date.

Bioassessment requirements that are included in the permit remain enforceable under the permit and CWA. See Response #25 regarding annual versus monthly reporting. See Response #30 regarding the issue of backsliding.

Antibacksliding

38. **Comment:** EPA erred in its interpretation and application of the antibacksliding prohibition with regard to WET limits. (Ref: Draft Permit, I.A.1, Table 1; Fact Sheet, Appendix C).

Regarding EPA's rationale for WET limits, on page 48 of the Fact Sheet an error is made (with respect to changes in WET limits that Permittee had requested) where EPA states: "EPA cannot justify a change in these limits based on antibacksliding." The WET limit, however, is a water quality-based effluent limit (WQBEL) for which backsliding is permitted as long as the antidegradation standard is not violated.

Teck respectfully requests that EPA delete the statement from the Fact Sheet at page 48 that WET limits may not be made less stringent due to antibacksliding. WET limits are like all other WQBEL parameters in that WQBELs may become less stringent so long as there is no violation of an antidegradation policy. Since ADEC already performed a Tier II analysis to justify changes in three parameters (cadmium, zinc and ammonia), it is

clear that a Tier II analysis could justify a WET limit change as well. In fact, in the prior Certificate for the prior permit iteration, ADEC stated that no WET limit was necessary in the NPDES permit to protect water quality.

Response: The commenter requests that EPA delete a statement from the Fact Sheet relating to WET limits and antibacksliding. EPA does not issue a revised Fact Sheet with the Final Permit.

Antidegradation

39. **Comment:** DEC has not established implementation procedures for its Anti-degradation Policy (ADP) as required by EPA, and as a result, cannot perform an antidegradation analysis for revised permitting standards in the Permit. Thus, when the State says that it "finds the reduction in water quality to be in compliance with the requirements of 18 AAC 70.015" there is no basis for the finding because no antidegradation implementation analysis could be performed. Fact Sheet p. 24. The 401 Certification, which authorizes reduced effluent limitations and significantly larger mixing zones, violates antidegradation requirements.

The State certifies in the Draft 401 Certification that a revised lower effluent limit for zinc is consistent with the State's antidegradation policy. The State purports to undertake an antidegradation analysis. See Fact Sheet, Appendix B, pp. 32-36. However, because there is no antidegradation policy implementation plan, the State cannot properly perform this analysis, and the certification to allow for backsliding of the effluent limitations for cyanide, zinc, and ammonia is illegal.

Response: The regulations at 18 AAC 70.015 represent the State of Alaska's antidegradation policy, which tracks the substantive requirements of 40 CFR 131.12. The CWA § 401 Certification demonstrates the State's compliance with this policy, and addresses the specific criteria that must be met under 18 AAC 70.015 and 40 CFR 131.12 for potentially lowering water quality in "Tier II" waters (water quality exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water). The Main Stem of Red Dog Creek and Ikalukrok Creek are classified for the following uses: contact recreation, *wading only*; secondary recreation, and growth and propagation of fish, shellfish, other aquatic life, and wildlife. The antidegradation analysis is based on a conservative assumption that these are Tier II waters, but also describes naturally occurring water quality conditions in both creeks (high metals concentrations) that have precluded some designated uses, which were removed.

As required by federal and state antidegradation regulations for Tier II waters, the CWA § 401 Certification addresses changes in effluent limitations for zinc, cyanide, and ammonia in light of the following factors: socioeconomic need; compliance with applicable water quality criteria; protection of existing uses; application of the most effective and

reasonable methods of pollution prevention, control and treatment; and achieving the highest statutory and regulatory requirements. Based on this analysis, the CWA § 401 Certification concludes that that the changes to effluent limitations are consistent with the antidegradation policy and will not violate applicable state water quality standards. In addition, in compliance with 18 AAC 70.015(c), the State issued a public notice inviting comments on the CWA § 401 Certification on February 6, 2009.

EPA further notes that the comment regarding the lack of implementation procedures goes to the adequacy of the underlying state water quality standards, of which an antidegradation policy is part. Alaska's water quality standards were approved by EPA in a separate proceeding and are not subject to review or comment in this permit reissuance.

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

Contrary to the comment, the mixing zones authorized by ADEC in this permit are the same size as previously authorized in the 1998 Permit.

40. **Comment:** On pages 34-36 of the Antidegradation Analysis and, additionally, on page 25 of the mixing zone analysis, the department provides its support for changing the TDS limits from those found in the 1998 permit to the limits proposed in the Draft Permit. The Antidegradation Analysis itself is somewhat unclear, insofar as it does not explicitly state that the TDS limits are subject to antidegradation review.

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

41. **Comment:** On page 34, the lead-in language to the antidegradation analysis should explicitly reference TDS. The sentence should read:

Accordingly, the following antidegradation analysis will focus on these parameters based on the theoretical possibility for water quality degradation: cyanide, zinc, TDS, and ammonia.

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

42. **Comment:** We understand that ADEC's antidegradation analysis follows the requirements in 18 AAC 70 and the procedures recommended in EPA's WQS Handbook (Second Edition 1993). We recommend insertion of a paragraph along the following lines into the Antidegradation Analysis:

The department's approach to implementing the antidegradation policy found in 18 AAC 70.015 is based on the requirements in 18 AAC 70 and

Chapter 4 of EPA's WQS Handbook (Second Edition 1993). In accordance with these requirements and policies, the department determines whether a waterbody, or portion of a waterbody, is a tier 1, tier 2, or tier 3 waterbody. Antidegradation analysis is applied on a pollutant-by-pollutant basis. For tier 2 waters, antidegradation analysis in accordance with 18 AAC 75.015(a)(2) is applied to permit limitations that are relaxed, or which the department concludes should otherwise be subjected to antidegradation analysis. Other factors, such as control of nonpoint sources of pollution, are assessed in light of permit limitations, including controls required under Best Management Plans and Storm Water Pollution Prevention Plans. Last, public participation and intergovernmental coordination is achieved through close coordination with EPA and agencies involved in the NEPA review. The public is afforded an opportunity to influence the department's antidegradation analysis through public hearings and an opportunity for comment on draft antidegradation analyses.

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

43. **Comment:** Teck understands that the department is currently working on draft regulations to formalize its Antidegradation Implementation Plan. Until those regulations are finalized, we suggest that the Department include language in the analysis summarizing the antidegradation process and procedures. This step, although not legally required, would clarify for the public the process that the department uses in its antidegradation analyses. A logical place for this explanation is in a new paragraph 2 on the first page of the Antidegradation Analysis (in this case, on page 32).

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

Metals, Cyanide and pH

44. **Comment:** EPA's reasonable potential analysis (RPA) for cyanide is flawed because EPA failed to average replicate samples. Proper consideration of the available data demonstrates that cyanide limits are not warranted in the Permit.

EPA included an Effluent Limit and Monitoring requirement for Weak Acid Dissociable (WAD) Cyanide in the Draft Permit, Section I.A.1. In EPA's RPA analysis for cyanide (Fact Sheet, Appendix C), EPA did not consider available and appropriate cyanide data. Rather, the RPA is driven by a single high value of cyanide (12.4 µg/L) from a sample collected on 9/18/06. However, there was additional data from split samples (on that same date) that EPA should have used to calculate an average value. The

average of the result of replicate samples is most representative of the effluent quality on that day compared to any single value.

Teck provided EPA effluent analysis from 2003 – 2007, which included both total cyanide and weak acid dissociable cyanide (CN-WAD), as well as samples fixed and unfixed to prevent interference from sulfide in the analysis. EPA selected the unfixed CN-WAD data for the RPA. This data set contained 205 values, of which half were replicate analyses.

Because EPA failed to average these available split samples, EPA's RPA for cyanide resulted in a finding that there was reasonable potential to exceed the chronic cyanide standard, and the conclusion that the Permit should contain limits for cyanide. However, if EPA had used the average of all of the split sample analyses for 9/18/06 (versus a single high value of cyanide of 12.4 µg/L), in addition to averaging replicate sets for all other available dates, EPA's RPA would have shown a projected maximum effluent concentration of 3.7 µg/L (with a 2.5 mixing zone dilution) and no reasonable potential for the effluent to exceed WQS in the receiving water. Based on these calculations, no cyanide permit limit would be appropriate.

Furthermore, EPA needs to correct the RPA not only for cyanide, but for any other effluent parameters for which EPA has failed to appropriately include replicate sample data by averaging the replicate results before performing the RPA.

Response: EPA is not under any obligation to average replicate samples, unless there is a specific reason or evidence to suggest that the higher value is inaccurate. Since no reason was provided by the Permittee, the higher values, as well as the replicate values, were used in the reasonable potential analysis to determine the maximum estimated concentration – consistent with EPA's Technical Support Document for Water Quality-based Toxics Control (TSD) procedures for conducting RPAs. There is no basis for the commentor's assertion that the average is most representative of effluent quality on the sampling date.

45. **Comment:** There is presently no cyanide-kill process employed by Teck before 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 at Outfall 001.

    Response: As documented in the CWA § 401 Certification, ADEC has determined that the proposed cyanide limits are protective of aquatic life in the receiving water. These limits can be met in the discharge at the outfall without additional treatment.

46. **Comment:** Numerous samples from Outfall 001 have failed the cyanide limitations contained in the existing NPDES permit. This was true even

though several forms of cyanide-related compounds are known to be present in the Red Dog effluents (such as metal-cyanide complexes, cyanate, thiocyanate), but are not detected by either the WAD or Total cyanide analytical methods. Nevertheless, with no technical justification provided, the Proposed NPDES Permit states that no enforceable limitations for any form of cyanide will be included in the new permit. This is an unreasonable change in the permit conditions. The 001 Outfall effluents 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: The Draft and Final permits both include effluent limits for cyanide. The WQS for cyanide were changed in 2004 when EPA approved revisions to the State's standards. In this revision, the measure for cyanide was changed from total cyanide to WAD cyanide to better correlate with the criteria which were promulgated as a free cyanide level. See Response #52. Since EPA approved the use of this WQS, measured as WAD cyanide, it was utilized here to determine reasonable potential and calculate effluent limits.

EPA is not aware of the references to cyanate and thiocyanate cited by the commenter and does not believe there is a purpose to require such monitoring in the permit.

47. **Comment:** While the Proposed Red Dog NPDES permit does contain limitations for a few metals and metal-like elements such as aluminum, iron, lead, copper, selenium and zinc, these limitations are extremely high when compared to their respective aquatic life criteria. The same is true for the limitations for ammonia and pH.

Response: 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. 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. These limits ensure compliance with the applicable WQS for metals, cyanide, and ammonia. Appendix C of the Fact Sheet and the CWA § 401 Certification specifically document the rationale for the pH limits, including how they protect the designated uses of the receiving water. The Fact Sheet analysis demonstrates that the limits were developed to be protective of aquatic life and human health.

48. **Comment:** EPA incorrectly calculated the effluent limits for copper, lead, nickel, and zinc (Draft Permit, I.A.1) because the Agency did not use the effluent hardness concentration to calculate the applicable water quality criteria.

The Draft Permit contains water quality-based limits for copper, lead, nickel, and zinc. As discussed in the Fact Sheet, Appendix C, Section

I.B.1.a, EPA calculated those limits (for hardness-based WQS) using a hardness concentration at the downstream edge of the mixing zone, at which point the creek's assimilative capacity has lowered the hardness concentration significantly compared to end-of-pipe effluent hardness. However, EPA did not apply those calculated criteria at the downstream edge of the mixing zone. Rather, the Agency moved upstream and applied them at end-of-pipe. In short, the error is that WQS were calculated using hardness values from one location, but were then applied to a different location that has different hardness values. This is a critical error and EPA should revise its calculations using end-of-pipe hardness values.

In its comments on the 2006 Draft NPDES Permit, Teck cited the methodologies described by EPA in its TSD as the appropriate means for calculating these water quality-based effluent limits (WQBELs). The TSD describes how to calculate WQBELs using the dilution that is achieved with a mixing zone. Calculation of WQBELs for metals with hardness-dependent water quality criteria should be performed using the hardness concentration of the water at the point in the stream at which the water quality criteria are to be achieved (i.e., the compliance point). Accordingly, using EPA's own methodology, the criteria must be calculated at the downstream edge of the mixing zone where they are to be met. Conversely, if the water quality criteria are to be met at end-of-pipe, calculations should employ the hardness concentration in the effluent at the end-of-pipe.

For the 2007 (withdrawn) NPDES Permit, in its response to Teck's comments, EPA acknowledged that it has followed the method outlined in the TSD when calculating WQBELs for several other Region X permits. However, EPA stated that as a matter of general policy it uses in-stream hardness to calculate WQBELs for metals, especially at mines. This unwritten policy not only conflicts with the written EPA guidance, but it is not scientifically accurate. Calculating metal WQBELs using the hardness concentration at the edge of a downstream mixing zone, at which point there is considerable dilution of the effluent hardness by upstream flows, and then assuming that the resulting water quality criterion applies to 100% effluent, is not technically defensible. The permit limits for copper, lead, nickel, and zinc should be revised by EPA, following its published methodology and WQBELs for metals derived using valid effluent hardness concentration data.

Response: In its 2007 (withdrawn) Response to Comments, EPA acknowledged that some permits have been written using effluent hardness. EPA did not state that this method was in accordance with the TSD or that the method employed in this permit is not. EPA agrees with the commentor that the "calculation of WQBELs for metals with hardness-dependent water quality criteria should be performed using the hardness concentration of the water at the point *in the stream* at which the water quality criteria are to be achieved" (emphasis added). However, EPA does not agree with the commentor that using the hardness of the effluent

prior to discharge would be "in the stream." The designated use protecting aquatic life has been removed from the stream segment where the outfall is located but this designated use does apply at the confluence of the North Fork and downstream. As noted in the CWA § 401 Certification, this point is designated as the edge of the pH mixing zone but pH is monitored at Station 151. The hardness-dependent water quality criteria use the 5th percentile hardness measured at Station 151 (historically at Station 10) in this segment. This hardness value will ensure that the metals criteria and limits are appropriately conservative and protective of aquatic life downstream of the discharge.

49. **Comment:** Consistent with many other aspects of the Proposed NPDES Permit, the zinc limitation at Outfall 001 is also proposed to be weakened. The proposal is to allow the zinc limitation to rise from 210 to 269 ug/L. Zinc has consistently been shown to be toxic to most species of cold water fish.

The Proposed Permit also would weaken the limitations at 001 for cadmium and selenium as well as for zinc.

Response: EPA did not propose to raise the limitations in the permit from 210 to 269 ug/L. The CWA § 401 Certification proposes to rescind the Natural Condition-based *chronic* SSC (NCBSSC) for zinc of 210 ug/L which applied to the main stem that was adopted in the CWA § 401 Certification issued for the 1998 NPDES Permit and approved by EPA. Although the State found in their CWA § 401 Certification that the *chronic* NCBSSC for zinc in the main stem is not required to protect existing uses of the waterbody, EPA has not yet acted on this submittal to change the WQS. Nevertheless, the calculations of the limitations in the permit are driven by the *acute* criterion. Thus, no matter which chronic criterion (NCBSSC or statewide) is used, the limitations in the Final Permit would not change from the draft. See Attachment B.

The permit's selenium average monthly effluent limit (AMEL) is more stringent than the 1998 permit, i.e., 4.4 compared to 4.9 ug/L, and the selenium maximum daily effluent limit (MDEL) is less stringent than the 1998 permit, i.e. 7.2 compared to 5.6 ug/L. As documented in the CWA § 401 Certification, these minor and offsetting changes are the result of statistical variability in the data set used to determine effluent limits but are based on same the WQS/wasteload allocation used in developing the 1998 Permit.

It is the State's judgment that these changes will not affect the levels of zinc and selenium in the discharge and the revised limits are protective of the existing uses of the receiving water.

The cadmium limits in the Final Permit are more stringent than the previous permit. The permit's cadmium average monthly effluent limit is 1.7 ug/L as compared to 2.0 ug/L in the 1998 permit. The cadmium

maximum daily effluent limit is 3.2 ug/L as compared to 3.4 ug/L in the 1998 permit.

50. **Comment:** Allowing the 001 Outfall effluent pH to rise as high as 10.5 s.u. permits discharge of waters that would be toxic to many species of aquatic organisms, strictly due to the high pH. In addition, such an elevated pH tends to increase the dissolved concentrations of numerous metal and metal-like chemical species in the effluent. Several of these elements, such as arsenic, antimony, molybdenum, vanadium, nickel, thallium, uranium, manganese, chromium, are likely to be present in elevated concentrations in the effluent at such pHs, but will not be regulated under the terms of the Proposed NPDES Permit.

The permit is proposing to allow discharges with a pH up to 10.5. The Gold Book, which recommends national water quality standard has a level for pH of from 6.5 - 9. There is no basis for allowing such a high pH discharge especially given the corresponding high permit levels for ammonia.

Response: As explained in Appendix C of the Fact Sheet, 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 s.u. is necessary to optimize metals removal. The CWA § 401 Certification indicates that the pH immediately upstream of the discharge ranges from 5.8 to 6.7 s.u. The pH stabilizes after the discharge and the pH is approximately 7 s.u. 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 WQS for metals. See Response #78 for details on the derivation of the ammonia effluent limitations.

51. **Comment:** The permit removes current end-of-pipe permit limitations or monitoring requirements for nickel, silver, TDS, total cyanide, and hardness. No support or analysis is offered in any of the environmental review documents for the removal of most of these analytes.

The new permit should both retain the existing permit's effluent limitations for nickel, silver, TDS, total cyanide and hardness, and also add monitoring and reporting requirements for the various reagents that Teck uses at the mine site.

Response: Nickel limits are included in the Final Permit. The permit's nickel average monthly effluent limit is 80.0 ug/L and the maximum daily effluent limit is 216.5 ug/L. These limits were included in the Draft Permit based on the analysis in Appendix C of the Fact Sheet. The previous permit did not include limits for silver, only monitoring requirements. As documented in the Fact Sheet (Section VI.F.6.), recent monitoring data

show that silver does not demonstrate reasonable potential to exceed the most stringent water quality criteria and therefore, neither continued limits nor monitoring are necessary. Hardness monitoring of the receiving water is used to determine applicable hardness-based water quality criteria. As required by Permit Part I.A.4. and noted in Section VI.F.5. of the Fact Sheet, the hardness of the effluent can be determined by calculation using the monitoring data for individual anions and cations. WAD cyanide monitoring and limits are included in the permit to ensure compliance with the State's WQS for cyanide, which is expressed as free cyanide rather than total cyanide. The rationale for deleting the TDS effluent limit is described in Appendix C, Section I.B.2. of the Fact Sheet. TDS monitoring of the effluent continues to be required.

Teck 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 Final Permit does not require monitoring the discharge for each of these reagents since analytical methods to monitor such reagents are limited and WQS 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 exceedance of the limit, then a Toxicity Reduction Evaluation (TRE) is required to determine the cause of the toxicity and prevent the recurrence of toxicity (See Permit Part I.F.3). Through the TRE, it may be determined whether one or a combination of the reagents listed above is causing a toxicity problem.

52. **Comment:** Monitoring using the total cyanide method is discontinued entirely – at the same time that the permit limitations for cyanide are almost wholly lifted. This creates the situation where there is no effluent limitation for cyanide being discharged, and no testing for it downstream (at Stations 2, 10, 151 and 160, all locations where it is currently monitored for), although Teck discharges millions of pounds of cyanide each year. Thus, the concerned public – particularly residents of Kivalina, who drink the water into which Teck is discharging the cyanide – will have no way of knowing the concentrations of cyanide in the water as it moves downstream.

Response: Alaska's aquatic life and drinking water standards for cyanide are 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 Final Permit contains ambient monitoring for WAD cyanide at the edge of the mixing zone at Station 151. Monitoring at stations further downstream is not necessary to determine compliance with effluent limitations or WQS. WAD cyanide limits at the discharge are included in the Final Permit. Note that the monthly average and daily maximum limits of 10.3 ug/L and 22.2 ug/L were derived from the chronic aquatic life WQS and are well below the applicable drinking water standard of 200 ug/L. From July 2003 through October 2007, no total cyanide levels exceeded 20 ug/L at Station 151. Therefore, no impacts on drinking water uses are expected.

53. **Comment:** In the second paragraph on page 35, the department appropriately notes that the statewide zinc standard is protective of the aquatic life designated use. Although it is not explicitly stated here, the department should clarify that the revised zinc is protective of "existing uses," as well as designated uses. We suggest the following revisions:

The rationale for condition 1 of the certification describes why the mixing zones for TDS, cyanide, and ammonia will have no adverse effects on aquatic life or other existing uses. Similarly, the state-wide water quality criterion for zinc, which is the basis for the effluent limits in this permit, is protective of the aquatic designated use and the existing uses in the waterbody. Outfall 001 discharge Zn concentrations have not exceeded the current or proposed limits during the previous six discharge seasons. Further, historic zinc concentrations have been relatively stable, and future discharge zinc concentrations are expected to remain at or about the same levels as those observed during previous years. The newly permitted discharge will be consistent with historical discharges, and the information assessed by the department indicates that these discharges have not impacted existing uses.

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

54. **Comment:** Because the treatment plant has been discharging a minimum of 2.418 billion gallons per year of effluent from Outfall 001, containing the associated chemical loads of numerous potentially toxic chemical constituents, significant effects are likely to occur to the environment, including aquatic life (fish, other aquatic organisms), soils and vegetation. It is the commentor's professional opinion that this change in the permit will cause a potentially significant impact to the environment.

The EA, FONSI and Draft Permit employ a totally misleading and incorrect definition of TDS as a means to avoid focusing on the detailed chemical composition of the effluents discharged from Outfall 001. The EA, page 29, section 5.0 [Water Management and Selective Water Treatment] states:

"The TDS and sulfate concentration of the tailings pond water is approximately the same as the TDS and sulfate concentration of the effluent water. However, the metals that were in the tailings pond water have been removed in the treatment process and replaced with calcium."

The last sentence is simply false, as is obvious by reviewing the NPDES water quality data presented in the Discharge Monitoring Reports (DMRs) submitted by TC to the US EPA. These DMRs reveal significant concentrations of the following metals / metal-like elements: zinc, nickel, manganese, and aluminum. In addition, TC fails to monitor numerous metals for which standards and criteria exist [*see Comment #56*], such as arsenic, which are undoubtedly appearing in the 001 effluent. Clearly it is not true to state that all the metals and metal-like elements are removed by the treatment plant.

Response: EPA disagrees with the commenter that permit development failed to address metals levels in the effluent. Neither the SEIS, which EPA assumes the commenter is referring to, nor the permit suggest that all metals are removed in the treatment process. The characteristics of the effluent have been well-established by many years of monitoring data, including for a wide range of metals. As documented in the Fact Sheet, EPA evaluated these data to determine which pollutants have reasonable potential to cause an exceedance of the applicable WQS. This led to the establishment of the permit limits and monitoring, including limits for cadmium, copper, lead, mercury, selenium, nickel, zinc, aluminum, iron, ammonia, and cyanide. Please see Response #9 to clarify the allowable discharge volume.

Minimum Levels

55. **Comment:** Currently Teck's contract laboratories report values between the MDL and PQL/MRL as estimated results; meaning that they are statistically confident the constituent is present, but the precise quantity cannot be determined with statistical confidence.

With respect to the proposed ML of 10 microgram per liter (µg/L) for barium (Draft Permit, Section 1.A.5.b), Teck's contract labs have experienced difficulties quantifying at this level for analyses of mine effluent samples. The interference(s) encountered at concentrations close to this level makes it necessary to dilute the samples, and therefore raise the MDL. For barium, results with an MDL of 20 µg/L, as well as results ranging from 8 µg/L to 40 µg/L, have been reported.

Iron has a proposed ML of 100 µg/L (Draft Permit, Section 1.A.5.b). Teck's contract labs have experienced difficulties achieving an MDL less than 100 µg/L for reasons similar to those associated with barium analyses. Teck's contract labs occasionally generate iron results <125 µg/L and have reported estimated results approaching 100 µg/L.

Accordingly, it has been difficult for Teck's laboratories to quantify barium and iron with statistical confidence at the proposed MLs. 40 C.F.R. Part 136 allows for matrix-specific development of MDLs and MLs. Teck requests that EPA include a provision allowing the Mine to develop site-specific MLs for barium and iron if the proposed MLs are not consistently achievable.

Response: The intent of designating a specific ML is to assure that EPA receives data on these parameters to determine reasonable potential or whether WQS are exceed. Since the WQS for both iron and barium is 1000 ug/L, an evaluation can be done even with higher MLs. EPA is changing the MLs in the Final Permit to 60 ug/L for Barium (3.18 x the MDL of 20 rounded down) and 125 ug/L for Iron.

Monitoring, Sampling and Reporting Requirements

56. **Comment:** Teck should be required to report detailed chemical analyses for both the untreated water entering the water treatment plant and the treated water being discharged at Outfall 001. These analyses should be reported at least twice during each operating season, and should include, as a minimum, the following constituents: aluminum, antimony, arsenic, barium, cadmium, copper, chromium, cobalt, iron, lead, manganese, mercury, molybdenum, nickel, selenium, silver, thallium, vanadium, zinc; major cations (calcium, magnesium, sodium and potassium), and nonmetals (sulfate, nitrate, ammonia, boron, phosphorus, fluoride, chloride, alkalinity), and natural radioactive constituents (uranium, thorium, potassium-40, gross alpha and beta). These samples should also be analyzed for an Organic Priority Pollutant Scan, together with oil and grease, WAD cyanide, thiocyanate and cyanate, water temperature, pH and WET Testing.

    Several of the constituents listed above are potentially toxic to aquatic and other organisms and they are not monitored as part of either the existing or the proposed NPDES permit. All these constituents should be added to the required monitoring and effluent limitations should be developed and included in the Proposed NPDES Permit.

    Response: The Final Permit includes all of the effluent and ambient monitoring necessary to determine compliance with permit limits. The basis for the effluent limits and monitoring were described in the Fact Sheet. In addition, the facility has to meet WET limitations which account for toxic effects of parameters that may have not been limited. Influent monitoring is not required or necessary because it is irrelevant to determining permit compliance and effects on the receiving waters. Teck may sample the influent to the treatment plant to ascertain treatment performance but the Final Permit does not require this type of monitoring.

57. **Comment:** The Final Permit should require that additional water quality monitoring, stream sediment sampling, flow measurement and toxicity testing be conducted by some competent, independent party, such as the U.S. Geological Survey, at the 001 Outfall and other strategic locations. This party should be both financially and politically independent of both Teck and the regulatory agencies. This independent monitoring should also include collection of 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 to evaluate the existence / degree of non-point seepage that might be occurring during the months when the treatment plant is not operating. Such surveys could easily employ the use of various remote sensing techniques.

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 and has no authority to require other federal agencies or other independent party to conduct required permit monitoring.

Note that the Permittee 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.

The Final Permit authorizes point source discharges from the mine and does not address any potential non-point source discharges, which are outside the authority of the NPDES program.

58. **Comment:** At present, all publicly-available water quality and toxicity samples for Outfall 001 and the other monitoring sites are collected, handled and analyzed by Teck or their paid representatives. Considerable public confidence would be generated by developing a source of independent data. As such, the Red Dog Mine is essentially self-monitoring.

Response: See Response #57 related to the CWA's self-monitoring requirements.

59. **Comment:** It is important that EPA clarify the reporting of split samples, but the method chosen in condition I.A.5.e would allow Teck to repeatedly split samples to get lower values to average in with violative results, as it has been doing for the past five years. The permit should require the reporting of the highest value of any valid test of a split sample to discourage this laboratory shopping that Teck has engaged in.

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 Plan (QAP).

60. **Comment:** Records of Precipitation and Evaporation Monitoring. (Ref: Draft Permit, I.D.6.b & c).

Manually operated precipitation and evaporation monitoring equipment and manual recording of data from such equipment has been replaced with use of electronic monitoring and recording equipment. The latter provides more accurate information at a far greater frequency than once per day. These two provisions should be either removed or modified to clearly cover automated electronic monitoring (i.e., "individuals" do not perform the readings of remote-monitored, automated weather stations as suggested in the Draft Permit language in Sections I.D.6.b and c).

Response: Draft Permit Parts I.D.6.b. and c. have been deleted. With the deletion of Draft Permit Part I.D.2, Permit Part I.D.6.a. has become Final Permit Part I.D.5.

61. **Comment:** Precipitation/Evaporation Reporting Requirements. (Ref: Draft Permit, I.D.8).

The terms "total precipitation" and "total evaporation rates" are unclear. Teck suggests that the term "rates" be replaced with the term "records."

Response: Change made as requested. With the deletion of Draft Permit Part I.D.2., Permit Part I.D.8. is now Final Permit Part I.D.7.

62. **Comment:** The last sentence of Draft Permit, Section I.A.5.e, states that "all laboratories used shall be identified on the DMR attachment." Teck requests removal of this requirement, as all laboratories used by the Permittee are detailed in the Quality Assurance Plan (QAP)(Draft Permit, Section I.G).

Response: The requested change has not been made. The language in the Final Permit, however, has been clarified to indicate that laboratories

should be recorded on the DMRs only where split sample results are reported.

63. **Comment:** The last sentence, second paragraph, page 5 of the Draft Permit states:

"The Permittee must supply written notice documenting the start of discharge to EPA within 24 hours."

Because of the remote location of the mine, there can be delays using regular mail. Teck requests that language in this paragraph be modified to expressly allow the Permittee to submit to EPA a facsimile of this written notice by either electronic fax-transmission or email methods either in lieu of, or to be followed by, USPS mailing of original document(s).

Response: The Final Permit language in Permit Part I.A. has been changed to allow electronic notice, via facsimile or email, of the start of discharge, followed up by written notification.

64. **Comment:** Reporting of Monitoring Results. (Ref: Draft Permit, II.B).

Teck requests that language in this paragraph be modified to allow the Permittee to submit to EPA a facsimile of the cover letter and a certification that the DMR is complete by either electronic fax-transmission or email methods if, for example, USPS mailing of a DMR is delayed by unforeseen circumstances.

Response: The Final Permit language has been changed to allow electronic notice, via facsimile or email, of the DMR certification.

65. **Comment:** Precipitation/Evaporation Recording Requirements. (Ref: Draft Permit, I.D.3).

This condition should be amended as follows:

"Precipitation (rain and snow) data shall be recorded daily."

The deleted language is a relic from historic use of manually operated weather stations (that required daily manual readings and recordings).

Response: The Final Permit has been changed as requested. With the deletion of Draft Permit Part I.D.2., Permit Part I.D.3. has become Final Permit Part I.D.2.

66. **Comment:** In order to streamline reporting requirements and to eliminate the possibility of inadvertently overlooking a once a year DMR attachment, Teck requests this condition (draft Permit Part I.A.7.f.) be amended to require the annual reporting of this information as part of the Annual Report described in Section I.I. of the Draft Permit.

Response: The requested change has not been made. Information confirming the accuracy of the TDS calculations needs to be submitted at the end of the discharge season (as required by final Permit Part I.A.7.e.) not in the Annual Report which is not required until the following March.

Mixing Zones

67. **Comment:** It is not clear in either ADEC's authorization of the mixing zone in its 401 certification, or in EPA's Fact Sheet on the NPDES Permit, why the mixing zone across the North Fork of Red Dog Creek, which exceeds chronic standards for cyanide and ammonia, would not form an avoidance barrier to migration of grayling into the North Fork.

    Recommendation: ADEC and EPA should affirmatively demonstrate that the mixing zone for cyanide and ammonia would not form a barrier to migration to grayling, or the mixing zones should not be authorized.

    In addition, the mixing zone violates the State's mixing zone regulations because it could create a barrier to fish passage.

    In this case, the mixing zone is proposed to run from Outfall 001 to Station 151, which would extend across the mouth of the North Fork of Red Dog Creek, a stream with spawning habitat for Arctic Grayling. Grayling migrate up the Mainstem of Red Dog Creek during early spring to spawn, and must pass through the lower portion of the proposed mixing zone. See Fact Sheet, Appendix A. The spawning period lasts for approximately two weeks, and fish were present from June to September in 1997, indicating that spawning and rearing take place in the Mainstem of Red Dog Creek.

    Exposure to toxic substances during this time could cause avoidance of the area, thus creating a barrier to migrating Grayling. Teck's discharges of cyanide and ammonia are highly toxic to fish and it is likely that the proposed mixing zone would constitute a barrier to Grayling migrating up Red Dog Creek into the North Fork to spawn. Since Teck has provided no evidence, and DEC has provided no explanation that these highly toxic chemicals do not constitute a barrier to fish migration, the proposed mixing zone violates 18 AAC 70.250(a)(2)(B). As a result, if a mixing zone is granted, the downstream edge of the mixing zone should not be allowed to impinge on the junction of the North Fork of Red Dog Creek, and to effectively manage that mixing zone, the downstream edge of any mixing zone should be Station 20.

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