BEFORE THE ENVIRONMENTAL APPEALS BOARD

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C.

In re Teck Cominco Alaska Inc.	)
Red Dog Mine	)
	)
Permit No. NPDES	)
AK-003865-2	)

PERMITEE'S PETITION FOR REVIEW

Submitted on Behalf of

TECK COMINCO ALASKA INCORPORATED

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INTRODUCTION

Teck Cominco Alaska Incorporated **(TCAK),** pursuant to 40 C.F.R. §124.19(a), petitions for review of thirteen terms or conditions imposed through the recent renewal of a National Pollutant Discharge Elimination System **(NPDES)** Permit, number AK-003865-2 **(the Permit).** The Permit renews authorization for TCAK to discharge treated wastewater from Outfall 001, located at the **Red Dog Mine,** to receiving water named "Middle Fork Red Dog Creek." The Permit also authorizes discharge of treated construction camp wastewater through Outfall 002 to the tundra. TCAK contends that those conditions listed in the **"Table of Contested Conditions"** are fundamentally flawed because of clearly erroneous findings of fact or conclusions of law.

THRESHOLD PROCEDURAL REQUIREMENTS

The Permit was issued to TCAK on March 12, 2007 by United States Environmental Protection Agency Region X, **(EPA Region X)**, 1200 6th Avenue, Seattle, Washington 98101. This Petition for Review is filed on April 11, 2007, the thirtieth day following issuance. TCAK, as the Permit Holder and Named Permittee who submitted written comments on the draft permit, has standing to petition for review. A copy of TCAK's Comments is appended as **"TCAK Exhibit 1"**. As cited in the arguments presented below, each of the issues raised by TCAK in this Petition was raised in those comments.

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TABLE OF CONTESTED CONDITIONS

Page of Permit	Permit Section	Topic
6, 16-19	I.A.1, Table 1 and I.G	Whole Effluent Toxicity Limits
5	I.A.1, Table 1	Hardness Value Used to Compute Effluent Limits
6	I.A.1, Table 1	Total Ammonia Calculation of Monthly Average
5	I.A.1., Table 1	Zinc
7	I.A.5.b.(1)	Minimum Level Iron
8, 15	I.A.7.d and I.D.7	Stream Flow Monitoring
11	I.C.3	Sump Pump Flow Data
13	I.D.3.	Post-discharge Monitoring
14-15	I.D.6., Table 3	Wet Monitoring Stations
	I.D.6., Table 3, Endnote 3 and I.A.5.b.(1)	WAD Cyanide
15	I.E.	Meteorologic Monitoring
22,23	I.I.2.f.(iv-v)	Best Management Practices
7, 11	I.A.5.b.(2) and I.B.3.g.	Total Residual Chlorine

FACTUAL AND STATUTORY BACKGROUND

Teck Cominco Alaska Incorporated **(TCAK)** operates the world's largest zinc mine on land in Northwest Alaska owned by the NANA Regional Corporation. **Red Dog Mine** is situated 90 miles north of Kotzebue and 47 miles inland from the coast of the Chukchi Sea. The mine is located on a ridge between the Middle and South Forks of Red Dog Creek.

The Red Dog deposit consists of metal sulfides in a Mississippian shale. The orebody lies within the drainage basin of the Middle Fork of Red Dog Creek. Facilities at the site include an open pit zinc/lead mine, concentrator, tailings impoundment, concentrate storage building, maintenance facilities, power generation plant and an accommodations complex. The open pit mine is established on both sides of the valley of the Middle Fork of Red Dog Creek.

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The mill is located on a graded pad adjacent to, and northeast of, the tailings dam. Concentrator tailings are pumped from the mill to the tailings impoundment and deposited either sub-aqueously or sub-aerially. The facility includes a rock fill dam and impoundment, a seepage collection and pumping system, a tailings discharge system (pumps and pipeline), and a water reclamation system. The impoundment has an ultimate capacity of approximately 39.3 million cubic yards (cy) of tailings.

Wastewater is discharged from two outfalls. Outfall 001 is the discharge point for treated mine drainage and excess precipitation. Outfall 002 discharges treated domestic wastewater. Stormwater is also discharged in accordance with the applicable *Stormwater Pollution Prevention Plan*. Outfall 001 discharges to the Middle Fork Red Dog Creek. Outfall 002 discharges to tundra.

This facility is subject to *New Source Performance Standards for the Ore Mining and Dressing Point Source Category*.[1] An *Environmental Impact Statement* **(EIS)** issued in 1984 and the first NPDES permit issued in 1985. That permit expired in 1990, reissued in 1998, and was modified in 2003. That modification was the subject of a prior action before this tribunal. In re: Teck Cominco Alaska Incorporated, Red Dog Mine, 11 EAD 457 (NPDES 03-09)(June 15, 2004)(**Teck Cominco I**).

TCAK re-applied for the reissuance of its NPDES permit in a timely manner so the permit was administratively extended. EPA prepared a preliminary draft permit renewal which was distributed November 8, 2005. A *Finding of No Significant Impact* issued and public notice

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[1] 40 C.F.R. Part 440

for the draft permit occurred on February 6, 2006. Various persons, including the Petitioner herein, commented on that draft.[2]

On February 12, 2007, the Alaska Department of Environmental Conservation **(ADEC)** issued a *Certificate of Reasonable Assurance under §401 of the Clean Water Act* **(2007 Section 401 Certification)**. EPA then renewed the Permit. The Permit is dated March 7, 2007 but it was received by TCAK some time after that and the Permit becomes effective April 12. Construing 40 C.F.R. §124.15 and using Georgia Pacific v. U.S.EPA, 671 F.2d 1235, 1240 (9th Cir. 1982) as a guide, this Petition has been filed within thirty days of the date of Permit Issuance. Accordingly, this Petition is timely.

Additional facts, specific to TCAK's challenge of the "Whole Effluent Toxicity Limit," are set forth in that section.

ISSUES PRESENTED FOR REVIEW

There are thirteen "Topics" identified in the *Table of Contested Conditions*, each of which is correlated to one or more permit conditions. TCAK seeks to have those conditions either (1) administratively corrected from manifest error, or (2) remanded to EPA with instructions to revise the conditions consistent with this tribunal's decision.

ARGUMENT

WHOLE EFFLUENT TOXICITY LIMITS
Permit Conditions I.A.1, Table 1 and I.G

The WET Limits Established By EPA Are Fundamentally Flawed In Two Material Respects

Summary

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[2] **TCAK Exhibit 1**, *Comments on Teck Cominco Incorporated (TCAK) Red Dog Mine February 2, 2006 Draft NPDES Permit* (March 2006)

Permit Conditions I.A.1 and I.G. impose two Whole Effluent Toxicity **(WET** or **Chronic Toxicity)** limitations on effluent from Red Dog Mine. The allowable daily maximum concentration is 12.2 chronic toxic units **(TUc)** while the monthly average may not exceed 9.7 TUc. EPA's inclusion of these limits is clearly erroneous for two reasons.

First, the condition predicate to inclusion, a reasonable potential that mine discharges could make receiving waters more toxic to aquatic life, has not been met. The receiving waters at issue are naturally high in toxicity. Undisputed evidence has demonstrated, beyond a reasonable doubt, that mine operations have actually reduced toxicity in the receiving water compared to a pre-mining baseline. There is no reasonable potential for mine discharges to increase aquatic toxicity above natural background. Therefore, EPA is without authority to impose toxicity limits on the discharge from Red Dog Mine.

Second, EPA has renewed precisely the same toxicity limits that were derived in 1998 using a water balance model. Refinement of data input for the model clearly establishes that the 1998 limits were predicated upon mistakes of fact (flawed input). It is irrational to adhere to demonstrated error.

A third error is procedural. EPA contends that it cannot now run the water balance model to derive factually correct output except through a process used when establishing a site-specific water quality criterion. That process was not required in 1998 and it is not required today. [3]

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Statement of Material Facts

Natural Toxicity

Red Dog Creek has several tributaries. There are North, South, and Middle Forks.[4]

[3] TCAK addressed these matters in its comments. See, TCAK Exh. 1 at page 37:"There are no regulatory impediments to eliminating the WET limits for both species from the NPDES Permit" and "Permitting flexibility is legally appropriate given the site-specific evidence of no toxicity to the invertebrate community of Red Dog and Ikalukrok Creeks."

These combine to form Red Dog Creek's "Main Stem" which flows into Ikalukrok Creek. Downstream, when Ikalukrok joins Tulak Creek, they become Wulik River. The River flows into the Chukchi Sea near the town of Kivalina.

The 1984 EIS was prepared prior to commencement of mining operations. It described the Mainstem of Red Dog Creek as "very toxic."[5] Concentrations of cadmium, lead, silver, and zinc were present in the water and concentrations of aluminum, chromium, mercury and nickel exceeded EPA criteria for aquatic life.[6] Baseline water quality characteristics at the mouth of Red Dog Creek showed those waters to be "toxic to fish during the summer."[7] Benthic invertebrates were "severely stressed."[8]

A 1996 letter from EPA Region X described the pre-mining condition of Red Dog Creek's Main Stem as "natural fish kills, in-situ fish kills and severe impacts to the benthic communities."[9] EPA's recent Response To Comments again acknowledges that "receiving waters exhibit background toxicity related to naturally high concentrations of [a variety of] toxins. . . ."[10] In recognition of this natural condition, ADEC removed the aquatic and wildlife use designation for some of the stream segments in the watershed where Red Dog Mine is located. Those stream segments were too polluted by natural

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[4] See Pre-Mining Maps, **TCAK Exhibit 2** at pages 13-14. Exhibit 2 is the *State of Alaska Department of Environmental Conservation Certificate of Reasonable Assurance, Red Dog Mine Site* (July 22, 1998) referred to herein as **(1998 Section 401 Certification)**

[5] USEPA/DOI 1984 at page IV-30 . The EIS has been incorporated into the current administrative record by the Environmental Assessment prepared for this permit renewal. EPA, *Environmental Assessment, Red Dog Mine Project NPDES Permit Renewal* (January 2006) **(2006 EA)** at pages 6, 7, 8

[6] Id.

[7] EIS at page IV-36

[8] EIS at page IV-30

[9] December 18, 1996 letter from Kathleen Collins (EPA Region 10) to Charlotte MacCay (Teck Cominco, formerly Cominco), referenced and quoted in TCAK Exh. 1 at page 29

[10] RTC #131, page 58

contaminants to support these uses.[11] The general consensus was that, before mining commenced, natural toxicity in Red Dog Creek and its tributaries severely inhibited growth or propagation of aquatic invertebrates and those waters were largely devoid of fish.[12]

Improvements To Water Quality

Many of the toxics that historically prevented aquatic communities from thriving were naturally occurring metals. Prior to mining, the Middle Fork of Red Dog Creek flowed directly over heavily mineralized rock. The creek also received surface and groundwater drainage from an orebody that contained high metal and sulfide concentrations.[13] Oxidation of metal sulfide mineralization led to elevated concentrations of metal sulfates in the water.[14] This natural occurrence of metal mineralization is the very reason a mine was constructed at this location.

In an irony explained below by "Water Balancing," the indigenous invertebrate community of these streams is now thriving because mine operations capture much of the water before it contacts the ore body and because mine personnel treat that appropriated water to substantially reduce metals otherwise present. Mining operations have reduced toxicity in Red Dog Creek...

As part of the process for renewing this Permit, EPA conducted an Environmental

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[11] See, 2007 Section 401Certification at 9, discussing why the State's toxicity criteria for aquatic life, 18 AAC 70.020(b)(11)(C) and 70.030, do not apply.
See also, 1998 Section 401 Certification at Appendix B, *Whole Effluent Toxicity*, **(1998 Water Balance)** at B-1.
The 1998 Section 401 Certification was incorporated by reference into, and made a part of, this Administrative Record by, *inter alia*, 2007 Section 401 Certification at Appendix C, *Updated Water Balance and WET Limit Calculations* (Feb. 12, 2007)**(Updated Water Balance)**

[12] EIS at page IV-36

[13] 1998 Section 401Certification at page 3

[14] 2006 EA at page 12

Assessment **(EA)**. [15] Concentrations of metals in Red Dog Creek have been reduced from pre-mining levels.[16] The EA noted "overall improvements in water quality, increased primary production and increased numbers and diversity of benthic invertebrates."[17] Since mine development, grayling have been known to spawn in Mainstem Red Dog Creek."[18] Grayling Fry hatch in late June and rear in Mainstem Red Dog Creek...."[19]

Foremost experts on the biological community of Red Dog Creek agree that the Mainstem is less toxic now than in its pre-mining condition.[20] Phyllis Scannell, an Alaska governmental specialist in water quality, prepared a report entitled *Comparison of Mainstem Red Dog Creek Pre- and Post- Mining*.[21] She noted overall improvements in water quality and aquatic life.[22] "Before" and "After" photographs of the Red Dog Creek clearly show the beneficial effect of mining activity.[23] In 1982, before mining operations commenced, the stream is red with natural toxicity. By June, 2005, water is visibly improved and the formerly denuded riparian area is green with vegetation.

Phyllis Scannell documented the beneficial effects on aquatic invertebrates:

> As with *periphyton* communities, aquatic invertebrate communities in Red Dog Creek show no indication that they have been reduced, either in density or taxonomic richness, by the current water quality conditions in Mainstem Red Dog

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[15] See note 5, *supra.*

[16] 2006 EA at page 13

[17] Id. at page 16

[18] Id. at page 15-16

[19] Id. at page 16. See also, TCAK Exh. 1 at 27-28

[20] These letters were appended to TCAK's Comments when those comments were submitted to EPA. They are part of TCAK Exhibit 1: Letters and reports from Dr. Alvin Ott (ADNR-OHMP), Dr. Phyllis Scannell (ADF&G - retired), Dr. Jonathan Houghton (formerly Dames and Moore).

[21] **Scannell Comparison** (March 11, 2005). This is one of the attachments to TCAK Exh. 1

[22] Id. at page 18 of the Report, "Summary of Characteristics" of the Waterbody

[23] TCAK Exh. 1 at page 34. "RDC" stands for Red Dog Creek. MS = MainStem MF=Middle Fork NF=North Fork

Creek. In fact, the aquatic communities in 1995-2002 are in sharp contrast to communities during baseline when few, or no invertebrates were found.[24]

EPA, Region X, also acknowledges these improvements, stating: "[W]ater quality and aquatic life conditions in Mainstem Red Dog Creek have improved from pre-mining conditions, particularly during the last five years."[25] The entire body of available scientific data unequivocally establishes that Red Dog Creek is less toxic now than it was before mining commenced.[26]

Water Balancing

There is absolutely no doubt about this fact: improvement in water quality is the direct result of TCAK's Water Management System. Red Dog Creek is cleaner now because TCAK captures a substantial portion of the creek's flow before that water comes into contact with mineralized ore. The mine completely captures all of the South Fork as well as a portion of the historical flow from the Middle Fork.[27] In addition, the mine captures precipitation runoff before it can enter the mineralized zones. This creek water and surface runoff are diverted into the Mine's Water Management System.[28] TCAK treats much of that water to reduce metals and other constituents.[29] Also, the collection of clean precipitation adds to the water volume and reduces the concentration minerals overall.[30]

When this treated effluent and collected precipitation is discharged it "dilutes the naturally occurring metals in Red Dog Creek, moderates the pH, and lessens the toxicity of

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[24] Scannell, *Justification for Modified TDS Limits in Red Dog Creek and Ikalukrok Creek* (July 4, 2003)**(Scannell Justification)** at page 22 . Scannell's Report was, and is, attached to TCAK's Comments. TCAK Exh. 1

[25] RTC #8 at page 5

[26] E.g., 2007 Section 401 Certification at Appendix A, page A-7

[27] 1998 Water Balance at B-2

[28] 1998 Section 401 Certification at page 3; 2006 EA at page 12

[29] Id.

[30] Scannell Comparison at 18

metals by increasing the hardness."[31] During the discharge season, as much as forty percent of the flow in the Middle Fork of Red Dog Creek comes from the Red Dog wastewater treatment plant. This treated effluent is less toxic than the ambient receiving water.[32]

Consequently, it is now widely recognized that the aforementioned improvements to stream quality are attributable to TCAK's water management practices.[33] EPA's recent Environmental Assessment unequivocally confirms that increased numbers and diversity of benthic invertebrates and other aquatic life are a direct consequence of better water quality due to mine operations and resulting effluent discharges that cleaned up natural stream toxicity. Rather than making the receiving streams more toxic, mine operation and discharges have made the receiving streams less toxic to aquatic invertebrates.[34]

This situation was not so clear in 1998. Although anecdotal evidence suggested that water quality was improving, much of the study and documentation has been conducted in the intervening years. And, ADEC was conflicted. Effluent was discharged into the Middle Fork of Red Dog Creek which, because of its pre-mining toxicity, was not protected for aquatic life. [35] On the other hand, the far reaches of the Main Stem and the waters of Lower Iklukrok Creek were so protected. In an exercise of caution, ADEC thought it prudent to apply a WET limit to the mine's effluent while simultaneously predicting that "when this draft permit is reissued in five years, [it may be that] we will have enough confidence in our biological monitoring that we can dispense with WET limits altogether."[36]

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[31] Id.

[32] RTC #130, page 56

[33] Scannell Justification at page 13

[34] See, TCAK Exh. 1 at pages 26-27, 44-46. See also 2007 Section 401 Certification, Appendix A, *Cadmium Natural Condition Based Site Specific Criterion,* at pages A-3, A-4, A-7, A-8, A-12 thru A-14

[35] 1998 Water Balance at page B-1

[36] Id. and at B-9

ADEC set out to determine what limit should apply. Because "the mine's effluent essentially replaces the historic flow" of several tributaries, ADEC reasoned that the waters to be protected would be protected so long as the effluent did not contribute more toxicity to the Receiving Streams than had been historically contributed by the natural flows the mine was now capturing.[37] ADEC then set about calculating the volume and toxicity of those captured waters so that the agency could "balance" the mine's discharge with historical toxicity loading.

Another variable was imposed by federal New Source Performance Standards. Under 40 C.F.R. Part 440, Red Dog Mine could not discharge collected precipitation except to the extent that collected precipitation exceeded annual evaporation.[38] A complex *Water Balance Model for the Red Dog Mine* was developed. Modelers estimated pre-mining toxicity in each relevant stream segment and estimated or calculated historical flow for each segment.[39] They estimated precipitation and evaporation. All of these variables were put into the model, statistically manipulated with a "Waste Load Allocation" and a "reasonable potential" analysis, then reduced to end-of-pipe toxicity limits roughly approximating the toxic loading that had existed pre-mining.[40] The end result was "daily maximum" and "monthly average" chronic toxicity limits of 12.2 and 9.7 TUc, respectively.[41]

Almost immediately thereafter, TCAK set about gathering more data to refine the variables used in the Water Balance Model. And, importantly, TCAK annually conducted field

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[37] Id. at B-2; RTC #130 at page 56

[38] 40 C.F.R. 440.12(c)(2):

> In the event that the annual precipitation falling on the treatment facility and the drainage area contributing surface runoff to the treatment facility exceeds the annual evaporation, a 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 subject to the limitations set forth in paragraph (a) of this section.

[39] 1998 Water Balance at page B-3. Updated Water Balance at page C-1.

[40] 1998 Water Balance at B-3 through B-9

[41] Id. at B-8

assessments of the aquatic biota **(bio-assessments)** in water downstream from the Red Dog Mine.[42] This work was joined by an Environmental Assessment in 2003 when the permit was modified with a site-specific criterion for Total Dissolved Solids **(TDS)**.[43] At that time, EPA Region X concluded that, so long as the mine's permit had effluent limitations for TDS and other parameter-specific, water-quality-based limitations, the bio-assessments confirmed that invertebrates in the receiving streams were actually benefited by mine operations.[44]

Recent Statutory Background

During the past year, ADEC has once again been studying the situation at Red Dog Mine so that ADEC could meet its obligations under Section 401 of the Clean Water Act. As this tribunal knows, all NPDES permit applicants must obtain a certification from the appropriate state agency validating the permit's compliance with the pertinent federal and state water pollution control standards. These validations are generally known as "Section 401 Certifications." In re Teck Cominco I, 11 EAD at 470 n. 15

After reviewing almost a decade's worth of bio-assessments and additional data with respect to the 1998 Water Balance, ADEC made two critical determinations in 2007:

(1) No WET limit should be included in the permit because "18 AAC 70.020(b)(11)(C) and 18 AAC 70.030 do not apply at the point of discharge and that the bio-monitoring program is ultimately more meaningful than WET testing" and "the department finds there is not reasonable potential for the toxicity of the effluent to exceed the toxicity of the receiving water in its natural condition...." ; [45]

and

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[42] TCAK Exh. 1 at 24-25, 32-33, 35-36, 42-43 etc.

[43] The topic of Teck Cominco I, 11 EAD 457

[44] 2003 Environmental Assessment, prepared by EPA for the Red Dog Mine Project NPDES Permit Modification (January 2003) **(2003 EA)** at pages 27- 29.

[45] 2007 Section 401 Certification at pages 9, 10

(2) If EPA does include WET limits in the 2007 permit based on the Water Balance Model, EPA should employ the updated water balance information which more accurately accounted for the source of, the quantity of, and the pre-mining toxicity of the water inflows to the mine.[46]

TCAK joined ADEC in this regard, asking EPA to either eliminate the WET Limit or, at a minimum, to refine the chronic toxicity limitations in the renewed permit in light of the improved water balance information.[47]

EPA declined to take either action. In response to the request that limits be eliminated, the federal agency thought it "necessary and appropriate to set WET limits to ensure that the treated effluent does not increase the in-stream toxicity in the receiving system." [48] EPA relied upon the fact that Whole Effluent Toxicity had been observed in the effluent from this facility.[49] EPA asserted its belief that there is no "solid basis" for the argument that the effluent is less toxic than the natural condition in the creek [50]

In response to the request that limits be adjusted to reflect updated Water Balance information, EPA acknowledged that the WET limits had originally been "tailored" to this facility[51] and that there was "validity" to the issues raised by TCAK and Geomatrix (developer of the water balance model) regarding "inconsistencies between actual and measured precipitation and evaporation rates." EPA even went so far as to acknowledge that such inconsistencies "have been well-documented at sites throughout the country."[52] Nonetheless, EPA was unwilling to apply the updated facts because EPA had not reviewed some of the new

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[46] Id. and Updated Water Balance at C-2 thru C-5
[47] TCAK Exh. 1 at pages 11 - 48
[48] RTC #130 at 56
[49] RTC #134 at 60
[50] RTC # 135 at page 60
[51] RTC #133 at page 59
[52] RTC #136 at page 62

flow data and because EPA contended that the new information could not be used in the permit but, rather had to be part of a new site specific criterion.[53]

This appeal followed

Argument

No Chronic Toxicity Limits May Be Imposed In This Permit Without A Prerequisite Finding That Red Dog Mine Operation and Effluent Have Reasonable Potential To Cause or Contribute To An Excursion of a Water Quality Standard

Water Quality Standards consist of water quality criteria and designated uses.[54] EPA is authorized to impose water-quality-based WET Limits in a permit when EPA determines that the permittee's discharge causes, or has the reasonable potential to cause, or contributes to, an in-stream excursion above an applicable numeric criterion or above an applicable narrative criterion.[55] There are no other legal authorities on which EPA may base WET limits in the subject permit. Absent "reasonable potential" to bring about an excursion, Red Dog Mine's effluent may not be subjected to a WET permit limit.

Alaska has both numeric and narrative toxicity criteria.[56] As with any water quality criteria, they are made applicable to stream segments depending on the use being made of that segment's waters.[57] These criteria are designed to protect organisms and, because there were no humans and few aquatic species existing in or on the water of Red Dog Creek's Middle Fork in the years before mining began, neither of Alaska's toxicity criteria apply to that stream segment;

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53 Id.

54 In re Hecla Mining Co, Lucky Friday Mine, 13 EAD 1, 6 (Oct. 31, 2006). Antidegradation, the third component, is not here at issue because antidegradation policies are not implicated when a discharger improves the natural water quality of its receiving water. 1998 Section 401 Certification at 1.

55 40 C.F.R. §122.44(d)(1)(iv), (v)

56 18 AAC 70.020(11)(C)(narrative) and 70.030(numeric)

57 In re Hecla, 13 EAD at 6

the point of discharge for Red Dog Mine.[58] Any potentiality analysis must occur further downstream where the Receiving Waters are protected for the designated use of aquatic life.[59]

In 1998, ADEC stated -- and EPA accepted -- that Alaska's numeric toxicity criterion was "an implementing regulation" used, when feasible, as a benchmark by which to guide the narrative criterion.[60] ADEC determined that the numeric criterion could not be used in a case where natural toxicity exceeds that benchmark.[61] This interpretation has not changed. Any analysis of the potential for Red Dog's effluent to cause or contribute to an excursion must be conducted in light of Alaska's narrative criterion.

The narrative Alaska criterion is this:

> There may be no concentrations of toxic substances...that, singly or in combination, cause, or reasonably can be expected to cause, adverse effects on aquatic life.[62]

In the case of Red Dog, this means that there cannot be an introduction of toxics in toxic amounts above the natural condition toxicity.[63]

There Is No Rational Basis On Which EPA Could Conclude That Red Dog Mine Effluent Has Reasonable Potential To Cause, Or Contribute To, Toxics In Toxic Amounts Above Natural Condition Toxicity

In its Response To Comments on this Permit, EPA asserts "**there is no solid basis in the data for the argument that the effluent is less toxic than the natural condition in the creek.**"[64] With all due respect to EPA, all of the available data supports this "argument." No data supports an opposite finding of fact. Indeed, in that same Response To Comments EPA

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58 1998 Water Balance at page B-1
59 Id.
60 1998 Water Balance at page B-1
61 Id. See also RTC #130, page 56
62 18 AAC 70.020(b)(11)(C)(2007). In 1998, the last clause read: "adverse effects on aquatic life"
63 1998 Water Balance at B-2; TCAK Exh. 1 at page 26
64 RTC # 135 at page 60

acknowledges that "the treated effluent has been determined to be less toxic than the ambient receiving water."[65]

A solid basis is provided by, among other things, TCAK's bio-assessment results. In a guidance document instructing regional personnel how to implement whole effluent toxicity in permits, EPA Headquarters instructs:

> "[B]io-assessments provide useful information to augment data demonstrating problems with attainment of water quality standards, specifically, the 'reasonable potential' evaluation about the need for a chronic toxicity limitation."[66]

When EPA did consider those bio-assessment results, the Agency concluded that so long as Red Dog has the TDS and other numeric limits in its permit, the bio-assesssments confirmed that receiving streams were more hospitable to invertebrates than they had been prior to mining discharges.[67] ADEC was clearer: "While changes have been observed, 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."[68]

ADEC finds a "solid basis" to support the notion that Red Dog effluent will have no negative effect on downstream aquatic life. That basis includes "comparisons of water quality data for metals concentrations" from before and after mining began.[69] That basis includes future as well as past bio-monitoring.[70] ADEC's "solid basis" includes a legitimate recognition that the criterion under consideration does not apply until effluent has been carried considerably

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[65] RTC #130 at page 56

[66] Memorandum from Tudor Davies and Michael B. Cook, EPA Headquarters to EPA Regions I-X, *Clarifications regarding Whole Effluent Toxicity Test Methods Recently Published at 40 CFR Part 136 and Guidance on Implementation of Whole Effluent Toxicity in Permits,* (July 21, 1997) at page 5

[67] 2003 EA at 27-29

[68] 2007 Section 401 Certification at page 10

[69] 2007 Section 401 Certification at page 9

[70] Id. at page 8, 10

downstream.[71] ADEC correctly found, as a matter of fact, that "there is no reasonable potential for the effluent to exceed pre-mining natural toxicity of Red Dog Creek."[72]

EPA offers up the rebuttal that "whole effluent toxicity has been observed on numerous occasions in the effluent from this facility." Nonsense. Since the WET Limits were imposed nine years ago, they have been conducted once each month in which there was discharge (approximately five months per year) but there have been only six tests that indicated possible toxicity above the limits. (Four of the six were in 1999 when laboratories were still acquainting themselves with WET testing analysis.)[73] Six of thirty-five constitutes about thirteen percent. Thirteen percent of all the samples provided some observation of toxicity. EPA predicts that WET tests will be wrong five to twenty percent of the time. Edison Elec. Institute v. E.P.A., 391 F.3d 1267, 1272 (C.A.D.C. 2004). The "observations" at this site were within the tests margin of error.

What is meant by "observing whole effluent toxicity" and is that a valid indicator of whether this effluent is likely to cause an excursion of a "no toxics over natural background" criterion? EPA's "*Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organisms*," declares that

> the objective of aquatic toxicity tests with effluent or pure compounds is to estimate the 'safe' or 'no effect' concentration of these substances, which is defined as the concentration which will permit normal propagation of fish and other aquatic life in the receiving waters.[74]

The "no effect" concept is interesting at Red Dog. If TCAK were to leave this particular Receiving Water in its natural state, making sure that TCAK's effluent had 'no effect,' the

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[71] Id. at 9

[72] 2007 401 Certification at 10

[73] This information can be derived from TCAK's discharge monitoring reports.

[74] EPA, *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Freshwater Organism* (October 2004) at §2.1, page 3.

invertebrates would be highly stressed and the fish would follow their "normal propagation" of dying before they could spawn. EPA's "observations" do not provide a rational basis for WET limits.

The Washington D.C. Circuit Court of Appeals felt that if the results of WET tests conflicted with other, arguably superior, site specific evidence, then changes should be made at the permitting stage to reflect the site-specific evidence. Edison. 391 F.3d at 1274 . That is what ADEC is advocating. ADEC relied upon its Updated Water Balance calculations, and the bio-monitoring results, and found as a matter of fact that this mine effluent has no reasonable potential to cause an excursion of Alaska's narrative toxicity criterion. From that finding, ADEC reasonably concluded that WET Limits were neither necessary nor appropriate .[75]

Substantial deference is owed to ADEC on this point. EPA may not simply substitute its interpretation for that of the State. EPA may impose a more stringent limitation than certified by the State only if EPA first bolsters its interpretation with a showing of "strong scientific or technological support." Ina Rd. Water Pollution Control Facility, 2 E.A.D. at 101 n.7

EPA has no such support. The methodology used in 1998 to assign a WET Limit contained numerous assumptions and uncertainties.[76] Occasional observed whole effluent toxicity in excess of such crudely crafted limits is not sufficient basis on which to override Alaska's interpretation of its standard. Nor is it a foundation on which one can reasonably conclude that the effluent has a meaningful potential to harm downstream aquatic life.

For all these reasons the permit should be remanded with instructions for EPA to remove the water-quality-based toxicity limits

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[75] 2007 Section 401 Certification at 6-10
[76] 2007 Section 401 Certification at page 9

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In The Alternative, If EPA Demonstrates A Rational Basis for Including A Chronic Toxicity Limit In The Permit, Those Limits Must Be Adjusted To Reflect Actual Water Balancing

> When a State certification specifically prescribes a permit condition or limitation that interprets one of the State's water quality standards 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.[77]

In its 2007 Section 401 Certification, ADEC specifically prescribed revised chronic toxicity limits of 11.2 TUc average monthly and 17.6 TUc maximum daily.[78] EPA has absolutely no basis for rejecting those numbers.

ADEC has come to realize that its 1998 Water Balance estimates were significantly off-the-mark. In 1998 the modelers estimated the mine's annual average inflow at 2.4 billion gallons per year (bgy).[79] This was thought to consist of 1.3 bgy that formerly flowed through the South Fork of Red Dog Creek; 0.3 bgy that formerly flowed through the Middle Fork; and 0.8 bgy of mystery water from "unknown origin."[80]

Each portion of the flow was assigned a pre-mining contamination concentration. South Fork water was thought to contain 6.1 TUc. North Fork water was thought to contain 35.2 TUc. The mystery water was thought to be a relatively clean 2.9 TUc.[81] Those volumes and concentrations were used to reach the conclusion that Red Dog Mine could discharge up to 2.4 bgy with toxic concentrations up to 9.7 TUc as a monthly average and 12.2 TUc as a maximum daily without imparting more toxicity into the Receiving Waters than Mother Nature had during

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[77] In re Am. Cyanamid Co., 4 E.A.D. 790, 801 n.12 (EAB 1993), renewed and reasserted in Teck Cominco I at 489-490

[78] 2007 Section 401 Certification, Updated Water Balance at C-5

[79] Updated Water Balance at page C-1

[80] Id.

[81] Id. at C-2

the centuries before TCAK arrived.[82] Unfortunately, the estimations were grossly inaccurate. Annual average discharge is not 2.4 bgy. Rather, that was the amount which would be discharged only if Red Dog experienced the 100 year to 1000 year annual precipitation event. In other words, the mine wasn't likely to get this much flow except once every century or millennium.[83] The mystery water didn't really exist.

Actual flows were metered, leading to significantly better precision.[84] Some flows, which had previously been ignored, such as Bons Creek, now had their existence acknowledged.[85] Under-catch of snow by the meteorological station -- the one vagary EPA acknowledged in its Response To Comments -- was documented and a calibration was built into the Water Balance formula.[86]

Using these new flow volumes but the same pre-mining concentrations of toxicity for the South and Middle Fork water (6.1 and 35.2) as well as a 0 TUc concentration for Bons Creek water, the model now predicts that Red Dog Mine can discharge effluent with a monthly average concentration of 11.2 TUc and a daily maximum of 17.6 TUc without contributing more toxicity to the Receiving Waters than was in them before TCAK arrived.[87]

EPA adheres to the 1998 toxicity numbers, the 1998 output of the Water Balance Model. Blind adherence to a fiction, embraced as fact, is clearly erroneous.[88] Unreasonable adherence to a fiction, masquerading as fact, cannot support a conclusion of "reasonable" potential. The permit must be remanded with instructions for EPA to employ the updated Water Balance in

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[82] Updated Water Balance at C-2
[83] Id.
[84] Id. at C-3
[85] Id. at C-4
[86] Id. at C-4
[87] Updated Water Balance at C-5
[88] Dickinson v. Zurko, 527 U.S. 150, 155, 119 S.Ct. 1816, 1819 (1999).

calculating any WET Limits.

EPA Is Mistaken In Its Assertion That Correct Limits Cannot Be Adopted Except As Site Specific Criteria

EPA has stated that "**the proposed** new, less stringent **WET criterion** cannot be used in the permit unless and until the State proposes it, and EPA approves it, as a new **site-specific criterion** (SSC)."[89] We highlight certain words to immediately elucidate EPA's negative pregnant. Were TCAK proposing a new criterion, TCAK agrees that it would go through the criterion adoption process. But since TCAK is proposing an effluent limitation, TCAK expects to go through the effluent limitation process.

Water Quality Standards consist of water quality criteria and designated uses.[90] The criteria apply statewide in correlation to designated uses.[91] Alaska does allow for a site specific water quality criterion which can modify an otherwise applicable, statewide criterion in a particular waterbody.[92] Such adjustments admittedly must go through rulemaking.

Once established, criteria -- whether statewide or site specific -- and their accompanying uses, are implemented in permits through water quality based effluent limitations.[93] That is what TCAK is proposing to do. The permit currently refers to 12.2 TUc and 9.7 TUc as "Chronic Toxicity Limits."[94] Those numbers are set out in the table of "Effluent Limitations."[95] There being no proposal to establish a site-specific criterion, there is no compulsion to follow the site-specific criterion adoption process.[96] Upon remand, if this tribunal does not completely strip

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89 RTC #136, page 62 (emphasis supplied)
90 In re Hecla Mining Co, Lucky Friday Mine, 13 EAD 6 (Oct. 31, 2006).
91 See generally, 18 AAC 70.020
92 18 AAC 70.235 - .236
93 40 C.F.R. §122.44(d), In re Hecla, 13 EAD at 5-6.
94 Permit at Condition I.G.5.a., page 18
95 Permit Condition I.A.1. Table 1
96 When these water-quality-based effluent limitations were first adopted in 1998, ADEC expressly stated:

the permit of WET Limits, it must instruct EPA to act on the proposed effluent limitation as an effluent limitation.[97]

MANIFEST ERRORS

Various Permit Conditions as Shown Below

EPA Purported To Accept Comments and Agreed to Make Changes but Did Not in Fact Make Those Changes In The Final Permit

It is clearly erroneous for a government to say it will do something which it then does not do. To say one thing but do another leaves a reviewing body with a definite and firm conviction that an error has been committed. That is the meaning of "clearly erroneous. Dickinson v. Zurko, 527 U.S. 150, 162, 119 S.Ct. 1816, 1823 (U.S. 1999) Indeed, this rises to the level of ministerial or manifest error, capable of being fixed without substantial further process.[98]

With respect to the following conditions, the final permit simply does not reflect EPA's commitments:

ZINC MONITORING FEQUENCY
Permit Condition I.A.1, Table 1

TCAK's comment, page 96, stated: "The [Outfall 001] monitoring frequencies specified in the draft permit for zinc and TSS is overly burdensome and should be reduced." EPA concurred and, in response stated, "The monitoring frequency for zinc has, therefore, been reduced to monthly."[99] However, Table 1 in the final Permit calls for monitoring "1/week." This should be modified to "1/month."

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In our original draft certification, **we proposed to establish a site-specific criterion** for Whole Effluent Toxicity (WET) in the Main Stem, to reflect the natural condition there. However, public comment ... as well as **interagency discussion, have persuaded us to abandon that approach.**
1998 Water Balance at B-2

[98] E.g., 40 C.F.R. §122.63; Dickinson, at 155, 1819 ("[T]he cases use words such as 'clear case of error' or 'clearly wrong' to describe the CCPA's review standard, while the remainder use words such as 'manifest error,' which might be thought to mean the same thing.")

[99] RTC #42, pg. 18 & #62, pg. 28

IRON'S "MINIMUM LEVEL"
Permit Condition I.A.5.b.(1)

Analytical testing involves a "Minimum Level" **(ML)**. That 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." [100]

Commentators requested clarification as to what ML would be appropriate for each specific test method to be employed under the permit.[101] EPA responded, *inter alia*, that the appropriate ML for Iron, Using Method 200.7, would be one hundred micrograms per liter (100 ug/L).[102] However, final Permit Condition I.A.5.b.(1) (Permit page 7) specifies that the permittee should use 10 ug/L as the ML for iron. Condition I.A.5.b.(1) should be amended to read: 100 ug/L

WET MONITORING STATIONS
Permit Condition I.D.6., Table 3

TCAK Commented: "Whole Effluent Toxicity monitoring at Stations 9 and 12 should not be required."[103] EPA agreed to eliminate monitoring "at the two stations referenced by the commenter."[104] However, Permit Condition I.D.6, Table 3, calls for Ambient Whole Effluent Toxicity Monitoring one time per month at Station 12. This should be eliminated because it directly contradicts the Agency's stated position.

SUMP PUMP FLOW DATA
Permit Condition I.C.3

TCAK discussed the Mine Drainage Collection system and flow monitoring of that system. TCAK requested: "Please remove the requirement to record and report the total volume

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[100] TCAK Exh. 1 at page 100, citing 40 C.F.R. Part 136, Appendix B
[101] RTC #57, page 25
[102] RTC Methods Table, page 26
[103] TCAK Exh. 1 at 62
[104] RTC #139, page 64

pumped from the 'Dirty Water Sump' in each DMR."[105] In response, EPA agreed that "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."[106] Notwithstanding EPA's concurrence in the proposed change, Condition I.C.3. of the final Permit states:

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

Because water pumped from the Collection Dam to the Tailings Impoundment is pumped through the "Dirty Water Sump," this condition effectively reinstates monthly DMR reporting for sump pumping. The final phrase of Condition I.C.3. should mirror other conditions that call for annual reporting (e.g., Conditions I.E.5 and 8), by stating:

> **... and reported with the Annual Report described in Permit Part I.J**.

BEST MANAGEMENT PRACTICES
Permit Condition I.I.2.f.(iv - v)

On page 22 of the Final Permit, EPA sets forth "Measures and Controls" for pollution prevention.[107] EPA failed to include this language:

> (v) Ensure that best blasting practices are used in any wet blast holes to minimize the amount of blasting agent that dissolves into the groundwater in the vicinity of the blast hole.

That language was written by the State of Alaska as a condition of its Section 401 Certification.[108] As authorized so to do by 40 C.F.R. §124.53(e), ADEC specified that the above-quoted

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[105] TCAK Exh. 1 at page 65

[106] RTC #65, pg. 29. See also, RTC 79, pg. 33, seemingly in accord, which involves spring snow pack readings and net precipitation and for which EPA crafted language for annual reporting "along with all of the other data collected during each discharge season." (Permit Conditions I.E.5 and 8)

[107] Condition I.I.2.f.

language is "necessary to ensure that appropriate source control measures are undertaken to minimize the amount of ammonia in the effluent."[109]

The regulatory provisions pertaining to state certification provide that EPA may not issue a permit "[u]nless the final permit incorporates the requirements specified in the certification under §124.53(e)."[110] It is well-settled that EPA cannot relax effluent limitations certified by the State as being necessary to ensure compliance with state standards. Teck Cominco I at 487-488. Thus, the condition is precisely the type that must be included in EPA's final permit. The provision should be added as Condition I.I.2.f.(v).

STREAM FLOW MONITORING
Permit Condition I.A.7.d and I.D.7

Final Permit Condition I.A.7.d. [Permit page 8] conflicts with Condition I.D.7. [Permit page 15]. These sections specify two different types of monitoring (instantaneous versus daily average) and frequencies (twice daily versus once per day) for flow at Station 151. These permit provisions should be remanded for clarification.

Type Of Monitoring

Condition I.A.7.d. instructs TCAK to calculate allowable flow conditions at Station 151 and at the outfall in "approximately the same time frame." This is instantaneous comparison monitoring.

Condition I.D.7. instructs TCAK to calculate streamflow at Station 151 using "standard methods recognized by the U.S. Geological Survey." Those methods use averaging, not instantaneous comparison. Which method does EPA want?

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[108] 2007 Section 401 Certification at Condition 8, page 10

[109] 2007[Section 401 Certification at pp. 10-11

[110] Teck Cominco I at 487, construing and applying 40 C.F.R. §124.55(a)

Frequency of Monitoring

Condition I.D.7 says: "Streamflow shall be determined daily at Station 151." [Permit at pg. 15] Condition I.A.7.d says "flow volume from Outfall 001 [shall be] at least twice each day" with "flow measurements at Station 151 and flow from the outfall must be taken within 30 minutes of each other." [Permit at pg. 8] Obviously, Condition I.A.7.d would require streamflow measurements at Station 151 twice each day. Which is it? Because violation of an NPDES permit carries with it a multitude of penalties, the permit cannot be vague. Where conditions in a permit create an undo ambiguity or vagueness, remand for clarification is appropriate. In re Puna Geothermal Venture, 9 EAD 243, 265 (June 27, 2000)[111] Petitioner seeks a remand so that EPA can make its permit internally consistent.

METEOROLOGIC MONITORING
Permit Condition I.E.

EPA failed to respond to TCAK's comment concerning Permit Condition I.E. That section requires certain meteorological monitoring. However, the monitoring methodology has been superseded by other State requirements. ADEC's Air Quality Control Permit requires continuous monitoring of a meteorologic station at the mine, which is more rigorous than the once per day monitoring requirements in this Permit Condition I.E. Compliance with the Air Permit protocol precludes the collection of information in the manner required by Condition I.E.6. Similarly, Condition I.E.4. is incorrect in its description of the dates that effective evaporation monitoring can be conducted. EPA should coordinate with ADEC and eliminate Condition I.E. or synchronize it with the air quality control permit. It was manifest error for EPA to disregard TCAK's comment and subject the company to conflicting permits.

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[111] Petitioner complained of ambiguity; agency agreed to clarify; EAB remanded "so that the Region can make appropriate modifications."

WAD CYANIDE
Permit Condition I.D.6., Table 3, Endnote 3
and
Permit Condition I.A.5.b.(1)

The above-referenced Permit Condition requires TCAK to notify ADEC when WAD cyanide concentrations exceed 3 ug/L. Permit Condition I.A.5.b.(1) and Response to Comments #57 and #59 establish that the ML for WAD cyanide is 10 ug/L. TCAK has no way of knowing when WAD exceeds 3, but is less than 10, ug/L. The concentration that triggers reporting cannot rationally be less than the minimum detectable. The Table should be adjusted to 10 ug/L.

[End of Manifest Errors]

POST DISCHARGE MONITORING
Permit Condition I.D.3.

So called "ambient monitoring" is designed to end each year after the mine ceases discharging at the start of winter. ADEC's Section 401 Certification says that such monitoring may be discontinued "7 days after the permittee has ceased discharging for the season."[112] According to ADEC, this is adequate to capture any downstream effects while not placing unnecessary monitoring requirements on the permittee.[113]

EPA's permit would not allow monitoring to cease until after "30 consecutive days" without a discharge. [Condition I.D.3]

> When a State certification specifically prescribes a permit condition or limitation that interprets one of the State's water quality standards 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.[114]

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112 2007 Section 401 Certification at page 6, Condition 5

113 Id. at page 7

114 In re Am. Cyanamid Co., 4 E.A.D. 790, 801 n.12 (EAB 1993), renewed and reasserted in Teck Cominco I at 489-490

EPA provides only a bald conclusion, stating: "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." In what way is it necessary to monitor Red Dog and Ikalukrok Creeks for thirty days when known flow data shows mine effluent reaches the Chukchi Sea in less than 6-days. (i.e. what is the nexus to the effluent or permit development).

AMMONIA
Permit Condition I.A.1. Table 1, Daily Maximum and Monthly Average

The Daily Maximum and Monthly Average Effluent Limitations For Ammonia Are Flawed Because EPA Made Calculation Errors[115]

Error In Monthly Average

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

The derivation of the permit limits for ammonia was provided in Attachment C of EPA's Response to Comments.[116] Average monthly limits **(AML)** are calculated by an equation that uses the number of samples collected during the month.[117] EPA's calculation of the ammonia AML is based on 30 samples per month.[118] That is a clear mistake of fact. The sampling

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[115] TCAK commented on the manner and methods used by EPA in its Reasonable Potential Analysis **(RPA)** for Ammonia and its development of final permit limits for ammonia. TCAK Exh. 1 at pp. 65-70

[116] RTC at pages 81-84

[117] See EPA, March 1991, *Technical Support Document for Water Quality-based Toxics Control*, EPA/505/2-90-001, Washington, D.C. (**TSD**) at pages 99, 103, 106, E-5, E-9

[118] RTC at page 84 and *EPA Fact Sheet NPDES Permit Number AK-003865-2* (March 6, 2006)(**Red Dog Fact Sheet**) at *Appendix C - Development of Effluent Limitations*, page 52, Calculation formula for the Ammonia AML

frequency for ammonia in the permit is once per week, resulting in 4 samples per month.[119] By using an incorrect number of samples, EPA set an AML for ammonia that is 11 percent too low.

Correct use of the number of samples in the derivation of permit limits is clearly described in EPA's Technical Support Document **(TSD)**. On page 107 of that document, EPA states: "[I]t is recommended that the actual planned frequency of monitoring normally be used to determine the value of n for calculating the AML."[120] Where equations are provided in the TSD for calculating the AML, the value "n" is clearly shown as the number of samples taken during the month (TSD at pages 99, 103, 106, E-5, E-9).

TCAK recognizes that guidance is not binding. In re V-1 Oil Co, 8 E.A.D. 729, 748 (Feb. 25, 2000). Nonetheless, it is error to deviate from standardized methodologies absent some compelling reason and a factual basis for such deviation. In re Indeck-Elwood LLC, 13 EAB 1, 46-47 (Sept. 27 2006)[121] There being no such reason here, the subject permit should be remanded for proper calculation of the AML.

Error In Chronic Ammonia Standard

EPA's calculation of the 30-day chronic ammonia standard used in developing the permit limits for ammonia is inconsistent with its policies, resulting in an unreasonably conservative standard and permit limits for ammonia that are unduly restrictive.

In developing the permit limits for ammonia, EPA had to consider the most stringent of three water quality standards for ammonia (acute, 4-day chronic, 30-day chronic).[122] Of the three

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119 See Permit Condition I.A.1, Table 1 "Sample Frequency"

120 This normally used methodology is abandoned only "...in situations where monitoring frequency is once per month or less, a higher value of n must be assumed for AML derivation purposes." [TSD at 107] With a sampling frequency of once per week in the Red Dog Mine permit, EPA should have applied the normal methodology.

121 If agency deviates from guidance its analysis must be at least as detailed as that contemplated by the guidance.

122 Ammonia is a "toxic substance" (18 AAC 70.990 (62)) subject to the WQS for "toxic and other deleterious substances (18 AAC 70.020(b)(11)). The three standards for ammonia are set forth in the *Alaska Water Quality Criteria Manual* referenced in that regulation.

standards, the 30-day chronic standard was the most restrictive and ultimately, as shown by EPA's calculations, it was the standard employed by EPA to determine the final ammonia permit limits for Red Dog Mine.[123]

The 30-day chronic ammonia standard is based on equations that incorporate the pH and temperature of the receiving water. The higher the pH and temperature, the lower, more restrictive, is the standard.[124] Therefore, EPA selected the upper 95th percentile values of pH and temperature measured at Station 10 in the main stem of Red Dog Creek from May 2001 through October 2005 to use in the equations. The Station 10 data were presented in Attachment C of EPA's Response to Comments.

The 95th percentile of a set of data is the value that is exceeded only 5% of the time. The 95th percentile values used by EPA were 7.9 for pH and 14.48°C for temperature. Therefore, only 5% of the pH values were greater than 7.9 and only 5% of the temperature values were greater than 14.48°C. Stated another way, the pH would be expected to be higher than 7.9 only 5 days out of every 100 days (and likewise for temperature).

Because the 30-day chronic standard represents average conditions over 30 days, it should be based on an average pH and temperature. The Station 10 pH and temperature data used by EPA for the 30-day chronic standard, however, are daily values, not averages. By using a daily 95th percentile for pH and temperature to calculate the 30-day chronic standard, EPA is effectively saying that such high pH and high temperature conditions persist for 30 days. This is not a rational conclusion, because it is inconsistent with the underlying statistical analysis. Using daily values to calculate an average-based chronic standard not only is irrational, but, as will be

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[123] RTC at Attachment C, page 83

[124] This topic raised and discussed at TCAK Exh. 1, pp. 65-66 & RTC #95, page 39.

shown below, it imparts a degree of conservatism that is well beyond currently effective, and traditionally followed, EPA policy.

In the TSD, EPA recommends that excursions from water quality standards be limited to one in a three-year period.[125] For a 30-day chronic standard, this could be interpreted as one month out of 36. In the case of Red Dog Mine, however, because it generally discharges only six months each year (May through October), this would be one month out of 18.

The Station 10 data can be used to calculate the probability that the monthly average pH and temperature would be greater than 7.9 and 14.48°C, respectively, over a 3-year period. That probability is only 1 in 131 (0.76%). That is, during only one month out of every 131 should EPA expect the average pH and temperature to be that high at the same time. Thus, the 30-day chronic ammonia standard calculated by EPA is over 7 times (131 divided by 18) more restrictive than what is recommended in its TSD guidance.

A rational calculation of a 30-day chronic standard uses the 95th percentile of the monthly averages of pH and temperature. The probability of exceeding the 30-day standard based on the 95th percentile of the averages is one month out of 22, which is reasonably close, but still higher than the EPA TSD guidance of 1 in 18. If the 95th percentiles of the averages are used, the 30-day chronic standard still determines the final permit limits, and these limits would be 12.3 mg/L for the daily maximum and 8.8 mg/L for the average monthly limit. (This average monthly limit includes the correction for a sampling frequency of once per week, as explained in the preceding comment.)

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Error In Acute Ammonia Standard

EPA made an error in the calculation of the acute ammonia standard. Using the Station 10 95th daily percentile value for pH, the acute standard with salmonids present should be 6.77

[125] TSD at page 36

mg/L.

The acute ammonia standard is calculated from an equation that includes the pH of the receiving water. As part of the derivation of final permit limits for ammonia, EPA calculated the acute ammonia standard (with salmonids present) based on the 95th percentile value of pH data at Station 10 on the main stem of Red Dog Creek. The Station 10 95th percentile value for pH is 7.9. The calculated ammonia standard with this pH value is 6.77 mg/L, which agrees with the value shown in Table VI of ADEC's "Alaska Water Quality Criteria Manual." The value shown in EPA's Response to Comments (Attachment C, "Ammonia Criteria Calculations"), however, is 6.54 mg/L.

Because of the foregoing errors in calculation, the permit should be remanded for proper calculation of the effluent limitations for Ammonia.

MINIMUM LEVEL FOR TOTAL RESIDUAL CHLORINE

Permit Conditions I.A.5.b.(2) and I.B.3.g

The Final Permit Includes A Minimum Level Of 20 Ug/L For Total Residual Chlorine, Which Is Inconsistent with other EPA Decisions, Is Unachievable, and Wrongfully Denies TCAK Its Regulatory Right to Develop An Effluent Specific Quantification Limit.

The final permit specifies that a Minimum Level **(ML)** of twenty micrograms per liter (20 ug/L) shall be achieved for effluent monitoring of Total Residual Chlorine **(TRC).** The draft permit and fact sheet did not specify an ML for TRC, so TCAK had no opportunity to comment on this ML during the public comment period. This ML, which is the required quantification limit for TRC monitoring, is inconsistent with other NPDES permits written by EPA Region X and is not achievable in an effluent matrix using any of the analytical methods approved for TRC.

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In "*Environmental Protection Agency's Response to Comments Received on the Draft NPDES General Permits for: Small Publicly Owned Treatment Works and Other Small Treatment Works in the State of Alaska, NPDES Nos. AKG-57-0000 and AKG-57-1000*" (June 17, 2004), EPA stated:

> The minimum level [for TRC] is listed as 100 µg/L in 'USEPA Approved Methods and Levels for NPDES Program', updated January 3, 2001. The final permit reflects the minimum level as 0.100 mg/L (0.100 mg/L).[126]

Can it be correct that in 2004 the ML for TRC was 100 ug/L but in 2007 the ML is 20 ug/L when there has been no substantive change to the TRC analytical methodology in over a decade?[127] Analytical methods are not like wine; they do not improve with age. They only become more sensitive from advances in techniques and technology, which have not occurred for the approved TRC analytical methods.

There are two approved analytical methods that can be used for low-level concentration measurements of TRC. These are: (1) Standard Method (SM) 4500-Cl E. and (2) SM 4500-Cl G.[128] For both methods the published "lower limits" of measurement in reagent (contaminant free) water are 10 ug/L. Standard Method SM 4500-CI G describes this as:

> c. *Minimum detectable concentration*: Approximately 10 ug Cl as Cl_2/L. This detection limit is achievable under ideal conditions; normal detection limits are typically higher. [129]

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[126] http://yosemite.epa.gov/r10/water.nsf/40db6e4de7be6d8888256c78007f8ff7/bc30f88057c7455088256c870082cd07/$FILE/AKG571000_and_0000_RtC.pdf, at page 5, Response to Comment No. 6

[127] Approved analytical methods for the determination of TRC can be found in *Standard Methods for the Examination of Water and Wastewater* 18th, 19th and 20th editions. The analytical methods are unchanged between the editions. The 18th edition was published in 1992.

[128] American Public Health Association (1995) *Standard Methods for the Examination of Water and Wastewater*, 19th edition, Washington, D.C.

[129] SM 4500-CI E simply states that "chlorine concentrations at the 10-ug/L level can be measured."

In other words, 10 ug/L is not a method detection limit **(MDL)** or ML for wastewater containing analyte. Rather, it is the minimum detectable concentration for contaminant free reagent tested under ideal conditions. [130]

EPA guidance states that an ML should be calculated as 3.18 times the MDL then rounding the results nearest to 1, 2, or 5 x 10^n, where n is an integer value. [131] While this approach would give an ML value of 20 ug/L if the 10 ug/L "lower limit" was applied, it is error to apply that limit when calculating the ML for Construction Camp effluent because 10 ug/L is not an MDL for wastewater containing analyte. That lower limit from the *Standard Methods* manual does not account for potential matrix interferences.

Applicable regulations -- 40 C.F.R. Part 136, Appendix B -- acknowledge that "the MDL for an analytical procedure may vary as a function of sample type."[132] Accordingly, those regulations allow a person to estimate MDL using a specific effluent matrix.[133] The ML for TRC specified in the permit is based on the "lower limit" set out in the *Standard Methods* which does not appear to have established using Appendix B procedures and clearly is not founded upon a specific effluent matrix.

EPAs inclusion of an ML of 20 ug/L for TRC is clearly erroneous because Red Dog's construction camp discharge is not contaminant-free reagent. The permit does not now include a provision that would allow TCAK to develop a matrix-specific MDL and ML, although such

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130 An MDL is measured in a reagent water sample, or a specific effluent matrix, using the procedure specified in Appendix B of 40 C.F.R. Part 136.

131 EPA (October 2004) *Revised Assessment of Detection and Quantitation Approaches*, EPA-821-B-04-005, Office of Water, Washington, D.C., p. 5-35.

132 40 C.F.R. Part 136, Appendix B, "Scope and Application"

133 Id. at "Procedure" 3.(b)

options are clearly allowed under 40 C.F.R. Part 136. TCAK requests that the ML for TRC in the final NPDES permit be remanded to EPA so that a provision can be added to the permit allowing the Mine to develop a site-specific ML if the 20 ug/L limit is unachievable.

HARDNESS-BASED METALS LIMITS
Permit Condition I.A.1. Table 1

EPA Incorrectly Calculated the Effluent Limits for Copper, Lead and Zinc Because The Agency Did Not Use the Effluent Hardness Concentration to Calculate the Applicable Water Quality Criterion

Alaska's water quality criteria for metals, s established in Alaska's *Water Quality Criteria Manual,* are expressed with an equation that includes a variable for "hardness".[134] To apply those criteria permit writers must implement that equation using a site-specific hardness factor.

This Permit established end-of-pipe, water quality-based, limits for copper, lead and zinc. EPA calculated those limits based on 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 if compared to end-of-pipe effluent hardness.[135] 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 numeric criteria were calculated using variable values from one location but were applied to a different location that has different variable values. This is fundamental error. These limits should be remanded to EPA and revised with end-of-pipe calculations.

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[134] 18 AAC 70.020(b)(4) and *Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances* (May 15, 2003) as incorporated into 18 AAC 70.020(b).

[135] RTC #35, page 15 and #121 at page 53-54

In its comments on the draft Permit, TCAK cited to EPA the methodologies described by EPA in its TSD as the appropriate means for calculating these water quality-based effluent limits **(WQBELs).**[136] 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. So, using EPA's own methodology, the criteria are calculated at the downstream edge of the mixing zone when they are to be met at the downstream edge of the mixing zone. Conversely, if the water quality criteria are to be met at end of pipe, calculators should employ the hardness concentration in the effluent at end of pipe.

In its response to TCAK's comments, EPA acknowledged that it has followed this method when calculating WQBELs for several other Region X permits.[137] However, EPA stated that as a matter of general policy it uses in-stream hardness to calculate WQBELs for metals, especially at mines[138]. This unwritten policy, which conflicts with the written methodology, is scientifically indefensible. 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 -- then assuming that the resulting water quality criterion applies to 100% effluent, is irrational. EPA admits that it applies this scientifically-baseless approach on an *ad hoc* basis and provides no scientific rationale to support its admittedly arbitrary and capricious approach. The permit limits for copper, lead and zinc should be remanded to EPA

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136 TCAK Exh. 1 at page 73

137 RTC #35 at page 15

138 In at least three of the four mines referenced by EPA in Response to Comment number 35, effluent limits were calculated with the benefit of some amount of dilution water (e.g. mixing zone). In which case, it is entirely appropriate that the criteria not be determined using the effluent hardness.

with instructions for them to follow their published methodology and derive the WQBELs for metals using the effluent hardness concentration data.[139]

CONCLUSION

For all the foregoing reasons, Petitioner and Permit Holder, Teck Cominco Alaska Incorporated, respectfully requests that NPDES Permit Renewal AK-003865-2 be remanded to United States Environmental Protection Agency, Region X, for corrections consistent with this tribunal's opinion.

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[139] TCAK notes that because the upstream flow contains metals concentrations that exceed the water quality criteria and the Red Dog Mine effluent dilutes the upstream metals concentrations, application of the conventional dilution calculation method is not practical.

RESPECTFULLY SUBMITTED this 11th day of April, 2007.

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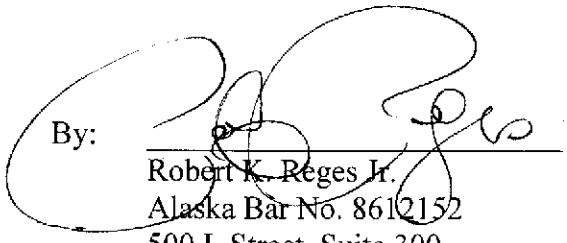

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