United States Department of Agriculture
Forest Service
R10-MB-744d September 2013

Greens Creek Mine

Tailings Disposal Facility Expansion

Final Environmental Impact Statement Appendices

Volume II

Tongass National Forest
Admiralty Island National Monument, Juneau, Alaska

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Appendix A, Part 1
Forest Service
Responses to Comments

Part 1: Forest Service Responses to Comments – List of Commenters

Comment

Angoon Community Association
P.O. Box 328
Alaska 99820
(907) 788-3412 Fax

Angoon
(907) 788-3411 Office

June 4, 2012

Admiralty Island National Monument
Tongass National Forest
Admiralty Island Monument Ranger
8510 Mendenhall Loop Road
Juneau, AK 99801
Re: Tailing Expansion

Dear Chad VanOrmer:

ACA.0.001 The Angoon Community Association, a federally recognized tribe, opposes the proposed Greens Creek Tailings Expansion. Angoon Community Association chooses Alternative (A). Under the No Action Alternative, The toxic tailings would continue to be placed in the approved tailings disposal facility until 2014 then would cease with no expansion.

ACA.0.002 Angoon, a Tlingit Indian Community, is the only permanent village on the island since time immemorial. We have respectfully utilized the resources from our island as our ancestors have throughout the history.

Angoon Community Association has grave concerns of the impact to our sacred land and waters on the four significant issues at hand, 1.) Water Quality. 2.) Wetlands. 3.) Aquatic Resources. 4.) Monument Values.

ACA.0.003 The 2012 Environmental Impact Statement does not accurately address the potential destructive impacts of the environment of Admiralty Island National Monument. There has also been an alarming rate of cancer showing up among our people, which have not been adequately addressed to determine the root causes leading to cancer. The area that is affected by mining activities will need treatment indefinitely, which goes far beyond the length of the mine affecting our future generations to come.

ACA.0.004 Hecla Greens Creek proudly states they provide an annual 1.2 million in property taxes to Juneau. In addition, the majority of the hiring comes directly out of Juneau, with 25% of Greens Creek workforce hired out of state. The Community of Angoon has a chronic 85% unemployment rate year around.

The 330 million in revenues minimally impacts Angoon with only nine Angoon members employed to date of three hundred Greens Creek employees. Angoon's Greens Creek

Response

Comment ID: ACA.0.001
Comment noted. Please be aware that HGCMC has indicated that with careful placement, tailings disposal at the approved facility could continue into 2016. The description of Alternative A has been revised accordingly throughout the document.

Comment ID: ACA.0.002
These have been acknowledged as significant concerns raised during scoping. The EIS fully describes how the proposed action and alternatives could impact water quality, wetlands, aquatic resources and Monument values. Sacred places are discussed in Section 3.17, Cultural Resources. The EIS also describes mitigation to reduce impacts.

Comment ID: ACA.0.003
The comment expresses concern about the accuracy of the impacts analysis. However, it is not clear what specific part of the analysis is of concern. Therefore, it is difficult to respond to this comment.

With regard to cancer rates, addressing cancer rates in the local population is beyond the scope of the analysis. A person's likelihood of developing cancer is affected by many risk factors, including age; family history and genetics; diet, level of exercise, and body weight; alcohol and tobacco use; certain bacterial and viral infections (e.g., hepatitis C); ionizing radiation (e.g., x-rays); and exposure to carcinogens (cancer-causing chemicals) in the workplace or the environment. These risk factors (and possibly others) and the types and incidences of cancers in a population would need to be evaluated in depth to begin to understand which risk factors may be contributing to the rates of cancer in a population. Cancer can be a result of a complex interaction of risk factors and thus is difficult to attribute to a single cause.

While it is possible that some of the metals at the mine site could cause adverse health effects if humans were exposed to sufficient levels in the environment, it is not expected that the mine operation will result in significantly elevated levels of metals beyond the mine site boundary. There is no evidence to indicate that the concentration of metals or contaminants in fish or wildlife as a result of exposure to mine operations would cause cancer or illness through subsistence foods gathered outside the mine site.

Comment

employment increased recently to nine Angoon employees, yet many of the Angoon employees' live in Juneau.

ACA.0.005

Greens Creek continues to be a threat to our environment with the permanent destruction of our sacred lands and water due to the past and continued exploration and extraction of our precious minerals and resources.

Angoon Community Association

Response

Metals released to the surface waters of Hawk Inlet will be kept within levels that are protective of the environment and will comply with the discharge permit enforced by the State, and metals contained in fugitive dust will be suppressed and controlled by dust control mitigation measures discussed in Section 3.2.3.1. Elevated levels of metals from the mine would not occur in Angoon, which is approximately 40 miles from the mine.

The area affected by the mine would not need to be treated indefinitely; the design of the cover at closure is intended to support the development of self-sustaining vegetation communities that would not result in the direct exposure of the tailings. Seepage through the tailings would need to be collected and treated prior to discharge until the discharge met water quality standards. The collection/treatment could last well beyond closure of the mine but its function would be guaranteed through the financial assurance required by the U.S. Department of Agriculture Forest Service (Forest Service) and the State of Alaska.

Comment ID: ACA.0.004
Comment noted. The socioeconomics discussion (Section 3.18) discusses these aspects of the existing operation and the alternatives.

Comment ID: ACA.0.005
Comment noted. Section 3.17 of the EIS discusses cultural resources, including sacred sites, and sections 3.6 and 3.7 discuss water and aquatic resources, respectively.

As discussed in sections 2.4.9 (Reclamation and Closure), 3.9 (Vegetation), and 3.13 (Land Use), disturbances at the site would be reclaimed at the end of mining operations. Reclamation would include covering the tailings facility and establishing a cover that supports spruce/hemlock forest. The pre-mining land use would be reestablished after closure.

Comment	*Response*
AK.0.001	**Comment ID: AK.0.001** Comment noted.

From: Art Kolter
To: FS:comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion
Date: Thursday, April 26, 2012 8:04:06 AM

Monument staff,

Greens Creek Mine proposed massive expansion of tailings into Admiralty Island National Monument over the next 50 years is a bad idea. The mine's cheapest and easiest tailings disposal should not trump Admiralty Island National Monument values and protection. Ask the Forest Service to select Alternative C and locate the tailings deposit outside off of the Monument.

Thank you,

Art Kolter
alkolter@gmail.com
P.O. Box 20414
Juneau, Alaska 99802-0414

Comment

Gas 'n' Go
PETRO
Express

May 31, 2012

Re: "Greens Creek Tailings Expansion"

Dear Sir or Madam

AL.0.001

I believe that Alternative B is the most environmentally sound, technically feasible, and economically viable alternative presented in the draft EIS, here are a few reasons why:

Alternative B provides for a logical expansion of the existing facility and consolidates our operations to the maximum extent practicable.

Alternative B allows for an upward extension of the existing facility as well as an expansion to the south which lessens disturbance and reclamation costs.

Alternative B maintains tailings disposal in an engineered, contained facility in a portion of a single watershed, as opposed to other alternatives that would place tailings in multiple watersheds.

Under its proposal, Hecla will maintain tailings disposal in an engineered, contained facility within a portion of a single watershed (Tributary Creek) versus the other action alternatives that would place tailings in a second facility but in multiple watersheds and create more disturbance. Proposal utilizes existing site support facilities, including the continued use of B Road that has served for tailings delivery since the mine opened versus the need, under the other action alternatives, for a major construction upgrade to approximately 2.5 miles of the A road.

AL.0.002

Proposal B will have minimal disruption to wildlife. Under proposal B, Hecla maintains the existing haul distances to the tailings versus the other action alternatives where an additional 7 miles of haulage will occur amounting to burning an extra 1,000,000 gallons of diesel fuel over the life of the project. This higher fuel use means more fuel transport to Admiralty Island and more greenhouse gas emissions.

If you should have need for any other information please contact me.

Sincerely,

Austin Lanz (Manager)

Response

Comment ID: AL.0.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment ID: AL.0.002
Comment noted. Calculations for greenhouse gas emissions for each action alternative have been included in Section 3.2.3. In addition, alternatives C and D would require an additional 5.6 miles round-trip of hauling, not 7 miles.

Comment

From: Bruce Abel
To: PE-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek/Alternative B
Date: Friday, June 01, 2012 9:53:52 AM

BA.0.001 I strongly encourage the approval of alternative B as the future tailings disposal option for the best long term solution for continued mining operations at Greens Creek Mine.

BA.0.002 The jobs that Greens Creek have provided for our region this past 25 plus years has been such a stabilizing and terrific factor that Juneau has largely avoided much of the ups and downs that the rest of the USA has endured due to the slumping economy and declining property values. The wages and benefits to the workforce are great and the trickle down effect of those dollars circulating here is evident in Juneau. The mining careers and training programs that have developed in Juneau over the years have provided many of our born and raised children here an excellent opportunity for high paying jobs and home ownership.

BA.0.003 The Greens Creek employees and management have proven to be great neighbors and contributors for SE Alaska. I have been to the mine site and came away totally impressed with all the environmental safeguards in place.

When you add up the total square miles of the mine's proposed expansion plans and compare that with the entire mine operation to the total square miles of Admiralty Island, it has to be a very minimal amount of space temporarily impacted by Greens Creek....the benefits of this type of responsible resource development is a model of how industry can co-exist in our region, without detriment to the environment.

Thank you,

Bruce Abel
9999 Glacier Highway
Juneau, AK.
99801

907-789-2155

Response

Comment ID: BA.0.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment ID: BA.0.002
Thank you for your comment. The socioeconomic effects of the project, including implications of mine wages are discussed in Section 3.18 of the Final EIS.

Comment ID: BA.0.003
Comment noted. Admiralty Island encompasses 1,053,440 acres, 995,000 acres of which is National Monument land. The Greens Creek Mine's current footprint is 65.3 acres; the proposed expansion could add up to 178 acres of new disturbance. Under Alternative D, the largest disturbance footprint of any of the alternatives (245 acres), approximately 0.023% of the total acres on Admiralty Island, would be affected. Most of the disturbance would be reclaimed following closure.

Comment

From: Bruce Baker
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion
Date: Saturday, June 02, 2012 7:03:56 AM

This message is directed to the Forest Service official responsible for deciding on the Greens Creek mine proposal to expand above-ground mine tailings disposal on Admiralty Island. Please include these comments in the administrative record.

BB.1.001 The DEIS is not in compliance with the National Environmental Policy Act (NEPA). Therefore, a supplemental DEIS needs to be made available for public and agency review and comment before an FEIS and Record of Decision are issued.

The DEIS is woefully deficient in the following respects:

BB.1.002 - There is no comprehensive cost-benefit analysis comparing the various decision alternatives.

BB.1.003 - There is no comprehensive analysis of how each decision alternative compares with the standards for protecting Admiralty Island National Monument values which are called for in the Alaska National Interest Lands Conservation Act (ANILCA).

BB.1.004 - The DEIS fails to display a decision alternative which would provide a sufficiently high degree of protection for water quality and fish habitat.

BB.1.005 - There appears to be no meaningful description of cultural values that could be impacted by any of the displayed decision alternatives.

BB.1.006 In short, the DEIS fails to provide reviewers or public agency decision makers enough information to adequately judge the relative advantages and disadvantages of decision alternatives.

BB.1.007 While Alternative C may be superior to Alternative B in terms of the protecting water quality and fish habitat, neither of these alternatives is shown in the DEIS to provide an adequate level of protection. On the basis of information in the DEIS, the only informed decision at this point would be a no-action alternative.

/S/ Bruce Baker, P.O. Box 211384, Auke Bay, AK 99821

Response

Comment ID: BB.1.001
Comment noted. The Forest Service respectfully disagrees that the DEIS is not in compliance with NEPA and that a supplemental DEIS is necessary. Responses to the commenter's specific concerns about the DEIS are provided.

Comment ID: BB.1.002
The regulations in 36 CFR 228.80(c)(2)(ii) require the authorized officer to consider the long- and short-term costs of mitigation measures in the context of the economic viability of the operations. The regulation does not indicate that this consideration is required to be included as part of the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures or alternatives would jeopardize the economic viability of the Greens Creek operation. The NEPA regulations do not require a cost–benefit analysis.

It is important to note that alternatives were developed using information typical for a scoping-level study for mining operations. The result is that each of the alternatives carried forward was economically feasible and therefore "practicable." The Forest Service, the USACE and the public are therefore free to base the comparison of alternatives on environmental effects without concern about the costs.

Comment ID: BB.1.003
Monument values are identified in Chapter 1 as a significant issue (Issue 4) that led to the formulation of alternatives and mitigation measures. The alternative TDF (alternatives C and D) was specifically developed to minimize the overall disturbed area in the Monument. Section 3.19 is dedicated to assessing impacts to the Monument and comparing alternatives. Additional impacts to the Monument are addressed in Section 3.22, Cumulative Effects. The information presented in the EIS is sufficient to compare alternatives and make an informed decision. The rationale for the decision and findings required by ANILCA are further documented in the Record of Decision.

Comment	*Response*
	Comment ID: BB.1.004 The commenter does not define what a "sufficiently high degree of protection" might be. Alternatives C and D were developed, in part, to provide alternatives that would reduce effects to fish habitat. All alternatives include water management and treatment as long asnecessary to ensure compliance with water quality standards and discharge permits issued by the State. Ongoing water quality monitoring and biological assessment would continue under all alternatives. **Comment ID: BB.1.005** Cultural resources are discussed in Section 3.17. We cannot provide a more detailed response since the commenter has not identified any specific cultural values he believes were not adequately described. **Comment ID: BB.1.006** Comment noted. The Forest Service respectfully disagrees that the DEIS is not in compliance with NEPA and that a supplemental DEIS is necessary. **Comment ID: BB.1.007** Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment

-----Original Message-----
From: Brad Fluetsch [mailto:bjf@gci.net]
Sent: Monday, June 04, 2012 4:56 PM
To: Firstencel, Heidi POA
Subject: Greens Creek Mining

BF.0.001 I support the expansion of Greens Creek mining, but would like to see the tailings removed from the Island. If "Fee in lieu of Mitigation" is used I absolutely oppose the funds going to Southeast Alaska Land
BF.0.002 Trust. SEAL Trust has completely mis-managed the Juneau Airports funds buying land outside the specifically designated areas and not purchasing land on the refuge. I would give the fee in lieu of
BF.0.003 mitigation funds to Federally Recognized Tribal entities Headquartered on Admiralty Island.

BF.0.004 I would like to see Greens Creek, (in fact require) to do more about hiring Indigenous people and have promotion policy for them based on effort, skills and time of service. It has come to my attention that Greens Creek could do significantly more about the working environment for indigenous people and eliminate the racism in the work environment.

Bradley J. Fluetsch, CFA

Managing Director and Chief Investment Officer

Fluetsch Financial Services, LLC

Response

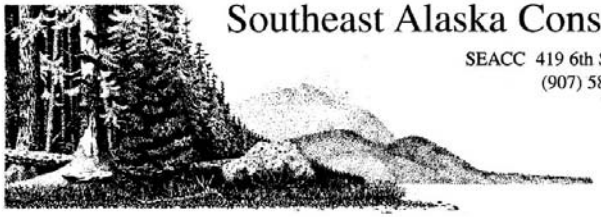
Comment ID: BF.0.001
Shipping wastes off site was identified during scoping as a potential alternative but was eliminated from full consideration because it would not have been economical and would simply move the same concerns to a different location. See Section 2.5 of the FEIS and Appendix C.

Comment ID: BF.0.002
Comment noted. At this time, we are unaware of any federally recognized tribal entities that manage an in-lieu fee program.

Comment ID: BF.0.003
All mitigation banks and in-lieu fee programs must have an approved instrument signed by the sponsor and the district engineer prior to being used to provide compensatory mitigation for CWA Section 404 permits.

Comment ID: BF.0.004
Comment noted. Neither the Forest Service nor the USACE has the authority to regulate hiring or employment practices, but both encourage HGCMC to work with the local Native communities to employ more indigenous people.

Comment



Southeast Alaska Conservation Council

SEACC 419 6th Street, Suite 200, Juneau, AK 99801
(907) 586-6942 phone • (907) 463-3312 fax
www.seacc.org • info@seacc.org

June 4, 2012

Sent via email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Re: Comments on Greens Creek Mine Tailings Dump Expansion Draft Environmental Impact Statement (DEIS)

Dear Forest Supervisor Cole and Monument Ranger VanOrmer:

In February of 2010, the Hecla Greens Creek Mining Company (Hecla) requested the Forest Service modify the mine's General Operating Plan to essentially double the size of its existing tailings dump, increase the size of its lease area to accommodate dumping additional tailings and waste rock, and "based on continued discovery of new ore and improved metal prices, . . . extend the life of the mine for another 30 to 50 years." *See DEIS at 1-6 – 1-8.* The Notice of Intent to prepare this DEIS was published on October 5, 2010. Please accept these timely comments on behalf of the Southeast Alaska Conservation Council (SEACC).

GENERAL COMMENTS

BL.0.001

The scope of the project and action alternatives considered in the DEIS were arbitrarily narrowed and the analysis of effects insufficient to fully inform the public and decision maker. In particular, the DEIS lacks a reasonably complete discussion of possible mitigation alternatives and measures to compensate for past, current, and reasonably foreseeable future impacts from mining activities. By concluding that reasonably foreseeable mining operations will only last another 30 to 50 years, the Forest Service unreasonably limits the required cumulative impact analysis for the proposed action and falls short of the "hard look" required by law. These temporal limitations prevent the Forest Service from meeting either the purposes of NEPA or the agency's obligation to make certain that all lands used for mining and milling purposes on Admiralty Island National Monument are compatible, to the maximum extent feasible, with protecting Monument values. Characterizing the "permanent loss" of over a thousand feet of fish habitat under all action alternatives, and about 4,000 feet, or 50 percent of the fish habitat in the Tributary Creek, as "negligible" is specious and inconsistent with the high level of fish habitat protection mandated by ANILCA.

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Response

Comment ID: BL.0.001

The action alternatives were determined based on narrowing down a wider range of possible alternatives; however, this was not done in an arbitrary manner. The range of alternatives was developed based on the issues raised during scoping. Section 2.5 clearly describes the alternatives that were considered but not carried forward for detailed analysis.

We also disagree with the assertion that the DEIS lacks a complete discussion of mitigation alternatives. Mitigation measures are discussed in Section 2.6 and in individual resource sections (e.g., 3.2.3.1 and 3.7.3.1). The decision to analyze impacts over a 30- to 50-year time frame reflects the action as proposed by HGCMC; the potential effects of mining for the full duration of the lease (beyond 30 to 50 years) are considered as part of cumulative effects (Section 3.22). For example, the DEIS is quite clear that water treatment will be needed beyond the 30- to 50-year time frame. We disagree with the assertion that these approaches fall short of the "hard look" required by NEPA.

Regarding the loss of fish habitat in Tributary Creek, Section 3.7 of the EIS discloses the amount of stream and habitat that would be lost for each alternative and the potential effects on aquatic resources. The stream/habitat loss is not negligible for Tributary Creek itself. However, when compared to the entire Monument (Section 3.19), the loss of part of Tributary Creek is not significant in the context of the fish and wildlife habitat distributed throughout the Monument. Section 3.19 acknowledges that effects on fish and wildlife in the Monument will be greater for Alternative B than for other alternatives. Requirements under ANILCA are discussed specifically in Section 3.19 (Monument Values) and addressed directly as part of the Record of Decision.

Comment ID: BL.0.002

The regulations in 36 CFR 228.80(c)(2)(ii) require the authorized officer to consider the long- and short-term costs of mitigation measures in the context of the economic viability of the operations. The regulation does not indicate that this consideration must be included as part of the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures or alternatives would jeopardize the economic viability of the Greens Creek operation. NEPA regulations do not require a cost–benefit analysis.

Comment

BL.0.002

The DEIS lacks any discussion, as required by agency regulations, of the short- and long-term costs to Hecla from implementing any of the action alternatives and proposed mitigation measures. It also lacks an evaluation of the effect of these costs on the economic viability of the mining operations as required by agency regulations. *See* 36 CFR 228.80(b)(2)((ii)(2011). In effect, two of the action alternatives (C and D) were developed to minimize the amount of surface disturbance within the Monument and assure that Hecla's mining operations are compatible to the maximum extent feasible, with the protection of Monument resources. The lack of detailed cost information or an evaluation of the practicability of these alternatives in the DEIS prevents the Forest Service, Corps of Engineers and public from determining which action alternative is the least environmentally damaging practicable alternative.

BL.0.003

Compounding the problems noted above is the Juneau-centric focus of the so-called socioeconomic analysis in the DEIS.[1] This constricted analysis prevents the Forest Service from fulfilling its obligation to identify and address the social, health, and environmental effects of this proposal borne disproportionately by both the Angoon and Hoonah communities.

BL.0.004

We recommend that the Forest Service correct these deficiencies and disclose the significant new information requested for additional public comment and review. Such a supplement will advance NEPA's purposes to promote efforts which will prevent or eliminate damage to the environment and to ensure informed and transparent environmental decision making.

Scope of the Proposal and Action Alternatives is Inadequate.

BL.0.005

NEPA requires the Forest Service to discuss mitigation when defining the scope of the proposed action, discussing alternatives to the proposed action, as well as consequences of those alternatives. *See* 40 C.F.R. §§ 1508.25(b), 1502.14(f), and 1502.16(h). The lack of a reasonably complete discussion of possible mitigation measures or mitigation alternatives to prevent or minimize adverse impacts on Monument values, particularly the irreparable loss of customary and traditional uses by Angoon and Hoonah residents and the Auk Kwaan of Juneau of Hawk Inlet/Greens Creek in this DEIS undermines the "action-forcing" function of NEPA.

BL.0.006

Key to the discussion regarding possible mitigation measures is how much money Hecla has made since purchasing 100% interest in Greens Creek in 2008. In short -- a bunch, consistently:

HECLA'S FINANCIAL NET PROFITS PER YEAR

- 2008 Hecla buys remaining 70.3% of mine from Rio Tinto for $750 million
- 2008 Hecla lost $66.6 million due to acquisition of Greens Creek and other expenses
- 2009 Hecla posted a net income applicable to shareholder distribution of $67.8 million
- 2010 Hecla posted a net income applicable to shareholder distribution of $82.6 million
- 2011 Hecla posted a net income applicable to shareholder distribution of $151 million
- First quarter 2012, Hecla posted a net income applicable to shareholder distribution of $12.4 million.[2]

[1] SEACC's submits for the record Power, The Role of Metal Mining in the Alaskan Economy (2002).
[2] Available at: http://investors.hecla-mining.com/phoenix.zhtml?c=63202&p=irol-newsArticle&ID=1656457&highlight=.

Response

It is important to note that alternatives were developed using information typical for a scoping-level study for mining operations. The result is that each of the alternatives carried forward was economically feasible and therefore "practicable." The Forest Service, the USACE, and the public are therefore free to base the comparison of alternatives on environmental effects without concern about the costs.

Comment ID: BL.0.003
The socioeconomic effects discussion focuses on where the effects of the operation occur, which is primarily Juneau. The socioeconomic section discloses that the majority of the workers employed at the mine reside in Juneau and presents current unemployment rates and poverty levels both in the City and Borough of Juneau and in the Hoonah–Angoon Census Area (see Section 3.18.2). Additional socioeconomic data and recognition of community concerns over unemployment, poverty levels, and population decline in Angoon, as well as the fact that Angoon realizes little benefit from the mine, have been added to Section 3.18.2. The submitted document, *The Role of Metal Mining in the Alaskan Economy* (Power 2002), has been reviewed and incorporated into the record.

Comment ID: BL.0.004
A supplemental EIS is necessary if a substantial change is made to the proposed action that is relevant to environmental concerns or there are significant new circumstances or information that is relevant to environmental concerns. An agency may also prepare a supplemental EIS if it determines that NEPA will be advanced by doing so. The comments on the DEIS have resulted in some changes to the Final EIS, but these changes do not rise to a level that would require supplementation. The Forest Service respectfully disagrees that supplementation is necessary to advance NEPA's purposes. The Forest Service has carefully followed NEPA regulations in preparing the EIS and we believe that the EIS fully informs our decision in the ROD.

Comment ID: BL.0.005
The EIS discusses mitigation measures in compliance with the regulations. A summary of the mitigation measures is provided in Table 2.6.2, which also identifies the sections of the EIS where more detailed discussions of the mitigation measures can be found. This comment does not provide specific information regarding why

Comment

BL.0.007

While NEPA's action-forcing function does not mandate particular results, the substantive standards contained in Sections 503, 504, and 505, as supplemented by the 1996 Greens Creek Land Exchange Agreement, do. Several introductory statements in Exchange Agreement between HGCMC's predecessor, Kennecott, and the Forest Service, indicate that the parties intended the future contemplated mine development to "occur without significant impact to Monument resources and its purposes" and "in an environmentally sound manner." The parties' intent provides a strong basis for taking a more extensive look at treatment alternatives such as pyrite removal or flow augmentation technology, shipping wastes off-site, or alternatives that maintain the present and continued productivity of all salmon habitats in the project area, including on National Forest lands within and outside the Monument.

BL.0.008

In December of last year, SEACC notified the Forest Service that direct discharge of toxic pollutants into a mixing zone in Hawk Inlet was no longer necessary and supplemented our earlier scoping comments with information regarding the potential mitigation measure. *See* Letter from SEACC to Monument Ranger VanOrmer (Dec. 9, 2011). With this letter we attached a PDF Portfolio that included SEACC's Informal Request for Review of APDES AK0043206; Director Bonnet's response, which stayed the permit's effective date and extended the EPA-issued permit AK00432006 (2005); our follow up letter to Morgan, head of ADEC's Waste Water Discharge Program; and, a letter from Dr. David M. Chambers of the Center for Science in Public Participation that identified demonstrated treatment technology, approved by ADEC and EPA, that eliminate the necessity for mixing zones containing toxic levels of pollutants in Hawk Inlet.

BL.0.009

The DEIS did not identify or evaluate this "flow augmentation" alternative to direct discharges from the tailings dump, with associated mixing zone, into Hawk Inlet, or the potential for this alternative treatment approach to mitigate adverse environmental consequences from the continuous discharge and loading of pollutants into Hawk Inlet. In addition, because the discussion in the DEIS at 3.5.2 with regard to current regulation of wastewater discharged into Hawk Inlet is inaccurate, *see supra* at 13, we again submit all of the above-referenced documents and request they be incorporated into the project planning record.

BL.0.010

The Council of Environmental Quality (CEQ) regulations implementing NEPA define "mitigation" as including "[c]ompensating for the impact by replacing or providing substitute resources or environments." 40 C.F.R. § 1508.20(e). Consequently, the Forest Service should consult with the federally recognized Tribal governments in Angoon and Hoonah about appropriate compensation packages for the irreversible impacts to their customary and traditional uses of Hawk Inlet and the surrounding lands from past, present, and reasonably foreseeable future development of the Greens Creek Mine. Because two of the action alternatives (C and D) could also adversely affect the land surrounding Young Bay, the Forest Service should also consult with the Auk Kwaan, the original occupants in Juneau.[3] These packages should be

[3] While the DEIS references Goldschmidt and Haas (1998), a reprint of the authors' 1946 Report by the Sealaska Heritage Institute and University of Washington Press as *Haa Aani, Our Land: Tlingit and Haida Land Rights and Use. Possessory Rights of the Natives of Southeastern Alaska.* Tetra Tech apparently didn't read the report. According to this study, "The natives of Juneau . . . include in their territory Hawk Inlet and the whole of Mansfield

Response

the commenter believes that the mitigation discussions are not reasonably complete.

The EIS clearly discloses the area that would be lost to subsistence activities for each alternative. Because the area lost is a small percentage of similar available land and mitigation will protect against further loss, the EIS concluded that impacts on subsistence would be minimal. The Forest Service does not consider mining activities to be an irreparable loss of traditional uses in Hawk Inlet. The EIS acknowledges the loss of traditional use in the mine area during operations and has included mitigation in the form of requiring the proponent to conduct additional research into traditional uses in the area.

Comment ID: BL.0.006
We do not believe that the EIS needs to disclose Hecla's corporate profits in relation to mitigation measures. But the EIS does need to identify mitigation that can be implemented and is effective. Cost is one factor in ensuring implementation, as is jurisdiction to require the specific mitigation, for example. The Forest Service worked with the cooperating agencies to come up with the mitigation measures included in the EIS. We believe that the EIS adequately discloses how mitigation will reduce environmental impacts and identifies who is responsible for ensuring implementation. We were careful to ensure that the discussion of mitigation is in compliance with recent guidance from CEQ on mitigation and monitoring (January 14, 2011, Memorandum from Nancy H. Sutley, CEQ, to Heads of Federal Departments and Agencies, "Appropriate Use of Mitigation and Monitoring…").

Comment ID: BL.0.007
The parties' intent does not dictate that unreasonable or impracticable alternatives be carried forward in detail. Shipping wastes off site is not a reasonable alternative because it is not practiced in lead/zinc mining (due to its expense—in this case, it could add more than $60/ton to disposal costs), it would transfer environmental concerns to a new location, and the transfer and transport would increase the risk of spills to the marine environment. The Forest Service considered pyrite removal in previous NEPA actions and for this tailings expansion EIS and determined that it was not a reasonable alternative to carry forward for detailed analysis. Section 2.5.3 of the DEIS explains that pyrite removal was eliminated from further consideration due to the logistical and operational constraints of placing the required facilities at the current

Comment

disclosed and evaluated in the supplemental DEIS. Appropriate compensation could include Hecla funding completion of the Thayer Creek hydro project for Angoon, funding the connection of Hoonah to the intertie that was extended to the Greens Creek Mine several years ago, and additional cleanup of the 1989 concentrate spill at the ore loading facility. As noted in the DEIS (at p. iv), the Forest Service has the authority to add stipulations or require additional mitigation measures in deciding whether and how to make a decision on Hecla's proposal to modify its General Operating Plan. We urge the Forest Service to use its authority to address the significant and irreversible losses suffered by tribal residents of Angoon and Hoonah from the development and operation of the Greens Creek Mine.

Cumulative Impact Analysis does not Constitute the "Hard Look" Required by Law.

BL.0.011

NEPA requires the Forest Service to "consider" cumulative impacts in an EIS. 40 C.F.R. § 1508.25(c)(3). This DEIS attempts to evaluate action alternatives that would expand the Greens Creek Mine's tailings dump to provide capacity for an additional 9.7 million cubic yards of tailings and waste rock or "accommodate an additional 30 to 50 years' worth of tailings and waste rock." DEIS at iii. Alternative B expands the tailings dump approximately 64 acres into the Monument, while Alternatives C and D partly expand the existing tailings dump in the Monument, but mostly add space with a new tailings dump constructed outside the Monument. *Id.* at v. Hecla hopes the expanded dump will accommodate the estimated 15 million cubic yards of additional tailings and waste rock from "ongoing operations and project reserves, and provide volume for waste rock co-disposal and an expanded resource base being defined by ongoing on-site exploration activities." *Id.* at 1-7. Past exploration activities have led Hecla to conclude that continued exploration will provide a "likelihood that new reserves will continue to be identified *well into the future*." *Id.* (emphasis added).

According to the DEIS, "the mine has operated as a 'ten-year' mine for the last 20 years." *Id.* at 1-6. The only basis offered in the DEIS for evaluating impacts across a 30 to 50 year timeframe is Hecla's belief that "they can extend the life of the mine for another 30 to 50 years . . . to process the *known* ore reserves." *Id.* The DEIS offers no explanation for why the 30-50 year timeframe is reasonable. Why is it reasonable to assume that "ongoing on-site exploration activities" will not identify new reserves sufficient to support continued mine development past 50 years? How are undiscovered reserves factored into the "current production and disposal rates"? A straightforward accounting of how Hecla and the agency arrived at all these figures and how they interact is lacking. Hecla apparently extrapolated this new timeframe from "current production and disposal rates" although it acknowledges that the predicted range "reflects variable nature of production and backfill rate." *Id.* at 2-6.

The shortened timeframe given for the life of the mine analysis also ignores Congressional ratification of the agreement negotiated between Hecla's predecessor in interest, Kennecott Greens Creek Mining Company, and the Forest Service. The Greens Creek Land Exchange Agreement gave Kennecott (now Hecla) "the right to explore and mine the subsurface lands adjacent to the Mine within the existing non-wilderness area of the monument (sic), *in an*

Peninsula." *Id. at 37.* The section describing the territory of the Auk (Juneau) and Taku (Douglas) also cites a map by Krause that identifies "the only villages in Auk territory besides the city of Juneau are on Young Bay on Admiralty Island and on the mainland at Swanson Harbor." *Id.*

Response

mill site and the risk to water quality and aquatic life that comes with handling chemically reactive pyrite material. Further, pyrite removal would not address the pyrite already present in the TDF.

Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the Clean Water Act (CWA) requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and with the awareness that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis. As such, the EIS does not consider alternative water treatment scenarios.

Comment ID: BL.0.008
The Forest Service has reviewed all the letters cited in this comment. They are included as a part of the public record. The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended.

Please see the response to Comment BL.0.007. The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue

Comment

BL.0.011 cont

environmentally sound manner."[4] In addition, the terms of the Exchange Agreement assert that "further exploration and potential development of the Mine can be accomplished without significant impact to the Monument and its purposes." *Id.* at 4920.

BL.0.012

Congress ratified this exchange agreement because it found that under those terms, Hecla's predecessor in interest had the right to explore and develop these lands "under terms and conditions consistent with the protection of the values of the Admiralty Island National Monument" for a term of 99 years, when the Exchange Agreement authorized the United States to take all title and possession of the subject lands. *See* Section 2(3), Greens Creek Land Exchange Act of 1995, Pub. L. No. 104-123, 110 STAT. 879 (Apr. 1, 1996); 141 Cong. Rec. H 4919, 4921-22 (daily ed. May 15, 1995).[5] Consequently, under these circumstances, we don't understand why the Forest Service is not preparing an EIS for the entire project contemplated by the Exchange Agreement. *See Cady v. Morton*, 527 F.2d 786, 795 (9th Cir. 1975).

BL.0.013

The vagueness and ambiguity of the DEIS is particularly striking in light of Hecla's predecessor in interest's inability to accurately estimate figures related to the size and longevity of the previous expansion of the tailings dump. Specifically, the thirty acre expansion permitted in 2003, which was to extend the life of the mine an additional 22 years, *see* Greens Creek 2003 EIS 4-54, is now expected to run out of disposal capacity in 2014. The expansion lasted only about *half as long* as expected. This 50% error rate is significant and not one that can be chalked up to "variability."

BL.0.014

The current DEIS explains the prior discrepancy as due to two factors. First, "geotechnical conditions (i.e., steep slopes and unstable material) prevented the use of some of the areas that had been approved for tailings disposal in 2003." DEIS at 1-6. Second, "average annual production" of tailings and waste rock increased compared to expectations in 2003. *Id.* The DEIS concludes that, this time around, "[s]lope stability is not expected to pose a credible risk," even while conceding that "these results are preliminary and based on several simplifying assumptions." *Id.* at 3-23.

BL.0.015

Here, again, the agency's reasoning conflicts with the evidence before it. The agency appears to presume that everything will go as predicted this time, although the record suggests that otherwise is more likely. Both the agency and Hecla apparently assume that there will be no geotechnical problems or other issues that reduce the predicted capacity available for disposal and consequently shrink the estimated timeline for the expanded dump's capacity. Just as the Kennecott and the Forest Service never took into account unforeseen issues like slope stability in 2003, Hecla and the Forest Service now leave no margin for error or consider the possibility of new or changed circumstances in the future. Given the complexity associated with proposed action, as well as past history, it would appear dangerous to assume that the amount of disposal space made available by the proposed expansion will meet predicted capacity. That the agency took a single precaution that it did not previously take – excluding some sloping hillsides from consideration – does not justify it making such an optimistic assumption. Did the Hecla and the

[4] *See* The Greens Creek Land Exchange Agreement (Dec. 14, 1994)(141 Cong. Rec. H4919, 4920 (daily ed. May 15, 1995)(emphasis added).
[5] *See also* http://www.hecla-mining.com/operations/operations_greenscreek.php (accessed June 3, 2012).

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to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). As such, the EIS does not consider alternative discharge or treatment scenarios.

If ADEC decides to authorize an off-river treatment system, then HGCMC would need to modify its GPO to construct it, and approving the modification would be subject to its own NEPA analysis. We do not see this as a reasonable alternative to evaluate in this EIS since it is outside of the Forest Service's jurisdiction to require, HGCMC is in compliance with its current discharge permit, and no changes to the treatment system have been proposed by HGCMC or the State.

Comment ID: BL.0.009
Please see responses to comments BL.0.007 and BL.0.008.

Comment ID: BL.0.010
The Forest Service acknowledges that compensation by replacing or providing substitute resources can be considered a form of mitigation. The Forest Service has not found that replacement or substitute resources are necessary or warranted based on our consultation with the local tribal and non-tribal entities. HGCMC funding the completion of the Thayer Creek hydro project for Angoon or funding the connection of Hoonah to the intertie would not replace or substitute "resources or environments" impacted and is unrelated to HGCMC's GPO.

Additional cleanup of the 1989 concentrate spill at the ore loading facility is under the jurisdiction of the State of Alaska and, if warranted, would need to be addressed through their contaminated sites program. While the Forest Service has the authority to add mitigation measures or additional stipulations to the GPO, that authority does not extend to requiring measures that are completely unrelated to the operation.

We encourage the tribes to work directly with HGCMC and the State on the issues raised in these comments. The Forest Service has had several consultation meetings and we are willing to have additional meetings to further explain actions that are and are not within our authority.

Comment

BL.0.015

Forest Service consider estimating the longevity of the proposed TDF by reference to the 2003 experience, i.e., estimate the current expansion to provide only 15-25 years' of disposal space (a number that takes into account prior variability)? If not, please explain why.

Further, the DEIS does not indicate whether Hecla or the Forest Service considered the possibility that the annual dumping rate may increase above the predicted annual average (again) sometime during the next 30-50 years. *See* DEIS at 1-6. As with any industry, it is highly unrealistic to assume that production capacity remains static over such a long period of time. Nonetheless, the DEIS reflects the assumption that the mine will continue to operate at its current rate for the next 3 to 5 decades. Missing from the DEIS is any specific explanation for the discrepancy between actual and expected production rates over the last 10 years. For example, if production increased due to more efficient technology, did the agency take into account the likelihood that even better technology may come on line within the next 30-50 years? If the markets for lead, zinc, and silver rise in the future, why wouldn't HGCMC expand production to take advantage of improved market prices? We request the Forest Service consider adding additional stipulations or mitigation measures, such as a cap on the amount of tailings and waste rock that maybe disposed in the dump annually in the supplemental DEIS.

BL.0.016

NEPA requires a DEIS to discuss "the relationship between short-term uses of man's environment and enhancement of long-term productivity." We could not find this required analysis in the DEIS. Its absence is surprising given the frank acknowledgement in the DEIS that post-closure water quality treatment will "be required at least 100 years after closure of the [tailings dump], perhaps in perpetuity. *See e.g.,* DEIS at 3-58 (emphasis added). Significantly, although the mine has been in operation since 1989, this is the first time the Forest Service has acknowledged the possibility of perpetual active water treatment. Perpetual water treatment includes the need for perpetual discharge of contaminants into the environment and perpetual disposal of the sludge waste product from treatment. Currently this sludge is disposed into the tailings dump. The DEIS contains no information of where or how the sludge from the treatment plant and other waste generated by the operators will be handled after closure and final reclamation or what infrastructure will be necessary to remove it from the site.

BL.0.017

The DEIS assumes that an adequate growth cover on the tailings will be engineered and proven to prevent pyrite oxidation even though Hecla is currently updating its reclamation plan. *See* DEIS at 2-24. As we note below in our comments concerning Tailings Contact Water Management, there is evidence that the current tailings dumping methods are contaminating ground water. Furthermore the DEIS contains no information as to the probability of successfully substituting fish habitat irreparably lost under all the action alternatives with additional fish passage in Greens Creek. We ask that the Forest Service fully explain how the proposed action will enhance the long term productivity of the natural environment in the supplemental DEIS.

BL.0.018

Absence of a Complete Cost Benefit Analysis in the DEIS Hamstrings Public Evaluation of Project Alternatives

The lack of a cost benefit evaluation in the DEIS hampers the public's ability to assess the comparative merits of the alternatives. The alternative screening process in Appendix C to the

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Comment ID: BL.0.011

The EIS reflects the duration of the proposal put forth by the proponent. A 30- to 50-year horizon is substantial future planning for a mining operation regardless of lease duration. The potential for impacts resulting from mining beyond 30 to 50 years and over the entirety of the lease term is addressed in the EIS in the cumulative effects analysis. See Section 3.22.

The disposal capacity addressed in the current EIS represents a reasonable maximum design, taking into account tailings and waste rock production rates over a series of years and based on the capacity of the existing mill, the need for disposal capacity for ancillary sites (e.g., Site E), and wastes approved for disposal in the ADEC Solid Waste Permit (e.g., wastewater treatment plant sludge and tires). The Forest Service is confident that the volumes used to design the facilities described in the proposed action and alternatives represent realistic values for production rates that are likely to occur over the next 50 years without substantial modification to processing facilities at the mill (i.e., changes that would drive the need for additional NEPA action).

Comment ID: BL.0.012

See the response to Comment BL.0.011.

Comment ID: BL.0.013

The EIS is not intentionally vague or ambiguous in describing the change in tailings storage capacity/demand from the 2003 EIS.

The disposal capacity addressed in the current EIS represents a reasonable maximum design, taking into account tailings and waste rock production rates over a series of years, the need for disposal capacity for ancillary sites (e.g. Site E), and wastes approved for disposal in the ADEC Solid Waste Permit (e.g., wastewater treatment plant sludge and tires). The Forest Service is confident that the volumes used to design the facilities described in the proposed action and alternatives in this EIS represent realistic values for production rates that are likely to occur without substantial modification to processing facilities at the mill (i.e., changes that would drive the need for additional NEPA action). If there are substantial changes in the future that warrant additional new tailings disposal locations, then these would need to be evaluated in future NEPA documents.

Comment

BL.0.018 cont

DEIS "acknowledged that there are substantial benefits to maintaining a single facility such as limiting new disturbance to watersheds already affected and limiting the focus on water management and water treatment requirements to the expansion of existing facilities rather than the construction of new, additional facilities." Yet, the DEIS does not offer a cost-benefit comparison of the alternatives with respect to this issue, a significant difference between the proposed action and Alternatives C and D. Although Appendix C uses "technical feasibility" as a criterion for alternative screening alternative, it makes no mention of the scope of what is technically feasible or the cost of implementing any particular alternative. The failure to disclose these costs, and degree of feasibility associated with the cost renders the alternatives indistinguishable. Without such information, neither the Corps of Engineers nor the public can determine if the benefits of modifying Hecla's General Operating Plan outweigh the permanent loss of special aquatic sites under any of the proposed alternatives. *See* 33 CFR § 320.4(a)(1). Even more importantly, without this information, the Corps of Engineers cannot determine whether there is a least damaging practicable alternative available. 40 C.F.R. § 230.10(a).

SECTION-SPECIFIC COMMENTS

Section 1.1 Background

BL.0.019

The description of the existing Greens Creek Mine offered in section 1.1 of Chapter 1 is incomplete. Absent from this description is any mention of the expansion of the mine-site storm water collection, treatment, and discharge system that occurred sometime after extreme storm events in 2007. *See* Alaska Dept. of Environmental Conservation, Final Fact Sheet for APDES AK0043206 at 16, 23, 26.[6] The Forest Service should update its description to reflect actual, current conditions at the Greens Creek Mine. The supplemental DEIS should disclose the costs of these improvements, evaluate their effects on the environment, as well as the effects of increased throughput capacity at the tailings dump's waste water treatment plant and the resulting proportional increase in daily maximum and monthly average discharge rates from outfall 002 into Hawk Inlet. What are the effects of the resulting increase in the loading of cadmium, copper, lead, mercury, and zinc into Hawk Inlet?

The importance of this evaluation is highlighted by the reference of the need to construct a new water treatment plant for Alternatives B, C, and D after 30 years. *See* DEIS at 2-6, 2-8, and 2-16. While the DEIS describes this replacement as necessary "due to the normal operational lifetime of the water treatment plant," please explain if the predicted "normal operational lifetime" reflects original plant conditions or those of the plant as expanded after 2007. Missing from the DEIS is any information relating to the cost of the constructing a new water treatment plant in the DEIS. Please include all this key information in the supplemental DEIS.

BL.0.020

Likewise the cursory discussion relating to the 2009 decision to allow for co-disposal of waste rock in the tailings dump is incomplete. According to the DEIS, Hecla's concern with Acid

[6] This document can be found at http://www.dec.alaska.gov/Water/WPSdocs/AK0043206_docs.pdf (last reviewed May 29, 2012). Inexplicably, both DNR and the DEC webpage identify this permit as in effect despite the fact that Director Bonnet stayed its effectiveness on October 28, 2011 and extended EPA's issued permit AK00432006 until DEC reissues the APDES. As of this date, DEC has not reissued this permit.

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Comment ID: BL.0.014

The reviewer cites three facts that are out of context and not directly related to one another. The change in production rates is not tied to geotechnical stability and is accounted for in this analysis (see the response to comments BL.0.011 and BL.0.013). The loss of storage volume resulted from some areas that are permitted for disposal being unsuitable for tailings placement because of geotechnical conditions in the native ground that precluded the use of those areas for tailings disposal. Avoiding these areas would avoid potential problems with the dry stack after the tailings had been placed. The quote from the geotechnical impacts section regarding slope stability refers to the stability of the TDF itself after it had been constructed. The stability analysis was conducted using the information available for the EIS and is appropriate based on the amount of information available and the "preliminary" level of analysis (as compared to a design- or construction-level engineering review).

Comment ID: BL.0.015

Please see the responses to comments BL.0.011, BL.0.013, and BL.0.014. HGCMC has optimized mill production levels since taking over mine operations from KGCMC (its predecessor), which contributed to the capacity shortage. The mill itself has limited space, meaning that further substantial increases in production levels would require additional new equipment for which there is no space, or another unforeseeable level of improvement in throughput efficiency. The future cannot be predicted absolutely; however, the Forest Service is confident that the EIS covers production rates that are reasonably foreseeable from any process-related activities in the existing mill. Any increase in production levels based on an increase in the physical size or processing capacity in the mill would likely call for another modification to the GPO, which in turn could result in another NEPA action. Likewise, expansion of the tailings disposal area beyond that contemplated in this EIS could be subject to future NEPA documentation.

Comment ID: BL.0.016

The EIS includes all the components required of a NEPA analysis in order to address the balance between short-term uses of the environment (the proposed project) and enhancement of long-term productivity (the development of alternatives with fewer environmental impacts, the discussion of environmental consequences, and identification of mitigation). Therefore, the EIS

Comment

BL.0.020

Rock Drainage (ARD) from waste rock stored at Site E prompted its request for co-disposal of waste rock in the tailings dump. This discussion raises several issues.

On the one hand, you note that "[Hecla]'s submittal included documentation supporting the geotechnical stability of co-disposal . . . ." DEIS at 1-6. On the other hand, the "loss" in disposal capacity is attributed in part to geotechnical conditions. *Id.* Please explain whether the loss in disposal capacity is due to unpredicted geotechnical stability issues related to the co-disposal of waste rock in the tailings dump. To what capacity does co-disposal affect Hecla's ability to compact the tailings? Does mixing tailings with large rock increase air penetration or create water conduits in the tailings pile? This looks like another example of Kennecott or Hecla's predictions proving wrong, like earlier predictions regarding the chemical stability of the tailings, the impermeability of the dump's clay base layer, or how much tailings the dump will hold.

Finally, no mention is made of the recently identified concern regarding leaching of potential ARD from Site C into Greens Creek. According to an on-site inspection report from the Alaska Department of Fish and Game (ADF&G), "a pool of discolored water that is leaching from Site C, through a berm, and into Greens Creek, [was observed.]."[7]

Production rock was disposed at Site C [adjacent to production rock site 23] in 1987 and 1988 and contains approximately 50,000 cubic yards of material, 20% of which is estimated by Hecla to be within 10-20 years of the end of its lag period. An environmental audit reveals that Site C's water quality is expected to worsen as more rock becomes acidic. See FINAL REPORT, Environmental Audit of the Greens Creek Mine at 49 (Section 4.2.3.4)(March 2009).[8] Though the water at Site C is collected and pumped to the water treatment plant Hecla is currently experiencing problems with the pump back system.[9]

BL.0.021

Please explain why Site C production rock lag time has been underestimated? What are the results of the leach water testing? Why is there no mention of the pump back issues in the DEIS? This critical information needs to be disclosed and analyzed in the supplemental DEIS.

1.6 Government-to-Government Consultations

BL.0.022

Although the Forest Service appropriately conducted government-to-government consultation with the Angoon Community Association, no mention is made of any attempts by the Forest Service to reach out to other federally recognized tribes with spiritual and cultural ties to Hawk Inlet, including the Hoonah Indian Association, or with recognized leaders of the Auk Kwaan.[10] The supplemental NEPA process we've requested will give the Forest Service the opportunity to fix this error.

[7] *See* Memo from Timothy, ADF&G Southeast Regional Supervisor (Sept. 26, 2011)(detailing observed leaching from legacy production rock at Site C into Greens Creek). Attached to SEACC comments for incorporation into the planning record for expansion of the tailings dump.
[8] Available at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/index.htm.
[9] Personal communication between SEACC's Archibald and J. Saran, Hecla Environmental in Juneau (Sept. 21, 2011).
[10] *See* Gilliam, Revised Greens Creek Tailings Expansion Heritage Review at 16-17 (Feb. 20, 2012). We have attached this report to our comments and request its inclusion in the project record.

Response

is compliant with this aspect of NEPA as well as all other aspects of NEPA.

The need for long-term water treatment is identified in the EIS based on more recent sampling and modeling of the quality of the tailings leachate than was available during previous NEPA analyses. Sludge from the water treatment plant is currently being disposed of in the tailings stack, and that practice will continue through closure. The methods of control and treatment, including options for sludge disposal, would be evaluated and designed as a part of the mine's reclamation and closure plan and regulated through ADEC's Solid Waste Permit.

Comment ID: BL.0.017
Although the EIS does not specifically use the words "enhance the long-term productivity of the natural environment," it does explain the mitigation, closure, and reclamation that will occur to reduce or mitigate impacts (in other words, enhance the long-term productivity).

The establishment of vegetation on the engineered cover is intended to return the land use to its pre-mining status. The engineered cover of the dry stack will minimize the movement of oxygen and water into the dry stack.

The potential sources of groundwater contamination, previous mitigation activities, and current monitoring for mitigation success are described in Section 3.6.2.3. This section also identifies potential impacts to groundwater that could be associated with fugitive tailings dust. As a result, the Forest Service is requiring additional fugitive dust monitoring and study, and a mitigation plan, if deemed necessary, to address identified sources (Section 3.2.3.1)

As stated in Section 3.7.3.1, the existing fish passage project was constructed as mitigation for a version of the project that was never developed. Therefore, it is appropriate to apply the habitat improvement as mitigation for the lost habitat associated with the proposed action or either alternatives. This section also provides estimated coho smolt production for the habitat gained by the fish passage project. To ensure the future operability of the fish passage project, quarterly monitoring is required (see Table 2.6-2).

Comment

1.8.4 State and Local Government

BL.0.023

The statement in the DEIS (at 1-23) that the permit issued by the Alaska Department of Environmental Conservation (ADEC) under the Alaska Pollutant Discharge Elimination System (APDES) program to establish water quality effluent limitations for the discharge of toxic pollutants from outfall 002 into Hawk Inlet "is in the process of being reissued" is accurate. As we point out *supra* at 13, the discussion and information disclosed in section 3.5.3.1 regarding the APDES discharge permit is incorrect.

BL.0.024

The DEIS further describes the authority of ADF&G to regulate in-stream activities on catalogued salmon-bearing waters, such as Tributary and Fowler Creeks. The statement that Alaska Statutes "requires protection of anadromous fish and fish-bearing waters for in-stream activities occurring in waters listed in ADF&G's *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes*" is unfortunately not correct.

BL.0.025

The Anadromous Fish Act, AS 16.05.871 requires permits to assure "proper protection" for activities that use or pollute waters "specified" by the commissioner as "important" for anadromous fish such as salmon. The "proper protection" standard and the discretion to determine which streams are "important" are vague, subjective, open to discretion, and lack statutory definition. This statute fails to articulate clear standards for protecting fish and game, habitats, and public uses of them and should not be relied on by the Forest Service to satisfy the precise and heightened standards articulated by Congress in sections 503, 504, and 505 of ANILCA.

2.3 Alternatives

BL.0.026

In describing the alternatives, the DEIS notes that all the alternatives "address the need for the same volume of waste disposal (tailings and rock)," but that both Alternatives C and D "would require construction of a new [tailings dump]" outside the Monument. DEIS at 2-3. No information is disclosed in the DEIS explaining the differences in cost associated with the alternatives. The DEIS notes that reconfiguring and realigning the design of Alternative B away from Tributary Creek "could render the project uneconomical (not practicable) over the long-term" because of the substantial costs associated with importing the volume of clean fill necessary to construct the redesigned tailings dump." *See* DEIS, Appendix C at C-6. This analysis also mentions "substantial cost resulting from this configuration would be the necessity to construct a new water treatment plant within the early phases of facility construction and well before the end of the existing plant's effective service life. . . ." *Id.* Please provide the economic data supporting these assertions in a supplemental DEIS.

2.4.8 Reclamation and Closure

BL.0.027

The DEIS explains that the final plan for successful reclamation depends on the lessons learned from the ongoing, concurrent reclamation of finished tailings storage areas. "[Hecla] assumes that a substantial amount of site-specific reclamation experience and performance data would be

Response

Comment ID: BL.0.018

The Forest Service respectfully disagrees about the need for a cost comparison among alternatives in order to conduct a rigorous environmental review of the project. NEPA regulations require that alternatives be reasonable, but does not require a cost–benefit analysis.

Feasibility, which takes into consideration cost (although not with the rigor of a cost–benefit analysis), was the initial criterion that drove the alternatives discussion once significant issues were identified. For example, tailings placement on a 30 percent slope is not technically feasible, nor would a wet tailings facility (dam) be, given the existing infrastructure. While shipping tailings is as technically feasible as shipping concentrate, it is not economically feasible and it is simply not done by lead-zinc mining operations. Submarine tailings disposal in Stephens Passage is technically feasible but is not feasible in terms of the time involved and the unpredictability associated with CWA permitting. The Forest Service considers each of the alternatives carried forward as technically and economically feasible, a situation confirmed by the absence of comments from HGCMC indicating otherwise.

This approach allows the Forest Service, cooperating agencies, and the public to evaluate the alternatives strictly based on environmental effects. We wholly disagree with the assertion that the alternatives are rendered undistinguishable; rather, the entire document is focused on presenting a hard look at the differences among a number of viable alternatives that address the significant issues.

Comment ID: BL.0.019

The description of wastewater management in Section 3.5.2.1 reflects upgraded designs as described by EDE (2010) and actual current conditions. However, a brief description of improvements that were made as a result of storm events in 2007 was added to the discussion. The existing plant's operational lifetime is anticipated to be 30 years as discussed in the EIS.

Please see the responses to comments BL.0.007 and BL.0.008. The control and discharge of contaminants to Hawk Inlet and the management of stormwater is currently regulated through the APDES permit using the 2005 permit conditions, which have been administratively extended until the APDES permit is reissued.

Comment

BL.0.027cont

available at final closure. At that time and based on information related to closure gleaned from experience at the site." DEIS at 2-25. "In addition to the benefits note (sic) above, contemporaneous reclamation could serve as a test facility in which to monitor vegetation establishment and succession, soil building processes and the performance and overall effectiveness of the cover itself." DEIS at 2-31.

The touted benefits from contemporaneous reclamation, however, do not apply to alternative B because "no concurrent reclamation and long-term stockpiling of soil is proposed under this scenario." DEIS at 3-110. Therefore, if the proposed action is adopted, the Forest Service and public will lack any assurance that this theoretical engineered tailings cap will actually work. Please explain how the Forest Service intends to account for this critical uncertainty? Will extra bonding be necessary? Please explain how this uncertainty changes the long-and short-term costs to Hecla associated with utilizing mitigation alternatives, such as the reduction of pyrite concentrations. How does the risk associated with the pyrite reduction alternative compare to the risk of banking on a theoretical final reclamation plan?

BL.0.028

The DEIS downplays these risks by advising that "[c]hanges in monitoring results outside an expected range can guide adjustments to, or changes in, specific mitigation measures." DEIS at 2-31. The Forest Service, however, does not disclose or identify the precise parameters of the "expected range." The supplemental DEIS needs to disclose what specific monitoring thresholds will trigger review and improvements to mitigation measures. Specific thresholds are necessary in order to establish clear performance expectations and ensure mitigation commitments are actually implemented.[11]

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2.5 Alternatives Considered but Not Carried Forward

BL.0.029

Here, the public is informed that "[h]illsides have a slope greater than 30 percent were eliminated from consideration for a tailings [dump] because of geotechnical stability concerns." DEIS at 2-27. Appendix C, however, explains that given the objective of assuring that each alternative dump location "meet[s] an adequate safety factor (a measure of stability) . . . only areas with less than a 20 percent slope were considered." DEIS, Appendix C at C-4. Please explain which screening criteria was actually applied and all the risks associated with including slopes greater than 20 percent in an alternative dump location.

BL.0.030

This section also explains that shipping wastes off site was identified during scoping as a potential alternative but was eliminated because it would have been uneconomical. *See* DEIS at 2-27. No economic data is presented in the DEIS to support this assertion. Likewise, no cost information is disclosed to inform the public about the relative merits of alternative tailings dump designs eliminated from further study. *Id.* at 2-28. "Ultimately, the costs and logistical complexity of [an alternative dump design], combined with the wetlands impacts within the Tributary Creek drainage and its presence within the Monument resulted in this alternative being eliminated from further consideration." *Id.* at 2-29. Without disclosing the economic and technical data that supports these conclusions, the Forest Service cannot take the hard look required by NEPA and its own regulations at the "long- and short-term costs to the operator of

[11] *See* CEQ Memo on Guidance for Establishing, Implementing, and Monitoring Mitigation Commitments (Jan. 14, 2011).

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In issuing the 2005 permit, the USEPA established effluent limits at levels that are protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, aquatic life, and wildlife.

It is beyond the scope of the EIS to evaluate the cost of mine stormwater management facilities or construction of a new wastewater treatment plant.

Comment ID: BL.0.020

As discussed in the response to Comment BL.0.014, the geotechnical concern that led to a loss of tailings disposal space resulted from conditions in the native ground (foundation material) rather than conditions in the TDF. The decision to allow co-disposal of tailings and waste rock was a separate action from this EIS and is not subject to comment at this time.

However, from an engineering standpoint, the geotechnical stability of the TDF does not substantially change with the addition of waste rock to the tailings. The geotechnical stability of the proposed expansion and alternative TDFs was evaluated in Section 3.3.3. As stated in Section 3.3.3.1, the Forest Service and ADEC will require monitoring for geotechnical stability under all alternatives so that any changes in anticipated conditions can be addressed by design modifications if necessary. The model used to predicted leachate quality anticipated through the TDF(s) considered the co-disposal of waste rock and tailings and is described in Section 3.5.3.1.

Leaching of ARD from Site C into Greens Creek would be an unpermitted discharge. To remain in compliance with its permits, the operator would need to capture the seepage as part of the water management plan. The treatment system has the capacity to handle additional seepage from Site C.

Comment ID: BL.0.021

The NEPA process is not an enforcement assessment tool tied to the environmental auditing required by ADEC's Solid Waste Permit. The issues surrounding Site C are related to the management of ongoing operations and are being addressed by the Forest Service in conjunction with ADEC. The situation related to HGCMC having issues with the pumpback system is a one-time or limited-duration occurrence and is not part of the normal operating conditions at the mine. Similarly, the leaching of discolored water from Site C into Greens Creek is not a permitted activity.

Comment

BL.0.030cont

utilizing such measures and the effect of these costs on the long-and-short-term economic viability of the operations." *See* 36 CFR 228.80(b)(2)((ii)(2011). Please provide this significant information for public review in the supplemental DEIS.

2.5.3 Reduction of the Pyrite Concentration in the Tailings

BL.0.031

Pyrite removal from the tailings was considered but eliminated as an alternative in the 2003 EIS. DEIS at 2-29. Although reevaluated for this NEPA process, the DEIS basically duplicates the earlier analysis and regurgitates the same conclusions. The Forest Service eliminates this alternative from consideration because of space limitations near the mill as well as the added hazards of storing pyrite and the reagent, sulfuric acid.

The DEIS offers no reasons why the pyrite recovery floatation cell cannot be housed anywhere within the mine's footprint. Currently, tailings containing pyrite are pumped over some distances as paste backfill back into the mine or trucked several miles to the tailings dump.

There is no explanation as to why pyrite concentrate is considered a greater risk to water quality, aquatic life, or monument values than the lead concentrate currently produced, let alone the acid rock drainage produced by oxidation of pyrite in the tailings and waste rock.

BL.0.032

Many of the chemicals used in the existing floatation process in the mill are hazardous and require special storage and handling such as MIBC-methyl isobutyl carbinol (used as a frother) and sodium cyanide (used as a depressant). The Forest Service does not describe any additional safety or containment issues for the sulfuric acid over and above what is necessary for currently used chemicals that demonstrates any additional hazard.

BL.0.033

Removing, or reducing the pyrite from the tailings would diminish the propensity for the tailings to oxidize, generate acid and mobilize metals. This could save money for the company, extend the life of the tailings facility and reduce the need for perpetual water treatment.[12] Both the Resource Conservation and Recovery Act (RCRA) and the Pollution Prevention Act of 1990 (PPA), encourage the reduction in volume, quantity and toxicity of waste. While RCRA focuses primarily on the reduction in volume and/or toxicity of hazardous waste, the PPA encourages maximum possible elimination of all waste through source reduction.

Pyrite is a marketable commodity. The Rio Tinto Mine in Spain produces pyrite/sulfur secondary to copper production. The mine produces more pyrite that zinc, gold, silver or lead. The Neal Mine in New Hampshire primarily produces copper and pyrite. The Bion Fraction, Lehigh Claim in South Dakota produces gold, silver and pyrite.

Current prices for pyrite range from $225-$400 per 100 metric tons depending on grade. *See* http://www.alibaba.com/showroom/pyrite-ore.html). Clearly more analysis is required to

[12] *See* U.S. Environmental Protection Agency. Pyrite Flotation: Magma Copper Company's Superior Facility Draft . Office of Solid Waste. March 1993 a (available at: http://infohouse.p2ric.org/ref/18/17051.pdfee)(a study on the costs/benefits of pyrite removal).

Response

A NEPA analysis is not intended to anticipate or address the range of potential upset conditions that could occur over the operational lifetime of any mining operation. The pumpback issue at Site C is outside the scope of the EIS. As noted in the audit, the lag time is an estimate. All water emanating from Site C is controlled and pumped to the water treatment plant.

Comment ID: BL.0.022
Additional consultation information has been added to Section 1.6, which notes that the Forest Service communicated with a local federally recognized tribes, Alaska Native Corporations, and members of the Aak'w Kwaan.

Comment ID: BL.0.023
The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDES permit is reissued.

Comment ID: BL.0.024
ADF&G has the statutory responsibility for "protecting" freshwater anadromous fish habitat and providing free passage for anadromous and resident fish in freshwater bodies (AS 16.05.841–871). Any activity or project that is conducted below the ordinary high water mark of an anadromous stream requires a Fish Habitat Permit. A Fish Habitat Permit is required before any action is taken to construct a hydraulic project; use, divert, obstruct, pollute, or change the natural flow or bed of a specified river, lake, or stream; or use wheeled, tracked, or excavating equipment or log-dragging equipment in the bed of a specified river, lake, or stream.

Comment ID: BL.0.025
The Anadromous Fish Act is one of several laws and directions considered in the document. Other laws and direction include ANILCA, the Magnuson-Stevens Fishery Conservation Act, Endangered Species Act, and direction from the Forest Plan Standards and Guidelines. See Section 1.8 of the EIS.

Comment ID: BL.0.026
Since cost is not a driving factor in making a NEPA decision, the Forest Service determined that a supplemental EIS is not necessary

Comment

evaluate the feasibility of this mitigation measure. *See* 36 C.F.R. § 228.80(c)(2). We look forward to seeing this in the supplemental DEIS.

2.6.1 Alternative B Reclamation

BL.0.034

The DEIS explains that in the unlikely case that active water treatment is not necessary for hundreds of years after closure, the final reclamation and closure plan for the tailings dump in Alternative B call for the outfall to naturally drain into Hawk Inlet rather than into Tributary Creek. *See* DEIS at 2-30. Such an outcome appears physically impossible because of the raised topography between the Tributary Creek watershed and Hawk Inlet (see map at 3-25) and the natural slope of the valley south toward Zinc Creek. "Prior to mining, the Tributary Creek drainage basin was about 482 acres *sloping south towards Zinc Creek . . . .*" DEIS at 3-39).

If the goals of the reclamation plan (Appendix F, section 4) are to return the surface to near natural condition, including restoring original surface drainage, how will this actually be accomplished without creating a different drainage route into Hawk Inlet?

2.6.3.1 Mitigation and Monitoring

BL.0.035

Why does Table 2.6.2 not include mitigation for impacts to minority or low income communities?

2.7 Comparison of Alternatives, Table 2.7-1.

BL.0.036

When summarizing the impacts of the alternatives, the DEIS notes that Angoon identified Hawk Inlet as a "sacred place." DEIS at 2-46. Other than identifying "Traditional cultural properties and sacred sites" as a value considered when analyzing potential changes to roadless areas, DEIS at 3-256 (Table 3.20-1), we could find no other description or analysis in the DEIS regarding this "sacred site."

BL.0.037

The 2008 Tongass Forest Plan Amendment requires the Forest Service to "[d]evelop site-specific management strategies that detail protection issues and enforcement mechanisms for identified sacred sites within the areas of potential effects in consultation with tribal government officials and authoritative representatives." TLMP at 4-20, HSS2.II.B. and III.B. ("Develop a protection plan that, as much as practicable, incorporates specific standards and methods as recommended by tribal government officials . . . ."). We recommend that the Forest Service prepare and adopt such a site-specific protection strategy in consultation with Angoon and Hoonah tribal government officials and with the leader of the Auk Kwaan, Rosa Miller.

3.4.2 Geochemistry – Existing Conditions

BL.0.038

The DEIS acknowledges that the Greens Creek mine tailings have "a net capacity to produce acidic drainage known as acid rock drainage (ARD)" through the oxidation of pyrite. DEIS at 3-28. The discussion relating to pyrite oxidation notes that this process generates heat but that "[c]urrently the temperature [of the tailings] is not monitored." DEIS at 3-27. Oxidation rates and zones in tailings plies are notoriously hard to predict with available information and

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to disclose cost details for this project. A supplemental memo regarding relative costs by alternative is included in the planning record.

Comment ID: BL.0.027
HGCMC has established and continues to monitor a test cover placed over a portion of the waste rock dump. This test facility serves to evaluate the design and performance of the cover. While this test cover is not over tailings, the movement of water through the cover and the establishment and effectiveness of vegetation on it will provide insight into its long-term performance. The Forest Service and permitting agencies will continue to monitor data collected from this site in the ongoing assessment of closure planning. This approach will eliminate some of the uncertainty associated with long-term performance. The Forest Service is confident of the financial assurance approach we implement in conjunction with the state and do not see a need to modify the bonding process to address more or less uncertainty. The Forest Service does not consider "pyrite reduction" a viable mitigation measure.

Comment ID: BL.0.028
It is not within the scope of this EIS to identify individual triggers and response pathways for parameters that are monitored under the various agencies' permitting and monitoring programs. Establishing such triggers in the EIS is not binding for other regulatory agencies and undermines their authority and effectiveness over the long term. Each of the various authorizations and permits identified in Chapter 2 have their own monitoring and reporting requirements.

Comment ID: BL.0.029
Edit made per comment. All slopes considered must be less than 30 percent. Edit made in Appendix C.

Comment ID: BL.0.030
The current cost to dispose of tailings is approximately $4.50/metric ton. If tailings were to be shipped off site, the costs of site preparation, trucking, stacking, and grading the tailings would remain.

HGCMC uses a cost of $68/ton to project costs for shipping and handling concentrate. Since tailings are of a similar consistency to concentrates, it is reasonable to assume that shipping and handling

Comment

BL.0.038 cont

acid/base accounting. Temperature is also a factor, along with available oxygen and grain size, to the rate of oxidation. Recording the internal temperature of the tailings could be a simple, cheap addition to the data gathered to help predict oxidation rates and foresee upcoming problems. SEACC recommends that monitoring of the tailings for temperature should be required in order to help improve the prediction of oxidation rates.

3.5.2 Water Resources – Surface Water – Baseline Conditions

BL.0.039

The DEIS states "[t]here are no streams listed as impaired under Section 303(d) of the CWA at the Greens Creek project site." DEIS at 3-41. While technically correct, SEACC recently nominated Althea Creek, Tributary Creek, and Hawk Inlet for listing as impaired waterbodies based on monitoring data reported in 2009 and 2010.[13] The 2011 monitoring report further supports a listing of these waters.

3.5.2.1 Wastewater Management

BL.0.040

The DEIS incorrectly claims that:

> The current APDES permit restricts the maximum allowable daily discharge to 4.6 million gallons per day (mgd) [3,190 gpm] and a monthly average discharge of 3.0 mgd (2,080 gpm). The permit limits assure compliance with all Alaska marine WQS. The permit also allows ten non-contact storm water discharge outfalls in Greens Creek, Zinc Creek, and Hawk Inlet.

DEIS at 3-47. These discharge rates were included in an APDES permit issued by ADEC on September 30, 2011, but later stayed by the ADEC Director of the Division of Water on October 28, 2011. The decision to arrest the implementation of Hecla's APDES Permit AK 0043206 also provided that "[t]he administratively extended the 2005 EPA-issued permit AK00432006 that became effective on July 1, 2005 will remain fully effective and enforceable until the permit is reissued and becomes effective."[14] Thus, the limits on daily maximum and monthly average flows, 3.6 mgd and 2.4 mgd, remain the authorized discharge rates for outfall 002.

3.5.2.2 Tailings Contact Water Management

BL.0.041

The DEIS does not reveal that storms in 2007 almost overwhelmed the mine's wastewater capture, storage, and treatment facilities. *See supra* p. 7 and note 5. In response to that threat, Greens Creek Mine expanded and upgraded wastewater management facilities. The failure to disclose this basic new information raises questions as to the level of oversight exercised by the Forest Service regarding both ongoing operations of Hecla's Greens Creek Mine and the NEPA contractor's preparation of this DEIS. What specific changes were made during this expansion and upgrade?

BL.0.042

The DEIS claims that the current tailings pile and the alternatives will have "[m]inimal effect on local hydrogeology; no impacts to ground water quality." DEIS at 2-43, Table 2.7.1. This

[13] *See*, Letter from Archibald, SEACC to Grant, ADEC (Sept. 14, 2011)(SEACC's Nominations for 303d Listing).
[14] EPA's 2005 NPDES is available at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/npdes.pdf.

Response

costs would be of a similar magnitude. If the costs to ship tailings to an off-site facility were 25 percent of the cost of shipping concentrate overseas, the costs of shipping and dry-stacking tailings would be approximately $17/metric ton. Because shipping the tailings would increase costs for tailings disposal roughly fourfold, an off-site alternative was not considered practicable and was not carried forward for detailed analysis.

As noted in response to Comment BL.0.002, the regulations at 36 CFR 228.80(c)(2)(ii) do not require the long- and short-term costs of mitigation measures to be incorporated into the NEPA process.

Comment ID: BL.0.031

Pyrite would need to be removed through flotation, similar to the process employed to recover lead or zinc concentrates. A pyrite recovery "cell" would need to be incorporated into (or replace a portion of) the current milling process. Installing flotation tanks to recover pyrite would require the displacement or repurposing of equipment currently used to generate marketable products (i.e., lead and zinc concentrates) to create a further-refined waste (i.e., pyrite). There would be no economic justification for designing and building a second mill facility elsewhere on the mine site strictly to reprocess a single waste (tailings) into two wastes (pyrite concentrate and tailings).

The approved configuration of the TDF will contain 5.5 million cubic yards of pyrite-containing tailings. Removing pyrite from subsequent placement will not eliminate the need to treat for metals in water emanating from the TDF. Even if all pyrite were removed from the tailings starting at the beginning of the process, there is insufficient evidence to indicate that TDF drainage would meet water quality standards without treatment.

Removal of the pyrite would reduce the potential for acid generation from the TDF. However, the data do not indicate that pyrite removal would be the solution to alleviate long-term risks to water quality, aquatic life, and Monument values, as suggested by the commenter. In terms of producing pyrite as a marketable product, the Forest Service is unable to substantiate that a viable market exists for pyrite produced at the Greens Creek Mine and ultimately cannot dictate how the mine conducts its milling operations or direct what products a proponent offers to the market.

Comment

BL.0.042 cont

statement is inconsistent with the results of area monitoring wells as reported in the Fresh Water Monitoring Program reports.[15]

The Fresh Water Monitoring Program compared the data from monitoring wells for water year 2011 to the strictest fresh water quality criterion for each applicable metal monitored. It reports that:

> "Exceedances in the tailings area were noted for low pH, low alkalinity, and elevated levels of arsenic and lead. The shallow wells (sites 58, 27, 29, and 32) continued to display a long history of exceedances due to the low pH and low alkalinity that characterize these sites located in organic rich peat sediments. Six exceedances for dissolved lead occurred at two of the three down gradient shallow wells (sites 29 and 32). These exceedances continue the recent history of low to moderate levels of lead that may in part be due to minor amounts of tailings escaping the facility due to fugitive dust or tracking. The single deep, downgradient well, Site 28, had four exceedances for arsenic."

2011 Fresh Water Monitoring Report at 1, 2.

BL.0.043

It is important to note that monitoring well Site 58 is the up gradient (background) well for Sites 27, 29 and 32. Site 58 is subject to prevailing winds at least 6% of the time, yet shows no indication of contamination from fugitive dust. *See* DEIS at 3-5, figure 3.2.2.1. Site 58 does not show any exceedances for metals, but three of the four down gradient wells from the tailings dump show exceedances for both lead and arsenic. This seems to be clear evidence that ground water quality is being affected by leaching from the current tailings pile.

Please explain why this data was not disclosed in the DEIS or any analysis conducted of the possibility of ground water contamination. If the monitoring parameters need to be improved, we request the Forest Service to do so. Otherwise, we question how the Forest Service will protect groundwater from any of the alternatives using the same design, control structures, and construction techniques applied on the existing tailings dump.

3.5.2.3 Hawk Inlet

BL.0.044

This discussion references a dispersion dye study over 30 years old used to determine the volume of water flushed through the Hawk Inlet each tidal cycle and calculate the number of tidal cycles required to completely flush the toxic pollutants continuously discharged from outfall 002 into Hawk Inlet from Hecla's Greens Creek Mine. *See* DEIS at 3-49. Absent from the DEIS, however, is any acknowledgement of the possible effects geophysical changes resulting to Hawk Inlet from ongoing glacial rebound since 1981 and the resulting effects.[16] Likewise, the Greens and Zinc Creek have presumably continued add material to their alluvial deposits across Hawk Inlet. How has this continued alluvial deposition and isostatic rebound affected the current

[15] These reports are available at: http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/
[16] *See* Post Little Ice Age Glacial Rebound in Glacier Bay and Surrounding Areas, Roman J. Motyka, 2004 at: http://fairweather.alaska.edu/chris/motyka.pdf.

Response

Comment ID: BL.0.032
Containment and control of hazardous materials is required by several permitting activities. As discussed in Section 1.8.3.3, control and containment of oil or other hazardous substances is required under Section 311 of the CWA. The USEPA requires that HGCMC prepare and maintain a Spill Prevention, Control, and Countermeasures plan that specifies storage, containment, spill responses, and reporting requirements.

Comment ID: BL.0.033
As the commenter notes, removing or reducing pyrite would diminish the propensity of the tailings to oxidize and generate acid; however, the overall benefit and effect on metals mobility is not necessarily as obvious. Likewise, there is no indication that costs or water treatment needs would necessarily be reduced over the long term.

While pyrite is a "marketable" commodity, the value of the product may not outweigh shipping costs. The same website provided by the commenter shows the price of zinc and lead concentrates at $100 to $300 per metric ton (zinc) and lead concentrate at $400 per metric ton (lead). Based on these gross, web-based estimates, the value of zinc and lead and zinc products range from 44 to 100 times the value of pyrite. The Forest Service does not have the authority to regulate the products that a particular mining operation takes to market. In this case, HGCMC would need to determine that pyrite is indeed a marketable product within the realm of its operational constraints. We would note that it is unclear from the information provided whether either the Neal Mine or Bion Fraction, Lehigh Claim are even operational mines; they do not appear to serve as model operations for pyrite production on National Forest lands.

Also see the response to Comment BL.0.032.

Comment ID: BL.0.034
Comment noted. Statements indicating that effluent from the TDF would be allowed to gravity drain to Hawk Inlet in the absence of management were removed from the EIS based on this and other comments received by the Forest Service. The NEPA analysis assumes that leachate from the TDF would need to be controlled and treated at all times, both during operations and after closure. These activities would be managed through a discharge permit.

Comment

geophysical character of Hawk Inlet? Please update the description of the existing condition of Hawk Inlet to account for these changes.

BL.0.045

The DEIS also references baseline studies prepared prior to mine development that "document marine life and to characterize existing levels of heavy metals in sediments and marine biota in Hawk Inlet." DEIS at 3-49. ADEC has noted, however, that:

> (c) Pre-mining, marine biological data collection began during the summer of 1984, and mining production began during the summer of 1989. Those data include tissue assays of mussels and marine worms for metals content. Unfortunately, the pre-mining data from 1984 to 1989 does not contain sufficient data to allow comparisons of diversity or abundance of organisms.[17]

BL.0.046

The discussion in the DEIS relating to the APDES discharge of pollutants into Hawk Inlet ends with the comment "[t]his EIS analysis can predict that the TDF discharge will exceed Alaska WQS and require a permit, but it cannot predict the conditions of a permit so far in the future." For the record, this is precisely the reason why we believe it is appropriate to evaluate the Pogo-like alternative recommended by Dr. Dave Chambers.[18]

3.5.3 Surface Water – Environmental Consequences

BL.0.047

The DEIS description of the existing regulation of wastewater pollutants (APDES discharge), discharged into Hawk Inlet out of outfall 002 is wrong. *See* DEIS at 3-52. Consequently, the effluent limits discussed in Table 3.5-6 are incorrect. Given the increase in flow permitted by the arrested APDES permit, the loading of the pollutants discharged in a given period into Hawk Inlet will increase. What is the actual amount by mass of the metals being dumped into Hawk Inlet?

BL.0.048

The DEIS notes that ". . . some values [metals concentration] recorded since mining began are higher than pre-mining years, especially near the Outfall 002 discharge site." DEIS at 3-92. The Forest Service needs to evaluate the effects of the continuous dumping of heavy metal contaminants into Hawk Inlet through outfall 002. Please explain to what extent permitted discharges from outfall 002 and unpermitted discharges, such as the 1989 concentrate spill at the loading dock, have resulted in the deposition of persistent bio-accumulative toxins in the sediments of Hawk Inlet. We request that the supplemental DEIS include this analysis.

3.7.1.1 Pre-Mining Aquatic Resource – Freshwater

BL.0.049

Juvenile fish are sampled for abundance and distribution, DEIS 2-41, Table 2.6-3. The DEIS does not disclose the on-going monitoring for whole body metal loading in fish. Instead of reporting current data on the levels of loading of metals in fish, the DEIS hides behind the statement that "[b]ecause of limited data and lack of comparability to current studies, results are

[17] Available at: http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/ak0043206commentresponse.pdf (ADEC's Response to Comments on Draft APDES No. AK0043206 at 8 (Sept. 30, 2011).
[18] *See supra* text at 2-3 and Letter from Dr. Chambers to SEACC (Nov. 18, 2011) attached to these comments.

Response

Comment ID: BL.0.035
Neither expansion of the existing TDF nor development of the alternative TDF site (alternatives C and D) would have measurable adverse impacts to minority or low-income communities. Section 3.18 has been revised to acknowledge that residents and representatives from Angoon have expressed concern over the population loss and the need for jobs in the community. This project, however, is not likely to have significant adverse or positive effects related to economic conditions in Angoon.

Comment ID: BL.0.036
Additional discussion has been included in Section 3.17.1 acknowledging that Angoon residents have identified Hawk Inlet as a sacred place because of its use as a traditional trade route, important food source, and area where traditions were taught.

Comment ID: BL.0.037
The reason that Hawk Inlet has been considered sacred is discussed in the EIS (Section 3.21, Environmental Justice). A management strategy is in place for the traditional migration corridor / trade route at the north end of Hawk Inlet (no alternative in this EIS would affect the corridor). Documentation of the oral history of the area through interviews with elders is required mitigation for Cultural and Subsistence resources (see Table 2.6-1) to addresses the historical use of the area by the current generation of elders. Subsistence Hearings were held in Hoonah on September 14, 2012, and in Angoon on November 8, 2012 (see Section 1.5.3). Current subsistence uses are described in Section 3.16.

Comment ID: BL.0.038
Comment noted. The current Waste Management Permit requires temperature monitoring in the TDF immediately before and following the closure process. Although it is not a current requirement, HGCMC has indicated that it does monitor temperature in the TDF.

Comment ID: BL.0.039
ADEC is the regulatory authority in listing impaired water bodies in the State of Alaska. ADEC's August 2012 Draft Water Quality Monitoring and Assessment Report did not propose listing any streams in the area of the Greens Creek Mine as impaired. ADEC did propose listing the water in Hawk Inlet in the immediate vicinity of the 1989 ore spill as impaired, but not the entire water body. The EIS has been modified to reflect this recent proposed listing in Section 3.7.2.1.

Comment

not reported here" DEIS 3-80. This ignores over 10 years worth whole body metals loading analysis in fish impacted by the Greens Creek Mine.

BL.0.050

Greens Creek has been monitored for metals in fish tissue at three sample stations for over 10 years. Site 48 is above mine activities (except exploration) and serves as a background monitoring site. Sites 6 and 54 are downstream of mine activities. Site 6 near the mill operations is only sampled once every 5 years, so the data set is very limited. Results of the fish tissue monitoring are reported in the Aquatic Biomonitoring at the Greens Creek Mine, 2011 Report.[19]

The report shows that metals loading in fish tissue at the downstream sites are higher than the background site. Site 54 fish display a higher average loading than the Site 48 fish (Background) except for the year 2005. Results in 2007 were also higher but within analytical limits. Data for 2011 is incomplete because of an error in the chain of custody resulted in the lab homogenizing the six samples resulting in only one data point for each metal sampled at each station. *Id.* at p. 25.

Site 6 shows higher lead levels than background in both years (2001 and 2006) where data is available. 2011 data also shows an increased level of lead over background but the data set for 2011 was compromised due to the same sampling error noted above. 2011 Aquatic Biomonitoring Report at 20, *supra* note 8.

The vast majority of downstream fish tissue samples displayed metals levels higher than the upstream, background tissue samples.

Tributary Creek below the TDF is also monitored for metals loading in juvenile fish, however Site 29 above the TDF is not monitored for metals in fish so there is no background information which to compare.

We feel that this readily available information is critical to any description of the current condition of freshwater aquatic resources and this information needs to be disclosed and analyzed in the supplemental DEIS. The Forest Service also needs to review the monitoring requirements and procedures used to be certain that the data collected is useful for showing changes to the surface waters due to mining activities.

BL.0.051

Finally, the DEIS analysis inaccurately describes the physical characteristics and stream habitat conditions for Tributary Creek. The DEIS does not disclose the significant influence of this stream's riffle and pool complexes on its habitat values. *See* DEIS at 3-81, 3-82.[20] This is critical information because, under the Section 404(b)(1) guidelines, the Corps of Engineers should attempt to avoid damaging special aquatic sites, including riffle and pool complexes. *See* 40 CFR §§ 230.3(q-1), 230.10(a)(3), 230.45. The failure to disclose and evaluate the effects of the alternatives on Tributary Creek's riffle and pool complexes violates NEPA and the Clean

[19] Available at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/gc2011bio.pdf. pages 78-81.
[20] *See* 2008 Aquatic Biomonitoring Report (http://www.adfg.alaska.gov/static/home/library/pdfs/habitat/09_02.pdf). The most recent version of this report also mentions that samples were collected from riffle areas (http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/gc2011bio.pdf).

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The commenter's letter to ADEC (September 14, 2011) has been reviewed and incorporated into the project record.

Comment ID: BL.0.040
Please see the response to Comment BL.0.023. All related text in the EIS has been changed accordingly, including maximum allowable discharges stated in Section 3.5.2.1.

Comment ID: BL.0.041
The description of wastewater management in Section 3.5.2.1 reflects improved designs as described by EDE (2010) and reflects actual current conditions. However, a brief description of improvements that were made as a result of storm events in 2007 was added to the discussion.

Comment ID: BL.0.042
The potential sources of groundwater contamination, previous mitigation activities, and current monitoring for mitigation success are disclosed in Section 3.6.2.3. This section also identifies potential impacts to groundwater that could be associated with fugitive tailings dust. As a result, the Forest Service is requiring additional fugitive dust monitoring and study, and a mitigation plan, if required, to address identified sources (Section 3.2.3.1).

Comment ID: BL.0.043
The potential sources of groundwater contamination, previous mitigation activities, and current monitoring for mitigation success are disclosed in Section 3.6.2.3. This section also identifies potential impacts to groundwater that could be associated with fugitive tailings dust. As a result, the Forest Service is requiring additional fugitive dust monitoring and study, and a mitigation plan, if required, to address identified sources (Section 3.2.3.1)

Comment ID: BL.0.044
Motyka et al. (2007) (Post Little Ice Age Rebound in the Glacier Bay Region) indicates that sea levels in Hawk Inlet are affected by approximately 1.0 centimeter (0.4 inch) per year. At this rate, it is not anticipated that tidal flushing behavior would have changed substantially since the 1981 dye dilution study. Likewise, it is not anticipated that natural sediment transport from Greens Creek or Zinc Creek would have substantially changed the Greens Creek delta or the bathymetry of Hawk Inlet.

Please see the response to Comment BL.0.008.

Comment

BL.0.051 cont

Water Act's Section 404(b)(1) guidelines. Again, preparation of a supplemental DEIS for public comment is required that contains this vital information and analysis.

The failure to disclose and evaluate the effects of the alternatives on Tributary Creek's riffle and pool complexes violates NEPA and the Clean Water Act's Section 404(b)(1) guidelines. Again, preparation of a supplemental DEIS for public comment is required that contains this vital information and analysis.

BL.0.052

3.7.2.1 Pages out of Order

Page 3-92 appears to be out of place. Please correct the page order in the supplement.

3.7.2.2 Baseline Conditions – Aquatic Resources – Marine

BL.0.053

The summary in the DEIS relating to the overall marine conditions ends with the comment "[o]verall, however, monitoring results indicate that the marine system in the vicinity is healthy." As noted above, *supra* at 13), this assertion is not supported by existing monitoring information collected on affected marine waters.

Three ocean sites in Hawk Inlet are sampled to monitor potential water quality effects from the mine. These data are used to evaluate potential changes in the Hawk Inlet marine environment. Seawater samples are collected quarterly from the sites on an outgoing tide, with the Chatham Strait sample (Location 106) collected just after low slack water (incoming tide). The two other sites are Location 107, located about mid-way east-west in Hawk Inlet and west of the ship loader facility, and Location108, located above the 002 diffuser in the mixing zone.[21] Samples at all three locations are taken at a depth of five feet. *See* 2011 Hawk Inlet Monitoring Report, Sec 2.0 (hereinafter "2011 HIMR").

Referring to the map of monitoring sampling locations, it is clear that 108 and 107 are inland from the mouth of Hawk Inlet; therefore, sampling on an outgoing tide assures that the water from the mixing zone is moving away from the sample site during sampling. *See* 2011 HIMR, Figure 1.1. The same is true for location 106. This site is seaward of the mixing zone so sampling at an incoming tide assures that the water is moving toward the mixing zone and away from 106 during sampling.

Location108 is the only sampling station near the mixing zone. The CORMIX runs performed by ADEC show that the plume of contaminants "traps close to the sea floor at 1-3m (3-9 ft) off the bottom and is approximately 1 m (3 ft) thick."[22] Given the depth of Hawk Inlet at 45 feet, sampling at 5 feet would miss the plume by a minimum of 28 feet.

[21] Mixing Zones must be monitored to assure that ambient water conditions are met at the edge of the mixing zone. *See* USEPA, *Technical Support Document for Water Quality-based Toxics Control.* (1991). Applicable ADEC regulations also require a mixing zone to be "as small as practicable" and that "water quality criteria must be met at the boundary of the mixing zone." *See* 18 AAC 70.240(a)(2); 70.255 (b)(Register 166, July 2003). For the record, although DEC later amended these mixing zone regulations, those changes have not been approved by EPA.

[22] *See* ADEC's 11-11-11 Response to CORMIX Modeling PRR at 19; *see also* ADEC's 12-23-11 Response to 2nd CORMIX Modeling PRR. SEACC has attached both of these documents and request they be incorporated into this project's planning record.

SEACC Comments on Greens Creek Mine
Tailings Dump Expansion DEIS, June 4, 2012 17

Response

Comment ID: BL.0.045
Comment noted. Marine fish and shellfish resources are summarized in Section 3.7, which cites the 2003 EIS (USFS 2003) for details. Additional details are not needed for analysis because alterations in marine discharge of treated water are not part of this decision. Issues related to the marine discharge of treated water were addressed in the earlier EIS (USFS 2003).

Comment ID: BL.0.046
Please see the responses to comments BL.0.007 and BL.0.008. The letter submitted (Chambers, September 18, 2011) has been reviewed and incorporated into the record.

Comment ID: BL.0.047
Please see the response to Comment BL.0.023.

Comment ID: BL.0.048
The discussion in the EIS was modified in Section 3.7.2.2 to reflect that the only noted increase at Site S-1 near Outfall 002 was for lead, where lead concentrations in sediments were 8.17 mg/kg prior to mining and averaged 8.80 mg/kg during mining. This increase is less than the natural variation as reflected by the standard deviation of 4.58.

To put loading into context, 2010 average flow and monitoring data were used to compare the natural loading of metals from Greens Creek to Hawk Inlet versus the loading of metals through the 002 outfall. Based on this comparison, the average natural loading of dissolved zinc from Greens Creek to Hawk Inlet in 2010 was 1.26 pounds per day. The average 2010 loading of total zinc through the 002 outfall to Hawk Inlet was 0.37 pound per day, approximately 60% less than the natural rate of loading.

Comment ID: BL.0.049
Section 3.7.1.1 presents pre-mining freshwater aquatic resources details. Recent and ongoing monitoring that occurs concurrently with mining and milling operations does not reflect pre-mining conditions. The statement cited in the comment (referring to the data as "limited") refers to the data collected prior to mining, not the data collected since mining began. Recent metals concentration monitoring in Dolly Varden, collected since 2001, is fully summarized in Section 3.7.2.1 of this EIS. Table 2.6-3 notes required juvenile fish sampling, including subsamples analyzed for chemistry.

Comment

BL.0.053

For more than ten years, mixing zone monitoring has been performed at ADEC-approved sampling location 106 to assure that water quality outside the mixing zone is protected, and the permit maintains monitoring station 106 as the site for mixing zone monitoring. *See* Final Fact Sheet for APDES AK0043206, *supra* note. 6, at 6.4. Later in the same document sampling location 106 is described as "represent[ing] background conditions." *Id.* at 6.5. Sampling location 106 cannot serve both functions. Regardless, location 106 is located west of Hawk Point and over half a mile from the edge of the mixing zone. *Id.* Figure 2 at p.33.

Locations 107 and 108 are described in the FFS (6.5) as the sites influenced by the diffuser. Location 107 is described as being "mid Hawk Inlet off cannery" and appears to be almost 1 mile from the edge of the mixing zone. *See* Final Fact Sheet for APDES AK0043206, *supra* note 6, Figure 2 at p. 33). It appears location 108 is the only sample station anywhere near the edge of the mixing zone, where water quality criteria must be met yet it is described as being located above the diffuser. *See* 2011 HIMR (at 2.2). Therefore, location 108 is not sited in an appropriate location for determining whether water quality criteria are met at the edge of the mixing zone.

3.7.3.3 Effects of Alternative B, Proposed Action

BL.0.054

"Several metrics were used to assess likely effects of the existing discharge and loading operations on the marine biotic environment" DEIS at 3-101. The extent of the contamination that resulted from an accidental spill that occurred during the loading of concentrate onto a barge in 1989 into Hawk Inlet has never been determined. Oceanus (2003) notes that metals concentrations at S-4, S-5N, and S-5S , in the area of the 1989 spill often exceed the lower ERL (effects range low) guideline levels and occasionally exceeded the higher effects ERM (effects range medium) guidelines. *See* DEIS at 3-93. The fact that all sample sites and events associated with the 1989 concentrate spill show exceedances demonstrate that the boundaries of the contaminated area remain undefined; therefore, the resulting impacts to Hawk Inlet are unknown. We would request that the Forest Service collect and analyze samples from intervals outward from the center of the spill in two directions to determine the extent of the spill. Furthermore, it is noted in the Hawk Inlet Monitoring Report (section 3.2) that "Prop wash from ore ships and associated tug boats continues to both re-suspend these pockets [of contamination] and also mix them with natural sediments."[23]

Without determining the boundaries of continued contamination resulting from this spill, the Forest Service cannot accurately describe the extent of either the contamination or the impacts to the aquatic community. None of the sites sampled show levels of contamination at or near background levels that would delineate the outward extent of the contamination. Is the response plan for future spills, should they occur, to be a partial clean up and minimal monitoring, like has occurred since 1989?

[23] Available at: http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/gchawk2011.pdf.

SEACC Comments on Greens Creek Mine
Tailings Dump Expansion DEIS, June 4, 2012 18

Response

Comment ID: BL.0.050
Available information on the monitoring, including statistically significant conditions, is summarized in Table 3.7-4 and discussed in Section 3.7.2.1. The EIS description accurately describes the current metals concentrations in these fish. The monitoring program was designed by state and federal resource agencies, including ADF&G, and is conducted by ADF&G with support from the Forest Service and the operator.

Effects to aquatic resources from expansion of the existing TDF would be greatest in Tributary Creek. The report *Aquatic Biomonitoring at the Greens Creek Mine, 2011 Report* (ADF&G 2012) concludes that whole-body metals concentrations in juvenile Dolly Varden char collected in 2011 were not significantly different compared to data from previous years and, overall, the data suggest a productive aquatic community at Site 9.

In Greens Creek, outside the TDF expansion area, the report (ADFG 2012) further concludes that fish tissue metals concentrations were similar in 2011 to those observed in previous years. Further, it states that, overall, samples collected in 2011 suggest a healthy aquatic community at Site 54. Recent recommendations from ADF&G for modification of the aquatic biomonitoring program included in the 2011 report (ADF&G 2012) are being considered.

Comment ID: BL.0.051
Pool and riffle features have been added to the description of Tributary Creek in section 3.7.1.1. The quality of the habitat that could be lost is considered in the estimate of coho salmon smolt production, which is quantitative in its assessment.

Comment ID: BL.0.052
The top of page 3-92 in the DEIS actually began a new subsection, the title of which was cut off during the document production process. That subsection is titled "Metals in Sediment in Hawk Inlet." This error has been corrected in the FEIS.

Comment ID: BL.0.053
Comment noted. The statement is valid based on the information reviewed in developing the EIS. The existing Hawk Inlet monitoring requirements were established by the USEPA and ADEC in the 2005 NPDES permit (AK0043206), following a public process. It was administratively extended in 2011. The ADEC is in the process

Comment

3.17 Cultural Resources

BL.0.055

This discussion does not explain the methodology used to evaluate the effects of the project alternatives on cultural resources. Although the DEIS notes oral histories "recounts of villages being crushed under the ice of advancing glaciers," no mention is made of the affect of subsequent isostatic rebound on the physical location of cultural resources from the so-called Transitional stage. *See* DEIS at 2-230. Consequently, surveys of lower elevations are unlikely to find evidence of habitation sites from this period or adequately evaluate the impacts of this proposal's alternatives on cultural resources.[24]

3.19 Monument Values

BL.0.056

Contrary to the requirements of Sections 503 and 504 of ANILCA, all of the action alternatives will irreparably harm Monument values by resulting in the "permanent loss" of catalogued salmon habitat. The proposed action – Alternative B – causes the greatest permanent loss: 1646 feet of Class I stream habitat and 2400 feet of Class II stream habitat, both in Tributary Creek. These habitats contain a variety of anadromous and resident fish species that constitute a significant part of the "exceptional distribution of animal species" for which Admiralty Island is justly famed. Presidential Proclamation 4611 (Dec. 1, 1978). As President Carter stated in his proclamation "[p]rotection of the entire island . . . is necessary to *preserve intact* the unique scientific and historic objects and sites located there." *Id.* (emphasis added).

Tributary Creek is rearing habitat for coho salmon and spawning habitat for coho, chum, and pink salmon. DEIS at 3-169. These salmon constitute an essential part of the local food chain and help support the "highest documented density of breeding bald eagles in North America." *Id.* at 3-151. These eagles depend on fish and are therefore "susceptible to water quality impacts that adversely affect their prey populations." *Id.* at 3-152. The Island also supports "one of the highest densities of brown bears in North America." DEIS at 3-149. The bears also depend on salmon and would be adversely impacted by permanent stream habitat loss because they "avoid areas used by other bears *and by humans*" and do not make "optimal use of available salmon resources in *heavily altered landscapes*." *Id.* at 3-150 (emphases added). The DEIS suggests that loss of salmon streams, "even less productive streams," has a far greater impact on the brown bears than the equivalent loss of land habitat. *Id.*

Based on a map of Alternative B, more than half of the total length of Tributary Creek would be permanently destroyed by filling one part with tailings and converting another part to a "water management pond." Moreover, Alternative B would result in the loss of 22 percent of the Tributary Creek watershed, which in turn affects Zinc Creek, into which Tributary Creek flows. Compared with the "no action" alternative, the proposed expansion would result in decreased water flow, although the exact amount of the expected decrease is vaguely and inadequately described in the DEIS. Alternatives C and D also result in decreased water flow compared with the "no action" alternative.

[24] *See* Baichtal, J.F., and R.J. Carlson 2010. "Development of a Model to Predict the Location of Early-Holocence Habitation Along the West Coast of Prince of Wales Island and the Outer Islands. Current Research in the Pleistocene Volume 27: 64-67.

Response

of reissuing the permit for the Greens Creek Mine under the APDES permit program; this process will include a public notice and comment period. This process could also result in changes to Hawk Inlet monitoring. Please see the response to Comment BL.0.008.

The records submitted (email and letter from ADEC) have been reviewed and incorporated into the record.

Comment ID: BL.0.054
The EIS describes the Hawk Inlet Monitoring Program, which requires regular monitoring of water quality, sediments, mussels, and worms at various locations in the inlet. The monitoring is required by ADEC.

ADEC's August 2012 Draft Water Quality Monitoring and Assessment Report did propose to list just the portion of Hawk Inlet in the immediate vicinity of the 1989 ore spill as impaired but not the entire water body. The EIS has been modified in Section 3.7. 2.2 to reflect this recent proposed listing.

Since the spill did not occur on Forest Service lands we do not have jurisdiction over how contamination would be remedied. A determination of whether a cleanup is warranted and the extent to which it would need to be conducted is under the jurisdiction of ADEC. The fact that elevated levels of metals are present in the area of the spill that occurred in 1989 does not provide the Forest Service any additional data that would be useful in selecting among the alternatives under consideration in this NEPA action.

Comment ID: BL.0.055
Additional detail has been provided in Section 3.17.2 to describe the survey work done to establish baseline conditions. The quoted statement refers broadly to conditions in Southeast Alaska. The potential impact areas in the project area have already been surveyed for cultural resources directly; consequently, the relevance of isostatic rebound in affecting the detection or occurrence of potential sites is minimal.

Comment ID: BL.0.056
Section 3.19.3 addresses effects to fish and wildlife resources in the Monument. As noted in the EIS, the expansion of the existing tailings under any alternative would represent about 1/100th of 1 percent of the total Monument area. Local effects to fish and wildlife

Comment

BL.0.056cont.

Overall, these consequences to surface waters within the Monument proposed in Alternative B would cause permanent loss of salmon, affecting important bald eagle and brown bear populations and undermining "the largest unspoiled coastal island ecosystem in North America." Presidential Proclamation 4611. Even under the "no action" alternative, water treatment in the area will be necessary for at least 100 years and potentially in perpetuity. The additional, irrevocable loss, and adverse impact upon, stream habitats would produce irreparable harm to the Monument's values of protecting objects of ecological and geological interest, and fish and wildlife values. This harm would be actual, imminent, substantial, and of long or permanent duration and therefore in contravention of section 503(i) and 504(f) of ANILCA.

3.23 Irretrievable and Irreversible Commitment of Resources

BL.0.057

Lastly, we must express our surprise and dismay on the failure of the Forest Service to identify the proposed permanent loss of salmon habitat in Tributary Creek and Fowler Creek from selection of one of the action alternatives as an irretrievable and irreversible commitment of resources. Even if one assumes that improvement of fish passage in Greens Creek will create new salmon habitat, such an outcome does not change the fact that expansion of Hecla's tailings dump will result in the permanent loss of salmon habitat in contravention of sections 503, 504, and 505(a) of ANILCA.

Conclusion

BL.0.058

Thank you for your careful attention to these comments and the information submitted for the planning record. As noted above, we believe the best way for the Forest Service to address the substantive deficiencies we have identified in the DEIS is to prepare a supplemental DEIS for additional public comment and review. Such a supplement will advance NEPA's purposes to promote efforts which will prevent or eliminate damage to the environment and to ensure informed and transparent environmental decision making.

Best Regards,

Buck Lindekugel
Grassroots Attorney

Guy Archibald
Mining & Water Quality Organizer

SEACC Comments on Greens Creek Mine Tailings Dump Expansion DEIS, June 4, 2012 20

Response

(including bears and eagles) are presented in sections 3.7 and 3.11, respectively.

Based on the ADF&G's catalogued fish streams, there are 1,665,917 feet of anadromous streams on Admiralty Island. The proposed action, Alternative B, would impact approximately 1,646 feet of Tributary Creek, an anadromous fish stream. The 1,646 feet of impacted anadromous fish stream accounts for 0.098% of the total cataloged anadromous fish streams on Admiralty Island and does not include all the uncataloged streams.

Comment ID: BL.0.057
Table 3.23-1, page 3-288 of the DEIS included the direct habitat loss of about 4,000 linear feet of streams (Class I and II combined) by burial for Alternative B. Table 3.23-1 in the FEIS has been revised to include the Class II habitat lost for alternatives C and D in the Fowler Creek drainage.

Please note that a fish passage facility on Greens Creek will be repaired as mitigation for the loss of salmon habitat in the Tributary or Fowler Creek drainage.

Comment ID: BL.0.058
Comment noted. The Forest Service believes that the DEIS provides the hard look at a range of alternatives as required by NEPA and that a supplemental draft is unwarranted.

Comment

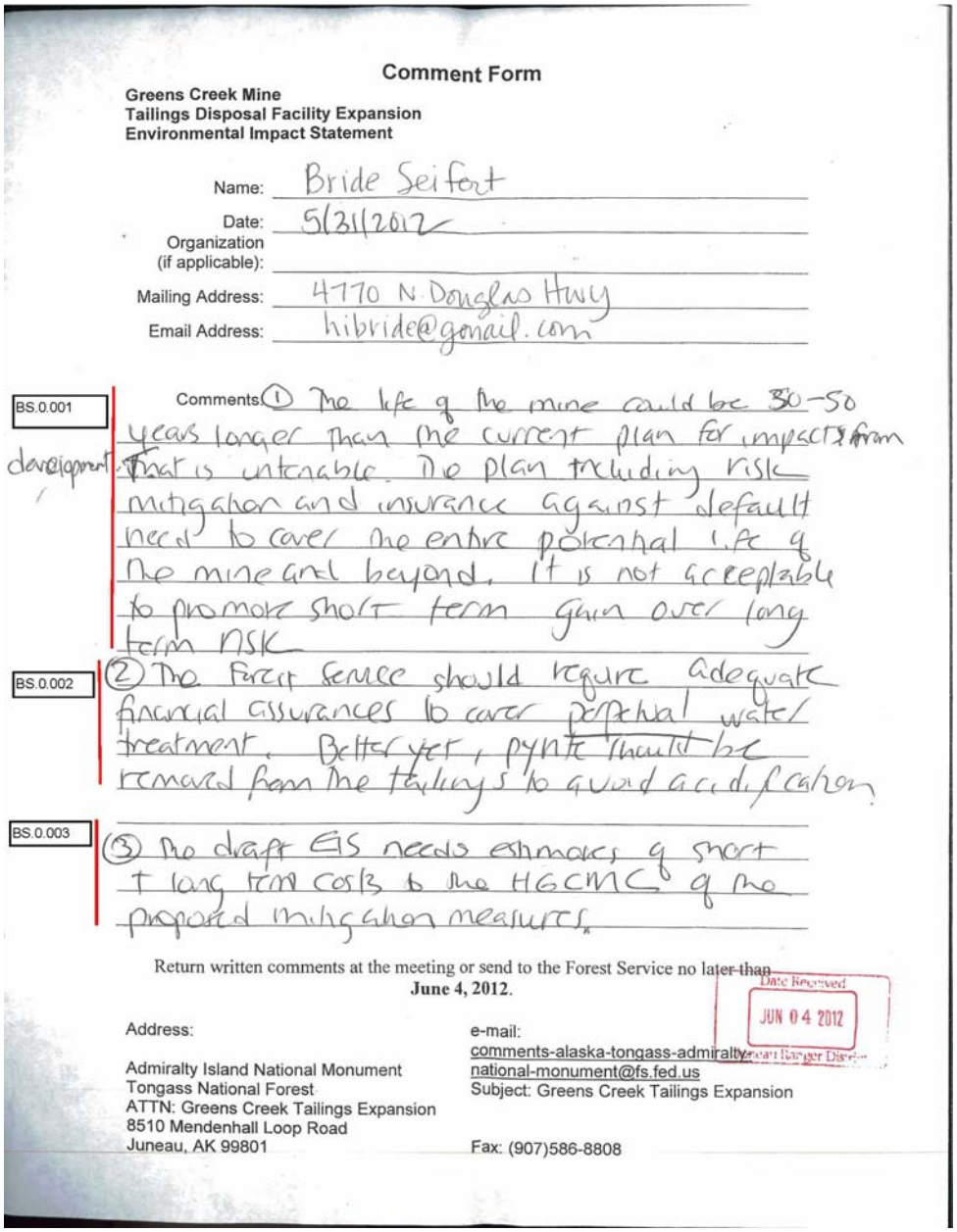
Response

ATTACHMENTS TO SEACC'S COMMENTS
ON GREENS CREEK MINE TAILINGS DUMP EXPANSION DEIS
JUNE 4, 2012

The documents listed below were combined into a PDF Portfolio and submitted with our comments on the Greens Creek Mine Tailings Dump Expansion DEIS.

1. Power, The Role of Metal Mining in the Alaskan Economy (2002)
2. Letter from SEACC to Monument Ranger VanOrmer (Dec. 9, 2011).
3. SEACC's Informal Request for Review of APDES AK0043206 (Oct. 13, 2011)
4. SEACC's Statement in Support of Request for Informal Review (Oct. 13, 2011
5. Director Bonnet's response to SEACC (Oct. 28, 2011)
6. Letter from Dr. David M. Chambers of the Center for Science in Public Participation to SEACC (Nov. 18, 2011)
7. Letter from SEACC to ADEC APDES WWP Manager Morgan (Dec. 8, 2011)
8. Memo from Timothy, ADF&G Southeast Regional Supervisor (Sept. 26, 2011)(detailing observed leaching from legacy production rock at Site C into Greens Creek)
9. Gilliam, REVISED Greens Creek Mine Proposed Tailings Disposal Facility Expansion (Feb. 29, 2012)
10. Letter from Archibald, SEACC to Grant, ADEC (Sept. 14, 2011)(SEACC's Nominations for 303d Listing)
11. ADEC's 11-11-11 Response to CORMIX Modeling PRR at 19; *see also* ADEC's 12-23-11 Response to 2nd CORMIX Modeling PRR
12. ADEC's 12-23-11 Response to 2nd CORMIX Modeling PRR

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Bride Seifert
Date: 5/31/2012
Organization (if applicable):
Mailing Address: 4770 N. Douglas Hwy
Email Address: hibride@gmail.com

BS.0.001

Comments: ① The life of the mine could be 30-50 years longer than the current plan for impacts from development. That is untenable. The plan including risk mitigation and insurance against default need to cover the entire potential life of the mine and beyond. It is not acceptable to promote short term gain over long term risk.

BS.0.002

② The Forest Service should require adequate financial assurances to cover perpetual water treatment. Better yet, pyrite should be removed from the tailings to avoid acidification.

BS.0.003

③ The draft EIS needs estimates of short & long term costs to the HGCMC of the proposed mitigation measures.

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012.**

Date Received
JUN 04 2012
Stewart Ranger District

Address:
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment ID: BS.0.001
This EIS evaluates the 30- to 50-year mine life proposed by the mine operator. Operations beyond this time frame are not reasonably foreseeable; however, sections 3.22.1 and 3.22.2, Cumulative Effects, have been revised to state that mining could potentially continue until 2095, as authorized by the Greens Creek Land Exchange Act. The process for establishing financial assurance for the long-term closure of the site is discussed in Section 1.8.3.1 and Appendix B.

Comment ID: BS.0.002
The process for establishing financial assurance for the long-term closure of the site is discussed in Section 1.8.3.1 and Appendix B.

The Forest Service considered pyrite removal in previous NEPA actions and for this tailings expansion EIS and determined that it was not a reasonable alternative to carry forward for detailed analysis. Section 2.5.3 of the DEIS explains that pyrite removal was eliminated from further consideration due to the logistical and operational constraints of placing the required facilities at the current mill site and the risk to water quality and aquatic life that comes with handling chemically reactive pyrite material.

Comment ID: BS.0.003
The regulations in 36 CFR 228.80(c)(ii) require the authorized officer to consider the long- and short-term costs of mitigation measures in terms of the economic viability of the operations. The regulation does not indicate that this consideration must be included as part of the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures would jeopardize the economic viability of the Greens Creek operation.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 10:43 AM
To: Cox, David; Weglinski, Gene
Cc: Samuelson, Sarah J -FS
Subject: FW: Comments

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Corey Baxter [mailto:cbaxter@iuoe302.org]
Sent: Monday, June 04, 2012 9:33 AM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Comments

CB.0.001

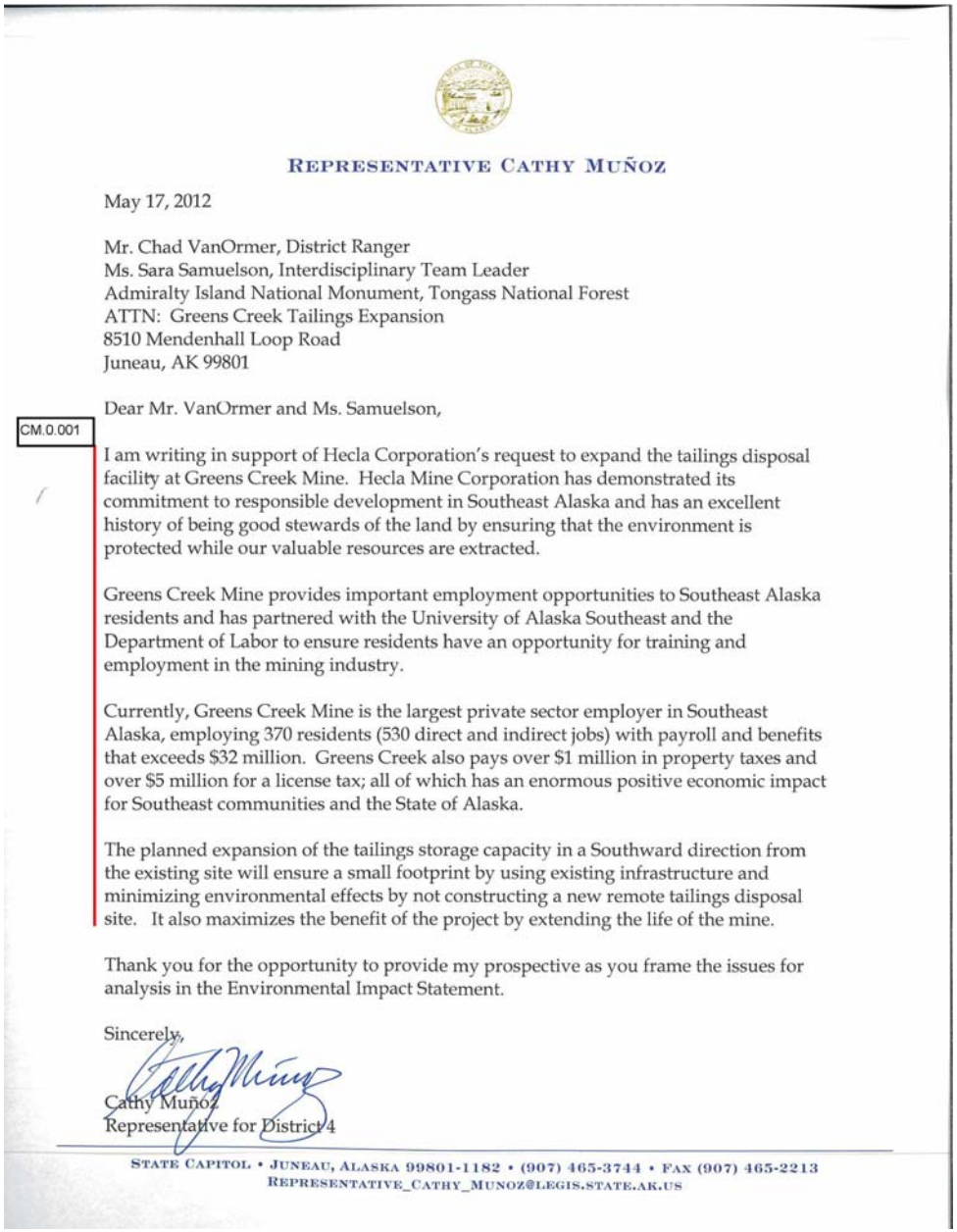
The Greens Creek Mine has operated in an environmentally responsible manner on Admiralty Island for the past 25 years. In order for the company to continue to be successful, and to contribute meaningfully to our regional economy, it needs to expand its dry stack tailings disposal site. I believe that Alternative B, the alternative recommended by HGCMC, is the most environmentally sound and economically feasible plan for this expansion. This alternative reduces the size of the potential impact, and keeps all the tailings together in the same location. HGCMC intends to use the same disposal methods and management procedures as they have used in the past, methods and procedures approved by all regulatory agencies with jurisdiction over this mine. The operating Engineers Local 302 are in full support of Alternative B. Thank you

Corey Baxter
District 8 Representative
Operating Engineers Local 302
9309 Glacier Hwy. Bldg A-105
Juneau, AK 99801
cbaxter@iuoe302.org
Office (907)586-3850
Cell (907)321-4271
Fax (907)463-5464

Response

Comment ID: CB.0.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment



REPRESENTATIVE CATHY MUÑOZ

May 17, 2012

Mr. Chad VanOrmer, District Ranger
Ms. Sara Samuelson, Interdisciplinary Team Leader
Admiralty Island National Monument, Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Dear Mr. VanOrmer and Ms. Samuelson,

CM.0.001

I am writing in support of Hecla Corporation's request to expand the tailings disposal facility at Greens Creek Mine. Hecla Mine Corporation has demonstrated its commitment to responsible development in Southeast Alaska and has an excellent history of being good stewards of the land by ensuring that the environment is protected while our valuable resources are extracted.

Greens Creek Mine provides important employment opportunities to Southeast Alaska residents and has partnered with the University of Alaska Southeast and the Department of Labor to ensure residents have an opportunity for training and employment in the mining industry.

Currently, Greens Creek Mine is the largest private sector employer in Southeast Alaska, employing 370 residents (530 direct and indirect jobs) with payroll and benefits that exceeds $32 million. Greens Creek also pays over $1 million in property taxes and over $5 million for a license tax; all of which has an enormous positive economic impact for Southeast communities and the State of Alaska.

The planned expansion of the tailings storage capacity in a Southward direction from the existing site will ensure a small footprint by using existing infrastructure and minimizing environmental effects by not constructing a new remote tailings disposal site. It also maximizes the benefit of the project by extending the life of the mine.

Thank you for the opportunity to provide my prospective as you frame the issues for analysis in the Environmental Impact Statement.

Sincerely,

Cathy Muñoz
Representative for District 4

STATE CAPITOL • JUNEAU, ALASKA 99801-1182 • (907) 465-3744 • FAX (907) 465-2213
REPRESENTATIVE_CATHY_MUNOZ@LEGIS.STATE.AK.US

Response

Comment ID: CM.0.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment

JUNEAU CHAMBER OF COMMERCE

3100 Channel Drive, Suite 300 • Juneau AK 99801• (907) 463-3488 • Fax (907) 463-3489
E-mail: iuneauchamber@eci.net • icc@alaska.com • Web site: http://www.iuneauchamber.com

Admiralty Island National Monument-Tongass National Forest
8510 Mendenhall Loop Road
Juneau, Alaska 99801

RE: Greens Creek Tailings Expansion

CR.0.001

On behalf of the directors, nearly 400 business members and officers of the Juneau Chamber of Commerce we would like to strongly support the "Greens Creek Tailings Facility Expansion Plan", Alternative B, which we agree is the most environmentally sound, technically feasible, and economically viable alternative analyzed in the EIS.

CR.0.002

Over the last 25 years Greens Creek Mine has grown to be the largest private sector employer in Juneau with 370 employees, 90% of the 75% Alaska residents who work at the mine reside in SE Alaska and their payroll including benefits reached $47 million last year and they were the largest property tax payer in Juneau. Additionally and most critical to the business community is that their total direct spending in SE Alaska on goods and services totaled $27 million. When a local non- profit organization or charity calls on Greens Creek for help they are right at the front of the line with not only money but volunteers as well.

Recently Hecla Greens Creek Mining gave $300,000 to University of Alaska (UAS) to help fund "Pathways to Mining Careers" and The UAS Center for Mine Training Career Education. Due to a projected 14% decline in SE Alaska's population over the next 20 years the Juneau Chamber has made it a top priority to help come up with solutions to retain our youth here in Juneau as they move into adulthood and begin their careers and families. Jobs at Greens Creek are some of the highest paying jobs in Juneau which make living in one of the least affordable cities in Alaska once again affordable to raise a young family in. This is not because the cost of living has gone down!

In 2003 the Forest Service approved a "Tailings Facility Expansion" for Greens Creek that was projected, by them (Greens Creek), to last 22 years, and here's the kicker every business would love to be able to report; *business is booming,* daily tonnage has increased to such a degree that they will have grown out of their current facility in less than half of the projected timeline. Another point of importance is that due to additional clean- up efforts at the site they have also been stacking waste rocks at the facility as well. Greens Creek miners have remained successful in managing their tailings facility in an environmentally sound and safe manner for many, many years. It is our hope that they will be allowed to continue for very many more. Reclamation efforts at Greens Creek have also been very successful, yes grass, vegetation and trees do grow back with proper care and effort. Wildlife continues to thrive on Admiralty Island.

We believe that the Greens Creek Mine's proposal to expand their tailings facility, (Greens Creek Tailings Facility Expansion Plan, Alternative B) is critical to the economic future of not only Juneau but to all of SE Alaska. We just can't afford to lose Greens Creek, it would be extremely damaging to our business community, economy, population, spirit and future.

Sincerely,

Cathie Roemmich, CEO
Juneau Chamber of Commerce

Date Received
MAY 15 2012
Juneau Ranger District

Response

Comment ID: CR.0.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment ID: CR.0.002
Comment noted. The EIS presents a discussion of socioeconomic effects of the alternatives in Section 3.18. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment

From: Cade Smith
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: "Greens Creek Tailings Expansion"
Date: Thursday, May 31, 2012 1:24:46 PM

CS.0.001

I am in favor of the expansion of the Greens Creek tailings dam. Please approve the project as soon as possible. The mine at Greens Creek provides excellent jobs and they are good citizens in the Juneau area. This country would not be the great place that it is to live without the mining industry, the jobs they provide and the products they produce.

Cade Smith
Juneau, Alaska

Response

Comment ID: CS.0.001
Comment noted. Please note that there is no tailings dam at the Greens Creek Mine; the tailings are disposed of in a "dry stack," as discussed in Section 2.4.3.1. The socioeconomic effects of the project are presented in Section 3.18.3.

Comment

From: Deryl Box
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: "Greens Creek Tailings Expansion"
Date: Thursday, May 31, 2012 1:09:05 PM

DB.0.001

I am in favor of the expansion of the Greens Creek tailings dam. Please approve the project as soon as possible. The mine at Greens Creek provides excellent jobs and they are good citizens in the Juneau area. This country would not be the great place that it is to live without the mining industry, the jobs they provide and the products they produce.

Thank you,

Deryl A. Box
570 Kentshire Drive
Fairbanks, AK 99709

Cell 907-460-2537
e-mail d.box@cmiak.com

Response

Comment ID: DB.0.001

Comment noted. Please note that there is no tailings dam at the Greens Creek Mine; the tailings are disposed of in a "dry stack," as discussed in Section 2.4.3.1. The socioeconomic effects of the project are presented in Section 3.18.3.

Comment

CENTER for SCIENCE in PUBLIC PARTICIPATION
224 North Church Avenue, Bozeman, MT 59715
Phone (406) 585-9854 / Fax (406) 585-2260 / web: www.csp2.org / e-mail: csp2@csp2.org
"Technical Support for Grassroots Public Interest Groups"

June 4, 2012

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801
comments-alaska-tongass-admiralty-national-monument@fs.fed.us

U.S. Army Corps of Engineers
Alaska District, Regulatory Division
ATTN: Heidi Firstencel
Juneau Field Office
8800 Glacier Highway, Suite 106
Juneau, AK 99801
heidi.x.firstencel@usace.army.mil

Re: Comments on the Draft Environmental Impact Statement Greens Creek Mine Tailings Disposal Facility Expansion

The Center for Science in Public Participation provides technical advice to public interest groups, non-governmental organizations, regulatory agencies, mining companies, and indigenous communities on the environmental impacts of mining. CSP2 specializes in hard rock mining, especially with those issues related to water quality impacts and reclamation bonding.

SECTION-SPECIFIC COMMENTS

Section 2.3.3 Alternative C: New TDF Located Outside Monument

Alternative C would involve placement of the final cover and revegetation of the existing TDF with closure of the final active disposal areas as soon as possible following tailings placement (beginning in approximately 3 years).

DC.0.001 The cover design for the tailings and waste rock is innovative. However, because it is innovative, there are likely to be some surprises associated with a new design. From a long-term closure standpoint there would be a significant advantage to closing the existing TDF under Alternative C so that the effect of the cover design on inhibiting AMD could be evaluated for an additional 10 years, as compared to the preferred Alternative D, before complete mine closure. Having the mine operator onsite to monitor and make engineering changes would be advantageous.

Section 2.4.4 Water Management

DC.0.002 Collected process wastewaters are treated at the Pond 7 Wastewater Treatment Plant to meet effluent limits identified in the APDES permit prior to discharge through a diffuser outfall located in Hawk Inlet.

Response

Comment ID: DC.0.001
Comment noted. The previous operator of the site, Kennecott Greens Creek Mining Company, installed a 2-acre test cover of the design over a portion of the waste rock dump in 2000. That cover's performance was monitored regularly and documented in Hopp, Giesen, and McDonnell (2010). Hopp, L., T. Giesen and J. McDonnell. 2010. Hydrological Performance of Cover Systems at the Greens Creek Mine: Combined Field-Modeling Analysis. Final Project Report. Oregon State University. Corvallis OR.

We agree that Alternative C would provide an additional 10 years of data on the behavior of acid generation in the dry stack while the operator continued mining and disposal activities on site. However, the test cover should help minimize the potential for surprises regardless of the alternative selected.

Comment ID: DC.0.002
Comment noted. The EIS has been modified throughout to reflect that the issuance of the APDES permit was stayed by ADEC. The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others referring to the permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDEs permit is reissued.

Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations."

For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA. The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment

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DC.0.002 The Greens Creek Mine was permitted in 1983, and limits for the discharge into Hawk Inlet are based on minimum treatment procedures (New Source Performance Standards) developed by EPA in 1982. Even though treatment technologies have advanced significantly in the past 30 years, the APDES permit renewed by ADEC in November, 2011, still allows a discharge of wastewater into Hawk Inlet at the same limits as originally determined/permitted in 1983.

DC.0.003 The discharge at New Source Performance Standards limits is acutely toxic to aquatic organisms, and requires a mixing zone in Hawk Inlet. The performance of the mixing is determined by a computer model. Actual water quality measurements are taken only once a quarter. None of the water quality measuring stations are at the edge of, or in, the mixing zone.

The mixing zone in Hawk Inlet is a 3-dimensional feature that is influenced by tides and the instantaneous volume of the discharge. Even if a water quality measuring station were located on the edge of the mixing zone it would be very difficult to actually verify the effectiveness of the mixing. The grab samples being collected at sampling points outside the mixing zone on a quarterly basis are not adequate to measure the effects of the mixing zone.

DC.0.004 An example of a more sophisticated and effective treatment approach can be seen at the Pogo Mine near Delta Junction, Alaska, where an "off-river treatment" brings the Pogo wastewater up to aquatic water quality standards before it is discharged. Not only does this eliminate any concern for potential effects in a "mixing zone" in the receiving waterbody (the Goodpaster River), but it also allows accurate measurements to be made at the point of discharge.

DC.0.005 ***Recommendation: If the wastewater discharge into Hawk Inlet were updated with 21st century treatment methods, like an "off-inlet treatment" approach, regulatory certainty could be achieved, and unintended impacts in the mixing zone could be avoided.***

Section 2.4.8 Reclamation and Closure

DC.0.006 The present reclamation bond for the Greens Creek mine is $30,455,000. (DEIS, Appendix B, p. B-8)[1] This is essentially an inflation update of the reclamation bond approved for ADEC Solid Waste Management Permit 0211-BA001, which was issued in November, 2003, and administratively extended in October, 2008.[2]

For the 2003 Solid Waste Permit bond calculations it appears that it was assumed water treatment would be needed for only 7 years after mine closure.[3]

DC.0.007 The timeline for post-closure water treatment has changed significantly since the Solid Waste Permit and post closure financial surety were last updated.[4] In the current DEIS it is noted:

> *"A comparison of the predicted water quality of the tailings wastewater at the TDF boundary and in the wet wells with the Alaska fresh WQS indicates that the Alaska fresh WQS would not be met for iron, manganese, zinc, sulfate, and total dissolved solids even several years after closure. It also indicates that the wastewater at the TDF boundary would not meet the Alaska marine WQS for manganese and zinc. These data indicate that* ***water treatment would be required at least 100 years after closure of the TDF(s), perhaps in perpetuity****." (DEIS, p. 3-58)* ***(emphasis added)***

[1] Draft Environmental Impact Statement Greens Creek Mine Tailings Disposal Facility Expansion, USDA Forest Service, by Tetra Tech, April 2012
[2] http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/index.htm, viewed 28May12.
[3] see Response to Comments -Kennecott Greens Creek Mine Waste Management Permit #0211-BA001, William D. McGee, ADEC, 7 Nov03, pp. 5-7
[4] CSP2 had suggested this possibility in comments to ADEC in 2003on the financial surety required for the Greens Creek Solid Waste Permit.

Response

Comment ID: DC.0.003
Please see the response to Comment DC.0.002.

Comment ID: DC.0.004
Please see the response to Comment DC.0.002. The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 CFR 228.8(h)). As such, the EIS does not consider alternative discharge or treatment scenarios.

Comment ID: DC.0.005
Comment noted. Please see the responses to comments DC.0.002 and DC.0.004.

Comment ID: DC.0.006
The DEIS acknowledges in Appendix B that the current reclamation bond needs to be updated to take into account the TDF expansion and the newly identified need for long-term water treatment. The DEIS contains an extensive discussion of the components that will be required of the updated financial assurance and the process that the Forest Service and State of Alaska follow to do this.

Comment ID: DC.0.007
As noted in the comment, the recent environmental audit (SRK 2009) identified a concern regarding the uncertainty in the need for long-term water treatment. Based on that concern, SRK recommended that the site should continue to collect the data needed for assessing long-term water quality treatment, treatment requirements, and treatment options.

The EIS identified the need for long-term water treatment. Thus, financial assurance for long-term water treatment will be required. This is reflected in the EIS (see sections 2.4.8.2, 3.4.4, and 3.5.3.1 and Appendix B). See the response to Comment DC.0.008 regarding the difficulty of including a cost estimate in the EIS. The reclamation and closure plan and financial assurance will be updated as a separate process following, and based on direction in, the Record of Decision.

Comment

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The increased time required for water treatment will significantly increase the cost of the financial surety.

DC.0.007

The 7-year treatment timeline also applies to the calculations done for the current Reclamation and Closure plan in Appendix F, which was developed by Kennecott in 2008.

> *"HGCMC has submitted revisions to its approved reclamation and closure plan to the Forest Service and the State of Alaska. HGCMC assumes that a substantial amount of site-specific reclamation experience and performance data would be available at final closure. ... The current reclamation and closure plan is included in Appendix F." (DEIS, p. 2-25)*

Although no cost calculation details are provided in Appendix F, the estimate for the reclamation bond in Appendix F (table labeled 'Reclamation Cost Revision Summary') is approximately $44 million. When long term water treatment is included in these calculations, this cost could easily double.

If the reclamation and closure estimate is off by 10-20 percent, there is a significant financial risk to taxpayers should the mine go bankrupt. In its 2009 Environmental Audit, SRK Consultants noted that "*The need for long-term water treatment represents the greatest uncertainty in the Reclamation Plan and cost estimate.*" (SRK, 2009, p. 112)[5] SRK also noted several other potentially significant discrepancies with the Reclamation and Closure Plan, including the fact that indirect management costs were low (SRK, 2009, p. 112), and that inflation was not included in the bond (SRK, 2009, p. 64).

As presented in the DEIS, the Reclamation and Closure Plan financial surety estimate is inadequate. Long term water treatment costs are not adequately addressed, the cost estimate is out of date (2008), and there is no detail presented to substantiate the cost estimate presented.

DC.0.08

Recommendation: A Reclamation and Closure Cost Estimate with an adequate level of detail, and that includes water treatment in perpetuity, should be presented to the public for review and comment.

Section 2.7 Comparison of Alternatives

DC.0.09

In reviewing the information in Table 2.7-1 ('Summary of Potential Impacts of Each Alternative by Resource'), Alternative C rates the same or better than Alternative D in every category assessed.

DC.0.010

In reviewing Section 2.3.3 (above) it was noted that Alternative C also provides a significant reclamation cover assessment advantage. It is not clear from the DEIS why the Forest Service has judged Alternative D to be better than Alternative C. Alternative D does provide HGCMC more time to make the move to the new north tailings storage area, but there is no rationale presented in the DEIS as to why this factor should determine the choice of the Preferred Alternative.

DC.0.011

Recommendation: Lacking more justification, it would appear that Alternative C is a better choice than Alternative D.

Section 3.3 Geotechnical Stability

DC.0.012

There are several aspects of the geotechnical stability analysis that raise concern for the long term seismic stability of the facility. The first concern is related to the way the peak ground acceleration due to a nearby earthquake was determined. In the DEIS it is stated:

> *"Based on regional active faults and other potential sources zones, this study recommended a maximum design earthquake peak ground acceleration of 0.3 g (gravitational force) and a design*

[5] SRK, 2009, Environmental Audit of the Greens Creek Mine, SRK Consulting (US) Inc., March 2009

Response

Comment ID: DC.0.008
Appendix B of the EIS states that (1) the Forest Service is committed to requiring water treatment for as long as needed beyond mine closure and (2) the Forest Service will require that the updated financial assurance includes costs for long-term water treatment. Appendix B specifies that, for the purposes of cost estimation, 100 years of water treatment is assumed. Even though water treatment could occur for a longer time, the bond estimate remains approximately the same for treatment beyond 100 years.

A numerical estimate of the reclamation and closure cost is not included in the EIS, since this amount will be determined after the ROD is issued. At that time there will be certainty regarding the selected alternative, mitigation measures that will be required, and any other stipulations.

We believe that the written commitment to require water treatment and to update the financial assurance is sufficient disclosure for the purposes of NEPA, without having to include an uncertain cost estimate. The Forest Service requires the submittal of a bond for reclaiming disturbances before approval of a plan of operations and implementation of the action (see FEIS Section 2.4.9.2).

The Forest Service's administration regulations do not require public review and comment on the reclamation and closure estimate. The State process does allow for public comment. This is disclosed in Appendix B of the EIS. Also see the response to Comment DM.3.007.

Comment ID: DC.0.009
Comment noted.

Comment ID: DC.0.010
The DEIS did not identify an agency-preferred alternative because none existed at the time. The FEIS includes a preferred alternative, consistent with 40 CFR 1502.14(e).

Comment ID: DC.0.011
Comment noted. The FEIS presents the Forest Service's identification of the preferred alternative (see Section 2.3.6).

Comment

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basis earthquake peak ground acceleration of 0.15 g for the site to ensure an adequate level of geotechnical stability."(DEIS, p. 3-19)

The Maximum Design Earthquake used to determine the peak ground acceleration of 0.3 g was derived using an earthquake that was 75% of the Maximum Credible Earthquake. (Klohn Crippen, 2006, page 11)[6] The Maximum Design Earthquake represents the ground motions or fault movements from the most severe earthquake considered at the site, relative to the acceptable consequences of damage in terms of life and property. (ADNR, 2005, pp. 6-6, 6-7)[7]

The estimated largest earthquake that could occur at any given location is called the Maximum Credible Earthquake. The Maximum Credible Earthquake is defined as the greatest earthquake that reasonably could be generated by a specific seismic source, based on seismological and geologic evidence and interpretations. (ADNR, 2005, p 6-6) The Maximum Credible Earthquake is often associated with a recurrence interval of 10,000 years.[8]

For most structures, including the design of buildings and other structures that are designed with finite lifetimes, the choice of a Maximum Design Earthquake is often one with a recurrence interval significantly less than that of the Maximum Credible Earthquake, since these structures will not be used indefinitely.

However, the choice of the Maximum Credible Earthquake as the Maximum Design Earthquake for a tailings facility is an appropriately conservative choice for the design seismic event. Tailings structures require a very conservative choice of design event. Once these structures are built, it is not economically or environmentally viable to move the waste that is impounded behind the dam. The dam must hold this waste safely in perpetuity. We don't know how long 'perpetuity' is, but 10,000 years (e.g. the approximate time since the last ice age) is a minimum approximation.

The use of 0.3g peak ground acceleration most probably underestimates the maximum ground acceleration the tailings facilities could experience.

DC.0.013

***Recommendation:** The peak acceleration due to the Maximum Credible Earthquake, not 75% of the Maximum Credible Earthquake, should be used as the Maximum Design Earthquake for mine facilities that must stand in perpetuity. At Greens Creek this would be the tailings and waste rock facilities.*

Section 3.3.3 Geotechnical Stability – Environmental Consequences

DC.0.014

The second concern for long term seismic stability is that pseudo-static analysis technique was used to evaluate the long term seismic stability of the tailings and waste rock facilities. (DEIS, p. 3-21)

DC.0.015

Today, few US regulatory agencies accept pseudostatic methods for seismic design of new dam projects. Seismic loading need not be considered for most new dams if the maximum credible earthquake produces a peak ground acceleration of less than 0.1 g at the site. The Federal Energy Regulatory Commission, which is responsible for many large dams in the US, has commented:

"A pseudostatic analysis (sometimes called seismic coefficient analysis) should only be considered as an index of the seismic resistance available in a structure not subject to build-up of pore pressure from shaking. It is not possible to predict failure by pseudostatic analysis, and other types of analysis

[6] Klohn Crippen, 2006, Greens Creek Mine Stage 2 Tailings Expansion Overall Stability Update, Klohn Crippen Ltd., 1Mar06
[7] ADNR, 2005, Guidelines for Cooperation with the Alaska Dam Safety Program, Prepared by Dam Safety and Construction Unit, Water Resources Section, Division of Mining, Land and Water, Alaska Department of Natural Resources, June 30, 2005
[8] Wieland, 2008, Large Dams the First Structures Designed Systematically Against Earthquakes, Martin Wieland, ICOLD, The 14th World Conference on Earthquake Engineering, Beijing, China, October 12-17, 2008

Response

Comment ID: DC.0.012
Long-term stability, both static and dynamic, will need to be addressed in detail during final design of the new dry-stack facility. However, these analyses are not appropriate for an alternatives investigation, nor will they have a significant impact on the choice among alternatives, because the seismic considerations will be roughly equal for all alternatives (see DEIS Section 3.3.4).

In addition, because this facility will not be impounding water, regulations pertaining to dams do not apply to the proposed facility. The facility will fall under the jurisdiction of ADEC Solid Waste Regulations (18 AAC 60), which require conceptual consideration of stability during permitting and detailed stability analyses prior to closure.

Comment ID: DC.0.013
Comment noted. See the response to Comment DC.0.012.

Comment ID: DC.0.014
Comment noted. See the response to Comment DC.0.012.

Comment ID: DC.0.015
Comment noted. The TDF is a dry-stack design not intended to impound either tailings or water. Therefore, the TDF is not comparable to a "large dam," nor would it be subject to Federal Energy Regulatory Commission regulations. Also see the response to Comment DC.0.012.

Comment

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are generally required to provide a more reliable basis for evaluating field performance." (FERC, May 2005)[9]

and;

"FERC practice previously allowed the use of the pseudostatic method of analysis in areas of low or negligible seismicity (peak ground accelerations of 0.05g or less). FERC no longer uses a pseudostatic analysis to judge the seismic stability of embankment dams." (USSD, February 2007, p. 13)[10]

Despite these recommendations from organizations with long experience in analyzing and managing the construction and long term operation of dams, many consultants continue to pseudostatic analysis instead of dynamic analysis for tailings dams, even in areas of moderate and high seismicity.

This is probably because pseudostatic analysis is less expensive than dynamic analysis. The most rigorous dynamic methods would use finite element or finite difference programs in which dynamic response, pore-pressure development, and deformations can be fully coupled.

Pseudostatic analysis also relies a great deal on the use of professional judgment. Professional judgment is based on 50 years of experience with tailings dams, however tailings dams must stand in perpetuity.

DC.0.016 ***Recommendation: Dynamic modeling, rather than pseudostatic modeling, should be used to analyze the stability of the tailings and waste rock facilities at Greens Creek.***

Appendix E. Greens Creek Liner Dry Stack Construction

DC.0.017 There are no details – liner material type, thickness, leak detection, etc. – in the DEIS, including in Appendix E. Leak detection and groundwater monitoring locations would be important for Alternatives C and D since the tailings facility would be located in a different drainage.

DC.0.018 ***Recommendation: More detail on the design and construction requirements for the liner for Alternatives C & D should be provided.***

Thank you for the opportunity to comment on this Draft EIS.

Sincerely:

David M. Chambers, Ph.D., P. Geop.

[9] FERC, 2005, Federal Guidelines for Dam Safety Earthquake Analyses and Design of Dams, Federal Energy Regulatory Commission, May 2005

[10] USSD, 2007, Strength of Materials for Embankment Dams, United States Society on Dams, February 2007

Response

Comment ID: DC.0.016
Comment noted. See the response to Comment DC.0.012.

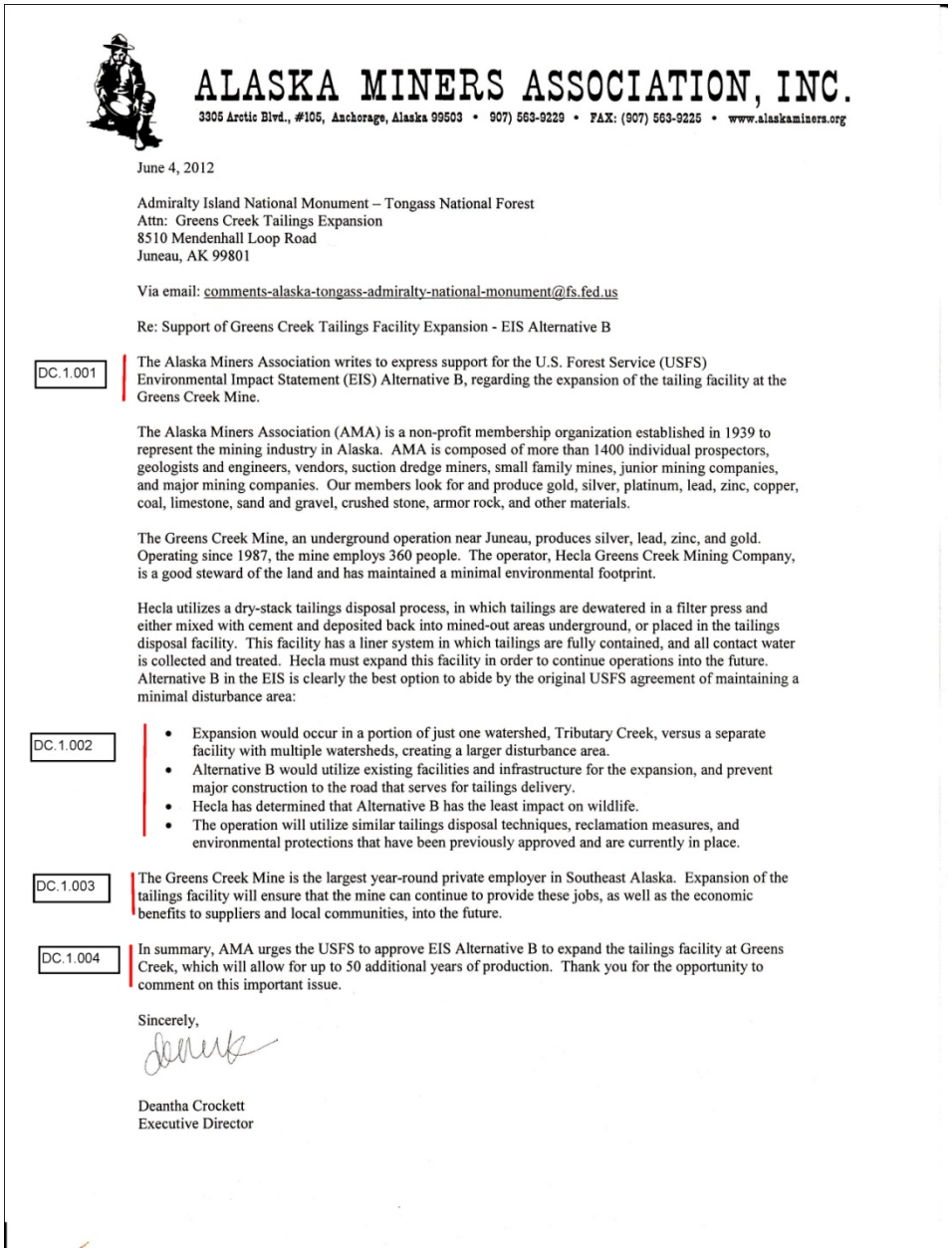
Comment ID: DC.0.017
The new TDF would be developed in the same manner as the existing TDF, including the design and construction and operation of the sub-drains, liner, and tailings placement. New finger and blanket drains would be placed to form the facility underdrain system. The underdrains would be built on a pad of nonreactive material. See EIS sections 2.3.3 and 2.3.4. Seepage through the TDF flows to the TDF underdrain collection system and is collected by a series of wet wells at the base of the TDF (EIS Section 2.4.4).

The operator will be required to submit a development plan, consistent with the selected alternative based on this analysis, that specifies the use of liners or other devices to prevent adverse impacts to groundwater and surface water and specifies the use of underdrains, finger drains, and french drains in a way that allows for tailings contact-water to be effectively controlled.

Monitoring will be required consistent with the GPO and State of Alaska Waste Management Permit, updated to reflect the selected alternative prior to development.

Comment ID: DC.0.018
See the response to Comment DC.0.017.

Comment



ALASKA MINERS ASSOCIATION, INC.

3305 Arctic Blvd., #105, Anchorage, Alaska 99503 • 907) 563-9229 • FAX: (907) 563-9225 • www.alaskaminers.org

June 4, 2012

Admiralty Island National Monument – Tongass National Forest
Attn: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Via email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Re: Support of Greens Creek Tailings Facility Expansion - EIS Alternative B

DC.1.001 The Alaska Miners Association writes to express support for the U.S. Forest Service (USFS) Environmental Impact Statement (EIS) Alternative B, regarding the expansion of the tailing facility at the Greens Creek Mine.

The Alaska Miners Association (AMA) is a non-profit membership organization established in 1939 to represent the mining industry in Alaska. AMA is composed of more than 1400 individual prospectors, geologists and engineers, vendors, suction dredge miners, small family mines, junior mining companies, and major mining companies. Our members look for and produce gold, silver, platinum, lead, zinc, copper, coal, limestone, sand and gravel, crushed stone, armor rock, and other materials.

The Greens Creek Mine, an underground operation near Juneau, produces silver, lead, zinc, and gold. Operating since 1987, the mine employs 360 people. The operator, Hecla Greens Creek Mining Company, is a good steward of the land and has maintained a minimal environmental footprint.

Hecla utilizes a dry-stack tailings disposal process, in which tailings are dewatered in a filter press and either mixed with cement and deposited back into mined-out areas underground, or placed in the tailings disposal facility. This facility has a liner system in which tailings are fully contained, and all contact water is collected and treated. Hecla must expand this facility in order to continue operations into the future. Alternative B in the EIS is clearly the best option to abide by the original USFS agreement of maintaining a minimal disturbance area:

DC.1.002

- Expansion would occur in a portion of just one watershed, Tributary Creek, versus a separate facility with multiple watersheds, creating a larger disturbance area.
- Alternative B would utilize existing facilities and infrastructure for the expansion, and prevent major construction to the road that serves for tailings delivery.
- Hecla has determined that Alternative B has the least impact on wildlife.
- The operation will utilize similar tailings disposal techniques, reclamation measures, and environmental protections that have been previously approved and are currently in place.

DC.1.003 The Greens Creek Mine is the largest year-round private employer in Southeast Alaska. Expansion of the tailings facility will ensure that the mine can continue to provide these jobs, as well as the economic benefits to suppliers and local communities, into the future.

DC.1.004 In summary, AMA urges the USFS to approve EIS Alternative B to expand the tailings facility at Greens Creek, which will allow for up to 50 additional years of production. Thank you for the opportunity to comment on this important issue.

Sincerely,

Deantha Crockett
Executive Director

Response

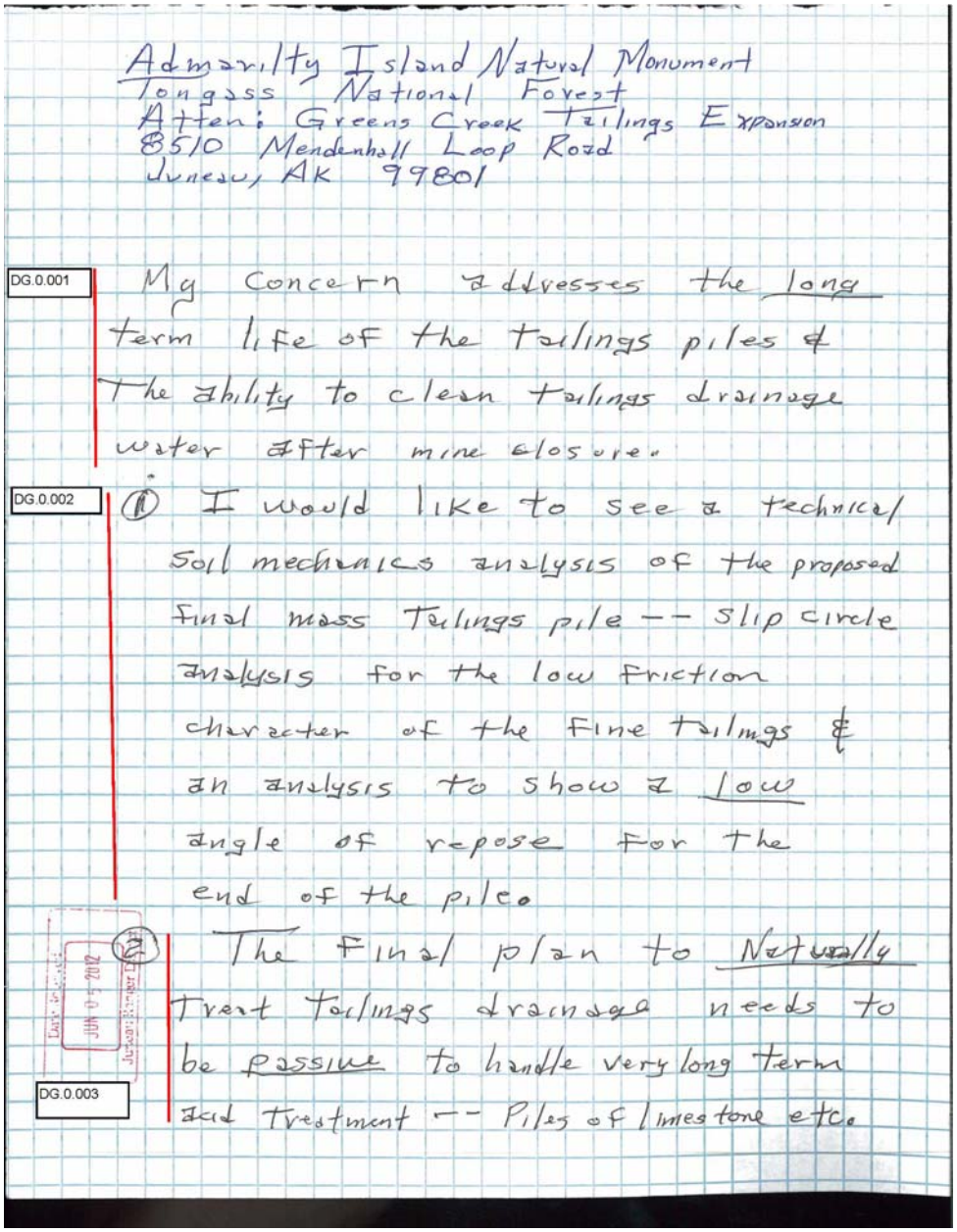
Comment ID: DC.1.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment ID: DC.1.002
Comment noted. The Forest Service's decision and the rationale for making it are presented in the Record of Decision.

Comment ID: DC.1.003
Comment noted. Section 3.18 discusses the socioeconomic impacts of the project.

Comment ID: DC.1.004
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment



Admiralty Island National Monument
Tongass National Forest
Attn: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

DG.0.001

My Concern addresses the long term life of the tailings piles & The ability to clean tailings drainage water after mine closure.

DG.0.002

① I would like to see a technical/ soil mechanics analysis of the proposed final mass Tailings pile -- slip circle analysis for the low friction character of the fine tailings & an analysis to show a low angle of repose for the end of the piles.

② The Final plan to Naturally Treat Tailings drainage needs to be passive to handle very long term Acid Treatment -- Piles of limestone etc.

DG.0.003

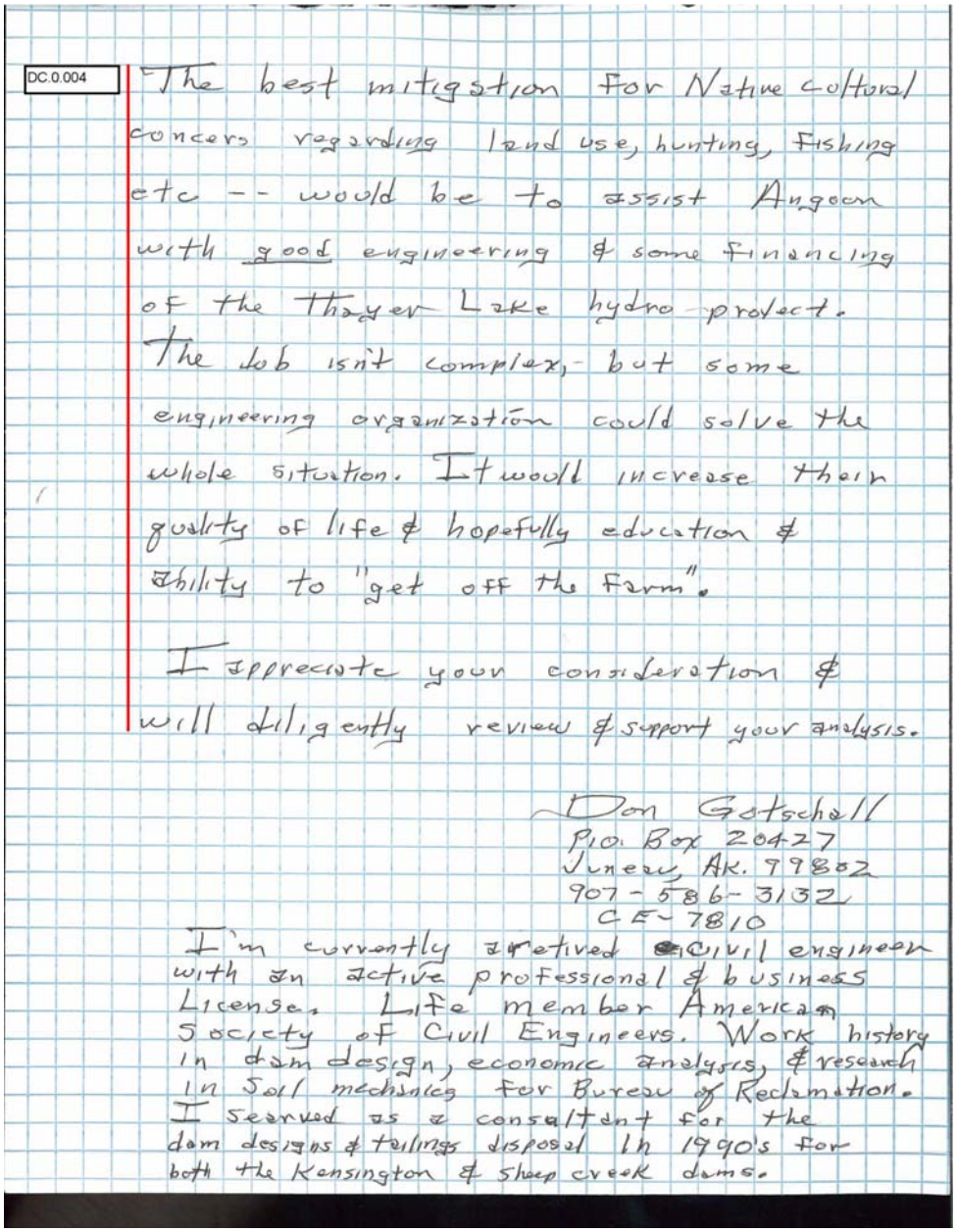
Response

Comment ID: DG.0.001
Comment noted. However, the NEPA analysis discloses in Section 3.5.3.1 that, based on current conditions, leachate (drainage) from the TDF will need to be controlled, treated, and regulated by a discharge permit both during operations and after closure. In addition, the Forest Service will require financial assurance to ensure that treatment occurs for as long as needed.

Comment ID: DG.0.002
Stability analyses were conducted using 3H:1V slopes rather than the angle of repose. Both circular and block slip surfaces were analyzed, using conservative material properties previously used by Klohn Crippen.

Comment ID: DG.0.003
As noted in comment responses and in Section 1.8.3.1 in the EIS, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA. The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. As such the EIS does not consider alternative discharge scenarios. Identifying passive treatment as a potential mechanism would be presumptive without treatability studies being conducted to evaluate the effectiveness and to determine a design for a system.

Comment


DC.0.004

The best mitigation for Native cultural concern regarding land use, hunting, fishing etc -- would be to assist Angoon with good engineering & some financing of the Thayer Lake hydro project. The job isn't complex, but some engineering organization could solve the whole situation. It would increase their quality of life & hopefully education & ability to "get off the Farm".

I appreciate your consideration & will diligently review & support your analysis.

Don Gotschall
P.O. Box 20427
Juneau, AK. 99802
907-586-3132
CE-7810

I'm currently retired Civil engineer with an active professional & business License. Life member American Society of Civil Engineers. Work history in dam design, economic analysis, & research in Soil mechanics for Bureau of Reclamation. I served as a consultant for the dam designs & tailings disposal in 1990's for both the Kensington & Sheep creek dams.

Response

Comment ID: DG.0.004

Thank you for your suggestion. Because of the scope of the EIS and its authority under the NEPA process, the Forest Service cannot require HGCMC to provide engineering or financial support to Angoon on the Thayer Lake hydro project.

Comment

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801
By email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us
June 3, 2012

Re: Letter of Appeal to DEIS "Greens Creek Tailings Expansion"

This is a letter of appeal regarding the Draft Environmental Impact Statement (DEIS) for the Greens Creek Tailings Expansion. My name is Daniel Monteith, 720 4th Street, Douglas, Alaska 99824. A summary of my credentials and expertise is as follows:

Ph.D. Anthropology, Michigan State University 1998
M.A. Anthropology, Michigan State University 1990
M.A. Social Science, University of Chicago 1986
B.A. Anthropology, University of Chicago 1985

I have over 22 years of experience in Southeast Alaska doing anthropological work and have authored numerous professional papers, reports, and publications on a wide variety of topics in anthropology and archaeology.

DM.0.001 The current DEIS is based on research that is inadequate and incomplete. The work done by the outside consulting firm Tetra Tech whose staff is insufficient. The personnel who worked on the cultural resource, social and economic, subsistence, and social justice areas were marginally qualified. I professional experience in Southeast and on the above subject matter is much greater than Tetra Tech staff combined. I have also taught anthropology on the college level for over 25 years.

DM.0.002 I will address concerns on this DEIS only in my area of expertise. The methods and conclusions in cultural resource, social and economic, subsistence, and social justice are based on inadequate research and thus the conclusions are inaccurate. The letter of appeal will be organized by subject areas and concise bullet statements discussing the problems with the document will be addressed. Some issues will be consistent throughout all four areas. These shortcomings in this planning document need to be addressed in order for the concerned Federal Agencies to continue with proposed actions. The specific federal laws that support the focus of my appeal are: Clean Water Act (CWA); Clean Air Act (CAA); General Mining Law of 1872; Magnuson-Stevens Fishery Conservation and Management Act (MSFCMA); National Historic Preservation Act (NHPA); National Environmental Policy Act (NEPA); Migratory Bird Treaty Act (MBTA); Fish and Wildlife Coordination Act; Bald and Golden Eagle Protection Act; Marine Mammal Protection Act (MMPA); Endangered Species Act (ESA); Alaska National Interest Lands Conservation Act (ANILCA); Greens Creek Land Exchange Act; Wilderness Act of 1964. Until the issues stated in this letter of appeal are addressed the Federal Agencies involved are not in compliance.

Response

Comment ID: DM.0.001
Comment noted. The Forest Service disagrees with the commenter's assertion about the qualifications of the EIS authors. Ultimately, the Forest Service is responsible for the content of the EIS, and it is confident that the quality and detail is sufficient to provide the necessary hard look at environmental consequences required by NEPA. Please also see responses to specific comments.

Comment ID: DM.0.002
Comment noted. The commenter should be aware that there is no appeal available corresponding to the release of a DEIS. An appeal period will be available following the issuance of a final EIS. While the letter is addressed to the Forest Service, it is not clear which federal agencies the commenter believes are out of compliance.

Comment ID: DM.0.003
The draft EIS relied on the best information available to provide information on traditional and customary subsistence uses. The commenter does not identify which "significant individuals and groups" were left out of the study. The Forest Service held public meetings during NEPA scoping and on the draft EIS in Angoon and Juneau, and held subsistence hearings in Angoon and Hoonah. Information related to subsistence uses received during those meetings has been incorporated into the final EIS. We received no written comments from individuals or groups that either provided or offered to provide additional information related to subsistence uses, socioeconomic conditions, or cultural resources.

Without more specific information on the significant individuals, groups, clans, or tribal entities that were left out, the Forest Service is unable to validate the commenter's concerns regarding inaccurate assumptions in the Cultural Resources and Socioeconomics sections. The document acknowledges the traditional use of the area (sections 3.16.1 and 3.16.2), presents the results of cultural resource literature review and field surveys (sections 3.17.1 and 3.17.2), and discusses the socioeconomics directly related to the proposed action and alternatives (Section 3.18.3). Since many of the impacts are common to all alternatives (e.g., activity in Hawk Inlet displacing subsistence users), it is not clear that ethnographic interviews or community surveys would provide substantial new information that would alter the decision-making process.

Comment

Subsistence

- DM.0.003 The Hawk Inlet area is a customary and traditional and contemporary use area for some clans and residents of Angoon, Hoonah, and Juneau. Significant individuals and groups were left out the study and thus the conclusions in the draft EIS are inaccurate. The study relies too heavily on outdated Alaska Department of Fish and Game Reports and other studies that were not designed or conducted for the purposes of the report. Further in depth ethnographic interviews and community surveys, interviews, and studies should be conducted. Key traditional family, clan, and tribal entities were left out of the study. These methodological inadequacies have led to numerous inaccurate assumptions in the DEIS.

- DM.0.004 This area is a significant historical canoe portage and contact area between lineages and clans of the Angoon, Hoonah, and Juneau Tlingit. This was not adequately addressed in the DEIS.

Socio-Economic

- DM.0.003 The above mentioned issue applies to this section: The Hawk Inlet area is a customary and traditional and contemporary use area for some clans and residents of Angoon, Hoonah, and Juneau. Significant individuals and groups were left out the study and thus the conclusions in the draft EIS are inaccurate. The study relies too heavily on outdated Alaska Department of Fish and Game Reports and other studies that were not designed or conducted for the purposes of the report. Further in depth ethnographic interviews and community surveys, interviews, and studies should be conducted. Key traditional family, clan, and tribal entities were left out of the study. These methodological inadequacies have led to numerous inaccurate assumptions in the DEIS.

- DM.0.005 Adequate and purposeful social and economic surveys of Angoon, Hoonah, and Juneau designed to address the issues of the DEIS were not developed. Instead, a literature search of basic socio-economic and demographic data were cut and pasted into this report. Little social science analysis of the data and its impacts to the above mentioned communities is presented.

- DM.0.006 It would be very helpful to me, trying to be an informed citizen on this DEIS to have a detailed cost benefit analysis of the different alternatives; including the cost and benefits of the company/companies involved and a detailed cost benefit analysis to the ecosystem services for the project area and communities concerned.

- DM.0.007 There is little or no discussion about the impacts to the commercial fishing, subsistence fishing and gathering, and/or sports fisheries. This is a major migration corridor for anadromous fish in the region.

- DM.0.008 There is little or no discussion as to the impact of shellfish in the area due to known toxic elements produced in the mining operations.

Response

The Forest Service acknowledges that mining activities have displaced some subsistence users in Hawk Inlet and surrounding areas and may continue to so; this displacement could also involve a cultural aspect of not using traditional harvest areas. Since the displacement would continue to occur under all alternatives, however, the Forest Service recognizes that additional detail on the customary and traditional uses of Hawk Inlet could benefit future decision-making processes and provide greater detail on the history of the area. The Forest Service is requiring that HGCMC document the history of Hawk Inlet and the cannery, including the customary, traditional, and contemporary use of the area based on research in the relevant communities and a review of available literature. This mitigation measure is discussed in sections 3.16.3.1 (Subsistence) and 3.17.3.1 (Cultural Resources).

Comment ID: DM.0.004
The canoe portage has been added to the discussion in sections 3.17.2 and 3.17.3.1. The site is outside the area of direct effects; the State Historic Preservation Officer concurred with the Forest Service's determination that there would be *no adverse effect*.

Comment ID: DM.0.005
The draft EIS relied on the best information already available to provide information on subsistence (i.e., traditional and customary) uses. The commenter does not identify which "significant individuals and groups" were left out of the study. The Forest Service held public meetings on the draft EIS in Angoon and Juneau and subsistence hearings in Angoon and Hoonah. Information related to subsistence uses received during those meetings was summarized in Appendix ANILCA and has been incorporated into the final decision-making process. We received no written comments from individuals or groups that either provided or offered to provide additional information related to subsistence uses, socioeconomic conditions, or cultural resources.

Without more specific information on the significant individuals, groups, clans, or tribal entities that were left out, the Forest Service is unable to validate the commenter's concerns regarding inaccurate assumptions. The EIS acknowledges the traditional use of the area (sections 3.16.1 and 3.16.2), presents the results of cultural resource literature review and field surveys (sections 3.17.1 and 3.17.2), and discusses the socioeconomics directly related to the proposed action and alternatives (Section 3.18.3). Since many of the impacts are common to all alternatives (e.g., activity in Hawk

Comment

DM.0.009
- There is a great deal of new research and methods in "ecosystem services" that would enhance this DEIS and study and assist the citizenry, Stakeholders, and federal agencies on the selection of alternatives that is not included in this study.

Cultural Resources

DM.0.003
- The above mentioned issue applies to this section: The Hawk Inlet area is a customary and traditional and contemporary use area for some clans and residents of Angoon, Hoonah, and Juneau. Significant individuals and groups were left out the study and thus the conclusions in the draft EIS are inaccurate. The study relies too heavily on outdated Alaska Department of Fish and Game Reports and other studies that were not designed or conducted for the purposes of the report. Further in depth ethnographic interviews and community surveys, interviews, and studies should be conducted. Key traditional family, clan, and tribal entities were left out of the study. These methodological inadequacies have led to numerous inaccurate assumptions in the DEIS.

DM.0.010
- With respect to archaeological resources the DEIS includes an inadequate literature search. There is no discussion of current and specific archaeological methods or field work. I realize archaeological resources are exempt from the Freedom of Information Act but in consultation with Forest Service archaeologists these concerns were not addressed by Tetra Tech. The original archaeological survey conducted by Carlson were flawed, inadequate, and questioned by Madonna Moss. Current archaeological work conducted by Forest Service archaeologists were not included or taken into consideration in this document.

DM.0.011
- Recent geoarchaeological work in Southeast Alaska also calls into question the current archaeological model used by the Forest Service used for determining high, medium, and low probability archaeological areas and what methods can be used in consultation with the State Historic Preservation Office (SHPO). The current modeling is highly problematic for northern Southeast Alaska. This is based on research conducted by both Forest Service and academic geologists and archaeologists. The key issue is the dramatic rate of uplift, glacial rebound, isostactic rebound has significantly altered the landscape and plain and simple archaeologists need to account for these factors in their models and survey techniques (see Mtyka et al; Connor et al; Carlson and Baichtal 2010).

DM.0.012
- In the older archaeological reports, EIS, and the current DEIS these issues have never been mentioned. These concerns need to be addressed otherwise the federal agencies involved are not following proper Section 106 processes according to the National Historic Preservation Act.

DM.0.004
- This area is a significant historical canoe portage and contact area between lineages and clans of the Angoon, Hoonah, and Juneau Tlingit. This was not adequately addressed in the DEIS.

DM.0.013
- When one examines current paleo-shoreline models and understands the significance of the area careful archaeological surveys should be conducted. This area may yield

Response

Inlet displacing subsistence users), it is not clear that ethnographic interviews or community surveys would provide substantial new information that would alter the decision-making process in this case.

The Forest Service acknowledges that mining activities have displaced some subsistence users from Hawk Inlet and surrounding areas and may continue to do so; this displacement could also involve a cultural aspect of not using traditional harvest areas. As a result, the Forest Service recognizes that additional detail on the customary and traditional uses could benefit future decision-making processes and provide greater detail on the history of the area. The Forest Service is requiring a mitigation measure that HGCMC document the history of Hawk Inlet and the cannery, including the customary, traditional, and contemporary use of the area based on a review of the literature and research in the relevant communities. This mitigation measure is discussed in more detail in sections 3.16.3.1 (Subsistence) and 3.17.3.1 (Cultural Resources).

Comment ID: DM.0.006
The Forest Service is unaware of a standardized methodology for conducting a cost–benefit analysis that compares corporate revenues with ecosystem services.

Comment ID: DM.0.007
See Section 3.7.3 for impacts to marine aquatic resources (Section 3.7.2.2 discusses commercial and sport fish and shellfish harvests). Impacts to sport fisheries are addressed in Section 3.15.3.1. Anadromous fish are discussed throughout Section 3.7.

Comment ID: DM.0.008
Testing was previously conducted to assess chronic and acute toxicity of effluent to shellfish as was required by the NPDES permit at the time. Testing was discontinued in 2005 with the reissuance of the permit, when the USEPA determined that the data show that the effluent from Outfall 002 has no reasonable potential to contribute to an exceedance of the (Alaska) water quality standards for toxicity and there was no reason to believe that the characteristics of the discharge would change over the term of the permit (USEPA 2005).

Section 3.7.2.2 acknowledges that metals present in Hawk Inlet sediments near the shiploader could be toxic to bivalves, amphipods, and burrowing organisms in the area. The decrease in metals

Comment

DM.0.013 regionally, nationally, and internationally significant research regarding the peopling and migrations of the Alaska Native peoples.

Social Justice

- DM.0.003 The above mentioned issue applies also to Social Justice issues: The Hawk Inlet area is a customary and traditional and contemporary use area for some clans and residents of Angoon, Hoonah, and Juneau. Significant individuals and groups were left out the study and thus the conclusions in the draft EIS are inaccurate. The study relies too heavily on outdated Alaska Department of Fish and Game Reports and other studies that were not designed or conducted for the purposes of the report. Further in depth ethnographic interviews and community surveys, interviews, and studies should be conducted. Key traditional family, clan, and tribal entities were left out of the study. These methodological inadequacies have led to numerous inaccurate assumptions in the DEIS.

Recommendations

DM.0.014 As previously stated the DEIS would benefit from more ethnographic interviews and community survey, more consideration given to the significance of Paleo-shoreline modeling, and more inclusive work with Alaska Native entities in Angoon, Hoonah and Juneau. Finally, without a cost-benefit analysis of company and eco-system services I do not think one can evaluate to true costs to any of the alternatives. The DEIS falls way short in evaluate impacts to subsistence, socio-economics, cultural resources, and social justice. I look forward to how the DEIS team will address these deficiencies and issues.

Sincerely,
Daniel Monteith
PhD. Anthropology

References Cited

Carlson, Risa and James Baichtal. "Development of a Model to Predict the Location of Early Holocene Habitation Sites." *Current Research in the Pleistocene*. Volume 27 (2010).

DM.0.011 Cathy Connor, Greg Streveler, Austin Post, Daniel Monteith and Wayne Howell. "The Neoglacial landscape and human history of Glacier Bay, Glacier Bay National Park and Preserve, southeast Alaska, USA." *Holocene* 19:3 (2009) pp. 375-387.

Motyka, Roman J., Christopher F. Larsen, Jeffrey T. Freymueller, Keith A. Echelmeyer. "Post Little Ice Age Glacial Rebound in Glacier Bay National Park and Surrounding Areas." Pp. 37-41.

Response

concentrations observed from 2002 to 2009, however, is expected to continue.

Comment ID: DM.0.009
The Forest Service is not aware of a standard methodology for assessing ecosystem services that is typically employed in the NEPA process and that would enhance the analysis. Without a specific reference to a particular methodology, we are unable to provide a more detailed response.

Comment ID: DM.0.010
Section 3.17.2 has been revised to note that Forest Service personnel conducted fieldwork (pedestrian surveys with discretionary probing) for the areas that would be affected by alternatives C and D. The results of the surveys were taken into account in the decision-making process. The commenter has not provided sufficient detail for the Forest Service to validate or assess the claim that the work conducted by Carlson was flawed or inadequate.

Comment ID: DM.0.011
Comment noted. The Forest Service is familiar with the literature cited and we acknowledge that isostatic rebound has influenced sites on Prince of Wales Island and in Glacier Bay. However, the applicability of this model throughout Southeast Alaska and on the northern end of Admiralty Island has yet to be evaluated.

The Forest Service conducted cultural resource surveys of the areas potentially affected by each of the alternatives. Therefore, the degree to which isostatic rebound would affect the Forest Service model for predicting the probability of occurrence of cultural resources in this particular case is limited.

Comment ID: DM.0.012
The text in Section 3.17.3 has been revised to indicate that the State Historic Preservation Office has issued a concurrence with the Forest Service's Section 106 finding of *no adverse effect*. Also, please see the responses to the previous comments.

Comment ID: DM.0.013
As noted in the response to Comment DM.0.011, the Forest Service has conducted cultural resource surveys of the areas of potential effects. No new archaeological resources were identified.

Comment	*Response*
	Comment ID: DM.0.014 The commenter repeatedly states that the EIS would benefit from more ethnographic interviews and community surveys but fails to describe specifically what information he believes is insufficient or lacking and could (or should) be gained through additional work. The Forest Service respectfully disagrees with the assertion that additional work is necessary for this decision. Subsistence hearings were held in Hoonah on September 14, 2012, and in Angoon on November 8, 2012 (see Section 1.5.3). NEPA does not require a cost–benefit analysis to be included in the process. We are unaware of any standardized processes that could practically be implemented to assess company benefits versus ecosystem services. The Forest Service finds that the range of alternatives combined with the information contained in the assessment is sufficient to take a hard look at environmental effects and to serve as the basis for making an informed decision.

Comment

June 4, 2012

Forrest Cole
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Dear Mr. Cole,

Thank you for the opportunity to comment on the Hecla Greens Creek Mine Tailings Expansion Plan Environmental Impact Statement.

I would like to preface that I am a member of the Alaska Independent Power Producers Association and a member of the City and Borough of Juneau's- Juneau Commission on Sustainability and I am employed by Juneau Hydropower, Inc. a Juneau based hydropower development. However, the comments I am making are my own and do not reflect or are representative of the opinion or standing of any of these organizations. These comments are my own.

DM.1.001

Hecla Greens Creek has been operating this mine located in the City and Borough of Juneau since Hecla purchased the controlling share interest from Kennecott Mines in February 2008. Hecla Mining has been a great community citizen and has contributed not only significant property taxes to the City and Borough but also has been a large financial contributor to charities, education (funding the Juneau Mine Training center) and many arts and humanities organizations in Juneau. I mention these factors because our community is positively, directly and indirectly, impacted by Hecla Greens Creek mine.

Greens Creek is proposing to expand their mine tailings expansion so that the mine can effectively operate for up to 30 to 50 more years. Their continued operation provides sustainable jobs and a sustainable economy for Juneau and surrounding communities. I have taken the time to read a substantial portion of the 418 page Environmental Impact Statement and support Alternative B of the proposed alternatives.

I will provide my rationale for this support.

DM.1.002

Alternative B is an expansion of the area that is currently used for the mine's tailing facilities. Collocating the new tailings facility of Alternative B with the current facility provides better site control and management control of the facility rather than operating tailings facilities in two separate locations. This provides an additional environmental safeguard and security of the mine tailings since employees will traverse and be located in the same area directly adjacent to the existing tailings facility.

1

Response

Comment ID: DM.1.001
Comment noted. The socioeconomic effects of the mining operation are discussed in Section 3.18 (Socioeconomics).

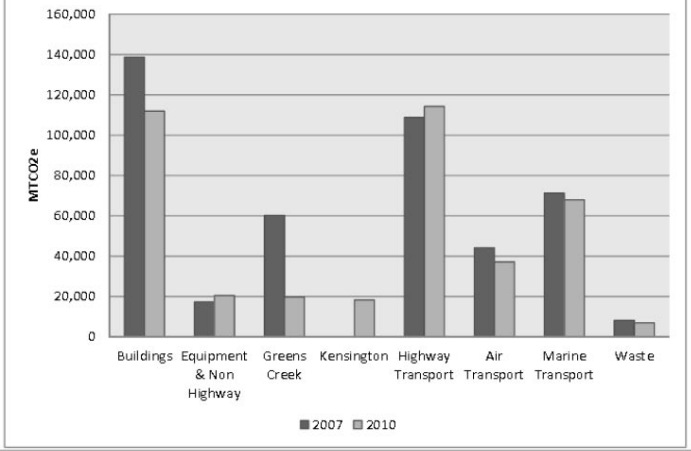
Comment ID: DM.1.002
Comment noted. The Forest Service's decision and the rationale for selecting it are presented in the Record of Decision.

Comment

Alternative B uses less fuel and energy to handle and store tailings than Alternative C and D. The City and Borough of Juneau in October 2011 passed its CBJ Climate Action Plan[1]. This plan calls for the reduction of carbon emissions within the boundaries of the City and Borough of Juneau. Alternative B is 5.6 roundtrip miles shorter than Alternative C or D haul distance. Over the course of multiple trips per day by haul vehicles and supporting vehicles to and from the tailing site for 30-50 years will result in the expenditure of significant amounts of fossil fuels. Comparatively to Alt C and Alt D, Alternative B will significantly require less fossil fuel use, require a smaller requirement of on-site storage, require less frequent resupply of fossil fuels and will therefore decrease the carbon emissions over the 30-50 year extended life of the mine. The EIS did not quantify the carbon emissions of the various alternatives and the EIS did not acknowledge the CBJ climate action and implementation plan, but Alternative B is the preferred alternatives from these perspectives and vantage points. Further, it should be pointed out that Hecla Greens Creek has significantly reduced their carbon footprint from approximately 60,000 MTCO2 in 2007 to 20,000 MTCO2 in 2010[2] (See CBJ Climate Action and Implementation Plan Figure 5 below). Alternative B appears to be in alignment with Hecla management's effectiveness to look for and find ways to further reduce its carbon footprint.

DM.1.003

Figure 5. Comparision of Community GHG EMISSIONS, 2007 & 2010



[1] CBJ Climate Action and Implementation Plan
http://www.juneau.org/manager/documents/CAP_Final_Nov_14.pdf
[2] CBJ Climate Action and Implementation Plan, page 13

2

Response

Comment ID: DM.1.003

An account of mobile greenhouse gas emissions has been added to Section 3.2, Air Quality, in the EIS. Currently, energy consumption and stationary source greenhouse gas emissions at the Greens Creek Mine account for 5% of Juneau's greenhouse gas emissions (*Juneau Climate Action and Implementation Plan*, 2011). Mobile greenhouse gases were calculated as follows for each action alternative:

Alternative B: 707 tons of carbon dioxide emissions per year, which would add 0.16% annually to Juneau's greenhouse gas emissions.

Alternative C: 946 tons of carbon dioxide emissions per year, which would add 0.21% annually to Juneau's greenhouse gas emissions.

Alternative D: 910 tons of carbon dioxide emissions per year, which would add 0.21% annually to Juneau's greenhouse gas emissions.

The difference in greenhouse gas emissions is 0.05% between Alternative B and alternatives C and D.

Comment

Response

Further, Alternative B appears to be in alignment with both the short term and long term goals of the CBJ Climate Action and Implementation plan to decrease GHG emissions associated with mining operations.

Goal MC-1: Decrease GHG emissions associated with mining operations.

Strategy MC1-A. Work with local mines to reduce GHG emissions and energy use.	
Short-Term Actions	**Responsible Party**
• Support/provide incentives to encourage the use of renewable energy sources for local industrial operations.	CBJ government/ Private sector
• Incentivize and reward companies that reduce energy use, GHG emissions, and waste.	CBJ government
• Encourage local operations to implement best energy management practices to reduce energy use (e.g. turning off equipment when not in use, keeping motors in good repair, etc.).	CBJ government/ Private sector
Long-Term Actions	**Responsible Party**
• When evaluating proposals for new mines or other large industrial projects, consider the potential impact on the community's GHG emissions.	CBJ government

DM.1.003

It should be noted that the CBJ climate action and implementation plan under its mining goals has a long term action: "When evaluating proposals for new mines or other large industrial projects, consider the potential impact on the community's GHG emissions." Additionally under the short term actions, the plan has the following action item, "Encourage local operations to implement best energy management practices to reduce energy use." Based on the objective fact that Alternative B will have a shorter haul distance of Alternative C&D and therefore the implementation of Alternative B will use less fuel and generate less GHG emissions, it appears that Alternative B meets the guidance of goal MC1-A of the CBJ Climate Action and Implementation Plan. I would further suggest the USFS reference the CBJ Climate Action and Implementation Plan (dated Nov. 2011) in the FEIS document. Further, the Alternative B in the FEIS should be documented as objectively superior to Alternative C and Alternative D in reducing GHG emissions not only in the CBJ boundaries but also in reducing carbon emissions and GHG in the Admiralty National Monument.

3

Comment

DM.1.004 In addition to the superior GHG attributes of Alternative B, Alternative B is more conservative in the use of USFS land. Further, it appears that it is objectively wiser to provide a long term risk reduction to the environment by providing the tailings expansion at the existing facility as suggested in Alternative B.

DM.1.005 Placing all tailings as suggested in Alternative B also ensures less impact on wildlife. From this perspective, Alternative B provides a concentration of resources as well as a concentration of effort to contain the tailings over the term of the tailings facility life.

DM.1.006 I appreciate the opportunity to comment on and support the Hecla Greens Creek Tailing Alternative B proposal for this EIS. Hecla Greens Creek has been an excellent corporate neighbor for the community of Juneau. Hecla's dedicated and well thought out efforts to continue their mine operation and provide economic sustainability for Juneau is appreciated by our community. Alternative B seeks to protect the environment, complies with the CBJ Climate Action Plan and provides one of Juneau's largest employers the opportunity to continue their mining operations in an environmentally responsible manner.

Sincerely,

Duff W. Mitchell
3274 Pioneer Ave.
Juneau, AK 99801

4

Response

Comment ID: DM.1.004
Comment noted.

Comment ID: DM.1.005
Comment noted.

Comment ID: DM.1.006
Comment noted.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 5:05 PM
To: Cox, David; Weglinski, Gene
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek expansion comments

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

-----Original Message-----
From: DOUGLAS MERTZ [mailto:dkmertz@ak.net]
Sent: Monday, June 04, 2012 4:04 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek expansion comments

DM.2.001 I strongly oppose the attempt to expand the tailings area at Greens Creek Mine with Admiralty National Monument.

DM.2.002 1. In the past Greens Creek grievously overestimated how long it would take before the capacity of its tailings area would be exceeded. This time it is important to assume that Greens Creek's estimate is very conservative, may be way off, and that the need for yet another expansion may likely happen.

DM.2.003 2. Large amounts of toxic and deleterious materials have already been dumped into or reached Hawk Inlet as a result of the existing project -- mercury, cadmium, cyanide, copper, lead and zinc. Yet the plan seems to assume that the harmful and longterm effects will all be mitigated through a mixing zone in Hawk Inlet. However, a mixing zone is an area where limits are exceeded and resources sacrificed, and there does not appear to be any serious study establishing lack of effects beyond the mixing zone, given that the area is narrow and subject to tidal dispersion twice a day, every day.

DM.2.004 3. It is evident that subsistence, sport, and commercial fishing will be and is being harmed by the release of this toxic substances. There is no planned mitigation at the site of the harm -- remote "mitigation" does nothing to lessen the immediate loss of centuries old subsistence resources.

DM.2.005 4. This entire mining venture was initially permitted on the premise of a minor footprint and on no harm to the resources of the area or its users. Yet repeatedly these promises have been found to be hollow. It is a necessity for the appointed guardians of these resources to protect the area, not work to find a way around legal restrictions.

Douglas K. Mertz
319 Seward Street, No. 5
Juneau, Alaska 99801

1

Response

Comment ID: DM.2.001
Comment noted.

Comment ID: DM.2.002
Greens Creek has calculated tailings and waste rock disposal needs at a conservative (high) level based on current production and disposal rates, with consideration for some small increases in efficiency (production). These capacity numbers also account for the volume for all other wastes authorized for disposal in the TDF under the ADEC Waste Management Permit (#0211-BA001). All action alternatives have been designed to provide capacity for an additional 50 years of disposal.

Comment ID: DM.2.003
Issuance of the discharge permit is a process independent from the proposed action under consideration—neither action depends on the outcome of the other. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations."

As expressed in other comment responses, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA. The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and that the discharge into Hawk Inlet is considered protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

The setting of effluent limits, treatment requirements, monitoring, and other requirements of the CWA are under the authority of ADEC and the USEPA.

Comment ID: DM.2.004
Please see the response to Comment DM.2.003. The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and with the awareness that the discharge

Comment	Response
	into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife. The analysis of impacts presented in Section 3.7.3 (Aquatic Resources) describes the effects of the mine's operations, including the permitted discharge. The document discusses impacts to subsistence resources in Section 3.16.3 (Subsistence). The comment provides no evidence or other information to support the assertion that the discharge will harm these resources. **Comment ID: DM.2.005** Comment noted. The Forest Service's decision and the rationale for it are discussed in the Record of Decision.

Comment

DM.3

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, Washington 98101-3140

JUL 2 4 2012

OFFICE OF THE
REGIONAL ADMINISTRATOR

Forrest Cole, Forest Supervisor
Tongass National Forest
648 Mission Street
Federal Building
Ketchikan, Alaska 99901-6591

Dear Mr. Cole:

DM.3.001 The U.S. Environmental Protection Agency has reviewed the Greens Creek Mine Tailings Expansion Draft Environmental Impact Statement. Our review and comments are provided in accordance with our responsibilities under the National Environmental Policy Act (NEPA), the Council of Environmental Quality's NEPA Implementation Regulations at 40 CFR 1500-1508, and our review authority under Section 309 of the Clean Air Act. For the reasons described below, the EPA is rating the Greens Creek Mine Tailings Expansion Draft Environmental Impact Statement (DEIS) "3-Inadequate Information." An explanation of our rating system is enclosed. The EPA would like to discuss these comments with you so that we can develop a path forward that both allows for a more fully-developed, sufficient EIS and ensures a mine plan that will provide adequate protection of public resources. We recommend that this information be provided as a supplement to the draft EIS and circulated for public comment.

Background

DM.3.002 On November 14, 2011, the EPA signed a Memorandum of Understanding with the U.S. Forest Service to be a cooperating agency for the Greens Creek Mine Tailings Expansion EIS. The EPA has a particular interest in the water quality issues, especially the need for long-term water quality treatment at the Greens Creek Mine.

DM.3.003 The Greens Creek Mine is an active underground metals mine located near Hawk Inlet on northern Admiralty Island on the Tongass National Forest. In addition, portions of the mine facilities are within the Admiralty Island National Monument. Full scale development began in 1987 and because of the operator's continued identification of ore reserves and the need for additional capacity for waste rock and tailings, the Forest Service conducted previous NEPA analyses in 1984, 1988 and 2003. The current EIS evaluates the proposal to expand the tailings facility to accommodate disposal of additional tailings and waste rock based on known and projected reserves for the next thirty to fifty years.

DM.3.004 The DEIS analyzes a Proposed Action (Alternative B) to allow up to fifty years of additional capacity for tailings disposal. The proposal includes expanding the existing tailings facility and would result in a loss of 4,046 feet of Tributary Creek (Class I and Class II stream) and 99 acres of jurisdictional wetlands. It would also directly impact an additional 109 acres of the Admiralty Island National Monument. The proposed action's reclamation plan includes an engineered soil cover and synthetic liner system as part of the water management system. The two other alternatives, Alternatives C and D, would minimize impacts to Tributary Creek and the Monument by constructing an additional tailings

Response

Comment ID: DM.3.001
Comment noted. See the responses to detailed comments.

Comment ID: DM.3.002
Comment noted.

Comment ID: DM.3.003
Comment noted.

Comment ID: DM.3.004
Comment noted. The FEIS has been corrected to state that no Class I streams would be directly affected by Alternative C or Alternative D.

Comment ID: DM.3.005
Comment noted. See the responses to specific comments.

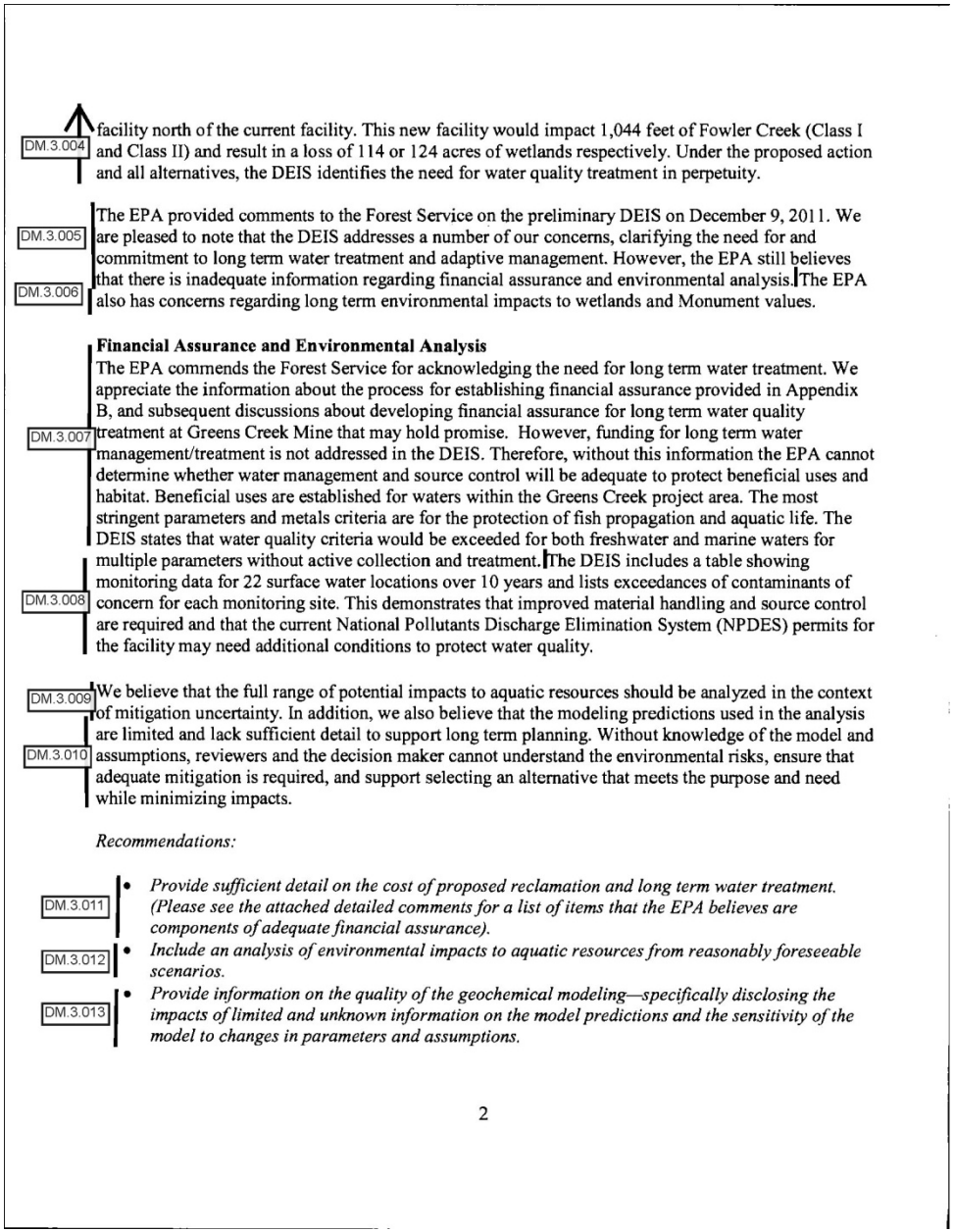
Comment ID: DM.3.006
Comment noted. Please see the response to detailed comments regarding impacts to wetlands (DM.3.017). Monument values are discussed in Section 3.19; without additional detail on USEPA concerns regarding long-term environmental effects on Monument values, we cannot provide further clarification.

Comment ID: DM.3.007
In its approach to NEPA, the Forest Service uses the assumption that facilities will be operated in compliance with applicable regulations, including the need to meet water quality standards. The EIS explains the process through which financial assurance will be determined, including the facts that the funding will need to accommodate long-term treatment and that the State of Alaska's portion of the process allows for public comment. The Forest Service considers the information presented adequate to meet the disclosure required under NEPA.

Comment ID: DM.3.008
Ambient monitoring of area streams and water features is required by the ADEC Waste Management Permit and through the FWMP established as a part of the GPO. HGCMC prepares annual monitoring reports through both of these programs and tracks trends in water quality. Mitigation measures are employed if "trigger" values are exceeded. In addition, the Forest Service is requiring additional study, and mitigation if needed, of impacts associated with fugitive dust (see Section 3.2.3.1).

The Forest Service does not have jurisdiction over the APDES permit conditions.

Comment



facility north of the current facility. This new facility would impact 1,044 feet of Fowler Creek (Class I and Class II) and result in a loss of 114 or 124 acres of wetlands respectively. Under the proposed action and all alternatives, the DEIS identifies the need for water quality treatment in perpetuity. DM.3.004

The EPA provided comments to the Forest Service on the preliminary DEIS on December 9, 2011. We are pleased to note that the DEIS addresses a number of our concerns, clarifying the need for and commitment to long term water treatment and adaptive management. However, the EPA still believes that there is inadequate information regarding financial assurance and environmental analysis. The EPA also has concerns regarding long term environmental impacts to wetlands and Monument values. DM.3.005 DM.3.006

Financial Assurance and Environmental Analysis

The EPA commends the Forest Service for acknowledging the need for long term water treatment. We appreciate the information about the process for establishing financial assurance provided in Appendix B, and subsequent discussions about developing financial assurance for long term water quality treatment at Greens Creek Mine that may hold promise. However, funding for long term water management/treatment is not addressed in the DEIS. Therefore, without this information the EPA cannot determine whether water management and source control will be adequate to protect beneficial uses and habitat. Beneficial uses are established for waters within the Greens Creek project area. The most stringent parameters and metals criteria are for the protection of fish propagation and aquatic life. The DEIS states that water quality criteria would be exceeded for both freshwater and marine waters for multiple parameters without active collection and treatment. The DEIS includes a table showing monitoring data for 22 surface water locations over 10 years and lists exceedances of contaminants of concern for each monitoring site. This demonstrates that improved material handling and source control are required and that the current National Pollutants Discharge Elimination System (NPDES) permits for the facility may need additional conditions to protect water quality. DM.3.007 DM.3.008

We believe that the full range of potential impacts to aquatic resources should be analyzed in the context of mitigation uncertainty. In addition, we also believe that the modeling predictions used in the analysis are limited and lack sufficient detail to support long term planning. Without knowledge of the model and assumptions, reviewers and the decision maker cannot understand the environmental risks, ensure that adequate mitigation is required, and support selecting an alternative that meets the purpose and need while minimizing impacts. DM.3.009 DM.3.010

Recommendations:

- *Provide sufficient detail on the cost of proposed reclamation and long term water treatment. (Please see the attached detailed comments for a list of items that the EPA believes are components of adequate financial assurance).* DM.3.011
- *Include an analysis of environmental impacts to aquatic resources from reasonably foreseeable scenarios.* DM.3.012
- *Provide information on the quality of the geochemical modeling—specifically disclosing the impacts of limited and unknown information on the model predictions and the sensitivity of the model to changes in parameters and assumptions.* DM.3.013

2

Response

The Forest Service does not have jurisdiction over the APDES permit conditions.

Comment ID: DM.3.009
Required mitigation, reclamation, and long-term water treatment are considered in the evaluation of effects to aquatic resources. See the response to Comment DM.3.015.

Comment ID: DM.3.010
HGCMC presented the model design and preliminary results to the USEPA, the Forest Service, and ADEC in a meeting at the USEPA Region 10 office on August 29, 2011. The USEPA did not comment on the model design or the results presented at that time.

As discussed in the DEIS, HGCMC's model predicts that leachate quality would not meet Alaska Marine or Fresh Water Quality Standards for hundreds of years after closure and perhaps in perpetuity. This outcome was obvious, even without the model, based on existing monitoring data that shows poor leachate quality and knowledge of the tailings mineralogy and mass in the TDF. The Forest Service and our third-party contractor (Tetra Tech) used the reported model data in the DEIS as an additional source of information substantiating the need for water treatment.

We did not rely heavily on the modeling predictions, since actual field data indicates that metal leaching is occurring and will continue to occur. Because we did not rely on the model for this conclusion, we do not agree that it is necessary to expend the resources and time to revise or further explain the modeling.

Comment ID: DM.3.011
See the responses to detailed comments DM.3.014 and DM.3.018 through DM.3.023.

Comment ID: DM.3.012
Required mitigation, reclamation, and long-term water treatment are considered in the evaluation of effects to aquatic resources. See the response to Comment DM.3.015.

Comment ID: DM.3.013
HGCMC's Solid Waste Management Permit requires that HGCMC monitor various water quality parameters in the Greens Creek TDF and at established points of compliance. In 2011, HGCMC chose to develop a water quality–based calculator (model) based on

Comment

The following discussion is provided to further clarify our concerns regarding financial assurance, analyses of long term impacts, and geochemical modeling.

Financial Assurance

In our review of the 2003 EIS for this project and throughout the development of this DEIS, the EPA has stressed the importance of establishing and disclosing the details of financial assurance for reclamation and long term water management. We believe the Forest Service and State of Alaska agree that financial assurance is important and needed. For example, the State identified the lack of long term bonding as the greatest uncertainty for the mine[1]. However, inadequate financial assurance persists at the Greens Creek Mine. While the DEIS states that financial assurance will be established, the DEIS limits the discussion to the Forest Service and State's process to establish financial assurance and information about the current bond amount of $30,455,000 which does not include long term water treatment.

DM.3.014

The EPA appreciates the inclusion of Appendices B and F that outline the process for establishing financial assurance and current bond information. However, the DEIS does not provide an adequate level of detail about the mechanism and cost for long term bonding or proposed reclamation. This information is needed to provide assurance that significant environmental impacts will be avoided or mitigated and that mitigation measures, operation and maintenance, and closure/post closure activities will be adequately bonded if the company fails to meet its requirements. Adequate financial assurance should be required for reclamation and potential long term maintenance of the cover system and long term water management. In order to resolve these issues regarding inadequate information, the EPA recommends that the Forest Service develop and disclose details regarding long term bonding and reclamation of proposed activities as a supplement to the draft EIS, and circulate it for public comment.

Analyses of Long Term Impacts

Without details in the EIS of adequate financial assurance to ensure that mitigation and regulatory requirements will be met to protect resources over the long term, we believe the impact analysis for aquatic resources is inadequate. The EIS needs to analyze the potential of the project to adversely impact beneficial uses of aquatic life and fish propagation and the potential to cause or contribute to water quality standards violations. Watersheds within the Greens Creek project area support anadromous and resident fish, and Hawk Inlet (site of the NPDES discharge point) supports a high value fishery. Through our conversations with the Forest Service, we understand that the assumption underlying the analyses in the DEIS is that there will be full compliance with the mine's NPDES permit in perpetuity. As noted above, there may be a need for more protective conditions in the current NPDES permit to prevent

DM.3.015

continued and additional water quality impacts. However, the DEIS does not analyze the potential environmental impacts if active water treatment ceases. We acknowledge that full compliance with an appropriately protective permit is a best case scenario; however, we believe that it is not reasonable or realistic to rely solely on this assumption given that the DEIS does not disclose adequate financial assurance to fund mitigation and water management. We note that it is not uncommon for mines to experience unforeseen circumstances as demonstrated at Greens Creek Mine where acid generating material resulted in greater than expected elevated metal concentrations in surface and ground water. Mines may undergo unexpected closures due to factors such as fluctuating metals prices and safety (e.g., Greens Creek closure between 1993 and 1996 due to low metal prices and Hecla's Lucky Friday mine in

[1] ADEC. 2009. *Environmental Audit of the Greens Creek Mine.*

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Response

requirements established by the Solid Waste Management Permit issued by ADEC. HGCMC's primary objective was to develop a tool that they could use in the future to assist them in managing the TDF and their water treatment plant. The modeling objectives and methods employed were developed by HGCMC, and were intended to assist them in reporting conditions of the TDF to ADEC and the Forest Service based on the Solid Waste Permit requirements.

While HGCMC did not conduct a formal sensitivity test, the review of the model by the Forest Service, Tetra Tech, and ADEC as part of the EIS process showed that HGCMC evaluated a range of conditions and predicted minimum, maximum, and average water quality of leachate and runoff from the pile.

Also, see the response to DM.3.010. Rerunning the model to test sensitivity would not change the outcome of the EIS (that long-term water treatment is needed) nor the alternatives evaluated.

Comment ID: DM.3.014
See the responses to comments DM.3.018 through DM.3.023.

Regarding the concern brought up in the environmental audit (SRK 2009), the commenter is correct that SRK found that the need for long-term water treatment represented the greatest uncertainty in the reclamation plan and cost estimate. Based on that, SRK recommended that the site should continue to collect the data needed for assessing long-term water quality treatment, treatment requirements, and treatment options. Appropriately, the need for long-term water treatment has been reviewed concurrently with and as part of this NEPA analysis. The EIS clearly states that long-term water treatment will be required, perhaps in perpetuity, and that financial assurance for long-term water treatment will be required (see sections 2.4.9.2, 3.4.3, and 3.5.3.1 and Appendix B).

The USEPA recommends that, in addition to the discussion already contained in the EIS, more detail is needed on the mechanism and cost. However, it is not clear to us why an estimated cost would provide the USEPA with more certainty than the Forest Service's current commitment that financial assurance will include long-term water treatment.

Comment ID: DM.3.015
Required mitigation, reclamation, and long-term water treatment are considered in the evaluation of effects to aquatic resources. We do

Comment

Idaho in 2011 due to safety concerns). The USFS should evaluate reasonable scenarios in order to disclose the potential impacts and to design appropriate alternatives and mitigation. Given that permanent wastewater treatment does not appear to be funded under the current bond for the mine, changes to waste management that would prevent wastewater treatment in the future appear to be the only viable mechanisms to protect water quality.

DM.3.015

Geochemical Modeling

The USFS should disclose the probability that predictions are accurate and identify any uncertainties or gaps. The level of confidence in predicted outcomes should be provided so that reasonable decisions about management, monitoring, and mitigation will be made.

DM.3.016

Disclosure of the uncertainty and sensitivity analysis is a key component in interpreting predictions. We recommend considering the EPA's guidance[2] (previously provided) as a resource on sufficient level of detail when discussing environmental modeling.

Long Term Impacts to Wetlands

The Greens Creek EIS will be adopted by the Corps of Engineers for their decision to issue a Clean Water Act Section 404 permit. As such, the alternatives analysis must satisfy the Section 404(b) (1) Guidelines. The Guidelines require that waters of the United States be avoided to the maximum extent practicable and that the least environmentally damaging practicable alternative be selected for permitting. The Corps of Engineers released a Public Notice of Application on April 20, 2012, for the discharge of fill material into waters of the United States to facilitate the construction of a dry stack mine tailings disposal site in a southward direction to create a maximum capacity for 15 million cubic yards of additional tailings and waste rock materials.

All alternatives discussed in the DEIS and Public Notice would fill high value wetlands and impact salmon bearing streams. The Proposed Action, Alternative B, would fill portions of Tributary Creek, which would affect stream habitat and Alternatives C and D would fill wetlands that drain into Fowler Creek.

DM.3.017

Concurrent, coordinated NEPA processes are encouraged to save time and money. CEQ recommends that to the fullest extent possible, agencies prepare draft EISs concurrently with and integrated with environmental analyses required by other environmental laws and executive orders[3]. We note that this DEIS includes information that the EPA and the Corps of Engineers requested on the functions and values of aquatic resources, but does not include other information relevant to the analysis of wetland impacts and mitigation.

The EPA recommends that the 404(b)(1) analysis be completed before publication of the final EIS, giving agencies an opportunity to take a hard look at minimizing long term impacts to wetlands.

[2] USEPA. 2009. Guidance on the Development, Evaluation, and Applications of Environmental Models. https://ecf.oknd.uscourts.gov/cgi-bin/DisplayPDF.pl?dm_id=852412&dm_seq=17

[3] 40 CFR Sections 1502.25. http://ceq.hss.doe.gov/nepa/regs/ceq/1502.htm

4

Response

not believe that it is reasonably foreseeable for water treatment to cease in violation of state and federal laws. We respectfully disagree that the language in the EIS describing the Forest Service's commitment to require financial assurance is inadequate to ensure that long-term water treatment would be carried out. As stated in the EIS and Appendix B, the reclamation cost estimate and bond will be updated to reflect the ROD, including long-term water quality treatment, prior to implementation of any action alternative. Also see the response to Comment DM.3.018.

Please note that procedures are in place in the event of a temporary shutdown, such as the one that occurred at the Greens Creek Mine between 1993 and 1995. The GPO, Appendix 15, addresses temporary shutdowns. Required and necessary activities, such as water treatment, erosion control, and monitoring, would continue.

Comment ID: DM.3.016

Please see the responses to comments DM.3.010 and DM.3.013. HGCMC's model predicts that leachate quality would not meet Alaska Marine or Fresh Water Quality Standards for hundreds of years after closure and perhaps in perpetuity. As a result, the DEIS discloses that HGCMC will be responsible for capturing, managing, and treating the leachate under all evaluated alternatives.

Requiring HGCMC to conduct additional modeling, or to additionally conduct a formal sensitivity analysis above the range of conditions already evaluated, would not change how leachate must be controlled, managed, and treated. For this reason, it would not provide additional or more robust information concerning impacts and water treatment that could be used to distinguish among alternatives. Ultimately, if the water quality were to become worse than the ranges predicted by the HGCMC model, the conclusions in the EIS and the treatment requirements would remain the same.

Comment ID: DM.3.017

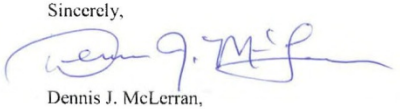
Comment noted. The USACE has indicated that a determination of project compliance with the 404(b)(1) guidelines cannot be accomplished without the information contained in the FEIS. Discussion of the alternatives required by NEPA and disclosed in the FEIS is required to conduct the 404(b)(1) analysis. See the USACE's response to USEPA Comment KK.0.020.

Comment

The EPA is committed to continuing our discussions with you to identify mechanisms to resolve the issues indentified in these comments. Thank you for the opportunity to provide comments on this DEIS. Our detailed comments are attached.

Please contact Kate Kelly, Director of the Office of Ecosystems, Tribal and Public Affairs at 206-553-1271 or Christine Reichgott, Manager of the Environmental Review and Sediment Management Unit at 206-553-1601 if you have questions.

Sincerely,



Dennis J. McLerran,
Regional Administrator

cc: US Army Corps of Engineers
Alaska Department of Natural Resources
Alaska Department of Environmental Conservation

Enclosures

5

Response

Comment ID: DM.3.018

Current Forest Service regulations and policy do not require the development or disclosure of financial assurance costs in NEPA documents. We disagree with the assertion that the language in the EIS regarding the need for long-term water treatment and the Forest Service will require financial assurance for this in an updated bond is inadequate without an estimated cost. In fact, an estimated cost at this point would have so much uncertainty (since the Forest Service has not selected a preferred alternative) that we have concerns that including such a number in the EIS could be misleading to the public.

The Forest Service and the State of Alaska cooperate under a Memorandum of Understanding (MOU) to calculate and secure financial assurance for mines located on National Forest System lands in Alaska. This MOU is handled outside and independently of the NEPA process. An important aspect of the agreement is a requirement from the State of Alaska for public disclosure and opportunity to comment prior to final approval of bonding. The State of Alaska publishes the Waste Management Permit for a 30-day public notice period. The permit documents include a narrative reclamation plan, which describes the work that will be done upon cessation of operations, the sequencing of that work, and the long-term aspects of the project that will continue once the earthwork is completed. The public notice materials also include the financial assurance cost estimate and all the spreadsheets, together with notes on items such as vendor quotes, which were used to determine the costs.

All financial assurances must be in place before the initiation of work approved in the Record of Decision. This process, which is separate from the current NEPA process, adequately addresses the interests of public disclosure and comment on financial assurance requirements.

Comment ID: DM.3.019

Consistent with 36 CFR 228.13(g), the reclamation plan, cost estimate, and bond will be adjusted to fit the modified GPO based on the Record of Decision. All financial assurances must be in place before the initiation of work approved in the Record of Decision. See the response to Comment DM.3.018 and Appendix B of the FEIS.

Comment

EPA's Detailed Comments on Greens Creek Mine DEIS

Financial Assurance

DM.3.018 Hardrock mines without appropriate financial assurance can pose significant risks to human health and the environment, and financial risks to responsible parties and the government should clean up become necessary[4]. Appropriate financial assurance ensures that adequate funds will be available to reclaim mines and conduct post-closure management according to approved plans, and thus avoid serious environmental impacts. If information on financial assurance is not disclosed in a NEPA document, decision makers, the EPA, other agencies, and the public are unable to evaluate the potential environmental consequences of proposed mine activities on public lands in a public forum. Because the adequacy of financial assurance is critical to determining the probability of mitigation measure implementation, the estimated amount and adequacy of the financial assurance should be discussed in the EIS transparently and prospectively.

DM.3.019 The EPA understands that the Forest Service is currently working with the State to update current reclamation costs and financial assurance at the Greens Creek Mine, as part of the State's five year review cycle. This evaluation includes activities covered in the 2003 EIS but does not include the current, proposed activities. We recommend that the Forest Service consider including the proposed activities and financial information for long term site management in an updated financial assurance package. We note that Appendix B of the DEIS states that financial assurance for proposed actions will need to be developed prior to approving the Plan of Operations. Including the current activities and financial information in the financial assurance update could expedite the approval process.

Our specific comments and recommendations for developing the financial assurance for reclamation and long term water management are provided below.

Review of Appendix B

DM.3.020 The Forest Service and State's process is described in Appendix B, which states that the cost estimate and financial assurance will not be finalized until after the modification is approved by the Forest Service. We continue to believe that information about the cost estimate and bonding should be made available during the NEPA process.

DM.3.021 Appendix B states that bonding will occur incrementally, in periods not to exceed 10 years. Since water quality treatment will be required at this site in perpetuity, operation and maintenance (O&M) costs will

[4] For example, EPA chose classes of facilities within the hardrock mining industry as the first for which EPA would develop financial responsibility requirements under CERCLA Section 108(b), based upon those facilities' sheer size; the enormous quantities of waste and other materials exposed to the environment; the wide range of hazardous substances released to the environment; the number of active hardrock mining facilities; the extent of environmental contamination; the number of sites in the CERCLA site inventory, government expenditures, projected clean-up costs and corporate structure and bankruptcy potential. Identification of Priority Classes of Facilities for Development of CERCLA Section 108(b) Financial Responsibility Requirements, 74 Fed. Reg. 37,213 (July 28, 2009).

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Response

Comment ID: DM.3.020
Comment noted. See the response to Comment DM.3.018.

Comment ID: DM.3.021
Bonding occurs incrementally for reclamation, but not for long-term water treatment. Pages B-7 and B-8 of Appendix B state that 100 years of treatment will be assumed in calculating the treatment cost. Costs beyond 100 years would make little difference in the bond amount since those years are heavily discounted.

For clarity, the Appendix B statement has been revised to state "If the changes proposed by HGCMC are approved, the Forest Service and State will determine the operational mining period and extent of disturbance that will be authorized and bonded for incrementally, not to exceed 10 years. Long-term components of the reclamation plan (e.g., water treatment operations and maintenance) will be included in the financial assurance requirements."

An incremental reclamation plan is appropriate for surface reclamation because later phases of expansion are decades in the future. As an example, there is no need to secure financial assurance for earthwork, cover installation, and materials to reclaim the full footprint of the TDF considered 30 to 50 years into the future. Note that later phases of expansion could not occur until the financial assurance is reviewed and modified to account for the phased expansion.

Comment ID: DM.3.022
As stated in Appendix B, additional comprehensive bond reviews may be conducted if, after modification of a reclamation or operating plan, an annual overview, or an inspection of the permit area, an agency determines that an increase in the bond level may be necessary. The Forest Service will review the bond as needed according to our guidance.

Comment ID: DM.3.023
See the response to Comment DM.3.018. This level of detail is not available until after the Forest Service makes its NEPA decision. In addition, this level of detail is not required for a Forest Service NEPA analysis.

Comment

be necessary for potentially hundreds of years. Financial assurance is meant to ensure that there will be funds to complete required reclamation tasks, (as Appendix B states, to serve as "the public's insurance DM.3.021 policy that reclamation will be performed,"). We believe there is risk to the federal government if the bond only covers a fraction of that time period. If only 10 years is bonded at a time, and Hecla Mining Company is unable to perform reclamation, the taxpayers may incur this liability.

Appendix B states that the bond review cycle will be 5 years. However, Forest Service guidelines recommend that bonds be reviewed annually for adequacy. Given the volatility of the minerals market, DM.3.022 annually ensuring that the financial assurance amount is at least equal to the current cost estimate may prevent a situation where a drop in commodities prices leaves the company in poor financial health and unable to update the instrument. Annual adjustments ensure that the financial assurance amount is close to the cost estimate amount in any given year.

Review of Current Bond

We appreciate the information that the Forest Service shared regarding the current bond for $30,455,000. Our assessment is based on what is disclosed in the EIS. To ensure that the overall financial assurance is protective at Greens Creek Mine, the USFS should provide the following additional information:

Site Reclamation (e.g., facility closure, earth moving/stabilization, revegetation, etc.):

- Estimated cost (+/- percent) to reclaim and close the site in a manner that achieves reclamation goals and post-mining land use objectives.
- Criteria for determining success of reclamation activities for bond release.
- Costs associated with implementing contingency measures to address reasonably foreseeable but not specifically predicted outcomes.

DM.3.023

Long-Term Site Management (e.g., post-closure water treatment, mitigation of aquatic resources, site maintenance, and monitoring):

- Itemized cost estimate (including reasonable contingencies) and appropriate economic variables to calculate the net present value of future expenses, including the time period to complete long term treatment, monitoring and maintenance.
- The "mechanics" of the financial assurance mechanism for the site, for example, if a trust is being used, include such details as:
  - Requirements for timing of payments into the trust fund and for "true-ups";
  - Discount rate used, if any, including assumptions for inflation, management fees, and tax rates;
  - Acceptable investment instruments;
  - Tax status of the trust fund and how management fees and taxes are paid; and
  - Identification of the trust fund beneficiaries.

Aquatic Resources

The DEIS states that metals concentrations in fish tissue have been observed in area streams. For DM.3.024 example, in Tributary Creek and Greens Creek fish tissue samples have shown an accumulation of metals including cadmium, copper and selenium, a bioaccumulating metalloid. The DEIS does not clearly present the basis for this summarized conclusion. The discussion of baseline conditions related to

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Response

Comment ID: DM.3.024

The EIS provides this information to describe the existing conditions. This information is derived from aquatic biomonitoring conducted in Greens and Tributary Creek by the ADF&G since 2001. The monitoring program was developed with input from the State of Alaska Department of Natural Resources (ADNR), USEPA, Forest Service, U.S. Fish and Wildlife Service (USFWS), ADF&G, State Attorney General's Office, and ADEC.The purpose of monitoring resident fish tissue metals concentration is to identify changes in water chemistry that could be a result of mining operations.

In the most recent aquatic biomonitoring report (monitoring year 2011, ADF&G 2012), ADF&G found that whole-body metals concentrations in juvenile Dolly Varden char collected in 2011 were not significantly different compared to data from previous years and, overall, the data suggests a productive aquatic community at Site 9, downstream of the existing TDF.

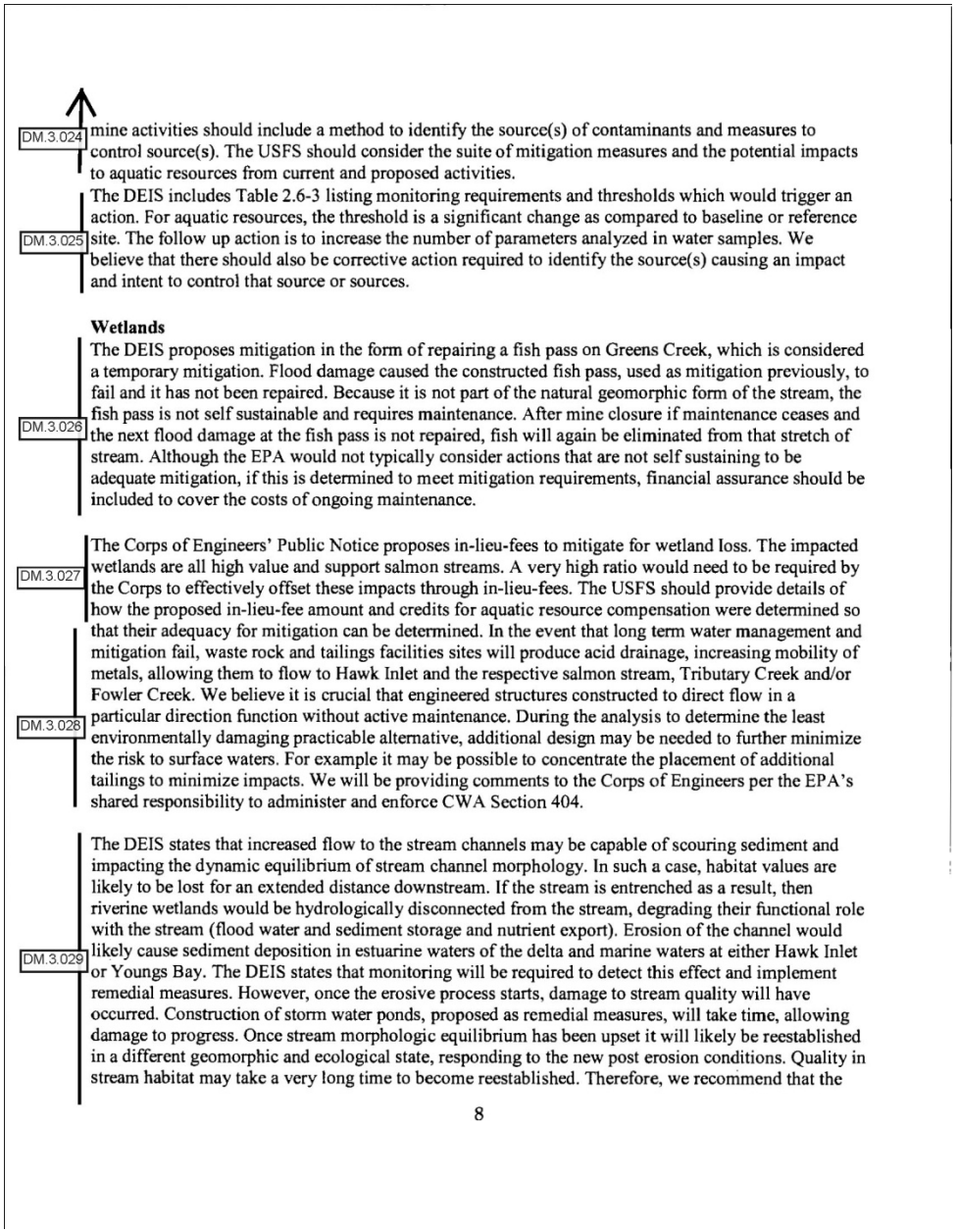
In Greens Creek, outside the TDF expansion area, the report (ADF&G 2012) also concludes that fish tissue metals concentrations downstream of the mill (Site 54) were similar in 2011 to those observed in previous years. Further, it states that, overall, samples collected in 2011 suggest a healthy aquatic community at Site 54. Site 54 is located downstream of the mine and Site 23 and is monitored to detect potential effects from the rock storage areas and treatment ponds, as well as from the mine, mill, and shop facilities upstream.

Based on these conclusions from the ADF&G, it is not clear to us that there is a change in the baseline trends or that mitigation measures are warranted.

Comment ID: DM.3.025

Corrective action is already required under the FWMP, GPO Appendix 1, which states that if a water quality standard exceedance is indicated, HGCMC will notify the Forest Service and ADEC within 14 days and conduct confirmation sampling. If the results are confirmed, HGCMC would prepare and submit a mitigation plan to the Forest Service and ADEC for review and approval.

Comment



DM.3.024 mine activities should include a method to identify the source(s) of contaminants and measures to control source(s). The USFS should consider the suite of mitigation measures and the potential impacts to aquatic resources from current and proposed activities.

DM.3.025 The DEIS includes Table 2.6-3 listing monitoring requirements and thresholds which would trigger an action. For aquatic resources, the threshold is a significant change as compared to baseline or reference site. The follow up action is to increase the number of parameters analyzed in water samples. We believe that there should also be corrective action required to identify the source(s) causing an impact and intent to control that source or sources.

Wetlands

DM.3.026 The DEIS proposes mitigation in the form of repairing a fish pass on Greens Creek, which is considered a temporary mitigation. Flood damage caused the constructed fish pass, used as mitigation previously, to fail and it has not been repaired. Because it is not part of the natural geomorphic form of the stream, the fish pass is not self sustainable and requires maintenance. After mine closure if maintenance ceases and the next flood damage at the fish pass is not repaired, fish will again be eliminated from that stretch of stream. Although the EPA would not typically consider actions that are not self sustaining to be adequate mitigation, if this is determined to meet mitigation requirements, financial assurance should be included to cover the costs of ongoing maintenance.

DM.3.027 The Corps of Engineers' Public Notice proposes in-lieu-fees to mitigate for wetland loss. The impacted wetlands are all high value and support salmon streams. A very high ratio would need to be required by the Corps to effectively offset these impacts through in-lieu-fees. The USFS should provide details of how the proposed in-lieu-fee amount and credits for aquatic resource compensation were determined so that their adequacy for mitigation can be determined.

DM.3.028 In the event that long term water management and mitigation fail, waste rock and tailings facilities sites will produce acid drainage, increasing mobility of metals, allowing them to flow to Hawk Inlet and the respective salmon stream, Tributary Creek and/or Fowler Creek. We believe it is crucial that engineered structures constructed to direct flow in a particular direction function without active maintenance. During the analysis to determine the least environmentally damaging practicable alternative, additional design may be needed to further minimize the risk to surface waters. For example it may be possible to concentrate the placement of additional tailings to minimize impacts. We will be providing comments to the Corps of Engineers per the EPA's shared responsibility to administer and enforce CWA Section 404.

DM.3.029 The DEIS states that increased flow to the stream channels may be capable of scouring sediment and impacting the dynamic equilibrium of stream channel morphology. In such a case, habitat values are likely to be lost for an extended distance downstream. If the stream is entrenched as a result, then riverine wetlands would be hydrologically disconnected from the stream, degrading their functional role with the stream (flood water and sediment storage and nutrient export). Erosion of the channel would likely cause sediment deposition in estuarine waters of the delta and marine waters at either Hawk Inlet or Youngs Bay. The DEIS states that monitoring will be required to detect this effect and implement remedial measures. However, once the erosive process starts, damage to stream quality will have occurred. Construction of storm water ponds, proposed as remedial measures, will take time, allowing damage to progress. Once stream morphologic equilibrium has been upset it will likely be reestablished in a different geomorphic and ecological state, responding to the new post erosion conditions. Quality in stream habitat may take a very long time to become reestablished. Therefore, we recommend that the

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Response

Comment ID: DM.3.026
ADF&G does not consider the fish passage to be "temporary mitigation" and has stated that the passage must be maintained. Monitoring and maintenance of the fish passage project will be included in the revised reclamation bond and required through the Record of Decision.

Comment ID: DM.3.027
The USACE is responsible for determining the mitigation ratio and will do so in their own Record of Decision. Since the USACE will use information in the Final EIS to evaluate the mitigation proposed by HGCMC and establish the final ratios, that information is not available for the Final EIS.

Comment ID: DM.3.028
Comment noted. To assume a long-term failure represents a worst-case scenario; NEPA does not require analyses of worst-case scenarios. During operations, diversions would be designed to keep contact water flows out of Hawk Inlet and the Tributary and Fowler Creek drainages. The design of the engineered cover as proposed would allow surface flows to follow natural drainage patterns once the cover is stabilized. Surface flow across the reclaimed TDF would be unlikely to exhibit acid drainage or mobilized metals. Water directed to the treatment systems following closure would be from subsurface collection areas.

The commenter has not provided adequate clarity on how the Forest Service might evaluate the potential to "concentrate the placement of additional tailings to minimize impacts" for us to formulate a specific response.

Comment ID: DM.3.029
Stormwater detention structures or ponds will be required in order to maintain the hydrogeomorphic integrity of the stream (see Table 2.6-2). Geomorphic and/or habitat monitoring would be for the purpose of detecting unanticipated changes, despite the use of detention structures or ponds. The last sentences in subsections 3.5.3.2–3.5.3.5 refer to the issue (DEIS and FEIS).

Comment ID: DM.3.030
See the responses to detailed comments DM.3.031 through DM.3.036.

Comment

DM.3.029 USFS consider the construction of stormwater detention structures along with the facility rather than post monitoring. If this results in additional wetland impacts, these impacts should be disclosed and mitigated.

Geochemistry

DM.3.030 We have several issues regarding different aspects of the geochemical characterization of the site. Specifically these issues are regarding: 1) the temporal representativeness of samples collected from the tailings; 2) the accuracy of the predictive modeling of the tailings water quality; and 3) the visualization of acid-base accounting data.

DM.3.031 *Sample temporal representativeness* The DEIS offers inadequate justification/citation to support the statement that the tailings data shown in Table 3.4-1 represents a ~5 year range of materials (i.e. mid-to-late 1990s). During previous discussions with the agency's EIS technical team the temporal representativeness of this same data has been said to represent an approximately 24 year time frame (i.e. 1988 to present). The large range of estimates of the temporal representativeness of the data (and lack of citation/justification) makes interpretation difficult.

DM.3.032 The DEIS presents data from single samples that were "randomly" collected; however it is unclear whether these samples were truly randomly selected or whether these are grab samples collected for another specific study, and therefore not representative of the average conditions of the tailings. It is important that the data is representative of the average conditions of the tailings. The DEIS should rely on summary statistics (e.g. averages, medians) that also include measures of variability (e.g., standard deviations/errors, ranges, etc.) to provide an overall and unbiased understanding of the data that has been collected.

DM.3.033 *Tailings water quality modeling* Overall, there are three main reasons why we believe the modeling performed as part of this DEIS is inadequate: 1) The model has not been subject to the peer-review process and is not publically available or available to the EPA—a cooperating agency on this project; 2) the model was not developed for the purposes of predicting long-term water quality. From Condon, 2011 *"[The model] is intended to be used as a tool to provide a reasonable indication of the characteristics of drainage under anticipated conditions, particularly following closure of the facility. It is not intended to predict exactly the concentration of trace elements or metals hundreds to thousands of years in the future"*; and 3) a sensitivity and uncertainty analysis was not performed on the model.

DM.3.034

DM.3.035

DM.3.036 To support the validity of the geochemical modeling, the DEIS cites similarities between the 2003 final EIS and the current Condon, 2011 modeling results. For example: *The agreement between model results generated on a theoretical basis (2003) and an empirical, field data basis serves to reinforce confidence in the estimates produced by Condon (2011)* (p3-33). However, this is not an entirely accurate description of the 2003 model. For example, from the 2003 EIS it states that: *The model is semi-empirical, meaning that portions of the model mechanistically simulate physical and chemical processes based on basic principles, and other parts of the model rely on empirical measurements...*" Furthermore, the 2003 model was calibrated using empirical wet well data from the tailings. As such, the two models are not entirely independent and the agreement between them should not be used to imply greater confidence than is warranted.

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Response

Comment ID: DM.3.031
The text was modified to show when and where samples were taken. Ten samples were taken in the early 2000s. Two were taken in the early 1990s and two were taken in 2004 in the mill. The field samples were collected along a west-to-east transect and in one additional location in the southwest corner of the tailings facility.

Comment ID: DM.3.032
Please see the response to Comment DM.3.031.

Comment ID: DM.3.033
Please see the responses to comments DM.3.010, DM.3.013, and DM.3.016.

Comment ID: DM.3.034
Please see the responses to comments DM.3.010 and DM.3.016.

Comment ID: DM.3.035
Please see the responses to comments DM.3.010 and DM.3.016.

Comment ID: DM.3.036
Please see the responses to comments DM.3.010, DM.3.013, and DM.3.016.

Comment ID: DM.3.037
Edit made per comment. Page 2-6 has been changed to read "the proposed action includes the expansion of the TDF by an additional 14.2 million cubic yards, based on the calculated disposal rate of annual tailings, waste rock, and other permitted materials."

Comment ID: DM.3.038
Edit made per comment. Title 83 has been removed; 83 has been added to the list of chapters under Title 18 in the above line.

Comment ID: DM.3.039
Edit made per comment. "Resources" has been changed to "resource."

Comment

EPA Specific Comments on Greens Creek DEIS

	Document Page Number	Line Number	Comment
DM.3.037	1-7 and 2-6		On page 1-7 the DEIS states that the tailings disposal facility (TDF) would accommodate an additional 15 million cubic yards of tailings and waste rock. On page 2-6 the DEIS states that the proposed action includes expanding the TDF to a total of 15 million cubic yards. Please correct these discrepancies.
DM.3.038	1-14	10	The wording should be to add Chapter 83 to Title 18 not "Title 83"
DM.3.039	2-1	¶2	2nd to the last line – "resources" should be "resource"
DM.3.040	2-8	3	This part states that there will be room for an additional 1 m yd^3 and that this room would allow for 3 more years of disposal. But Section 2.3.1 says that 180,000 yd^3/yr of tailings are disposed and 54,000 yd^3/yr are co-disposed. 1m yd^3 / (180,000 + 54,000) = 4.3 years
DM.3.041	2-12	3	Same comment as above except it is 3 m yd^3 adding 10 more years of disposal but even adding the average waste rock going to Site 23, the math comes out to 12 yrs.
DM.3.042	2-12	Footnote 2	Is this necessary since Footnote 1 says the same?
DM.3.043	2-16	6	then discharged to Hawk Inlet
DM.3.044	2-20	11	The existing mitigation measures listed further seem to apply to both water and wind so should wind be deleted here or should "surface water diversions" be deleted from line 13?
DM.3.045	2-23	Section 2.4.8 ¶2	It is not clear how surface water diversions prevent wind erosion
DM.3.046	2-28	Section 2.5.2	The language about submarine tailings disposal from the previous page is repeated here.
DM.3.047	3-21	Last ¶	Please clarify how the Nevada Division of Water Resources safety factors are applicable in SE Alaska given the differential rainfall and the potentially related differential in pore water pressure conditions.
DM.3.048	3-24	Table 3.4-1	Several issues: 1) There are extra periods in the data (e.g. 3.8.3 %); 2) Barite should be 12.0 instead of 12.3; 3) the chemical formula for chlorite the "5" should be subscripted; and 4) n=12 should be added to the Table title.
DM.3.049	-24		The averages are based on 12 samples not 14 samples.
DM.3.050	3-24		Waterloo (2011) is not listed in the references.
DM.3.051	3-25		Regarding: "Data presented in the figure span ages from 1994 to 2008 and provide a representation of the variability of the acid-base balance in Greens Creek tailings." It should be clear what the dates represent—are these the dates the samples were collected or the dates the ABA analysis was completed? It's not entirely clear, but it appears that the data referred to as "2008 data" may have been collected in 2005 and stored in the freezer

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Response

Comment ID: DM.3.040

An average of 360,000 cubic yards of tailings are produced each year, with approximately one-half, or 180,000 cubic yards of tailings, being backfilled whereas the remaining 180,000 cubic yards are disposed of in the TDF. Additional material from Site 23 and Site E and miscellaneous materials are permitted to be disposed of in the TDF. Based on the Annual Tailings and Production Rock reports from HGCMC to the ADNR over the past 5 years (2007–2011), an average of 260,143 cubic yards of tailings, waste rock, and other permitted materials have been annually disposed of in the TDF. This average disposal rate allows for approximately 4.28 years of disposal.

Based on HGCMC's proposed action's capacity calculations, approximately 14.2 million cubic yards of additional capacity are needed. The first stage of Alternative B years 1–10 is designed to accommodate 3,183,874 cubic yards of tailings, waste rock, and other materials disposal: 3,183,874 cubic yards/10 years = 318,387 cubic yards of tailings, waste rock, and other materials annually.

This is based on HGCMC's projected disposal needs (318,387 cubic yards per year × 3 years = 955,161 cubic tons for three years). Edits have been made to text to clarify numbers. Calculations are based on projected disposal rates provided by HGCMC.

Comment ID: DM.3.041

An average of 360,000 cubic yards of tailings are produced each year, with approximately one-half, or 180,000 cubic yards of tailings, being backfilled while the remaining 180,000 cubic yards are disposed of in the TDF. Additional material from Site 23 and Site E and miscellaneous materials are permitted to be disposed of in the TDF. Based on the Annual Tailings and Production Rock reports from HGCMC to the ADNR over the past 5 years (2007–2011), an average of 260,143 cubic yards of tailings, waste rock, and other permitted materials have been annually disposed of in the TDF. This average disposal rate allows for approximately 4.28 years of disposal.

Based on HGCMC's proposed action's capacity calculations, approximately 14.2 million cubic yards of additional capacity are needed. The first stage of Alternative B years 1–10 is designed to accommodate 3,183,874 cubic yards of tailings, waste rock, and

Comment

DM.3.051			for 3 years before it was analyzed. If this is the case, the Figure and text should be changed to say 2005 data instead of "current study" or "2008".
DM.3.052	3-25		Regarding: "The dashed box in (b) corresponds to the range of data in (a) for the years 1994-2004." This information should be placed in the Figure 3.4-1caption and not in the main body of the text.
DM.3.053	3-27	Table 3.4-3	For Hg there is a footnote 14 that doesn't seem to refer to anything.
DM.3.054	3-27		The statement that the grain size of the tails remains essentially constant would only be accurate if there were no co-disposal occurring, since the waste rock material in the tailings would result in the tailings having very heterogeneous grain sizes (as mentioned on p 3-25). Other statements on p 3-29 also make reference to the tailings being fine-grained and how this would restrict infiltration; however, the impacts on infiltration during co-disposal scenarios due to the large grain size of the waste rock is not discussed.
DM.3.055	3-28		Regarding "Laboratory rate equations have also been established for oxidation of pyrite at the Greens Creek Mine site (Williamson and Rimstidt 1994)." A reasonable interpretation of this sentence implies that Williamson and Rimstidt, 1994 performed a laboratory study on Greens Creek tailings materials to determine the pyrite oxidation rates. However, the rate law presented in Williamson and Rimstidt, 1994 is not based on Greens Creek samples but instead was performed on pyrite that was obtained from Peru. Presumably, the pyrite oxidation rate of 200 mg/kg/week presented in the DEIS was calculated using the rate law established in Williamson and Rimstidt, 1994 by using Greens Creek site specific data. The way the sentence is currently worded and cited may be misleading. Suggested change "Using the general rate law for pyrite destruction established by Williamson and Rimstidt, 1994, Greens Creek site specific data was used to predict…."
DM.3.056	3-29		Text describes the development of ARD in seeps associated with tailings "where unlimited water and oxygen were available." It is clear that a distinction is being made between those areas and the current and future TDF based on their exposure to oxygen, but it isn't clear what those areas were other than that they were "associated with tailings." Describe their locations and other characteristics and explain how their setting is different from those that will be found in the future.
DM.3.057	3-33		Regarding: "In other words, the inherent error of the points associated with each model line overlaps every other line." The graphs do not show any measure of the error associated with the

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Response

other materials disposal: 3,183,874 cubic yards/10 years = 318,387 cubic yards of tailings, waste rock, and other materials annually. This is based on HGCMC's projected disposal needs (318,387 cubic yards per year × 10 years = 3.2 million cubic yards for ten years). Edits have been made to text to clarify numbers. Calculations are based on projected disposal rates provided by HGCMC.

Comment ID: DM.3.042
Edit made per comment (footnote 2 deleted).

Comment ID: DM.3.043
Edit made per comment. Text has been changed from "then it would be discharged to Hawk Inlet" to "then discharged to Hawk Inlet."

Comment ID: DM.3.044
Edit made per comment. Wind was deleted from line 11 so the discussion now applies to all erosion types.

Comment ID: DM.3.045
Edit made per comment. See edit to Comment DM.3.045; language edited for clarity.

Comment ID: DM.3.046
The second reference to submarine tailings deposition has been deleted from Section 2.5.2 in the Final EIS.

Comment ID: DM.3.047
ADEC has not established specific requirements for factors of safety; therefore, the factor of safety cited from the Nevada Division of Water Resources regulations was presented strictly as an example of how factors of safety are implemented. Factors of safety are calculated based on the specific aspects of a particular facility, including slope, compaction levels, materials characteristics (e.g., size and cohesiveness), and degree of saturation. The calculations therefore are developed independent of location—a safety factor of 1.3 means the same thing in Nevada or Alaska, although site-specific conditions and design aspects may be different.

Comment ID: DM.3.048
Table data have been replaced with correct values; other edits have been made.

Comment

DM.3.057			lines. If uncertainty and sensitivity analysis were not performed on the model how was the level of error determined?
DM.3.058	3-33		Regarding: "Overall, the modeled estimates for future water quality discharging from the tailings impoundment is very similar to the estimates made in 2003." The term "very similar" is vague and a more quantitative statement is preferable. In doing our own comparison of the 2003 and 2011 models, for most parameters the predictions between the two are within the same order of magnitude, though 2 to 7-fold differences are common. For some elements (such as Selenium and Cadmium) the difference in the two model's predictions means the differences between meeting and exceeding Alaska Chronic Fresh WQS. As such, stating that the model results were within the same order of magnitude is more accurate than stating that they were "very similar".
DM.3.059	3-76		"The groundwater monitoring system will be used..." Doesn't the expansion require a new ground water monitoring system? Explain when that system is designed, where it will be fully described and whether it will be available for public review.
DM.3.060	Section 3.4.2		Clarify the locations of the seeps discussed here-- are they within the TSF, in nearby areas with drainage controlled and directed to treatment, or in uncontrolled areas?
DM.3.061	Section 3.4.4, p 3-34	Figure 3.4	The summary should list the parameters that are expected to exceed WQS. *Acid-base accounting* We believe the geochemistry data presented in Figure 3.4- contains inaccurate and incomplete information. For example: • In graph (a) the "boxes" labeled 2002-2004 should be labeled 1994; and presumably the "triangle" data labeled 1994 should be changed to 2002-2004. • The DEIS text refers to the "circle" data as "raw data"; however on graph (a) it is referred to as "Current study" and on graph (b) it is referred to as "Reported". Using consistent terminology between graphs and the text will increase the clarity of the information presented. • Showing the raw data twice on graph (a) and (b) does not make sense as the raw data should not be used for temporal comparisons—instead the corrected/calculated values are a better comparison. If the "calculated" values were added to graph (a) instead of the "reported" values this would then negate the need to the "dashed box" in graph (b). This would result in a stronger visual representation of the data. To demonstrate that there has not been any systematic change in the acid-base ratios over time, the EIS should present all of the years' data on a single graph. As such, data that was collected

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Response

Comment ID: DM.3.049
Edit made per comment (changing the value from 14 to 12).

Comment ID: DM.3.050
Waterloo (2011) is referenced in the EIS as Lindsey and Blowes (2011).

Comment ID: DM.3.051
The figure was taken directly from Lindsay and Blowes (2011) as a report of the work done. It has not been changed. However, text has been added to the document to indicate that the ages of the tailings samples pre-dates 2008 (see text in Section 3.4.2) and provides estimated ranges for those dates of tailings production.

Comment ID: DM.3.052
Edit made per comment.

Comment ID: DM.3.053
Edit made per comment.

Comment ID: DM.3.054
The grain size of tails remains essentially constant, although the grain size of material in the TDF does vary due to the presence of any co-disposed waste rock. Co-disposed waste rock is placed at depth in the tailings and does not occur near the margins. Thus, the infiltration characteristics of the tailings facility are dictated by the properties of the tailings themselves and are not affected by any co-disposed material.

Comment ID: DM.3.055
The text in Section 3.4.2 has been modified to indicate that the literature rate laws were applied to the Greens Creek tailings site-specific data to produce a comparison rate.

Comment ID: DM.3.056
The indicated text is not trying to make a distinction between those areas and the current and future TDF. It is making the point that ARD has been observed in limited and restricted seeps in the TDF and the timing of its appearance is consistent with estimates for the delay before onset. The text has not been modified.

Comment

DM.3.061			from 1990 and 1999 (as presented in the 2003 EIS) should be added to this figure.
DM.3.062	3-77	¶ before 3.6.3.5	"would" should be "could" (this was changed in an earlier reference (pg 76 ¶ before Mitigated B) but not here or the next one)
DM.3.063	3-78	¶ 3	"would" should be "could" (see above)
DM.3.064	3-93	1 – 13	Earlier in the document, there was a statement about the inlet fully flushing every 5 tidal cycles. Does this have any impact on what is presented in this section?
DM.3.065	3-135	1st line after Table	"were" should be "are"
DM.3.066	3-136	Tables 3.10-4,6,7,8	For each of these tables except 10-6, the numbers in the columns add up to the Total shown. Each has a note below stating that a certain amount of acreage is included but that amount is only added in to the total in Table 3.10-6. Why is it added here and not in the other Tables?
DM.3.067		Table 3.4.1	The percent by weight column has extra decimals. The paragraph above the table describes the number of samples and the multiple depths, but needs to clarify the number of separate locations sampled as well.
DM.3.068	Section 3.22		The cumulative effects of activities potentially impacting water resources at the mine need to be considered. For example, we understand that waste rock storage facility, Site 23, was constructed on a historic landslide event in uplands directly above Greens Creek and has been incrementally shifting. The EIS should disclose site conditions such as this that may impact water resources in the future should be disclosed.

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Response

Comment ID: DM.3.057
The level of error was estimated by consideration of the typical uncertainty of analysis of metals in water (±15%) and then conceptually increased from that minimum to reflect increasing uncertainty associated with other error for parameters included in the model calculations and the extension of all to future time periods. For example, in Figure 3.4-2, the error associated with estimated zinc concentration of 0.45 mg/L, considering ±15%, produces a range 0.45 ± 0.07 (0.38 to 0.52), which spans all the model prediction lines in the graph. Thus, owing to analytical uncertainty alone, no distinction between the various model results is appropriate.

Comment ID: DM.3.058
The text has been amended to indicate that current and 2003 model calculations are within one order of magnitude of each other.

Comment ID: DM.3.059
Additional groundwater monitoring requirements and wells would be incorporated, as needed, with appropriate modifications to the FWMP (required through the GPO) and ADEC's Waste Management Permit.

Comment ID: DM.3.060
The EIS has been revised to reflect that the seeps are in the TDF and are controlled and treated.

Comment ID: DM.3.061
It would be highly speculative to list parameters, especially metals, that could potentially cause excursions above water quality standards. Observed effluent chemistry and in situ monitoring is discussed in Section 3.5, Water Resources.

As indicated on the figure, the graphs presented were taken from Lindsey and Blowes (2011) and presented in the EIS. If the recalculated data in graph (b) were combined with the original data in graph (a), the figure would be excessively crowded and cluttered, because the differences are small. We believe this is the reason Lindsey and Blowes (2011) chose to make the illustration as they did. Data from 1990 and 1999 were amended to the figure.

Comment ID: DM.3.062
Edit made per comment.

Comment

U.S. Environmental Protection Agency Rating System for Draft Environmental Impact Statements Definitions and Follow-Up Action*

Environmental Impact of the Action

LO – Lack of Objections
The U.S. Environmental Protection Agency (EPA) review has not identified any potential environmental impacts requiring substantive changes to the proposal. The review may have disclosed opportunities for application of mitigation measures that could be accomplished with no more than minor changes to the proposal.

EC – Environmental Concerns
EPA review has identified environmental impacts that should be avoided in order to fully protect the environment. Corrective measures may require changes to the preferred alternative or application of mitigation measures that can reduce these impacts.

EO – Environmental Objections
EPA review has identified significant environmental impacts that should be avoided in order to provide adequate protection for the environment. Corrective measures may require substantial changes to the preferred alternative or consideration of some other project alternative (including the no-action alternative or a new alternative). EPA intends to work with the lead agency to reduce these impacts.

EU – Environmentally Unsatisfactory
EPA review has identified adverse environmental impacts that are of sufficient magnitude that they are unsatisfactory from the standpoint of public health or welfare or environmental quality. EPA intends to work with the lead agency to reduce these impacts. If the potential unsatisfactory impacts are not corrected at the final EIS stage, this proposal will be recommended for referral to the Council on Environmental Quality (CEQ).

Adequacy of the Impact Statement

Category 1 – Adequate
EPA believes the draft EIS adequately sets forth the environmental impact(s) of the preferred alternative and those of the alternatives reasonably available to the project or action. No further analysis of data collection is necessary, but the reviewer may suggest the addition of clarifying language or information.

Category 2 – Insufficient Information
The draft EIS does not contain sufficient information for EPA to fully assess environmental impacts that should be avoided in order to fully protect the environment, or the EPA reviewer has identified new reasonably available alternatives that are within the spectrum of alternatives analyzed in the draft EIS, which could reduce the environmental impacts of the action. The identified additional information, data, analyses or discussion should be included in the final EIS.

Category 3 – Inadequate
EPA does not believe that the draft EIS adequately assesses potentially significant environmental impacts of the action, or the EPA reviewer has identified new, reasonably available alternatives that are outside of the spectrum of alternatives analyzed in the draft EIS, which should be analyzed in order to reduce the potentially significant environmental impacts. EPA believes that the identified additional information, data, analyses, or discussions are of such a magnitude that they should have full public review at a draft stage. EPA does not believe that the draft EIS is adequate for the purposes of the National Environmental Policy Act and or Section 309 review, and thus should be formally revised and made available for public comment in a supplemental or revised draft EIS. On the basis of the potential significant impacts involved, this proposal could be a candidate for referral to the CEQ.

* From EPA Manual 1640 Policy and Procedures for the Review of Federal Actions Impacting the Environment. February, 1987.

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Response

Comment ID: DM.3.063
Edit made per comment.

Comment ID: DM.3.064
Tidal flushing information provided in Section 3.5.2.3 provides a context for the behavior of water in Hawk Inlet in relation to effluent discharged by the mine, as currently authorized by the USEPA. To our knowledge, the relationship between tidal flushing rates, sediment deposition rates, and metals concentrations in Hawk Inlet has not been investigated.

Comment ID: DM.3.065
Edit made per comment.

Comment ID: DM.3.066
The numbers in the tables in the wetlands section (now Section 3.8) have been revised and the total values equal the sum of the individual components.

Comment ID: DM.3.067
Data in Table 3.4-1 have been edited. Text has been added to clarify number of tailings sample locations.

Comment ID: DM.3.068
At this time, we have no reason to believe Site 23 stability is likely to affect water quality in Greens Creek. HGCMC continues to monitor and assess stability at Site 23. Ongoing stability monitoring consists of inclinometers and several survey hubs monitored full time by GPS. The operator recently reported that there has been about 12 mm of lateral movement at a surface about 80 feet deep since 2006, with about 2 mm of movement from November 2010 to December 2011. This depth roughly corresponds to the base of what is believed to be the slide/colluvium unit and the top of the dense till in the foundation. At this point we believe that ongoing monitoring is the best approach to addressing Site 23 and that impacts to water quality from the site are not reasonably foreseeable.

Additional details are provided in *Hecla Greens Creek Mining Company, Tailings and Production Rock Site, 2011 Annual Report*. This report is available online at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/gc2011tailings.pdf.

Comment

From: Don Reid
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion
Date: Tuesday, May 08, 2012 11:15:17 AM

DR.0.001

I am writing this letter in support of the proposed tailing expansion being proposed by Hecla Greens Creek Mine. I have lived in Juneau for 47 years and I am a heavy user of Hawk Inlet for hunting and fishing. I am also a local business person that recognizes the need for responsible resource development in Southeast Alaska. The business I manage has done business with Greens Creek Mining Company since the mine was initially developed. I have had several tours of the facility over the years as well as have advised them on facility development issues and safety issues. In every case they have demonstrated that their first priority is to operate safely and responsibly in regards to employee safety and environmental impacts and secondly to operate efficiently. It is getting harder and harder to operate an economically viable mine in the United States due to the ever increasing regulation coming from every direction. For that reason I urge you to take into consideration economic impacts of the various alternatives to avoid unnecessary cost increases that could jeopardize the long term viability of the mine. GGMC has demonstrated that their current tailings facility performs it's purpose in an environmentally responsible manner so I support their request to expand the current disposal facility rather than requiring them to create and manage a second and separate facility. I see no advantage to starting another tailings disposal site which would impact a separate area and create more environmental issues for them to contend with.

In regards to the other uses of Hawk Inlet I spend several weekends each year in Hawk Inlet on my boat hunting and fishing. I am continually impressed with how an operation the size of the Greens Creek Mine can operate in a relatively small area and supply excellent employment and still not adversely affect the ability for locals to enjoy Hawk Inlet. They have proven to be a responsible user of the area and a good neighbor.

I have several personal friends that are employed at the mine and they and their families depend on the mine for their livelihood. You would have to look a long time to find someone that would argue that they are not one of the best employers we have in our area. We need them in Southeast Alaska and based on their track record of being a responsible employer and member of the mining community I urge you to approve their permit using their preferred method of expanding the existing tailings facility.

Regards,

Don Reid
16870 Glacier Hwy
Juneau, AK 99801
907-789-3242

Response

Comment ID: DR.0.001

Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment	*Response*
From: Doug Schwartz **To:** FS-comments-alaska-tongass-admiralty-national-monument **Subject:** Greens Creek Mine Tailings expansion! **Date:** Tuesday, May 08, 2012 4:12:44 PM DS.0.001 I support the efforts of Greens Creek and hope this expansion succeeds, sincerely Doug Schwartz Doug Schwartz Arrowhead Transfer Wrangell Alaska 907 874 3314 Cell 907 305 0383	**Comment ID: DS.0.001** Comment noted.

Comment	*Response*
From: david l wilmarth **To:** FS-comments-alaska-tongass-admiralty-national-monument **Subject:** Greens creek tailings expansion. **Date:** Thursday, May 31, 2012 7:56:28 PM DW.0.001 Leave them alone. They are a much needed customer.	**Comment ID: DW.0.001** Comment noted.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 2:14 PM
To: Weglinski, Gene; Cox, David
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Tailings Expansion

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: David Wetzel [mailto:dwetzel@admiraltyenv.com]
Sent: Monday, June 04, 2012 10:11 AM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion

Good morning,

DW.1.001
I am writing to you to express my support for the tailings expansion of the Greens Creek mine by the Hecla Mining Company. I am the owner of Admiralty Environmental, a Juneau-based environmental testing and consulting firm. We perform analytical testing and environmental sampling for a broad variety of clients in southeast Alaska, including cruise ship companies, local municipalities, drinking water operators, and large mining companies. We are currently analyzing compliance samples for both of the local large mines (Coeur Alaska Kensington and Hecla Greens Creek). In our position, we interact closely with the Hecla Mining Company with respect to their environmental compliance programs and testing, and in this regard have a unique perspective on their approach to environmental issues. In my opinion, the Hecla Mining Company has been highly responsible from an environmental impact standpoint and their presence is crucial in order to support the local economy in Juneau.

The environmental compliance staff at Hecla Greens Creek is a group of well trained environmental professionals with a great deal of integrity. I have personally worked with several of them over the last 12 years and know them to be dedicated to their work and the requirements of environmental compliance with their EPA permit. I am confident that any type of expansion of their tailings facility will be handled in the most environmentally responsible manner and with the least possible impact to Admiralty Island.

DW.1.002
In this consideration, I believe that Alternative B of the Hecla Greens Creek Mining Company proposal is the most logical approach to expanding their tailings facility. This option would merely expand the existing footprint of the tailings facility and fits in with the original agreement to consolidate the mine's facilities to the maximum extent possible. This would allow for more efficient treatment and monitoring of the tailings facility, would lessen disturbance, and would minimize closure and reclamation costs. This option would also limit the tailings facility to a single watershed, in contrast to the other options that would involve multiple watersheds and thus a greater impact. This option would also use existing road and support facilities, in contrast to other options that involve new road building. I also understand that there is an active goshawk nest at the new location proposed by options C and D. I worked for the Forest Service for several years at the Juneau Ranger District on a project to monitor and track goshawks, and am acutely aware of their sensitivity to human disturbance. I would be opposed to options that would potentially disturb these birds.

DW.1.003
As a contractor for Hecla and the Greens Creek Mine, I also support the tailings expansion because it will extend the operation of one of our largest clients. We maintain a business that is crucial for providing drinking water compliance testing in northern southeast Alaska, and the work of large clients like Hecla allows for us to maintain a viable laboratory

1

Response

Comment ID: DW.1.001
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment ID: DW.1.002
Comment noted.

Comment ID: DW.1.003
Comment noted.

Comment

operation in Juneau for our smaller clients. We have 4 full time employees that depend on this work in order to support their positions here. We also have many local vendors that we purchase goods and services from in the Juneau area that would be impacted if Hecla were not operating the Greens Creek Mine to full capacity.

DW.1.004

In conclusion, I support the Hecla Mining Company's proposal to expand their tailings facility under Alternative B. This would provide the least environmental impact and would allow the mine to operate for many years to come. I am confident that they will do this in an environmentally sound manner, just as they have done so far with their existing facility.

Best Regards,

David Wetzel
Admiralty Environmental
641 W. Willoughby Ave., Suite 301
Juneau, AK 99801
(907) 463-4415 ofc
(907) 723-4415 cell

Response

Comment ID: DW.1.004
Comment noted.

Comment

From: Ethan Berto
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Talings Expansion
Date: Wednesday, May 16, 2012 7:10:04 AM

To Whom it May Concern:

EB.0.001 I am in support of Hecla Greens Creek Mining Company and their proposed alternative B for the following reasons:

EB.0.002
- HGCMC's proposal provides for a logical expansion of the existing facility where tailings have been placed for nearly a quarter century and abides by the original agreement for the mine's facilities to be consolidated to the maximum extent practicable *VERSUS* the alternatives that would spread the disturbances, operational and reclamation impacts, and monitoring requirements between two sites separated by over 2 miles.

EB.0.003
- HGCMC's proposal allows for both a southward extension and an upward expansion of the existing facility, which lessen disturbance and closure/reclamation costs *VERSUS* more disturbance and higher costs for the alternatives.

EB.0.004
- Under its proposal, HGCMC will maintain tailings disposal in an engineered, contained facility within a portion of a single watershed (Tributary Creek) *VERSUS* the alternatives that would place tailings in a similar facility but in multiple watersheds and create more disturbance.

EB.0.005
- HGCMC's proposal utilizes existing site support facilities, including the continued use of B Road that has served for tailings delivery since the mine opened *VERSUS* the need, under the alternatives, for a major construction upgrade to approximately 2.5 miles of the A road.

EB.0.006
- HGCMC's proposal will have minimal disruption to wildlife *VERSUS* the alternatives. There is an active goshawk nest at the new location under the alternatives, and the nest and surrounding habitat for this sensitive species would be impacted if development in this area were to occur. Also, the heavy hauling and increased maintenance over 2.5 miles of the A road necessary for the alternative location would cause increase impacts to all wildlife in this area.

EB.0.007
- Under its proposal, HGCMC maintains existing haul distances to the tailings facility *VERSUS* the alternatives where an additional 7 miles of haulage would be added to each truck trip, resulting in an extra 20,000 to 30,000 gallons of diesel fuel being burned every year. That amounts to burning an extra 1,000,000 gallons of diesel fuel over the life of the project. This higher fuel use means more fuel transport to Admiralty Island and more greenhouse gas emissions. More energy will be consumed pumping contact water from the alternate site to the water treatment plant as well.

EB.0.008 HGCMS for the past 25 years has contributed to the southeast Alaska economy while being a good steward of the land, for these reasons I support their ongoing development.

Regards,

Response

Comment ID: EB.0.001
Comment noted.

Comment ID: EB.0.002
Comment noted. The Record of Decision presents the Forest Service's final selection and the rationale behind that choice.

Comment ID: EB.0.003
Comment noted.

Comment ID: EB.0.004
Comment noted.

Comment ID: EB.0.005
Comment noted. Additional acres would be disturbed under alternatives C and D, as well as an additional 14 acres of wetland for the A road upgrade.

Comment ID: EB.0.006
Comment noted. Additional acres would be disturbed under alternatives C and D, as well as an additional 14 acres of wetland for the A road upgrade.

Comment ID: EB.0.007
Correction: Alternatives C and D would add an additional 5.6 miles round-trip for haul trucks to travel from the portal to the new northern TDF. Fuel usage would vary by alternative.

Greenhouse gas calculations were added for each action alternative in Section 3.2.3. Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment ID: EB.0.008
Comment noted.

Comment

From: Eric Badger
To: PS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion
Date: Tuesday, May 08, 2012 4:42:28 PM

ALASKA MARINE TRUCKING

To Whom It May Concern;

EB.1.001

Alaska Marine Lines and Alaska Marine Trucking are writing in support of Hecla Greens Creek Mine's efforts to expand their existing tailings facility using ***"Alternative B"*** under the draft EIS submitted by the US Forest Service for the following reasons:

- Expansion of their tailings facility is an essential component in their plans to continue operating the Greens Creek Mine now and for the future
- Alternative B minimizes the impacts to the environment by keeping the tailings facility consolidated versus the other alternatives
- Alternative B would continue their tailings disposal in an engineered, contained facility within a single watershed versus the other alternatives that would place tailings in multiple watersheds
- Alternative B would allow them to continue to utilize existing site support facilities including "B" Road versus other alternatives that would require major construction upgrades to "A" Road
- Alternative B using the current location for tailings has no new impacts on area wildlife versus the other alternatives that have an active goshawk nest in the area
- Alternative B is the only option that would not increase Greens Creek's use of fossil fuels in the transportation of tailings to the disposal facilities

EB.1.002

Hecla Greens Creek Mine has been an integral part of our Southeast Alaska Community for the past 25 years by providing high paying jobs, purchasing supplies and services locally, and operating in a safe and environmentally friendly manner. Alternative B gives them the additional capacity for their future and to continue to be a part of our future here in Southeast Alaska.

Sincerely,

Eric W. Badger

Eric Badger
Juneau Port Manager
ALASKA MARINE TRUCKING
Phone: (907) 463-9326
Fax: (907) 463-3298
ebadger@lynden.com

Response

Comment ID: EB.1.001
Comment noted. The Forest Service's decision and the rationale behind it are presented in the Record of Decision.

Comment ID: EB.1.002
Comment noted.

Comment	*Response*
From: emorrison-dia@gci.net [mailto:emorrison-dia@gci.net] **Sent:** Wednesday, May 16, 2012 2:37 PM **To:** Gilliam, Myra -FS **Cc:** Peter Naoroz; Walter Jack; Andrea Cadiente-Laiti **Subject:** RE: Consultation on Greens Creek Dry Tailings Expansion Project Myra; sorry I was hoping the consultation was to be today on the request from the Greens Creek mine for additional acreage for tailings and I checked the scheduled date that you had and noticed it is scheduled for next week. I am at an air conference all next week.I will be looking forward to another date and may invite an elder and an Angoon rep if possible. But I do have some thoughts EM.0.001 on the request for additional acreage for tailing. We at DIA would be very interested in developing some means to commence water studies on the beach waters adjacent to the tailing site as well as the adjacent 2 streams. we may also want to request a permit to acquire some salmon from these streams to check for their health and viability. I will continue to keep Angoon informed on our progress in this matter because I know their resources are as limited as ours. Eric Morrison Douglas Indian Association Environmental Planner 811 W. 12th St. Juneau 99801 907-364-2916	**Comment ID: EM.0.001** Comment noted.

Comment

4-24-2012
PO Box 34315
Juneau, AK 99803

Sarah Samuelson
Tongass National Forest
Juneau, AK

RE: Hecla Greens Creek Mine Proposed Tailings Expansion

Dear Ms. Samuelson:

EP.0.001

I am writing regarding the EIS for Hecla Greens Creek Tailings Expansion. I support the project as submitted. Greens Creek has proven to be a company that complies with regulations and goes the extra step to maintain environmental constraints.

I recently had the opportunity to go on a mine tour with the Introduction to Mining class the University of Alaska Southeast sponsors for Juneau High School students. I was extremely impressed with their treatment facility for water quality. We had the opportunity to tour the facility and have a representative from the mine explain the tailings pile, the layers and how it is protected from storms, earthquakes, etc.

The mine employs over 350 people with good wages with benefits. Safety is a major concern and was stressed throughout the tour. Their reputation for community and long term employment is important to Juneau and surrounding communities. This expansion will assure the mines longevity into the future for many years. Unless a person has actually had the opportunity to tour the site they have no concept of how important this project is and how it has been designed to preserve the environment.

Thank you for the opportunity to comment.

Sincerely,

Elaine Price

Elaine Price

Response

Comment ID: EP.0.001
Comment noted.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 9:09 AM
To: Weglinski, Gene; Cox, David
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Tailings Expansion

#8 and now we are caught up for the moment!

~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

-----Original Message-----
From: Eric Twelker [mailto:twelker.eric@gmail.com]
Sent: Monday, June 04, 2012 8:05 AM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion

ET.0.001

I write in support of Alternative B of the Draft EIS. This option represents an incremental increase into an adjacent area with very similar characteristics to the existing facility. Everything significant aspect of this option is a known quantity based on experience from the years of prior operation.

ET.0.002

That said, I object to submitting a full-blown EIS for a project like this. In the past, numerous projects of equal or larger impact throughout the country have been approved with 'findings of no significant impact' and EAs. By introducing a highly complex, lengthy, and contentious EIS process to an incremental expansion-including ridiculous made up high-impact off site alternatives-the Forest Service elevates process over common sense. It makes the decision-making less accessible to the public and makes it far more difficult for itself. Decisions like this one are in danger of being converted into a game for the lawyers of special interest groups with process overwhelming the substance. That's not right. The Forest Service needs resist if it wants to remain an effective land management agency.

Eric Twelker
10430 Dock Street
Juneau, AK 99801
907-789-6800

Response

Comment ID: ET.0.001
Comment noted.

Comment ID: ET.0.002
Respectfully, it appears that the commenter does not have recent exposure to the permitting process for mining activities in the western United States. The Forest Service determined early in the process that the proposed action had the potential to cause significant impacts to the environment and therefore determined it was appropriate to develop an EIS. To have done otherwise would have invited a longer process involving lawsuits and appeals.

Comment

Amerikanuak, Inc.
PO Box 22909
Juneau, AK 99802
(907) 523-1995 phone/fax
(907) 321-3637 cell
aki2k@gci.net

May 31, 2012

Admiralty Island National Monument – Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, Alaska 99801

RE: Comments on DEIS for Greens Creek Mine Tailings Expansion

Dear Sir/Madame:

FB.0.001 The USFS and its contractor have prepared a draft environmental impact statement in response to a request by Hecla Greens Creek Mining Company's to modify their General Plan of Operations (GPO) for expansion of the existing tailings facility. Please select Alternative B – discussed therein – as the preferred environmental alternative in the FEIS and ROD.

FB.0.002 Greens Creek Mine is a pillar of the Juneau community and economy as the single largest provider of private sector jobs. It also pays significant CBJ property and sales taxes. Without a doubt, CBJ growth resulting from Greens Creek has helped offset population and economic decline in the remainder of the private and public sectors. This has netted a stagnant CBJ population relative to declining population in the remainder of Southeast Alaska. The ill effects of this regional population decline have been highlighted by the Forest Service via its own initiative to research and spur economic growth in the post pulp mill era (e.g. JEDC cluster working groups). To lose Greens Creek employment would be catastrophic for Juneau and Southeastern. Increased operating costs associated with alternatives other than B would degrade project economics and threaten project viability. Therefore, there must be a highly compelling case to select any alternative other than B.

FB.0.003 Greens Creek has conducted a very responsible and environmentally sensitive operation these past 25 years. Because the proposed action is a continuation of the ongoing successful operation there is no reason to project any impacts beyond those measured to date. Actual impacts are negligible – if measureable. Alternatives C and D would result in expansion of impacts into otherwise undisturbed areas, greater energy consumption, greater fuel transportation and combustion, and expanded closure requirements.

FB.0.004 While NEPA requires study of action alternatives, those proposed clearly fail to fulfill the purpose and need as compared to Alternative B. Indeed, the other alternatives run counter

Response

Comment ID: FB.0.001
Comment noted.

Comment ID: FB.0.002
Comment noted.

Comment ID: FB.0.003
Comment noted.

Comment ID: FB.0.004
Comment noted.

Comment

May 31, 2012

to USFS agreements that the facility be consolidated to the maximum practicable extent (ANILCA Section 503).

FB.0.005

Ultimate closure of the expanded Alternative B facility would have the least potential environmental impacts. The water balance cap would be minimized in area (lower surface area to volume), resulting in minimum infiltration, percolation, and seepage. Impacts – such as they are – would be limited to a single watershed. Alternatives C and D would require expansion of appurtenant facilities and consumables (fuel and equipment) relative to Alternative B.

FB.0.006

The facts clearly support Alternative B as the superior environmental choice. Please select Alternative B in the FEIS and ROD, and proceed with all alacrity to issue the revised GPO.

Best regards,

Frank Bergstrom
Principal

Enclosure

Page 2

Response

Comment ID: FB.0.005

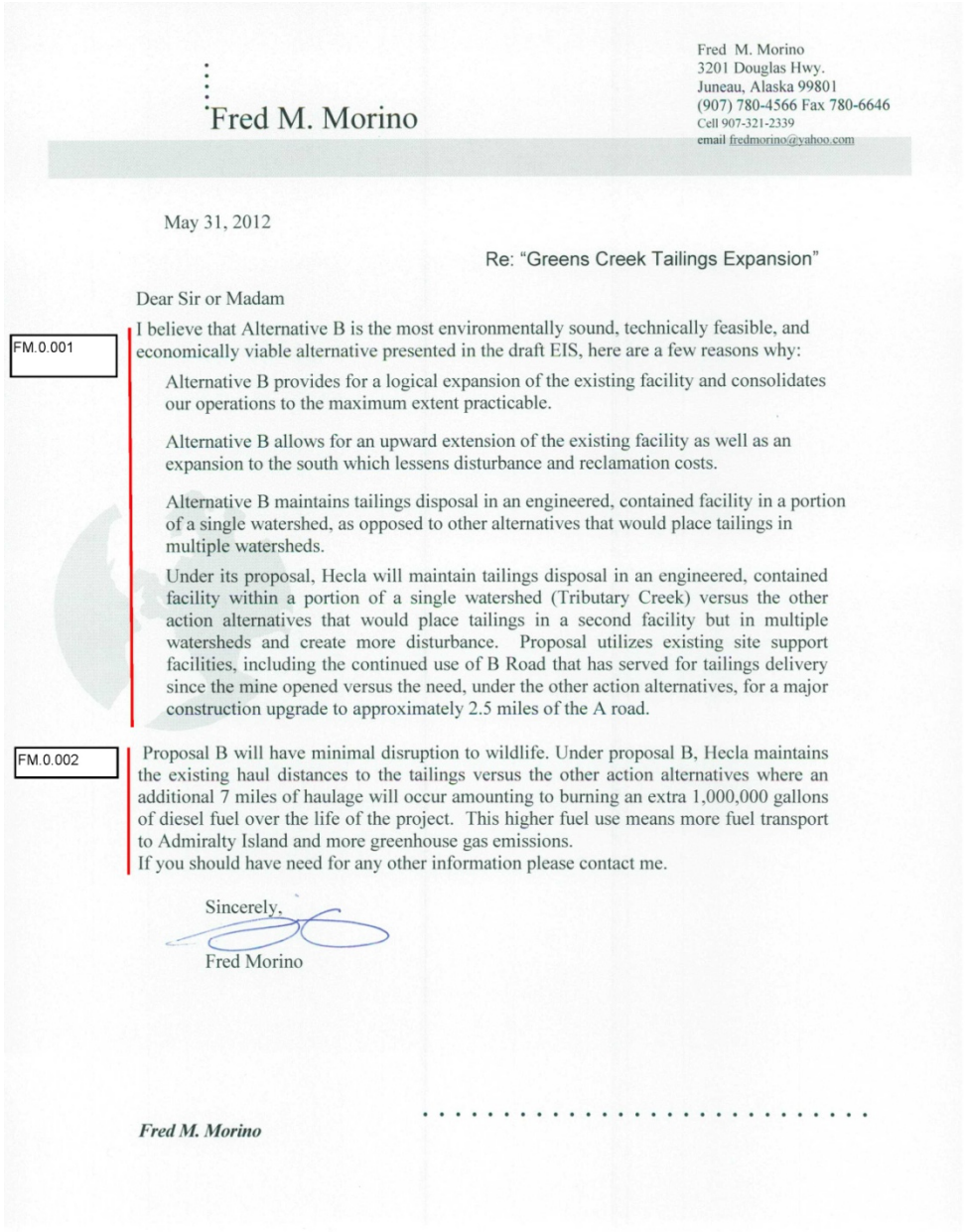
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and the South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment ID: FB.0.006

Thank you for your comment. Please see the Record of Decision for the Forest Service's selected alternative and the rationale for that selection.

Comment



Fred M. Morino

Fred M. Morino
3201 Douglas Hwy.
Juneau, Alaska 99801
(907) 780-4566 Fax 780-6646
Cell 907-321-2339
email fredmorino@yahoo.com

May 31, 2012

Re: "Greens Creek Tailings Expansion"

Dear Sir or Madam

FM.0.001

I believe that Alternative B is the most environmentally sound, technically feasible, and economically viable alternative presented in the draft EIS, here are a few reasons why:

Alternative B provides for a logical expansion of the existing facility and consolidates our operations to the maximum extent practicable.

Alternative B allows for an upward extension of the existing facility as well as an expansion to the south which lessens disturbance and reclamation costs.

Alternative B maintains tailings disposal in an engineered, contained facility in a portion of a single watershed, as opposed to other alternatives that would place tailings in multiple watersheds.

Under its proposal, Hecla will maintain tailings disposal in an engineered, contained facility within a portion of a single watershed (Tributary Creek) versus the other action alternatives that would place tailings in a second facility but in multiple watersheds and create more disturbance. Proposal utilizes existing site support facilities, including the continued use of B Road that has served for tailings delivery since the mine opened versus the need, under the other action alternatives, for a major construction upgrade to approximately 2.5 miles of the A road.

FM.0.002

Proposal B will have minimal disruption to wildlife. Under proposal B, Hecla maintains the existing haul distances to the tailings versus the other action alternatives where an additional 7 miles of haulage will occur amounting to burning an extra 1,000,000 gallons of diesel fuel over the life of the project. This higher fuel use means more fuel transport to Admiralty Island and more greenhouse gas emissions.
If you should have need for any other information please contact me.

Sincerely,

Fred Morino

Fred M. Morino

Response

Comment ID: FM.0.001
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and the South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Upgrades to the A road would impact an additional 30 acres of wetlands under alternatives C and D.

Comment ID: FM.0.002
Correction: Alternatives C and D would add an additional 5.6 miles round-trip for haul trucks to travel from the portal to the new northern TDF. Fuel usage would vary by alternative.

Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 5:05 PM
To: Weglinski, Gene; Cox, David
Cc: Samuelson, Sarah J -FS
Subject: FW: Support for Greens Creek Tailings Expansion-EIS Alternative B

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Howard Grey [mailto:h_l_grey@hotmail.com]
Sent: Monday, June 04, 2012 3:41 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Support for Greens Creek Tailings Expansion-EIS Alternative B

HG.0.001

This is to acknowledge support for Alternative B of the Green's Creek proposed tailings expansion. This will permit the expansion to occur where the existing facility is located which has advantages both environmentally and economically. Placing the facility in any of the other proposed locations would increase the impact, make maintenance and operations more difficult and not be as useful to the mine. Location B will also have less impact on wildlife and the watershed. Thank you for the opportunity to comment on this issue.

Howard J. Grey
1927 W 13th Ave.
Anchorage, AK 99501
Email: h_l_grey@hotmail.com

1

Response

Comment ID: HG.0.001
Comment noted. The Forest Service's decision and the rationale for selecting it are presented in the Record of Decision.

Comment

Hugh Noel Grant

5165 Glacier Highway
Juneau, Alaska 99801
(907) 780-4566 Fax 780-6646

May 31, 2012

Re: **"Greens Creek Tailings Expansion"**

Dear Sir or Madam

HG.1.001

I support Alternative B

Since opening in 1987, the Greens Creek Mine has operated within the Admiralty Island National Monument in accordance with federal, state and local laws and regulations. One of the original agreements between Greens Creek and the USFS calls for facilities to be consolidated to the maximum extent practicable

HGCMC's proposal (Alternative B) provides for a logical expansion of the existing facility where tailings have been placed for a quarter century and abides by the original agreement for the mine's facilities to be consolidated to the maximum extent practicable.

HGCMC's proposal allows for both a southward extension and an upward expansion of the existing facility, which lessen disturbance and closure/reclamation costs.

HG.1.002

The Alaska Department of Environmental Conservation (ADEC) regulates mill tailings and waste rock disposal facilities at the Greens Creek mine as well as other aspects of the operation primarily through Title 18 of the Alaska Administrative Code (AAC), Chapters 50, 60, 70, 72 and 80. ADEC's Waste Management Permit authorizes tailings and waste rock disposal and prescribes design, monitoring, reporting, closure, post-closure and financial responsibility requirements.

HGCMC proposes to extend the existing dry stack disposal site in a southward direction to create a maximum capacity for 15 million cubic yards of additional tailings and waste rock materials. This volume will allow for up to 50 years of capacity for ongoing operations and project reserves, and provide volume for tailings that will be generated from processing of a resource base being defined by ongoing on-site exploration activities. The proposed expansion will meet HGCMC management direction to design and permit a long-term tailings facility capable of handling projected operational requirements.

HGCMC proposes to use the same tailings disposal techniques, environmental management procedures, and reclamation measures that were reviewed in the 2003 Forest Service environmental impact statement (EIS) for the site and have been approved by the Forest Service, the Alaska Department of Environmental Conservation (ADEC) and the Alaska Department of Natural Resources (ADNR).

Upon permanent cessation of project activities, HGCMC plans to reclaim the tailings facility. Unnecessary structures and facilities will be decommissioned and removed. An engineered soil cap will be placed over the tailings facility, which will include a covering of reclamation growth material to facilitate revegetation.

If I can be of any other assistance please contact me.

Sincerely

Hugh Noel Grant

Hugh Noel Grant

Response

Comment ID: HG.1.001

Comment noted. The Forest Service's decision on the selected alternative and the rationale for selecting it are presented in the Record of Decision.

Comment ID: HG.1.002

Comment noted.

Comment

SIERRA CLUB
FOUNDED 1892

June 4, 2012

Sarah Samuelson, Interdisciplinary Team Leader
Tongass National Forest Minerals Program Leader
Admiralty Island National Monument
8510 Mendenhall Loop Road
Juneau, AK 99801

RE: Preliminary Draft Environmental Impact Statement (PDEIS) for Greens Creek Tailings Disposal Facility (TDF) Expansion

IA.0.001

These comments are submitted on behalf of the Sierra Club. We request that they be included in the administrative record. As indicated in our following comments, the deficiencies of this PDEIS are so egregious and out of line with requirements of the National Environmental Policy Act (NEPA) that a supplemental DEIS is required in order for the public and government agencies to have enough information to evaluate decision alternatives for the proposal. Notable examples of how the document is deficient are the lack of any water quality alternative, lack of a cost benefit analysis comparing various decision alternatives, lack of a cultural analysis, and lack of any meaningful analysis as to how the decision alternatives relate to National Monument standards for Admiralty Island, as they are provided for in the Alaska National Interest Lands Conservation Act (ANILCA).

IA.0.002

That said, we wish to point out that our organization strongly supports the Angoon Community Association's review of Tlingit cultural resources. The people of Angoon and the Sierra Club have a long history of cooperation in preserving the cultural, natural, wildlife and wilderness values of Admiralty Island, including our joint effort in Congress to establish Admiralty Island National Monument & Kootznoowoo Wilderness.

The PDEIS

IA.0.003

It is apparent that there is insufficient information provided in the PDEIS for the USFS or the public to determine the full effects of the existing mine and its operation on marine and freshwater resources. Thus it is premature to determine what the next 30 to 50 years of mining operations will have on these resources. It also appears National Monument values are being sacrificed to compensate for poor business and planning decisions made by the project proponent.

Response

Comment ID: IA.0.001
The Forest Service respectfully disagrees with the commenter's opinion on the adequacy of the DEIS. Please see the responses to specific comments below.

Comment ID: IA.0.002
Comment noted.

Comment ID: IA.0.003
The commenter provides no rationale for the assertion that there is insufficient information on effects of the mine on marine and freshwater resources or that Monument values are being sacrificed to compensate for poor planning. The EIS presents a detailed evaluation of marine and freshwater resources (Section 3.5) and aquatic resources (Section 3.7). The commenter does not state why the evaluation is insufficient; therefore, we cannot respond more specifically to this comment.

Comment ID: IA.0.004
The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDES permit is reissued. Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations."

For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and with the awareness that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment

IA.0.004

After more than 20 years of mining activity and monitoring, Greens Creek and Hawk Inlet are both listed as Category 3 waters in Alaska's Final 2010 Integrated Water Quality Monitoring and Assessment Report. Water bodies are placed in Category 3 if data or information is insufficient to determine whether water quality standards are being attained for any of the designated uses. Additionally since DEC withdrew the new waste water discharge (APDES) permit that was issued in November 2011, there is uncertainty about how mining effluent will meet water quality requirements.

IA.0.005

Further, the PDEIS does not disclose the total expected need for mine tailings disposal over the life of the mine. While the alternatives are intended to cover 30-50 years of mining, it is likely that new reserves will continue to be discovered, as they have in the past. The mine has a lease that does not expire until 2096. The additional tailings will have to be put somewhere, creating additional foreseeable impacts that have not been evaluated or disclosed. This is a critical omission that should be corrected in a supplemental draft EIS. The action alternatives should describe options for potential future expansion and discuss the impacts of any such expansion.

IA.0.006

Only the No Action Alternative precludes further encroachment into the National Monument. Greens Creek mine has increased tailings production from the projections in the 2003 ROD, adding acid-generating waste rock into the TDF. Poor planning has resulted in not allowing a new facility to be permitted and built outside monument boundaries prior to the existing TDF reaching capacity.

Water Quality Issues

IA.0.007

Marine Waters: The USFS should immediately determine what additional data and information is required to make an analysis of the water quality status of Hawk Inlet so it can be removed from Category 3. There is a significant source of pollutants and a responsible party that is still operating. A determination of future impacts cannot be made when past actions have been little evaluated. After 20+ years of operating a mine in Hawk Inlet there should be a clear understanding of how this water body has changed due to this activity.

IA.0.008

The expired waste water outfall permit, APDES, has been extended after the renewed permit was withdrawn after an informal review request. Because the permit has not been reissued or the problem clarified , it is not clear how this mining operation is going to meet water quality standards in Hawk Inlet. Alternative treatment or discharge methods need to be considered, both of which could influence TDF design and siting.

IA.0.009

Little information is supplied on the dungeness crab population in Hawk Inlet. Dungeness crab should be a key indicator species as they are bottom scavengers and are important to commercial and subsistence fisheries. The density and quality of this species inside and outside of the mixing zone should be evaluated.

IA.0.010

Freshwater: If there is a feasible alternative, eliminating a large portion of a productive and cataloged Class 1 and 2 anadromous fish streams should not be considered. An economic advantage for the mining operator only indicates that mitigation requirements are too lenient for the destruction of this type of habitat.

Response

Comment ID: IA.0.005
The proposed action and alternatives were developed in response to HGCMC's request for expansion of the TDF to accommodate 30 to 50 years of additional tailings. See the response to Comment BL.0.011. Mining beyond the current proposal of 30 to 50 years is possible; therefore, the effects of tailings disposal throughout the duration of the lease period is addressed in the cumulative effects discussion (Section 3.2.2).

Comment ID: IA.0.006
Comment noted. Alternative C was developed to address this issue and to minimize any additional encroachment on the Monument.

Comment ID: IA.0.007
Sections 3.5.2.3 and 3.7.1.2 in the EIS describe the Hawk Inlet Monitoring Program, which requires regular monitoring of water quality, sediments, mussels, and worms at various locations in the inlet. The results of this monitoring is reviewed by both the Forest Service and ADEC annually.

The Forest Service does not have the authority to determine what information is necessary to change a water body's level of attainment or whether the information is sufficient. Categorizing water bodies for attainment is under the authority of ADEC and is not within the scope of the EIS.

Comment ID: IA.0.008
See the response to Comment IA.0.004. The Forest Service cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). As such, the EIS does not consider alternative discharge or treatment scenarios.

Comment ID: IA.0.009
Comment noted. To our knowledge, data on the density of the species inside and outside the mixing zone are not available. Section 3.7.2.2 discloses the information and data that are available for commercial fish and shellfish harvests in Hawk Inlet. Also see the response to Comment IA.0.007.

Comment

IA.0.011

As noted above in *marine waters,* in order that Greens Creek can be removed from Category 3 status, the USFS should determine what additional data and information is required for an analysis of the water quality of the creek. The mine is a significant source of pollutants and is operated by a responsible party that is accountable. A determination of future impacts cannot be made when past actions have been little evaluated.

IA.0.012

It is unlikely that ADF&G permitted a partially functioning fish passage project in Greens Creek to mitigate loss of fish habitat. Improving fish passage actually means repairing a damaged fish passage structure/facility that is required to be maintained per standard permit stipulations for these types of structures. The repair of an existing permitted structure to enable it to operate as designed should not be considered mitigation for further loss of fish habitat.

National Monument Values

IA.0.013

All alternatives except the No Action Alternative require additional encroachment into the National Monument. The primary reasons appear to be the economic advantage of the operator and poor planning of the operator and USFS. The mine operator increased the rate of deposition into the TDF significantly and requested permission to add acid-generating waste rock. These business decisions were apparently made with the assumption that National Monument values were expendable compared to operator profits. This is not an acceptable rationale for the permanent loss of National Monument values.

IA.0.014

Sections 503(i)(1)(B) and 504(f)(2)(A) of the Alaska National Interest Lands Conservation Act (ANILCA) require the Forest Service to deny approval for any mining-related actions that would cause "irreparable harm" to the Monument. The permanent destruction of Class 1 and 2 catalogued anadromous streams in the Monument is certainly "irreparable harm" that must be prohibited under these provisions of ANILCA.

IA.0.015

USFS Responsibility: Under section 1.8 of the DEIS document describing USFS responsibilities the following is excerpted: "If another agency cannot meet its regulatory responsibilities, the Forest Service is ultimately responsible for ensuring that federal and state regulations are implemented on National Forest System lands." It appears DEC is unable or unwilling to fulfill its responsibilities to safeguard water quality in and around this mining operation. The requirements for removal of Greens Creek and Hawk Inlet from the list of Category 3 waters needs to be determined. The issues surrounding the APDES permit need to be resolved in a way that will protect the waters of Hawk Inlet without an excessive mixing zone.

Irene Alexakos
Alaska Chapter Sierra Club

Response

Comment ID: IA.0.010
Comment noted. Class I streams support anadromous species while Class II streams support resident fish species. Alternatives C and D were developed, in part, to reduce impacts to aquatic habitat; however, due to the ubiquitous nature of streams in the area, it was not possible to find a feasible alternative site that completely avoided aquatic habitat.

The commenter's point with regard to "an economic advantage" is unclear; the CWA requires that an alternative be "practicable," with practicability including an economic element. Mitigation requirements under the CWA are defined in 40 CFR 230 and 33 CFR 325 and 332.

Comment ID: IA.0.011
See the response to Comment IA.0.007. Section 3.5 presents a detailed description of water quality in the study area. Monitoring of water quality at the site, including in Greens Creek, is required through various permits and programs, including the Solid Waste Permit and the APDES permit, and as a part of the GPO. Both ADEC and the Forest Service oversee these sampling programs.

Comment ID: IA.0.012
As stated in Section 3.7.3.1 of the EIS, the fish passage project was constructed as mitigation for a tailings dam that was never built. Therefore, the Forest Service, in consultation with ADG&G, has determined that the project can still be considered mitigation for the lost habitat under the proposed action and alternatives. The requirement for maintenance of the fish passage structure will be included as part of the authorization for the amended GPO.

Comment ID: IA.0.013
Comment noted. Monument values are discussed in Section 3.19 and in the Record of Decision.

Comment ID: IA.0.014
Comment noted. Alternatives C and D were developed, in part, to provide alternatives that would reduce effects to fish habitat. Repairing the existing but non-functioning fish passage facility in Greens Creek has been considered as mitigation for the loss of this habitat under all action alternatives. Irreparable harm is discussed in Section 3.19 (Monument Values) and in the Record of Decision.

Comment	*Response*
	Comment ID: IA.0.015 As previously indicated, both ADEC and the Forest Service are actively involved with setting monitoring programs throughout the site. We disagree with the commenter's assertion that ADEC is unable or unwilling to fulfill its responsibilities. See the response to Comment IA.0.007 with regard to the Category 3 listing.

Comment

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801
Email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

RE: Greens Creek Tailings Expansion

To Whom It May Concern:

IG.0.001 I am writing to express my support for Alternative B in the Draft Environmental Impact Statement for the Draft Greens Creek Mine Tailings Disposal Facility Expansion (April 2012). This option would extend the footprint of the tailings disposal facility to the south, providing capacity to dispose of approximately 30-50 years worth of tailings and waste rock.

EXPANSION OF CURRENT LOCATION

IG.0.002 I am in support of expanding the current location of the mine tailings site, rather than relocation out of the Admiralty National Monument area. Relocation has more significant impacts to the environment at large:

- The existing road would need to be more extensively developed, creating a bigger road footprint
- Traffic on the road would be increased, increasing dust, erosion, and carbon footprint.
- A pipeline for dewatering would need to be developed to drain to the holding pond.

Every time tailings are handled there is the opportunity for an accident – key to environmental safety is minimizing transfer and handling. The more time hazardous materials spend in transit and being transferred between modes, the more exposure there is to environmental risk – trucks can wreck, pipelines can leak, monitoring two sites can create distractions. Expanding the current site assures that the area being watched for environmental impact is contained and all environmental monitoring efforts are focused.

IG.0.003 In a more developed area, protection of the monument for the sake of the monument would be extremely important. Admiralty's isolation creates a situation where this sort of protection has a more significant environmental impact than further development of the tailings site in the monument. The monument border is just a line on the map. The forest is no different on one side of the border than the other, and significant development outside of the monument is highly unlikely in the foreseeable future, not in part because it is National Forest land and extremely isolated.

50 YEAR PERMITTING

IG.0.004 I am whole-heartedly supportive of a 50-year timeline in permitting the tailings site. Hecla Greens Creek plans to develop the additional tailings storage incrementally, to accommodate 10 years worth of tailings at a time. Over-development would not serve the company's bottom line, as it makes no sense to develop infrastructure that will not be used. Over-development also does not make environmental sense either, as it would impact lands that may or may not be needed in the future, and require maintenance in the interim, and reclamation at closure. Ongoing costs to over-development would include maintaining structural integrity, as well as wastewater monitoring and mitigation.

Response

Comment ID: IG.0.001
Comment noted.

Comment ID: IG.0.002
Comment noted.

Alternatives C and D would add an additional 5.6 miles round-trip for haul trucks to travel from the portal to the new northern TDF.

Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment ID: IG.0.003
Comment noted.

Comment ID: IG.0.004
Comment noted.

Comment

While according extremely valuable environmental protections, the permitting process is extensive and costly. A 50-year permit, with an agreement for phased development, would provide HGC with the economic stability to continue development in the area.

ECONOMIC AND SOCIAL IMPACT OF THE MINE

IG.0.005

The company I work for is a planning, environmental and engineering firm with deep roots in Southeast Alaska. Our Juneau office was begun in 1945 by a mining engineer searching for work after the closure of the Alaska Juneau Gold Mine. Today that office supports six engineers, three surveyors, an environmental analyst, a planner, and administrative support, all of whom live in Juneau.

This cadre represents a significant community impact as well. Between all of the staff we serve one secular and two Christian social service organizations, participate in the Chamber of Commerce, coach youth sports and play on hockey teams, support Juneau Jazz and Classics and Perseverance Theatre, run a lodge, and serve on various boards. Nine of us are property owners, and two are looking to purchase this year.

Over the last year our survey team was a subcontractor to one of Greens Creek's contractors. We were able to keep 1 surveyor employed full time, and two others part time. With an office this size, that sort of stability is vital to modulating the seasonal shifts in construction and design. Our on-site work has given us a glimpse into a mine that does things right. Greens Creek extensively self-regulates on safety and environmental impact, and that culture that is evident in every worker we've been exposed to.

Not only is HCG Juneau's top private employer (JEDC Juneau and Southeast Economic Indicators 2011) in an industry with an average wage of $95,085, and not only are they Juneau's largest tax payer, but HGC continues to contribute to the community, and has illustrated a commitment to hiring locally. They provided $300-thousand dollars toward an $800-thousand dollar mine trainer for the University of Alaska Southeast Center for Mine Training (Juneau Empire, May 3, 2012). They've also shown a commitment to developing our youth with the "Introduction to Mining Occupations and Operations" class provided to high school students, which included basic orientation and training, a field trip to the mine, and the possibility of internships (Capital City Weekly, May 3, 2012). This class stresses requirements for various mine jobs, including the need to be drug-free to work at the mine.

In summary, the HGC is a model corporate citizen that I would like to see supported in their efforts to continue doing business in the region.

Thank you,

Irene M. Gallion 5/9/2012

Irene M. Gallion
PO Box 21254
(800 F Street)
Juneau, AK 99802
imgallion@yahoo.com

Response

Comment ID: IG.0.005
Comment noted.

Comment

JOEL BENNETT PRODUCTIONS

15255 POINT LOUISA ROAD
JUNEAU, ALASKA 99801
PHONE: (907) 789-1718 (HOME)
PH/FAX: (907) 789-2328 (BUS.)
EMAIL: killik@gci.net

June 4, 2012

Admiralty Island National Monument
8510 Mendenhall Loop Rd
Juneau, AK 99801

Attention: Hecla Greens Creek Mine tailings Expansion DEIS

To Whom It May Concern:

JB.0.001 This is to support Alternative "C" as the preferred DEIS alternative for Greens Creek tailings expansion.

JB.0.002 It is unfortunate that this issue even arises as it appears that underestimated production needs and poor planning have created the problem in the first place. Now the American public is being asked to give up more land and resources to remedy these mistakes.

If these alternatives are the only ones available, I believe that the alternative that is the least injurious to Monument values must be chosen. If either the proposed alternative "B" or Alternative "D" is chosen, irreparable harm will occur to the headwaters of Tributary Creek and other watercourses and high value wetlands south of the existing tailings deposit area. Water quality is a key issue here and this will be further compromised due to the size and duration of the tailings disposal in the plan as outlined in either Alternative B or D. Therefore, it is critical to locate a site for expanded tailings off Monument lands.

The legislation that created the Monument mining exemption for Admiralty specifically provides that mining must not cause irreparable harm to Monument values. In this case irreparable harm clearly will result due to tailings deposited on Monument lands and over the headwaters of Tributary creek, Fowler creek and other watercourses.

JB.0.003 Alternative "C" gives Greens Creek adequate extended time to continue to add to its existing tailings deposit in order to construct a new off monument tailings site 6 miles to the north. This is a viable option. This area has no anadromous streams and is near

Response

Comment ID: JB.0.001
Comment noted.

Comment ID: JB.0.002
Comment noted. Please note, however, that the headwaters of Fowler Creek that would be affected by alternatives C and D are outside the Monument. Water quality is discussed in Section 3.5, wetlands in Section 3.8, and irreparable harm in Section 3.19 (Monument Values) and the Record of Decision.

Comment ID: JB.0.003
Comment noted.

Comment

existing road development. This is a reasonable compromise and not unduly burdensome given the national significance of Monument lands.

JB.0.004

President Carter, in his Proclamation creating Admiralty Island Nat'l Monument in 1978, stressed that the island had unique island ecology and was the largest unspoiled coastal island ecosystem in North America. Future mining development must not compromise these overall values.

I am a 42 year resident of Juneau, Alaska, who has spent a considerable time every year enjoying recreational and wilderness pursuits on Admiralty island National Monument. This includes hunting, fishing, hiking, mountain climbing, river paddling and photography.
I own property in Funter Bay on the Mansfield Peninsula and often utilize Hawk Inlet for fishing and wildlife viewing.

I support and treasure Admiralty's Monument values and do not wish to see them further compromised.

Sincerely,

Joel Bennett

Joel Bennett
15255 Point Louisa Rd
Juneau, AK 99801
(907)789-1718

Response

Comment ID: JB.0.004
Comment noted.

Comment

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

June 18, 2012

Forrest Cole, Forest Supervisor
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Re: POA-1988-0269-2, Hawk Inlet
and Greens Creek Mine Tailings Expansion
Draft Environmental Impact Statement

Dear Mr. Cole:

The National Marine Fisheries Service (NMFS) has reviewed USDA Forest Service's (USFS) Draft Environmental Impact Statement (DEIS) for the Greens Creek Mine Tailings Disposal Facility Expansion. In conjunction with the DEIS, the U.S. Army Corps of Engineers (Corps) has published the above referenced public notice and is requesting comments on activities regulated by the Corps. NMFS offers the following comments under the Fish and Wildlife Coordination Act and the Essential Fish Habitat (EFH) provisions of the Magnuson-Stevens Fishery Conservation and Management Act (MSA), to both the USFS and the Corps on the DEIS.

Background

The Greens Creek mine is operated by the Hecla Greens Creek Mining Company (Hecla) and located on Admiralty Island, approximately 18 miles southwest of Juneau, Alaska. The mine has been in operation since 1988 and produces lead and zinc concentrates that also contain silver. Mine tailings are co-disposed with waste rock. Major portions of the mine are located on National Forest System lands and most of the existing tailings disposal facility (TDF) is located in the Admiralty Island National Monument (Monument). The TDF is currently approved to hold 5.3 million cubic yards of tailings and waste rock and cover approximately 62 acres. At the current mining rate, the TDF will be filled to capacity by 2014. Hecla proposes to expand the TDF to accommodate up to 10 million cubic yards of tailings and waste rock over a period of 30 to 50 years.

Project Alternatives

Four alternatives were analyzed for the project, a no action alternative and three action alternatives. The main differences between the three action alternatives are the location and configuration of the TDFs and the type and amount of wetlands and fish streams that would be lost. All actions design for an additional 30–50 year timeframe for mine production.

Response

Comment

Under Alternative A (the no action alternative), the Corps would not issue a permit and mining would cease in 2014, or thereabouts, when the currently approved TDF reaches its full capacity.

Under Alternative B (Hecla's proposed action), the footprint would extend the existing TDF south into the Monument. Approximately 1,646 feet of anadromous fish stream in Tributary Creek would be lost under this proposal. Ninety-nine acres of wetlands would be filled. The proposed action includes expansion of the existing TDF from its currently permitted capacity of 5.3 million cubic yards of tailings and waste rock to a total capacity of 15 million cubic yards of tailings and waste rock, an increase in capacity of approximately 9.7 million cubic yards.

Under Alternative C (TDF located outside the Monument), the existing TDF would be expanded to hold an additional one million cubic yards of tailings (about three years of additional capacity). Under this alternative, a new TDF would be developed north of the existing TDF, outside of the Monument. The new TDF would be developed to accommodate the remaining 8.7 million cubic yards, providing adequate capacity to contain the same amount of tailings and waste rock considered under the proposed action. No anadromous reaches would be filled. An additional 114.2 acres of wetlands would be filled.

Under Alternative D (modified proposed action), the existing TDF would be expanded to accommodate an additional three million cubic yards of tailings (about 10 years of capacity. A new, separate TDF would be built outside the Monument to accommodate seven million cubic yards of tailings and waste rock over the additional 30-50 years. Approximately 1,044 feet of resident fish stream and 124.9 acres of wetlands would be disturbed. No anadromous reaches would be filled.

Essential Fish Habitat

Section 305(b)(2) of the MSA requires federal agencies to consult with NMFS on all actions or proposed actions authorized, funded, or undertaken by the agency that may adversely affect EFH. The DEIS states that an EFH assessment is being prepared by the USFS and the Corps to consult with NMFS on adverse impacts to EFH as a result of the proposed project. NMFS recently received a copy of the EFH Assessment (June 8, 2012) and will be providing EFH conservation recommendations as appropriate to complete consultation with the USFS and the Corps under section 305(b)(2) of the MSA.

General Comments and Recommendations

JB.1.001

Least Environmentally Practicable Alternative

The Clean Water Act Section 404(b)(1) Guidelines (Guidelines) state that only the least environmentally damaging practicable alternative (LEDPA) for a proposed discharge of fill into jurisdictional wetlands or waterways can be permitted by the Corps. Both

2

Response

Comment ID: JB.1.001

Comment noted. The 404(b)(1) guidelines require the USACE to identify and select the Least Environmentally Damaging Practicable Alternative. The Forest Service's selected alternative and the rationale behind that selection are presented in the Record of Decision.

Comment

alternatives C and D do not require fill in anadromous streams. NMFS recommends the USFS and Corps select either Alternative C or Alternative D as the LEDPA.

JB.1.002

Mitigation

The Guidelines require the applicant to take all appropriate and practicable steps to avoid and minimize adverse impacts to waters of the United States. Compensatory mitigation for unavoidable impacts may be required to ensure that an activity complies with the Guidelines.

JB.1.003

The Alaska District Regulatory Guidance Letter (RGL) ID No. 09-01 provides sample ratios for compensatory mitigation. The RGL suggests that high quality habitat be mitigated at a ratio of at least 3:1. Anadromous waters are considered high-quality habitat where impacts should be avoided if possible. NMFS recommends that a minimum ratio of 3:1 be used to mitigate for unavoidable impacts associated with this project.

JB.1.004

In 1983, during the original permitting process for the Greens Creek mine, the mine operator and agencies agreed to mitigate for potential lost fish production by creating upstream fish passage on Greens Creek at river mile 3.6. The fish pass, constructed in 1989, has not properly functioned since 2005. The applicant has proposed repairing the fish ladder on Greens Creek to mitigate for their proposed project.

JB.1.005

NMFS recommends that prior to requiring the existing fish pass be repaired, the applicant complete an analysis on the success of the fish passage above mile 3.6. The analysis should use data between 1989 and the last date of known records. The analysis should include the extent of stream surveyed, adult survival records, and estimates of stream carrying capacity. In addition, the analysis should describe why and how often failure occurred. If the proposed failed fish ladder is selected as part of the mitigation package, it should include a monitoring plan with adaptive management measures in the event of failure(s). Due to fish passage failure in the past, and the possibility of failure in the future, NMFS recommends additional mitigation measures be identified and developed with input from NMFS, to mitigate for the loss to fish production.

JB.1.006

The DEIS states that Hecla will have to actively treat the water from the tailings piles for "hundreds of years if not in perpetuity." Continued annual monitoring could detect stochastic events of both natural and project-caused origin that have or could have adverse impacts to aquatic resources. Therefore, NMFS supports annual monitoring for the life of the project, rather than discontinuing monitoring after five years. Monitoring should include quantitative statistical analyses for meaningful comparisons of periphyton, invertebrates, and fish health over the life of the project. Standardized macro-invertebrate metrics developed for Southeast Alaska can be used to characterize stream health (Rinella et al. 2005). Adaptive management alternatives should be developed and applied if unacceptable changes in monitored biota are detected.

3

Response

Comment ID: JB.1.002
Comment noted. Wetlands mitigation requirements and guidelines are established by the USACE. The focus of mitigation has shifted from a preference for on-site, in-kind mitigation to the in-lieu fee approach discussed in the EIS. Forested lands will be reestablished following closure; however, there will be some long-term reduction in the number of acres of wetlands at the site.

Comment ID: JB.1.003
Comment noted. The Forest Service will work with ADF&G and the USACE in determining final mitigation plans. The USACE ultimately has the authority to establish compensatory mitigation requirements through the Section 404 permit.

Comment ID: JB.1.004
Comment noted.

Comment ID: JB.1.005
The ADF&G, a cooperating agency in this analysis, has determined that the fish passage was successful when it functioned. Quarterly monitoring of the fish passage will be required and financial assurances will ensure continued operation of the fish passage. See Table 2.6-2.

Comment ID: JB.1.006
Monitoring requirements are established in the APDESpermit, ADEC's Waste Management Permit, and the Record of Decision for the amended GPO, all of which include monitoring requirements that extend beyond five years. The freshwater monitoring program is established under the GPO, which is approved by the Forest Service. The ADEC is responsible for establishing monitoring requirements associated with the wastewater discharge permit. All permitting requirements are subject to regular review and allow for adaptive management if adverse trends are detected.

Comment

Response

Should you have any questions regarding our comments on the DEIS please contact Chiska Derr at 907-586-7345 or Chiska.Derr@noaa.gov.

Sincerely,

for James W. Balsiger, Ph.D.
Administrator, Alaska Region

cc: comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Randall.P.Vigil@usace.army.mil, Corps, Juneau
Steve_Brockman@fws.gov, USFWS, Juneau
brenda.krauss@alaska.gov, ADNR, Juneau
Chiska.Derr@nmfs.gov, NMFS, HCD, Juneau

References

Rinella, D. J., D. L. Bogan, K. Kishaba, and B. Jessup. 2005. Development of a Macroinvertebrate Biological Assessment Index for Alexander Archipelago Streams – Final Report. For Alaska Department of Environmental Conservation. 52 pp.

G:USFS Greens Creek Expansion DEIS comments cd 6-18-12

4

Comment

LAW OFFICE OF JAMES F. CLARK
1109 C Street
Juneau, Alaska 99801
Telephone: 907-586-0122 Fax: 907-586-1093

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, Alaska 99801

June 1, 2012

Dear Sir/Madam,

JC.0.001

I write in support of the continued expansion of the existing Tailings facility for the Greens Creek Mine, Alternative B. The No Action alternative would result in mine closure which would have significant and serious socio-economic impacts on Juneau from the resulting loss of 360 jobs. For the reasons given below, development of a new tailings site two miles from the existing facility would be more environmentally damaging than continued expansion of the existing facility and would provide no offsetting environmental benefit.

JC.0.002

Alternative B would extend the existing tailings impoundment southward and upward, thereby providing sufficient capacity for another 50 years o operation. This would allow Greens Creek to continue to use exactly the same tailings facility operating practices that it has successfully used for 25 years and that were approved by DEC, DNR, and the Forest Service when Tailings facility expansion was previously permitted.

JC.0.003

Alternative B has the additional following advantages that make it superior to the other alternatives:

- Fewer acres of disturbance;
- Facility contained within an engineered facility in a single watershed; and
- Transportation of tailings from mine to tailings facility contained to the B road; no need to upgrade the A road thereby avoiding reconstruction of a portion of the A road and the increased fuel usage of a longer haul.

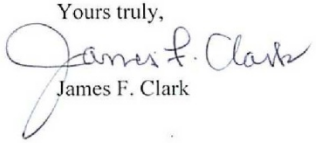
1

Response

Comment ID: JC.0.001
Comment noted.

Comment ID: JC.0.002
Comment noted.

Comment ID: JC.0.003
Comment noted.

Comment	Response
JC.0.004 Given the continued, successful operation of the existing Tailings facility, it makes the most sense for the Forest Service to allow sufficient expansion of that facility to meet Greens Creek's needs going forward. Accordingly, I urge the Forest Service to select Alternative B in the Record of Decision. Yours truly,  James F. Clark 2	**Comment ID: JC.0.004** Comment noted.

Comment

5165 Glacier Highway
Juneau, Alaska 99801
(907) 780-4566 Fax 780-6646

D.J.G. DEVELOPMENT

May 31, 2012

RE: DEIS ""Greens Creek Tailings Expansion"

Dear Sir or Madam:

Please accept this letter as my support for Alternative B

JG.0.001

Greens Creek believes that Alternative B is the most environmentally sound, technically feasible, and economically viable alternative presented in the draft EIS and here are a few reasons why:

A logical expansion of the existing facility and consolidates our operations to the maximum extent practicable.

An upward extension of the existing facility as well as an expansion to the south which lessens disturbance and reclamation costs.

Maintains tailings disposal in an engineered, contained facility in a portion of a single watershed, as opposed to other alternatives that would place tailings in multiple watersheds.

JG.0.002

For past 25 years, the Greens Creek Mine has contributed to the southeast Alaska economy with

High-paying jobs
Local purchases of goods and services
Major contributor to local tax base

Hecla is a good steward of the land and has operated the Greens Creek Mine with minimal disturbance to the environment by maintaining a small footprint and using the dry-stack method of tailings disposal.
Upon permanent cessation of project activities, HGCMC plans to reclaim the tailings facility. Unnecessary structures and facilities will be decommissioned and removed. An engineered soil cap will be placed over the tailings facility, which will include a covering of reclamation growth material to facilitate revegetation.
If you should have any questions please call 780-4566 or 321-1184.

Sincerely,

Jeff Grant
CEO

D.J.G. DEVELOPMENT

Response

Comment ID: JG.0.001
Comment noted. Please note that alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek and the South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Comment ID: JG.0.002
Comment noted.

Comment

From: Jason Morford
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: IN FAVOR OF GREENS CREEK"S TAILINGS FACILITY EXPANSION
Date: Tuesday, May 08, 2012 11:39:19 AM

To Whom It May Concern:

JM.0.001 I just wanted to briefly voice my opinion that the new tailing facility seems like a no-brainer. I have read their environmental impact document, and I believe it's of good reasoning, and well thought out. I know that Greens Creek has a great track record as a responsible company for safety, lowest possible environmental impact, and as a financial support for our community. I hope this helps them stay in business for the next 50 years with the same positive impact they've been making so far. Thank you for your consideration.

Sincerely,

Jason Morford (resident of Juneau, AK)

Response

Comment ID: JM.0.001
Comment noted.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Tuesday, June 05, 2012 8:37 AM
To: Cox, David; Weglinski, Gene
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Mine Dry Stack Expansion

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Morrison, Jason [mailto:Jason.Morrison@redpathmining.com]
Sent: Monday, June 04, 2012 4:33 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Mine Dry Stack Expansion

As a former Mine Manager of the Greens Creek Mine the expansion of the dry stack facility will allow continued operations of the Greens Creek Mine to continue with resulting minimal impact.

The facility has operated for 24 years without creating any undue harm to the environment, has allowed for continual co-existence with the animals inhabiting the area and places the dry stack in a focused area where they can best be handled in the future for reclamation. Adding another area of dry stack will require additional impact. Need for additional roads, placement of materials in a new area will have a much more significant impact on the surrounding area.

JM.1.001

The facility is located in an area where there is minimal drainage to the surrounding environment and is well maintained at all times.

The water treatment facility is positioned ideally to allow for continued treatment of waters contacting the tailings.

Alternative locations will create the need for additional facilities of current infrastructure, require additional clearing of forested areas and change current patterns which would create an adverse impact on wildlife that has adapted very well to the current facility.

Consideration of other areas for an additional facility does not make for effective stewardship of the available land.

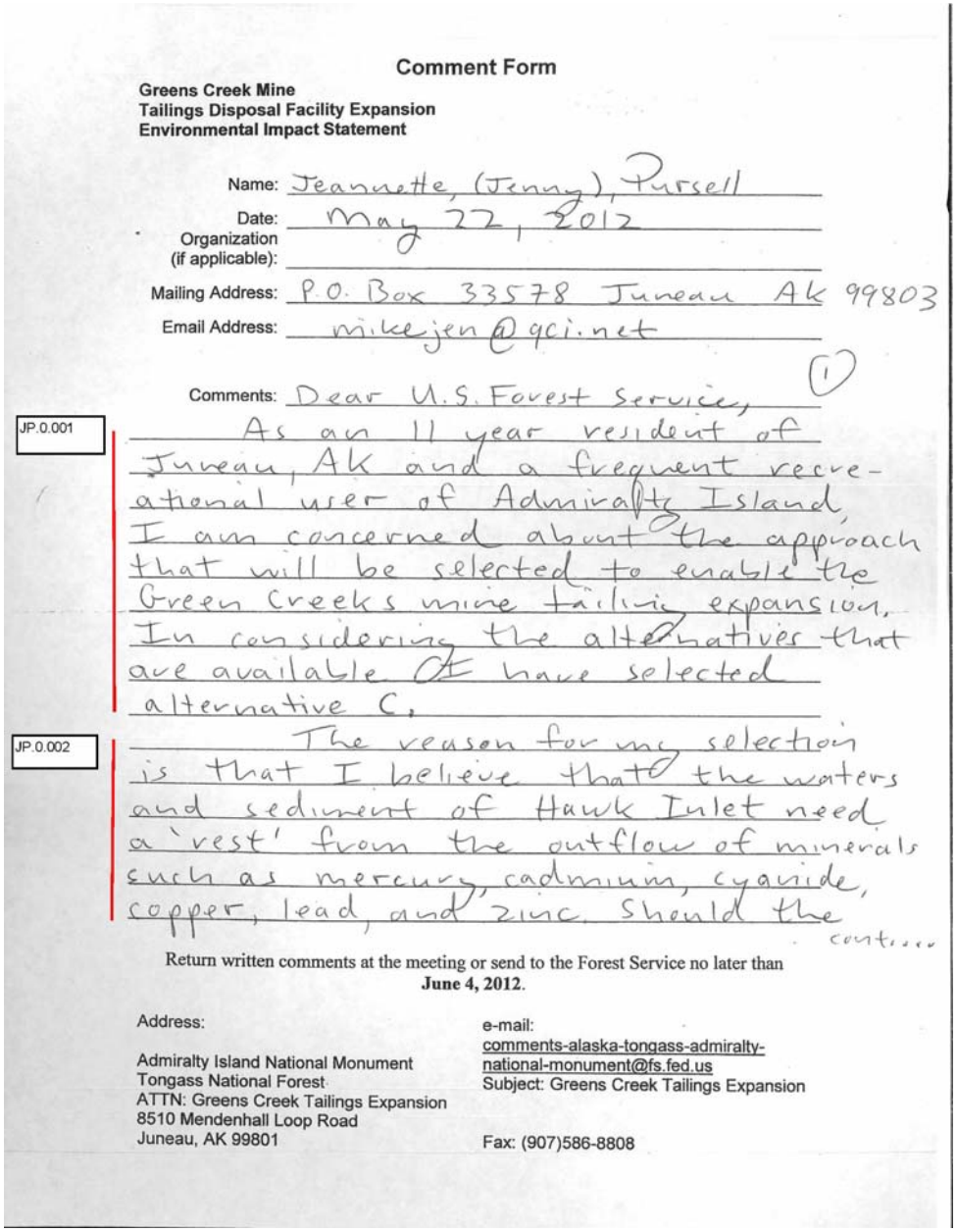
Jason Morrison
Area Manager
J.S. Redpath Corporation
Office 907-789-3752
Cell 907-723-6127

1

Response

Comment ID: JM.1.001
Comment noted.

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Jeannette, (Jenny), Pursell
Date: May 22, 2012
Organization (if applicable):
Mailing Address: P.O. Box 33578 Juneau AK 99803
Email Address: mikejen@gci.net

(1)

Comments: Dear U.S. Forest Service,

JP.0.001

As an 11 year resident of Juneau, AK and a frequent recreational user of Admiralty Island, I am concerned about the approach that will be selected to enable the Green Creek's mine tailing expansion. In considering the alternatives that are available I have selected alternative C.

JP.0.002

The reason for my selection is that I believe that the waters and sediment of Hawk Inlet need a 'rest' from the outflow of minerals such as mercury, cadmium, cyanide, copper, lead, and zinc. Should the

cont....

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012**.

Address:
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

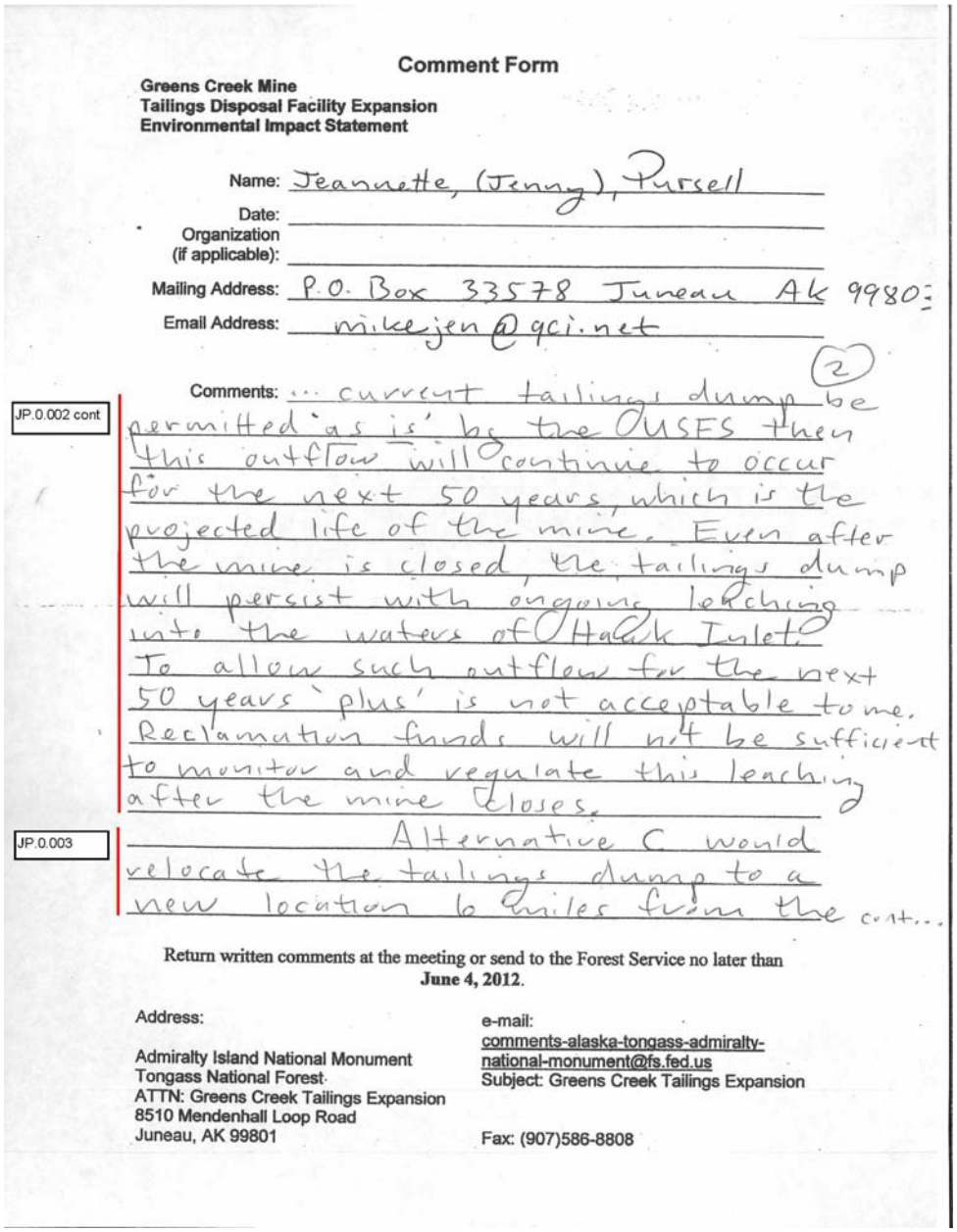
Comment ID: JP.0.001
Comment noted.

Comment ID: JP.0.002
The control, treatment, and discharge of effluent to Hawk Inlet and the management of stormwater is currently regulated through the APDES permit. Leaching untreated effluent from the TDF would be in violation of the existing permit.

The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 CFR 228.8(h)). As such, the EIS does not consider alternative discharge scenarios.

Financial assurance will be required to control and treat water in perpetuity. A description of financial assurance procedures is found in Section 1.8.3.1 and in Appendix B.

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Jeannette, (Jenny), Pursell
Date:
Organization (if applicable):
Mailing Address: P.O. Box 33578 Juneau AK 99803
Email Address: mikejen@gci.net

(2)

Comments: ... current tailings dump be permitted 'as is' by the USFS then this outflow will continue to occur for the next 50 years, which is the projected life of the mine. Even after the mine is closed, the tailings dump will persist with ongoing leaching into the waters of Hawk Inlet. To allow such outflow for the next 50 years 'plus' is not acceptable to me. Reclamation funds will not be sufficient to monitor and regulate this leaching after the mine closes. JP.0.002 cont

Alternative C would relocate the tailings dump to a new location 6 miles from the cont... JP.0.003

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012.**

Address:
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

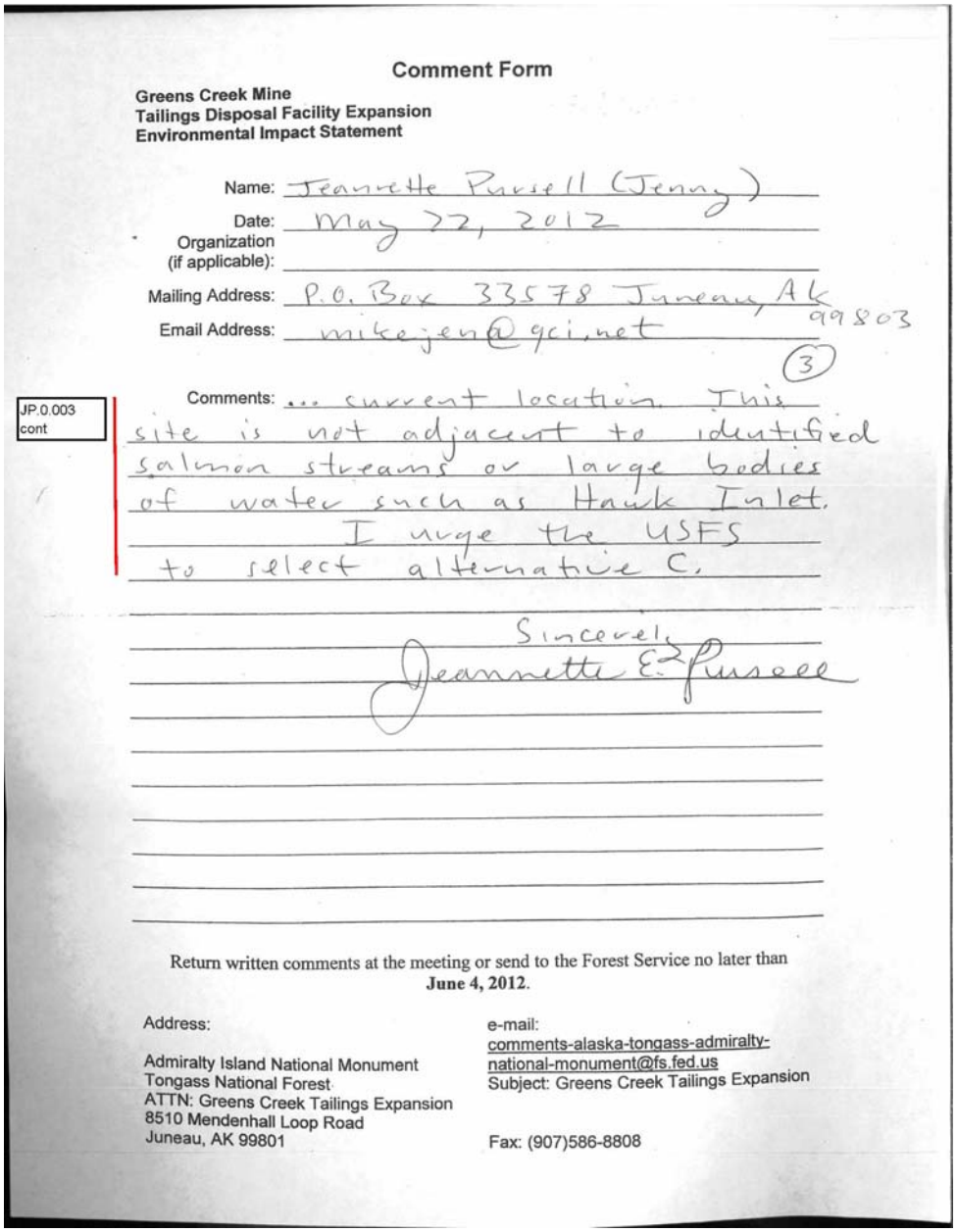
e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment ID: JP.0.003
Comment noted. Please be aware that while water control, treatment, and management would be required under all alternatives, the streams in the vicinity of the TDF under alternatives C and D drain to Young Bay.

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Jeannette Pursell (Jenny)
Date: May 22, 2012
Organization (if applicable):
Mailing Address: P.O. Box 33578 Juneau, AK 99803
Email Address: mikejen@gci.net

(3)

JP.0.003 cont

Comments: ... current location. This site is not adjacent to identified salmon streams or large bodies of water such as Hawk Inlet. I urge the USFS to select alternative C.

Sincerely,
Jeannette E. Pursell

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012**.

Address:
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment	*Response*
JR.0.001	**Comment ID: JR.0.001** Comment noted.

From: Rust, John
To: FS-comments-alaska-tongass-admiralty-national-monument; heidi.x.firstencel@usace.army.mil
Cc: Lois Norrgard; Amy Rust; Amy Rust; Dawn; Schaust, Steve; admiralty_friends@yahoo.com; info@beyondak.com; info@juneaukayak.com
Subject: Admiralty Island: Greens Creek Tailings Expansion - Tongass national Forest
Date: Friday, May 25, 2012 9:34:24 AM

May 25, 2012
Subject: Greens Creek Tailings Expansion on Admiralty Island

Dear USDA Forest Service and U.S. Army Corps of Engineers

My son and I kayaked and camped on Admiralty Island during August of 2010 for 8 days. We were very impressed with the huge Sitka Spruce, Western Red Cedar, and Western Hemlock trees of the Tongass National Forest – part of a temperate rain forest. We watched wild salmon swimming upstream, brown bears fishing for salmon; saw a proliferation of bald eagles, and diversity of sea life including jellyfish, seals and whales. This area is truly a national treasure. Please note and register our comments as to the expansion of the Greens Creek Mine Tailings areas. Our recommendation and preference is to do the utmost to truly protect the pristine and beautiful character of Admiralty Island, the channels surrounding the island and the habitat and wildlife.

Thank you for taking the time to register our comments.

Sincerely,
John and Kyle Rust
9725 Oliver Ave. North
Brooklyn Park, MN 55444
763-202-3346

Comment

From: Shearer, Justin
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion
Date: Friday, June 01, 2012 2:56:56 PM

To whom it may concern,

JS.0.001

As a member of the Southeast Alaska Business Community, we support Hecla Greens Creek in believing that "Alternative B" is the most feasible and logical alternative to expand their existing tailings facility. This alternative creates less disturbances to all areas of the site on Admiralty Island, AK. Continually, it keeps the tailings disposal in a contained single watershed and minimizes impact to the environment.

JS.0.002

Hecla Greens Creek remains one of the most important parts of the Juneau Economy. For the past 25 years, they have employed over 300 families with good high paying jobs that filter revenue into the surrounding Juneau Economy. They have played a major roll working with the University of Alaska Southeast to ensure students have proper training before starting a career in the mining industry. Juneau and Southeast Alaska depend on Hecla Greens Creek. Please join me in supporting them on "Alternative B".

Thank you,

NC MACHINERY CAT

Justin Shearer
Branch Manager (Juneau)
Office: 907-789-0181
Cell: 907-321-2464

Response

Comment ID: JS.0.001
Comment noted.

Comment ID: JS.0.002
Comment noted.

Comment

From: Jeanine St. John
To: PS-comments-alaska-tongass-admiralty-national-monument
Cc: Jeanine St. John
Subject: Greens Creek Tailings Expansion
Date: Friday, May 11, 2012 7:15:30 AM

LYNDEN

May 11, 2012

Admiralty Island National Monument – Tongass National Forest

ATTN: Greens Creek Tailings Expansion

8510 Mendenhall Loop Road

Juneau, Alaska 99801

Comments-alaska-tongass-admiralty-national-monument@fs.fed.us

To Whom It May Concern:

Lynden is a multi-modal transportation and logistics company, with over 700 Alaska employees, a history of scheduled service to Alaska starting in 1954, and extensive activity throughout the state of Alaska, including support for all segments of the economy. Lynden has provided support services for the mining industry including significant logistics support for virtually every project in Alaska.

JS.1.001

Lynden is writing in support of Hecla Greens Creek Mine's efforts to expand their existing tailings facility using ***"Alternative B"*** under the draft EIS submitted by the US Forest Service for the following reasons:

- Expansion of their tailings facility is an essential component in their plans to continue operating the Greens Creek Mine now and for the future
- Alternative B minimizes the impacts to the environment by keeping the tailings facility consolidated versus the other alternatives

Response

Comment ID: JS.1.001

Comment noted. Calculations of mobile source greenhouse gas emissions at the Greens Creek Mine showed that Alternative B would result in 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B annually. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and the South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Comment

- Alternative B would continue their tailings disposal in an engineered, contained facility within a single watershed versus the other alternatives that would place tailings in multiple watersheds
- Alternative B would allow them to continue to utilize existing site support facilities including "B" Road versus other alternatives that would require major construction upgrades to "A" Road
- Alternative B using the current location for tailings has no new impacts on area wildlife versus the other alternatives that have an active goshawk nest in the area
- Alternative B is the only option that would not increase Greens Creek's use of fossil fuels in the transportation of tailings to the disposal facilities
-

JS.1.002

Hecla Greens Creek Mine has been an integral part of our Southeast Alaska Community for the past 25 years by providing high paying jobs, purchasing supplies and services locally, and operating in a safe and environmentally sound manner. Alternative B gives them the additional capacity for their future and supports our business, which provides transportation services throughout Southeast Alaska.

Sincerely,

LYNDEN LOGISTICS

Jeanine M. St. John
Vice President
Lynden Logistics
6400 S. Airpark Place Suite 1
Anchorage, AK 99502
(907)249-0215
Mobile (907)250-4038
Email: jjohn@lynden.com

Response

Comment ID: JS.1.002
Comment noted.

Comment	*Response*
JS.2.001	**Comment ID: JS.2.001** Comment noted.

From: Joe.G.Sorenson@lesschwab.com
To: PS-comments-alaska-tongass-admiralty-national-monument
Subject: greens creek tailing expansion
Date: Tuesday, May 08, 2012 5:42:45 PM

to: US Forest Service

It would seem to me that that the B tailings is the only way to go on the island . way would you want to double up on all the monitoring and treatment equipment when you try and lessen a foot print . and only having one sight to keep track of for the rest of time seems to be a better solution . so I would only support the B tailings proposal.

Thank you,
Joe Sorenson
Juneau resident
Les Schwab co.

Comment

From: John Sandor
To: FS-comments-alaska-tongass-admiralty-national-monument
Cc: John Sandor; Don Burford; shartman@hecla-mining.com; fredmorino@yahoo.com; Neil MacKinnon; gmbell@uas.alaska.edu; "Juneau Chamber"; Cal Richert; Brian Kleinhenz
Subject: Hecla Greens Creek Tailing Expansion
Date: Tuesday, May 15, 2012 10:32:06 AM

U.S. Forest Service Admiralty Island National Monument:

I am John A. Sandor, 3311 Foster Avenue, Juneau, AK 99801 commenting on the recently issued Draft EIS that examines alternatives for the additional tailings disposal at the Hecla Mining Company Greens Creek Mine on Admiralty Island.

JS.3.001

The Hecla Mining Company has successfully operated this mine for over twenty years, and has been in conformance with all federal and state regulatory requirements - and is a major employer in our community.

I support the Hecla Greens Creek Mining Company plan to use Alternative B - which continues their past method of tailings disposal and is most environmentally sound, technically feasible and economically viable.

Hecla Mining Company's Greens Creek Mine is one of the largest employers in the Juneau-Douglas region and a major contributor to the economy and quality of life of our community.

We are looking forward to the continued positive benefits of this mine's operations in our community.

John A. Sandor
3311 Foster Avenue
Juneau, AK 99801
907-596-2497

Response

Comment ID: JS.3.001
Comment noted.

Comment

Admiralty Island National Monument Tongass National Forest
Attention: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801
email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

June 4, 2012

To the Forest Service Decision Makers:

JS.4.001

Please accept my comments on the proposed expansion of the tailings disposal facility for the Greens Creek mine on Admiralty Island. I am a thirty year resident of southeast Alaska and I have spent a great deal on time on Admiralty Island. I hunt and fish on lands immediately adjacent to the Greens Creek mine. Family and friends fish commercially for a living along the shores of Admiralty Island, harvesting seafood from the streams and estuaries of the island as well as migratory fish that feed on the abundant forage fish and plankton that thrive in the coastal waters of Admiralty Island. I engage in recreational boating and hiking in the area as well as throughout Admiralty Island National Monument and Kootznoowoo Wilderness Area. For many years I worked as a wilderness guide on Admiralty Island. Our clients were there to see bears, catch fish, photograph eagles, watch birds and learn about wildland natural history. Many came to Admiralty specifically because of its wilderness quality, to experience first hand a vast northern old growth forest. These resources, these uses and these intact wild ecosystems are important to my way of life and to the jobs and businesses and quality of life of many other Alaskans.

As a Juneau resident and a past three-term member of the Juneau Economic Development Council I am keenly aware of the contribution the Greens Creek mine makes to the local economy. Greens Creek is our community's largest private sector taxpayer and, like many Juneau residents, I know people who have good jobs at or related to the mine. I know local businesses owners whose patrons include mine employees. The mine is an important art of the local economy and enjoys strong support from Juneau's business ad political community.

I am also a conservationist, a strong supporter of protecting and taking care of the natural, wild and renewable resources that also are important to our lives. I understand that most of Admiralty Island is a National Monument, an International Biosphere Reserve, a Wilderness Area. It has great ecological, scientific and recreational importance to the United States and to the world. In fact, in a global context Admiralty Island is and perhaps always will be the largest contiguous, intact tract of temperate rainforest that is protected as a conservation area.

JS.4.002

Perhaps most significant, Admiralty Island – Kootznoowoo - is the home of the Angoon Tlingit people. The Angoon people were instrumental leaders in establishing Admiralty Island National Monument and Kootznoowoo Wilderness.

1

Response

Comment ID: JS.4.001
Comment noted.

Comment ID: JS.4.002
Traditional uses of the region are discussed in sections 3.16 (Subsistence) and 3.17 (Cultural Resources).

Effects to marine and freshwater resources, including Hawk Inlet and salmon streams, are addressed in Section 3.7, Aquatic Resources. All lands currently used or proposed for use for mining, milling, or related processes are open to mineral entry or the claimant retains valid existing rights that were established before the withdrawal. No alternative would extend into the Wilderness portion of the Monument or into what was formerly the Young Bay Experimental Forest, both of which are currently withdrawn from lands available for mineral entry. Although termination of the mineral withdrawal for the former experimental forest would be consistent with management of the area under the Semi-Remote Recreation Land Use Designation (LUD), which includes direction providing that "Forest lands within this LUD are open to mineral exploration and development," this has not occurred. For the withdrawal to be terminated, the Regional Forester would have to request that the U.S. Department of the Interior revoke the 1963 mineral withdrawal, and a decision whether to approve that request would be made by the Secretary of the Interior. The process would include an environmental analysis under NEPA. The Forest Service uses the Forest Plan to guide management actions throughout the Tongass National Forest and therefore does not maintain a separate Monument/Island Plan. Based on internal review and the public scoping process (Section 1.5), Monument values were identified as a significant issue (Section 1.7) and alternatives and mitigation measures (sections 2.2 and 2.6) were identified and included in the EIS to reduce effects to the Monument. Section 3.19 is dedicated for consideration of impacts to the Monument specifically.

It is not possible to predict an absolute fixed date of closure. The current proposal is to authorize additional disposal capacity to accommodate another 30 to 50 years of operations, although under the terms of the Greens Creek Land Exchange Act, mining may not continue past 2095. This is acknowledged in Section 3.22, Cumulative Effects.

Comment

JS.4.002 cont

Tlingit people from the Juneau area, Hoonah, and especially Kake have also used and depended upon the traditional uses and resources of Admiralty Island since time immemorial.

I cite these interests, values and perspectives because they together call on the Forest Service decision makers to summon their best talents and convictions as land stewards for the American – and Alaskan -- people. There is and will be pressure to get the decision done with fewer staff and less money than ever. Pressure will come to bear from the mining company to make a decision that maximizes their profits while minimizing their costs and their risk of delay due to appeals and litigation. The Juneau City & Borough leaders are facing their own budgeting challenges and will have their eyes on the tax revenues related to the mine. There will be concerns, alternate proposals and objections from conservationists. Why? Because the tailings are toxic and pollute to varying degrees, depending on conditions, and could threaten the productivity of Hawk Inlet and other water bodies. Because the expansion will bury and destroy a salmon spawning stream. Because the proposed expansion will likely spill into lands previously off limits to mining development. Because this expansion proposal is likely to be followed, in the future, by additional expansion proposals and there is concern that there is no "life of the mine" plan. Because there is no long-range plan for Admiralty Island as a geographic unit and as a result truly significant decisions are being made in a piece meal, incremental fashion that probably is not consistent with long term stewardship.

For all of these reasons the Forest Service must step up from the permit-processing and minimum-legal-compliance mindsets and claim their crucial role as steward of a magnificent local, national and international conservation area: Admiralty Island – Kootznoowoo – Fortress of the Bear. This means that the Monument values must be the priority in this decision. This does not mean they trump mining that was authorized in ANILCA. It does not mean Greens Creek has a bad track record – there are some environmental problems but overall the mine is one of the better examples of how mineral development can proceed responsibly in Alaska. The Forest Service's stewardship responsibility that at the end of each decision related to Admiralty Island the Monument and Wilderness are in as good or better condition as thy were before the decision.

The mine is likely going to continue to operate for decades; there are no signs it is going to close until the ore plays out; their reports are that there is a lot more lucrative ore to be mined. The mining company needs to accept, as previous owners have, at times, demonstrated, that in doing business on Admiralty Island they must meet a very high conservation standard. When they take they should also give back. This means they should take extra measures to protect the environment, reduce environmental risk and fund or engage in compensatory measures to make the Monument whole. It means they need to accept very lucrative profits and forego maximizing profits. To a significant extent this will be a product of technology and law and a diligent permitting process. It is also about seeing the forest for the trees, seeing the whole of Admiralty and what it means to so many people -- not just the blueprint for a tailings impoundment.

2

Response

Numerous practices are in place or will be implemented to reduce effects to the environment, including those found in the GPO, USACE CWA Section 404 permit, APDES permit, ADNR reclamation plan approval and water right authorizations, ADEC Waste Management Permit and Air Quality permit, ADF&G Fish Habitat Permit, and City and Borough of Juneau Large Mine Permit.

Many of these measures that relate to tailings placement and operations at the TDF are called out in Table 2.6-2. The EIS assesses the environmental effects of various aspects of tailings disposal across a wide range of resources, including the consideration of the Monument (discussed in Section 3.19, Monument Values).

The Forest Service is working closely with cooperating agencies, including the USEPA, USACE, State of Alaska, and CBJ in addition to interested parties from the USFWS and NMFS. We have also conducted meetings with local tribal entities in Angoon and Juneau. The Forest Supervisor's selected alternative and the rationale for his choice are presented in the Record of Decision.

Comment ***Response***

While the company can do a lot to work with people who care about Admiralty Island to strike a better balance, and many other groups and individuals can engage in the process with that result in mind, the Forest Service must be the leader. The Forest Service has a public mission and very good staff who can do this right. In this instance the Forest Service leadership needs to support the Monument Manager and all project staff in making this a top priority for both the local economy and the conservation and preservation of the Admiralty Island Monument values. There are plenty of people in the community, and beyond, who will help in that regard – if the Forest Service steps up to the plate. There is potential for an excellent outcome overall. There is also potential for a tough, protracted dispute.

My call is for the Forest Service to lay the groundwork for the better result, for the mining company to embrace a conservation area mining strategy, and for local people to support alternatives that solve problems and in which all parties can take pride. If the agency can't get it right on Admiralty Island, what does this say about the prospects for managing mineral development on other Forest Service lands in Alaska? Yet if the Forest Service can handle this proposal in a way that protects the Monument while allowing business to continue to prosper, a very strong precedent is set for the future.

Thank you for the opportunity to comment on the Greens Creek Tailings Expansion.

Sincerely,

John Sisk
4435 North Douglas Highway
Juneau, AK 99801

3

Comment

Response

Hecla
GREENS CREEK

June 4, 2012

VIA EMAIL

Ms. Sarah Samuelson
Interdisciplinary Team Leader
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Re: Hecla Greens Creek Mining Company Comments on Draft EIS

Dear Ms. Samuelson:

On behalf of Hecla Greens Creek Mining Company ("HGCMC"), I am pleased to provide comments on the draft Environmental Impact Statement ("DEIS") concerning the Greens Creek Mine Tailings Disposal Facility Expansion. Completion of the EIS and issuance of the Clean Water Act Section 404 dredge and fill permit is critically important to the Mine, and we appreciate the hard work that the U.S. Forest Service and U.S. Army Corps of Engineers have put into this project. We will provide comments on the draft 404 permit (Appendix A of DEIS) under separate cover to the U.S. Army Corps of Engineers.

If you have any questions, please contact me at (907) 790-8474.

Sincerely,

Jennifer Saran

Jennifer Saran
Environmental Manager

Comment

Hecla GREENS CREEK

HECLA GREENS CREEK MINING COMPANY DRAFT EIS COMMENTS

Comment 1

General.

JS.5.001 All APDES permit references to values for flow/discharge are not for the permit currently in place; they are the proposed values under the current permit renewal that have not yet been approved.

Comment 2

Abstract, p. i.

JS.5.002 There is a typo in the second sentence of the Abstract, which should read: "The analysis includes four alternatives: the proposed action which calls for a 30 to 50-year expansion of facilities within the Monument; a no action alternative under which an expansion would not be authorized; an alternative that provides an equal amount of waste disposal capacity while reducing the footprint within the Monument; and an alternative that would allow expansion into the Monument but would avoid direct impacts to Tributary Creek, an anadromous stream in the project area."

Comment 3

Summary, p. iii.

JS.5.003 The third sentence in the first paragraph should be corrected to read: "The mine has been in operation since 1989 with a two year period of temporary closure."

Comment 4

Summary, p. iii, General Comment.

JS.5.004 In the last sentence of the second paragraph, and in numerous locations elsewhere in the document, the DEIS incorrectly states that the expansion of the existing TDF will hold an additional 9.7 million cubic yards of tailings and waste rock. This figure is incorrect and instead should be 15 million cubic yards. Section 1.3 (Proposed Action) on p. 1-7 correctly states that the "TDF expansion would accommodate an estimated additional 15 million cubic yards of tailings and waste rock." Please change all references in the DEIS regarding the TDF expansion volume to 15 million cubic yards.

Comment 5

Summary, p. iii, General Comment.

JS.5.005 In the second paragraph, and in numerous locations elsewhere in the document, the DEIS incorrectly states that the existing "TDF will be filled to capacity in 2014." Please correct this date to "2016" to reflect that the mine can continue to operate until late 2016 if the remaining capacity at the TDF is judiciously used to the extent practicable.

2

Response

Comment ID: JS.5.001
The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDES permit is reissued. All related text has been modified.

Comment ID: JS.5.002
Edit made per comment.

Comment ID: JS.5.003
Edit made per comment.

Comment ID: JS.5.004
Edit made per comment. All numbers referring to the expansion of the existing TDF have been corrected to 14.2 million cubic yards, which is the total calculated disposal rate for all tailings, waste rock, and other permitted materials.

Comment ID: JS.5.005
The FEIS has been revised to indicate that HGCMC anticipates reaching capacity in 2016.

Comment

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Comment 6

Summary, p. iv, Scoping and Significant Issues.

JS.5.006 Under Scoping Issue 1, Water Quality, the first sentence should be revised to reflect that discharges to the marine environment are discharges permitted pursuant to an ADEC-issued Alaska Pollution Discharge Elimination System (APDES) permit. This section should read: "Water quality may be impacted directly by runoff from acid-generating material or by direct impacts of the expanded facilities or by permitted marine discharges of treated mine water."

Comment 7

Summary, p. v, Alternatives.

JS.5.007 In the description of Alternatives C and D, the DEIS states "… a new, separate TDF would be built outside the Monument…" A sentence should be added to both alternatives clarifying that the new facility would be located on Juneau Ranger District Forest Service semi-remote recreation land. In addition, this clarification should also be reflected throughout the DEIS.

Comment 8

Summary, p. v, Alternatives.

JS.5.008 The first sentence of the paragraph following the bullet list states, "The major difference among the alternatives is the location and configuration of the TDF (or TDFs)." Please revise this to read: "The major differences among the alternatives are the location and configuration of the TDF (or TDFs), the ability to use existing infrastructure versus building new infrastructure, and the ability to gravity drain water to collection and treatment at closure versus pumping the water."

Comment 9

Summary, p. v, Alternatives.

JS.5.009 The first sentence of the last paragraph in this section should be revised to read: "Each of the action alternatives (B through D) also includes construction of water management ponds, access roads, and laydown areas for storage of reclamation materials."

Comment 10

Summary, p. vi, Alternatives, Table ES-1.

It appears an incorrect boundary line was used to determine the acreages of total new disturbances for the alternatives listed in the Table (and shown and discussed throughout the document). Please correct the acreages using the 2003 Forest Service lease boundary line as the starting location for new disturbances.

JS.5.010 It is unclear why the acreage for ponds would be less in Alternatives C and D than for B. More ground will be disturbed in C and D, and therefore more contact water will need to be collected and sent to treatment. The summary for Alternative B indicating 12.0 acres seems within reason. The June 2011, phase 4, plate 3 of the EDE wastewater collection document lists 7.9 acres of pond, which should be

3

Response

Comment ID: JS.5.006
Edit made per comment.

Comment ID: JS.5.007
The requested information is presented in Section 3.13.

Comment ID: JS.5.008
The HGCMC Proposal (April 2011) describes active pumping from Pond 13. The summary and other chapters of the EIS have been modified to show that alternatives C and D and Mitigated Alternative B would require pumping of effluent from additional TDF collection areas to the water treatment plant and that this would be required as long as necessary to meet water quality standards.

Comment ID: JS.5.009
Edit made per comment.

Comment ID: JS.5.010
Acres of total new disturbance were determined using the currently approved disturbance footprint. The acreages for ponds and reclamation sites were developed based on preliminary levels of design that are adequate for this analysis and the comparison of alternatives. Pond and reclamation site sizes relate to the size of the disturbance as well as the facility configuration (e.g., height or depth) and the thickness of materials removed. Construction level design of the selected alternative may result in some modification of the facility footprints.

Comment

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acreage based on high surface water, excluding disturbance due to embankments, etc. With 5 pond sites and embankments, it is reasonable this figure may reach 12 acres. However, it is confusing and misleading to state that the pond acreages for Alternatives C and D would be about 60% less than for Alternative B. It is reasonable to expect total pond disturbance for Alternative D to be more than Alternative C and not less. Alternative D includes expansion of the existing TDF for the first 10 years, which includes expanding Pond 9 and constructing a new pond south of the TDF. Including Pond 7, net acreage at the existing facility under Alternative D should be roughly 8 acres. Combined with the construction of a new pond at the new TDF location under Alternative D, the total number of acres disturbed for ponds in Alternative D should be between 10 to 12 acres. JS.5.010

The allotted acreages for reclamation materials are less for Alternatives C and D than for Alternative B yet the tailings acreages are greater. There may be insufficient space for development and storage of reclamation materials as outlined for Alternatives C and D.

Comment 11

Summary, p. vi, Alternatives, Table ES-1.

Please add a footnote to Table ES-1 to define "Ancillary Disturbance" and define this term in Chapter 6, Glossary. JS.5.011

Comment 12

Summary, p. vi, Affected Environment and Environmental Consequences.

The description of Current Baseline Conditions should be revised to read as follows: "The current (baseline) conditions for each resource are described. Since the mine has been in operation for more than 20 years, the baseline conditions may include impacts that have occurred as a result of existing operations." JS.5.012

Comment 13

Summary, p. vii, Table ES-2, and p. 2-43, Comparison of Alternatives, Table 2.7-1.

The following list of comments relate to Table ES-2 (p. vii) and Table 2.7-1 (p. 2-43). JS.5.013

- Please add a new column for Mitigated Alternative B for ease of comparing to all other alternatives.
- Under the "Water Resources – Surface Water" section, the "Percent of watersheds affected by new disturbance" category is an impact that does not tell the reader actual impacts as it is determined from total acres in the watershed and this varies greatly for these sites. This category would be more accurate if it reflected the number of watersheds or the acres of watershed disturbed. JS.5.014
- Under the "Water Resources – Surface Water" section, the "Percent of watersheds affected by new disturbance" category does not include North Hawk Inlet as a watershed. Please add North Hawk Inlet watershed to Alternatives C and D. JS.5.015

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Response

Comment ID: JS.5.011
Ancillary disturbance removed from alternative footprints.

Comment ID: JS.5.012
Edit made per comment.

Comment ID: JS.5.013
Edit made per comment. The Final EIS has been modified to address Mitigated Alternative B as a stand-alone alternative.

Comment ID: JS.5.014
Edit made per comment. Total acres impacted in each watershed have been added to Table 2.7-1.

Comment ID: JS.5.015
Edit made per comment. Percentage and acres affected by new disturbance for the North Hawk Inlet watershed have been added to Table 2.7-1.

Comment

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JS.5.016
- Under the "Water Resources – Surface Water" section, the category "Additional water management infrastructure such as diversions, groundwater slurry walls, and water management ponds" does not accurately reflect the infrastructure needed for Alternatives C and D. Some of the additional water management infrastructure needed for Alternatives C and D includes pipeline construction and maintenance, and pumps/pump stations.

JS.5.017
- In the following three sections, "Geochemistry," "Geotechnical Stability," and "Vegetation" (pp. viii and 2-44) the tables do not accurately reflect the potential impacts between Alternatives B and C/D. In the columns for Alternatives C and D, please change the text from "Same as Alternative B" to "Similar to Alternative B, but impact will be at 2 TDF sites, including the upgrade and increased use of the A road area."

JS.5.018
- In the "Geotechnical Stability" section, please add a new row/category for the total facility height.

JS.5.019
- In the sections "Soils," "Vegetation," and "Wildlife/Deer Habitat," the acres of disturbance or lost soil productivity does not take into account post-reclamation productivity. These sections should include the following language, which reflects post-reclamation conditions: "When reclamation is initiated and final cover is placed, 90% (or similar) of the lost productivity, forest vegetation and deer habitat will be replaced."

JS.5.020
- In the "Wildlife" section, the table provides that Alternatives C and D will result in 1 or <1 acre disturbance of brown bear buffers. However, under the "Aquatic Resources" section of these tables, 34 feet of Class 1 fish habitat will be permanently lost in Alternatives C and D in Fowler Creek. The "Wildlife" section should be updated to accurately reflect the number of acres of brown bear buffer that will be disturbed in the Fowler Creek watershed under Alternatives C and D.

Comment 14

Summary, pp. xxi and xxii, List of Acronyms.

JS.5.021

Please add the following acronyms to the List of Acronyms on pp. xxi-xxii:

- FSH Forest Service Handbook
- FSM Forest Service Manual
- ROS Recreation Opportunity Spectrum

Comment 15

Section 1.1, p. 1-1, Background.

JS.5.022

As indicated in the final sentence of the first paragraph, the Greens Creek Mine produces gold in addition to lead, zinc, and silver. The first sentence of the first paragraph should be revised to read: "The Greens Creek Mine is an underground metals mine (primarily lead, zinc, silver, and gold) located near Hawk Inlet on northern Admiralty Island."

5

Response

Comment ID: JS.5.016
Text modified based on suggestion: "… including construction and maintenance of pipeline and pump stations" has been added to Table ES-2 and Table 2.7-1, Alternative C. This carries over to Alternative D, because it is described as similar to Alternative C.

Comment ID: JS.5.017
Edit made per comment. Table 2.7-1 and Table ES-2 have been changed to say "similar to Alternative B" or "similar to Alternative A."

Comment ID: JS.5.018
Comment noted. Total facility height has not been added to Table 2.7-1. Geotechnical stability is based on slope stability, with a design ratio of 3:1; visual impacts of each alternative can be seen in figures 3.14-5 through 3.14-10.

Comment ID: JS.5.019
We have included language that says soil productivity would improve and vegetation would be reestablished across most of the site with time following closure under all alternatives. The time required for wildlife, and particularly deer habitat, to recover and the extent to which it would resemble pre-mining conditions is more difficult to predict. The text in the vegetation and soils sections has been revised.

Comment ID: JS.5.020
Tables ES-2 and 2.7-1 have been revised to state that 0 feet of Class I fish habitat would be permanently lost under alternatives C and D.

Comment ID: JS.5.021
Edit made per comment. FSH, FSM, and ROS have been added to the list of acronyms.

Comment ID: JS.5.022
Edit made per comment. Text now reads, "The Greens Creek Mine is an underground metals mine (primarily lead, zinc, silver, and gold) located near Hawk Inlet on northern Admiralty Island."

Comment

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Comment 16

JS.5.023

Section 1.1, p. 1-1, Background.

This section should include a sentence to clarify the makeup of the land ownership upon which the mine operates. Add the following sentence after '(ANILCA)' near the end of the first paragraph: "The remainder of the mine's facilities (north end of the tailings disposal facility and the A Road) are located in the Juneau Ranger District or on privately held land near Hawk Inlet (cannery camp and port facilities)."

Comment 17

JS.5.024

Section 1.1, p. 1-1, Background.

The last sentence in the first paragraph should be revised to accurately reflect annual production. This sentence should read: "On an annual basis, production from the Greens Creek Mine averages approximately 7 million ounces of silver, 40,000 ounces of gold, and a total of 200,000 combined tons of zinc, lead, and bulk concentrates."

Comment 18

JS.5.025

Section 1.1, p. 1-1, Background.

The fourth sentence of the first paragraph should be revised as follows: "The mine and portions of the TDF are within the Admiralty Island National Monument (Monument), on lands classified as non-wilderness and affecting less than 1/100th of 1% of the total monument area; at its nearest point, the Kootznoowoo Wilderness is approximately 2 miles from the mine's mill and mine portal."

Comment 19

JS.5.026

Section 1.1, p. 1-4, Figure 1.1-2.

Consider using the base map of Figure 3.1-1 (p. 3-2) instead of the map shown on Figure 1.1-2 (p. 1-4). Figure 3.1-1 provides a better perspective of the wilderness boundary in relation to the mine's location. Cannery Creek should also be added to Figure 3.1-1.

Comment 20

JS.5.027

Section 1.1, p. 1-5, Figure 1.1-3.

This photo should be updated with the following information: (1) please add a date to the satellite photo (2009); (2) add a line to depict the existing lease boundary; and (3) please check the scale for accuracy (the distance from B Road to Pond 7 is approximately 1200').

Comment 21

JS.5.028

Section 1.1, p. 1-6, Background.

The first sentence of the second full paragraph on page 1-6 states: "With continued discovery of new ore and improved metal prices, HGCMC believes they can extend the life of the mine for another 30 to 50

6

Response

Comment ID: JS.5.023
Edit made per comment.

Comment ID: JS.5.024
Edit made per comment.

Comment ID: JS.5.025
Suggestion noted; however, this information is included in Section 3.19, Monument Values, and is unnecessary in the background discussion.

Comment ID: JS.5.026
Edits made per comment. See updated figures 1.1-2 and 3.1-1.

Comment ID: JS.5.027
To limit confusion, the existing lease boundary will only be shown for Alternative A, Figure 2.3-1, which was permitted under the existing lease boundary. A reference to satellite image, 2009, has been added to the figure caption. The scale has been adjusted for accuracy.

Comment ID: JS.5.028
Comment noted. It is acknowledged that mining may continue through 2095 under the land exchange agreement. This has been added to Section 3.22, Cumulative Effects.

Comment

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JS.5.028

years." The land exchange agreement provides for the rights to explore and mine from the subject lands until 2095. HGCMC believes that the mine life can be extended through systematic and sustained exploration that results in continued discovery and delineation of new ore reserves. This has been the case since the mine opened in 1989; however, a long-term tailings strategy to support continued operations will also be required to extend the mine life.

Comment 22

Section 1.1, p. 1-6, Background.

JS.5.029

The second sentence in the second full paragraph states: "Consequently, to process the known ore reserves, additional disposal capacity of approximately 15 million cubic yards is needed for tailings and waste rock material." Consider replacing this sentence with the following:

> The request of the expansion is based on the need for a long-term tailings disposal strategy to sustain mine operations for currently defined reserves, present and future waste rock disposal requirements, and potential future discovery of resources and conversion to reserve similar to the historic success of replacing reserves through sustained and systematic exploration since 1989. This will provide a comprehensive long-term plan; however, actual construction will be performed in phases that limit impacts to defined actual needs at the time of each phase.

Comment 23

Section 1.1, p. 1-6, Background.

JS.5.030

The last sentence on the bottom of page should be revised to read: "This EIS analyzes the proposed action and alternatives to the proposed action and their effects on pertinent physical, biological, and social resources."

Comment 24

Section 1.3, p. 1-7, Proposed Action.

JS.5.031

In the first paragraph of Section 1.3, please delete the word "proven" both times it appears.

Comment 25

Section 1.3, p. 1-7, Proposed Action.

JS.5.032

Please delete the text box in italics on the right of the page ("*Proven, Inferred, and Probable Resources*") as these definitions are incorrectly used.

Comment 26

Section 1.3, p. 1-7, Proposed Action.

JS.5.033

The first sentence of the third paragraph should be revised as follows to reflect the incremental development stages of the mine: "The TDF expansion would accommodate an estimated additional 15

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Response

Comment ID: JS.5.029
Text revised per comment.

Comment ID: JS.5.030
Text revised per comment.

Comment ID: JS.5.031
Text revised per comment.

Comment ID: JS.5.032
Comment noted. Text box removed.

Comment ID: JS.5.033
Text revised per comment.

Comment

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JS.5.033 million cubic yards of tailings and waste rock, with development proceeding incrementally in 10 year phases, with the Forest Service and ADEC approval required prior to phased construction."

Comment 27

Section 1.7, p. 1-12, Significant Issues.

JS.5.034 Under Issue 4, the first sentence should be revised to read: "The Greens Creek Mine and portions of the proposed expansion occur within the non-wilderness portion of the Admiralty Island National Monument."

Comment 28

Section 1.8.3.3, p. 1-21, U.S. Environmental Protection Agency.

The third sentence of paragraph 2 should be revised to accurately reflect the discharges provided in the APDES permit. This sentence should be revised to read:

JS.5.035 During the effective period of the renewed APDES permit, the Permittee will be authorized to discharge from outfalls 002 and 003 to Hawk Inlet, outfall 004 to wetlands, outfall 005.2 to Zinc Creek, and outfalls 005.3, 005.4, 005.5, 006, 007, 008, and 009 to forest duff or to Greens Creek, within the limits and subject to the conditions set forth in the APDES permit.

Comment 29

Section 2.1, p. 2-1, Greens Creek Mine Overview.

JS.5.036 Consider revising the last sentence of the first paragraph on page 2-2 that states: "Tailings that are not backfilled are trucked to the TDF where they are placed in a series of layers (lifts) within discrete disposal locations (cells)." This sentence is somewhat misleading because "discrete cells" may imply that boundary materials are placed to contain cells. This sentence should be revised to specify that the "discrete cells" are placement areas and do not include boundary materials.

Comment 30

Section 2.1, p. 2-2, Greens Creek Mine Overview.

JS.5.037 The first sentence of the second paragraph on p. 2-2 needs to be revised to reflect that all contact water is treated prior to discharge pursuant to the APDES permit. This sentence should read: "All water coming in contact with mine-related activities is collected and either recycled back to the mill or treated and discharged into Hawk Inlet as authorized in the Alaska Pollutant Discharge Elimination System (APDES) permit."

8

Response

Comment ID: JS.5.034
Text revised per comment.

Comment ID: JS.5.035
Comment noted. The text in section 1.8.3.3 has been revised to reflect the current status of the APDES permit.

Comment ID: JS.5.036
Edit made per comment. The word “discrete” has been removed.

Comment ID: JS.5.037
The text has been revised to reflect the current status of the APDES permit.

Comment ID: JS.5.038
The Monument boundary line as depicted in Chapter 2 is correct and is based on Forest Service mapping data.

Comment ID: JS.5.039
Text has been added to sections 2.3, 3.5, and 3.7 to reflect a truck wash and requirement for a water withdrawal permit from Fowler Creek.

Comment

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Comment 31

JS.5.038

Section 2, p. 2-1, Description of Proposed Action and Other Alternatives.

All figures in Chapter 2 need to be revised to correctly and consistently depict the Monument boundary line. For example, the map provided in Appendix A to this letter accurately depicts the Monument boundary.

Comment 32

JS.5.039

Section 2.3, General Comment Regarding Alternatives C and D.

The descriptions for Alternatives C and D do not identify a water source for the truck wash and other potential fresh water needs. The potential impact of developing a water source for Alternatives C and D should be presented and evaluated.

Comment 33

JS.5.040

Section 2.3, General Comment Regarding Alternatives C, D, and Mitigated B.

Alternatives C, D, and Mitigated B prevent the ability to have a single no-pump, gravity flow/discharge system following closure of the TDF. Although the DEIS states that discharge without treatment is not anticipated, eliminating the option for no-pump, gravity flow would be short-sighted. Predictions of water quality following closure of the TDF are intentionally pessimistic. If actual closure water quality ends up being better than predicted, options including gravity flow would substantially reduce impacts compared to pump-dependent options. Alternative B is the only alternative that would allow gravity flow to one discharge point.

Comment 34

JS.5.041

Section 2.3, General Comment Regarding Alternatives C and D – Water Resources.

Alternatives C and D have the potential to impact the Fowler Creek and North Hawk Inlet drainages in ways not fully discussed in the DEIS. Efforts to minimize impacts from fugitive dust would be the same for all alternatives; however, development of Alternative C or D would expand the extent of potential fugitive dust impacts to two additional watersheds.

JS.5.042

Potential impacts to groundwater in Alternatives C and D may not be fully described. Changes in reduction/oxidation conditions and water levels under lined areas may change the composition of groundwater (e.g., iron/manganese reduction) in the headwaters of Fowler Creek and the North Hawk Inlet drainage. As described, Alternatives C and D do not provide a description of how groundwater will be collected if necessary. It does not appear that there is a no-pump option to keep water from beneath the lined C/D footprints from flowing toward Fowler Creek. If there is a plan to fill beneath the liner to attain grade, this would complicate construction, reduce capacity and potentially impact Fowler Creek and North Hawk Inlet drainages and groundwater.

JS.5.043

Developing rock quarries in the Fowler Creek and North Hawk Inlet watersheds could influence groundwater by increasing pH, hardness and sulfate in water that percolates through the quarry floor. Quarrying related to development of Pond 7 and the northwest corner of the existing TDF had this type of

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Response

Comment ID: JS.5.040
Statements indicating that effluent from the TDF would be allowed to drain to Hawk Inlet in the absence of management were removed from the DEIS based on other comments received by the Forest Service.

The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, monitoring requirements, or outfall locations. Identifying potential options discussing how effluent would be controlled, treated, and permitted in the future would be presumptive in the EIS. As such, the EIS does not consider alternative treatment methods, such as passive system or discharge scenarios.

Statements have been added to Mitigated Alternative B and alternatives C and D to the effect that active pumping would remain a requirement after closure.

Comment ID: JS.5.041
Comment noted. The text has been modified to include potential impacts to the North Hawk Inlet watershed.

Comment ID: JS.5.042
The EIS indicates that the north TDF design would be similar to the proposed action. Groundwater beneath the liner would contact the underdrain pad and flow downgradient.

Sections 2.3.3 (Alternative C) and 2.3.4 (Alternative D) indicate that the underdrain pad would be graded so that if the liner system were compromised, effluent would drain toward Hawk Inlet and avoid the Fowler Creek drainage.

Potential impacts to the north TDF are discussed in Section 3.6.3.4. Potential impacts to both groundwater flow and quality are disclosed, as well as potential impacts to flow and quality in Fowler Creek.

Comment ID: JS.5.043
A discussion regarding the potential for impacts to water quality due to quarry development has been added in Section 3.6.3.4 (Groundwater).

Comment

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JS.5.043 influence on groundwater and surface water. Dilute, acidic waters in the Fowler Creek and North Hawk Inlet watersheds may be sensitive to higher pH, higher hardness water. Developing quarries in the Alternative B footprint could have a similar effect on groundwater but the impacts would be confined to fewer watersheds and there is the potential for no-pump options for water management in the Tributary Creek drainage.

Comment 35

Section 2.3.1, p. 2-4, Table 2.3-1.

JS.5.044 In Table 2.3-1, it would be helpful to include the estimated disturbances that would be within the existing TDF permitted lease boundary for each alternative. It would also be helpful to show the existing permitted lease boundary on all of the figures in this chapter.

Comment 36

Section 2.3.1, p. 2-4, Alternative A: No Action Alternative.

JS.5.045 The text box on p. 2-4 incorrectly states that the existing TDF will be filled to capacity in 2014. Please correct this date to "2016" to reflect that the mine can continue to operate until late 2016 if the remaining capacity at the TDF is judiciously used to the extent practicable.

Comment 37

Section 2.3.1, p. 2-5, Alternative A: No Action Alternative.

JS.5.046 The Legend on Figure 2.3-1 incorrectly indicates that Pond 9 has not been built; it has.

Comment 38

Section 2.3.2, p. 2-6, Alternative B: Proposed Action.

JS.5.047 Footnote 1 on p. 2-6 is incorrect as diversion tubes do not function similarly to sand bags. This footnote should be revised to read: "Diversion tubes are flexible, water conveying tubes used for storm water diversion and erosion control."

Comment 39

Section 2.3.3, p. 2-8, Alternative C: New TDF Located Outside Monument, and Section 2.3.4, p. 2-16, Alternative D: Modified Proposed Action.

JS.5.048 The second sentence in paragraph 2 on p. 2-8 and the second sentence of paragraph 1 on p. 2-16 should be revised to reflect that an additional pond would be required under Alternatives C and D. For the proposed expansion of the existing TDF under Alternatives C and D, it is inaccurate to assume that a larger Pond 9 on the north end of the existing TDF is capable of handling the southern expansion. This sentence should be revised as follows:

Contact water from disturbed sites would be routed into water management ponds, including an expanded Pond 9 (see Figure 2.3-3c or 2.3-4c) and an additional pond to the south, and

10

Response

Comment ID: JS.5.044
Comment noted. To limit confusion, the existing lease boundary will only be shown for Alternative A (Figure 2.3-1), which was permitted under the existing lease boundary.

Comment ID: JS.5.045
Text has been revised as suggested.

Comment ID: JS.5.046
Edit made per comment. The legend for Figure 2.3-1 has been changed to indicate that Pond 9 has been built.

Comment ID: JS.5.047
Text has been revised as suggested.

Comment ID: JS.5.048
The discussion referring to the expanded pond volumes is not intended to be a design-level description, but rather a conceptual discussion of potential management requirements. Specific pond volume and location requirements would need to be determined as a part of design.

Comment

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JS.5.048 then pumped to the existing Pond 7, from where it would be pumped to the water treatment plant for treatment before being discharged to Hawk Inlet.

Comment 40

Section 2.3.3, p. 2-8, Alternative C: New TDF Located Outside Monument.

JS.5.049 The first paragraph incorrectly states that the "development of the new TDF to the north would require 2 – 3 years for site preparation and construction." The development of the new north TDF will likely take longer, potentially 3 – 5 years, due to the additional infrastructure and construction requirements needed prior to any tailings placement occurring. This sentence should be revised to reflect the anticipated longer timeframe required to design and construct a new TDF prior to tailings placement at a remote location.

Comment 41

Section 2.3.3, p. 2-8, Alternative C: New TDF Located Outside Monument, and Section 2.3.4, p. 2-16, Alternative D: Modified Proposed Action.

JS.5.050 The second paragraph of Section 2.3.3 and the third paragraph of Section 2.3.4 underestimate the complexity of constructing underdrains for a new TDF. Building and grading this pad will make construction more complex, expensive and take up tailings storage volume. It is likely an impact may still occur in Fowler Creek from construction occurring in the area and also from changing the redox conditions in the ground water, which then likely flows to Fowler Creek. The following sentences should be revised to reflect the complexity associated with constructing underdrains in a TDF and controlling potential impacts to the Fowler Creek watershed: "The underdrains would be built on a pad of unreactive material. The underlying pad would be graded and the underdrain system designed so that, in the absence of active water management, contact water from the new TDF would drain toward Hawk Inlet and avoid Fowler Creek, which supports anadromous fish populations."

Comment 42

Section 2.3.3, p. 2-9, Figure 2.3-3a. Greens Creek Mine Alternative C – Final North Layout.

JS.5.051 To be consistent with the presentation of Alternative B, the start of Fowler Creek should be shown on the figure. Figure 3.5-6 shows Fowler Creek in the Alternative C and D disturbance area but Figure 2.3-3a does not. This figure should be revised to show the start of Fowler Creek.

Comment 43

Section 2.3.3, p. 2-10, Figure 2.3-3b, and Section 2.3.4, p. 2-14, Figure 2.3-4b.

JS.5.052 It is difficult to read the inset figure for the cross section of the road. For example, what is the proposed size of the pipelines under Alternatives C and D? Please include additional details regarding the infrastructure required for water management under Alternatives C and D, which may include adding a new figure under Alternatives C and D to expand the cross-section inset that is currently undecipherable in Figures 2.3-3b and 2.3-4b.

11

Response

Comment ID: JS.5.049
Comment noted. The text (and analysis) has been revised to indicate that construction of a new facility would take 3–5 years.

Comment ID: JS.5.050
Please see the response to Comment JS.5.042. The text has been modified to be similar, as suggested.

Comment ID: JS.5.051
An updated stream layer has been added to figures 2.3-1 through 2.3-4c, and Fowler Creek tributaries have been added to figures 2.3-3a through 2.3-4c.

Comment ID: JS.5.052
Figures 2.3-3b and 2.3-4b have been updated; the cross-section inset has been enlarged for easier viewing.

Comment

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JS.5.053 HGCMC calculations indicate Alternatives C and D will need extensive water management infrastructure to get the water from the site to the water treatment plant. This would include two 18" pipelines approximately 20,000 feet long and a multi-stage (3) turbine pump system. This is to handle an estimated 21 cfs, or 9400 gpm. Please include additional details regarding the infrastructure required for water management under Alternatives C and D. For example, in the EDE proposed Stage 3 expansion project water collection and containment, the B Road tails Phase 1 expansion runoff water footprint is referenced at ~ 140.3 acres (p. 21). In Autocad, the Alternative C footprint looks to be about 101 acres; this results in a 72% ratio. The tails phase 1, 25-yr/24-hr event is referenced at ~18 cfs. Underdrains, truck wash, and pond 7 seepage return pushes this up to 29.7 cfs.

Comment 44

Section 2.3.3, p. 2-11, Figure 2.3-3c, and Section 2.3.4, p. 2-15, Figure 2.3-4c.

JS.5.054 Please add the existing lease boundary to Figures 2.3-3c and 2.3-4c.

Comment 45

Section 2.3.3, p. 2-12, Alternative C: New TDF Located Outside Monument, and Section 2.3.4, p. 2-16, Alternative D: Modified Proposed Action.

JS.5.055 A sentence should be added to the second sentence of the first paragraph on p. 2-12 and the fourth paragraph on p. 2-16 regarding rock used for road construction after the following sentence: "The A Road would be upgraded to accommodate construction traffic and haul truck use." The following sentences should be added to accurately reflect the rock used for road construction: "Rock must meet construction specification for materials including index and geochemical parameters. If geochemically stable rock materials are encountered, these may also be used for general site road maintenance outside of the TDF."

Comment 46

Section 2.3.4, p. 2-16, Alternative D: Modified Proposed Action.

JS.5.056 The fifth paragraph on p. 2-16 does not accurately reflect the issue of capacity for contact water for Alternative D. The following sentence is misleading because it does not take into account contact water surge ponds at the new TDF: "Because the expansion at the existing TDF would be less than under the proposed action, less contact water capacity would be necessary and fewer basins and ponds would be built at the site." This should clarify which "site" is referenced, and also include a sentence discussing the additional contact water pond that must be constructed under Alternative D in the new A Road TDF.

Comment 47

Section 2.4.1, p. 2-17, Mining Activities.

JS.5.057 The description of mining is incorrect; HGCMC uses cut and fill and long-hole methods. Cut and fill is the primary mining method used to extract the ore. Long-hole stoping is also utilized in select ore zones

12

Response

Comment ID: JS.5.053
While the amount of detail requested in the comment was not added to the EIS, the text has been modified to show that under alternatives C and D and Mitigated Alternative B, the pumping of effluent from additional TDF collection areas to the water treatment plant would be required as long as necessary. Additional language has also been added where appropriate to further emphasize the increased infrastructure needs.

Comment ID: JS.5.054
Edit not made. The existing lease boundary is displayed in Figure 2.3-1, and adding lease boundaries in subsequent figures would add confusion.

Comment ID: JS.5.055
Text was revised based on comment. Inserted:

Rock used for road construction must meet specification for materials including index and geochemical parameters. If geochemically stable rock materials are encountered, these may also be used for general site road maintenance outside of the TDF.

Comment ID: JS.5.056
The text in Section 2.3.4 has been clarified.

Comment ID: JS.5.057
Text has been revised to accurately reflect the mining methods employed at Greens Creek.

Comment

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JS.5.057 conducive to this bulk mining method. Please revise this section to accurately reflect the mining methods employed at Greens Creek.

Comment 48

Section 2.4.2, p. 2-17, Mineral Processing.

JS.5.058 This section does not accurately reflect the milling process at Greens Creek. This section should be renamed "Ore Concentrate Milling" to more accurately describe the beneficiation activities conducted at Greens Creek. The second sentence of section should be revised to read: "Ore is fed into the mill where it is ground in a SAG mill and ball mill with water. A portion of the gold and silver are recovered through gravity concentration. Then very small amounts of reagents are added to cause minerals of interest to attach to air bubbles to be floated into and recovered from a froth in a series of flotation cells. The concentrates and tailings are then filter pressed to create moisture levels acceptable for transport."

Comment 49

Section 2.4.2, p. 2-17, Mining Activities.

JS.5.059 The last sentence of this section should be revised to read: "…tailings are either trucked to the TDF or used to make backfill and used underground to fill voids from mining, which provides ground support."

Comment 50

Section 2.4.3.2, p. 2-19, Waste Rock.

JS.5.060 The last sentence in this section needs to be deleted because it is not accurate. Please delete the following sentence: "HGCMC also uses waste rock or quarry rock to define disposal cells."

Comment 51

Section 2.4.3.3, p. 2-19, Co-Disposal (Tailings and Waste Rock).

JS.5.061 The last paragraph on p. 2-19 references co-disposal use for "delineating disposal cells." This is not accurate and this reference should be deleted. The sentence should be revised to read: "Sources of waste rock used or co-disposed at the TDF include rock used for erosion control, internal roads and relocated rock from inactive waste rock storage sites."

Comment 52

Section 2.4.5, p. 2-21, Rock Quarries.

JS.5.062 In the fourth sentence of this section, and within the text box, a statement should be added that permits the operator to use a local/nearby source for road rock if geochemically stable materials are located. The fourth sentence (and text box) should be revised as follows: "Given the potential for acid generation, none of this rock material would be used external to the TDF, unless the on-island rock source is determined to have a geochemically stable matrix and is found to be non-acid generating." This allows some flexibility in the event that geochemically stable rock is located for road construction.

13

Response

Comment ID: JS.5.058
Text has been revised as suggested.

Comment ID: JS.5.059
The text was revised as suggested.

Comment ID: JS.5.060
The sentence was removed from the FEIS.

Comment ID: JS.5.061
The text was revised as suggested.

Comment ID: JS.5.062
The text was revised as suggested. We understand this reflects the current operating procedures at the site.

Comment

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Comment 53

Section 2.4.7, p. 2-22, Support and Service Roads.

JS.5.063 The last paragraph of this section should be updated to reflect the range of daily round trips from the mill to the TDF. This paragraph should be revised to read: "Currently tailings are transported from the mill to the TDF in 45-ton capacity covered tractor/trailer trucks. Approximately 20 - 40 round trips from the mill to the TDF are made daily, delivering an annual average of 1,000 tons per day to the TDF. Round trip travel time for each truck is approximately one hour. Tailings transport is usually conducted during the day shift with two to four trucks in use at any given time."

Comment 54

Section 2.4.8, p. 2-23, Reclamation and Closure.

JS.5.064 The text box on p. 2-23 should be revised to read: "The overall goal of reclamation is to stabilize the disturbed areas and return the site to vegetated conditions for long-term protection of surrounding land and water resources."

Comment 55

Section 2.4.8, p. 2-23, Reclamation and Closure.

JS.5.065 The first sentence of this section incorrectly states: "Reclamation and closure techniques would be the same for all the alternatives." This statement is only true for the cap to be installed on the TDF(s). Reclamation and closure will not be the same for water treatment; Alternative B will be able to gravity drain water at closure, while the new site on the A road (Alternatives C and D) will require pumping water to the water treatment plant. This will result in additional infrastructure, pump stations and electricity, road access, and ongoing maintenance.

Comment 56

Section 2.4.8, p. 2-23, Reclamation and Closure.

JS.5.066 In the last paragraph on p. 2-23, the bullet list should be revised as follows: "In GPO Appendix 14, Reclamation Plan (included in part as Appendix F here), HGCMC identified the following four stages of reclamation that may be applicable to the tailings facility expansion:

- Interim reclamation;
- Temporary cessation;
- Concurrent and final reclamation; and
- Post-closure care and maintenance."

14

Response

Comment ID: JS.5.063
The text has been revised as suggested.

Comment ID: JS.5.064
Text revised as suggested.

Comment ID: JS.5.065
The EIS has been modified in sections 2.3.3 and 2.3.4 to show that alternatives C and D and Mitigated Alternative B would require the pumping of effluent from additional TDF collections areas to the water treatment plant, and that treatment would be required as long as necessary to meet water quality standards. Additional language has also been added to sections 3.5.3.3 and 3.5.3.4 where appropriate to further emphasize the increased infrastructure needs.

Comment ID: JS.5.066
Edit made per comment.

Comment

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Comment 57

Section 2.4.8.2, p. 2-25, Final Reclamation.

JS.5.067 The third sentence of paragraph two is a fragment and should be redrafted to tie into the previous or subsequent sentence. Currently, it states: "At that time, and based on information related to closure gleaned from experience at the site."

Comment 58

Section 2.4.8.3, p. 2-25, Engineered Tailings Soil Cover.

JS.5.068 The discussion of the requirement for the cover should include a statement that the proposed design *or equivalent* will be constructed. It is possible that there will be design modifications that could improve performance and/or lower costs.

The lower capillary break is not intended to function as a drain as stated in the text, rather its primary purpose is to minimize downward migration of water from the barrier layer by creating a capillary break between the barrier layer and the tailings. It is unlikely that percolation through the barrier layer will be sufficient to promote flow in the lower capillary break. Water percolating through the barrier layer will likely continue through the lower capillary break into the tailings.

Comment 59

Section 2.5, p. 2-27, Alternatives Considered but Not Carried Forward.

JS.5.069 The discussion of submarine tailings disposal is discussed twice; first on p. 2-27 in the second paragraph of Section 2.5, then on p. 2-28 in the first paragraph of Section 2.5.2. These discussions should be consolidated into one section.

Comment 60

Section 2.5.3, p. 2-29, Reduction of the Pyrite Concentration in the Tailings.

JS.5.070 The final paragraph on p. 2-29 should be redrafted as the claims in this paragraph are not substantiated by HGCMC's work. It appears that the risks related to both the use of sulfuric acid and the potential for spontaneous combustion of a pyrite concentrate may be somewhat overstated; however, logistical and footprint constraints are significant impediments to developing a pyrite concentrate. Pyrite concentrate would require care similar to the other concentrates present at Greens Creek mine. Pyrite concentrate markets and economies have not been proven even though there has been significant work to do so.

Comment 61

Section 2.5.3, p. 2-30, Reduction of the Pyrite Concentration in the Tailings.

JS.5.071 This section attempts to provide a partial feasibility analysis for reduction of pyrite concentration in tailings. There are other operational factors and cost factors not considered. The summary text indicated in the last bullet on p. 2-30 states: "The unreasonable level of risk to water quality, aquatic life, and Monument values as well as human health that would be associated with the shipping and storage of

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Response

Comment ID: JS.5.067
The fragmented sentence was replaced with the following: Prior to implementing final reclamation, HGCMC will submit a detailed reclamation plan to the Forest Service and State of Alaska that would incorporate decades of monitoring results and the most up-to-date site-specific information.

Comment ID: JS.5.068
Any design changes to the cover would need to be approved by the Forest Service and State of Alaska prior to implementation. The description of the lower capillary break was provided by HGCMC in the detailed description of the proposal *Proposed State 2 Tailings Expansion*, April 2011.

Comment ID: JS.5.069
Section 2.5 has been revised to consolidate the submarine tailings disposal discussion.

Comment ID: JS.5.070
Section 2.5.3 has been revised based on information provided by HGCMC.

Comment ID: JS.5.071
Comment noted. The language in question in Section 2.5.3 has been revised to focus on the existing operational constraints. We recognize that as technology improves and economics change, it may be appropriate to reevaluate this option in the future.

Comment

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JS.5.071 sulfuric acid, and the handling of pyrite concentrate because of its potential reactivity." This statement should be rewritten to consider that as technology improves and economics change, it may be appropriate to fully re-evaluate this option in the future.

Comment 62

Section 2.6.1, p. 2-30, Alternative B Mitigation.

JS.5.072 In the second paragraph (and numerous other locations within the DEIS) it states: "While it is not anticipated, in the absence of active water management, the outfall from the TDF would be designed at closure to drain to Hawk Inlet, rather than to Tributary Creek." This statement needs clarification. For instance, does it mean everything will be gravity drained and discharged to Hawk Inlet through the existing outfall pipeline?

Comment 63

Section 2.6.1, pp. 2-30 to 2-32, Alternative B Mitigation.

JS.5.073 The TDF reconfiguration under Mitigated Alternative B would involve extending tailings placement to the northeast of the existing facility. As indicated in this section, in the absence of active water management, the outfall from the TDF would be designed at closure to drain to Hawk Inlet. However, extending the TDF into the northeast (NE) as indicated in Figure 2.6-1 and placing a water management pond next to Cannery Creek creates several water related issues not identified in the DEIS:

- If the tails facility were to be expanded to the NE, there would no longer be gravity flow to Hawk Inlet in absence of pump operations as this new area would drain into Cannery Creek.
- JS.5.074 Cannery Creek is a permitted secondary drinking water source for the mine site. It is likely that this water source would continue to be a permitted drinking water source during the post-closure monitoring and maintenance period for the facility. Pond 9-A as indicated in the mitigation design does not have adequate separation from Cannery Creek for source water protection. The emergency over flow from this pond would be gravitationally directed towards Cannery Creek.
- JS.5.075 Space/capacity for a pond may be limited in this area. The pond also appears to overlie the electrical substation.
- JS.5.076 A significant portion of the NE area indicated is considered a marsh wetland, likely in direct communication with Cannery Creek. While Cannery Creek is not an anadromous creek due to a natural barrier, it appears to be only 2000 feet from the NE proposed expansion area to Hawk Inlet.

Comment 64

Section 2.6.2, p. 2-31, Contemporaneous Reclamation.

JS.5.077 In the first paragraph of Section 2.6.2, Line 5, "note" should read "noted."

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Response

Comment ID: JS.5.072
Statements indicating that the TDF effluent would be allowed to drain to Hawk Inlet have been removed from the EIS based on this and other comments. The NEPA analysis assumes that leachate from the TDF would need to be controlled and treated both during operations and after closure. As previously noted, these activities would be managed though a discharge permit.

Comment ID: JS.5.073
Please see the response to Comment JS.5.072. The text in Section 3.5.3.4 has been revised to reflect pumping and infrastructure needs and potential impacts to Cannery Creek and the water supply.

Comment ID: JS.5.074
Comment noted. Section 3.5.3.3 has been modified to reflect potential impacts to Cannery Creek and the public water supply.

Comment ID: JS.5.075
The Forest Service understands that space is limited in this area. Additional language has been added to Section 3.5.3.3 discussing potential impacts to Cannery Creek as well as other appropriate infrastructure needs.

Comment ID: JS.5.076
Comment noted. These wetlands are discussed in Section 3.10.

Comment ID: JS.5.077
Edit made per comment.

Comment

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Comment 65

Section 2.6.3.1, p. 2-33, Table 2.6-2, Mitigation Measures by Resource.

JS.5.078 HCGMC has the following comments on Table 2.6-2:

- Please add a column to the table that indicates what items are already being done and what items are new requirements.

JS.5.079
- Please add a column that describes the source addressed by the mitigation. A number of measures in the table appear to be site-wide rather than TDF specific. The TDF is the scope of the analysis.

JS.5.080
- On p. 2-33, the text in the "Measure" column regarding "Truck wash at concentrate storage building" (row 5) should be revised. At the 920 concentrate load-out building, wheels are washed prior to leaving the facility. At the concentrate storage building at Hawk Inlet, the trucks dump the loads without entering the building, and therefore tracking issues do not exist. A truck wash does exist at the Hawk Inlet beach area for wash down of road dirt at the end of shift. The text in this section should be revised to state that washing of wheels is required only if for some reason trucks or other equipment enter the concentrate storage building.

JS.5.081
- On p. 2-34, the text in the "Measure" column in the "Water Resources/Water Quality" category (rows 3 and 4) should be revised in the first two rows as it is too prescriptive and inflexible. These measures should allow for more flexibility in what 'water detention structure' may be best used for this application. For example, the operator should have flexibility to control storm water and divert water flows back to natural surface water flows in a manner that will not erode channels or overwhelm creeks.

JS.5.082
- On p. 2-35, row 7 "Stabilization of channels," the language should be changed from "channels will be stabilized" to "channels may be stabilized." Currently, if required, channels are stabilized with degradable fiber mat to establish vegetation.

JS.5.083
- On p. 2-36, row 3, "Ensure that clean water remains clean," the third sentence should be removed regarding "Clean water intercept "B" pond." This sentence does not add clarification to the measure text provided, and B Pond no longer exists.

JS.5.084
- On p. 2-36, row 6, "Fisheries Mitigation," in the "Comment" column, the text regarding replacing lost fishery habitat should be deleted as it is confusing and is more clearly explained in Section 3.7 ("Aquatic Resources").

JS.5.085
- On p. 2-37, row 8 (Wetlands), the "Responsibility" column should include the U.S. Army Corps of Engineers as this agency is responsible for issuing the CWA § 404 Dredge and Fill Permit.

Comment 66

Section 2.6.3, pp. 2-39 to 2-42, Table 2.6-3.

HCGMC has the following comments on Table 2.6-3:

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Response

Comment ID: JS.5.078
Footnote added marking all new mitigation measures. A new column not needed to represent the new mitigation measures presented in Table 2.6-2.

Comment ID: JS.5.079
A column has been added describing the sites the mitigation measures apply to.

Comment ID: JS.5.080
The measure was revised to reflect wheel washing requirements for vehicles leaving the TDF.

Comment ID: JS.5.081
The text has been modified to emphasize flexibility in the manner and design of control and includes the objective of maintaining geomorphologic integrity of the natural channel. The purpose for the measure is to ensure that clean water discharged from detentions structures in the Tributary Creek drainage will not increase erosion within the stream channel as wetlands are lost.

Comment ID: JS.5.082
Text revised per comment.

Comment ID: JS.5.083
Text revised per comment.

Comment ID: JS.5.084
Text revised per comment.

Comment ID: JS.5.085
Text revised per comment.

Comment

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JS.5.086 • A number of measures in the table appear to be site-wide rather than TDF specific. The TDF is the scope of this analysis.

JS.5.087 • On p. 2-41, row 1, (Juvenile fish sampling) – the "Responsible Party" column should be revised to the Alaska Department of Fish and Game.

JS.5.088 • On p. 2-41, row 1, the language regarding toxicity testing should be removed as it is no longer required.

JS.5.089 • On p. 2-41, row 3, the invasive species inspection should be clarified to state when this is to be included in the GPO. Should this be included in this table if not yet a requirement? HGCMC will bring Forest Service botanist to site for these inspections.

Comment 67

Section 2.6.4, p. 2-40, Table 2.6-3, Monitoring Requirements and Authority.

JS.5.090 Under the air quality resource, monitoring (total suspended particulates, lead, zinc, and particulate matter less than10 microns (PM10)) at the mine and Hawk Inlet marine facility is no longer required.

JS.5.091 Under the geochemistry resource, paste pH is measured on a five-year interval and net neutralization potential is determined from monthly tailings composites from the mill. Replace the word "leach" with "leachate" or "drainage." The monitoring section may need to be updated to reflect current practices outlined in draft GPO Appendix 3.

Comment 68

Section 3.2, p. 3-3, Air Quality, General Comment.

JS.5.092 The DEIS should conclude whether or not an air permit (Title I PSD or Title I minor or Title V revision) is triggered by the increase in fugitive emissions from each of the alternatives, pursuant to 40 CFR 52.21, 18 AAC 50, or 40 CFR 70/71.

Comment 69

Section 3.2, p. 3-4, Air Quality.

JS.5.093 The last sentence in the first paragraph on p. 3-4 should be revised to read: "… potential to emit more than 250 tons per year (tpy) of NO_X." This incorrectly states 205 tpy as currently written.

Comment 70

Section 3.2.3, p. 3-7, Table 3.2-3, Summary of Emission Units currently Permitted at the Greens Creek Mine.

JS.5.094 Table 3.2-3 requires revision as shown below. Edits are indicated by ***red bold italics***. The changes requested reflect a more accurate description of the emission units currently permitted and their potential

18

Response

Comment ID: JS.5.086
Sitewide mitigation measures were included as they related to the TDF, transport of tailings, or ongoing mining and milling processes that would continue if an expansion is approved, although the list is not exhaustive.

Comment ID: JS.5.087
Text revised per comment.

Comment ID: JS.5.088
The text regarding toxicity testing has been removed.

Comment ID: JS.5.089
Table 2.6.3 indicates that this GPO requirement is “to be included.”

Comment ID: JS.5.090
Edit made per comment. The reference to air quality monitoring at the site for TSP, lead, zinc, and $PM_{2.5}$ was removed from Table 2.6-3.

Comment ID: JS.5.091
The suggested changes have been made to Table 2.6.3.

Comment ID: JS.5.092
Title I Prevention of Significant Deterioration (PSD), Title I minor, and Title V revised permits will not be impacted by the predicted fugitive dust emissions under all action alternatives. PSD determination is based on 100 tpy for the 28 source categories (Greens Creek does not fall under any of the categories) or 250 tpy for other sources. Only stationary sources (not fugitive sources) need to be reviewed to determine if the facility is subject to PSD. Refer to the excerpts from the PSD regulations (40 CFR 51.166) below:

40 CFR 51.166(b)(1)(b): Notwithstanding the stationary source size specified in paragraph (b)(1)(i)(a) of this section, any stationary source which emits, or has the potential to emit, 250 tons per year or more of a regulated NSR pollutant; (Note: 40 CFR 51.166(b)(1)(i)(a) defines the 28 source categories.)

Comment

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emissions based on source test data, vendor data, AP-42 emission factors, and the allowable limits under the current Operating Permit No. AQ0302TVP02 Revision 1 issued on March 3, 2011.

Table 3.2-3. Summary of Emission Units (EU) Currently Permitted at the Greens Creek Mine.

EU ID No.	EU Description	Potential to Emit[1], Tons Per Year (TPY)				
		NO_X	CO	PM_{10}	SO_2	Volatile Organic Compounds
1	Ruston Diesel Engine	535.7[2]	100.0[2]	2.4	7.6	9.1
2	Ruston Diesel Engine			2.4	7.6	9.1
3	Ruston Diesel Engine			2.4	7.6	9.1
4	CAT 3516B Diesel Engine		7.8	0.5	40.0[2]	7.6
18	CAT 3516B Diesel Engine		7.8	0.5		7.6
19	Diesel Solar Taurus Turbine		1.7	0.8		8.6
6	Sullair Compressor	36.1	7.8	2.6		2.9
5	Volcano Oil Boiler	1.6	0.4	0.1		0.02
7	Sag Mill (Crusher)	0	0	0.0044	0	0
8	Ball Mill (Crusher)	0	0		0	0
9	Conveyor Drop Points	0	0	0.042	0	0
N/A	Cleaver-Brooks Boiler	2.81	0.7	0.04	3.18	0.14
N/A	Insignificant Emission Units	0.31	0.08	0.063	1.09	0.0039
All Units (Total)		576.5	126.3	11.8	67.1	54.2

JS.5.094

Notes:

1. *This table includes potential emissions from the significant emission units as listed in the current Operating Permit No. AQ0302TVP02 Revision 1 issued on March 3, 2011; emission units as described in off-permit changes; and insignificant emission units that are not required to be in the permit as set out in 18 AAC 50.326(d).*

2. *Potential emissions based on allowable limits under the current operating permit.*

Comment 71

Section 3.2.2, p. 3-6, Air Quality – Baseline Conditions.

JS.5.095

In the first paragraph of Section 3.2.2, change "Air quality measurements" to "Ambient air quality monitoring" to distinguish between monitoring conducted on ambient air quality versus source testing conducted on emission units, which is also a measurement. Merge with the 3rd paragraph (or provide a note that details are following) since this paragraph explains the ambient air PM monitoring to greater detail.

19

Response

40 CFR 51.166(b)(2)(iii): The fugitive emissions of a stationary source shall not be included in determining for any of the purposes of this section whether it is a major stationary source, unless the source belongs to one of the following categories of stationary sources:

(Note: The categories are the 28 source categories; Greens Creek does not fall under any of them.)

Comment ID: JS.5.093
Comment noted. Edits have been made in text replacing "Air quality measurements" with "Ambient air quality monitoring" in the first and third paragraphs of Section 3.2.2.

Comment ID: JS.5.094
Edits made to Table 3.2-3. Emission units currently permitted at Greens Creek Mine were updated based on the current Operating Permit No. AQ0302TVP02, Revision 1, issued on March 3, 2011.

Comment ID: JS.5.095
The text has been revised to reflect ambient air quality monitoring was conducted and the paragraph discussing PM10 was moved up in the text.

Comment

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Comment 72

JS.5.096

Section 3.2.2, p. 3-6, Air Quality – Baseline Conditions.

In the second paragraph, add "Revision 1" to "Title V Permit No. AQ0302TVP02." This permit has a current Revision 1 issued on March 3, 2011.

Comment 73

JS.5.097

Section 3.2.2, p. 3-7, Air Quality – Baseline Conditions.

Under the heading "Dust Control Improvement Methods," this section states that "current dust control methodologies are not required under permit terms and conditions…" Condition 33 of Title V Permit No. AQ0302TVP02 Revision 1 addresses prevention of fugitive emissions. It requires the Permittee to take reasonable precautions to prevent particulate matter from being emitted into the ambient air. In addition, the source is subject to the NSPS Subpart LL under Condition 14, which addresses process fugitive emissions and requires monthly dust inspections from access and operating ports of EU IDs 7 – 9 (crusher and conveyor points).

Comment 74

JS.5.098

Section 3.2.3.1, p. 3-10, Figure 3.2-3.

The data presented in Figure 3.2-3 for the PM 2.5 emissions needs to be clarified. Data presented in Figure 3.2-2 for the PM 10 emissions shows that Alternatives C and D have higher emissions than Alternatives A and B. It appears inconsistent that for PM 2.5, lower emissions are expected from Alternatives C and D than Alternatives A and B.

Comment 75

JS.5.099

Section 3.2.3.1, p. 3-10, Mitigation and Monitoring.

The second paragraph indicates a data gap exists for fugitive dust. HGCMC does not agree that there is a data gap. HGCMC has a monitoring program in place to characterize the extent and source of metals around the TDF. This program includes snow sampling as well as passive collection methods.

Comment 76

JS.5.100

Section 3.2.3.1, p. 3-11, Table 3.2-5.

Table 3.2-5 presents optional and general dust control measures. Numerical specifics should be removed from this table as they are inapplicable and cause confusion. For instance, in the last row on p. 3-11 for Unpaved Roads, the "Threshold" column states that "unpaved road must be more than 50 feet wide at all points." This does not apply and causes confusion. It may be more appropriate to revise this table into a bullet list of potential control measures, such as:

- Operational controls may be implemented including temporary speed reduction, fencing, and/or ceasing operations on high wind days.

20

Response

Comment ID: JS.5.096
Edit made: (Revision 1) added to the Title V permit.

Comment ID: JS.5.097
Edit made per comment. In section 3.2.2, under Dust Control Improvement, a sentence has been added discussing reasonable precautions to prevent fugitive dust as listed in the current Title V Permit No. AQ0302TVP02, Revision 1.

Comment ID: JS.5.098
Edits were made to figures 3.2-2 and 3.2-3, and PM_{10} and $PM_{2.5}$ emissions were recalculated and corrected in the above-noted tables. Thank you for the correction.

Comment ID: JS.5.099
The text has been revised to indicate that snow monitoring, load analysis, and passive systems are currently in place.

Comment ID: JS.5.100
Edit made per comment. Table 3.2-5 has been simplified to recommend control measures that are applicable to the Greens Creek Mine.

Comment

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JS.5.100

- Natural controls including watering, hydroseed application for vegetative cover growth, or biodegradable matting.

Comment 77

Section 3.2.3.2, p. 3-14, Mitigated Alternative B.

JS.5.101

The first paragraph states that enlarging the quarry rather than developing a new one is a possibility; however, this has not yet been explored and is likely not possible. Enlarging the quarry would increase the difficulty to collect water from the quarry and would further complicate closure and reclamation. The discussion regarding enlarging the quarry under Mitigated B should clarify that it is unclear whether this is technically feasible, or delete this discussion altogether.

Comment 78

Section 3.3.2, p. 3-20, Geotechnical Stability – Baseline Conditions.

JS.5.102

The last sentence of paragraph four should be revised to read: "They determined that the phreatic surface would need to be much higher than the current groundwater levels to reduce the factor of safety from 1.3 to 1.1 to potentially affect TDF stability."

Comment 79

Section 3.4.2, p. 3-24, Table 3.4-1, Tailings Mineral Composition by Weight.

JS.5.103

Many of the values found in column 3 (Percent by Weight) have too many decimals and need to be corrected.

Comment 80

Section 3.4.2, p. 3-24, Geochemistry – Existing Conditions.

JS.5.104

Regarding the 14 XRD samples referred to in the fourth paragraph in Section 3.4.2, the ten samples collected from the test cells were likely of tailings placed in the early 2000s rather than 1990s. Two of the other four samples were from the early to mid 1990s and the other two were fresh samples from the mill in 2004.

Comment 81

Section 3.4.2, p. 3-29, Geochemistry – Existing Conditions.

JS.5.105

In the first paragraph on p. 3-29, the comment regarding the delay time for the onset of ARD from tailings may be misleading. Comparing the delay time of waste rock to that of tailings is problematic because milling makes the carbonate minerals more available to neutralize acidity in tailings than in waste rock. No examples of acidification of Greens Creek tailings have been found to date. "Products of pyrite oxidation" do not necessarily indicate depletion of neutralization capacity. The few cases of acidic drainage near the tailings facility were due to acidification of rock fill (in addition to Fe and Mn reduction/oxidation in muskeg soils), not tailings. While it may be difficult to argue definitively that tailings exposed to optimal weathering conditions will not acidify in less than 30 years, the field results

21

Response

Comment ID: JS.5.101
Comment noted. If preconstruction geotechnical and engineering review indicates that an enlarged quarry is not feasible, then the quarry considered under Alternative C, along the A road, could be used.

Comment ID: JS.5.102
Edit made per comment.

Comment ID: JS.5.103
Values in Table 3.4-1 have been edited.

Comment ID: JS.5.104
Text has been edited as follows: “Ten of these samples were taken from several depths (0.5–2.5 meters) within test cells studied by Lindsay (2009) and are estimated to have been produced in the early 2000s. Two of the remaining four samples were from the mid-1990s and two were fresh from the mill in 2004.”

Comment ID: JS.5.105
Standard procedure for conducting humidity cell tests provides for substantial crushing of material, relative to waste rock, to be tested. While not crushed as fine as tailings, the substantial size reduction should produce test results that are appropriate for use in estimating potential lag times for the onset of ARD in tailings. Field observation of acidic seeps associated with the tailings pile are noted as being consistent with previous estimates based on lab tests and nothing more.

Comment

Hecla GREENS CREEK

JS.5.105 really do not support the concept that tailings are projected to acidify in 10 to 33 years under those conditions.

Comment 82

Section 3.4.2.1, p. 3-29, Solutions Associated with Tailings.

JS.5.106 Here and throughout the DEIS the document referenced as "Condon (2011)" might more appropriately be referenced as "Petros (2011)," "Petros GeoConsulting (2011)" or "PGI (2011)." Also, the reference list appears not to refer to the version that was revised November 18, 2011.

JS.5.107 The document referenced as "Condon (2012)" is actually titled "Statistical calculations for representative water types at the Greens Creek tailings facility." The reference list has the title, "Geochemical Composition of Observed Solutions in the Greens Creek Mine TDF."

Comment 83

Section 3.4.2.1, p. 3-30, Table 3.4-4, Chemical Composition of Solutions Associated with Greens Creek Tailings.

JS.5.108 The highest detection limit is shown for elements with non-detect results; however, the lowest detection limit value more closely indicates the actual concentration in the water. Therefore, for non-detects, the lower detection limit should be indicated in the table and update the footnote. In many cases a high detection limit was reported if the sample was in a batch of other samples that contained samples with higher concentrations.

Comment 84

Section 3.4.2.2, p. 3-30, Sulfate Reduction Monitoring Program.

JS.5.109 The SRMP test plots were constructed in 2004, not 2006.

JS.5.110 The second paragraph on p. 3-31 discusses weathered waste rock (co-disposal) in the SRMP field trials. The field cells did not contain weathered waste rock, and Lindsay and Blowes do not recommend carbon amendment to weathered tailings (and by extension, co-disposed weathered waste rock).

Comment 85

Section 3.5.1.2, p. 3-35, Surface Water.

JS.5.111 The last sentence in paragraph 2 should be revised to read: "The primary withdrawal point is located immediately east of the B Road crossing near the existing TDF site." Following this revised sentence, add new sentences that read: "There is an alternative withdrawal point near the Hawk Inlet camp buildings. Source water protection for the Cannery Creek water system must be maintained."

22

Response

Comment ID: JS.5.106
Comment noted. The reference was changed to Petros and updated to November 2011.

Comment ID: JS.5.107
Reference has been corrected.

Comment ID: JS.5.108
Although it affects only a couple of table values, highest detection limits have been replaced with lowest for cases where a constituent was always undetected. The footnote has been changed to reflect this.

Comment ID: JS.5.109
The text has been corrected.

Comment ID: JS.5.110
The reference to co-disposal of waste rock in test cells has been deleted and the conclusion of Lindsay and Blowes to not establish sulfate reduction in weathered tailings has been noted.

Comment ID: JS.5.111
The text has been revised per comment.

Comment

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Comment 86

JS.5.112

Section 3.5.1.2, p. 3-39, Surface Water.

Please provide a description regarding why "Further Seep" is a "seep of interest." The last sentence of paragraph 3 on p. 3-39 states: "One particular seep of interest is called Further Seep, an intermittent seep with a flow of approximately one gpm." Why is this a "seep of interest?"

Comment 87

JS.5.113

Section 3.5.2, p. 3-39, Water Resources – Surface Water – Baseline Conditions.

The first sentence of paragraph 1 needs to clarify that the Hawk Inlet drainage area in question is the "south" area; this sentence should be revised to read: "The TDF occupies a gently sloping terrace that straddles the drainage divide between the Tributary Creek drainage basin, the Cannery Creek drainage basin, and the South Hawk Inlet drainage area."

Comment 88

JS.5.114

Section 3.5.1.2, p. 3-39, Surface Water.

The streams discussed in the third paragraph on p. 3-39 (e.g., Proffett Creek, Franklin's Creek, CC Creek and Further Creek) are very small ephemeral drainages, which were given colloquial names for reference by site personnel. They in fact are not streams. Please add this information to the text. Also, delete Althea Creek and Further Creek/seep from p. 3-60, Figure 3.5-5, which shows watersheds.

Comment 89

JS.5.115

Section 3.5.2, p. 3-41, Table 3.5-2, Applicable Water Quality Standards for Area Streams.

It appears the footnote references in the table are not correct. For example, only manganese should have note "c," and arsenic should have note "d."

Comment 90

JS.5.116

Section 3.5.2, p. 3-43, Table 3.5-3.

Table 3.5-3 should be revised to include the reference monitoring location site IDs in Figure 3.5-2 on p. 3-42.

Comment 91

JS.5.117

Section 3.5.2, p. 3-44, Table 3.5-3, Summary of Surface Water Quality Monitoring Stations.

The table provides site names but not site numbers as shown on Figure 3.5-2 (Surface Water Quality Monitoring Sites). Table 3.5-3 should be revised accordingly.

JS.5.118

Gilbert Creek is a small spring-fed drainage near the mine site above Site 23. Herman's Gulch (east) is a small drainage that flows from under the rock fill at the truck pad at the Hawk Inlet marine terminal.

23

Response

Comment ID: JS.5.112
The text has been modified and the term “of interest” was removed.

Comment ID: JS.5.113
Edit made per comment.

Comment ID: JS.5.114
These drainages were referred to as creeks in the 2003 EIS and are named creeks in the Water Quality Data Base. The names were left unchanged for consistency.

Comment ID: JS.5.115
The footnotes have been corrected.

Comment ID: JS.5.116
Edit made per comment. Site ID numbers have been added to the site location name in Table 3.5-3 in relation to the monitoring sites shown in Figure 3.5-2.

Comment ID: JS.5.117
Edit made per comment. Site ID numbers have been added to the site location name in Table 3.5-3 in relation to the monitoring sites shown in Figure 3.5-2.

Comment ID: JS.5.118
Edit made per comment. Gilbert Creek, Herman’s Gulch (east), and Herman’s Gulch (south) have been removed from Table 3.5-3.

Comment

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JS.5.118 Herman's Gulch (south) is a foundation drain from the shift housing building at the Hawk Inlet camp. These drainages are not associated with the tailings facility and should be removed from the table and the text on p. 3-46, Paragraph 2, Line 1.

Comment 92

Section 3.5.2, p. 3-46, Water Resources – Surface Water – Baseline Conditions.

JS.5.119 A sentence should be added to the end of this section that reads: "HGCMC has initiated a study to determine natural background concentrations for surface water and ground water in the area." This comment also applies to paragraph 2 of Section 3.6.1.3 (Groundwater Quality) on p. 3-67.

Comment 93

Section 3.5.2.1, p. 3-47, Wastewater Management.

JS.5.120 In the first paragraph on p. 3-47, waters from quarries are not addressed via ambient groundwater monitoring as specified by the FWMP. Quarries are monitored under GPO Appendix 11 or the stormwater monitoring program. In the second paragraph, water treatment relies on precipitation of calcium carbonate, iron hydroxide and other metal hydroxide phases. In the third paragraph the reference to *non-contact* storm water discharges may be in conflict with the definition given for contact water in the first paragraph, particularly as it relates to quarries.

Comment 94

Section 3.5.2.1, p. 3-47, Wastewater Management.

JS.5.121 The first sentence of the second paragraph on p. 3-47 should be revised to read: "The four primary wastewater management areas at the site are the Hawk Inlet camp/loadout facilities area, the waste rock storage areas (Pond C, Pond D, Site 23), 920 mine and mill area, and the tailings facility area, consisting of the TDF, water containment and storage, and the Pond 7 wastewater treatment plant (WWTP)."

Comment 95

Section 3.5.2.3, p. 3-51, Table 3.5-4.

JS.5.122 Delete manganese from Table 3.5-4; manganese is not an analyte that is required to be analyzed in the APDES permit, and therefore there is no manganese data to compare to the standard in Table 3.5-5. Also, the title of Table 3.5-4 should be changed to: "Alaska Chronic Marine Water Quality Standards."

Comment 96

Section 3.5.2.3, p. 3-51, Table 3.5-5.

JS.5.123 The permit requires dissolved metals analyses, not "total" for all metals except mercury. The values in HGCMC 2009 (cited for this table) are dissolved metals, and do not match this table.

24

Response

Comment ID: JS.5.119
Comment noted. Text has been added.

Comment ID: JS.5.120
Comment noted. The text has been modified. The phrase concerning non-contact water outfalls in the permit is consistent with the discharge permit and the rest of the document.

Comment ID: JS.5.121
The text was changed for clarity.

Comment ID: JS.5.122
The manganese standard has been deleted from the table.

Comment ID: JS.5.123
The table has been changed to show dissolved phases for cadmium, copper, lead, and zinc. The table values are an average of 2005 through and including 2009.

Comment

Hecla GREENS CREEK

Comment 97

Section 3.5.3.1, p. 3-52, Table 3.5-6.

JS.5.124 The flow values in Table 3.5-6 are proposed values under the pending APDES permit renewal and have not yet been approved. Also, all metals are measured as total recoverable, except mercury, which is measured as total.

Comment 98

Section 3.5.3.1, p. 3-53, Surface Water – Environmental Consequences.

JS.5.125 On p. 3-53, the last sentence of first paragraph should be revised to read: "This EIS analysis can only predict with a water quality model that the TDF discharge will exceed current Alaska WQS and require a permit at closure, but it cannot predict the requirements of a permit in the future."

Comment 99

Section 3.5.3.1, p. 3-54, Table 3.5-7.

JS.5.126 Footnote (b) in Tables 3.5-7 (p.3-54), 3.5-8 (p.3-55), 3.5-9 (p.3-56), and 3.5-10 (p.3-57) references that Alaska chronic fresh Water Quality Standard (WQS) are based on a long-term average hardness of 37 mg/L as $CaCO_3$. A clarification statement should be provided regarding how this differs from the hardness of 46 mg/L $CaCO_3$ in Tributary Creek used to set the WQS for discharge to area streams referenced in Tables 3.5-2 and 3.5-3 (pp. 3-41 and 3-43).

Comment 100

Section 3.5.3.1, p. 3-57, Effects Common to All Alternatives.

JS.5.127 The closure facility boundary zinc concentration for Alternative B in Table 3.5-8 states 210 ug/l, but the text in Paragraph 1 states 220 ug/l. The 100 year post closure wet well sulfate concentration for Alternative B in Table 3.5-8 states 824 mg/l, but the text states 810 mg/l. The 100 year post closure wet well sulfate concentration for Alternative D in Table 3.5-10 states 870 mg/l, but the text states 335 mg/l. It appears that the table values are correct, and the text should be updated to correct this inconsistency.

Comment 101

Section 3.5.3.1, p. 3-58, Effects Common to All Alternatives.

JS.5.128 Paragraph 2 on p. 3-58 discusses the rationale for stating that water treatment would be required for more than 100 years, perhaps in perpetuity. This rationale should be stated or summarized clearly when this topic is first mentioned in Section 2, p. 2-4 and elsewhere. Previous EIS documents (1983 and 2003) assumed some level of mixing with receiving waters, which would alleviate the need for long term water treatment. The following text from the 2003 EIS Appendix A (p. 18) shows the variety of acceptable discharge options considered:

> Post-closure, water flowing out of the underdrains will either be discharged without dilution under gravity to the surface or subsurface (discharge scenario 1(a), SEIS Section 2.2); diluted

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Response

Comment ID: JS.5.124
Please see the response to Comment JS.5.001.

Comment ID: JS.5.125
Comment noted. The term “requirements” has replaced “conditions” in the statement noted in the comment.

Comment ID: JS.5.126
The footnotes have been made consistent.

Comment ID: JS.5.127
The text has been corrected.

Comment ID: JS.5.128
Please see the response to Comment JS.5.040. The Forest Service does not view the evaluation of water treatment and discharge scenarios as consequential to this analysis since both currently are and will continue to be conducted within regulatory standards (i.e., protective of beneficial uses) as managed by ADEC and the USEPA. Identifying passive treatment as a potential mechanism would be presumptive without treatability studies being conducted to evaluate feasibility and potential effectiveness and to determine a design for a system.

Comment

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JS.5.128

with surface runoff from the pile and downgradient groundwater prior to discharge to the surface or subsurface (discharge scenario 1(b); discharged to marine waters with the potential for dilution from a marine mixing zone (discharge scenario 2); or discharged to marine waters using a diffuser (discharge scenario 3). It is possible that discharge scenarios 1(a) and 1(b) may involve the use of a low maintenance biological treatment system (a.k.a. treatment works) constructed at the land surface or subsurface. Underdrain water will continue to be collected and treated using a conventional chemical precipitation water treatment facility until such time the water quality meets the standards applicable to one of the selected discharge scenarios described above.

The 2003 EIS used a mixing ratio of 50:1 for marine discharge when comparing alternatives. A discussion of the change in approach for addressing the need for long term treatment relative to previous NEPA analyses is warranted.

Comment 102

JS.5.129

Section 3.5.3.2, p. 3-58, Effects of Alternative A, No Action, and Section 3.5.3.3, p. 3-59, Effects of Alternative B, Proposed Action.

Under both Sections 3.5.3.2 and 3.5.3.3, the first paragraph contains a sentence regarding non-contact water runoff that should be revised to read as follows: "Additionally, non-contact surface runoff from upgradient of the TDF is captured and routed in diversions to the Cannery Creek and Tributary Creek watersheds."

Comment 103

JS.5.130

Section 3.5.3.3, p. 3-59, Effects of Alternative B, Proposed Action.

The third paragraph of Section 3.5.3.3 should be revised to read: "The current treatment capacity and permitted maximum daily discharge of the Pond 7 WWTP to the outfall in Hawk Inlet is 3.6 mgd. Under the full expansion of the TDF, the existing WWTP would be upgraded or a new WWTP would be constructed. The additional treatment capacity is needed in order to accommodate the additional volume of tailings wastewater collected. At full build out of Alternative B to accommodate the additional 30 – 50 years of operation, EDE (2010) estimated the need for a 4.6 mgd permitted discharge rate."

Comment 104

JS.5.131

Section 3.5.3.3, p. 3-60, Figure 3.5-5.

The exact facility locations/footprints for all alternatives are difficult to see on this map, and they are not the color indicated in the legend (grey). Please provide a revised map that accurately depicts the facility footprints for all alternatives.

Comment 105

JS.5.132

Section 3.5.3.3, p. 3-61, Mitigated Alternative B.

Paragraph 1 should be revised to clarify that Mitigated Alternative B may result in an impact to the Cannery Creek watershed. Following the second to last sentence in paragraph 1 ("The slight difference in wetlands impacted may produce a very minor improvement in flow attenuation and groundwater

26

Response

Comment ID: JS.5.129
The term “non-contact” has been added to the text.

Comment ID: JS.5.130
The text has been modified.

Comment ID: JS.5.131
Edit made per comment. Figure 3.5-5 has been revised to match the legend and appear more visible.

Comment ID: JS.5.132
Potential impacts to Cannery Creek have been added to the text for Mitigated Alternative B.

Comment

Hecla GREENS CREEK

JS.5.132 discharge to Tributary Creek compared to Alternative B."), insert a new sentence that reads: "Also, this alternative may impact Cannery Creek."

Comment 106

Section 3.5.3.3, p. 3-61, Mitigated Alternative B.

JS.5.133 Paragraph 1 states: "About 2 million cubic yards of tailings and waste rock being placed in the northeast corner of the existing TDF." Please elaborate on why "approximately half of the material would be placed in the initial phase of the expansion with the remaining volume being placed in the final phase." This mitigation would preclude concurrent reclamation of the north side of the pile if concurrent

JS.5.134 reclamation is warranted. It also prevents gravity flow of contact water and below-liner drainage back to the southwest. Gravity flow to the southwest of the existing TDF is a desirable option for post-closure

JS.5.135 water management. Expansion of the quarry northwest of the TDF and expansion of the TDF to the northeast may impact Cannery Creek. The reclamation material stockpile near the junction of the A and

JS.5.136 B roads could also require additional water management infrastructure if treatment of drainage is necessary.

Comment 107

Section 3.5.4, p. 3-64, Surface Water - Summary.

JS.5.137 The last sentence in Section 3.5.4 should be revised to reflect the reality that captured TDF effluent under Alternatives C and D will be required to be pumped to the wastewater treatment facility indefinitely. This sentence should read: "For alternatives C and D, captured TDF effluent from the northern facility will be required to be pumped to the wastewater treatment facility during operations and closure until water quality standards are met."

Comment 108

Section 3.6.1.3, p. 3-68, Table 3.6-1, and p. 3-69, Table 3.6-2.

JS.5.138 The footnotes to Tables 3.6-1 and 3.6-2 state that averages are calculated using half detection limit. This does not seem appropriate to average minimum and maximum method detection limits. For example, for lead, how does the average of <2 and <10 equal <10? Would it be more accurate to list n/a? Does (<) sign indicate less than method detection limit or some other value?

Comment 109

Section 3.6.2.3, p. 3-71, Groundwater Quality.

JS.5.139 The first paragraph cites an EDE 2007a report for groundwater data. Why does this section cite to the EDE 2007a report when there is an EDE 2011 report? Similarly, why does the last paragraph of this section use 2009 data for the FWMP and not the 2010 data? This section should be revised and cite more recent reports and data or provide a reason why the most current data is not being used.

27

Response

Comment ID: JS.5.133
The placement of material in the northeast corner first would buttress the existing tailings and serve as a base for the material that would be placed later in the process of expanding the TDF. It is noted that this approach would preclude concurrent reclamation.

Comment ID: JS.5.134
The impact was noted in the text along with the fact that additional effluent collection areas would be required in this area and effluent would have to be pumped to water treatment, perhaps in perpetuity.

Comment ID: JS.5.135
The potential impact to Cannery Creek was noted in the text.

Comment ID: JS.5.136
Comment noted. The text has been modified to reflect that additional water management, control, and potential treatment would be required.

Comment ID: JS.5.137
Comment noted. The text has been modified for alternatives C and D and Mitigated Alternative B, and further discussion was added to the Summary concerning additional effluent collection area requirements, pumping of effluent, and infrastructure needs.

Comment ID: JS.5.138
Comment noted. The table values have not been changed. The treatment of non-detects in summary statistics is always arguable, but the method of calculation is noted in the footnote.

Comment ID: JS.5.139
The 2011 groundwater report was not available until after the preliminary agency draft of the EIS was prepared. Similarly, the 2009 FWMP report was the most recent that was made available at the time of the agency draft. The inclusion of the most recent data that is now available will not change the overall analysis and conclusions of this section.

Comment

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Comment 110

JS.5.140

Section 3.6.2.3, pp. 3-72 and 3-73, Tables 3.6-3 and 3.6-4.

Please add footnotes to the Tables that indicate: 1) if the data is based on hardness; and 2) if the values listed as < (less than) are less than the MDL.

Comment 111

JS.5.141

Section 3.6.2.3, p. 3-73, Groundwater Quality.

The sixth sentence in paragraph one on p. 3-73 states: "Currently, sulfate concentrations are still elevated above background levels but are decreasing in all but two wells measured." What is considered "background" in this sentence?

Comment 112

JS.5.142

Section 3.6.2.3, p. 3-73, Groundwater Quality.

It is unlikely that the small increase in sulfate observed in MW-2S is derived from seepage of contact water into bedrock from the unlined portion of the TDF. If that were the case one would expect similar concentrations in the aquifer between the bedrock and the MW-2S. Sulfate is in fact lower in MW-2D (deep) than MW-2S (shallow). Quarrying of rock can increase sulfate concentrations in the absence of contact water from the TDF, because the rock in the quarries contains pyrite. Influences from surface sources (e.g., dust, placement of pyritic quarry rock and perhaps quarrying activities in the area) may account for the increase in sulfate in shallow wells like MW-2S.

Comment 113

JS.5.143

Section 3.6.3.2, p. 3-75, Effects of Alternative A, No Action.

The second paragraph of Section 3.6.3.2 states: "Decreases of elevated sulfate concentrations in bedrock aquifer monitoring wells would continue to be monitored, and the effectiveness of excavating and relining sections of the originally unlined TDF determined." Does this refer to the previously excavated and lined northwest corner of the pile, or does it refer to potential new excavations? Excavation of additional unlined area would not be feasible without moving nearly the entire existing TDF.

Comment 114

JS.5.144

Section 3.6.3.5, p. 3-77, Effects of Alternative D, Modified Proposed Action.

Change "line" to "liner" in the fifth sentence in the first paragraph.

28

Response

Comment ID: JS.5.140
Appropriate footnotes have been added.

Comment ID: JS.5.141
The word “background” has been changed to “pre-mining.”

Comment ID: JS.5.142
Comment noted. The text is based on HGCMC reports that are part of the administrative record.

Comment ID: JS.5.143
The text refers to the effectiveness of the previous excavation.

Comment ID: JS.5.144
Edit made per comment.

Comment

Hecla GREENS CREEK

Comment 115

JS.5.145

Section 3.7.1.1, p. 3-79, Pre-mining Aquatic Resources - Freshwater.

The second sentence in this section should be revised to include a reference to Figure 3.5-1 as in the preceding sentence, instead of Table 3.7-1. This sentence should read: "A few other streams and drainages also enter Hawk Inlet outside of the project area (Figure 3.5-1)."

Comment 116

JS.5.146

Section 3.7.1.1, pp. 3-79 and 3-81, Pre-mining Aquatic Resources - Freshwater.

The stream length for Greens Creek is listed as 211,340 ft in the Table 3.7-1, and 10 miles or 52,800 ft in text (p. 3-81). The correct stream length should be accurately reflected in both the table and text.

JS.5.147

In addition, there are numerous references in the text on pp. 3-81 through 3-103 to figures and tables that are incorrect.

Comment 117

JS.5.148

Section 3.7.2.2, p. 3-92, Baseline Conditions – Aquatic Resources - Marine.

The last sentence in the first paragraph on p. 3-92 should be deleted as it is not attributable to HGCMC 2011. This sentence should be replaced by the following: "Based on these data, it appears that heavy metals in sediment near the outfall 002 site continue to vary from year to year, and have not increased above the range of area-wide baseline levels during mining years (HGCMC 2010)."

Comment 118

JS.5.149

Section 3.7.2.2, p. 3-92, Baseline Conditions – Aquatic Resources - Marine.

On p. 3-92, the third sentence in the second paragraph should be revised as follows: "A concentrate spill occurred from the shiploader in 1989 near Site S-5; …"

The fifth sentence in the second paragraph should be revised to read: "Based on sampling results, a rapid increase in metals concentrations occurred after the spill and sample values have been highly variable, but remain elevated in the immediate vicinity of the shiploader relative to metals concentration in other inlet sampling sites."

Comment 119

JS.5.150

Section 3.7.2.2, p. 3-94, Baseline Conditions – Aquatic Resources - Marine.

The first sentence on p. 3-94 should be revised to read: "The metals levels in sediments observed through 2002 in the immediate area of the shiploader could be toxic to bivalves, amphipods and burrowing organisms."

29

Response

Comment ID: JS.5.145
The correction has been made.

Comment ID: JS.5.146
The text in Section 3.7.1.1 has been revised to indicate that the stream lengths in Table 3.7-1 include tributaries in each watershed.

Comment ID: JS.5.147
The references have been reviewed and corrected.

Comment ID: JS.5.148
Text has been revised as suggested.

Comment ID: JS.5.149
The text has been revised to clarify that the spill was at the shiploader site and elevated metal concentrations are in the immediate vicinity of the site.

Comment ID: JS.5.150
The text has been revised as suggested.

Comment

Hecla GREENS CREEK

Comment 120

Section 3.7.2.2, p. 3-95, Baseline Conditions – Aquatic Resources - Marine.

JS.5.151 On p. 3-95, under the "Overall Marine Conditions" heading, the sixth sentence in the first paragraph should be revised to read: "There are no distinct indications of direct effects of metals to this environment although some degradation of the habitat near the shiploader facility is possible."

Comment 121

Section 3.7.3.2, p. 3-98, Effects of Alternative A, No Action, Freshwater.

JS.5.152 The fifth sentence in Section 3.7.3.2 under the "Freshwater" heading should be revised to read: "Potential changes in some metals levels in Greens Creek, if related to mining, may be possible in the short term; however, metals levels have remained relatively consistent in the control and downgradient sites, so short-term changes for the remaining operating period appear unlikely."

Comment 122

Section 3.7.3.2, p. 3-99, Table 3.7-8, and Summary, p. viii, Table ES-2.

JS.5.153 The DEIS is not consistent in its characterization of resident fish stream habitat that would be lost in Fowler Creek under Alternatives C and D. Table ES-2, p. viii, states that 34 feet of Class 1 habitat will be permanently lost in Fowler Creek under Alternatives C and D. However, Table 3.7-8 does not represent that there will be any loss of Class 1 habitat in Fowler Creek. Also, numbers in the text of the second paragraph on p. 3-103 do not match this table. The text and tables need to be revised to accurately reflect the potential permanent loss of Class I and Class II fish habitat under Alternatives C and D.

Comment 123

Section 3.7.3.5, p. 3-105, Effects of Alternative D, Modified Proposed Action.

JS.5.154 The third sentence of paragraph one on p. 3-105 states that the "total basin area that would have flow diversion would be 98 acres of Tributary Creek and Zinc Creek basins." Why does this include Zinc Creek?

JS.5.155 The fifth sentence should be revised as follows to reflect that the construction of the pond would also be in the Tributary Creek drainage: "The design would also require the placement of tailings as well as the construction of a water management pond within the Cannery Creek drainage and the Tributary Creek drainage."

Comment 124

Section 3.7.4, p. 3-106, Aquatic Resources - Summary.

JS.5.156 The first sentence at the top of p. 3-106 should be revised as follows: "Monitoring in Hawk Inlet has shown some elevated concentrations of metals in sediments near the shiploader site and also variable metals concentrations in sediments near Outfall 002."

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Response

Comment ID: JS.5.151
The text has been revised as noted.

Comment ID: JS.5.152
The text has been revised to the following:

Potential changes in some metals levels in Greens Creek, if related to mining, are possible in the short term; however, metals levels have remained relatively consistent in the control and downgradient sites, so short-term changes for the remaining operating period appear unlikely.

Comment ID: JS.5.153
The DEIS erroneously reported in places that the alternative TDF site would affect 34 feet of Class I streams. This is not correct; the alternative TDF site would not directly affect (by burial) any Class I streams. This has been corrected in the FEIS. The text has been edited to correct inconsistencies.

Comment ID: JS.5.154
Text has been added to clarify that Tributary Creek is part of the larger Zinc Creek basin.

Comment ID: JS.5.155
Revision made as suggested.

Comment ID: JS.5.156
Text revised per comment.

Comment

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Comment 125

JS.5.157

Section 3.8.3.1, p. 3-109, Effects Common to All Alternatives.

The third bullet point ("Filter fabric") at the top of p. 3-109 should be deleted.

Comment 126

JS.5.158

Section 3.8.3.3, p. 3-111, Mitigated Alternative B.

The last line of the first paragraph states that mitigation would be the same as that recommended under Alternative B; however, there is no mitigation recommended for Alternative B in this section. Perhaps this should refer to Alternative A instead of Alternative B.

Comment 127

JS.5.159

Section 3.8.4, p. 3-112, Soils – Summary.

The proposed mitigation of developing test plots to "determine the optimum depth of the plant growth layer for the desired plant communities" will not provide enough time to determine rooting depths of mature species. Observations of rooting depths from natural slopes provide an indication of rooting depth as discussed in OSU (2011).

Comment 128

JS.5.160

Section 3.9.3.1, p. 3-115, Effects Common to All Alternatives.

The text box on p. 3-115 should be deleted in its entirety as this does not apply to the HGCMC site.

Comment 129

JS.5.161

Section 3.10.3.1, p. 3-127, Table 3.10-3.

Footnotes should be added to Table 3.10-3 to specify which columns equate to which alternatives.

Comment 130

JS.5.162

Section 3.10.3.4, p. 3-136, Effects of Alternative C, New TDF Located Outside Monument.

Replace "northwest" with "northeast" on line 3 of paragraph 2 and also on line 6 of the second paragraph in Section 3.10.3.5 on p. 3-140.

Comment 131

JS.5.163

Section 3.10.3.4, p. 3-140, Effects of Alternative C, New TDF Located Outside Monument.

On p. 3-140, in the paragraph under Table 3.10-7, it states that impacts to wetlands due to the upgrade of the A Road for Alternative C were not factored in. The same analysis would be applicable to Section

31

Response

Comment ID: JS.5.157
Text revised per comment.

Comment ID: JS.5.158
The sentence has been deleted.

Comment ID: JS.5.159
As noted in the comments, the Ohio State University study is based on observations of tree rooting depths on natural slopes. These natural slopes typically exhibit shallow soils underlain by bedrock, which plays a role in confining roots near the surface. It is unclear whether the capillary layer will provide the same barrier function as bedrock. The test plot would need to mimic the entire engineered cover and instead should focus specifically on rooting depths and root behavior at the growth media / capillary layer boundary. Since root behavior is the focus of the study, it would not be necessary for trees to reach maturity and a 15- to 20-year time frame may provide substantial insight as to how tree roots may interact with the boundary with different depths of growth media. The text has not been changed.

Comment ID: JS.5.160
Comment noted. The text box in Section 3.10.3.1 referring to succession was rephrased slightly to present examples of succession. We respectfully disagree that this discussion does not apply to the HGCMC site; the successional process will indeed occur at the site following reclamation and closure.

Comment ID: JS.5.161
Table 3.10-3 represents current baseline conditions and is not associated with the effects analysis of the alternatives.

Comment ID: JS.5.162
Text revised per comment.

Comment ID: JS.5.163
Additional wetland impacts have been included in sections 3.10.3.4 and 3.10.3.5 to address road improvements under alternatives C and D.

Comment

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JS.5.163 3.10.3.5, Effects of Alternative D. These impacts will not be minor and should be considered and added to the total wetlands disturbance acreage for Alternatives C and D. The A Road will need to be widened, truck turnouts will need to be constructed, and a pipeline corridor will be needed with two 18" pipelines buried parallel to the road; all of these impacts will involve fill in wetlands.

Comment 132

Section 3.11, p. 3-142, Wildlife, General Comment.

JS.5.164 Potential water quality impacts to species and/or their prey are not consistently covered. For example, the species descriptions for marbled murrelet and bald eagles state that water quality could impact prey for these species. However, this is not addressed in environmental consequences. In addition, under environmental consequences, for river otter it states that Alternative A would not affect prey species and water quality is not discussed in the other alternatives for river otters.

Comment 133

Section 3.11, p. 3-142, Wildlife, General Comment.

JS.5.165 It may be important to note that when referencing the wildlife field studies, just because a species or indicators of species were not observed does not mean they are not present.

Comment 134

Section 3.11, p. 3-142, Wildlife, General Comment.

JS.5.166 In the first sentence on p. 3-142, the acronym "MIS" (Management Indicator Species) should be spelled out and defined (see, e.g., the first sentence of the second paragraph). Also, consider summary tables, where one table could be MIS species and how each species is impacted by each alternative, then a separate table for "Other Species of Concern."

Comment 135

Section 3.11, Wildlife, General Comments.

Technical edits by page number:

JS.5.167
- P. 3-155; first line: "KAI Environmental" should be changed to "Kai Environmental."
- P. 3-155; fourth paragraph: the reference of "KAI Environmental" should be changed to "Kai Environmental."

JS.5.168
- P. 3-160; end of first paragraph: consider adding in the time periods that USFWS recommends avoiding vegetation clearing.

JS.5.169
- P. 3-163; add a period to the end of the first sentence.

JS.5.170
- P. 3-165; Waterfowl and Shorebirds; fourth line: correct "thus that it."

32

Response

Comment ID: JS.5.164
Additional text regarding potential water quality impacts to the bald eagle, river otter, marbled murrelet, and waterfowl and shorebirds has been added to sections 3.11.3.2, 3.11.3.3, 3.11.3.4, and 3.11.3.5.

Comment ID: JS.5.165
A statement to this effect has been added to Section 3.11.2.

Comment ID: JS.5.166
MIS is defined at its first use in Section 3.7.1.1, Aquatic Resources, and is spelled out. Table 3.11-4, summarizing impacts to MIS and other species of concern, has been added.

Comment ID: JS.5.167
Edit made per comment.

Comment ID: JS.5.168
USFWS-recommended periods for avoiding vegetation clearing to minimize impacts to migratory birds have been added to Section 3.11.3.1.

Comment ID: JS.5.169
Edit made per comment.

Comment ID: JS.5.170
Edit made per comment.

Comment

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JS.5.167 • P. 3-179; "KAI Environmental" should be changed to "Kai Environmental."

JS.5.171 • P. 3-183; fourth full paragraph: use of word "documented" twice in the sentence is awkward.

JS.5.172 • P. 3-183; Queen Charlotte Goshawk: the second sentence states the listing was found to be not warranted twice, but only one year is listed.

JS.5.173 • P. 3-186; first paragraph, 7th line: "constants speeds" should read "constant speed."

JS.5.174 • P. 3-189; Section 3.12.4.3; first sentence: change Section 3.12.4.6 to 3.12.4.1. Same comment for section references under each of the "Effects of Alternatives."

Comment 136

Section 3.11.2.1, p. 3-151, Management Indicator Species – Bald Eagle.

JS.5.175 In Section 3.11.2.1, under the "Bald Eagles" heading, no historical information on bald eagle nests are provided; however, USFWS has GIS data for these. The section does not address eagles that may build nests between the 2011 survey and when construction begins.

Comment 137

Section 3.11.2.1, p. 3-151, Management Indicator Species – Sitka Black-tailed Deer.

JS.5.176 In Section 3.11.2.1, under the "Sitka Black-tailed Deer" heading, the affected environment section discusses road kill of deer, which is not discussed under the environmental consequences alternatives. For Alternative B, the same number of road kill would remain the same over a longer period. For Alternatives C and D, there would be additional road used for hauling tailings so an increase of road traffic would be expected. Therefore, there is a potential for increased road kill of Sitka Black-tail for Alternatives C and D.

Comment 138

Section 3.11.2.2, p. 3-155, Other Species of Concern.

JS.5.177 In Section 3.11.3.2, under the "Marbled murrelet" heading, the second sentence states it is unlikely that marbled murrelets use the area, but the environmental consequences for other alternatives state that a marbled murrelet was seen flying through the field study area and mitigation measures were recommended. Either a citation that they are unlikely to use the area should be added, or the statement should be amended to correct the inconsistency.

Comment 139

Section 3.11.2.2, p. 3-157, Other Species of Concern.

JS.5.178 In Section 3.11.2.2, under the "Migratory Birds" heading, the fourth line of the first paragraph refers to species of concern, and both the state and federal government have lists so this should be defined. Under paragraph 2, it refers to 20 species and then only discusses habitat for 19. In addition, the primary habitat for the "remaining 5" is not defined and it may be worth noting if it is or is not found in any project area.

33

Response

Comment ID: JS.5.171
Edit made per comment.

Comment ID: JS.5.172
A clarification of the listing petition history for the goshawk has been added to Section 3.12.3.3.

Comment ID: JS.5.173
Edit made per comment.

Comment ID: JS.5.174
Edit made per comment.

Comment ID: JS.5.175
Bald eagle nest data were obtained from the USFWS in July 2011. Additional text stating that the project would adhere to National Bald Eagle Management Guidelines (USFWS 2007) if nests are found to be active, including new nests, has been added to Section 3.11.3.3 and Section 3.11.3.4.

Comment ID: JS.5.176
The EIS has been revised to reflect this. Text has been added to sections 3.11.3.2, 3.11.3.3, 3.11.3.4, and 3.11.3.5, regarding effects related to road kill of deer under each alternative.

Comment ID: JS.5.177
Text in Section 3.11.3.2 was clarified to indicate that this statement referred to the existing TDF (under Alternative A), which lacks the forest structural attributes preferred by marbled murrelets for nesting. This is consistent with the conclusion drawn in the 2003 EIS.

Comment ID: JS.5.178
Text in Section 3.11.2.2 and corresponding information in Table 3.11-1 have been clarified to indicate habitat preferences for the migratory bird species.

Comment

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Comment 140

JS.5.179

Section 3.11.3.3, p. 3-163, Effects of Alternative B, Proposed Action – Management Indicator Species – Bald Eagle.

In Section 3.11.3.3, under the "Bald Eagle" heading, the second sentence should add "inactive in 2011" to remain consistent with other sections regarding activity in the nests in 2011.

Comment 141

JS.5.180

Section 3.11.3.3, p. 3-163, Effects of Alternative B, Proposed Action.

On p. 3-163, under the "Management Indicator Species" heading, the text references a 330-ft management zone around eagle nests; however, the text on p. 3-167 states that there should be a 660-ft buffer. Please revise this inconsistency and provide the correct size of the management zone surrounding a bald eagle nest site and provide the appropriate citation.

Comment 142

JS.5.181

Section 3.11.3.3, p. 3-164, Table 3-11.3.

Table 3.11-3 shows the breakdown of POG being removed under each alternative, and it includes a comparison between Alternative B and Mitigated Alternative B. There is no discussion of Mitigated Alternative B by species in the text of Section 11.3, which is confusing and should be provided in the EIS.

Comment 143

JS.5.182

Section 3.11.3.3, p. 3-164, Effects of Alternative B, Proposed Action – Vancouver Canada Goose.

In Section 3.11.3.3, under the "Vancouver Canada Goose" heading, would habitat loss be minimal compared to the abundant adjacent habitat available? In addition, under the discussion for Alternatives C and D, it does not indicate how many acres of habitat would be disturbed if the new TDF were constructed. If these details are discussed in the Biological Assessment/Biological Evaluation report, please reference the relevant section.

Comment 144

JS.5.183

Section 3.11.3.3, p. 3-164, Effects of Alternative B, Proposed Action – River Otter.

In Section 3.11.3.3, under the "River Otter" heading, how much habitat loss would result under Alternative B, Alternative C (p. 3-167), and Alternative D (p. 3-170)? If these details are discussed in the Biological Assessment/Biological Evaluation report, please reference the relevant section.

34

Response

Comment ID: JS.5.179
Text regarding bald eagle nest inactivity in 2011 has been added to Section 3.11.3.3.

Comment ID: JS.5.180
Text in sections 3.11.3.3 and 3.11.3.4 has been clarified to reference the 660-foot bald eagle nest buffer.

Comment ID: JS.5.181
Text has been added to Section 3.11.3.3 under the species on which Mitigated Alternative B would have different effects than Alternative B.

Comment ID: JS.5.182
Additional text has been added to Section 3.11.3.3, Section 3.11.3.4, and Section 3.11.3.5 related to the effects of wetland habitat loss to Vancouver Canada geese.

Comment ID: JS.5.183
Additional text related to acres of habitat loss for the river otter have been added to sections 3.11.3.3, 3.11.3.4, and 3.11.3.5.

Comment ID: JS.5.184
Acres of habitat loss have been added to Section 3.11.3.3 under Red-breasted Sapsucker, Hairy Woodpecker, and Brown Creeper.

Comment

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Comment 145

JS.5.184

Section 3.11.3.3, pp. 3-164 and 3-165, Effects of Alternative B, Proposed Action – Red-breasted Sapsucker, Hairy Woodpecker, and Brown Creeper.

In Section 3.11.3.3, under the "Red-breasted sapsucker, Hairy woodpecker, and Brown creeper" heading, how much habitat loss would result under Alternative B? Similarly, how much habitat would be lost under Alternative C (p. 3-168) or Alternative D (p. 3-170)? If these details are discussed in the Biological Assessment/Biological Evaluation report, please reference the relevant section.

Comment 146

JS.5.185

Section 3.11.3.4, p. 3-166, Effects of Alternative C, New TDF Located Outside Monument – Management Indicator Species – Brown Bear.

In Section 3.11.3.4, under the "Brown Bear" heading, are there creek impacts that should be discussed?

Comment 147

JS.5.186

Section 3.11.3.4, p. 3-167, Effects of Alternative C, New TDF Located Outside Monument – Management Indicator Species – River Otter.

In Section 3.11.3.4, under the "River Otter" heading, are there impacts to "unnamed creek" that should be discussed?

Comment 148

JS.5.187

Section 3.11.3.4, p. 3-168, Effects of Alternative C, New TDF Located Outside Monument – Management Indicator Species – Red-breasted Sapsucker, Hairy Woodpecker, and Brown Creeper.

In Section 3.11.3.4, under the "Red-breasted sapsucker, Hairy woodpecker, and Brown creeper" discussion, is the north-flowing drainage to Hawk Inlet the same as "unnamed creek?"

Comment 149

JS.5.188

Section 3.11.3.4, p. 3-168, Effects of Alternative C, New TDF Located Outside Monument – Management Indicator Species – Other Species of Concern.

In Section 3.11.3.4, under the "Endemic Species" discussion, how much habitat fragmentation will result under this alternative, or how much fragmentation will result relative to Alternative D?

Comment 150

JS.5.189

Section 3.11.3.5, p. 3-170, Effects of Alternative D, Modified Proposed Action – Management Indicator Species – River Otter.

In Section 3.11.3.5, under the "River Otter" heading, a discussion of Fowler Creek should be addressed in this section.

35

Response

Comment ID: JS.5.185
Additional text related to creek impacts has been added to Section 3.11.3.4 under Brown Bear, as follows: Effects near the existing TDF would be the same as Alternative A. Development of the north TDF under Alternative C would result in the burial of approximately 1,080 feet of stream determined to be resident fish bearing (see Section 3.7.3.4 for additional discussion) and minor reductions in downstream flow. This would result in the permanent loss of anadromous fish rearing and spawning habitat, though overall stream channel loss would be only a small portion of stream channels within the Fowler Creek drainage. Therefore, effects to brown bear food sources would be minor under Alternative C.

Comment ID: JS.5.186
Text related to creek impacts has been added to Section 3.11.3.4 under River Otter. Approximately 1,044 feet of Class II streams, and thus river otter habitat, would be lost due to TDF development along the tributary to Fowler Creek (Table 3.7-8). The unnamed creek draining to Hawk Inlet would not be affected. The text has been corrected and clarified for river otters and for the red-breasted sapsucker, hairy woodpecker, and brown creeper.

Comment ID: JS.5.187
No. The “unnamed creek” is the “unnamed drainage to Fowler Creek.” The text has been corrected to clarify this issue. There would be no direct effects to these species in the drainage flowing north to Hawk Inlet.

Comment ID: JS.5.188
Additional text has been added to Section 3.11.3.4 under Endemic Species related to fragmentation under Alternative C with comparisons to Alternative D.

Comment ID: JS.5.189
Text related to creek impacts has been added to Section 3.11.3.5 under River Otter. Approximately 1,044 feet of Class II streams, and thus river otter habitat, would be lost due to TDF development along the tributary to Fowler Creek (Table 3.7-8).

Comment

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Comment 151

JS.5.190

Section 3.11.3.5, p. 3-171, Effects of Alternative D, Modified Proposed Action – Management Indicator Species – Other Species of Concern – Endemic Species.

In Section 3.11.3.5, under the "Endemic Species" heading, how much habitat fragmentation will result under this alternative, or how much fragmentation will result relative to Alternative C?

Comment 152

JS.5.191

Section 3.12.3, p. 3-182, Threatened, Endangered, Candidate, and Forest Service Alaska Region Sensitive Species – Affected Environment.

The first sentence in Section 3.12.3 is unclear. Consider striking "This section describes," and instead begin the sentence with, "The status, distribution…"

Comment 153

JS.5.192

Section 3.12.3.1, p. 3-182, Threatened, Endangered, Candidate, and Forest Service Alaska Region Sensitive Species – Affected Environment, Humpback whale (Endangered).

In Section 3.12.3.1, under the "Humpback whale" discussion, consider adding a sentence in the first paragraph clarifying that the Endangered Species Conservation Act preceded the Endangered Species Act of 1973.

Comment 154

JS.5.193

Section 3.12.3.3, p. 3-184, Queen Charlotte Goshawk (Forest Service Sensitive).

In Section 3.12.3.3, the last sentence in the second paragraph is difficult to follow. Suggest breaking into two sentences between "….more adaptable than once thought" and "When these habitats are not available…" The third paragraph leads off with only 2 goshawks being found on Admiralty Island, then ends with an additional find. Consider clarifying how many goshawk nests have been found in total. Additionally, goshawks are known to build multiple nests and may use different ones each year, which might be worth mentioning because "active nest" is defined.

Comment 155

JS.5.194

Section 3.12.3.4, p. 3-184, Black Oystercatcher (Forest Service Sensitive).

The discussion of the Black Oystercatcher in Section 3.12.3.4 appears to be lacking a description regarding whether the species has the potential to be in the project area. For other species in the section, the DEIS states if the species has the potential to be in the project area.

Comment 156

Section 3.12.3.6, p. 3-185, Sensitive Plants.

The following is a list of questions regarding the discussion of "Sensitive Plants" in Section 3.12.3.6:

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Response

Comment ID: JS.5.190
Additional text has been added to Section 3.11.3.5 under Endemic Species related to fragmentation under Alternative D.

Comment ID: JS.5.191
The requested edit to Section 3.12.3 has been made.

Comment ID: JS.5.192
The requested edit to Section 3.12.3.1 under Humpback Whale has been made.

Comment ID: JS.5.193
The suggested edits have been made to Section 3.12.3.3.

Comment ID: JS.5.194
Table 3.12-1 indicates that suitable habitat (rocky shorelines along the coast) is present in the project area. Text has been added to section 3.12.3.4 to specify that this includes rocky shorelines in the vicinity of Hawk Inlet. Note that Section 3.12.4.1 states that no large concentrations of oystercatchers have been documented in Hawk Inlet.

Comment

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JS.5.195 • Who conducted botanical studies for the project, and are there reports to cite or reference in an appendix?

JS.5.196 • What is the "Planning Area," and has that been previously defined?

JS.5.197 • In the third sentence, the words "adversely affect impact" need to be reworded.

Comment 157

Section 3.12.4.1, p. 3-187, Effects Common to All Alternatives - Goshawks.

JS.5.198 In Section 3.12.4.1, under the "Queen Charlotte goshawk" heading, it is important to mention that goshawks may be impacted by removal of a nesting tree. In addition, a discussion may be warranted regarding whether there would be a potential reduction or displacement of prey species.

Comment 158

Section 3.12.4.1, p. 3-187, Effects Common to All Alternatives – Lynn Canal Pacific Herring.

JS.5.199 Section 3.12.4.1 refers to an analysis between salmon/steelhead and herring, but these species are not referenced anywhere else (other than table). Was the information in the Biological Assessment/Biological Evaluation report?

Comment 159

Section 3.12.4.3, p. 3-189, Effects of the Alternative B: Proposed Action.

JS.5.200 While no goshawks were found in 2010, that does not necessarily preclude them from nesting in the future. In addition, the Tongass survey protocol requires 2 years of survey in an area, to confirm no active nests are currently present and the survey conducted by Kai Environmental was only one season (as approved by USFS). Because habitat is available, it may be that the USFS would recommend nest clearance surveys prior to removal of trees as a mitigation measure for potential affects. This same comment extends to "Mitigated Alternative B," p. 3-189.

Comment 160

Section 3.18.3.1, p. 3-243, Socioeconomics – Environmental Consequences.

JS.5.201 The final sentence in Section 3.18.3.1 on p.3-243 should be revised to delete reference to the ownership of the cannery by a third party; this property is owned by the Greens Creek Mine Joint Venture. In addition, it is unclear whether this sentence mistakenly refers to "mill" closure as a trigger for reversion instead of "mine" closure. This sentence should read: "Further, were the mine to permanently close, per the Exchange Act and Agreement, the lands owned and occupied by HGCMC would revert to federal ownership and be entirely removed from the local tax base."

37

Response

Comment ID: JS.5.195
Ellen Anderson, a botanist for the Juneau Ranger District, Tongass National Forest, conducted and wrote the botanical studies for the project. The report is included in the administrative/planning record, and cited in the reference list.

Comment ID: JS.5.196
Edit made per comment: “planning area” has been replaced with “study area,” which is shown in Figure 3.1-1 outlining the study area of sensitive plants in relation to this EIS.

Comment ID: JS.5.197
Comment noted. Correction to text made; “affect” deleted

Comment ID: JS.5.198
Text has been added to section 3.12.4.1 regarding the removal of goshawk nesting habitat and potential effects to goshawk prey.

Comment ID: JS.5.199
The reference to listed salmon/steelhead has been removed from the EIS. These are addressed in the Biological Assessment and Biological Evaluation, prepared under separate cover.

Comment ID: JS.5.200
Alternative C or D would require a non-significant Forest Plan Amendment because of the active nest located in 2011 adjacent to the alternative TDF proposed under these alternatives. Currently, Forest Plan Standards and Guidelines will apply to reduce any disturbance during the nesting season.

Comment ID: JS.5.201
Text revised per comment. See Section 3.18.3.1.

Comment

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Comment 161

Section 3.18.3.3, p. 3-245, Effects of Alternative B, Proposed Action.

JS.5.202

The second paragraph of Section 3.18.3.3 states: "Full build-out for development, construction, and reclamation under this alternative would employ a small number of contractors (about 10) for specialized work, like liner installation, but the current mine work force would do most of the work." This sentence is not entirely accurate because HGCMC hires more than a "small number of contractors" for preparation, field work, and construction. The number of contractors hired and the scope of work covered by contractors is understated in this paragraph and should be revised accordingly to represent the significance of indirect jobs created in the economy as a result of contract work. This is true for all action alternatives.

Comment 162

Section 3.19.3.1, p. 3-250, Effects Common to All Alternatives.

JS.5.203

The fourth bullet under Section 3.19.3.1 should be revised to read: "Constructing the TDF as described in Section 2.3.6 to contain tailings contact waters."

The fifth bullet should be revised to read: "Relocating existing waste rock piles to the TDF to improve containment to reduce potential for oxygen and water infiltration and improve geotechnical stability."

Comment 163

Section 3.19.3.1, p. 3-251, Effects Common to All Alternatives.

JS.5.204

In the second paragraph under the "Forestry" heading, the second sentence should be revised to clarify that vegetation would be "cleared" under Alternatives C and D, and not just "cleared" under Alternative B. This sentence should read: "Clearing of vegetation associated with Alternative B would be located adjacent to the existing TDF, whereas Alternatives C and D would result in clearing vegetation to the area north of the A Road, which is outside of the Monument."

Comment 164

Section 3.19.3.1, p. 3-253, Effects Common to All Alternatives.

JS.5.205

On p. 3-253, under the "Fish and Wildlife" heading, the fourth sentence in the first paragraph should be revised to read: "Alternative A would have the least affect to fish and wildlife resources within the Monument because of the limited extent of disturbance of the operations."

Comment 165

Section 3.20.3.4, p. 3-264, Figure 3.20-2.

JS.5.206

The title for Figure 3.20-2 should be changed to "IRA Affected by Each Alternative," to accurately reflect what the figure represents.

38

Response

Comment ID: JS.5.202
The text was revised to read as follows:

Full build-out for development, construction, and reclamation under this alternative would employ contractors for site preparation, additional investigations, construction, and specialized work, like liner installation. The current mine work force would also do much of the work.

Comment ID: JS.5.203
Edit made per comment.

Comment ID: JS.5.204
Revised sentence to read as follows:

Clearing of vegetation associated with Alternative B would occur adjacent to the existing TDF, whereas alternatives C and D would result in vegetation clearing at the alternative TDF site, which is outside the Monument.

Comment ID: JS.5.205
Revised sentence to read as follows:

Alternative A would have the least effect to fish and wildlife resources in the Monument because no further expansion into the Monument would be approved.

Comment ID: JS.5.206
Edit made per comment. The title of Figure 3.20-2 has been changed to read “IRA Affected by Each Alternative.”

Comment

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Comment 166

Section 3.22.2, p. 3-276, Descriptions of Selected Relevant Actions.

JS.5.207

Under the "Geotechnical Drilling" heading on p. 3-276, the acres of ground disturbance listed (1.75 acres) should be clarified to state that the 1.75 acres of disturbance was for the whole drilling program (14 – 17 sites). Only three of these sites were within an IRA. HGCMC estimates that ground disturbance for each drill site in the IRA to be 4800 square feet (0.1 acre) per site. The Greens Creek IRA (two drill sites) resulted in disturbance of approximately 9600 square feet; whereas the disturbance in the Mansfield IRA, with one drill site, is estimated at 4800 square feet. The total ground disturbance for this drill program within an IRA was 0.3 acres.

Comment 167

Section 3.23, p. 3-289, Table 3.23-1, Irreversible and Irretrievable Resource Commitments.

JS.5.208

On p. 3-289, within the "Land Use and Recreation Resource" row, why does this information only reflect an irreversible commitment of acreage "within the Monument?" Also, it does not appear that this commitment will be "irreversible" because people will be able to use the site after closure. This "loss" may be better characterized as "irretrievable."

Comment 168

Section 5, p. 5-1, References.

JS.5.209

There are numerous items referenced in the DEIS that are not included in Chapter 5, References. The following is a partial list of references that should be added to Chapter 5:

- USFS 2008 (Forest Plan)
- P. 3-97 ADF&G FH11-I-0123 draft 2011
- P. 3-98 Buell, 1981
- P. 3-122 Adamus 2012
- P. 3-146 Caouette et al, 2006
- P. 3-147 Allen & Angliss, 2010
- P. 3-149 ADF&G, 2000
- P. 3-149 AMAP, 2002
- P. 3-153 Dawson et al 2007

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Response

Comment ID: JS.5.207
The text was revised to clarify total disturbance and disturbance in Inventoried Roadless Areas (IRAs).

Comment ID: JS.5.208
A new row for the commitments of Monument lands was added to Table 3.23-1. The text was revised to indicate that the commitment of Monument lands is irretrievable, but not irreversible as previously stated because lands will be returned to near natural condition.

Comment ID: JS.5.209
Edits made per comment. Missing references have been identified and added to the reference list and administrative record.

Comment

Hecla GREENS CREEK

- Oceanus Alaska, October 2003, Review of Essential Fish Habitat in Hawk Inlet Subsequent to Mining Operations (this report is cited under Ridgeway, but the text cites Oceanus; *see, e.g.,* p.3-83)

JS.5.209

- Kanouse 2011 (?) at p. 3-86
- HGCMC 2010, 2011 Hawk Inlet 2010 Annual Report, Hawk Inlet 2011 Annual Report

When preparing the Final EIS, please ensure that the reference list is updated, complete, and accurate.

Comment 169

Section 5, p. 5-1, References, and General Comment.

JS.5.210

Not all year citations are correct or consistent when citing to a reference. When referencing a Forest Plan, is it a USFS or USDA document (e.g., p. 3-97). Please correct and revise throughout the DEIS accordingly. Please make sure all references to USFS documents are accurate; for example, should USFS be 2008, 2008a, or 2008c?

Comment 170

Section 6, p. 6-1, Glossary.

The following definitions should be revised in the Glossary:

JS.5.211

- **Ore** (p. 6-8): A naturally occurring solid material from which a metal or valuable mineral can be profitably extracted.
- **Ore body** (p. 6-8): A natural accumulation of a metal, gemstone or other valuable mineral substance, which is rich enough in concentration that it can be mined and processed at a profit.
- **Ore reserve** (p. 6-8): mineral deposits which are valuable and legally, economically and technically feasible to extract.
- **Precipitation** (p. 6-10): [this definition should be revised to remove reference to "flocculation" because this is different from precipitation. The transformation of soluble species to an insoluble species in a liquid is often a precipitation reaction. Flocculation combines insoluble or colloidal species in a liquid so that they can be settled or filtered out more effectively]. Accordingly, the definition of **Precipitation** should be: "The process of removing solid or liquid particles from a gas or smoke; the process of forming a precipitate from a solution; rain, mist, snow, and the like."
- **Waste rock** (p. 6-14): Also known as development rock or production rock, waste rock is the non-ore rock extracted to gain access into the ore zone. It contains no metal values economic to recover.
- **Xanthates** - A class of chemicals known as "collector" chemicals that attach to floating minerals, making them normally capable of adhering to the froth in a flotation circuit.

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Response

Comment ID: JS.5.210
Edit made per comment.

Comment ID: JS.5.211
Edit made per comment. Definitions have been revised in glossary.

Comment ID: JS.5.212
Comment noted.

Comment ID: JS.5.213
Please see the response to Comment JS.5.040.

If water quality at closure is better than current predictions, the method of control, treatment, drainage, and discharge, as well as the outfall location, would be evaluated as a part of APDES permitting requirements and as a part of the final reclamation plan at that time.

Comment

Hecla GREENS CREEK

Comment 171

General Technical Comment.

HGCMC believes a number of technical aspects to the Alternatives were not adequately discussed in the DEIS. Below is a non-exhaustive list of the technically complex issues we believe are part of each alternative:

Alternative B

JS.5.212 • HGCMC will continue to work with both the USFS and the U.S. Army Corps of Engineers to develop and implement various mitigation measures to address and mitigate impacts during subsequent stages of development.

Alternative C

JS.5.213 • Alternative C prevents the ability to have a single no-pump, gravity flow/discharge system following closure of the TDF. Although the DEIS states that discharge without treatment is not anticipated, eliminating the option for no-pump, gravity flow would be short-sighted. Predictions of water quality following closure of the TDF are intentionally pessimistic. If actual closure water quality ends up being better than predicted, options including gravity flow would substantially reduce impacts compared to pump-dependent options. Alternative B is the only alternative that would allow gravity flow to one discharge point.

JS.5.214 • The east side of the proposed facility footprint on the existing slope will make construction difficult. In order to ensure technical stability, the TDF needs to be on flat ground. The facility boundary may need to be moved 600 feet to the west to accomplish this.

JS.5.215 • The 2011 drilling at the center of the proposed footprint encountered 17 feet of peat.

JS.5.216 • Sensitive Species northern goshawk nest was found at the site. Activities would need to be designed around the nest tree and buffer zone.

JS.5.217 • The reclamation storage area is likely undersized for Alternative C.

JS.5.218 • Alternatives C and D result in a larger amount of impact than Alternative B, particularly if the mine were to close prior to filling the 30 to 50 year capacity. Construction of infrastructure (roads, pipelines, ponds, quarries, etc.) would have to begin very quickly for Alternative C and shortly thereafter for Alternative D. If the mine were to close earlier than 30 to 50 years, this disturbance and whatever tailings placement had occurred in multiple watersheds in the C and D footprints would be spread over a much larger area than Alternative B at the time of closure.

Alternative D

JS.5.219 • Alternative D prevents the ability to have a single no-pump, gravity flow/discharge system following closure of the TDF. Although the DEIS states that discharge without treatment is not anticipated, eliminating the option for no-pump, gravity flow would be short-sighted. Predictions of water quality following closure of the TDF are intentionally pessimistic. If actual closure

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Response

Comment ID: JS.5.214
The east side of the expanded TDF under alternatives C and D would be built in an area that would be quarried prior to tailings placement. The process of removing material in developing the quarry would reduce the extent of the slope in that area. The design would be more challenging than shifting the facility to the west; however, the location as proposed reduces the extent of wetland impacts.

Comment ID: JS.5.215
The particular technical aspect related to the presence of 17 feet of peat not adequately discussed is unclear from the comment. Text has been added in Section 2.4.3.1 (Tailings) to indicate that peat and other unsuitable materials are stripped from the site prior to the installation of the liner system. This practice in consistent with current operations. Section 2.4.6 (Reclamation Material Stockpiles) has also been included to briefly describe the handling of growth media.

Comment ID: JS.5.216
Selection of alternative C or D would require a non-significant Forest Plan Amendment because of the active nest located in 2011 adjacent to the alternative TDF proposed under these alternatives. Currently, Forest Plan Standards and Guidelines will apply to reduce any disturbance during the nesting season.

Comment ID: JS.5.217
The size of the reclamation storage areas considers the fact that there would be consolidation of the organic material in the salvaged materials upon placement.

Comment ID: JS.5.218
Comment noted.

Comment ID: JS.5.219
Please see the response to Comment JS.5.213.

Comment

Hecla GREENS CREEK

JS.5.219 water quality ends up being better than predicted, options including gravity flow would substantially reduce impacts compared to pump-dependent options. Alternative B is the only alternative that would allow gravity flow to one discharge point.

- JS.5.220 The east side of the proposed facility footprint on the existing slope will make construction difficult. In order to ensure technical stability, the TDF needs to be on flat ground. The facility boundary may need to be moved 600 feet to the west to accomplish this.
- JS.5.221 The 2011 drilling at the center of the proposed footprint encountered 17 feet of peat.
- JS.5.222 Depth to bedrock in the proposed north end quarry location may not be practical because the drill location nearest this site was not able to verify bedrock. It is possible that bedrock may be considerably greater than ground surface, and the sands encountered may be considered too fine to use as a sand source.
- JS.5.223 The reclamation storage area is likely undersized for Alternative D.
- JS.5.224 Sensitive Species northern goshawk nest was found at the site. Activities would need to be designed around the nest tree and buffer zone.

JS.5.225 Alternatives C and D result in a larger amount of impact than Alternative B, particularly if the mine were to close prior to filling the 30 to 50 year capacity. Construction of infrastructure (roads, pipelines, ponds, quarries, etc.) would have to begin very quickly for Alternative C and shortly thereafter for Alternative D. If the mine were to close earlier than 30 to 50 years, this disturbance and whatever tailings placement had occurred in multiple watersheds in the C and D footprints would be spread over a much larger area than Alternative B at the time of closure.

Mitigated B Alternative

- JS.5.226 Mitigated B alternative prevents the ability to have a single no-pump, gravity flow/discharge system following closure of the TDF. Although the DEIS states that discharge without treatment is not anticipated, eliminating the option for no-pump, gravity flow would be short-sighted. Predictions of water quality following closure of the TDF are intentionally pessimistic. If actual closure water quality ends up being better than predicted, options including gravity flow would substantially reduce impacts compared to pump-dependent options. Alternative B is the only alternative that would allow gravity flow to one discharge point.
- JS.5.227 NE expansion area referenced in Alternative B mitigation; per p. 3-66, the issues with this area include: "The sand source may indirectly discharge to the creek via the peat, and the sand and the peat are in hydraulic communication," so the discharge area if impacted by expansion may impact the public water source on Cannery Creek.
- JS.5.228 Reclamation material stockpile referenced north of the access to the Hawk Inlet Cannery Facility would be beneficial if the site could operate in the same area as the helicopter pad, and if water could be collected from this site.
- JS.5.229 The filling of half of the NE area now, and the other half later, may prevent this portion of the pile from any potential concurrent reclamation.

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Response

Comment ID: JS.5.220
See the response to Comment JS.5.214.

Comment ID: JS.5.221
See the response to Comment JS.5.215.

Comment ID: JS.5.222
The Forest Service recognizes that the geotechnical drilling for the site is limited. We are confident that a borrow source could be identified within the proposed disturbance footprint. An alternative borrow area could be evaluated in a subsequent NEPA analysis should the need to expand beyond the proposed footprint be necessary.

Comment ID: JS.5.223
See the response to Comment JS.5.217.

Comment ID: JS.5.224
Selection of alternative C or D would require a non-significant Forest Plan Amendment because of the active nest located in 2011 adjacent to the alternative TDF proposed under these alternatives. Currently, Forest Plan Standards and Guidelines will apply to reduce any disturbance during the nesting season.

Comment ID: JS.5.225
Comment noted.

Comment ID: JS.5.226
The text has been modified to indicate that Mitigated Alternative B would create an additional underdrain collection area in the northeast corner.

Comment ID: JS.5.227
Potential impacts to the public water supply have been added to the text in Section 3.5.3.3.

Comment ID: JS.5.228
While it is not necessarily clear from the conceptual-level drawings, the stockpile north of the Hawk Inlet Cannery Facility could be incorporated into operation of the helicopter pad.

Comment ID: JS.5.229
Comment noted.

Comment

Hecla GREENS CREEK

Comment 172

Appendix C, Alternatives Development.

JS.5.230 Most of the alternatives developed but not carried forward would have greater footprints and therefore greater impacts because they consist of a facility at a new location (Areas 1, 2, 3, 4, 5, and 6). They could impact additional watersheds, and also require additional pipelines and pumping infrastructure to return the collected water at the new facility to the existing water treatment plant.

JS.5.231 Area 7 could impact an additional watershed (Cannery Creek) and is located too close to the Creek, which is a permitted secondary drinking water source for the mine site. Development in the northeast area for Area 7 could not achieve gravity drainage at closure.

JS.5.232 Area 8 evaluated an expansion of the existing facility to the south and west. The design places tailings in the southwest corner of the area, which is a bedrock knob area. This elevated area likely could not be used for tailings placement unless the rock was blasted out and removed.

JS.5.233 Similar to Alternatives C and D, but on a much larger scale, the effects of below-liner and peripheral rock fill may be significant in Area 8. Infiltration and groundwater interaction with this fill could impact water quality. Dilute, acidic waters in the Tributary Creek and Hawk Inlet watersheds may be sensitive to higher pH, higher hardness water that the fill could generate. Changes in reduction/oxidation conditions and water levels under lined areas may change the composition of groundwater (e.g., iron/manganese reduction) in Tributary and Hawk Inlet drainages.

JS.5.234 Section A (Figure 10, p. C-21) shows that more than 50 feet of rock will need to be removed to attain liner grade. This would likely create a material handling/storage problem because this rock may be potentially acid generating and would need to be stockpiled with its drainage collected prior to use within the tailings pile footprint. It does not appear that there is space for the very large stockpile that would be required. Blasting of the rock could influence groundwater by increasing pH, hardness and sulfate in water that infiltrates the disturbed area. Quarrying related to development of Pond 7 and the northwest corner of the existing TDF had this type of influence on groundwater and surface water.

JS.5.235 There is very little space available to collect water if necessary from multiple locations between the Area 8 footprint and Tributary Creek and Hawk Inlet. If water from the stabilizing berm ends up requiring collection this may pose significant logistical/design challenges.

JS.5.236 As stated in Appendix C, all of the alternatives except Area 8 developed but not carried forward only considered tailings placement areas; none of the associated facilities were considered (i.e., reclamation storage areas, water collection ponds, etc.). Area 8 did consider a large water management pond; however, p. C-7 states: "The preliminarily design presented represents half of the storage capacity anticipated under the proposed action." Water collection ponds are an integral part of the operation and design of an effective and contained facility, and the size and location of these ponds are an important factor in the consideration of a viable alternative.

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Response

Comment ID: JS.5.230
Comment noted. One aspect of alternatives development was to minimize the footprint of each facility to the extent possible. As noted in Appendix C, the screening process involved looking only at the footprint associated with the tailings. Since each of these alternatives was determined to have flaws compared to the alternatives carried forward, the process did not require laying out ancillary/supporting facilities as part of the design.

Comment ID: JS.5.231
Comment noted. Please see the response to Comment JS.5.074.

Comment ID: JS.5.232
Comment noted. If this area were to be considered as part of a detailed analysis of alternatives, the bedrock knob in the southwest corner of the area would need to be quarried, as it would under Alternative B.

Comment ID: JS.5.233
Comment noted.

Comment ID: JS.5.234
Comment noted. Please see the response to Comment JS.5.233.

Comment ID: JS.5.235
Comment noted. The Forest Service is aware that this design would present substantial logistical and design challenges, which is part of the reason for not carrying the design forward for detailed analysis.

Comment ID: JS.5.236
Comment noted. The Forest Service is aware that most of the alternative designs not carried forward did not consider the various ancillary facilities that would be required should one of those designs have been carried forward in detail. These facilities would have increased the disturbance footprints in all cases. We concur that water collection ponds are an integral part of operations and that the preliminary design of Area 8 as presented does not reflect a viable facility in terms of water management.

Comment	Response

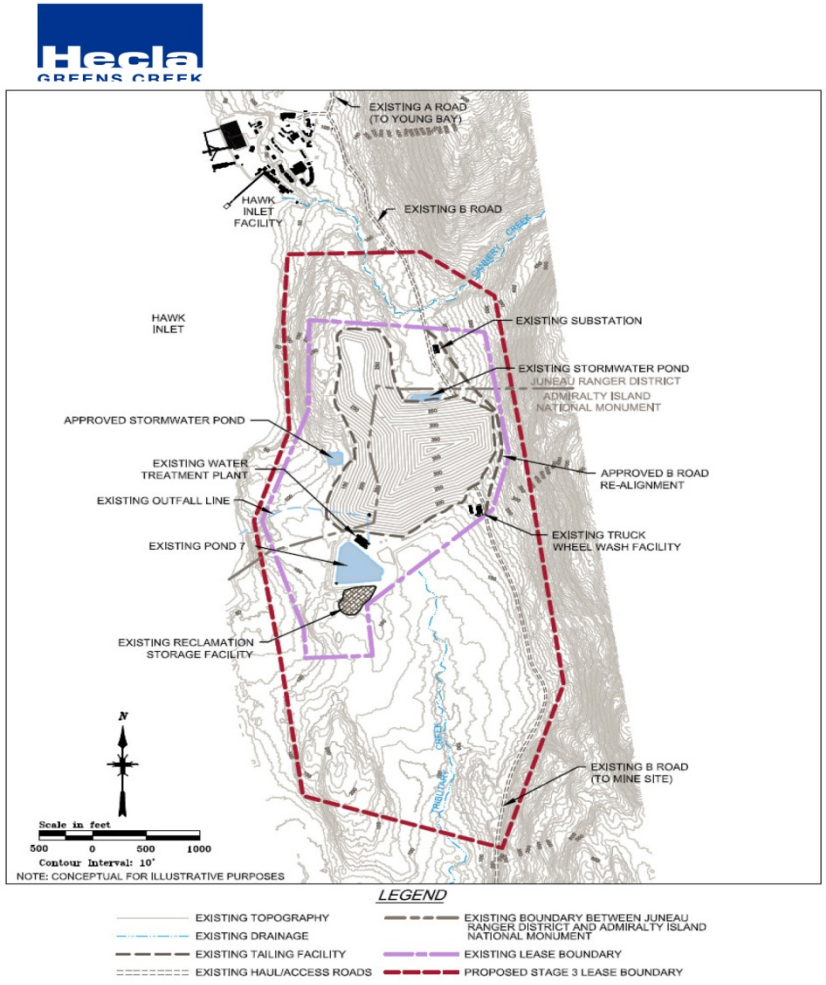
Hecla GREENS CREEK

APPENDIX A

MAP DEPICTING ADMIRALTY ISLAND NATIONAL MONUMENT BOUNDARY

Comment

Response



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Comment	*Response*
From: Jocelyn Webb **To:** FS-comments-alaska-tongass-admiralty-national-monument **Subject:** GREENS CREEK TAILING EXPANSION **Date:** Tuesday, May 08, 2012 2:10:07 PM JW.0.001 I fully support the expansion of the Greens Creek tailing facility STAGE 3. They have been there for 35 years and it does not seem to have a negative effect on the surrounding area. Jocelyn Webb	**Comment ID: JW.0.001** Comment noted.

Comment

ALASKA MARINE LINES

May 2nd, 2012

Admiralty Island National Monument – Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, Alaska 99801
Comments-alaska-tongass-admiralty-national-monument@fs.fed.us

To Whom It May Concern;

KA.0.001

Alaska Marine Lines and Alaska Marine Trucking are writing in support of Hecla Greens Creek Mine's efforts to expand their existing tailings facility using ***"Alternative B"*** under the draft EIS submitted by the US Forest Service for the following reasons:

- Expansion of their tailings facility is an essential component in their plans to continue operating the Greens Creek Mine now and for the future
- Alternative B minimizes the impacts to the environment by keeping the tailings facility consolidated versus the other alternatives
- Alternative B would continue their tailings disposal in an engineered, contained facility within a single watershed versus the other alternatives that would place tailings in multiple watersheds
- Alternative B would allow them to continue to utilize existing site support facilities including "B" Road versus other alternatives that would require major construction upgrades to "A" Road
- Alternative B using the current location for tailings has no new impacts on area wildlife versus the other alternatives that have an active goshawk nest in the area
- Alternative B is the only option that would not increase Greens Creek's use of fossil fuels in the transportation of tailings to the disposal facilities

KA.0.002

Hecla Greens Creek Mine has been an integral part of our Southeast Alaska Community for the past 25 years by providing high paying jobs, purchasing supplies and services locally, and operating in a safe and environmentally friendly manner. Alternative B gives them the additional capacity for their future and to continue to be a part of our future here in Southeast Alaska.

Sincerely,

Kevin Anderson – President, Alaska Marine Lines

Response

Comment ID: KA.0.001
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Alternatives C and D would add an additional 5.6 miles round-trip for haul trucks to travel from the portal to the new northern TDF.

Comment ID: KA.0.002
Comment noted. Please see the Record of Decision for a description of the selected alternative.

Comment

JEDC.org
612 West Willoughby Ave. Suite A
Juneau, AK 99801
Phone 907-523-2300
Fax 907-463-3929

June 4, 2012

Mr. Chad VanOrmer
Monument Ranger
Admiralty Island National Monument
Tongass National Forest
Attn: Greens Creek Tailing Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Re: Greens Creek Tailing Expansion

Dear Mr. VanOrmer:

KF.0.001

For the past 25 years, the Juneau Economic Development Council has worked to foster a healthy and sustainable economic climate in Juneau and throughout Southeast Alaska. In collaboration with other organizations, we implement initiatives to maintain, expand, and create economic opportunities.

The Hecla Greens Creek Mining Company (HGCMC) began operations around the same time as our organization, and has proved to be a strong economic force in Northern Southeast Alaska, and a good corporate citizen in the region. The company currently employs 370 people, about 2/3 of them from Juneau, and many others from rural areas of the region. Mining employment paid an average annual wage of about $96,000 in 2010, more than twice the average annual wage for all industries in Juneau. HGCMC purchased goods and services worth about $27 million in Juneau, and paid over $1.2 million in property taxes to the Borough government last year. In a region with past erosion of population and earnings, the contribution of such a vibrant economic player cannot be overstated.

In addition to the very important economic contribution to the region, HGCMC has engaged with the University of Alaska, Southeast, and other organizations in workforce training and development activities that has improved the skill set and earnings ability of all regional residents. The company has developed both public and private infrastructure in the region. As a good corporate citizen, HGCMC also contributes to regional communities through corporate donations to local activities and organizations.

Response

Comment ID: KF.0.001
Comment noted.

Comment

KF.0.002

The Greens Creek Mine has operated in an environmentally responsible manner on Admiralty Island for the past 25 years. In order for the company to continue to be successful, and to contribute meaningfully to our regional economy, it needs to expand its dry stack tailings disposal site. The JEDC board believes that Alternative B, the alternative recommended by HGCMC, is the most environmentally sound and economically feasible plan for this expansion. This alternative reduces the size of the potential impact, and keeps all the tailings together in the same location. HGCMC intends to use the same disposal methods and management procedures as they have used in the past, methods and procedures approved by all regulatory agencies with jurisdiction over this mine.

The JEDC board fully supports HGCMC's preferred mine tailings expansion plan, and urges the Monument to approve it. This company has proven a strong economic partner in the region, and a good neighbor. Please keep the Greens Creek Mine thriving by approving this plan.

Warm Regards,

Kurt Fredriksson
Board President

Brian Holst
Executive Director

Response

Comment ID: KF.0.002
Comment noted.

Comment	*Response*
KG.0.001 **From:** Ken Gerondale **To:** FS-comments-alaska-tongass-admiralty-national-monument **Subject:** Greens Creek Tailings **Date:** Thursday, May 31, 2012 12:55:49 PM To Whom it May Concern: I am the President of Construction Machinery Industrial, LLC. In speaking for myself and many of our employees ..... we are for the approval of the "Greens Creek Tailing Expansion". Our company has been involved with Greens Creek Mine since it opened and find Greens Creek a work class mining company that is environmentally sensitive and at the same time committed to our Juneau community. Thank you, Ken Gerondale **Ken Gerondale** C: 907-351-0287 DD: 907-261-0138 k.gerondale@cmiak.com	**Comment ID: KG.0.001** Comment noted.

Comment

Friends of Admiralty Island – response to Hecla Greens Creek Tailing Expansion DEIS – June 4, 2012

Sent via email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Admiralty Island National Monument Tongass National Forest
ATTN: Greens Creek Tailings Expansion 8510 Mendenhall Loop Road Juneau, AK 99801
Re: Comments on Greens Creek Mine Tailings Dump Expansion Draft Environmental Impact Statement (DEIS)

Dear Forest Supervisor Cole and Monument Ranger VanOrmer:

KM.0.001 As a preface to our comments it is important to state that we fully acknowledge the right of Hecla Greens Creek to operate their mine and associated milling operations in Hawk Inlet. We have previously gone on record to acknowledge the economic and community benefits that the mine based employment, taxes and secondarily economic benefits contributes to Juneau's well being. When Congress created Admiralty Island National Monument boundaries they included the actual mine and access in the National Monument non-Wilderness, but excluded the mine tailings and milling. This is a Congressional endorsement of the value of this mine, but also very specific congressional language holds the operation of the mine to a high standard which reflects the value of maintaining the integrity of the National Monument.

KM.0.002 Therefore our response is directed at those compliance requirements and standards that current law establishes for a mine operating in and adjacent to Admiralty Island National Monument.

Friends of Admiralty Island[1] responded to the 2010 Forest Service Scoping Document for the proposed expansion of the Hecla Greens Creek mine tailings expansion. The current Draft Environmental Impact Statement (DEIS) does not adequately address the key issues we identified in our 2010 response.

KM.0.003 The current DEIS falls way short of a full-disclosure and unbiased analysis of impacts by the proposed tailings expansion - whichever of the action alternatives is selected. There are both process and factual flaws that the DEIS is built on.

Because of these significant deficiencies we urge the Forest Service do a supplemental DEIS. A supplement will provide the public with an opportunity for a more reasoned and informed response. A supplemental will prove a far greater value to decision makers and other responding agencies.

Friends of Admiralty Island endorses the response of SEACC (dated June 4, 2012)to this DEIS and requests that their response be considered a part of our response.

[1] Friends of Admiralty Island (FOAI) was formed in 1997 as a non-profit (501-c-3) educational and advocacy organization to promote and protect the Wilderness and National Monument values of the island as described in the Alaska National Interest Lands Conservation Act (ANILCA) of 1980. FOAI have specifically advocated for the entire island, with consideration of adjacent waters to be managed as a single unit. Such a comprehensive management plan must contain research and educational components.

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Response

Comment ID: KM.0.001
Comment noted.

Comment ID: KM.0.002
Comment noted. Please see detailed responses to individual comments.

Comment ID: KM.0.003
Comment noted. The Forest Service respectfully disagrees with the assertion that the EIS contains process and factual flaws. We also disagree about the need for a supplemental DEIS and public review. Some changes were made to the DEIS based on comments, but the changes do not rise to a level of significance that would warrant a supplemental EIS.

Please see responses to specific comments. Comment responses to SEACC's comments are provided above (see comment ID numbers starting with BL.0).

Comment

Friends of Admiralty Island – response to Hecla Greens Creek Tailing Expansion DEIS – June 4, 2012

KM.0.004

Specific to the current DEIS:

There is no explanation of how the alternatives relate to the Alaska National Interest Conservation Act (ANILCA) requirements or standards for allowing mining /milling to occur in Admiralty Island National Monument. ANILCA specifies in section 503:

> "(A) that milling activities necessary to develop such claims cannot be feasibly carried out on such claims or on other land owned by such holder;
> (B) that the use of the site to be leased will not cause irreparable harm to the Misty Fjords or the Admiralty Island National Monument; and
> (C) that the use of such leased area for such purposes will cause less environmental harm than the use of any other reasonably available location."

ANILC Section 505 (5) recognizes the importance of protecting fish habitat and water quality in relation to mining operations adjacent to National Monuments and is another example of allowing mining, but protecting Monument values, in this case fish habitat and water quality.

KM.0.005

We endorse the statements that the DEIS also lacks any discussion of the short- and long-term costs to HGCMC from implementing any of the action alternatives or utilizing proposed mitigation measures or the effect of these costs on the economic viability of the mining operations as required by agency regulations. *See* 36 CFR 228.80(b)(2)((ii)(2011). In effect, two of the alternatives (C and D) were developed to minimize the amount of surface disturbance within the Monument and assure that Hecla's mining operations are compatible to the maximum extent feasible, with the protection of Monument resources. The lack of detailed cost information or an evaluation of the practicability of these alternatives in the DEIS prevents the Forest Service, Corps of Engineers, and public from determining which action alternative is the least environmentally damaging practicable alternative under the Clean Water Act's 404(b)(1) Guidelines.

.

Insufficient analysis of the subsistence use of the area and Hawk Inlet:

KM.0.006

The Forest Service relied on studies conducted before 1990 to estimate the customary and traditional use of the area by residents of Hoonah and Angoon and concluded that the use was either very limited or restricted to the mouth of Hawk Inlet. It is imperative that the forest Service conduct current community use surveys for the area and develop a compensation package for Hecla to implement in the affected communities for the loss of customary and traditional uses on lands and waters impacted by mineral development at Greens Creek.

KM.0.007

Compensation could include Hecla funding completion of the Thayer Creek hydro project for Angoon or funding the connection of Hoonah to the intertie that was extended to the Greens Creek Mine several years ago. As noted in the DEIS (at p. iv), the Forest Service has the authority to add stipulations or require additional mitigation measures in making a decision relating to Hecla's proposal to modify its General Operating Plan.

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Response

Comment ID: KM.0.004
Section 3.19 is dedicated to assessing impacts to the Monument and comparing alternatives. The information presented in the EIS is sufficient to make an informed decision. The rationale for the decision and findings required by ANILCA are further documented in the Record of Decision.

Comment ID: KM.0.005
The regulations in 36 CFR 228.80(c)(2)(ii) require the authorized officer to consider the long- and short-term costs of mitigation measures in the context of the economic viability of the operations. The regulation does not indicate that this consideration must be included as part of the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures or alternatives would jeopardize the economic viability of the Greens Creek operation. The NEPA regulations do not require a cost–benefit analysis.

It is important to note that alternatives were developed using information typical for a scoping-level study for mining operations. The result is that each of the alternatives carried forward was economically feasible and therefore "practicable." The Forest Service, the USACE, and the public are therefore free to base the comparison of alternatives on environmental effects without concern about the costs.

Comment ID: KM.0.006
Customary and traditional uses are defined by the ADF&G related to the specific use of various species for subsistence. The subsistence discussions reflect the ADF&G's current definitions of customary and traditional uses.

Comment ID: KM.0.007
The suggested projects would not mitigate any effects identified as a result of any alternative.

Comment

Friends of Admiralty Island – response to Hecla Greens Creek Tailing Expansion DEIS – June 4, 2012

KM.0.008

Destruction of Salmon Habitat:

ANICLA only allows the Forest Service to issue leases and associated permits for mining purposes on Monument lands if it determines that use of the site "will not cause irreparable harm to the Monument" and requires the Forest Service to maintain the continued productivity of all salmon habitats. All the action alternatives presented in the DEIS irreversibly impact salmon streams. Alternative B calls for the destruction of 4,046 feet of Class 1 and 2 fish habitat in Tributary Creek. Alternatives C and D, call for the destruction of 1,078 feet of Class 1 and 2 habitats in Fowler Creek. Overall, these alternatives would cause permanent loss of habitat for salmon, an essential part of the local food chain for the Monument's bald eagles and brown bears. The conclusion that this irreparable loss of salmon habitat can be mitigated by improving fish passage in Greens Creek is simply wrongheaded.

KM.0.009

Cultural Values Underestimated:

The impacts to cultural values in the DEIS relies only on the recent past. Historically, Hawk Inlet opened up to Young's Bay. It was an important passage way from Chatham Strait to Stephens Passage. The area was utilized by clans from Juneau, Hoonah, and Angoon. The analysis did not consider any recent ground surveys that would take into account new information on isostatic rebound that shows cultural sites could be located hundreds of feet above the current sea level. We ask that the Forest Service conduct a more through ground survey of possible cultural sites. We also urge the Forest Service to consult with the Hoonah Indian Association, and recognized representatives of the Auk Kwaan.

The response of Dr. Daniel Monteith (appended) is especially applicable to the cultural resources of Admiralty Island – a key value supporting the establishment of the Monument. We agree with his conclusions.

Hecla's proposed expansion would seem to be in an area of high probability to contain ancient cultural evidence. Additional investigations are clearly warranted prior to further disturbance.

KM.0.010

Cost comparison of the Alternatives:

The DEIS lacks any discussion about the short- and long-term costs to HGCMC of utilizing proposed mitigation measures or the effect of these costs on the economic viability of the mining operations as required by agency regulations for mining operations within Misty Fiords and Admiralty Island National Monuments. The Forest Service needs to supplement this draft EIS to disclose and analyze these costs.

KM.0.011

Economic Benefits Analysis Only Considers Juneau:

The Juneau-centric focus of the analysis prevents the Forest Service from fulfilling its obligation to identify and address the social, health, and environmental effects of this proposal that may be borne disproportionately by the communities of Angoon and Hoonah. We ask that the Forest

3 | Page

Response

Comment ID: KM.0.008

Section 3.19.3 address effects to fish and wildlife resources in the Monument. As noted in the EIS, the expansion of the existing tailings, under any alternative, would represent about 1/100th of 1 percent of the total Monument area. Local effects to fish and wildlife (including bears and eagles) are presented in sections 3.7 and 3.11, respectively. As discussed in Section 3.11.3.3, mitigation for loss of salmon spawning and rearing habitat would also mitigate for impacts to brown bears that rely on salmon. This is also true for bald eagles.

Please note that the DEIS erroneously reported that the alternative TDF site would affect 34 feet of Class I streams. This is not correct; the alternative TDF site would not directly affect (by burial) any Class I streams. This has been corrected in the FEIS.

Also see the response to Comment KM.0.004.

Comment ID: KM.0.009

The Forest Service conducted cultural resource surveys across areas potentially affected by the proposed action and alternatives, including lands affected by isostatic rebound. Therefore, the effect on archaeological resources for this particular project is minimized.

Additional consultation information has been added to Section 1.6.

Comment ID: KM.0.010

The regulations in 36 CFR 228.80(c)(ii) require the authorized officer to "consider" the long- and short-term costs of mitigation measures in terms of the economic viability of the operations. The statute does not require that this consideration be included in the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures would jeopardize the economic viability of the Greens Creek operation.

Comment ID: KM.0.011

The socioeconomic analysis appropriately focuses on Juneau, because that is where the majority of socioeconomic effects from the mine occur.

Comment

Friends of Admiralty Island – response to Hecla Greens Creek Tailing Expansion DEIS – June 4, 2012

Service expand the economic benefits (and impacts) analysis to include Angoon, Hoonah and Tenakee Springs.

Need for Perpetual Water Treatment:

KM.0.012

The DEIS states that Hecla will have to actively treat the water from the tailings piles for "hundreds of years if not in perpetuity." This need raises questions as to whether such mineral development is "environmentally sound" and protects Monument values as required by ANILCA and the Greens Creek Land Exchange Act of 1996. The present reclamation bond for the Greens Creek mine is $30,455,000 based on the 2003 Solid Waste permit and adjusted for inflation. The 2003 permit assumed water treatment would be needed for approximately 7 years after mine closure. Any lack of adequate funding could place the burden on the public should Hecla declare bankruptcy. We ask that the Forest Service require adequate financial assurances to cover perpetual water treatment.

Discharges into Hawk Inlet:

KM.0.013

Greens Creek is allowed to discharge contaminants into Hawk Inlet under a State permit that allows for a toxic mixing zone. The DEIS does not mention that this permit was stayed by DEC pending further review and that 2005 EPA permit still governs discharges from outfall 002 into Hawk Inlet. Unfortunately, neither permit effectively monitors water quality at the edge of the mixing zone. Consequently, the agencies lack adequate monitoring data to support a finding that mining activities have not degraded water quality in Hawk Inlet and protect existing aquatic uses as required by the Clean Water Act. Furthermore, the mixing zone design relies on a physical description of Hawk Inlet over 20 years old that does not account for isostatic rebound or other recent changes to the channel. The Forest Service's reliance on the State to protect the aquatic habitat of Hawk Inlet with a permit yet to be released is mistaken. The Forest Service needs to update its analysis in the DEIS to reflect existing conditions in Hawk Inlet and develop meaningful compensation for the long-term degradation of Hawk Inlet from the discharge and loading of toxic pollutants into this waterbody.

Sincerely,

K.J. Metcalf

K.J. Metcalf, President
Friends of Admiralty Island
PO Box 20791
Juneau, Alaska 99801

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Response

Comment ID: KM.0.012
See the response to DC.0.008.

Comment ID: KM.0.013
The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDES permit is reissued.

Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The mixing zone is based on specific modeling conducted using an EPA hydrodynamic mixing model and not the 1981 study. However, Motyka et al. (2007) (Post Little Ice Age Rebound in the Glacier Bay Region) indicates that sea levels in Hawk Inlet are affected by approximately 1.0 centimeter (0.4 inch) per year. At this rate, it is not anticipated that tidal flushing behavior would have changed since the 1981 dye dilution study.

The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and with the awareness that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment

Sent via email: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

To: Admiralty Island National Monument Tongass National Forest
ATTN: Greens Creek Tailings Expansion 8510 Mendenhall Loop Road Juneau, AK 99801
Re: Comments on Greens Creek Mine Tailings Dump Expansion Draft Environmental Impact Statement (DEIS)

From: K.J. Metcalf
PO BOX 20221
Juneau AK, 99802

June 4, 2012

Dear Supervisor Forrest,

I would like to add my voice to those calling for a supplemental Draft EIS for this project.

I was the first Monument Manager (Ranger) assigned to Admiralty Island National Monument. I sincerely believe congress intended to accommodate the Greens Creek mine, but with very specific standards to be applied to protecting the Monument. KM.1.001

Thy DEIS does not give enough analysis or information to be able to comment on the action alternatives. I endorse the comments made by Southeast Alaska Conservation Council and Friends of Admiralty Island in supporting this conclusion.

KM.1.002 I also endorse the comments submitted by Dr. Daniel Monteith relating to the cultural resources and Social Justice.

KM.1.003 The cultural resources of the island was one of the major values that President Carter used to proclaim the Admiralty Island National Monument, followed by Congressional action to include the island in ANILCA. Hawk Inlet could hold ancient cultural sites of international importance. Given the dramatic isostatic rebound of the north end of Admiralty such sites most likely will be well above the current sea level and most likely in the Greens Creek and Tributary area.

This possibility deserves ground truthing before any further disturbance occurs.

KM.1.004 The wording in ANILC seems very clear that no development will occur in the Monument that will cause irreparable harm. Extension of the current tailings deposit (Alt B.) over Tributary Creek will violate this intent. In addition milling (tailings) will not be allowed within the Monument when other locations are available outside of the Monument.

1 | Page

Response

Comment ID: KM.1.001
Comment noted. Please see the response to Comment KM.1.004.

Comment ID: KM.1.002
Comment noted.

Comment ID: KM.1.003
See the response to Comment KM.0.009.

Comment ID: KM.1.004
Monument values are identified in Chapter 1 as a significant issue (Issue 4) that led to the formulation of alternatives and mitigation measures. The alternative TDF (alternatives C and D) was specifically developed to minimize disturbed area in the Monument. Section 3.19 is dedicated to assessing impacts to the Monument and comparing alternatives. Additional impacts to the Monument are addressed in Section 3.22, Cumulative Effects. The information presented in the EIS is sufficient to make an informed decision. The rationale for the decision and findings required by ANILCA are further documented in the Record of Decision.

Comment

KM.1.005 The water quality is a serious issue. When I was Monument Manager and overseeing the DEIS for the mine's development base-line bio-assays were taken of the benthic organisms in Hawk Inlet. This important base–line data is missing – no one can find it- and constitutes a serious breach of ANILCA direction and the scientific method.

KM.1.006 I believe that Hawk Inlet is currently an "impaired water-body." The barge load of lead concentrate that tipped over adjacent to the cannery site is not benign. The amount of from the current tailings toxins that have been discharged into the inlet is the cause for much debate. The solution to have a mixing zone contained on land (Pogo gold mine model) seems worthy of consideration at Greens Creek.

I appreciate you considering my additional comments to those of SEACC and Friends of Admiralty Island.

Sincerely,

K.J. Metcalf

K.J. Metcalf

2 | Page

Response

Comment ID: KM.1.005
Very intensive water quality and bio-assay data collection has continued for many years and data are used for trend analysis through the Hawk Inlet Monitoring Program. Annual reports are provided to the Forest Service and ADEC. There is adequate information to make a reasonable determination of current project effects.

Comment ID: KM.1.006
ADEC's August 2012 Draft Water Quality Monitoring and Assessment Report did propose to list the water in Hawk Inlet in the immediate vicinity of the 1989 ore spill as impaired, but not the entire water body, and not the location of the discharge. The EIS has been modified in Section 3.7.2.2 to reflect this recently proposed listing.

Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). As such, the EIS does not consider alternative treatment or discharge scenarios.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 9:02 AM
To: Weglinski, Gene; Cox, David
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Alternative B

#2

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Kasen Spickler [mailto:kasen_spickler@hotmail.com]
Sent: Sunday, June 03, 2012 9:44 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Alternative B

KS.0.001

This letter is to voice my opinion of approval for Alternative B. Greens Creek has proved to southeast citizens that they can responsibly operate this mine in a environmentally safe way. The total amount of temporarily impacted lands is very minimal when you look at the entire size of Admiralty island and the engineering of the tailings disposal plan is constructed in such a way to have minimal impact on the area.

KS.0.002

I have lived in Juneau for 27 years and have seen the positive impacts Greens Creek has made in this community. I have many friends that have worked there as contractors and I also have a brother that has worked underground for the last 8 years. When you give Juneau citizens opportunities to make good wages with benefits it strongly affects everyone here. I've seen first hand how this mine can help Juneau sustain a growing economy and I hope it can continue to grow for years to come.

Thank you,

Kasen Spickler
9690 N. Douglas Hwy.
Juneau, AK 99801

907-723-9330

1

Response

Comment ID: KS.0.001
Comment noted.

Comment ID: KS.0.002
Comment noted.

Comment

From: Les Cronk
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Talings Expansion Comments
Date: Wednesday, May 16, 2012 9:47:21 AM

May 16, 2012

Good day,

LC.0.001

This letter is to support the Hecla Greens Creek Mining Company's tailings facility expansion plan, Alternative B, and to request the USFS approve the mines proposed plan because it is the most environmentally sound, technically feasible, and economically viable alternative analyzed in the EIS.

LC.0.002

Since its opening back in 1987, the Greens Creek Mine has operated within the Admiralty Island National Monument in accordance with federal, state and local laws and regulations and continually demonstrated the highest care for the environment. The operation of the Greens Creek Mine has been with minimal disturbance to the environment and they have maintained a small footprint and using the dry-stack method of tailings disposal. This small foot print follows one of the original agreements between Greens Creek and the United States of America by and through the USFS that calls for facilities to be consolidated to the maximum extent practicable. The HGCMC proposed plan allows expansion of the current facility rather than requiring additional road building and development which helps maintain their very limited impact.

LC.0.003

HGCMC proposes to use the same tailings disposal techniques, environmental management procedures, and reclamation measures that were reviewed in the 2003 Forest Service environmental impact statement (EIS) for the site and have been approved by the Forest Service, the Alaska Department of Environmental Conservation (ADEC) and the Alaska Department of Natural Resources (ADNR). This system has been proven to work and needs to be continued as proposed and Alternative B is the best because:

LC.0.004

- Alternative B provides for a logical expansion of the existing facility and consolidates the operations to the maximum extent practicable.
- Alternative B allows for an upward extension of the existing facility as well as an expansion to the south which lessens disturbance and reclamation costs.

LC.0.005

- Alternative B maintains tailings disposal in an engineered, contained facility in a portion of a single watershed, as opposed to other alternatives that would place tailings in multiple watersheds.

LC.0.006

The Greens Creek Mine has contributed to the Southeast Alaska economy for the past 25 years providing high-paying jobs, major contributions to the local tax base and significant

Response

Comment ID: LC.0.001
Comment noted.

Comment ID: LC.0.002
Comment noted.

Comment ID: LC.0.003
Comment noted.

Comment ID: LC.0.004
Comment noted.

Comment ID: LC.0.005
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Comment ID: LC.0.006
Comment noted.

Comment	*Response*
amounts of money into the Southeast Alaskan economy. Our Company has worked with this mine for these past 25 years and we have the highest regard for the quality of their operation and have seen their commitment to being good stewards of that land. We need this kind of responsible resource development to continue and expand in Alaska and throughout America to build a sustainable economy. LC.0.007 We ask for your approval of Alternative B in this EIS so the Green Creek Mine operations can continue to benefit our Country well into the future. Sincerely, Les Cronk, Vice President Southeast Stevedoring Corporation PO Box 8080 Ketchikan, AK 99901 P-907-225-6157 F-907-225-8254	**Comment ID: LC.0.007** Comment noted.

Comment	*Response*
LG.0.001 **From:** Lydia Garvey **To:** FS-comments-alaska-tongass-admiralty-national-monument **Cc:** info@seacc.org **Subject:** Greens Creek Tailings **Date:** Thursday, May 31, 2012 7:29:39 PM Nix: 1. Request for permit to expand toxic tailing dumping! ,and 2. DEIS Alternatives A-D!- All are unacceptable-All kill salmon streams & violate environmental laws, along with being highly inappropriate in National Monument lands/waters! Do you job- Protect Our Public lands, waters, wildlife & health! You work for citizens, Not industry! Your attention to this most urgent matter would be much appreciated by all present & future generations of all species. Thank you Lydia Garvey Public Health Nurse 429 S 24th Clinton OK 73601	**Comment ID: LG.0.001** Comment noted.

Comment

From: Louis C. Harris, Jr.
To: PS-comments-alaska-tongass-admiralty-national-monument
Subject: Green Creek Tailings
Date: Friday, June 01, 2012 8:44:21 AM

LH.0.001

We are long overdue to have concerns about the impact of mining on our environment. If a mining operation cannot avoid serious further damage to the environment, then the mining operation needs to be terminated.

Thank you for your attention.

Response

Comment ID: LH.0.001
Comment noted.

Comment

From: Lauren Heine
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: "Greens Creek Tailings Expansion"
Date: Friday, June 01, 2012 7:49:29 PM

To Whom It May Concern:

Please include the following comments.

LH.1.001

1. The life of the mine has been underestimated. All the action alternatives proposed in the DEIS, consider a life-of-mine timeline between 30 and 50 years -- but the mine could be active until 2095. The DEIS does not explain why it selected this timeline or demonstrate that the expanded tailings dump can provide the predicted capacity for tailings and waste rock over the selected timeframe.

LH.1.002

2. he Forest Service relied on studies conducted before 1990 to estimate the customary and traditional use of the area by residents of Hoonah and Angoon and concluded that the use was either very limited or restricted to the mouth of Hawk Inlet. It is imperative that the forest Service conduct current community use surveys for the area and develop a compensation package for Hecla to implement in the affected communities for the loss of customary and traditional uses on lands and waters impacted by mineral development at Greens Creek. Compensation could include Hecla funding completion of the Thayer Creek hydro project for Angoon or funding the connection of Hoonah to the intertie that was extended to the Greens Creek Mine several years ago. As noted in the DEIS (at p. iv), the Forest Service has the authority to add stipulations or require additional mitigation measures in making a decision relating to Hecla's proposal to modify its General Operating Plan.

LH.1.003

3. ANICLA only allows the Forest Service to issue leases and associated permits for mining purposes on Monument lands if it determines that use of the site "will not cause irreparable harm to the Monument" and requires the Forest Service to maintain the continued productivity of all salmon habitats. All the action alternatives presented in the DEIS irreversibly impact salmon streams. Alternative B calls for the destruction of 4,046 feet of Class 1 and 2 fish habitat in Tributary Creek. Alternatives C and D, call for the destruction of 1,078 feet of Class 1 and 2 habitats in Fowler Creek. Overall, these alternatives would cause permanent loss of habitat for salmon, an essential part of the local food chain for the Monument's bald eagles and brown bears. The conclusion that this irreparable loss of salmon habitat can be mitigated by improving fish passage in Greens Creek is simply wrongheaded.

LH.1.004

4. The DEIS lacks any discussion about the short- and long-term costs to HGCMC of utilizing proposed mitigation measures or the effect of these costs on the economic viability of the mining operations as required by agency regulations for mining operations within Misty Fiords and Admiralty Island National Monuments. The Forest Service needs to supplement this draft EIS to disclose and analyze these costs.

LH.1.005

5. The DEIS states that Hecla will have to actively treat the water from the tailings piles for "hundreds of years if not in perpetuity." This need raises questions as to whether such mineral development is "environmentally sound" and protects Monument values as required by ANILCA and the Greens Creek Land Exchange Act of 1996. The present reclamation bond for the Greens Creek mine is $30,455,000 based on the 2003 Solid Waste permit and adjusted for inflation. The 2003 permit assumed water treatment would be needed for approximately 7 years after mine closure. Any lack of adequate funding

Response

Comment ID: LH.1.001
Section 1.1 of the EIS explains that the 30- to 50-year duration reflects the request from HGCMC to modify their GPO. This represents the proposed action and is what is carried forward in the analysis of direct and indirect effects in the body of Chapter 3. The disposal of tailings and waste rock for the remaining period of the mining lease is addressed as part of cumulative effects. Sections 1.1 and 1.3 discuss how tailings disposal capacity has been developed.

Comment ID: LH.1.002
Customary and traditional uses are defined by the ADF&G related to the specific use of various species for subsistence. The subsistence discussions reflect the ADF&G's current definitions of customary and traditional uses.

As the commenter notes, the Forest Service has the authority to add stipulations to the GPO as part of developing mitigation for adverse impacts. However, any stipulations must be related to the execution of the GPO; Forest Service authority does not extend to off-site activities, such as requiring HGCMC to fund all or part of the Thayer Creek hydro project or to extend the intertie to Hoonah.

Comment ID: LH.1.003
Please see the response to Comment MH.2.004.

Comment ID: LH.1.004
The regulations in 36 CFR 228.80(c)(ii) require the authorized officer to consider the long- and short-term costs of mitigation measures in terms of the economic viability of the operations. The regulation does not require that this consideration be included as part of the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures would jeopardize the economic viability of the Greens Creek operation.

Comment ID: LH.1.005
See the response to DC.0.008.

Comment ID: LH.1.006
The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have

Comment

could place the burden on the public should Hecla declare bankruptcy. We ask that the Forest Service require adequate financial assurances to cover perpetual water treatment.

LH.1.006

6. Greens Creek is allowed to discharge contaminants into Hawk Inlet under a State permit that allows for a toxic mixing zone. The DEIS does not mention that this permit was stayed by DEC pending further review and that 2005 EPA permit still governs discharges from outfall 002 into Hawk Inlet. Unfortunately, neither permit effectively monitors water quality at the edge of the mixing zone. Consequently, the agencies lack adequate monitoring data to support a finding that mining activities have not degraded water quality in Hawk Inlet and protect existing aquatic uses as required by the Clean Water Act. Furthermore, the mixing zone design relies on a physical description of Hawk Inlet over 20 years old that does not account for isostatic rebound or other recent changes to the channel. The Forest Service's reliance on the State to protect the aquatic habitat of Hawk Inlet with a permit yet to be released is mistaken. The Forest Service needs to update its analysis in the DEIS to reflect existing conditions in Hawk Inlet and develop meaningful compensation for the long-term degradation of Hawk Inlet from the discharge and loading of toxic pollutants into this waterbody.

LH.1.007

7. The mine should be required to use best available technology to avoid any acidification from the tailings.

Thank you for your consideration of these points.

--

Lauren Heine, Ph.D.
Consulting Co-Director, Clean Production Action
Director, GreenScreen Program
Principal, Lauren Heine Group LLC
Clean Production Action
Juneau, AK
Tel: 360-220-2069
lauren@lheinegroup.com

Response

been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDES is reissued.

Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The mixing zone is based on specific modeling conducted using an EPA hydrodynamic mixing model and not the 1981 study. However, Motyka et al. (2007) (Post Little Ice Age Rebound in the Glacier Bay Region) indicates that sea levels in Hawk Inlet are affected by approximately 1.0 centimeter (0.4 inch) per year. At this rate, it is not anticipated that tidal flushing behavior would have changed since the 1981 dye dilution study.

The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and with the awareness that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment ID: LH.1.007
Comment noted.

The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). As such, the EIS does not consider alternative treatment scenarios.

Comment

COEUR
THE PRECIOUS METALS COMPANY

Luke J. Russell
Sr. VP EHS, Social Responsibility

June 4, 2012

Admiralty Island National Monument – Tongass National Forest
ATTN: Ms Sarah Samuelson, Interdisciplinary Team Leader
8510 Mendenhall Loop road
Juneau, Alaska 99801

Re: Greens Creek Tailings Expansion

Dear Ms Samuelson

On behalf of Coeur d'Alene Mines we appreciate your consideration of the following comments in regard to the proposed Tailings Expansion plan by Helca Mining and the Greens Creek Mine.

LR.0.001

The Greens Creek Mine has been a vital component to the Juneau and Southeast Alaska economy for over 25 years. As presented in the draft Environmental Impact Statement (DEIS) the mine currently provides 493 direct and indirect good paying jobs with $48 million direct and indirect payroll for the region. Without the proposed tailings expansion most all of these jobs and economic contribution would be lost to the region plus the potential for a net loss of 650 residents in the City and Bureau of Juneau.

LR.0.002

The Greens Creek Mine has been located within the Admiralty Island National Monument since 1987 and operated in accordance with federal, state and locals laws and regulations including Section 503 of the Alaska National Interest Lands Conservation Act (ANILCA). The project provides a tremendous economic impact to the region while affecting only a very small area of land within the Monument.

LR.0.003

As presented in the DEIS the proposed action (Alternative B) would have less land disturbance, less impact to air quality, similar impacts on water resources and less impact to wetlands than the other action alternatives. Alternative B provides for the logical expansion of the existing tailings facility where it has been placed for nearly a quarter century without spreading impacts to other sites or drainages. Maintaining mine facilities within their current context also minimizes new impacts to the Monument.

Coeur d'Alene Mines Corporation
505 Front Avenue, P.O. Box I
Coeur d'Alene, ID 83816
Telephone 208.665.0996
Facsimile 208.667.2213
www.coeur.com

Response

Comment ID: LR.0.001
Comment noted.

Comment ID: LR.0.002
Comment noted.

Comment ID: LR.0.003
Comment noted.

Comment

We encourage the Forest Service to select Alternative B and complete the EIS timely so mine operations and significant economic contributions from the mine can continue uninterrupted.

Sincerely,

Luke Russell

cc. W. Zigarlick

Response

Comment	*Response*
LW.0.001	**Comment ID: LW.0.001** Comment noted.

From: Larry Weihs
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings
Date: Friday, June 01, 2012 5:04:07 AM

To whom this may concern:

I have witnessed firsthand the environmental stewardship displayed within the the operation of Greens Creek Mine. The mine management and their dedication to Safety, Health and the Environment is evidenced in their track record and the focus on the daily safe operation of this mine. I support their tailings expansion application.

Sincerely,

-Larry Weihs

Larry Weihs
COO
ESS Support Services Worldwide
A division of Compass Group
201 Post Road
Anchorage, AK 99501
Telephone Number: 907-865-9825
Mobile Number: 907-232-2195
212° in 2012

Comment

Freeman Bell
10009 Camden Place
Juneau, AK 99801

5-30-2012

USDA Forest Service
Admiralty Island National Monument-Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, Alaska 99801

Dear Sir:

MB.0.001

I am writing in support of Alternative B for the Greens Creek Tailings Expansion. I worked for Greens Creek for six years and saw firsthand how conscientious Greens Creek management is about following all environmental guidelines and sometimes exceeding regulations concerning tailings and other aspects of mining.

I also own a business that has benefitted from the local mines. The mining industry has a very positive effect on all Southeast Alaska's economy. The economic impact for Alaska would be devastating if Greens Creek were not able to continue mining once the current tailings facility reached capacity. In Juneau, Hecla supports cultural, sporting, nonprofit events and charities.

Having been to Greens Creek recently and seeing the facility I have no reservations supporting the expansion of the current tailings facility. Alternative B makes the most sense environmentally and economically.

Thank you for the opportunity to comment.

Sincerely,

Mike Bell
Owner

Response

Comment ID: MB.0.001
Comment noted.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 5:05 PM
To: Cox, David; Weglinski, Gene
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Tailings Expansion

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Mike Heatwole [mailto:mikeheatwole@pebblepartnership.com]
Sent: Monday, June 04, 2012 2:53 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion

MH.0.001

I write today as a long time Alaskan in support of the Hecla Greens Creek Mining Company's proposed tailings expansion. The mine has provided steady employment for the Juneau area for over 20 years. This is important since there are not many year round jobs left in the private sector in Southeast – especially after the demise of the logging industry. Greens Creek has been a responsible operator and corporate citizen. The proposed alternative B, supported by the company, makes the most sense – especially considering it is informed by the technical experts at the company. I encourage the Forest Service to expeditiously approve the expansion so the company can know their next phase of operation can go forward.

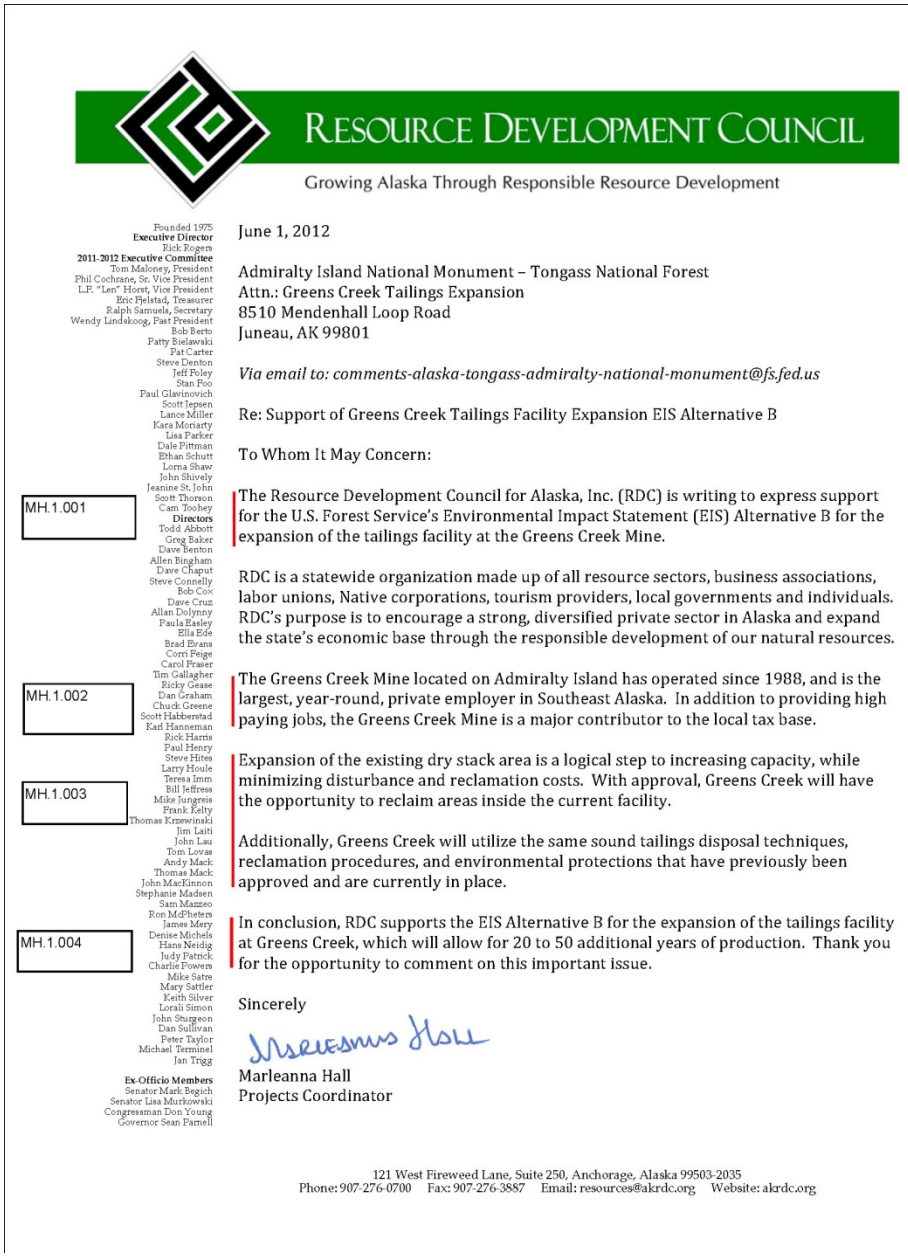
Mike Heatwole
5200 Huffman Road
Anchorage, AK 99516

1

Response

Comment ID: MH.0.001
Comment noted.

Comment



RESOURCE DEVELOPMENT COUNCIL

Growing Alaska Through Responsible Resource Development

June 1, 2012

Admiralty Island National Monument – Tongass National Forest
Attn.: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Via email to: comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Re: Support of Greens Creek Tailings Facility Expansion EIS Alternative B

To Whom It May Concern:

MH.1.001

The Resource Development Council for Alaska, Inc. (RDC) is writing to express support for the U.S. Forest Service's Environmental Impact Statement (EIS) Alternative B for the expansion of the tailings facility at the Greens Creek Mine.

RDC is a statewide organization made up of all resource sectors, business associations, labor unions, Native corporations, tourism providers, local governments and individuals. RDC's purpose is to encourage a strong, diversified private sector in Alaska and expand the state's economic base through the responsible development of our natural resources.

MH.1.002

The Greens Creek Mine located on Admiralty Island has operated since 1988, and is the largest, year-round, private employer in Southeast Alaska. In addition to providing high paying jobs, the Greens Creek Mine is a major contributor to the local tax base.

MH.1.003

Expansion of the existing dry stack area is a logical step to increasing capacity, while minimizing disturbance and reclamation costs. With approval, Greens Creek will have the opportunity to reclaim areas inside the current facility.

Additionally, Greens Creek will utilize the same sound tailings disposal techniques, reclamation procedures, and environmental protections that have previously been approved and are currently in place.

MH.1.004

In conclusion, RDC supports the EIS Alternative B for the expansion of the tailings facility at Greens Creek, which will allow for 20 to 50 additional years of production. Thank you for the opportunity to comment on this important issue.

Sincerely

Marleanna Hall
Projects Coordinator

121 West Fireweed Lane, Suite 250, Anchorage, Alaska 99503-2035
Phone: 907-276-0700 Fax: 907-276-3887 Email: resources@akrdc.org Website: akrdc.org

Response

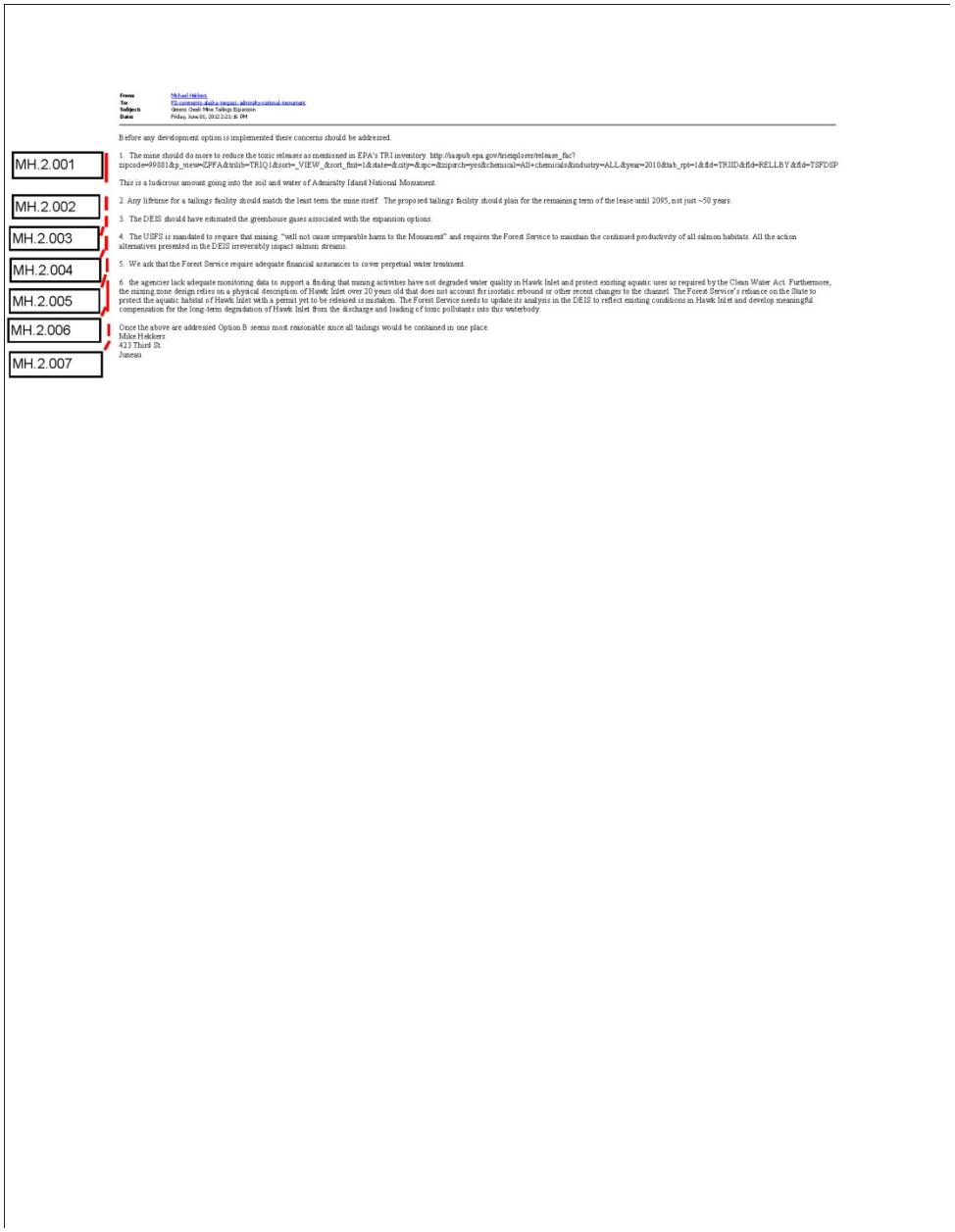
Comment ID: MH.1.001
Comment noted.

Comment ID: MH.1.002
Comment noted.

Comment ID: MH.1.003
Comment noted.

Comment ID: MH.1.004
Comment noted.

Comment



From: Michael Hekkers
To: FS comments, alaska region, admiralty national monument
Subject: Greens Creek Mine Tailings Expansion
Date: Friday, June 01, 2012 2:21:16 PM

Before any development option is implemented these concerns should be addressed.

MH.2.001 1. The mine should do more to reduce the toxic releases as mentioned in EPA's TRI inventory. http://iaspub.epa.gov/triexplorer/release_fac?zipcode=99801&p_view=ZPFA&trilib=TRIQ1&sort=_VIEW_&sort_fmt=1&state=&city=&pc=&fzipprch=yes&chemical=All+chemicals&industry=ALL&year=2010&tab_rpt=1&fid=TRIID&fid=RELLBY&fid=TSFDSP

This is a ludicrous amount going into the soil and water of Admiralty Island National Monument.

MH.2.002 2. Any lifetime for a tailings facility should match the least term the mine itself. The proposed tailings facility should plan for the remaining term of the lease until 2095, not just ~50 years.

MH.2.003 3. The DEIS should have estimated the greenhouse gases associated with the expansion options.

MH.2.004 4. The USFS is mandated to require that mining "will not cause irreparable harm to the Monument" and requires the Forest Service to maintain the continued productivity of all salmon habitats. All the action alternatives presented in the DEIS irreversibly impact salmon streams.

MH.2.005 5. We ask that the Forest Service require adequate financial assurances to cover perpetual water treatment.

MH.2.006 6. the agencies lack adequate monitoring data to support a finding that mining activities have not degraded water quality in Hawk Inlet and protect existing aquatic uses as required by the Clean Water Act. Furthermore, the mixing zone design relies on a physical description of Hawk Inlet over 20 years old that does not account for isostatic rebound or other recent changes to the channel. The Forest Service's reliance on the State to protect the aquatic habitat of Hawk Inlet with a permit yet to be released is mistaken. The Forest Service needs to update its analysis in the DEIS to reflect existing conditions in Hawk Inlet and develop meaningful compensation for the long-term degradation of Hawk Inlet from the discharge and loading of toxic pollutants into this waterbody.

MH.2.007 Once the above are addressed Option B seems most reasonable since all tailings would be contained in one place.
Mike Hekkers
423 Thirrd St.
Juneau

Response

Comment ID: MH.2.001
As disclosed in Section 3.5.2.1 of the EIS, all water that comes in contact with tailings is controlled, captured, and treated prior to discharge to Hawk Inlet. Because the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). In addition, non-contact-water is diverted so it can not become contaminated and require treatment (Section 3.5.2.1). Appropriate ambient monitoring programs have also been established through the GPO and by ADEC's Waste Management Permit.

Comment ID: MH.2.002
The analysis of the proposed action and alternatives is based on the time frame requested by HGCMC. The Forest Service agrees that this is a reasonable duration for anticipated future activities. Tailings disposal for the duration of the lease (through 2095) is considered as part of cumulative effects.

Comment ID: MH.2.003
Comment noted. Greenhouse gas calculations were added for each action alternative in Section 3.2.3. Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment ID: MH.2.004
Monument values are identified in Chapter 1 as a significant issue (Issue 4) that led to the formulation of alternatives and mitigation measures. The alternative TDF (alternatives C and D) was specifically developed to minimize disturbed area in the Monument. Section 3.19 is dedicated to assessing impacts to the Monument and comparing alternatives. The information presented in the EIS is sufficient to make an informed decision. The rationale for the decision and the findings required by ANILCA are further documented in the Record of Decision. Please note that the DEIS

Comment

Response

erroneously reported that the alternative TDF site would affect 34 feet of Class I streams. This is not correct; the alternative TDF site would not directly affect (by burial) any Class I streams. This has been corrected in the FEIS. The mitigative actions relative to salmon production for all alternatives compensate for losses, resulting in no net loss of salmon production in the Monument.

Comment ID: MH.2.005
The reclamation and cost estimate will be revised to reflect the Record of Decision and will include long-term water quality treatment.

Comment ID: MH.2.006
The mixing zone is based on specific modeling conducted using an EPA hydrodynamic mixing model and not the 1981 study. However, Motyka et al. (2007) (Post Little Ice Age Rebound in the Glacier Bay Region) indicates that sea levels in Hawk Inlet are affected by approximately 1.0 centimeter (0.4 inch) per year. At this rate, it is not anticipated that tidal flushing behavior would have changed since the 1981 dye dilution study. The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the APDES permit is reissued.

Issuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that “certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations.” For this reason, the Forest Service defers to the USEPA’s and ADEC’s expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA. The Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)).

Comment ID: MH.2.007
Comment noted.

Comment

Trout Unlimited Alaska

June 1, 2012

Admiralty Island National Monument
Tongass National Forest
Attn: Greens Creek Tailings Expansion DEIS
8150 Mendenhall Loop Road
Juneau, AK 99801

Submitted via email to:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Trout Unlimited (TU) is a 501c3 organization with approximately 150,000 members nation wide and 1,500 members in Alaska. Our mission is to protect, conserve, and restore coldwater fisheries and the habitat that supports them.

MK.1.001

We appreciate the consideration of fisheries values and of our scoping comments regarding them in the DEIS, however we are concerned that all of the action alternatives proposed include some level of permanent fish habitat loss. An action alternative which avoids impacts to both Class I and II fish habitat entirely could and should have been developed. We encourage the Forest Service to continue to explore and develop such an alternative.

MK.1.002

Because all of the current action alternatives do propose permanent loss of fish habitat we are unable to support any of them. That said, because Alternative C would avoid Class I fish habitat entirely and would minimize new potential impacts to tributaries of Greens Creek, we see it as a better alternative than the others proposed.

MK.1.003

Given Alternative C would necessitate a new tailings disposal site and water treatment and monitoring

Trout Unlimited: America's Leading Coldwater Fisheries Conservation Organization
Alaska Office: 419 Sixth Street, Suite 200, Juneau, AK 99801 • (907) 321-3725
www.savebristolbay.org • www.tu.org

Response

Comment ID: MK.1.001
Comment noted. The interagency team expended considerable effort to identify a feasible alternative location that would avoid fisheries impacts. Due to the ubiquitous nature of streams and fish habitat in the area and the design and engineering constraints of the TDF, no such site was identified. The alternative TDF site was first identified based in part on previous sampling from the 1980s that did not identify fish in the north site streams. During the course of this analysis, resident fish were identified in the affected streams. Please note that the DEIS erroneously reported that the alternative TDF site would affect 34 feet of Class I streams. This is not correct; the alternative TDF site would not directly affect (by burial) any Class I streams. This has been corrected in the FEIS.

Comment ID: MK.1.002
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Alternative B would impact 1,646 feet of Class I fish habitat in Tributary Creek.

Comment ID: MK.1.003
Comment noted. If selected, the new TDF would be designed to contain and collect all contact-water, which would then be treated and discharged to Hawk Inlet at the existing discharge location.

Comment

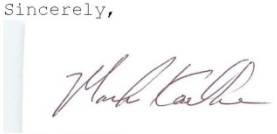
Response

MK.1.003 cont

facilities, we request that this new infrastructure, associated monitoring protocols, and reclamation bonds be held to the highest standards possible to protect fisheries values in Fowler Creek and its associated tributaries and wetlands to the highest degree possible.

Thank you for the opportunity to comment.

Sincerely,



Mark Kaelke
Southeast Alaska Project Director
(907)321-4464

Comment

ELGEE REHFELD MERTZ, LLC

CERTIFIED PUBLIC ACCOUNTANTS

9309 Glacier Highway, Suite B-200 • Juneau, Alaska 99801
907.789.3178 • FAX 907.789.7128 • www.ermcpa.com

June 2, 2012

Admiralty Island National Monument-Tongass National Forest
8510 Mendenhall Loop Road
Juneau, Alaska 99801

RE: Greens Creek Tailings Expansion

Dear Sir/Madam:

MM.0.001

I am a business owner in Juneau, Alaska. My partners and I employ 25 people in Juneau. We have witnessed first hand the direct positive impact that the Greens Creek mine has had on the community:

- We have over 800 clients in Alaska. Many of these are business owners whose business activity has been positively impacted by supplying the Greens Creek mine and by the patronage of the mine's employees.
- Many of our clients are employed by the Greens Creek mine. Our business has been positively impacted by this and would be adversely affected if the mine were to close.
- The non-profit and educational community in Juneau has greatly benefited from the contributions and other support Greens Creek has provided. We have partners and staff who sit on the Boards of Directors of some of these entities, and know what a positive impact this support has had.

MM.0.002

I support Greens Creek Tailings Facility Expansion Plan Alternative B as detailed in the Tailings Expansion draft EIS. This is an ecologically sound, reasonable and logical solution. Alternative B will ensure that Greens Creek is able to operate for many years to come. It is in a single watershed, and as someone who fishes in the waters of both Young Bay outside of Hawk Inlet and hunts that particular area of Admiralty Island, I believe Greens Creek has been an excellent steward of the natural resources in which they operate.

Greens Creek is an excellent community member and asset, and you should do everything in your power to ensure that Southeast Alaska, and especially Juneau, does not lose that.

Sincerely

Max E. Mertz, CPA
Partner

Response

Comment ID: MM.0.001
Comment noted.

Comment ID: MM.0.002
Comment noted.

Comment

From: Mike Nadon
To: PS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailinings Expansion
Date: Friday, June 01, 2012 8:29:31 AM

MN.0.001

I wish to lend my support to this project. Hecla is a responsible company and I am sure will adhere to policies and commitments. Mining revenue is critical to Alaska as are the jobs that will be provided by a continuation and expansion of operations at Greens Creek.

Regards,
Mike Nadon

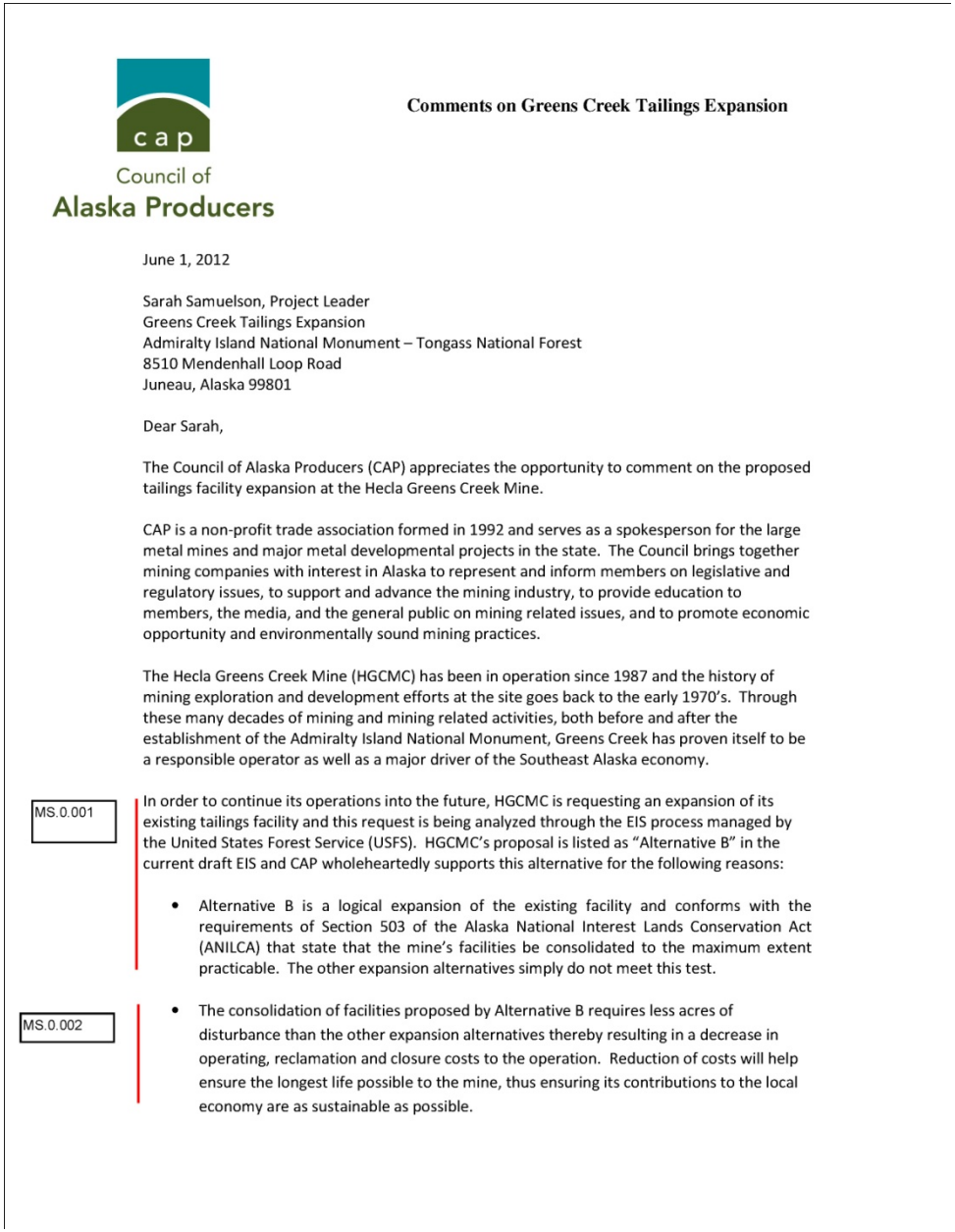
President
Cementation USA Inc.
10150 South Centennial Parkway, Suite 110
Sandy, UT 84070
Phone: 801-937-4120
Cell: 801-707-6949
mike.nadon@cementation.us
www.cementation.us

Cementation
WE BUILD MINES. SAFELY.

Response

Comment ID: MN.0.001
Comment noted.

Comment



Council of
Alaska Producers

Comments on Greens Creek Tailings Expansion

June 1, 2012

Sarah Samuelson, Project Leader
Greens Creek Tailings Expansion
Admiralty Island National Monument – Tongass National Forest
8510 Mendenhall Loop Road
Juneau, Alaska 99801

Dear Sarah,

The Council of Alaska Producers (CAP) appreciates the opportunity to comment on the proposed tailings facility expansion at the Hecla Greens Creek Mine.

CAP is a non-profit trade association formed in 1992 and serves as a spokesperson for the large metal mines and major metal developmental projects in the state. The Council brings together mining companies with interest in Alaska to represent and inform members on legislative and regulatory issues, to support and advance the mining industry, to provide education to members, the media, and the general public on mining related issues, and to promote economic opportunity and environmentally sound mining practices.

The Hecla Greens Creek Mine (HGCMC) has been in operation since 1987 and the history of mining exploration and development efforts at the site goes back to the early 1970's. Through these many decades of mining and mining related activities, both before and after the establishment of the Admiralty Island National Monument, Greens Creek has proven itself to be a responsible operator as well as a major driver of the Southeast Alaska economy.

MS.0.001

In order to continue its operations into the future, HGCMC is requesting an expansion of its existing tailings facility and this request is being analyzed through the EIS process managed by the United States Forest Service (USFS). HGCMC's proposal is listed as "Alternative B" in the current draft EIS and CAP wholeheartedly supports this alternative for the following reasons:

- Alternative B is a logical expansion of the existing facility and conforms with the requirements of Section 503 of the Alaska National Interest Lands Conservation Act (ANILCA) that state that the mine's facilities be consolidated to the maximum extent practicable. The other expansion alternatives simply do not meet this test.

MS.0.002

- The consolidation of facilities proposed by Alternative B requires less acres of disturbance than the other expansion alternatives thereby resulting in a decrease in operating, reclamation and closure costs to the operation. Reduction of costs will help ensure the longest life possible to the mine, thus ensuring its contributions to the local economy are as sustainable as possible.

Response

Comment ID: MS.0.001
Comment noted. The Forest Service has identified its selected alternative in the Record of Decision.

Comment ID: MS.0.002
Comment noted.

Comment

cap
Council of
Alaska Producers

MS.0.003

- Alternative B will have minimal disruption to wildlife when compared to the other expansion alternatives. There is an active goshawk nest at the new location under proposed alternatives C and D, and the nest and surrounding habitat for this sensitive species would be impacted if development in this area were to occur.

MS.0.004

- Alternative B maintains the existing haul distances to the tailings facility unlike the other expansion alternatives where an additional seven miles would be added to each truck trip to the new facility. The increased fuel required to make this trip could result an additional 1,000,000 gallons of diesel fuel over the life of the project, resulting in significantly increased greenhouse gas emissions.

MS.0.005

CAP believes that Alternative B is the most environmentally sound, technically feasible, and economically viable alternative detailed in the draft EIS. We urge the USFS to adopt HGCMC's proposal as its preferred alternative and issue the Record of Decision as expeditiously as possible.

Thank you for your consideration in this matter,

Michael Satre
Executive Director
Council of Alaska Producers
PO Box 33499
Juneau, Alaska 99803
907-957-2149

Response

Comment ID: MS.0.003
Comment noted. An active goshawk nest was located in 2011 adjacent to the proposed new TDF to the north under alternatives C and D. An appropriate discussion and analysis of this finding was provided in Section 3.12.

Comment ID: MS.0.004
Correction: Alternatives C and D would add an additional 5.6 miles round-trip for haul trucks to travel from the portal to the new northern TDF. Fuel usage may vary based on hauling needs.

Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment ID: MS.0.005
Comment noted.

Comment

From: Mike Tobin Jenny Pursell
To: PS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailing Expansion
Date: Saturday, June 02, 2012 11:27:33 AM

Dear Forest Service,

MT.0.001

Of the available alternatives I prefer C in that it would apparently cause less heavy metal run-off into Hawk Inlet and would affect the Monument less than alternative B.

Thank you,

Michael Tobin

PO Box 33578

Juneau, AK 99803

Response

Comment ID: MT.0.001

Comment noted. Please note that as discussed in Section 3.5.2.1, all contact-water that is or could be contaminated is controlled and not allowed to run off into Hawk Inlet.

Please note that discharge from all proposed action alternatives will still be from the same outfall point in Hawk Inlet. Since the discharge is and will continue to be permitted by agencies (USEPA and ADEC) with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and is aware that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 10:43 AM
To: Cox, David; Weglinski, Gene
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Tailings Expansion

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Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~

-----Original Message-----
From: Margo Waring [mailto:margowaring@ak.net]
Sent: Monday, June 04, 2012 9:33 AM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion

Thank you for the opportunity to comment on Hecla Greens Creek Mining Company's proposal to expand its tailings facility at Hawk Inlet.

MW.0.001
I am opposed to granting this permit and favor a "no action" alternative for several reasons.

MW.0.002
The proposed expansion is said to provide for storage for the next 50 years; yet the company's projection for the current storage facility was twice what reality provided. Thus, it is possible that the Stage 3 facility will not meet the needs for the next 50 years. In addition, even if the facility accommodates 50 years worth of material, the mine lease extends an additional 30 years or so, meaning that a Stage 4 request would be likely. All this is important because current water quality management has failed to adequately minimize amounts of toxics and acid into Hawk Inlet.

MW.0.003
Water quality is my chief concern. Even the current tailings pile will require active water treatment for acids for hundreds of years. Heavy metals are daily dumped into Hawk Inlet and later flushed out into Chatham Strait. Mercury, cadmium, cyanide, copper, lead and zinc are all recognized to adversely impact the health of marine organisms, fish and humans. Already 196 pounds of lead, a potent neurotoxin, has been dumped into Hawk Inlet. In 50 years, this number will be 1,400 pounds. These toxic metals do not get flushed out and then disappear. They reappear throughout the environment and threaten human health. We all want to be able to fish and eat our catch of fish caught in Chatham Strait and its connecting waters. Over time the safe area for local fishers and subsistence users will be further and further from their homes.

MW.0.004
The company and DEC claim that contaminants are well treated through the establishment of "mixing zones". As a former employee of DEC, I know that mixing zones are are flexible ways in which to accommodate pollution: not only can the zone be expanded, but testing can be done in ways that minimize readings and, thereby, appear to satisfy permits.
While water may "dilute" the load at any given point, it does not change the total amount of toxic heavy metal contamination.

1

Response

Comment ID: MW.0.001
Comment noted.

Comment ID: MW.0.002
The Forest Service has evaluated HGCMC's disposal capacity needs for tailings, waste rock, and other approved wastes, including wastewater treatment plant sludge. In reviewing these needs and documented production rates, the Forest Service is confident that the alternatives put forward represent a reasonable maximum design that is adequate to address the 30- to 50-year time frame.

The discharge is and will continue to be permitted by agencies (USEPA and ADEC) with authority for CWA compliance. The Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and is aware that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment ID: MW.0.003
Please see the response to Comment MW.0.002.

To put loading into context, 2010 average flow and monitoring data were used to compare the natural loading of metals from Greens Creek to Hawk Inlet versus the loading of metals discharged through the 002 outfall. Based on this comparison, the average natural loading of dissolved zinc from Greens Creek to Hawk Inlet in 2010 was 1.26 pounds per day. The average 2010 loading of total zinc through the 002 outfall to Hawk Inlet was 0.37 pounds per day, approximately 60% less than the natural rate of loading.

Comment ID: MW.0.004
Issuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest

Comment

MW.0.005

Regarding the proposed "mitigation" of extra wetlands through SEAL, this strategy scarcely begins to address the actual damage being done. It neither takes contamination from the water or makes the fish healthier. Specifically, it does not address the problem where it occurs or the damages done where they occur. Subsistence users near Hawk Inlet are not made whole by wetlands hundreds of miles away.

MW.0.006

We must also keep in mind that Greens Creek is not the only mining operation in Southeast Alaska, all of which dump similar amounts of toxins into our inside waters. Recently, BC announced that two "world class" mines are requesting permits to dump toxics into the Stikine River. While we can't control Canada's standards, we can raise our own. Until the day comes when water treatment at the site is more capable of removing toxic heavy metals and truly eliminating acid drainage, the Greens Creek mine should not be permitted to expand.

Margo Waring
11380 N. Douglas Hwy.
Juneau, AK 99801

2

Response

Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit.

Comment ID: MW.0.005
Wetlands mitigation requirements and guidelines are established by theUSACE. The focus of mitigation has shifted from a preference for on-site, in-kind mitigation to the in-lieu fee approach discussed in the EIS. Forested lands will be reestablished following closure; however, there will be some long-term reduction in the number of acres of wetlands at the site.

Comment ID: MW.0.006
Comment noted. Please see the response to Comment MW.0.005. The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and with the awareness that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment

Neil MacKinnon

1114 Glacier Ave

Juneau, Alaska 99801

Admiralty Island National Monument – Tongass National Forest

ATTN: Greens Creek Tailings Expansion

8510 Mendenhall Loop Road

Juneau, Alaska 99801 May 31, 2012

RE: Comments on DEIS for GPO of Greens Creek Tailings Facility Expansion

Dear Sir/Madme:

NM.0.001 I write in support of the Alternative B proposal by Hecla Greens Creek Mining Company to expand the present tailings facility in order to allow for the continued operation of the Creens Creek Mine. Over the last twenty five years of operation, HGCMC has been a substantial element of the local economy while being a good steward of the land and a model for modern mining.

NM.0.002 Greens Creeks consumption of surplus power from the Lake Dorthy Hydorelectric Project made possible the financing and construction of this project. Lake Dorthy's hydro electric energy will result in significant savings over the cost of alternative meand of electric generation in the future. Savings that accrue to all electric customers on the Juneau Grid. These savings will only be realized if Greens Creek can continue to operate and consume surplus power.

NM.0.003 Greens Creek's plan alternative B is founded on many years of operating the present facility along with new knowledge of the potential of the Greens Creek deposit. Planning out fifty years is wise in light of the potential of the Greens Creek mineral system. Also keeping operations compact reduces impacts, increases efficiency of operation and monitoring.

NM.0.001 Again I urge the Forest Service to select Alternative B as the logical and environmentally preferred alternative in the FEIS and issue a ROD and approve a General Plan of Opertions based thereon.

Sincerely,

Neil MacKinnon

Response

Comment ID: NM.0.001
Comment noted. The ROD presents a description of the selected alternative and the rationale for its selection.

Comment ID: NM.0.002
Comment noted.

Comment ID: NM.0.003
Comment noted.

Comment

United States Department of the Interior

OFFICE OF THE SECRETARY
Office of Environmental Policy and Compliance
1689 C Street, Room 119
Anchorage, Alaska 99501-5126

9043.1
ER12/261
PEP/ANC

May 30, 2012

Ms. Sarah Samuelson
Interdisciplinary Team Leader
Admiralty Island National Monument
Tongass National forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Dear Ms. Samuelson:

PB.0.001

The U.S. Department of the Interior (DOI) has reviewed the April 2012 Hecla Greens Creek Mine Tailings Disposal Facility Expansion Draft Environmental Impact Statement (EIS). We offer the following comments under provisions of the Fish and Wildlife Coordination Act, the National Environmental Policy Act, and Executive Order 11990 (Protection of Wetlands). Our primary interests for this project include migratory birds and their habitats, anadromous fish, and wetlands affected by the proposed tailings expansion.

PROJECT DESCRIPTION

Hecla Greens Creek Mining Company (HGCMC) proposes to expand the Greens Creek Mine tailings disposal facility (TDF) to accommodate approximately 10 million cubic yards of additional tailings and waste rock over a 30- to 50-year period. The mine is located on Admiralty Island, approximately 18 miles southwest of Juneau, Alaska. Major portions of the mine are located on Tongass National Forest lands and most of the TDF is located in the Admiralty Island National Monument (Monument). The mine produces lead and zinc concentrates that also contain silver.

GENERAL COMMENTS

The Draft EIS presents one no-action and three action alternatives. The major differences among the alternatives are the location and configuration of the TDFs, and the types and amounts of wetlands and fish streams that would be lost.

The proposed alternative (Alternative B) would extend the footprint of the existing TDF south into the Monument. Approximately 4,000 linear feet of fish habitat in Tributary

Page 1 of 8

Response

Comment ID: PB.0.001
Comment noted.

Comment

Creek would be lost under this proposal, including 1,646 feet of anadromous fish stream and 2,400 feet of resident fish stream. A total of 98.4 acres of wetlands would be filled.

Alternative C would expand the existing TDF to hold an additional 3 million cubic yards of tailings and establish a new TDF outside the Monument that would hold an additional 7 million cubic yards of tailings and waste rock. Approximately 1,044 feet of Class II stream and 114.2 acres of wetlands would be lost. No anadromous reaches would be filled.

Alternative D would implement a smaller expansion of the existing TDF to hold an additional 1 million cubic yards of tailings with a larger TDF outside of the Monument that would hold an additional 9 million cubic yards of tailings and waste rock. Approximately 1,044 feet of resident fish stream and 124.9 acres of wetlands would be disturbed.

Minimization of Fish Habitat Loss

PB.0.002
PB.0.003
PB.0.004

We recommend selection of Alternative C because it would have less impacts to fish habitat than the proposed Alternative B. We believe the selected alternative would help minimize impacts to fish and wildlife habitat through maintenance of fish-bearing streams, minimization of wetland loss, and minimization of disturbance to migratory bird habitats. Under Alternative B, the proposed TDF expansion would result in a loss of 1,600 feet of anadromous fish spawning and rearing habitat and an additional 2,400 feet of resident fish stream habitat in Tributary Creek, representing a 50 percent loss of fish habitat by stream length. Although Alternative C would impact over 1,000 feet of a resident fish stream and would include substantial wetland loss, overall stream loss would be reduced.

Mitigation for Impacts to Fish-bearing Streams

PB.0.005

Fish-bearing streams are considered high-quality aquatic features (USACE 2009) and need to be avoided where possible. Where impacts are unavoidable, we recommend that the Final EIS state that fish-bearing streams will be mitigated at a ratio of at least 3:1. If repair of the failed fish passage structure on Greens Creek is selected as mitigation, we believe an adequate monitoring plan with adaptive management should be required by the U.S. Forest Service.

PB.0.006

The joint Environmental Protection Agency and U.S. Army Corps of Engineers Final Rule *Compensatory Mitigation for Losses of Aquatic Resources* (Final Rule) (2008) specifies that because streams are difficult to replace, emphasis should be on preservation, rehabilitation, or enhancement. According to the Final Rule, a monitoring schedule is required, and reports must be submitted to assess development and condition of the compensation project. In addition, mitigation plans must contain performance standards that will be used to assess whether the project is achieving its objectives. These components (none of which are included in the Draft EIS) need to be specified in the Final EIS.

Page 2 of 8

Response

Comment ID: PB.0.002
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6). Alternative B would impact 1,646 feet of Class I habitat in Tributary Creek.

Comment ID: PB.0.003
Comment noted. An active goshawk nest was located in 2011 adjacent to the proposed new TDF to the north under alternatives C and D. Alternative B would impact 1,646 feet of Class I habitat in Tributary Creek. Upgrades to the A road would impact an additional 30 acres of wetlands under alternatives C and D.

Comment ID: PB.0.004
Comment noted. Alternatives C and D would not impact any Class I anadromous fish stream and 1,044 feet of Class II resident fish streams in Fowler Creek. The text has been revised accordingly.

Comment ID: PB.0.005
Comment noted. Long-term monitoring and maintenance of the fish passage system is required by the ADF&G and will be included in the revised Reclamation Plan and Cost Estimate. Please see the response to Comment PB.0.006.

Comment ID: PB.0.006
The USACE has the ultimate authority to establish compensatory mitigation requirements for any given project under Section 404 of the CWA. The USACE has indicated that a mitigation plan is required that includes monitoring requirements to assess whether performance standards are being achieved if the applicant has proposed a permittee responsible mitigation project. However, the mitigation statement that Hecla Greens Creek Mining Company submitted with their CWA Section 404 permit application states that an in-lieu fee will likely be proposed as compensatory mitigation for the unavoidable impacts to aquatic resources.

In addition to any requirements established by the USACE, the fish passage facility will be monitored quarterly under the guidance of the ADF&G. A permit will also be required from the ADF&G for the construction and monitoring. Requirements for the fish passage facility objectives can be included in the permit.

Comment

PB.0.007

The Draft EIS (page 3-97) includes discussion of a failed fish passage project that was developed as mitigation in 1989. There is a proposal for repair of that fish passage system as new mitigation for loss of 4,000 feet of Tributary Creek that would occur in Alternative B. The fish passage system would allow anadromous fish access to an additional 18,400 feet of stream in Greens Creek. Given the failure of the previously attempted fish pass, if this proposed mitigation is selected, the Final EIS needs to include a monitoring plan that identifies alternative mitigation plans. We recommend adaptive management be incorporated so that if the proposed mitigation project fails to meet objectives, suitable alternative mitigation will be provided. Any fish passage mitigation project will need to be monitored for the full lifetime of the water treatment that will be required, as both water quality and physical access to habitat are necessary to sustain fish populations.

Minimization of Wetland Loss

PB.0.008

Forested wetlands, bogs, marshes, and high-functioning fens would be lost under all action alternatives evaluated. Fens are hydrologically supported primarily by groundwater, which is typically high in mineral nutrients. Compared to other wetland types in the project area, and across the Southeast Alaska in general, fens provide particularly high functions for streamflow support, streamwater cooling, aquatic invertebrate habitat, amphibian habitat, and native plant habitat (Draft EIS, pages 3-127 to 3-128). Great volumes of groundwater typically flow through fen wetlands, increasing the potential for transport of contaminants, if toxic materials are deposited upon them. Because these fens flow into fish-bearing streams, avoiding contamination of the fens will provide a measure of protection for the health of the streams and their associated biota. Alternative C avoids further impacts to the fen located to the south of the existing TDF, and impacts the smallest area of fens (25 acres) of any of the action alternatives. As currently configured, however, Alternative C would impact a substantial fen, plus forested wetlands and bogs at the proposed alternative TDF. We recommend that, in the Final EIS, water quality and wildlife habitat be protected by modifying the TDF to avoid fen wetlands entirely.

Stream habitat and aquatic resources monitoring

PB.0.009

Although a storm water detention structure is proposed to catch surface runoff from the TDF, additional sediment is likely to be delivered to Tributary Creek and/or Fowler Creek, as typically occurs with these structures. Suspended solids are a primary carrier for metals and other contaminants, which can affect stream productivity. Sediment can

PB.0.010

also adversely affect aquatic macro-invertebrates and fish by covering stream-bottom gravel, which is used by invertebrates and fish for reproduction/spawning and rearing.

PB.0.011

State law requires that water quality standards for total suspended solids be met. Degradation of salmon stream habitat is not allowed. Therefore, water quality monitoring in Tributary Creek would be required if Alternative B is selected. For monitoring programs to detect significant change, baseline and project operational data sets for

Page 3 of 8

Response

Comment ID: PB.0.007
Long-term monitoring and maintenance of the fish passage system is required by the ADF&G and will be included in the revised Reclamation Plan and Cost Estimate. Also, see the response to PB.0.006.

Comment ID: PB.0.008
The process of developing alternatives to the proposed action involved a consideration of the resources that would be potentially impacted. The USEPA and the USACE have participated in the process from the beginning, including alternatives development. While the Forest Service appreciates the commenter's concern over fen wetlands, we consider the impacts resulting from the alternative designs to be unavoidable.

Comment ID: PB.0.009
As described in the EIS, storm runoff from the TDF (contact-water) is not allowed to enter Tributary Creek, but is captured and treated. Storm runoff of contact-water from TDFs for alternatives C and D would be similarly controlled and treated. Non-contact-water from undisturbed uplands is captured and diverted around the TDF. As described in sections 3.5.3.2, 3.5.3.3, and 3.5.3.4, potential impacts to the natural creek channels would be mitigated by the use of stormwater detention structures or detention ponds.

Comment ID: PB.0.010
See the response to Comment PB.0.009.

Comment ID: PB.0.011
Total Suspended Solids throughout the site are managed by stormwater controls and monitoring is required by theAPDES permit at 10 stormwater outfalls. The APDES permit will continue to regulate stormwater and Total Suspended Solids at the site when it is reissued.

As specified in Section 3.5.3.3, the Forest Service and ADEC will require habitat and geomorphic surveys in Tributary Creek downstream. Aquatic biomonitoring is conducted annually by ADF&G. Monitoring includes fish counts and species identification and whole-body metals tissue testing of Dolly Varden, periphyton biomass, and benthic macro invertebrates. A report is produced annually.

Comment

periphyton, invertebrates, and fish should use statistical comparisons of standardized, quantitative metrics to characterize stream health. This needs to be described in the Final EIS.

PB.0.012

Aquatic resource monitoring as described in the Draft EIS (Table 2.6-3) includes: (1) juvenile fish sampled for abundance and distribution; (2) fish subsamples analyzed for chemistry; (3) water samples taken for temperature and toxicity testing; (4) periphyton samples collected for biomass; and (5) invertebrates sampled for abundance and community structure. Details on sample schemes, chemical analyses, and statistical techniques are not included in the Draft EIS; nor does the Draft EIS refer the reader to documentation of such information. As a result, it is difficult to evaluate the adequacy of these monitoring programs. We believe standardized macro-invertebrate metrics, which have been developed for Southeast Alaska, need to be used to characterize stream health (Rinella et al. 2005). Moreover, statistical evaluations, in addition to qualitative review of these metrics, need to be used to detect changes over the life of the project. Furthermore, similar quantitative measures need to be adopted for the other parameters included in the monitoring plans. This information needs to be included in the Final EIS.

PB.0.013

If monitoring detects changes potentially attributable to mine operation, remedial actions will need to be evaluated and implemented as appropriate. Specific triggers for such evaluations need to be included in the operation plans for the mine and described in the Final EIS. We believe monitoring is only meaningful if it provides data and analyses sufficient to initiate and inform adaptive management.

Water Quality Monitoring

PB0.014

A plan for monitoring water treatment and water quality needs to be evaluated in the Final EIS. Contamination of water and biota from tailings leachate is one of the greatest potential impacts likely to result from the proposed project. Without a robust monitoring plan that includes specific triggers for initiation of remedial action, it will not be possible for the U.S. Forest Service or the public to evaluate any significant potential impacts associated with the project.

PB.0.015

Treatment of tailings contact water from any of the TDF alternatives will be required for at least 100 years and likely longer, based on modeling information included in the Draft EIS. Because treated water goes to marine discharge, any breakdown of the treatment system could adversely affect water quality in Hawk Inlet and affect fish, wildlife, and invertebrates, including many invertebrate species fed upon by migratory birds.

PB.0.016

HGCMC is currently operating under a 2005 Alaska Pollutant Discharge Elimination System (APDES) permit that allows continued discharge to Hawk Inlet. The permit allows a mixing zone in Hawk Inlet for dilution of cadmium, copper, lead, mercury, zinc and pH. Water quality sample sites are over 1,600 feet from the edge of the mixing zone in Hawk Inlet. Various maps in the Draft EIS show the sampling sites at different locations. However, details of the sampling scheme are lacking and need to be included in the Final EIS.

Page 4 of 8

Response

Comment ID: PB.0.012
The aquatic biomonitoring program is required by the mine's FWMP in the GPO and the mine's current Waste Management Permit from the ADEC. Freshwater aquatic monitoring has been occurring since 2001 and is carried out and reported by the ADF&G in coordination with the Forest Service and the mine operator.

The current version of the FWMP is a result of a Greens Creek–sponsored interagency regulatory review of the Greens Creek Mine. The Project Team consisted of representatives from KGCMC (the former operator) and several state and federal regulatory agencies, including the USEPA, Forest Service, USFWS, ADNR, ADF&G, ADEC, and the State Attorney General's Office.

The FWMP will be updated to reflect the decision documented in the Record of Decision.

Reports from previous years' biomonitoring work are available in Weber, Scannell, and Paustian (2002); Jacobs et al. (2003); Durst and Townsend (2004); Durst et al. (2005); Durst and Jacobs (2006, 2007, 2008, 2009, 2010); and Kanouse (2011, 2012).

Comment ID: PB.0.013
As required by the FWMP, GPO Appendix 1, if a water quality standard exceedance is indicated, HGCMC will notify the Forest Service and ADEC within 14 days and conduct confirmation sampling. If the results are confirmed, HGCMC would prepare and submit a mitigation plan to the Forest Service and ADEC for review and approval. Also see the response to Comment PB.0.012.

Comment ID: PB.0.014
See the responses to comments PB.0.12, PB.0.13, PB.016, and PB.0.17.

Comment ID: PB.0.015
The effluent limits and permit coditions in the APDES permit were developed to be protective of designated uses. The operator is required to comply with the APDES discharge permit conditions at all times until the effluent meets water quality standards.

NEPA analyses are developed under the premise that authorized activities are conducted in compliance with applicable permits.

Comment

PB.0.017

We recommend that monitoring samples be taken at the edges of the mixing zone rather than far from the mixing zone. We further recommend that the model used to evaluate the subtidal mixing zone in the monitoring plan account for tidal action that is likely to repeatedly expose biota to toxins. In addition, monitoring samples will need to be taken during tidal periods that put the outfall plume upstream of the sampling sites rather than the reverse. This detailed information on monitoring needs to be included in the Final EIS.

PB.0.018

The selected alternative needs to allow adaptive management to implement improved water treatment methods as they are identified in the future, and to require evaluation of remedial actions, if water quality monitoring detects declines in water quality. This information also needs to be included in the Final EIS.

SPECIFIC COMMENTS

2.3.2 Alternative B: Proposed Action

PB.0.019

Page 2-6: The Draft EIS states that "Similar to Alternative A, it is anticipated that drainage from the TDF would require treatment for hundreds of years after closure." However, the document does not quantify the time periods, and does not describe the processes that might minimize the period to less than "hundreds of years". The Final EIS needs to include quantitative estimates of treatment times and descriptions of possible processes that might reduce the need for treatment.

2.3.3 Alternative C: New TDF Located Outside Monument

PB.0.020

Page 2-8: The Draft EIS states that "The expansion of the existing TDF and the construction of the new TDF would make use of the existing water treatment plant for approximately 30 years, after which a replacement to the water treatment plant would be necessary (due to normal operational lifetime of the water treatment plant). There would be no water treatment plant at the new TDF site." The document does not quantify how long the water treatment will be necessary, and does address the issue of post-mining water treatment. The Final EIS needs to quantify the water treatment periods, and if water treatment continues beyond the lifetime of the mine, provide an estimation of the number of treatment plants that will be necessary.

PB.0.021

Page 2-12: The Draft EIS states that: "Under this alternative, portions of the new TDF would be reclaimed in the interim as conditions allowed, until final reclamation occurred. Final reclamation would be conducted at the end of tailings disposal and would include covering, revegetation, and ongoing water management." The Final EIS needs to describe the scope and duration of the "ongoing water management requirements".

Page 5 of 8

Response

Comment ID: PB.0.016

Sections 3.5.2.3 and 3.7.1.2 of the EIS describe the Hawk Inlet Monitoring Program, which requires regular monitoring of water quality, sediments, mussels, and worms at various locations in the inlet, not just in the mixing zone. These monitoring requirements are required as a part of the APDES permit. A more detailed description of the Hawk Inlet Monitoring Program is contained in annual reports and referenced in the EIS. Sampling locations for Hawk Inlet are depicted in Figure 3.5-4. Since the sampling locations and protocols would be the same for all alternatives, additional detail would not assist the Forest Service in the decision-making process.

Comment ID: PB.0.017

The mixing zone is based on specific modeling conducted using an USEPA hydrodynamic mixing model. The model incorporates and accounts for tidal action.

As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit.

Reissuance of the permit is a process independent from the proposed action under consideration.

The Forest Service cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit.

Comment ID: PB.0.018

Comment noted. The EIS assumed that water treatment would continue to be required in order to meet water quality standards. The EIS did not look at different water treatment methods, since there would be no benefit to conducting that analysis (the current water treatment plant discharge is in compliance), nor would the conclusions of the EIS differ. Water treatment is required under the APDES permit. If water quality standards or permit limits change in

Comment

2.3.4 Alternative D: Modified Proposed Action

PB.0.022

Page 2-16: The Draft EIS states that: "The expansion of the existing TDF and the construction of the new TDF would make use of the existing water treatment plant for approximately 30 years, after which a replacement to the water treatment plant would be necessary (due to normal operational lifetime of the water treatment plant)." The Final EIS needs to describe the scope and duration of the ongoing and future water management requirements.

2.4.8 Reclamation and Closure

PB.0.023

Page 2-23: The Draft EIS states that: "Reclamation growth medium material (consisting of soil and peat) would be removed from the areas disturbed by enlargement or construction of any of the TDF structures and placed into stockpiles. This material would be used for reclamation and site closure." Organic material stored for 30 years will be subject to diagenesis and will be reduced in volume. The Final EIS needs to include a description of the estimated diagenesis and reduction in volume, and an estimate of how much additional soil material would be needed to bring the volume up to the amount that was originally removed.

PB.0.024

Page 2-23: The Draft EIS states that one of the goals is: "Return the disturbed areas to near-natural conditions to the extent practical;" however, the document does not include a through description of the present natural conditions. The Final EIS needs to include a description of the present environment sufficient to provide reviewers and decision makers with an adequate baseline understanding of the present natural environment.

3.5.2 Water Resources-Surface Water-Baseline Conditions

PB.0.025

Page 3-40: The Draft EIS discusses results and trends based on data from the Fresh Water Monitoring Program (FWMP) and FWMP annual report, however, the reference information is not provided. The Final EIS needs to provide all references and necessary information so that reviewers can check and document the presented results and trends.

3.10.3 Wetlands - Environmental Consequences

PB.0.026

Page 3-127/8: Table 3.10-3, "Wetland Functions and Values," contains relevant and useful data for those familiar with the WESPAK-SE functional assessment methodology. Its usefulness for most readers would be improved by the addition in the Final EIS of a description of what the values in each column represent. Additionally, the heading for the second major column ("Forested Bog") appears to be incorrect. We believe the heading should read "Forested Alternative B."

Section 3

PB.0.027

Throughout Section 3 there are inconsistencies between the reference citations and the list of references, and the data presented in several tables are not referenced. For example, a quick cross check identified the following errors.

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Response

the future, then different treatment methods may be needed, but prediction of these changes is beyond the scope of this analysis. The Forest Service expects that ADEC and USEPA will continue to require a permit for the discharge that is in compliance with water quality standards and the CWA.

The Forest Service practices an adaptive management approach. As disclosed in Section 3.5.2, annual reports of water quality monitoring include a trend analysis so that mitigation can be implemented if specific "trigger" values are exceeded.

Comment ID: PB.0.019
The NEPA analysis discloses in Section 3.5.3.1 that, based on current data, leachate from the TDF would need to be controlled, treated, and regulated by a discharge permit both during operations and after closure over the long term. Current leachate quality data are presented in tables 3.5-7 through 3.5-10 and in Technical Support Documents referenced in the EIS. The EIS does not provide a quantifiable estimate of treatment times and processes since these time frames are difficult to predict over the very long term, which is the case for the Greens Creek Mine TDF drainage.

Comment ID: PB.0.020
The NEPA analysis discloses in Section 3.5.3.1 that treatment would be required at least 100 years after closure of the mine, and perhaps in perpetuity. It further discloses in Section 3.5.3.4 that effluent would need to be pumped to the water treatment plant from the northern TDF site.

As indicated in the EIS, HGCMC will be required to provide financial assurance. Financial assurance will be required to control and treat water in perpetuity. A description of financial assurance procedures is found in Section 1.8.3.1 and Appendix B.

Comment ID: PB.0.021
Section 3.5.2.2 discusses how tailings contact-water would be managed under all alternatives. Sections 3.5.3.1 through 3.5.3.5 disclose how tailings contact-water and effluent would be managed, controlled, and treated for each alternative.

Comment

Page 3-40: The document Alaska Department of Environmental Conservation (ADEC) 2009 is not included in the list of references.

Page 3-46: The documents Hecla Greens Creek Mining Company (HGCMC) 2009a, Kennecott Greens Creek Mining Company (KGCMC) 2003, and HGCMC 2009 are not included in the list of references.

The document references needs to be checked and corrected in the Final EIS; and all data presented in tables need to be referenced in the Final EIS.

If you have any questions concerning our general comments, please contact Deborah Rudis at deborah_rudis@fws.gov or at 907-780-1183 in the Juneau Field Office of the U.S. Fish and Wildlife Service. If you have any questions about our specific comments, please contact Gary LeCain, U.S. Geological Survey Coordinator for Environmental Document Reviews, at 303-236-1475 or at gdlecain@usgs.gov.

Thank you for the opportunity to comments on this Draft EIS.

Sincerely,

Pamela Bergmann

Pamela Bergmann
Regional Environmental Officer – Alaska

Page 7 of 8

Response

Comment ID: PB.0.022
See responses to the previous comments on this issue. The NEPA analysis discloses in Section 3.5.3.1 that, based on current data, leachate from the TDF would need to be controlled, treated, and regulated by a discharge permit both during operations and after closure. Current leachate quality data are presented in tables 3.5-7 through 3.5-10 and in EIS Technical Support Documents.

Comment ID: PB.0.023
Calculating the amount of diagenesis is beyond the scope of the EIS and there is no need to ensure that the volume at closure would be the same as originally removed. The thickness of the growth media layer as proposed in the engineered cover would be 24 to 36 inches. If the amount of plant growth media available at closure was insufficient, the operator would need to import material. Importing material would not be unprecedented; HGCMC currently imports approximately 16,000 cubic yards of rock annually for road construction.

Comment ID: PB.0.024
The discussions of the pre-mining environment and baseline conditions throughout the Chapter 3 discuss “natural conditions” and are consistent with the level of detail typically presented in NEPA documents. The commenter does not provide enough detail in describing what aspects of natural conditions descriptions are not adequately discussed for the Forest Service to provide a more specific response.

Comment ID: PB.0.025
Comment Noted. The reference has been added.

Comment ID: PB.0.026
The presentation of the functions and values in Section 3.8 has been revised based on input from the USACE and USEPA. Table 3.10-3 has also been revised.

Comment ID: PB.0.027
Edit made per comment. Reference list has been updated to include missing references listed.

Comment

Response

References

Rinella, D. J., D. L. Bogan, K. Kishaba, and B. Jessup. 2005. Development of a Macroinvertebrate Biological Assessment Index for Alexander Archipelago Streams – Final Report. For Alaska Department of Environmental Conservation. 52 pp.

USACE (U.S. Army Corps of Engineers). 2009. Alaska District Regulatory Guidance Letter. RGL ID No. 09-01.

EPA (Environmental Protection Agency). April 10, 2008. Environmental Protection Agency and Corps of Engineers Final Rule Compensatory Mitigation for Losses of Aquatic Resources. Federal Register. Volume 73. Number 70.

Comment	*Response*
PH.0.001	**Comment ID: PH.0.001** Comment noted.

From: Paul Haavig
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Letter of Support
Date: Tuesday, May 08, 2012 1:06:28 PM

I'm writing this brief email to add my name of support to Greens Creek request of expansion to their tailings facility. Their proven record of safe environmental practices combined with the good family supporting jobs they provide is very important to our region.

Paul Haavig
Arrowhead Transfer
1517 Sawmill Creek Road
Sitka, Alaska 99835
907-747-8647 Office
907-752-5049 Cell
907-747-6433 Fax
haavig@ati.lynden.com

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 2:14 PM
To: Cox, David; Weglinski, Gene
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Tailing Expansion

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Paul Larson [mailto:p.larson@cmiak.com]
Sent: Monday, June 04, 2012 10:40 AM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailing Expansion

My thoughts are that the Forest Service should allow the expansion of the Greens Creek Mine Tailings project. Greens Creek Mine is a very valuable asset to the communities of SE Alaska and the City and Borough of Juneau. Greens Creek has a very extensive environmental, safety and operations procedures in place and works diligently towards safety for all the workers and the environment .
Please allow the Greens Creek Mine Tailing Expansion to move forward.

PL.0.001

Thank you,

Paul Larson
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(907)-780-4030 Office
(907)-780-4058 Direct Line
(907)-321-4423 Cell
(907)-780-4800 Fax

1

Response

Comment ID: PL.0.001
Comment noted.

Comment

KOOTZNOOWOO
INCORPORATED

June 4, 2012

SENT VIA EMAIL comments-alaska-tongass-admiralty-national-monument@fs.fed.us

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Re: Greens Creek Tailings Expansion

PN.0.001

In October 2010, the Forest Service issued a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for the Greens Creek Mine Tailings Expansion. The Greens Creek Mine and appurtenant infrastructure straddles the Tongass National Forest, Juneau Ranger District and the Admiralty Island National Monument Admiralty Island/Kootznoowoo Wilderness Ranger Districts (collectively "Forest Service"). We stated in our scoping letter of November 19, 2010 that we understand that the action was prompted by requests from the Hecla Greens Creek Mining Company's (Hecla) to change the mine's approved General Plan of Operation (GPO) to accommodate additional tailings which would provide additional mine life by doubling the size of the tailings from approximately 50 acres to 100 acres and increasing the permissible height of the stack from approximately 200 feet to nearly 400 feet. Additional changes include other sites that have not been identified as well as necessary roads and other infrastructure most notably water treatment, waste rock sites, quarries and staging areas. Unlike previous proposals for modification and changes to the GPO the current proposal is intended to extend the GPO 30 to 50 years; or said another way approximately half of the time remaining for Hecla to mine within the Monument under an agreement which governs the rights and responsibilities between Hecla and the Forest Service which Congress approved and ratified in Public Law 104-123, 110 STAT. 879 (1995 Exchange Agreement).

Kootznoowoo, Inc. submits the following comments on the scope of the proposed analysis in its various capacities including as a member of the public, in accord with the government to government consulting authority as well as specific authority under Section 506 of ANILCA.

8585 Old Dairy Road, Suite 104 Juneau, AK 99801 Phone: 907.790.2992 Fax: 907.790.2995

Response

Comment ID: PN.0.001
Comment noted. The Forest Service respectfully disagrees with the assertion that changes would occur to "other sites have not been identified" since the assessment addresses the need for water treatment, waste rock sites, and quarries associated with each alternative. Staging areas would continue to be used in the future as they are used currently.

Comment ID: PN.0.002
The timeline for reaching capacity and implementing closure of the existing TDF under the GPO approved with the 2003 EIS was provided to the Forest Service by Kennecott Greens Creek Mining Company (HGCMC's prececessor). HGCMC revised its estimate for when it will reach approved capacity of the dry stack, pushing back the date until 2016. The Forest Service believes that HGCMC's proposed action to encompass 30 to 50 years worth of tailing disposal capacity represents a reasonable long-term approach to managing their operation and that the alternatives effectively address the issues identified during the scoping process.

Comment ID: PN.0.003
Irreparable harm is addressed as part of the discussion on Monument values in Section 3.19. Mining for the duration of the Exchange Agreement is considered as part of cumulative effects, which also address Monument values.

Despite Mr. Hartman's quote, the dry-stack approach to tailings management is actually an effective method for tailings disposal in a wet environment, as evidenced in part by the successes at Greens Creek. The dry-stack approach minimizes the footprint needed for tailings disposal compared to wet or paste disposal methods. Moving tailings off site was not considered for detailed analysis in developing alternatives since shipping tailings would increase disposal cost substantially and is not a practice employed in the lead/zinc mining industry.

The Forest Service has not included an isotherm of the region since defining areas with similar temperatures would not influence our decision-making process.

Comment

Specific Comments:

PN.0.002

The Forest Service has in recent years approved numerous expansions of the facilities located on Monument lands on Admiralty Island. The most recent Record of Decision (2003 ROD) estimated the mine life to be approximately 12 years based on known ore reserves and the current rate of production.

During scoping, Hecla disclosed that the design for the proposed tailings facilities expansion assumes production for an additional 30 to 50 years and that if the proposed changes to the GPO are not approved the mine will need to cease operations in 2014 and commence closure and reclamation. We understand from company statements that alternatives within the current GPO exist to extend operations longer than the 2014 date.

Furthermore and according to a Juneau Chamber of Commerce speech by Hecla's GM, Scott Hartman, on May 3, 2012 *"when it comes to something like tailings we don't want it to be a short sighted 5-10 year exercise, we need a long term strategy and then we will construct it in a responsible manner in increments as needed"* The Draft EIS has failed to provide alternatives that provide for this long term strategy and need. We therefore request that the current document be supplemented with information that does provide for sound long term decision making. The additional information needed is described herein.

PN.0.003

While Kootznoowoo supports responsible mining in this portion of Admiralty Island as has been evidenced by many years of support we do not see any of the action alternatives as providing a responsible long term solution that does not pose irreparable harm to Monument values. In fact what we see at best will extend and provide for tailing and waste rock disposal for approximately half of the period provided under the Exchange Agreement. None of the action alternatives provide the necessary surface area necessary for stacking tailing until the year 2095. We concur with Mr. Hartman that *"running a dry stack tailing is particularly difficult in a rainy area";* yet, the Forest Service did not look to any locations off the Monument that were in dry or less rainy areas. At a minimum an isotherm of the region should be included in the record of decision looking for areas more suitable for a dry stack or *in the alternative* suitable locations and alternative processes should be examined for tailings processing or disposal.

PN.0.004

While we are delighted with today's high metal prices, demand and beneficial economic outlook for the region based almost entirely on important existing and potential mining activities over the near and midterm we are concerned about several factors that have not been fully disclosed or analyzed in the DEIS:

> Underlying assumptions and calculations related to the various proven and probable mineral reserves (including minerals in the existing tailings stack) available to Hecla mining activities[1] as well as others located on Monument (e.g. Exchange land and the adjacent "Mammoth Claims"). The EIS should disclose fully the Forest Service verification and confirmation of these reserves. Because this mining operation is the only subsurface managed by the Forest Service, qualified independent verification of Hecla's

Page 2

Response

Comment ID: PN.0.004

While we appreciate the commenter's interest in mineral resources in the Monument, neither NEPA nor Forest Service regulations require that an EIS validate proven and probable reserves for a proposed expansion of a mine's operation.

Comment ID: PN.0.005

Alternatives to the proposed action were developed that would meet the purpose and need of the proposed action, that would provide 30–50 years of disposal capacity, and that would address the significant issues developed during scoping. See Sections 1.2, Purpose and Need; 1.7, Significant Issues; and Section 2.2, Issues and Alternative Development. The Forest Service uses the Forest Plan (2008) to guide management actions throughout the Tongass National Forest. However, the Admiralty Island National Monument Plan (1988) is also applicable.

While the utility corridors and easements are identified in the Forest Plan, their use is not reasonably foreseeable within the context of this EIS and therefore is beyond its scope.

The environmental audit is required under the State Waste Disposal Permit and is not the subject of this analysis; however, recommendations from the analysis were considered as they related to the tailings disposal.

The Young Bay Experimental Forest was disestablished in 2009. Although termination of the mineral withdrawal is consistent with management of the area under the Semi-Remote Recreation LUD, which includes direction providing that "Forest lands within this LUD are open to mineral exploration and development." this has not occurred. In order for the withdrawal to be terminated, the Regional Forester would have to request that the U.S. Department of the Interior revoke the 1963 mineral withdrawal, and a decision whether to approve that request would be made by the Secretary of the Interior. The process would include an environmental analysis under NEPA.

It is not possible to predict an absolute fixed date of closure. The current proposal is to authorize additional disposal capacity to accommodate another 30 to 50 years of operations, though under the terms of Greens Creek Land Exchange Act, mining may not continue past 2095. This is acknowledged in Section 3.22, Cumulative Effects.

Comment

estimates should be considered by the Forest Service as a means of increasing the confidence of the public in the propose purpose and need.

PN.0.005

We are appreciative of the longer term perspective that Hecla has taken in their proposal however the action alternatives shown in the DEIS appear unsatisfactory in terms of comparison to Alternative "B". The opportunity to provide for a long term solution was missed by the authors of the DEIS and the opportunity to integrate such alternatives into a Monument/Island Plan was missed with this draft document.

Accordingly, Kootznoowoo, Inc. again encourages the Forest Service to also consider alternatives that take into consideration this longer increment of time and scale and update disclosures and analysis fully within the Admiralty Island Monument to include changes such as:

- Impacts of transportation and utility corridors and easements created by Congress and the Angoon Community Association (IRR route 0025 attached) since the current GPO was originally authorized should be included in the scoping review. The current GPO is insufficient in terms of disclosure in this regard and Kootznoowoo understands that the GPO is in the process of being updated. Highlights of the update should be included in the EIS. For instance the scoping disclosure do not address recent recommendation to the Forest Service on necessary improvements which should occur (e.g. SRK Consulting Environmental Audit (2009))

- Impacts on transportation and utility corridors necessary to complete the Southeast Intertie and current and future Southeast transportation plans and alternatives. Of particular note should be the impacts of connecting Greens Creek to Juneau power and other communities such as Angoon.

- Impacts on existing infrastructure authorized under the current GPO on foreseeable impacts of decommissioning the existing experimental forest at Young Bay to any other status than Wilderness /Monument or Monument status. Please see Kootznoowoo's TLMP comments and appeals for additional information. The DEIS does not speak to the status of the former adjacent Experimental Forest, its mining/mineral values and cumulative impacts to Monument values The DEIS should better address the cumulative impacts to Monument values based on the actual lifespan of the mine operation and on an absolute fixed date of closure and should analyze in constant dollars mitigation and other costs and should provide analysis as to how the tailings expansion meets the law and regulation requirement to avoid irreparable harm. This was not sufficiently analyzed.

PN.0.006

The Forest Service should give careful attention to defining a reasonable prediction for the life of the mine and fully disclose the basis for supporting that determination. If they cannot make such a prediction they should use the average tailing production over the last 23 years for the period of time remaining according on the Exchange Agreement with some adjustment for other valid claims.

Page 3

Response

Comment ID: PN.0.006

The purpose and need for this action is to accommodate tailings disposal associated with mining known resources in addition to resources identified in the future through exploration. The possibility of mining through the time remaining under the Greens Creek Land Exchange Act has been added to the Cumulative Effects discussion in Section 3.22.

Comment

The Monument was established for the purpose of protecting objects of ecological, cultural, geological, historical, pre-historical and scientific interest, in particular its fish and wildlife and supporting habitats which create the largest unspoiled island ecosystem in not only the United States but the world and the home of the people of Angoon.

PN.0.007

The EIS should also disclose the response of these resources to adverse environmental change and the potential for irreparable harm to this island ecosystem and National Monument treasure in perpetuity. As stated elsewhere the life of mine is underestimated. Also with regard to the cumulative effects, we have previously recommend the EIS carefully explain what methods it is using to assure that no irreparable harm will occur under the proposal and alternatives. We even offered to participate with the Forest Service and proponent to look at available "tools under several acts of Congress" to assist in determining the proper balance of environmental impacts and preservation of Monument values which should have been a part of the DEIS. Therefore the process to date lacks efforts to design a long term solution that is compatible to the maximum extent feasible, with the purposes for which the Monument was established as is required by Section 503(f)(2)(A) of ANILCA. Until this is done the Forest Service cannot assure that they are compatible with Monument Values. The Forest Service indicated that there were insufficient facts to analyze alternative sites off of Admiralty Island in a consulting meeting which occurred on May 9th with Kootznoowoo, Inc. This seems remarkable as the Forest Service often acquires or trades properties and is aware of numerous sales and dispositions by virtue of this work and should be aware generally of alternative lands that may be more suitable than Monument lands for further processing and ultimate disposal of tailings.

PN.0.008

In considering other alternatives to the proposed action, including the no action alternative, we recommend the Forest Service applying the following criteria and analysis (including complete cost/benefit in constant and comparable dollars):

- Does the alternative action meet the purpose and need;
- Is the action better addressed through another alternative or combination of alternatives including other locations that the project proponent may own, rent or exchange opportunities proximate to their claims;
- How well will the alternative minimize adverse environmental effects to Monument values and the indigenous people of Angoon, including cumulative effects;
- Will the alternatives better assure that irreparable harm does not comes to Monument values?
- Which alternative maintain the habitats of fish and wildlife, and maintain the present and continued productivity of such habitats, to the maximum extent feasible
- Finally, to what extent will the alternatives expand or contract the footprint of the mining activities on unencumbered Monument lands adjacent to Wilderness?

PN.0.009

Previously we have requested a complete 3-D rendering and in our scoping comments we requested that the height and scale of ultimate planned structure to a commonly known reference point such as the Washington Monument or the Washington, D.C. Mall area as a means of

Page 4

Response

Comment ID: PN.0.007

Effects to components of the ecosystem are described throughout Chapter 3 of the EIS, with Section 3.18 dedicated specifically to Monument values. Numerous alternative sites were considered during alternatives development (see Section 2.2, Issues and Alternative Development, and Section 2.5, Alternatives Considered but Not Carried Forward). The EIS considered alternative TDF sites located outside the Monument. There are no other sites available to HGCMC that are suitable for containing 30–50 years' worth of waste material disposal that are economically feasible and that would cause less environmental harm.

Comment ID: PN.0.008

Comment noted. These questions are analyzed in the EIS. All alternatives carried forward meet the purpose and need. See Chapter 2, sections 2.2 (Issues and Alternative Development), 2.3 (Alternatives), and 2.5 (Alternatives Considered but Not Carried Forward), and Chapter 3, sections 3.7 (Aquatic Resources), 3.11 (Wildlife), 3.16 (Subsistence), 3.18 (Socioeconomics), and 3.22 (Monument Values).

Comment ID: PN.0.009

The layout of each alternative is provided in Chapter 2. Section 3.14.3 provides a visual simulation of each alternative. These presentations provide sufficient detail for analysis and comparison of the alternatives in the context of the site itself from the perspective of someone looking from the water in Hawk Inlet. We respectfully disagree that the Washington Monument would be an appropriate reference point or provide any logical basis for comment compared to how the facility appears in its actual setting.

Comment

soliciting public comments and making a better decision. We could not find such a disclosure or analysis in the alternatives presented.

PN.0.010 Disclosure document should clearly state the degree of completion of all engineering, drawings and support documents. Documents showing "75% complete" should be made available to the public.

PN.0.011 The extent on impacts related to of Tributary Creek which is shown to be impacted by the proposal should be fully understood and valued yet this was not done. Any mitigation to wetlands and streams should be in the context of Admiralty Island only yet the DEIS indicates that planned mitigations funds will be directed to a Juneau based company. At a minimum, "fee in lieu" or other mitigation measures should be in the same or adjacent drainage to the impacted areas within the Monument and in accordance with an approved up to date "Monument Plan".

PN.0.012 A full discussion of mitigation, closure and reclamation should be included in the EIS using a sensitivity analysis on interest rates on necessary bonds. Since a tailings facility will be present possibly in perpetuity, Hecla and the Forest Service should plan for and provide the means to monitor and manage reclamation after the closure considering financial liabilities and ultimate ownership. This was not completed either in terms of constant dollars, or for the full mitigation necessary and certainly among meaningful alternatives including an off Monument disposal.

PN.0.013 Agency regulations and direction are lacking relative to programmatic management direction of adjacent wilderness and non wilderness impacts. Methods of integrating transportations and utility corridors such as through Title 11 of ANILCA in wilderness designation are also not fully described in the DEIS nor is the status of the roads and right of way covered in the context of the 2005 Congressional surface transportation authorization (SAFETEA-LU).

PN.0.014 Adaptive Management is described a mechanism in the DEIS as providing *"sufficient flexibility to take preventative or remedial action if environmental concerns arise."* Understanding the importance of a general plan of operation (GPO), the status of the current GPO and the fact that it is not altogether up to date gives little comfort to the concept of adaptive management being an effective tool to change permit conditions or take remedial action necessary to assure that irreparable harm to Monument values does not occur. If adaptive management is to be a requirement of the management of the dry stack, the most affected stakeholders should understand under what conditions changes would occur and what measures would be allowable under what circumstances. Specific examples should be disclosed such as relates to subsistence impacts, environmental justice, economic benefits/provisions, discharges of potentially toxic waters and possible reclamation.

PN.0.015 Finally, the possibility ("Alternatives C and D") of moving waters that would otherwise naturally drain into Young Bay into water treatment and then discharge into the mixing zone of Hawk Inlet (some of which is in State waters and some of which is within federal waters located within the Monument Wilderness boundary) is not fully analyzed in the DEIS.

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Response

Comment ID: PN.0.010
Designs typically reviewed during the NEPA process are considered "conceptual" rather than "design" drawings at a given percent completion. There is no statutory requirement to generate documents at a 75% complete level.

Comment ID: PN.0.011
Effects to Tributary Creek and associated wetlands are described in sections 3.5 (Surface Water), 3.7 (Aquatic Resources), and 3.10 (Wetlands). HGCMC will work with the USACE to determine mitigation for impacts to waters of the United States; the ultimate decision for how compensatory mitigation for wetland impacts would be accomplished lies with the USACE. Mitigation for impacts to fish species would occur in Greens Creek.

Comment ID: PN.0.012
Current Forest Service regulations and policy do not require the development or disclosure of financial assurance costs in NEPA documents. The Forest Service and State of Alaska cooperate under an Memorandum of Understanding to calculate and secure financial assurance for mines located on National Forest System lands in Alaska outside the NEPA process.

See EIS Appendix B for a detailed discussion on reclamation bond and financial assurance.

Comment ID: PN.0.013
Management of National Forest System lands affected by the project is guided by the Tongass National Forest Land Use and Management Plan, which includes management direction for Non-Wilderness National Monument and Semi-Remote Recreation, the applicable Land Use Designations in the project area.

Utility corridors identified in Title 11 of ANILCA are not considered reasonably foreseeable since there are no plans currently under active consideration that would make use of the easements. Likewise we are unaware of any pending projects authorized or appropriated under the SAFETEA-LU (Safe Accountable Flexible Efficient Transportation Equity Act—A Legacy for Users) either through the National Corridor Infrastructure Improvement Program, Section 1702 High Priority Projects, or otherwise, that would be considered reasonably foreseeable in terms of this analysis and decision.

Comment

PN.0.016 We would be happy to meet with the Forest Service, other stakeholders and Hecla to assist in providing necessary information and review the analysis necessary to assure this important mine continues many years into the future as Congress has provided for. Thank you for this opportunity to comment on the DEIS.

Sincerely:

Peter Naoroz

Kootznoowoo, Incorporated
By: Peter Naoroz
General Manager

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[i] Hecla Mining activities include activities related to mining claims which are preexisting the designation of ANILCA as well as mining claims post the 1995 Greens Creek Land Exchange Act.

Page 6

Response

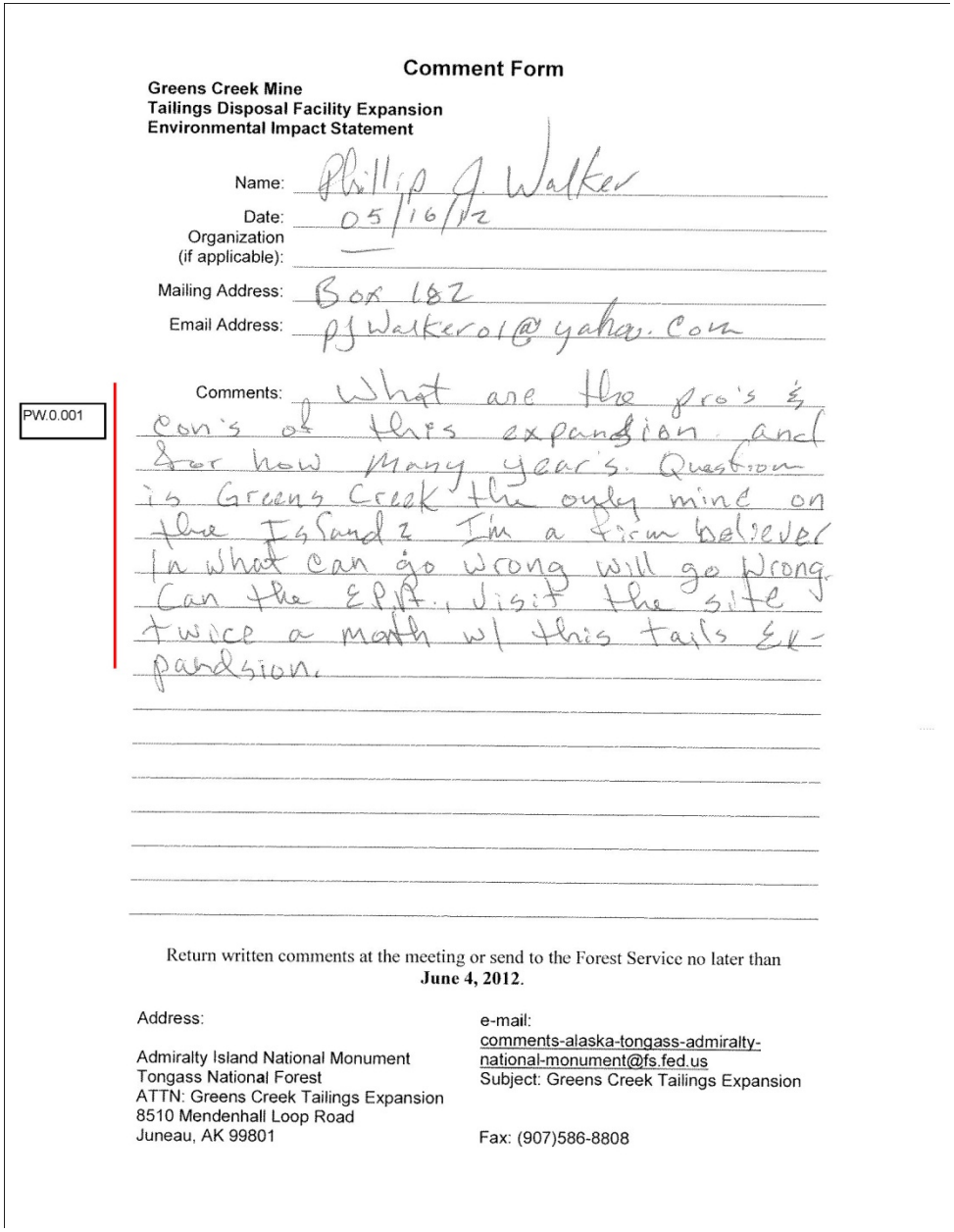
Comment ID: PN.0.014
Components of the GPO are updated as conditions warrant, such as when new information is gained that requires operational changes or when operational changes are proposed by the mine. Following the Record of Decision for this assessment, the GPO will be updated to reflect the selected alternative and any additional requirements or stipulations included in the ROD.

We understand the commenter's concerns related to adaptive management. However, adaptive management is currently the best method available to respond and react to the changes that are inevitable when monitoring environmental systems. When changes are needed (based on monitoring or changes in site conditions or operations), the Forest Service follows its administrative procedures to respond. Most of these procedures allow for public comment. Adaptive management is discussed in detail in Section 2.6.3. The Forest Service does not anticipate the need to apply adaptive management for potential impacts to subsistence, environmental justice, or socioeconomics since we do not anticipate the results of the analysis to change in regard to these resources over time. Water quality is addressed in Section 2.6.3 and we believe that the mitigation requirements identified for soils and vegetation as they relate to the permanent cover will serve as adaptive management related to reclamation of the TDF.

Comment ID: PN.0.015
The proposed new TDF under Alternative C would occupy 15.8 acres, and under Alternative D, 15.5 acres. These footprints are each approximately 0.01% of the 132,719 acre drainage area for Fowler Creek. The effect of capturing runoff and drainage from either of these TDFs would be inconsequential to base or storm flows in Fowler Creek or the amount of water that naturally drains to Young Bay.

Comment ID: PN.0.016
Comment noted.

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Phillip J. Walker
Date: 05/16/12
Organization (if applicable):
Mailing Address: Box 182
Email Address: pjwalker01@yahoo.com

PW.0.001

Comments: What are the pro's & con's of this expansion and for how many years. Question is Greens Creek the only mine on the Island? I'm a firm believer in what can go wrong will go wrong. Can the EPA visit the site twice a month w/ this tails Expansion.

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012**.

Address:

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment ID: PW.0.001
The benefits and effects of the expansion are presented in the FEIS. Greens Creek Mine is the only active mine on Admiralty Island, although there are several other mining claims located outside the Monument. The majority of site inspections are conducted by the Forest Service and State of Alaska; the USEPA does not regularly conduct site inspections.

Comment	*Response*
From: Randy Brand **To:** FS-comments-alaska-tongass-admiralty-national-monument **Subject:** Greens Creek Tailings Expansion **Date:** Thursday, May 31, 2012 2:01:39 PM RB.0.001 I support the Greens Creek Tailings Expansion project. Randy Brand 2975 Van Horn Road Fairbanks, AK 99709	**Comment ID: RB.0.001** Comment noted

Comment	*Response*
RC.0.001 **From:** Rod & Kathi Cleland **To:** FS-comments-alaska-tongass-admiralty-national-monument **Subject:** Greens creek tailings expansion. **Date:** Wednesday, April 25, 2012 10:48:04 AM Hello, I agree that Hecla's plan to expand the existing facility is superior to the other options. Thr tailings disposal plan should be approved. The mine is too important to the local economy to impeede its continuing ability to operate. Rod Cleland	**Comment ID: RC.0.001** Comment noted.

Comment

From: Roger Calloway
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion
Date: Monday, April 30, 2012 4:44:30 PM

To Whom it May Concern;

My Name is L. Roger Calloway Jr., I am Owner and President of Reliable Transfer Corp. in Juneau, Alaska. We are a small business in Juneau and provide employment for 35 people annually. We have been in business since 1914.

RC.1.001

I am in support of Hecla Greens Creek Mining Company tailings facility expansion plan ***Alternative B.*** If Greens Creek is not allowed to expand its tailings facility and it forced to stand down operations it would have a negative impact on my company. The lost of the direct and indirect business activities would cause the decrease of 2 to 4 Full time position at my company. Whereas the approval of Alternative B would support the addition of 1 to 2 Full Time positions.

Sincerely;
L. Roger Calloway Jr.,
President / Owner
Reliable Transfer Corporation
8717 Mallard Street
Juneau, Alaska 99801
Phone: 907-789-1490
Fax: 907-789-1272
Cell Phone: 907-723-2896
"Juneau's Only Locally Owned and Operated Moving & Storage Company"
"Servicing Juneau Alaska and Beyond Since 1914

Response

Comment ID: RC.1.001
Comment noted.

Comment

From: rebachester58@gmail.com
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: destroying salmon streams with Green Creek Mine site
Date: Friday, June 01, 2012 1:53:03 AM

RC.2.001

How can it be possible that we are considering to allow the Green Creek Mine to destroy fish habitat in Tributary Creek? This cannot be allowed to happen. Nor can we allow Alternatives C and D, that call for the destruction of 1,078 feet of Class 1 and 2 habitats in Fowler Creek.

RC.2.002

The Forest Service is relying on studies conducted before 1990. We need to keep our land and subsistance lifestyles alive. What happened to "not causing irrepairable harm"? It is important for our Alaska lifestyle to maintain the continued productivity of all salmon habitats!

RC.2.003

We cannot allow anymore destruction, so please rethink this possible decision to all the continued distruction of the Green Creek Mine to our surrounding Salmon Streams.

Kind regards,

a concerned Alaska resident
Rebecca Chester

Response

Comment ID: RC.2.001
Comment noted. Alternatives C and D were developed in response to scoping comments that identified concerns about impacts to aquatic habitat. Because of the physiographic setting, it was not possible to develop an alternative that would avoid all wetlands and aquatic resources. These alternatives meet the purpose and need while minimizing impacts to wetlands and aquatic resources.

Please note that the DEIS erroneously reported that the alternative TDF site would affect 34 feet of Class I streams. This is not correct; the alternative TDF site would not directly affect (by burial) any Class I streams. This has been corrected in the FEIS.

Comment ID: RC.2.002
The Forest Service has relied on a range of studies conducted over a specific period of time. Prior to using the reports, we evaluated the relevance and value of the data in each one, regardless of when they were drafted. Irreparable harm is addressed as part of the Monument values discussion presented in Section 3.19.

Comment ID: RC.2.003
Comment noted. The Forest Service's decision and the rationale for making that decision are presented in the Record of Decision.

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 2:16 PM
To: Weglinski, Gene; Cox, David
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Tailings Expansion Project

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Rick Fredericksen [mailto:rsfredericksen@gmail.com]
Sent: Monday, June 04, 2012 12:14 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Tailings Expansion Project

RF.0.001

For past twenty-five years, the Greens Creek Mine has contributed to the southeast Alaska economy including high-paying jobs, local purchases of goods and services, and is a major contributor to local tax base. HGCMC is a good steward of the land and has operated the Greens Creek Mine with minimal disturbance to the environment by maintaining a small footprint and using the dry-stack method of tailings disposal. Since its opening back in 1987, the Greens Creek Mine has operated within the Admiralty Island National Monument in accordance with federal, state and local laws and regulations. Congress provided for mining at this site in Section 503 of the Alaska National Interest Lands Conservation Act (ANILCA). One of the original agreements between Greens Creek and the United States of America by and through the USFS calls for facilities to be consolidated to the maximum extent practicable.

I strongly support Greens Creek's proposed tailings facility expansion plan Alternative B:

HGCMC's proposal (Alternative B) provides for a logical expansion of the existing facility where tailings have been placed for nearly a quarter century and abides by the original agreement for the mine's facilities to be consolidated to the maximum extent practicable versus the other action alternatives (Alternatives C and D) that would spread the disturbances, operational and reclamation impacts, and monitoring requirements between two sites separated by over 2 miles. HGCMC's proposal allows for both a southward extension and an upward expansion of the existing facility, which lessen disturbance and closure/reclamation costs versus more acres of disturbance and higher costs for the other action alternatives. Under its proposal, HGCMC will maintain tailings disposal in an engineered, contained facility within a portion of a single watershed (Tributary Creek) versus the other action alternatives that would place tailings in a second facility but in multiple watersheds and create more disturbance. HGCMC's proposal also utilizes existing site support facilities, including the continued use of B Road that has served for tailings delivery since the mine opened versus the need, under the other action alternatives, for a major construction upgrade to approximately 2.5 miles of the A road. And lastly, HGCMC's proposal will have minimal disruption to wildlife versus the other action alternatives. There is an active goshawk nest at the new location under proposed alternatives C and D, and the nest and surrounding habitat for this sensitive species would be impacted if development in this area were to occur. Also, the heavy hauling and

1

Response

Comment ID: RF.0.001
Comment noted.

Comment

increased maintenance over 2.5 miles of the A road necessary for the alternative location would increase impacts to all wildlife in this area.

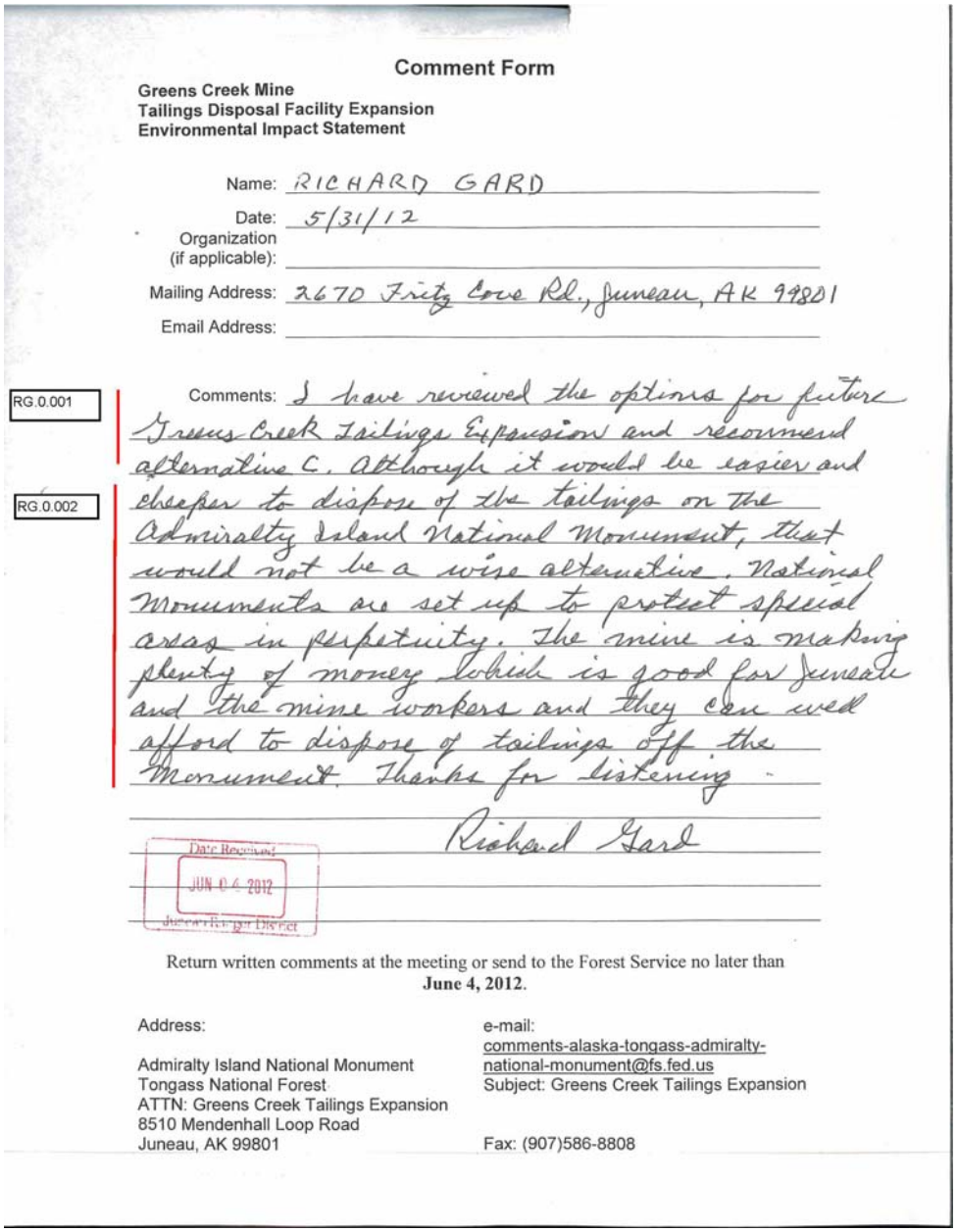
Thank you for the opportunity to comment.

Rick Fredericksen
4164 James Drive
Anchorage, Alaska 99504

2

Response

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: RICHARD GARD

Date: 5/31/12

Organization (if applicable):

Mailing Address: 2670 Fritz Cove Rd., Juneau, AK 99801

Email Address:

RG.0.001 RG.0.002

Comments: I have reviewed the options for future Greens Creek Tailings Expansion and recommend alternative C. Although it would be easier and cheaper to dispose of the tailings on the Admiralty Island National Monument, that would not be a wise alternative. National Monuments are set up to protect special areas in perpetuity. The mine is making plenty of money which is good for Juneau and the mine workers and they can well afford to dispose of tailings off the Monument. Thanks for listening.

Richard Gard

Date Received
JUN 04 2012
Juneau Ranger District

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012**.

Address:

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment ID: RG.0.001
Comment noted.

Comment ID: RG.0.002
Comment noted. The decision about whether to expand tailings storage in the Monument is complex and is discussed specifically in the Record of Decision.

Comment

Steven C. Borell, P.E.
Borell Consulting Services LLC
6420 Rockridge Drive
Anchorage, AK 99516

June 3, 2012

Admiralty Island National Monument – Tongass National Forest
Comments-alaska-tongass-admiralty-national-monument@fs.fed.us
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

RE: Greens Creek Tailings Expansion

Dear Sirs,

SB.0.001 I am writing in support of **Alternative B** for expansion of the tailings facility at the Greens Creek Mine.

SB.0.002 **Alternative B** is the best choice for various reasons. **Alternative B** would simply expand the existing tailings facility in the same location and utilize the current water treatment facilities. This would result in the smallest footprint. It would also confine the footprint to the currently affected drainage. At the same time it would result a single area to be managed and would result in the least impact on wildlife.

SB.0.003 Since the Greens Creek Mine began operating in February of 1989 it has done an excellent job of managing the wide variety of environmental issues found at this mine. This is and has always been a showcase operation. Greens Creek has shown how a major mine with high sulfide ores and the associated acid rock potential can be managed without adverse impacts to the fisheries or to the wildlife. All this while providing the best-paying, highly skilled jobs in all of Southeast Alaska and while paying the most property tax of any entity in the Juneau area.

SB.0.004 I urge that **Alternative B** be selected and that a legally defensible Record of Decision be completed at the earliest possible time so the mine can continue operating uninterrupted.

Sincerely,

Steven C. Borell, P.E.
Principal

Response

Comment ID: SB.0.001
Comment noted.

Comment ID: SB.0.002
Comment noted.

Comment ID: SB.0.003
Comment noted.

Comment ID: SB.0.004
Comment noted.

Comment

FIRST THINGS FIRST
ALASKA FOUNDATION

P.O. Box 240605
Douglas, AK 99824

907.209.1797 phone
907.500.7336 fax
fffoundation.org

First Things First Alaska Foundation is a 501(c)(3) nonprofit organization dedicated to preserving the economic viability and future of Alaska through education

May 31, 2012

Admiralty Island National Monument – Tongass National Forest
8510 Mendenhall Loop Road
Juneau, AK 99801
Attn: Greens Creek Tailings Expansion

RE: Comments on DEIS for GPO of Greens Creek Tailings Facility Expansion

Dear Sir/Madame:

SC.0.001

Please accept the following comments on the DEIS for the Hecla Greens Creek Mining Company Tailings Facility Expansion. First Things First is a non-profit organization dedicated to preserving the economic viability and future of Alaska through education. Natural resource extraction has been and will continue to be the backbone of the Alaskan economy, and in particular that of Southeast Alaska. With the decline of Southeast's timber industry, mining is the one shining light that promises growth of high paying year-round employment. Greens Creek offers employment opportunities for both urban and rural residents. Economic hardship has hit our villages disproportionately hard, and a camp operation such as Greens Creek facilitates village employment to the maximum extent practicable.

SC.0.002

Greens Creek has proven mining can coexist with the wildlife and wilderness values of rural Admiralty Island and Monument. Copious monitoring data have been collected over the past 40 odd years, which document minimal to un-measurable environmental impacts. Thus the cost/benefit of Greens Creek is exemplary. Greens Creek – including its dry stack tailings facility – is a demonstrably viable long-term economic driver, and every reasonable effort should be made to maintain or enhance its economic vitality for the benefit of its employees, Southeast businesses that supply and service the mine, and Southeast communities, including Juneau, which derive sales and property tax from the company and its employees.

SC.0.003

Alternative B best maintains the economic viability of Greens Creek and protects the island and Monument environment. Consolidating impacts in one facility reduces operating costs, enhances project economic vitality and ability to weather metal price fluctuations, reduces long-term environmental impacts and costs, and perpetuates proven infrastructure. Alternative B minimizes impacts

Response

Comment ID: SC.0.001
Comment noted.

Comment ID: SC.0.002
Comment noted.

Comment ID: SC.0.003
Comment noted.

Comment

relative to other action alternatives for; fuel costs and handling, road construction and maintenance, watershed impacts, wildlife habitat impacts, closure impacts, capital expenditures, and operating costs. And Alternative B maximizes impacts – relative to other action alternatives – for employment viability, and project life.

The Forest Service has funded the JEDC mining cluster assessment to help explore means to expand mining sector employment. This laudable objective is consistent with making permitting decisions that support ongoing mining operations at Greens Creek – subject to good land stewardship. Based on the analysis in the DEIS and annual monitoring reports submitted by HGCMC, continuation and expansion of the existing dry stack tailings facility is the logical environmental alternative and should be selected as the environmentally preferred alternative in the FEIS and ROD for issuance of a revised General Plan of Operations.

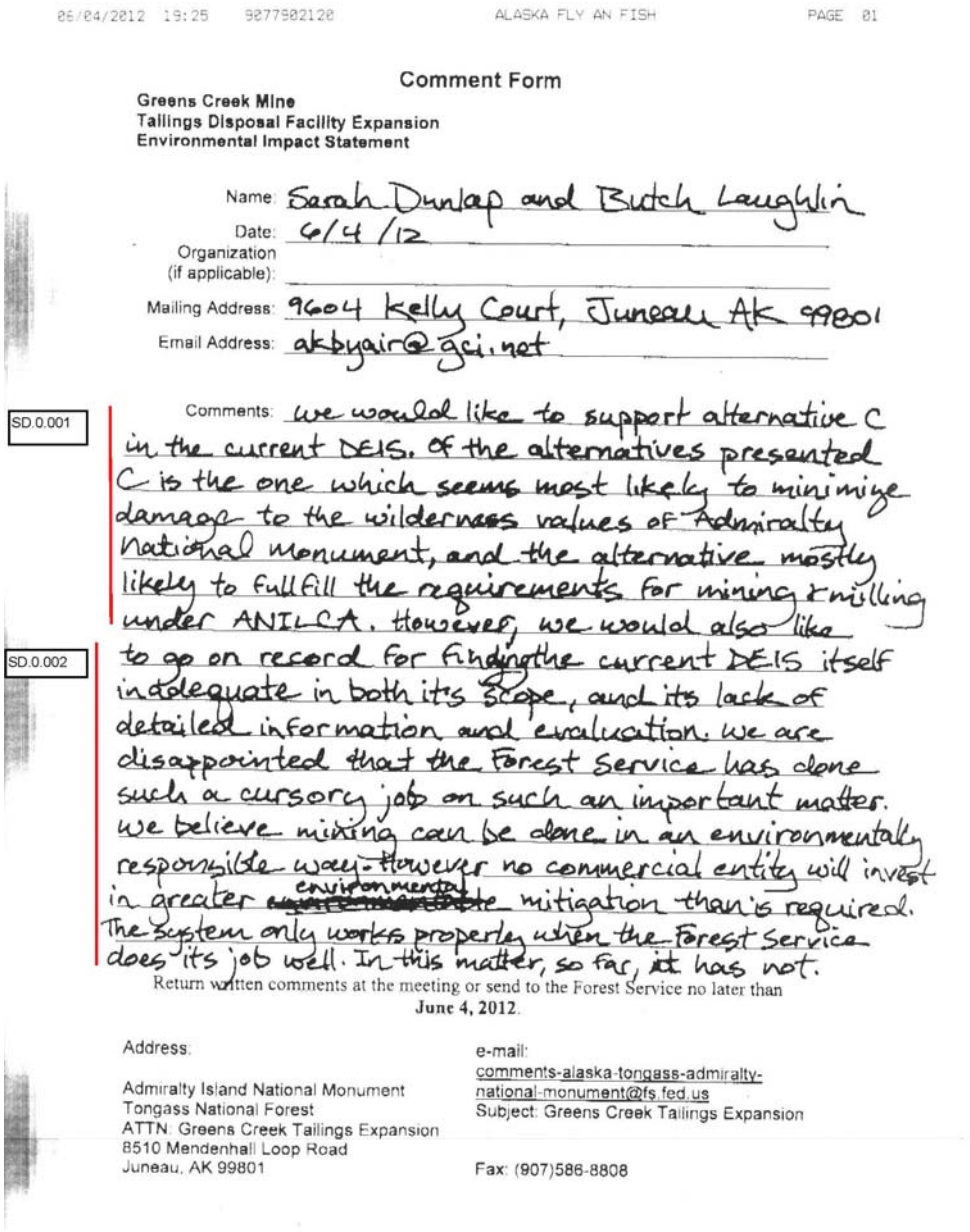
Regards,

Sara Chambers
President

2

Response

Comment



06/04/2012 19:25 9077982120 ALASKA FLY AN FISH PAGE 01

Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Sarah Dunlap and Butch Laughlin
Date: 6/4/12
Organization (if applicable):
Mailing Address: 9604 Kelly Court, Juneau AK 99801
Email Address: akbyair@gci.net

SD.0.001

Comments: we would like to support alternative C in the current DEIS. Of the alternatives presented C is the one which seems most likely to minimize damage to the wilderness values of Admiralty National Monument, and the alternative mostly likely to fullfill the requirements for mining & milling under ANILCA. However, we would also like to go on record for finding the current DEIS itself inadequate in both it's scope, and its lack of detailed information and evaluation. We are disappointed that the Forest Service has done such a cursory job on such an important matter. We believe mining can be done in an environmentally responsible way - however no commercial entity will invest in greater environmental mitigation than is required. The system only works properly when the Forest Service does its job well. In this matter, so far, it has not.

SD.0.002

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012.**

Address:

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

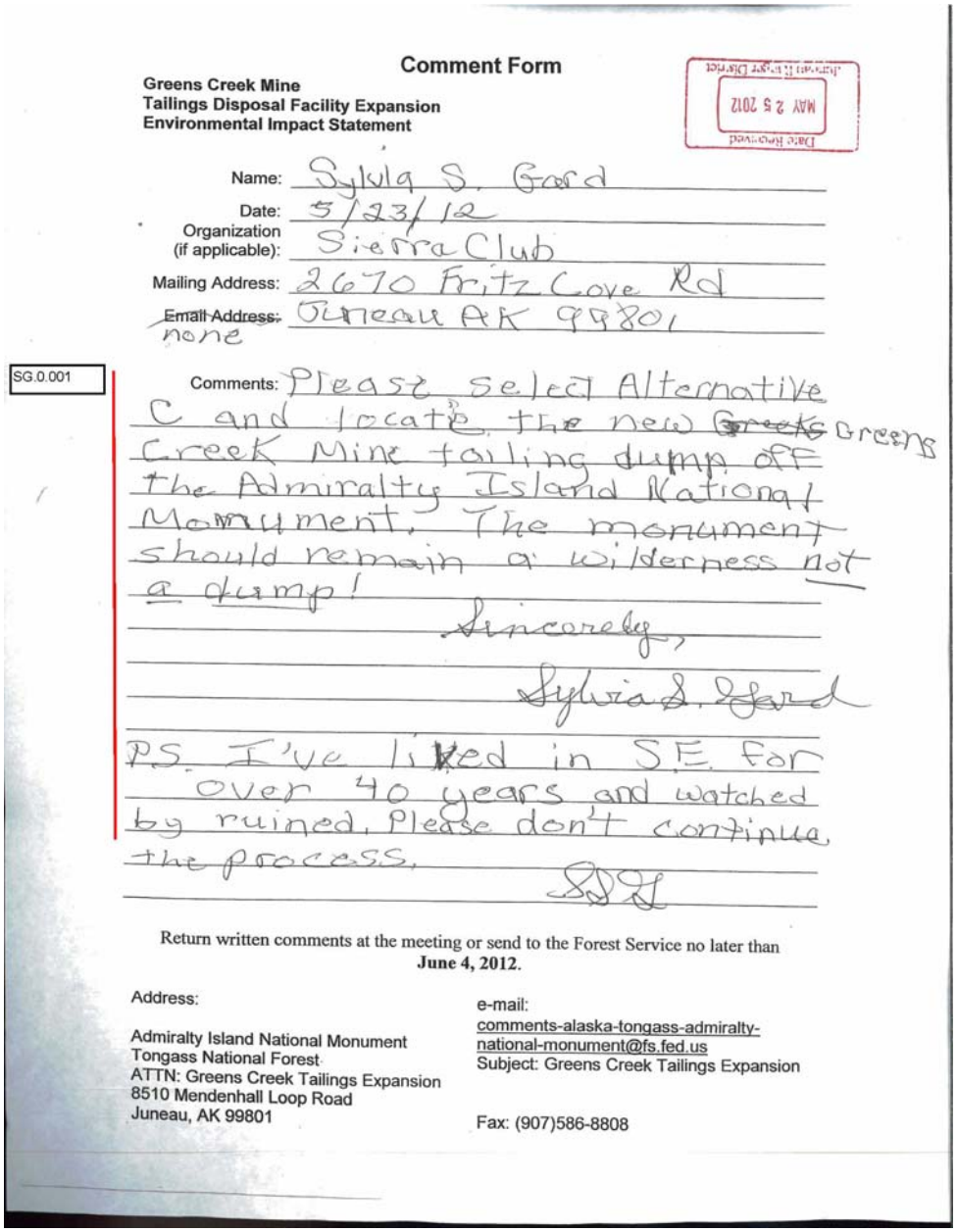
Fax: (907)586-8808

Response

Comment ID: SD.0.001
Comment noted.

Comment ID: SD.0.002
Comment noted. The comments have been included as part of the administrative record. However, we are unable to provide a detailed response to the comment about doing a "cursory job" since no details were provided on what aspects of the analysis are considered cursory. Likewise, we cannot consider changes in how we do our work without specific input on what the public believes we are doing wrong.

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Date Received
MAY 25 2012
Juneau Ranger District

Name: Sylvia S. Gard
Date: 5/23/12
Organization (if applicable): Sierra Club
Mailing Address: 2670 Fritz Cove Rd
Juneau AK 99801
~~Email Address:~~ none

SG.0.001

Comments: Please select Alternative C and locate the new ~~Greeks~~ Greens Creek Mine tailing dump off the Admiralty Island National Monument. The monument should remain a wilderness not a dump!

Sincerely,

Sylvia S. Gard

P.S. I've lived in SE for over 40 years and watched by ruined. Please don't continue the process.

SSG

Return written comments at the meeting or send to the Forest Service no later than **June 4, 2012.**

Address:

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

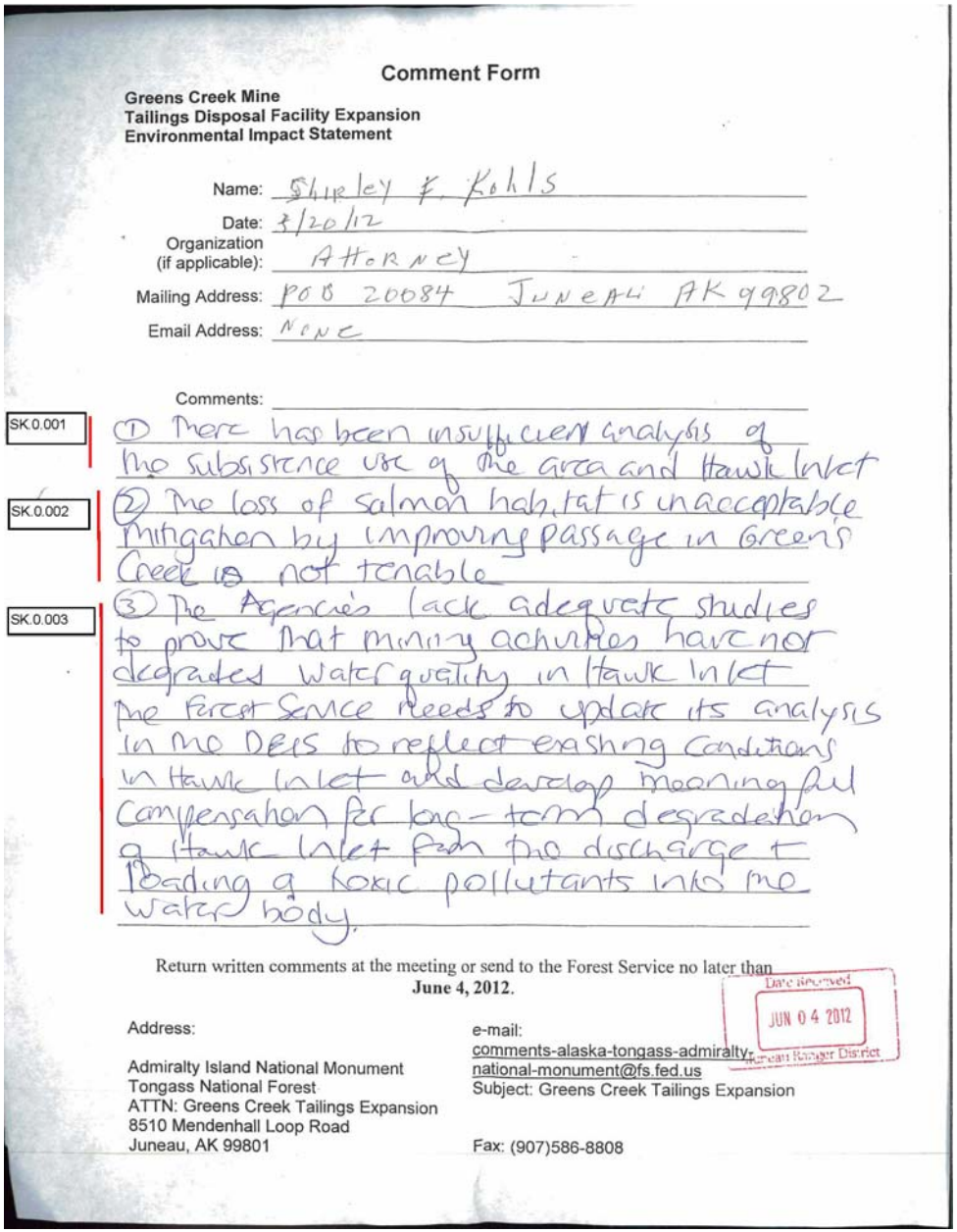
e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment ID: SG.0.001
Comment noted.

Comment



Comment Form

Greens Creek Mine
Tailings Disposal Facility Expansion
Environmental Impact Statement

Name: Shirley F. Kohls
Date: 3/20/12
Organization (if applicable): Attorney
Mailing Address: POB 20084 Juneau AK 99802
Email Address: None

Comments:

SK.0.001 (1) There has been insufficient analysis of the subsistence use of the area and Hawk Inlet

SK.0.002 (2) The loss of salmon habitat is unacceptable Mitigation by improving passage in Greens Creek is not tenable

SK.0.003 (3) The Agencies lack adequate studies to prove that mining activities have not degraded water quality in Hawk Inlet The Forest Service needs to update its analysis in the DEIS to reflect existing conditions in Hawk Inlet and develop meaningful compensation for long-term degradation of Hawk Inlet from the discharge & loading of toxic pollutants into the water body.

Return written comments at the meeting or send to the Forest Service no later than June 4, 2012.

Date Received JUN 04 2012 Stream Ranger District

Address:
Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

e-mail:
comments-alaska-tongass-admiralty-national-monument@fs.fed.us
Subject: Greens Creek Tailings Expansion

Fax: (907)586-8808

Response

Comment ID: SK.0.001
The commenter has not provided the Forest Service with sufficient detail to allow us to determine what aspect of the analysis the commenter believes is insufficient.

Comment ID: SK.0.002
Comment noted. The proposed mitigation for salmon habitat in Greens Creek came about through discussion with biologists with the Forest Service and ADF&G.

Comment ID: SK.0.003
The Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations." For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA.

The Forest Service does not have authority over how ADEC and the USEPA conduct permitting, establish monitoring, or implement mitigation through their respective authorities under the CWA or under State solid waste regulations. Appropriate monitoring programs are established in conjunction with permitting. Currently, water quality and sediment quality are monitored at several locations, and bioassays of resident mussels and sediment worms take place in accordance with the APDES permit (see Section 3.5.2.3).

Comment

Cox, David

From: Iwamoto, Karen -FS <kiwamoto@fs.fed.us> on behalf of FS-comments-alaska-tongass-admiralty-national-monument <comments-alaska-tongass-admiralty-national-monument@fs.fed.us>
Sent: Monday, June 04, 2012 9:01 AM
To: Weglinski, Gene; Cox, David
Cc: Samuelson, Sarah J -FS
Subject: FW: Greens Creek Talings Expansion

First of 5 or 6 comments received in our comments mail-in database

Karen Iwamoto
Land Management Planner
Tongass National Forest
907-747-4230
kiwamoto@fs.fed.us

From: Scott & Pat Hartman [mailto:nomeimporta@gci.net]
Sent: Sunday, June 03, 2012 7:08 PM
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek Talings Expansion

June 3, 2012

We, Scott and Patricia Hartman of Juneau, Alaska submit the following comments regarding the Hecla Greens Creek Tailings Expansion.

SPH.0.001

We have lived in several western states over the last several decades, but have decided to make Juneau and S.E. Alaska our home because of the natural beauty and special character of the region and its people. Our living has been dependent on the natural resources industry for the past 34 years and we are very familiar with the question of benefit vs. impact and how society's view on this question has changed during our lifetime. We believe that with the consumption of natural resources, comes the responsibility of responsibly developing and producing those resources as practical, rather than just exporting the impacts of our consumption as a nation. We also believe in conservation and efficiency in both consumption and production of resources as an important means to best mitigate the overall impact. Hecla Greens Creek has been and can continue to be a responsible domestic producer of mineral products of zinc, silver, gold, and lead contained in items we use every day; but this will require a tailings expansion.

SPH.0.002

Besides the direct economic impact of a good job to us personally and to many others in the region, Greens Creek is an important private sector economic engine and tax payer in Juneau and S.E. Alaska. The type of jobs, compensation, and benefits provided by Hecla Greens Creek characteristic of the natural resources industry and manufacturing are critical to rebuilding and sustaining the economy of our nation and region. There must be a balance between producing something tangible of value vs. services or intellectual property, and there also must be a balance between incomes and benefits that support a healthy middle class.

SPH0.003

We believe that alternative "B" which provides for an incremental expansion of the existing facility will best balance impact with whatever ultimate capacity is required. We believe that alternative "B" would have less overall impact than alternatives "C" or "D", specifically; less disturbance to land and wildlife, less consumption of energy and materials, and less hauling and impact to air during construction, operation, and especially long-term closure. Alternative "B" may preclude long-term pumping; whereas, alternatives "C" or "D" guarantee long-term pumping and associated impacts (disturbance, energy, materials). We recommend alternative "B" be selected in the Record of Decision.

1

Response

Comment ID: SPH.0.001
Comment noted.

Comment ID: SPH.0.002
Comment noted.

Comment ID: SPH.0.003
Comment noted. Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment

Response

Scott Hartman & Patricia Hartman
17060 Island View Drive
Juneau, Alaska 99801

Comment

From: Scott Spickler
To: FS-comments-alaska-tongass-admiralty-national-monument
Subject: Greens Creek/Alternative B
Date: Friday, June 01, 2012 8:42:33 AM

SS.0.001

I would encourage you to expedite the approval of alternative B as the future tailings disposal option for the best long term solution for continued mining operations at Greens Creek Mine.

SS.0.002

I am a 51 year resident of Juneau and business owner for the past 33 years. The jobs that Greens Creek have provided for our region this past 25 plus years has been such a stabilizing and terrific factor that Juneau has largely avoided much of the ups and downs that the rest of the USA has endured due to the slumping economy and declining property values. The wages and benefits to the workforce are great and the trickle down effect of those dollars circulating here is evident in Juneau. The mining careers and training programs that have developed in Juneau over the years have provided many of our born and raised children here an excellent opportunity for high paying jobs and home ownership.

SS.0.003

The Greens Creek employees and management have proven to be great neighbors and contributors for SE Alaska. I have been to the mine site and came away totally impressed with all the environmental safeguards in place, not to mention the fact that worker safety is paramount in their daily activities.

When you add up the total square miles of the mine's proposed expansion plans and compare that with the entire mine operation to the total square miles of Admiralty Island, it has to be a very minimal amount of space temporarily impacted by Greens Creek....the benefits of this type of responsible resource development is a model of how industry can co-exist in our region, without detriment to the environment.

Thank you,

Scott and Sandy Spickler
10754 Horizon Dr.
Juneau, AK.
99801

907-789-3780

Response

Comment ID: SS.0.001
Comment noted.

Comment ID: SS.0.002
Comment noted.

Comment ID: SS.0.003
Comment noted.

Comment

Response

STATE OF ALASKA
DEPARTMENT OF NATURAL RESOURCES
OFFICE OF PROJECT MANAGEMENT AND PERMITTING

SEAN PARNELL, GOVERNOR

550 WEST 7TH AVENUE, SUITE 920
ANCHORAGE, ALASKA 99501
PHONE: (907) 269-0880
FAX: (907) 269-8930

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801
VIA EMAIL

June 19, 2012

To: Sarah Samuelson, USFS Interdisciplinary Team Leader
Forrest Cole, USFS Tongass Forest Supervisor

The State of Alaska, through an Memorandum of Understanding (MOU) with the US Forest Service (USFS), has participated as a cooperating agency on the Hecla Greens Creek Mine ("the mine" or "Hecla") Tailings Disposal Facility Expansion Draft Environmental Impact Statement (DEIS) released in April 2012. The state resource agencies submitted comments and technical information to the USFS and met with the USFS, its contractor, and other cooperating agencies during the development of the DEIS.

These comments are supplemental to the cooperating agency comments submitted prior to release of the DEIS. Along with additional technical comments on the draft, the State of Alaska's comments on the tailings expansion alternatives are included.

The Alaska Department of Environmental Conservation (ADEC) issues a state waste management permit that authorizes placement of tailings and waste rock at the mine and requires monitoring of groundwater at the facility. ADEC has particular interest in long-term water quality at the site. ADEC also issues certifications under the Clean Water Act that ensure that any new wetlands disturbance does not impair water quality. The Alaska Department of Fish and Game (ADF&G) is directed to protect fish habitat and aquatic resources, especially anadromous fish such as salmon. The Alaska Department of Natural Resources (ADNR) is the state's lead agency for mining. ADNR approves reclamation and closure and makes certain that financial assurances to accomplish the approved plans are in place. ADNR must approve reclamation plans regardless of land ownership, and thus works cooperatively with the USFS on the Greens Creek mine plan approvals.

"To responsibly develop Alaska's resources by making them available for maximum use and benefit consistent with the public interest."

Comment

The State of Alaska ("the State") has reviewed the alternatives proposed in the DEIS. The DEIS analyzes a no-action alternative, Alternative A, and four action alternatives to continue mining for 30-50 years; Alternative B, expansion of the existing pile into the Tributary Creek drainage and Admiralty National Monument, mitigated Alterative B which would provide less impact to Tributatry Creek and the Monument but would require expansion into Cannery Creek, and two remote disposal sites off the "A" road, Alternatives C and D.

Under Alternative A, tailings disposal would continue at the approved TDF until the facility reached capacity, expected in 2014. Alternative B affords expansion of the existing TDF, similar in footprint to the wet TDF approved in 1983 but never developed, which would fill about 4,000 feet of Class I and II streams in Tributary Creek. Hecla's existing fish pass in Greens Creek, originally mitigation for the undeveloped wet TDF, would mitigate the loss of fish habitat in Tributary Creek.

SS.1.001

Mitigated Alternative B would avoid high value wetlands at the headwaters of Tributary Creek by moving reclamation material storage areas to a site north of the camp and port facilities and placing some of the tailings into the Cannery Creek watershed. Alternatives C and D both include development of a second TDF, which would require maintenance and treatment in perpetuity, and expand the overall footprint of the mine. The new TDF would be located north on the A Road, in watersheds draining to the north end of Hawk Inlet and to Young Bay. The fish pass would also serve as mitigation for impacts to Class II streams documented at the proposed new TDF site.

Tributary Creek is included in ADF&G's *Catalog of Waters Important for Spawning, Rearing, or Migration of Anadromous Fishes* and provides habitat for coho salmon *Oncorhynchus kisutch*, pink salmon *O. gorbuscha*, and Dolly Varden char *Salvelinus malma* (Johnson and Blanche 2011). Cutthroat trout *O. clark*i, rainbow trout *O. mykiss*, and sculpin *Cottus* sp. also have been observed in the creek (Kanouse 2012).

Discussion of alternatives:

The National Environmental Policy Act (NEPA) requires the USFS, as the lead federal agency, to identify both an environmentally preferable alternative and a preferred alternative in a Record of Decision (ROD) issued after the public comment period.

SS.1.002

Aside from the No Action alternative, which would allow no further expansion of the mine, the State considers either Alternative B or mitigated Alternative B as having the least potential for environmental impacts given proper planning,

Response

Comment ID: SS.1.001
Comment noted.

Comment ID: SS.1.002
Comment noted.

Comment

engineering, construction, operation, closure and monitoring of the expansion site.

SS.1.003

Both Alternatives C and D require construction of a new Tailings Disposal Facility (TDF) outside of the Monument. The state appreciates the USFS consideration of resource and other values associated with managing the Admiralty National Monument (ANM) within the Tongass National Forest. A 1994 land exchange agreement with the mine and the USFS encouraged continued consolidation of facilities and operations associated with the mine to the maximum extent possible within the Monument designation established through the Alaska National Interest Lands Conservation Act (ANILCA) in 1980.

SS.1.004

Least to greatest new disturbance are with Mitigated Alternative B at 136.3 acres (Table 2.6-1). Alternative B at142.8 acres, Alternative C at 156.8 acres, and Alternative D at177.9 acres (Table ES-1). For Alternatives B and Mitigated B, environmental impact would be limited to a single receiving environment, whereas for Alternatives C and D there would be multiple sites of disturbance. Additionally, for Alternatives C and D, the "A" road would require upgrades and widening for haul truck traffic. Impacts from hauling along the A road route could include increased dust and the potential for more impacts at stream crossings and wetlands.

SS.1.005

The mitigated version of Alternative B is quite similar to the original "Alternative B Final". The mitigated version moves some of the tailings from the south end of the TDF and moves then into the northeast corner.

Mitigated Alternative B has both positive and negative consequences. It moves some tailings away from the headwaters of Tributary Creek, and affects less area of that watershed. However, it moves those tailings into the Cannery Creek watershed. The newly proposed area appears to have steeper slopes and will require more contact water to be pumped a longer distance for treatment and discharge.

SS.1.006

While both the Alternative B Final, and Mitigated Alternative B have potential advantages over Alternatives C and D, the original Alternative B (Alternative B Final) affects less acreage than Alternatives C and D, and has fewer long-term stability and treatment issues. Alternatives C and D both require that tailings are placed into steep areas that have may have stability issues. A slope failure in this area could cause deposition of tailings into, or the blockage of nearby streams. The disposal of tailings at an area away from the current TDF also necessitates contact water to be pumped back to the current facility for treatment and/or discharge. The extra pumps, pipes and power that are needed to transfer the water back to the treatment/discharge point provides an

Response

Comment ID: SS.1.003
Comment noted.

Comment ID: SS.1.004
Comment noted.

Comment ID: SS.1.005
Comment noted. Estimated maximum fugitive dust emissions (PM_{10}) for each alternative in Table 3.2-4:
Alternative A: 159 tons per year
Alternative B: 192 tons per year
Alternative C: 259 tons per year
Alternative D: 260 tons per year

Under alternatives C and D, upgrades to the A road would impact an additional 13.8 acres of wetlands.

Comment ID: SS.1.006
Comment noted.

Comment ID: SS.1.007
NEPA does not require an assessment of worst-case scenarios (e.g., failures). The Forest Service does not pursue permitting actions under the assumption that a facility would be improperly designed, built, operated, or closed. The design of the TDF does not involve new or unproven technology; therefore, the Forest Service would not expect a failure of the bottom liner or collection system to be reasonably foreseeable. Likewise, the soil cover system will need to be tested as part of the mitigation measures; based on the ongoing cover studies at Site 23 and the mitigation to be required to demonstrate performance of the cover, a failure of that system is not reasonably foreseeable. A failure of run-on diversion is reasonably foreseeable since it could occur as a result of a storm in excess of the design capacity of the facility. These cases are addressed as part of the APDES permit and would need to be remedied as soon as possible after the event.

This type of failure is considered in the analysis of water resources (Section 3.5) and aquatic resources (Section 3.7).

Comment

SS.1.006 cont

increased potential for failure of those elements of the design and operation and possible impacts to wetlands along the pipeline transportation route. The most stable placement of tailings would be on a flat surface. ADEC regulations do allow for an application for a waiver for monofills constructed on slopes greater than 10% grade (see 18 AAC 60.410).

Additional technical comments:

SS.1.007

The document could be strengthened by discussing potential environmental risks of each Alternative in the event of failures. Failures could result from improper design, construction, operation and closure of facilities. These failures could include failures of containment, the bottom liner, the leachate collection system, run-on diversions, or soil cover systems.

SS.1.008

The Department of Environmental Conservation (ADEC) has highlighted in previous comments to the USFS that there are net disadvantages to planning, designing, constructing, operating and closing multiple landfills, and those disadvantages extend to monofills of tailings as well. Alternatives C and D would require multiple landfills. Not all of these factors are examined in a NEPA review.

SS.1.009

However, ADEC has outlined the following as disadvantages to multiple facilities: duplication of effort for the company and the regulating agencies; increased operational costs; increased monitoring and monitoring costs; increased closure costs; potential contamination into multiple receiving areas; and increased effort for long-term closure care, monitoring, water treatment and maintenance. These disadvantages could tie in to long-term environmental effects that are described in the DEIS.

SS.1.010

ADEC understands that most of the issues described above are not typically addressed in a NEPA analysis that focuses on the environmental effects of a project and that the USFS does not directly include cost considerations into the environmental review process. These comments are made to emphasize that it is environmentally more acceptable to have one large managed landfill than several small ones. There could, however, be direct and indirect environmental impacts related to the costs associated with multiple landfills/disposal sites.

Section-specific comments:

SS.1.011

Summary, page vi, Table ES-1 . To better comprehend overall impacts post-closure for the acreage(s) covered by tailings alone it would be helpful to add a line that shows total post-closure disturbance after reclamation for all tailings for the mine project. Similarly it would be helpful to add a line showing the

Response

Comment ID: SS.1.008
Comment noted. The Forest Service is aware that the State has concerns with multiple disposal facilities beyond those discussed in the EIS. The EIS focuses on the environmental effects related to the siting, construction, operation, and closure of the tailings facility expansion.

Comment ID: SS.1.009
Comment noted. We believe that the EIS presents some of these issues, but acknowledge that the State has a different perspective as well as different statutes and standards that need to be considered. The Record of Decision provides the rationale involved in identifying the selected alternative.

Comment ID: SS.1.010
While the NEPA decision does not necessarily consider nuances in costs (we must consider measures that could be cost prohibitive), the document has addressed the issue of multiple locations versus a single location in terms of environmental effects.

Comment ID: SS.1.011
Table ES-1 has a line item showing new tailings disturbance by alternative:
Alternative A: 0
Alternative B: 54.3 acres
Mitigated Alternative B: 43.5 acres
Alternative C: 101.7 acres
Alternative D: 103.1 acres

Reclamation and closure are discussed in Section 2.4-9:Upon permanent cessation of operations, an engineered soil cover will be placed over the TDF, with the overall purpose to stabilize the disturbed area and ensure long-term protection of land and water resources in the area and to obtain near-natural conditions.

Total new wetlands removed by alternative can be found in Section 3.10, Wetlands, tables 3.10-4, 3.10-6, 3.10-7, and 3.10-8:
Alternative A:0
Alternative B: 89 acres
Mitigated Alternative B: 70 acres
Alternative C: 128 acres
Alternative D: 139 acres

Comment

SS.1.011 cont

total wetlands removed from productive use after reclamation. Alternative B differs from C and D in that the Alternative B enables the existing TDF to be constructed considerably higher as well as extended laterally, resulting in an overall smaller footprint for tailings disposal. This table could better reflect tailings already disposed of at the existing TDF and what would be added through continued operations.

SS.1.012

Summary, page viii, Table ES-2. Risk of chemical or mining product spill. For Alternatives C and D, there may be greater potential for tailings trucks to spill product due to longer haul distances and the need to cross additional waterbodies and wetlands. Assuming the pipeline carrying tailings seepage water from the tailings disposal areas to the treatment plant is laid adjacent to the road, and based on historic damage to pipelines adjacent to the B-road and associated spills, a new pipeline from Alternatives C and D would provide the potential for additional spills to surface waters and wetlands. The existing pipeline from the mill to the treatment plant does not have secondary containment and leaks have occurred due to punctures from graders. New pipelines in Alternatives C and D could have similar risks.

SS.1.013

Summary, page x, Table ES-2: Scenic resources. Visual impacts could be greater with the additional height to the existing tailings facility under Alternative B.

SS.1.014

Section 1.8.2, page 1-14: Pursuant to Alaska Statute 16.05.841 and 16.05.871, a fish habitat permit will be required for expansion of the TDF for any of the alternatives selected. Please include this permit in the list of permits and decisions required.

SS.1.015

Section 2.6.5, page 2-41: ADF&G requires quarterly inspections of the fish pass, not annually as described in Table 2.6-3.

SS.1.016

Section 3-4, page 3-41: The freshwater monitoring program plan (Appendix 1 of the mine General Plan of Operations) states that the hardness of the surface water is 37 mg/L as $CaCO_3$, not 46 mg/L. There should be data to show why 46 mg/L (stated as the long-term average hardness) can be used for Tributary Creek in order to set water quality standards for metals at this hardness.

SS.1.017

Section 3.4.2, page 3-24: All but the first four values listed in the third column, percent by weight, appear to have one extra decimal place.

SS.1.018

Figure 3.5.3, page 3-48: Water balance model. Since Wet Well A collects tailings drainage water, the diagram gives a false impression that the average flow from the tailings is 12 gallons per minute (gpm), whereas it should be 29

Response

Comment ID: SS.1.012
Comment noted. The possibility that the pipeline between the new TDF and the existing treatment plant could be ruptured is addressed in sections 3.7.3.4 and 3.7.3.5 (Aquatic Resources—Freshwater, alternatives C and D, respectively). The information was added to Section 3.5, Water Resources.

Comment ID: SS.1.013
Comment noted.

Comment ID: SS.1.014
The requested information has been added to Section 1.8.4, State and Local Governments.

Comment ID: SS.1.015
Text revised per comment.

Comment ID: SS.1.016
The FWMP was established using the 25th percentile of sitewide hardness values. Besides being used to establish a conservative regulatory value, this low value was also used to calculate Method Limits (ML) and Method Detection Limits (MDL) for analytical quality control objectives for the program (i.e., ML = 0.9*AWQS and MDL = ML/3.18). This lower hardness value assured that analytical detection goals in the Quality Assurance Program Plan were established that were sensitive enough for comparison to the water quality standards.

While the Forest Service understands that the hardness value used is always arguable, the standards presented in the EIS are not used to establish regulatory criteria. For the purposes of the EIS, an average hardness of 46 mg/L for Tributary Creek was used to show how hardness-based metal criteria are calculated and for data comparison purposes. Tributary Creek was chosen because it is an important stream in the impacts analysis.

Comment ID: SS.1.017
Edit made per comment: Extra decimal places removed.

Comment ID: SS.1.018
Figure 3.5-3 was developed from HGCMC's 2010 Site Water Balance report, prepared by EDE. The purpose of the figure was primarily to support the discussion of sitewide water management in

Comment

SS.1.018 cont

gpm. Either the wet well should be shown as located within the tailings facility or it should be called "Tailings Wet Well A". The water balance could be clarified to show whether all underdrain water goes to Wet Well A, and if so, what would be the resulting flow or range of flows. The flows for the existing facility should concur with those determined from the percolation rates and acreages in Hecla's document ""GCM Stage III Tailings Expansion Drainage Geochem Final 8-22-11.pdf" by Petros Consulting Inc., dated August 22, 2011.

SS.1.019

Section 3.5.3.1, page 3-52. APDES discharge. This section references an Alaska Pollutant Discharge Elimination System (APDES) permit not yet in effect for the discharge of process water to Hawk Inlet. The permit finalized by ADEC was remanded for changes during the public appeals period for the APDES permit. The Environmental Protection Agency (EPA) National Pollutant Discharge Elimination System (NPDES) permit, effective July 2005 before the transfer of those permits to the State of Alaska, is still in effect. The discharge limits are the same in both permits, but the flow rates in Table 3.5.6 differ. While this may factor into long-term water quality and quantity predictions and management, the industrial discharge from the mill is less a factor in evaluating the tailings expansion than are water quality and quantity factors at the site of the selected tailings disposal alternative. Note that the final APDES permit could have conditions different from both the EPA NPDES and the permit previously issued by ADEC.

SS.1.020

Section 3.5.3.1, pages 3-54 to 3-57. Tables: ADEC would not consider the facility "closed" if the discharge does not meet Alaska water quality standards. Rather than say "closure", use the term "termination", or "termination of mining".

SS.1.021

Section 3.5.3.3 , page 3-59: Effects of Alternative B. This section could include a discussion of the ultimate fate of water that drains within the tailings pile and whether it would be possible to discharge water by gravity to a passive treatment system then to the diffuser in Hawk Inlet. This is one of the possible long-term disposal options for contact water once active pumping and water treatment cease.

SS.1.022

Section 3.6.2, pages 3-68, 3-69, 3-72 and 3-73. Tables 3.6-1, 3.6.2, 3.6.3 and 3.6.4: A footnote stating that the Alaska water quality standards are hardness dependent for some metals and that a default hardness of 25 mg/L as $CaCO_3$ is used.

SS.1.023

Section 3.5.2, pages 3-43–3-45: Please provide the dates data were collected at each site for the surface water quality data presented in Table 3.5-3. It is the

Response

Sections 3.5.3.1 and 3.5.3.2 rather than to present a detailed water balance for the TDF. The EDE report used estimates to determine drainage in the TDF from 2003 that are different than the observed data used by Petros (2011). The figure has been removed based on this and other comments in order to avoid confusion.

Comment ID: SS.1.019
The EIS has been modified throughout to reflect that ADEC stayed the effective date of reissuance of the APDES permit (AK0043206) and administratively extended the 2005 NPDES permit conditions until the permit is reissued.

Comment ID: SS.1.020
Comment noted. The EIS defines closure as "the final stage of mining, which involves closing all mine openings, regrading and reclaiming disturbed areas." We are satisfied with this definition for closure as it is used throughout the document.

Comment ID: SS.1.021
Statements indicating discharge without treatment have been eliminated from all alternatives. The Forest Service does not view the evaluation of water treatment technologies or potential discharge scenarios as consequential to this analysis since both currently are and will continue to be conducted within regulatory standards (i.e., protective of beneficial uses) as managed by ADEC and USEPA.

Identifying passive treatment as a potential mechanism would be presumptive without treatability studies being conducted to evaluate effectiveness and to determine a design for a system. If water quality at closure or some time after closure is better than current predictions, the method of control, treatment, and discharge, as well as the outfall location, would be evaluated as a part of future APDES permitting requirements.

Comment ID: SS.1.022
For consistency, the water quality standards for hardness-based metals in this section were made consistent with the standards presented in Section 3.5. Please see the response to Comment SS.1.016.

A footnote was added to these tables explaining the hardness used.

Comment

State's understanding that the Lower Tributary site was sampled earlier in mine life, whereas sampling at the Upper Tributary site began more recently.

SS.1.024

Section 3.6.3.3, page 3-76: Paragraph 2 refers to estimates (from Condon 2011) of drainage from the post-closure TDF to be between 107 and 163 gpm. The water balance does not allow an easy comparison with these numbers. By deduction it would appear the flow rate for tailings seepage water and upwelling water would be the underdrain water at 12 gpm, the Wet Well A water at 17 gpm and the Pit 5/East & West Ditch water at (192-28) gpm for a total of 164 gpm. This is for the existing tailings area of 62 acres. The tailings area in year 2062 for Alternate B would be the existing 62 acres per the permitted acreage in the 2003 Waste management permit, plus the 64.2 acre expansion (Table 2.3-1), for a total area of 126.2 acres. The facility doubles in size, however the seepage flow does not increase substantially. A better explanation of the various flows and flow estimates would be useful, as would a water balance for each tailings facility.

SS.1.025

Section 3.7.2.1, page 3-86–3-89: The long-term aquatic studies dataset for Greens Creek Mine is occasionally reviewed to ensure accuracy. Errors are corrected and reported whenever they are found. The most recent technical report (Kanouse 2012) presents the current dataset and should be used to analyze data from previous years.

SS.1.026

Benthic macroinvertebrate density is measured by the number of insects per square meter of substrate, not number of insects per cubic meter of water. Also, the percentage of *Ephemeroptera*, *Plecoptera*, and *Trichoptera* is not compared against the percentage of *Chironomidae*, those percentages are presented separately and compared together for each sample site.

SS.1.027

Much of the discussion on benthic macroinvertebrates focuses on comparing results from samples collected in 2009 with results from previous years. It would be best to present trend data for each site in the analysis, rather than comparing data from one year against previous years. Additional data was collected in 2010 and 2011 and should be included in the analysis as well.

SS.1.028

High flows may scour the streambed and reduce benthic macroinvertebrate taxa richness within a few weeks after the high flow event. However the general statement that lower taxa richness in samples from Greens Creek sites is attributable to greater flows in Greens Creek, is incorrect. In reviewing the 2001-2011 dataset, more taxa were observed in Greens Creek samples than Tributary Creek samples in seven of the eleven years (2001-2002, 2004, 2007-2008, and 2010-2011) when flow was moderate to high three weeks prior to sampling.

Response

Comment ID: SS.1.023
Comment noted. The purpose of the table is to help present baseline conditions for the site in as simple a manner as possible. The dates for sampling at all the stations vary. The dates were not inserted because the Forest Service feels that it complicates the table further without adding to the outcome of the analysis.

Comment ID: SS.1.024
Comment noted. Please see the response to Comment SS.1.018.

A more detailed explanation of how water flows through the pile, including the discharges at the facility boundary (i.e., in the wet wells) is presented in more detail in Condon (2011). The commenter (or reader) is referred to that report. In addition, the Forest Service will require HGCMC to update the TDF water quality model in conjunction with required environmental audits. The flow calculations could be evaluated further at that time.

Comment ID: SS.1.025
The FEIS has been updated to include information from Kanouse 2012.

Comment ID: SS.1.026
Text revised per comment.

Comment ID: SS.1.027
The discussion of benthic macroinvertebrates in Section 3.7.2.1 was revised. Data were added and differences among years relative to significance were noted.

Comment ID: SS.1.028
The reference to flow in Greens Creek was removed.

Comment

SS.1.029 Methods for monitoring whole body metals concentrations include only sampling 2-3 year old juvenile Dolly Varden char, in an attempt to sample only resident fish and avoid sampling anadromous Dolly Varden char that may be present in Tributary Creek. Adult Dolly Varden char are not sampled. Please clarify this in the narrative.

SS.1.030 Juvenile fish populations are estimated using a modification of a depletion minnow trapping method developed by the USFS (Bryant 2000). Sampling methods presented under the "Fish Monitoring" section leads the reader to believe a catch-per-unit-effort trapping method is used, which is incorrect.

SS.1.031 Comparison of the juvenile Dolly Varden char density data includes both 2009 and 2010 data. In writing the report summarizing data collected in 2010, ADF&G found an error made in calculating the 2009 Dolly Varden char density at Site 48 the previous year. Densities of juvenile Dolly Varden char at sites 48 and 54 were equal (0.36 fish/m^2) in 2009. Therefore, the statements regarding 2009 fish densities compared to average forest values are incorrect.

SS.1.032 When comparing Dolly Varden char densities between Tributary Creek and Greens Creek sample sites, it is important to include in the analysis that those systems are geomorphically different and each support different aquatic species, including fish, which directly influence juvenile Dolly Varden char populations.

SS.1.033 Section 3.7.3.1, page 3-97: ADF&G issued Fish Habitat Permit FH11-I-0123 to Hecla Greens Creek Mining Company on March 22, 2012 authorizing repair and maintenance of the fish pass in perpetuity. Success of the fish pass will be documented by juvenile coho salmon captured at Site 54 during the annual biomonitoring sampling. If juvenile coho salmon are not captured within three years after fish pass repair, Hecla will be required to investigate adult coho salmon passage through the fish pass.

SS.1.034 Section 3.7.3.3, page 3-100: Monitoring results suggest mine operations have not adversely affected aquatic life since monitoring began in 2001, not since mining began as the first sentence presumes.

Response

Comment ID: SS.1.029
Text revised per comment. Added "Juvenile Dolly Varden (2–3 years old) are used for the sampling to ensure metal concentrations are based on resident fish populations."

Comment ID: SS.1.030
Text was revised for clarity.

Comment ID: SS.1.031
Text revised per comment. The reference to Tongass National Forest densities has been removed. More recent information from 2011 has been added.

Comment ID: SS.1.032
Text has been added to section 3.7.2.1 to note the influence of stream geomorphology on aquatic life.

Comment ID: SS.1.034
Text revised per comment. The sentence was revised to "Monitoring data show that mine operations have not affected aquatic organisms, including periphyton, benthic macroinvertebrates, or fish, since monitoring began in 2001."

Comment

References Cited:

Alaska National Interest Lands Conservation Act, 1980. Public Law 96.487.

Bryant, M.D. 2000. Estimating fish populations by removal methods with minnow traps in Southeast Alaska streams. North American Journal of Fisheries Management 20:923–930.

Johnson, J. and P. Blanche. 2011. Catalog of waters important for spawning, rearing, or migration of anadromous fishes–Southeast Region, effective June 1, 2011. Special Publication No. 11-06. Alaska Department of Fish and Game, Anchorage, Alaska.

Kanouse, K.M. 2012. Aquatic biomonitoring at Greens Creek Mine, 2011. Technical Report 12-03. Alaska Department of Fish and Game, Division of Habitat, Douglas, Alaska.

USFS, 1994. Agreement between Kennecott Greens Creek Mining Company and USDA Forest Service . December 14, 1994.

Please do not hesitate to contact me at 907.269.0880 or sharmon.stambaugh@alaska.gov if there are any questions or concerns regarding these comments.

Sincerely,

Sharmon M. Stambaugh
Large Project Coordinator
Office of Project Management and Permitting

cc. (VIA EMAIL)

Joe Manning (USFS/Minerals)
Brent Martellaro, (DNR/DMLW/Mining)
David Wilfong (DNR/DMLW/Mining)
Ted Deats (DNR/MLW/Water)
Kate Kanouse (DF&G/Habitat)
Kenwyn George (DEC/Water)
Ed Emswiler (DEC/Solid Waste)
Tom Crafford (DNR, Director, OPMP)
Sue Magee (DNR/OPMP/ANILCA coordination)
Kyle Moselle (DNR/OPMP/Project coordination)

Response

Comment

Southeast Conference

May 25, 2012

Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

RE: "Greens Creek Tailings Expansion"

Dear Ms. Firstencel,

SW.0.001 Southeast Conference would like to express support for the Hecla Greens Creek Mine Tailings Proposed Expansion (EIS Alternative B). The EIS that has been released details Alternative B, the plan for storing future tailings, expanding the existing facility. Approval of Alternative B will allow the tailings to be stored in an area that already serves as a storage area for past tailings, thus utilizing one storage area as opposed to multiple storage locations.

Southeast Conference is a non-profit membership organization that works to advance the collective interests of the people, communities, and businesses of Southeast Alaska. Members include municipalities, native corporations and village councils, regional and local businesses, civic organizations and individuals from throughout the region. We are the Alaska Regional Development Organization (ARDOR), and the Federal Economic Development District (EDD) for the region. Each of these designations requires Southeast Conference to take an active role in regional resource management and economic development planning.

SW.0.002 This proposed mine tailings expansion will allow for consolidation, which will lessen the reclamation costs and total impact on the area as opposed to using another method. The mine has expended significant efforts in researching other alternatives to store the mine tailings and believes this method titled Alternative B is the best method in which to do so.

SW.0.003 The Greens Creek Mine promotes core values that will allow Southeast Alaska to grow positively. As the project continues in the coming years, it will provide numerous job opportunities for our children. These jobs will be near Juneau so the workers will not be far from home. As well as giving local people the option to stay in their hometown and raise a family, the resources yielded from this mine can be used while responsibly maintaining the integrity of the area. Therefore, we believe that the efforts of the Greens Creek Mine are valuable to support.

P.O. Box 21989 612 W. Willoughby Avenue, Suite B, Juneau Alaska 99802
(907) 523-4351 (907) 463-5670 Fax shellyw@seconference.org
www.seconference.org

~ 1 ~

Response

Comment ID: SW.0.001
Comment noted. The Forest Service's selected alternative and the rationale for the selection are presented in the Record of Decision. The USACE will issue its own Record of Decision as well.

Comment ID: SW.0.002
Comment noted.

Comment ID: SW.0.003
Comment noted. Socioeconomic effects of the mine are discussed in Section 3.18, Socioeconomics.

Comment

Southeast Conference

SW.0.004

Hecla has made efforts to follow safety precautions and to continually maintain the resources made available in a responsible manner. Our goal is to support economic development projects that promote strong economies, healthy communities, and a quality environment for Southeast Alaska. We believe that the efforts of the mine are valuable to our region. The Greens Creek Mine promotes core values that contribute to the growth of Southeast Alaska. For these reasons we support the Greens Creek Tailings Expansion Alternative B proposed project.

Sincerely,

Shelly Wright

Shelly Wright
Executive Director

Cc:
Greens Creek Mine
&
U.S. Army Corps of Engineers
Alaska District, Regulatory Division
ATTN: Heidi Firstencel
Juneau Field Office
8800 Glacier Highway, Suite 106
Juneau, AK 99801

heidi.x.firstencel@usace.army.mil

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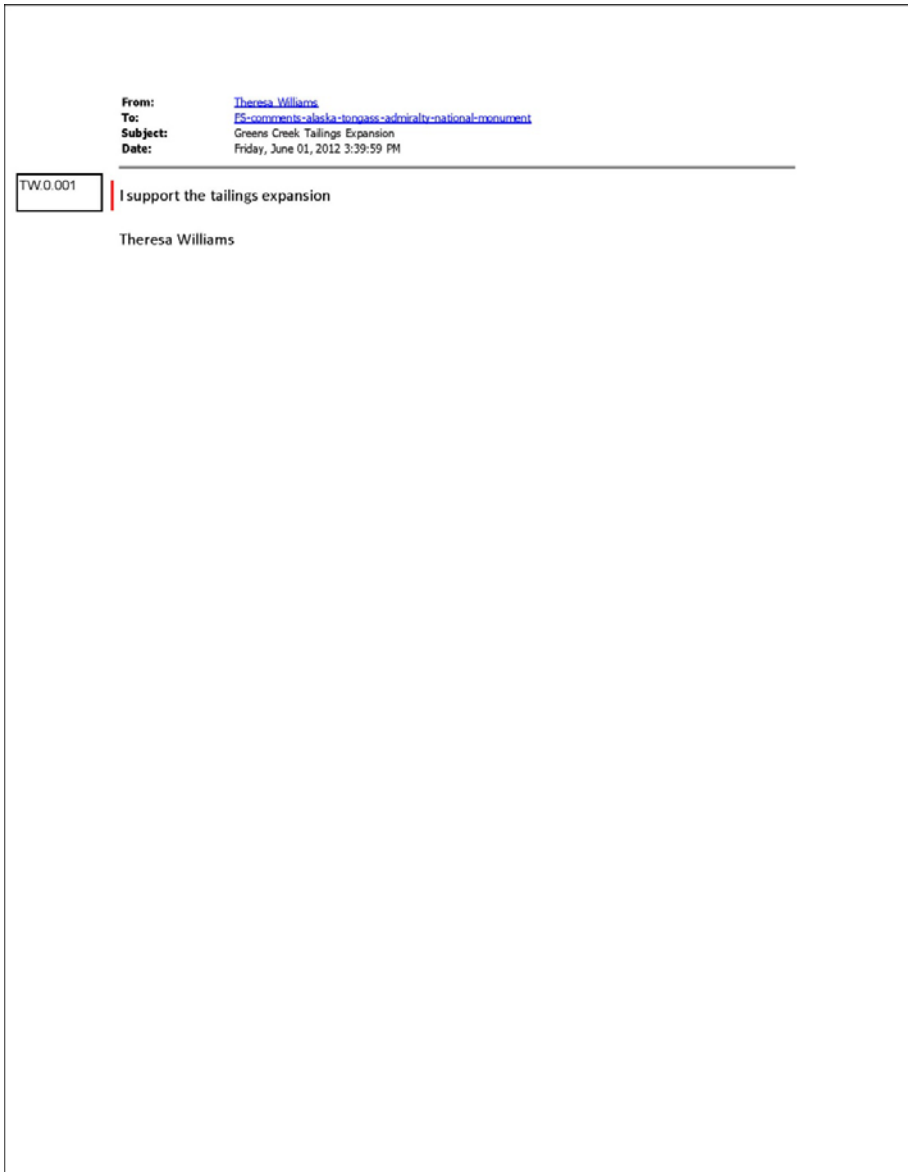
~ 2 ~

Response

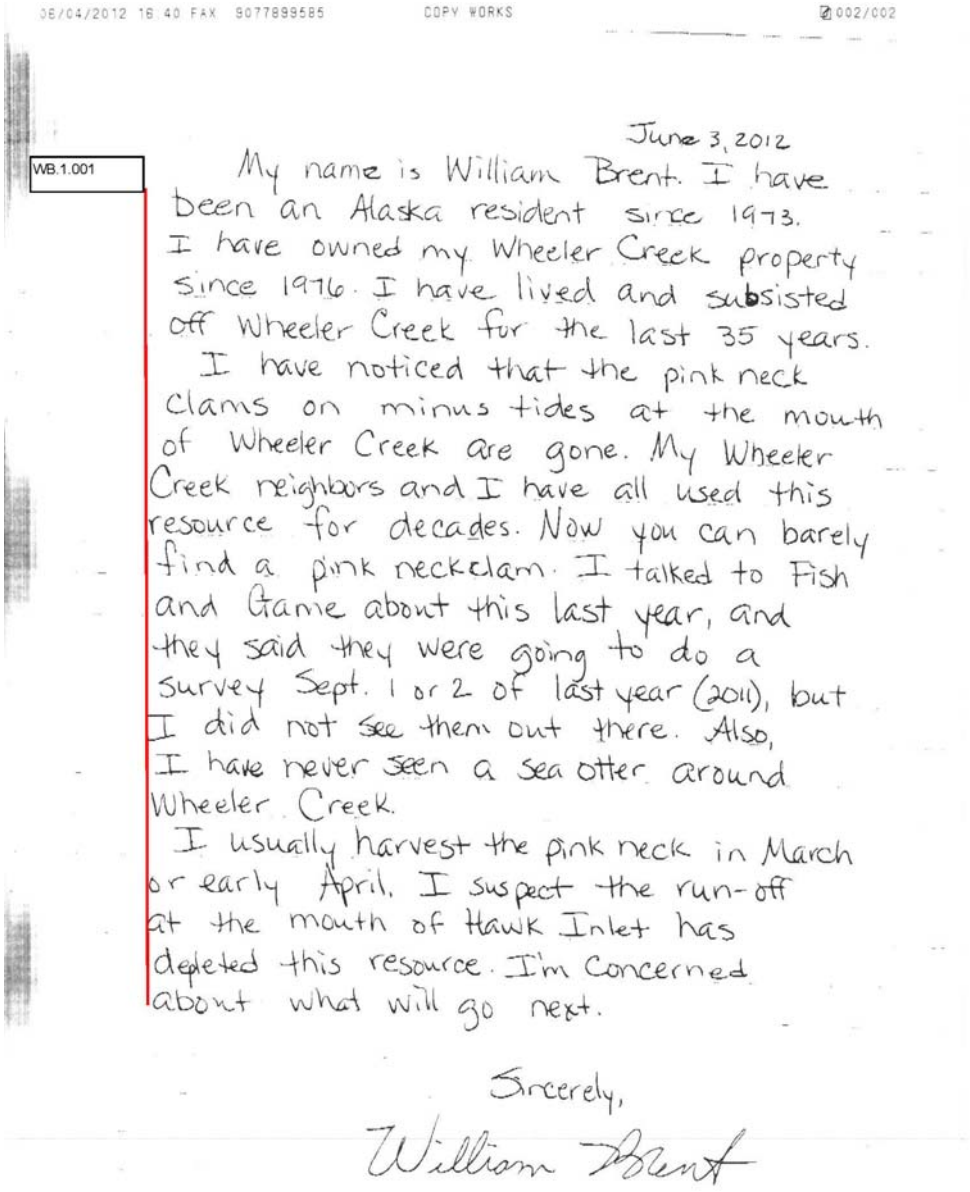
Comment ID: SW.0.004
Comment noted.

Comment	*Response*
From: Tim Shockley **To:** PE-comments-alaska-tongass-admiralty-national-monument **Subject:** Hecla Greens Creek Mine Tailings Expansion **Date:** Thursday, May 10, 2012 12:42:05 PM 05/10/2012 Hello, TS.0.001 As a lifelong resident of SE Alaska, I fully support Greens Creek Mining in our home. I've seen their operations firsthand both as an avid outdoorsman as well as a contractor working at their location. I have read through their proposed expansion and see it as a good thing both for our economy and our environment. I would appreciate your approval of their proposed expansion. Thank you, -Tim Shockley ALPG	**Comment ID: TS.0.001** Comment noted.

Comment	*Response*
	**Comment ID: TW.0.001** Comment noted.

Comment	*Response*
From: wayne browning To: FS-comments-alaska-tongass-admiralty-national-monument Subject: greens creek tailings expansion Date: Thursday, May 31, 2012 11:00:36 PM WB.0.001 I strongly urge the permit application be accepted. Properly constructed and managed it can and will be safe for our environment. Sincerely, Wayne Browning	**Comment ID: WB.0.001** Comment noted.

Comment



06/04/2012 16:40 FAX 9077899585 COPY WORKS 002/002

June 3, 2012

WB.1.001

My name is William Brent. I have been an Alaska resident since 1973. I have owned my Wheeler Creek property since 1976. I have lived and subsisted off Wheeler Creek for the last 35 years.

I have noticed that the pink neck clams on minus tides at the mouth of Wheeler Creek are gone. My Wheeler Creek neighbors and I have all used this resource for decades. Now you can barely find a pink neckclam. I talked to Fish and Game about this last year, and they said they were going to do a survey Sept. 1 or 2 of last year (2011), but I did not see them out there. Also, I have never seen a sea otter around Wheeler Creek.

I usually harvest the pink neck in March or early April. I suspect the run-off at the mouth of Hawk Inlet has depleted this resource. I'm concerned about what will go next.

Sincerely,

William Brent

Response

Comment ID: WB.1.001

Testing was previously conducted on waters collected in Hawk Inlet near the mine's permitted discharge point to assess chronic and acute toxicity of effluent to shellfish, as required by the NPDES permit at the time. Testing was discontinued in 2005 with the reissuance of the permit when the USEPA determined that the data showed that the effluent from Outfall 002 has no reasonable potential to contribute to an exceedance of the (Alaska) water quality standards for toxicity and there was no reason to believe that the characteristics of the discharge would change over the term of the permit (USEPA 2005). Thus, the Forest Service does not have a reason to believe that the treated water discharged from the mine into Hawk Inlet is affecting pink neck clams near Wheeler Creek.

Comment

5810 Thane Road
Juneau, AK 99801
May 1, 2012

Admiralty Island National Monument
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

WC.0.001

Dear Sir:

I am the owner of 5 acres of patented land on the west side of Admiralty Island located at an area generally known as Lizard Head (or specifically Lots 1, 2 and 3 of Chatham Subdivision). The property is approximately 6 miles northwest of the Greens Creek Mine. On this land I have constructed a small cabin and frequently stay there to hunt blacktail deer as well as fish for salmon and halibut. I have owned the property since 1984 and have found the Greens Creek Mine to be a good neighbor. I also believe the Mine to be an important component of the economy of the City and Borough of Juneau.

I support the expansion the Greens Creek tailing facility in order that the Mine may continue to operate for many years. Specifically I favor the Alternative B proposal for enlarging the existing tailing facility. Moving the tailing facility to the north under Alternative C or D will bring it nearer to my cabin and may adversely impact the area where I do most of my hunting.

Thank you for offering me the opportunity to comment.

Sincerely,

Bill Corbus

William A. Corbus

Response

Comment ID: WC.0.001
Comment noted.

Comment

ALASKA ENERGY AND RESOURCES COMPANY

5601 Tonsgard Court Juneau AK 99801-7201 907-780-2222

May 1, 2012

Admiralty Island National Monument
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801

Dear Sir:

The Alaska Energy and Resources Company (AERC) is a Juneau based corporation that is the owner of the Alaska Electric Light and Power Company (AELP) and AJT Mining Properties, Inc. AELP is an electric utility that has been serving Juneau and environs since 1896 and under normal circumstances satisfies its annual energy requirements with hydroelectric energy.

WC.1.001

This letter represents the views of AERC. It has read most parts of the Draft Environmental Impact Statement prepared to assess the impacts of the expansion of the Greens Creek tailing disposal facility. AERC is in support of the continued operation of the Greens Green Mine for the long run. It believes that an expanded tailings facility that will allow the Mine to operate for the foreseeable future is essential. In AERC's view the Greens Creek Mine is a very important ingredient of the CBJ economy for several reasons:

WC.1.002

1. It is a very important component of the City and Borough of Juneau (CBJ) employment base. It employees approximately 390. The jobs are comparatively high paying compared to other employment opportunities in Juneau and help balance employment base that is overly dependent on government sector.

2. Greens Creek is the CBJ's largest tax payer. The tax revenue from Greens Creek tax base more than offsets the cost of additional CBJ services required for the Mine and its Juneau based employees.

3. AERC's affiliate, AELP recently completed construction of the Lake Dorothy Hydroelectric Project. Lake Dorothy and AELP's other hydroelectric projects produce electric energy in excess of AELP's firm electric customer needs. This excess is sold as interruptible energy to Greens Creek. AELP revenues, received from Greens Creek

1

Response

Comment ID: WC.1.001
Comment noted.

Comment ID: WC.1.002
Comment noted.

Comment

electric purchases, minimizes the rates for AELP's firm CBJ rate payers. As the CBJ firm loads grow, less energy will be sold to Greens Creek. This is a win-win situation for AELP's customers as well as Greens Creek.

WC.1.003

AERC has examined the four tailings disposal Alternatives. Alternative A will result in the Mine closing down in about 2014. Alternative B expands the existing foot print and Alternatives C and D envision opening a new site to the north, but on the west side of Hawk Inlet. AERC finds it difficult to understand why Alternatives C or D would be acceptable as it will require an access road and new tailings disposal facility, both of which will impact undisturbed habitat. Therefore, AERC supports Alternative B which will have the least impact on the area surrounding the Mine and the area to the north.

As previously stated the Greens Creeks Mine is one of the keys to the CBJ's long term economic future. AERC supports Alternative B, enlarging the existing tailings facility.

Thank you for offering AERC to comment on this important issue.

Very truly yours,

William A. Corbus

William A. Corbus
President

2

Response

Comment ID: WC.1.003
Comment noted.

Comment

From: wpnason
To: PS-comments-alaska-tongass-admiralty-national-monument
Subject: Support of Hecla Greens Creek Mining application for expansion of tailings disposal area
Date: Friday, June 01, 2012 4:30:17 AM

To whom it may concern:

WN.0.001

I urge the Forest Service to grant HGCMC permission to extend its tailing area.

- For past 25 years, the Greens Creek Mine has contributed to the southeast Alaska economy where private sector resource jobs are needed:
  - ✓ High-paying jobs
  - ✓ Local purchases of goods and services
  - ✓ Major contributor to local tax base

- HGCMC has been a good steward of the land and has operated the Greens Creek Mine with minimal disturbance to the environment by maintaining a small footprint and using the dry-stack method of tailings disposal.

WN.0.002

- Since its opening in 1987, the Greens Creek Mine has operated within the Admiralty Island National Monument in accordance with federal, state and local laws and regulations. Congress provided for mining at this site in Section 503 of the Alaska National Interest Lands Conservation Act (ANILCA). One of the original agreements between Greens Creek and the United States of America by and through the USFS calls for facilities to be consolidated to the maximum extent practicable.

Support for Greens Creek's proposed tailings facility expansion plan:

WN.0.003

- HGCMC's proposal (Alternative B) provides for a logical expansion of the existing facility where tailings have been placed for nearly a quarter century and abides by the original agreement for the mine's facilities to be consolidated to the maximum extent practicable ***VERSUS*** the other action alternatives (Alternatives C and D) that would spread the disturbances, operational and reclamation impacts, and monitoring requirements between two sites separated by over 2 miles.

- HGCMC's proposal allows for both a southward extension and an upward expansion of the existing facility, which lessen disturbance and closure/reclamation costs ***VERSUS*** more acres of disturbance and higher costs for the other action alternatives.

- Under its proposal, HGCMC will maintain tailings disposal in an engineered, contained facility within a portion of a single watershed (Tributary Creek) ***VERSUS*** the other action alternatives that would place tailings in a second facility but in multiple watersheds and create more disturbance.

- HGCMC's proposal utilizes existing site support facilities, including the continued use of B Road that has served for tailings delivery since the mine opened ***VERSUS*** the need, under the other action alternatives, for a major construction upgrade to approximately 2.5 miles of the A road.

Response

Comment ID: WN.0.001
Comment noted.

Comment ID: WN.0.002
Comment noted.

Comment ID: WN.0.003
Comment noted. Alternatives A and B would impact three watersheds: Cannery Creek, Tributary Creek, and South Hawk Inlet. Alternatives C and D would impact five watersheds: Cannery Creek, Tributary Creek, South Hawk Inlet, Fowler Creek, and North Hawk Inlet (see Section 3.5, figures 3.5-5 and 3.5-6).

Comment

WN.0.004

ƒ HGCMC's proposal will have minimal disruption to wildlife ***VERSUS*** the other action alternatives. There is an active goshawk nest at the new location under proposed alternatives C and D, and the nest and surrounding habitat for this sensitive species would be impacted if development in this area were to occur. Also, the heavy hauling and increased maintenance over 2.5 miles of the A road necessary for the alternative location would increase impacts to all wildlife in this area.

WN.0.005

ƒ Under its proposal, HGCMC maintains the existing haul distances to the tailings facility ***VERSUS*** the other action alternatives where an additional 7 miles of haulage would be added to each truck trip, resulting in an extra 20,000 to 30,000 gallons of diesel fuel being burned every year. That amounts to burning an extra 1,000,000 gallons of diesel fuel over the life of the project. This higher fuel use means more fuel transport to Admiralty Island and more greenhouse gas emissions. More energy will be consumed pumping contact water from the alternate site to the water treatment plant as well.

Wes Nason
2175 Arcadia Drive
Anchorage, AK 99517

Response

Comment ID: WN.0.004
Comment noted. An active goshawk nest was located in 2011 adjacent to the proposed new TDF to the north under alternatives C and D. Impacts to the goshawk and other wildlife species are presented in sections 3.11 (Wildlife) and 3.12 (Threatened, Endangered, Candidate, and Forest Service Alaska Region Sensitive Species).

Comment ID: WN.0.005
Correction: Alternatives C and D would add an additional 5.6 miles round-trip for haul trucks to travel from the portal to the new northern TDF. Fuel usage may vary.

Mobile source greenhouse gas emissions at the Greens Creek Mine for Alternative B would add 707 tons of carbon dioxide emissions per year, or 0.16% of Juneau's total greenhouse gas emissions; Alternative C would add 946 tons of carbon dioxide emissions per year, or 0.21%, of Juneau's total greenhouse gas emissions; and Alternative D would add 910 tons of carbon dioxide emissions per year, or 0.21% of Juneau's total greenhouse gas emissions. Alternatives C and D would produce 0.05% more greenhouse gas emissions than alternatives A and B yearly. In comparison, Juneau's yearly highway transportation greenhouse gas emissions equal 29% of the borough's total greenhouse gas emissions.

Comment	*Response*
Section 3.7.3.1, page 3-97: ADF&G issued Fish Habitat Permit FH11-I-0123 to Hecla Greens Creek Mining Company on March 22, 2012 authorizing repair and maintenance of the fish pass in perpetuity. Success of the fish pass will be documented by juvenile coho salmon captured at Site 54 during the annual biomonitoring sampling. If juvenile coho salmon are not captured within three years after fish pass repair, Hecla will be required to investigate adult coho salmon passage through the fish pass.	**Comment ID: SS.1.033** Comment noted. This information has been added to the Final EIS.

Appendix A, Part 2
U.S. Army Corps of Engineers
Responses to Comments

Part 2: U.S. Army Corps of Engineers Responses to Comments – List of Commenters

Comment

United States Department of the Interior
FISH AND WILDLIFE SERVICE
Juneau Fish & Wildlife Field Office
3000 Vintage Blvd., Suite 201
Juneau, Alaska 99801-7100
(907) 780-1160

June 1, 2012

Heidi Firstencel
US Army Corps of Engineers
Juneau Field Office
8800 Glacier Highway, Suite 106
Juneau, AK, 99801-8079

Re: POA 1988-0269-2 Greens Creek Mine Tailings Expansion

Dear Ms. Firstencel,

BH.0.001

The U. S. Fish and Wildlife Service (Service) has reviewed the Public Notice of Application for Permit for the Greens Creek Tailings Expansion and the Draft Environmental Impact Statement (DEIS). Our comments are intended to assist your office in identifying environmental concerns related to fish, wildlife and their habitats associated with a Department of the Army permit for this project.

BH.0.002

We offer these comments under provisions of the Fish and Wildlife Coordination Act, the National Environmental Policy Act, and Executive Order 11990, which directs agencies to minimize "destruction, loss, or degradation of wetlands" in carrying out their responsibilities. We have concerns for migratory birds and their habitats and food sources, anadromous fish, and wetlands that would be affected by the proposed tailings expansion. We also offer recommendations to improve your evaluation of significant potential impacts to wetlands and fish and wildlife resources, and to help identify the least damaging practicable alternative.

Project Description

The Hecla Greens Creek Mining Company (HGCMC) proposes expansion of their Greens Creek Mine tailings disposal facility (TDF) to accommodate approximately 10 million cubic yards of additional tailings and waste rock over a 30 to 50 year period. The mine is located on Admiralty Island approximately 18 miles southwest of Juneau, Alaska. The mine produces lead and zinc concentrates that also contain silver. Major portions of

1

Response

Comment ID: BH.0.001
Comment noted. Please see the responses to detailed comments below.

Comment ID: BH.0.002
See the responses to detailed comments below.

Comment

the mine are located on Tongass National Forest lands and most of the TDF is located in the Admiralty Island National Monument (Monument)

The DEIS presents one no-action and three action alternatives. The major differences among the action alternatives, as presented in the DEIS, are location and configuration of the TDFs, and the types and amounts of wetlands and fish streams that would be lost.

The proposed alternative (Alternative B) would cause the loss of approximately 4,000 linear feet of fish habitat in Tributary Creek, including 1,646 feet of anadromous fish stream and 2,400 feet of resident fish stream. A total of 98.4 acres of wetlands would be filled.

Alternative C would cause the loss of approximately 1,044 feet of resident fish stream and 114.2 acres of wetlands would be lost. No anadromous reaches would be filled.

Alternative D would eliminate approximately 1,044 feet of resident fish stream and 124.9 acres of wetlands would be disturbed.

BH.0.003

We recommend that the Corps permit an alternative that minimizes environmental impact through maintenance of fish-bearing streams, avoidance of the most productive wetlands, and effective monitoring of project impacts with specific triggers for remedial action. These topics are discussed in more detail below.

Minimizing Impacts to Fish Habitat

BH.0.004

Fish-bearing streams typically support a diversity of wildlife species, such as kingfishers, mergansers, mink, and otters that are usually not found along streams that lack fish. Streams that support anadromous fish (primarily salmon) are particularly productive because they tend to support a community of larger predators, such as bald eagles and bears; salmon eggs and fry are preyed upon by many additional species, such as dippers and resident trout. Carcasses of spawned and predated salmon provide a significant input of nutrients, such as nitrogen, calcium, and phosphorous to both the stream system and the surrounding landscape (Gende et al. 2002). Fish-bearing streams would be lost under all action alternatives considered in the DEIS, but the alternatives vary in the level of impacts.

Streams are considered high-quality aquatic features (USACE 2009) that should be avoided where possible. The 2008 Final Rule on *Compensatory Mitigation for Losses of Aquatic Resources* (33 CFR 325 and 332) (2008 Rule) specifies that because streams are difficult to replace, emphasis should be on preservation, rehabilitation, or enhancement. Guidance from the Alaska District of the Corps recommends that all streams be considered high value, with a suggested mitigation ratio of 2:1 for restoration or enhancement efforts and 3:1 for preservation (ACOE 2009, Appendix B). We recommend a mitigation ratio of at least 3:1 for restoration or enhancement of fish-bearing streams, because of their higher value for a broad diversity of other species and functions, as compared to non-fish-bearing streams. Impacts to salmon streams should be

2

Response

Comment ID: BH.0.003
Comment noted. See the responses to detailed comments below.

Comment ID: BH.0.004
Project impacts to fish habitat are an important consideration in the district engineer's analysis of potential beneficial and detrimental impacts to the environment, as well as the overall public interest, when evaluating a proposal under the NEPA review process.

The decision by the district engineer on whether to issue a permit for the proposed work will be based on consideration of all factors that may be relevant to the proposal, including conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and the general needs and welfare of the people.

Comment

compensated at higher ratios than impacts to resident fish streams because they provide more ecological benefits.

BH.0.005

Under Alternative B, the proposed TDF expansion would destroy 1,600 feet of anadromous fish spawning and rearing habitat and an additional 2,400 feet of resident fish stream habitat in Tributary Creek, representing a 50 percent loss of fish habitat by stream length. Alternative C would result in loss of 1,044 feet of Fowler Creek, which supports resident fish in the reach that would be lost. This loss is clearly lower than would be realized under Alternative B. We therefore recommend Alternative C as the least-damaging alternative because it has lower impacts to fish habitat than the proposed alternative.

Mitigation for Impacts to Fish-bearing Streams

BH.0.006

The DEIS (p 3-97) includes discussion of a failed fish passage project that was developed as mitigation in 1989. The HGCMC proposes to repair the fish pass as new mitigation for loss of 4,000 feet of Tributary Creek that would occur in Alternative B. The fish passage system would provide anadromous fish access to an additional 18,400 feet of stream in Greens Creek.

The 2008 Rule specifies that mitigation plans must contain performance standards that will be used to assess whether the project is achieving its objectives. A monitoring schedule and reporting are required. None of these components are included in the DEIS or the Corps' public notice.

Given the failure of the previously attempted fish pass, if this proposed mitigation is approved, the Corps should require a monitoring plan that includes adaptive management. If the proposed project fails to meet objectives, remedial action or suitable alternative mitigation should be provided. Any fish passage mitigation project should be monitored for the full lifetime of the water treatment that will be required, as both water quality and physical access to habitat are necessary to sustain fish populations.

Minimization of Wetland Loss

BH.0.007

High-functioning fens would be lost under all action alternatives evaluated. Fens are hydrologically supported primarily by groundwater, which is typically high in mineral nutrients. Their plant communities are dominated by sedges and grasses, rather than sphagnum moss. These characteristics distinguish them from lower-productivity bogs, which are abundant in the region. Compared to other wetland types in the project area, and across Southeast Alaska generally, fens provide particularly high functions for streamflow support, streamwater cooling, aquatic invertebrate habitat, amphibian habitat, and native plant habitat (DEIS, pp. 3-127 to 3-128). Great volumes of groundwater typically flow through fen wetlands, increasing potential for transport of contaminants if toxic materials are deposited upon them. Because fens in the project area flow into fish-bearing streams, avoiding contamination of the fens will provide a measure of protection for health of the streams and their associated biota.

3

Response

Comment ID: BH.0.005
Project impacts to anadromous fish habitat are an important consideration in the district engineer's analysis of potential beneficial and detrimental impacts to the environment, as well as the overall public interest, when evaluating a proposal under the NEPA review process.

The decision by the district engineer on whether to issue a permit for the proposed work will be based on consideration of all factors that may be relevant to the proposal, including conservation, economics, aesthetics, general environmental concerns, wetlands, historic properties, fish and wildlife values, flood hazards, floodplain values, land use, navigation, shore erosion and accretion, recreation, water supply and conservation, water quality, energy needs, safety, food and fiber production, mineral needs, considerations of property ownership, and the general needs and welfare of the people.

Comment ID: BH.0.006
Please note that repair of the fish passage project would provide anadromous fish access to an additional 10,600 feet of stream in Greens Creek. Following the Forest Service Record of Decision, the financial assurance and reclamation and closure plan will be updated. The Forest Service will require bonding for maintenance of the fish passage facility in perpetuity. Additionally, the Forest Service and ADF&G will require quarterly inspection of the fish passage structure (see Table 2.6-2).

Comment ID: BH.0.007
Contamination of fen wetlands would be in violation of the GPO and the APDES permit. The facility as designed is lined, and water in contact with tailings (contact water) would be collected and pumped to the wastewater treatment plant prior to being discharged into Hawk Inlet.

The alternatives were each developed to minimize the extent of wetlands impacted while remaining practicable in their design. Therefore, impacts to fen wetlands could not be avoided entirely. The EIS discloses this situation and mitigation will take all wetland impacts into account.

Comment

BH.0.007 cont

Alternative C avoids further impacts to the fen located to the south of the existing TDF, and impacts the smallest area of fens (25 acres) of any of the action alternatives. Alternative C, as currently configured, however, would impact a substantial fen, plus forested wetlands and bogs at the proposed alternative TDF. We recommend that water quality and wildlife habitat be protected by modifying the TDF to avoid fen wetlands entirely. This might be accomplished by modifying the proposed location or reducing the size and tailings capacity of the TDF.

Water Treatment Monitoring

BH.0.008

Contamination of water and biota from tailings leachate is one of the greatest potential impacts from the proposed project. Treatment of tailings contact water from any of the TDF alternatives will be required for at least 100 years and likely longer, based on modeling information included in the DEIS. Because treated water goes to marine discharge, any breakdown of the treatment system could adversely affect water quality in Hawk Inlet and affect fish, wildlife, and invertebrates (including many invertebrate species fed upon by migratory birds). A robust monitoring plan is necessary to expeditiously detect and correct any such failings.

BH.0.009

The HGCMC is currently operating under a 2005 Alaska Pollutant Discharge Elimination System (APDES) permit that allows continued discharge to Hawk Inlet. Some of the water quality sample sites are over 1,600 feet from the edge of the mixing zone in Hawk Inlet. We recommend that samples intended to monitor effectiveness of water treatment be taken at the edges of the mixing zone, rather than far from it.

BH.0.010

We also recommend that the model used to evaluate the subtidal mixing zone account for tidal action which is likely to repeatedly expose biota to toxins. Monitoring samples, for example, should be taken during phases of the tidal cycle that put the outfall plume upstream of the sampling sites rather than the reverse. Timing is likely to vary, therefore, for individual sample points depending on their location. Averaging samples taken upstream and downstream of the outfall plume is likely to mask effects and should not be allowed. Samples should also be taken at the same depth as the outfall release.

BH.0.011

The selected alternative should specifically allow adaptive management to implement improved water treatment methods as they are identified in the future, and should require evaluation and implementation of remedial action if water quality monitoring detects declines in water quality.

Stream habitat and aquatic resources monitoring

BH.0.012

Suspended solids in storm water runoff are a primary carrier for metals and other contaminants, which can affect stream productivity. Sediment can also adversely affect aquatic macro-invertebrates and fish by covering stream-bottom gravel, which is used by invertebrates and fish for reproduction/spawning and rearing. Although a storm water detention structure is proposed to catch surface runoff from the TDF, additional sediment

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Response

Comment ID: BH.0.008
Monitoring would continue to be required by the General Plan of Operations (GPO), Freshwater Monitoring Program (FWMP), Waste Management Permit, and the APDES permit. The FWMP was developed during an interagency regulatory review. The FWMP requires surface water, groundwater, and biological monitoring.

If an exceedance of Alaska Water Quality Standards is identified, the operator is required to identify and explain the cause of the exceedance in a written notice to the Forest Service and ADEC within 30 days of identifying the exceedance. This notice must contain a plan to mitigate the cause of the exceedance. The agencies will either approve the mitigation plan, or recommend changes to the plan that will help alleviate potential impacts to the designated uses of the receiving waters.

Under the FWMP, an annual report is produced as a part of the operations plan. This report documents trends in water quality in all project drainage features and creeks. This annual FWMP report is sent to the Forest Service and ADEC for review and presented at a meeting that is open to the public.

Additionally, the Waste Management Permit requires a facility-wide environmental audit to be completed every five years.

Comment ID: BH.0.009
Monitoring requirements are established in the 2005 APDES Permit (AK0043206. Under this permit, effluent is monitored prior to discharge, as well as in Hawk Inlet. As required by the APDES permit, HGCMC conducts its Hawk Inlet Monitoring Program and prepares an annual report summarizing the findings. The terms and monitoring conditions established by the permit are outside the scope of this decision.

Comment ID: BH.0.010
Monitoring requirements are established by the APDES Permit (AK0043206). As required by the permit, HGCMC conducts its Hawk Inlet Monitoring Program and prepares an annual report summarizing the findings. The terms and monitoring conditions established by the permit are outside the scope of this decision.

Comment ID: BH.0.011
See response to Comment BH.0.008.

Comment

BH.0.012 cont

is likely to be delivered to Tributary Creek and/or Fowler Creek, as typically occurs with these structures. Aquatic resources in Tributary Creek will be monitored to ensure that degradation does not occur (DEIS, pp. 3-97).

BH.0.013

For monitoring programs to detect significant change, baseline and project operational data sets for periphyton, invertebrates, and fish should use statistical comparisons of standardized, quantitative metrics, in addition to qualitative descriptions, to characterize stream health.

BH.0.014

Aquatic resource monitoring as described in the DEIS (Table 2.6-3) includes (1) juvenile fish sampled for abundance and distribution, (2) fish subsamples analyzed for chemistry, (3) water samples taken for temperature and toxicity testing, (4) periphyton samples collected for biomass, and (5) invertebrates sampled for abundance and community structure. Details on sample schemes, chemical analyses, and statistical techniques are not included. References to such information are either not cited in the text, or are cited but not listed in the references section (e.g., Durst and Jacobs 2010, cited on p. 3-86). As a result, it is difficult to evaluate the adequacy of these monitoring programs.

BH.0.015

Standardized macro-invertebrate metrics have been developed for Southeast Alaska that rely on sampling from a diversity of stream habitats (Rinella et al. 2005), rather than just riffles, as done at Greens Creek (Kanouse 2012, p. 8). We recommend that the more robust indices developed by Rinella et al. (2005) be used to characterize stream health. Statistical evaluations, in addition to qualitative review of these metrics, should be used to detect changes over the life of the project. An example mine monitoring report that incorporates such metrics (FDEP 2006) is enclosed separately. Similar quantitative measures should be adopted for the other parameters included in the monitoring plans.

If monitoring detects changes potentially attributable to mine operation, remedial actions should be evaluated and implemented as appropriate. Specific triggers for such evaluations should be included in operation plans, and referenced in any Corps permit issued for the project.

Reclamation and Mine Closure

BH.0.016

The DEIS (p. 2-23) states that one of the objectives is to "Return the disturbed areas to near-natural conditions to the extent practical." Natural habitats provide food and cover for native wildlife, so restoration of near-natural habitats is an important goal.

Successful reclamation should restore species diversity and structural complexity of the plant communities, with an emphasis on native plants, and on flowering plants that support native pollinators. We recommend that specific criteria for species and structural diversity be established for reclaimed areas, and that monitoring be done to ensure that the criteria are met. These criteria should be based on pre-existing conditions in the area selected for the TDF.

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Response

Comment ID: BH.0.012
Comment noted. Aquatic monitoring would continue under all alternatives.

Comment ID: BH.0.013
Monitoring would continue to be required by the GPO, FWMP, and Waste Management Permit. The FWMP was developed during an interagency regulatory review. The FWMP requires surface water, groundwater, and biological monitoring using quantitative metrics.

Comment ID: BH.0.014
References to the cited monitoring reports have been added. Please note that the FWMP, Hawk Inlet Monitoring Program, and recent annual reports are available to the public online at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/.

Comment ID: BH.0.015
Aquatic monitoring is performed as required by the GPO and Waste Management Permit. The FWMP states that macroinvertebrate community assessment should follow the techniques described in Major and Barbour (1999). "Standard Operating Procedures for the Alaska Stream Condition Index: A Modification of the U.S. EPA Rapid Bioassessment Protocols" (Kanouse 2012, p. 8) provides the basis for using riffles:

"We collected five benthic macroinvertebrate samples from each site using a Hess sampler in riffles where we observe the greatest amount of taxonomic density and richness (Barbour et al. 1999). This sample design reduces the variability that arises from sampling other habitats, such as pools, where pollution-sensitive taxa are less likely to be present."

Kanouse, K.M. 2012. *Aquatic Biomonitoring at Greens Creek Mine, 2011*. Technical Report 12-03. Alaska Department of Fish and Game, Division of Habitat, Douglas, Alaska.

Comment ID: BH.0.016
Comment noted. Please note that areas that were previously wetland habitat and that would be buried by the TDF would be reclaimed as upland forest.

Comment

BH.0.017

We find neither quantitative reclamation goals nor descriptions of the present natural conditions at the TDF sites that quantitative reclamation goals might be based upon. We therefore recommend a quantitative vegetation survey to document present baseline conditions, followed by development of a monitoring plan with specific reclamation goals based on the results of the vegetation survey. As with other monitoring plans, remedial actions should be evaluated and implemented if success criteria are not attained.

Summary

In summary, we recommend the following actions to reduce adverse effects to fish and wildlife:

BH.0.018

- Fish-bearing streams are considered high-quality aquatic features that should be avoided where possible. Alternative C is less damaging that Alternative B, in this regard.

BH.0.019

- Impacts to fish streams should be mitigated at a ratio of at least 3:1.

BH.0.020

- If repair of a failed fish ladder is selected as mitigation, a robust monitoring plan with appropriate adaptive management should be included.

BH.0.021

- Fen wetlands are particularly productive and produce large quantities of flowing water that discharge to fish streams in the project area. These fens should be avoided through modification of Alternative C.

BH.0.022

- Plans for monitoring water treatment, water quality, aquatic biota, and reclamation of disturbed areas should be included as a part of the project plans. These plans should rely on quantitative measures and include specific triggers for initiation of remedial action.

BH.0.023

We recommend Alternative C with modifications to avoid damage to fens as the least environmentally damaging, practicable alternative.

We appreciate the opportunity to provide comments on this permit application. If you have any questions about our comments, please contact Deborah Rudis of the U.S. Fish and Wildlife Service at Deborah_rudis@fws.gov or at 907-780-1183. Thank you for your consideration.

Sincerely,

for Bill Hanson
Field Supervisor

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Response

Comment ID: BH.0.017
Chapter 3, sections 3.x.2 discuss the baseline (present natural) conditions for each of the resources analyzed in the document. Neither the Forest Service nor the State of Alaska requires an operator to establish quantitative reclamation goals as part of a closure plan.

Comment ID: BH.0.018
Comment noted.

Comment ID: BH.0.019
Comment noted.

Comment ID: BH.0.020
Following the Forest Service Record of Decision, the financial assurance and reclamation and closure plan will be updated. The Forest Service will require bonding for maintenance of the fish passage facility in perpetuity. Additionally, the Forest Service and ADF&G will require quarterly inspection of the fish passage structure (see Table 2.6-2). As required by the FWMP, annual aquatic biomonitoring is conducted above the fish passage structure. As part of this program, State biologists use a three-pass depletion method to sample fish abundance.

Comment ID: BH.0.021
The footprint of Alternative C was developed to minimize impacts to aquatic systems, including wetlands, subject to geotechnical requirements.

Comment ID: BH.0.022
Discharge and receiving water quality monitoring is required by the APDES permit. Freshwater and aquatic biomonitoring are established by the FWMP and the GPO.

Please note that the FWMP, Hawk Inlet Monitoring Program, and recent annual reports are available to the public online at http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/.

Also, see the response to Comment BH.0.008.

Comment ID: BH.0.023
Comment noted.

Comment

Response

References Cited

ACOE (Army Corps of Engineers). 2009. Alaska District Implementation of the Federal Rule on Compensatory Mitigation: Compensatory Mitigation for Losses of Aquatic Resources. Alaska District Regulatory Guidance Letter RGL ID No. 09-01.

Gende, S. M., R. T. Edwards, M. F. Willson, and M. S. Wipfli. 2002. Pacific salmon in aquatic and terrestrial ecosystems. BioScience 52(10):917-928.

Kanouse, K. M. 2012. Aquatic biomonitoring at Greens Creek mine, 2011. Alaska Dept of Fish and Game, Division of Habitat. 20 pp.

Rinella, D. J., D. L. Bogan, K. Kishaba, and B. Jessup. 2005. Development of a macroinvertebrate biological assessment index for Alexander Archipelago streams – final report. For Alaska Department of Environmental Conservation, Division of Air and Water Quality, Anchorage, AK. 52 pp.

Attachment

FDEP (Florida Department of Environmental Protection). 2006. Biological assessment of E.I. DuPont – Trailridge Mine, January 2006. FDEP Biology Section, Bureau of Laboratories, Division of Resource Assessment and Management. 40 pp.

cc:
Cindi Godsey , EPA
Jeanne Hanson, NMFS
Teri Camery, CBJ
Carrie Bohan, ADNR, DCOM
Jackie Timothy, ADF&G
Forest Cole, USFS

7

Comment | ***Response***

Biological Assessment of

E. I. DuPont – Trailridge Mine

Bradford County

NPDES #FL0000051

Sampled July 2005

January 2006

Biology Section

Bureau of Laboratories

Division of Resource Assessment and Management

Quality Manual No. 870346G

NELAC Certification No. E31780

Comment

Response

Florida Department of Environmental Protection
Fifth Year Inspection Summary

Discharger:	E. I. Dupont – Trailridge Mine		
Physical Address:	State Road 230, Starke	County:	Bradford
NPDES Number:	FL0000051	Permit Expiration:	May 9, 2006

Toxics Sampling Inspection **(XSI)**

Date Sampled: July 18, 2005

Results: All metals complied with Class III Criteria and permit limits. No organic priority pollutants were detected in the effluent sample.

Compliance Biomonitoring Inspection **(CBI)**

Date Sampled: July 18, 2005

Results: The effluent sample was not acutely toxic to the fish, *Pimephales promelas,* or to the water flea, *Ceriodaphnia dubia,* during the 96-hour acute screening bioassays.

Water Quality Inspection **(WQI)**

Date Sampled: July 18, 2005

Results: With the exception of nitrate+nitrite, all nutrients, were lower at the Test Site compared to the Control Site. Conductivity and temperature were higher at the Test Site (458 μmhos/cm, 30.8 °C) relative to the Control Site (248 μmhos/cm, 25.8 °C) and virtually identical to effluent values (458 μmhos/cm, 31 °C).

Impact Bioassessment Inspection **(IBI)**

Date Sampled: July 18, 2005

Results: AGP was less than the Method Detection Limit in the effluent and in the receiving water samples. Qualitative periphyton taxa richness was 66% lower at the Test Site compared to the Control Site and there was greater percentage of blue-green algae at the Test Site (68.7%) compared to the Control Site (6.4%).

There were several indications that the macroinvertebrate community at the Test Site was impaired relative to the Control Site. Diversity was 57% lower at the Test Site (1.24) compared to the Control Site (2.87) in the quantitative Hester-Dendy samples, which is a violation of the Biological Integrity Criterion 62-302.530 (11) F.A.C. There were relatively few individuals in the Control and Test Site samples which can result in a negative bias in Shannon-Weaver Diversity calculations; however, there were additional indications of an impaired macroinvertebrate community downstream of the outfall. Taxa richness was 63% lower, EPT taxa 80% lower, and the percent dominant taxon was 44% higher at the Test Site compared to the Control Site. In the qualitative macroinvertebrate samples, the Test Site received a SCI score of 16, which placed it in the "Very Poor" category compared to the Control Site SCI score of 44, which was considered "Poor".

Biological assessments prepared by FDEP staff, provide information for NPDES permit renewal applications and in conjunction with other information concerning the subject facility and its receiving-water body, aid in determining appropriate permit conditions.

Comment

Introduction

The E. I. DuPont – Trailridge Mine is located in Bradford County, Florida (Appendix 1). This facility dredges heavy mineral sands to obtain ilmenite, zircon, and staurolite. Activities at this facility include acidification of mining wastewater with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 and 3.5 standard units. Flocculation of colloidal material is followed by settling in a series of diked ponds. The wastewater is then neutralized with hydrated lime to a pH between 6.0 and 8.5, with additional settling prior to final discharge into the Class III fresh waters of Alligator Creek. Upon Department approval, polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to Alligator Creek. Storm water and rainfall runoff from mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride and/or ferric sulfate is added (prior to the humate settling ponds). A substantial revision was made on April 4, 005 to redirect a portion of the effluent to the Southwest Quadrant Pond. Approximately 400 gallons per minute will be routed to an existing ditch with discharges into the Southwest Quadrant Pond and eventually into Blue Pond. This rerouting is part of an effort to improve lake water levels in the Keystone Heights area (see Facility Summary in Appendix 2).

The maximum design flow of the wastewater system is 30.0 million gallons per day (MGD). The actual mean flow during this survey was 7.58 MGD and the facility has an annual average permitted flow of 8.5 MGD (Appendix 2).

According to the facility's monthly discharge monitoring reports, the routine chronic *C. dubia* test in November 2004 failed acute and chronic endpoints; however, the follow-up test passed both acute and chronic endpoints (Appendix 2). In July 2004, the facility experienced an abnormal event when an estimated 5,000 gallons of turbid water exited the property boundary. An investigation determined that the transfer ditch that carries stormwater from the active mining area to the water treatment facilities had become restricted at a culvert which resulted in a portion of the water in the transfer ditch to back-up and flow outside of the water treatment transfer ditch. Immediate actions were taken to contain the turbid water remaining on site. Gypsum was used to reduce the turbidity of the impacted water on the site. During September and October 2004, the facility had exceedances of flow, pH, and length of longest pH excursion due to hurricanes Frances and Jeanne (Appendix 2). Surface Water Quality Criteria and facility permit limits are listed in Table 1.

Methods

The purpose of this investigation was to determine the potential effects of the facility's effluent on the biota of the receiving waters. Chemical and biological comparisons were made between a Control Site (below County Road 230 in a branch of Alligator Creek) and a Test Site (located in a separate branch of Alligator Creek approximately 60 meters downstream of the discharge), see Map in Appendix 1. Detailed methods and their relationship to Florida Administrative Code are given in Appendix 3.

All field and laboratory biological methods followed Biology Section Standard Operating Procedures (SOPs, see http://www.floridadep.org/labs/qa/2002sops.htm for details) and met FDEP quality assurance/quality control standards (see http://www.floridadep.org/labs/qa/index.htm).

The following were involved in this investigation: Tom Kallemeyn, Jeremy Parrish, Eesa Ali, Lacey Smith, and Joe Jordan (FDEP Northeast District), and FDEP Central Laboratory in Tallahassee. The report was reviewed by District representatives and the Point Source Studies Review Committee (Wayne Magley, Shannan Bogdanov, and Michael Tanski).

Results & Discussion

- Specific chemical results are reported in Table 1 and a complete list of chemical analytes can be reviewed in Appendix 4. The iron concentration in the Control Site sample (1,490 mg/L) exceeded the Class III Water Quality Criteria (62-302.530 (39) F.A.C.). It is not clear from this study what is contributing to the elevated levels of iron at the Control Site.
- The metals nickel, selenium, and zinc were found in the effluent and Test Site samples at levels above the method detection limit (MDL) and below the practical quantitation limit (PQL). Aluminum and iron were detected in the effluent and Test Site samples at levels that complied with Class III Fresh Water Quality Criteria.
- Radium 226 and 228 were detected in the effluent at a level that complied with the facility's permit limit.
- No priority organic pollutants were detected in the effluent.
- Effluent conductivity, pH and dissolved oxygen complied with Class III Water Quality Criteria (62-302 F.A.C.) and facility permit limits.

Response

Comment

Table 1. Effluent limits, Class III Freshwater Criteria and chemical, and toxicological data.

DuPont Trailridge Mine	Class III Stds	Effluent Limits	Effluent Samples	Control Site	Test Site
Organic Constituents (µg/L)					
None Detected	-	-	-	-	-
Metals (µg/L unless otherwise noted)					
Aluminum	-	-	391	331	428 A
Arsenic	≤ 50	-	4 U	4 U	4 U
Cadmium	≤ 1.5 b	-	0.5 U	0.5 U	0.5 U
Calcium (mg/L)	-	-	52.6	14.6	51.4 A
Chromium-III	≤ 114.9 b	-	2 U	2 U	2 U
Copper	≤ 12.6 b	-	0.5 U	0.5 U	0.5 U
Iron	≤ 1000	≤ 1000	78	1490	91 A
Lead	≤ 5 b	-	2.1 U	2.1 U	0.075 U
Magnesium (mg/L)	-	-	2.6	2.3	2.5 A
Nickel	≤ 70.2 b	-	7.5 I	2 U	7.2 I
Selenium	≤ 5	-	0.66 I	0.5 U	0.79 I
Silver	≤ 0.07	-	0.025 U	0.025 U	0.025 U
Zinc	≤ 161.3 b	-	4.2 I	5.1 I	4.9 I
Nutrients (mg/L)					
Ortho-phosphate	-	-	0.004 U	0.004 U	0.004 U
Total Phosphorus	-	-	0.035 I	0.045 I	0.032 I
Ammonia	-	-	0.028	0.051	0.028
Unionized Ammonia	≤ 0.02	-	≤ 0.02 c	≤ 0.02 c	≤ 0.02 c
Nitrate+Nitrite	-	-	0.005 I	0.004 U	0.006 I
Total Kjeldahl Nitrogen	-	-	0.06 U	0.71	0.06 U
Organic Nitrogen	-	-	0.03 c	0.66 c	0.03 c
Total Nitrogen	-	-	0.07 c	0.71 c	0.07 c
General Physical and Chemical Parameters					
Radium 226 (pCi/L)	-	-	0.9	-	-
Radium 226-Counting Error (pCi/L)	-	-	0.2	-	-
Radium 228 (pCi/L)	-	-	1.4	-	-
Radium 228-Counting Error (pCi/L)	-	-	0.8	-	-
Combined Radium 226 and 228 (pCi/L)	-	≤ 5	1.3	-	-
Habitat Assessment	-	-	-	98	78
Dissolved Oxygen (mg/L)	≥ 5.0	-	7	7.2	6.7
pH (S.U.)	-	6.0-8.5	6.9	4.4	7.5
Conductivity (umhos/cm)	≤ 1275	-	458	248	458
Temperature (C)	-	-	31	25.8	30.8
Phytoplankton Chlorophyll *a* (µg/L)	-	-	0.85 U	2.4 I	0.85 U
Phytoplankton Phaeophytin (µg/L)	-	-	-	0.77 J	0.85 U
Flow (MGD)	-	≤ 30.0	7.4	-	-
Hardness (mg/L)	-	-	142 c	45.9 c	138.6 c
TSS (mg/L)	-	≤ 30.0	4 U	-	-
Toxicology Bioassays (96 hour Acute Screen Bioassays; % mortality in 100% effluent)					
Fish (*Pimephales promeles*)	-	NOEC	0%	-	-
Water flea (*Ceriodaphnia dubia*)	-	NOEC	0%	-	-

Value exceeds the Class III Water Quality Criteria

b - Value is calculated based on hardness

c - Value is calculated

A - Value reported is the mean of two or more determinations

I - The reported value is between the laboratory method detection limit and the laboratory practical quantitation limit.

J - Estimated value

U - Material analyzed for but not detected; value reported is the minimum detection limit

NOEC - A no observed effect concentration less than 100% effluent will constitute a violation of this permit

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Table 2. Measured and predicted algal growth potential (AGP) for total soluble nitrogen (TSIN) and ortho phosphate (OP) limitation for Pseudokirchneriella subcapitata.

Location	AGP (measured)	Predicted AGP (TSIN) ± 20%	Predicted AGP (OP) ± 20%	Predicted AGP (TN) ± 20%	Predicted AGP (TP) ± 20%	Inorganic N:P ratio	Total N:P ratio
Effluent Sample	0.300 U	1.25 ± 0.25	0 ± 0 *	0.19 ± 0.038	15.05 ± 3.01	0.03	0.14
Control Site	0.300 U	1.94 ± 0.388	0 ± 0 *	26.98 ± 5.396	19.35 ± 3.87	0.05	15.78
Test Site	0.300 AU	1.29 ± 0.258	0 ± 0 *	0.23 ± 0.046	13.76 ± 2.752	0.03	0.19

A - Value reported is the mean of two or more determinations
U - Material analyzed for but not detected; value reported is the method detection limit
* - AGP could not be predicted due to undetected levels of ortho-phosphate

- Dissolved oxygen, pH and conductivity complied with Class III Water Quality Criteria (Table 1, 62-302.530 F.A.C.) at the receiving water sites, however, Test Site conductivity and temperature (458 µmhos/cm, 30.8 °C) were higher compared to the Control Site (248 µmhos/cm, 25.8 °C).
- The effluent sample was not acutely toxic to the fish, *Pimephales promelas*, or to the water flea, *Ceriodaphnia dubia*, during 96-hour acute screening bioassays (See Table 1 for percent mortality and Appendix 6 for bioassay bench sheets).
- The effluent total nitrogen concentration was 0.07 mg/L (Table 1). Effluent total phosphorus (0.035 mg/L), ortho-phosphate (0.004 mg/L), and total ammonia concentrations (0.028 mg/L, Table 1) did not contribute to Test Site levels. Nutrient levels at the Control Site were higher than those at the Test Site with the exception of nitrate+ nitrite. Total ammonia at the Test Site ranked above the 10th percentile of typical values for Florida streams while all other nutrients were undetected or below the practical quantitation limits (Appendix 5). Concentrations of total Kjehldahl nitrogen (TKN) and total ammonia at the Control Site ranked in the 20th and 30th percentiles of typical values for Florida streams, respectively.
- Algal growth potential (AGP) is a measure of nutrients available for algal growth (Miller *et al.* 1978). Raschke and Shultz (1987) found that AGP above 5.0 mg dry wt/L represent a "problem" threshold for fresh receiving waters, implying nutrient enrichment. The AGP values at the Control and Test Sites were below the MDL indicating no nutrient enrichment related to the Trailridge discharge in this portion of Alligator Creek. There was no evidence of growth inhibition in the AGP data (Table 2).
- Chlorophyll-*a* was below the MDL in the effluent and in the sample from the Test Site and below the practical quantitation limit in the Control Site sample (Table 1). We note that nutrients in the water column may or may not fuel algal production immediately, depending upon the sum of environmental conditions that limit algal growth at the site (e.g. pH, shading, turbidity). Thus, it is not necessarily contradictory for ambient nutrient levels to be high and for no chlorophyll to be detected in water samples.
- There were differences in periphyton algal community composition between the Control and Test Sites (Table 3, Appendix 8). There were 32 taxa at the Control Site compared to 11 taxa at the Test Site and a shift away from a community dominated by diatoms at the Control Site (92.3%) to one dominated by blue-green algae at the Test Site (68.7%). Diatoms are indicative of a healthy flowing stream, while blue-green algae can be indicative of disturbance. Standard Operating Procedures call for 300 algal units to be identified per sample (SOP AB03), however, only 67 units were identified in the Test Site periphyton

Table 3. Periphyton composition

DuPont Trailridge Mine	Control Site	Test Site
Number of Taxa	32	11
Percent Dominant Taxon	43.6	20.9
Dominant Taxon (name)	*Eunotia* sp.	*Planktothrix* sp.
Number of Algal Units Identified	310	67
Percentage Composition		
Blue-green algae	6.4	68.7
Diatoms	92.3	31.3
Green algae	1.3	0

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Table 4. Macroinvertebrate Hester-Dendy Samples - Quantitative

DuPont Trailridge Mine	Control Site	Test Site
Summary Statisics		
Shannon-Weaver Diversity	2.87	1.24
Number of Taxa	16	6
Florida Index	5	1
Number of EPT Taxa	0	0
Percent Dominant Taxon	33.5	77.4
Dominant Taxon (name)	*Thienemannimyia grp.*	*Polypedilum illinoense grp.*
Dominant Taxon (group)	Diptera	Diptera
Total Number of Individuals	116	80
Community Composition: Percent of total		
Acariformes	0	1.3
Coleoptera	25	0
Diptera	66.4	98.7
Ephemeroptera	0	0
Odonata	6.9	0
Oligochaeta	0.9	0
Plecoptera	0	0
Trichoptera	0	0
Other	0.8	0
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	0.9	0
Predators	50	2.5
Surface Deposit Feeders	29.3	53.1
Suspension Feeders	0.5	0
Scrapers	12.4	0
Shredders	6.9	44.3

communication with T. Kallemeyn (DEP Northeast District), suggest that large amounts of iron-sulfur bacteria may be responsible for the reduction in the algal communities at the Test Site.

- A habitat assessment score of 98 placed the Control Site in the "Sub-optimal" category while a score of 78 placed the Test Site in the "Marginal" category (Table 1, data sheets in Appendix 7). There were differences among all primary and secondary habitat parameters between the Control and Test sites. Tom Kallemeyn (personal communication) noted that stream banks at the Test Site were covered by 0.3-0.6 meters of iron-sulfur bacteria. Large amounts of the bacteria had sloughed off resulting in severe habitat smothering and little productive habitat at the Test Site. Large amounts of the bacteria were also seen at County Road 230, approximately 1.6 kilometers (1.0 mile) downstream of the outfall. The Trailridge treatment process involves the addition of ferric chloride and/or ferric sulfate, which may explain the excessive growth of iron-sulfur bacteria at the Test Site.
- Quantitative measures of benthic macroinvertebrate assemblages from Hester-Dendy samplers showed a 57% reduction in diversity from the Control Site (2.87) to the Test Site (1.24), a violation of the Biological Integrity Criterion 62-302.530 (11) F.A.C. (Table 4, Appendix 9). It should be noted that depending on the overall number of taxa present at a site, Shannon-Weaver Diversity does not become an unbiased estimator until +/-300 individuals have been identified. Therefore, diversity results at the Control and Test Site (with 116 and 80 individuals, respectively) may have been negatively biased by the small number of individuals and should be viewed with caution. There was, however, further evi-dence of degradation in the quantitative samples as seen in the reduction of taxa richness and the increase in the dominant taxa at the Test Site compared to the Control Site.
- Qualitative measures of benthic macroinvertebrate assemblages from dipnet samples are summarized in Tables 5 and 6 and in Appendix 10. The Control Site SCI score of 44 and the Test Site SCI score of 16 placed them in the "Poor" and "Very Poor" categories, respectively. Also, a larger portion of material was sorted at the Test Site in order to obtain the target number of individuals compared to the Control Site suggesting a less productive community at the Test Site. Very tolerant organisms, mostly dipterans, made up a majority of the Test Site community (88.5%) compared to the Control Site (21%).

Summary

The Shannon-Weaver Diversity Index was 57% lower at the Test Site compared to the Control Site, a violation of the Biological Integrity Criterion (62-302.530 (11) F.A.C.). As was noted earlier, this should be viewed with caution as the small numbers of individuals in the Control and Test Site samples may have resulted in a negative bias in the Shannon-Weaver Diversity calculations. There were, however, additional indications of impairment in the Test Site biological communities in both the quantitative and qualitative macroinvertebrate

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Table 5. Macroinvertebrate Dipnet Samples - Qualitative

DuPont Trailridge Mine	Control Site	Test Site
Stream Condition Index (value)	44	16
Stream Condition Index (word)	Poor	Very Poor
Stream Condition Index Metrics		
Number of Total Taxa	28	11
Number of Ephemeroptera Taxa	1	1
Number of Trichoptera Taxa	4	2
Number of Clinger Taxa	4	2
Number of Long-lived Taxa	0	1
Number of Sensitve Taxa	4	3
Percent Dominant Taxon	16	84.62
Percent Suspension Feeders and Filterers	25	1.92
Percent Tanytarsini Individuals	0	0
Percent of Very Tolerant Individuals	21	88.46
Dominant Taxon (name)	*Stenelmis sp.*	*Cricotopus albiforceps*
Dominant Taxon (group)	Coleoptera	Diptera
Total Number of Individuals	100	104
Community Composition: Percent of total		
Amphipoda	9	0
Coleoptera	18	0
Diptera	19	94.2
Ephemeroptera	1	1
Odonata	11	0
Oligochaeta	17	1
Plecoptera	0	0
Trichoptera	24	2.9
Other	1	0.9
Functional Feeding Groups: Percent of total		
Burrowing Deposit Feeders	16	1
Predators	28.5	3.4
Surface Deposit Feeders	18	48.6
Suspension Feeders and Filterers	25	1.9
Scrapers	9	0.5
Shredders	2.5	44.7
Unknown	1	0

samples and the qualitative periphyton samples. Elevated conductivity, temperature and habitat smothering from silt and iron-sulfur bacteria, may have contributed to degraded biological communities at the Test Site. Re-evaluation of the monitoring frequency for these parameters and additional monitoring stations to assess impacts of the newly permitted discharge into Blue Pond may be warranted.

It should also be noted that the Test and Control Sites were located in separate branches of Alligator Creek and although a thorough attempt was made to find comparable water bodies, some of the differences seen between the sampling stations may be due to natural variation.

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Table 6a. Stream Condition Index Metrics - Northeast

DuPont Trailridge Mine Control Site			
Metric:	Value	Raw Metric Score	Fixed Score 0 -10
Total Number of Taxa	28	4.6	4.6
Number of Ephemeroptera Taxa	1	2.9	2.9
Number of Trichoptera Taxa	4	6.2	6.2
Number of Clinger Taxa	4	4.4	4.4
Number of Long-lived Taxa	0	0.0	0.0
Number of Sensitive Taxa	4	3.6	3.6
Percent Contribution of Dominant Taxon	16	8.6	8.6
Percent Suspension Feeders and Filterers	25	5.9	5.9
Percent of Tanytarsini individuals	0	0.0	0.0
Percent of Very Tolerant individuals	21	3.0	3.0
Total Score		**Poor**	**44**
Interpretation of Scores		Good	73-100
		Fair	46-72
		Poor	19-45
		Very Poor	0-18

Table 6b. Stream Condition Index Metrics - Northeast

DuPont Trailridge Mine Test Site			
Metric:	Value	Raw Metric Score	Fixed Score 0 -10
Total Number of Taxa	11	-1.9	0.0
Number of Ephemeroptera Taxa	1	2.9	2.9
Number of Trichoptera Taxa	2	3.1	3.1
Number of Clinger Taxa	2	2.2	2.2
Number of Long-lived Taxa	1	3.3	3.3
Number of Sensitive Taxa	3	2.7	2.7
Percent Contribution of Dominant Taxon	84.62	-7.0	0.0
Percent Suspension Feeders and Filterers	1.92	0.2	0.2
Percent of Tanytarsini individuals	0	0.0	0.0
Percent of Very Tolerant individuals	88.46	-0.2	0.0
Total Score		**Very Poor**	**16**
Interpretation of Scores		Good	73-100
		Fair	46-72
		Poor	19-45
		Very Poor	0-18

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Appendices

- Appendix 1. Map of facility
- Appendix 2. Facility summary and DMR data
- Appendix 3. Explanation of measurements
- Appendix 4. Chemical analyses of effluent and receiving water.
- Appendix 5. Typical values for selected parameters in Florida waters
- Appendix 6. Additional physical, chemical, toxicological and microbiological results
- Appendix 7. Habitat Assessment field sheets
- Appendix 8. Periphyton: Taxa list and number of individuals counted
- Appendix 9a. Hester-Dendy multi-plate samplers: Taxa list and macroinvertebrate density (average number of individuals per m^2)
- Appendix 9b. Hester-Dendy multi-plate samplers: Taxa list and total number of macroinvertebrates counted
- Appendix 10a. Dipnet samples: Taxa list and number of macroinvertebrates counted (collapsed)
- Appendix 10b. Dipnet samples: Taxa list and number of macroinvertebrates counted

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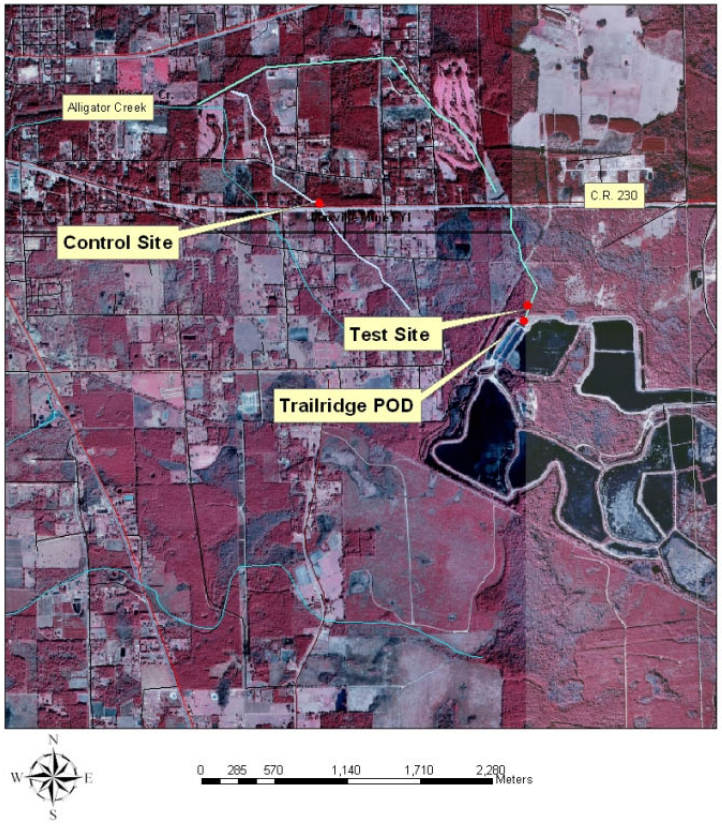
Appendix 1

Map of Facility

Trailridge FYI



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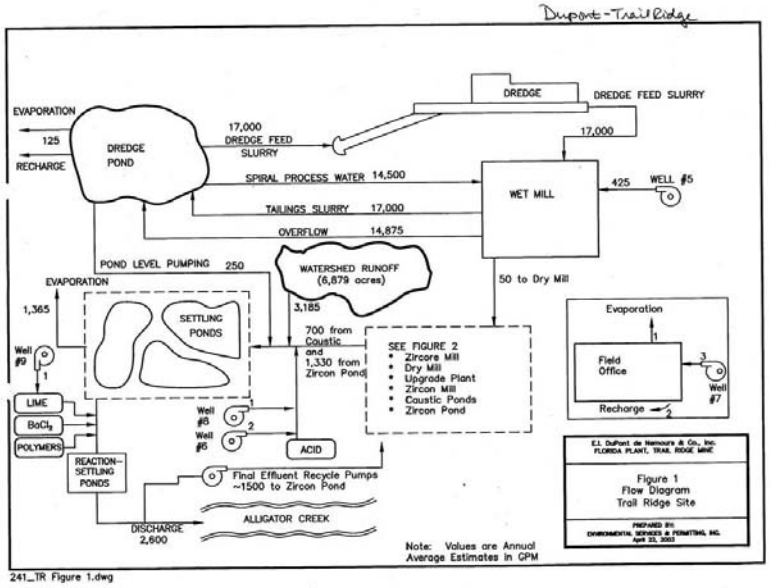

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Appendix 2

Facility Summary and DMR data

State of Florida
Department of Environmental Protection
Facility Introduction

E.I. Dupont de Nemours & Company
Trailridge Mine
FL0000051

The Trailridge Mine is a heavy minerals mining wastewater treatment system providing acidification with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 to 3.5 standard units, for flocculation of colloidal material, followed by settling in a series of diked ponds, neutralization with hydrated lime to a pH of between 6.0 to 8.5, and additional settling with final discharge to Alligator Creek. Upon Department approval, polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to Alligator Creek. Storm water and rainfall runoff from mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride and or ferric sulfate is added (prior to the humate settling ponds).

The facility is an existing 8.5 MGD annual average (30.0 MGD maximum) permitted discharge at Outfall D-001, to Alligator Creek, a Class III fresh surface water. The point of discharge is located approximately at latitude 29°55'25"N, longitude 82°03'43"W.

A new permitted discharge at Outfall D-002 to the Southwest Quadrant Pond then Blue Pond, a Class III fresh surface water. The point of discharge is located approximately at latitude 29°54'46"N, longitude 82°02'03"W.

A substantial revision was made on April 4, 2005 to redirect a portion of the effluent to the Southwest Quadrant Pond. The existing recycle line from D-001 will be tapped and a pipeline will be constructed to route approximately 400 gallons per minute (gpm) of the wastewater to an existing ditch which then discharges into the Southwest Quadrant Pond with eventual discharge into Blue Pond. This rerouting of final effluent is part of an effort of The Keystone Stakeholders Committee to help improve lake water levels in the Keystone Heights area.

The substantial revision also consists of providing additional treatment of the wastewater for the removal of combined radium 226 and 228 to below the water quality standard of 5.0 picocuries per liter [FAC Rule 62-302.530(58)(a)].

Land Application: Some percolation occurs through the wastewater treatment settling ponds. All discharges are to Class GII ground waters of the state. Ground water monitoring is required by Part III of the permit.

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Facility Name (as it appears on permit): E.I. Dupont – Trailridge Mine		**Former Names:**
Physical Address: State Road 230 Starke, Florida	**NPDES Permit No.:** FL0000051 **Expiration Date:** May 9, 2006	**Prepared By:** Reza Shayan
County: Bradford	**District:** NE	**Facility Type:** Major
Function of Facility: Dredge mining of heavy mineral sands to separate ilmenite, zircon, and staurolite.		
Sampling Location (actual permit designation of permitted sampling point): Outfall D-001 ⇒ Latitude 29°55'25"N Longitude 82°03'43"W Outfall D-002 ⇒ Latitude 29°54'46"N Longitude 82°02'03"W		
Description of permitted outfall: The existing 8.5 MGD annual average (30.0 MGD Maximum) Permitted discharge at Outfall D-001, to Alligator Creek, a Class III fresh surface water. A new permitted discharge at Outfall D-002 to the Southwest Quadrant Pond then Blue Pond, a Class III fresh surface water.		
Description of treatment process (if multiple discharge points, include a map or diagram of facility): The facility is a heavy minerals mining wastewater treatment system providing acidification with ferric chloride, sulfuric acid or ferric sulfate to a pH between 3.0 to 3.5 standard units, for flocculation of colloidal material, followed by settling in a series of diked ponds, neutralization with hydrated lime to a pH of between 6.0 to 8.5, and additional settling with final discharge to Alligator Creek. Upon Department approval, Polymer addition may be provided after neutralization for aluminum reduction prior to final discharge to Alligator Creek. Storm water and rainfall runoff from mined areas are also collected and treated as described above. The treatment train consists of the addition of barium chloride to the wastewater at the location where ferric chloride and or ferric sulfate is added (prior to the humate settling ponds).		
Receiving Waters: Alligator Creek and Blue Pond.	**Classification (indicate whether fresh or marine):** Class III fresh surface waters.	
Temperature (C):	**Design Flow:** 8.5 MGD annual average (30.0 MGD maximum).	
pH (SU):	**Mean Flow:** 7.58 MGD from April 2004 through March 2005.	
Conductivity (umhos/cm):	**Flow During Survey:**	
Method of Chlorination	**Method of Dechlorination**	
Dissolved Oxygen (mg/L):	**Total Residual Chlorine (mg/L) (after disinfection):**	
Discharge is: Rainfall Dependent		
Toxicity Test Requirements (routine and/or additional test language test species, salinity adjustment, etc.): **D-001** => Requires chronic screening tests with 24-hr composite samples using freshwater species conducted quarterly. If NOEC < 100% effluent in any routine test, facility needs "up to 3" additional definitive tests. If 1st definitive passes, the remaining two tests are not required. When 5 consecutive discharge days have not occurred, the permittee shall conduct acute toxicity testing in accordance with Part I.C.2 of this permit in lieu of the chronic testing. Acute tests will be 96-hr screens, also with *C.dubia* and *P.promelas*, using one 24-hr composite sample. If mortality > 20% in 100% effluent, then "a minimum of 3" valid additional acute definitives are required.		
Administrative or Consent Orders: None		

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Facility Mixing Zone Details:
List permit violations (DMR data) and plant upsets that occurred at the plant within the last year: (1) The routine chronic *C. dubia* test reported in November 2004 failed acute and chronic endpoints; however, the follow-up test passed both acute and chronic endpoints. (2) On July 4, 2004, the facility experienced an abnormal event when an estimated 5,000 gallons of turbid water exited the property boundary. It was investigated that the transfer ditch that carries stormwater from the active mining area to the water treatment facilities had become restricted at a tube crossing and a portion of the turbid water in the transfer ditch had backed-up and sheetflowed outside of the water treatment transfer ditch. Immediate actions were taken to contain the turbid water remaining on site. Gypsum was used to reduce the turbidity of the impacted water on the site. (3) During September and October 2004, the facility had the following exceedances due to Hurricane Frances and Jean: Flow, pH, and Length of Longest pH Excursion.
Describe previous impact bioassessments, WQBEL's, and previous or current enforcement actions: FDEP has not conducted a 5th -year bioassessment at the **Trailridge** mine. Two 3rd -year sampling events were made in January 1983 and April 1995. The effluent was not toxic to any of the 4 test species in 1983. No chemical analyses were reported. Nor was the effluent toxic to either test species in 1995. No organics were detected and the metals were in compliance at that time.
Discuss MOR trends to prior data; is trend improving or declining: No noticeable trend.
List Effluent Limits (include additional sheets as necessary):

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Parameter and Units Outfall D-001 and D-002 Alligator Creek and Blue Pond	**Limit**	**Describe special permit conditions and permit modifications:**
Flow (MGD)	Monthly Average: Report Daily Maximum: 30.0 Annual Average: 8.5	
TSS (mg/L)	Monthly Average: 20.0 Daily Maximum: 30.0	
Total Recoverable Iron (mg/L)	Monthly Average: 1.0 Daily Maximum: 1.0	
Acute Whole Effluent Toxicity, (%)	The LC50 shall not be less than 100%.	
Chronic Whole Effluent Toxicity, (%)	NOEC ≥ 100%.	The pH at EFF-1 shall be monitored continuously via a recorder. The pH at EFF-2 shall be monitored weekly on a grab sample of the effluent. The pH values shall not deviate outside the range of 6.0 standard units to 8.5 standard units more than 1% of the time in any calendar month and no individual excursion shall exceed 60 minutes. An "excursion" is an unintentional and temporary incident in which the pH value of discharged wastewater exceeds the range set forth in the permit. Samples shall be taken at the monitoring site locations EFF-1 and EFF-2 at the nearest accessible point after final treatment but prior to the actual discharge with the receiving water: EFF-1: The nearest accessible point after final treatment but prior to actual discharge into Alligator Creek. EFF-2: At the discharge point into the unnamed ditch which discharges into the Southwest Quadrant Pond.
Combined radium 226 and 228, Picocuries/L	Daily Maximum: 5.0	
pH, standard units	Daily Minimum: 6.0 Daily Maximum: 8.5 See comments	

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Appendix 3

Explanation of Measurements

(1) Quality Assurance and Quality Control

FDEP's quality assurance requirements for analytical laboratories and field activities are codified in Chapter 62-160, F.A.C., Quality Assurance (QA Rule) and in internal Standard Operating Procedures (FDEP SOPs). Methods for all analyses are on file at the FDEP Central Laboratory in Tallahassee and may be viewed on the web at http://www.floridadep.org/labs/sop/index.htm and/or http://www.floridadep.org/labs/qa/index.htm .

(2) Chemical Analyses of the Effluent

The effluent was analyzed for nutrients, metals, organic constituents (base, neutral, and acid extractables) and pesticides following FDEP SOPs. A list of the analytes tested for, results, data qualifiers, the minimum detection limit and the practical quantitation limit are given in Appendix 4. The results from these analyses were compared with Water Quality Criteria (62-302 F.A.C.) and facility permit limits (Table 1, Appendix 2). Exceedances of Water Quality Criteria may be violations of specific provisions of Chapter 62-302 (F.A.C.) and/ or facility permit limits.

(3) Toxicity Bioassays

Acute screening toxicity bioassays were performed on the effluent sample using the water flea, *Ceriodaphnia dubia*, and the fish, *Pimephales promeles* following FDEP SOPs TA07_01 and TA07_02. Failure of toxicity testing may constitute a violation of 62-302.520(21), 62-302.530(62) and/or facility permit limits.

(4) Bacteriological Testing

The effluent and water from control and test sites were not analyzed for the presence and concentration of total and fecal coliform bacteria for this study.

(5) Habitat Assessment

Habitat assessment is used to evaluate the physical structure and extent of disturbance in a waterbody. Eight aspects are ranked, with 20 possible points for each aspect (QA Rule SOP FT 3100). The Habitat Assessment score includes types and amounts of benthic substrates, water velocity, amount of sand or silt accumulation, extent of artificial channelization, bank stability, and riparian zone width and vegetation type. All scores are summed to yield an overall Habitat Assessment score. Habitat Assessment score ranges from 11-160 and overall habitat quality is assigned to one of four categories: Optimal (120-160 points), Suboptimal (80-119 points), Marginal (40-79 points), and Poor (11-39 points).

(6) Algal Growth Potential (AGP)

The effluent and water from control and test sites are autoclaved, filtered (0.45µm), inoculated with the unicellular green alga, *Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum*, USEPA 2002), and incubated for 14 days (FDEP SOP TA08_05). The algal growth potential (AGP) value is the peak growth of the alga within that 14-day period, recorded as mg dry weight/L. Raschke and Shultz (1987) found that an AGP above 5.0 mg dry weight/L represents a "problem" threshold for fresh receiving waters, implying nutrient enrichment. High AGP values may constitute one line of evidence for violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

The concentration of nutrients in a water sample may be used to calculate the expected yield of AGP under the assumption that other required nutrients (e.g. silicon, micronutrients) are present in excess (Miller *et al.* 1978). The expected amount of production is calculated as 38 times the total soluble inorganic nitrogen (nitrate and nitrite plus ammonia) under nitrogen limitation or 430 times the ortho-phosphate (OP) concentration under phosphorus limitation with an error of ± 20%. When the ratio of nitrogen to phosphorus (N: P) is less than 10:1, nitrogen limitation of algal production is likely. When the N: P ratio is 20:1 or greater, phosphorus limitation is likely (USEPA 2000). For ratios in-between, co-limitation may occur. Production of lower biomass than expected may be evidence of growth inhibition related to toxic compounds present in the water sample tested and may be a violation of 62-302.530(62) F.A.C..

(7) Algal Phytoplankton and Periphyton Assemblages

Methods: Qualitative periphyton were sampled at both control and test sites by taking subsamples of algae from natural substrates throughout the sample reach. Phytoplankton were sampled using a 1 L grab sample (QA Rule SOP FS7100). Periphyton were subsampled and identified to the lowest practical level, usually species (FDEP SOPs AB03, AB03_1 and AB05).

Chlorophyll *a* Content: Chlorophyll *a* content is measured in both phytoplankton and periphyton samples to estimate algal biomass (FDEP SOP BB05). High algal biomass implies nutrient stress (Stevenson and Bahls 1999) and may be a violation of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

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Algal Density: Algal density is estimated as number of natural units/ml for phytoplankton samples and number of natural units/cm^2 for periphyton samples. Although algal density of a single site is highly variable and depends on a number of factors, comparison of algal density at a control site to algal density at a related test site gives a partial comparison of algal biomass at the two sites (Stevenson and Smol 2003).

Taxa richness: Taxa richness is the number of distinct algal taxa present in a sample. Extreme nutrient enrichment tends to reduce the number of different types of algae present in a sample because a few tolerant taxa tend to reproduce rapidly and constitute the majority of the cells present. However, moderate nutrient enrichment of nutrient poor waters may sometimes be correlated with increased algal taxa richness (Stevenson and Bahls 1999) as the algal community begins to respond to the increased input of nutrients.

Community Composition: Shifts in relative proportions of major groups of algae downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Stevenson and Bahls 1999) and may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present with more equitable abundance among taxa (Magurran 1988). Low diversity scores related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

(8) Benthic Macroinvertebrate Assemblages

Methods: Benthic macroinvertebrates were collected using two methods. Quantitative samples were collected from Hester-Dendy multi-plate samplers incubated for 28 days (QA Rule SOP FS7430). Qualitative collections are made using 20 dipnet sweeps (QA Rule SOP FS7420). Benthic macroinvertebrates were sorted and identified to the lowest practical taxonomic level, usually species (FDEP SOP IZ06).

Taxa richness: Taxa richness is the number of distinct macroinvertebrate taxa present in a sample. Stress, habitat destruction and pollution tend to reduce the number of different types of organisms present (Karr and Chu 1998). Decreases in taxa richness related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Percent Contribution of Dominant Taxon: Percent contribution of the dominant taxon is calculated by dividing the number of individuals in the most abundant taxa by the total number of individuals counted. Percent contribution of the dominant taxon tends to increase with increasing perturbation (Plafkin *et al.*, 1989). Increases in the percent contribution of the dominant taxon related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C. and/or 62-302.530(48)(b) F.A.C..

Shannon-Weaver Diversity Index: This index is specified in the Florida Administrative Code 62-302 as a measure of biological integrity. Low diversity scores are undesirable. Where diversity is low, only a few taxa are abundant as compared to an area where many taxa are present in equitable abundance among taxa (Magurran 1988). A difference of 25% in Shannon-Weaver diversity between results from Hester-Dendy multiplate samplers incubated for 28 days at test and control sites constitutes a violation of 62-302.530(11) F.A.C..

Community Composition: Shifts in proportions of major groups of organisms downstream of a point source, compared to upstream, control conditions, may indicate negative effects of a discharge (Karr and Chu 1998). Shifts in community composition related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

Functional Feeding Groups: Environmental degradation may differentially affect groups of invertebrates based on how the group feeds (e.g. predators, deposit feeders, etc.). In Florida, pollution may be responsible for reducing the numbers of filter feeders (FDEP 1994) and shredders (EA Engineering 1994). Changes in the proportions of functional feeding groups related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

The Stream Condition Index (SCI): The SCI is a composite macroinvertebrate metric developed for Florida. This Index was revised in 2004 using data from qualitative dipnet samples. The SCI now assigns points to ten parameters; depending on how closely each parameter approaches an expected value (QA Rule SOP LT 7200). Points are assigned depending on which bioregion (Panhandle, Northeast, or Peninsula) the sampling location exists in and summed to yield a final SCI score (range 0-100). Included in the calculation of SCI are taxa richness, number of Ephemeroptera taxa, number of Trichoptera taxa, percent contribution of the dominant taxon, number of sensitive taxa, number of clinger taxa, number of long-lived taxa, percent contribution of Tanytarsini, percent contribution of very tolerant, and the percent contribution of suspension and filter feeders. Scores are broken into four ordinal groups: Good, Fair, Poor, and Very Poor. A decrease in ordinal SCI score from the Control to the Test site may be evidence of degradation related to a facility's effluent. An SCI score of "Poor" or "Very Poor" related to a facility's effluent may constitute violations of 62-302.530(47) F.A.C., 62-302.530(48)(a) F.A.C., 62-302.530(48)(b) F.A.C. and/or 62-302.530(62) F.A.C..

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Appendix 4

Chemical analysis of effluent and receiving water

DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-AGP/LimNut	Algal Growth Potential	0.3	mg DryWt/L	U	0.3	0.9
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	2.4	ug/L	I	2.1	6.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.77	ug/L	J	2.1	6.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	30	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	8	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	27	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	6	#Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Aluminum	331	ug/L		5	20
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Calcium	14.6	mg/L		0.05	0.2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Chromium	2	ug/L	U	2	8
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Iron	1.49E+03	ug/L		10	40
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Lead	2.1	ug/L	U	2.1	8.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Magnesium	2.3	mg/L		0.01	0.04
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Nickel	2	ug/L	U	2	8
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Metals-Water	Zinc	5.1	ug/L	I	3	12
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	Ammonia-N	0.051	mg N/L		0.01	0.02
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	Kjeldahl Nitrogen	0.71	mg N/L		0.12	0.4
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230	Nutrients-Liquid	Total-P	0.045	mg P/L	I	0.02	0.06
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230 REP 2	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	13	# Taxa			
7/18/2005 9:45	ALLIGATOR CR BELOW CR 230 REP 3	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	10	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-AGP/LimNut	Algal Growth Potential	0.3	mg DryWt/L	AU	0.3	0.9
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Invertebrates	Macroinvert-FW-Qual-Dipnetx20-# Taxa	12	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Invertebrates	Macroinvert-FW-Quan-ArtSubstr-# Taxa	2	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Peri/Phyto	Periphyton-Qualitative-# Diatom Taxa	7	# Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Bio-Peri/Phyto	Periphyton-Qualitative-# Wet Taxa	4	#Taxa			
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Aluminum	428	ug/L	A	5	20
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Calcium	51.4	mg/L	A	0.05	0.2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Chromium	2	ug/L	U	2	8
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Iron	91	ug/L	A	10	40
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Magnesium	2.5	mg/L	A	0.01	0.04
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Nickel	7.2	ug/L	I	2	8
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Selenium	0.79	ug/L	I	0.5	2
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Metals-Water	Zinc	4.9	ug/L	I	3	12
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	Ammonia-N	0.028	mg N/L		0.01	0.02
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	Kjeldahl Nitrogen	0.06	mg N/L	U	0.06	0.2

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DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	NO2NO3-N	0.006	mg N/L	I	0.004	0.01
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD	Nutrients-Liquid	Total-P	0.032	mg P/L	I	0.02	0.06
7/18/2005 12:15	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD REP 2	Bio-Invertebrates	MacroInvert-FW-Quan-ArtSubstr-# Taxa	4	# Taxa			
7/18/2005 12:50	ALLIGATOR CR 100M BELOW TRAIL RIDGE POD REP 3	Bio-Invertebrates	MacroInvert-FW-Quan-ArtSubstr-# Taxa	5	# Taxa			
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	2-Nitrophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzidine	96	ug/L	U	96	380
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15

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DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Phenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Alachlor	0.58	ug/L	UJ	0.58	2.3
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Chlorpyrifos Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Ethoprop	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Fonofos	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Hexazinone	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Malathion	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Metalaxyl	0.24	ug/L	UJ	0.24	0.96
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Metolachlor	0.48	ug/L	UJ	0.48	1.9
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Metribuzin	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Naled	0.77	ug/L	U	0.77	3.1
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Parathion Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Phorate	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Prometryn	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	EQUIPMENT BLANK	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Aluminum	5	ug/L	U	5	20
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Calcium	0.05	mg/L	U	0.05	0.2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Chromium	2	ug/L	U	2	8

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DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Iron	10	ug/L	U	10	40
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Lead	0.075	ug/L	U	0.075	0.3
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Magnesium	0.01	mg/L	U	0.01	0.04
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Nickel	2	ug/L	U	2	8
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Selenium	0.5	ug/L	U	0.5	2
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 12:50	EQUIPMENT BLANK	Metals-Water	Zinc	3	ug/L	U	3	12
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	Ammonia-N	0.01	mg N/L	U	0.01	0.02
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	Kjeldahl Nitrogen	0.12	mg N/L	U	0.12	0.4
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	NO2NO3-N	0.004	mg N/L	U	0.004	0.01
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 12:50	EQUIPMENT BLANK	Nutrients-Liquid	Total-P	0.02	mg P/L	U	0.02	0.06
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 226	0.2	pCi/L			
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 226-Counting Error	0.1	pCi/L			
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 228	1	pCi/L	U		
7/18/2005 12:50	EQUIPMENT BLANK	Overflow	Radium 228-Counting Error	0.7	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,2,4-Trichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,2-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,3-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	1,4-Dichlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4,6-Trichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dichlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dimethylphenol	48	ug/L	U	48	190
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dinitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,4-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2,6-Dinitrotoluene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Chloronaphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Chlorophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Methyl-4,6-dinitrophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	2-Nitrophenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	3,3'-Dichlorobenzidine	38	ug/L	U	38	150
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4,4'-DDD	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4,4'-DDE	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4,4'-DDT	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Bromophenyl phenyl ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Chloro-3-methylphenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Chlorophenyl phenyl ether	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	4-Nitrophenol	14	ug/L	U	14	58
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Acenaphthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Acenaphthylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Aldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzidine	96	ug/L	U	96	380
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(a)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(a)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(b)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(g,h,i)perylene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Benzo(k)fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-chloroethoxy)methane	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-chloroethyl)ether	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-chloroisopropyl)ether	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Bis(2-ethylhexyl)phthalate	14	ug/L	U	14	58
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Butyl benzyl phthalate	4.8	ug/L	U	4.8	19

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DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Chrysene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Di-n-butyl phthalate	4.8	ug/L	U	4.8	19
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Di-n-octyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Dibenzo(a,h)anthracene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Dieldrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Diethyl phthalate	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Dimethyl phthalate	48	ug/L	U	48	190
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endosulfan I	3.8	ug/L	U	3.8	15
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endosulfan II	3.8	ug/L	U	3.8	15
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endosulfan sulfate	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endrin	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Endrin aldehyde	3.8	ug/L	U	3.8	15
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Fluoranthene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Fluorene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Heptachlor	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Heptachlor epoxide	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachlorobenzene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachlorobutadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachlorocyclopentadiene	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Hexachloroethane	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Indeno(1,2,3-cd)pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Isophorone	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	N-Nitrosodi-n-propylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	N-Nitrosodimethylamine	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	N-Nitrosodiphenylamine	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Naphthalene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Nitrobenzene	1.9	ug/L	U	1.9	7.7
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Pentachlorophenol	2.9	ug/L	U	2.9	12
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Phenanthrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Phenol	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	Pyrene	0.96	ug/L	U	0.96	3.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	alpha-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	beta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	delta-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	BNA-Water	gamma-BHC	1.4	ug/L	U	1.4	5.8
7/18/2005 12:50	FINAL EFFLUENT	Bio-AGP/LimNut	Algal Growth Potential	0.3	mg Dry Wt/L	U	0.3	0.9
7/18/2005 12:50	FINAL EFFLUENT	Bio-Chl-a	Chlorophyll-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:50	FINAL EFFLUENT	Bio-Chl-a	Phaeophytin-A, Monochromatic, Water	0.85	ug/L	U	0.85	2.6
7/18/2005 12:50	FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-C.dubia, LC50	100	LC50	L		
7/18/2005 12:50	FINAL EFFLUENT	Bio-Toxicology	Bioassay-Acute-Screen-FW-Fish, LC50	100	LC50	L		
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Alachlor	0.58	ug/L	UJ	0.58	2.3
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Ametryn	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Atrazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Azinphos Methyl	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Bromacil	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Butylate	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Chlorpyrifos Ethyl	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Chlorpyrifos Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Diazinon	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Ethion	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Ethoprop	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Fenamiphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Fonofos	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Hexazinone	0.096	ug/L	U	0.096	0.38

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DATE SAMPLED	FIELD ID	ANALYSIS GROUP	COMPONENT	RESULT	UNITS	REMARK	MDL	PQL
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Malathion	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Metalaxyl	0.24	ug/L	UJ	0.24	0.96
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Metolachlor	0.48	ug/L	UJ	0.48	1.9
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Metribuzin	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Mevinphos	0.19	ug/L	U	0.19	0.76
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Naled	0.77	ug/L	U	0.77	3.1
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Norflurazon	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Parathion Ethyl	0.14	ug/L	U	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Parathion Methyl	0.096	ug/L	U	0.096	0.38
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Phorate	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Prometryn	0.14	ug/L	UJ	0.14	0.56
7/18/2005 12:50	FINAL EFFLUENT	GC-Water	Simazine	0.048	ug/L	U	0.048	0.19
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Aluminum	391	ug/L		5	20
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Arsenic	4	ug/L	U	4	16
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Cadmium	0.5	ug/L	U	0.5	2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Calcium	52.6	mg/L		0.05	0.2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Chromium	2	ug/L	U	2	8
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Copper	0.5	ug/L	U	0.5	2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Iron	78	ug/L		10	40
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Lead	2.1	ug/L	U	2.1	8.4
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Magnesium	2.6	mg/L		0.01	0.04
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Nickel	7.5	ug/L	I	2	8
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Selenium	0.66	ug/L	I	0.5	2
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Silver	0.025	ug/L	U	0.025	0.1
7/18/2005 12:50	FINAL EFFLUENT	Metals-Water	Zinc	4.2	ug/L	I	3	12
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	Ammonia-N	0.028	mg N/L		0.01	0.02
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	Kjeldahl Nitrogen	0.06	mg N/L	U	0.06	0.2
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	NO2NO3-N	0.005	mg N/L	I	0.004	0.01
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	O-Phosphate-P	0.004	mg P/L	U	0.004	0.01
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	TSS	4	mg/L	U	4	16
7/18/2005 12:50	FINAL EFFLUENT	Nutrients-Liquid	Total-P	0.035	mg P/L	I	0.02	0.06
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 226	0.9	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 226-Counting Error	0.2	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 228	1.4	pCi/L			
7/18/2005 12:50	FINAL EFFLUENT	Overflow	Radium 228-Counting Error	0.8	pCi/L			

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Comment

Response

Appendix 5

Typical Values for Selected Parameters in Florida Waters

Percentile Distribution (1617 stations)

CONTROL SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**ND**
Hester-Dendy Diversity	0.84	2.12	2.48	2.74	**2.88**	3.09	3.25	3.40	3.52	3.76	3.90	**2.87**
Hester-Dendy Taxa Richness	6	6.5	9	11.5	13	**15**	17	21.5	26	29	32	**16**
Dipnet Taxa Richness	9	12	17	20	22	24.5	26	**28**	31	37	53	**28**
Total Kjeldahl Nitrogen	0.30	0.39	**0.56**	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.71**
Total Ammonia	0.02	0.02	0.04	**0.05**	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.051**
Nitrate plus Nitrite	**0.01**	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**0.004 U**
Total Phosphorus	0.02	**0.03**	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.045 I**
Orthophosphate	**0.01**	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.004 U**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**ND**

TEST SITE

Parameter	5%	10%	20%	30%	40%	50%	60%	70%	80%	90%	95%	Measured
Periphyton Chlorophyll *a* (mg/m^2)	0.31	0.43	0.77	1.04	2.16	2.94	6.45	10.51	17.00	39.51	60.85	**ND**
Hester-Dendy Diversity	**0.84**	2.12	2.48	2.74	2.88	3.09	3.25	3.40	3.52	3.76	3.90	**1.24**
Hester-Dendy Taxa Richness	**6**	6.5	9	11.5	13	15	17	21.5	26	29	32	**6**
Dipnet Taxa Richness	**9**	12	17	20	22	24.5	26	28	31	37	53	**11**
Total Kjeldahl Nitrogen	**0.30**	0.39	0.56	0.73	0.87	1.00	1.11	1.26	1.49	1.93	2.80	**0.06 U**
Total Ammonia	0.02	**0.02**	0.04	0.05	0.06	0.08	0.11	0.14	0.20	0.34	0.60	**0.028**
Nitrate plus Nitrite	**0.01**	0.01	0.03	0.05	0.07	0.10	0.14	0.20	0.32	0.64	1.05	**0.006 I**
Total Phosphorus	0.02	**0.03**	0.05	0.06	0.10	0.13	0.18	0.25	0.39	0.74	1.51	**0.032 I**
Orthophosphate	**0.01**	0.01	0.03	0.04	0.05	0.08	0.11	0.17	0.27	0.59	1.37	**0.004 U**
Turbidity (NTU)	0.60	0.90	1.20	1.45	2.10	2.80	3.60	4.50	6.65	10.45	16.30	**ND**

Taxa richness and diversity values are for benthic macroinvertebrates. Hester-Dendy sample= benthic macroinvertebrates collected from a standardized multi-plate sampler. Dipnet taxa richness = number of taxa collected in standardized dipnet sweep samples. Diversity = Shannon-Weaver H'. NTU = Nephelometric turbidity units. Adapted from Joe Hand, FDER, personal communication, 1991 (data collected 1980-1989). ND = No data.

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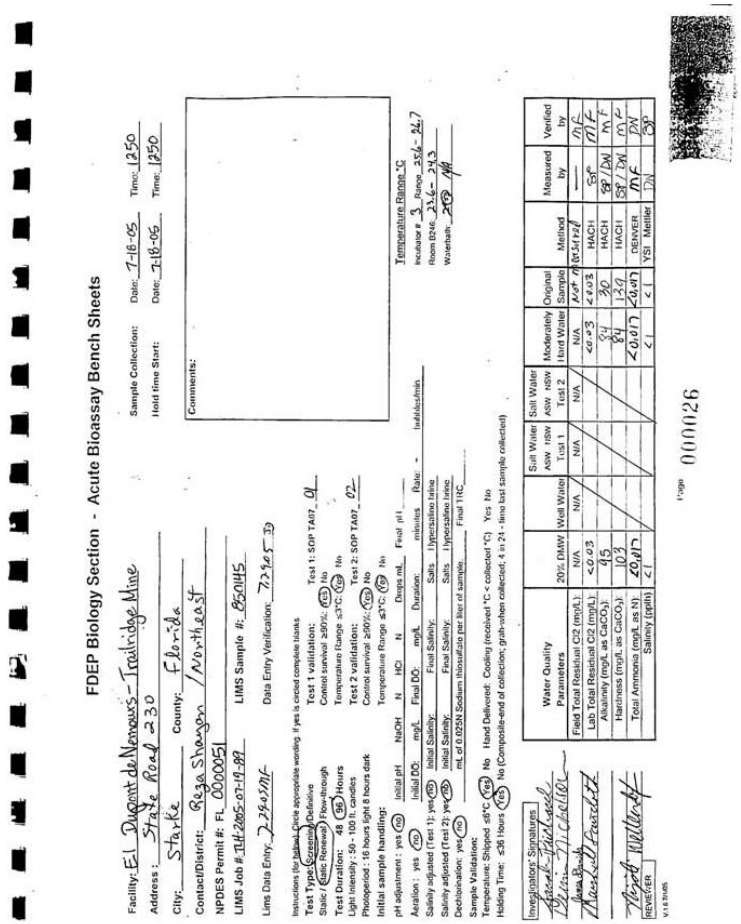
Comment ***Response***

Appendix 6

Additional physical, chemical, toxicological and microbiological results



FDEP Biology Section - Acute Bioassay Bench Sheets

Facility: E.I. Dupont de Nemours - Tradridge Mine
Address: State Road 230
City: Starke County: Florida
Contact/District: Reza Shaugn / Northeast
NPDES Permit #: FL 0000051
LIMS Job #: TUE 2005-07-19-89
Lims Data Entry: JAMF
LIMS Sample #: 850145
Data Entry Verification: JAMF

Sample Collection: Date: 7-18-05 Time: 1250
Hold time Start: Date: 7-18-05 Time: 1250

Comments:

Instructions (for below): Circle appropriate wording. If yes is circled complete boxes
Test Type: Screening/Definitive
Static / (Static Renewal) Flow-through
Test Duration: 48 (96) Hours
Light Intensity : 50 - 100 ft. candles
Photoperiod : 16 hours light 8 hours dark
Initial sample handling:
pH adjustment : yes (no) Initial pH ___ NaOH ___ N HCl ___ N Drops mL ___ Final pH ___
Aeration : yes (no) Initial DO: ___ mg/L Final DO: ___ mg/L Duration ___ minutes Rate: ___ Inhibitor/min
Salinity adjusted (Test 1): yes (no) Initial Salinity: ___ Final Salinity: ___ Salts ___ Hypersaline brine
Salinity adjusted (Test 2): yes (no) Initial Salinity: ___ Final Salinity: ___ Salts ___ Hypersaline brine
Dechlorination: yes (no) ___ mL of 0.025N Sodium thiosulfate per liter of sample. ___ Final TRC ___
Sample Validation:
Temperature: Shipped ≤6°C (Yes) No Hand Delivered: Cooling (received °C < collected °C) Yes No
Holding Time: ≤36 hours (Yes) No (Composite-end of collection; grab-when collected; 4 in 24 - time last sample collected)

Test 1: SOP TA97_01
Test 2: SOP TA97_02

Temperature Range °C
Incubator # 3 Range 25.6 - 26.7
Room B246 23.6 - 24.3
Waterbath 26.9 AM

Investigators' Signatures													
Water Quality Parameters	20% DMW	Well Water	Salt Water ASW / NSW Test 1	Salt Water ASW / NSW Test 2	Moderately Hard Water	Original Sample	Method	Measured by	Verified by
Field Total Residual Cl2 (mg/L)	N/A	N/A	N/A	N/A	N/A	Not Tested		—	MF
Lab Total Residual Cl2 (mg/L)	<0.03				<0.03	<0.03	HACH	SR	MF
Alkalinity (mg/L as $CaCO_3$)	95				84	30	HACH	SR / DW	MF
Hardness (mg/L as $CaCO_3$)	103				84	130	HACH	SR / DW	MF
Total Ammonia (mg/L as N)	<0.017				<0.017	<0.017	DENVER	MF	DW
Salinity (ppts)	<1				<1	<1	YSI Meiller	DW	SR

REVIEWER

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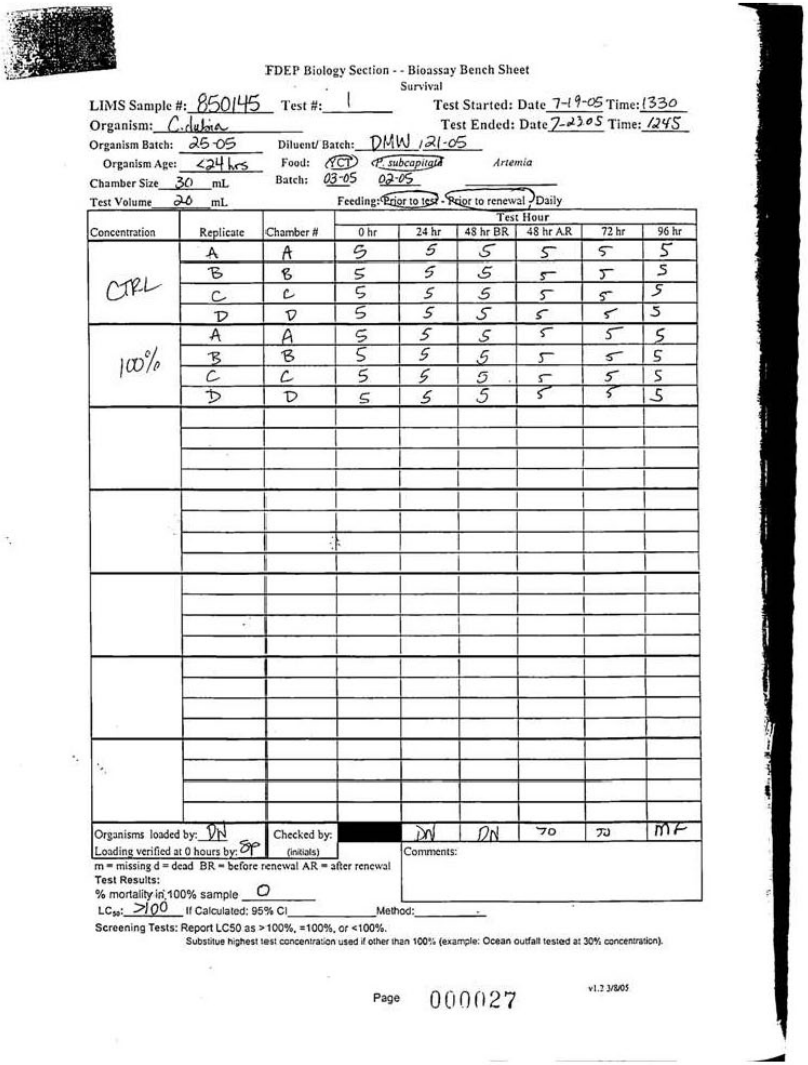
Comment

Response



FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 850145 Test #: 1 Test Started: Date 7-19-05 Time: 1330
Organism: C. dubia Test Ended: Date 7-23-05 Time: 1245
Organism Batch: 25-05 Diluent/ Batch: DMW 121-05
Organism Age: <24 hrs Food: YCT, S. subcapitata, Artemia
Chamber Size 30 mL Batch: 03-05 02-05
Test Volume 20 mL Feeding: Prior to test - Prior to renewal / Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
100%	A	A	5	5	5	5	5	5
	B	B	5	5	5	5	5	5
	C	C	5	5	5	5	5	5
	D	D	5	5	5	5	5	5
Organisms loaded by: DN		Checked by: [redacted]	DN	DN	70	70	MF	
Loading verified at 0 hours by: SP		(initials)						

m = missing d = dead BR = before renewal AR = after renewal
Comments:

Test Results:
% mortality in 100% sample 0
LC_{50}: >100 If Calculated: 95% CI _____ Method: _____

Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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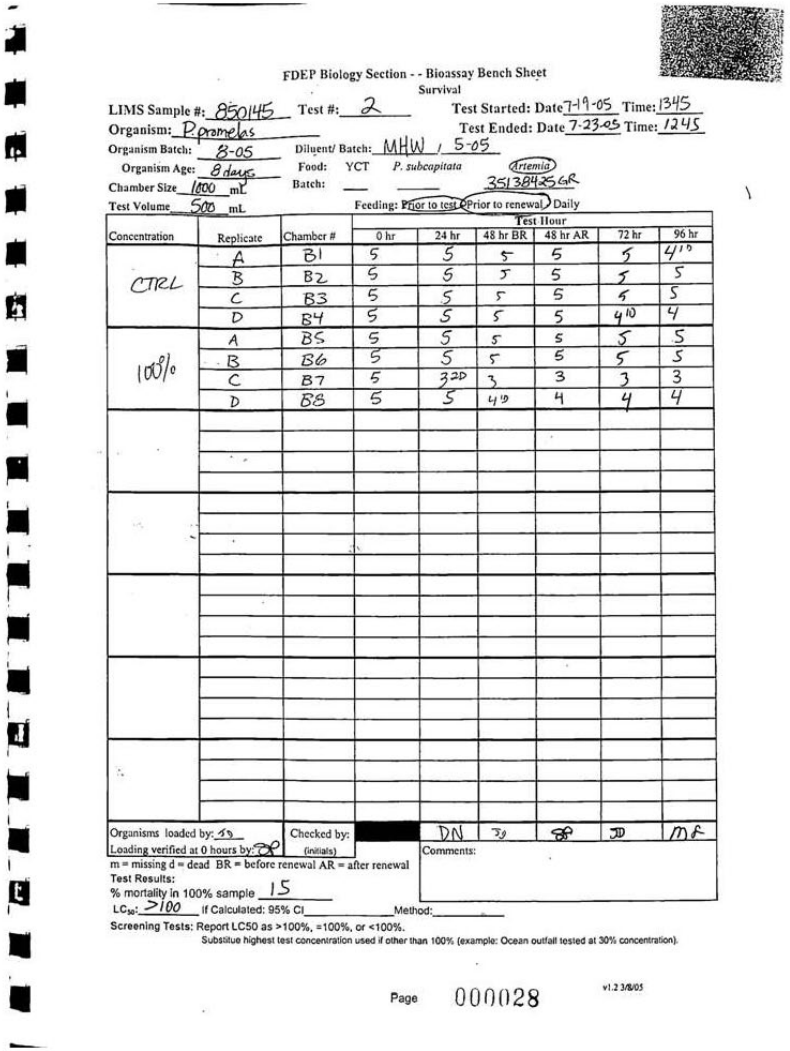
Comment ***Response***



FDEP Biology Section - - Bioassay Bench Sheet
Survival

LIMS Sample #: 850145 Test #: 2 Test Started: Date 7-19-05 Time: 1345
Organism: P. promelas Test Ended: Date 7-23-05 Time: 1245
Organism Batch: 8-05 Diluent/ Batch: MHW / 5-05
Organism Age: 8 days Food: YCT *P. subcapitata* Artemia
Chamber Size 1000 mL Batch: — — 351384256R
Test Volume 500 mL Feeding: Prior to test / Prior to renewal / Daily

Concentration	Replicate	Chamber #	Test Hour 0 hr	24 hr	48 hr BR	48 hr AR	72 hr	96 hr
CTRL	A	B1	5	5	5	5	5	4 10
	B	B2	5	5	5	5	5	5
	C	B3	5	5	5	5	5	5
	D	B4	5	5	5	5	4 10	4
100%	A	B5	5	5	5	5	5	5
	B	B6	5	5	5	5	5	5
	C	B7	5	3 2D	3	3	3	3
	D	B8	5	5	4 10	4	4	4

Organisms loaded by: SD Checked by: [redacted] DN SD SD JD MF
Loading verified at 0 hours by: SD (initials)
m = missing d = dead BR = before renewal AR = after renewal
Comments:
Test Results:
% mortality in 100% sample 15
LC_{50}: >100 if Calculated: 95% CI _____ Method: _____
Screening Tests: Report LC50 as >100%, =100%, or <100%.
Substitue highest test concentration used if other than 100% (example: Ocean outfall tested at 30% concentration).

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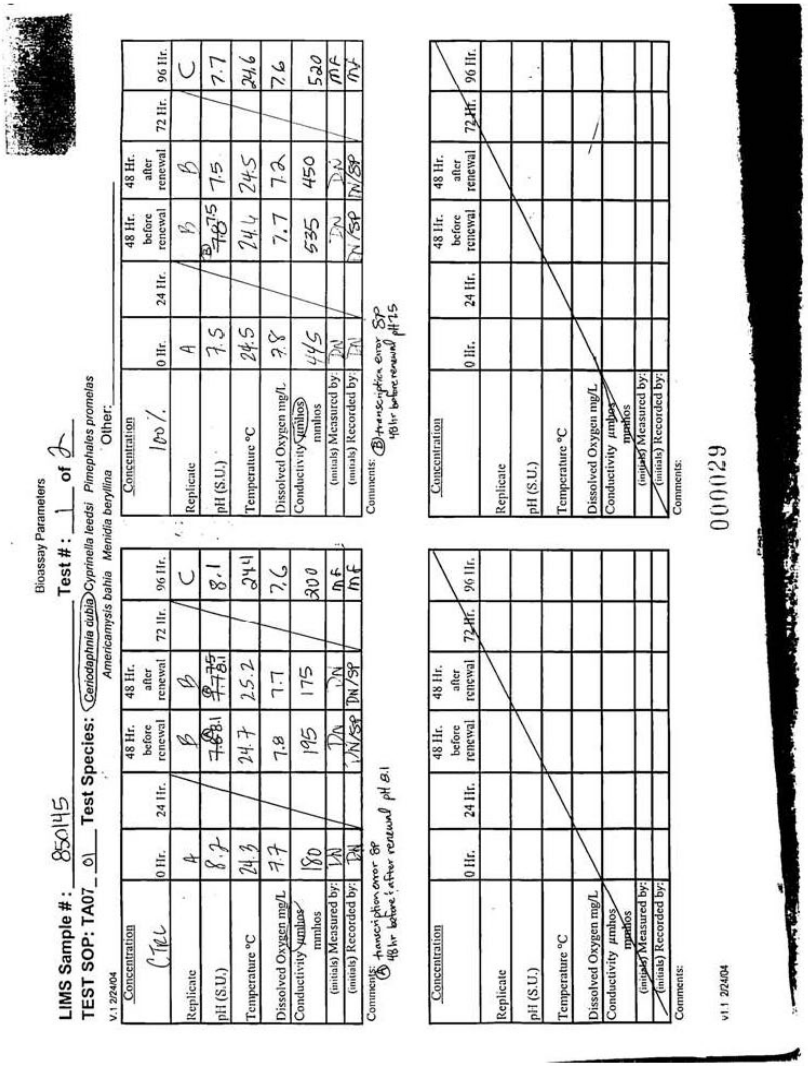
Comment

Response



Bioassay Parameters

LIMS Sample #: 850145 Test #: 1 of 2

TEST SOP: TA07_01 Test Species: (Ceriodaphnia dubia) Cyprinella teedsi Pimephales promelas
Americamysis bahia Menidia beryllina Other:

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Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
CTRL						
Replicate	A		B	B		C
pH (S.U.)	8.2		7.6 8.1	7.7 8.1		8.1
Temperature °C	24.3		24.7	25.2		24.4
Dissolved Oxygen mg/L	9.7		7.8	7.7		7.6
Conductivity µmhos mmhos	180		195	175		300
(initials) Measured by:	DN		DN	DN		mf
(initials) Recorded by:	DN		DN/SP	DN/SP		mf

Comments: ⑧ Concentration error SP
48 hr before renewal pH 8.1

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
100 %						
Replicate	A		B	B		C
pH (S.U.)	7.5		7.6 8.1	7.5		7.7
Temperature °C	24.5		24.4	24.5		24.6
Dissolved Oxygen mg/L	7.8		7.7	7.2		7.6
Conductivity µmhos mmhos	445		635	450		520
(initials) Measured by:	DN		DN	DN		mf
(initials) Recorded by:	DN		DN/SP	DN/SP		mf

Comments: ⑧ Concentration error SP
48 hr before renewal pH 8.1

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity µmhos mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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Comment ***Response***

Bioassay Parameters

LIMS Sample #: 850145 Test #: 2 of 2

TEST SOP: TA07_02_ Test Species: *Ceriodaphnia dubia* *Cyprinella leedsi* *Pimephales promelas* *Americamysis bahia* *Menidia beryllina* Other:

V.1 2/24/04

Concentration Ctrl	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	6.0	8.1	7.9	8.0	7.8	7.9
Temperature °C	25.4	25.8	24.1	24.0	24.7	25.1
Dissolved Oxygen mg/L	7.9	7.5	7.8	7.7	6.6	7.2
Conductivity ~~µmhos~~ mmhos	~~325~~ 326 @ 25°C	359	360	330	345	350
(initials) Measured by:	JN	JN/BF	JN	BF	JN	MF
(initials) Recorded by:	JN	BF	JN	BF	JN	MF

Comments: @ correct conductivity for 325 µmhos taken from morning read @ 8C

Concentration 100%	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate	A	B	C	C	D	A
pH (S.U.)	7.0	7.4	7.4	7.4	7.3	7.3
Temperature °C	25.1	24.3	24.8	24.4	25.5	25.1
Dissolved Oxygen mg/L	8.1	7.4	7.7	7.3	6.8	7.0
Conductivity ~~µmhos~~ mmhos	460	476	493	455	470	475
(initials) Measured by:	JN	JN/BF	JN	BF	JN	MF
(initials) Recorded by:	JN	BF	JN	BF	JN	MF

Comments:

Concentration	0 Hr.	24 Hr.	48 Hr. before renewal	48 Hr. after renewal	72 Hr.	96 Hr.
Replicate						
pH (S.U.)						
Temperature °C						
Dissolved Oxygen mg/L						
Conductivity ~~µmhos~~ mmhos						
(initials) Measured by:						
(initials) Recorded by:						

Comments:

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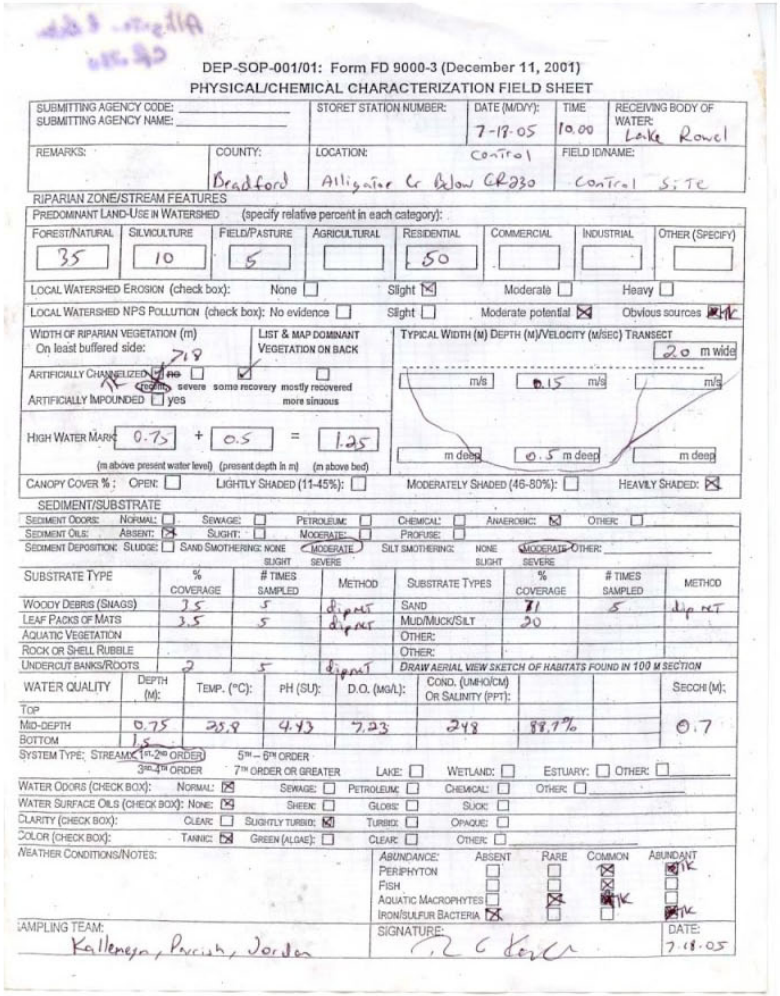
Comment ***Response***

Appendix 7

Habitat Assessment Field Sheets



DEP-SOP-001/01: Form FD 9000-3 (December 11, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:		STORET STATION NUMBER:	DATE (M/D/Y): 7-18-05	TIME: 10.00	RECEIVING BODY OF WATER: Lake Rowel
REMARKS:	COUNTY: Bradford	LOCATION: Control Alligator Cr Below CR230		FIELD ID/NAME: Control Site	

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
35	10	5		50			

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☒ Moderate ☐ Heavy ☐

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☒ Obvious sources ☒ MK

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: 7.8

LIST & MAP DOMINANT VEGETATION ON BACK

ARTIFICIALLY CHANNELIZED: ☒ no ☐ ~~yes~~ ☐ severe ☑ some recovery ☐ mostly recovered

ARTIFICIALLY IMPOUNDED ☐ yes more sinuous

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT

HIGH WATER MARK: 0.75 + 0.5 = 1.25

(m above present water level) (present depth in m) (m above bed)

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☐ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☒

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☐ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☒ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE SLIGHT ~~MODERATE~~ SEVERE SILT SMOTHERING: NONE SLIGHT ~~MODERATE~~ SEVERE OTHER:

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	15	5	dipnet	SAND	71	5	dipnet
LEAF PACKS OR MATS	3.5	5	dipnet	MUD/MUCK/SILT	20		
AQUATIC VEGETATION				OTHER:			
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS	2	5	dipnet	DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH	0.75	25.9	4.43	7.23	248	88.7%		0.7
BOTTOM	1.5							

SYSTEM TYPE: STREAM: ~~1ST, 2ND ORDER~~ 3RD, 4TH ORDER 5TH – 6TH ORDER 7TH ORDER OR GREATER LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☐ SLIGHTLY TURBID: ☒ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☒ GREEN (ALGAE): ☐ CLEAR: ☐ OTHER: ☐

WEATHER CONDITIONS/NOTES:

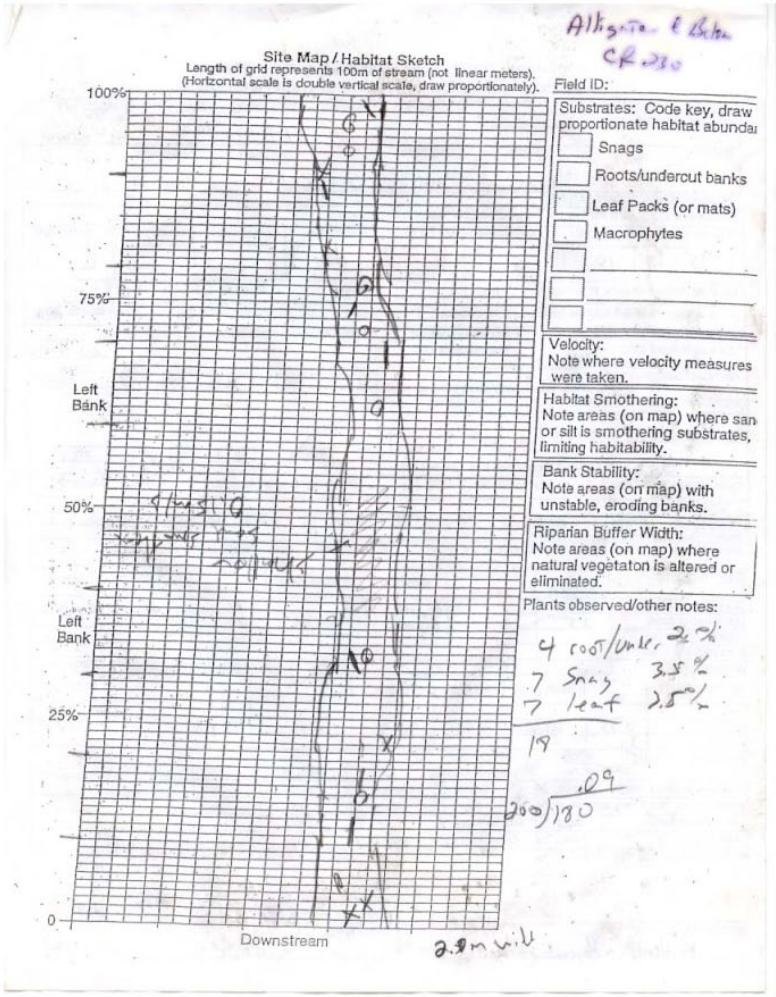
ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☒	☒ MK
FISH	☐	☐	☒	☐
AQUATIC MACROPHYTES	☐	☒	☒ MK	☐
IRON/SULFUR BACTERIA	☒	☐	☐	☒ MK

SAMPLING TEAM: Kallemeyn, Perrish, Jordan

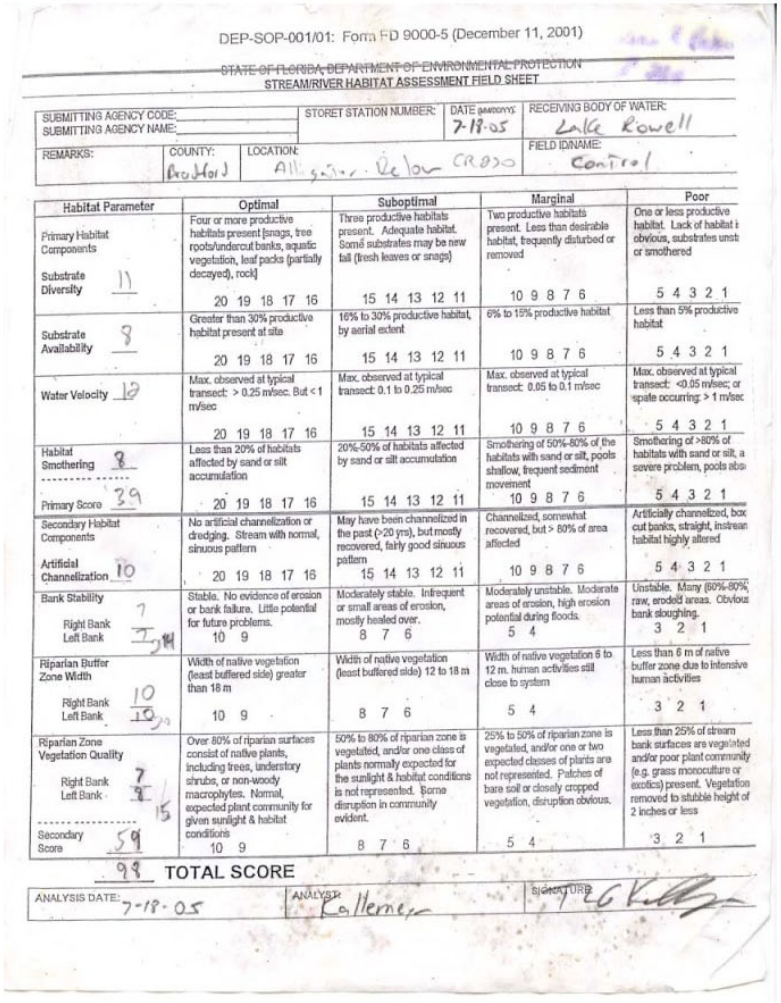
SIGNATURE: J. C Kallemeyn

DATE: 7-18-05

Comment ***Response***



Comment ***Response***



DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

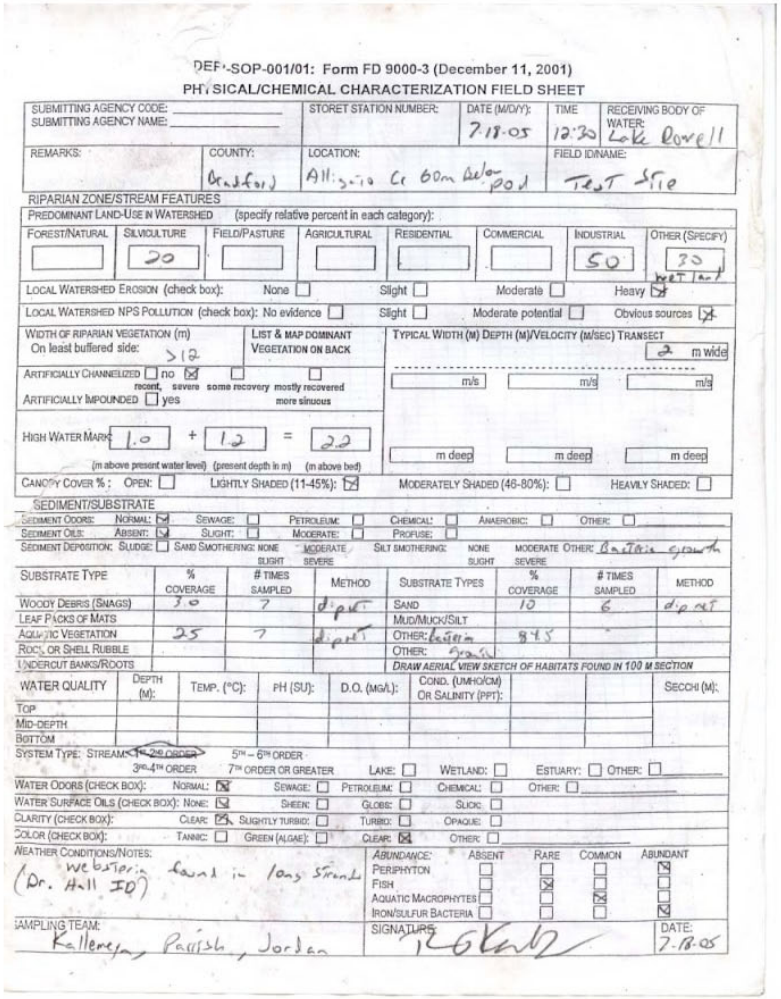
SUBMITTING AGENCY CODE: SUBMITTING AGENCY NAME:		STORET STATION NUMBER:	DATE (MM/DD/YY): 7-19-05	RECEIVING BODY OF WATER: Lake Rowell
REMARKS:	COUNTY: Bradford	LOCATION: Alligator. Below CR 230		FIELD ID/NAME: Control

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 11	Four or more productive habitats present (snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock) 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat i obvious, substrates unst or smothered 5 4 3 2 1
Substrate Availability 8	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 12	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 8 Primary Score 39	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools abs 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 10	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box cut banks, straight, instrean habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 7 Left Bank 7	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (60%-80% raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 10 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 7 Left Bank 8 Secondary Score 59	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

98 TOTAL SCORE

ANALYSIS DATE: 7-19-05 ANALYST: Callemer SIGNATURE:

Comment ***Response***



DEF-SOP-001/01: Form FD 9000-3 (December 11, 2001)

PHYSICAL/CHEMICAL CHARACTERIZATION FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (M/D/Y): 7.18.05	TIME: 12:30	RECEIVING BODY OF WATER: Lake Dorell
REMARKS:	COUNTY: Bradford	LOCATION: All: 3-10 Cr 60m below pond		FIELD ID/NAME: Test Site

RIPARIAN ZONE/STREAM FEATURES

PREDOMINANT LAND-USE IN WATERSHED (specify relative percent in each category):

FOREST/NATURAL	SILVICULTURE	FIELD/PASTURE	AGRICULTURAL	RESIDENTIAL	COMMERCIAL	INDUSTRIAL	OTHER (SPECIFY)
	20					50	30 wet land

LOCAL WATERSHED EROSION (check box): None ☐ Slight ☐ Moderate ☐ Heavy ☒

LOCAL WATERSHED NPS POLLUTION (check box): No evidence ☐ Slight ☐ Moderate potential ☐ Obvious sources ☒

WIDTH OF RIPARIAN VEGETATION (m) On least buffered side: >12

LIST & MAP DOMINANT VEGETATION ON BACK

TYPICAL WIDTH (M) DEPTH (M)/VELOCITY (M/SEC) TRANSECT: 2 m wide; m/s; m/s; m/s; m deep; m deep; m deep

ARTIFICIALLY CHANNELIZED ☐ no ☒ ☐ ☐ (recent, severe, some recovery, mostly recovered, more sinuous)

ARTIFICIALLY IMPOUNDED ☐ yes

HIGH WATER MARK: 1.0 (m above present water level) + 1.2 (present depth in m) = 2.2 (m above bed)

CANOPY COVER %: OPEN: ☐ LIGHTLY SHADED (11-45%): ☒ MODERATELY SHADED (46-80%): ☐ HEAVILY SHADED: ☐

SEDIMENT/SUBSTRATE

SEDIMENT ODORS: NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ ANAEROBIC: ☐ OTHER: ☐

SEDIMENT OILS: ABSENT: ☒ SLIGHT: ☐ MODERATE: ☐ PROFUSE: ☐

SEDIMENT DEPOSITION: SLUDGE: ☐ SAND SMOTHERING: NONE ☐ SLIGHT ☐ MODERATE ☐ SEVERE ☐ SILT SMOTHERING: NONE ☐ SLIGHT ☐ MODERATE ☐ SEVERE ☐ OTHER: Bacteria growth

SUBSTRATE TYPE	% COVERAGE	# TIMES SAMPLED	METHOD	SUBSTRATE TYPES	% COVERAGE	# TIMES SAMPLED	METHOD
WOODY DEBRIS (SNAGS)	3.0	7	dip	SAND	10	6	dip
LEAF PACKS OF MATS				MUD/MUCK/SILT			
AQUATIC VEGETATION	25	7	dip	OTHER: Gravel	8.5		
ROCK OR SHELL RUBBLE				OTHER:			
UNDERCUT BANKS/ROOTS				DRAW AERIAL VIEW SKETCH OF HABITATS FOUND IN 100 M SECTION			

WATER QUALITY	DEPTH (M):	TEMP. (°C):	PH (SU):	D.O. (MG/L):	COND. (UMHO/CM) OR SALINITY (PPT):			SECCHI (M):
TOP								
MID-DEPTH								
BOTTOM								

SYSTEM TYPE: STREAM: 1ST–2ND ORDER ☐ 3RD–4TH ORDER ☐ 5TH–6TH ORDER ☐ 7TH ORDER OR GREATER ☐ LAKE: ☐ WETLAND: ☐ ESTUARY: ☐ OTHER: ☐

WATER ODORS (CHECK BOX): NORMAL: ☒ SEWAGE: ☐ PETROLEUM: ☐ CHEMICAL: ☐ OTHER: ☐

WATER SURFACE OILS (CHECK BOX): NONE: ☒ SHEEN: ☐ GLOBS: ☐ SLICK: ☐

CLARITY (CHECK BOX): CLEAR: ☒ SLIGHTLY TURBID: ☐ TURBID: ☐ OPAQUE: ☐

COLOR (CHECK BOX): TANNIC: ☐ GREEN (ALGAE): ☐ CLEAR: ☒ OTHER: ☐

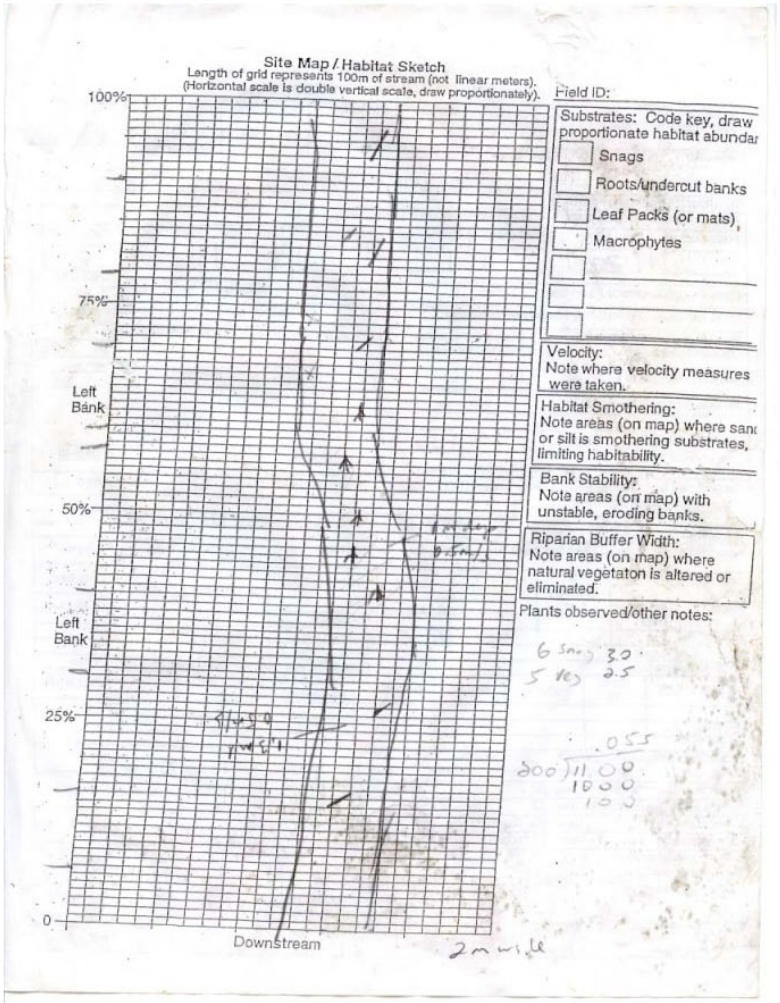
WEATHER CONDITIONS/NOTES: Webstoria found in long Stream (Dr. Hall ID)

ABUNDANCE:	ABSENT	RARE	COMMON	ABUNDANT
PERIPHYTON	☐	☐	☐	☒
FISH	☐	☒	☐	☐
AQUATIC MACROPHYTES	☐	☐	☒	☐
IRON/SULFUR BACTERIA	☐	☐	☐	☒

SAMPLING TEAM: Kallenberg, Parrish, Jordan

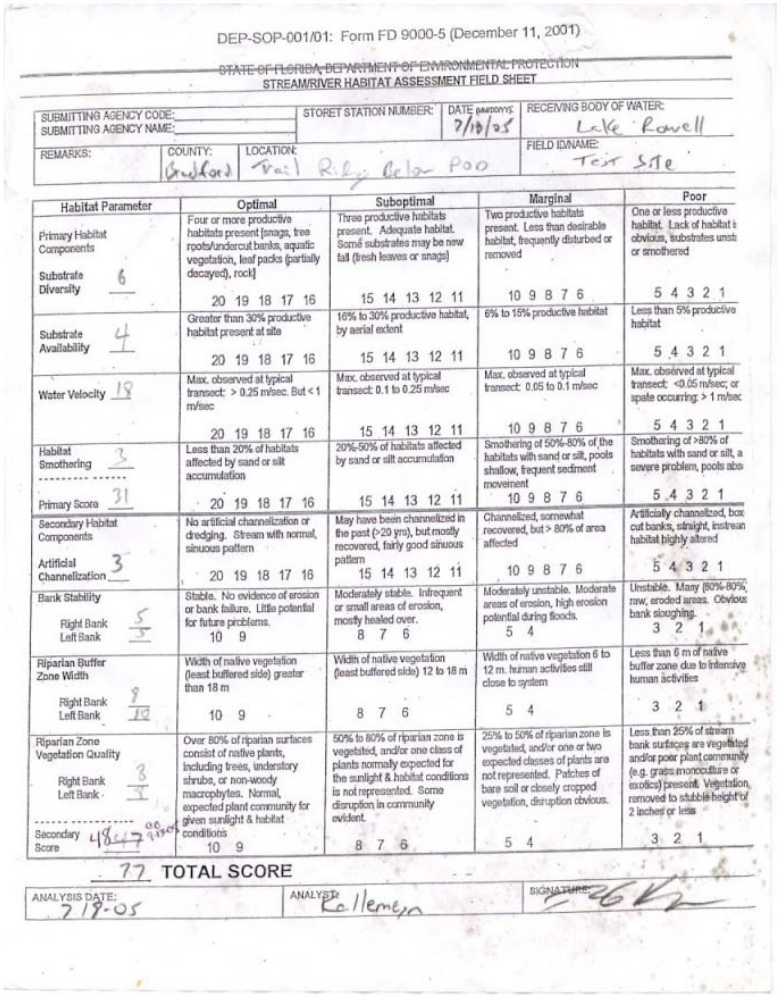
SIGNATURE: [signature] DATE: 7.18.05

Comment	Response



33

Comment ***Response***



DEP-SOP-001/01: Form FD 9000-5 (December 11, 2001)

STATE OF FLORIDA, DEPARTMENT OF ENVIRONMENTAL PROTECTION
STREAM/RIVER HABITAT ASSESSMENT FIELD SHEET

SUBMITTING AGENCY CODE: / SUBMITTING AGENCY NAME:	STORET STATION NUMBER:	DATE (MM/DD/YY): 7/19/05	RECEIVING BODY OF WATER: Lake Powell
REMARKS:	COUNTY: Bradford	LOCATION: Trail Ridge Below Pond	FIELD ID/NAME: Test Site

Habitat Parameter	Optimal	Suboptimal	Marginal	Poor
Primary Habitat Components Substrate Diversity 6	Four or more productive habitats present (snags, tree roots/undercut banks, aquatic vegetation, leaf packs (partially decayed), rock) 20 19 18 17 16	Three productive habitats present. Adequate habitat. Some substrates may be new fall (fresh leaves or snags) 15 14 13 12 11	Two productive habitats present. Less than desirable habitat, frequently disturbed or removed 10 9 8 7 6	One or less productive habitat. Lack of habitat i obvious, substrates unst or smothered 5 4 3 2 1
Substrate Availability 4	Greater than 30% productive habitat present at site 20 19 18 17 16	16% to 30% productive habitat, by aerial extent 15 14 13 12 11	6% to 15% productive habitat 10 9 8 7 6	Less than 5% productive habitat 5 4 3 2 1
Water Velocity 18	Max. observed at typical transect: > 0.25 m/sec. But < 1 m/sec 20 19 18 17 16	Max. observed at typical transect: 0.1 to 0.25 m/sec 15 14 13 12 11	Max. observed at typical transect: 0.05 to 0.1 m/sec 10 9 8 7 6	Max. observed at typical transect: <0.05 m/sec; or spate occurring: > 1 m/sec 5 4 3 2 1
Habitat Smothering 3 Primary Score 31	Less than 20% of habitats affected by sand or silt accumulation 20 19 18 17 16	20%-50% of habitats affected by sand or silt accumulation 15 14 13 12 11	Smothering of 50%-80% of the habitats with sand or silt, pools shallow, frequent sediment movement 10 9 8 7 6	Smothering of >80% of habitats with sand or silt, a severe problem, pools abs 5 4 3 2 1
Secondary Habitat Components Artificial Channelization 3	No artificial channelization or dredging. Stream with normal, sinuous pattern 20 19 18 17 16	May have been channelized in the past (>20 yrs), but mostly recovered, fairly good sinuous pattern 15 14 13 12 11	Channelized, somewhat recovered, but > 80% of area affected 10 9 8 7 6	Artificially channelized, box cut banks, straight, instrean habitat highly altered 5 4 3 2 1
Bank Stability Right Bank 5 Left Bank 5	Stable. No evidence of erosion or bank failure. Little potential for future problems. 10 9	Moderately stable. Infrequent or small areas of erosion, mostly healed over. 8 7 6	Moderately unstable. Moderate areas of erosion, high erosion potential during floods. 5 4	Unstable. Many (80%-80% raw, eroded areas. Obvious bank sloughing. 3 2 1
Riparian Buffer Zone Width Right Bank 8 Left Bank 10	Width of native vegetation (least buffered side) greater than 18 m 10 9	Width of native vegetation (least buffered side) 12 to 18 m 8 7 6	Width of native vegetation 6 to 12 m. human activities still close to system 5 4	Less than 6 m of native buffer zone due to intensive human activities 3 2 1
Riparian Zone Vegetation Quality Right Bank 3 Left Bank 3 Secondary Score 48+47 96 ÷ 12 = 8	Over 80% of riparian surfaces consist of native plants, including trees, understory shrubs, or non-woody macrophytes. Normal, expected plant community for given sunlight & habitat conditions 10 9	50% to 80% of riparian zone is vegetated, and/or one class of plants normally expected for the sunlight & habitat conditions is not represented. Some disruption in community evident. 8 7 6	25% to 50% of riparian zone is vegetated, and/or one or two expected classes of plants are not represented. Patches of bare soil or closely cropped vegetation, disruption obvious. 5 4	Less than 25% of stream bank surfaces are vegetated and/or poor plant community (e.g. grass monoculture or exotics) present. Vegetation removed to stubble height of 2 inches or less 3 2 1

77 TOTAL SCORE

ANALYSIS DATE: 7/19-05	ANALYST: Kellemeyn	SIGNATURE:

34

Comment | ***Response***

Appendix 8

Taxa list and number counted for periphyton collected from natural substrates upstream and downstream of E. I. Dupont – Trailridge Mine discharge, July 18, 2005.

	Control Site	Test Site
Bacillariophyta		
Achnanthes exigua	2	-
Brachysira sp.	-	2
Brachysira vitrea	-	9
Diadesmis confervacea	1	-
Encyonema sp.	1	-
Encyonopsis microcephala	-	4
Eunotia sp.	135	-
Eunotia femoriformis	9	-
Eunotia flexuosa	4	-
Eunotia incisa	2	-
Eunotia pectinalis	4	-
Eunotia zygodon	1	-
Frustulia sp.	6	1
Frustulia rhomboides	12	-
Frustulia saxonica	8	1
Hippodonta sp.	2	-
Hippodonta hungarica	2	-
Luticola sp.	1	-
Navicula sp.	6	-
Navicula exigua	1	-
Navicula kotschyi	2	-
Naviculaceae	7	-
Nitzschia sp.	17	1
Nitzschia palea	41	3
Nitzschia prolongata	2	-
Pinnularia sp.	11	-
Stauroneis sp.	2	-
Surirella sp.	6	-
Surirella minuta	1	-
Chlorophycota		
Chlorococcum sp.	3	-
Cosmarium sp.	1	-
Cyanophycota		
Jaaginema sp.	-	8
Planktolyngbya sp.	6	12
Planktothrix sp.	1	14
Pseudanabaena sp.	10	12
Synechocystis sp.	3	-

...

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Comment ***Response***

Appendix 9a

Benthic macroinvertebrates collapsed taxa list and density (average number of individuals/m^2 rounded to the nearest individual, n = 3 samples) from Hester-Dendy artificial substrates incubated for 28 days upstream and downstream of the E. I. Dupont – Trailridge Mine and collected July 18, 2005. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Naididae	3	-
Arthropoda		
Arachnida		
Acariformes		
Hygrobates sp.	-	3
Crustacea		
Amphipoda		
Crangonyx sp.	3	-
Insecta		
Coleoptera		
Stenelmis sp.	77	-
Diptera		
Ablabesmyia mallochi	3	-
Ceratopogonidae	3	5
Chironomus sp.	-	16
Cricotopus albiforceps	-	16
Cryptochironomus sp.	20	-
Dicrotendipes modestus	3	-
Hemerodromia sp.	5	-
Kiefferulus sp.	3	-
Larsia sp.	3	-
Polypedilum illinoense grp.	11	164
Polypedilum scalaenum grp.	25	-
Polypedilum tritum	6	8
Thienemannimyia grp.	103	-
Tribelos jucundum	20	-
Odonata		
Argia tibialis	21	-

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Comment

Response

Appendix 9b

Benthic macroinvertebrates taxa list and counts (number of individuals counted) collected from Hester-Dendy artificial substrates (n= 3 samples) incubated upstream and downstream of the E. I. Dupont – Trailridge Mine and collected July 18, 2005

	Control Site	Test Site
Annelida		
Oligochaeta		
Naididae	1	-
Arthropoda		
Arachnida		
Acariformes		
Hygrobates sp.	-	1
Crustacea		
Amphipoda		
Crangonyx sp.	1	-
Insecta		
Coleoptera		
Stenelmis sp.	29	-
Diptera		
Ablabesmyia mallochi	1	-
Ceratopogonidae	1	2
Chironomus sp.	-	6
Cricotopus albiforceps	-	6
Cryptochironomus sp.	7	-
Dicrotendipes modestus	1	-
Hemerodromia sp.	2	-
Kiefferulus sp.	1	-
Larsia sp.	1	-
Polypedilum illinoense grp.	4	62
Polypedilum scalaenum grp.	10	-
Polypedilum tritum	2	3
Thienemannimyia grp.	40	-
Tribelos jucundum	7	-
Odonata		
Argia tibialis	8	-

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Comment ***Response***

Appendix 10a

Qualitative benthic macroinvertebrate collapsed taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of E. I. Dupont – Trailridge Mine and collected July 18, 2005. See SOP LT 7100 sect. 4.2.1 for method on collapsing taxa.

	Control Site	Test Site
Annelida		
Oligochaeta		
Eclipidrilus sp.	3	1
Limnodrilus hoffmeisteri	11	-
Pristina aequiseta	1	-
Pristinella longidentata	1	-
Pristinella osborni	1	-
Arthropoda		
Crustacea		
Amphipoda		
Crangonyx sp.	9	-
Insecta		
Coleoptera		
Carabidae	1	-
Dubiraphia vittata	1	-
Stenelmis sp.	16	-
Diptera		
Ceratopogonidae	1	2
Chlorotabanus sp.	1	-
Cricotopus albiforceps	-	88
Cryptochironomus sp.	-	1
Hemerodromia sp.	1	-
Labrundinia pilosella	1	-
Nilothauma sp.	-	3
Orthocladius annectens	1	-
Polypedilum halterale grp.	1	-
Polypedilum illinoense grp.	2	3
Rheocricotopus robacki	-	1
Simulium sp.	2	-
Stenochironomus sp.	1	-
Thienemannimyia grp.	8	-
Ephemeroptera		
Maccaffertium sp.	-	1
Pseudocloeon sp.	1	-
Megaloptera		
Corydalus cornutus	-	1
Odonata		
Argia sedula	8	-
Hetaerina sp.	2	-
Libellulidae	1	-
Trichoptera		
Cheumatopsyche sp.	11	-
Chimarra sp.	-	2
Hydropsyche sp.	11	-
Oecetis sp.	1	1
Oxyethira sp.	1	-
Mollusca		
Bivalvia		
Undetermined Bivalvia	1	-

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Comment

Response

Appendix 10b

Qualitative benthic macroinvertebrate taxa list and number of individuals counted from 20-discrete-dipnet sweeps upstream and downstream of E. I. Dupont – Trailridge Mine and collected July 18, 2005.

	Control Site	Test Site
Annelida		
Oligochaeta		
Eclipidrilus sp.	3	1
Limnodrilus hoffmeisteri	1	-
Pristina aequiseta	1	-
Pristinella longidentata	1	-
Pristinella osborni	1	-
Tubificidae	10	-
Arthropoda		
Crustacea		
Amphipoda		
Crangonyx sp.	9	-
Insecta		
Coleoptera		
Carabidae	1	-
Dubiraphia vittata	1	-
Elmidae	1	-
Stenelmis sp.	15	-
Diptera		
Ceratopogonidae	1	2
Chironomidae	2	4
Chlorotabanus sp.	1	-
Cricotopus albiforceps	-	84
Cryptochironomus sp.	-	1
Hemerodromia sp.	1	-
Labrundinia pilosella	1	-
Nilothauma sp.	-	3
Orthocladius annectens	1	-
Polypedilum halterale grp.	1	-
Polypedilum illinoense grp.	2	3
Rheocricotopus robacki	-	1
Simulium sp.	2	-
Stenochironomus sp.	1	-
Thienemannimyia grp.	6	-
Ephemeroptera		
Maccaffertium sp.	-	1
Pseudocloeon sp.	1	-
Megaloptera		
Corydalus cornutus	-	1
Odonata		
Argia sedula	2	-
Coenagrionidae	6	-
Hetaerina sp.	2	-
Libellulidae	1	-
Trichoptera		
Cheumatopsyche sp.	11	-
Chimarra sp.	-	2
Hydropsyche sp.	11	-
Oecetis sp.	1	1
Oxyethira sp.	1	-
Mollusca		
Bivalvia		
Undetermined Bivalvia	1	-

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Comment

Response

The Bioassay of the E. I. DuPont Trailridge Mine effluent sampled on July 18, 2005, NPDES #FL0000051.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

Transaction Code				NPDES NUMBER										YR/MO/DA						Insp Type		Inspector		Fac Type	
1	N		2	5		3	F	L	0	0	0	0	0	5	1	#	#	0	5	0	7	1	8	#	**B**	#	**S**	#	2

Remarks

#

The Priority Pollutants Analysis for Bioassay of the E. I. DuPont Trailridge Mine effluent sampled on July 18, 2005, NPDES #FL0000051.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

Transaction Code				NPDES NUMBER										YR/MO/DA						Insp Type		Inspector		Fac Type	
1	N		2	5		3	F	L	0	0	0	0	0	5	1	#	#	0	5	0	7	1	8	#	**X**	#	**S**	#	2

Remarks

#

Biological Analyses of the E. I. DuPont Trailridge Mine effluent sampled on July 18, 2005, NPDES #FL0000051.

Fill Out This Section For All Surface Water Discharger Inspections(CEI, CSI, CBI, PAI, XSI-RI Optional)

Transaction Code				NPDES NUMBER										YR/MO/DA						Insp Type		Inspector		Fac Type	
1	N		2	5		3	F	L	0	0	0	0	0	5	1	#	0	5	0	7	1	8	#	**S**	#	**S**	#	2

Remarks

#

Comment

Southeast Alaska Conservation Council

SEACC 419 6th Street, Suite 200, Juneau, AK 99801
(907) 586-6942 phone • (907) 463-3312 fax
www.seacc.org • info@seacc.org

June 4, 2012

Sent via email: heidi.x.firstencel@usace.army.mil

U.S. Army Corps of Engineers
Alaska District, Regulatory Division
ATTN: Heidi Firstencel
Juneau Field Office
8800 Glacier Highway, Suite 106
Juneau, AK 99801

Re: POA-1988-0269-2 Hawk Inlet

Dear Ms. Firstencel:

Please accept the following comments on the above-referenced fill permit application submitted by Hecla Greens Creek Mining Company (Hecla) for the "Stage 3 Tailings Dump Expansion" located within the Admiralty Island National Monument and Tongass National Forest. Below are the Southeast Alaska Conservation Council's (SEACC) comments on this project.

BL.1.001

According the Draft Environmental Impact Statement (DEIS) prepared by the Forest Service for the expansion of Hecla's tailings dump, the Corps of Engineers is a cooperating agency on this project and responsible for deciding whether to issue the 404 permit necessary for expansion of Hecla's tailings dump. DEIS at 1-19, 1-20. Like the Forest Service, the Corps of Engineers needs to comply with federal law, as well as orders requiring tribal consultation, environmental justice considerations, and minimization of impacts to aquatic resources.

BL.1.002

The DEIS also informs us that the Corps of Engineers will be relying on the Forest Service's NEPA analysis to support its decisions. Unfortunately, because of the inadequacy of the DEIS, we don't believe the Corps of Engineers can do so. As we write in our comments to the Forest Service (at p.2):

> The DEIS lacks any discussion, as required by agency regulations, of the short- and long-term costs to Hecla from implementing any of the action alternatives and proposed mitigation measures or an evaluation of the effect of these costs on the economic viability of the mining operations as required by agency regulations. *See* 36 CFR 228.80(b)(2)((ii)(2011). In effect, two of the action alternatives (C and D) were developed to minimize the amount of surface disturbance within the Monument and assure that Hecla's mining operations are compatible to the maximum extent feasible, with the protection of Monument resources. The lack of detailed cost information or an evaluation of the practicability of these alternatives in the DEIS prevents the Forest Service, Corps of Engineers and

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Response

Comment ID: BL.1.001
Comment noted.

Comment ID: BL.1.002
The regulations in 36 CFR 228.80(c)(2)(ii) require the authorized officer to consider the long- and short-term costs of mitigation measures in the context of the economic viability of the operations. The regulation does not indicate that this consideration must be included as part of the NEPA analysis. Based on comments received from HGCMC, the authorized officer has no indication that any of the mitigation measures or alternatives would jeopardize the economic viability of the Greens Creek operation. NEPA regulations do not require a cost–benefit analysis.

It is important to note that alternatives were developed using information typical for a scoping-level study for mining operations. The result is that each of the alternatives carried forward was economically feasible and therefore "practicable." The Forest Service, the USACE, and the public are therefore free to base the comparison of alternatives on environmental effects without concern about the costs.

Comment ID: BL.1.003
The EIS has been modified throughout to reflect the current status of the APDES permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others that refer to the discharge permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the permit is reissued.

The Forest Service and USACE have reviewed all the letters cited in this comment. They are included as a part of the public record.

The USACE has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA Section 402 compliance, we consider the discharge to be protective of water quality in Hawk Inlet and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife, for the purposes of this analysis. As such, the EIS does not consider alternative discharge or treatment scenarios.

Comment

BL.1.002 cont.

public from determining which action alternative is the least environmentally damaging practicable alternative.

BL.1.003

In December of last year, SEACC notified the Forest Service that direct discharge of toxic pollutants into a mixing zone in Hawk Inlet was no longer necessary and supplemented our earlier scoping comments with information regarding the potential mitigation measure. *See* Letter from SEACC to Monument Ranger VanOrmer (Dec. 9, 2011). With this letter we attached a PDF Portfolio that included SEACC's Informal Request for Review of APDES AK0043206 and Statement in Support of Request; Director Bonnet's response, which stayed the permit's effective date and extended the EPA- issued permit AK00432006 (2005); our follow up letter to the Director; and, a letter from Dr. David M. Chambers of the Center for Science in Public Participation that identified demonstrated treatment technology, approved by ADEC and EPA, that eliminate the necessity for mixing zones containing toxic levels of pollutants in Hawk Inlet.

BL.1.004

The DEIS did not identify or evaluate this "flow augmentation" alternative to direct discharges from the tailings dump, with associated mixing zone, into Hawk Inlet, or the potential for this alternative treatment approach to mitigate adverse environmental consequences from the continuous discharge and loading of pollutants into Hawk Inlet. In addition, because the discussion in the DEIS at 3.5.2 with regard to current regulation of wastewater discharged into Hawk Inlet is inaccurate, we submit all of the above-referenced documents and request they be incorporated into the Corps of Engineers project planning record for this permit.

BL.1.005

Another inadequacy of the Forest Service's DEIS is its discussion of mitigation when defining the scope of the proposed action, discussing alternatives to the proposed action, as well as consequences of those alternatives. *See* 40 C.F.R. §§ 1508.25(b), 1502.14(f), and 1502.16(h). The lack of a reasonably complete discussion of possible mitigation measures or mitigation alternatives to prevent or minimize adverse impacts on Monument values, particularly the irreparable loss of customary and traditional uses by Angoon and Hoonah residents and the Auk Kwaan of Juneau of Hawk Inlet/Greens Creek in this DEIS undermines the "action-forcing" function of NEPA.

BL.1.006

CEQ regulations implementing NEPA define "mitigation" as including "[c]ompensating for the impact by replacing or providing substitute resources or environments." 40 C.F.R. § 1508.20(e). As the Corps of Engineers recognizes, mitigation is an important aspect of its review and balancing process during its public interest review of the draft permit. *See* 33 C.F.R. § 320.4(r). We urge the Corps of Engineers to consult directly with the federally recognized Tribal governments in Angoon and Hoonah about reasonable and justified compensation packages for the irreversible impacts to their customary and traditional uses of Hawk Inlet and the surrounding lands from past, present, and reasonably foreseeable future development of the Greens Creek Mine. Because two of the action alternatives (C and D) could also adversely affect the land surrounding Young Bay, the Forest Service should also consult with the Auk Kwaan, the original occupants in Juneau.[1] These packages should be disclosed and evaluated in a

[1] While the DEIS references Goldschmidt and Haas (1998), a reprint of the authors' 1946 Report by the Sealaska Heritage Institute and University of Washington Press as *Haa Aani, Our Land: Tlingit and Haida Land Rights and Use. Possessory Rights of the Natives of Southeastern Alaska,* Tetra Tech apparently didn't read the report. According to this study, "The natives of Juneau . . . include in their territory Hawk Inlet and the whole of

Response

Comment ID: BL.1.004
Please see the response to Comment BL.1.003 and the Forest Service responses to comments BL.0.007 and BL.0.008.

The referenced documents have been incorporated into the project record.

Comment ID: BL.1.005
The EIS discusses mitigation measures in compliance with the regulations. A summary of the mitigation measures is provided in Table 2.6.2, which also identifies the sections of the EIS where more detailed discussions of the mitigation measures can be found. This comment does not provide specific information regarding why the commenter believes that the mitigation discussions are not reasonably complete.

The EIS clearly discloses the area that would be lost to subsistence activities for each alternative. Because the area lost is a small percentage of similar available land and mitigation will protect against further loss, the EIS concluded that impacts on subsistence would be minimal. The Forest Service does not consider mining activities to be an irreparable loss of traditional uses in Hawk Inlet. The EIS acknowledges the loss of traditional use in the mine area during operations and has included mitigation in the form of requiring the proponent to conduct additional research into traditional uses in the area.

Comment ID: BL.1.006
We do not find that replacement or substitute resources are necessary or warranted, based on consultation with the local tribal and non-tribal entities conducted by the Forest Service.

HGCMC's funding the completion of the Thayer Creek hydro project for Angoon or funding the connection of Hoonah to the intertie would not replace or substitute "resources or environments" impacted and is unrelated to HGCMC's GPO.

Additional cleanup of the 1989 concentrate spill at the ore loading facility is under the jurisdiction of the State of Alaska and, if warranted, would need to be addressed through their contaminated sites program.

Comment

BL.1.006 cont

supplemental DEIS. Appropriate compensation could include Hecla funding completion of the Thayer Creek hydro project for Angoon, funding the connection of Hoonah to the intertie that was extended to the Greens Creek Mine several years ago, and additional cleanup of the 1989 concentrate spill at the ore loading facility.

BL.1.007

Compounding the problems noted above is the Juneau-centric focus of the so-called socioeconomic analysis in the DEIS.[2] This constricted analysis prevents the Forest Service from fulfilling its obligation to identify and address the social, health, and environmental effects of this proposal borne disproportionately by both the Angoon and Hoonah communities.

BL.1.008

Another example of the inadequacy of the DEIS analysis is the lack of an accurate description of the physical characteristics and stream habitat conditions for Tributary Creek. The DEIS does not disclose the significant influence of this stream's riffle and pool complexes on its habitat values. *See* DEIS at 3-81, 3-82.[3] This is critical information because, under the Section 404(b)(1) guidelines, the Corps of Engineers should attempt to avoid damaging special aquatic sites, including riffle and pool complexes. *See* 40 CFR §§ 230.3(q-1), 230.10(a)(3), 230.45. The failure to disclose and evaluate the effects of the alternatives on Tributary Creek's riffle and pool complexes violates NEPA and the Clean Water Act's Section 404(b)(1) guidelines. Again, preparation of a supplemental DEIS for public comment is required that contains this vital information and analysis.

BL.1.009

Given its responsibilities under NEPA as a cooperating agency, we would have hoped that the information disclosed and analyzed in the DEIS would be sufficient to support the Corps of Engineer's decisionmaking processes. Given the inadequacies of the DEIS, we urge the Corps of Engineers to inform the Forest Service of the need to supplement the DEIS.

Thank you for your attention to these comments.

Best Regards

Buck Lindekugel
Grassroots Attorney

Mansfield Peninsula." *Id.* at 37. The section describing the territory of the Auk (Juneau) and Taku (Douglas) also cites a map by Krause that identifies "the only villages in Auk territory besides the city of Juneau are on Young Bay on Admiralty Island and on the mainland at Swanson Harbor." *Id.*

[2] SEACC's submits for the record Power, The Role of Metal Mining in the Alaskan Economy (2002).

[3] *See* 2008 Aquatic Biomonitoring Report (http://www.adfg.alaska.gov/static/home/library/pdfs/habitat/09_02.pdf). The most recent version of this report also mentions that samples were collected from riffle areas (http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/pdf/gc2011bio.pdf).

SEACC Comments & Attachments
On POA-1988-0269-2 June 4, 2012 3

Response

We encourage the tribes to work directly with HGCMC and the State on the issues raised in these comments. The Forest Service has had several consultation meetings and we are willing to have additional meetings to further explain actions that are and are not within our authority.

Comment ID: BL.1.007
The socioeconomic effects discussion focuses on where the effects of the operation occur, which is primarily Juneau. The socioeconomic section discloses that the majority of the workers employed at the mine reside in Juneau and presents current unemployment rates and poverty levels both in the City and Borough of Juneau and in the Hoonah–Angoon Census Area (see Section 3.18.2). Additional socioeconomic data and recognition of community concerns over unemployment, poverty levels, and population decline in Angoon, as well as the fact that Angoon realizes little benefit from the mine, have been added to Section 3.18.2.

Comment ID: BL.1.008
Pool and riffle features have been added to the description of Tributary Creek in Section 3.7.1.1. The quality of the habitat that could be lost is considered in the estimate of coho salmon smolt production, which is quantitative in its assessment.

Comment ID: BL.1.009
The USACE respectfully disagrees with the assertion that the EIS contains process and factual flaws. We also disagree about the need for a supplemental DEIS and public review. Some changes were made to the DEIS based on comments, but the changes do not rise to a level of significance that would warrant a supplemental EIS.

Comment ***Response***

ATTACHMENTS TO SEACC'S COMMENTS
ON POA-1988-0269-2 Hawk Inlet
JUNE 4, 2012

The documents listed below were combined into a PDF Portfolio and submitted with our comments on POA-1988-0269-2.

1. Power, The Role of Metal Mining in the Alaskan Economy (2002)
2. Letter from SEACC to Monument Ranger VanOrmer (Dec. 9, 2011).
3. SEACC's Informal Request for Review of APDES AK0043206 (Oct. 13, 2011)
4. SEACC's Statement in Support of Request for Informal Review (Oct. 13, 2011
5. Director Bonnet's response to SEACC (Oct. 28, 2011)
6. Letter from Dr. David M. Chambers of the Center for Science in Public Participation to SEACC (Nov. 18, 2011)
7. Letter from SEACC to ADEC APDES WWP Manager Morgan (Dec. 8, 2011)
8. Memo from Timothy, ADF&G Southeast Regional Supervisor (Sept. 26, 2011)(detailing observed leaching from legacy production rock at Site C into Greens Creek)
9. Letter from Archibald, SEACC to Grant, ADEC (Sept. 14, 2011)(SEACC's Nominations for 303d Listing)
10. ADEC's 11-11-11 Response to CORMIX Modeling PRR at 19; *see also* ADEC's 12-23-11 Response to 2nd CORMIX Modeling PRR
11. ADEC's 12-23-11 Response to 2nd CORMIX Modeling PRR

Comment

CENTER for SCIENCE in PUBLIC PARTICIPATION
224 North Church Avenue, Bozeman, MT 59715
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"Technical Support for Grassroots Public Interest Groups"

June 4, 2012

Admiralty Island National Monument
Tongass National Forest
ATTN: Greens Creek Tailings Expansion
8510 Mendenhall Loop Road
Juneau, AK 99801
comments-alaska-tongass-admiralty-national-monument@fs.fed.us

U.S. Army Corps of Engineers
Alaska District, Regulatory Division
ATTN: Heidi Firstencel
Juneau Field Office
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Juneau, AK 99801
heidi.x.firstencel@usace.army.mil

Re: Comments on the Draft Environmental Impact Statement Greens Creek Mine Tailings Disposal Facility Expansion

The Center for Science in Public Participation provides technical advice to public interest groups, non-governmental organizations, regulatory agencies, mining companies, and indigenous communities on the environmental impacts of mining. CSP2 specializes in hard rock mining, especially with those issues related to water quality impacts and reclamation bonding.

SECTION-SPECIFIC COMMENTS

Section 2.3.3 Alternative C: New TDF Located Outside Monument

Alternative C would involve placement of the final cover and revegetation of the existing TDF with closure of the final active disposal areas as soon as possible following tailings placement (beginning in approximately 3 years).

DC.0.001 The cover design for the tailings and waste rock is innovative. However, because it is innovative, there are likely to be some surprises associated with a new design. From a long-term closure standpoint there would be a significant advantage to closing the existing TDF under Alternative C so that the effect of the cover design on inhibiting AMD could be evaluated for an additional 10 years, as compared to the preferred Alternative D, before complete mine closure. Having the mine operator onsite to monitor and make engineering changes would be advantageous.

Section 2.4.4 Water Management

DC.0.002 Collected process wastewaters are treated at the Pond 7 Wastewater Treatment Plant to meet effluent limits identified in the APDES permit prior to discharge through a diffuser outfall located in Hawk Inlet.

Response

Comment ID: DC.0.001
Comment noted. The previous operator of the site, Kennecott Greens Creek Mining Company, installed a 2-acre test cover of the design over a portion of the waste rock dump in 2000. That cover's performance was monitored regularly and documented in Hopp, Giesen, and McDonnell (2010). Hopp, L., T. Giesen and J. McDonnell. 2010. Hydrological Performance of Cover Systems at the Greens Creek Mine: Combined Field-Modeling Analysis. Final Project Report. Oregon State University. Corvallis OR.

We agree that Alternative C would provide an additional 10 years of data on the behavior of acid generation in the dry stack while the operator continued mining and disposal activities on site. However, the test cover should help minimize the potential for surprises regardless of the alternative selected.

Comment ID: DC.0.002
Comment noted. The EIS has been modified throughout to reflect that the issuance of the APDES permit was stayed by ADEC. The EIS has been modified throughout to reflect the current status of the permit (AK0043206). Sections 1.2, 1.8.3.3, 2.4.4, and 3.5.2.1, among others referring to the permit, have been modified to reflect that the 2005 NPDES permit conditions have been administratively extended until the permit is reissued.

Reissuance of the wastewater discharge permit is a process independent from the proposed action under consideration. As noted in comments and in the EIS in Section 1.8.3.1, the Forest Service is responsible for ensuring that the CWA requirements are met on National Forest System lands. Regulations in 36 CFR 228.8(h) state that "certification of other approval issued by state agencies or other federal agencies of compliance with laws and regulations relating to mining operations will be accepted as compliance … with these regulations."

For this reason, the Forest Service defers to the USEPA's and ADEC's expertise in managing the reissuance of the authorized wastewater discharge permit and assumes for the purposes of this analysis that the permitted discharge complies with the CWA. The Forest Service recognizes that the discharge is being conducted as a legally permitted activity and that the discharge into Hawk Inlet is protective of the receiving water body and its designated beneficial uses, including the propagation of fish, shellfish, and other aquatic life and wildlife.

Comment

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DC.0.002 The Greens Creek Mine was permitted in 1983, and limits for the discharge into Hawk Inlet are based on minimum treatment procedures (New Source Performance Standards) developed by EPA in 1982. Even though treatment technologies have advanced significantly in the past 30 years, the APDES permit renewed by ADEC in November, 2011, still allows a discharge of wastewater into Hawk Inlet at the same limits as originally determined/permitted in 1983.

DC.0.003 The discharge at New Source Performance Standards limits is acutely toxic to aquatic organisms, and requires a mixing zone in Hawk Inlet. The performance of the mixing is determined by a computer model. Actual water quality measurements are taken only once a quarter. None of the water quality measuring stations are at the edge of, or in, the mixing zone.

The mixing zone in Hawk Inlet is a 3-dimensional feature that is influenced by tides and the instantaneous volume of the discharge. Even if a water quality measuring station were located on the edge of the mixing zone it would be very difficult to actually verify the effectiveness of the mixing. The grab samples being collected at sampling points outside the mixing zone on a quarterly basis are not adequate to measure the effects of the mixing zone.

DC.0.004 An example of a more sophisticated and effective treatment approach can be seen at the Pogo Mine near Delta Junction, Alaska, where an "off-river treatment" brings the Pogo wastewater up to aquatic water quality standards before it is discharged. Not only does this eliminate any concern for potential effects in a "mixing zone" in the receiving waterbody (the Goodpaster River), but it also allows accurate measurements to be made at the point of discharge.

DC.0.005 ***Recommendation: If the wastewater discharge into Hawk Inlet were updated with 21st century treatment methods, like an "off-inlet treatment" approach, regulatory certainty could be achieved, and unintended impacts in the mixing zone could be avoided.***

Section 2.4.8 Reclamation and Closure

DC.0.006 The present reclamation bond for the Greens Creek mine is $30,455,000. (DEIS, Appendix B, p. B-8)[1] This is essentially an inflation update of the reclamation bond approved for ADEC Solid Waste Management Permit 0211-BA001, which was issued in November, 2003, and administratively extended in October, 2008.[2]

For the 2003 Solid Waste Permit bond calculations it appears that it was assumed water treatment would be needed for only 7 years after mine closure.[3]

DC.0.007 The timeline for post-closure water treatment has changed significantly since the Solid Waste Permit and post closure financial surety were last updated.[4] In the current DEIS it is noted:

> *"A comparison of the predicted water quality of the tailings wastewater at the TDF boundary and in the wet wells with the Alaska fresh WQS indicates that the Alaska fresh WQS would not be met for iron, manganese, zinc, sulfate, and total dissolved solids even several years after closure. It also indicates that the wastewater at the TDF boundary would not meet the Alaska marine WQS for manganese and zinc. These data indicate that* ***water treatment would be required at least 100 years after closure of the TDF(s), perhaps in perpetuity****." (DEIS, p. 3-58)* ***(emphasis added)***

[1] Draft Environmental Impact Statement Greens Creek Mine Tailings Disposal Facility Expansion, USDA Forest Service, by Tetra Tech, April 2012

[2] http://dnr.alaska.gov/mlw/mining/largemine/greenscreek/index.htm, viewed 28May12.

[3] see Response to Comments -Kennecott Greens Creek Mine Waste Management Permit #0211-BA001, William D. McGee, ADEC, 7 Nov03, pp. 5-7

[4] CSP2 had suggested this possibility in comments to ADEC in 2003on the financial surety required for the Greens Creek Solid Waste Permit.

Response

Comment ID: DC.0.003
Please see the response to Comment DC.0.002.

Comment ID: DC.0.004
Please see the response to Comment DC.0.002. The Forest Service has no authority over the permit reissuance process and cannot compel the USEPA or ADEC to require particular treatment technologies, dilution methods, or monitoring requirements associated with the permit. Since the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 CFR 228.8(h)). As such, the EIS does not consider alternative discharge or treatment scenarios.

Comment ID: DC.0.005
Comment noted. Please see the responses to comments DC.0.002 and DC.0.004.

Comment ID: DC.0.006
The DEIS acknowledges in Appendix B that the current reclamation bond needs to be updated to take into account the TDF expansion and the newly identified need for long-term water treatment. The DEIS contains an extensive discussion of the components that will be required of the updated financial assurance and the process that the Forest Service and State of Alaska follow to do this.

Comment ID: DC.0.007
As noted in the comment, the recent environmental audit (SRK 2009) identified a concern regarding the uncertainty in the need for long-term water treatment. Based on that concern, SRK recommended that the site should continue to collect the data needed for assessing long-term water quality treatment, treatment requirements, and treatment options.

The EIS identified the need for long-term water treatment. Thus, financial assurance for long-term water treatment will be required. This is reflected in the EIS (see sections 2.4.8.2, 3.4.4, and 3.5.3.1 and Appendix B). See the response to Comment DC.0.008 regarding the difficulty of including a cost estimate in the EIS.

The reclamation and closure plan and financial assurance will be updated as a separate process following, and based on direction in, the Record of Decision.

Comment

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The increased time required for water treatment will significantly increase the cost of the financial surety.

DC.0.007

The 7-year treatment timeline also applies to the calculations done for the current Reclamation and Closure plan in Appendix F, which was developed by Kennecott in 2008.

> *"HGCMC has submitted revisions to its approved reclamation and closure plan to the Forest Service and the State of Alaska. HGCMC assumes that a substantial amount of site-specific reclamation experience and performance data would be available at final closure. ... The current reclamation and closure plan is included in Appendix F." (DEIS, p. 2-25)*

Although no cost calculation details are provided in Appendix F, the estimate for the reclamation bond in Appendix F (table labeled 'Reclamation Cost Revision Summary') is approximately $44 million. When long term water treatment is included in these calculations, this cost could easily double.

If the reclamation and closure estimate is off by 10-20 percent, there is a significant financial risk to taxpayers should the mine go bankrupt. In its 2009 Environmental Audit, SRK Consultants noted that "*The need for long-term water treatment represents the greatest uncertainty in the Reclamation Plan and cost estimate.*" (SRK, 2009, p. 112)[5] SRK also noted several other potentially significant discrepancies with the Reclamation and Closure Plan, including the fact that indirect management costs were low (SRK, 2009, p. 112), and that inflation was not included in the bond (SRK, 2009, p. 64).

As presented in the DEIS, the Reclamation and Closure Plan financial surety estimate is inadequate. Long term water treatment costs are not adequately addressed, the cost estimate is out of date (2008), and there is no detail presented to substantiate the cost estimate presented.

DC.0.08

Recommendation: A Reclamation and Closure Cost Estimate with an adequate level of detail, and that includes water treatment in perpetuity, should be presented to the public for review and comment.

Section 2.7 Comparison of Alternatives

DC.0.09

In reviewing the information in Table 2.7-1 ('Summary of Potential Impacts of Each Alternative by Resource'), Alternative C rates the same or better than Alternative D in every category assessed.

DC.0.010

In reviewing Section 2.3.3 (above) it was noted that Alternative C also provides a significant reclamation cover assessment advantage. It is not clear from the DEIS why the Forest Service has judged Alternative D to be better than Alternative C. Alternative D does provide HGCMC more time to make the move to the new north tailings storage area, but there is no rationale presented in the DEIS as to why this factor should determine the choice of the Preferred Alternative.

DC.0.011

Recommendation: Lacking more justification, it would appear that Alternative C is a better choice than Alternative D.

Section 3.3 Geotechnical Stability

DC.0.012

There are several aspects of the geotechnical stability analysis that raise concern for the long term seismic stability of the facility. The first concern is related to the way the peak ground acceleration due to a nearby earthquake was determined. In the DEIS it is stated:

> *"Based on regional active faults and other potential sources zones, this study recommended a maximum design earthquake peak ground acceleration of 0.3 g (gravitational force) and a design*

[5] SRK, 2009, Environmental Audit of the Greens Creek Mine, SRK Consulting (US) Inc., March 2009

Response

Comment ID: DC.0.008
Appendix B of the EIS states that (1) the Forest Service is committed to requiring water treatment for as long as needed beyond mine closure and (2) the Forest Service will require that the updated financial assurance includes costs for long-term water treatment. Appendix B specifies that, for the purposes of cost estimation, 100 years of water treatment is assumed. Even though water treatment could occur for a longer time, the bond estimate remains approximately the same for treatment beyond 100 years.

A numerical estimate of the reclamation and closure cost is not included in the EIS, since this amount will be determined after the ROD is issued. At that time there will be certainty regarding the selected alternative, mitigation measures that will be required, and any other stipulations.

We believe that the written commitment to require water treatment and to update the financial assurance is sufficient disclosure for the purposes of NEPA, without having to include an uncertain cost estimate.

The Forest Service requires the submittal of a bond for reclaiming disturbances before approval of a plan of operations and implementation of the action (see FEIS Section 2.4.9.2).

The Forest Service's administration regulations do not require public review and comment on the reclamation and closure estimate. The State process does allow for public comment. This is disclosed in Appendix B of the EIS.

Also see the response to Comment DM.3.007.

Comment ID: DC.0.009
Comment noted.

Comment ID: DC.0.010
The DEIS did not identify an agency-preferred alternative because none existed at the time. The FEIS includes a preferred alternative, consistent with 40 CFR 1502.14(e).

Comment ID: DC.0.011
Comment noted. The FEIS presents the Forest Service's identification of the preferred alternative (see Section 2.3.6).

Comment

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basis earthquake peak ground acceleration of 0.15 g for the site to ensure an adequate level of geotechnical stability."(DEIS, p. 3-19)

The Maximum Design Earthquake used to determine the peak ground acceleration of 0.3 g was derived using an earthquake that was 75% of the Maximum Credible Earthquake. (Klohn Crippen, 2006, page 11)[6] The Maximum Design Earthquake represents the ground motions or fault movements from the most severe earthquake considered at the site, relative to the acceptable consequences of damage in terms of life and property. (ADNR, 2005, pp. 6-6, 6-7)[7]

The estimated largest earthquake that could occur at any given location is called the Maximum Credible Earthquake. The Maximum Credible Earthquake is defined as the greatest earthquake that reasonably could be generated by a specific seismic source, based on seismological and geologic evidence and interpretations. (ADNR, 2005, p 6-6) The Maximum Credible Earthquake is often associated with a recurrence interval of 10,000 years.[8]

For most structures, including the design of buildings and other structures that are designed with finite lifetimes, the choice of a Maximum Design Earthquake is often one with a recurrence interval significantly less than that of the Maximum Credible Earthquake, since these structures will not be used indefinitely.

However, the choice of the Maximum Credible Earthquake as the Maximum Design Earthquake for a tailings facility is an appropriately conservative choice for the design seismic event. Tailings structures require a very conservative choice of design event. Once these structures are built, it is not economically or environmentally viable to move the waste that is impounded behind the dam. The dam must hold this waste safely in perpetuity. We don't know how long 'perpetuity' is, but 10,000 years (e.g. the approximate time since the last ice age) is a minimum approximation.

The use of 0.3g peak ground acceleration most probably underestimates the maximum ground acceleration the tailings facilities could experience.

DC.0.013

Recommendation: The peak acceleration due to the Maximum Credible Earthquake, not 75% of the Maximum Credible Earthquake, should be used as the Maximum Design Earthquake for mine facilities that must stand in perpetuity. At Greens Creek this would be the tailings and waste rock facilities.

Section 3.3.3 Geotechnical Stability – Environmental Consequences

DC.0.014

The second concern for long term seismic stability is that pseudo-static analysis technique was used to evaluate the long term seismic stability of the tailings and waste rock facilities. (DEIS, p. 3-21)

DC.0.015

Today, few US regulatory agencies accept pseudostatic methods for seismic design of new dam projects. Seismic loading need not be considered for most new dams if the maximum credible earthquake produces a peak ground acceleration of less than 0.1 g at the site. The Federal Energy Regulatory Commission, which is responsible for many large dams in the US, has commented:

"A pseudostatic analysis (sometimes called seismic coefficient analysis) should only be considered as an index of the seismic resistance available in a structure not subject to build-up of pore pressure from shaking. It is not possible to predict failure by pseudostatic analysis, and other types of analysis

[6] Klohn Crippen, 2006, Greens Creek Mine Stage 2 Tailings Expansion Overall Stability Update, Klohn Crippen Ltd., 1Mar06
[7] ADNR, 2005, Guidelines for Cooperation with the Alaska Dam Safety Program, Prepared by Dam Safety and Construction Unit, Water Resources Section, Division of Mining, Land and Water, Alaska Department of Natural Resources, June 30, 2005
[8] Wieland, 2008, Large Dams the First Structures Designed Systematically Against Earthquakes, Martin Wieland, ICOLD, The 14th World Conference on Earthquake Engineering, Beijing, China, October 12-17, 2008

Response

Comment ID: DC.0.012
Long-term stability, both static and dynamic, will need to be addressed in detail during final design of the new dry-stack facility. However, these analyses are not appropriate for an alternatives investigation, nor will they have a significant impact on the choice among alternatives, because the seismic considerations will be roughly equal for all alternatives (see DEIS Section 3.3.4).

In addition, because this facility will not be impounding water, regulations pertaining to dams do not apply to the proposed facility. The facility will fall under the jurisdiction of ADEC Solid Waste Regulations (18 AAC 60), which require conceptual consideration of stability during permitting and detailed stability analyses prior to closure.

Comment ID: DC.0.013
Comment noted. See the response to Comment DC.0.012.

Comment ID: DC.0.014
Comment noted. See the response to Comment DC.0.012.

Comment ID: DC.0.015
Comment noted. The TDF is a dry-stack design not intended to impound either tailings or water. Therefore, the TDF is not comparable to a "large dam," nor would it be subject to Federal Energy Regulatory Commission regulations. Also see the response to Comment DC.0.012.

Comment

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are generally required to provide a more reliable basis for evaluating field performance." (FERC, May 2005)[9]

and;

"FERC practice previously allowed the use of the pseudostatic method of analysis in areas of low or negligible seismicity (peak ground accelerations of 0.05g or less). FERC no longer uses a pseudostatic analysis to judge the seismic stability of embankment dams." (USSD, February 2007, p. 13)[10]

Despite these recommendations from organizations with long experience in analyzing and managing the construction and long term operation of dams, many consultants continue to pseudostatic analysis instead of dynamic analysis for tailings dams, even in areas of moderate and high seismicity.

This is probably because pseudostatic analysis is less expensive than dynamic analysis. The most rigorous dynamic methods would use finite element or finite difference programs in which dynamic response, pore-pressure development, and deformations can be fully coupled.

Pseudostatic analysis also relies a great deal on the use of professional judgment. Professional judgment is based on 50 years of experience with tailings dams, however tailings dams must stand in perpetuity.

DC.0.016 ***Recommendation: Dynamic modeling, rather than pseudostatic modeling, should be used to analyze the stability of the tailings and waste rock facilities at Greens Creek.***

Appendix E. Greens Creek Liner Dry Stack Construction

DC.0.017 There are no details – liner material type, thickness, leak detection, etc. – in the DEIS, including in Appendix E. Leak detection and groundwater monitoring locations would be important for Alternatives C and D since the tailings facility would be located in a different drainage.

DC.0.018 ***Recommendation: More detail on the design and construction requirements for the liner for Alternatives C & D should be provided.***

Thank you for the opportunity to comment on this Draft EIS.

Sincerely:

David M. Chambers, Ph.D., P. Geop.

[9] FERC, 2005, Federal Guidelines for Dam Safety Earthquake Analyses and Design of Dams, Federal Energy Regulatory Commission, May 2005

[10] USSD, 2007, Strength of Materials for Embankment Dams, United States Society on Dams, February 2007

Response

Comment ID: DC.0.016
Comment noted. See the response to Comment DC.0.012.

Comment ID: DC.0.017
The new TDF would be developed in the same manner as the existing TDF, including the design and construction and operation of the sub-drains, liner, and tailings placement. New finger and blanket drains would be placed to form the facility underdrain system. The underdrains would be built on a pad of nonreactive material. See EIS sections 2.3.3 and 2.3.4. Seepage through the TDF flows to the TDF underdrain collection system and is collected by a series of wet wells at the base of the TDF (EIS Section 2.4.4).

The operator will be required to submit a development plan, consistent with the selected alternative based on this analysis, that specifies the use of liners or other devices to prevent adverse impacts to groundwater and surface water and specifies the use of underdrains, finger drains, and french drains in a way that allows for tailings contact-water to be effectively controlled.

Monitoring will be required consistent with the GPO and State of Alaska Waste Management Permit, updated to reflect the selected alternative prior to development.

Comment ID: DC.0.018
See the response to Comment DC.0.017.

Comment	*Response*

From: Rust, John
To: FS-comments-alaska-tongass-admiralty-national-monument; heidi.x.firstencel@usace.army.mil
Cc: Lois Norrgard; Amy Rust; Amy Rust; Dawn; Schaust, Steve; admiralty_friends@yahoo.com; info@beyondak.com; info@juneaukayak.com
Subject: Admiralty Island: Greens Creek Tailings Expansion - Tongass national Forest
Date: Friday, May 25, 2012 9:34:24 AM

May 25, 2012
Subject: Greens Creek Tailings Expansion on Admiralty Island

JR.0.001

Dear USDA Forest Service and U.S. Army Corps of Engineers

My son and I kayaked and camped on Admiralty Island during August of 2010 for 8 days. We were very impressed with the huge Sitka Spruce, Western Red Cedar, and Western Hemlock trees of the Tongass National Forest – part of a temperate rain forest. We watched wild salmon swimming upstream, brown bears fishing for salmon; saw a proliferation of bald eagles, and diversity of sea life including jellyfish, seals and whales. This area is truly a national treasure. Please note and register our comments as to the expansion of the Greens Creek Mine Tailings areas. Our recommendation and preference is to do the utmost to truly protect the pristine and beautiful character of Admiralty Island, the channels surrounding the island and the habitat and wildlife.

Thank you for taking the time to register our comments.

Sincerely,
John and Kyle Rust
9725 Oliver Ave. North
Brooklyn Park, MN 55444
763-202-3346

Comment ID: JR.0.001
Comment noted.

Comment

Hecla GREENS CREEK

June 4, 2012

VIA EMAIL

U.S. Army Corps of Engineers
Alaska District, Regulatory Division
ATTN: Heidi Firstencel
Juneau Field Office
8800 Glacier Highway, Suite 106
Juneau, AK 99801

Re: Hecla Greens Creek Mining Company Comments on Application for 404 Permit (# POA-1988-0269-2)

Dear Ms. Firstencel:

On behalf of Hecla Greens Creek Mining Company ("HGCMC"), I am pleased to provide comments on the application materials noticed by the U.S. Army Corps of Engineers ("Corps") concerning the Greens Creek Mine Tailings Disposal Facility Expansion. Timely completion of the EIS and issuance of the Corps' Clean Water Act Section 404 dredge and fill permit is critically important to the Mine, and we appreciate the hard work that the Corps has played in the process, working in conjunction with the U.S. Forest Service and other State and federal agencies.

JS.6.001

Acreage Discrepancies. p. A-2, Proposed Work, last sentence: The proposed activity would result in the loss of a total of 92.4 acres of wetlands. There is a discrepancy in the acreages of wetlands disturbance listed in the 404 permit application and the draft EIS (98.4 acres). HGCMC believes that the reason for the discrepancies between the two documents for wetlands disturbance as well as total disturbance is that an incorrect boundary line was used in the draft EIS calculations. We submitted a comment to the Forest Service on the draft EIS regarding the discrepancies, with a request to recalculate the acreages using the correct boundary line (2003 EIS Forest Service lease line).

JS.6.002

Mitigation. p. A-2, Applicant Proposed Mitigation, last sentence: Further information of the applicant's proposed avoidance, minimization and compensatory mitigation is described in the draft EIS. We note that additional information on mitigation is found HGCMC's 404 permit application.

JS.6.003

Historical Impacts. p. A-2, Additional Information. The last sentence on page 2 suggests that most of the 60-acres authorized under the 2003 permit involved wetlands. The December 1, 2003 permit states:

> Modify an existing authorized mine tailings impoundment structure by the discharge of approximately 500,000 cy of fill and dredged fill materials into approximately 30.1 ac of waters, including wetlands, of the US. Also, but not cumulative to the total impacted

Hecla Greens Creek Mining Company ~ PO Box 32199 ~ Juneau, Alaska 99803-2199
907-790-8474 ~ jsaran@hecla-mining.com

Response

Comment ID: JS.6.001
The Final EIS has been updated to reflect the most current wetland loss calculation. The FEIS now discloses that the proposed action would affect 89 acres of wetlands.

Comment ID: JS.6.002
Comment noted.

Comment ID: JS.6.003
The impacts within wetlands authorized by CWA permit modification POA-1988-269-N, issued December 8, 2003, are provided below (from the Kennecott Greens Creek Mining Company Section 404 Permit Application for the Stage II Tailings Expansion Project).

Estimated affected wetlands area and quantities for fill (Quantities are maximum amounts) for the Stage II expansion area only.

(Site; Extent; Fill Volume)
Q1 – Quarry Area; 1.3 acres; 1,000 cy
Q2 - Quarry Area; 1.4 acres; 2,500 cy
New Pond 7 Systems; 5.6 acres; 60,000 cy Road/Berms (6,000 ft.); 8.0 acres; 80,000 cy Tails Underdrain System 3.5; 20,000 cy
R1 - Reclamation Storage Area; 1.5 acres; 35,000 cy
R2 - Reclamation Storage Area; 7.5 acres; 350,000 cy
Other Misc. areas; 11.1 acres; <30,000 cy
TOTAL; 39.9 acres; 578,500 cy

Estimated areas and quantities for fill within the existing permitted lease area affected by the Stage II development.

(Site; Extent; Fill Volume)
Wet Well #1 Area-existing; 4.5 acres; 6,000 cy
Pond 6 Area – existing; 4.8 acres; 25,000 cy

Comment

JS.6.003 cont.

acreage, mechanical land clearing will occur on approximately 28.8 ac of waters of the US.

We ask that the Corps review the authorization from 2003 and clarify, if necessary, the nature of the filling that was authorized in relationship to "wetlands" versus other non-wetlands areas constituting "waters of the U.S."

JS.6.004

Permit Term/NEPA. HGCMC is seeking authorization for a tailings facility to cover the next fifty years of operations. The work would likely occur over four phases. It is unclear from the public notice materials what the Corps contemplates for the permit term. HGCMC favors the longest permit term available under law. To avoid future questions, we would like to see a clear articulation of the permit term. On a related front, we envision that any future work by the Corps on the permit for this project would tier off the EIS currently under development. We believe it would be appropriate, and helpful to future permit proceedings, for the Corps to signal that future permit evaluations may "tier" off the existing permit currently under development. Our intent on this front is to gain a good understanding of what may be required for project permitting, the timeframes involved, and the possible approaches for any future NEPA evaluation that may be required.

JS.6.005

404(b)(1) Analysis. HGCMC looks forward to the Corp's analysis of the 404(b)(1) factors, and we offer our assistance in providing any additional information, or answering any questions, sought by the Corps. Through separate cover letter, we are providing a copy of our comments on the draft EIS. We believe the draft EIS and our comments lay a strong foundation for the Corps to conclude that Alternative B, which minimizes project impacts to the existing project area, constitutes the least environmentally damaging practicable alternative.

If you have any questions, please contact me at (907) 790-8474.

Sincerely,

Jennifer Saran
Environmental Manager

cc: Sarah Samuelson, USFS
Tom Crafford, DNR
Sharmon Stambaugh, DNR
William Ashton, ADEC
Jack Hewitt, USACE

Hecla Greens Creek Mining Company ~ PO Box 32199 ~ Juneau, Alaska 99803-2199
907-789-8100 ~ FAX 907-789-8108 ~ www.greenscreek.com

Response

Comment ID: JS.6.004
The district engineer does have the option to issue a CWA Section 404 permit that authorizes phased development of the mine over an extended time (20–30 years). However, if the permitted project was amended during the time limit specified, a permit modification would be required and a public interest review may be deemed appropriate depending on the significance of the change.

Comment ID: JS.6.005
Comment noted.

Comment

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

OFFICE OF
ECOSYSTEMS, TRIBAL AND
PUBLIC AFFAIRS

June 18, 2012

Colonel Reinhard W. Koenig
Alaska District Engineer
U.S. Army Corps of Engineers
P.O. Box 6898
JBER, Alaska 99506-0898

Re: Reference No.: POA-1988-0269-2, Hawk Inlet
Applicant: Hecla Greens Creek Mining Company

Dear Colonel Koenig:

This letter responds to the U.S. Army Corps of Engineers Alaska District's April 20, 2012, Public Notice of an Application for a Permit for a proposal by Hecla Greens Creek Mining Company (HGCMC) to expand a tailings facility at the site of the Greens Creek Mine. Under the proposal, HGCMC would place up to an additional 15 million cubic yards of tailings and waste rock in the headwaters and surrounding wetlands of Tributary Creek, a freshwater stream that flows into Hawk Inlet within the City and Borough of Juneau, Alaska. As stated in the Public Notice the project would include:

- mechanized land clearing for site preparation;
- foundation preparation and liner installation;
- grading of the above area to facilitate construction of storm water and tailings pile seepage control facilities (i.e. ditches, culverts, detention basins and storm water collection ponds);
- construction of a new water treatment plant and related infrastructure;
- construction of support and service roads;
- stockpiling of reclamation materials;
- development of rock quarries for source material; and
- construction of a new truck wheel-wash facility

The Greens Creek Mine is an active underground silver, lead and zinc mine located on northern Admiralty Island within the Tongass National Forest. Portions of the mine facilities exist within the Admiralty Island National Monument. Full scale development began in 1987. Because of HGCMC's identification of additional ore reserves and the need for additional capacity for waste rock and tailings disposal, the U.S. Forest Service has in the past conducted previous environmental analyses. An ongoing process under the National Environmental Policy Act is evaluating the proposal to expand the tailings facility to accommodate an additional 30 to 50 years worth of tailings and waste rock disposal based on known and projected reserves.

The proposal described in the Public Notice includes expanding the existing tailings facility to the south and would result in a loss of approximately 8,250 linear feet of stream channel and 92.4 acres of wetlands. The Draft Environmental Impact Statement (DEIS), currently under public review, includes four alternatives with losses ranging from 1,078 to 4,046 feet of stream channel (Class I and Class II

Response

Comment ID: KK.0.001
Comment noted.

Comment ID: KK.0.002
Comment noted. Please note that aquatic surveys conducted by the Forest Service and ADF&G at the proposed alternative TDF site have determined that the affected tributary stream to Fowler Creek contains resident fish, but not anadromous fish. See section 3.7.1 under "Unnamed Tributary to Fowler Creek and North Hawk Inlet Drainage."

Comment ID: KK.0.003
Comment noted. We have reviewed and considered the most recent analysis of wetlands functions. The presentation of the functions and values in Section 3.8 has been revised based on input from the USACE and USEPA. Table 3.10-3 has also been revised.

Comment ID: KK.0.004
Comment noted. We have reviewed and considered the most recent analysis of wetlands functions. The FEIS Section 3.8 has been updated with this information.

Comment ID: KK.0.005
Comment noted.

Comment ID: KK.0.006
Comment noted. Please note that the stream that would be impacted by the alternative (north) TDF is a small tributary stream to Fowler Creek, not Fowler Creek itself. See Section 3.7.1 under "Unnamed Tributary to Fowler Creek and North Hawk Inlet Drainage," Section 3.7.3.5, and Section 3.7.3.6. About 1,044 feet of small Class II resident fish streams would be lost (FEIS Table 3.7-8). This would result in permanent loss of mostly rearing and some spawning habitat of resident fish. The presentation of the functions and values in Section 3.8 has been revised based on input from the USACE and USEPA. Table 3.10-3 has also been revised.

Comment ID: KK.0.007
Non-contact-water from undisturbed uplands is captured and diverted around the TDF. As described in sections 3.5.3.2, 3.5.3.3, and 3.5.3.4, potential impacts to the natural creek channels would be mitigated by the use of stormwater detention structures or detention ponds.

Comment

streams) and 99 to 124.9 acres of wetlands. The DEIS also describes direct impacts to an additional 109 acres of the Admiralty Island National Monument. The DEIS proposals' reclamation plan includes an engineered soil cover and synthetic liner system as part of the water management system. Two alternatives included in the DEIS, Alternatives C and D, would minimize impacts to Tributary Creek and the National Monument by constructing an additional tailings facility north of the current facility. The new facility would impact 1,044 linear feet of Fowler Creek and fill 114 or 124 acres (Alternatives C and D respectively) of wetlands outside of the National Monument.

Aquatic Resources at Risk

Streams

KK.0.001 According to the DEIS, Tributary Creek drains a small watershed south of the existing tailings pile bounded by a forested mountain slope to the east, and a low ridge separating the basin from Hawk Inlet to the west. The Alaska Department of Fish and Game (ADFG) Anadromous Waters Catalogue lists Dolly Varden char (*Salvelinus malma),* coho salmon (*Oncorhynchus kisutch),* and pink salmon *(Oncorhynchus gorbuscha)* as being present in Tributary Creek. The DEIS lists Tributary Creek as having 5,169 linear feet of anadromous reach and 2, 991 linear feet of resident fish bearing channel. It specifies that both juveniles and adults of these fish species are present. Tributary Creek is tributary to Zinc Creek approximately 1000 feet above tidewaters at Hawk Inlet where the flow shares a tidal delta with Greens Creek. Zinc and Greens Creeks are listed by ADFG as containing the three anadromous fish species listed above. These two streams are also home to adult chum salmon *(Oncorhynchus keta).* The DEIS adds cutthroat trout *(Oncorhynchus clarki clarki)* and sculpin *(Cottus sp.)* to the fish of these streams. Stickleback are listed as present in Zinc and Greens Creeks. For more detail see Tables 3.7-1 and 3.7-2 of the DEIS.

KK.0.002 Fowler Creek drains an area that includes tailings piles proposed in Alternatives C and D. The DEIS describes Fowler Creek as consisting of 25.1 miles of channel in several branches with 7.3 miles of anadromous channel and 2.3 miles of resident fish bearing channel. The branch of Fowler Creek upon which Alternatives C and D would sit is approximately 2.2 miles from the headwaters to tidewater and is entirely anadromous. Fowler Creek drains to Youngs Bay on the north shore of Admiralty Island. Fowler Creek is home to the same compliment of fish species listed above for Zinc and Greens Creeks. Again, more detail can be found in the DEIS tables.

Wetlands

KK.0.003 Wetland functions and values are listed for each wetland polygon and each alternative in Section 3.10 of the DEIS. Wetlands that would be affected by Alternative B are generally described as being highly functioning and having high ecological condition. Functions listed as scoring significantly above the regional median include carbon sequestration for bog types wetlands; stream flow support, stream water cooling, aquatic invertebrate, amphibian and native plant habitat for the sedge fen type; phosphorus retention for forested type; and sediment and toxicant retention, stabilization and nitrate removal and retention for marsh type wetlands. The Forest Service has recently presented information not available for the DEIS that shows wetlands in the project area are highly functional for several wetland functions.

KK.0.004 Much of the wetlands in the headwaters of the Fowler Creek watershed at the location of Alternatives C and D are described in the DEIS as having a similar number of functions scoring above the median as the fen at Alternative B. Most of these wetlands are highly functioning with high ecological condition. Again, recent information provided by the Forest Service but not included in the DEIS shows these wetlands to be high functioning for a wide variety of functions.

2

Response

Comment ID: KK.0.008
Comment noted. Effects to downstream aquatic resources are disclosed in Section 3.7.3. Table 3.23-1 discloses irreversible and irretrievable resource commitments, including wetlands and aquatic resources.

Comment ID: KK.0.009
As disclosed in Section 3.5.2.1 of the EIS, all water that comes in contact with tailings is controlled, captured, and treated prior to discharge to Hawk Inlet. the discharge is and will continue to be permitted by agencies with authority for CWA compliance; the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). In addition, non-contact water is diverted so it cannot become contaminated and require treatment (Section 3.5.2.1). Appropriate ambient monitoring programs have also been established through the GPO and by ADEC's Waste Management Permit.

Bypasses (the intentional diversion of waste streams from any portion of the treatment facility) would be handled in accordance with provisions specified by the APDES permit. It is anticipated that any intentional diversions would still be discharged through the outfall in Hawk Inlet, avoiding freshwater aquatic systems.

The type of failure described in the comment, with acidic water and high concentrations of metals flowing into local fish streams in volumes capable of affecting downstream fish access, is not reasonably foreseeable, and the location, magnitude, and downstream resources are unpredictable for the purposes of modeling.

Comment ID: KK.0.010
Comment noted. Effects to streams, aquatic resources, and wetlands are described in sections 3.5, 3.7, and 3.8 of the EIS. Table 3.23-1 discloses irreversible and irretrievable resource commitments, including wetlands and aquatic resources.

Comment ID: KK.0.011
Comment noted.

Comment ID: KK.0.012
33 CFR 332 establishes standards and criteria for the use of all types of compensatory mitigation, including on-site and off-site permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation to

Comment

Impacts on Aquatic Resources

KK.0.005 Alternative B would fill 4,046 linear feet of Tributary Creek of which 1,600 linear feet directly supports coho salmon. Alternative "B Mitigated" would fill 2,416 linear feet of the stream. Dolly Varden typically use headwaters upstream of the range of coho salmon, making it likely that significant Dolly Varden habitat would also be filled. Sculpin and stickleback habitat may also be filled. Ninety-nine acres of highly functioning wetlands, supporting stream flow in Tributary Creek, as well as a variety of other functions listed above would be eliminated.

KK.0.006 Alternatives C and D would fill 1,044 linear feet of Fowler Creek. No coho habitat is believed to exist in this reach but Dolly Varden, sculpin and stickleback habitat may be eliminated. One hundred fourteen or 124.9 (depending on which of Alternatives C and D were implemented) acres of wetlands would also be eliminated in this headwater position. Neither the Public Notice nor the DEIS describes the functions that would be lost from filling these wetlands. But as noted above, they are described as highly functioning and with a high ecological condition.

In addition to the footprint of the fill material, there are some adverse impacts that apply to both stream/wetland systems.

- KK.0.007 The DEIS describes increased flow directed to the stream channels that may be capable of scouring sediment and upsetting the dynamic equilibrium of stream channel morphology. In such a case habitat values are likely to be lost for an extended distance downstream. If the stream is entrenched as a result, riverine wetlands would be hydrologically disconnected from the channel degrading their functional relationship with the stream (flood water and sediment storage and nutrient export). Erosion of the channel would likely cause deposition in estuarine waters of the delta and marine waters at either Hawk Inlet or Youngs Bay. The DEIS states that monitoring will be required to detect this effect and remedial measures could be implemented. However, once the erosive process starts the damage has been done. Construction of storm water ponds proposed as remedial measures will take time, allowing damage to progress. And, once stream morphologic equilibrium has been upset it will likely be reestablished in a different geomorphic and ecological state, responding to the new, post-erosion conditions. Quality in stream habitat may take a very long time to become reestablished.
- KK.0.008 Headwater wetlands and streams export organic materials, supporting downstream food webs. Filling the headwaters reduces the productivity of downstream waters.
- KK.0.009 The tailings proposed to be placed in these sites are potentially acid generating. Water from these sites is proposed to be directed to a water treatment system. Should the collection system fail, acidic water with high concentrations of metals would flow into Tributary Creek and/or Fowler Creek affecting downstream water quality. Contaminated water would affect aquatic organisms for some distance downstream until sufficient tributary water diluted the effluent to non-toxic concentrations. This might not happen until the effluent has mixed with a sufficient quantity of marine waters in Hawk Inlet or Youngs Bay. If such a bypass occurred during salmon migration, the fish moving to Zinc Creek, Greens Creek and Fowler Creek (in addition to the tributary where the project would be located) could be blocked from migration or killed. The DEIS does not model the effects of a bypass; however a bypass is possible during the life of the mine and likely in the perpetual time frame that the tailings will be in place.

3

Response

offset unavoidable impacts to waters of the United States authorized through the issuance of CWA Section 404 permits. A final mitigation plan for the Greens Creek Mine TDF expansion proposal has not been submitted by HGCMC.

Comment ID: KK.0.013
Following the Forest Service Record of Decision, the financial assurance and reclamation and closure plan will be updated. The Forest Service will require bonding for maintenance of the fish passage facility in perpetuity. Additionally, the Forest Service and ADF&G will require quarterly inspection of the fish passage structure.

Comment ID: KK.0.014
Comment noted.

Comment ID: KK.0.015
Comment noted. Effects to streams, aquatic resources, and wetlands are described in sections 3.5, 3.7, and 3.8 of the EIS. Effects to downstream aquatic resources are disclosed in Section 3.7.3. Table 3.23-1 discloses irreversible and irretrievable resource commitments, including downstream aquatic resources.

Comment ID: KK.0.016
Non-contact water from undisturbed uplands is captured and diverted around the TDF. As described in sections 3.5.3.2, 3.5.3.3, and 3.5.3.4, potential impacts to the natural creek channels would be mitigated by the use of stormwater detention structures or detention ponds. As specified in Section 3.5.3.3, the Forest Service and ADEC will require habitat and geomorphic surveys in Tributary Creek downstream. Aquatic biomonitoring is conducted annually by ADF&G. Monitoring includes fish counts and species identification and whole body metals tissue testing of Dolly Varden, periphyton biomass, and benthic macroinvertebrates. A report is produced annually.

Comment ID: KK.0.017
As disclosed in Section 3.5.2.1 of the EIS, all water that comes in contact with tailings is controlled, captured, and treated prior to discharge to Hawk Inlet. Because the discharge is and will continue to be permitted by agencies with authority for CWA compliance, the Forest Service considers the discharge to be protective of water quality for the purposes of this analysis (36 FCR 228.8(h)). In addition, non-contact water is diverted so it can not become contaminated and require treatment (Section 3.5.2.1). Appropriate ambient monitoring programs

Comment

Proposed Mitigation

The Public Notice states that the Applicant proposes in-lieu-fees to be paid to the Southeast Alaska Land Trust as compensatory mitigation. Wetlands at the sites of all alternatives are described in the DEIS as highly functioning and of high ecological condition. These wetlands provide hydrologic and food web support to salmon streams for which they are the headwaters. At the sites of each alternative, all of the headwaters of the affected streams will be removed from the stream/wetlands ecosystem, and therefore all functions of wetlands supporting those systems will be eliminated from the sites and lost from the landscape. It is unlikely that restoration sites exist in these watersheds or on Admiralty Island to compensate for this loss. It is also unlikely that similar headwater wetland/stream systems nearby will be in need of and available for restoration. Compensatory mitigation will likely be the preservation of off-site and out-of-kind waters. Therefore a high ratio should be used in calculating the in-lieu-fee. A ratio of 1:10 has been used in other Alaska situations that involved the loss of high value wetlands. We recognize that each case must be evaluated independently, and in this case a higher ratio may be appropriate.

KK.0.010

KK.0.011

KK.0.012

The DEIS describes compensatory mitigation as the repair of a fish passage structure on Greens Creek. The fish passage structure was constructed in 1989 as mitigation for a portion of the Greens Creek Mine that was never built. For this reason, it is asserted that the structure is still available to provide compensatory mitigation. The structure has not functioned since at least 2005 according to the DEIS. If passage is reestablished, it will provide access for anadromous fish to approximately 3.5 miles of suitable habitat. However, the fish passage structure will require maintenance. Unless arrangements are made for maintenance in perpetuity, the structure will eventually cease to function and thereby will cease to mitigate lost wetland and stream habitat.

KK.0.013

Conclusions

The Public Notice includes a project description with wetland and stream channel losses. However, the DEIS includes three additional project scenarios, including a no-action alternative. It has not yet been determined which project will be carried forward. Among the alternatives, estimates of stream loss range from 1,044 linear feet to 4,046 linear feet. It is reasonable to conclude that adverse stream impacts would extend much further in the short term and to tidewater in the long term. Additional adverse impacts include:

KK.0.014

- Degraded ecological function of an undetermined length of downstream waters due to loss of headwaters ecosystem support from wetlands and stream channel.

KK.0.015

- Degradation of downstream channel and isolation from riverine wetlands due to changes in flow and resulting erosion and upset of the dynamic equilibrium of the geomorphic process.

KK.0.016

- Potential for significant short and long term adverse impacts to streams due to the discharge of acid drainage from the tailings piles. These discharges could affect the entire channel from headwaters to marine waters: over a mile at Tributary Creek and approximately 2.2 miles at Fowler Creek. If such a discharge occurred during salmon migration, adverse water quality could be a barrier for migration to other branches of these stream systems such as in Fowler Creek, Zinc Creek and Greens Creek.

KK.0.017

KK.0.018

The Public Notice describes 92.4 acres of wetland loss. The DEIS includes a range of 99 to 124.9 acres.

KK.0.019

Wetlands at all alternative sites are considered high value and provide support for downstream salmon bearing waters.

4

Response

have also been established through the GPO and by ADEC's Waste Management Permit.

Long-term impacts to the streams as a result of acid rock drainage are not anticipated since it would be in violation of the discharge permits that we reasonably anticipate to remain in place into the closure period. Any failure after closure would need to be remedied either by HGCMC or through the financial assurance that would be in place. Short-term effects would presumably be in response to an isolated upset condition and would need to be addressed under the existing regulatory program.

During operations, diversions would be designed to keep contact water flows out of Hawk Inlet and the Tributary and Fowler Creek drainages. The design of the engineered cover as proposed would allow surface flows to follow natural drainage patterns once the cover is stabilized. Surface flow across the reclaimed TDF would be unlikely to exhibit acid drainage or mobilized metals. Water directed to the treatment systems following closure would be from subsurface collection areas.

Comment ID: KK.0.018

The Final EIS has been updated to reflect the most current wetland loss calculation. The FEIS now discloses that the proposed action would affect 89 acres of wetlands.

Comment ID: KK.0.019

Comment noted. This is reflected in the EIS in tables 3.8-3, 3.8-5, 3.8-6, and 3.8-7.

Comment ID: KK.0.020

The project described in the Public Notice of Application for Permit, Appendix A, Section 404 Permit, is the proposal submitted to the USACE by Hecla Greens Creek Mining Company. Unless this project alternative is modified by the applicant, the district engineer will make a permit decision based on this proposal. An amended public notice will only be issued if the proposed alternative is modified.

A determination of project compliance with the 404(b)(1) guidelines cannot be accomplished without the information contained in the FEIS. Discussion of the alternatives required by NEPA and disclosed in the FEIS is required to conduct the 404(b)(1) analysis.

Comment

Recommendations

To avoid, minimize and compensate for adverse impacts to waters of the United States to the greatest extent practicable we recommend the following:

- KK.0.020 This CWA 404 Public Notice was issued before a final project has been identified in the NEPA process including a complete 404(b)(1) analysis. Therefore, we recommend that a final 404 (b)(1) analysis be completed before publication of the Final EIS and that a CWA 404 Public Notice be issued with the Final EIS. This will allow the public and agencies to evaluate a project that more closely resembles a likely final project proposal.
- KK.0.021 Explore with the applicant the possibility of reducing the tailings disposal facility foot print at the sites of Alternatives C and D so as to avoid Fowler Creek and to provide a buffer around the stream channel.
- KK.0.022 Require the construction of adequate stormwater retention structures to prevent increased peak flows that would scour stream channels. If it is not possible to avoid placing these structures in wetlands, then additional compensatory mitigation will be required to offset this loss.
- KK.0.023 Require a written plan and adequate financial assurance for maintenance of the fish passage structure on Green Creek. The structure and infrastructure for access must be maintained in perpetuity.
- KK.0.024 Require a ratio of at least 1:10 for in-lieu-fees to offset lost wetland functions.
- KK.0.025 Require sufficient financial assurance to maintain, repair and replace facilities to treat acid drainage in perpetuity.
- KK.0.026 Require an adaptive management plan for acid drainage that requires monitoring of each site and adjustment of management strategies to fully mitigate environmental problems revealed during monitoring.

KK.0.027 We want to acknowledge and thank you for granting the 15-day extension to allow us time to review wetland information that was not included in the DEIS. However, a final wetland functional assessment has not been distributed. These comments are submitted based on available information, and we request an opportunity to further discuss these issues as more information is forthcoming. Please call me at (206) 553-1271 or Phil North of my staff at (907) 714-2483, to discuss the contents of this letter.

Sincerely,

Kate Kelly, Director
Office of Ecosystem, Tribal and Public Affairs

cc: USDA- Forest Service, Sarah Samuelson
ADNR, Sharmon Stambaugh
City and Borough of Juneau, Teri Camery
USFWS, Deb Rudis
NOAA- Fisheries, Katharine Miller
ADEC, Kenwyn George
ADFG, Kate Kanouse
DCOM, Jill Taylor

5

Response

Comment ID: KK.0.021

Due to design and geotechnical considerations, the alternative facility footprint could not be shifted away from the stream. Please note that the stream that would be impacted by the alternative (north) TDF is a small tributary stream to Fowler Creek, not Fowler Creek itself. See Section 3.7.1 under "Unnamed Tributary to Fowler Creek and North Hawk Inlet Drainage," Section 3.7.3.5, and Section 3.7.3.6.

Comment ID: KK.0.022

As described in the EIS, storm runoff from the TDF (contact-water) is not allowed to enter Tributary Creek, but is captured and treated. Storm runoff of contact-water from TDFs for alternatives C and D would be similarly controlled and treated. Non-contact water from undisturbed uplands is captured and diverted around the TDF. As described in sections 3.5.3.2, 3.5.3.3, and 3.5.3.4, potential impacts to the natural creek channels would be mitigated by the use of stormwater detention structures or detention ponds.

The ADNR Waste Management Permit (#0211-BA001) requires effective run-on and runoff controls and storage capacity to handle a 25-year, 24-hour storm event. Table 2.6-2 notes the requirement that drainage channels be designed to handle flows from a 24-hour/25-year storm event.

Comment ID: KK.0.023

Following the Forest Service Record of Decision, the financial assurance and reclamation and closure plan will be updated. The Forest Service will require bonding for maintenance of the fish passage facility in perpetuity. Additionally, the Forest Service and ADF&G will require quarterly inspection of the fish passage structure.

Comment ID: KK.0.024

33 CFR 332 establishes standards and criteria for the use of all types of compensatory mitigation, including on-site and off-site permittee-responsible mitigation, mitigation banks, and in-lieu fee mitigation to offset unavoidable impacts to waters of the United States authorized through the issuance of CWA Section 404 permits. A final mitigation plan for the Greens Creek Mine TDF expansion proposal has not been submitted by HGCMC.

Comment

Response

Comment ID: KK.0.025
Financial assurance will be required by the Forest Service and State of Alaska to control and treat water in perpetuity. A description of financial assurance procedures is found in Section 1.8.3.1 and in Appendix B.

Comment ID: KK.0.026
Monitoring would continue to be required by the GPO, FWMP, and Waste Management Permit. The FWMP was developed during an interagency regulatory review with participation from the USEPA. The FWMP requires surface water, groundwater, and biological monitoring.

If an exceedance of Alaska Water Quality Standards is identified, the operator is required to identify and explain the cause of the exceedance in a written notice to the Forest Service and ADEC within 30 days of identifying the exceedance. This notice must contain a plan to mitigate the cause of the exceedance. The agencies will either approve the mitigation plan or recommend changes to the plan that will help alleviate potential impacts to the designated uses of the receiving waters.

Under the FWMP, an annual report is produced as a part of the GPO. This report documents trends in water quality in all project drainage features and creeks. This annual FWMP report is sent to the Forest Service and ADEC for review and presented at a meeting that is open to the public.

Additionally, a facility-wide environmental audit is required every five years.

Comment ID: KK.0.027
Comment noted.

Comment

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June 4, 2012

U.S. Army Corps of Engineers
Alaska District, Regulatory Division
ATTN: Heidi Firstencel
Juneau Field Office
8800 Glacier Highway, Suite 106
Juneau, AK 9980

Ms. Firstencel,

WS.0.001 I am writing to express my support for the "Greens Creek Tailings Facility Expansion Plan," Alternative B, which I believe is the most environmentally sound, technically feasible, and economically viable alternative analyzed in the EIS.

WS.0.002 Over the last 25 years, Greens Creek Mine has grown to be the largest private sector employer in Juneau with 370 employees. 90% of the 75% Alaska residents who work at the mine reside in SE Alaska and their payroll, including benefits, reached $47 million last year and they were the largest property tax payer in Juneau. Additionally, and most critical to the business community, is that their total direct spending in SE Alaska on goods and services totaled $27 million. Greens Creek is a strong supporter of the local non- profit organizations with not only monetary contributions, but with strong volunteer support from their employee group.

WS.0.003 As the President /CEO of a Southeast Alaska nonprofit with a major emphasis on fundraising, the participation and support of Greens Creek and their employees makes that job much easier. The philanthropic support of the company as well as that of their employees have a major impact on the southeast communities giving and provide leverage to garner greater support.

Recently Hecla Greens Creek Mining gave $300,000 to University of Alaska (UAS) to help fund "Pathways to Mining Careers" and the UAS Center for Mine Training Career Education. Due to a projected 14% decline in SE Alaska's population over the next 20 years it is a top priority of our community to develop solutions to provide opportunity for employment for our youth here in Juneau as they move into adulthood and begin their careers and families.

Response

Comment ID: WS.0.001
Comment noted.

Comment ID: WS.0.002
Comment noted. The socioeconomic effects of the mine's operations are presented in Section 3.18.

Comment ID: WS.0.003
Comment noted. The socioeconomic effects of the mine's operations are presented in Section 3.18.

Comment

WS.0.004 Jobs at Greens Creek are some of the highest paying jobs in Juneau thus making the training and preparation of young employees paramount to the future of our community.

WS.3.005 The proposed expansion of the tailings facility allows for a single point of monitoring versus having two separate rock disposal areas. Utilizing the current disposal area for expansion provides the mine operator a strong familiarity with the topography and geology of the current rock disposal area, provides lower energy demand to operate in the current disposal area and a lower operating cost. It also minimizes additional disturbance of additional land around the mine facility.

WS.3.006 I believe that the Greens Creek Mine's proposal to expand their tailings facility, (Greens Creek Tailings Facility Expansion Plan, Alternative B) is critical to the economic future of not only Juneau, but to all of Southeast Alaska. We cannot afford to lose Greens Creek and the economic opportunity the mine provide to our communities. The closure of the mine facility would be extremely damaging to our business community, economy, population, spirit and future.

WS.3.007 I strongly and steadfastly support the "Greens Creek Tailings Facility Expansion Plan," Alternative B, which I firmly believe is the most environmentally sound, technically feasible, and economically viable alternative analyzed in the EIS.

Your careful attention and thoughtful consideration of these comments in support of Alternative B are genuinely appreciated.

Yours in economic prosperity,

Wayne A. Stevens

Response

Comment ID: WS.0.004
Comment noted. The socioeconomic effects of the mine's operations are presented in Section 3.18.

Comment ID: WS.0.005
Comment noted. The Forest Service's selected alternative and the rationale behind that selection are presented in the Record of Decision.

Comment ID: WS.0.006
Comment noted.

Comment ID: WS.0.007
Comment noted.

Appendix B

Alaska National Interest Lands Conservation Act Findings

The Alaska National Interest Lands Conservation Act (ANILCA) seeks to preserve certain lands and waters within the State of Alaska for present and future generations. Lands addressed by ANILCA include Admiralty Island National Monument (the Monument). ANILCA Title VIII addresses subsistence management and use. The following discussions present considerations and findings regarding ANILCA Section 810 as it relates to the Greens Creek Mine tailings expansion.

ANICLA Title VIII – Subsistence Management and Use – Section 810 Subsistence and Land Use Decisions

Section 810 acknowledges "the national interest in the proper regulation, protection, and conservation of fish and wildlife" on public lands and the "continuation of the opportunity for a subsistence way of life by residents of rural Alaska." Section 810(a) of ANILCA requires that the Forest Service conduct an evaluation of subsistence uses and needs prior to making a determination to "withdraw, reserve, lease, or otherwise permit the use, occupancy or disposition of public lands."

Approving the expansion of tailings disposal under any of the action alternatives would constitute the "use" of public lands. As such, an evaluation of potential impacts to subsistence under the ANILCA § 810(a) must be completed as part of this NEPA action. ANILCA requires the evaluation of the following points:

- The effect of the use, occupancy, or disposition on subsistence uses and needs;
- The availability of other lands for the purpose sought to be achieved; and
- Other alternatives that would reduce or eliminate the use, occupancy, or disposition of public lands needed for subsistence purposes.

ANILCA prohibits the use of those lands in a manner that would significantly restrict subsistence uses unless the Forest Service determines:

- Such a significant restriction of subsistence uses is necessary, consistent with sound management principles for the utilization of the public lands,
- The proposed activity will involve the minimal amount of public lands necessary to accomplish the purposes of such use, occupancy or other disposition, and
- Reasonable steps will be taken to minimize adverse impacts upon subsistence uses and resources resulting from such actions.

The evaluation and findings required by the ANILCA Section 810 are set out for each of the four action alternatives considered in the Greens Creek Mine Tailings Disposal Facility Expansion EIS.

The Forest Service conducted hearings, as required under Section 810(b), in Hoonah AK on September 14, 2012 and in Angoon AK on November 8, 2012. For the November 8 meeting, a phone line was made available and the phone number was published in the Juneau Empire and provided to the City of Tenakee Springs. Transcripts of the hearings are included in the planning record of the EIS. One person testified in Hoonah expressing support for Angoon and the Kootznoowoo Corporation in ensuring that the Clean Water Act is enforced and rivers of the area remain protected. Twelve individuals commented in Angoon identifying a number of issues

ranging from economic considerations to environmental concerns both in general and in relation to subsistence activities.

The following synopsis of cultural and subsistence is based on the hearings in combination with other meetings among Forest Service personnel and representatives of the Native Village of Angoon and other Alaska Native entities.

Current subsistence use in the Hawk Inlet area are considered to be light and dispersed. The majority of subsistence users in the area come from the private inholdings in Wheeler Creek. Other communities such as Angoon, Tenakee Springs and Hoonah also have some association of historical and contemporary subsistence use in the area.

The Hawk Inlet area was likely used the heaviest by subsistence users during the period when the cannery was in operation (1910-1976). The cannery seasonally employed many residents from rural communities in the area as well as Juneau. Families spent their summers in Hawk Inlet participating in the commercial fishing and canning industry as well as practicing subsistence lifestyles. Documentation shows that several camps and smokehouses historically existed in the area prior to and during the cannery days.

As a result of this analysis the community of Angoon voiced the biggest concerns regarding the mine and how it has impacted their subsistence way of life. It is evident that the community has strong ties to the Hawk Inlet area as many families were tied to the cannery operations. The current generation of elders in the community has shared stories of how they lived, raised families and practiced a subsistence lifestyle while working at the cannery. These stories remain very important to the Angoon community as it defines their past and serves as a bridge to their present.

The community of Angoon also has very strong ties to the creation of the Admiralty Island National Monument. A popular story told with pride from the community describes the cross-roads between the Alaska Native Claims Settlement Act (ANCSA) and the ANILCA. One of the central issues during that cross-road was subsistence rights or the right to a traditional way of life for Alaska Natives and rural communities. The community was united to preserve their traditional way of life, which in current day is described as subsistence. Elders from the community were engaged in the land use debate and successfully lobbied with others to preserve their island as a National Monument for future generations. The story is told that the community was united and voted unanimously to support the creation of the Admiralty Island National Monument. This voice was heard in Washington D.C. and in 1978 President Jimmy Carter exercised his authority under the Antiquities Act for the creation of the National Monument. For the community of Angoon, the National Monument stands as a symbol for their right to a traditional way of life.

The Final EIS demonstrates that the use of the Hawk Inlet area today by the community of Angoon for subsistence is light and incidental. Hawk Inlet is located approximately 40 miles north of Angoon. The cannery closed in 1976. Access from the community is primarily by boat via Chatham Strait. Chatham Strait is a large body of water and the west coast of Admiralty Island is commonly known to have very few places to shelter during a storm. The reason for the community's lack of use of Hawk Inlet today can be attributed to a series of social and economic changes in the past 37 years since the cannery has closed. The pivotal changes were the closing of the cannery and the loss of a commercial fishing economy in Angoon, neither of which is attributable to the Greens Creek Mine.

It was noted by a several community member's testimony that they no longer go to Hawk Inlet for subsistence activities. The reasons provided for avoiding the area include the long distance and expense of fuel to travel, unknown health risks associated with consuming wild foods and stories of being asked to leave by mine personnel. As noted earlier, one of the reasons Hawk Inlet is not heavily used by subsistence users is the long distance from Angoon. The long travel to Hawk Inlet from Angoon requires an economic investment in fuel, which for many in Angoon is a struggle due to the high cost of fuel, lack of jobs, and overall poor local economy (many like to point out that it takes money to practice subsistence). Residents who expressed health concerns from mine waste feel that the mine or regulators do not do enough to ensure that the wild edible foods will not cause long-term health effects such as cancer. They cite that the mine and regulators test marine worms and other inedible wild foods and don't do enough to ensure human safety. Finally, some say that they have been run out of Hawk Inlet by mine personnel. Hawk Inlet is secured when the ore ships enter and leave, therefore restricting access for discrete time periods.

Since the mine has begun operations, it is apparent that there has been some reduction in subsistence use as a result of the mining operations. The reduction comes in the form of displacement of users of Hawk Inlet resulting from real or perceived conditions; the reduction in subsistence results from limitations on the access to resources. The tailings expansion could have the effect of extending the duration of the displacement but would not substantially increase the magnitude of the changes that have already occurred. Some of the limitations in use would remain temporary (e.g. while ships are loading) while others based on mine activities or perceptions (e.g., concerns about subsistence resources being contaminated by contact with tailings or contact water) may be longer-term and more widespread. Direct effects would occur to varying degrees during operations under all alternatives; although in all cases, less than one percent of the applicable Wildlife Assessment Area(s) would be affected. Mitigation in the form of active management (e.g., pre-commercial thinning) of the reclaimed landscape would ensure that valuable deer habitat was replaced on-site although reclamation would take tens of to more than a hundred years to re-create old growth habitat. The project would not result in the reduction in availability of fish and wildlife resources because of an alteration to migration or location. The fish passage mitigation in Greens Creek would more than offset the numbers of anadromous and resident fish lost by the placement of tailings in Tributary Creek should Alternative B be selected.

The EIS addresses a number of alternatives, including a no action alternative. The driving factor for the selection of the location for the various alternatives was to minimize environmental effects. The ubiquitous nature of wildlife habitat in Southeast Alaska precluded finding an area that would meet the geotechnical and operational constraints necessary to expand the tailings storage capacity while avoiding all impacts to subsistence resources.

This evaluation concludes that the action shall not result in a significant restriction of subsistence values.

Appendix C
Financial Assurance Procedures

Financial Assurance Procedures

This appendix describes the financial assurance (also referred to as bonding) requirements that apply to the Greens Creek Mine and describes how the financial assurance amount will be revised based upon the outcome of the EIS, the Forest Service's decision, and decisions of other agencies that have authority to establish financial assurance requirements. The Forest Service, State of Alaska, U.S. Army Corps of Engineers, and City and Borough of Juneau all have authority to require financial assurance for the Greens Creek Mine.

1. REQUIREMENTS

Pursuant to the Organic Administration Act[i] and regulations adopted thereunder, a mine operator is required to submit a reclamation bond or other financial assurance to the Forest Service before the Forest Service may approve an operations plan for the mining activity. 36 CFR 228.13(g) directs that when an approved operations plan is modified, the Forest Service may review and adjust the bond to fit the modified operations plan[ii].

In accordance with Alaska Statutes 27.19 (Reclamation) and 38.05 (Alaska Land Act) and the Alaska Administrative Code, Title 11 Chapter 97 (Mining Reclamation), a mine operator is required to submit a reclamation bond to the State before the Alaska Department of Natural Resources' (ADNR) approval of the reclamation plan takes effect. The Alaska Department of Environmental Quality (ADEQ) also requires financial assurance to cover the cost associated with waste management at the site, such as closing the tailings disposal facility (TDF) and the cost of post-closure monitoring requirements[iii].

The amount of the reclamation bond may not be less than the estimated cost to the Forest Service or the State to ensure compliance with the respective federal and state reclamation and monitoring requirements. The federal reclamation requirements include compliance with 36 CFR 228, Subpart A. Thus, a reclamation bond represents the public's "insurance policy" that reclamation will be performed. Together, these agencies have entered into a memorandum of understanding[iv] (MOU) to jointly manage the reclamation bond in order to avoid duplicative reclamation and closure requirement.

Pursuant to 33 CFR 332.3(n), the Corps can require sufficient financial assurances to ensure a high level of confidence that any compensatory mitigation project permitted under a 404 permit will be successfully completed in accordance with applicable performance standards. In some circumstances, the Corps may determine that financial assurances are not necessary for a compensatory mitigation project. In consultation with the project sponsor, the Corps determines the amount of the required financial assurances, which is based on the size and complexity of the compensatory mitigation project, the degree of completion of the project at the time of project approval, the likelihood of success, the past performance of the project sponsor, and any other factors the Corps deems appropriate. Financial assurances may be in the form of performance bonds, escrow accounts, casualty insurance, letters of credit, legislative appropriations for government sponsored projects, or other appropriate instruments, subject to the Corp's approval. If financial assurances are required, the 404 permit will include a special condition requiring the financial assurances to be in place prior to commencing the permitted activity.

The Corps' financial assurance for 404-permitted mitigation is phased out once the Corps determines mitigation is successful in accordance with the plan's performance standards.

The City and Borough of Juneau (CBJ) also requires financial warranties to be in place for mining operations prior to issuance of the Large Mine Permit (CBJ 49.65.140). The CBJ may not issue a large mine permit until the required financial warranty has been submitted by the operator, approved by the City Attorney, and accepted by the Community Development Department. The amount of the financial warranty for a large mine is set by the Planning Commission with the assistance of the Community Development and Engineering Departments. In setting the amount of the financial warranty, the CBJ is to take into consideration the amount and scope of any financial warranties which have been submitted to other agencies. However, the CBJ may require the operator to post a separate financial warranty if it is determined that the warranty submitted to another agency does not adequately protect the CBJ's interests. Currently, the CBJ has determined the existing bond to be sufficient to satisfy local code.

2. Procedures

HGCMC has proposed modifications to its operating plan to expand the TDF so that additional tailings can be disposed. The proposed modification is being reviewed by the agencies and the appropriate level of environmental analysis is being performed. For the TDF expansion, the Forest Service determined that an Environmental Impact Statement (EIS) is required. After the Forest Service selects an alternative for implementation and issues a Record of Decision (ROD) and the State and Corps make their decisions, HGCMC will revise its reclamation plan and cost estimate based on the selected alternative and submit these revisions to the agencies. Agency staff will review the revised reclamation plan and cost estimate to ensure that the reclamation and closure requirements of each agency are met. The Forest Service requires that all bonds pertaining to mining operations on National Forest System lands be developed or reviewed by a Certified Locatable Minerals Administrator. The training abilities and required knowledge of the administrator are outlined in Forest Service Manual, Chapter 2890. If an increase in the bond is required, the Forest Service will not approve the operating plan modification until HGCMC submits the additional bond amount. Forest Service regulations at 36 CFR 228.13 requires submittal of a bond for reclaiming disturbances on National Forest System lands before approval of a Plan of Operations.

As required by Alaska Statues 27.19 and 38.05 and AAC Title 11 Chapter 97, the total amount of the bond required by the State must be in place prior to the issuance of an waste management permit unless the applicable plan identifies phases or increments of disturbance which may be individually identified and for which individual, incremental bonds may be calculated. . If the changes proposed by HGCMC are approved, the Forest Service and State will determine the period and extent of disturbance that will be authorized and bonded for incrementally, not to exceed 10 years[v].

The comprehensive bond review required by the Forest Service and State currently occurs every five years unless it is determined that a shorter review cycle is necessary. The agencies may conduct additional comprehensive bond reviews if, after modification of a reclamation or operating plan, an annual overview, or an inspection of the permit area, an agency determines that an increase in the bond level may be necessary. Bond release is performance based, and is granted or denied based on the

agencies' evaluation. The Forest Service may not release a bond until the reclamation requirements of 36 CFR 228.8(g) are met. Pursuant to section 11 AAC 97.435 the ADNR will inspect or review actions taken under the approved reclamation plan, and will make a written finding that each applicable requirement of the approved reclamation plan has been completed prior to release of any bond amount. The ADEC will approve a request to terminate the post-closure care requirements if the department finds that the facility does not pose a threat to public health, safety, or welfare, or to the environment (18 AAC 6.270). All information regarding bond releases and decreases is available to the public upon request.

To avoid requiring a mine operator to submit duplicative bonds, the Forest Service and the State have executed a MOU allowing the agencies to accept a joint bond that satisfies both federal and state reclamation requirements. The reclamation bond may be forfeited jointly by the agencies or by one of the agencies acting without the concurrence of the other agency. Even if the reclamation bond is forfeited by one of the agencies, the bond must be expended in a manner that satisfies both federal and state reclamation requirements. To ensure administrative continuity and to conform to the intent of the MOU, the Forest Service has adopted a 5-year schedule for reviewing the sufficiency of the reclamation bond. Guidance for Forest Service bonding can be found in *Training Guide for Reclamation Bond Estimation and Administration* (USDA Forest Service 2004).

HGCMC has previously submitted a reclamation bond in the amount of $30,455,000. If HGCMC's changes to its Plan of Operations, or one of the other alternatives (Alternatives C or D), are approved by the agencies, the reclamation plan, cost estimate, and waste management permit will need to be revised to conform to the selected alternative. At that juncture, the agencies will evaluate how much the current bond needs to be increased to ensure reclamation occurs under the Plan of Operations and waste management permit. HGCMC would not be allowed to operate under the modified Plan of Operations until the additional bond was submitted.

3. Reclamation Costs

The amount of financial assurance required is the agencies' estimated cost to complete site reclamation in the event the operator cannot or will not perform the required reclamation. The Plan of Operations modification submitted by HGCMC to the Forest Service for approval describes the proposed operation modification, the types of disturbances which may be expected under the proposed operation, and the reclamation proposed by HGCMC. As part of the NEPA process, the Forest Service is evaluating, in addition to the proposed action alternative, a reasonable range of other alternatives. Additional modifications may be made in the course of developing stipulations to minimize environmental impacts. The Forest Service will identify a selected alternative and stipulations when its ROD for the Plan of Operation modification is issued. The State is participating in the NEPA process and may issue a modification to HGCMC's waste management permit to make the federal and state approvals consistent. If one of the TDF expansion alternatives is ultimately approved, then the bond amount for the selected alternative will be determined.

The agencies currently do not have the information required to complete a bond calculation because the ROD has not yet been issued. The bond amount will be determined after the ROD is issued since at that time there will be certainty regard the selected alternative, mitigation measures that will be required, and any other stipulations that will be required. All of these impact the numerical amount of the bond.

The Forest Service and State will require reclamation for traditional near-term reclamation activities such as facilities removal, site regrading, and revegetation and requirements to collect and treat mine-impacted waters, and site maintenance and monitoring for as long as necessary to ensure the protection of environmental resources. Appendix D of this EIS includes the current reclamation plan. The modified reclamation plan approved after agency decisions are made will include detailed, task-oriented descriptions capable of being used to estimate costs of the specific work tasks and materials required to satisfy performance goals.

The first part of the financial assurance calculation addresses reclamation tasks that can be completed soon after cessation of operations, such as interim operations and maintenance, disposal of hazardous materials, earthwork, facility demolition and removal, revegetation, and other measures. It will outline both direct and indirect for post closure reclamation activities. The direct costs are line item costs for activities outlined in the Plan of Operations and waste management permit. Indirect costs are calculated as a percentage of the direct costs and are associated with unexpected conditions encountered during mine operations, reclamation, and closure. Because the bond is reviewed and recalculated every 5 years, an inflation factor is applied to both direct and indirect costs. This approach to bond calculation is consistent with common cost estimating practices.

The second part of the financial assurance calculation addresses water treatment and long-term monitoring, which will continue for many years after mine closure. Separating the cost estimates into two calculations allows the agencies to use a discounted cash flow approach for the long term activities.

The bond amount also reflects the estimated cost for the agencies to contract, manage, and direct construction at the site during reclamation. For projects such as the Greens Creek Mine, this often means the agencies will include the cost to retain a third-party to prepare the contract documents, to serve as the construction manager overseeing on-site reclamation, and to act as the liaison between the agencies and the various contractors performing the work.

Additional information in how direct costs, indirect costs, and other reclamation costs are determined is provided below.

Direct Costs

A reclamation cost calculation includes direct and indirect costs. Direct costs are assigned to reclamation tasks that are specific in scope and to which a cost can be assigned based on requirements outlined in the ROD, the approved Plan of Operations and waste management permit. Examples of direct costs would include removal of surface facilities and roads, wetland mitigation, adit closures, capping of the TDF, installing permanent surface water diversions, and revegetating disturbed areas.

The final slope angle of waste dumps, depth of topsoil cover, location and design of surface diversions, and seed mix are typical information contained in a reclamation plan and used by the agencies to estimate reclamation costs. Because the reclamation information in the ROD, Plan of Operations and waste management permit are projections of future site conditions, often well in advance of closure, the actual disturbance area, quantity of salvaged reclamation materials, and quantity and quality of water being managed are estimates and final quantities may vary.

For most of the reclamation items, the agencies have enough information to estimate reclamation costs more precisely. Direct costs are estimated by the agencies using data from a number of sources. These include bids from past mine reclamation contracts awarded by the Forest Service or State, industry accepted references such as the Caterpillar Performance Handbook (2010), RS Means cost data service, quotes from local contractors and vendors, and the Forest Service's *Training Guide for Reclamation Bond Estimation and Administration* (USDA Forest Service 2004).

Water treatment costs are estimated using actual costs from the existing water treatment plant and from plants at either other operating mines or from abandoned mine sites under the jurisdiction of government agencies. The agencies recognize uncertainties associated with long-term water treatment and the agencies make various assumptions to account for these uncertainties. In every instance, the bond estimate is annotated to identify the source of information used in the calculations and the assumptions made to account for missing or incomplete data.

Indirect Costs

The other cost component of the reclamation estimate is indirect costs, which are those costs that cannot be attributed to any one specific activity. Rather, indirect costs represent expenses necessary to the overall successful implementation and execution of the reclamation. Examples of indirect costs include contractor mobilization and demobilization, bid and scope contingency, engineering redesign, and project administration.

The agencies estimate indirect costs based on a percentage of the total direct cost. This approach is used in part due to the uncertainty associated with many of the indirect cost line items and the inherent difficulty in assigning costs to these uncertainties. For example, engineering redesign is considered an indirect cost because it is not known what design modifications, if any, may be necessary to take the mine site at the cessation of operations to final reclamation. Usually, some additional engineering design is required during final reclamation to account for incomplete data and changed site conditions from the time when the reclamation plan was initially developed during permitting to the moment of actual on-the-ground reclamation. The scope of possible modifications to the final reclamation plan is difficult to project during permitting, and consequently, this uncertainty is addressed through a percent multiplier of the direct cost. Cost data providers, such as RS Means, and various government agencies have suggested indirect cost percentages based on data they have compiled, and which the Forest Service has referenced and modified for their own use (USDA Forest Service 2004). Typically, the guidance suggests a range for indirect costs based on the dollar amount of the calculated direct costs and the level of certainty associated with the accuracy of the cost estimate. These ranges are intended

as guidelines for the agencies, and there is latitude in their application depending on site-specific conditions, complexity of reclamation, potential environmental risk, and professional judgment.

Other Reclamation Costs

Third-Party Oversight

Should site reclamation become the agencies' responsibility, there are other activities and costs aside from those identified in previous sections that can have an effect on a final reclamation cost. If an operator fails to reclaim a site adequately and forfeits the bond, the agencies frequently will retain the services of a third-party contractor, such as an engineering or construction management firm, to assume management of the mine site and oversee reclamation. They assist the agencies during closure of the mine site, and often assume the role of project manager. Their duties may include technical advisor, on-going site maintenance, environmental compliance, preparation of construction and environmental documents associated with site closure, and construction management during reclamation. The agencies retain overall responsibility for the site.

Interim Site Care and Maintenance

Frequently, a mine site will need to be maintained for some period before reclamation can begin in earnest. This may be due to legal processes and other restrictions, lead time to contract for the actual on-site reclamation work, and weather. During this interim period, mine-related activities, such as water treatment, may need to continue to ensure environmental protection. In the bond estimate, the agencies assume that they will manage the site on a daily basis. In the case of the Greens Creek Mine Project, access to the site would be maintained, water management at the TDF and in underground workings would continue, ventilation and power to underground workings may be required, attendant care and maintenance activities would continue. The responsibility to maintain the mine systems requires the agencies to establish a physical presence at site, most likely by a third-party contractor. Thus, the agencies include a "Care and Maintenance" line item in the direct cost calculation. This site maintenance requirement may last from 6 months to 1 year and can be a significant expense.

Long-Term Site Monitoring and Maintenance

Other reclamation costs include site monitoring and maintenance for a period after initial site reclamation has been completed. This typically lasts from 5 to 20 years, but in some instances may be extended depending on the complexity and longevity of the risk of environmental impact. The current waste management permit requires HGCMC to conduct post-closure care and monitoring for 30 years at the waste sites; 50 years of post-closure is required for the marine discharge diffuser if it is necessary post closure. Activities associated with site monitoring and maintenance may include water sampling, diversion ditch maintenance, repair of recent erosion events, and revegetation. For sites like Greens Creek Mine that would have areas of extensive surface reconfiguration, some redesign and reconstruction of reclaimed areas may be required to address episodic reclamation failure. It may take several years before disturbed areas reach equilibrium and are self-sustaining. The agencies account for this maintenance need by assuming labor and material requirements and applying them over a specified

maintenance period. Monitoring and maintenance is assumed to be needed annually for an initial period, usually projected at 5 to 10 years while reclamation becomes established, and then may be needed intermittently after that. The agencies' bond calculation captures this initial annual phase as well as the future intermittent requirements.

Inflation

The agencies assume reclamation costs may rise from year to year and account for the cost increase by assigning an inflation factor to the reclamation estimate. The agencies use data provided by the Office of Management and Budget when determining an appropriate inflation factor (Office of Management and Budget 2010). Annual inflation is applied to both direct and indirect costs and would be determined based on information available from the Office of Management and Budget at the time the financial assurance value is recalculated.

Long Term Reclamation Bond Considerations

Water Treatment

The agencies account for reclamation activities that may extend into the future, well after completion of site reclamation, by making assumptions about the frequency and level of effort required to ensure site reclamation is being maintained and is accomplishing its intended objectives. These obligations have been discussed previously in the *Long Term Site Monitoring and Maintenance* section. Other reclamation requirements may continue for a much longer time. One of these is water treatment and management, where maintaining protection of water quantity and quality can be a significant financial liability long after a mine has ceased operations.

HGCMC is required to manage water during operations, including collection and treatment of water that comes into contact with the tailings. The analysis in this EIS has determined that water management and treatment will be required for a significant time after closure. To account for this, the agencies will require that costs associated with long-term water treatment are included in the reclamation bond calculation.

Discounted Cash Flow Analysis and Net Present Value

The Forest Service and State calculate long-term water treatment costs using a discounted cash flow (DCF) analysis, where the annual treatment costs are converted to a net present value (NPV). A NPV is the amount of money that must be put in a trust account on Day 1 of the mining operation so that it will provide sufficient revenue to pay for all future daily operation of the water management, including treatment, as well as for future capital equipment. The exact time frame for water management and treatment at Greens Creek Mine currently is unknown, but the agencies estimate it may be at least 100 years, perhaps in perpetuity. Therefore, for the Greens Creek Mine Project, the agencies have projected the DCF over 100 years.

This time frame is in line with federal guidelines contained in the USDA's *Economic and Environmental Principles and Guidelines for Water and Related Land Resources Implementation Studies* (USDA 1983).

Estimating costs beyond 100 years would make little difference in the bond amount because those years are heavily discounted. In addition, it is assumed that the cost of water treatment will become more economical with technological advances. The agencies use four variables when calculating a bond for a water management and treatment system: 1) the annual cost of the system, 2) the rate of inflation, 3) the rate of return on money in the trust fund, and 4) capital replacement costs. In a DCF analysis, the first three variables are held constant from one year to the next over the projected 100-year time frame. If any of the variables deviate from their initial estimates over a 100-year period, the result may be either a shortfall in the amount of money in the trust fund needed to operate the water management system for a 100-year period or conversely, there may be a surplus of monies available to run the system. These variables are evaluated during each 5-year bond review.

The agencies refer to the Office of Management and Budget's Circular No. A-94, Appendix C, for guidance on nominal (market) and real (inflation-adjusted) interest rates to be used as the discount rate in the DCF analysis (Office of Management and Budget 2010). This publication provides Federal Government forecasts and recommendations on select discount rates for up to 30 years into the future. These rates are updated annually. For analyses beyond 30 years, the Office of Management and Budget recommends using rates for the 30-year time frame. The longer the forecast is projected, the more uncertainty there is in the accuracy of the forecast. The agencies use Federal guidelines and circulars as one source of information in developing their financial projections, but owing to the significant forward-looking time frames involved in this type of forecasting, they consult other sources of information and use professional judgment in arriving at the final bond estimate.

The agencies invest monies for long-term water treatment in government-backed securities that typically earn a lower interest rate than other type of investments but have less financial risk. Treasury bills, notes and bonds, are typical investment options. The longest term for government auctioned treasury bills is also 30 years.

4. Current Status of the Bond

As part of ongoing management of the mine, the Forest Service and State are currently conducting a comprehensive bond revaluation for the currently approved operations. Before revaluation, the bond held by the agencies is $30,455,000. In reviewing the current reclamation plan and cost estimate, the agencies are also considering the findings of a recent environmental audit performed by an independent third party (SRK 2009). An environmental audit is required every five years by the State. The most recent environmental audit made the following recommendations:

- Equipment ownership, insurance, maintenance labor, overhead and profit need to be checked in some cases and equipment types need to be defined.
- Overtime labor costs should be added.
- Contractor profit and freight components relating to materials need to be checked.
- Requirements for a one-year "Holding Period" need to be better defined and costed. Long-term treatment costs need to consider possible changes in influent chemistry. Additional supervision of foreman during Years 1 and 2 should be included.

- Efficiency and correction factors need to be documented for production rock sites. A constant fleet needs to be assumed rather than an optimal fleet for each task. Costs for keeping the underground mine open while backfilling Class 3 or 4 rock should be considered.
- A wastage factor should be included in the cover construction for the Tailings Disposal Facility to allow for covers that do not meet specifications and need to be re-built.
- A contingency of 20% is more usual for costs that are not based on detailed design.
- Post-closure costs should be discounted using a net present value method
- The need for long-term water treatment represents the greatest uncertainty in the Reclamation Plan and cost estimate. The site should continue to collect the data needed for assessing long-term water quality, treatment requirements and treatment options.

5. Public Process

The Forest Service released the Draft Reclamation Bond Estimating and Administration Guide (Bond Guide), which guides Forest Service bonding practices for comment on May 15, 2003. Copies of the Bond Guide were sent to reviewers including all Forest Service Regional Minerals Staffs, other State and Federal Agencies, Mining Industry and Environmental Groups as well interested public commenters. In addition, the Forest Service made the Bond Guide available through the Forest Service Washington Office Minerals and Geology website. After the Forest Service issues the ROD for this EIS, if an expansion of the TDF is selected, the Forest Service will work with HGCMC and other agencies to update the reclamation plan and financial assurance cost estimate, to reflect the approved actions. The reclamation plan and cost estimate must be finalized and adequate financial assurance must be in place before the Forest Service can approve the revised Plan of Operations.

The financial assurance amount will be subject to a public review period during the review period for the State's waste management permit. ADEC notices the draft waste management permit, including the required financial assurance value, for a 30 day review period. During this time, any person who disagrees with the decision may request an adjudicatory hearing in accordance with 18 AAC 15.195- 18 AAC 15.340 or an informal review by the Division Director in accordance with 18 AAC 15.185. Informal review requests must be delivered to the Division Director within 15 days of the permit decision. Adjudicatory hearing requests must be delivered to the Commissioner of the Department of Environmental Conservation within 30 days of the permit decision. If a hearing is not requested within 30 days, the right to appeal is waived.

The ADNR will issue a reclamation plan approval following its acceptance of the reclamation plan and cost estimate. This decision will be subject to appeal in accordance with 11 AAC 02. If no appeal is filed by the appeal deadline, the decision will become a final administrative order and decision of the department 31-days after issuance. An eligible person must first appeal this decision in accordance with 11 AAC 02 before appealing this decision to Superior Court.

References

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SRK Consulting. 2009. Environmental Audit of the Greens Creek Mine. Final Report. March 2009.

USDA Forest Service. 2004. Training Guide for Reclamation Bond Estimation and Administration. Available online at http://www.fs.fed.us/geology/bond_guide_042004.pdf

[i] Organic Administration Act of 1897. This Act opened National Forest System Lands to entry under the 1872 Mining Law and gave the Secretary of Agriculture authority to regulate such activities. Regulations defining this authority were issued in 1974 and are found in 36 CFR 228A.

[ii] 36 CFR 228.13(c). In the event that an approved plan of operations is modified in accordance with §228.4 (d) and (e), the authorized officer will review the initial bond for adequacy and, if necessary, will adjust the bond to conform to the operations plan as modified.

[iii] 18 AAC 60.265 **Proof of financial responsibility.** Unless the applicant has provided equivalent surety through a government agency or has demonstrated financial assurance under 18 AAC 60.398, the department will require proof of financial responsibility to cover the cost of closing a landfill and, if monitoring is required, the cost of post-closure monitoring, if the department determines proof of financial responsibility is necessary to protect the public health, safety, welfare, or the environment. Proof of financial responsibility under this section may be demonstrated by self-insurance, insurance, surety, or other guarantee approved by the department to assure compliance with applicable closure standards and post-closure monitoring requirements.

[iv] FS Agreement No. 07MU-11100500-059 (2007).

[v] 11 AAC 97.320. (a) The commissioner will, in his or her discretion, approve a reclamation plan for any term not to exceed 10 years.

Appendix D
Alternatives Development

TETRA TECH

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Memorandum

To: File **From:** Gene Weglinski

Date: September 30, 2011 (revised March 26, 2012)

Re: Alternatives Development and Screening

Introduction

Analyses conducted under the National Environmental Policy Act (NEPA) are focused using significant issues identified during the scoping process. The significant issues drive the formulation of alternatives to the Proposed Action. The alternatives development process involved an interdisciplinary team including the Forest Service as lead agency, the cooperating agencies (U.S. Army Corps of Engineers, U.S. Environmental Protection Agency, the State of Alaska (departments of Natural Resources, Environmental Conservation, and Fish & Game, and the City and Borough of Juneau), as well as Tetra Tech, the third-party contractor supporting the writing of the environmental impact statement (EIS). Developing the alternatives involved defining a set of objectives and screening criteria that the project team ultimately used to identify four categories of alternatives. The four alternative categories investigated for their potential to address the issues were:

1. Evaluating alternative locations for the facility put forth as Hecla's proposed action;
2. Reconfiguring the design of the facility put forth as Hecla's proposed action;
3. Opportunities for contemporaneous reclamation of the tailings disposal facility; and,
4. Reducing the concentration of pyrite in the tailings.

The rest of this memo describes the significant issues and the process through which the alternatives carried forward and not carried forward were developed for the analysis.

Significant Issues

The following significant issues were developed based on comments provided during the scoping process:

- **Water Quality** – Water quality may be impacted by mine facilities based on the potential existence of acid generating rock, potential metals loading, impacts to waters of the U.S. from expanded facilities, and marine discharges. Changes to water quality could cause adverse impacts on aquatic life.
- **Wetlands** – Expansion of the mine tailings disposal facility may cause direct and indirect impacts to wetlands. Loss of wetlands can impact migrating and resident birds as well as other wildlife species. Any impacts to wetlands must be mitigated based on 404(b) guidelines.
- **Aquatic Resources** – Construction of storm water collection ponds, tailings storage sites and road crossings along/over creeks (Greens Creek, Tributary Creek, and Cannery Creek) could

negatively impact anadromous and resident salmonids and other fish species such as, Dolly Varden char, cutthroat trout, and steelhead trout.

- **Monument Values** – The Greens Creek Mine and proposed expansion occurs partially within the Admiralty Island National Monument. The Monument was established for the purpose of protecting objects of ecological, cultural, geological, historical, prehistorical, and scientific interests. Any lease of Monument lands for mining must not cause irreparable harm to Monument values.

The objectives/criteria necessary to address the significant issues were distilled into the following key aspects as a first step.

Water Quality

Hecla currently uses a number of techniques to maintain water quality at the site, including diverting clean run off to prevent it from coming in contact with mining operations and collecting and treating all "contact water" so that it may be discharged in compliance with an Alaska Pollutant Discharge Elimination System (APDES) permit. Reducing the amount of contact water can be accomplished by effectively keeping run off from snowmelt and rainfall from entering into areas disturbed by mining operations and by minimizing the amount of water that is able to pass into the waste rock dump and tailings storage facility (dry stack). Since operational requirements would be similar among all the alternatives as well as the proposed action, the consideration of water management issues focused on the size and configuration of the dry stack and ancillary facilities. The key objectives considered in developing alternatives to improve water quality included the following:

- Avoiding the need for long-term treatment (ability to walk away in terms of water treatment);
- Reducing the duration of long-term treatment;
- Reducing the volume of contact water;
- Optimizing the opportunity for the diversion of run-on water;
- Reducing the cumulative volume of treated water; and,
- Improving the ratio of surface area to unit mass (store more tailings in a smaller footprint).

Wetlands

An initial step in minimizing the effects to wetlands can be accomplished by simply avoiding or reducing the extent of disturbances to wetland areas. The challenge that arises is the ubiquitous nature of wetlands within the project area; while non-wetland areas are present, they are generally steep and present difficulty in terms of providing adequate geotechnical stability or water management. The Clean Water Act requires that impacts to wetlands and waters of the United States be minimized where they cannot be avoided and that mitigation is put in place for unavoidable impacts. Following the initial efforts to locate facilities outside of wetlands to the extent possible, the specific design of each alternative included maximizing the use of upland areas while minimizing the effect on wetlands to the extent practicable. While using this approach, some wetland impacts are inevitable. The key objectives/measures that were identified in developing alternatives for wetlands are:

- Type of wetland affected, focusing on avoiding impacts to "high value[1]" wetland complexes that support habitat values for birds, wildlife and anadromous fisheries;
- Size of wetland affected;

[1] The value assessment for this exercise was done without the benefit of a full functions and values assessment for wetland resources in the area. The functions/values assessment report was submitted at a much later point in the EIS development process.

- Presence of anadromous species downstream; and
- Practicability of the alternative.

Aquatic Resources

Key issues associated with impacts to aquatic life are closely tied to the issues associated with water quality and wetlands. Water quality must be managed in both the short- and long-term to meet designated uses for aquatic life. As was discussed above for water quality, this is accomplished by establishing clean water diversions; collecting, treating and minimizing the volume of contact water; and assuring that there are no long term affects to water quality. The same key objectives and measures that apply to wetlands are associated with aquatic resources. Effects to streams, particularly with regard to riparian areas and stream features need to be minimized. The type of aquatic habitat with respect to both anadromous and resident fishes needs to also be considered.

Monument Values

The Alaska National Interest Lands Conservation Act (ANILCA) requires that impacts to areas within the Monument are minimized and that mining operations do not cause irreparable harm to Monument values. With respect the proposed project, considered alternatives must be designed to address three primary objectives:

- Reduce the extent of disturbance within the Monument boundary;
- Reduce the duration of effects within the Monument boundary; and
- Assure that operations do not cause irreparable harm.

Identified Alternatives and Screening Criteria

The first phase of screening was to develop a series of alternatives and identify screening criteria that could be used to evaluate their effectiveness in addressing the significant issues. Criteria were identified during interagency meetings on February 22 and 23, 2011 and refined based on the core aspects of the significant issues – wetlands, water quality, aquatic life, and monument values.

In order to address the issues, the considered alternatives developed for screening focus on four categories:

- Alternative locations for disposal of tailings;
- Reconfiguring the design of Hecla's proposed action;
- Contemporaneous reclamation of the tailings facility;
- Reduction in the pyrite concentration of the tailings.

Alternative Locations

Alternative locations were identified by the interagency team and have been considered in order to minimize impacts to wetlands, minimize impacts to other waters of the U.S. (i.e., streams), and minimize of impacts to aquatic life, including anadromous and resident fishes. The potential alternative locations identified for this exercise are depicted as Proposed Alternative Areas 1 through 6 in Figure 1. The same facility footprints are shown in relation to National Wetland Inventory-mapped wetlands in Figure 1A.

The specific screening criteria that have been identified to compare alternative locations are:

- Linear feet of stream directly affected;
- Acres of wetlands or riparian management areas disturbed;
- Type of wetland disturbed;
- Total linear feet of stream(s) downstream from the tailings location;
- Length of stream(s) (linear feet) that support anadromous fish.

In addition to these criteria, two other overriding conditions were considered when evaluating alternative locations. First, no alternative locations were considered that were within the Monument Boundary or would increase the proposed footprint with the boundary. Second, the geotechnical stability of the tailings disposal facility over the long- and short-term needed to be evaluated at for each alternative location. This is an overriding (fatal flaw) analysis, in that each alternative must meet an adequate safety factor (a measure of stability). For screening purposes, only areas with less than a 20 percent slope were considered.

Reconfiguring and Realigning the Design of the Proposed Action

Participants in the interagency alternatives meeting expressed interest in minimizing effects on wetlands and aquatic resources within the Tributary Creek watershed by reconfiguring the design of Hecla's proposed action. While locating additional storage capacity outside the Monument would achieve some of the objectives set forth in the alternatives analysis, it is acknowledged that there are substantial benefits to maintaining a single facility such as limiting new disturbance to watersheds already affected and limiting the focus on water management and water treatment requirements to the expansion of existing facilities rather than the construction of new, additional facilities. Proposed Alternative Areas 7 and 8 in figures 1, 1A, 8, and 9 provide more detail on locations given further consideration as components of potential tailings disposal alternatives.

The screening criteria identified for this alternative were similar to those of the 2003 evaluation:

- Technical feasibility;
- Linear feet of stream directly affected;
- Acres of wetlands or riparian management areas that are disturbed;
- Type of wetland disturbed;
- Total linear feet of stream(s) downstream from the tailings location; and,
- Length of stream(s) (linear feet) that support anadromous fish.

Contemporaneous Reclamation of the Tailings Facility

The oxidation of pyrite could potentially produce geochemical conditions known as acid rock drainage (ARD) or ARD chemistry. Typical ARD chemistry includes leachate or pore water that has high levels of acidity, dissolved solids (including sulfate), low pH, and elevated metals concentrations from the dissolution of minerals. The development of ARD chemistry is confounded and dependent on a variety of factors, including buffering potential and exposure to oxygen. Depending on conditions, ARD could develop relatively rapidly, take hundreds or thousands of years, or not develop at all. The development of ARD conditions could significantly impact water quality. Contemporaneous reclamation could be used to establish a final cover over stages of the tailings facility that have been completed and sufficiently separated from active tailings placement. Placing the final cover incrementally rather than postponing the process until all tailings have been placed could reduce the time that tailings at the surface are exposed to air. Contemporaneous reclamation would accomplish two objectives; reduce the risk of ARD chemistry developing at the surface and provide an earlier start to re-establishing the long-term vegetation cover and thereby reducing the temporal aspect of the disturbance within the Monument.

While several factors would need to be considered in a detailed analysis of alternatives, only a single criterion was identified to screen the use of contemporaneous reclamation of the tailings facility, technical feasibility. Issues that could affect technical feasibility include the availability and location of sufficient materials to construct the cap, including top soil, low permeability materials, and materials to construct the capillary breaks; access of equipment to the finished portion of the tailings facility; and operational logistics associated with the active placement of tailings.

Reduce the Concentration of Pyrite in the Tailings

Factors associated with the oxidation of pyrite and the potential development of ARD conditions were discussed above for *Contemporaneous Reclamation.* The objective of the alternative would be drive the acid potential:neutralization ratio to a level that would favor neutralization within the tailings. The alternative would require modifying a flotation circuit to concentrate pyrite thereby lowering the pyrite concentration within the existing lead zinc tailings prior to disposal at the tailings facility. This would result in two products, tailings with substantially less pyrite than the existing tailings, and a pyrite concentrate that would need to be managed separately. The pyrite concentrate would be backfilled into the mine, with the tailings placed in the tailings facility. A substantial reduction in pyrite concentrations could potentially reduce the risk of ARD chemistry developing in the tailings, especially at the surface where they are exposed to the air.

A similar alternative involving a pyrite flotation circuit was identified, screened, and evaluated in the 2003 EIS. A detailed discussion and evaluation of several options regarding this alternative were provided in Appendix G of that document. The alternative was screened out from further consideration at that time. However, during the inter agency meeting on February 22 – 23, 2011, there was renewed interest in re-screening and reviewing the feasibility and merits of this alternative.

The screening criteria that have been identified for this alternative are similar to those associated with the alternative location alternative:

- Technical and logistical feasibility; and,
- Predicted long-term water quality

Screening Results

Alternative Locations

The location for potential alternative facility sites consumed a substantial portion of time during the interagency alternatives meeting. The discussion of alternative locations was followed by a robust discussion of screening criteria to be employed in assessing the ecological sensitivity of different alternative location(s) and how the most appropriate location(s) would be identified. The following discussion focuses on six alternative locations although two others (areas 7 and 8 were also assessed using the same criteria) are discussed below under the *Reconfiguring and Realignment* discussion below.

Alternative locations areas 1, 2, and 3 (see Figure 1) were initially included in a February 15, 2011 alternatives memo. Areas 4, 5, and 6 (Figure 1) resulted from the mapping exercise at the interagency meetings. Figures 2 through 7 present detailed views of each of these areas with respect to their relationship to wetlands and their fit in terms of local topography. As discussed during the interagency meeting, areas 2 and 3 are too small to accommodate the full capacity of the proposed action (approximately 14.2 million cubic yards of tailings). While these facilities are presented in the figures and in the following data, they were not recommended for further consideration because of their inadequate capacity.

Table 1 presents a summary of stream, aquatic life, and wetland aspects of each alternative area with Tetra Tech's initial rankings on an overall basis. The table includes the length of stream directly affected, the length of stream downstream from each facility, the degree to which each facility encroaches into stream buffer areas (Riparian Management Areas), and the length of anadromous stream occurring downstream. The table also includes a summary in acres of wetlands affected. Table 2 presents the type of wetlands that would be affected by each alternative area. For weighing purposes and based on the discussion during the interagency meeting, wetland complexes, consisting of two or more wetland types were considered to have higher habitat values than simple wetland communities (e.g., forested or emergent). Further, wetlands within anadromous drainages were considered of higher value than

wetlands that did not occur within anadromous drainages, regardless of the proximity to anadromous habitat.

Two of the sites (areas 1 and 4) could be built such so that contact water could be directed away from the Fowler Creek drainage (which supports a large anadromous fishery). The construction techniques that could keep contact water out of the Fowler Creek drainage would result in the loss of some wetland habitat that currently supports anadromous fish habitat in Fowler Creek. The fact that long-term water management could reduce or eliminate threats to water quality within the Fowler Creek drainage made these two locations desirable for further consideration in the alternatives analysis. Area 1 would affect substantially less wetland than Area 2 and was therefore the recommended alternative location to carry forward for detailed study. The other areas with adequate capacity to store the tailings expansion (areas 5 and 6) are both entirely within the Fowler Creek drainage and would affect a greater extent of wetlands compared to Area 1. Therefore these locations were not recommended to be carried forward for detailed analysis.

Reconfiguring and Realigning the Design of the Proposed Action

The reconfiguration of the tailings disposal facility expansion described under the proposed action could reduce some long-term effects to wetlands in the Tributary Creek drainage, compared to the proposed action. Proposed Alternative Area 7 (see figures 1, 1A, and 8) would result in tailings being placed into wetland areas within the Cannery Creek drainage. The design of this potential alternative was incorporated into the mitigated version of Alternative B and is discussed in greater detail in the EIS and is not considered further here.

Proposed Alternative Area 8 (see figures 1, 1A, and 9) would involve shifting the tailings disposal facility to the west and away from the Tributary Creek channel. This design was carried beyond the preliminary layout by incorporating supporting facilities including water management ponds and an access road (Figure 10).

Most of the existing tailings facility sits on a layer of drainage material, which is consistent with the design of the proposed expansion. In addition to the drainage layer, the reconfiguration depicted by Proposed Alternative Area 8 would involve the placement of a substantial volume of fill (3.6 million cubic yards) to create a buttress along the slope leading to Hawk Inlet (see figures 10 and 11, cross-sections B-B' and C-C'). The buttress would be necessary to enhance the stability of the western slope of the facility, which would be located on the slopes directly above Hawk Inlet. The slopes of the reconfigured facility including the buttress, would achieve a slightly lower factor of safety (1.28) compared to that which would be met by proposed action and other facility designs (minimum 1.30). The proximity of the pile to Hawk Inlet was not considered in calculating the factor of safety or the potential consequences of a failure.

The 3.6 million cubic yards of clean fill for the buttress would need to be barged to the site as is currently done with material necessary for road construction. The volume of fill necessary to construct the facility would be 225 times greater than the typical volume of clean fill imported annually (16,000 cubic yards) and would represent a substantial cost to the operation. Another substantial cost resulting from this configuration would be the necessity to construct a new water treatment plant within the early phases of facility construction and well before the end of the existing plant's effective service life. The increased costs were not evaluated directly in terms of whether they could render the project uneconomical (not practicable) over the long-term.

Compared to the proposed action, the Area 8 reconfiguration would expand the facility away from sedge/fen wetlands in the headwaters of Tributary Creek into forested wetlands that drain to Tributary Creek and Hawk Inlet. Emergent wetlands in the Tributary Creek drainage would be affected under both designs. An initial facility layout that includes supporting infrastructure (Figure 10) shows that numerous water management ponds would need to be built around the perimeter of the facility, which would have

short-term effects to wetlands. A large water management pond would need to be constructed on relatively steep (10 percent slope) immediately above the Hawk Inlet shoreline. The ultimate capacity of the water management pond was not calculated; however the preliminary design presented in Figure 10 represents approximately half of the storage capacity anticipated under the proposed action. The western portion of the facility would be built on slopes above Hawk Inlet with much of the infrastructure (e.g., access road, water management pond and wastewater treatment plant) being both within the Forest Service's 1,000-foot Beach and Estuary Fringe and visible to vessel traffic and recreational users within Hawk Inlet. The design would not address the significant issue related to Monument values since it would not minimize the footprint within the Monument.

Area 8 was not recommended for further analysis for a number of reasons including:

- The presence of the facility within the Monument and the 1,000-foot Beach and Estuary Fringe;
- The costs associated with construction of the retaining berm and construction of a new water treatment plant;
- The proximity of the facility to Hawk Inlet, which would be immediately downslope of the dry stack; and
- The complexity of managing contact water and the limited space available to provide adequate capacity for the water management pond.

Contemporaneous Reclamation

Contemporaneous reclamation would involve placing the final cover on portions of the dry stack that have achieved their ultimate height and slope. As currently described, the design of the proposed action would support the placement of the cover over small portions of the facility without the need to wait until the final stages of tailings placement. In addition to the benefits note above, contemporaneous reclamation could serve as a test facility in which to monitor vegetation establishment and succession, soil building processes and the performance and overall effectiveness of the cover itself. Since contemporaneous reclamation is technically feasible and would provide some clear benefits, it was recommended for inclusion in the EIS as either part of an alternative or a mitigation measure. It should be noted however, that incorporating contemporaneous reclamation into the alternative designs could prove challenging since the driver for the design of those facilities has been minimizing the overall footprint. The alternative designs may not provide a sufficient amount of working surface to incorporated an aspect of contemporaneous reclamation.

Reduction in the Pyrite Concentration in the Tailings

Existing flotation circuits in the mill could not be used for pyrite flotation without reducing the production rates of iron and zinc concentrates. For this reason, a separate pyrite plant would need to be constructed adjoining the existing mill at the 920 mine site. The pyrite concentration process uses sulfuric acid requiring an additional sulfuric acid storage area. A concentrate storage facility would also need to be constructed in order to coordinate disposal with underground operations. It is likely that the rate of production of pyrite concentrate would sometimes exceed the ability of the underground mine to accept it, simply due to mining logistics.

The 2003 EIS estimated that the pyrite plant would require approximately 1 acre. That analysis also estimated that a sulfuric acid storage and handling facility could require an additional one half acre and a concentrate handing and temporary storage facility would could occupy an additional acre. All three facilities would need to be located in the mill site which is a highly congested area with steep topography. The feasibility of locating these facilities in this area is low.

The storage of sulfuric acid would greatly add to the inventory of hazardous materials at the mine, and would require a high level of spill prevention and pollution controls. There would also be increased risk

of hazardous material spills during shipping, both by barge to the mine and by truck to the mill. Spills could directly and severely impact water quality, aquatic life, and Monument values.

The pyrite concentrate would be highly reactive with the potential for spontaneous combustion. The 2003 EIS estimated that the pyrite concentrate would have the potential to oxidize within a year. Like the sulfuric acid storage facility, pyrite storage facility would require a high level of spill prevention, special material handling, and pollution controls.

This alternative was not recommended for further analysis for the following reasons:

- The difficult logistics and low feasibility of placing the required facilities at the current millsite.
- The increased risk to water quality, aquatic life, and Monument values as well as human health that would be associated with the shipping and storage of sulfuric acid, and the handling of pyrite concentrate, a highly reactive material.
- Placement of pyrite concentrate underground would have a very high ARD risk because the concentrate would likely become oxidized and acidic before flooding or closure of the mine. This could create further hazardous conditions in the mine.

Table 1. Effects of Alternative Areas on Aquatic Resources and Wetlands

	Stream Length Directly Affected (Linear feet)	RMA Affected (Acres)	Anadromous Stream Segment Affected (Linear Feet)	Total Disturbed Wetland Area (Acres)	New Tailings Footprint *(Acres)	Tentative Rating (Higher = Better)
Area 1	0	0	0	34	94	1
Area 2	0	6.1	8,490	7	46	N/A (insufficient capacity)
Area 3	0	0	0	43.5	51.5	N/A (insufficient capacity)
Area 4	0	0	0	96	119	2
Area 5	0	1.8	15,223	87.3	91.3	3
Area 6	0	1.2	11,692	45	84	2
Area 7	0	0.2	0	4.7	7.0	N/A - Separate Alternative
Area 8	80	5.8	9,228	92	110	N/A - Separate Alternative

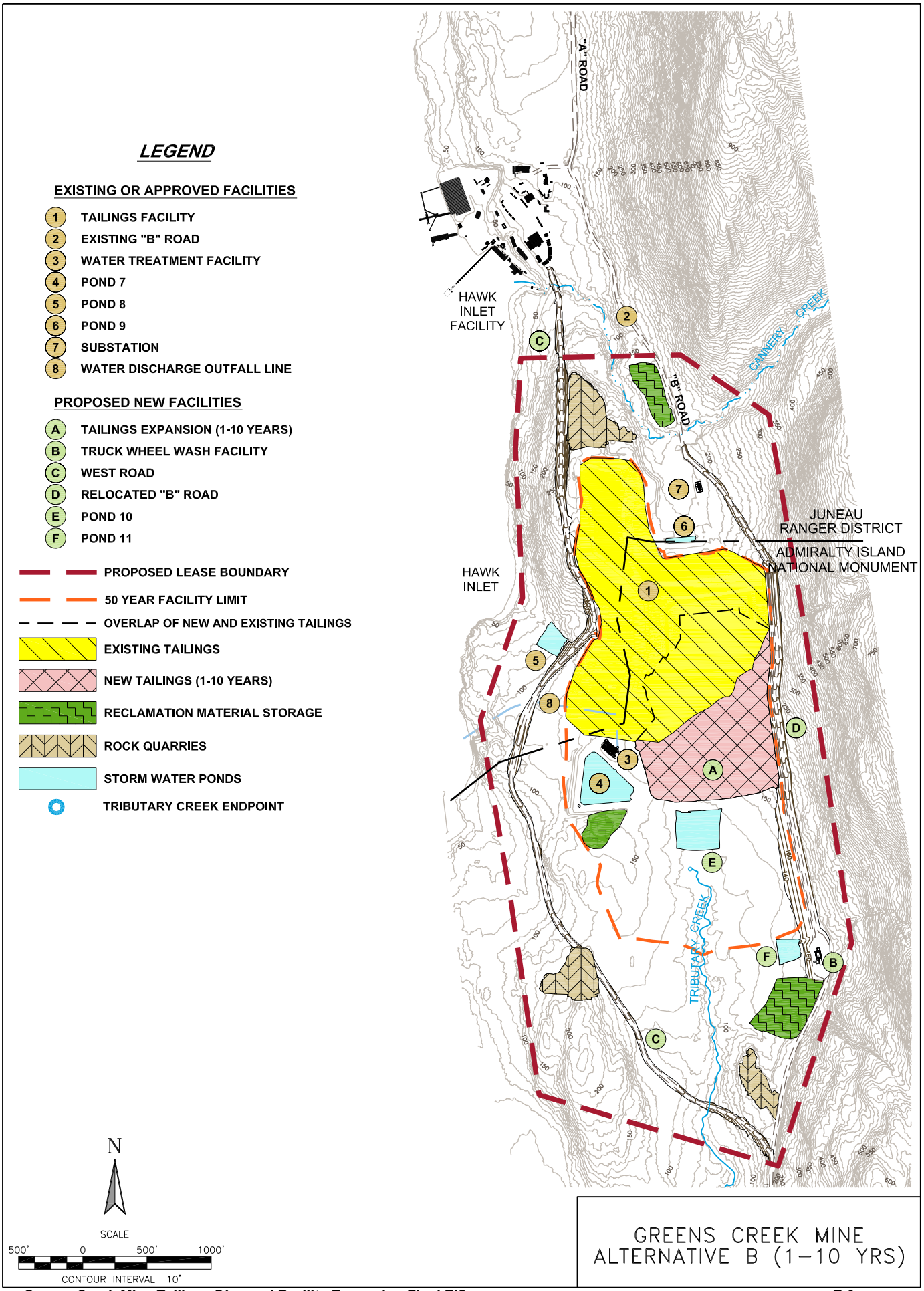
* The illustrations in the figures 1 through 9 represent only the tailings footprint for the various tailings facilities. The water management structures, access roads, and other associated structures that would be necessary to operate a tailings disposal facility would increase the size of the footprint at any of these proposed new areas.

Table 2. Wetland Types Disturbed by Alternative

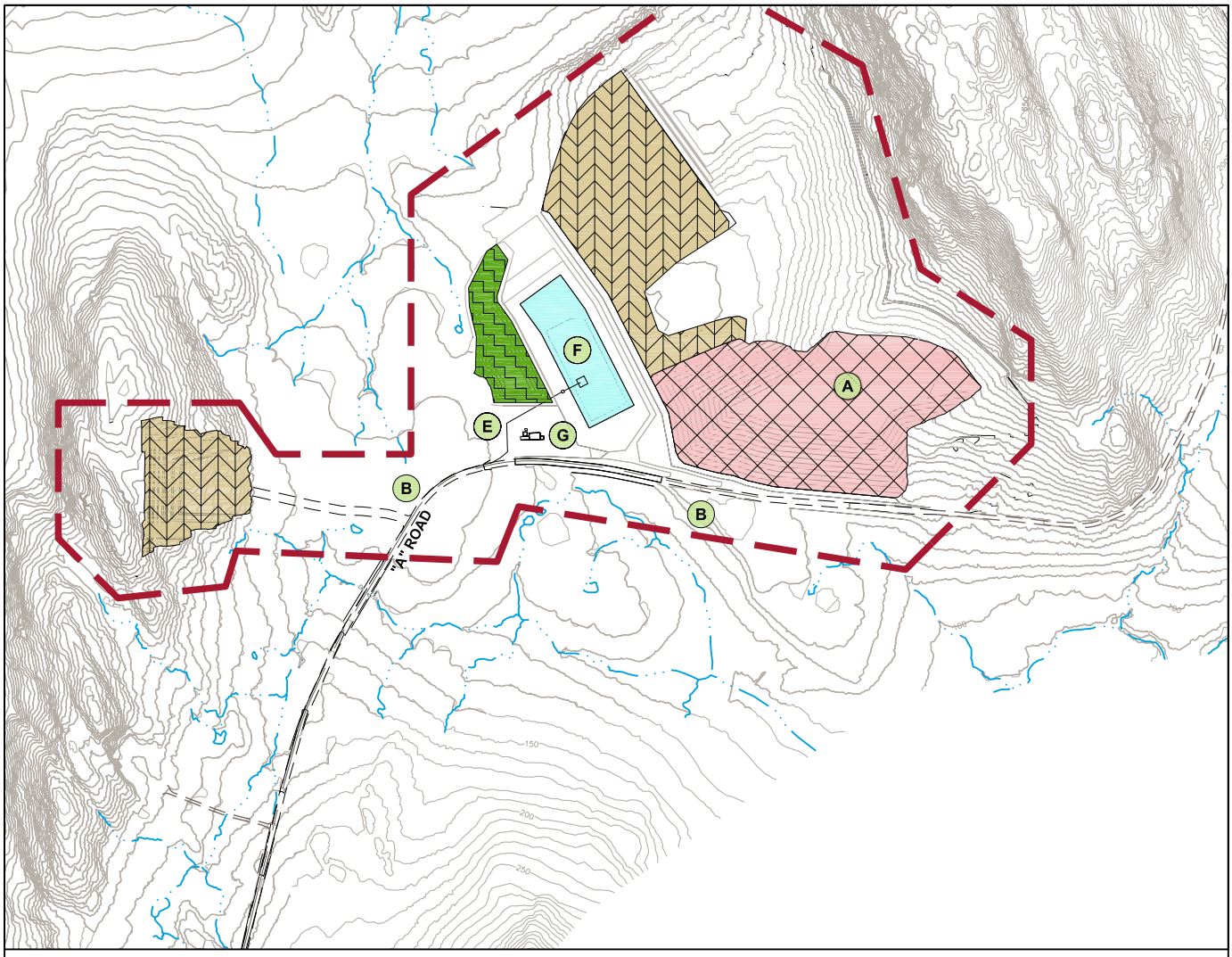
Alternative Location	Disturbed Area (acres)							Total Disturbed Wetland Area	Total Disturbed Area
	Forested Wetland	Forested/ Shrub Wetland Complex	Shrub/ Emergent Wetland Complex	Shrub Wetland	Emergent/ Shrub Wetland Complex	Shrub/ Forested Wetland Complex	Upland		
Area 1	11	23	-	-	-	-	60	34	94
Area 2	2	-	5	-	-	-	39	7	46
Area 3	43	-	-	0.5	-	-	8	43.5	51.5
Area 4	35	49	-	-	12	-	23	96	119
Area 5	65	0.3	22	-	-	-	4	87.3	91.3
Area 6	45	-	-	-	-	-	39	45	84
Area 7	2.4	-	-	2.3	-	-	2.3	4.7	7.0
Area 8	52	-	23	-	-	18	18	92	110

Appendix E

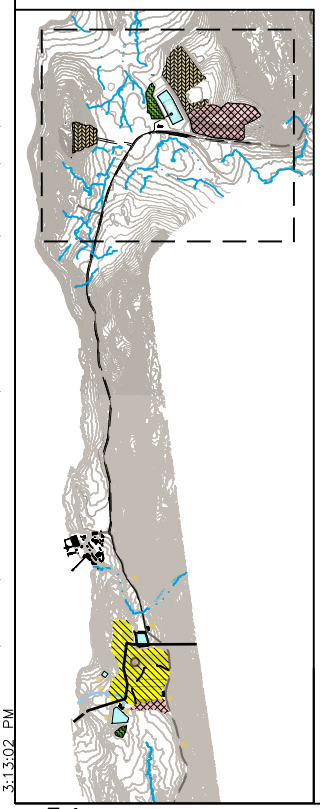
Maps Showing Years 1–10



York, Andrew – T:\CLIENTS\HECLA MINING COMPANY\GREENS_CREEK_EIS\PROJECT\CAD\C3D – PROJ NAME\DRAFT\DWGS\EDITED AUG2011\FIG2.2-2A_ALTB.DWG – Thursday, September 08, 2011 6:53:06 PM



KEY MAP



LEGEND

PROPOSED NEW FACILITIES

- (A) NEW TAILINGS (1-10 YEARS)
- (B) ROAD UPGRADES & NEW ROADS
- (E) PIPELINE TO WATER TREATMENT PLANT
- (F) POND
- (G) TRUCK WHEEL WASH FACILITY

- PROPOSED LEASE BOUNDARY
- NEW TAILINGS (1-10 YEARS)
- RECLAMATION MATERIAL STORAGE
- ROCK QUARRY
- STORM WATER POND

N

SCALE

500' 0 500' 1000'

CONTOUR INTERVAL 10'

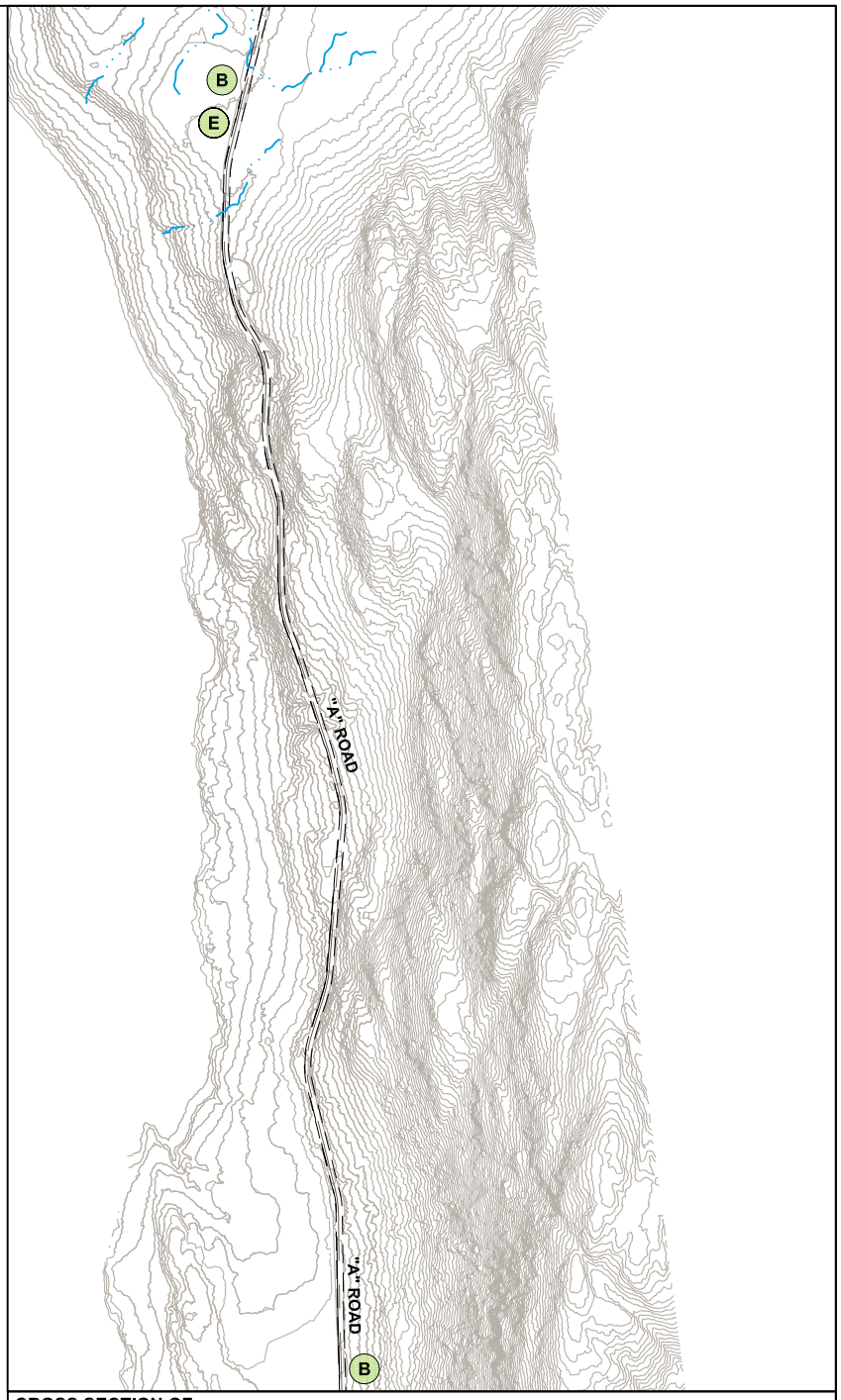
GREENS CREEK MINE
ALTERNATIVE C (YRS 1–10)
NORTH LAYOUT

York, Andrew – T:\CLIENTS\HECLA MINING COMPANY\GREENS_CREEK_EIS\PROJECT\CAD\C3D – PROJ NAME\DRAFT\DWGS\EDITED AUG2011\FIG2.2-3A_ALTC_(YR1-10)_NORTH_CENTRAL_SOUTH.DWG – Thursday, September 08, 2011 3:13:02 PM

LEGEND

PROPOSED NEW FACILITIES

- B — ROAD UPGRADES & NEW ROADS
- E — PIPELINE TO WATER TREATMENT PLANT



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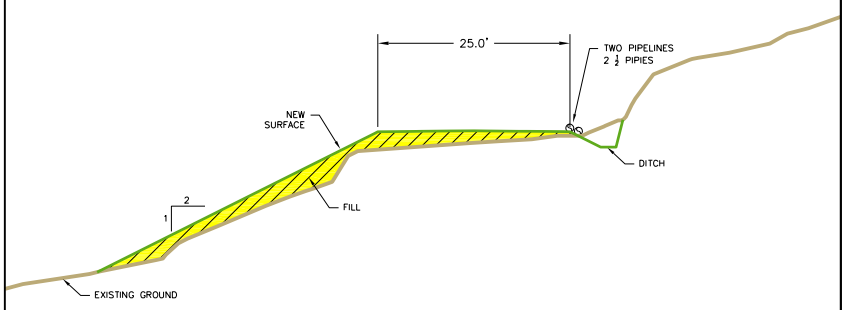
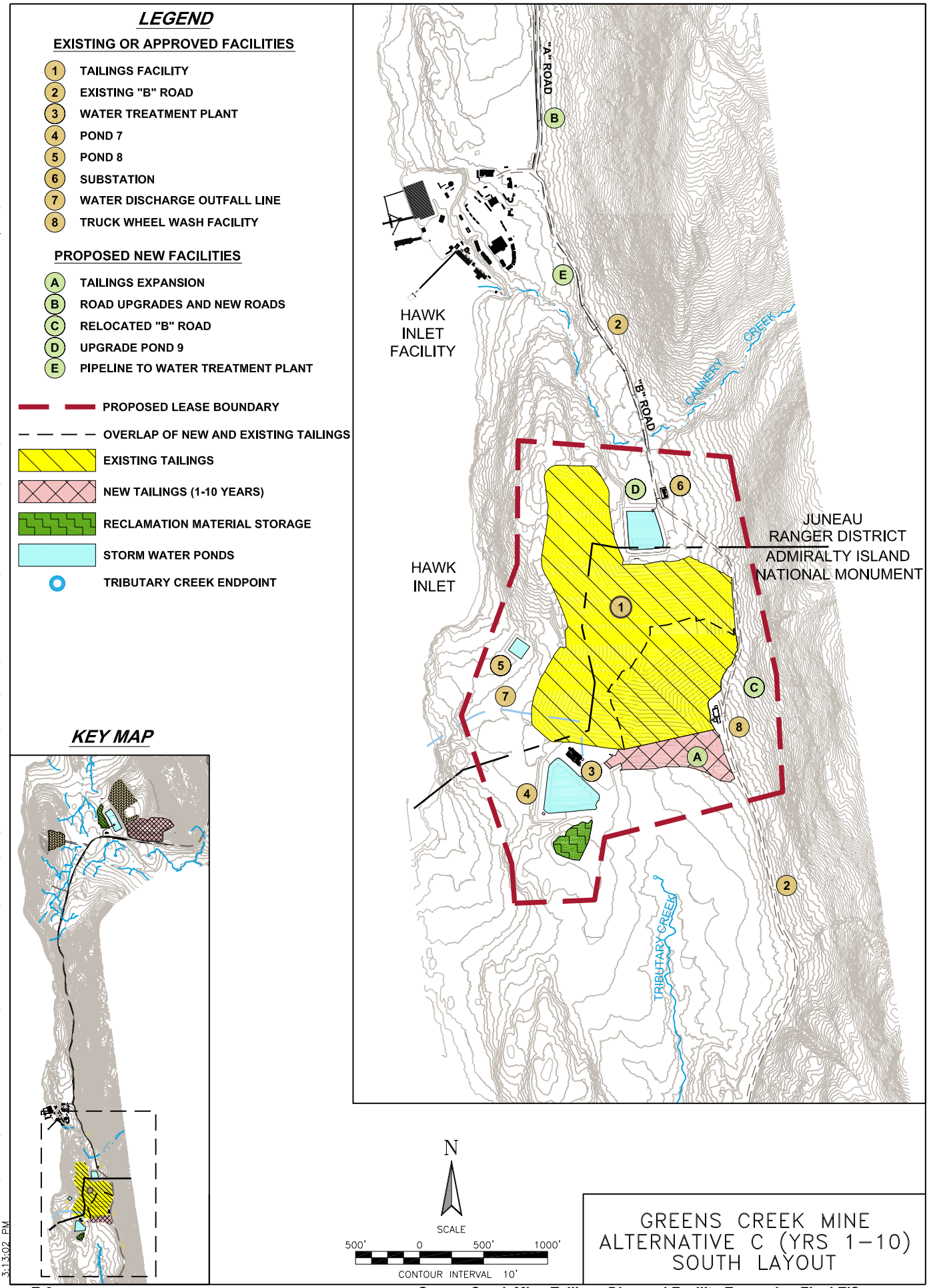
KEY MAP

CROSS SECTION OF PROPOSED ROAD B



GREENS CREEK MINE ALTERNATIVE C – FINAL CENTRAL LAYOUT



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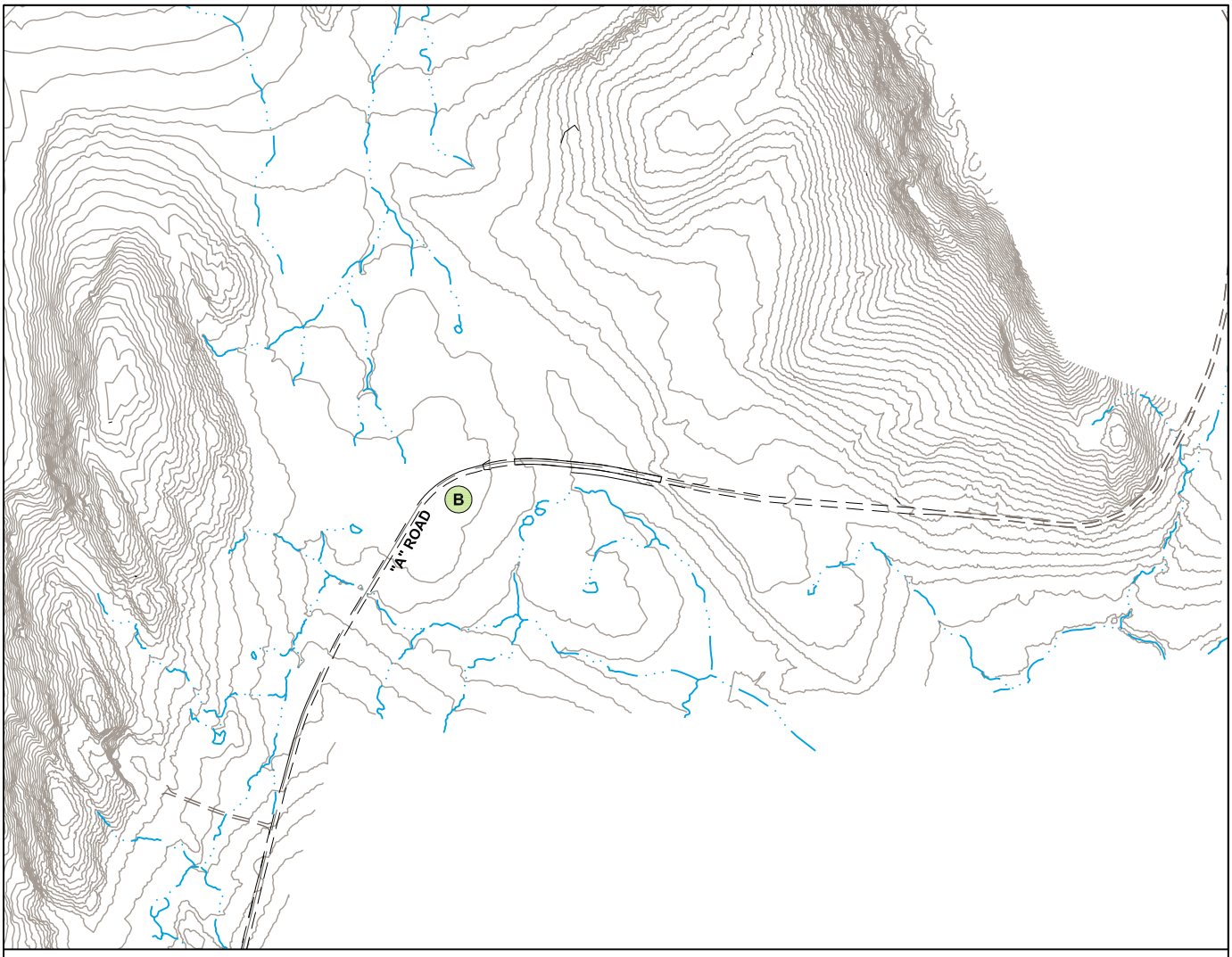
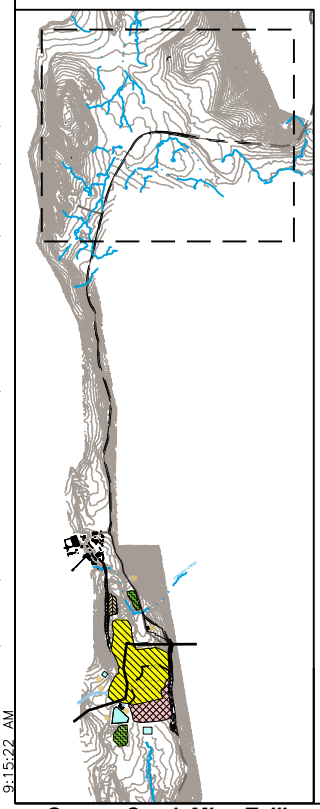


KEY MAP



LEGEND

PROPOSED NEW FACILITIES

B ROAD UPGRADES & NEW ROADS

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CONTOUR INTERVAL 10'

GREENS CREEK MINE
ALTERNATIVE D (YRS1–10)
NORTH LAYOUT

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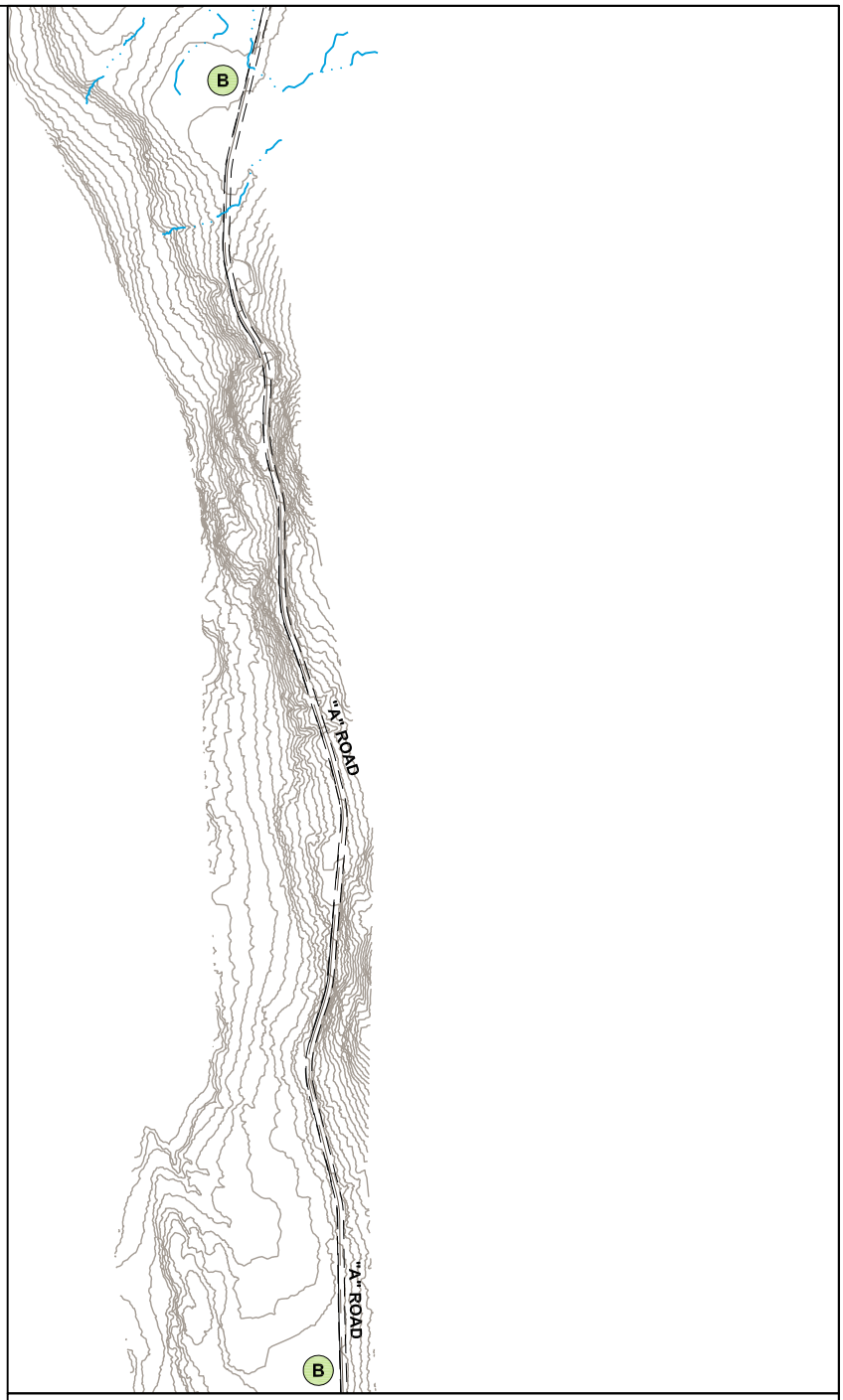
LEGEND

PROPOSED NEW FACILITIES

B — ROAD UPGRADES & NEW ROADS



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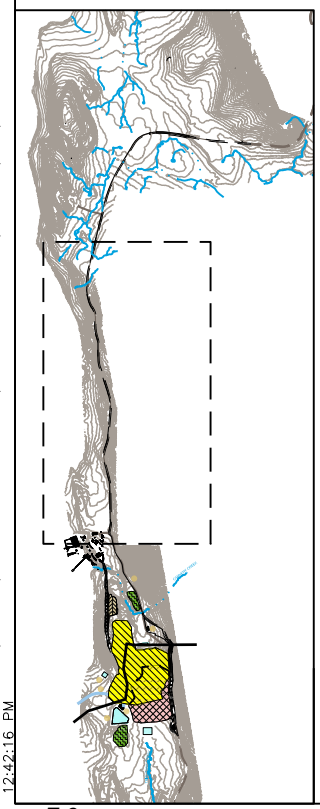
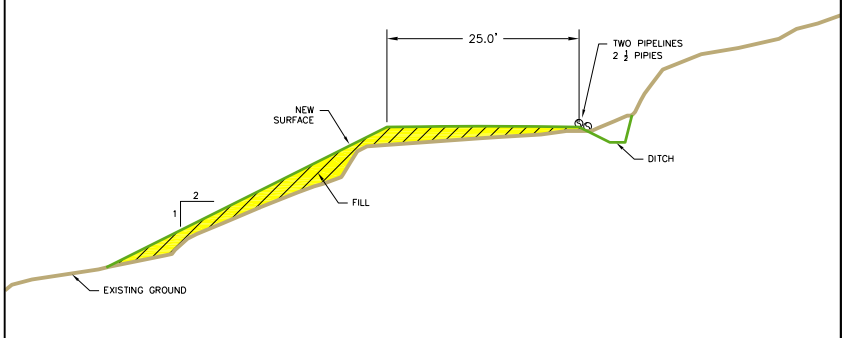
KEY MAP



CROSS SECTION OF PROPOSED ROAD B



GREENS CREEK MINE ALTERNATIVE D (YRS1–10) CENTRAL LAYOUT

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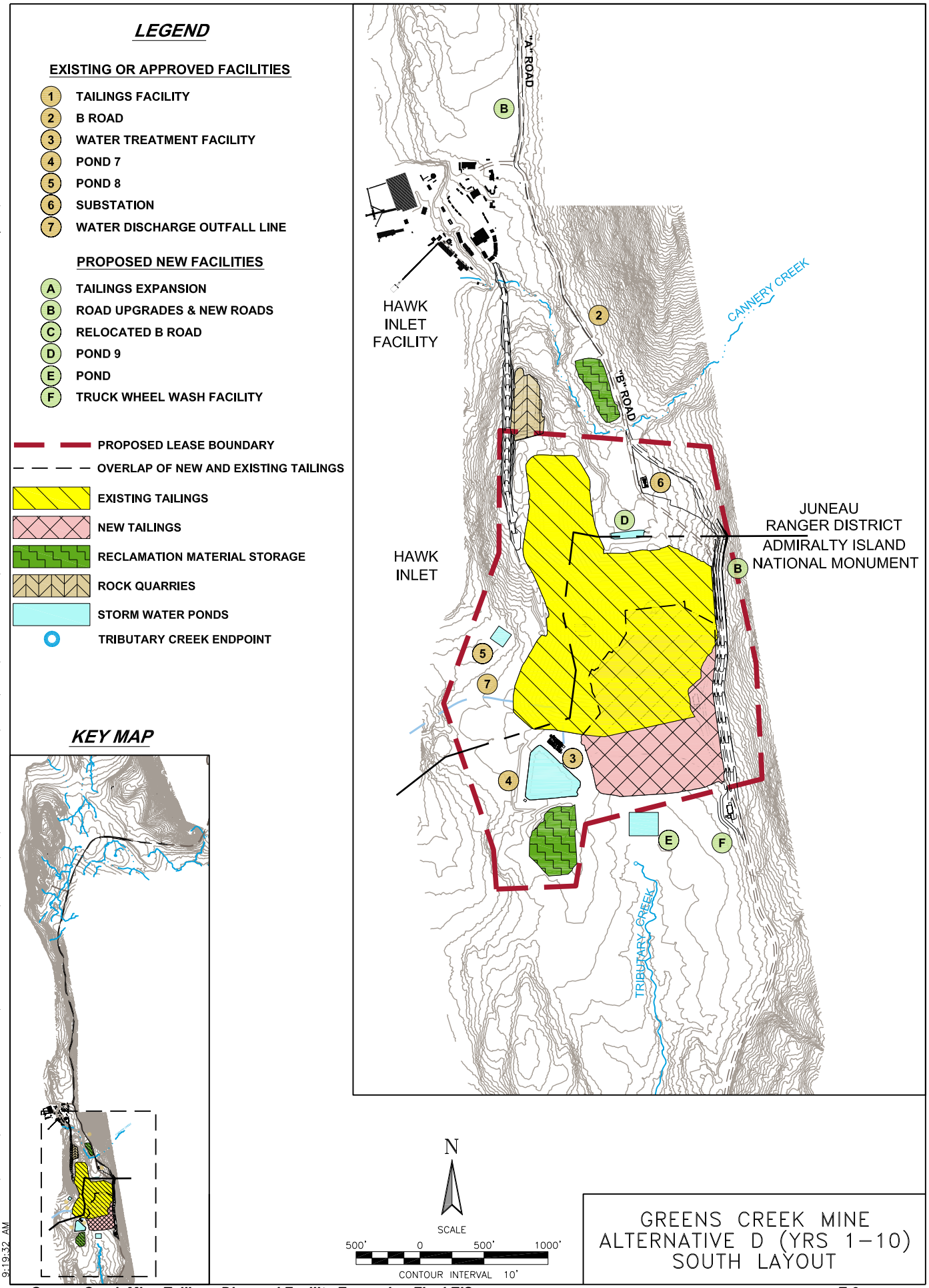


York, Andrew – T:\CLIENTS\HECLA MINING COMPANY\GREENS_CREEK_EIS\PROJECT\CAD\C3D – PROJ NAME\DRAFT\DWGS\EDITED AUG2011\FIG2.2-4_ALTD_YRS1-10_NORTH_CENTRAL_SOUTH.DWG – Wednesday, September 14, 2011 9:19:32 AM

Appendix F

General Plan of Operations, Appendix 14, Attachment A, Detailed Reclamation Plan Cost Estimates

Kennecott Minerals

KENNECOTT GREENS CREEK MINING COMPANY

GENERAL PLAN OF OPERATIONS

APPENDIX 14
ATTACHMENT A

DETAILED RECLAMATION PLAN
COST ESTIMATES

Date:
April 1, 2008

Kennecott Minerals

Date: 3/8/2008

Subject: GPO Appendix 14 – Attachment "A" – Detail Reclamation Plan Cost Estimates electronic submittal.

The electronic version of the GPO Appendix 14 – Attachment "A" has been given to you in CD format

The document is in PDF format, and was made in Adobe Acrobat Version 7, and is just over 41 MB in size. The document does have security settings on it for any context changes, but should be fully available for copying and printing. If there is any problems with it, give me a call.

We understand that your agencies and consultants will use portions of the document as needed, but we advise that our professional responsibility is limited to use and interpretations of the document as a whole, with all referenced materials, and the remainder of the GPO Appendix 14. Those who use excerpts from the document are completely responsible for the consistency, accuracy and completeness of those excerpts within their documents.

If you have any questions, please give me a call at (907) 790-8482, or Jennifer Saran at (907) 790-8474.

Thank you

Nellie Ballou
Associate Environmental E.I.T.
Greens Creek Mining Company

Executive Summary

This updated Detailed Reclamation Plan document is Attachment A to GPO Appendix 14. It is designed to return the Kennecott Greens Creek Mining Company (KGCMC) land to a near natural condition as stated in the 1983 Final Environmental Impact Statement (FEIS). This plan provides a sufficient cost estimate for all reclamation needs in the event of a default closure. It is intended to fulfill Forest Service, Alaska Department of Conservation (ADEC), including the Waste Management Permit 0211-BA001 section 9, and other regulatory requirements. This 2008 update is the first comprehensive update since 2001, although regulatory agencies have approved two incremental updates (2003 and 2006) have been made since 2001.

This Reclamation Plan sets performance goals for interim, concurrent and final reclamation and addresses post-closure monitoring requirements. It also establishes scheduling for final closure tasks.

KGCMC has made changes to the overall reclamation plan based on accumulated knowledge and regulatory input since the last update, and this updated document will provide for a complete closure scenario and identifies the costs to fully support a third party. The cost revisions are specifically identified within the seven Elements as in previous versions. This updated 2008 Plan estimates the closure cost at approximately US$44.4 M, a substantial increase over the US $29.6 M Plan 2006 update. Please see the following two pages for a summary of the 2008 updates

In the process of updating the Closure Plan in 2008, the original 2001 cost estimate format was kept intact as much as possible to facilitate consistency of review and to ease future updates. Format recommendations were requested of the regulatory agencies with no changes suggested.

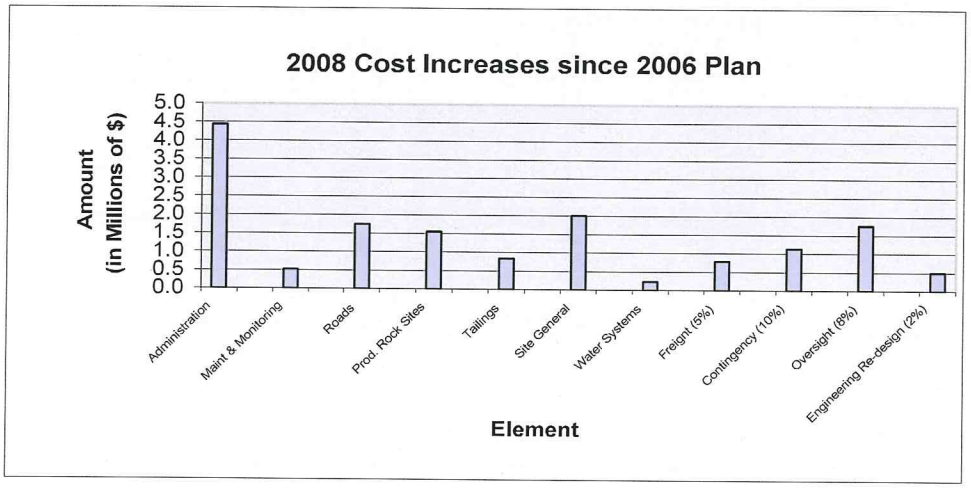
Greens Creek is committed to providing a plan that is compliant, safe, thorough, and minimizes environmental and human impacts. Greens Creek also strives to provide a financially sound and robust plan which will be accepted by the industry and the community as a responsible, environmentally sound solution for mine closure.

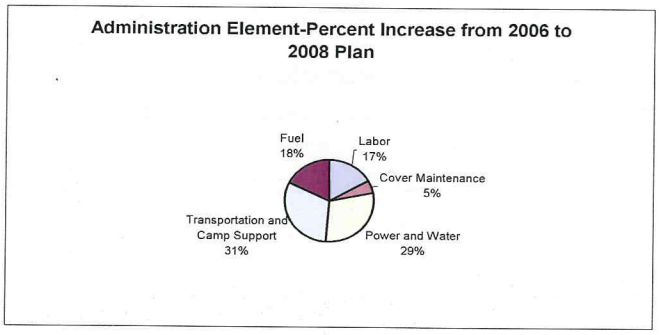
Despite incorporating improved information, this cost estimate update continues sustains an accuracy level of +-10% for two primary reasons; critical water quality issues continue to be investigated and a substantial portion of the mine life remains.

Historically, KGCMC has shown progressive implementation of environmental procedures. Several third party reviews for geochemistry, geotechnical, hydrology and safety issues have been completed and their results were factored into this plan update, which provides further detail and accuracy to the closure planning process.

Reclamation Cost Revision Summary

KGCMC Closure Cost Estimate Elements	Regulatory Bonding Cost Estimate based for the Updated Closure Cost Estimate ($) Aug 2006	% increase	Regulatory Bonding Totals for 2008 Regulatory Closure Plan	Variance of the Updated Plan to the 2006 Plan ($)	Comments on changes to the 2008 Plan since the 2006 Update
Administration	$8,316,631	52	$12,672,594	$4,355,963	Fuel unit price increase. Extended water treatment and personnel. Equipment package. Technology change allowance
Maintenance / Monitoring	$2,175,325	24	$2,688,820	$513,495	2 additional FWMP sites near Tailings (1 includes bio monitoring)
Roads	$653,656	268	$2,403,760	$1,750,104	Road Maintenance. Power Pole Removal. Sand Pit. Additional PAG material removal with Lime application
Production Rock Sites	$4,977,122	31	$6,531,636	$1,554,514	Removal of C and D and lime application all PAG material
Tailings	$4,463,751	19	$5,320,749	$856,998	No major changes. Updated prices of equipment and labor
Site General	$3,297,082	61	$5,302,799	$2,005,717	920 Admin expansion. Hawk Inlet Camp Expansion. Larger Tailings Water Treatment Plant. Removal of PAG material from building foundations
Water Systems	$395,715	61	$635,190	$239,475	Addition of Pond 7 and 9,
SUBTOTAL COSTS $	$24,279,282	46	$35,555,548	$11,276,266	
Freight at 5%	$990,761	79	$1,777,777	$787,016	updated
Contingency at 10%	$2,427,928	46	$3,555,555	$1,127,627	updated
Regulatory Oversight at 8%	$1,088,265	161	$2,844,444	$1,756,179	updated
Engineering Re-design at 2%	$217,653	227	$711,111	$493,458	updated
ESTIMATED TOTAL COST $	$ 29,003,889	53	$44,444,435	$15,440,546	





Examples of Unit Price Increases to 2008 update from Previous Plans

	Fuel ($/gallon)	General Labor ($/hour)	Boat Transportation ($/trip)	Plane Transportation ($/trip)	Camp Support ($/person/day)	Barge Rates ($/trip)	Capillary Break Material ($/cy)	Max Haul rate ($/hr)	330 Excavator ($/hr)
Previous Plan	1.80	49	1000	250	21	25000	13.00	34	23
2008 Plan	2.43	61	2120	350	28	75000	19.60	65	44
Difference	0.63	12	1120	100	7	50000	6.60	31	21

Examples of Overall Increases to 2008 update from Previous Plans

	Labor (hours)	Fuel (gallons)	Equipment Rental (hrs)	Water Treatment Flow (gpm)
Previous Plan	98029	651141	71043	1075
2008 Plan	128409	829963	95069	3415
Difference	30380	178822	24026	2340

2008 GPO 14 Attachment A - Reclamation Plan Table of Contents

1 Introduction

Kennecott Greens Creek Mining Company (KGCMC) operates an underground poly-metallic sulfide mine partially within Admiralty Island National Monument, approximately 18 miles southwest of Juneau, Alaska. KGCMC is attentive to the environmental issues associated with operating a mine within a National Monument and strives to operate beyond comoliance with all regulatory requirements. KGCMC operates the mine to reduce environmental and community impacts in accordance with its General Plan of Operations (GPO) appendices.

KGCMC produces three concentrates containing four payable metals (silver, zinc, lead, and gold) for shipping to smelters around the world. The mine began operations in 1989 and has more than 300 fulltime employees. A detailed site description and environmental overview is located in Appendix K.

This detailed Reclamation Plan satisfies health, safety, environmental and regulatory aspects associated with a default closure scenario. It is designed to return the mine to a near-natural condition as contemplated in the Final Environmental Impact Statement (FEIS) and to implement concurrent reclamation, as appropriate, to minimize the effects of disturbance while mining within Admiralty Island National Monument.

This plan includes cost estimates for completing all reclamation tasks including post-closure maintenance and monitoring of the site. KGCMC developed the total cost estimate using a unit cost approach and categorizes cost estimate into seven Elements, which represent different aspects of the property closure. The seven Elements are Administration, Maintenance and Monitoring, Roads, Production Rock Sites, Tailings, Site General and Water Systems. Specific element explanations in Section 5 contain accompanying detailed cost estimate sheets.

2 History, Updates and Studies

2.1 History

The Greens Creek Mine (Drawing 1) is located on Admiralty Island, largely within the Admiralty Island National Monument. Northern portions of t KGCMC facilities lie with in the Tongass National Forest Lands. A portion of the facility is located on private land (Hawk Inlet camp/shipping facilities).

The Greens Creek operation is a joint venture. Kennecott Minerals Company (KMC) headquartered in Salt Lake City, UT controls approximately 70 percent of the joint venture. Hecla Mining Company, headquartered in Coeur d' Alene, Idaho holds the remaining percentage. KMC operates the property for the joint venture partners.

In 1980, the Alaska National Interest Land Conservation Act (ANILCA) classified most of Admiralty Island as both National Monument and Wilderness. The mine site hydrographic drainage (Greens Creek drainage area) was included with in the Monument boundary, but excluded from the wilderness designation. ANILCA specifically provided for the continued development of the mine site which eventually opened to operation in 1988. During the development period, two Federal National Environmental Policy Act (NEPA) processes were completed to permit the operation; the 1983 Final Environmental Impact Statement

(1983 FEIS) and the 1988 Environmental Assessment (EA) for Proposed Changes to the General Plan of Operations for the Development of Greens Creek Mine, Admiralty Island, Alaska (1988 EA).

The 1983 FEIS was a comprehensive assessment of the project that evaluated eight action alternatives and a no action alternative to determine the project's effect on the environment and the community, as well as appropriate avoidance and mitigation. The 1983 FEIS considered the technical, biological, hydrological, and socioeconomic issues associated with the project. Complete site descriptions and evaluations were written about the KGCMC property in the 1983 FEIS, including climate and weather data, wildlife and fauna studies, fisheries and water (fresh and marine) quality reviews, social impacts on the area communities and other health, safety and environmental issues.

The 1983 FEIS recommended many mitigation, monitoring and reclamation measures to minimize the impact of the operations on the environment. KGCMC addressed the issues in the FEIS primarily through development of a General Plan of Operations (GPO). Additional State and Federal permits/leases/agreements and the Tongass Land Management Plan applied mitigation and monitoring measures during construction and operations.

KGCMC began milling operations in February 1989, suspended operations for low metal prices in 1993 and resumed operation in 1996. The operation has been stable and improving since the re-commissioning period. Currently identified ore reserves are sufficient to sustain operations into 2018.

In 2003, KGCMC received permits and started an expansion of the surface tailings impoundment area. A Final Environmental Impact Plan (2003 FEIS) for the tailings area was completed in November 2003, which updated and supported much of the original information supplied in prior FEIS (1983) and subsequent Environmental Assessments (1988, 1992 and1993), and also extended comprehensive hydrologic and water quality modeling estimates of the tailings impoundment.

The 2003 FEIS also initiated a Sulfate Reduction Monitoring Program (SRMP) at the tailings area. The SRMP investigates the performance and sustainability of sulfate reduction in the dry-stacked surface tailings pile (Appendix E).

In late 2004, KGCMC received International Standards Organization (ISO) 14001 certification of its Environmental Management System (EMS), which was renewed in 2007. To maintain certification KGCMC must meet significant procedural environmental responsibilities identified in the EMS. KGCMC integrated environmental compliance with other facets of the operation, specifically safety and job performance, and comprehensively examines environmental aspects of the operation to promote compliance with KGCMC Health, Safety and Environmental Policies. A third party audit group conducts semi-annual environmental audits, which include visits to regulatory agencies and contractors.

2.2 2008 Updates

Notable updates to the 2008 Reclamation Plan are associated with potentially acid generatin (PAG) and water treatment issues. In this plan, an additional 430,000 cubic yards of potential PAG material will be hauled to containment. A large portion of this material is located in Production Rock Sites C and D. Both of these sites were originally

planned to receive an engineered soil cover, however, after further analysis KGCMC determined that environmental risks would be further reduced if the material from these sites were consolidated with other permitted Waste Management Permit Sites (Underground, Site 23 or Tailings Site) for closure. In addition, the provision for post-closure water treatment at the Tailings Site was increased 10 to 14 years post closure to ensure adequate treatment capability during the monitoring period. The flow (gallons per minute) of water to be treated has also been increased. These details are updated in the Element sections narrative and associated cost estimate sheets to include detailed descriptions of these updates as well as the associated cost estimate sheets.

2.3 Areas of Further Investigation and Continued Research

The 2008 Closure Plan is as comprehensive as currently possible. However, the 2008 Closure Plan recognizes some significant closure issues that remain to be fully defined and mitigated. The potential impacts of these outstanding items on the closure plan are currently being evaluated. These issues are listed below.

- Power utility infrastructure changes – Alaska Electric Light and Power (AEL&P), the local power utility, has extended the power grid to Admiralty Island. KGCMC has dedicated significant resources to accommodate this infrastructure change, which will provide sustainable hydro-generated power to the area at the 920 and Hawk Inlet. This change is planned to reduce the use of diesel fuel.KGCMC is the first step in the hydro-based power grid expansion to outlying communities in this area and provides an important jump-off point to establish further power installations for other communities, such as Hoonah.
- Continuation of the Sulfate Reduction Monitoring Program (SRMP) study to evaluate performance and potential amendments to the tailings pile.
- Continued engineered soil cover evaluation and design modifications based on cover monitoring and emerging technologies. More development and information on cover performance is becoming available as more soil cover installations are monitored and reported on world-wide. KGCMC is involved and participates with International Network for Acid Prevention (INAP) and the Mine Environmental Neutral Drainage (MEND) in international acid rock drainage programs.
- Underground hydrology updates are initiated and will help define the water quality and potential discharges from the expanding underground facilities.
- Drilling programs have and will continue to extend stability monitoring at Site 23 and the Tailings Impoundment area, install additional monitoring wells and piezometers, investigate potential sulfate migration beyond containment at the tailings area and install dewatering wells in the mill backslope.
- Continued compliance water monitoring and annual reporting as well as continuation of internal geochemical monitoring.
- Continued tailings and production rock placement optimization, including compaction methodology, co-disposal and monitoring.
- Continued identification and development of potential reclamation material sources and investigation into mill processing of reclamation materials.
- Completion of capital projects, such as storm water, water treatment and tailings placement expansions that include closure design concepts.
- Engineering assessments of tailings and production rock co-disposal programs.
- Investigation of potential expansion of production rock storage facilities.

3 Strategy and Design Concepts

The physical aspects of the closure strategy are designed to return the land to as near a natural condition as possible and utilize established industry standards, such as common civil works activity using mobile equipment for grading, contouring and hydroseeding with native species. Infrastructure setup will maintain power and utilities as long as necessary to maintain water treatment during the closure period and beyond, as required by regulation. Facility and structure removal is well defined, and common industry practice will be employed to remove all structures and facilities from the property. For planning and estimating purposes, all facilities will eventually be removed from the property, but some features of the infrastructure may be maintained past the significant completion of reclamation to accommodate monitoring and treatment systems. Provisions for operational support during the closure period and beyond are included in the cost estimates.

Returning the land to a safe use condition as a publicly owned national forest will present a unique challenge for long-term engineered soil cover monitoring and maintenance. Challenges include tree blow down on the cover area and natural disasters, such as earthquakes or heavier-than design rainfall that cause erosion issues. KGCMC long-term material disposal sites are structurally engineered and designed to the specific geologic hazards of the area, using standards and international guidelines. Third party audits have been completed to ensure standard application of geotechnical design criteria, and key issue reports have been completed throughout the KGCMC mine life. Continued performance monitoring and QA/QC checks for compaction and soil strength add to the database, supporting a safe, environmentally sound closure. Currently, there are no population centers that would be within the influence of a major structural failure at the 920, tailings or production rock sites (besides the KGCMC operations). This remote aspect of the property benefits future rehabilitation and expected post-closure land uses.

3.1 Potentially Acid Generating (PAG)

The KGCMC Closure Strategy takes into account the fundamental concepts for the physical tasks of mine and associated facility reclamation and closure, which were initially formulated in 1982 during the development of the original Feasibility Study. The early concepts have since been modified extensively to meet current conditions. Considerations for potential acid generating (PAG) material and other geochemical and geotechnical issues have driven the most significant Reclamation Plan changes.

The sulfide content of the ore body at Greens Creek has a significant influence on the evolution of reclamation and closure planning. PAG and metal leaching characteristics have influenced most aspects of mine operations and reclamation planning. Current operating practice, as defined in the KGCMC GPO reflects the need to properly handle, place and treat materials with PAG or metal leaching characteristics. Allowances are included in the cost estimates for closure issues that are not fully defined and are still being investigated. The costs of some items, such as the impacts of the ongoing SRMP research, are not possible to estimate with an acceptable level of accuracy, and therefore cannot be precisely defined in the context of this report. The strategy to address water quality issues is important to facilitate future updates. Key closure strategies aim to maintain high level fishery and wildlife resources in the area, by limiting contaminant release. And although there is limited human dependency on the area, fishing and hunting (sport and commercial) occur frequently in the area. The formulation of closure options for the main storage sites and the underground facilities is ongoing with considerations of international technical knowledge advancements, and is the cornerstone of successful implementation of the closure plan.

3.2 Water Quality

Alaska Water Quality Standards (AWQS) for discharge to the environment at closure are specified in GPO Appendix 14. Closure commitments include an extended period of up to 30 years post-closure water quality monitoring and treatment as needed. KGCMC has also retained the option to use the marine environment for future water discharges, if needed, through the 2003 FEIS with water treatment facilities maintained for at least 14 years.

Extensive water (surface and ground) sampling is used as a measure to monitor the effects on the environment. Background information is updated and lab quality analyses are made. These measures are detailed in GPO Appendix 1-Fresh Water Monitoring, GPO Appendix 11 for internal production rock sites and GPO Appendix 3 for the tailings area. Post closure planning for site monitoring is detailed in GPO Appendix 14.

Closure studies have identified the potential impacts of the operation, which consistently point towards long-term water quality and compliance of all discharges, and the long-term stability of closed facilities as the key issues. Six Federal FEIS and EA studies have been completed that include comprehensive stakeholder involvement. KGCMC also has a Waste Management Permit as well as 60+ other Federal, State and Local regulations (See Appendix F for list of currently active permits, leases, agreements and agencies).

3.3 Current Operations to Support Closure

Operations are designed to support closure strategies, such as underground backfilling of mill tailings and production rock. Underground backfilling will limit oxygen ingress and most likely will present a flooded condition for the materials at closure. This condition will result in less oxidation than surface disposal. Conventional and current paste backfilling methods will also be utilized during the closure period to backfill as much material as possible into the mine opening. An underground hydrology study is in progress which will detail the available space for backfill and the expected quantity and quality of the mine water that can be expected following backfilling and portal closure. Initial flooding of the underground workings after final backfilling is expected to flush stored oxidation products (metals, metalloids and sulfate) that have accumulated in the backfill and exposed workings over the mine life, therefore it is expected that the water treatment facilities will remain operational until water quality reaches an acceptable level. Continued studies will confirm these closure issues, and allowances and provisions are included in the cost estimates.

The closure strategy has affected operations by influencing the decision making process for disposal site design. For example, KGCMC has specifically designed and constructed waste sites utilizing compaction and encapsulation to minimize or prevent potential contamination.

3.4 Vegetation

Biological and vegetative aspects of closure planning have also been considered extensively through sensitive plant studies within the EIS and involvement of USFS experts and third party reviews. Rehabilitation and revegetation will not present major obstacles at KGCMC, due to the relatively small disturbance areas, climate and soil conditions. It is likely that natural re-generation of forested areas will return the native genotypical plant communities. This natural regeneration is already occurring in previously reclaimed areas. Interim hydroseeding formulas have been established by the USFS for

use at KGCMC and are described in the GPO Appendix 14 to provide surface protection and erosion control while the surrounding natural forest community re-establish itself.

3.5 Hazardous Materials

The cost of handling contaminated or hazardous materials, such as products used during operations or the closure period, were based on industry standards. KGCMC cannot process or dispose of hazardous materials or soils on-site, unless identified within the ADEC Waste Management Permit. A list of permissible material is included in the ADEC Waste Management Permit, and all other materials are planned for site removal and transport to appropriate facilities.

3.6 Risk Analysis

KGCMC established a procedure to further evaluate closure aspects and impacts and optimize closure planning. The procedure is consistent with KGCMC's Environmental Management System (EMS) and considers risk assessment, mitigation measures and option selection criteria.

3.7 Alternative Concepts

KGCMC has evaluated various projects and alternate concepts related to closure (Appendix L). For instance, one alternative closure option included a review of a potential pyrite circuit, which might have benefited surface disposal of the de-pyrited tailings, but the study conducted in the 2003 FEIS concluded that this option was not the best environmental option, if the pyrite concentrate could not be transported off of Admiralty Island. The product of a pyrite circuit was predicted to be very reactive and harder to control in the short term versus use of the naturally present carbonate content of the mine's host rock to buffer the reactive materials, while they are exposed for the short operational duration during placement, compaction and covering. Cost estimates were also conducted for this alternative as well as supplementation of the buffering capacity at the tailings pile with limestone. A third party evaluation of alternatives for the tailings operation and expansion was completed in the 2003 FEIS.

4 Detailed Reclamation Plan

4.1 Goals

The overall Kennecott Greens Creek Mining Company reclamation goal, as set forth in the 1983 Final Environmental Impact Plan (FEIS), is to return the disturbed areas to a near-natural condition. This includes sealing the mine openings, restoring original surface drainage, removing all structures, recontouring where possible, and revegetating all disturbed areas. Both Monument and Non-Monument lands will be reclaimed using the same comprehensive closure measures.

- The closure and reclamation of the Greens Creek facilities are guided by Federal, State and Local Agencies, including the United States Forest Service (USFS), Alaska Department of Environmental Conservation (ADEC), Alaska Department of Natural Resources (ADNR), United States Army Corps of Engineers (USACE), United States Environmental Protection Agency (EPA) and the City and Borough

of Juneau (CBJ). Agency requirements are covered in the General Plan of Operations (GPO) Appendix 14, Section 1.4 and Section 1.5.

- As required by the GPO - Appendix 14, Section 1.7, Attachment A must set out detailed physical work tasks and cost estimates for final closure and reclamation of the Greens Creek Property. These detailed objectives of the Plan will;
    - Allow calculation of closure costs, including post-closure maintenance and monitoring;
    - Describe monitoring to be conducted post closure (also detailed in GPO Appendix 14 - Section 2)
    - Contain preliminary engineering drawings and calculations;
    - Tabulate material quantities required to complete reclamation;
    - Contain detail maps of the property;
    - Contain vegetative type/land use designations;
    - Contain a detailed schedule that designates all areas that have or will be concurrently reclaimed by year;
    - Develop a system to identify the monitoring to be conducted for the Fresh Water Monitoring Plan GPO Appendix 1, internal contact water and vegetation establishment (also detailed in GPO Appendix 14 - Section 2);
    - Contain an evaluation of the predicted environmental performance of the facilities;
    - Contain a contingency plan to address failed performance.

The detailed Plan objectives as stated above are meant to fulfill the requirements to complete the GPO Appendix 14 Reclamation Plan update. This Plan details all physical tasks to satisfy the objectives and address the monitoring and cost aspects of reclamation planning at the Greens Creek Property for final closure.

4.2 Standard Reclamation Vegetation

Cost estimates reflect reclamation vegetative standards stated in GPO Appendix 14, Section 2.3 for the Greens Creek Property. Vegetative standards are meant to closely match existing conditions to create a basis for natural forest re-generation. KGCMC will continue to work in conjunction with regulatory agencies to maintain approved seeding mixtures, and proper application of products.

KGCMC will initially reclaim disturbed areas with grass/forb meadows. This vegetative cover provides quick (1-2 year) protective cover to the soil medium, as well as a productive food resource for wildlife, and seed bed for the eventual self- generation of the forest cover. KGCMC revegetated areas show initial tree re-establishment can be expected in 3-10 years, primarily dependent on micro-site conditions and distance from the mature forest seed source.

Natural forest regeneration ensures retention of the native genotype species within Admiralty Island National Monument, satisfying a FEIS standard. With full tree canopy closure, the then underlying grass/forb soil cover can be expected to give way to the typical forest understory, accomplishing return of the spruce/hemlock forest.

4.3 Wetlands

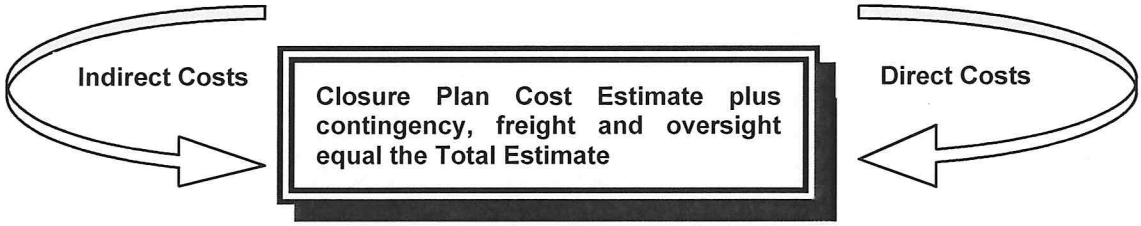
KGCMC will take advantage of ecological opportunities, and reclaim selected areas to wetlands. Wetlands selection criteria will mainly be based on the existing site's ability to maintain year round water sources for effective re-establishment of the wetland conditions needed to sustain development in the reclaimed area.

KGCMC has already re-established one wetland in the Pit 7 area. A third party consultant (Three Parameters Plus) worked with KGCMC staff to create the wetland's physical conditions and biological community, then reviewed and documented the successful implementation of the wetland remediation. The Army Corps of Engineers (USACE) approved the constructed wetlands. The proper selection of potential wetland sites enhances the likelihood of successful wetland creation and restoration. KGCMC has committed to an additional two acres of wetland reclamation with the USACE. Sites that will be considered for constructed wetlands are Pond 23, Pond D, Pond 7, Pit 174 and Althea Creek. Contouring will be used to create surface and subsurface conditions ensuring necessary water availability and retentionat the selected sites. This may include tie-in to adjacent wetlands, and/or water transmittal features independent of established wetlands. Hydric soils will be recovered or borrowed, and applied as appropriate. Designs will incorporate open water and vegetated wetlands as site conditions allow. Wetlands vegetation will be established through seeding of appropriate plant species or transplanting from borrow areas. When established upon selected conducive sites, and incorporated into the overall restoration plan, wetlands creation/restoration will not require a significant reclamation cost differential over other standard reclamation tasks. Therefore, wetlands specific costs are not detailed separately in the Plan.

5 Elements

The Greens Creek property has been divided into seven Elements that make up different aspects of the mine. The 2008 Reclamation Plan presents direct and indirect costs separately for each Element. The seven Elements described in the cost estimates aim to achieve the objectives of the closure strategy. They are a direct way of interpreting how to complete the physical, monitoring and maintenance aspects of the plan. Direct costs are the definitive, physical, field-oriented reclamation costs. Indirect costs are all other required costs, which do not become a physical part of the reclamation. The cost estimates help verify the proper use of unit cost parameters and assure that the scope of activities fully address the closure requirements. The figure below illustrates the Element components considered in the closure planning.

Admin.	Maint & Monitoring	Roads	Waste Sites	Tailings	Site General	Water Systems
transport-ation	Ecology	Quarries	Soil Cover Installation	Soil Cover Installation	Buildings Demolition	Pipes and Diversions
Office Support	Permits	Drainage	Contouring and Erosion	Contouring and erosion	Ditches	Treatments
Camp	Water	Contouring	Vegetation	Vegetation	Bridges	Spillways
Workforce	Lab Work	Topsoil	Backfill	Design and Engineering	Utilities	Stormwater Ponds
Fuel/Power & Water Treatment.	Consulting	PAG/Metal	PAG/Metal	PAG/Metal	Structures	Wells
Soil Cover Maint.	Land use and monitoring	Vegetation	Design and Engineering	QA/QC	Decon and HAZMAT	Design and Engineering



5.1 Administration

The Administration Element is the largest expense element within the reclamation plan at US $12.7 M. It includes cost estimates to maintain support services personnel, power, water treatment, fuel, soil cover maintenance, camp support, and transportation requirements to facilitate final reclamation activities at the site. In addition, a one year of "Holding Costs" is included for maintaining facilities during any idle time associated with regulatory closure plan approval.

Personnel cost estimates reflect disciplines that may be needed outside of the main reclamation workforce to maintain support facilities. Contractor overhead is included in these estimates. The administrative team will provide all management, engineering,

procurement service and contract administration of the closure project. The number of personnel needed after the second year of reclamation decreases when the majority of the key tasks (cover installations, facility removal, contouring and hydroseeding) are completed. From years three to five post-closure, smaller crews are needed to maintain water treatment as well as monitor water quality and reclamation performance.

Cost estimates for all contractors and employees to live in camp are included and the standard shift for personnel based on straight time pay due to the length of the project. It is estimated that all tasks can be completed with straight time personnel. Camp support, which also includes communications costs, is reflected in the estimate. In addition, the cost estimate accounts for island transportation via boat or float plane and is reduced as reclamation tasks are completed. These rates are based on current prices.

Diesel fuel estimates are represented as a lump sum based on a workforce and equipment hour breakdown by individual physical reclamation task (Appendix G). Fuel consumption was calculated using manufacturer predicted fuel usage and task itemized equipment hours. A unit price of $2.43 was used for this update.

Water treatment and power (or generation plants) will remain at the 920 Site for at least two years until KGCMC has completed most of the demolition and reclamation tasks. After that time, water from Site 23 and the Mine Portal will be routed, via pipeline, to be treated at the Tailings water treatment plant. Water costs are based on KGCMC's historical costs and the expected water collection flowrates at closure. Expected pre-treatment water qualities and flows are predicted in the 2003 FEIS and other hydrologic/geochemical investigation reports (EDE 2000, 2003, 2007). The updated cost estimate includes 14 years of water treatment at the Tailings water treatment plant, a contingency lump sum for 30 years of treatment, and additional maintenance cost of the outfall pipeline for 50 years post-closure. It is expected that utilization of the outfall line as a discharge point will be maintained, and as site water quality improves post closure, due to the expected performance of the engineered soil covers, water discharges may remain permanently directed through the outfall line. As reclamation is completed, water and power systems may be incrementally reduced. Current water systems may be replaced with smaller portable units based on capacity and timing of project closure. An allowance has been added to purchase equipment, if needed, to support new technology that may become available. Electric power during the reclamation period is principally for water system management, pumping and camp facilities. KGCMC plans on utilizing excess AEL&P power for most closure power needs. These costs are defined within the cost sheets.

Funds are provided for repair work to the engineered soil covers after the cover installations mature, and is estimated to be reduced after several years. Concurrent reclamation experience gained during operations will enable advanced cover construction techniques and take into consideration the most probable cause of cover damage, which is erosion from runoff. Generally, the cost estimates for cover repairs are scheduled for the five years following closure and cover installation, and the estimates reflect repairs to each covered acre five times over. This is a conservative approach to the long term maintenance of the covers. Actual costs to maintain the soil cover test plot are used as a model to identify and define repair work. To date, the costs for maintenance of the test cover have been significant.

5.2 Maintenance and Monitoring

The Maintenance and Monitoring Element includes cost estimates for cover inspections and the monitoring of surface water, marine environment, sediment, and re-vegetation

performance monitoring. The estimate of US $2.7 M includes 33 years of monitoring comprised of a holding year, which is any idle time associated with regulatory plan approval and organization of work, two years during which major reclamation tasks are to take place and 30 years post-closure as required by the Waste Management Permit and GPO Appendix 14 - Section 1.4.2.

It is recognized that discharge water quality, post-closure, must meet Alaska Water Quality Standards (AWQS). KGCMC technical analysis of storage sites shows discharge water quality is attainable for most studied components, but may require the use and maintenance of the outfall pipeline long term for some components. KGCMC plans to utilize the existing outfall line long-term as part of the final closure plan and could extend its use beyond the planned 50 year post-closure period. Monitoring will provide progressive information for closure performance evaluation and reporting, and subsequently, bond release.

During the operational period, KGCMC has implemented a concurrent reclamation plan in which certain inactive production rock sites, disturbed road corridors and many of the areas identified in the closure study will have been reclaimed prior to closure. Therefore, several years of performance monitoring data will exist for these areas and provide KGCMC valuable information prior to closure. As projects are closed, KGCMC will seek agency approval and signoff. Upon signoff, the bond value for that particular project may be released or reduced. After closure, the same process would occur for the entire property, and if approved, KGCMC could terminate monitoring when appropriate.

Monitoring areas of reclamation which require only standard civil work related closure tasks, such as a majority of the road, are scheduled to be monitored extensively for a five year period post-closure, with inspections becoming less frequent with regulatory approval after that period. Monitoring costs of these sites, as well as other sites not specifically listed but are described in the Waste Management Permit and the GPO. This timeframe will provide adequate performance information for these reclaimed areas and does not eliminate inspections of remote sites from the normal workloads of the remaining monitoring personnel who will be frequenting most areas for continued water monitoring.

The Maintenance and Monitoring Element sheets show various tests that are currently used to monitor water quality. A monitoring frequency for closure was developed using regulatory criteria and input. The freshwater monitoring tests consist of different sample suites (Suites P, Q and R in GPO Appendix 1, Sec. 5.3), which analyze for metals, conductivity, pH, hardness, alkalinity and includes bio-sampling (Suite R). In addition, QA/QC samples must also be collected and analyzed including field blanks, matrix spikes, laboratory control samples, and blind duplicates. Sampling locations are detailed in GPO Appendix 1, Section 4.2.

Stormwater and NPDES monitoring tests include analysis for oil and grease, lead, zinc, Total Suspended Solids (TSS), and pH. Marine sampling includes analysis for selected metals in the water and sediments and bioassay monitoring of benthic organisms. Vegetation monitoring includes identifying species and determining coverage percentages for species. Surface inspections for stormwater/erosion controls, vegetative progress, wetlands and slope stability following weather events, are dictated in GPO Appendix 14 - Section 2.3 and 2.4, and are included with the cost estimates for long term performance monitoring.

The Professional Services cost estimate includes consultant hours to perform specialty engineering, ecological surveys or other specific needs.

There were only minor additions to this Element for the 2008 update. Two monitoring sites were added near the tailings site and monitoring frequencies were slightly adjusted to reflect current monitoring practices.

5.3 Roads

The Road Element includes cost estimates associated with reclamation tasks for closure of all surface road systems at the Greens Creek Mine. The estimated cost to reclaim the roads is US $2.4 M. The cost estimates are organized by section and are generally standard civil works related reclamation tasks.

The road corridor (Drawing 2) is 14 miles of single lane road and covers 148 acres with the actual road bed comprising of approximately 68 acres. The eight and a half miles of road between Hawk Inlet and the 920 Mine Site is called the "B" Road and supports a majority of the KGCMC traffic, including all truck haulage to the Hawk Inlet Shiploading Facility and Tailings Area. The "A" road is approximately five miles long and is utilized by lighter vehicle traffic and personnel transport to Young Bay. The remaining road, the "B" Road Extension, is primarily used for access to the upper mine portal (1350 Area) and the 1160' water tank.

Extensive hydroseeding, which is an interim reclamation measure, and installation of rock check dams, sediment basins and silt fence help minimize erosion and sediment production from the road area. In addition, the Surface Operation crews maintain the road and remove accumulated sediment from the road and ditches annually. The USFS regularly inspects the road corridor for compliance with the GPO Appendix 8-Road Operations and Maintenance.

The road reclamation tasks are itemized by area and encompass all major road components including the road corridor, power lines, pipelines, guardrails, culverts and quarries. Bridge removal cost estimates are included in the Site General Element. The standard civil works reclamation methods within the roads portion include contouring, soil application, revegetating, establishing sediment control and long term drainage routes for the non-PAG areas. Road areas constructed of potentially acid-generating (PAG) rock are designated for removal to a containment site. As reflected in the cost sheets, all material that is defined as short lag (meaning it has a relatively short time before it is acid producing) will be backfilled underground. Residual material (material with buffering capacity) will be placed at the Tailings Area or Site 23.

KGCMC cost estimates were based on typical equipment performance guidelines (Caterpillar Equipment Catalog #31/37), historical KGCMC cost estimates and standard reclamation practices. The roads will be blended into the existing contours in accordance with the GPO Appendix 14-Reclamation Plan and USFS guidelines. Storage material sources along the road will also be used for other reclamation purposes as needed, such as soil cover applications (Drawing 12).

Road reclamation is scheduled around the other Reclamation Elements to maintain access to monitoring and water treatment infrastructure at the Tailings Area, Site 23 and the 920 Portal. Minimal traffic is expected once the major site demolition and capping projects are completed. Road closure will occur in two stages following mine closure. During the first one to two years after closure, the road will remain open for site demolition activities. After major demolition and capping projects occur, the road corridor will be minimized to allow only light vehicle traffic (pickups or all terrain vehicles) for the

monitoring crews. When the monitoring access is no longer required, the remaining road corridor reclamation will be completed with track equipment. The bridges will remain in place until road access to the upper mine site is no longer needed. At that time, the final road corridor will be made impassable to motor vehicles, leaving only aerial or small trail access to the upper elevations of the property.

The long-term road system plan has been altered due to the installation of a local power grid extension by AEL&P. Currently, the grid extends to KGCMC facilities but may expand beyond KGCMC property in the future to accommodate outlying communities in Southeast Alaska. Therefore, it is likely that the road from Young Bay to 1.2 Mile "B" road will not be reclaimed by KGCMC and responsibility of the road will be transferred to the local utility owner post closure. However, all road areas have been included in the KGCMC reclamation cost estimate until further provisions are made. Other additions to the 2008 plan include an increased volume of PAG rock removal. Since the last full update to the plan, KGCMC continued to evaluate rock sources used in the construction of the road and has concluded that excavation of PAG road material will be appropriate as it is encountered. These road areas and quantities are defined within the cost estimates. Also included in the 2008 update is the 1.4 Mile "A" Road Sand Pit, constructed in 2004, which currently supplies construction materials and will be a source for reclamation materials at closure. Costs have also been added for road maintenance for the first two years of closure to support traffic associated with reclamation activities.

5.4 Production Rock Sites

The Production Rock Sites Element includes cost estimates associated with the reclamation tasks for closure of all production rock sites at the Greens Creek property. The cost estimate for this element is US $6.5 M. These sites represent a major component of KGCMC environmental risk, therefore, continued research and development to enhance closure strategy is a primary focus. Minimizing contact water and pyrite oxidation and water handling are primary components of this strategy. Water discharges from production rock sites must not cause or contribute to an exceedance of AWQS in receiving waters. In the event water quality cannot be held compliant at closure, then passive or active water treatment facilities, mixing zones or transport systems may be implemented to reduce the impact. Regulatory agencies have the final decision for completion and acceptance of closure at the mine and cost estimates to maintain agency oversight are included in the plan.

The methods preferred for final reclamation are engineered soil cover installation or relocation of materials to contained sites (Tailings Area, Underground and Site 23) for final storage. KGCMC has implemented specific operating criteria in GPO Appendix 11 to reduce PAG exposures during operations and prevent acid generation. Operational, regulatory and third party monitoring audits and reviews ensure compliance checks are made and have helped KGCMC to design, construct and operate the active disposal site (Site 23) in a manner that minimizes PAG potential.

KGCMC is focused on completing concurrent reclamation projects for inactive sites that have potential for short term drainage problems. The 1350 Site and Site E are inactive production rock sites and are concurrent reclamation sites. The 1350 is in the removal process and Site E removal is planned to begin in 2008. Removing the material removes the ACID GENERATING potential source. At the 960 Site, almost all of the material has been removed and water quality improvement has been documented (Appendix C). If necessary, a thin soil layer would be placed on the surface to promote vegetative growth.

The sites would need minimal monitoring since removing the material removes the ACID GENERATING potential, as occurred at the 960 Site.

Inactive Sites C and D (Drawing 9) were previously scheduled to be reclaimed with an engineered soil cover but after additional evaluation, these sites are planned for removal to further reduce the environmental risk. Soft till material excavated during construction of the mill was placed at the base of Site D. This material has the potential to liquefy during an earthquake and will also be removed. Additional geotechnical evaluation is planned to determine if buttressing the toe of Site 23 following removal of Site D is necessary. The cost estimates for these sites assume all PAG material will be backfilled underground and residual material will be placed at the Tailings Area or Site 23.

Production Rock Site 23 (Drawing 7) is the only active production rock site and will be the only site, besides Tailings, to receive an engineered cover at closure. The full build-out of this site is 18 acres; however, KGCMC may not develop the entire site. Cost estimates have been made for the full 18 acres. Surface water and groundwater controls have been constructed as part of the active site design. Final closure diversion of stormwater and interception of groundwater will help control erosion and reduce the possibilityl for PAG from the placed material. Site 23 has sufficient placement space for rock through the current mine plan. The backslope of Site 23 is one of the major borrow sites for engineered soil cover materials.

Production rock site reclamation cost estimates include labor, equipment, materials and professional services. Consulting, geotechnical investigations, testing, and monitoring instrumentation may be needed at various waste sites for closure planning. Consulting could be used for cover construction review, vegetation sampling, plant cover analysis, hydrologic evaluations or a variety of other issues. Monitoring instrumentation will be installed to monitor surface water, ground water, and cover performance. Quality control testing will be needed to assure soil materials meet appropriate specifications and construction meets appropriate standards. Permitting may be necessary at certain sites if expansion is necessary in the waste area. Estimated permitting costs would also cover costs for site closure reports and correspondence with regulatory agencies.

5.5 Tailings Area

This Element defines estimates for closure cost of the 43-acre Tailings Pile (Drawing 3) and surrounding area. The US $5.3 M estimate includes costs to construct the four-layer engineered soil cover design mentioned previously in the Production Rock Sites Element. The estimate also includes recontouring, establishing runoff control, and revegetating the area.

The Tailings area represents the most significant closure issue at KGCMC. PAG and metal leaching potentials are documented for the tailings area and have been the focus of studies (2003 FEIS) to determine the best remediation measures and to establish applicable operational procedures (GPO Appendix 3-Tailings Impoundment). These procedures will minimize environmental impacts and ensure a stable pile configuration. Research and study programs (SRMP and co-disposal) continue to further define operational and closure strategy for this area. Engineered soil cover development and associated hydrologic, geotechnical and geochemistry modeling have significantly progressed since 2001. Impoundment design controls established in 1997 have continued to improve as knowledge increases. These improvements are utilized in the design for

expansion areas that incorporate sub-drains and liners in the tailings area (Klohn Crippen 2000-2007).

Within this closure plan, KGCMC has mapped out a system of water diversion, collection and treatment, engineered soil cover installation and soil amendments to extend the sulfate reduction process occurring in the tailings pile, as well as maintenance and monitoring expectations for the tailings site. As of year end 2008, approximately 31 of the 43 estimated acres of the Tailings pile have been developed, however, this plan accounts for an engineered soil cover for the entire 43 acre pile. The rest of the pile will be developed as tailings space is needed.

Closure planning includes alternative analysis, such as KGCMC evaluating a pyrite circuit within the 2003 FEIS. It was concluded that unless the pyrite concentrate was shipped off island, the environmental impact from the concentrate would outweigh existing placement method impacts. Closure modeling eliminated this option from consideration in the 2003 FEIS. The 2003 FEIS investigated several amendment options to the tailings pile to reduce environmental liabilities and concluded the best option was continued research into a Sulfate Reduction Monitoring Program (SRMP), and to continue current placement practices under the guidance of GPO Appendix 3–Tailings Impoundment. The KGCMC Environmental Department is directing the SRMP (Appendix E) with several consultants and has supplied project progress updates annually to regulatory agencies.

Water collection and treatment for this area could extend beyond the closure plan schedule because the magnitude of environmental risk depends upon actual cover performance. Closure cost provisions may be added to future plan updates as studies confirm water quality mitigation measures for the tailings area. Consultants are seconded to assist KGCMC and have produced several reports to support closure and design procedures (EDE 2000-2007 and Klohn Crippen 2000-2007). Currently, KGCMC expects to continue utilizing the outfall line as the water discharge point for the tailings area after water monitoring indicates treatment is no longer required.

Regulatory changes to water quality standards may also affect the closure plan scope and the cost estimates, as they did during the 2003 FEIS. During the 2003 environmental studies associated with the tailings expansion project, the Alaska State Water Quality Standards were changed by the Environmental Protection Agency (EPA) and accepted by the USFS and ADEC, who facilitated the permitting process. KGCMC re-evaluated predicted water discharge qualities relative to the newly accepted standards. Future changes may affect the closure plan in a similar manner.

5.6 Site General

The Site General Element includes cost estimates for site-wide facility removal. The cost for this Element is US $5.3 M. Although some potential for demolition plan modification exists for private lands at Hawk Inlet, the cost estimates include site demolition on all lands at the KGCMC property.

Site inspections by KGCMC technical staff and a salvage contractor, Northwest Metals and Salvage Service, Inc. of Seattle, were used to establish the site-wde demolition costs and salvage estimates. The cost estimates represent a general overview of the demolition and salvage components that can be used in future contract development for the closure tasks. The estimated salvage values for equipment, rolling stock and steel are not deducted in the Cost Summary Sheet. Cost estimates for shipping of equipment and scrap, mobilization/demobilization, hazardous waste handling and marine equipment

rentals are included. Contractor labor rates for specialty disciplines involving steel/electrical demolition work are higher than those utilized in the other Element labor cost estimates, and were established using Davis Bacon rate tables from December 2007.

The tasks were itemized by area and account for all the major structures at the Greens Creek Property, including all buildings and foundations, power and water facilities, tanks, mine portals, bridges and marine facilities. The estimates consist of decontamination, demolition, and removal of materials to acceptable disposal sites and organizing salvageable equipment and steel. Prior to closure, decontamination of the mill facilities will be completed by flushing lines, cleaning the tanks, draining oil from systems, steam cleaning, and removing residual ore, concentrate, and tailings. Operational prep work prior to decommissioning will significantly ease the overall complexity and reduce the amount of decontamination required post-closure.

Decontamination expectations are that materials will be pressure washed or vacuumed in a decontamination station and water will be routed to the water treatment plant. This decontamination method will be appropriate for all facilities including the assay labs. Steel scrap will be sent to a salvager or smelter. Waste oils and surfactants used to clean fuel tanks would be sent to a licensed recycle station. Waste disposal estimates are based on current KGCMC operating costs. If soil contamination is detected, KGCMC would appropriately dispose of the soils or land farm and reuse the soils for reclamation.

KGCMC has further investigated the material that the 920 and Hawk Inlet facilities were constructed upon. Portions of that material are PAG rock, which has inherently greater environmental risk. To reduce this risk, KGCMC will haul material from specified locations to the Tailings pile or underground. These quantities and locations are defined in the cost sheets. Material removal will take place after major demolition has taken place. Concrete left from the 920 area demolition may be used to buttress the slope after it is properly decontaminated. In this scenario, a layer of soil may be placed on the concrete to establish vegetative growth and KGCMC will reestablish slope drainage. The mill site will be revegetated using standard reclamation measures described in GPO Appendix 14 after some material from the site is hauled underground.

KGCMC is in the process of evaluating mine hydrology and geochemistry (Appendix I) for the predicted openings left within the underground facilities at closure. A third party consultant has been seconded to complete the estimation of water quantity and quality that may result post-closure from the underground facilities. Currently KGCMC plans to manually flood the underground workings; however analysis of a natural recharge scenario is also being evaluated. Further investigation and analysis are needed to make proper risk assessments to determine the best solution for this site. The mine is considered a dry mine, as it produces approximately 30-70 gpm of water, however, KGCMC fully appreciates the potential for mine drainage to impact water quality post-closure. The PAG and metals leaching potential of materials in the underground workings and the mine's proximity to Greens Creek are significant factors controlling long-term environmental risk. Since the last update, KGCMC has increased water treatment cost estimates to 14 years, however KGCMC will maintain water treatment longer if necessary as more knowledge is gained in this area.

Most structures will be demolished within the first two years post-closure. However specified structures, such as the tailings water treatment plant, Site 23 and D pump houses, will remain to support water treatment efforts until water quality goals are met. See appendix A for a full schedule.

Other additions to the 2008 Site General Element include a larger capacity water treatment facility (currently under construction) at the Tailings area. The original treatment plant at Pit 5 will be demolished during operations and is no longer included in the cost estimate. In 2006, in conjunction with the construction of Pond 7, Tank 6 was demolished and replaced with Tank 7. For this estimate, only Tank 7 was included. Tank 7 reclamation costs are in the Water Systems Element. Additional updates include increased cost for demolition and reclamation of the 920 Administration Building addition which is planned for construction in 2008. Minor adjustments have also accounted for the addition of the powerhouse turbine at the 920 and the planned 2008 camp expansion at Hawk Inlet.

5.7 Water Systems

The Water Systems Element includes cost estimates for removal and reclamation of water facilities and piping, which are not included in the other direct cost Elements (Roads, Production Rock Sites or Site General). The cost estimate for this element is $.64 M. The cost estimates are organized by area for major water systems and are generally civil works related reclamation tasks.

The physical tasks are itemized by area and will be coordinated with other closure tasks, which require an operational water treatment system. These tasks will be organized to provide adequate maintenance and monitoring access to ensure long-term compliance with permits.

Water treatment system capacities will be reduced as the volume of water requiring treatment decreases. At closure, when the milling process ceases there will be an approximately 80% decrease in the volume of water requiring treatment at the mill site. The remaining water, which includes stormwater from the mill site, will continue to be collected until site closure projects are completed, and the natural drainage is re-established. Water collected from Site 23 and the mine portal will be routed to the tailings water treatment facility after major reclamation tasks have been completed. The pipeline down the hill will remain as long as water treatment is necessary.

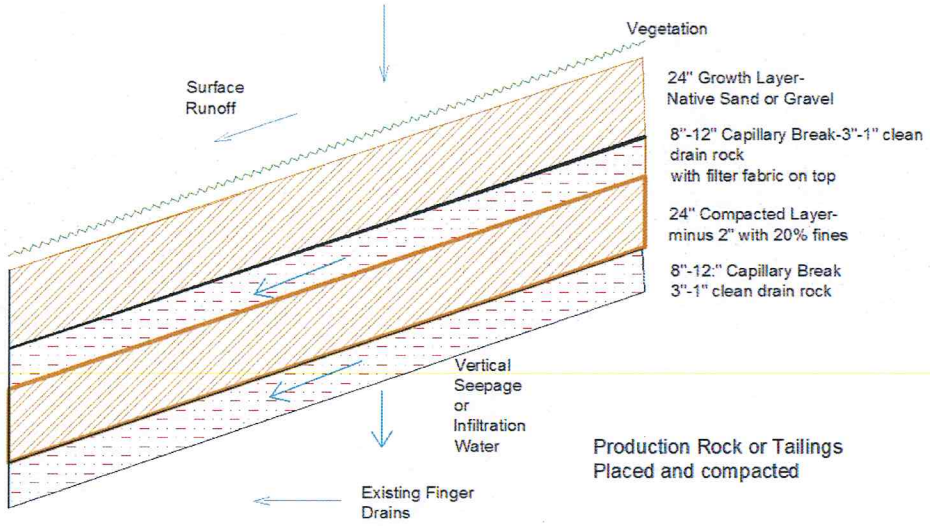
Cost estimates were based on established site reclamation guidelines and used standard reclamation cost estimates. Installation of low maintenance water treatment systems is included in the cost estimates for final closure on all public and private properties, where needed. Some of the Water Systems buildings may need to remain functional, if needed for monitoring and water sampling. With information on water quality predictions (2003 FEIS, EDE 2003, EDE 2007) and the availability of the outfall line post-closure as per the EPA NPDES Permit, water treatment is planned for approximately 14 years. The estimated cost for water treatment plant operation is presented in the Administration Element.

The construction and use of integrated water management systems to assist in long term water compliance are included in the cost estimates (Pit 5 Wastewater task sheets). Integrated water systems at the Tailings and Production Rock Sites will return a sites water flows to normal flow paths based on topographic conditions. Directional controls such as contouring, ditches and drains, will constitute the majority of the water management systems included in the Plan. Engineered cover performance and water monitoring cost estimates are also included. Certain sites are suitable candidates for constructed wetlands. See section 4.3 for more details.

Additions to the 2008 Water Systems Element include Pond 7, Pond 9 and the new water treatment facility at Pond 7. Features which have been or soon will be removed (Pit 5 Water Treatment Plant, and Pond 6) were eliminated from the cost sheets.

6 Engineered Soil Cover

An engineered soil cover design was developed by Unsaturated Soils Engineering, Ltd., of Saskatoon, Canada. KGCMC completed construction of an initial one-acre test plot in 2001 at Site 23. The plot is currently being monitored and evaluated for modifications to improve performance by O'Kane Consultants, Ltd of Saskatchewan, Canada and researchers from Oregon State University. The purpose of the cover is to reduce oxygen and water infiltration post closure. The test cover is minimizing oxygen ingress but may be allowing infiltration at a rate that is higher than desired. Further investigation is necessary before a final soil cover is implemented. KGCMC plans to construct an additional test cover based on results of the 2001 test cover to optimize the cover application. The four layer cover incorporates an underdrain (1st capillary break) for slope stability in areas that have seepage along the slope. The cover was designed to take advantage of the on-site soil properties to minimize the cost of importing material. The design specifies an eight-inch capillary break, topped by a two-foot compacted layer, topped by another twelve-inch capillary break and finally topped with a two-foot growth layer (see Drawing 12). Provisions have been included in the estimate to address constructability issues and maintain design specifications.



Typical 4 Layer Engineered Cover for Reclamation placed on a 3:1 Slope

Results of the ongoing performance monitoring of KGCMC's reclamation cover system are summarized in Appendix J. In 2007 KGCMC expanded performance monitoring of the cover system at Site 23. Collaboration with consultants and academic researchers continues to help quantify the hydrologic performance of the multilayer soil cover. Determining the effects of soil processes and a transition to native forest vegetation will also help characterize the cover's long term ability to limit the ingress of water and oxygen into the mine's waste rock and tailings piles.

Several reclamation stockpiles are available for the covers throughout the property (see drawing 13). However, additional borrow sites or off-island sources may be necessary to complete reclamation at the tailings area. Cost estimates consider imported material costs for capillary break layer, but the barrier layer and growth layer are planed to be supplied from on-site sources. The mill complex also has the potential to process material to develop stable soil cover materials, as well as a system that could potentially remove bulk

sulfides from the materials through the flotation circuit. As reclamation material needs warrant, KGCMC will utilize the best and most cost effective means of establishing the materials.

7 Cost Estimates

The total reclamation cost is the sum of the subtotals of the seven Elements. The Elements were broken down by area. The Element areas were further broken into tasks. All reclamation tasks were calculated using a unit cost approach. Labor, equipment, materials, monitoring, engineering services, instrumentation/repairs and contractor profits are included in the unit costs. The unit and quantity are defined for each item. Task descriptions for individual tasks complete the detail estimation process. Listed below is the hierarchy of the cost estimate spreadsheets.

TOTAL RECLAMATION COST ESTIMATE

- Total cost of all the elements
- Freight
- Contingency
- Regulatory Oversight
- Engineering re-design.

ELEMENT SUMMARY

- Total Cost of Element
- Lists **areas** included in Element
- Total Element cost of Labor, Equipment, and Materials.
- Overall unit cost for particular Element

ELEMENT SUMMARY SPREADSHEET TABLE

- Shows all tasks for all areas of that Element
- Includes cost and comments for each task in spreadsheet format

ELEMENT TASK SUMMARY

- Shows all tasks and costs for individual areas

TASK COST ESTIMATE

- Task description
- Unit cost and quantity
  - Labor
  - Equipment
  - Materials

Cost estimations utilize a variety of standardized unit costs to establish a baseline rate estimate for labor, equipment and materials. Each unit cost component is listed in the cost sheet and was developed using the following methods;

Labor Costs -Unit costs for labor rates were averaged to a single hourly rate for the purposes of standardizing the labor cost estimates for all reclamation tasks on site. The labor rate established is $61/hr which includes fringes for Operator/Labor disciplines and was averaged from the December 2007 Davis Bacon Heavy Industry Wage Report. Also included in the labor rate calculation is approximately 30% of the base wages for contractor profit and labor burdens that are not included in the normal Davis Bacon wage rate tables, such as Workman's Compensation Insurance, Alaska Unemployment, FICA Tax and Social Security. Generalized labor rates account for various disciplines working in a construction environment. It is expected that the Equipment Operator/ Truck Driver Laborer disciplines will dominate the majority of reclamation activities at Greens Creek, due to the high percentage of civil works related activity.

Wage rate considerations for the special skills of a "Steel Worker" (including steel and electrical demolition work) were used in a majority of the Site General Element at $63/hr from the November 30, 2007 Bacon Davis report. This rate includes the required fringes, burdens, contractor profits and other insurance similar to the labor estimates above. The amount of work hours in the Site General Element requiring steel/electrical demolition was considered significant enough to itemize.

Material Costs - Materials cost estimates are designated on the unit cost sheets and reflect vendor estimates and historical cost data at the Greens Creek Operation. The material costs include contractor/vendor profit margins and shipping to Hawk Inlet.

Equipment Costs - Equipment cost estimates were based on local vendor rental rates. If the equipment was not available at a vendor for rental, historic KGCMC operating costs were used. These rates include general maintenance.

Fuel usage rates (gallon per hour) are itemized within the equipment unit cost sheet however; fuel usage of each piece of equipment is tabulated in Appendix G. Fuel costs have been included as a lump sum in the Administration Element.

Monitoring Costs - Monitoring and Qualitative Laboratory costs reflect current KGCMC unit costs for these offsite, third party assay services. Greens Creek currently includes extensive monitoring of water, biological and soil analysis as part of the normal environmental sampling protocols (GPO Appendix 1 – Fresh Water Monitoring Program).

Changes in agency requirements, public expectations, and best management practices (BMP) will affect future costs. An overall 20% contingency has been included in this estimate. Contingency is included as a provision for unforeseeable elements of cost within the defined project scope. The contingency applies both to direct and indirect costs.

8 Schedule

A reclamation schedule is presented in Appendix A. This schedule displays a tentative timeline to complete all reclamation tasks. It includes a holding year, two years of major reclamation, 30 years of maintenance and monitoring and maintenance of the outfall line

for 50 years post-closure. The schedule is intended to represent a flow of work to reclaim the property while minimizing the required infrastructure to sustain maintenance, monitoring and water treatment activities until final regulatory approval.

Most physical reclamation projects are scheduled for completion within two years following mine closure and the holding year. After completion of the major reclamation tasks, maintenance and monitoring activities continue with water treatment and compliance sampling. The schedule includes time frame estimates by task with estimated completion periods. Sequential scheduling of reclamation tasks is important to a timely project completion with certain reclamation priorities emphasized. For instance, water treatment systems will be maintained at the 920 site until the site has been demolished and reclaimed and then water will be routed to the Tailings water treatment facility. The water treatment systems require power and equipment to remain operational, but the entire water treatment system capacity will not be needed past mill shutdown, therefore staged water treatment and power facility removal is reflected in the schedule.

The overall flow of the schedule maintains water treatment and road access as key components for supporting the facility decommissioning. The project schedule estimate is flexible (some of the project is weather dependent such as engineered soil cover installation) and is based on independently completing many areas of reclamation simultaneously, while maintaining the infrastructure needed to sequentially close and monitor the property.

Most reclamation tasks are not dependent on a sequential completion of projects to each other. For example, the demolition of the Assay Lab is not dependent on the Safety Shop demolition. Therefore, optimizing the schedule and reducing costs of reclamation will be the responsibility of the project management team in place at the time of reclamation.

9 Concurrent and Interim Reclamation Projects

9.1 Concurrent Reclamation Projects

Greens Creek has set forth a rigorous concurrent reclamation project list to continue in 2008. KGCMC has purchased additional equipment and will hire additional staff to specifically assist with some of these projects. Concurrent reclamation strategy at KGCMC focuses on sites that are available for final reclamation activities while general operations continue. Areas that are potential candidates for concurrent reclamation work include Production Rock Sites 1350, E, and portions of Site 23, Site D, and other small sites.

Currently, the scheduling (Appendix B) of concurrent reclamation is dependent on weather, resources and storage capacity of the relocation sites. The projects must have flexible completion dates to accommodate project and material limitations. For example, the backslope of Site 23 is the key long-term borrow source area for engineered cover materials. The excavation of reclamation materials must be planned over several years and in conjunction with production rock placement to avoid over-excavation of the back slope, which could cause an unsafe backslope highwall for placement personnel. Long-term operations planning focuses on the Site 23 backslope excavation as a major source of reclamation materials for concurrent reclamation projects to minimize surface disturbances at the property. In the case of a short-term closure, ample sources of reclamation materials are available all along the road corridor to overcome the

dependency on the Site 23 backslope for cover materials to enhance project economics with shorter haulage cycles.

Each site has specific project needs that must be met before concurrent reclamation can proceed. The planned concurrent projects are discussed below.

Site 23 is the active production rock disposal site at Greens Creek. The site is being constructed with an outside slope ready to accept an engineered soil cover application. KGCMC installed a test cover with instrumentation over one acre of the pile which has provided data to evaluate the cover performance, including water and air infiltration, temperatures within the cover and moisture levels. Knowledge gained from the original cover performance data will help in updating the design of a second test cover will be constructed within one to two years and monitored in order to determine the optimal final engineered soil cover design for closure.

Site 960 is an inactive production rock storage area, which has nearly reached final reclamation. The material stored at the site was removed between 2001 and 2005. Low pyrite content rock was hauled to Site 23 and high pyrite content rock was backfilled in the mine. Natural revegetation is being observed and water quality improvements continue to be documented (Appendix C).

Site 1350 is an inactive production rock storage area, which is currently undergoing reclamation. Approximately 10% of the material was hauled underground in 2006 and 2007. This project will continue as underground void space is available and weather is favorable.

Site E (Drawing 9) is an inactive production rock storage area. KGCMC is planning material removal to the tailings area commencing on a large scale beginning summer/fall of 2008. This is estimated to be a 2-3 year haulage and placement project and will relocate approximately 365,000 cubic yards of material. Geotechnical, hydrology and geochemical analysis were completed on this area (Klohn 2003) and a geochemistry study is in progress to confirm co-disposal placement advantages.

Other small material sites that will be given consideration for removal during operations include 1.8 Mile B road, Hawk Inlet truck pad, B Pond Berm and Pit 174. All of these sites have some amount of pyritic material. All PAG material will be backfilled underground or placed at the Tailings Area or Site 23.. The distinction between PAG and non acid generating material will be at the discretion of KGCMC geochemical staff. Details of each site are described within the cost estimates.

9.2 Interim Reclamation

Greens Creek regularly implements interim reclamation actions that aim to stabilize slopes, reduce erosion, and protect quality of disturbed areas during operations. There is not a specific schedule for interim reclamation as it occurs continually. These activities include grading, silt removal, water controls, diversion of non-contact water, slope armoring, jute matting, hydroseeding (about 20 acres per year), collection and treatment, lime amendment additions and disturbance rehabilitation.

10 Regulatory Administration, Freight, Contingency and Re-design

In addition to the project work and monitoring estimates listed in the seven major Elements in the Plan, KGCMC includes cost estimates for Regulatory Administration, Freight and Contingency into the Overall Cost Estimate. These costs consist mainly of typical indirect cost items associated with project work and are itemized in the cost summary, and include;

Regulatory Administration - cost estimates have been included for closure oversight. The cost estimate for Regulatory Administration was negotiated with Federal, State and Local Agencies in an interdisciplinary agreement in 2001 to an amount which was approximately eight percent (8 %) of the seven Element costs. Regulatory Administration costs have been again estimated at 8% of the total Plan costs in this 2008 update and are included in the cost summary.

Freight - cost estimates have been included at five percent (5%) of the seven major Element costs, and are all inclusive of freight issues at the property (contractor mobilization/demobilization, equipment, materials, fuel haulage/equipment and storage, warehousing and storage of goods, personnel, purchasing, inventory return, temporary rentals of transport and yard equipment, island freight haulage, port facility and road maintenance). Typical freight designations at this remote site include everything coming/going to/from the island via sea or air transport modes, and the island management of such. Greens Creek is not accessible by overland freight, and relies heavily on sea barge freight haulage. The cost estimate for the overall reclamation projects reflects typical historical project and operational costs for these items. Specialty marine demolition equipment, decontamination equipment, hazardous wastes and all salvage scrap shipments have Freight components itemized within the individual cost Elements (Site General - Miscellaneous), in addition to the overall 5% adjustment for Freight. Therefore, the Freight estimates are considered very conservative for supporting the project.

Contingency – cost estimates have been included at ten percent (10%) of the seven major Element costs and are included in the Summary Cost Sheet. Contingency addresses unforeseen activities or failed performance repair work that may be needed to complete the Plan. Contingency sensitivities are highest for the Tailings Area and the Production Rock Site reclamation tasks, because of the length of monitoring performance based criteria. These areas account for approximately 36% of the cost estimates outlined in the Plan. An overall ten percent contingency was established instead of individual area sensitivity based contingency factors, due to the tasking detail presented in the Plan for the majority of the projects.

Re-design - cost estimates have been included at two percent (2%) of the seven major Elements and are included in the Summary Cost Sheet. These professional level costs can be used in any capacity by regulatory agencies under a default scenario and therefore could be utilized for engineering re-design assignments as necessary. These costs were provided to supplement all engineering needs for the Reclamation cost estimate.

11 Conclusion

GPO Appendix 14 Reclamation Plan Attachment A details the cost estimates and activities required to reclaim the Greens Creek Mine property to a near natural condition. The Plan divides the property into seven Elements which are each cost estimated to establish the total amount needed for reclamation of the current site.

KGCMC has carefully evaluated each aspect of the property to determine the best strategy for closure and has defined those strategies within this 2008 Reclamation Plan update. Significant changes, and subsequent bond increase, to this updated plan were governed by environmental risks that PAG material presents and the need for increased water treatment. KGCMC will continue with ongoing research to provide the most up to date technical information of the site.

This plan will be submitted to regulatory agencies for approval and will be fully updated and re-evaluated again in 2013.

Appendix G
Subsistence

1. SUBSISTENCE

The purpose of this section is to describe subsistence uses in the Greens Creek Mine area and to assess potential impacts on subsistence related to the proposed expansion of the Tailings Disposal Facilities (TDF) at Greens Creek Mine. Subsistence uses are central to the customs and traditions of indigenous cultural groups in Alaska, including the Tlingit Indians of Southeast Alaska. Subsistence customs and traditions encompass processing, sharing, redistribution networks, and cooperative and individual hunting, fishing, gathering, and ceremonial activities. Both federal and state regulations define subsistence uses to include the customary and traditional uses of wild renewable resources for food, shelter, fuel, clothing, and other uses (Alaska National Interest Lands Conservation Act [ANILCA], Title VIII, Section 803, and Alaska Statute [AS] 16.05.940[33]). The Alaska Federation of Natives (AFN) not only views subsistence as the traditional hunting, fishing, and gathering of wild resources, but also recognizes the spiritual and cultural importance of subsistence in forming Native peoples' worldview and maintaining ties to their ancient cultures (Alaska Federation of Natives 2005).

Subsistence fishing and hunting are traditional activities that help transmit cultural knowledge between generations, maintain the connection of people to their land and environment, and support healthy diet and nutrition in rural communities in Alaska. The Alaska Department of Fish and Game (ADF&G) estimates that the annual wild food harvest in rural areas of Southeast Alaska is approximately 5 million pounds, or 178 pounds per person per year (Wolfe 2000). Subsistence harvest levels vary widely from one community to the next. Sharing of subsistence foods is common in rural Alaska and can exceed 80 percent of households giving or receiving resources (ADF&G 2011). The term harvest and its variants – harvesters and harvested – are used as the inclusive term to characterize the broad spectrum of subsistence activities, including hunting, fishing, and gathering.

Subsistence is part of a rural economic system called a "mixed, subsistence-market" economy, wherein families invest money into small-scale, efficient technologies to harvest wild foods (Wolfe 2000). According to Wolfe and Walker (1985), fishing and hunting for subsistence resources provide a reliable economic base for rural regions and these important activities are conducted by domestic family groups who have invested in fish wheels, gill nets, motorized skiffs, and snowmachines. Subsistence is not oriented toward sales, profits, or capital accumulation (commercial market production), but is focused toward meeting the self-limiting needs of families and small communities. Participants in this mixed economy in rural Alaska augment their subsistence production by cash employment. Cash (from commercial fishing, trapping, and/or wages from public sector employment, construction, fire fighting, oil and gas industry, or other services) provides the means to purchase the equipment, supplies, and gas used in subsistence activities. The combination of subsistence and commercial-wage activities provides the economic basis for the way of life so highly valued in rural communities (Wolfe and Walker 1985). Regarding the importance of the mixed economy to the subsistence lifestyle, George and Bosworth (1988: 35) noted the following on the state of subsistence in the community of Angoon: "Commercial fishing income is, in fact, an important element of the Angoon 'mixed' economy, which greatly depends on a relatively secure cash flow and a productive subsistence resource base."

Participation in subsistence activities promotes transmission of traditional knowledge from generation to generation and serves to maintain people's connection to the physical and biological environment. The subsistence lifestyle encompasses cultural values such as sharing, respect for elders, respect for the environment, hard work, and humility. In addition to being culturally important, subsistence is a source of nutrition for residents in areas of Alaska where food prices are high. While some people earn income from employment, these and other residents rely on subsistence to supplement their diets throughout the year. Furthermore, subsistence activities support a healthy diet and contribute to residents' overall well-being.

Alaska and the federal government regulate subsistence hunting and fishing in the state under a dual management system. The federal government recognizes subsistence priorities for rural residents on federal public lands, while Alaska considers all residents to have an equal right to participate in subsistence hunting and fishing when resource abundance and harvestable surpluses are sufficient to meet the demand for all subsistence and other uses.

The U.S. Congress adopted ANILCA recognizing that "the situation in Alaska is unique" regarding food supplies and subsistence practices. The Act specifies that any decision to withdraw, reserve, lease, or permit the use, occupancy, or disposition of public lands must evaluate the effects of such decisions on subsistence use and needs (16 United States Code [USC] 3111-3126). In 1990, the U.S. Department of the Interior and the U.S. Department of Agriculture established a Federal Subsistence Board to administer the Federal Subsistence Management Program (55 Federal Register [FR] 27114). The Federal Subsistence Board, under Title VIII of ANILCA and regulations at 36 Code of Federal Regulations (CFR) 242.1 and 50 CFR 100.1, recognizes and regulates subsistence practices for rural residents on federal lands. Federal regulations recognize subsistence activities based on a person's residence in Alaska, defined as either rural or nonrural. Only individuals who permanently reside outside federally designated nonrural areas are considered rural residents and qualify for subsistence harvesting on federal lands under federal subsistence regulations. However, federal subsistence regulations do not apply to certain federal lands, regardless of residents' rural designations. These include lands withdrawn for military use that are closed to general public access (50 CFR Part 100.3). Nonrural areas in Alaska include the areas around Fairbanks North Star Borough, Wasilla/Palmer, Anchorage, Kenai, Homer, Valdez, Seward, Juneau, and Ketchikan.

The Alaska Board of Fisheries and the Alaska Board of Game have adopted regulations enforced by the State for subsistence fishing and hunting on all State of Alaska lands and waters, and lands conveyed to Alaska Native Claims Settlement Act (ANCSA) groups. State law is based on AS 16 and Title 5 of the Alaska Administrative Code (AAC) (05 AAC 01, 02, 85, 92, and 99) and regulates state subsistence uses. Under Alaska law, when there is sufficient harvestable surplus to provide for all subsistence and other uses, all Alaskan residents qualify as eligible subsistence users.

The State distinguishes subsistence harvests from personal use, sport, or commercial harvests based on where the harvest occurs, not where the harvester resides (as is the case under federal law). More specifically, state law provides for subsistence hunting and fishing regulations in areas outside the boundaries of "nonsubsistence areas," as defined in state regulations (5 AAC 99.015). According to these regulations, a nonsubsistence area is "an area or community where dependence upon subsistence is not a principal characteristic of the economy, culture, and way of life of the area of community" (5 AAC 99.016).

Activities permitted in these nonsubsistence areas include general hunting and personal use, sport, guided sport, and commercial fishing. There is no subsistence priority in these areas; therefore, no subsistence hunting or fishing regulations manage the harvest of resources. Nonsubsistence areas in Alaska include the areas around Anchorage, Matanuska-Susitna Valley, Kenai, Fairbanks, Juneau, Ketchikan, and Valdez (Wolfe 2000).

1.1 Subsistence – Pre-mining Environment

This section addresses the subsistence environment before the development of the Greens Creeks Mine in 1976. Prior to European contact, the study area was inhabited by Tlingit Indians; many of their descendants continue to reside in southeast Alaska communities, including the study communities of Angoon and Hoonah. Studies that describe early subsistence patterns and historical territories of the Tlingit near the study area include Emmons (1991), Goldschmidt and Haas (1998), de Laguna (1960), Krause (1970), and Grinev (2005). These studies documented Tlingit history in the area from the time of European contact through Alaska statehood. In 1946, Goldschmidt and Haas (1998) documented the

traditional Angoon territory as part of Tlingit and Haida land claims. Angoon residents' traditional territory included the shores of Chatham Strait on Admiralty Island from Point Marsden south to Chapin Bay, and on Chichagof and Baranof islands from Basket Bay south to Gut Bay (Goldschmidt and Haas 1998: 67). Just as they had documented the traditional territory of Angoon, Goldschmidt and Haas (1998) documented the traditional Hoonah territory in 1946 as part of Native land claims. Hoonah's traditional territory included the area along Chatham Strait from Point Howard westward to Cape Fairweather; Chichagof Island from Point Augusta west to Point Urey; and all the islands in Icy Straits and Cross Sound (Goldschmidt and Haas 1998: 53). Later studies, primarily by ADF&G, documented more contemporary subsistence uses of the study area and are described below.

1.2 Subsistence – Baseline Conditions

1.2.1 Study Area

The proposed Greens Creek Mine Tailings Disposal Facility Expansion is located within Hawk Inlet on lands owned by the U.S. Department of Agriculture Forest Service, Tongass National Forest (Forest Service) and Admiralty Island National Monument. Because the project is located within federal lands, federal subsistence regulations apply and only harvests by rural residents in these areas are considered subsistence harvests. Nonrural residents (e.g., Juneau area residents) are not allowed to hunt or fish on these lands under federal subsistence regulations. Nonrural residents may harvest fish and game on these federal lands; however these harvests occur under state regulations. Because the entire project lies in the state defined Juneau nonsubsistence area boundary, all harvests of wildlife and fish near the project area by nonrural residents are considered sport or personal use harvests and are not addressed in this section. Subsistence harvests by rural residents that may be most affected by the proposed project include the nearby rural communities of Angoon, Hoonah, and Tenakee Springs.

Important subsistence resources harvested by residents of Angoon, Hoonah, and Tenakee Springs include deer, salmon, halibut, seal, waterfowl, marine invertebrates, berries, and plants. Due to their island locations and lack of major road development, much of these communities' use areas are accessed using skiffs or boats with some hiking further inland for resources not readily found along the coast. The increased development of logging roads beginning in the early 1980s associated with the passage of the Tongass Land Management Plan and ANILCA has opened access to additional areas. Access to Hawk Inlet is either by boat and skiff or by floatplane.

1.2.2 Angoon

Angoon is located on the west coast of Admiralty Island approximately 44 miles to the south of Hawk Inlet and has a population of 459 residents, 76 percent of which are Alaska Native (U.S. Census Bureau 2011). Subsistence studies that document Angoon residents' harvest activities are primarily found in ADF&G, Division of Subsistence technical papers collection and the Community Subsistence Information System (CSIS) (ADF&G 2011). Complete, all resources harvest studies for Angoon are available for the 1984, 1987, and 1996 study years and are based on studies conducted by George and Bosworth (1988) as well as unpublished ADF&G technical papers and a U.S. Forest Service report for the Tongass Resource Use Cooperative Survey (TRUCS) prepared by Kruse and Frazier (1988a). Individual resources studies, particularly for deer and harbor seal, were also conducted in Angoon by ADF&G and include Technical Papers 39 (Hall 1981), 70 (George and Kookesh 1982), 71 (George and Kookesh 1983), 238 (Wolfe and Mishler 1996), 241 (Wolfe and Mishler 1997), 246 (Wolfe and Mishler 1998), 250 (Wolfe and Hutchinson-Scarbrough 1999), 266 (Wolfe and Scott 2001), 273 (Wolfe, Fall, Stanek, and Scott 2002), 288 (Fall, Kerlin, Easley, and Walker 2004), 291 (Wolfe, Fall, and Stanek 2004), 303 (Wolfe, Fall, and Stanek 2005), 345 (Wolfe, Fall, and Riedel 2009a), and 347 (Wolfe, Fall, and Riedel 2009b).

Map 3.16-1 in the main body of text shows the subsistence use areas of Angoon residents for the time periods of pre-1988 (TRUCS 1988) and 1991-1995 (ADF&G 1997). Although not digitized and hence not shown on Map 3.16-1, ADF&G (1986) documented Angoon subsistence use areas for the pre-1985 time period. For the pre-1985 time period, Angoon residents reported use areas along the Admiralty, Chichagof, and Baranof islands on either side of Chatham Strait. Pre-1988 subsistence use areas included the pre-1985 use areas and covered the entirety of Admiralty Island, including the area around Hawk Inlet as well as across Chatham Strait along the eastern coastline of Chichagof and Baranof islands to the area just south of Catherine Island. Use areas for game and fish during the 1991-1995 time period are centered along Chatham Strait with additional fish use areas further south of the community into the Pacific Ocean. During the mapping studies (ADF&G 1986, TRUCS 1988), Angoon households reported using the Hawk Inlet area for deer hunting and marine invertebrate harvesting for the pre-1985 and pre-1988 time periods. During the most recent 1991-1995 study, Angoon residents did not report use areas within Hawk Inlet.

All resources harvest data are available for the 1984, 1987, and 1996 study years (Table 1). ADF&G (2011) considers the 1996 study year data to be the most representative of Angoon residents' harvests. In all study years, fish provide approximately half of the total subsistence harvest, and land mammals account for roughly one quarter to one third of the total harvest, with marine mammals, marine invertebrates, and vegetation accounting for the remaining harvests. Bird and egg harvests do occur but do not provide a substantial amount of the yearly harvest as measured in edible pounds. Individual resources that contribute a large amount to Angoon's total harvest based on the most representative study year (1996) include salmon (36 percent), deer (23 percent), halibut (18 percent), harbor seal (four percent), chiton (four percent), and butter clams (four percent) (Table 2). Table 3 shows 12 individual study years for harbor seal; residents reported harvesting between 46 and 85 harbor seals during these study years.

Angoon's seasonal round of harvest activity is based on the research conducted by George and Bosworth (1988) (Figure 1). At the peak of summer, residents are engaged in fishing activities, particularly for salmon but also other species such as halibut, cod, and other marine fish.

Beginning in August and continuing on through the fall and early winter, a variety of marine invertebrates are harvested in the shallow waters and harbor seals are also sought. As summer turns to fall, Angoon residents harvest deer in alpine areas and harvest waterfowl and berries. Late fall and early winter include continued harvests of crab, seal, and waterfowl as well as the peak coho season. Shellfish are also a focus of residents' activities due to the extreme tides, and other marine fish are harvested during these months. For the few individuals that trap, furbearers are targeted beginning in December and on through January. Early winter subsistence activities are fewer than in other months but include harvests of deer, shellfish, Dolly Varden, herring, king salmon, and grouse. Late spring and early summer are characterized by harvests of king salmon and other marine fish, bird eggs, and seaweed.

Table 1: Angoon Subsistence Harvests by Major Resource Category

Year	Resource	Percent Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
1984	All Resources	97	97	97	74	87		134469	927	216	100
	Fish	92	90	90	55	74		74399	513	120	55
	Land Mammals	90	63	61	50	47	454	36327	251	58	27
	Marine Mammals	32	16	16	13	24	57	10302	71	17	8
	Birds and Eggs	18	16	13	5	8	313	508	4	1	0
	Marine Invertebrates	87	84	84	45	58		8056	56	13	6
	Vegetation	92	92	92	40	50		4876	34	8	4
1987	All Resources	100		99	84	93		127202	912	244	100
	Fish	99		75	60	87		54952	394	106	43
	Land Mammals	100		75	40	53	474	37926	272	73	30
	Marine Mammals	38		32	18	21	198	16640	119	32	13
	Birds and Eggs	11		10	6	4	245	296	2	1	0
	Marine Invertebrates	88		75	40	61		13510	97	26	11
	Vegetation	99		98	37	50		3879	28	7	3%
1996	All Resources	97	93	93	68	95		130385	810	224	100
	Fish	89	70	70	50	84		75230	467	130	58
	Land Mammals	74	51	51	27	50	379	29811	185	51	23
	Marine Mammals	32	15	15	8	28	63	5239	33	9	4
	Birds and Eggs	5	5	5	1	3	152	99	1	0	0
	Marine Invertebrates	89	78	78	42	73		17480	109	30	13
	Vegetation	66	62	57	18	50		2525	16	4	2

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Table 2: Angoon Subsistence Harvests by Species – Most Representative Study Year - 1996

Resource	Percent of Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
All Resources	97	93	93	68	95	130385	130385	810	224	100
Fish	89	70	70	50	84	75230	75230	467	130	58
Salmon	80	65	65	42	62	7882	47590	296	82	36
Chum Salmon	18	16	16	10	11	733	5074	32	9	4
Coho Salmon	55	45	43	20	32	3207	17446	108	30	13
Chinook Salmon	57	47	46	26	30	946	12001	75	21	9
Pink Salmon	14	11	11	5	4	442	963	6	2	1
Sockeye Salmon	68	51	50	23	45	2554	12107	75	21	9
Non-Salmon Fish	82	61	61	30	70	27640	27640	172	48	21
Herring	32	26	26	0	14	838	838	5	1	1
Herring Roe	41	7	7	7	39	1153	1153	7	2	1
Herring Spawn on Kelp	5	3	3	3	4	544	544	3	1	0
Herring Roe on Hair Seaweed	1	0	0	0	1	0	0	0	0	0
Herring Roe on Hemlock Branches	35	3	3	4	35	566	566	4	1	0
Smelt	3	0	0	1	3	0	0	0	0	0
Cod	7	5	5	3	1	70	223	1	0	0
Flounder	1	1	1	0	0	7	20	0	0	0
Lingcod	1	1	1	0	0	2	14	0	0	0
Halibut	72	50	50	27	50	23508	23508	146	40	18
Rockfish	18	12	12	4	8	292	978	6	2	1
Dolly Varden	12	11	11	1	5	213	576	4	1	0
Grayling	1	1	1	0	0	52	37	0	0	0
Cutthroat Trout	3	3	3	0	0	33	49	0	0	0
Steelhead	3	1	1	0	1	4	37	0	0	0

Resource	Percent of Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
Land Mammals	74	51	51	27	50	379	29811	185	51	23
Large Land Mammals	74	51	51	27	50	372	29811	185	51	23
Deer	74	50	50	26	49	370	29589	184	51	23
Goat	1	1	1	1	1	2	222	1	0	0
Moose	3	0	0	0	3	0	0	0	0	0
Small Land Mammals	3	3	3	0	1	7	0	0	0	0
Land Otter	3	3	3	0	1	7	0	0	0	0
Marine Mammals	32	15	15	8	28	63	5239	33	9	4
Harbor Seal	32	15	15	8	28	63	5239	33	9	4
Birds and Eggs	5	5	5	1	3	152	99	1	0	0
Bufflehead	1	1	1	0	1	7	3	0	0	0
Harlequin	1	1	1	0	1	7	3	0	0	0
Mallard	3	3	3	0	1	35	35	0	0	0
Long-tailed Duck	1	1	1	0	1	9	7	0	0	0
Northern Pintail	1	1	1	0	1	2	2	0	0	0
Teal	1	1	1	0	1	4	1	0	0	0
Wigeon	1	1	1	0	1	2	2	0	0	0
Unknown Ducks	1	1	1	0	1	22	18	0	0	0
Canada Geese	1	1	1	0	0	13	16	0	0	0
Common Snipe	1	1	1	1	1	44	4	0	0	0
Grouse	1	1	1	0	0	9	9	0	0	0

Resource	Percent of Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
Marine Invertebrates	89	78	78	42	73	17480	17480	109	30	13
Chitons	58	47	47	22	39	729	5470	34	9	4
Butter Clams	65	51	51	18	37	1295	5761	36	10	4
Pacific Littleneck Clams (Steamers)	4	4	4	0	0	7	20	0	0	0
Basket Cockles	28	27	27	8	22	703	2186	14	4	2
Heart Cockles	20	12	12	5	11	283	880	5	2	1
Unknown Cockles	22	16	16	4	14	196	609	4	1	0
Dungeness Crab	46	31	30	19	32	938	1238	8	2	1
King Crab	4	1	1	1	3	33	176	1	0	0
Tanner Crab	7	5	5	3	3	120	197	1	0	0
Limpets	1	1	1	0	0	2	3	0	0	0
Octopus	7	7	7	3	0	37	237	1	0	0
Sea Cucumber	1	1	1	0	0	11	87	1	0	0
Sea Urchin	3	3	3	0	0	4	7	0	0	0
Shrimp	8	5	5	1	3	76	609	4	1	0
Vegetation	66	62	57	18	50	2525	2525	16	4	2
Berries	31	35	28	5	7	659	987	6	2	1
Plants/Greens/Mushrooms	19	18	18	5	7	226	91	1	0	0
Seaweed/Kelp	49	30	30	7	41	2298	1447	9	2	1
Wood	28	26	26	4	5	263	0	0	0	0

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Table 3: Angoon Harbor Seal Harvest by Study Year

Year	Estimated Harbor Seal Harvest	Estimated Pounds Harvested
1995	81	6972
1997	51	4366
1998	53	4575
2000	64	5480
2001	85	7279
2002	73	6304
2003	55	4713
2004	47	4071
2005	56	4743
2006	46	3955
2007	76	6650
2008	64	5600

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Resource	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Fish												
King Salmon												
Chum Salmon												
Coho Salmon												
Pink Salmon												
Red Salmon												
Halibut												
Dolly Varden												
Cod												
Herring												
Herring Eggs												
Flounder												
Sole												
Snapper												
Sculpin												
Mammals												
Deer												
Black Bear												
Furbearers												
Seal												
Birds												
Geese												
Ducks												
Grouse												
Bird Eggs												
Shellfish												
Dungeness Crab												
Tanner Crab												
King Crab												
Clam												
Cockle												
Gumboot												
Sea Urchin												
Sea Cucumber												
Plants												
Blueberry												
Salmonberry												
Thimbleberry												
Seaweed												

Occasional Harvest Effort. Primary Harvest Effort

Source: Adapted from George and Bosworth 1988; Stephen R. Braund & Associates, 2011

Figure 1: Angoon Seasonal Round of Harvest Activities

1.2.3 Hoonah

Hoonah is located on the northeast shore of Chichagof Island, approximately 28 miles west of Hawk Inlet, and has a population of 760 people, 53 percent of whom are Alaska Natives (U.S. Census Bureau 2011). Subsistence studies that document Hoonah residents' harvest activities are primarily found in ADF&G, Division of Subsistence technical papers collection and CSIS (ADF&G 2011). Complete all resources harvest studies for Hoonah are available for the 1985, 1987, and 1996 study years and are based off the studies conducted by Schroeder and Kookesh (1990) as well as unpublished ADF&G technical papers and a U.S. Forest Service report prepared by Kruse and Frazier (1988b). Individual resources studies, particularly for halibut and harbor seal, were also conducted in Hoonah by ADF&G and include Technical Papers 238 (Wolfe and Mishler 1996), 241 (Wolfe and Mishler 1997), 246 (Wolfe and Mishler 1998), 250 (Wolfe and Hutchinson-Scarbrough 1999), 266 (Wolfe and Scott 2001), 273 (Wolfe, et al. 2002), 288 (Fall, et al. 2004), 291 (Wolfe, et al. 2004), 303 (Wolfe, et al. 2005), 345 (Wolfe, et al. 2009a), and 347 (Wolfe, et al. 2009b).

Map 3.16-2 in the main body of text shows the subsistence use areas of Hoonah residents for the time periods of pre-1986 (Schroeder and Kookesh 1990), pre-1988 (TRUCS 1988) and 1991-1995 (ADF&G 1997). Hoonah use areas (pre-1986 and pre-1988) were for the time period community residents had been living in Hoonah. For both studies, their terrestrial subsistence use areas included the northern portion and western coastline of Chichagof Island, Yakobi Island, and northwest coastline of Admiralty Island near Hawk Inlet (Map 3.16-2). Marine use areas included the area from Palma Bay along the Pacific Ocean; Glacier Bay; Excursion, Hawk, and Tenakee inlets; and northern portion of Chatham Strait. Use areas for game and fish during the 1991-1995 time period are located in similar areas as previous mapping studies with additional areas used near Douglas Island and in the Pacific Ocean along the coast towards Yakutat. During the mapping study, Hoonah households reported using the Hawk Inlet area for deer hunting, marine fish, salmon, and non-salmon fishing. During the most recent 1991-1995 study, Hoonah residents reported use areas at the entrance of Hawk Inlet but not within the Inlet.

All resources harvest data are available for the 1985, 1987, and 1996 study years (Table 4). ADF&G selected 1996 as the most representative study year for that community (ADF&G 1997). Fish provided nearly half of Hoonah residents' overall harvest in 1987 and 1996 (38 percent in 1985). Land mammals accounted for nearly one quarter of total harvests, with marine mammals, marine invertebrates, and vegetation accounting for the remaining harvests. In all study years, birds and eggs accounted for less than one percent of the total harvest. Individual resources that accounted for the majority of harvests, as recorded during the 1996 study year, included salmon (30 percent), deer (20 percent), a variety of marine invertebrates (16 percent), halibut (eight percent), and harbor seal (six percent) (Table 5). Hoonah residents harvested between 34 and 237 harbor seals annually over a period of 12 study years (Table 6).

Hoonah's seasonal round of harvest activity is based on the research conducted by Schroeder and Kookesh (1990) (Figure 2). While some species of fish are available year-round (e.g., halibut, snapper, and king salmon), the majority of fishing begins in June and continues through the summer into fall. During this time, halibut, salmon, and several species of cod are harvested. Residents also harvest plants during the summer months. Although available year-round, the majority of crabs are taken during the summer when they move to shallow waters. Late July and August signal the beginning of berry harvests and deer, seal, black bear, and goat hunting. Late fall harvest activities include waterfowl, spruce grouse, moose, and cranberry harvesting as well as continued fishing and marine invertebrate harvesting. Furbearer harvests occur during the winter. Fishing and marine invertebrate harvesting are also winter activities.

Table 4: Hoonah Subsistence Harvests by Major Resource Category

Year	Resource	Percent Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
1985	All Resources	100		100			188016	188016	671	210	100
	Fish	100			34		35128	72200	277	87	38
	Land Mammals	87		54			595	51503	184	58	27
	Marine Mammals	54	30	28			211	18990	68	21	10
	Birds and Eggs	18		13			308	552	2	1	0
	Marine Invertebrates	85		66			20089	20090	72	22	11
	Vegetation	94		93			19235	19236	69	21	10
1987	All Resources	100		95	84	100	269367	269367	1230	385	100
	Fish	100		84	72	96	125019	125019	571	179	46
	Land Mammals	94		65	46	63	2749	63163	288	90	23
	Marine Mammals	55		29	28	43	463	36926	169	53	14
	Birds and Eggs	32		23	9	10	983	829	4	1	0
	Marine Invertebrates	87		60	42	81	34591	34591	158	49	13
	Vegetation	94		90	52	59	8838	8838	40	13	3
1996	All Resources	97	95	95	78	90	331453	331453	1184	372	100
	Fish	91	86	82	66	81	160344	160344	573	180	48
	Land Mammals	78	61	56	40	39	884	71825	257	81	22
	Marine Mammals	56	27	26	25	47	240	20084	72	23	6
	Birds and Eggs	14	13	12	8	4	662	618	2	1	0
	Marine Invertebrates	78	61	61	52	68	51956	51956	186	58	16
	Vegetation	84	79	79	60	55	26627	26627	95	30	8

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Table 5: Hoonah Subsistence Harvests by Species – Most Representative Study Year – 1996

Resource	Percent Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
All Resources	97	95	95	78	90	331453	331453	1184	372	100
Fish	91	86	82	66	81	160344	160344	573	180	48
Salmon	86	77	74	57	64	16753	100791	360	113	30
Chum Salmon	51	39	35	25	27	2822	19527	70	22	6
Coho Salmon	69	58	55	38	33	4135	22492	80	25	7
Chinook Salmon	73	64	56	42	42	2069	26236	94	29	8
Pink Salmon	36	35	33	17	9	1622	3536	13	4	1
Sockeye Salmon	65	47	43	29	36	6069	28767	103	32	9
Unknown Salmon	1	1	1	1	0	36	233	1	0	0
Non-Salmon Fish	83	75	71	47	68	59553	59553	213	67	18
Herring	31	26	25	12	9	8505	8505	30	10	3
Herring Roe	49	8	4	14	48	218	218	1	0	0
Herring Roe/Unspecified	1	1	1	0	0	36	36	0	0	0
Herring Spawn on Kelp	1	1	1	0	0	55	55	0	0	0
Herring Roe on Hair Seaweed	4	0	0	0	4	0	0	0	0	0
Herring Roe on Hemlock Branches	48	7	3	14	48	127	127	0	0	0
Smelt	12	3	3	3	10	7036	7036	25	8	2
Sea Bass	1	0	0	0	1	0	0	0	0	0
Cod	10	10	10	3	1	196	615	2	1	0
Flounder	1	1	1	0	0	4	11	0	0	0
Lingcod	14	10	10	7	4	258	1627	6	2	0
Halibut	75	57	53	34	48	25502	25502	91	29	8
Rockfish	43	23	21	9	29	1462	5202	19	6	2
Dolly Varden	46	48	43	9	5	2436	6578	23	7	2
Cutthroat Trout	14	16	14	5	0	376	565	2	1	0
Rainbow Trout	5	5	5	0	0	62	124	0	0	0
Steelhead	7	7	5	3	1	29	247	1	0	0

Resource	Percent Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
Land Mammals	78	61	56	40	39	884	71825	257	81	22
Large Land Mammals	78	61	56	40	39	851	71825	257	81	22
Black Bear	3	3	1	1	1	4	211	1	0	0
Brown Bear	3	1	1	0	1	4	545	2	1	0
Caribou	4	0	0	0	4	0	0	0	0	0
Deer	74	60	56	39	31	829	66327	237	74	20
Goat	1	0	0	0	1	0	0	0	0	0
Moose	16	7	4	4	12	11	4364	16	5	1
Dall Sheep	1	1	1	1	0	4	378	1	0	0
Small Land Mammals	3	3	3	0	0	33	0	0	0	0
Land Otter	0	1	0	0	0	0	0	0	0	0
Marten	3	3	3	0	0	25	0	0	0	0
Mink	1	1	1	0	0	7	0	0	0	0
Marine Mammals	56	27	26	25	47	240	20084	72	23	6
Harbor Seal	56	27	26	25	47	240	20084	72	23	6
Birds and Eggs	14	13	12	8	4	662	618	2	1	0
Bufflehead	1	1	1	1	0	11	4	0	0	0
Goldeneye	1	1	1	1	0	11	9	0	0	0
Mallard	7	7	7	5	0	291	291	1	0	0
Lesser Scaup	1	1	1	1	0	18	16	0	0	0
Teal	4	4	4	3	0	124	37	0	0	0
Wigeon	1	1	1	1	0	47	33	0	0	0
Unknown Ducks	0	0	0	0	0	0	0	0	0	0
Canada Geese	7	7	7	3	0	87	183	1	0	0
Grouse	4	4	4	0	0	36	36	0	0	0
Seabird & Loon Eggs	4	1	1	1	3	36	7	0	0	0

Resource	Percent Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
Marine Invertebrates	78	61	61	52	68	51956	51956	186	58	16
Abalone	1	0	0	0	1	0	0	0	0	0
Chitons	42	29	29	22	25	647	4822	17	5	1
Butter Clams	57	47	47	23	27	2447	10890	39	12	3
Horse Clams (Gaper)	1	1	1	0	0	1	4	0	0	0
Pacific Littleneck Clams (Steamers)	38	31	31	14	13	549	1708	6	2	1
Razor Clams	3	1	1	1	1	7	27	0	0	0
Unknown Clams	9	8	8	4	1	400	1696	6	2	1
Basket Cockles	8	5	5	5	5	218	679	2	1	0
Heart Cockles	51	38	38	25	27	2902	9025	32	10	3
Unknown Cockles	5	5	5	3	3	145	452	2	1	0
Dungeness Crab	61	30	29	30	47	5193	6854	24	8	2
King Crab	53	16	14	18	47	1898	10201	36	11	3
Tanner Crab	29	14	12	9	18	662	1092	4	1	0
Octopus	9	9	8	4	1	69	442	2	1	0
Scallops	3	1	1	1	3	11	18	0	0	0
Sea Cucumber	3	3	3	0	0	58	465	2	1	0
Sea Urchin	5	3	3	0	3	58	99	0	0	0
Shrimp	25	14	14	9	20	435	3482	12	4	1
Vegetation	84	79	79	60	55	26627	26627	95	30	8
Berries	75	71	71	43	25	14955	21941	78	25	7
Plants/Greens/Mushrooms	40	40	40	27	12	2138	1279	5	1	0
Seaweed/Kelp	60	36	36	30	40	5404	3406	12	4	1
Wood	44	43	43	8	4	986	0	0	0	0

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Table 6: Hoonah Harbor Seal Harvest by Study Year

Year	Estimated Harvest	Estimated Pounds Harvested
1995	237	20106
1997	144	12182
1998	170	14241
2000	148	12305
2001	143	11972
2002	96	8132
2003	52	4373
2004	53	4438
2005	55	4624
2006*	34	2975
2007*	34	2975
2008	36	3132

*Reported Harvest – No Estimates Available

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Resource	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Fish												
Pacific Cod	■	■	■	■	■	■					■	■
Black Cod									■	■		
Ling Cod						■	■	■				
Dolly Varden				■	■	■	■					
Flounder (sole)	■	■	■	■	■	■	■	■	■	■	■	■
Halibut	■	■	■	■	■	■	■	■	■	■	■	■
Herring Eggs					■	■						
Pacific Herring				■	■	■			■			
Hooligan				■	■	■						
Irish Lords			■	■								
Other Rockfish	■	■	■	■	■	■	■	■	■			
Red Snapper	■	■	■	■	■	■	■	■	■	■	■	■
Chum Salmon							■	■	■	■		
Coho Salmon						■	■	■	■	■		
King Salmon	■	■	■	■	■	■	■	■	■	■	■	■
Pink Salmon						■	■	■	■			
Sockeye Salmon						■	■	■				
Surf Smelt			■	■								
Cutthroat Trout			■	■	■	■	■	■				
Steelhead			■	■								
Birds												
Sandhill Crane									■	■		
Ducks				■	■	■	■		■	■	■	■
Geese						■	■		■	■	■	■
Spruce Grouse				■	■	■	■		■	■		
Willow Ptarm.								■				
Seagull Eggs					■	■						
Waterfowl Eggs					■	■						
Intertidal												
Abalone						■	■	■				
Clams	■	■	■	■	■				■	■	■	■
Dungeness Crab	■	■	■	■	■	■	■	■	■	■	■	■
King Crab	■	■	■	■	■	■	■	■	■	■	■	■
Tanner Crab	■	■	■	■	■	■	■	■	■	■	■	■
Black Gumboot	■	■	■	■	■	■	■	■	■	■	■	■
Red Gumboot	■	■	■	■	■	■	■	■	■	■	■	■
Blue Mussels				■	■							
Octopus	■	■	■	■	■	■	■	■	■	■	■	■
Sea Cucumber					■	■	■		■	■		
Shrimp	■	■	■	■	■	■	■	■	■	■	■	■
Black Seaweed				■	■	■						
Sea Ribbon						■	■					
Garden Seaweed				■								

Resource	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Mammals												
Black Bear												
Deer												
Land Otter												
Marten												
Mink												
Moose												
Mountain Goat												
Harbor/Hair Seal												
Weasel												
Ermine												
Berries												
Blueberry												
Highbush Cran.												
Lowbush Cran.												
Grey Current												
Elderberry												
Goose Berry												
Black Huckleberry												
Red Huckleberry												
Jacob Berry												
Nagoon Berry												
Raspberry												
Salmonberry												
Soapberry												
Strawberry												
Plants												
Devil's Club												
Ferns												
Firewood												
Goose Tongue												
Hemlock Bark												
Hudson Bay Tea												
Indian Rice												
Sourdock												
Spruce Roots												
Wild Celery												
Wild Parsley												
Wild Sweet Potato												

Source: Adapted from Schroeder and Kookesh 1990; Stephen R. Braund & Associates, 2011

Figure 2: Hoonah Seasonal Round of Harvest Activities

1.2.4 Tenakee Springs

Tenakee Springs is located along the eastern coast of Chichagof Island approximately 28 miles southwest of Hawk Inlet and has a population of 131 residents, one percent of whom are Alaska Native (U.S. Census Bureau 2011). Subsistence studies that document Tenakee Springs harvest activities are primarily found in ADF&G, Division of Subsistence technical papers collection and the CSIS (ADF&G 2011). All resources harvest studies for Tenakee Springs are available for 1984 and 1987 and are based on the studies conducted by Leghorn and Kookesh (1987) and a U.S. Forest Service report prepared by Kruse and Frazier (1988c).

Once the site of an important Tlingit winter village and originally part of the Wooshkeetaan and later Deisheetaan clan, Tenakee Springs is now primarily comprised of retired non-Native residents (Goldschmidt and Haas 1998; Leghorn and Kookesh 1987). Although not digitized and thus not shown on Map 3.16-3 (in the main body of text), Leghorn and Kookesh (1987) documented the lifetime use areas (pre-1984) of Tenakee Springs residents. Pre-1988 use areas documented during the TRUCS project show Tenakee Springs residents' subsistence use areas encompassed the entire Tenakee Inlet and surrounding lands, portions of Peril Strait, and coastline areas around Baranof, Pleasant, Douglas, and Admiralty islands (Map 3.16-3). Tenakee Springs use areas on Admiralty Island are located along much of the island's western and southern coastline including Hawk Inlet; Tenakee Springs residents reported deer hunting along Hawk Inlet's coastline.

All resources harvest data are available for the 1984 and 1987 study years (Table 7). ADF&G (2011) considers the 1987 study year data to be the most representative Tenakee Springs study years. During the two study years, fish accounted for between 40 and 45 percent of the total harvest; land mammals between 26 and 41 percent; marine invertebrates between 13 and 24 percent; and the remaining resource categories contributed no more than five percent individually. Based on the most representative study year (1987), individual resources that contribute a large amount to Tenakee Springs' total harvest include deer (41 percent), salmon (15 percent), halibut (14 percent), Dungeness crab (five percent), clams (four percent), and Dolly Varden (four percent) (Table 8).

Tenakee Springs seasonal round of harvest activity was documented by Leghorn and Kookesh (1987) (Figure 3). Similar to other study communities, several resources are harvested throughout the year with peaks in harvest effort during certain months; fish and marine invertebrates are the primary resources harvested throughout the year. Fishing peaks during the summer months with the large runs of salmon. Berry and plant picking also peak in the summer and into fall for berries. Deer are primarily harvested during the fall and early winter alongside ducks and geese. Winter activities include some trapping as well as fishing and marine invertebrate gathering. Resources harvested in the spring include additional species of fish and marine invertebrates such as cod, herring, and mussels as well as fresh plants.

Table 7: Tenakee Springs Subsistence Harvests by Major Resource Category

Year	Resource	Percent Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
1984	All Resources	96	88	88	79	92	23475	23475	499	250	100
	Fish	96	71	71	54	88	10635	10635	226	113	45
	Land Mammals	88	54	54	42	63	116	6110	130	65	26
	Marine Mammals	13	4	4	4	13	353	353	8	4	2
	Birds and Eggs	4	4	4	0	0	6	16	0	0	0
	Marine Invertebrates	96	67	67	42	79	5733	5734	122	61	24
	Vegetation	88	88	88	25	21	629	629	13	7	3
1987	All Resources	100		90	68	97	31234	31234	702	330	100
	Fish	97		61	45	81	12423	12423	279	131	40
	Land Mammals	87		55	39	55	387	12826	288	135	41
	Marine Mammals	10		3	3	6	30	721	16	8	2
	Birds and Eggs	32		26	19	13	150	197	4	2	1
	Marine Invertebrates	94		64	45	74	4065	4065	91	43	13
	Vegetation	87		81	32	32	1001	1001	23	11	3

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Table 8: Tenakee Springs Subsistence Harvests by Species – Most Representative Study Year – 1987

Resource	Percent of Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
All Resources	100		90	68	97	31234	31234	702	330	100
Fish	97		61	45	81	12423	12423	279	131	40
Salmon	77		48	29	58	964	4671	105	49	15
Chum Salmon	23		16	3	6	59	364	8	4	1
Coho Salmon	48		29	16	23	178	1371	31	14	4
Chinook Salmon	65		35	16	45	89	1357	31	14	4
Pink Salmon	23		19	3	3	555	1222	27	13	4
Sockeye Salmon	36		16	10	26	83	358	8	4	1
Non-Salmon Fish	97		58	45	77	7752	7752	174	82	25
Herring	36		13	0	32	121	121	3	1	0
Herring Roe	16		10	10	6	185	185	4	2	1
Herring Spawn on Kelp	16		10	10	6	185	185	4	2	1
Smelt	0		0	0	0	0	0	0	0	0
Cod	45		32	23	23	208	665	15	7	2
Flounder	16		16	3	0	53	159	4	2	1
Halibut	90		58	42	55	4412	4412	99	47	14
Rockfish	74		48	32	36	470	939	21	10	3
Dolly Varden	39		32	19	10	471	1272	29	13	4
Land Mammals	87		55	39	55	387	12826	288	135	41
Large Land Mammals	87		55	39	55	160	12826	288	135	4
Black Bear	3		0	0	3	0	0	0	0	0
Deer	87		55	39	45	160	12826	288	135	41
Moose	10		0	0	10	0	0	0	0	0
Small Land Mammals	16		16	0	0	227	0	0	0	0

Resource	Percent of Households (HH) Using	Percent HH Attempting to Harvest	Percent HH Harvesting	Percent HH Giving Away	Percent HH Receiving	Estimated Harvest	Estimated Pounds Harvested	Average Lbs Harvested per HH	Per Capita Lbs Harvested	Percent of Harvest
Marine Mammals	10		3	3	6	30	721	16	8	2
Harbor Seal	10		3	3	6	9	721	16	8	2
Unknown Marine Mammals	3		3	3	0	21	0	0	0	0
Birds and Eggs	32		26	19	13	150	197	4	2	1
Ducks	32		26	19	10	112	93	2	1	0
Canada Geese	23		16	0	6	26	88	2	1	0
Seabirds & Loons	6		6	3	0	10	15	0	0	0
Seabird & Loon Eggs	3		0	0	3	0	0	0	0	0
Marine Invertebrates	94		64	45	74	4065	4065	91	43	13
Abalone	3		0	0	3	0	0	0	0	0
Chitons (bidarkis, gumboots)	6		6	3	0	3	21	0	0	0
Clams	42		35	10	10	358	1113	25	12	4
Dungeness Crab	90		61	42	55	1148	1516	34	16	5
King Crab	42		16	13	39	183	970	22	10	3
Tanner Crab	10		6	6	10	11	19	0	0	0
Octopus	19		13	6	13	43	275	6	3	1
Scallops	16		6	3	10	29	29	1	0	0
Shrimp	48		6	6	42	123	123	3	1	0
Unknown Marine Invertebrates	3		0	0	3	0	0	0	0	0
Vegetation	87		81	32	32	1001	1001	23	11	3
Berries	74		68	19	26	479	718	16	8	2
Plants/Greens/Mushrooms	39		32	13	10	113	113	3	1	0
Seaweed/Kelp	16		10	3	6	170	170	4	2	1
Wood	35		35	10	0	206	0	0	0	0

Source: ADF&G 2011; Stephen R. Braund & Associates, 2011

Resource	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Mammals												
Deer												
Seal												
Land Otter												
Mink												
Weasel												
Marten												
Intertidal and Other Gathered Resources												
Clams and Cockles												
Mussels												
Sea Urchins												
Chiton												
Scallops												
Octopus												
Shrimp												
Herring Eggs												
Crabs												
Kelp												
Sea Weed												
Berries												
Wild Rhubarb												
Indian Celery												
Ferns												
Roots												
Hudson Bay Tea												
Goose Tongue												
Beach Asparagus												
Mushrooms												
Firewood												
Fish												
King Salmon												
Sockeye Salmon												
Chum Salmon												
Pink Salmon												
Coho Salmon												
Halibut												
Cod												
Bass												
Dolly Varden												
Herring												
Red Snapper												
Birds												
Ducks												
Canada Goose												

Source: Adapted from Leghorn and Kookesh 1987; Stephen R. Braund & Associates, 2011

Figure 3: Tenakee Springs Seasonal Round of Harvest Activities

1.3 Environmental Consequences

1.3.1 Effects Common to All Alternatives

Based on existing data as described in Section 2, the communities of Angoon, Hoonah, and Tenakee Springs have documented use of the Hawk Inlet area for subsistence purposes. Subsistence users' access to use areas would not be expected to be impacted except for a potential loss of deer hunting area near the new TDF location at Fowler Creek (see Alternative C and D discussion). Current policy by the applicant prohibits hunting and fishing from mine employees while working at the site and thus extending the duration of the mine would not have an effect on competition for subsistence resources. According to the Aquatic Resources Section 3.7 and Wildlife Section 3.11, effects on certain subsistence resources (e.g., deer, salmon, non-salmon fish, marine invertebrates) could potentially occur due to habitat loss, fuel and other hazardous material spills, heavy metals accumulation, or fugitive dust dispersal. Depending on the magnitude of these potential impacts, subsistence resource abundance, health, and availability for species that are harvested within Hawk Inlet could be affected. Existing mitigation plans such as spill control plans, treatment of surface water runoff, dust abatement measures, and mine reclamation plans, if implemented properly, should minimize these effects.

1.3.2 Effects of Alternative A, No Action

Under Alternative A, the current mining activity regarding the creation, transport and disposal of tailings would contain as allowed under existing permits. Tailings would continue to be produced at a rate of 650,000 tons per year until 2014 at which point the facility will have reached capacity. Expansion for this Alternative under the existing permits is limited to approximately 60 acres; the least disturbance of all alternatives. Subsistence uses would not be impacted beyond any potential impacts that may already occur from the project under the No Action Alternative. The previous Environmental Impact Statement for the project, which also addressed an expanded tailings area, identified the impacts of the project as negligible to subsistence uses (U.S. Department of Agriculture 2003: 4-53). Of all alternatives, Alternative A would have the least prolonged impact on subsistence resources as the proposed duration is three years compared to 30-50 years for Alternative B, C, and D.

1.3.3 Effects of Alternative B, Proposed Action

Under Alternative B, mining at Greens Creek would extend 30-50 years, and the existing TDF would be expanded by approximately 200 acres. Alternative B would require expanding the existing facilities southward, increasing the facilities lease area, and allowing for the continued use of the existing wastewater treatment plant for approximately 30 years into the project. Alternative B would have minimal impact on subsistence uses of all the action alternatives because any potential impact would occur within an already developed area. The expanded TDF and associated proposed components under Alternative B are collocated nearest to the already existing TDF and other facilities versus the other action alternatives, which include development of a new TDF in previously undisturbed area where subsistence resources, particularly deer, may be taken. Documented uses of Hawk Inlet for deer hunting occurred in pre-1985 (ADF&G 1986) and pre-1988 (TRUCS 1988) time periods, however, the 1991-1995 (ADF&G 1997) data do not show subsistence uses within Hawk Inlet. Effects to aquatic resources, including subsistence resources such as freshwater fish, would also be the least under Alternative B (see Section 3.7).

1.3.4 Effects of Alternative C, TDF Located Outside Monument

Under Alternative C, mining would extend 30-50 years, with short-term expansion of the existing TDF and the construction of a new TDF located in the Fowler Creek area, approximately three miles north of the existing TDF. Expansion under this alternative would disturb approximately 200 acres and require the

improvement of existing roads for transport of tailings and waste rock. Alternative C would have greater impacts on subsistence uses than Alternatives A and B due to the new TDF and resulting effects on aquatic resources and removal of a deer hunting area near Fowler Creek. Documented uses of Hawk Inlet for deer hunting occurred in pre-1985 (ADF&G 1986) and pre-1988 (TRUCS 1988) time periods, however, the 1991-1995 (ADF&G 1997) data do not show subsistence uses within Hawk Inlet.

1.3.5 Effects of Alternative D, Modified Proposed Action

Similar to Alternative C, Alternative D would extend mining 30-50 years, with expansion of the existing TDF and construction of a new TDF located in the Fowler Creek area. In this alternative, the existing TDF would be expanded by 5 million tons to accommodate for an additional 10 to 15 years of use followed by a second TDF and upgraded haul road three miles north of the existing facility in order to provide an additional source for tailings disposal once the current TDF was filled to capacity. Alternative D expansion would impact approximately 240 acres. Alternative D impacts on subsistence would be the same as Alternative C due to the new TDF and resulting effects on aquatic resources and removal of a deer hunting area near Fowler Creek. Documented uses of Hawk Inlet for deer hunting occurred in pre-1985 (ADF&G 1986) and pre-1988 (TRUCS 1988) time periods, however, the 1991-1995 (ADF&G 1997) data do not show subsistence uses within Hawk Inlet.

1.4 Subsistence – Summary

Alternative A would have the least impact on subsistence uses due to the limited new construction and shorter project timeline ending in 2014. Alternative B would have the least impact on subsistence uses of all action alternatives due to the collocation of new project components with existing components. Alternatives C and D would have the same impact on subsistence uses and would be the greatest of all alternatives due to the extended project timeline and increased effects to aquatic resources and removal of a deer hunting area near Fowler Creek from the new TDF.

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Appendix H
Cultural Resources

1. CULTURAL RESOURCES

The purpose of this section is to describe cultural resources in the area of Greens Creek Mine, describe impacts on cultural resources resulting from mine activities to date, and to assess potential impacts on cultural resources related to the proposed expansion of the tailings disposal facility (TDF) at Greens Creek Mine. The study area includes the proposed TDF's, a relocated roadway, assorted buildings and facilities, and other project components with the potential for ground disturbance. The following discussion identifies reported cultural resources within the study area and the potential for unknown or undocumented cultural resources that may be affected by the proposed undertaking.

The Cultural Resources section includes a discussion of cultural resources that have been, or could be, found in the vicinity of the proposed TDF expansions. Cultural resources include sites and materials of prehistoric Native American, historic Euro-American, and historic Tlingit origin (e.g., traditional cabin sites, camp sites, burial grounds, traditional subsistence harvest sites, middens, and other traditional land use areas, landscapes, and place names). Residents in nearby communities such as Hoonah and Angoon are descendants of the original Tlingit inhabitants and have cultural ties to the sites and the lands in which they are found. A key assumption for the cultural resources analysis is that cultural resources in the study area are assumed to be eligible for the National Register of Historic Places (NRHP) unless otherwise specified.

The cultural resources analysis relies on:

1) Alaska Heritage Resource Survey (AHRS) files located at the Alaska Department of Natural Resources, Office of History and Archaeology (ADNR, OHA, 2011),
2) An assessment of available literature regarding cultural resources in the proposed project area, and
3) The application of existing laws and regulations regarding the assessment of effects on cultural resources caused by an undertaking.

The relevant regulations for the evaluation of effects to cultural resources are the National Environmental Policy Act (NEPA) and Section 106 of National Historic Preservation Act (NHPA) and its implementing regulations 36 CFR Part 800.

1.2 Cultural Resources – Pre-mining Environment

1.2.1 Prehistoric Environment (Before 12,500 years ago to A.D. 1740)

Archaeological sequences for the Northwest Coast area include the Paleomarine Tradition, a Transitional stage, and a Northwest Coast stage as shown in Table 1. Peats in the Juneau area have been found to be as old as 39,000 years Before Present (BP), indicating that the inner fjords of Southeast Alaska were open and ice free in places; however, no evidence exists to indicate humans were present at that time (Ames and Maschner 1999). The earliest human occupation of Southeast Alaska dates to the end of the Pleistocene epoch, about 11,700 years ago. Much of Southeast Alaska was heavily glaciated at that time, and human activity was likely concentrated in the lower elevations and coastal plains that have since been inundated by rising sea levels. For this reason, there are few known archaeological sites from this period in the area.

Table 1: Sequence of Archaeological Cultures in Southeast Alaska

Stage	Phase	Dates	Sites	Notes
Paleomarine		12,500 BP to 6,400 BP	Groundhog Bay, Hidden Falls, Chuck Lake	Core and blade using people with microblades, burins, and slotted bone and antler points similar to the Paleoarctic Tradition.
Transition		6,500 to 5,000 BP	Lake Eva, Point Couverdon, Irish Lake, Hidden Falls Component II	Ground stone tool technology replaced microblades and unifacial flaked tool technology. Climate more stable following glacial retreat.
Northwest Coast	Early	4,670 to 3,265 BP	Hidden Falls, Rosie's rock shelter, Coffman Cove and Trader's Island.	Fully developed ground stone tool industry. Subsistence emphasis on intertidal resources and fishing, development of large communal winter settlements near shorelines and specialized subsistence camps. Unilaterally barbed harpoon point indicates possible use of marine mammals. Material resembles Takli Birch phase of Alaska Peninsula and Locarno Beach phase in BC.
	Middle	3,000 to 1,300 BP	Hidden Falls Component III	
	Late	1,000 BP to 1750 AD	Groundhog Bay Component I, Starrigavan, Russian Cove, Bear Shell Midden	Characterized by development of larger structures and defensive structures, continued use of seasonal procurement camps for shellfish, sea mammals, fish, deer and berries. Continued use of ground stone and bone with some chipped stone tools. New materials and technologies included native copper, drift and meteoric iron, stone bowls and oil lamps, and new harpoon forms.

Source: U.S. Department of Interior, National Park Service (USDOI, NPS) n.d.; Ames and Maschner 1999; Stephen R. Braund & Associates, 2011

A broken mandible and pelvis from On Your Knees Cave (PET-00408) at the northern end of Prince of Wales Island are the oldest human remains ever found in Canada or Alaska, dating to 9,880 years BP (Heaton 2002). Other materials related to human activity recovered in and around the cave include a bone tool and hearth materials, both dating to 10,300 years BP (Heaton 2002). The remains from On Your Knees Cave are associated with the first stage of human occupation, referred to as the Paleomarine Tradition. The Paleomarine is related to the more familiar northern Paleoarctic Tradition with its characteristic microblades and unifacially flaked tools (Davis 1990:197). Regional deglaciation in Southeast Alaska was probably complete by 13,900 years ago, creating a relatively stable coastal environment with sea levels several meters lower than they are now (Mann and Streveler 2008). The Paleomarine people in Southeast Alaska at this time relied on a "coastal-marine" economy based on hunting sea mammals and fishing, probably from boats (Davis 1990:197). There is little other evidence to indicate settlement patterns, seasonal rounds, or other elements of culture at the time.

About 6,000 years ago, glaciers in Southeast Alaska re-advanced and the relative sea level began to rise (Mann and Streveler 2008). These changes in the environment, called the Neoglacial period for its cooler, wetter weather and glacier growth, correspond with changes in the culture of the people living in Southeast Alaska. Starting around 4,500 years ago, the microblades and unifacial tools of the Paleomarine Tradition began to be replaced by ground stone technology. This period of change is referred to as the Transitional stage, indicating that the Paleomarine Tradition was in the process of being replaced by another tradition. Communities formed at favorable locations for shellfish harvests, marked by accumulations of discarded shells called middens. Ground slate tools may be associated with a shift to the harvest of marine mammals such as seal, sea lion, and sea otters. Studies of human skeletons from the

period indicate that up to 90 percent of the diet was derived from marine resources (Ames and Maschner 1999). The periodic glacial advances and retreats caused by changes in climate beginning in the Transitional stage may have presented new challenges for people living in coastal Southeast Alaska into historic times. Oral history recounts villages being crushed under the ice of advancing glaciers (Connor, Streveler, Post, Monteith and Howell 2009). However, by about 3,000 years ago, people had adapted to the changing environment and their cultures diversified during the Northwest Coast stage.

The Northwest Coast Stage is characterized by ground stone and bone tools and a subsistence economy that emphasized the near-shore and intertidal resources such as fishing and mollusks as evidenced by the occurrence of shell middens. Winter settlements became larger, subsistence camps more specialized, and fortified locations were built as this stage progressed. The Northwest Coast stage consisted of early, middle, and late phases, and ended in historic times with cultural groups like the Eyak and Tlingit (Davis 1990:199-200).

1.2.2 Historic Environment (After A.D. 1740)

The historical period for Southeast Alaska began with several expeditions on behalf of the Spanish, English, Russians, and French to explore the northern Pacific coast. The first European explorer to reach the region, Alexei Chirikof, sighted the Fairweather Coast in 1741, giving Alaska to Russia by right of discovery. Subsequent explorations by James Cook starting in 1778 expanded European awareness of Alaskan geography and human populations, and piqued interest in the abundance and profitability of natural resources. European interest first focused on the sea otter populations, whose pelts were a highly sought after commodity in Chinese, European, and Russian markets. Russia, England, Spain, France, and the United States would soon compete for these resources. In 1791, Aleksandr Baranov became chief manager of the Shelikhov-Golikov Company which would become the Russian American Company with Imperial charter in 1799. From a base of operations at Kodiak, Baranov sought to control the fur trade in Alaska, establishing key outposts in the southeast at Yakutat and Sitka. The Russian American Company's management policies resulted in the near extinction of the sea otter and increased resentment among the Tlingit of Southeast Alaska. Resentment grew and eventually spurred violence, resulting in Tlingit attacks in 1802 which destroyed the Russian post at Old Sitka and in 1805 which destroyed the Russian outpost at Yakutat.

The Russians reoccupied Sitka in 1804, strengthening their hold on Southeast Alaska. Large-scale harvesting of sea otters in Tlingit areas ended in the 1820s, and after 1841, the Russians relied primarily on trade with Tlingit middlemen for land peltry. Tlingit trade networks continued to increase in scope during the early nineteenth century, as did their control of trade to the interior. In an effort to participate in the trade with interior Athabaskans and avoid Tlingit middlemen, the Hudson's Bay Company set up the Fort Selkirk trading post in 1848 at the confluence of the Yukon and Pelly rivers. The Tlingit responded to their British competitors by attacking and looting the post in 1852, after which the British abandoned the endeavor. Despite setbacks from competition and disease (i.e., a smallpox epidemic in 1835-1839), Tlingit domination of the trade economy peaked between 1840 and 1867 – a time of "great Tlingit prosperity" (de Laguna 1990:223). Russian profits in the fur trade were declining, however, and Russia was concerned about its ability to hold Alaska against the British. To prevent this, Alaska was sold to the United States in 1867.

The Alaska Purchase brought a major influx of Euroamericans to Tlingit territory between 1867 and 1870. Army forts at Sitka, Wrangell, and Tongass brought soldiers, speculators, and camp followers to these trading posts, which became bases for prospectors, miners, and tourists. Fundamental changes to Tlingit culture came as early as the 1870s when commercial fishing, canneries and the tourist industry developed, integrating the Tlingit into the wage-based American economy (de Laguna 1990:224). Noncompliant communities were punished, with Kake and Angoon bombarded by Navy ships in 1869 and 1882. Beginning in 1877 missionaries proselytized to diminish Tlingit traditions and culture. The

1898-1899 Klondike gold rush brought thousands of miners to Tlingit territory through some of the most important Tlingit trade routes. The construction of the White Pass and Yukon Railroad and steamboats on interior waters that followed the gold rush ended the Tlingit trade monopoly, effectively limiting their economic opportunities to wage work. By 1900, many Tlingit appeared Western and participated in the wage economy, spoke English, and attended Protestant or Orthodox churches; however, Euroamerican settlers continued to consider them inferior due to their race. In 1912 the Alaska Native Brotherhood was established by Tlingits attending Sheldon Jackson Junior College, a Presbyterian school, to pursue equal rights and justice, including land claims, anti-discrimination laws, access to public schools and services, Native hospitals, citizenship and the right to vote (Brown 2011).

Commercial activities in the region at the end of the nineteenth and beginning of the twentieth centuries included fishing, whaling, minerals exploration, timber harvest, fur farming, and tourism (Bower, Iwamoto, and McCallum 2003:9). In 1878, profitable salmon canneries were constructed near Klawock and Sitka, marking the onset of the commercial fishing industry that would eventually construct 134 canneries in Southeast Alaska (Bower, Iwamoto, and McCallum 2003:8). The Hawk Inlet Cannery was constructed by the Hawk Fish Company around 1910 as the industry was becoming highly mechanized and dependable markets were being developed, utilizing fish traps as the predominant harvest method. The cannery changed ownership several times, being sold to Peter Pan Seafoods in 1967 and finally to the Dillingham Native Corporation in 1975. In May of 1976 most of the cannery was destroyed in a fire.

Other commercial opportunities including trapping and mining continued to attract homesteaders, migrant workers, and profit seekers to the region during the first half of the twentieth century. Mink, marten, skunk, raccoon, beaver, muskrat, and fox were all harvested for fur, and after legislation was passed in 1911 in order to protect fur seals, the price of a single pelt jumped from $12.50 to $185 in less than ten years (Bower et al. 2003:10). Gold was extracted from the Alaska Empire Mine beginning in 1919 near Hawk Inlet, and in 1926 there were 96 claims in the vicinity, though production slowed steadily until only a crew of five was employed there in 1946. In 1973 the Pan Joint Venture began exploring for base metals in Southeast Alaska, and from 1974 to 1976 geologic studies revealed high base metal deposits on Admiralty Island. Noranda, Inc. assumed responsibilities for field operations in 1976 and began the initial work at Greens Creek (Bower et al. 2003:9).

1.2 Cultural Resources – Baseline Conditions

Based on a review of available information regarding cultural resources in the study area, nine documented cultural resource sites are located in an area bounded by the head of Hawk Inlet to the north, the southwest corner of Young Bay to the east, Chatham Strait to the west, and as far south as the mouth of Hawk Inlet. Site types in the area include mining sites with accompanying built environment resources, early twentieth century homestead claims cabins, prehistoric shell middens, a reported petroglyph/pictograph, and the Hawk Inlet Cannery. Five sites have been evaluated for inclusion on the NRHP; two sites, including the Hawk Inlet Cannery (JUN-00092) and the Young Bay Midden site (JUN-00091), have been determined eligible for the NRHP. Fowler Creek Homestead (JUN-00918), Jacobsen's Cabin (JUN-00236), and the Greens Creek Midden site (JUN-00090) were all determined to be ineligible for inclusion on the NRHP. The Piledriver Cover Pictograph/Petroglyph (JUN-00045), Soldier's Additional Homestead Claim (JUN-00237), Greens Creek Cabin (JUN-00238), and Alaska Empire Mine and Dock Site (JUN-00689) have not been evaluated for eligibility to the NRHP.

Cultural resource investigations of note in the study area include an archaeological impact assessment (Carlson 1981) conducted prior to the development of an Environmental Assessment (U.S. Department of Agriculture, Forest Service [USDA, FS] 1982) for the Noranda Mining Project at Greens Creek. Two midden sites (JUN-00090 and JUN-00091), three historic cabins (JUN-00236; JUN-00237; JUN-00238), and a historic cannery (JUN-00092) located within the study area were initially recorded by Carlson

(1981); the middens were later more fully investigated by Davis (1990). In 1983, the Hawk Inlet Cannery (JUN-00092) was documented and determined to be eligible for the NRHP (see Johannsen 1983).

1.3 Cultural Resources – Environmental Consequences

1.3.1 Effects Common to All Alternatives

An adverse effect to a cultural resource occurs when an undertaking may alter, directly or indirectly, any of the characteristics of a cultural resource that could qualify the property for the inclusion in NRHP in a manner that would diminish the property's integrity (location, design, setting, materials, workmanship, feeling, association) and/or association (i.e., association with an important even or person [Criteria A and B], style of architecture [Criterion C], or information potential [Criterion D]) thus rendering it ineligible for the NRHP. Effects to cultural resources also include those impacts that result from the action later in time or further removed in distance but still reasonably foreseeable such as increased access to and close proximity of project components to culturally sensitive areas.

Examples of direct effects to cultural resources from ongoing or proposed activities could include physical destruction of or damage to all or part of the resource, removal of the resource from its original location, change of the character of the resource's use or of physical features which in the resource's setting that contribute to its historic significance, change in access to traditional use sites by traditional users, or loss of cultural identity with a resource. Indirect effects to cultural resources from the proposed project could include impacts caused by increased access to and close proximity of project components to cultural resources. This could result in a greater vulnerability of cultural resources to damage caused by project personnel and equipment construction and operation.

1.3.2 Effects of Alternative A, No Action

Under Alternative A, current mining activities would continue under existing permits. Tailings would continue to be produced at a rate of 650,000 tons per year, and would continue to be stored at the location currently reserved for their storage until 2014 at which point the TDF will have reached capacity. Further expansion for this alternative under the existing permits is limited to 65.3 acres. Continued use of the Greens Creek Mine, TDF and associated facilities until 2014 may result in direct and indirect effects on cultural resources as a result of material spills, fuel spills or discharge of water from the current underground drainage system. Risk of project personnel visiting a site and causing damage or disturbance to its historic context would continue throughout the life of the project. Currently, appropriate identification efforts have already been conducted for the current project, and it is likely that no additional sites will be found in this area; two previously identified sites (Hawk Inlet Cannery and Jacobsen's Cabin) are within 0.5 miles of the existing site although the Jacobsen Cabin has been previously determined ineligible for the NRHP. Alternative A would have the least potential for impacts on cultural resources due to lack of construction activities and shortened project timeline that extends only to 2014.

1.3.3 Effects of Alternative B, Proposed Action

Under Alternative B the existing TDF would be expanded to allow for approximately 30-50 years of continued production at the current production rates. Alternative B would require expanding the existing TDF southward, increasing the facilities lease area, and allowing for the continued use of the existing water treatment plant for approximately 30 years into the project.

No previously identified sites are located within the proposed footprint of project components under this alternative; however three sites (Hawk Inlet Cannery, Jacobsen's Cabin, and Soldiers' Homestead) are located within 0.5 miles and could experience indirect effects. As discussed above, the Jacobsen's Cabin has been previously determined ineligible for the NRHP. As the total number of acres disturbed

increases, the potential for the destruction of unidentified cultural resources increases. The 208 acre expansion under Alternative B would pose a greater potential for destroying unidentified cultural resources than Alternative A (65.3 acres). Unidentified cultural resources within the proposed TDF and associated structures could be affected due to construction of the TDF. Additionally, the length of time for uncovering unidentified cultural resources would be extended due to the projected 50 year timeline. Furthermore, cultural resources near these facilities could be contaminated or disturbed in the event of a material spill, fuel spill or discharge of water from the proposed TDF. Risk of project personnel visiting a site and causing damage or disturbance to its historic context would continue throughout the life of the project and be greater than Alternative A because of the expanded TDF area and extended project timeline.

1.3.4 Effects of Alternative C, TDF Located Outside Monument

Under Alternative C, a new TDF would be created approximately three miles north of the existing TDF. Since Alternative C requires the construction of a new TDF, a small expansion of the existing TDF would be necessary to accommodate three years' worth of tailings and waste rock disposal during the time necessary to develop the new TDF.

No previously identified sites are located within the proposed new TDF for this alternative; however two sites (Hawk Inlet Cannery and Jacobsen's Cabin [NRHP ineligible]) are located within 0.5 miles and could experience indirect effects. The 221 acre expansion under Alternative C would pose a greater potential for destroying unidentified cultural resources than alternatives B (208 acres) and A (65.3 acres). In addition to increasing the length of time in which cultural materials may be discovered and potentially damaged, unidentified cultural resources within the proposed new TFD could be affected due to construction of as the TDF and associated activity. Furthermore, cultural resources near these facilities could be contaminated or disturbed in the event of a material spill, fuel spill or discharge of water from the proposed TDF. Risk of project personnel visiting a site and causing damage or disturbance to its historic context would continue throughout the life of the project and be greatest under this alternative because of the upgraded haul road, new TDF, and extended project timeline.

1.3.5 Effects of Alternative D, Modified Proposed Action

Under Alternative D, the existing TDF would be expanded by 5 million tons to accommodate for an additional 15 years of use. In addition, a new TDF and upgraded haul road would be constructed three miles north of the existing TDF.

Similar to Alternative C, Alternative D proposes constructing a new TDF as well as extend the existing TDF. No previously identified sites are located within the new TDF under this alternative; however two sites (Hawk Inlet Cannery and Jacobsen's Cabin [NRHP ineligible]) are located within 0.5 miles and could experience indirect effects. The 243 acre expansion under Alternative D would pose a greater potential for destroying unidentified cultural resources than alternatives A (65.3 acres), B (208 acres), and C (222 acres). In addition to increasing the length of time for uncovering cultural materials by extending the mines operating capacity, unidentified cultural resources within the new TFD and associated structures could be affected due to construction of this facility as well as associated activity. Furthermore, cultural resources near these facilities could be contaminated or disturbed in the event of a material spill, fuel spill or discharge of water from the proposed TDF. Risk of project personnel visiting a site and causing damage or disturbance to its historic context would continue throughout the life of the project and be greater than alternatives A and B because of the upgraded haul road, expanded and new TDF, and extended project timeline.

1.5 Cultural Resources Summary

Alternative A would have the least potential for impacts on cultural resources due to the least amount of disturbance (65.3 acres) and shortened project timeline that extends to 2014. Of all the action alternatives, Alternative B would have the least potential for impacts on cultural resources due to the smaller area of disturbance (208 acres). Alternatives C and D would pose greater risk to impacts on cultural resources due to the larger area of disturbance (222 and 243 acres respectively). In addition, these two alternatives could increase the potential for indirect effects such as increased access to cultural sites due to the upgraded haul road and new TDF. Alternative D (243 acres) would have the greatest potential for impacts on cultural resources due to having the largest area of disturbance and thus the most likely to impact unidentified cultural resources.

1.6 Recommended Mitigation

Access related effects could be mitigated through implementation of a Cultural Resources Management Procedure that includes annual training for employees/contractors, posting of cultural resource information including company policy regarding cultural resources, and maintaining confidential records for all sites with access limited to designated employees. Continued enforcement of procedures related to cultural resources such as halting operations when cultural resources are found and documenting the site will help mitigate any potential effects in the unlikely event that previously unidentified cultural resources are located in the expansion areas. If material for reclamation of mine components is obtained from areas outside of the existing footprint or from areas not previously surveyed, previously undocumented cultural resources could be affected. These areas should be surveyed carefully prior to ground disturbing activity. If a cultural resource is found, it should be assessed for eligibility for the NRHP and avoided or mitigated in an appropriate manner.

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