



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
REGION 10**

1200 Sixth Avenue, Suite 155, 14-D12  
Seattle, WA 98101-3144

REGIONAL  
ADMINISTRATOR'S  
DIVISION

May 22, 2023

Francis Sherman  
Acting Forest Supervisor  
648 Mission Street  
Ketchikan, Alaska 99901

Dear Francis Sherman:

The U.S. Environmental Protection Agency has reviewed the U.S. Forest Service's Draft Supplemental Environmental Impact Statement for the Greens Creek Mine North Extension Project in the Admiralty Island National Monument and the Tongass National Forest, Alaska (CEQ Number 20230041, EPA Project Number 01-012-AFS). EPA has conducted its review pursuant to the National Environmental Policy Act and our review authority under Section 309 of the Clean Air Act. The CAA Section 309 role is unique to EPA and requires EPA to review and comment publicly on any proposed federal action subject to NEPA's environmental impact statement requirement.

The DSEIS evaluates the environmental impacts associated with expanding the existing dry stack Tailings Disposal Facility and improving the water storage and management facilities and infrastructure at the Greens Creek Mine. The DSEIS analyzes Alternatives that extends the mine life from 12 and up to 40 years but does not identify a Preferred Alternative.

EPA is supportive of domestic mining activities that are protective of human health and the environment. In reviewing the DSEIS, EPA has identified environmental concerns and deficiencies in the NEPA analysis that should be addressed in the Final SEIS.

The attached Detailed Comments include recommendations for improving the geotechnical stability of the Tailings Disposal Facility, protecting air and water quality, incorporating climate change considerations, addressing environmental justice concerns, and providing for adaptive management. In identifying the Preferred Alternative in the FSEIS, EPA recommends aligning the NEPA alternative with the Clean Water Act § 404 requirements specific to the Least Environmentally Damaging Practicable Alternative. EPA highlights the following key recommendations:

**Greenhouse Gases and Climate Change Recommendations:**

- Provide estimates of direct and indirect Greenhouse Gas emissions including emissions from biological sources like organic peat soils in wetlands. Utilize these estimates when calculating the Social Costs of GHGs.
- Discuss and disclose past and recent climate-related changes in Southeast Alaska and impacts to the Mine infrastructure and operations.
- Evaluate carbon offsets to reduce the carbon footprint created by the Mine (e.g., opportunity to acquire established carbon credits in Southeast Alaska).

**Environmental Justice Analysis Recommendations:**

- Evaluate traditional Tribal subsistence activities and uses within the project area, including Hawk Inlet, and impacts of the proposed activity on subsistence practices (e.g., disproportionate impacts to

subsistence users displaced from traditional hunting/fishing/gathering areas). Include incorporation of Traditional Ecological Knowledge.

- Conduct a screening level health impact assessment related to the risk of consuming subsistence foods harvested within the project area, including Hawk Inlet.
- Consider mine closure and post-closure long-term sampling related to subsistence foods, e.g. biomonitoring, fugitive dust monitoring, and reporting on the ecological health within the project area, including Greens Creek Delta and Hawk Inlet.
- Ensure meaningful engagement and involvement for communities with Environmental Justice concerns in agency decisions regarding this project. Consider establishing an Advisory Group to monitor and address potential EJ concerns throughout the extended life of the mine, as well as during closure and post-closure.

Thank you for the opportunity to review the DSEIS for this project. As a Cooperating Agency, EPA welcomes the opportunity to meet with the Forest Service to discuss these comments and recommendations. If you have any questions regarding EPA's review, please contact Mark Jen in our office in Anchorage, Alaska, at (907) 271-3411 or [jen.mark@epa.gov](mailto:jen.mark@epa.gov) or me at (206) 553-1774 or at [chu.rebecca@epa.gov](mailto:chu.rebecca@epa.gov).

Sincerely,

Rebecca Chu, Chief  
Policy and Environmental Review Branch

Enclosure

**U.S. Environmental Protection Agency**  
**Detailed Comments on the Greens Creek Mine North Extension Project**  
**Draft Supplemental Environmental Impact Statement**  
**City and Borough of Juneau, Alaska**

**May 2023**

### **The Proposed Action**

The DSEIS analyzes a No-Action Alternative and three Action Alternatives.<sup>1</sup> The DSEIS identifies Alternative B as the Proposed Alternative, and Alternatives C and D are additional Action Alternatives. NEPA requires Federal Agencies to use a format for the EIS that will encourage good analysis and clear presentation of the alternatives including the proposed action.<sup>2</sup> The alternatives section should present the environmental impacts of the proposed action and the alternatives in comparative form.<sup>3</sup>

EPA recommends the FSEIS identify and reference the Action Alternative which represents the Proposed Action and the Preferred Alternative, if different. Compare the environmental consequences to those other Action Alternatives and the No Action Alternative. This approach would better align with NEPA requirements to inform the public, Tribes, and communities with EJ concerns, as well as agency decision-makers.

### **The Environmentally Preferable Alternative**

The DSEIS does not identify a Preferred Alternative. EPA recommends the FSEIS identify and evaluate a Preferred Alternative to align with the Environmentally Preferable Alternative under NEPA. The Environmentally Preferable Alternative results in the least damage to the biological and physical environment, and protects, preserves, and enhances historic, cultural, and natural resources.<sup>4</sup>

Identification of the Environmentally Preferable Alternative provides public and agency decision-makers with clarity among alternatives and an option that best fulfills the national environmental policy. EPA recommends meaningful consideration of comments received from the public, Tribes, and communities with EJ concerns in identifying the Environmentally Preferable Alternative and selection of the Preferred Alternative in the FSEIS and Record of Decision.

EPA recommends the FSEIS discuss and disclose the substantive screening criteria developed to identify and evaluate the Environmentally Preferable Alternative, which requires compliance with federal laws and implementing regulations pursuant to NEPA, Clean Air Act, Clean Water Act, etc. Additionally, there are several recent Executive Orders specific to Environmental Justice<sup>5</sup> and climate change, as well as CEQ guidance on greenhouse gases and climate change.<sup>6</sup> EPA recommends aligning the Environmentally Preferable Alternative with the national commitments and goals for EJ and GHG

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<sup>1</sup> DSEIS; Abstract

<sup>2</sup> 40 CFR § 1502.10. Recommended Format.

<sup>3</sup> 40 CFR § 1502.14. Alternatives including the Proposed Action.

<sup>4</sup> Council of Environmental Quality (March 23, 1981). Forty Most Asked Questions Concerning CEQ's National Environmental Policy Act Regulations. 46 FR 18026. As amended (1986). No. 6. Environmentally Preferable Alternative. Accessible at: <https://www.govinfo.gov/content/pkg/FR-1981-03-23/pdf/FR-1981-03-23.pdf>. Accessed on April 21, 2023.

<sup>5</sup> <https://www.whitehouse.gov/briefing-room/presidential-actions/2023/04/21/executive-order-on-revitalizing-our-nations-commitment-to-environmental-justice-for-all/> Accessed May 17, 2023.

<sup>6</sup> Council on Environmental Quality (January 9, 2023) National Environmental Policy Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. Accessible at: <https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>. Accessed on April 6, 2023.

reductions. Consider direct, indirect, and cumulative effects of the Proposed Alternative B and Action Alternatives, including past, present, and reasonably foreseeable actions.

The DSEIS indicates that the Action Alternative with a longer operational mine life would generally contribute more to cumulative effects on environmental resources.<sup>7</sup> In particular, Alternative D, would result in 4.5 acres of more new surface impacts in the Admiralty Island National Monument,<sup>8</sup> which is anticipated to result in the most significant cumulative impacts as compared to the Proposed Alternative B, Alternative C, and the No Action Alternative for the resources evaluated in the DSEIS.<sup>9</sup>

## **Proposed Alternative B**

### Tailings Disposal Facility – Baseline Environmental Resources

The proposed Tailings Disposal Facility north extension area would impact five acres of a wetlands and tributary complex that provides important resource functions, such as groundwater base flow to Cannery Creek.<sup>10</sup> The DSEIS does not fully characterize and evaluate the baseline resources of the north extension area. EPA recommends the FSEIS provide information to evaluate the environmental impacts associated with the TDF north extension area, including: a soil profile of the wetland/tributary complex (soil layers/horizons, and the depth to bedrock displayed in 2- or 3-dimensional models); and modelling information to evaluate the groundwater/surface water interactions, annual groundwater elevations, flow rates/volumes, hydrograph, etc.

### Conceptual Plan Designs and Criteria

The DSEIS does not include conceptual engineering plan designs and criteria, and information depicting site preparation, construction methods, and operations to address the TDF geotechnical stability, surface water, runoff, sediment and erosion management, and impacts to downslope surface waters, such as Cannery Creek. EPA recommends the FSEIS include descriptions of the construction design methods and operation practices that would be implemented to manage excessive ponding, minimize erosion, and control runoff and sediment loading to surface waters. EPA recommends the FSEIS provide additional information to evaluate the impacts associated with the TDF north extension area including the following:

- Provide conceptual engineering design specifications and plans (overview and cross-sectional views) for the north extension area tailings stack foundation – site preparation, construction methods, and operations.
- The proposed processes, methods, and estimates of the depth of the 89,500 cubic yards of peat/granular material expected to be excavated in preparing the site. The DSEIS indicates that boreholes in the project area have identified peat thicknesses up to 15-feet thick in some areas.<sup>11</sup> Based on certain information in the DSEIS, EPA estimates suggest that excavation may extend to a depth of over 17-feet.
- The proposed processes, methods, and estimates of the volume of clean backfill material to create a stable foundation for the TDF north extension area after excavation of the peat/granular material. The U.S. Army Corps of Engineers' (USACE) Revised Public Notice of Application (POA-1988-

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<sup>7</sup> DSEIS; Page 3-345.

<sup>8</sup> DSEIS; Page S-3.

<sup>9</sup> DSEIS; Section 3.22.3 Cumulative Effects by Resource, Pages 3-319 to 3-345.

<sup>10</sup> DSEIS; Page 3-97.

<sup>11</sup> DSEIS; Appendix A, Page A-54.

00269; Cannery Creek) estimates 32,100 cubic yards of sand, gravel, rock, and unconsolidated fill material.<sup>12</sup>

- The proposed processes and methods for managing surface water within the work area during construction and operations (e.g. cofferdam, grout curtain, spillways, conduits, pumps, or other temporary and permanent features).
- The proposed erosion and sediment control measures and best management practices implemented during and after construction to minimize erosion both at the site and downstream to Cannery Creek.

### Geotechnical Stability

The TDF is designed and constructed to support the disposal of dry stack filtered tailings, waste rock, and other inert materials. The DSEIS indicates that a dry stack facility may be designed for a lower factor of safety standards in cases where the consequences of a failure will be less than water dams or tailings dams that retain fluids.<sup>13</sup> Organic peat soils generally have extremely high water content, which results in high compressibility, low shear strength, and low permeability, and would contribute to localized sinking, embankment failures, and excessive settlements in both the short- and long-terms when subjected to the slightest loading.<sup>14</sup>

EPA has concerns with the high water content associated with the estimated 89,500 cubic yards of peat/granular soils that would be disposed within in the TDF. Consistent with the current design and construction of the TDF to maintain a dry stack disposal facility (e.g., retains less water, and thereby reducing the overall volume of material), EPA recommends evaluation of a mitigation measure to ensure geotechnical stability of the TDF that requires the peat/granular material to be dewatered, dried, and/or pressed at approved peat overburden storage areas, and to remove at least 90 percent moisture prior to placement in the TDF containment cells. In addition, EPA recommends the FSEIS include construction mitigation measures that would ensure stabilization of the foundation of the north extension area by incorporating soil stabilizers, such as clay, bentonite, cement, and/or other inert compounds.

### B-Road Realignment

The Proposed Alternative B would relocate the B-Road to the east and require a new upstream bridge crossing over Cannery Creek. Alternatives C and D would relocate the B-Road to the west and require a new downstream bridge crossing. EPA recommends the FSEIS discuss the removal, reclamation, and rehabilitation of the segment of the existing B-Road and Cannery Creek bridge crossing that would no longer be needed after the new relocated B-Road and bridge crossing have been constructed. Incorporate removal, reclamation, and rehabilitation of the existing B-Road segment into the Greens Creek Mine Reclamation and Closure Plan.

### Pond 7/10 Expansion

The Proposed Alternative B would raise the embankment of Pond 7/10 an additional 5-feet, which meets the Environmental Design Flood (e.g., 50-year, 48-hour storm event),<sup>15</sup> and represents the largest flood

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<sup>12</sup> U.S. Army Corps of Engineers (April 18, 2023). Revised Public Notice of Application (POA-1988-00269; Cannery Creek) on Sheets 7 of 8 and Sheet 8 of 8. Accessible at:

<https://www.poa.usace.army.mil/Portals/34/docs/regulatory/publicnotices/2023/RevisedPublicNoticePOA198800269CanneryCreek.pdf?ver=ajZrgi8TkW38BUJEqZr01A%3d%3d>. Accessed on April 19, 2023.

<sup>13</sup> DSEIS; Page 3-42.

<sup>14</sup> Gowthaman, S, Chen M., Nakashima, K, Komatsu, S, and Kawasaki, S. (2022). Chapter 4 – Biocementation technology for stabilization/solidification of organic peat. In *Low Carbon Stabilization and Solidification of Hazardous Wastes*, Tsang, D.C.W. and Wang, L. (Eds). Elsevier Publishers. Accessible at: <https://www.sciencedirect.com/book/9780128240045/low-carbon-stabilization-and-solidification-of-hazardous-wastes>. Accessed on April 14, 2023.

<sup>15</sup> DSEIS; Page 2-15.

event that the contact water management system is designed to collect, store, and treat, without the release of untreated water to the environment. The DSEIS includes the Alternative D conceptual drawing of the Pond 7/10 with a 7-foot high embankment raise,<sup>16</sup> and the general embankment fill plans (overview and cross-sectional views) of the embankment crest and geomembrane detail. EPA recommends the FSEIS include the Proposed Alternative B conceptual level design drawing depicting the overview and cross-sectional view of Pond 7/10 incorporating the proposed 5-ft embankment raise and fill plans, which results in less surface impacts than the 7-ft embankment raise proposed in Alternative D.

## **Fugitive Dust**

### Regional Air Quality

The maximum measured PM<sub>10</sub> concentrations at the mine site range within 100 micrograms per cubic meter for short periods.<sup>17</sup> EPA recommends the FSEIS include additional information regarding the maximum measured concentration of PM<sub>10</sub> (24-hour average) and statistics regarding distribution of the 24-hour average concentration, since the PM<sub>10</sub> National and Alaska Ambient Air Quality Standards are based on the 24-hour averages. This additional information would inform the public and decision-makers regarding the current magnitude of ambient impacts from fugitive dust deposition associated with PM<sub>10</sub> emissions at the mine site.

### Fugitive Dust Modelling

Fugitive dust modeling was conducted to estimate the potential extent of current and future fugitive dust deposition and to analyze the potential effects of the Proposed Alternative B on resources from metals associated with fugitive dust.<sup>18</sup> EPA recommends the FSEIS apply the model output results to predict maximum ambient PM<sub>10</sub> concentrations from the Proposed Alternative B, in order to evaluate the accuracy of the model (by comparing concentration statistics to measured values) and to disclose an expected range of air quality impacts from the project action alternatives. EPA recommends the FSEIS include the fugitive dust modeling ambient PM<sub>10</sub> concentration results and compare them to the ambient air quality standards and the site measurement record.

### Emissions Calculation Methodology

The PM<sub>10</sub> emission factor used for routine tailings placement activities is 0.11 tons per acre per month, which was a factor adopted from the Fugitive Dust Handbook, Revision 1<sup>19</sup> and EPA AP-42<sup>20</sup> for general construction operations.<sup>21</sup> The PM<sub>10</sub> emission factor is based on construction of residential units in semi-arid conditions without significant earth-moving activities. The 0.11 tons per acre per month emission factor may underrepresent potential emissions during routine tailings disposal activities. The Fugitive Dust Handbook and AP-42 both provide more sophisticated methods for determining emissions

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<sup>16</sup> DSEIS; Appendix 1. KCB Consultants, Ltd. Letter to Mr. Aaron Marsh, Civil Engineer, Hecla Greens Creek Mining Company (May 10, 2021). North Extension Project Trade-off Studies Water Management Trade-off – Preferred EDF Storage Alternative – Revision 1. Figure 4.1 Pond 7/10 Raise: 7-foot Raise with Parapet Wall Schematic (page A-43).

<sup>17</sup> DSEIS; Page 3-12.

<sup>18</sup> DSEIS; Page 3-16.

<sup>19</sup> Countess Environmental (September 7, 2006). Western Regional Air Partnership (WRAP) Fugitive Dust Handbook, Chapter 9 Storage Pile Wind Erosion. Accessible at: <http://waterfrontballparkdistrict.com.s3.amazonaws.com/10.%20Remainder/AR%200025064-%20AR%200025307.pdf>. Accessed on May 2, 2023.

<sup>20</sup> U.S. Environmental Protection Agency (September 2006). AP-42 Fifth Edition Volume 1 Chapter 13: Miscellaneous Sources. Accessible at: <https://www.epa.gov/air-emissions-factors-and-quantification/ap-42-fifth-edition-volume-i-chapter-13-miscellaneous-0>. Accessed on May 2, 2023.

<sup>21</sup> DSEIS; Page 3-19.

when more information is known about the volume of material disposed at a site. EPA recommends the FSEIS include additional analysis to account for the volume of tailings material disposed per month to provide a more representative estimate of fugitive dust emissions during routine activity periods. Alternatively, if using the emission factor of 0.11 tons per acre per month in the FSEIS, demonstrate that this emission factor is adequately representative of the conditions at the mine site.

The threshold dust entrainment wind speed of 8.23 meter per second corresponds to the threshold friction velocity of 0.436 meters per second.<sup>22</sup> The DSEIS reports hourly emissions which can only occur less than eight percent hours per year. EPA recommends the FSEIS include additional information to clarify that the threshold wind speed of 8.23 meter per second is an instantaneous measurement of wind speed, not an hourly average wind speed. EPA recommends the FSEIS confirm that the eight percent hours per year when dust emission can occur is accurate based on maximum instantaneous wind speeds during each hour of the year and not the average hourly wind speed distribution. The modeling report states that the emissions are based on the highest wind speed measured for each hour, which provides a conservative estimate of emissions. Otherwise, fugitive dust emissions may be underestimated if average hourly wind speed is used to estimate emissions. EPA recommends the FSEIS include additional discussion to clarify what statistics are presented regarding the wind speed distribution and to confirm and disclose that peak hourly wind speeds used to estimate fugitive dust emissions.

#### Lead Loading

The Atmospheric Depositional Container (ADC) methodology is applicable for relative comparisons between sites. It does not provide accurate quantitative measurements due to the aerodynamic characteristics of the sampler and is not appropriate for estimating quantitative lead loading rates in the project area.<sup>23</sup> EPA recommends the FSEIS include additional analysis and discussion regarding lead deposition rates by including comparisons with natural ambient background concentrations in the soil, surface waters, or other available information concerning natural background lead deposition rates. EPA recommends the FSEIS disclose information regarding the expected range of error associated with the lead loading measurements and the level of accuracy to evaluate potential significant impacts to the environment.

#### Fugitive Dust Deposition

The results of the fugitive dust deposition modeling provide a comparison of the relative impacts between the Proposed Alternative B and Action Alternatives only.<sup>24</sup> EPA recommends the FSEIS include additional discussion and analysis to identify average rates of fugitive dust deposition (e.g. grams per square meter per month or year) for each watershed, or by distance along the cross-sections. Additionally, EPA recommends the FSEIS provide an analysis of the environmental impact of the fugitive dust deposition rates. EPA recommends the FSEIS compare these values to any known natural levels of deposition or deposition rates of concern with respect to environmental impacts in the scientific literature, if available. Compare the fugitive dust deposition modeling results to the rates determined from the ADC measurements.

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<sup>22</sup> *Id.*

<sup>23</sup> DSEIS; Footnote 15, Page 3-14.

<sup>24</sup> DSEIS; Page 3-29.



## Particulate Matter and Background Metal Concentrations

The DSEIS identifies water quality impacts resulting from fugitive dust modelling for several metals, including lead, mercury, zinc, copper, and manganese.<sup>25</sup> The discussion of the fugitive dust modelling focuses on the deposition of particulate matter. It does not include quantitative estimates of the metal concentrations associated with the fugitive dust particulate matter, the TDF (source), and the bedrock/parent material (background) to serve as a comparison. EPA recommends the FSEIS include quantitative estimates of the metal concentrations in the particulate matter, TDF, and the bedrock/parent material in order to better predict the water quality impacts associated with fugitive dust deposition from the TDF expansion based on existing conditions and monitoring results.

## **Geochemistry**

The chemical composition and potential acid generation of tailings and disposal practices are the same as described in the 2013 FEIS.<sup>26</sup> EPA recommends the FSEIS include a quantitative analysis of the geochemistry and metal mobility of the ore body assessed as part of the 2013 FEIS to demonstrate that there is not a significant difference between the geochemistry of the tailings and other materials placed in the proposed TDF north expansion area. If significant differences do exist, then EPA recommends the FSEIS include additional modelling to predict the expected conditions of the TDF north extension area within the extended mine life of the Selected/Preferred Alternative.

## **Mine Water Management**

### Stormwater Discharges

The Alaska Pollutant Discharge Elimination System (APDES) permit number AK-004320-6 for the Greens Creek Mine (effective October 1, 2015) authorizes one wastewater discharge outfall 002 and 10 representative stormwater outfall discharge sites.<sup>27</sup> The APDES permit requires stormwater outfall monitoring twice per year (during spring runoff or snowmelt and during the fall “monsoon” months).<sup>28</sup> Technology-based or water quality-based numeric effluent limits were not developed for the individual storm water outfalls. The APDES permit requires implementation of corrective actions and best management practices if a storm water discharge exceeds a water quality criterion.<sup>29</sup>

The 2019 stormwater outfall monitoring summary indicates potential water quality impacts for lead and zinc at certain outfall locations.<sup>30</sup> One year of stormwater outfall monitoring information may not be sufficient to characterize the cumulative impacts of storm water discharges on the water quality of receiving waters at the mine site. EPA recommends the FSEIS summarize the multi-year stormwater outfall monitoring data collected since 2015, including spring and fall months. Include a mitigation measure to require stormwater outfall monitoring during the summer months to serve as a baseline. A summary of the multi-year stormwater data sampling set would support evaluation of the potential contribution of stormwater discharges and cumulative impacts to receiving waters.

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<sup>25</sup> DSEIS; Page 3-16.

<sup>26</sup> DSEIS; Page 3-46.

<sup>27</sup> DSEIS; Page 3-68.

<sup>28</sup> Alaska Department of Environmental Conservation (August 20, 2015). APDES Individual Permit (AK-004320-6) for the Greens Creek Mine. Accessible at: <https://dnr.alaska.gov/mlw/mining/large-mines/greens-creek/pdf/gcapdes-ak0043206.pdf>. Accessed on May 13, 2023.

<sup>29</sup> Alaska Department of Environmental Conservation. APDES Individual Permit Fact Sheet, Permit Number: AK0043206 - Hecla Greens Creek Mining Company. Accessible at: <https://aws.state.ak.us/OnlinePublicNotices/Notices/Attachment.aspx?id=141327>. Accessed on May 12, 2023.

<sup>30</sup> DSEIS; Table 3.5-6, Page 3-68.



## Wastewater Outfalls

On May 3, 2023, the Alaska Department of Environmental Conservation issued a Notice of Review of an APDES Draft Individual Permit (AK0043206) to discharge into Waters of the United States (WOTUS) from the Greens Creek Mine.<sup>31</sup> The Permit Fact Sheet identifies proposed new outfalls 002A and SW-012.<sup>32</sup> The new sub-marine outfall 002A would be located approximately 1-mile to the north of existing outfall 002 to increase discharge flow capacity during heavy precipitation events. During routine operations, treated wastewater will be discharged via outfall 002. During high precipitation events, excess water over the discharge capacity of outfall 002 wastewater treatment plant would be discharged via the new outfall 002A at a maximum discharge rate of 1,200 gallons per minute. A mixing zone (90-ft W x 30-ft L) in Hawk Inlet would be authorized for outfall 002A for cadmium, copper, cyanide, lead, mercury and zinc, in addition to the existing mixing zone for outfall 002.<sup>33</sup> Stormwater outfall SW-012 would be located at the A-Road sand pit area.

EPA recommends the FSEIS identify and evaluate the proposed new outfalls 002A and SW-012, including the direct, indirect and cumulative impacts of the proposed outfalls on human health and the environment of the project area, including Hawk Inlet. Consider mechanisms and mitigation measures to minimize the environmental direct, indirect and cumulative impacts (e.g. increasing the diameter and/or capacity of the existing outfall 002, reusing outfall 001, etc.).

## Mine Contact Water Balance Model

An updated mine contact water balance model is important to address water management during the design, development, and operation of a mine and to carry out risk analyses, evaluate potential environmental impacts, support strategic planning, and optimize operations.<sup>34</sup> EPA recommends the FSEIS include an updated mine contact water balance model for the proposed project, which includes the new sump pumping system at the TDF north extension area, the expansion of Pond 7/10 wastewater storage capacity, and the proposed new outfalls 002A and SW-012. Include estimates of the flow rates and volumes anticipated in the updated model. EPA recommends the FSEIS include the existing mine contact water balance model (No Action Alternative) as a comparison.

EPA recommends the FSEIS include a Hydrology Assessment Map for the Proposed Alternative B depicting the location of pumps, outfalls, ponds, culverts, diversion ditches (contact and non-contact water) pipes, discharge pipes, weirs, spillways, etc.

## Non-Contact Water Diversion System

In conjunction with the realignment of the East B-Road, the non-contact water diversion system would be realigned upslope to the east to accommodate more tailings capacity within the TDF. The DSEIS indicates that non-contact surface runoff from native areas is diverted around the TDF using diversion

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<sup>31</sup> Alaska Department of Environmental Conservation (May 3, 2023). Notice of Review of an Alaska Pollutant Discharge Elimination System Draft Individual Permit (AK0043206) to discharge to Waters of the United States from the Greens Creek Mine. Accessible at: <https://aws.state.ak.us/OnlinePublicNotices/Notices/View.aspx?id=210944>. Accessed on May 12, 2023.

<sup>32</sup> Alaska Department of Environmental Conservation (May 3, 2023). APDES Permit Fact Sheet, Permit Number: AK0043206 - Hecla Greens Creek Mining Company. Accessible at: <https://aws.state.ak.us/OnlinePublicNotices/Notices/Attachment.aspx?id=141327>. Accessed on May 12, 2023.

<sup>33</sup> Alaska Department of Environmental Conservation (May 3, 2023). APDES Draft Individual Permit, Permit Number: AK0043206 - Hecla Greens Creek Mining Company Accessible at: <https://dec.alaska.gov/water/wastewater/>. Accessed on May 12, 2023.

<sup>34</sup> Swanson, S.; Breckenridge, L.; and Leduc, M. (2016). Mine Water Balances – A New Proposed Approach. Proceedings IMWA 2016, Freiberg/Germany | Drebenstedt, Carsten, Paul, Michael (eds.) | Mining Meets Water – Conflicts and Solutions. Accessible at: [https://www.imwa.info/docs/imwa\\_2016/IMWA2016\\_Swanson\\_231.pdf](https://www.imwa.info/docs/imwa_2016/IMWA2016_Swanson_231.pdf). Accessed on April 4, 2023.

ditches.<sup>35</sup> One diversion ditch directs runoff to Cannery Creek and another to Tributary Creek, which is an anadromous water body and designated as a category 4b impaired waterbody<sup>36</sup> pursuant to CWA § 303(d) by ADEC. The non-contact water is not treated prior to discharging into Hawk Inlet.

To demonstrate that the non-contact surface water diversion system is not indirectly in contact with mine facilities, EPA recommends additional surface water quality sampling and monitoring be conducted during the summer and winter to establish a baseline for the non-contact water diversion system, as well as immediately downstream from the discharge points at Cannery Creek and Tributary Creek. The water quality sampling results would validate that the surface water diversion systems to be “non-contact” mine water, and would not represent a source of pollutants requiring treatment prior to discharge into adjacent waterbodies.

## **Cannery Creek**

### Surface and Groundwater Diversions

The Proposed Alternative B would divert/withdraw surface water from Cannery Creek for the new freshwater collection system upstream at the relocated B-Road crossing, the new sump pumping system, and groundwater baseflow resulting from the construction and operations of the TDF north extension area. Average stormwater treatment is anticipated to be approximately 1,450 gallons per minute.<sup>37</sup> EPA recommends the FSEIS include estimates of the surface and groundwater volumes, flow rates, etc. diverted from Cannery Creek and discuss the potential impacts to Cannery Creek associated with water diversion/withdrawal activities.

### Construction/Operations – TDF North Extension Area

Potential impacts to Cannery Creek could result during site preparation, construction, and operations at the TDF north extension area if surface water and erosion management measures are not properly planned and implemented, resulting in excess sediment loading to Cannery Creek. EPA recommends the FSEIS include identification of mitigation measures, best management practices, and water quality monitoring downstream from the TDF north extension area during construction and operations.

EPA recommends the FSEIS consider an option for incorporating a perimeter berm/embankment along the north end of the TDF (between the West and East B-Roads) to reduce the potential risk of tailings contacting water discharging into Cannery Creek. The berm would provide additional access around the TDF for maintenance activities.

### Fugitive Dust Deposition

The proposed TDF extension would be in close proximity to Cannery Creek and the fugitive dust model shows additional fugitive dust could reach Cannery Creek, resulting in metal leaching into the creek.<sup>38</sup> EPA has concerns that these impacts to water quality could result in exceedances of certain water quality standards, particularly in conjunction with surface and groundwater diversions/withdrawal from Cannery Creek. EPA recommends the FSEIS evaluate mitigation measures to minimize water quality impacts to Cannery Creek and include additional surface water monitoring, as appropriate.

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<sup>35</sup> DSEIS; Page 3-107.

<sup>36</sup> Category 4b are impaired waterbodies where Alaska Water Quality Standards can be attained through other required control measures that are expected to result in the attainment of an applicable water quality standard in a reasonable period of time.

<sup>37</sup> DSEIS; Page 2-16.

<sup>38</sup> *Id.*

## **Water Quality**

### Temporal Analysis

Fugitive dust can be deposited in streams and indirectly affect water quality of watersheds. EPA recommends the FSEIS include a temporal analysis of the water quality monitoring data/results to demonstrate the cause-and-effect relationship regarding water quality exceedances due to fugitive dust deposition from the TDF during the winter months.<sup>39</sup> EPA recommends the FSEIS bolster the information and analysis to demonstrate the connection between fugitive dust deposition and the water quality monitoring data/results.

### Reference Sites

The water quality measurements occasionally exceed the AWQS values at the reference sites.<sup>40</sup> The information in the DSEIS regarding the reference sites that is being referred to and where it is located, is difficult to discern. For example, the DSEIS depicts the surface water monitoring locations, but does not include information on where the reference site is located.<sup>41</sup> The DSEIS provides a summary of the water quality data/results,<sup>42</sup> however, it is not clear based on the location descriptions whether any of these samples are collected from a reference area. EPA recommends the FSEIS include additional information to clarify the location of the reference sites/areas being referred to, their locations, and where the data is presented showing that metal concentrations exceed WQS.

### Monitoring Stations

The DSEIS presents a summary of water quality monitoring data/results between 2011 to 2020.<sup>43</sup> Station 60 (Unnamed Drainage below TDF) indicates WQS exceedances for mercury, with 17 of the 39 samples collected demonstrating exceedances. EPA recommends the FSEIS identify and discuss the potential source(s) and/or cause(s) of these exceedances, as well as proposed mitigation measures that would be implemented to reduce these exceedances of the mercury standard.

Station 37 (Upper Cannery Creek) indicates four samples (observations) for mercury, as compared to an average sample size of 11 for the other metals at this location. Previous information regarding Station 37 identified 11 samples, which included exceedances for mercury in Upper Cannery Creek.

EPA recommends the FSEIS include a discussion regarding the rationale for the difference in the sample location numbers between mercury any the other metals, including if the number of sample locations has changed over time and why, as well as any changes to sample data/results from the summary table of monitoring results. EPA recommends the FSEIS identify and discuss the potential source(s) and/or cause(s) of this exceedance of the mercury standard for Upper Cannery Creek, as well as proposed mitigation measures that would be implemented to reduce exceedances of the mercury standard.

### Impaired Waters and Total Maximum Daily Load

In 2012, ADEC listed an area in Hawk Inlet near the mine ore concentrate loading dock on the CWA § 303(d) list for nonattainment of water quality standards for toxic and other deleterious organic and inorganic substances. In 2017, EPA approved the ADEC prepared Total Maximum Daily Load (TMDL)

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<sup>39</sup> DSEIS; Table 3.5-4; Page 3-63 to 3.6-5.

<sup>40</sup> DSEIS; Page 3-60.

<sup>41</sup> DSEIS; Figure 3.5-2; Page 3-58.

<sup>42</sup> DSEIS; Table 3.5-5; Page 3-67.

<sup>43</sup> DSEIS; Table 3.5-5; Page 3-63.

for metals (cadmium, copper, lead, mercury, and zinc) in marine sediments in Hawk Inlet.<sup>44</sup> Potential sources of metal concentrations included nonpoint sources such as historic runoff from abandoned mines, fugitive ore dust, natural sources, and internal loading. EPA recommends the FSEIS include a mitigation measure for long-term sampling, biomonitoring, and reporting on the ecological health of Hawk Inlet.

## **Waters of the United States**

### Revised Definition

On January 18, 2023, EPA and the Department of Army published a final rule establishing the Revised Definition of “Waters of the United States” (2023 Rule).<sup>45</sup> The 2023 Rule became effective on March 20, 2023. However, on April 12, 2023, a district court judge in North Dakota issued an Order preliminarily enjoining the 2023 Rule in 24 states, including Alaska.<sup>46</sup> In light of this preliminary injunction, as of the date of these comments, the pre-2015 regulatory definition remains applicable in Alaska. EPA recommends the FSEIS discuss and disclose the current status of the 2023 Rule and the preliminary injunction in Alaska, which would be subject to future changes. For the latest information on interpretation of WOTUS in Alaska, EPA encourages the Forest Service to contact the USACE or visit EPA’s Rule Status webpage for information about the status of the rule and litigation.<sup>47</sup>

The DSEIS includes a broad regional scale map of the wetlands in the project study area.<sup>48</sup> EPA recommends the FSEIS include a focused wetland map and/or aerial image of the TDF and Ponds 7/10 project area identifying the location of the direct wetland impacts (acres) and the wetland types for each Action Alternative to provide a visual depiction of the information in the DSEIS.<sup>49</sup> In addition, EPA recommends the FSEIS include a wetlands map identifying the location of the 54.6 acres and the wetland types resulting from the indirect impacts associated with fugitive dust deposition within a 300-foot buffer.<sup>50</sup>

### CWA Section 404 and NEPA

On April 18, 2023, the USACE issued a Revised Public Notice of Application<sup>51</sup> for this project, which identified Alternative D as the applicant’s Proposed Alternative. The DSEIS identifies and evaluates Alternative B as the Proposed Alternative. This apparent inconsistency between the Proposed Alternative B in the DSEIS under NEPA and the applicant’s Proposed Alternative D in the CWA § 404 permit application may result in potential confusion with the public, Tribes, communities with EJ concerns, and agency decision-makers. The FSEIS/ROD serves as the decision document for the CWA § 404 permit. EPA recommends the FSEIS identify the Preferred Alternative that aligns with the

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<sup>44</sup> Alaska Department of Environmental Conservation (May 2017). Total Maximum Daily Load for Metals in the Marine Sediments of Hawk Inlet near Juneau, Alaska. Accessible at: <https://dec.alaska.gov/media/18462/hawk-inlet-tmdl-final.pdf>. Accessed on May 5, 2023.

<sup>45</sup> Department of the Army, Corps of Engineers, Department of Defense and Environmental Protection Agency (January 18, 2023). Revised Definition of “Waters of the United States.” (88 FR 3004). Accessible at: <https://www.federalregister.gov/documents/2023/01/18/2022-28595/revised-definition-of-waters-of-the-united-states/>. Accessed on May 10, 2023.

<sup>46</sup> See *West Virginia v. EPA*, 2023 WL 2914389 (D. N.D. 2023).

<sup>47</sup> <https://www.epa.gov/wotus/definition-waters-united-states-rule-status-and-litigation-update> . Accessed 5/11/2023.

<sup>48</sup> DSEIS; Figure 3.8-1, Page 3-156.

<sup>49</sup> DSEIS; Table 3.8-6, Page 3-167.

<sup>50</sup> DSEIS; Page 3-165.

<sup>51</sup> U.S. Army Corps of Engineers (April 18, 2023). Revised Public Notice of Application (POA-1988-00269; Cannery Creek) Hecla Greens Creek Mining Company. Accessible at: <https://www.poa.usace.army.mil/Portals/34/docs/regulatory/publicnotices/2023/POA198800269CanneryCreekPN.pdf?ver=LJFmxvmGa1IEzHJeS5cFmw%3d%3d>. Accessed on April 19, 2023.

Environmentally Preferable Alternative under NEPA and the Least Environmentally Damaging Practicable Alternative under the CWA. EPA recommends coordinating with the Cooperating Agencies to identify and evaluate a Preferred Alternative for the FSEIS consistent with NEPA and CWA § 404 requirements.

### Wetlands Functional Assessment

The Wetland Ecosystem Services Protocol for Southeast Alaska (WESPAK-SE) was used to quantify the current functional capacity and values of wetlands in the project area. The DSEIS indicates that the overall ratings ranged from lower to moderate for all 11 assessment areas evaluated within the proposed project expansion area.<sup>52</sup> EPA recommends the FSEIS evaluate the indirect wetland impacts, including those which the wetland functional assessment has documented as resulting in a loss of function and value (i.e., resulting in a reduction of a function or value rating).

Wetland impacts associated with the level of disturbance, proximity to roads, disruption of hydrology, etc., affect whether an assessed wetland is considered intact, disturbed, or degraded. Applying WESPAK-SE, EPA recommends the FSEIS quantify the functional loss from indirect impacts and discuss the required compensatory mitigation for the unavoidable direct and indirect impacts to WOTUS, including wetlands, to replace the aquatic resource functions and values lost.<sup>53</sup>

### Compensatory Mitigation

The DSEIS identifies actions the applicant will take to avoid and minimize impacts to wetlands and indicates that the permanent loss of wetlands was a primary issue in the 2013 ROD. Conceptual options were identified for how the permanent loss of wetlands from the Proposed Alternative might be compensated, if required. EPA recommends the FSEIS disclose the compensatory mitigation options to offset unavoidable impacts to WOTUS, including wetlands for the Proposed Alternative. EPA recommends the FSEIS include the mitigation statement consistent with the USACE's Revised Public Notice.<sup>54</sup>

In 2014, the CWA § 404 permit was amended through the development and implementation of a Compensatory Mitigation Plan for the unavoidable and permanent wetland losses.<sup>55</sup> The Compensatory Mitigation Plan included an off-site permittee-responsible mitigation established at a 3:1 ratio.<sup>56</sup> EPA recommends the FSEIS include a Draft Mitigation Plan for the Preferred Alternative to compensate for the unavoidable direct and indirect wetland impacts. Prepare the Draft Mitigation Plan in accordance with USACE and EPA regulations,<sup>57</sup> and include the elements and the level of detail commensurate with the scale and scope of the direct, indirect, and cumulative impacts.<sup>58</sup> EPA recommends the FSEIS include the Draft Mitigation Plan as an Appendix to the FSEIS.

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<sup>52</sup> DSEIS; Page 3-159.

<sup>53</sup> 40 CFR 230.92(f)(1).

<sup>54</sup> 33 CFR 325.1(d)(7) requires applications for the discharge of dredged or fill material to include a statement describing how impacts to WOTUS will be avoided and minimized. The application must also include a statement describing how impacts will be compensated for or explaining why compensatory mitigation should not be required.

<sup>55</sup> DSEIS; Page 3-161.

<sup>56</sup> Ecological Land Services (March 2014). Mitigation Plan for Hecla Greens Creek Mining Company Greens Creek Mine Stage 3 Expansion. Prepared for Nevada Creek Mitigation Partners; ELS Project Number 2039.01. Accessible at: [https://dnr.alaska.gov/mlw/mining/large-mines/greens-creek/pdf/poa1988-269m5\\_pnrevmitpln.pdf](https://dnr.alaska.gov/mlw/mining/large-mines/greens-creek/pdf/poa1988-269m5_pnrevmitpln.pdf). Accessed on April 17, 2023.

<sup>57</sup> 33 CFR 332.4(c)(1)(i) and 40 CFR 230.94(c)(1)(i).

<sup>58</sup> 40 CFR 230.94(c)(2) through (c)(14).

The Draft Compensatory Mitigation Plan requires determination of credits,<sup>59</sup> which can be calculated based on the methodology developed by the USACE Alaska District<sup>60</sup> or the method of an approved third-party provider in Southeast Alaska. EPA recommends the FSEIS include the results of the overall functional ratings and relative ranks<sup>61</sup> of the WESPAK-SE functional assessment areas to estimate the debits associated with the direct and indirect impacts. EPA recommends the FSEIS evaluate potential credits required by local Mitigation Banks and/or In-Lieu Fee (ILF) providers in the Southeast Alaska service area as the first option for compensatory mitigation to offset the unavoidable direct and indirect impacts to WOTUS, including wetlands, consistent with EPA and USACE Compensatory Mitigation Final Rule.<sup>62</sup>

## **Air Quality**

### National Ambient Air Quality Standards (NAAQS) Emissions

The NAAQS include six criteria pollutants, including carbon monoxide, sulfur oxides, nitrogen oxides, particulate matter (2.5 and 10 microns), ozone, and lead. The DSEIS provides NAAQS operational emissions for the No Action Alternative,<sup>63</sup> and construction<sup>64</sup> and operational<sup>65</sup> emissions for the Proposed Alternative B. According to the DSEIS, under Alternative C and D, the annual construction emissions would be the same, with only minor differences, as compared to the Proposed Alternative B. The annual operational emissions over the life of the mine would be greater under Alternatives C and D.

EPA recommends the FSEIS include the annual NAAQS operational emissions for Alternatives C and D to serve as a comparison with the Proposed Alternative B and the No Action Alternative and to inform the public and decision-makers. For the construction and operational emissions, EPA recommends the FSEIS including a detailed list or inventory of all stationary and mobile emissions sources used in the NAAQS emissions estimates. Include NAAQS emissions from marine transportation of ore concentrate, construction materials, mine workers (e.g., tankers, barges, crew boats, etc.) to and from the mine site.

## **Greenhouse Gases and Climate Change**

### GHG and Climate Change Guidance

On January 9, 2023, Council on Environmental Quality (CEQ) published interim guidance to assist federal agencies in assessing and disclosing climate change impacts during environmental reviews.<sup>66</sup> CEQ developed this guidance in response to E.O. 13990 on *Protecting Public Health and the*

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<sup>59</sup> 40 CFR 230.94(c)(6).

<sup>60</sup> U.S. Army Corps of Engineers, Alaska District (April 29, 2016). Methodology for Assessing Functional Gains and Losses for Permittee Responsible Compensatory Mitigation and Calculating Compensatory Mitigation Credits and Debits for Third Party Mitigation Providers in the Alaska District. Accessible at: [https://www.poa.usace.army.mil/Portals/34/docs/regulatory/specialpns/2016/SPN-2016-187\\_4-29-2016%20Alaska%20District%20Credit-Debit%20Methodology-Attached%20to%20SPN.pdf](https://www.poa.usace.army.mil/Portals/34/docs/regulatory/specialpns/2016/SPN-2016-187_4-29-2016%20Alaska%20District%20Credit-Debit%20Methodology-Attached%20to%20SPN.pdf). Accessed on May 2, 2023.

<sup>61</sup> DSEIS; Table 3.8-3, Page 3-159.

<sup>62</sup> U.S. Army Corps of Engineers and U.S. Environmental Protection Agency (April 10, 2008). Compensatory Mitigation for the Losses of Aquatic Resources, Final Rule (73 FR 19593). Accessible at: <https://www.federalregister.gov/documents/2008/04/10/E8-6918/compensatory-mitigation-for-losses-of-aquatic-resources>. Accessed on April 7, 2023.

<sup>63</sup> DSEIS; Table 3.2-3, Page 3-13.

<sup>64</sup> DSEIS; Table 3.2-7, Page 3-27.

<sup>65</sup> DSEIS; Table 3.2-8, Page 3-29.

<sup>66</sup> Council on Environmental Quality (January 9, 2023) National Environmental Policy Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. Accessible at: <https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>. Accessed on April 6, 2023.



*Environment and Restoring Science to Tackle the Climate Crisis*.<sup>67</sup> This interim guidance is effective immediately. CEQ indicated that agencies use this interim guidance to inform the NEPA review for all new proposed actions and may use it for evaluations in process, as agencies deem appropriate, such as informing the consideration of alternatives or helping address comments raised through the public comment process. EPA recommends the FSEIS apply the interim guidance as appropriate, to ensure robust consideration of potential climate impacts, mitigation, and adaptation issues.

### GHG Emissions

CEQ has compiled GHG estimating tools and related resources for estimating GHG emissions.<sup>68</sup> NEPA requires federal agencies to analyze and consider the climate change effects prior to making decisions. Estimating GHG emissions or the reduction in emissions is a key element in considering the relationships between the Proposed Alternative B and climate change. EPA recommends the FSEIS consider these GHG tools and resources to estimate GHG emissions for the Proposed Alternative, Action Alternatives, and the No Action Alternative, as appropriate.

On April 13, 2023, EPA released the 30th Annual Inventory of U.S. Greenhouse Gas Emissions and Sinks, which presents a national-level overview of annual greenhouse gas emissions from 1990 to 2021.<sup>69</sup> The GHG Inventory covers seven key greenhouse gases: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride. EPA recommends the FSEIS consider estimating GHG emissions for the Proposed Alternative B, Action Alternatives, and the No Action Alternative based on the recently released GHG Inventory, as appropriate.

The DSEIS provides the construction<sup>70</sup> and operational<sup>71</sup> GHG emissions for the Proposed Alternative B and the existing operational GHG emissions for the No Action Alternative,<sup>72</sup> which serves as the environmental baseline. The DSEIS also provides the predicted cumulative GHG emissions and includes a one-time project construction emissions and the operational emissions over the life of the mine for each Action Alternative C and D.<sup>73</sup> EPA recommends the FSEIS include the existing operational GHG emissions of the No Action Alternative as a comparison to the cumulative operation emissions of the Proposed Alternative B and Action Alternatives to inform the public and agency decision-makers.

The DSEIS indicates that processed ore concentrates are trucked approximately 8 miles from the mill to the Hawk Inlet facility for shipment to smelters around the world.<sup>74</sup> EPA recommends the FSEIS include estimates of the GHG emissions associated with the marine transportation of the ore concentrate from Hawk Inlet to international refining plants/smelters and the metal refining process of concentrate to

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<sup>67</sup> Executive Order 13990 (January 20, 2021). *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*. 86 FR 7037. Accessible at: <https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis>. Accessed on April 14, 2023.

<sup>68</sup> Council on Environmental Quality GHG Tools and Resources. Accessible at: <https://ceq.doe.gov/guidance/ghg-tools-and-resources.html>. Accessed on May 3, 2023.

<sup>69</sup> U.S. Environmental Protection Agency (2023) Inventory of U.S. Greenhouse Gas Emissions and Sinks: 1990-2021. EPA 430-R-23-002. Accessible at: <https://www.epa.gov/ghgemissions/inventory-us-greenhouse-gas-emissions-and-sinks-1990-2021>. Accessed on April 13, 2023.

<sup>70</sup> DSEIS; Table 3.2-7, Page 3-27.

<sup>71</sup> DSEIS; Table 3.2-8, Page 3-29.

<sup>72</sup> DSEIS; Table 3.2-3, Page 3-13.

<sup>73</sup> DSEIS; Table 3.22-2, Page 3-321.

<sup>74</sup> DSEIS; Page 3-316.



evaluate the downstream GHG and climate change effects. This analysis is consistent with CEQ guidance.<sup>75</sup>

### Biological Sources

Peat soils store large amounts of organic matter and function as sources and sinks for GHGs (e.g. carbon dioxide, methane, and nitrous oxides).<sup>76</sup> When peat soils are excavated and/or disturbed by mechanical equipment, they come into contact with air and oxidizes, becoming a source of GHGs.<sup>77</sup> Emissions from drained peatlands are estimated at 1.9 gigatons of CO<sub>2</sub>-e annually.<sup>78</sup>

The Proposed Alternative B would result in excavation of 57,500 cubic yards of organic peat soils, primarily from the TDF north extension area.<sup>79</sup> EPA recommends the FSEIS include quantitative estimates of GHG emissions (CO<sub>2</sub>-e) from the excavation and/or disturbance of peat soils and disposal within the TDF and/or placement on the side slopes of the tailings stack. Include estimates of peat as biological sources of GHG emissions to the overall summary estimates comparing the Proposed Alternative B, and Alternatives C and D to the No Action Alternative.

### Social Costs of GHGs

Executive Order 13990 on *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis* emphasizes the importance for federal agencies to capture the full costs of GHG emissions, including consideration of global damages.<sup>80</sup> In February 2021, the Interagency Working Group (IWG) on the Social Cost of Greenhouse Gases issued a Technical Support Document<sup>81</sup> which provided interim estimates for the social costs of carbon dioxide, methane, and nitrous oxide (referred to collectively as SC-GHG) for agencies to use “when monetizing the value of changes in GHG emissions resulting from regulations and other relevant Federal agency actions until final values are published.” In September 2022, EPA's National Center for Environmental Economics (NCEE) released the *Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances*<sup>82</sup> using the current recommended interim values for the SC-GHG and incorporating a sensitivity analysis of the climate benefits using a new set of estimates.

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<sup>75</sup> Council on Environmental Quality (January 9, 2023) National Environmental Policy Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. Accessible at: <https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>. Accessed on April 6, 2023.

<sup>76</sup> International Peatland Society. Accessible at <https://peatlands.org/peatlands/peatlands-and-climate/>. Accessed on April 4, 2023.

<sup>77</sup> DSEIS; Page 3-27.

<sup>78</sup> International Union for Conservation of Nature (November 2021). Issues Brief. Peatlands and Climate Change. Accessible at: [https://www.iucn.org/sites/default/files/2022-04/iucn\\_issues\\_brief\\_peatlands\\_and\\_climate\\_change\\_final\\_nov21.pdf](https://www.iucn.org/sites/default/files/2022-04/iucn_issues_brief_peatlands_and_climate_change_final_nov21.pdf). Accessed on April 6, 2023.

<sup>79</sup> DSEIS; Page 3-27.

<sup>80</sup> Executive Order 13990 (January 25, 2021). *Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis*. 86 FR 7037. Accessible at: <https://www.federalregister.gov/documents/2021/01/25/2021-01765/protecting-public-health-and-the-environment-and-restoring-science-to-tackle-the-climate-crisis>. Accessed on April 3, 2023.

<sup>81</sup> Interagency Working Group on Social Cost of Greenhouse Gases, United States Government (February 2021). Technical Support Document: Social Cost of Carbon, Methane, and Nitrous Oxide Interim Estimates under Executive Order 13990. Accessible at [https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument\\_SocialCostofCarbonMethaneNitrousOxide.pdf](https://www.whitehouse.gov/wp-content/uploads/2021/02/TechnicalSupportDocument_SocialCostofCarbonMethaneNitrousOxide.pdf). Accessed on April 3, 2023.

<sup>82</sup> U.S. Environmental Protection Agency, National Center for Environmental Economics (September 2022). Report on the Social Cost of Greenhouse Gases: Estimates Incorporating Recent Scientific Advances (External Review Draft). EPA-HQ-OAR-2021-0317. Accessible at: <https://www.epa.gov/environmental-economics/scghg>. Accessed on April 3, 2023.

The SC-GHG estimates are useful disclosure metrics that can help the public, Tribes, communities with EJ concerns, and agency decision-makers understand and contextualize GHG emissions and climate damages. EPA recommends the FSEIS apply the best available estimates of the SC-GHGs for each type of GHG emissions expected from the Proposed Alternative and Action Alternatives and disclose the monetized climate damages. This type of comparative analysis would illustrate the costs and benefits to society associated with each alternative, and the significance of GHG emissions and climate change effects.

CEQ identifies the use of disclosure and contextualization methods that best fit the Proposed Alternatives and Action Alternatives.<sup>83</sup> For example, EPA's Greenhouse Gas Equivalencies Calculator<sup>84</sup> can convert GHG emissions to more familiar metrics, such as the equivalent amount of carbon dioxide emissions from certain number of cars on the road, gallons of gasoline burned, households emissions, etc. Such general comparisons may be a useful supplement and provide a comparison along with the monetized damage estimates using SC-GHG values. EPA recommends the FSEIS provide accessible comparisons or equivalents using the GHG Equivalencies Calculator to help the public, Tribes, and communities with EJ concerns, and agency decision-makers understand GHG emissions in more familiar terms.

### Climate Changes in Southeast Alaska

Southeast Alaska has experienced exceptional variability of hydroclimatic extremes between 2019 and 2020, beginning with record-breaking drought and ending in record-breaking precipitation.<sup>85</sup> Warmer air temperatures and increasing moisture that flow in Atmospheric Rivers ultimately could make them more intense in the future.<sup>86</sup> EPA recommends the FSEIS discuss the potential for extreme weather events associated with Atmospheric Rivers and other climate-related effects that could impact the proposed project.

EPA recommends the FSEIS evaluate potential impacts of extreme weather events on mine infrastructure and operations, including Pond 7/10 and other water management components reaching capacity and releasing untreated effluent into Hawk Inlet.<sup>87</sup> When evaluating the impact of extreme weather and other climate-related impacts, include estimated costs associated with operational delays and shutdowns and the corrective measures implemented in response to these impacts.

Under the Proposed Alternative B, the embankment/spillway of Pond 7/10 would be raised an additional 5-feet, increasing the water storage capacity to accommodate a 50-year, 48-hour storm event. This represents adaptive management planning to increase resilience of the Greens Creek Mine facilities and infrastructure to climate change effects.

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<sup>83</sup> Council on Environmental Quality (January 9, 2023) National Environmental Policy Guidance on Consideration of Greenhouse Gas Emissions and Climate Change. Accessible at: <https://www.federalregister.gov/documents/2023/01/09/2023-00158/national-environmental-policy-act-guidance-on-consideration-of-greenhouse-gas-emissions-and-climate>. Accessed on April 6, 2023.

<sup>84</sup> U.S. Environmental Protection Agency Greenhouse Gas Equivalencies Calculator (updated April 2023). Accessible at: <https://www.epa.gov/energy/greenhouse-gas-equivalencies-calculator>. Accessed on May 3, 2023.

<sup>85</sup> Thoman, R., and J. E. Walsh, (2019). Alaska's changing environment: Documenting Alaska's physical and biological changes through observations. H.R. McFarland, Ed. International Arctic Research Center, University of Alaska, Fairbanks. Accessible at: <https://uaf-iarc.org/our-work/alaskas-changing-environment/>. Accessed on April 6, 2023.

<sup>86</sup> Rozell, N. (March 17, 2022). In the Crosshairs of an Atmospheric River. UAF News and Information. University of Alaska, Fairbanks, Geophysical Institute. Accessible at: <https://uaf.edu/news/in-the-crosshairs-of-an-atmospheric-river.php>. Accessed on April 12, 2023.

<sup>87</sup> DSEIS; Page 3-133.

## Adaptation and Resilience

A Failure Modes and Effects Analysis (FMEA) is a systematic method to evaluate processes and facilities for possible failures and to prevent them by correcting the processes or design proactively, rather than reacting to adverse events after failures have occurred.<sup>88</sup> Development of a FMEA is an opportunity to bolster resilience of the Proposed Alternative B and the mine to the impacts of climate change. A FMEA has been developed for other proposed mines in Alaska, including Donlin and Pebble.

EPA recommends the FSEIS include a mitigation measure to address the resilience of the Preferred Alternative to climate change effects by development of a FMEA, which identifies climate change impacts as a significant failure mode(s) for the mine facilities and infrastructure. Include in the FMEA consideration of prevention, response, and recovery plans to bolster resilience from the effects of climate change with minimal disruptions to facility operations and costs and impacts to public safety and environmental resources.

## GHG Reduction Strategy and Goals

EPA recommends the FSEIS provide additional context in describing the effects associated with the predicted GHG emissions in the NEPA analysis by comparing them to relevant reduction goals and targets, such as planning efforts conducted by local and state governments in the region, and national climate action goals, plans, and commitments, including the *Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050*.<sup>89</sup> EPA recommends the FSEIS discuss the project-level GHG emissions in the context of GHG emissions reduction strategies and goals, including the U.S. economy-wide target under the Paris Agreement to achieve a 50 to 52 percent reduction in net GHG emissions from 2005 levels by 2030.<sup>90</sup>

EPA recommends the FSEIS avoid comparing and/or expressing the overall project-level GHG emissions as a percentage of the state or national GHG emissions. This approach diminishes the significance of the notable climate damages caused by substantial project-scale GHG emissions and is misleading given the nature of the climate policy challenge to reduce GHG emissions from a multitude of sources.

## Carbon Offsets

EPA recommends the FSEIS consider and evaluate available mitigation measures to avoid, minimize, and/or compensate for GHG emissions and climate change effects when those measures are reasonable and consistent with achieving the purpose and need for the Project. Mitigation measures could include enhanced energy efficiency, renewable energy generation and energy storage, lower-GHG-emitting technology, carbon capture and sequestration, sustainable land management practices, carbon offsets, etc.

A project's overall GHG emissions can be reduced through carbon offsets to make up for all or a portion of GHG emissions that occur within the same geographic area. For example, in 2020, Kootznoowoo,

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<sup>88</sup> Shariatia, S. (April 8, 2014). Underground Mine Risk Assessment by Using FMEA in the Presence of Uncertainty. *Decision Science Letters* 3 (2014) 295–304. Accessible at: [https://www.growingscience.com/dsl/Vol3/dsl\\_2014\\_15.pdf](https://www.growingscience.com/dsl/Vol3/dsl_2014_15.pdf). Access on April 5, 2023.

<sup>89</sup> U.S. Department of State and the U.S. Executive Office of the President (November 2021). *Long-Term Strategy of the United States: Pathways to Net-Zero Greenhouse Gas Emissions by 2050*. Accessible at: <https://www.whitehouse.gov/wp-content/uploads/2021/10/US-Long-Term-Strategy.pdf>. Accessed on May 3, 2023.

<sup>90</sup> United States' Nationally Determined Contribution: Reducing Greenhouse Gases in the United States: A 2030 Emissions Target (April 20, 2021). Accessible at: <https://unfccc.int/sites/default/files/NDC/2022-06/United%20States%20NDC%20April%202021%20Final.pdf>. Accessed on April 5, 2023.

Incorporated, established under the Alaska Native Claims Settlement Act for the Village of Angoon in Southeast Alaska, created over 100,000 carbon offset credits from the Kootznoowoo's Improved Forest Management Project on Prince of Wales Island.<sup>91</sup> The project area protects old growth forests, including habitat for Sitka black-tailed deer, black bear, mountain goat, moose, beaver, weasel, otter, and fox. The area also includes 12 fish bearing streams that support all five species of Pacific salmon.

EPA recommends the FSEIS evaluate carbon offsets as a mitigation measure/commitment to reduce the overall cumulative or a portion of the carbon footprint created by the mine.

## **Environmental Justice**

On April 21, 2023, E.O. 14096 on *Revitalizing Our Nation's Commitment to Environmental Justice for All*<sup>92</sup> was issued to build upon E.O. 12898 on *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*,<sup>93</sup> and directs federal agencies to make achieving EJ part of its mission. This includes actions to identify, analyze, and as available and appropriate, consider adopting or requiring mitigation measures to avoid, minimize, or mitigate disproportionate and adverse human health and environmental effects, including risks and hazards of federal activities on communities with EJ concerns, such as communities of color, Tribes, and low-income, underserved and vulnerable populations.

This also includes carrying out environmental reviews under NEPA in a manner that evaluates direct, indirect, and cumulative effects of environmental and other burdens already experienced by such communities, including climate change-related risks and hazards and human health effects arising from exposure to pollution or other environmental hazards; and provides opportunities in the NEPA process for early and meaningful public engagement and involvement of communities with EJ concerns in agency decision-making.

## Subsistence Users and Resources

Prior to the 1980s, Hawk Inlet was traditionally used more frequently for deer hunting and shellfish harvesting. Subsistence use has reduced and may occasionally occur within Hawk Inlet.<sup>94</sup> There are subsistence harvest areas outside of Hawk Inlet for traditional subsistence and tribal uses.<sup>95</sup>

The DSEIS evaluates subsistence uses in the study area to determine if there are significant restrictions resulting from the Proposed Alternative B.<sup>96</sup> EPA recommends the FSEIS consider whether subsistence users have been significantly displaced from their traditional subsistence resources and tribal use areas in Hawk Inlet and must substitute subsistence foods and resources from other areas. EPA recommends

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<sup>91</sup> Bluesource Newsletter (September 2020). Accessible at: <https://www.bluesource.com/newsletters/bluesource-q3-newsletter-2/>. Accessed on April 6, 2023.

<sup>92</sup> Executive Order 14096 (April 21, 2023). *Revitalizing Our Nation's Commitment to Environmental Justice for All* (88 FR 25251). Accessible at: <https://www.federalregister.gov/documents/2023/04/26/2023-08955/revitalizing-our-nations-commitment-to-environmental-justice-for-all>. Accessed on May 1, 2023.

<sup>93</sup> Executive Order 12898 (February 11, 1994). *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations* (59 FR 7629). Accessible at: <https://www.govinfo.gov/content/pkg/FR-1994-02-16/html/94-3685.htm>. Accessed on May 1, 2023.

<sup>94</sup> Stephen R. Braund & Associates (2021). Traditional, Customary and Contemporary Uses of Hawk Inlet and Hawk Inlet Cannery Cultural Context Report. Prepared for Hecla Mining Company and the USDA Forest Service.

<sup>95</sup> U.S. Department of Agriculture, Forest Service (August 30, 2013). Greens Creek Mine Tailings Disposal Facility Expansion. Final Environment Impact Statement and Record of Decision. Tongass National Forest and Admiralty Island National Monument. Accessible at: [https://www.fs.usda.gov/Internet/FSE\\_DOCUMENTS/stelprdb5435080.pdf](https://www.fs.usda.gov/Internet/FSE_DOCUMENTS/stelprdb5435080.pdf) Accessed on April 14, 2023.

<sup>96</sup> *Id.*

the FSEIS evaluate any disproportionate burdens placed on displaced subsistence users, such as longer travel distances and times, additional fuel costs, and other resource expenditures, etc. to access and reach alternative subsistence resources and tribal use areas outside of Hawk Inlet.

EPA also recommends that the FSEIS consider impacts regarding safety of subsistence food consumption and traditional uses within the proposed project area. The Angoon Community Council has raised concerns regarding the health of the seal and other subsistence resources in Hawk Inlet, such as clams, crab, halibut, shrimp, deer and seaweed. The Council has urged tribal members to restrict harvesting of traditional subsistence foods from Hawk Inlet until it has been proven safe to consume.<sup>97</sup> The Council has also expressed concerns regarding traditional tribal uses in Hawk Inlet.

To address the community EJ concerns regarding safe consumption of subsistence foods from Hawk Inlet and traditional uses, EPA recommends the FSEIS evaluate a screening-level HIA or health risk assessment to complement the screening-level ecological risk assessment (Mitigation Measure AR-2).<sup>98</sup> EPA recommends incorporating technical guidance provided by the Alaska Department of Health and Social Services in developing a screening-level assessment.<sup>99</sup> EPA has developed an HIA Resource and Tool Compilation, which provides additional guidance, if appropriate.<sup>100</sup>

Additionally, EPA recommends the FSEIS consider a mitigation measure to include long-term sampling (e.g. during and post closure of the mine) for contaminants associated with the proposed project for the purposes of ensuring safe subsistence practices and traditional use. EPA also encourages meaningfully engaging with subsistence users who are disproportionately impacted by the proposed mining activity in identifying opportunities to avoid, minimize and mitigate for those impacts. This would include meaningfully engaging communities with EJ concerns specific to developing the long-term monitoring and reporting of contaminants impacting subsistence practices and traditional uses.

In addition, EPA recommends the FSEIS identify any changes to the quality and/or quantity of subsistence resources, diet, and nutrition resulting from the substitution of traditional subsistence foods from areas outside of Hawk Inlet. This comparison would be useful in determining the potential for disproportionate and adverse effects to communities with EJ concerns regarding human health and subsistence foods and resources. Identify mitigation measures to minimize or mitigate potential disproportionate and adverse human health and environmental effects, including risks associated with potential exposure to pollutants from consumption of subsistence foods and resources of Hawk Inlet.

### Meaningful Community Engagement and Involvement

E.O. 14096 *Revitalizing Our Nation's Commitment to Environmental Justice for All* requires the consideration of meaningful public engagement and involvement in agency decision-making under NEPA, including but not limited to, sharing of information and identifying and addressing barriers to participation; fully considering public input; seeking out and encouraging involvement by potentially

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<sup>97</sup> Jenkins, E. (February 6, 2016). Angoon calls for help after discovering high mercury levels in subsistence seal. Available at: <https://www.ktoo.org/2016/02/06/05mine/>. Accessed on April 5, 2023.

<sup>98</sup> DSEIS; Table 2.6-1, Page 2-51.

<sup>99</sup> Alaska Health Impact Assessment Program, Department of Health and Social Services (2015). Technical Guidance for Health Impact Assessment in Alaska, Version 2.0. Accessible at: <https://health.alaska.gov/dph/Epi/hia/Documents/AlaskaHIAToolkit.pdf>. Accessed on April 5, 2023.

<sup>100</sup> U.S. Environmental Protection Agency, Office of Research and Development, National Exposure Research Laboratory (September 2016). The Health Impact Assessment (HIA) Resource and Tool Compilation: A Comprehensive Toolkit for New and Experienced HIA Practitioners in the U.S. (EPA/600/R-15/330). Accessible at: [https://www.epa.gov/sites/default/files/2017-07/documents/hia\\_resource\\_and\\_tool\\_compilation.pdf](https://www.epa.gov/sites/default/files/2017-07/documents/hia_resource_and_tool_compilation.pdf). Accessed on May 10, 2023.



affected communities, such as those related to disability, language access, and lack of resources; and providing technical assistance, tools, or other resources to facilitate participation.

EPA recommends the FSEIS include additional information describing how E.O. 14096 is being integrated into the proposed project NEPA analysis to identify and address communities with EJ concerns; inform communities about the project and the potential impacts; input received to date from the communities; and how that input will be used in agency decision-making.

EPA recommends the FSEIS consider a mitigation measure to develop an adaptive management strategy to monitor for EJ concerns during project construction and operations and implement adaptive management strategies to address EJ concerns where possible. EPA recommends the FSEIS consider the establishment and maintenance of an EJ Advisory Group to include impacted communities to monitor and address potential EJ concerns throughout the extended life of the mine. Consider involving the EJ Advisory Group in evaluating studies and reports regarding the health of the Greens Creek Delta/Hawk Inlet and subsistence resources, and to discuss other matters, as appropriate.

### Indigenous Knowledge

On November 30, 2022, CEQ published Guidance for Federal Department and Agencies on Indigenous Knowledge.<sup>101</sup> EPA recommends the FSEIS include the identification, inclusion, and integration of Traditional Knowledge where appropriate. The guidance includes promising practices to apply when considering indigenous knowledge in decision-making processes.

### **Tribal Consultation and Coordination**

EPA encourages the U.S. Forest Service to consult and coordinate with the Tribes and incorporate feedback from the Tribes when making decisions regarding the project. EPA recommends the FSEIS describe the issues raised during the consultations and how those issues were addressed through additional mitigation and monitoring measures, if applicable.

### **Mitigation, Monitoring, and Adaptive Management**

#### Independent Engineering Review Board

EPA recommends including a mitigation and conservation measure in the FSEIS for an Independent Engineering Review Board to provide ongoing independent review and oversight responsibilities of the mine infrastructure, operations, maintenance, and post-closure for the TDF and Pond 7/10, underground mine, processing and milling facilities, waste rock disposal facilities, Hawk Inlet facilities, port facilities, and other infrastructure. Include oversight of project design and construction; mitigation measures, compliance, and geotechnical, water quality, and fugitive dust monitoring; adaptive management; inspections, audits, and reporting; development of a FMEA; performance and risk management; reclamation and closure, long-term management activities, etc.

#### Financial Assurance Estimates

EPA recommends the FSEIS disclose the current Financial Assurance estimates for the Greens Creek Mine, including estimates to cover responsibilities for long-term post-closure water treatment, monitoring, and periodic dam safety inspections. Identify the types of Financial Assurance instruments, such as bonds and/or trust funds, or other mechanisms. Since fugitive dust management, monitoring, and

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<sup>101</sup> Council on Environmental Quality (November 30, 2022). *Guidance for Federal Department and Agencies on Indigenous Knowledge*. Accessible at: <https://www.whitehouse.gov/wp-content/uploads/2021/11/111521-OSTP-CEQ-ITEK-Memo.pdf>. Accessed May 11, 2023.

corrective actions may be required during mine closure and post-closure, EPA recommends evaluation of the Financial Assurance estimates to include long-term fugitive dust monitoring and management, and to address long-term impacts to wetlands, vegetation, etc. as well as to mitigate exceedances of water quality standards of adjacent water bodies. EPA recommends the FSEIS include consideration of Financial Assurance estimates to address disproportionate impacts to subsistence users within the project area, including long-term monitoring and reporting on project impacts to subsistence resources.

In addition, EPA recommends the Financial Assurance include funds for the development and implementation of a Wetlands Compensatory Mitigation Plan associated with the CWA § 404 permit.

### **Specific Comments**

#### Table 3.5-4; Page 3-63

This table presents a summary of water quality monitoring data from 2011 to 2020. Station 60 (Unnamed Drainage) was previously referred to as Althea Drainage. EPA recommends the FSEIS include proper identification of this waterbody.

#### Section 3.7.1.3; Page 3-113

EPA recommends the FSEIS include a description of how differences in fish length were taken into consideration when comparing tissue concentrations, such as normalizing each fish by length prior to making comparisons of tissue concentrations.

#### Section 3.8.1.2; Page 3-158

The DSEIS states: *At the time of writing, the current legislation defining federally jurisdictional waters is in flux and no accepted jurisdictional determination has been made for WOTUS within the proposed Project expansion footprint area.* EPA recommends changing “legislation” to “regulation.”