UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
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September 9, 2009

Colonel Reinhard W. Koenig
District Engineer, Alaska District
U.S. Army Corps of Engineers
P. O. Box 898
Anchorage, Alaska 99506-6898

Re: POA-2000-495-M3
Gastineau Channel

Attn: Randall Vigil

Dear Col. Koenig:

This letter is to convey the National Marine Fisheries Service's (NMFS) concerns to the Corps of Engineers (Corps) on the inadequacy of several reports intended to evaluate the potential for chemical and biological effects to living marine resources, including Essential Fish Habitat (EFH), from the discharge of dredge material from Douglas Harbor into nearby Gastineau Channel. The harbor, located at Latitude 58° 16'30" N., Longitude -134° 23'8" W., Douglas Island, Juneau, Alaska, is undergoing expansion due to increased moorage demands. The expansion involves removal of existing moorings, creosote pilings, and dredge material to return the harbor to its original design depth of -14 ft MLLW. The dredging aspect of the project involves the removal and disposal of approximately 30,000 cy of sediment and disposal at a previously utilized uncontained aquatic site in Gastineau Channel. Gastineau Channel is used as rearing, feeding, and migrating habitat by all five species of Pacific salmon and other marine organisms, including crab, halibut, herring and other forage fish, and marine mammals.

NewFields was contracted by PND Engineers, an agent for the City and Borough of Juneau (CBJ), to conduct chemical and biological analyses of sediment material dredged from within the Douglas Harbor. NewFields produced the "Dredged Material Evaluation for the Douglas Harbor Marina, Juneau, Alaska Final Report" (NewFields March, 2009). This report indicated that all individual samples and sediment composites contained mercury (Hg) at concentrations above project screening levels. These concentrations exceed NOAA's National Status and Trends program low range levels for sediments (Rudis 1996). There are elevated levels of Hg in two distinct sediment layers within the Douglas Harbor basin, both of these layers would be dredged. The NewField report suggests that the Hg in Douglas Harbor is native material; however, given Juneau's hard rock mining history where Hg was commonly used to extract gold from ore, historic mining activities are likely sources of elevated levels of Hg in the Douglas Harbor (Rudis 1996). Historic records indicate that at least 102,000 tons of tailings from the Treadwell

Complex, the A-J Mine and the Alaska Gastineau Mine were deposited into Gastineau Channel and the Douglas and Juneau town sites between 1893 and 1944 (Rudis 1996).

In April of 2009, NewFields produced the "Supplemental Evaluation for Bioaccumulation Data from the Dredged Material Evaluation for the Douglas Harbor Marina" (NewFields April, 2009), followed by a second final report, "Dredged Material Evaluation for the Douglas Harbor Marina, Juneau, Alaska (NewFields June, 2009a), which included a revised "Supplemental Evaluation for Bioaccumulation Data from Dredged Material Evaluation for the Douglas Harbor Marina" (NewFields June, 2009b). During a state and federal interagency teleconference on July 23, 2009, there was discussion regarding which level of Hg to use as a bioaccumulation threshold, and the modeling methods and data interpretations used to evaluate bioaccumulation of Hg in the food web. NewFields used the Acid Volatile Sulfides/Simultaneously Extracted Metals (AVS/SEM) method to evaluate the effects of metals on benthic organisms (NewFields March, 2009). However, according to the Environmental Protection Agency (EPA), AVS/SEM is not a valid method for testing Hg uptake:

> "To evaluate the potential effects of metals on benthic species, the molar concentration of AVS was compared to the sum of SEM molar concentrations for six metals: cadmium, copper, nickel, lead, zinc, and silver. Molar concentrations of cadmium, copper, nickel, lead, and zinc are comparable with AVS on a one-to-one basis...Mercury was excluded from AVS comparison because other important factors play a major role in determining the bioaccumulation potential of mercury in sediment. Specifically, under certain conditions mercury binds to an organic methyl group and is readily taken up by living organisms (EPA 2004 p. 2-13)."

NewFields analyzed the short term (acute) effects of Hg, neglecting to analyze the long term (chronic) effects. Also, they did not adequately address the adverse effects on larval and embryonic life stages, which are the most sensitive to Hg. The reports also do not take into account the role of anaerobic bacteria (e.g. sulfate reducing bacteria) in the Hg methylation process, and the selected bioaccumulation threshold does not consider the chronic effects of Hg toxicity, which can be as low as 0.02ppm for salmonids (Beckvar et al. 1996).

The fate of Hg in the environment depends on the chemical form released and the environmental conditions present at the disposal site (Beckvar et al. 1996). Most Hg is released into the environment as inorganic Hg, which is primarily bound to particulates and organic substances and may not be available for direct uptake by aquatic organisms (Becvar et al. 1996). The process of methylation, by which inorganic Hg is made bioavailable in the form of methylmercury, is an important key to the fate of Hg in the environment (Becvar et al. 1996). One of the most important impacts to EFH of dredging and unconfined aquatic disposal of Hg contaminated material is the potential for Hg mobilization into the food web. Mobilization allows for increased conversion of Hg to methylmercury, which bioaccumulates in fish and other aquatic life, presenting a potential threat to EFH. Toxic effects of Hg on aquatic animals include reproductive impairment, growth inhibition, developmental abnormalities, and altered behavioral

responses (Beckvar et al. 1996). Exposure to low concentrations of Hg may not result in direct mortality, but may retard growth thereby increasing the risk of predation (Beckvar et al. 1996).

NMFS recommends that the Corps disregard the AVS/SEM test results supplied in the NewFields reports, because the test is not a valid estimator of the fate of Hg in aquatic systems. Also, as the proposed project moves into the permitting phase, answers to the following questions will be important in developing appropriate EFH conservation recommendations:

1. What are the chronic effects of Hg exposure and bioaccumulation in the aquatic food web? Marine organisms will be exposed to Hg from the fill material for decades, if not longer. While the NewFields report focuses on acute effects, juvenile salmon experience sublethal chronic effects at Hg levels much lower than 0.2 mg/kg.

2. What are the effects of Hg bioaccumulation at higher trophic levels in the food web? The NewFields tests evaluated clams and worms, not organisms such as forage fish, or commercial or sport caught fish intended for human consumption.

3. What are the effects of Hg methylation by microbial action on marine organisms? Mercury moved from anaerobic to aerobic conditions is more easily methylated by microbial action, and the sediment dredged from the Douglas Harbor basin will be exposed to aerobic conditions.

4. What is an appropriate Hg threshold for bioaccumulation effects? This level should be determined through collaboration with EPA, Alaska Department of Environmental Conservation (ADEC), and other appropriate specialists.

In addition, PND Engineers produced the "Douglas Harbor Dredge Material Disposal Practicable Alternative Analysis Report" (PND June, 2009a) and after evaluating 12 alternatives identified the preferred disposal method and location as at the previously utilized Gastineau Channel site (PND June, 2009a). Other practicable alternatives could minimize adverse effects to EFH. For example, as stated in the alternatives analysis report, approximately 1/3 of the material could be placed at a Treadwell Mine depression that is of low historic significance due to the lack of mining relics. Another 1/3 could be placed at the Treadwell Mine cave-in site. Fifteen percent could be contained on-site, beneath a proposed expanded harbor parking lot. Ten percent could be confined behind a newly-constructed timber retaining wall. Any remaining material could be used at the proposed confined intertidal Alaska Marine Lines storage yard expansion identified as an alternative disposal site. NMFS recommends that disposal methods which would eliminate or substantially reduce the discharge of uncontained mercury contaminated material directly into the marine environment be implemented to reduce the risk of adverse effects to living marine resources.

Finally, PND Engineers also produced the report "Douglas Harbor Renovation – Applicant Proposed Mitigation" (PND June, 2009b) that: a) proposes to avoid impacts by placing dredged

material into a previously used site in Gastineau Channel; b) does not propose minimization due to the nature of the harbor improvements (dredging to accommodate larger vessels); and c) states that compensation is not required because best management practices will be used for this deferred maintenance effort (creosote-treated piles will be replaced with galvanized steel, a vibratory hammer will be used where practical, new moorage and boarding floats will be treated with Ammoniacal Copper Zinc Arsenate (PND June 2006b). If upland disposal options prove not to be practicable after further evaluation, NMFS recommends that given the potential for adverse effects to EFH, mitigation be required for any permit issued for this project.

Thank you for your consideration. We look forward to continued discussions with the Corps on the proposed projects. If you have questions, please contact Ms. Chiska Derr at Chiska.Derr@noaa.gov or by phone at (907) 586-7345.

Sincerely,

Robert D. Mecum

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Acting Administrator, Alaska Region

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