UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
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REGIONAL ADMINISTRATOR

March 2, 2010

Colonel Reinhard W. Koenig
District Engineer, Alaska District
US Army Corps of Engineers
PO Box 6898
Elmendorf AFB, Alaska 99506-0898

Subject: EPA Comments on Public Notice of Application for Permit
Reference Number: POA-2000-495-M3
Applicant: City and Borough of Juneau
Location: Douglas Harbor and Gastineau Channel, Juneau, Alaska

Attention: Heidi Firstencel, Project Manager

Dear Colonel Koenig:

This letter pertains to the US Army Corps of Engineers (ACE) Alaska District "Public Notice of Application for Permit," Reference Number: POA-2000-495-M3. The applicant is the City and Borough of Juneau (CBJ), and the project location is the Douglas Small Boat Harbor in Juneau, Alaska. The applicant's stated purpose is to renovate the existing Douglas Harbor in order to meet changing moorage demand in Juneau. CBJ's proposal includes dredging approximately 30,000 cubic yards of material from the harbor. The proposed dredged material disposal site is in Gastineau Channel, and the proposed dredged material disposal method is unconfined aquatic disposal via barge.

The Environmental Protection Agency (EPA) has reviewed the public notice for the proposed discharge of dredged material into Gastineau Channel. The recommendations herein have been prepared under the authority of and in accordance with Section 404 of the Clean Water Act (CWA) and its implementing regulations under 40 CFR Part 230, Guidelines for Specification of Disposal Sites for Dredged or Fill Material. Pursuant to Part IV, Paragraph 3(b) of the August 11, 1992, Memorandum of Agreement (MOA) between our agencies relative to Section 404(q) of the CWA, we believe the proposed project will result in substantial and unacceptable impacts on aquatic resources of national importance.

As stated in our letter of February 5, 2010, Gastineau Channel supports numerous fish, shellfish and wildlife resources including crab, halibut, salmon, shrimp, seals, sea lions, whales, waterfowl, seabirds, shorebirds and bald eagles. It also supports several important commercial, sport and personal use fisheries and hatcheries. EPA is concerned about the potential for

mercury bioaccumulation in fish and shellfish, and that the lower layer of the proposed dredged material may be harmful to aquatic life, wildlife and human health.

Enclosures 1 and 2 provide EPA's detailed comments on the public notice and the basis of our findings. Enclosure 1 includes EPA's evaluation of the bioaccumulation test results relative to the 404(b)(1) Guidelines and Sediment Evaluation Framework for the Pacific Northwest (SEF). Enclosure 2 is EPA's evaluation of the bioaccumulation test results under the Inland Testing Manual (ITM). The following is a summary of our concerns.

The bioaccumulation test results indicate that the total mercury tissue concentrations in *Macoma nasuta* ranged from 0.016 µg/g in the Reference Composite to 0.213 µg/g in the Lower Composite (wet weight). The difference between the Lower Composite and the Reference Composite is not only statistically significant, but the Lower Composite tissue concentration is more than 13 times higher than the Reference Composite tissue concentration. This suggests that mercury in the lower sediment layer is bioavailable to benthic organisms. The Lower Composite tissue concentration also exceeds the SEF Target Tissue Levels (TTL) for protection of aquatic life, aquatic dependent wildlife and human health.

Therefore, in the opinion of EPA, the lower sediment layer is unsuitable for unconfined aquatic disposal. If the project moves forward, we recommend that the proposed dredged material from the lower sediment layer be placed in an upland disposal facility or in a confined aquatic disposal facility. EPA is also concerned that the new dredged surface in Douglas Harbor (i.e., the bottom of the harbor after dredging) will expose aquatic organisms to mercury contaminated sediment that is presently isolated. Therefore, we recommend that such exposed surfaces be capped with sufficient clean fill material.

Conclusions

EPA recommends that ACE deny a permit for the project as proposed in the public notice because the project will result in substantial and unacceptable impacts on aquatic resources of national importance.

If ACE decides to issue a permit, EPA recommends that ACE condition the permit to either: 1) prohibit the discharge of dredged material from the lower layer of Dredged Material Management Units (DMMU) 1, 2, 4A and 4B into waters of the United States; or 2) authorize the discharge of fill material to construct a confined aquatic disposal facility to contain the dredged material from the lower layer of DMMUs 1, 2, 4A and 4B. In addition, EPA recommends that ACE require the applicant to cap the bottom of the harbor with a sufficient volume of clean fill material immediately after the dredging operation is complete if the lower layer is exposed. The above permit conditions may require the applicant to submit a modified permit application. The above options may also require a public notice and comment period, and in any case, it would be subject to interagency review and approval.

If you disagree with EPA's conclusions, then we recommend that ACE perform a rigorous risk assessment pursuant to Tier IV of the ITM, including an ecological risk assessment

using ACE's Trophic Trace model, and a human health risk assessment consistent with EPA guidance.

This determination was made based on: 1) EPA's authority under 33 USC § 1344 and 40 CFR Part 230; 2) EPA's expertise in dredged material testing and evaluation consistent with 40 CFR Part 230, Subpart G, the ITM and the SEF; and 3) EPA's review of site specific information including, but not limited to the permit application and supplemental submissions, the 1995 Chemical Data Report, the 2007 Sediment Characterization Report, and the 2009 Dredged Material Evaluation for the Douglas Harbor Marina.

We look forward to your response, and to your Notice of Intent to Proceed, pursuant to Part IV, Paragraph 3(c) of the MOA. In the meantime, EPA will continue to work with your staff and the applicant to resolve the above issues. Please call me at (206) 553-1234, if you wish to discuss this letter.

Sincerely,

Dennis J. McLerran
Regional Administrator

Enclosures (2)

cc: Mayor Bruce Botelho (CBJ)
John Stone, Port Director (CBJ)
Chiska Derr, NMFS
Deb Rudis, FWS
William Ashton, ADEC

Enclosure 1

EPA Comments of the Douglas Harbor Dredging Project

404(b)(1) Guidelines

40 CFR § 230.10 Restrictions on discharge.

EPA believes there may be one or more practicable alternatives to the proposed discharge which would have less adverse impact on the aquatic ecosystem. We recommend that ACE perform a more robust alternatives analysis, including upland disposal or confined aquatic disposal. [40 CFR § 230.10(a)]

Based on the available information, EPA finds that the proposed discharge of dredged material from the lower layer of DMMUs 1, 2, 4A and 4B will likely cause or contribute to significant degradation of the waters of the United States. [40 CFR § 230.10(c)]

40 CFR § 230.11 Factual determinations.

For the reasons stated below, EPA also finds that: 1) the proposed dredged material from the upper layer of DMMUs 1, 2, 4A and 4B is environmentally acceptable for unconfined aquatic disposal; and 2) the proposed dredged material from the lower layer of DMMUs 1, 2, 4A and 4B is a carrier of contaminants and is environmentally unacceptable for unconfined aquatic disposal. [40 CFR § 230.11(d)]

Sediment and Bioaccumulation Test Results

Douglas Harbor sediment was tested in accordance with the Inland Testing Manual (ITM), which includes four tiers: Tier I uses existing information, including previous testing; Tier II includes sediment and water chemistry tests; Tier III includes toxicity and bioaccumulation testing; and Tier IV allows case-specific lab and field testing in unusual circumstances.

In this case, ACE conducted Tier II testing in 1995 and detected total mercury above the screening level of 0.21 mg/kg. Total mercury concentrations in sediment samples ranged from 1.54 mg/kg to 2 mg/kg (dry weight).

The applicant performed more Tier II tests in 2007 and identified mercury as the only contaminant of concern. Total mercury sediment concentrations ranged from 0.47 mg/kg to 5.4 mg/kg for individual samples, and from 1.3 mg/kg to 3.5 mg/kg for composite samples (dry weight).

In 2008 and 2009, the applicant conducted Tier II and Tier III testing, including bioaccumulation tests. Methyl mercury concentrations in sediment ranged from 0.277 ng/g in the Reference Composite to 3.46 ng/g in the Lower Composite, and total mercury sediment concentrations ranged from 0.226 mg/kg in the Reference Composite to 3.22 mg/kg in the Area

4A Upper Composite (dry weight). The total mercury tissue concentrations ranged from 0.008 mg/kg in the Reference Composite to 0.027 mg/kg in the Lower Composite for *Nephtys caecoides*, and from 0.016 mg/kg in the Reference Composite to 0.213 mg/kg in the Lower Composite for *Macoma nasuta* (wet weight).

Applicant's Proposed Action Limit Is Inappropriate

The Alaska Department of Environmental Conservation (ADEC) recommended a project specific action limit of 0.32 mg/kg based on its interpretation of the Alaska Division of Public Health's (ADPH) fish advisory. ADEC's recommended number is based in part upon ADPH's chronic oral Acceptable Daily Intake of 0.0004 mg/kg of body weight/day. However, the fish advisory states that the document is not intended to influence regulatory standards and that it is inappropriate to use the Acceptable Daily Intake for regulatory purposes. ADPH recently corrected ADEC's misunderstanding, and ADEC subsequently withdrew its recommended action limit.

EPA agrees with ADPH, ADEC and ACE that is inappropriate to use ADPH's Acceptable Daily Intake in a regulatory context. EPA recommends that ACE use EPA's Reference Dose of 0.0001 mg/kg of body weight/day for any risk assessment or risk management decision related to this project. For example, see Table 1 below.

Table 1. Comparison of Acceptable Tissue Concentrations (ATC), Using Basic Risk Assessment Equation: (Reference Dose)(Body Weight)/Ingestion Rate = ATC

	Reference Dose (mg/kg of body weight/day)	Body Weight (kg)	Ingestion Rate (kg/day)	ATC (mg/kg)
ADEC Recommendation (withdrawn)*	0.0004	80	0.1	0.32
ADEC Recommendation (adjusted)*	0.0001	70	0.1	0.07
SEF TTL1* Human Health	0.0001	70	0.054	0.13
SEF TTL2 Human Health	0.0001	70	0.175	0.040
SEF TTL3* Human Health	0.0001	70	0.584	0.012

* Shown for comparison purposes only. EPA is using the SEF TTL2 in this case.

EPA Evaluation of Bioaccumulation Test Results

EPA has evaluated the bioaccumulation test results consistent with the Tier III guidance in the ITM (see Enclosure 2). Based on that review, we conclude that the 15,400 cubic yards of dredged material in the lower sediment layer of DMMUs 1, 2, 4A and 4B are unsuitable for unconfined aquatic disposal.

EPA also assessed mercury bioaccumulation potential by comparing the Tier III test tissue concentrations to ACE and EPA's risk-based Target Tissue Levels (TTLs) in the 2009 Sediment Evaluation Framework for the Pacific Northwest (SEF). Specifically, we compared the Lower Composite Macoma nasuta tissue concentration (i.e., 0.213 mg/kg) to the SEF Human Health TTL2 (i.e., 0.04 mg/kg).

The applicant's interpretation of the bioaccumulation test results is based on a series of non-conservative (i.e., non-protective) assumptions, as follows. First, the applicant assumes that the test organisms reached steady state in the 28 day exposure test. Although the ITM recommends a 28 day test as a cost effective compromise, it also recognizes that steady state may not be attained in 28 days:

> "Bioaccumulation of most compounds, if it occurs, will be detectable after the 28-day exposure period, even though steady state may not have been reached. Thus, Tier III bioaccumulation tests provide useful information about the potential for bioaccumulation (i.e., bioavailability), even when steady-state tissue residues are not determined, e.g. when comparing to a reference sediment." [ITM, page 6-4.]

ACE's Engineer Research and Development Center (ERDC) raised this issue in its comments to the Alaska District and recommended applying a conservative steady state conversion factor of 2.5. EPA concurs with ERDC's recommended 2.5 conversion factor.

Second, the applicant assumes that 44% of the total mercury measured in *Macoma nasuta* was present as methyl mercury. Although this assumption may be reasonable, no scientific citation is given, and it does not appear to be a conservative estimate.

Third, by comparing clam tissue data (trophic level 2) to a proposed action limit based on a fish tissue concentration (trophic levels 2, 3 and 4), the applicant assumes that methyl mercury will not biomagnify as it moves up the food web. EPA recommends that ACE apply a conservative biomagnification factor to account for the propensity of methyl mercury to biomagnify as it is transferred from trophic level 2 to trophic levels 3 and 4.

EPA has evaluated the above factors (i.e., steady state, % methyl mercury and biomagnification) across a broad range of scenarios using different sets of assumptions (see Table 2 below). It is noteworthy that even the Low End Scenario estimated fish tissue concentration (0.094 mg/kg), which is based on nonconservative assumptions, exceeds the SEF TTL2 (0.040 mg/kg) by more than a factor of two.

New Dredged Surface

EPA is also concerned that the new dredged surface in Douglas Harbor (i.e., the bottom of the harbor after dredging) will expose aquatic organisms to mercury contaminated sediment that is presently isolated. EPA recommends that ACE require the applicant to cap the bottom of the harbor with a sufficient volume of clean fill material immediately after the dredging operation is complete.

Table 2. Range of Scenarios for Interpreting Bioaccumulation Data Based on a Range of Assumptions Regarding Steady State, % Methyl Mercury and Biomagnigication

Douglas Harbor, Lower Composite, *Macoma nasuta*, wet weight	Low End Scenario (based on nonconservative assumptions)	Static Scenario (clam tissue concentration = fish tissue concentration)	Mid-Range Scenario (based on moderately conservative assumptions)	High End Scenario (based on conservative assumptions)
Mean Total Mercury Tissue Concentration (mg THg/kg)	0.213	0.213	0.213	0.213
Steady State Conversion Factor	1	1	1.75 Note A	2.5 Note B
Estimated Steady State Tissue Concentration (mg THg/kg)	0.213	0.213	0.373	0.533
% Methyl Mercury Conversion Factor	44% Note C	100%	64% Note D	100% Note E
Estimated Methyl Mercury Tissue Concentration (mg MHg/kg)	0.094	0.213	0.239	0.533
Biomagnification Factor (from trophic level 2 to trophic level 3 & 4)	1	1	>1 Note F	>1 Note F
Estimated Fish Tissue Concentration (mg MHg/kg)	0.094	0.213	>0.239	>0.533

Notes:

A: Best et al. (September 2005), http://el.erdc.usace.army.mil/elpubs/pdf/trel05-15.pdf

B: Recommended by ACE, Engineer Research & Development Center, Dr. Lotufo.

C: Estimated in NewFields Supplemental Report, Revised June 2009. Basis or citation omitted.

D: Best et al. (September 2007), http://el.erdc.usace.army.mil/elpubs/pdf/trel07-21.pdf

E: Worst case assumption.

F: Based on propensity of methyl mercury to biomagnify as it transfers up the food web.

Enclosure 2

EPA Comments on the Douglas Harbor Dredging Project under the Inland Testing Manual

Inland Testing Manual Tier III Evaluation: Benthic Bioaccumulation	EPA Evaluation of Douglas Harbor Bioaccumulation Test Results
"Based on tissue comparisons with Food and Drug Administration (FDA) levels, one of the following conclusions is reached: • Tissue concentrations of one or more contaminants are not statistically less than the FDA levels. Therefore, the dredged material is predicted to result in benthic bioaccumulation of contaminants. • Tissue concentrations of all contaminants either are statistically less than FDA levels or there are no FDA levels for the contaminants. In this case, the information is insufficient to reach a conclusion with respect to benthic bioaccumulation of contaminants. The dredged material needs to be further evaluated in Tier III as described below for bioaccumulation potential to furnish information to make determinations under the Guidelines." [Pages 6-4 & 6-7]	The FDA action level for methyl mercury is 1.0 parts per million (ppm). Tissue concentrations were measured as total mercury, not methyl mercury. However, even if we assume that 100% of the total mercury was present in the form of methyl mercury, the highest tissue concentration was 0.213 ppm for Macoma nasuta in the Lower Composite sample. Therefore, EPA concludes that tissue concentrations of methyl mercury are statistically less than the FDA action level.
"Tissue contaminant concentrations following exposure to dredged material which are statistically less than FDA levels, or for which there are no such levels, are compared to tissue contaminant concentrations for organisms similarly exposed to reference sediment. One of the following conclusions is reached based on this comparison: • Tissue concentrations of contaminants of concern in organisms exposed to dredged material do not statistically exceed those of organisms exposed to the reference sediment; therefore, the dredged material is predicted not to result in benthic bioaccumulation of contaminants. However, benthic toxicity effects also have to be considered.	EPA concludes, based on data collected for this project, that tissue concentrations of methyl mercury in organisms exposed to dredged material statistically exceed those of organisms exposed to the reference material.

Inland Testing Manual Tier III Evaluation: Benthic Bioaccumulation	EPA Evaluation of Douglas Harbor Bioaccumulation Test Results
• Tissue concentrations of contaminants of concern in organisms exposed to dredged material statistically exceed those of organisms exposed to the reference material. In this case, the final conclusion regarding benthic bioaccumulation of contaminants would be based upon technical evaluations that emphasize the various factors deemed appropriate in a particular region (see last paragraph in this section). Additional testing (Tier IV) may be required." [Page 6-7]	
"When the bioaccumulation of contaminants in dredged-material tests statistically exceeds that in reference-material tests, five factors should be assessed. Where available, regional guidance should be consulted regarding the relative importance of these factors: • What is the toxicological importance of the contaminants (e.g., Do they biomagnify? Do they have effects at low concentrations?) whose bioaccumulation from the dredged material statistically exceeds that from the reference material? • By what magnitude does bioaccumulation from the dredged material exceed bioaccumulation from the reference material? • What is the propensity for the contaminants with statistically significant bioaccumulation to biomagnify within aquatic food webs (Kay, 1984)? Contaminants which biomagnify appear to be few in number but widespread, and include DDT, PCB, methylmercury and, possibly, dioxins and furans. • What is the magnitude by which contaminants whose bioaccumulation from the dredged material exceeds that from the reference material also exceeds the concentrations found in comparable species living in the vicinity of the proposed disposal site? • For how many contaminants is bioaccumulation from the dredged material statistically greater than bioaccumulation	• The toxicological importance of mercury is well documented. See: "Mercury Study Report to Congress," EPA, December 1997, http://www.epa.gov/mercury/report.htm; "Toxicological Profile for Mercury," ATSDR, March 1999, http://www.atsdr.cdc.gov/toxprofiles/tp46.html; and "Global Mercury Assessment," UNEP, December 2002, http://www.chem.unep.ch/mercury/Report/GMA-report-TOC.htm. Methyl mercury does biomagnify and it has effects at low concentrations (e.g., below the FDA action level). • Bioaccumulation from the Lower Composite dredged material exceeds that from the reference material by more than an order of magnitude: 0.213ppm/0.016ppm = 13.3 • Methyl mercury tends to biomagnify within aquatic food webs. It is widespread and is the subject of numerous fish advisories nationwide. • There is insufficient information to assess comparable species living in the vicinity of the proposed disposal site. • Mercury is the only contaminant of concern in this case.

Inland Testing Manual Tier III Evaluation: Benthic Bioaccumulation	EPA Evaluation of Douglas Harbor Bioaccumulation Test Results
from the reference material?" [Page 6-8]	
"After considering these factors, one of the following Tier III conclusions is reached: • Discharge of the dredged material is predicted not to result in above-reference toxicity or benthic bioaccumulation of contaminants. • Discharge of the dredged material is predicted to result in above-reference toxicity or bioaccumulation of contaminants. • Further information is needed to make factual determinations, specifically in Tier IV." [Pages 6-8 & 6-9]	EPA concludes that discharge of the dredged material from the Lower Composite is predicted to result in above reference bioaccumulation of methyl mercury. Therefore, the lower layer of sediment in DMMUs 1, 2, 4A and 4B is unsuitable for unconfined aquatic disposal. EPA recommends that the dredged material from the lower sediment layer be placed in an upland disposal facility or in a confined aquatic disposal facility.