UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
P.O. Box 21668
Juneau, Alaska 99802-1668

July 11, 2005

Ms. Nancy Sonafrank, Section Manager
Alaska Department of Environmental Conservation
Water Quality Assessment and Monitoring Program
610 University Avenue
Fairbanks, Alaska 99709

Dear Ms. Sonafrank:

The National Marine Fisheries Service (NMFS) has reviewed proposed revisions to the residue criteria for Alaska Water Quality Standards. Based on information provided NMFS offers comments on the Alaska Department of Environmental Conservation's (DEC) proposed changes to the existing residue criteria in 18 AAC 70.020(b)(8) and (b)(20) of the Alaska Water Quality Standards as it relates to resources of our concern under the Endangered Species Act, the Marine Mammal Protection Act, the Fish and Wildlife Coordination Act and the Essential Fish Habitat provisions of the Magnuson-Stevens Fishery Conservation Management Act. In addition we have attached comments from scientists at our Auke Bay Laboratory on the draft document reviewing literature on the impacts of residues on the aquatic environment.

Residues are defined as floating solids, debris, sludge, deposits, foam, scum, or any other material or substance remaining in a water body as a result of direct or nearby human activity. Examples of residues include seafood waste from processing facilities and bark waste at log transfer facilities.

Residue criteria is used for:

- Wastewater discharge permitting and compliance, where residue discharges may be allowed in mixing zones or zones of deposit;
- Waterbody assessment where the Department evaluates whether a waterbody meets the designated uses assigned to those waters;
- Waterbody recovery plans; and Enforcement actions for water quality violations.

Currently a zero-based criterion specifies that residues may not "be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines" except as authorized in a wastewater discharge permit. DEC proposes to replace this standard with less stringent language which allows for more interpretation. For example, under the standard addressing growth and propagation of fish, shellfish, other aquatic life and wildlife, the existing language states:

> "May not, alone or in combination with other substances or wastes, make the water unfit or unsafe for the use, or cause acute or chronic problem levels as determined by bioassay

or other appropriate methods. May not, alone or in combination with other substances, cause a film, sheen, or discoloration on the surface of the water or adjoining shorelines; cause leaching of toxic or deleterious substances; or cause a sludge, solid, or emulsion to be deposited beneath or upon the surface of the water, within the water column, on the bottom, or upon adjoining shorelines."

The new proposed language would read:

"May not, alone or in combination with other substances, be present in concentrations or amounts that settle to form objectionable deposits or result in undesirable or nuisance species."

While NMFS recognizes that the current narrative criteria may be subject to interpretation, we are concerned that the language in the proposed revision is so vague as to be unenforceable. For example, descriptive terms such as "objectionable", "undesirable" and "nuisance" are difficult to quantify or define, making it difficult to measure when the criteria for the standard have been exceeded.

Therefore, NMFS recommends that DEC retain the more specific existing residue criteria, which assures that designated uses and standards are protective of resources of our concern. Should DEC decide to go forward with the proposed changes, NMFS recommends that DEC develop implementation guidance with prescribed requirements for monitoring in order to determine what forms an "objectionable deposit" or results in an "undesirable or nuisance species".

Should you have any questions regarding these comments please contact Ms. Jeanne Hanson at (907) 271-3029. Additional information regarding NMFS' trust resources can be found at http://www.fakr.noaa.gov/protectedresources/default.htm and http://www.fakr.noaa.gov/habitat/default.htm.

Sincerely,

James W. Balsiger
Administrator, Alaska Region

Enclosure

cc: USFWS, ADNR-OHMP, ADEC – Anchorage

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Review of "Environmental Impacts of Residues on the Aquatic Environment" - Draft for Stakeholder Review (7/26/04)

The review focuses on the three primary residues of current concern in Alaska: accumulation of woody debris, submarine mine tailings, and seafood processing waste. The purpose of the standard for residues is to prevent burial and smothering of benthic organisms. Recent research on these three topics suggests residues are also capable of altering the habitat for sufficient time to alter the ecology of the area. The potential short and long-term toxicity as well as their potential to alter the topography of the benthos could easily affect critical fish habitat for nearshore fish and invertebrates as well as altering the availability of prey in the area. The review does a good job of summarizing the possible short-term effects: smothering, oxygen levels, toxicity, and organic enrichment. The draft standards reflect this focus on the short term by setting criteria that can be measured by acute bioassays, with less mention of the potential for altering the ecology of the area. Although this effect is mentioned for submarine tailings in the Executive Summary and the word "chronic" does appear in the standards, the greatest probability for effects on essential fish habitat lies more with long term ecological change than with short-term toxicity or smothering. Comment on specific types of residues follow:

Woody Debris

The time scale of potential impacts to essential fish habitat and the issue of chronic toxicity do not emerge from the literature review. The result minimizes the problems associated with woody debris.

1. Time scales: The two page summary lays out the problems and research on LTF sites with woody debris. The time scales are under-emphasized, although one sentence in the "Direct Physical Impacts" section correctly states "Log bark degrades very slowly and has been observed to persist for decades after LTF operations cease." Woody debris does persist at LTF sites for decades, resulting in long-term impacts of LTFs on fish habitat. The implication of the review is that if there is no short term toxicity, there are no problems with these sites.
2. Acute versus chronic toxicity; Given that these woody debris piles will persist for decades, chronic toxicity issues should be discussed. The tone of the piece concedes that oxygen and chemical toxicity issues will persist within the pile, and the reader can infer from that statement that there will be chronic toxicity issues in the immediate area above and around the debris piles. Those would be difficult to quantify. Survival may not be affected, but productivity might be. The distance above and around the pile that has chronic effects may be very limited (as in the oxygen discussion), but may be extended further in space and time in the case of toxic chemicals, particularly those that are more organic in nature.

On page 10, a box containing the "Final Decision Document" does not appear to be an adequate finding. The first paragraph correctly summarizes the research findings, but (as noted above) time scale is not mentioned here. In item 5 for example, "LTF activities in conformity with the

general permits will interfere with recreation uses and the harvesting of aquatic resoures within the project area"- What is missing here is "for decades".

The Decision Document states: " Taken as a whole, the evidence and testimony clearly supports DEC's basic finding: that only significant impact of bark and wood debris on the benthic environment is the burial of organisms on the marine bottom, and that toxicity will not occur outside of the bark and wood debris pile." This statement does not mention that the burial of the natural bottom can last decades, and that it is only acute toxicity that will not occur outside the pile. Research by O'Clair and Freese (1988), Buchanan et al. (1976), Chang and Levings (1976) and Morado et al. (1988) demonstrates the potential for reproductive and histological effects on Dungeness crabs associated with bark deposits from Log Transfer Facilities. Significant impacts of bark and wood debris on the benthic environment include the burial of organisms on the marine bottom, the likely impairment of the reproductive condition of Dungeness crabs, and that chronic, sublethal toxicity will most likely occur outside of the bark and wood debris pile.

The literature review is fairly complete; however, the following references should be included in both the review and in the literature cited:

Faris, T. L. And K. D. Vaughan. 1985. Log transfer and storage facilities in southeast Alaska: a review. General Technical Report PNW-174. U.S. Forest Service, Portland, OR. 24 pp.

Ch2M-Hill. 1982. Environmental review of the Shee Atika Cube Cove log transfer facillity. Prepared for Shee Atika, Inc., Sitka, AK. CH2M-Hill, Inc., Bellevue, WA.

Freese, J.L., R.P. Stone, and C.E. O'Clair. 1988. Factors affecting benthic deposition of bark debris at log transfer facilities in southeast Alaska: A short-term retrospective evaluation. NOAA Technical Memorandum NMFS F/NWC-136. 74 pp.

Meyers, T.F. 1977. Effects of Logging Study: A summary of NMFS activities. National Marine Fisheries Service, Environmental Assessment Division, Juneau, AK. 63 pp.

Peters, G.B., H.J. Dawson, B.F. Hrutfjord, and R.R.Whitney. 1976. Aqueous leachate from western red cedar: effects on some aquatic organisms. J. Fish. Res. Board Can. 33:2703-2709.

Schaumburg, F.D. 1973. The influence of log handling on water quality. Report EPA-R2-73-085. U.S.Environmental Protection Agency, Office of Research and Monitoring. Washington, D.C. 105 pp.

Submarine Tailings

The following three papers, with Alaskan species, are relevant. The literature in the review relies heavily on studies sponsored by the mining industry. These three were done by government scientists. Inclusion of these studies would impart a more comprehensive overview of the subject.

Johnson, S. W., R. P. Stone, and D. C. Love. 1998. Avoidance behavior of ovigerous Tanner crabs (*Chionoecetes bairdi*) exposed to mine tailings: a laboratory study. Alaska Fish. Res. Bull. 5:39-45.

Avoidance behavior was examined in ovigerous Tanner crabs (*Chionoecetes bairdi*) exposed to mine tailing produced in a pilot plant associated with a proposed gold mine near Juneau, Alaska. Individual crabs were placed in a circular tank that was divided into 4 equal sections containing natural marine sediment (control) and tailings in alternate sections. A time-lapse video camera recorded the position of each crab within the tank over 24 h. Crabs spent significantly more time on control sediment (61%) than on tailings (39%). Of 25 test crabs, 19 spent the most time ($\geq$ 12 h) on control sediment, whereas only 6 crabs spent the most time on tailings. Tanner crabs may avoid areas affected by submarine disposal of tailings during the life of the mine. Location of potential submarine tailings disposal sites in areas with high natural sedimentation may accelerate recovery of the sea floor by rapid burial of tailings.

Johnson, S. W., S. D. Rice, and D. A. Moles. 1998. Effects of submarine mine tailings disposal on juvenile yellowfin sole (Pleuronectes asper): a laboratory study. Mar. Pollut. Bull. 36:278-287.

Behavior, survival, and growth studies were conducted in the laboratory on juvenile yellowfin sole (*Pleuronectes asper*) exposed to mine tailings produced in a pilot plant associated with a proposed gold mine near Juneau, Alaska. Fish avoided fresh tailings in favor of natural marine sediments (control) and weathered tailings (75 years old). Only when fresh tailings were covered with 2 cm of control sediment did fish prefer control and fresh tailings equally. Survival of fish was similar for fish held on all test sediments. Fish held on fresh tailings for 60 d grew significantly less than control fish during the first, but not the second month. Avoidance or short-term reductions in flatfish growth may occur from submarine disposal of tailings. Rapid burial of tailings in areas with high natural sedimentation (e.g., large river mouths) may accelerate recovery of the sea floor.

Stone, R. P. and S. W. Johnson. 1997. Survival, growth, and bioaccumulation of heavy metals by juvenile Tanner crabs (*Chionoecetes bairdi*) held on weathered mine tailings. Bull. Environ. Contam. Toxicol. 58:830-837.

Objectives of this study were to determine the bioavailability of heavy metals to juvenile Tanner crabs held for 500+ d on weathered mine tailings, and to examine possible effects on survival, growth, and health of the animals. After decades of weathering, tailings deposited into Gastineau Channel from the Alaska-Gastineau Mine do not appear to be deleterious to juvenile Tanner crab. We found no significant differences in survival and growth of crabs held on tailings and control sediment for 500+ days and through two molts. Tissue burdens of metals were also similar between treatments. Whether or not there was some leaching and increased bioavailability of metals the first few years after tailings disposal ceased is unknown. Thus, future studies should focus on metal leaching and potential impacts to biota that may occur within the first few years after tailings are deposited on the sea floor.

The Table on Page 40 could be amended to include the following:

Increased compaction of sediments	Altering long-term particle size of benthos leading to changes in community structure	Avoidance by crabs and flatfishes