Comments
Alaska Department of Environmental Conservation
Dredged Material Evaluation for the Douglas Harbor Marina
Juneau, Alaska

Comments:

1. DMMU 1 was not uniformly sampled, Was there a reason for this? The southwest arm of DMMU 1 was not sampled (pg 10). While the overall dredging footprint is well sampled, especially relative to EPA requirements, a major portion of DMMU 1 seems to have been left out. Since the decision was made to separate out the footprint into smaller areas, those areas should be sampled as uniformly as possible.
Response to Comment 1. The southwest arm of DMMU 1 was not re-sampled in 2008; sediment was collected with a tug and vibratory hammer and maneuvering the barge into the southwest arm of DMMU 1 would have been problematic. PND conducted a survey of Douglas Harbor in 2007 (PND 062065), stations PND07-09, 10, and 11 were sampled and chemical analysis was performed. These stations are within the southwest arm of the *current* DMMU 1 and have been included on Figure 3-1. The mercury data collected from station PND07-11 was reported as 1.3 mg/kg which is comparable to current mercury levels reported for composites samples of DMMU 1 (concentrations were 1.11 and 1.29 mg/kg for Area 1 Upper and Lower composites respectively). Further, field notes from the 2007 sampling of stations PND07-09, 10, and 11 are similar to notes collected for the stations within the current DMMU 1 footprint. The location of the stations within DMMU 1 was included in the project SAP delivered and approved the agencies prior to sampling.
2. Sampling depth at 2 locations in DMMU 1 are substantially short. They both start at +8 ft, and go down only 1.5 ft, to +6.5 ft, Is there a way, using historical photos, survey information, and engineering information, to judge at what depth native fill material starts in the area? At present there are only two complete stations representing the area. Are we correct in assuming that the map on pg 10 is the proposed sampling locations and Figure 3-1 on pg 31 is the actual sampling locations?
Response to Comment 2. Several attempts were made to collect cores at all locations (Appendix A) using the vibratory hammer core. Large rocks and riprap materials were encountered during some attempts preventing penetration to project depth. Sediment cores were collected from each of four locations ranging from approximately 10 inches (PND07-02 and PND07-03) to 10.5 ft of sediment. These four stations were sampled by PND in 2007 using either a diver core or drilling rig. The data for this sampling event is summarized in PND (062065). As noted in the response to Comment 1, similar mercury concentrations and sediment types were reported for the 2007 and 2008. A chemical data report was published by the USACE in April of 1995. Samples were collected from within the federally mandated dredging limits and the entrance channel. The reported mercury concentration from this report was 2 mg/kg which is comparable to both the 2007 and 2008 studies. Review of sediment photos collected ad PND-07-01shows about 2 to 3 ft of black silty clay

material followed by up to 8 feet of grey sand. The sand becomes more hard-packed and dense around 8 ft below MLLW. PND-07-04 had a similar black silty clay layer for the first 2 ft followed by grey sand. This grey sand is most likely native material. Grey sand was encountered at all four sampling stations during the 2007 below the newer black silty-clay material. It is reasonable to assume the native material starts about 2 to 3 ft below the more recent sediment deposition in the DMM1 Area.

The target sampling locations are shown in Figure 1-5. Figure caption has been changed to Douglas Harbor Site Map with *Target* Field Sampling Locations and Compositing Strategy. Figure 3-1 shows the actual sampling locations.

3. The northeast part of DMMU 4, based on Figure 1-5, is not well sampled. Please include a brief description of why this occurred.

Response to Comment 3.

DMMU 4 was divided into two sample composites Composite 4A and Composite 4B. Each of these composites consisted of sampling locations previously investigated (PND07 designation) and new station locations (NF08 designation) collected from areas with more recent sediment

deposition. The PND07 samples were collected to provide a basis of comparison with previous studies and to determine if site conditions were changing through time. DMMU 4 represents approximately 15,000 cubic yards of material. According to ITM guidance (see Table 1-2) only 4 stations and 1 composite are required for 5 to 20,000 cubic yards of dredged volume. DMMU 4 consisted of eight stations and two composites, twice the number required by guidance.

4. Please expand Table 3-1 to include the depth at which sediment in DMMU 4 was separated from upper to lower composites. The information is included in Appendix A; however, it is very difficult to decipher some of the field notes. Tables 3-16 on page 51, 3-18 on page 53, 3-19 on page 54: the pH and salinity data look a little strange. Were pH and salinity numbers flipped, or was a table imported without cleaning out old data?

Response to Comment 4.

Two columns have been added to Table 3-1 that show the length of each core used in the upper and lower composites.

The headings on the pH and salinity columns were switched in Tables 3-16 and 3-19, the data are correct and the tables have been corrected. Table 3-18 does not contain salinity or pH data.

5. Table 3-21 on page 57 is pretty bleak. The upper sediment in DMMU 4 has enough contamination to be substantially toxic to the mussel larvae. Please include a discussion of these results and any explanations for the low survival values in Table 3-21. The results of the modeling effort are not sufficient to exclude these mortalities from overall consideration of the project.

Response to Comment 5

The results of the mussel test are definitive and pass the requirements for suitability for aquatic disposal based on section 6.1 of the ITM. The modeled concentration at the edge of the disposal site does not exceed the limiting permissible concentration. Further, the results of the larval development test in Table 3-21 are the percent of organisms with normal development, not percent survival. As discussed in Section 4.3 and shown in Table 4-6, it appears that ammonia concentrations contributed to the test results. Ammonia concentrations in the upper composites were near or above those concentrations which caused effects in the ammonia reference toxicants tests.

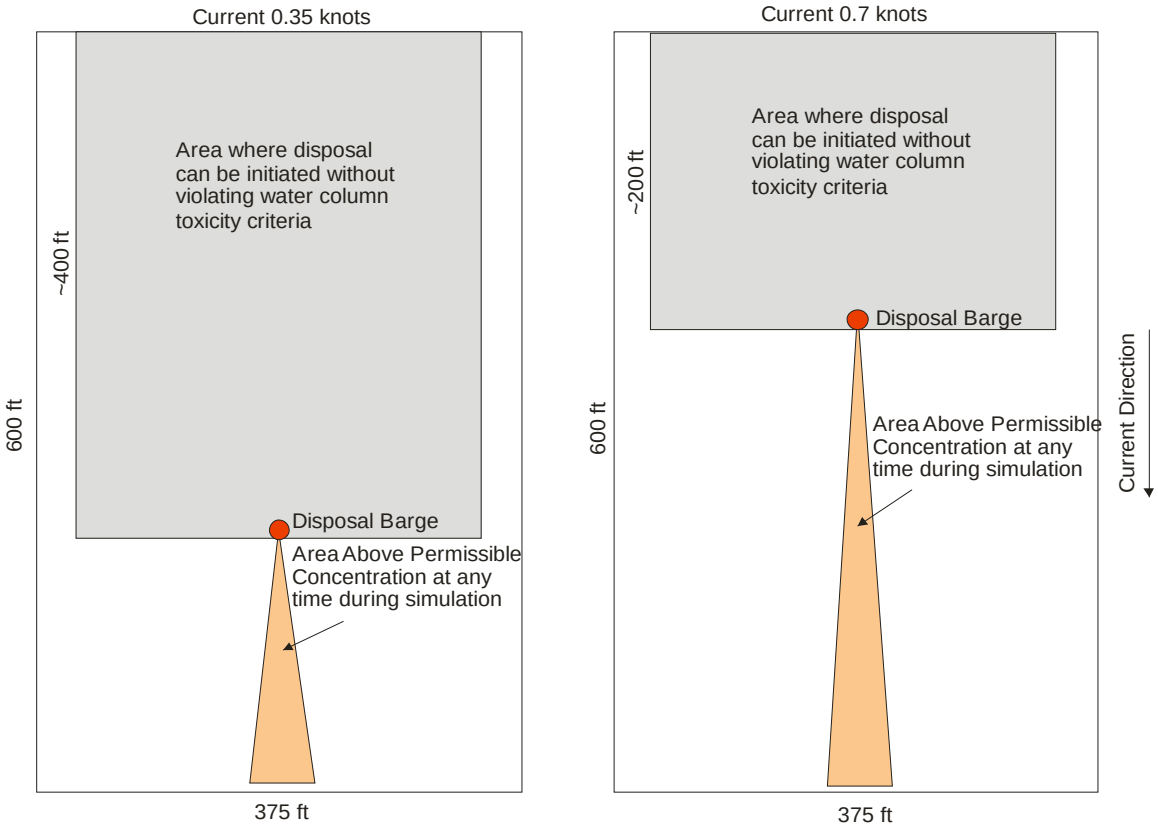
The model used one percent of the lowest EC_{50} data (4B Upper) to determine whether toxicity criteria were violated. This is a conservative application as noted in the ITM (Section 11.1.6) which states "Note that the 0.01 factor is intended for acute mortality data (e.g., relating acute to chronic toxicity) and not for more subtle effects such as abnormalities, growth or reproduction, including EC_{50} data (NAS, 1972)."

6. Section 4.3.1: The modeling effort appears to be insufficient. The current chosen for the one model run was 0.083 feet per second. Maximum currents listed for Juneau in 2009 are calculated to reach 0.7 knots (2009 NOAA Tides and Currents). This is 14X the current speed chosen. Because the disposal of dredged materials is a dynamic process occurring over the entire range of tides, the range of currents encountered should be used in separate runs of the

mode1 to bracket the expected sediment and water column transport. This would ensure that the conditions are accurately depicted at the disposal site during disposal activities. Unless all dumping will occur at the upcurrent end of the defined disposal area, as modeled, runs should start at the center of the disposal area, or a series of runs should be done from both the upcurrent and downcurrent ends of the disposal area.

Response to Comment 6.

The STFATE model has been rerun using two current input velocities of 0.35 knots (0.59 feet per second) and 0.7 knots (1.18 feet per second) in the longitudinal direction of the disposal site. The slower velocity was selected because it corresponds to the most frequently occurring current (0.3-0.4 knots). Because the disposal site is so small the dump site was retained at the upcurrent end of the site under the assumption that disposal would be done at whichever end of the site was upcurrent at the time. The figure below shows the area within the disposal site where disposal can be initiated without violating water column toxicity criteria under each current scenario.



7. Section 4.3.1: Please expand the description of the SFATE model input parameters and discussion of the results that lead to the statement in Table 4-7 that states the "Water Quality Criteria" were not violated. Also please compare these results with the Alaska water quality standard for mercury for Aquatic Life saltwater (acute) 1.8 µg/L (one-hour average) dissolved and the Aquatic Life Saltwater (chronic) 0.94 µg/L (four-day average) dissolved (from *Alaska*

Water Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances, as amended through May 15, 2003). The discussion should include modeling under a range of current velocities, as discussed above.
Response to Comment 7. The description and Table 4-7 have been expanded to include additional input parameters pertinent to the site. Table 4-7 has also been modified to change the words "Water Quality Criteria" to the more appropriate "Water Column Toxicity Criteria". Note that the model criterion is that the diluted concentration is below 1% of the EC_{50} for the larval test, not a specific concentration of mercury. However, if the pore water measurements shown in Table 3-7 are compared to the Aquatic Life Saltwater Criteria, it can be seen that there would be no violation of these criteria; the highest porewater concentration observed was 29.2 ng/L or 0.029 µg/L, well below even the chronic criterion of 0.94 µg/L.