

17 November 1999

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION OF THE SUITABILITY OF DREDGED MATERIAL TESTED UNDER DMMP EVALUATION PROCEDURES FOR JAMES HARDIE GYPSUM (95-2-00837) FOR DISPOSAL AT THE ELLIOTT BAY OPEN-WATER DISPOSAL SITE.

1. James Hardie Gypsum proposes to maintenance dredge approximately 10,000 cubic yards of sediment from the vicinity of its dock in the Duwamish Waterway at Seattle Washington. The following summary reflects the DMMP agencies (Corps of Engineers, Department of Ecology, Department of Natural Resources and the Environmental Protection Agency) consensus decision on the acceptability of the sampling plan and all relevant test data to make a determination of suitability for the disposal of the material at a DMMP open-water disposal site.
2. The ranking for this area is "high" based on guidance provided in the PSDDA User's Manual, February 1998, page 17, and in the Management Plan Report, Phase II, page A-10.
3. Sampling and analysis was completed in two rounds. A sampling and analysis plan for Round I was completed for this project and approved by the DMMP agencies on 6 November 1998. Round I sampling for this project was performed on 28 November 1998. The sampling and analysis plan for Round II was approved by the agencies on 27 June 1999. Sampling was completed for Round II on July 15 and 16, 1999.

SAP approval dates	6 November 1998 27 June 1999
Sampling dates	28 November 1998 15, 16 July 1999
Data Report submittal date	14 October 1999
Recency determination date	6 November 2000 (Round I) 15 July 2001 (Round II)

4. Round I sampling was completed on 5 surface DMMUs. DMMU 1 had no SL exceedances. DMMUs 2, 3, 4, and 5 exceeded the screening value for PCBs, and required biological testing. All detection limits for Round I chemical sampling were below screening levels.

5. Biological testing was completed on Round 1 sediments from DMMUs 2, 3, 4, and 5. The sediment larval test, using *Strongylocentrotus purpuratus*, failed to meet performance requirements due to high mortality in the reference sediment. For this reason, the test results were rejected and retesting was required.
6. The second round of sampling was undertaken in an attempt to isolate any chemical contamination and provide adequate information for decision-making. Sampling locations and corresponding DMMUs were designated as 2b, 3, 4, 5, A, B, C, D, and E. In this second round, samples A and 4 had no SL exceedances and did not require further testing. Round II samples 2b, 3, 5, B and E exceeded the screening level for PCBs. Sample C exceeded the screening level for phenanthrene, pyrene, dibenzo(a,h)anthracene and PCBs. Sample D exceeded the screening level for mercury, dieldrin and PCBs. No bioaccumulation triggers or maximum levels were exceeded (see Table 2).
7. Due to the exceedances of screening levels, biological testing was required for samples 2b, 3, 5, B, C, D, and E. The amphipod 10-day acute toxicity test, the bivalve sediment larval combined mortality and abnormality (effective mortality) test, and the *Neanthes* 20-day growth test were conducted. Tests were conducted according to the guidelines specified by PSEP (1995), as modified by the PSDDA program.
8. Reference sediment for use in the bioassays came from Carr Inlet. Control sediment was collected from Naragansett Bay. *Ampelisca Abdita* was used for the amphipod bioassay. The echinoderm *Dendraster excentricus* was used in the larval test.
9. Bioassay results are listed in Table 3. Samples B and E passed the bioassays. Sample 2b, 3, 5 and D had one-hit failures in the bioassays. Sample C failed the bioassays based on 2-hit criteria.
10. In summary, the DMMP-approved sampling and analysis plan was followed, and quality assurance, quality control guidelines specified by the DMMP were followed. The data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program. Based on the results of the chemical and biological testing from Rounds I and II, the consensus determination of the DMMP agencies is that 4,486 cubic yards of sediment from the James Hardie site (represented by sample locations 1, 4, A, B and E) is suitable for open-water disposal and that 4,743 cubic yards of material (represented by samples 2, 3, 5, C and D) is unsuitable for open-water disposal.
11. This memorandum documents the suitability of proposed dredged sediments for disposal at an open-water disposal site or for beneficial use. It does not constitute final agency approval of the project. A dredging plan for this project must be completed, outlining the sequence for dredging the suitable and unsuitable material, prior to project initiation.

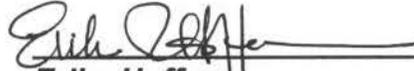
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Concur:

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Table 1. Sediment Conventional Parameters¹

Parameter	Sample 1	Sample 2b	Sample 3	Sample 4	Sample 5	Sample A	Sample B	Sample C	Sample D	Sample E
Total Solids (%)	56.8	51.6	52	51.4	52.7	51.5	52.4	52.6	54.2	56.8
Total Organic Carbon (%)	1.3	1.9	1.5	1.9	1.9	2.1	1.9	1.9	1.8	1.5
Bulk Ammonia (mg/kg)	60	53	65	46	54	37	64	37	86	12
Total Sulfides (mg/kg)	93	950	780	470	860	320	540	420	1100	860
Grain-size (%)										
gravel					0.3	0.7	2.8	8.0	0.4	
sand		16.5	12.8	9.8	16.4	15.8	14.9	21.2	21.6	23.3
silt		70.2	62.9	62.4	73.9	67.4	55.7	48.3	68.4	65.1
clay		12.0	24.4	27.8	9.6	16.4	26.6	22.4	9.6	11.6

1. Data for Sample 1 taken from Round I. Data for all other samples taken from Round II.

Table 2. Round II SL Exceedances

Sample	PCBs ($\mu\text{g}/\text{kg}$)	Phenanthrene ($\mu\text{g}/\text{kg}$)	Pyrene ($\mu\text{g}/\text{kg}$)	Fluoranthene ($\mu\text{g}/\text{kg}$)	Mercury (mg/kg)	Dieldrin ($\mu\text{g}/\text{kg}$)
2b	140					
3	175					
5	139					
B	137					
C	142	2200	2800	2400		
D	1010				0.432	11
E	590					

Table 3. Bioassay Results

Sample	Amphipod Mortality (<i>Ampelisca abdita</i>) (%)	Sediment Larval Test (<i>dendraster excentricus</i>) (effective mortality %)	20 Day Neanthes Growth (mig)	Suitability for Non-Dispersive Disposal
Control	10	28.8	0.98	NA
Carr Inlet 02	23	1.16	1.02	NA
Carr Inlet 10	23	26.85	0.85	NA
2b	54*	17.5	0.90	Fail
3	55*	23.4	0.77	Fail
5	49+	40.7*	0.75	Fail
B	48+	14.4	0.76	Pass
C	39	29.6+	0.68+	Fail
D	52+	51.7*	0.73	Fail
E	40	22.7	0.86	Pass

* one-hit
+ two-hit