

MEMORANDUM FOR: RECORD

September 9, 2008

SUBJECT: SUPPLEMENTAL DETERMINATION REGARDING THE SUITABILITY, WITH RESPECT TO DIOXIN, OF PROPOSED DREDGED MATERIAL FROM DELTA MARINE INDUSTRIES, DUWAMISH RIVER, SEATTLE, KING COUNTY, FOR UNCONFINED OPEN-WATER DISPOSAL AT THE ELLIOTT BAY NONDISPERSIVE SITE.

1. **Introduction.** This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Washington Departments of Ecology and Natural Resources, and the Environmental Protection Agency) regarding the suitability, with respect to dioxin, of up to 6,534 cubic yards (cy) of dredged material from the Delta Marine Industries facility for disposal at the Elliott Bay nondispersive open-water site.
2. **Background.** A suitability determination was issued for this project on October 19, 2007 (DMMP, 2007). The determination included both maintenance dredging to -10 feet MLLW (DMMU 1), covered by existing permit 200200175, and dredging to -15 feet MLLW, part of which was to be covered by a modification of the existing permit (DMMU 3) and part of which was to be covered by a new permit (DMMU 4). DMMU 1 was dredged and disposed of at the Elliott Bay open-water site in January 2008 under the existing permit.

Dioxin testing was not required for the October 19, 2007 suitability determination. However, subsequent to that determination, a report was published by the Lower Duwamish Workgroup that showed elevated concentrations of dioxin in close proximity to the Delta Marine facility (LDWG, 2008). The DMMP agencies, in conjunction with EPA's Superfund Program, requested that Delta Marine conduct dioxin testing on the new-work material (6,534 cubic yards in DMMUs 3 and 4) to determine whether it would meet the interim dioxin disposal guidelines for the Elliott Bay site. Modification of permit 200200175 (to include DMMU 3) and issuance of a new permit (for DMMU 4), were made contingent on the results of the dioxin testing.

3. **Project Summary.** Table 1 includes project summary and tracking information.

Table 1. Project Summary

Project ranking	High
Total dredging volume	6,534 cubic yards
DMMU 3 volume	2,629 cubic yards
DMMU 4 volume	3,905 cubic yards
Proposed dredging depth	-15 feet MLLW
Draft dioxin analysis plan received	May 21, 2008
Draft dioxin analysis plan returned for revisions	June 3, 2008
Revised dioxin analysis plan received	June 23, 2008

Revised dioxin analysis plan approved	July 1, 2008
Data report received	August 22, 2008
DAIS Tracking number	DELTA-1-A-F-244
USACE Permit Application Numbers	NWS-200200175 (existing) NWS-2008320-NO (new)

Note: Volumes include 2 feet of overdepth and a 10% bulking adjustment.

4. **Testing Requirements.** The DMMP agencies, in conjunction with the Superfund program, required dioxin testing of DMMUs 3 and 4, as well as the z-sample from station S-3 (DMMU 3). Sediment from the original sampling effort in July 2007 had been stored at -20° C at Analytical Resources Incorporated. The holding time for sediment stored at this temperature is 1 year. Since the analysis of the archived sediment was scheduled to take place within the 1-year holding time, the DMMP agencies approved this approach. A dioxin analysis plan was drafted by AMEC (AMEC, 2008a) and approved by the DMMP agencies.

5. **Chemical Analysis.** The approved analysis plan was followed and quality control guidelines were met, with minor exceptions. The data (AMEC, 2008b) were considered sufficient and acceptable for regulatory decision-making under the DMMP program. The dioxin results are shown in Table 2. The toxicity equivalents (TEQs, with undetects = ½ detection limit) for DMMU 3 and DMMU 4 were 3.53 and 0.82 part per trillion (pptr) respectively.

6. **Sediment Exposed by Dredging.** Sediment exposed by dredging must either meet the State of Washington Sediment Quality Standards (SQS) (Ecology, 1995) or the State's antidegradation standard (DMMP, 2008). There is currently no SQS for dioxins/furans, therefore the State's antidegradation standard was used. The z-sample from station S-3, underlying DMMU 3, represents the sediment that will be exposed by dredging. The TEQ for this z-sample was 0.45 pptr. This is nearly an order of magnitude less than the TEQ for the overlying sediment in DMMU 3. Therefore, the antidegradation standard is met for this project.

7. **Suitability Determination.** This memorandum documents the evaluation, with respect to dioxin, of the suitability of sediment proposed for dredging from Delta Marine Industries for open-water disposal. In 2007 the DMMP agencies formulated interim dioxin disposal guidelines for each of the nondispersive disposal sites in Puget Sound. The interim guidelines included a maximum concentration for each site. Any DMMU with a concentration above this maximum value is considered unsuitable for open-water disposal. The interim guidelines also include a mean concentration for each site. The mean concentration of all DMMUs proposed for disposal from a project must be less than the site mean. For the Elliott Bay site, the maximum concentration is 10.6 pptr TEQ and the mean concentration is 8.0 pptr TEQ. The TEQs for DMMUs 3 and 4 are below the maximum concentration. The mean of DMMUs 3 and 4 is 2.2 pptr, well below the mean for the Elliott Bay site.

Based on the results of the previously described testing, the DMMP agencies conclude that **all 6,534 cubic yards are suitable** for open-water disposal at the Elliott Bay non-dispersive site.

This suitability determination does *not* constitute final agency approval of the expanded project. During the public comment period that follows a public notice, the resource agencies will provide input on the overall project. A final decision will be made after full consideration of agency input, and after an alternatives analysis is done under section 404(b)(1) of the Clean Water Act.

A pre-dredge meeting with DNR and the Corps of Engineers will be required. A dredging quality control plan must be developed and submitted to the Enforcement Section of the Regulatory Branch of the Seattle District Corps of Engineers at least 7 days prior to the pre-dredge meeting. A DNR site use authorization must also be acquired.

8. References.

AMEC, 2008a. *Delta Marine Industries, Inc. – PSDDA Sediment Analysis Plan [for polychlorinated dioxins and furans], Lower Duwamish Waterway, Seattle, Washington.* Prepared by AMEC Earth & Environmental, Kirkland, Washington for Delta Marine Industries. June 2008.

AMEC, 2008b. *Delta Marine Industries, Inc. – Results of PSDDA Dioxin/Furan Sediment Analysis, Lower Duwamish Waterway, Seattle, Washington.* Prepared by AMEC Earth & Environmental, Kirkland, Washington for Delta Marine Industries. August 2008.

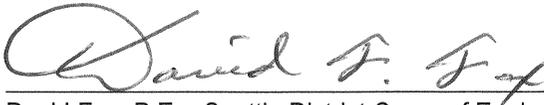
DMMP, 2007. *Memorandum for Record: Determination Regarding the Suitability of Proposed Dredged Material from Delta Marine Industries, Duwamish River, Seattle, King County, for Beneficial Use or Unconfined Open-Water at the Elliott Bay Nondispersive Site.* Prepared by the U.S. Army Corps of Engineers for the DMMP Agencies, October 2007.

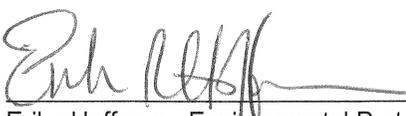
DMMP, 2008. *Quality of Post-Dredge Sediment Surfaces (Updated) – 2008 Sediment Management Annual Review Meeting Clarification Paper.* Dredged Material Management Program. June 2008.

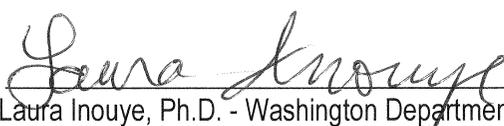
Ecology, 1995. *Sediment Management Standards – Chapter 173-204 WAC.* Washington State Department of Ecology, December 1995.

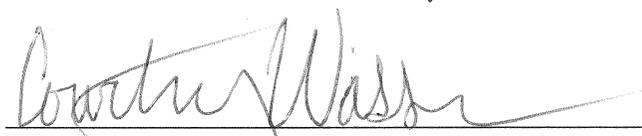
9. Agency Signatures.

Concur:

9/11/08 
Date David Fox, P.E. - Seattle District Corps of Engineers

9/11/08 
Date Erika Hoffman - Environmental Protection Agency

9/11/2008 
Date Laura Inouye, Ph.D. - Washington Department of Ecology

9/12/08 
Date Courtney Wasson - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Amy Klein, Seattle District Regulatory
Jacalen Printz, Seattle District Regulatory
Meg Strong, AMEC
Jeff Layton, Layton & Sell
Doug Greason, Delta Marine Industries

Table 2. Dioxins/Furans Data and TEQ Calculations

CHEMICAL	TEF	DMMU 3			DMMU 4			DMMU 3 - Z		
		conc	QL	TEQ	conc	QL	TEQ	conc	QL	TEQ
DIOXINS (ng/kg dry)										
2,3,7,8-TCDD	1	0.43	UJ	0.2150	0.46	U	0.2300	0.4	U	0.2000
1,2,3,7,8-PeCDD	1	0.5	UJ	0.2500	0.35	U	0.1750	0.25	U	0.1250
1,2,3,4,7,8-HxCDD	0.1	1.7	J	0.1700	0.31	U	0.0155	0.27	U	0.0135
1,2,3,6,7,8-HxCDD	0.1	4.5	J	0.4500	0.96	U	0.0480	0.3	U	0.0150
1,2,3,7,8,9-HxCDD	0.1	0.34	UJ	0.0170	0.7	U	0.0350	0.27	U	0.0135
1,2,3,4,6,7,8-HpCDD	0.01	95	J	0.9500	14		0.1400	0.29	U	0.0015
OCDD	0.0003	820	J	0.2460	100		0.0300	2.3	U	0.0003
FURANS (ng/kg dry)										
2,3,7,8-TCDF	0.1	0.34	UJ	0.0170	0.37	UJ	0.0185	0.28	UJ	0.0140
1,2,3,7,8-PeCDF	0.03	0.37	UJ	0.0056	0.39	U	0.0059	0.19	U	0.0029
2,3,4,7,8-PeCDF	0.3	1.8	J	0.5400	0.26	U	0.0390	0.15	U	0.0225
1,2,3,4,7,8-HxCDF	0.1	2.2	J	0.2200	0.26	U	0.0130	0.18	U	0.0090
1,2,3,6,7,8-HxCDF	0.1	1.8	J	0.1800	0.21	U	0.0105	0.19	U	0.0095
1,2,3,7,8,9-HxCDF	0.1	0.52	J	0.0520	0.29	U	0.0145	0.22	U	0.0110
2,3,4,6,7,8-HxCDF	0.1	0.18	UJ	0.0090	0.24	U	0.0120	0.2	U	0.0100
1,2,3,4,6,7,8-HpCDF	0.01	18	J	0.1800	3	J	0.0300	0.2	U	0.0010
1,2,3,4,7,8,9-HpCDF	0.01	1.7	J	0.0170	0.57	U	0.0029	0.24	U	0.0012
OCDF	0.0003	48	J	0.0144	6	J	0.0018	0.38	U	0.0001
Total TEQ				3.5330			0.8215			0.4499

B = detected in sample and in method blank
 J = estimated concentration
 U = undetected
 QL = laboratory qualifier
 TEF = toxicity equivalence factor
 TEQ = toxicity equivalents
 ng/kg = nanogram/kilogram (parts per trillion)