

MEMORANDUM FOR: RECORD

August 13, 2008

SUBJECT: DETERMINATION REGARDING THE SUITABILITY OF PROPOSED DREDGED MATERIAL FROM THE PORT OF GRAYS HARBOR TERMINAL 3, HOQUIAM, GRAYS HARBOR COUNTY, FOR OPEN-WATER DISPOSAL AT THE SOUTH JETTY OR POINT CHEHALIS DISPERSIVE SITES, OR FOR BENEFICIAL USE.

1. **Introduction.** This memorandum reflects the consensus determination of the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers, Environmental Protection Agency, and Washington Departments of Ecology and Natural Resources) regarding the suitability of up to 40,000 cubic yards (cy) of dredged material from the Port of Grays Harbor Terminal 3 for beneficial use or for disposal at one of the Grays Harbor dispersive open-water sites.
2. **Background.** The design depth at Terminal 3 is -40 ft MLLW. It was last dredged in 2001, but has not been used in recent years. Terminal 3 is currently available for sale or lease and sediment characterization was conducted by the Port of Grays Harbor in anticipation of future needs. See Figure 1 for a vicinity map.

The Port of Grays Harbor terminals are located in an area where sediment can accumulate rapidly and is therefore considered to be relatively homogeneous. In areas subject to rapid shoaling, not all sediment to be dredged will be in place at the time of sampling. Therefore, the volume estimated for Terminal 3 was based on historical dredging records and best professional judgment, as required in the DMMP Users Manual (DMMP, 2007).

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

Table 1. Project Summary

Project ranking	Low-moderate
Characterized volume	40,000 cubic yards
Maintenance depth	-40 feet MLLW (plus 1 ft. overdepth)
Draft SAP received	August 3, 2007
Draft SAP returned for revisions	August 22, 2007
SAP addendum received	August 27, 2007
Revised SAP approved	August 27, 2007
Sampling date	September 7, 2007
Final data report received	July 29, 2008
DAIS Tracking number	POGHT-1-A-F-256
USACE Permit Application Number	NWS-2008-997-SO
Recency Determination (low-moderate rank = 6 years)	September 2013

4. **Project Ranking and Sampling Requirements.** Terminal 3 is ranked "low-moderate" (DMMP, 2008). In low-moderate-ranked areas with homogeneous sediment, the number of field samples and dredged material management units (DMMUs) are calculated using the following guidelines:
 - Maximum volume of sediment represented by each field sample = 8,000 cubic yards
 - Maximum volume of sediment represented by each DMMU in a low-moderate-ranked area = 40,000 cubic yards.

Based on these guidelines, 5 field samples and 1 DMMU were required for this project.

5. **Sampling.** Sampling took place on September 7, 2007 using a power grab sampler (in areas with homogeneous sediment, surface grab samples are deemed adequate to represent the sediment – DMMP, 2008). Sampling was accomplished without incident and according to the sampling and analysis plan (Integral, 2007a). See Figure 2 for sampling locations.
6. **Chemical Analysis.** The approved sampling and analysis plan was followed and quality control guidelines specified by the PSEP and DMMP programs were met, with only minor quality control deviations (Integral, 2007b). The data were considered sufficient and acceptable for regulatory decision-making under the DMMP program.

Sediment conventional results (Table 2) show that the proposed dredged material is predominantly sandy silt. The total organic carbon content was 2.01 percent. The chemical results indicated that there were no exceedances of DMMP screening levels (Table 3). Consequently, bioassay testing was not required for this material. The single DMMU met suitability guidelines, based on chemistry alone, for open-water disposal at either of the Grays Harbor dispersive sites.

In addition to routine DMMP chemicals of concern, analysis of dioxins/furans was required for this project. These chemicals are widespread in Grays Harbor due to the historical presence of bleach process pulp mills. Dioxins/furans had not been analyzed in Port of Grays Harbor sediments since the early to mid 1990s and the agencies required confirmation testing for this round of sediment characterization.

Results (Table 4) showed detected levels of dioxins/furans. The toxic equivalency (TEQ) (with non-detects calculated as ½ reporting limit) was 7.1 ng/kg dry wt., below the 15 ng/kg TEQ suitability level set for Grays Harbor.

7. **Beneficial-Use Analysis.** The proposed dredged material had no exceedances of the State of Washington numerical Sediment Quality Standards (see Table 5). However, based on agency best professional judgment regarding acceptable dioxin concentrations in beneficial use material, sediment from this project may be used for beneficial use only after comparison of dioxin concentrations in the source and receiving areas. Specifically, if the TEQ of sediment proposed for beneficial use is equal to or less than that in a representative sampling of the sediments from the receiving area(s), the dredged material will be acceptable for beneficial use at that approved location.

To assess the suitability for upland beneficial use, the chemical results were compared to the Model Toxics Control Act (MTCA) guidelines (Ecology, 2005). Table 6 indicates that, while undetected, the

reporting limit for arsenic exceeds the Method B guideline for carcinogens. Therefore, it is possible that the dredged material may be unsuitable for some types of upland use. Ecology, DNR and the local health department should be consulted if upland beneficial use is contemplated. Also, while there is no MTCA Method A guideline for total chromium, the total chromium value does exceed the guideline for chromium VI. Additional analysis may be required for upland beneficial use in order to determine the chromium VI content of the sediment.

8. **Suitability Determination.** This memorandum documents the evaluation of the suitability of sediment proposed for dredging from the Port of Grays Harbor Terminal 3 for open-water disposal or beneficial use. The approved sampling and analysis plan was followed and the data gathered were deemed sufficient and acceptable for regulatory decision-making under the DMMP program.

Based on the results of the previously described testing, the DMMP agencies conclude that **all 40,000 cubic yards are suitable** for open-water disposal at either the South Jetty or Point Chehalis dispersive site. If in-water beneficial use is to be considered, dioxin testing will be required of the receiving area.

This suitability determination does ***not*** constitute final agency approval of the 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 conference call with DNR, Ecology 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 conference call. A DNR site use authorization must also be acquired.

9. **References.**

DMMP, 2008. *Dredged Material Evaluation and Disposal Procedures (Users Manual)*. Dredged Material Management Program, July 2008.

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

Ecology, 2005. *Model Toxics Control Act – Chapter 70.105D RCW and Cleanup Regulation - Chapter 173-340 WAC*. Washington State Department of Ecology, October 2005.

Integral, 2007a. *Sampling and Analysis Plan, Sediment Characterization for Terminal 3, Port of Grays Harbor, Grays Harbor, Washington*. Prepared by Integral Consulting Inc. for HDR Engineering. July 2007.

Integral, 2007b. *Sampling and Analysis Plan Addendum, Sediment Characterization for Terminal 3, Port of Grays Harbor, Grays Harbor, Washington*. Prepared by Integral Consulting Inc. for HDR Engineering. August 2007.

Integral, 2008. *Data Report, Sediment Characterization for Terminal 3, Port of Grays Harbor, Grays Harbor, Washington*. Prepared by Integral Consulting Inc. for HDR Engineering. April 2008.

10. Agency Signatures.

Concur:

8/13/08
Date

David F. Fox
David Fox, P.E. - Seattle District Corps of Engineers

8/14/08
Date

Erika Hoffman
Erika Hoffman - Environmental Protection Agency

08/14/08
Date

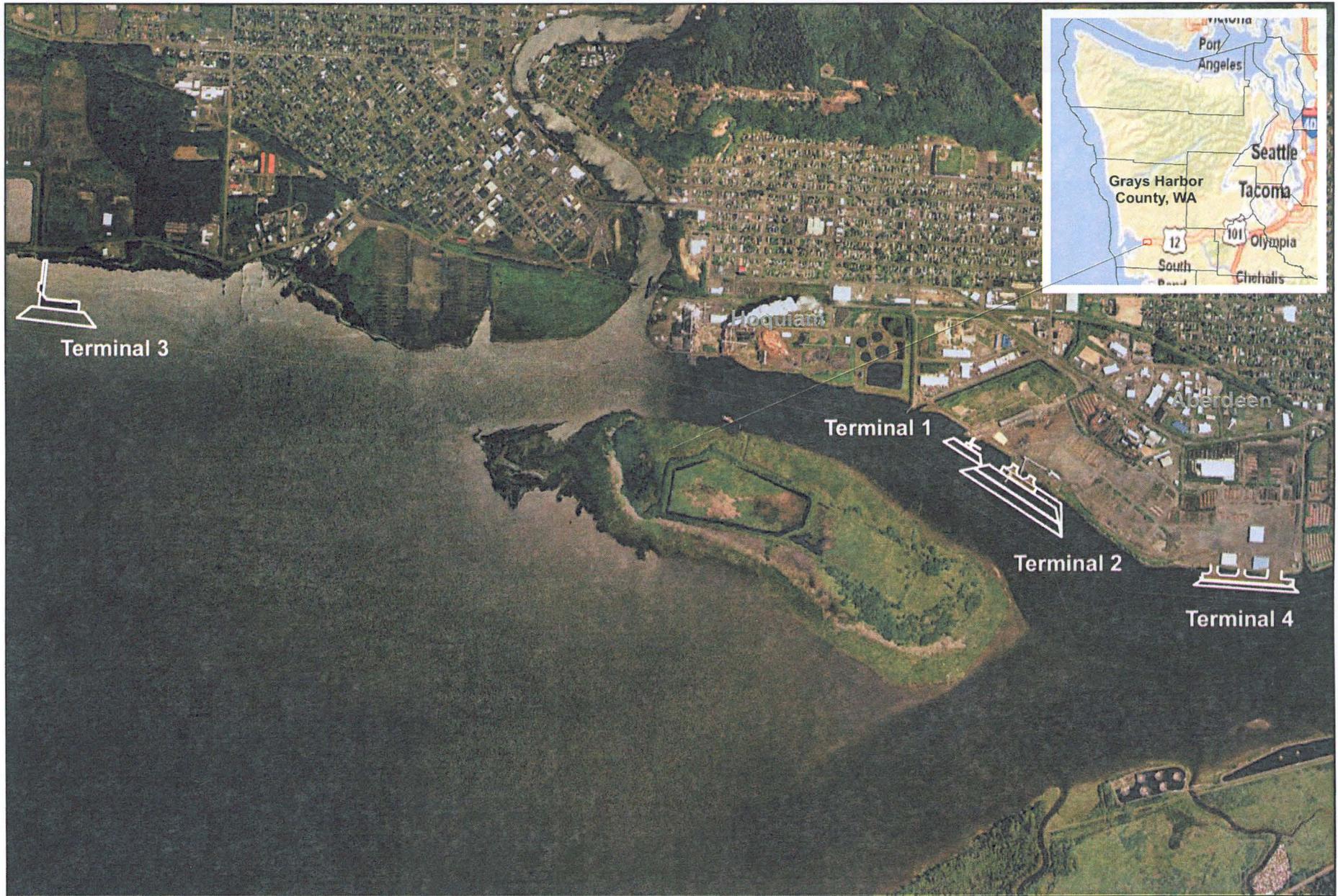
Laura Inouye
Laura Inouye, Ph.D. - Washington Department of Ecology

8/14/08
Date

Courtney Wasson
Courtney Wasson - Washington Department of Natural Resources

Copies furnished:

DMMP signatories
Casey Ehorn, Seattle District Regulatory
Susan Fitzgerald, Integral Consulting
Irina Makarow, HDR
Michael Johnson, Port of Grays Harbor



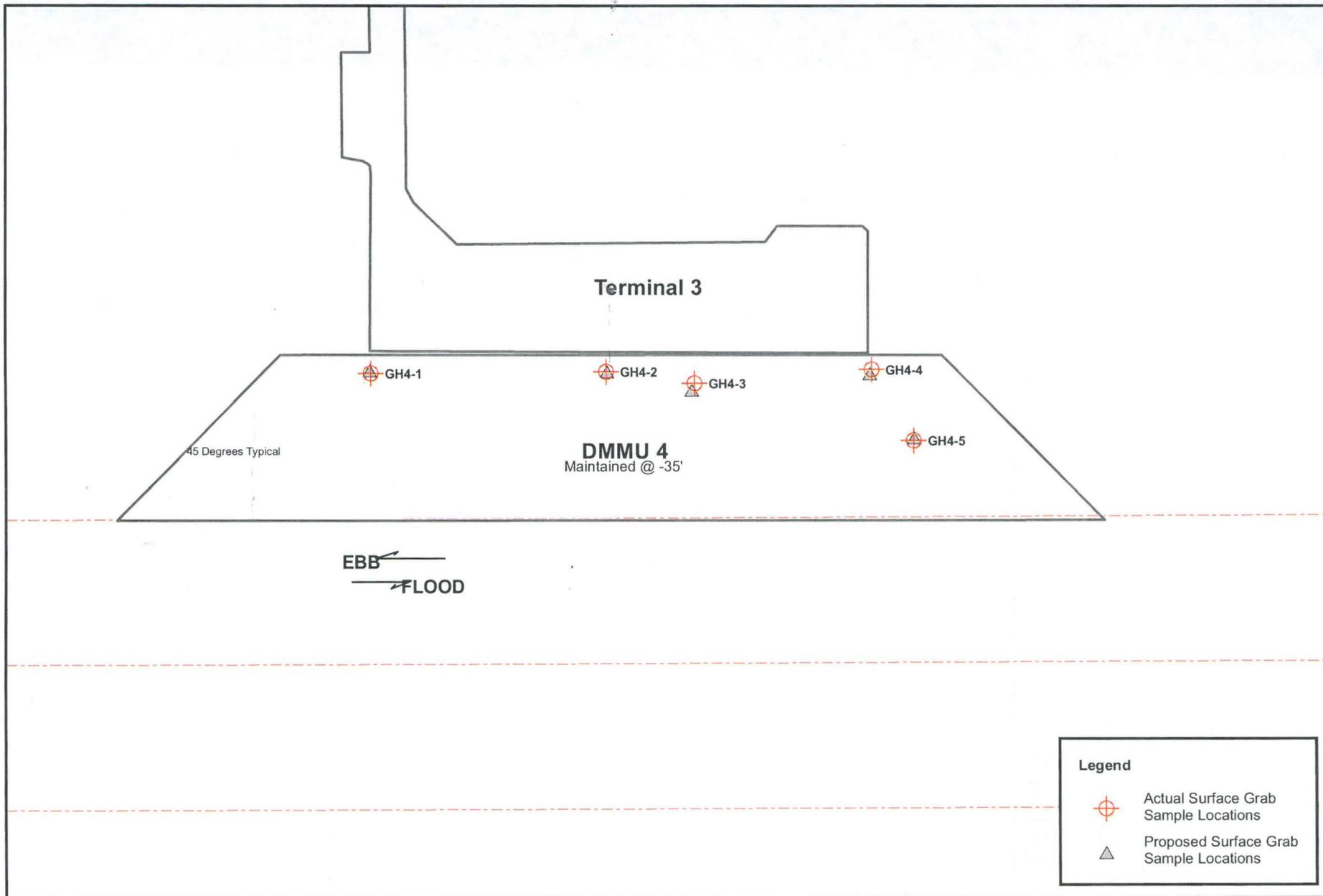


Table 2. Sediment Conventional Data.

		Terminal 3
Lab ID:		GH4
DAIS ID:		C1
DMMU #:		DMMU 4
GRAIN SIZE	% Gravel:	0.1
	% Sand:	31.4
	% Silt:	50.0
	% Clay:	18.4
	% Fines (clay+silt):	58.4
Total Solids (%):		46.6
Volatile Solids (%):		6.6
Total Organic Carbon (%):		2.01
Total Sulfides (mg/kg):		361
Total Ammonia (mg N/kg):		50.7

Table 3. Chemical results compared to DMMP regulatory guidelines.

				Terminal 3	
				Lab ID:	GH4
				DAIS ID:	C1
CHEMICAL	SL	BT	ML	DMMU 4	
METALS (mg/kg dry)				conc	QL
Antimony	150	---	200	10	UJ
Arsenic	57	507	700	10	U
Cadmium	5.1	11.3	14	0.4	U
Chromium	---	267	---	34	
Copper	390	1,027	1,300	48.1	
Lead	450	975	1,200	5	
Mercury	0.41	1.5	2.3	0.09	U
Nickel	140	370	370	24	
Selenium	---	3.0	---	0.4	U
Silver	6.1	6.1	8.4	0.6	U
Zinc	410	2,783	3,800	72	
LPAH (ug/kg dry)					
2-Methylnaphthalene	670	---	1,900	61	U
Acenaphthene	500	---	2,000	61	U
Acenaphthylene	560	---	1,300	61	U
Anthracene	960	---	13,000	61	U
Fluorene	540	---	3,600	61	U
Naphthalene	2,100	---	2,400	61	U
Phenanthrene	1,500	---	21,000	61	U
Total LPAH	5,200	---	29,000	61	U
HPAH (ug/kg dry)					
Benzo(a)anthracene	1,300	---	5,100	61	U
Benzo(a)pyrene	1,600	---	3,600	61	U
Benzo(g,h,i)perylene	670	---	3,200	61	U
Benzofluoranthenes	3,200	---	9,900	61	U
Chrysene	1,400	---	21,000	61	U
Dibenzo(a,h)anthracene	230	---	1,900	61	U
Fluoranthene	1,700	4,600	30,000	61	U
Indeno(1,2,3-c,d)pyrene	600	---	4,400	61	U
Pyrene	2,600	11,980	16,000	61	U
Total HPAH	12,000	---	69,000	61	U
CHLORINATED HYDROCARBONS (ug/kg dry)					
1,2,4-Trichlorobenzene	31	---	64	6.1	U
1,2-Dichlorobenzene	35	---	110	6.1	U
1,3-Dichlorobenzene	170	---	---	6.1	U
1,4-Dichlorobenzene	110	---	120	6.1	U
Hexachlorobenzene	22	168	230	0.99	U

CHEMICAL	SL	BT	ML	DMMU 4	
PHTHALATES (ug/kg dry)					
Bis(2-ethylhexyl)phthalate	1,300	---	8,300	61	U
Butyl benzyl phthalate	63	---	970	6.1	U
Di-n-butyl phthalate	1,400	---	5,100	61	U
Di-n-octyl phthalate	6,200	---	6,200	61	U
Diethyl phthalate	200	---	1,200	61	U
Dimethyl phthalate	71	---	1,400	6.1	U
PHENOLS (ug/kg dry)					
2 Methylphenol	63	---	77	6.1	U
2,4-Dimethylphenol	29	---	210	6.1	U
4 Methylphenol	670	---	3,600	61	U
Pentachlorophenol	400	504	690	30	U
Phenol	420	---	1,200	61	U
MISCELLANEOUS EXTRACTABLES (ug/kg dry)					
Benzoic acid	650	---	760	610	U
Benzyl alcohol	57	---	870	30	U
Dibenzofuran	540	---	1,700	61	U
Hexachlorobutadiene	29	---	270	0.99	U
Hexachloroethane	1,400	---	14,000	61	U
N-Nitrosodiphenylamine	28	---	130	6.1	U
PESTICIDES AND PCBs (ug/kg dry)					
Aldrin	10	---	---	0.99	U
Chlordane	10	37	---	2	U
Dieldrin	10	---	---	2	U
Heptachlor	10	---	---	0.99	U
Lindane	10	---	---	0.99	U
Total DDT	6.9	50	69	2	U
Total PCBs	130	---	3,100	14	U
Total PCBs (mg/kg OC)	---	38	---	0.7	U

J = estimated concentration

U = undetected

QL = laboratory qualifier

OC = organic carbon

SL = screening level

BT = bioaccumulation trigger

ML = maximum level

Table 4. Dioxin/Furan data.

		Terminal 3			
		Lab ID: GH4			
		DAIS ID: C1			
CHEMICAL	TEF	DMMU 4			
		conc	QL	TEQ (U=½ DL)	TEQ (U=0)
DIOXINS (ng/kg dry)					
2,3,7,8-TCDD	1	2.3		2.3	2.3
1,2,3,7,8-PeCDD	1	2.9	J	2.9	2.9
1,2,3,4,7,8-HxCDD	0.1	0.78	J	0.078	0.078
1,2,3,6,7,8-HxCDD	0.1	2.4	J	0.24	0.24
1,2,3,7,8,9-HxCDD	0.1	7.1		0.71	0.71
1,2,3,4,6,7,8-HpCDD	0.01	31		0.31	0.31
OCDD	0.0003	200		0.06	0.06
FURANS (ng/kg dry)					
2,3,7,8-TCDF	0.1	0.91	J	0.091	0.091
1,2,3,7,8-PeCDF	0.03	0.25	J	0.0075	0.0075
2,3,4,7,8-PeCDF	0.3	0.44	J	0.132	0.132
1,2,3,4,7,8-HxCDF	0.1	0.48	J	0.048	0.048
1,2,3,6,7,8-HxCDF	0.1	0.24	J	0.024	0.024
1,2,3,7,8,9-HxCDF	0.1	0.13	EMI	0.013	0.013
2,3,4,6,7,8-HxCDF	0.1	0.42	J	0.042	0.042
1,2,3,4,6,7,8-HpCDF	0.01	8.1		0.081	0.081
1,2,3,4,7,8,9-HpCDF	0.01	0.44	J	0.0044	0.0044
OCDF	0.0003	16		0.0048	0.0048
TOTAL TEQ:				7.05	7.05

J = estimated concentration
 EM = estimated maximum possible concentration
 I = interference present
 QL = laboratory qualifier
 TEF = toxic equivalency factor (WHO 2005 mammalian)
 TEQ = toxic equivalency

Table 5. Chemical results compared to SMS regulatory guidelines.

		Terminal 3		
		Lab ID:	GH4	
		DAIS ID:	C1	
CHEMICAL	SQS	CSL	DMMU 4	
METALS (mg/kg dry)			conc	QL
Arsenic	57	93	10	U
Cadmium	5.1	6.7	0.4	U
Chromium	260	270	34	
Copper	390	390	48.1	
Lead	450	530	5	
Mercury	0.41	0.59	0.09	U
Silver	6.1	6.1	0.6	U
Zinc	410	960	72	
LPAH (mg/kg OC)				
2-Methylnaphthalene	38	64	3.0	U
Acenaphthene	16	57	3.0	U
Acenaphthylene	66	66	3.0	U
Anthracene	220	1200	3.0	U
Fluorene	23	79	3.0	U
Naphthalene	99	170	3.0	U
Phenanthrene	100	480	3.0	U
Total LPAH	370	780	3.0	U
HPAH (mg/kg OC)				
Benzo(a)anthracene	110	270	3.0	U
Benzo(a)pyrene	99	210	3.0	U
Benzo(g,h,i)perylene	34	88	3.0	U
Benzofluoranthenes	230	450	3.0	U
Chrysene	110	460	3.0	U
Dibenzo(a,h)anthracene	12	33	3.0	U
Fluoranthene	160	1200	3.0	U
Indeno(1,2,3-c,d)pyrene	34	88	3.0	U
Pyrene	1000	1400	3.0	U
Total HPAH	960	5300	3.0	U
CHLORINATED HYDROCARBONS (mg/kg OC)				
1,2,4-Trichlorobenzene	0.81	1.8	0.30	U
1,2-Dichlorobenzene	2.3	2.3	0.30	U
1,4-Dichlorobenzene	3.1	9	0.30	U
Hexachlorobenzene	0.38	2.3	0.05	U
PHTHALATES (mg/kg OC)				
Bis(2-ethylhexyl)phthalate	47	78	3.0	U
Butyl benzyl phthalate	4.9	64	0.3	U
Di-n-butyl phthalate	220	1700	3.0	U
Di-n-octyl phthalate	58	4500	3.0	U
Diethyl phthalate	61	110	3.0	U
Dimethyl phthalate	53	53	0.3	U

CHEMICAL	SQS	CSL	DMMU 4	
PHENOLS (ug/kg dry)				
2 Methylphenol	63	63	6.1	U
2,4-Dimethylphenol	29	29	6.1	U
4 Methylphenol	670	670	61	U
Pentachlorophenol	360	690	30	U
Phenol	420	1200	61	U
MISCELLANEOUS EXTRACTABLES (ug/kg dry)				
Benzoic acid	650	650	610	U
Benzyl alcohol	57	73	30	U
MISCELLANEOUS EXTRACTABLES (mg/kg OC)				
Dibenzofuran	15	58	3.0	U
Hexachlorobutadiene	3.9	6.2	0.05	U
N-Nitrosodiphenylamine	11	11	0.3	U
PCBs (mg/kg OC)				
Total PCBs (mg/kg carbon)	12	65	0.7	U

U = undetected

QL = laboratory qualifier

OC = organic carbon

SMS = Sediment Management Standards

SQS = sediment quality standard

CSL = cleanup screening level

Table 6. Chemical results compared to MTCA regulatory guidelines.

		Terminal 3	
		Lab ID:	GH4
		DAIS ID:	C1
CHEMICAL	Method A ¹	Method B ²	DMMU 4
METALS (mg/kg dry)			conc QL
Arsenic, inorganic	20	0.67	10 U
Cadmium	2	---	0.4 U
Chromium (total)	---	---	34
Chromium VI	19	---	---
Copper	---	---	48.1
Lead	250	---	5
Mercury	2	---	0.09 U
Silver	---	---	0.6 U
Zinc	---	---	72
LPAH (ug/kg dry)			
Acenaphthene	---	---	61 U
Anthracene	---	---	61 U
Fluorene	---	---	61 U
Naphthalene	5,000	---	61 U
HPAH (ug/kg dry)			
Benzo(a)anthracene	---	140	61 U
Benzo(a)pyrene	100	140	61 U
Benzo(b,k)fluoranthenes	---	---	61 U
Benzo(b)fluoranthene	---	140	61 U
Benzo(k)fluoranthenes	---	140	61 U
Chrysene	---	140	61 U
Dibenzo(a,h)anthracene	---	140	61 U
Fluoranthene	---	---	61 U
Indeno(1,2,3-c,d)pyrene	---	140	61 U
Pyrene	---	---	61 U
CHLORINATED HYDROCARBONS (ug/kg dry)			
1,2,4-Trichlorobenzene	---	---	6.1 U
1,2-Dichlorobenzene	---	---	6.1 U
1,4-Dichlorobenzene	---	42,000	6.1 U
Hexachlorobenzene	---	630	0.99 U
PHTHALATES (ug/kg dry)			
Bis(2-ethylhexyl)phthalate	---	71,000	61 U
Butyl benzyl phthalate	---	---	6.1 U
Di-n-butyl phthalate	---	---	61 U
Di-n-octyl phthalate	---	---	61 U
Diethyl phthalate	---	---	61 U
Dimethyl phthalate	---	---	6.1 U

CHEMICAL	Method A ¹	Method B ²	DMMU 4	
PHENOLS (ug/kg dry)				
2,4-Dimethylphenol	---	---	6.1	U
Pentachlorophenol	---	8,300	30	U
Phenol	---	---	61	U
MISCELLANEOUS EXTRACTABLES (ug/kg dry)				
Benzoic acid	---	---	610	U
Benzyl alcohol	---	---	30	U
Dibenzofuran	---	---	61	U
Hexachlorobutadiene	---	13,000	0.99	U
N-Nitrosodiphenylamine	---	200,000	6.1	U
PESTICIDES AND PCBs (ug/kg dry)				
Aldrin	---	59	0.99	U
Chlordane	---	2,900	2	U
Dieldrin	---	63	2	U
Heptachlor	---	220	0.99	U
Heptachlor epoxide	---	110	0.99	U
Lindane	10	770	0.99	U
Total DDT	---	---	2	U
DDT	3,000	2,900	2	U
DDE	---	2,900	2	U
Total PCBs	1,000	500	14	U

¹Soil, Method A, Unrestricted Land Use, Table Value

²Soil, Method B, Carcinogen, Standard Formula Value, Direct Contact (ingestion only), u

Y = estimated concentration

U = undetected

QL = laboratory qualifier