Prepared by:
Dredged Material Management Office
Seattle District, US Army Corps of Engineers

Memorandum for Record **August 12, 2021**

Subject: Suitability Determination Memorandum and Antidegradation Assessment for the Port of Everett Boat Launch and Connector Channel Maintenance Dredging, in Everett, Washington (NWS-NWS-2017-239 for boat launch area; new channel connection dredging tracking # TBD).

Introduction

This suitability determination memorandum (SDM) and antidegradation assessment documents the consensus regarding the suitability of the proposed dredged material for unconfined aquatic disposal and compliance of the post-dredge leave surface as determined by the Dredged Material Management Program (DMMP) agencies (U.S. Army Corps of Engineers [USACE], Washington Departments of Ecology [Ecology] and Natural Resources [DNR], and the U.S. Environmental Protection Agency [EPA]).

Project Description

The 10th Street Boat Launch is a public facility at the Port of Everett's Jetty Landing Park. It requires maintenance dredging to continue to provide public boat launch services. In addition, sedimentation in the vicinity of the Boat Launch entrance requires dredging of a Boat Launch Connector Channel to enable passage to the Snohomish River navigation channel.

Project Summary

Waterbody	Mouth of the Snohomish River
Water classification	Estuarine
Project rank	Low
Total proposed dredging volume	64,700 cubic yards (cy)
Target proposed dredging depth	-10 ft MLLW
Max. proposed dredging depth (includes 2 feet overdepth allowance)	-12 ft MLLW
Proposed disposal location(s)	Port Gardner non-dispersive disposal site
Dredged Material Management Units (DMMUs); number of samples	2 surface DMMUs and 2 subsurface DMMUs; 5 cores
Sampling method	vibracorer
DMMO tracking number	POEBL-1-A-F-433
EIM Study ID	POEBL21
USACE Regulatory Reference Numbers	• NWS-2017-239 (boat basin) • New permit anticipated for connector channel
Sampling and Analysis Plan (SAP) Approval Date	March 26, 2021
Sampling Date(s)	March 31-April 1, 2021
Testing Parameters	DMMP standard marine COCs + dioxins & TBT
Biological Testing	Not required
Suitability Outcome	All material found suitable for in-water disposal
Recency Expiration Date (low = 7 years)	March 2028
Antidegradation Assessment	In compliance

Sampling Design Considerations

Previous characterization and permitting has been only for the Boat Launch portion of this project, represented by DMMU 1 (surface) and DMMU 2 (subsurface). The Connector Channel has never been either characterized or dredged and will be permitted separately; this portion of the dredge prism is represented by DMMU 3 (surface) and DMMU 4 (subsurface). Both portions of the project were ranked low, consistent with previous data from the boat launch area and nearby navigation channel.

Sampling and Analysis Description

Sampling was conducted from March 31 – April 1, 2021, using a vibracorer deployed from the *R/V Tieton* provided by Gravity Marine. A total of five cores were collected to characterize the four DMMUs, with cores split horizontally and composited for the surface and subsurface DMMU samples per Tables 1 and 2.

Coring attempts at S1-01 and S1-02 met refusal at depth but before the bottom of the proposed sample, apparently due to fibrous material in the dredge prism. Field modifications were made as follows, in consultation with the DMMO:

- **S1-01:** An alternate location about 30 meters south of S1-01 also met refusal at an even shallower depth. The longest of the cores from the original S1-01 location was used, though it didn't include a Z-sample.
- **S1-02:** After three unsuccessful tries at the original location, S1-02 was moved to another part of the proposed dredge footprint where the core was able to penetrate to the full planned depth (Figure 2).

Resulting samples were considered sufficiently representative of the dredge prism, and analyzed for DMMP chemicals of concern plus tributyltin and Dioxins/Furans (D/F). All analyses were conducted by Analytical Resources, Inc. Laboratory in Tukwila, Washington.

Data Validation

A data quality assurance/quality control review comparable to an EPA Stage 2a data validation was performed by Laboratory Data Consultants, Inc. in Carlsbad, CA. Based on the information reviewed, the overall data quality was considered acceptable for all uses, as qualified. No data were rejected. The results summary (Table 3) includes qualifiers as assigned in the validation report, not necessarily as originally qualified in the lab results.

Analytical Testing Results

As summarized in Table 3, analytical results from all four DMMUs fell below DMMP Screening Level guidelines. Sediment in the Boat Launch area (DMMUs 1 and 2) showed higher fine grain sizes (62.6% and 63.8%) and total organic carbon (2.4% and 2.6%) than in the Connector Channel area (DMMUs 3 and 4), which had 46.9% and 32.3% fines and 1.5% and 1.3% TOC.

Dioxins/furans and Tributyltin. D/F and tributyltin analyses were performed because they are chemicals of concern in portions of the Port of Everett area. The D/F concentration found in the sample composites ranged from 0.6 to 2.1 ng/kg-TEQ, all below the 4 ng/kg-TEQ guideline. D/F results and TEQ calculations are broken down in Table 4.

The concentration of tributyltin was undetected at levels (~3.8 ug/kg) well below the 74 ug/kg Bioaccumulation Trigger (BT).

DMMP Determinations

Suitability Determination

Chemical concentrations in the dredge prism composite samples were below the DMMP marine SLs and BTs as discussed above. Samples were collected per DMMP guidelines and all data were considered acceptable as qualified.

The DMMP agencies have concluded that all characterized material from the Port of Everett Boat Launch and Connector Channel are suitable for in-water disposal at the Port Gardner DMMP disposal site. As long as there are no significant changes to the project scope or new contaminant sources identified, material from this project will be considered suitable through the recency period ending in March 2028.

Antidegradation Determination

The sediment to be exposed by dredging must either meet the State of Washington Sediment Management Standards (SMS) or the State's Antidegradation Standard (Ecology, 2013) as outlined by DMMP guidance (DMMP, 2008). Concentrations of all DMMP chemicals of concern were below the DMMP SLs, and there is no reason to believe that a new exposed surface would be contaminated relative to the overlying materials; therefore, this project is in compliance with the State of Washington Antidegradation Standard.

Debris Management

The DMMP agencies implemented a debris screening requirement following the 2015 SMARM in order to prevent the disposal of solid waste and debris at open-water disposal sites in Puget Sound (DMMP, 2015). Per these guidelines, a screening grid should be used for this project to remove potential debris not allowed at DMMP disposal sites. Alternate debris management plans may be submitted to the DMMP prior to dredging if it can be demonstrated that debris is unlikely to be present or that other removal options are sufficient.

Notes and Clarifications

The decisions documented in this memorandum do ***not*** constitute final agency approval of the project. During the public comment period that follows a public notice, 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, Ecology and the Corps of Engineers is required at least 7 days prior to dredging. A dredging quality control plan must be developed and submitted to the USACE Seattle District's Regulatory Branch and Ecology. Refer to the USACE permit and Ecology 401 certification for project-specific submittal requirements and timelines.

The DMMP does not make specific beneficial use determinations. However, these data are available for the assessment of project-specific beneficial use by the project proponent, permitting agencies, local health jurisdictions and/or the owner of a receiving property.

Projects proposing to use one of the DMMP open-water disposal sites must submit their application for a Site Use Authorization (SUA) to the Washington State Department of Natural Resources (DNR) at least 4 weeks prior to dredging. Applications submitted less than 4 weeks prior to dredging may be subject to delays.

References

DMMP, 2008. *Quality of Post-Dredge Sediment Surfaces (Updated).* A Clarification Paper Prepared by David Fox (USACE), Erika Hoffman (EPA) and Tom Gries (Ecology) for the Dredged Material Management Program, June 2008.

DMMP, 2018. *Dredged Material Evaluation and Disposal Procedures (User Manual)*. Dredged Material Management Program, updated December 2018.

Ecology, 2013. *Sediment Management Standards – Chapter 173-204 WAC*. Washington State Department of Ecology, February 2013.

Windward Environmental LLC (Windward), 2021a. *Port of Everett Boat Launch/Boat Launch Connector Channel – Sediment Characterization Sampling and Analysis Plan*. Prepared for Port of Everett, March 29, 2021.

Windward Environmental LLC (Windward), 2021b. *Port of Everett Boat Launch/Boat Launch Connector Channel – Sediment Characterization Data Report*. Prepared for Port of Everett, July 9, 2021.

Agency Signatures

August 12, 2021 — Lauran Cole Warner
Date — Lauran Warner – U.S. Army Corps of Engineers, Seattle District

08/12/2021 — Erika Hoffman
Date — Erika Hoffman – U.S. Environmental Protection Agency, Region 10

08/12/2021 — Laura Inouye
Date — Laura Inouye, PhD. – Washington State Department of Ecology

08/12/2021 — Shannon Soto
Date — Shannon Soto – Washington State Department of Natural Resources

Copies Furnished:
DMMP agencies
USACE Regulatory Project Manager
DMMO File

Figure 1. Vicinity map for Port of Everett 10th Street Boat Launch

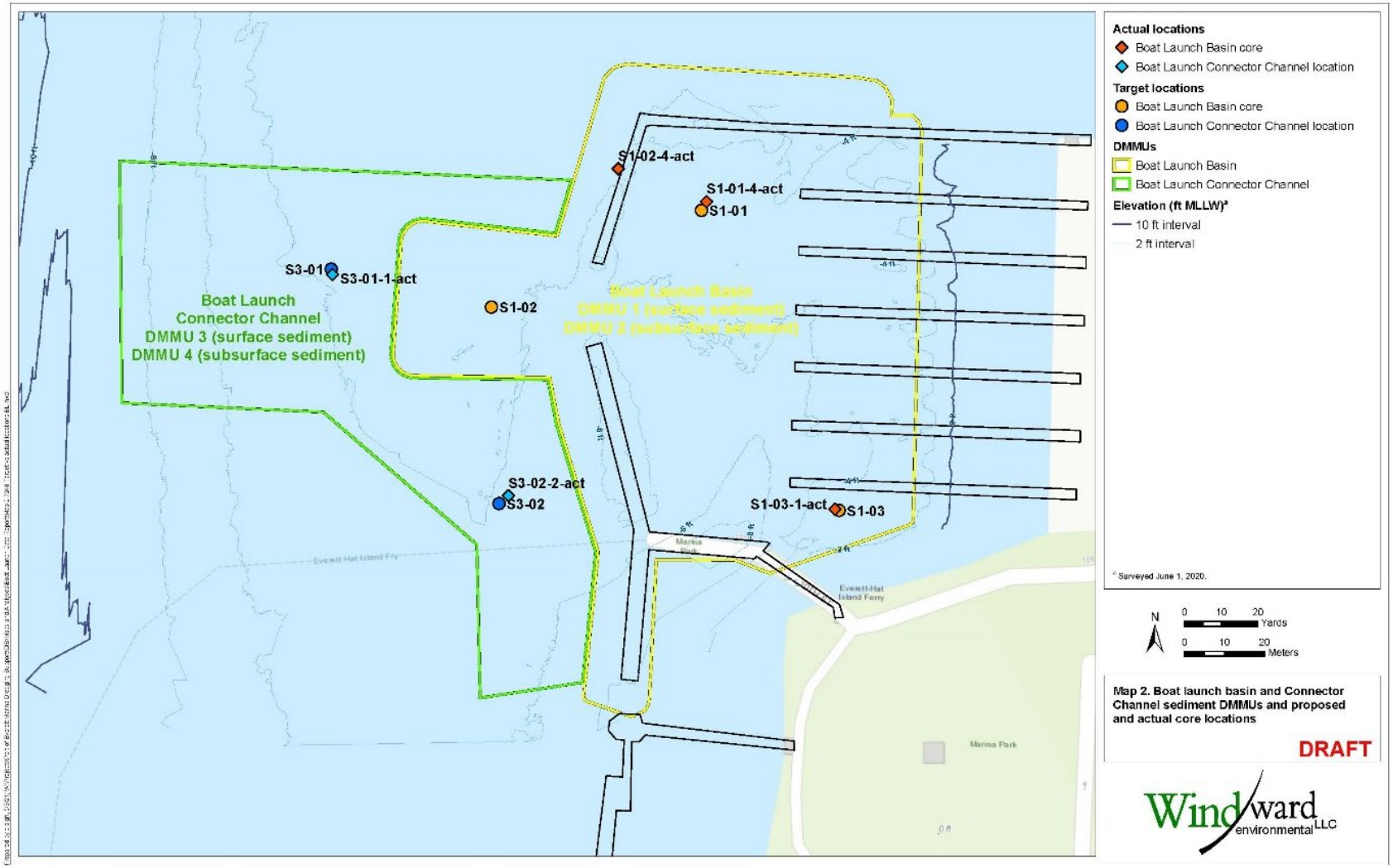

Figure 2. Target and actual sample locations for Port of Everett 10th Street Boat Launch & Connector Channel

Table 1. DMMU sampling and compositing scheme

	DMMU	Estimated Dredge Volume (CY)	No. of Core Samples	Estimated Dredge Volume per Core (CY)	Core ID	Sediment Elevation (ft MLLW)
Surface	1	20,000	3	6,700	S1-01	-2.4 to -6.4
					S1-02	-4.0 to -8.0
					S1-03	-3.1 to -7.1
	3	13,210	2	6,605	S3-01	-4.2 to -8.2
					S3-02	-4.8 to -8.8
Subsurface	2	21,000	3	7,000	S1-01	-6.4 to -11.0
					S1-02	-8.0 to -12.0
					S1-03	-7.1 to -12.0
	4	10,488	2	5,244	S3-01	-8.2 to -12.0
					S3-02	-8.8 to -12.0

Table 2. Sample target and actual coordinates, penetration, and recovery depths (adapted from Windward 2021b)

Core ID	Target		Actual		Distance from Target (ft)	Water Depth[b] (ft)	Tide Elevation[c] (ft)	Estimated Mudline Elevation (ft MLLW)	Penetration Depth (ft)	Core Recovery Depth (ft)	Recovery (%)
	Latitude[a]	Longitude[a]	Latitude[a]	Longitude[a]							
S1-01	48.005032	-122.222940	48.005052	-122.222924	8.2	6.0	3.6	-2.4	-11.9	8.75	92.1
S1-02	48.004805	-122.223640	48.005122	-122.223222	154.2[d]	15.0	11.0	-4.0	-16.5	10.5	84.0
S1-03	48.004362	-122.222460	48.004364	-122.222474	3.7	13.5	10.4	-3.1	-16.1	11.4	87.7
S3-01	48.004885	-122.224179	48.004872	-122.224176	4.5	15.1	10.9	-4.2	-18.2	10.75	76.8
S3-02	48.004363	-122.223602	48.004381	-122.223572	10.1	14.6	9.8	-4.8	-15.7	10.4	95.4

[a] NAD83 geographic coordinates – decimal degrees.

[b] Water depth was measured using a leadline.

[c] Tide elevations from NOAA's predictions for Everett tide station No. 9447659.

MLLW – mean lower low water

NAD83 – North American Datum of 1983

Table 3. Chemistry results for DMMU composite samples compared to DMMP guidelines

	DMMP Marine Guidelines			DMMU 1		DMMU 2		DMMU 3		DMMU 4	
	SL	BT	ML	Surface		Subsurface		Surface		Subsurface	
CONVENTIONALS (% dry weight)											
Total gravel				1.7	J	1.5		0.5		0.7	
Total sand				34.3	J	35.8		52.6		67	
Total silt				53.6		53.8		40		27.5	
Total clay				10.2		8.8		6.9		4.8	
Total Fines (silt + clay)				63.8		62.6		46.9		32.3	
Total organic carbon (TOC)				2.38	J	2.62	J	1.51	J	1.25	J
Total solids				55.09		60.15		61.51		69.47	
METALS (mg/kg dry weight)											
Antimony	150	---	200	0.36	UJ	0.33	UJ	0.32	UJ	0.31	UJ
Arsenic	57	507.1	700	12.2		11.8		11.7		8.99	
Cadmium	5.1	--	14	0.22		0.25		0.16		0.09	J
Chromium	260	--	---	44.5		38.8		37.6		32.6	
Copper	390	--	1,300	53.5		46.6		42.5		32.6	
Lead	450	975	1,200	9.91		10.9		7.57		6.65	
Mercury	0.41	1.5	2.3	0.0809		0.0703		0.0587		0.0424	
Selenium	--	3	--	1.27		1.03		1.07		0.92	
Silver	6.1	--	8.4	0.16	J	0.14	J	0.11	J	0.07	J
Zinc	410	--	3,800	78.9		70.9		67.5		59.2	
ORGANOMETALLICS (µg/kg dry weight)											
Tributyltin as ion				3.84	UJ	3.86	UJ	3.82	UJ	3.84	U
PAHs (µg/kg dry weight)											
2-Methylnaphthalene	670	---	1,900	9.2	J	20.8		13.1	J	33.9	
Total LPAHs	5,200	---	29,000	66.1	J	219.1	J	158.8	J	312.3	J
Acenaphthene	500	---	2,000	19.9	U	17.1	J	8	J	30.5	
Acenaphthylene	560	---	1,300	19.9	U	12.7	J	19.9	U	6.5	J
Anthracene	960	---	13,000	7.3	J	17.8	J	8.8	J	27.1	
Fluorene	540	---	3,600	14.5	J	26.9		10	J	33.7	
Naphthalene	2,100	---	2,400	13.8	J	76		110		131	
Phenanthrene	1,500	---	21,000	30.5		68.6		22		83.5	
Total HPAHs	12,000	---	69,000	257.9	J	371.3	J	83.8	J	310.3	J
Benzo(a)anthracene	1,300	---	5,100	13.4	J	27		19.9	U	20	

	DMMP Marine Guidelines			DMMU 1		DMMU 2		DMMU 3		DMMU 4	
	SL	BT	ML	Surface		Subsurface		Surface		Subsurface	
Benzo(a)pyrene	1,600	---	3,600	15.1	J	24.1		6.7	J	13.4	J
Benzo(g,h,i)perylene	670	---	3,200	17.3	J	21.4		19.9	U	11.5	J
Benzofluoranthenes (b, j, k)	3,200	---	9,900	36.1	J	54.3		17.2	J	29.2	J
Chrysene	1,400	---	21,000	20.8		43.6		19.9	U	27	
Dibenzo(a,h)anthracene	230	---	1,900	16.5	J	11.3	J	19.9	UJ	7	J
Fluoranthene	1,700	4,600	30,000	63.3	J	86.3	J	32.2	J	108	J
Indeno(1,2,3-cd)pyrene	600	---	4,400	19.4	J	15.3	J	19.9	U	6.8	J
Pyrene	2,600	11,980	16,000	56	J	88	J	27.7	J	87.4	J
PHTHALATES (µg/kg dry weight)											
Bis(2-ethylhexyl)phthalate	1,300	---	8,300	49.9	U	31.5	J	49.8	U	49.8	U
Butyl benzyl phthalate	63	---	970	27.7	J	19.6	J	14	J	8.8	J
Diethyl phthalate	200	---	1,200	19.9	U	21.1		19.9	U	19.9	U
Dimethyl phthalate	71	---	1,400	19.9	U	20	U	19.9	U	19.9	U
Di-n-butyl phthalate	1,400	---	5,100	19.9	UJ	20	UJ	19.9	UJ	19.9	UJ
Di-n-octyl phthalate	6,200	---	6,200	19.9	U	20	U	19.9	U	19.9	U
Other SVOCs (µg/kg dry weight)											
1,2,4-Trichlorobenzene	31	---	64	5	U	5	U	5	U	5	U
1,2-Dichlorobenzene	35	---	110	5	U	5	U	5	U	5	U
1,4-Dichlorobenzene	110	---	120	0.8	U	1.2	U	0.9	U	1.3	U
2,4-Dimethylphenol	29	---	210	19.9	U	3.1	J	19.9	U	19.9	U
2-Methylphenol	63	---	77	19.9	U	20	U	19.9	U	19.9	U
4-Methylphenol	670	---	3,600	19.1	J	72.3		47.4		59.5	
Benzoic acid	650	---	760	199	U	200	U	199	U	199	U
Benzyl alcohol	57	---	870	27.5		20	U	24.1		19.9	U
Dibenzofuran	540	---	1,700	9.5	J	12.7	J	6.7	J	17.6	J
Hexachlorobenzene	22	168	230	0.5	U	0.5	U	0.5	U	0.5	U
Hexachlorobutadiene	11	---	270	0.5	U	0.5	U	0.5	U	0.5	U
n-Nitrosodiphenylamine	28	---	130	19.9	U	20	U	19.9	U	19.9	U
Pentachlorophenol	400	504	690	99.7	UJ	100	UJ	99.6	UJ	99.7	UJ
Phenol	420	---	1,200	45.8		45.6		36.2		18.6	J
PCBs											
Total PCB Aroclors (µg/kg dry weight)	130	---	3,100	19.8	U	19.9	U	20	U	20	U
Total PCB Aroclors (mg/kg OC)	---	38	---	0.83	U	0.76	U	1.32	U	1.60	U

	DMMP Marine Guidelines			DMMU 1		DMMU 2		DMMU 3		DMMU 4	
	SL	BT	ML	Surface		Subsurface		Surface		Subsurface	
PESTICIDES											
4,4'-DDD	16	---	---	1	U	1	U	1	U	1	U
4,4'-DDE	9	---	---	1	U	1	U	1	U	1	U
4,4'-DDT	12	---	---	1	U	1	U	1	U	1	U
Total DDTs	---	50	69	1	U	1	U	1	U	1	U
Aldrin	9.5	---	---	0.5	U	0.5	U	0.5	U	0.5	U
Total Chlordane	2.8	37	---	2	U	1	U	1	U	1	U
Dieldrin	1.9	---	1,700	1	U	1	U	1	U	1	U
Heptachlor	1.5	---	270	0.5	U	0.5	U	0.5	U	0.5	U
DIOXINS/FURANS											
Dioxin/furan TEQ - mammal (half DL)	4	10	---	1.63	J	2.09	J	0.6	J	0.629	J

Notes:
DMMP – Dredged Material Management Program
DMMU – dredged material management unit

SL – screening level
BT – bioaccumulation trigger
ML – maximum level

LPAH – low-molecular-weight polycyclic aromatic hydrocarbon nc – no criterion
HPAH – high-molecular-weight polycyclic aromatic hydrocarbon
SVOC – semivolatile organic compound
TEQ – toxic equivalent
OC – organic carbon

J – estimated concentration
U – result undetected at reporting limit shown
UJ – result undetected at the estimated reporting limit shown

Table 4. Dioxin/furan TEQ results calculated with both non-detect = 1/2 reporting limit, and non-detect = 0.

Chemical	TEF[1]	ND=1/2 RL TEQ				ND=0 TEQ			
		DMMU 1	DMMU 2	DMMU 3	DMMU 4	DMMU 1	DMMU 2	DMMU 3	DMMU 4
2,3,7,8-TCDD	1	0.048	0.038	0.054	0.041	0.000	0.000	0.000	0.000
1,2,3,7,8-PeCDD	1	0.607	0.394	0.087	0.186	0.607	0.000	0.000	0.186
1,2,3,4,7,8-HxCDD	0.1	0.043	0.074	0.025	0.018	0.043	0.074	0.025	0.018
1,2,3,6,7,8-HxCDD	0.1	0.137	0.246	0.039	0.068	0.137	0.246	0.000	0.068
1,2,3,7,8,9-HxCDD	0.1	0.093	0.148	0.056	0.024	0.093	0.148	0.056	0.000
1,2,3,4,6,7,8-HpCDD	0.01	0.318	0.443	0.174	0.140	0.318	0.443	0.174	0.140
OCDD	0.0003	0.074	0.093	0.043	0.039	0.074	0.093	0.043	0.039
2,3,7,8-TCDF	0.1	0.074	0.178	0.031	0.034	0.074	0.178	0.031	0.034
1,2,3,7,8-PeCDF	0.03	0.007	0.014	0.002	0.002	0.007	0.014	0.000	0.000
2,3,4,7,8-PeCDF	0.3	0.040	0.159	0.017	0.023	0.000	0.159	0.000	0.000
1,2,3,4,7,8-HxCDF	0.1	0.068	0.066	0.012	0.005	0.068	0.066	0.000	0.000
1,2,3,6,7,8-HxCDF	0.1	0.015	0.052	0.018	0.007	0.000	0.052	0.018	0.000
1,2,3,7,8,9-HxCDF	0.1	0.004	0.029	0.005	0.006	0.000	0.029	0.000	0.000
2,3,4,6,7,8-HxCDF	0.1	0.040	0.072	0.004	0.009	0.040	0.072	0.000	0.000
1,2,3,4,6,7,8-HpCDF	0.01	0.055	0.078	0.029	0.024	0.055	0.078	0.029	0.024
1,2,3,4,7,8,9-HpCDF	0.01	0.001	0.005	0.002	0.001	0.000	0.005	0.002	0.000
OCDF	0.0003	0.004	0.004	0.002	0.002	0.004	0.004	0.002	0.002
Dioxin/furan TEQ		**1.63**	**2.09**	**0.60**	**0.63**	**1.52**	**1.66**	**0.38**	**0.51**

Notes:
[1] TEFs used are from World Health Organization (WHO) 2005.
Values shaded in yellow are non-detects.