MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION ON THE SUITABILITY OF PROPOSED DREDGED MATERIAL TESTED FOR THE BAY CENTER MARINA ENTRANCE CHANNEL DREDGING PROJECT EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR FLOW LANE DISPOSAL AT DESIGNATED SITE.

1. The following summary reflects the consensus suitability determination of the Agencies that comprise the regional Dredged Material Management Program (DMMP) for the State of Washington on testing conducted for the maintenance dredged material within the Bay Center Entrance Channel, Willapa Harbor, Washington. The entrance channel is 100 feet wide and is authorized at 10 feet deep at MLLW (**Figure 1**). This characterization evaluates approximately 18,000 cy of material within the entrance channel, which is expected to be dredged utilizing a small hydraulic dredge owned/operated by the Port of Willapa. The maintenance dredged material will be disposed at a DMMP approved "Flowlane" disposal site.

2. **Table 1** documents the regulatory tracking information and dates for the DMMP testing conducted.

Table 1. Regulatory Tracking Information and Dates

Initial SAP submittal date (prepared by DMMO in coordination with DMMP)	June 3, 2011
SAP approval date: (email approval due to short suspense)	June 30, 2011
Sampling date: Port of Willapa Sampling Vessel	July 12, 2011 (at 5Van Veen grab sample Stations)
Characterization Report submittal:	October 7, 2011
Volume Tested (# DMMUs), Sampling Method:	18,000 cy; (1 DMMU); Van Veen Grab
DAIS Tracking Number:	BCECW-1-A-F-310
Recency Determination Date: **Low** = 7 **years**	July 2018 (**Low**)

Background/Previous Testing History:

3. The Port of Willapa proposes to perform maintenance dredging of up to 18,000 cy of maintenance dredging to remove critical and limiting shoals leading to the Bay Center marina, which would require a minimum of three samples. However, to get better spatial resolution of the proposed dredged material within the Marina and Entrance Channel, five grab samples will be collected and composited for a single DMMU sample as depicted in

4. **Table** 2 for analysis of routine DMMP chemicals-of-Concern, dioxin/furans (USACE 2009 Users Manual), and the special chemical Glyphosate**.**

Table 2. Bay Center, Willapa Bay DMMP Characterization Sampling Summary.

DMMU ID	Station ID#	Latitude*	Longitude*	Depth to Mudline (feet below MLLW)
C1	BC-1	46.6292	-123.9529	1.7
	BC-2	46.6294	-123.9519	3.9
	BC-3	46.6298	-123.9502	2.6
	BC-4	46.6303	-123.9487	4.3
	BC-5	46.6306	-123.9476	3.7

*NAD83 WA State Plane Coordinates

5. The area surrounding Bay Center is relatively free of sources of contaminants in the aquatic environment. The most recent full sediment characterization at the Bay Center Channel occurred in 2001 and all sediments were considered suitable for open-water disposal. No significant activities (such as spill events) have been reported since that time. In each of the previous dredging projects conducted in the Bay Center Channel and Entrance Channel from 1989-2002, the dredged material has been ranked "Low" by the DMMP agencies in terms of chemical contamination risk. Chemical characterization testing was generally not required for most of these projects. However, in 2000 and 2001 supplemental testing was conducted to address specific concerns by oyster growers and the Shoalwater Indian Tribe. Testing for the limited chemicals in 2000 did not show elevated levels of Methylmercury, Sevin (Carbaryl) or Glyphosate, and are documented in Dredging Year 2000 suitability determination (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/USACE-WB-Bay-Center-Entrance-DY00-SDM.pdf).
6. The sediments within the marina and entrance channel were last characterized in Dredging Year 2001. That suitability determination (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/USACE-POW-Bay-Center-Marina-DY01-SDM.pdf) characterized 38,000 cy of maintenance material with two surface DMMUs and one subsurface DMMU for open-water disposal at either Goosepoint or Cape Shoalwater disposal sites. Samples were collected by vibracorer and analyses included all routine DMMP Chemicals of Concern (including TBT, but no dioxin), and included special COC analyses for Carbaryl (sediments and porewater) and Glyphosate. All chemicals were either detected or undetected below DMMP SLs, and TBT was quantitated at low levels, 0.01-0.02 µg/L in the three DMMUs characterized, within the same dredging areas proposed for dredging in 2011. Additionally, the special chemicals of concern assessed were both undetected (Carbaryl bulk sediments = 3.3 µg/kg U; porewater = 0.067 µg/L U; 1-Naphthol[1] bulk sediments = 3.3 µg/kg U; porewater = 0.067 µg/L U; Glyphosate = 13 µg/kg U). The DMMP agencies currently do not have regulatory limits established for these special chemicals, but the levels quantified were deemed below levels of concern to Tribal health and shellfish health.
7. The last time Bay Center project underwent routine maintenance dredging by the Corps occurred during 2002. At that time 56,756 cy was dredged from the Marina, and disposed at the Goose Point dispersive site, and 72,910 cy was dredged from the Bay Center Entrance Channel and disposed of at the Cape Shoalwater dispersive site. All previous dredged material tested was judged suitable for unconfined open-water disposal at either the Goosepoint or Cape Shoalwater disposal sites.

[1] Primary degradation product of carbaryl

8. The project was ranked **Low** within the Entrance Channel for DMMP characterization. The SAP was prepared by the Dredged Material Management Office in coordination with the DMMP agencies for review/approval on June 3, 2011, and approved by the DMMP agencies on June 30, 2011 (See **Table 1**).

Sampling:

9. **Figure 1** depicts the five grab sampling locations within the entrance channel sampled on July 12, 2011 and composited into a single DMMU-C1 (see **Table 2**). Sampling occurred from the Port of Willapa sampling vessel, and consisted of collecting surface samples with a Van-Veen grab sampler at five stations located with the entrance channel. The Data Characterization Report was submitted to the DMMP agencies for review on October 7, 2011, and included full data validation on the dioxin testing results. The DMMP agencies concluded, after reviewing the data validation report, that the data was acceptable for decision-making using best professional judgment.

Chemical Testing Results:

10. The conventional and DMMP chemical analyses results are summarized in **Table 3,** and the comparative SMS evaluation summary is provided in **Table 3**. It demonstrates that for chemicals of concern including dioxin/furan, no chemicals exceeded DMMP screening level guidelines, or bioaccumulation triggers. Evaluation of these data relative to SMS guidelines, indicate that there were no Sediment Quality Standard (SQS) exceedances within the entrance channel. An evaluation of these data relative SMS guidelines, indicated that all chemicals were below SMS dry weight values or carbon-normalized values for SQS.

11. **Table 4** provides a summary of the validated dioxin/furan congener specific testing results for the single DMMU-C1, and the quantitated toxicity equivalence concentrations (TEQ ½ DL) were relatively low at 1.36 pptr for the dioxin testing results.

12. The existing DMMP dioxin guideline in place for Coastal Washington is 15 pptr-TEQ for interpreting dioxin data. The single DMMU evaluated was quantitated well below the existing guideline of **15.0- pptr-TEQ,** and all the dredged material within the Bay Center entrance channel dredging project is suitable for either open-water disposal at a DMMP approved "Flowlane" disposal site or at an appropriate beneficial use site based on these dioxin testing results.

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Suitability Determination:

13. The results of the single DMMU analysis in summary (all DMMP COC and dioxins/furans) after comparison to SMS guidelines, indicate that all 18,000 cy of proposed dredged material are suitable for either open-water "Flowlane" disposal or disposal at appropriate beneficial use locations based on these testing results using best professional judgment (BPJ).

14. This memorandum documents the suitability of material proposed for dredging from the Bay Center entrance channel maintenance dredging project in Willapa Bay, Washington, for open-water disposal (including flowlane disposal at approved sites) or at an appropriate beneficial use site. However, this suitability determination does not constitute final agency approval of the project. A dredging and disposal plan for this project must be completed as part of the final project approval process. 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.

Concur:

10/7/2011
Date — David Kendall, Ph.D., Seattle District Corps of Engineers

10/01/2011
Date — Laura Inouye, Ph.D., Washington Department of Ecology

10/7/2011
Date — Justine Barton, Environmental Protection Agency, Region 10

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Date — Celia Barton, Washington Department of Natural Resources

John Hicks, Corps Navigation Project Manager
Rebecca Chaffe, Port of Willapa
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DMMO File

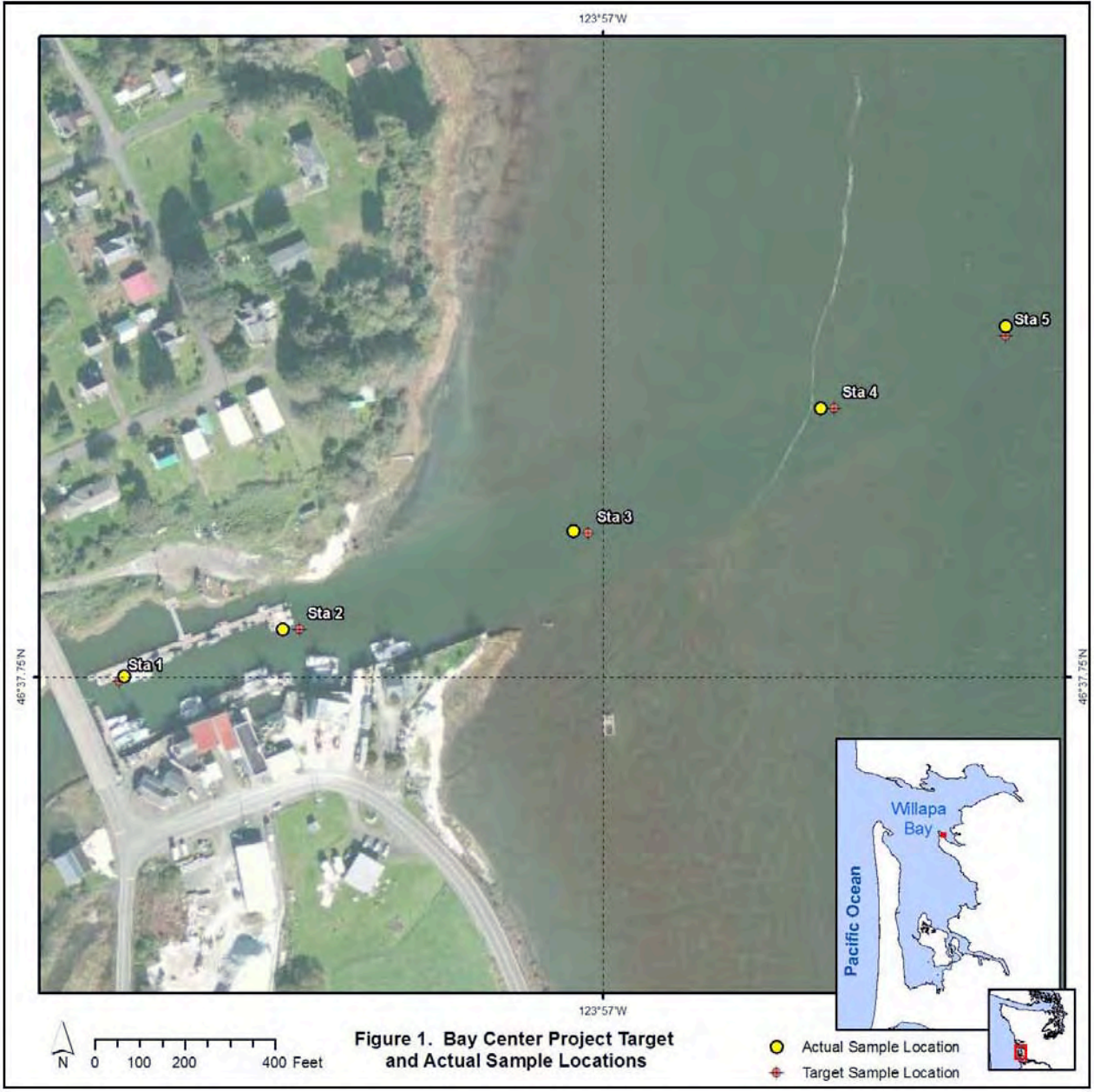

Figure 1. Bay Center Project Target and Actual Sample Locations

Table 3. DMMP Characterization Results Summary for DMMU Sediment Sample collected on 8/12/11 at Bay Center Entrance Channel, Willapa Harbor WA

Chemical Name	DMMP Guidelines				SMS Guidelines			BC11-01-S (DMMU-C1)		
	Unit	SL	ML	BT	Unit	SQS	CSL	Result	Result	VQ
								DMMP	SMS	
Metals								dry wgt	mg-oc-norm	
Antimony	mg/kg dw	150	200	-		--	--	10		U
Arsenic	mg/kg dw	57	700	507.1	mg/kg	57	93	10		
Cadmium	mg/kg dw	5.1	14	11.3	mg/kg	5.1	6.7	0.5		
Chromium	mg/kg dw	-	-	267	mg/kg	260	270	32		
Copper	mg/kg dw	390	1300	1027	mg/kg	390	390	26.7		
Lead	mg/kg dw	450	1200	975	mg/kg	450	530	8		
Mercury	mg/kg dw	0.41	2.3	1.5	mg/kg	0.41	0.59	0.05		
Nickel	mg/kg dw	140	370	370	mg/kg	--	--	20		
Selenium	mg/kg dw	-	-	3	mg/kg	--	--	1		U
Silver	mg/kg dw	6.1	8.4	6.1	mg/kg	6.1	6.1	0.7		U
Zinc	mg/kg dw	410	3800	2783	mg/kg	410	960	77		
PAHs										
Acenaphthene	µg/kg dw	500	2000	-	mg/kg-OC	16	57	19	1.05	U
Acenaphthylene	µg/kg dw	560	1300	-	mg/kg-OC	66	66	19	1.05	U
Anthracene	µg/kg dw	960	13000	-	mg/kg-OC	220	1,200	19	1.05	U
Benzo(a)anthracene	µg/kg dw	1300	5100	-	mg/kg-OC	110	270	19	1.05	U
Benzofluoranthene	µg/kg dw	3200	9900	-	mg/kg/OC	230	450	12	0.66	J
Benzo(g,h,i)perylene	µg/kg dw	670	3200	-	mg/kg-OC	31	78	19	1.05	U
Benzo(a)pyrene	µg/kg dw	1600	3600	-	mg/kg-OC	99	210	19	1.05	U
Chrysene	µg/kg dw	1400	21000	-	mg/kg-OC	110	460	19	1.05	U
Dibenzo(a,h)anthracene	µg/kg dw	230	1900	-	mg/kg-OC	12	33	19	1.05	U
Dibenzofuran	µg/kg dw	540	1700	-	mg/kg-OC	15	58	19	1.05	U
Fluoranthene	µg/kg dw	1700	30000	4600	mg/kg-OC	160	1,200	21	1.16	
Fluorene	µg/kg dw	540	3600	-	mg/kg-OC	23	79	19	1.05	U
Indeno(1,2,3-cd)pyrene	µg/kg dw	600	4400	-	mg/kg-OC	34	88	19	1.05	U
2-Methylnaphthalene	µg/kg dw	670	1900	-	mg/kg-OC	38	64	19	1.05	U
Naphthalene	µg/kg dw	2100	2400	-	mg/kg-OC	99	170	19	1.05	U
Phenanthrene	µg/kg dw	1500	21000	-	mg/kg-OC	100	480	18	0.99	J
Pyrene	µg/kg dw	2600	16000	11980	mg/kg-OC	1,000	1,400	18	0.99	J
Total HPAHs	µg/kg dw	12000	69000	-	mg/kg-OC	960	5,300	51	2.82	J
Total LPAHs	µg/kg dw	5200	29000	-	mg/kg-OC	370	780	18	0.99	J
Phthalates										
Butyl benzyl phthalate	µg/kg dw	63	970	-	mg/kg-OC	4.9	64	19	1.05	U
Di-n-butyl phthalate	µg/kg dw	-	-	-	mg/kg-OC	220	1,700	19	1.05	U
Di-n-octyl phthalate	µg/kg dw	6200	6200	-	mg/kg-OC	58	4,500	19	1.05	U
Diethyl phthalate	µg/kg dw	200	1200	-	mg/kg-OC	61	110	48	2.65	U
Dimethyl phthalate	µg/kg dw	71	1400	-	mg/kg-OC	53.0	53.0	19	1.05	U
Bis(2-ethylhexyl) phthalate	µg/kg dw	1300	8300	-	mg/kg-OC	47	78	54	2.98	
Phenols										
2,4-Dimethylphenol	µg/kg dw	29	210	-	ug/kg	29	29	29		UJ
2-Methylphenol	µg/kg dw	63	77	-	ug/kg	63	63	19		U
4-Methylphenol	µg/kg dw	670	3600	-	ug/kg	670	670	23		J
Pentachlorophenol	µg/kg dw	400	690	504	ug/kg	360	690	190		U
Phenol	µg/kg dw	420	1200		ug/kg	420	1,200	16		J
Other SVOCs										
Benzoic Acid	µg/kg dw	650	760	-	ug/kg	650	650	380		U
Benzyl Alcohol	µg/kg dw	57	870	-	ug/kg	57	73	19		U
1,2-Dichlorobenzene	µg/kg dw	35	110	-	mg/kg-OC	2.3	2.3	19	1.05	U
1,3-Dichlorobenzene	µg/kg dw	170	-	-	mg/kg-OC	--	--	19	1.05	U
1,4-Dichlorobenzene	µg/kg dw	110	120	-	mg/kg-OC	3.1	9.0	19	1.05	U
Hexachlorobenzene	µg/kg dw	22	230	168	mg/kg-OC	0.38	2.3	0.99	0.05	U
Hexachlorobutadiene	µg/kg dw	29	270	-	mg/kg-OC	3.9	6.2	2.9	0.16	Y
Hexachloroethane	µg/kg dw	1400	14000	-	mg/kg-OC	--	--	19	1.05	U
N-Nitrosodiphenylamine	µg/kg dw	28	130	-	mg/kg-OC	11	11	19	1.05	U
1,2,4-Trichlorobenzene	µg/kg dw	31	64	-	mg/kg-OC	0.81	1.8	19	1.05	U
PCB Aroclors										
Aroclor 1016	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1221	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1232	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1242	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1248	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1254	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1260	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1262	µg/kg dw	-	-	-		--	--	20		U
Aroclor 1268	µg/kg dw	-	-	-		--	--	20		U
Total PCBs	µg/kg dw	130	3100	-	mg/kg/OC	**12.0**	**65.0**	20	1.1	U
Total PCBs	mg/kg OC	-	-	38				1.1		U
Pesticides										

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Chemical Name	DMMP Guidelines				SMS Guidelines			BC11-01-S (DMMU-C1)		
	Unit	SL	ML	BT	Unit	SQS	CSL	Result	Result	VQ
Aldrin	µg/kg dw	10	-	-		--	--	0.99		U
gamma-BHC (Lindane)	µg/kg dw	-	-	-		--	--	0.99		U
cis-Chlordane	µg/kg dw	-	-	-		--	--	0.99		U
trans-Chlordane	µg/kg dw	-	-	-		--	--	0.99		U
Total chlordane	µg/kg dw	-	-	-		--	--	0.99		U
4,4'-DDD	µg/kg dw	-	-	-		--	--	2.0		U
4,4'-DDE	µg/kg dw	-	-	-		--	--	2.0		U
4,4'-DDT	µg/kg dw	-	-	-		--	--	2.0		U
Total DDTs	µg/kg dw	6.9	69	50		--	--	2.0		U
Dieldrin	µg/kg dw	10	-	-		--	--	2.0		U
Heptachlor	µg/kg dw	10	-	-		--	--	0.99		U
cis-Nonachlor	µg/kg dw	-	-	-		--	--	2.0		U
trans-Nonachlor	µg/kg dw	-	-	-		--	--	2.0		U
Oxychlordane	µg/kg dw	-	-	-		--	--	2.0		U
Herbicides										
Glyphosate	µg/kg ww	-	-	-		--	--	48		
AMPA	µg/kg ww	-	-	-		--	--	24		
Dioxin (TEQ: see Table 4 for detailed congener specific results)	**mg/kg**							1.36		
Total Solids	ng/kg							44.4		
Total Volatile Solids	%							7.99		
Total Organic Carbon	%							1.81		
Total Ammonia	%							19.6		
Total Sulfides	mg/kg							893.7		
Gravel	mg/kg							0.1		
Sand	%							24.7		
Silt	%							56.8		
Clay	%							18.4		
Fines (percent silt + clay)	%							75.3		
Bioassay Determination: **(P/F)**	%							NA		
BTs exceeded: Y/N										
Bioaccumulation conducted: Y/N								N		
Bioaccumulation Determination: **(P/F)**										
ML Rule exceeded: Y/N								N		
PSDDA Determination: (Suitable/Unsuitable)								**Suitable**		
DMMU Volume: (cy)								18,000		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)								L		
Mean Grab sampling depth (cm)	cm							10		
DMMU ID:								**C1**		

Legend:
VQ = Validation Qualifier
NA = not applicable
BT = bioaccumulation trigger
DDD = dichlorodiphenyldichloroethane
DDE = dichlorodiphenyldichloroethylene
DDT = dichlorodiphenyltrichloroethane
DMMP = dredged material management program
DMMU = dredged material management unit
dw = dry weight
HPAHs = high molecular weight polycyclic aromatic hydrocarbons
LPAHs = low molecular weight polycyclic aromatic hydrocarbons
LQ = laboratory qualifier
ML = maximum level
OC = organic carbon normalized
PCBs = polychlorinated biphenyls
RL = reporting limit
SL = screening level
SVOCs = semi-volatile organic compounds
VOC = volatile organic compound
ww = wet weight

Table 4. Dioxin/furan Summary for Bay Center DMMU-C1

Analyte	WHO (05) TEF	C1 (BCM) ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	0.214	JEMPC	0.107
1,2,3,7,8-PeCDD	1	0.505	JEMPC	0.2525
1,2,3,4,7,8-HxCDD	0.1	0.449	JEMPC	0.02245
1,2,3,6,7,8-HxCDD	0.1	**1.36**	**J**	**0.136**
1,2,3,7,8,9-HxCDD	0.1	1.16	JEMPC	0.058
1,2,3,4,6,7,8-HpCDD	0.01	**33.6**		**0.336**
OCDD	0.0003	**263**		**0.0789**
2,3,7,8-TCDF	0.1	**0.795**	**J**	**0.0795**
1,2,3,7,8-PeCDF	0.03	**0.549**	**BJ**	**0.01647**
2,3,4,7,8-PeCDF	0.3	0.339	JEMPC	0.05085
1,2,3,4,7,8-HxCDF	0.1	**0.882**	**BJ**	**0.0882**
1,2,3,6,7,8-HxCDF	0.1	**0.344**	**J**	**0.0344**
2,3,4,6,7,8-HxCDF	0.1	**0.392**	**J**	**0.0392**
1,2,3,7,8,9-HxCDF	0.1	0.117	U	0.00585
1,2,3,4,6,7,8-HpCDF	0.01	**4.63**		**0.0463**
1,2,3,4,7,8,9-HpCDF	0.01	0.212	U	0.00106
OCDF	0.0003	**12**		**0.0036**
Total TEQ (u = 1/2):				**1.36**
Total TEQ (u=0):				**0.86**
TOC (%)				**1.8**

Legend:
LQ = laboratory qualifier
U = undetected at reporting limit
J = Estimated value, less than reporting limit, and/or QC parameter out of Control limits
JEMPC = estimated value, maximum possible concentration (treated as undetects)
BJ = Method blank contaminated, estimated value
Y = Undetected at elevated reporting limit