

## MEMORANDUM FOR RECORD

**SUBJECT: DETERMINATION ON THE SUITABILITY OF PROPOSED DREDGED MATERIAL TESTED FOR THE SILVER KING LLC DREDGE PROJECT (NWS-2013-809 ), CLALLAM COUNTY, WASHINGTON EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR DISPOSAL AT THE PORT ANGELES DISPERSIVE OPEN-WATER DISPOSAL SITE, OR FOR USE AT AN APPROPRIATE BENEFICIAL USE 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 dredging of the Silver King LLC Dredge Project. The project is located east of Clallam Bay, Washington, on the Strait of Juan de Fuca. The DMMP agencies include the Corps of Engineers, Department of Ecology, Department of Natural Resources, and the Environmental Protection Agency. These agencies are charged with determining the suitability of the proposed maintenance dredging of up to 7,300 cy of proposed dredged material from the boat basin channel and boat ramp for placement at the Port Angeles dispersive open-water disposal site, or for use at an appropriate beneficial use 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:	March 21, 2013
2 <sup>nd</sup> Revised SAP	April 22, 2013
3 <sup>rd</sup> Revised SAP	May 22, 2013
SAP approval Email date	May 29, 2013
Sampling date:	May 30, 2013
Characterization Report submittal:	July 8, 2013
Volume Tested (# DMMUs), Sampling Method:	7,300 cy (surface/subsurface DMMU) PVC collection tubes
DAIS Tracking Number:	SKLLC-1-A-F-341
<b>Recency Determination Date:</b> <b>Low-Moderate = 6 years</b>	May 2019 ( <b>Low-Moderate</b> )

### Background:

3. The proposed maintenance dredging of the boat basin channel and boat ramp is necessary to restore the channel and boat ramp area to a serviceable depth. Removal of the approximately 7,300 cy of material will require an average dredge depth to -5.25 ft MLLW and a maximum depth of -9 ft MLLW (**Figure 1**). The applicant currently proposes to beneficially use the dredged material outside the boat basin, with placement adjacent to the east jetty. The project

is located in Clallam County along Hwy 112, just east of Pysht, Washington, along the Strait of Juan de Fuca.

- The project was ranked **Low-Moderate** for DMMP characterization. The initial SAP was submitted on March 21, 2013, and required two additional submittals before the DMMP agencies approved the SAP on May 29, 2013 (See **Table 1**).

### Sampling:

- Figure 1** depicts the site vicinity and plan view of core sampling locations. **Figure 2** provides a plan view of the dredging area and cross section profiles of channel. Three PVC core samples (2 at Station 1) were collected down to the proposed dredging depth, and composited into a surface DMMU A and subsurface DMMU B (see **Table 2**). Core samples were collected at low tide so sampling was done on exposed sediment. The two DMMUs were comprised of composited samples from two core stations in DMMUs A and B. Core recoveries were low ranging from 41% to 71%, and the low recoveries were not coordinated with the DMMP agencies. After reviewing the qualitative differences between the two DMMU chemical signatures, the DMMP agencies agreed to accept the characterization results using best professional judgment. The Data Characterization Report was submitted to the DMMP agencies for review on July 8, 2013. The DMMP agencies concluded, after reviewing the data validation report, that the data was acceptable for decision-making using best professional judgment.

**Table 2. Actual Sediment Sampling Locations (Silver King LLC)**

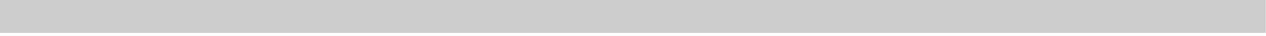
Location	DMMU	Latitude	Longitude	PVC Core Driven Depth (Recovered Length), inches	Volume, cy
1	A & B	48.18703 N	124.06243 W	96 ( 39.5 recovered), 41% recovery 72 (51 recovered), 71% recovery	7,300
2	A & B	48.18706 N	124.06263 W	84 (41 recovered), 49% recovery	
1 & 2	A	NA	NA	0-4 ft (0-19.5"; 0-34"; 0-19.5")	5,300
1 & 2	B	NA	NA	4-8 ft (19.5-39.5"; 34-51"; 19.5-41")	2,000

### Chemical Testing Results:

- 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 detected chemicals exceeded DMMP screening level guidelines, or bioaccumulation triggers. Total chlordane and dieldrin had reporting limits exceeding the SL, but the MDL (method detection limits) were below the SL. Evaluation of these data relative to SMS guidelines, indicate that there were no Sediment Quality Standard (SQS) exceedances within the two DMMUs.
- Table 4** provides a summary of the validated dioxin/furan congener specific testing results and Puget Sound SRM results for DMMU-A. The single surface DMMU-A was quantitated at 0.382 ppt TEQ (TEQ: U = 1/2 DL). Based on this testing result, there was no need to analyze the archived subsurface DMMU-B sample.
- The DMMP agencies implemented a new interim dioxin guideline in 2010 (<http://www.nws.usace.army.mil/Missions/CivilWorks/Dredging/Dioxin.aspx>).

- i. **Dispersive Site Management Guideline:** 4 pptr (parts per trillion, dry-weight) 2,3,7,8-tetrachloro-*p*-dibenzodioxin toxicity-equivalents (TEQ) will be defined as the Site Management Objective for all dispersive disposal sites in Puget Sound.
- ii. The single DMMU quantified was below the new interim dioxin guideline for dispersive sites (4 pptr-TEQ).

### **Suitability Determination:**

9. Using best professional judgment and based on these testing results, all 7,300 cy of proposed dredged material are determined to be suitable for unconfined open-water disposal at a dispersive disposal site (Port Angeles is the closest designated site).
  10. In addition, the results of these analyses compared to SMS guidelines, indicate that all 7,300 cy of proposed dredged material are suitable for an appropriate beneficial use project.
  11. This memorandum documents the suitability of material proposed for dredging from the Silver King LLC Dredge Project near Clallam Bay, Washington, for either open-water disposal at a dispersive disposal site, or at an appropriate beneficial use site. However, this suitability determination does not constitute final agency approval of the project. A dredging and disposal/placement 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.
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Concur:

07/22/2013

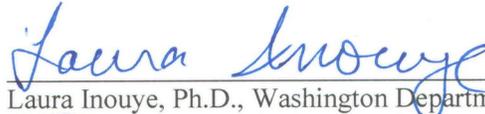
Date



David Kendall, Ph.D., Seattle District Corps of Engineers

07/22/2013

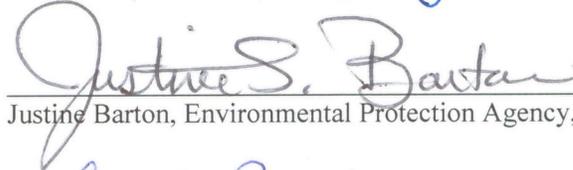
Date



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

7/29/2013

Date



Justine Barton, Environmental Protection Agency, Region 10

7/23/13

Date



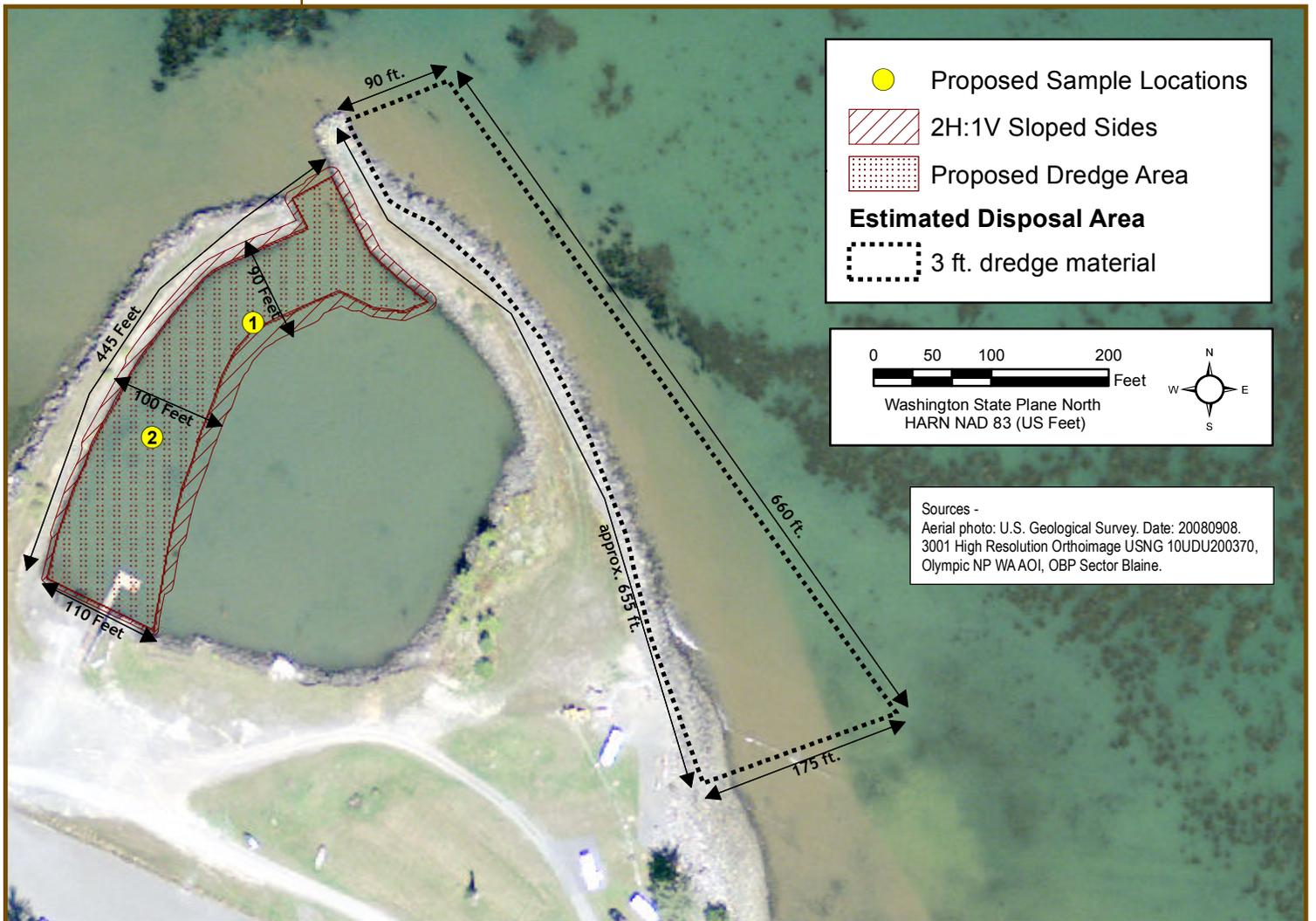
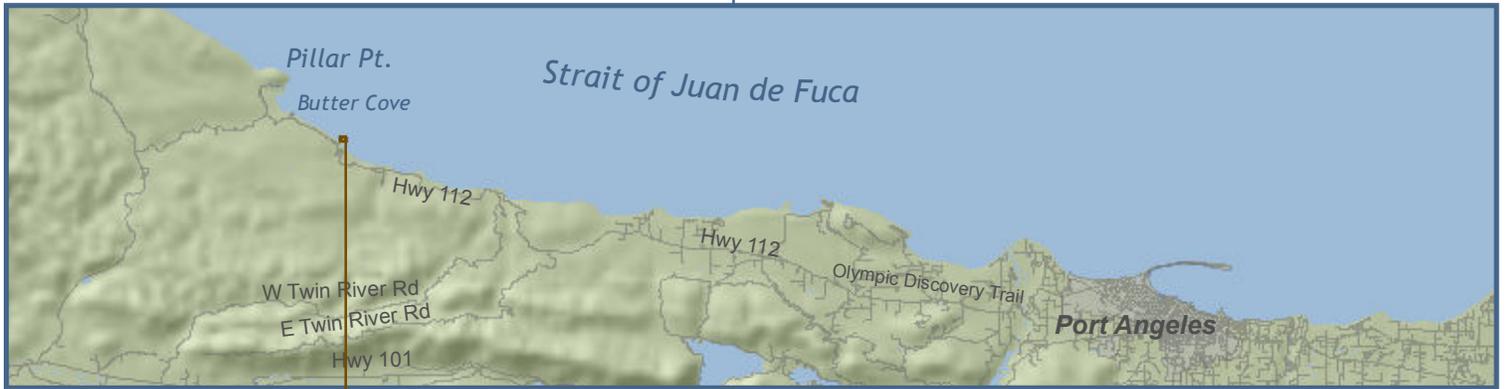
Celia Barton, Washington Department of Natural Resources

Laura Inouye, Ph.D., Ecology  
Justine Barton, EPA  
Celia Barton, DNR  
DMMO File



**Figure 1:  
Pillar Point  
Vicinity, Location, & Site;  
Sample & Disposal Locations  
(REVISED)**

April 2013

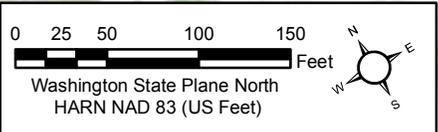
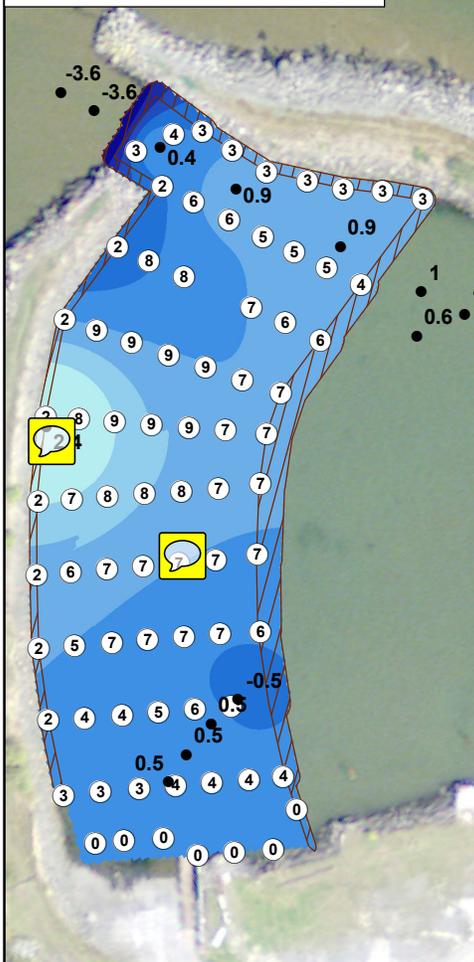
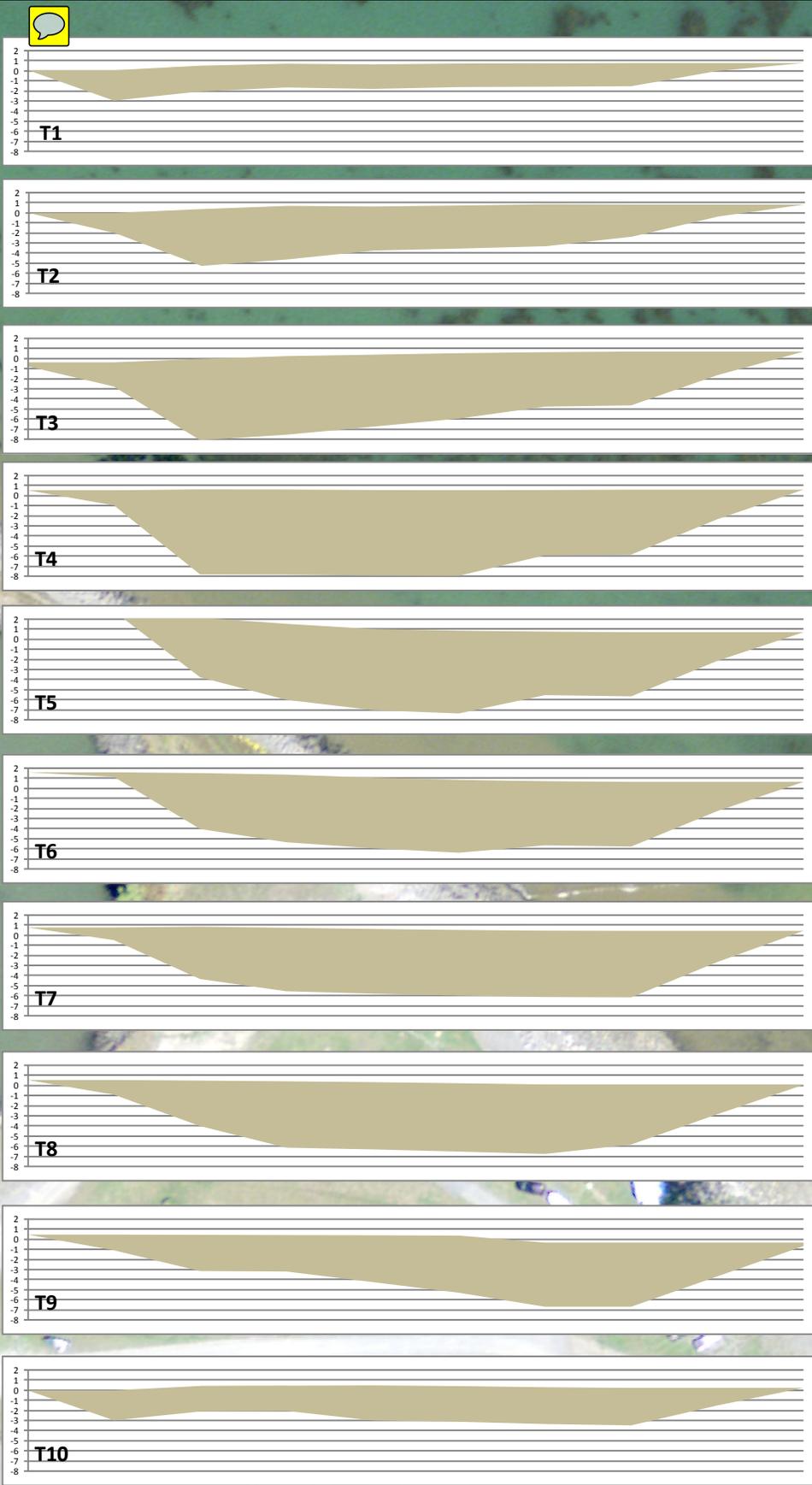


**Legend**

- Measured Depths (ft MLLW)
- Mud Thickness (ft)
- ▨ 2:1 Sloped Sides

**Estimated Depths (ft MLLW)**

- -2.4 to -1.5
- -1.5 to -1
- -1 to -0.5
- -0.5 to 0
- 0 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2.4



Sources -  
 Aerial photo: U.S. Geological Survey, Date: 20080908.  
 3001 High Resolution Orthoimage USNG 10UDU200370,  
 Olympic NP WAAOI, OBP Sector Blaine.

**Figure 2: Pillar Point Estimated Depth, Mud Thickness, & Profile Cross-Sections of Proposed Dredge Area - March 2013**

Table 3 . DMMP Characterization Results Summary for Silver King LLC Dredge Project, Clallam Bay, WA

Chemical Name	DMMP Guidelines				SMS Guidelines			SK-A (surface)			SK-B (subsurface)		
	Unit	SL	ML	BT	Unit	SQS	CSL	Surface / composite		VQ	Subsurface / composite		VQ
								DMMP	SMS		DMMP	SMS	
								dry wgt	mg-oc-norm		dry wgt	mg-oc-norm	
<b>Metals</b>													
Antimony	mg/kg dw	150	200	-		--	--	0.3		U	0.3		U
Arsenic	mg/kg dw	57	700	507.1	mg/kg	57	93	0.3			7.8		
Cadmium	mg/kg dw	5.1	14	11.3	mg/kg	5.1	6.7	0.2			0.3		
Chromium	mg/kg dw	260	-	260	mg/kg	260	270	18.5			18.4		
Copper	mg/kg dw	390	1300	1027	mg/kg	390	390	14.5			17.3		
Lead	mg/kg dw	450	1200	975	mg/kg	450	530	3.8			4.7		
Mercury	mg/kg dw	0.41	2.3	1.5	mg/kg	0.41	0.59	0.03		U	0.03		U
Selenium	mg/kg dw	-	-	3	mg/kg	--	--	0.7		U	0.7		U
Silver	mg/kg dw	6.1	8.4	6.1	mg/kg	6.1	6.1	0.3		U	0.3		U
Zinc	mg/kg dw	410	3800	2783	mg/kg	410	960	61			72		
<b>PAHs</b>													
<b>Total LPAHs</b>	µg/kg dw	5200	29000	-	mg/kg-OC	370	780	69	7.05		160	14.4	
Naphthalene	µg/kg dw	2100	2400	-	mg/kg-OC	99	170	14	1.43	J	27	2.43	
Acenaphthylene	µg/kg dw	560	1300	-	mg/kg-OC	66	66	19	1.94	U	20	1.80	U
Acenaphthene	µg/kg dw	500	2000	-	mg/kg-OC	16	57	19	1.94	U	15	1.35	J
Fluorene	µg/kg dw	540	3600	-	mg/kg-OC	23	79	19	1.94	U	18	1.62	J
Phenanthrene	µg/kg dw	1500	21000	-	mg/kg-OC	100	480	21	2.15		46	4.14	J
Anthracene	µg/kg dw	960	13000	-	mg/kg-OC	220	1,200	19	1.94	U	20	1.80	U
2-Methylnaphthalene	µg/kg dw	670	1900	-	mg/kg-OC	38	64	34	3.47		54	4.86	
<b>Total HPAHs</b>	µg/kg dw	12000	69000	-	mg/kg-OC	960	5,300	23	2.35	J	91.8	8.27	
Fluoranthene	µg/kg dw	1700	30000	4600	mg/kg-OC	160	1,200	11	1.12	J	28	2.52	
Pyrene	µg/kg dw	2600	16000	11980	mg/kg-OC	1,000	1,400	12	1.23	J	31	2.79	
Benzo(a)anthracene	µg/kg dw	1300	5100	-	mg/kg-OC	110	270	19	1.94	U	9.8	0.88	J
Chrysene	µg/kg dw	1400	21000	-	mg/kg-OC	110	460	19	1.94	U	12	1.08	J
Benzo(a)fluoranthene (b,j,k)	µg/kg dw	3200	9900	-	mg/kg-OC	230	450	38	3.88	U	11	0.99	J
Benzo(a)pyrene	µg/kg dw	1600	3600	-	mg/kg-OC	99	210	19	1.94	U	20	1.80	U
Indeno(1,2,3-cd)pyrene	µg/kg dw	600	4400	-	mg/kg-OC	34	88	19	1.94	U	20	1.80	U
Dibenzo(a,h)anthracene	µg/kg dw	230	1900	-	mg/kg-OC	12	33	19	1.94	U	20	1.80	U
Benzo(g,h,i)perylene	µg/kg dw	670	3200	-	mg/kg-OC	31	78	19	1.94	U	20	1.80	U
<b>Chlorinated Hydrocarbons</b>													
1,4-Dichlorobenzene	µg/kg dw	110	120	-	mg/kg-OC	3.1	9.0	19	1.94	U	20	1.80	U
1,2-Dichlorobenzene	µg/kg dw	35	110	-	mg/kg-OC	2.3	2.3	19	1.94	U	20	1.80	U
1,2,4-Trichlorobenzene	µg/kg dw	31	64	-	mg/kg-OC	0.81	1.8	19	1.94	U	20	1.80	U
Hexachlorobenzene	µg/kg dw	22	230	168	mg/kg-OC	0.38	2.3	19	1.94	U	20	1.80	U
<b>Phthalates</b>													
Dimethyl phthalate	µg/kg dw	71	1400	-	mg/kg-OC	53.0	53.0	19	1.94	U	20	1.80	U
Diethyl phthalate	µg/kg dw	200	1200	-	mg/kg-OC	61	110	47	4.80	U	49	4.41	U
Di-n-butyl phthalate	µg/kg dw	-	-	-	mg/kg-OC	220	1,700	19	1.94	U	20	1.80	U
Butyl benzyl phthalate	µg/kg dw	63	970	-	mg/kg-OC	4.9	64	19	1.94	U	20	1.80	U
Bis(2-ethylhexyl) phthalate	µg/kg dw	1300	8300	-	mg/kg-OC	47	78	19	1.94	J	30	2.70	
Di-n-octyl phthalate	µg/kg dw	6200	6200	-	mg/kg-OC	58	4,500	19	1.94	U	20	1.80	U
<b>Phenols</b>													
Phenol	µg/kg dw	420	1200	-	ug/kg	420	1,200	14		J	29		
2-Methylphenol	µg/kg dw	63	77	-	ug/kg	63	63	20		U	20		U
4-Methylphenol	µg/kg dw	670	3600	-	ug/kg	670	670	19		U	20		U
2,4-Dimethylphenol	µg/kg dw	29	210	-	ug/kg	29	29	19		U	20		UJ
Pentachlorophenol	µg/kg dw	400	690	504	ug/kg	360	690	190		U	200		UJ
<b>Miscellaneous Extractables</b>													
Benzyl Alcohol	µg/kg dw	57	870	-	ug/kg	57	73	19		U	20		U
Benzoic Acid	µg/kg dw	650	760	-	ug/kg	650	650	380		U	120		J
Dibenzofuran	µg/kg dw	540	1700	-	mg/kg-OC	15	58	19	1.94	U	20	1.80	U
Hexachlorobutadiene	µg/kg dw	11	270	-	mg/kg-OC	3.9	6.2	9	0.92	UJ	9.3	0.84	UJ
N-Nitrosodiphenylamine	µg/kg dw	28	130	-	mg/kg-OC	11	11	19	1.94	U	20	1.80	U
<b>Pesticides</b>													
4,4'-DDD	µg/kg dw	16	-	-		--	--	3		U	2.9		U
4,4'-DDE	µg/kg dw	9	-	-		--	--	3		U	2.9		U
4,4'-DDT	µg/kg dw	12	-	-		--	--	3		U	2.9		U
Sum of 4,4'-DDD,4,4'-DDE and 4,4'-DDT	µg/kg dw		69	50		--	--	3		U	2.9		U
Aldrin	µg/kg dw	9.5	-	-		--	--	1.5		U	1.5		U

Table 3 . DMMP Characterization Results Summary for Silver King LLC Dredge Project, Clallam Bay, WA

Chemical Name	DMMP Guidelines				SMS Guidelines			SK-A (surface)			SK-B (subsurface)		
	Unit	SL	ML	BT	Unit	SQS	CSL	Surface / composite		VQ	Subsurface / composite		VQ
								DMMP dry wgt	SMS mg-oc-norm		DMMP dry wgt	SMS mg-oc-norm	
<b>Metals</b>													
Total chlordanes (sum of cis, trans, cis-nonachlor, trans-nonachlor, oxychlordanes)	µg/kg dw	2.8		37		--	--	3		U	2.9		U
Dieldrin	µg/kg dw	1.9	-	-		--	--	3		U	2.9		U
Heptachlor	µg/kg dw	1.5	-	-		--	--	1.5		U	1.5		U
<b>PCB Aroclors</b>													
Aroclor 1016	µg/kg dw	-	-	-		--	--	17		U	19		U
Aroclor 1221	µg/kg dw	-	-	-		--	--	17		U	19		U
Aroclor 1232	µg/kg dw	-	-	-		--	--	17		U	19		U
Aroclor 1242	µg/kg dw	-	-	-		--	--	17		U	46		U
Aroclor 1248	µg/kg dw	-	-	-		--	--	17		U	19		U
Aroclor 1254	µg/kg dw	-	-	-		--	--	17		U	19		U
Aroclor 1260	µg/kg dw	-	-	-		--	--	17		U	19		U
<b>Total PCBs</b>	µg/kg dw	130	3100	-	mg/kg/OC	12.0	65.0	17	1.74	U	46	4.14	U
Total PCBs	mg/kg OC	-	-	38									
<b>Dioxin (TEQ: see Table 4 for detailed congener specific results)</b>	<b>mg/kg</b>							0.382			NA		
<b>Total Solids</b>	ng/kg							67.4			61.8		
<b>Total Volatile Solids</b>	%							3.58			4.37		
<b>Total Organic Carbon</b>	%							0.979			1.11		
<b>Total Ammonia</b>	%							65.2			147		
<b>Total Sulfides</b>	mg/kg							5,060			4,020		
Gravel	mg/kg							0.1			0.1		
Sand	%							68.3			35.3		
Silt	%							22.1			49.2		
Clay	%							9.6			15.5		
<b>Fines (percent silt + clay)</b>	%							31.7			64.7		
Bioassay Determination: (P/F)	%							NA			NA		
BTs exceeded: Y/N								No			No		
Bioaccumulation conducted: Y/N								NA			NA		
Bioaccumulation Determination: (P/F)								NA			NA		
ML Rule exceeded: Y/N								No			No		
<b>PSDDA Determination: (Suitable/Unsuitable)</b>								Suitable	Suitable BU		Suitable	Suitable BU	
<b>DMMU Volume: (cy)</b>								5,300			2,000		
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)								LM			LM		
Mean Core sampling depth (ft)	cm							4			3		
<b>DMMU ID:</b>								<b>SK-A (surface)</b>			<b>SK-B (subsurface)</b>		

**Legend:**

VQ = Validation Qualifier

NA = not accomplished

BT = bioaccumulation trigger

SL = screening level (>RL, but < MDL)

ML = maximum level

Suitable UCOWD and/or BU

UCOWD = unconfined-open-water disposal

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

OC = organic carbon normalized

PCBs = polychlorinated biphenyls

RL = reporting limit

Table 4. Dioxin/furan Summary for the Silver King LLC Dredge Project, Clallam Bay, Washington.

Analyte	WHO (05) TEF	DMMU-A			Puget Sound SRM-060513			SRM Acceptance Limits		
		ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ	ng/kg-dw (AVG)	TEQ	In/Out (Low/High)
2,3,7,8-TCDD	1	0.24	BJEMPC	0.12000	1.2	BEMPC	0.60000	1.05	1.05	In (.525/1.57)
1,2,3,7,8-PeCDD	1	<b>0.183</b>	J	<b>0.18300</b>	1.91		<b>1.91000</b>	1.08	1.08	Out (.542/1.63)
1,2,3,4,7,8-HxCDD	0.1	0.0994	U	0.00497	2.31	EMPC	0.11550	1.59	0.159	In (0.797/2.39)
1,2,3,6,7,8-HxCDD	0.1	0.166	JEMPC	0.00830	4.3		<b>0.43000</b>	3.88	0.388	In (1.94/5.82)
1,2,3,7,8,9-HxCDD	0.1	0.136	JEMPC	0.00680	3.5		<b>0.35000</b>	3.04	0.304	In (1.52/4.55)
1,2,3,4,6,7,8-HpCDD	0.01	1.88	BEMPC	0.00940	107		<b>1.07000</b>	90.6	0.906	In (45.3/136)
OCDD	0.0003	<b>12.3</b>	B	<b>0.00369</b>	955		<b>0.28650</b>	811	0.2433	In (406/1217)
2,3,7,8-TCDF	0.1	0.175	JEMPC	0.00875	1.21		<b>0.12100</b>	1.11	0.111	In (0.557/1.67)
1,2,3,7,8-PeCDF	0.03	<b>0.121</b>	BJ	<b>0.00363</b>	1.54	B	<b>0.04620</b>	1.23	0.0369	In (0.613/1.84)
2,3,4,7,8-PeCDF	0.3	0.103	BJEMPC	0.01545	1.28	B	<b>0.38400</b>	1.07	0.321	In (0.533/1.60)
1,2,3,4,7,8-HxCDF	0.1	0.0624	BJEMPC	0.00312	3.36		<b>0.33600</b>	3.02	0.302	In (1.51/4.53)
1,2,3,6,7,8-HxCDF	0.1	0.0838	BJEMPC	0.00419	1.58	B	<b>0.15800</b>	1.09	0.109	In (.545/1.64)
2,3,4,6,7,8-HxCDF	0.1	0.0955	BJEMPC	0.00478	2.37		<b>0.23700</b>	1.83	0.183	In (.917/2.75)
1,2,3,7,8,9-HxCDF	0.1	0.0741	U	0.00371	0.934	JEMPC	0.04670	0.511	0.0511	Out (.255/0.77)
1,2,3,4,6,7,8-HpCDF	0.01	0.404	BJEMPC	0.00202	20.5		<b>0.20500</b>	18.7	0.187	In (9.36/28.1)
1,2,3,4,7,8,9-HpCDF	0.01	0.076	U	0.00038	1.59		<b>0.01590</b>	1.63	0.0163	In (.815/2.44)
OCDF	0.0003	0.766	JEMPC	0.00011	65.6		<b>0.01968</b>	58.4	0.01752	In (29.2/87.6)
<b>Total TEQ (u = 1/2):</b>				<b>0.382</b>			<b>6.331</b>		<b>5.465</b>	
<b>Total TEQ (u=0):</b>				<b>0.190</b>			<b>5.569</b>		<b>5.465</b>	
<b>TOC (%)</b>				<b>0.98</b>						

**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 undetected)

BJEMPC = blank contaminated estimated value, maximum possible concentration (treated as undetected)

BJ = Method blank contaminated, estimated value