CENWS-OD-TS-DMMO

MEMORANDUM FOR: RECORD October 6, 2011

SUBJECT: DETERMINATION ON THE SUITABILITY OF EXPOSED SEDIMENT SURFACE RELATIVE TO WASHINTON STATE ANTIDEGRADATION COMPLIANCE AFTER PROPOSED MAINTENANCE REMOVAL OF LIMESTONE SPILL AGGREGATE FROM J.A. JACK AND SONS OFFLOADING BERTH AREA, DUWAMISH WATERWAY (**NWS-2011-570**) EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR UPLAND BENEFICIAL REUSE DISPOSAL

1. The following summary reflects the suitability determination memorandum on the characterization conducted to assess the Z-sample layer at the J.A. Jack and Sons, Inc. maintenance to remove approximately 1,000 cy of limestone spill aggregate at their barge offloading berthing area, along the lower Duwamish Waterway, and 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) on the suitability of the exposed sediment surface after spill material removal, relative to Washington State's antidegradation compliance evaluation.

Table 1. Project DMMP Tracking Details

JARPA APPLICATION NO.	**NWS-2011-570**
SAP submitted:	June 9, 2011
SAP approved	July 5, 2011
Sampling dates: piston corer (3-foot polycarbonate tube)	July 28, 1011 (2-2ft-Z-station/samples)
Data characterization report submitted:	September 15, 2011
Recency Determination: High Concern (2 years)	July 2013
DAIS reference number:	JAJAS-1-A-O-314

2. Background. This project is located in a High Concern area, along the Lower Duwamish Waterway (LDW), and the applicant, J.A. Jack & Sons, Inc. is proposing to conduct maintenance dredging activities at its operational berth area due to a limestone spill that previously occurred within the berth area (Figure 1, vicinity map). The maintenance will remove approximately 1,000 cy of limestone material to restore navigable depths at the berthing area to its original depth of approximately -16 feet mean lower low water (MLLW). The limestone material will be reused, if possible, or disposed of at an approved upland location. Because the limestone material represented an impenetrable material to assess the z-layer that would be exposed after removal, two stations surrounding and outside the limestone material were selected as surrogate stations to represent the likely sediment surface that would be exposed.

3. Sampling and Analysis Plan. The initial sampling and analysis plan (SAP) was submitted for DMMP review on June 9, 2011, and approved by the DMMP agencies with revisions on July 5, 2011.

4. Sampling. The sampling commenced on July 28, 2011, and core samples were collected with a piston corer, with target depths 2 feet below the mudline (Z-sample). Table 2 and Figure 2 depicts the stations, and two uncomposited z-sample stations occupied for the antidegradation evaluation. A Z+1 ft (actually 0.5 ft) sample was collected an archived at each of the two stations pending analysis of the overlying Z-samples. The data characterization report was submitted to the DMMP agencies for review and data quality assurance/control review on September 15, 2011. The DMMP agencies concluded, after reviewing the data validation report, that the data was acceptable for decision-making using best professional judgment.

Table 2. Summary of the Z-Sample Locations at JA Jack & Sons, Incorporated.

Core Station ID:	Latitude (°N)	Longitude (°W)	Mudline Elevation (feet MLLW	Depth Achieved (feet MLLW)	Z-samples
JAJ-01-01	47.55336090	-122.34072382	-16.8	-19.3	S1Z (analyze): Mudline to 2 ft below mudline S1Zb (Z+1: archive): 2 ft below mudline to 2.5 ft (end of core)
JAJ-01-02	47.55316514	-122.34070702	-18.7	-21.2	S2Z (analyze): Mudline to 2 ft below mudline S2Zb (Z+1: archive): 2 ft below mudline to 2.5 ft (end of core)

5. Chemical Testing Summary. Chemical Analysis and Comparison with DMMP Marine and SMS Guidelines. The Agencies' approved sampling and analysis plan was followed and quality assurance/quality control guidelines specified by PSEP and DMMP were generally complied with. A summary of chemical analysis results for all COC except dioxins/furans is provided in Table 3. The results indicated that all chemicals were below DMMP and SMS Guidelines except dioxin/furans and benzyl alcohol, which exceeded the DMMP Maximum Level (ML) and SMS Cleanup Screening Level (CSL) guidelines in both samples.

6. Dioxin Testing Results Summary. Table 4 provides the results of dioxin/furan testing results for the two z-samples as follows: S1Z = 12.5 pptr-TEQ, and S2Z = 13.1 pptr-TEQ (U = ½ detection limit).

7. Dioxin Interim Interpretative Framework. The DMMP implemented new interim guidelines for interpreting dioxin data implemented on December 6, 2010, and are summarized below for non-dispersive disposal sites (http://www.nws.usace.army.mil/PublicMenu/documents/DMMO/New_Interim_Guidelines_for_Dioxins.pdf):

    a. Nondispersive Screening Levels. DMMUs with dioxin concentrations below 10 pptr TEQ will be allowed for open-water disposal as long as the volume-weighted average concentration of dioxins in material from the entire dredging project does not exceed the Disposal Site Management Objective of 4 pptr TEQ.

8. Dioxin Interpretation relative to DMMP site management. As summarized in paragraph 6 above, S1Z and S2Z were both quantitated above the 10 pptr-TEQ upper dioxin guideline limit, and both exceeded the 4 pptr-TEQ DMMP background based site management guideline. Therefore, based on these dioxin testing results the exposed surface represented by the two stations is degraded relative to DMMP dioxin guidelines.

9. Antidegradation Evaluation of S1Z and S2Z: Based on the DMMP and SMS CSL exceedances for Benzyl Alcohol and the elevated dioxin concentrations expressed at both Z-sample stations (Tables 3 and 4) the exposed sediment surfaces represent degraded surfaces relative to these two chemicals. Therefore, the DMMP has concluded that the z-sample results for both samples are not in compliance with the Washington State antidegradation standard. The following actions will be required to remedy the exposed surface after maintenance dredging removal of the limestone spill material is completed:

    a. Dredge an additional two-foot of material below the existing mudline (e.g., -16 ft + 2 ft allowable overdepth MLLW) after removal of the limestone spill .
    b. Place a one-foot clean sand cover over the exposed surface within the maintenance dredging limestone removal footprint..

10. Suitability of Limestone Material. The approximate 1,000 cy of uncharacterized maintenance limestone spill material will be disposed upland and either beneficial reused by JA Jack & Sons, or disposed at an Ecology approved upland confined disposal site.

11. This memorandum documents the suitability determination for the uncharacterized limestone maintenance material to be removed at the J.A. Jack & Sons, berthing area. It also documents the antidegradation compliance evaluation of the exposed surface, and the remedy to address this concern. However, this suitability determination does not constitute final agency approval of the project. A dredging 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:

6 Oct 2011
Date

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

Oct 6, 2011
Date

Erika Hoffman, Environmental Protection Agency

10/06/2011
Date

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

10/6/11
Date

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AERIAL SOURCE: Google Earth Pro, 2011.

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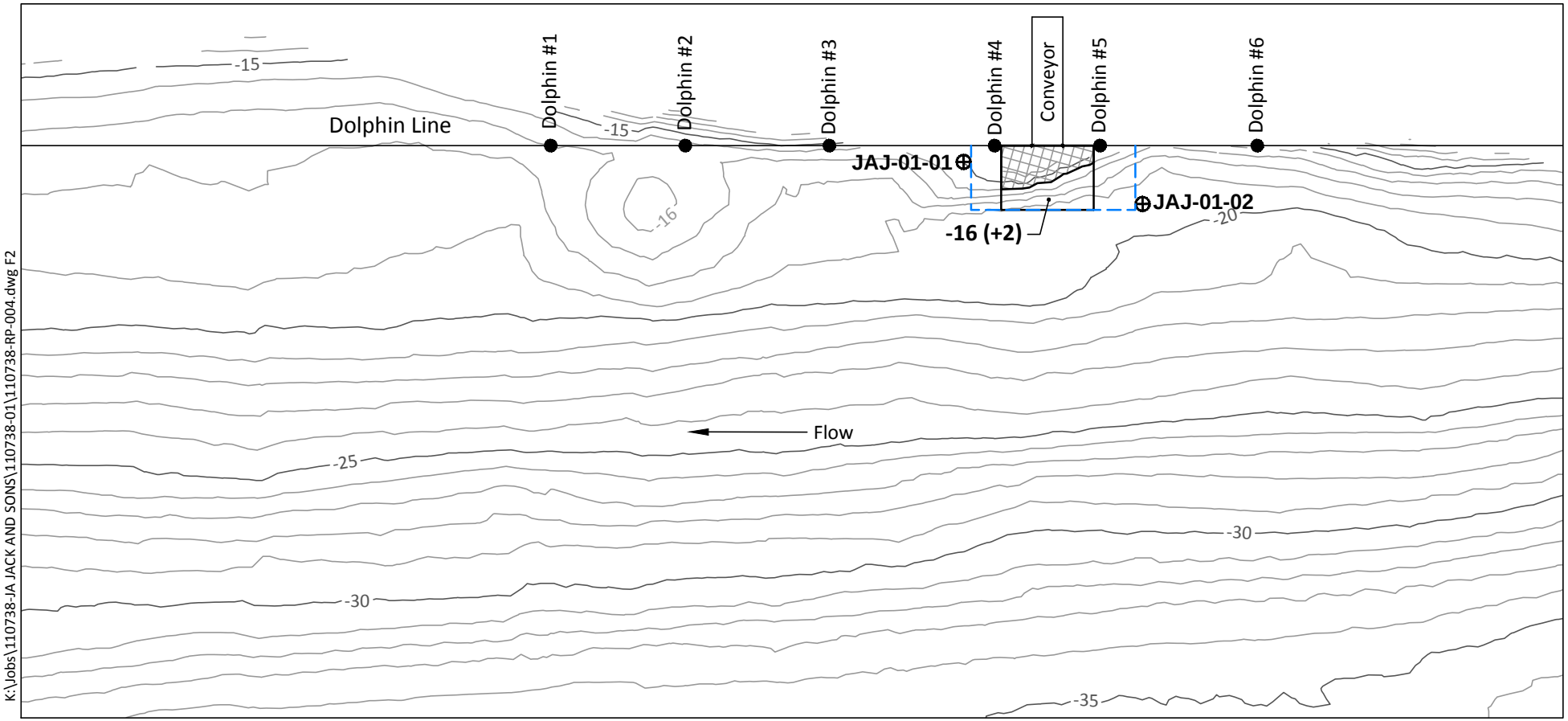
Scale in Miles

ANCHOR QEA

Figure 1
Vicinity Map
Sediment Characterization Report
J.A. Jack & Sons



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LEGEND:

- Maximum Extent of Dredge Prism Boundary
- Proposed Dredge Prism Boundary
- **-16(+2)** Target Elevation and (Allowable Overdepth)
- Footprint of Anticipated Dredge Cut
- **JAJ-01-02** ⊕ Sample Location

0 60
Scale in Feet

SOURCE: Drawing prepared from survey data provided by Manson Construction dated March 3, 2011.
HORIZONTAL DATUM: Washington State Plane North, NAD83.
VERTICAL DATUM: Mean Lower Low Water (MLLW).

ANCHOR QEA

Figure 2
Actual Sampling Locations
Sediment Characterization Report
J.A. Jack & Sons

Table 3. JA Jack and Sons Antidegradation Evaluation

CHEMICAL NAME	Units	DMMP SL	DMMP BT	DMMP ML	Units	SMS SQS	SMS CSL	Sample ID: / Station ID: / Depth (ft MLLW)	JAJ-01-01 S1Z mg/kg-DW DMMP	JAJ-01-01 S1Z mg/kg-OC	JAJ-01-01 S1Z VQ	JAJ-01-02 S2Z mg/kg-DW DMMP	JAJ-01-02 S2Z mg/kg-OC SMS	JAJ-01-02 S2Z VQ
Antimony		150		200					9.0		uj	9.0		uj
Arsenic	mg/kg	57	507.1	700	mg/kg	57	93		**15.0**			**17.0**		
Cadmium	mg/kg	5.1	11.3	14	mg/kg	5.1	6.7		**0.6**			**0.7**		
Chromium	mg/kg	(2)	267	(2)	mg/kg	260	270		**28.3**			**36.0**		
Copper	mg/kg	390	1,027	1,300	mg/kg	390	390		**69.9**			**75.4**		
Lead	mg/kg	450	975	1,200	mg/kg	450	530		**40.00**			**43.00**		
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.41	0.59		**0.18**		j	**0.19**		j
Selenium	mg/kg	(2)	**3**	(2)	mg/kg	--	--							
Silver	mg/kg	6.1	6.1	8.4	mg/kg	6.1	6.1		0.50		u	0.6		u
Zinc	mg/kg	410	2,783	3,800	mg/kg	410	960		**125.0**			**155.0**		
Tributyltin (bulk sediment/ion)	ug/kg	73	73						**35.0**			**21.0**		
ORGANIC CHEMICALS														
Total LPAH	ug/kg	5,200		29,000	mg/kg-OC	370	780		**455.0**	**22.2**		**380.0**	**18.27**	
Naphthalene	ug/kg	2,100		2,400	mg/kg-OC	99	170		**50.0**	**2.4**		**49.0**	**2.36**	
Acenaphthylene	ug/kg	560		2,000	mg/kg-OC	66	66		**32.0**	**1.6**		22.0	**1.06**	
Acenaphthene	ug/kg	500		2,000	mg/kg-OC	16	57		**27.0**	**1.3**		14.0	**0.67**	j
Fluorene	ug/kg	540		3,600	mg/kg-OC	23	79		**39.0**	**1.9**	j	**27.0**	**1.30**	j
Phenanthrene	ug/kg	1,500		2,100	mg/kg-OC	100	480		**170.0**	**8.3**	j	**170.0**	**8.17**	
Anthracene	ug/kg	560		13,000	mg/kg-OC	220	1,200		**110.0**	**5.4**		84.0	**4.04**	
2-Methylnapthalene	ug/kg	670		1,900	mg/kg-OC	38	64		**27.0**	**1.3**		**14.0**	**0.67**	j
Total HPAH	ug/kg	12,000		69,000	mg/kg-OC	960	5,300		**4,198.0**	**204.8**		**2,777.0**	**133.51**	
Fluoranthene	ug/kg	1,700	4,600	30,000	mg/kg-OC	160	1,200		**670.0**	**32.7**	j	**370.0**	**17.79**	
Pyrene	ug/kg	2,600	11,980	16,000	mg/kg-OC	1,000	1,400		**1,200.0**	**58.5**		**610.0**	**29.33**	
Benzo(a)anthracene	ug/kg	1,300		5,100	mg/kg-OC	110	270		**330.0**	**16.1**		**200.0**	**9.62**	
Chrysene	ug/kg	1,400		21,000	mg/kg-OC	110	460		**440.0**	**21.5**		**350.0**	**16.83**	
Total Benzo(b+k)fluoranthenes	ug/kg	3,200		9,900	mg/kg/OC	230	450		**790.0**	**38.5**		**620.0**	**29.81**	
Benzo(a)pyrene	ug/kg	1,600		3,600	mg/kg-OC	99	210		**340.0**	**16.6**	j	**240.0**	**11.54**	**j**
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	mg/kg-OC	34	88		**160.0**	**7.8**		**150.0**	**7.21**	
Dibenzo(a,h)anthracene	ug/kg	230		1,900	mg/kg-OC	12	33		78.0	**3.8**	j	**67.0**	**3.22**	**j**
Benzo(g,h,I)perylene	ug/kg	670		3,200	mg/kg-OC	31	78		**190.0**	**9.3**		**170.0**	**8.17**	
1,3-Dichlorobenzene	ug/kg	170			mg/kg-OC	--	--		4.8	0.1	u	4.8	0.12	u
1,4-Dichlorobenzene	ug/kg	110		120	mg/kg-OC	3.1	9.0		**4.6**	**0.2**	j	**4.8**	**0.23**	j
1,2-Dichlorobenzene	ug/kg	35		110	mg/kg-OC	2.3	2.3		**2.4**	**0.1**	j	4.8	0.12	u
1,2,4-Trichlorobenzene	ug/kg	31		64	mg/kg-OC	0.81	1.8		4.8	0.1	u	4.8	0.12	u
Hexachlorobenzne (HCB)	ug/kg	22	168	230	mg/kg-OC	0.38	2.3		0.23	0.01	u	0.23	0.01	u
Dimethylphthalate	ug/kg	71		1,400	mg/kg-OC	53.0	53.0		**0.38**	**0.02**		**0.46**	**0.02**	
Diethylphthalate	ug/kg	200		1,200	mg/kg-OC	61	110		2.3	0.1	u	2.3	0.06	u
Di-n-butylphthalate	ug/kg	1,400		5,100	mg/kg-OC	220	1,700		0.93	0.05	u	**0.63**	**0.03**	**j**
Butylbenzylphthalate	ug/kg	63		970	mg/kg-OC	4.9	64		**1.3**	**0.1**		**1.4**	**0.07**	
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	mg/kg-OC	47	78		**13.0**	**0.6**		**14.0**	**0.67**	
Di-n-octylphthalate	ug/kg	6,200		6,200	mg/kg-OC	58	4,500		0.93	0.02	u	0.91	0.02	u
Phenol	ug/kg	420		1,200	ug/kg	420	1,200		**67.0**			**160.0**		
2-Methylphenol	ug/kg	63		77	ug/kg	63	63		**7.3**			**10.0**		
4-Methylphenol	ug/kg	670		3,600	ug/kg	670	670		**26.0**		**j**	38.0		u
2,4-Dimethylphenol	ug/kg	29		210	ug/kg	29	29		**8.2**		**j**	**11.0**		
Pentachlorophenol	ug/kg	400		690	ug/kg	360	690		24.0		u	24.0		u
Benzyl alcohol	ug/kg	57		87	ug/kg	57	73		**160.0**			**220.0**		
Benzoic acid	ug/kg	650		760	ug/kg	650	650		**310.0**		j	**630.0**		
Dibenzofuran	ug/kg	540		1,700	mg/kg-OC	15	58		**1.4**	**0.07**		**1.7**	**0.08**	
Hexachloroethane	ug/kg	600		1,600	mg/kg-OC	--	--		--			0.9	0.02	u
Hexachlorobutadiene	ug/kg	29		270	mg/kg-OC	3.9	6.2		0.23	0.01	u	0.23	0.01	u
N-Nitrosodiphenylamine	ug/kg	28		130	mg/kg-OC	11	11		0.23	0.01	u	0.23	0.01	u
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg	6.9	50	69		--	--							
Aldrin	ug/kg	10				--	--							
Chlordane	ug/kg	10				--	--							

Table 3. JA Jack and Sons Antidegradation Evaluation

						Sample ID:		JAJ-01-01			JAJ-01-02		
						Station ID:		S1Z			S2Z		
						Depth (ft MLLW)							
		DMMP				SMS		mg/kg-DW	mg/kg-OC	VQ	mg/kg-DW	mg/kg-OC	VQ
CHEMICAL NAME	Units	SL	BT	ML	Units	SQS	CSL	DMMP			DMMP	SMS	
Dieldrin	ug/kg	10	37			--	--						
Heptachlor	ug/kg	10				--	--						
Alpha-BHC	ug/kg	10				--	--						
Gamma-BHC (Lindane)	ug/kg	10	10			--	--						
Aroclor 1016	ug/kg							9.5		u	9.8		u
Aroclor 1221	ug/kg							9.5		u	9.8		u
Aroclor 1232	ug/kg							9.5		u	9.8		u
Aroclor 1242	ug/kg							9.5		u	9.8		u
Aroclor 1248	ug/kg							**26.0**			**28.0**		
Aroclor 1254	ug/kg							**39.0**			**42.0**		
Aroclor 1260	ug/kg							**29.0**			**32.0**		
Total PCBs	ug/kg	130		3,100		--	--	**94.0**	**4.6**		**102.0**	**4.9**	
Total PCBs (TOC-normalized)	**ug/kg**		38***		**mg/kg/OC**	**12.0**	**65.0**	**4.6**			**4.9**		
Dioxin (TEQ: see Table 5 for detailed results)	**mg/kg**							**12.5**			**13.1**		
Total Solids	ng/kg							**56.6**			**51.6**		
Total Volatile Solids	%							**7.2**			**8.3**		
Total Organic Carbon	%							**2.1**			**2.1**		
Total Ammonia	%							**11.6**			**42.4**		
Total Sulfides	mg/kg							**777.0**			**1,740**		
Gravel	mg/kg							**4.0**			**2.3**		
Sand	%							**29.5**			**12.1**		
Silt	%							**46.0**			**61.5**		
Clay	%							**20.4**			**24.1**		
Fines (percent silt + clay)	%							**66.4**			**85.6**		
Bioassay Determination: **(P/F)**	%							**NA**			**NA**		
BTs exceeded:								**No**			**No**		
Bioaccumulation conducted:								**No**			**No**		
Bioaccumulation Determination: **(P/F)**								NA			NA		
ML Rule exceeded:								**No**			**No**		
PSDDA Determination: antidegradation								**Fails: antidegradation**			**Fails: antidegradation**		
DMMU Volume:													
Rank (Low = L, Moderate = M, Low-Moderate =LM, High = H)								**M**			**L**		
Mean Grab sampling depth (cm)	cm							**10.0**			**10.0**		
Maximum sampling depth (mudline) (with Z-sample)	na							**na**			**na**		
DMMU ID:								**DMMU-S1Z**			**DMMU-S2Z**		

DW = dry weight

Fails: antidegradation

ML/CSL = Exceedance DMMP/SMS

VQ = Validation Qualifier

UCOWD = Unconfined open-water disposal

NA = Not applicable

U = undetected at the reporting limit

UJ = result undetected at the estimated reporting limit shown

J = Estimated Concentration (< reporting limit)

B = Analyte detected in sample and method blank, sample results reported without blank correction

Table 4. Dioxin Summary for Z-samples at J.A. Jack & Sons

Analyte	WHO (05) TEF	S1Z (JAJ)			S2Z (JAJ)		
		ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ
2,3,7,8-TCDD	1	**0.467**	j	**0.467**	**0.608**	j	**0.608**
1,2,3,7,8-PeCDD	1	**2.18**	j	**2.18**	**2.56**	j	**2.56**
1,2,3,4,7,8-HxCDD	0.1	**2.77**		**0.277**	**3.25**	j	**0.325**
1,2,3,6,7,8-HxCDD	0.1	**11.7**	j	**1.17**	**12.7**	j	**1.27**
1,2,3,7,8,9-HxCDD	0.1	**6.25**		**0.625**	**7**		**0.7**
1,2,3,4,6,7,8-HpCDD	0.01	**337**	j	**3.37**	**327**	j	**3.27**
OCDD	0.0003	**2930**	j	**0.879**	**2790**	j	**0.837**
2,3,7,8-TCDF	0.1	**1.79**		**0.179**	**1.79**		**0.179**
1,2,3,7,8-PeCDF	0.03	1.61	j	**0.0483**	**1.37**	j	**0.0411**
2,3,4,7,8-PeCDF	0.3	**2.47**		**0.741**	2.56		**0.768**
1,2,3,4,7,8-HxCDF	0.1	**9.09**		**0.909**	**8.83**		**0.883**
1,2,3,6,7,8-HxCDF	0.1	**2.75**		**0.275**	**3**		**0.3**
2,3,4,6,7,8-HxCDF	0.1	**3.82**	j	**0.382**	**4.37**	j	**0.437**
1,2,3,7,8,9-HxCDF	0.1	**1.86**	j	**0.186**	**1.91**	j	**0.191**
1,2,3,4,6,7,8-HpCDF	0.01	**63.4**		**0.634**	**62.4**		**0.624**
1,2,3,4,7,8,9-HpCDF	0.01	**5.98**	j	**0.0598**	**5.56**	j	**0.0556**
OCDF	0.0003	**236**		**0.0708**	**200**		**0.06**
Total TEQ (u = 1/2):				**12.5**			**13.1**
Total TEQ (u=0):				**12.5**			**13.1**
TOC (%)				**2.1**			**2.1**