

MEMORANDUM FOR RECORD

SUBJECT: DETERMINATION ON THE SUITABILITY OF PROPOSED MATERIAL TO BE EXCAVATED FOR THE REPLACEMENT WASTEWATER OUTFALL FOR THE NIPPON PAPER INDUSTRIES WATER FILTER PLANT, PORT ANGELES, WASHINGTON (NWS-2006-334) EVALUATED UNDER SECTION 404 OF THE CLEAN WATER ACT FOR EITHER OPEN-WATER DISPOSAL AT THE PORT ANGELES DISPERSIVE DISPOSAL SITE, OR FOR SIDE CASTING ALONG THE OUTFALL CORRIDOR.

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 proposed excavation material for replacement outfall for the Nippon Paper Industries (NPI), Port Angeles, Washington, as part of the Elwa Dam Restoration Project for the National Park Services. The agencies include the Corps of Engineers, Department of Ecology, Department of Natural Resources, and the Environmental Protection Agency. The agencies are charged with determining the suitability of the estimated 1,000 cy of excavated material along the proposed outfall corridor, for side-cast placement along the corridor, or for open-water disposal at the Port Angeles dispersive disposal site.
2. **Table 1** documents the regulatory tracking information and dates for the DMMP testing conducted.

Table 1. Regulatory Tracking Information and Dates

Permit No.	NWS-2006-334
Initial SAP submittal date:	March 11, 2010
SAP approval letter date	March 15, 2010
Sampling date(s): Vibracore sampling (dioxin) Grab sampling (Outfall corridor character stations)	April 6, 2010 April 7, 2010
Characterization Report submittal:	May 10, 2010
Volume Tested, Sampling Method: (# samples)	1,000 cy, Grab: (7 samples); Core Samples (2 samples, Dioxin)
DAIS Tracking Number:	NPIOF-1-A-O-294
Recency Determination Date: High = 2 years	April 2012 (High)

Background:

3. The National Park Service (NPS) conducted sediment sampling in the vicinity of Nippon Paper Industries (NPI) existing wastewater outfall (Outfall 002), and proposed replacement outfall corridor. The existing outfall was constructed in the 1920s and currently intermittently discharges approximately 6,800 gallons/minute of filtered fresh water backwash from the NPDES Permit WA-00292-5. The purpose of this characterization effort is to evaluate the sediment quality of the material along the proposed outfall replacement corridor, and includes dioxin testing near the existing outfall (see **Figure 1-Vicinity Map**, **Figure 2 – Sampling Stations**).

4. The project was ranked **High** for this DMMP sediment quality characterization. The initial SAP was submitted for DMMP review on March 11, 2010, and approved by the DMMP on March 15, 2010 (See **Table 1**).

Sampling:

5. **Figure 2** depicts the two core stations for dioxin evaluation, and grab sample sediment quality stations. Core sampling at Stations 125 and 150 (135-02) were initiated on April 6, 2010, and attempts to collect core samples down to 15 feet below the sediment surface were unsuccessful due to the coarse nature of the sediments, and cores were subsequently limited to 29 inches due to a cobble layer. Grab sampling (Van Veen) was initiated on April 7, 2010, and grab sample penetration was also limited due to cobble/gravel sediments and 10 cm samples were only collected at Stations 500, and 906W (including duplicate Station: 1200), whereas the remaining grab station samples were limited to 5-7 cm sample depths. The Data Characterization Report was submitted to the DMMP agencies for review on May 10, 2010. At the DMMP agencies request, full data validation on the dioxin testing results was accomplished. 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:

6. The conventional and DMMP chemical analyses results are summarized in **Table 2**, and, the comparative SMS evaluation summary are provided in **Table 2**. It demonstrates that for chemicals of concern including dioxin/furan, no detected or undetected chemicals exceeded DMMP screening level guidelines, or bioaccumulation triggers. Evaluation of these data relative SMS guidelines, indicate that there were no Sediment Quality Standard (SQS) exceedances for detected chemicals, but undetected exceedances of SQS were noted for 1,2,4-Trichlorobenzene and Hexachlorobenzene. However, the associated Total Organic Carbon (TOC) at each of these stations was low, ranging from 0.103 to 0.219%. When TOC's are below 0.5% using dry weight values confirm that these two chemicals do not pose a concern at any of the stations evaluated along the outfall corridor based on Best-Professional-Judgment (BPJ).
7. **Table 3** provides a summary of the validated dioxin/furan congener specific testing results for the two stations closest to the existing outfall. The results indicated low concentrations of dioxin/furans with TEQ (Toxicity Equivalence) concentrations ranging from a low of 0.0364 at Station 135-02, and a high of 0.0871 pprr-TEQ (U = $\frac{1}{2}$ Detection Limit) at Station 125-02.
8. The DMMP agencies are currently using an interim process for interpreting dioxin data (http://www.nws.usace.army.mil/PublicMenu/Menu.cfm?sitename=DMMO&pageName=Dioxin_Guidelines) pending the development of a programmatic regulatory framework, expected in late 2010. Both of the Stations closest to the existing outfall were quantitated below the Samish Reference Bay Interim Dioxin/Furan Guideline of **2.44- pprr-TEQ**, which is applicable for Dispersive Site disposal under the existing interim guidelines.

Suitability Determination:

9. The results of these analyses in summary (all DMMP COC and dioxins/furans) indicate that the sediment quality of the estimated 1,000 cy of sediments to be excavated along and adjacent to the proposed outfall corridor are suitable for either side-casting along the outfall trenching

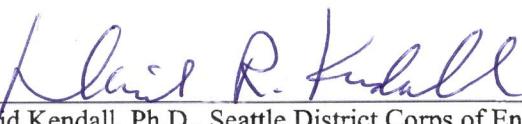
corridor, or for open-water dispersive site disposal (Port Angeles) based on these testing results using best-professional-judgment (BPJ).

10. This memorandum documents the suitability of material proposed for excavation along the proposed replacement outfall corridor for side casting adjacent to the trenching corridor, or for disposal at the nearest dispersive disposal site at Port Angeles. 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.
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Concur:

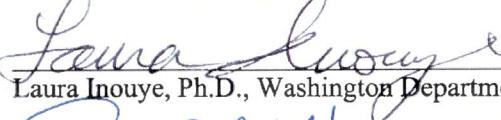
6/1/2010

Date


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

May 19, 2010

Date


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

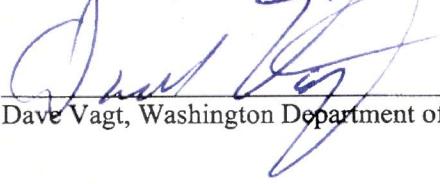
5/19/10

Date


Erika Hoffman, Environmental Protection Agency, Region 10

6/1/2010

Date


Dave Vagt, Washington Department of Natural Resources

Pamela Sanguinetti, Corps Regulatory Project Manager

Cameron Ochiltree, URS Corporation

Laura Inouye, Ph.D., Ecology

Erika Hoffman, EPA

Dave Vagt, DNR

DMMO File

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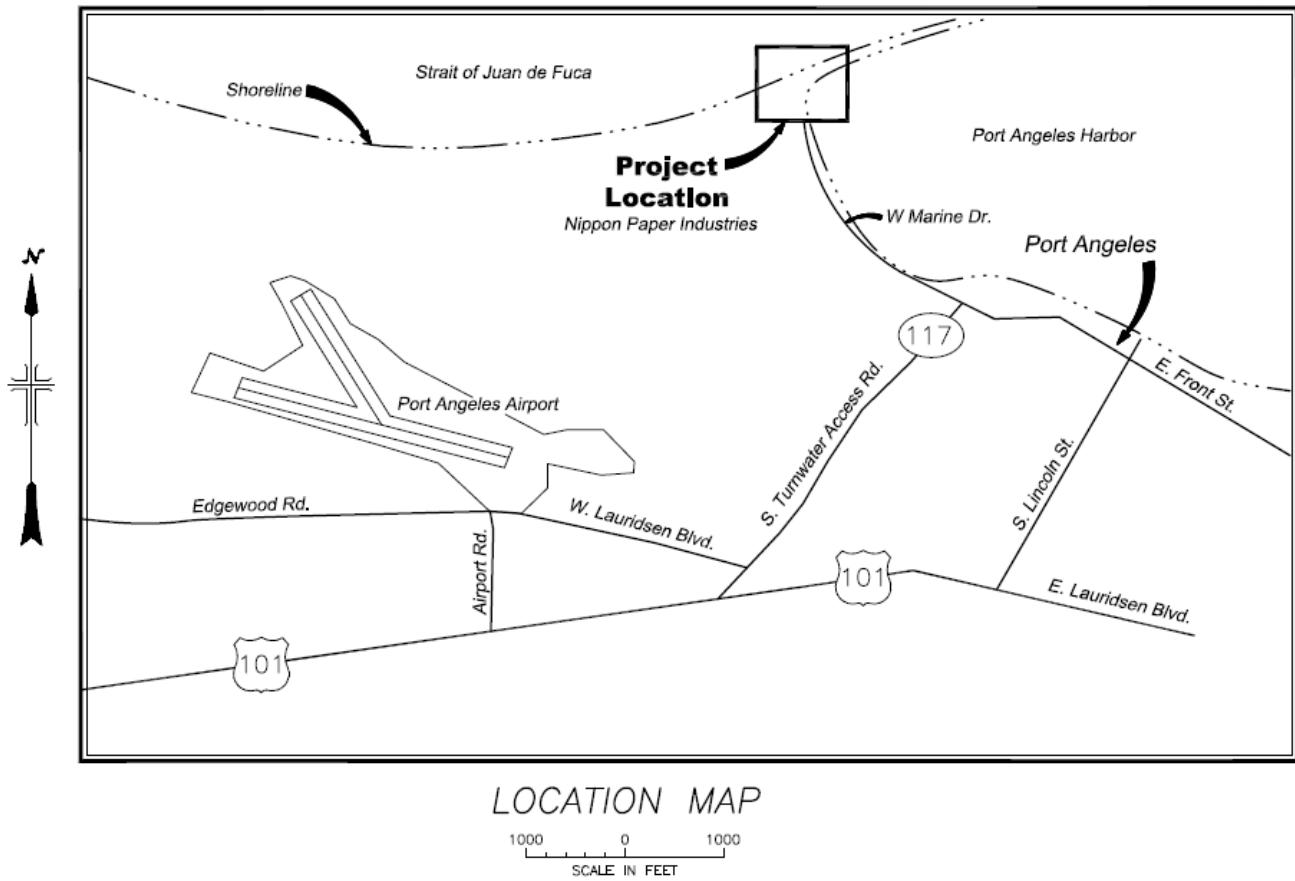


Figure 1.

Site Location Map

Job No. 22241568

URS

Nippon Paper Industries
Port Angeles, WA

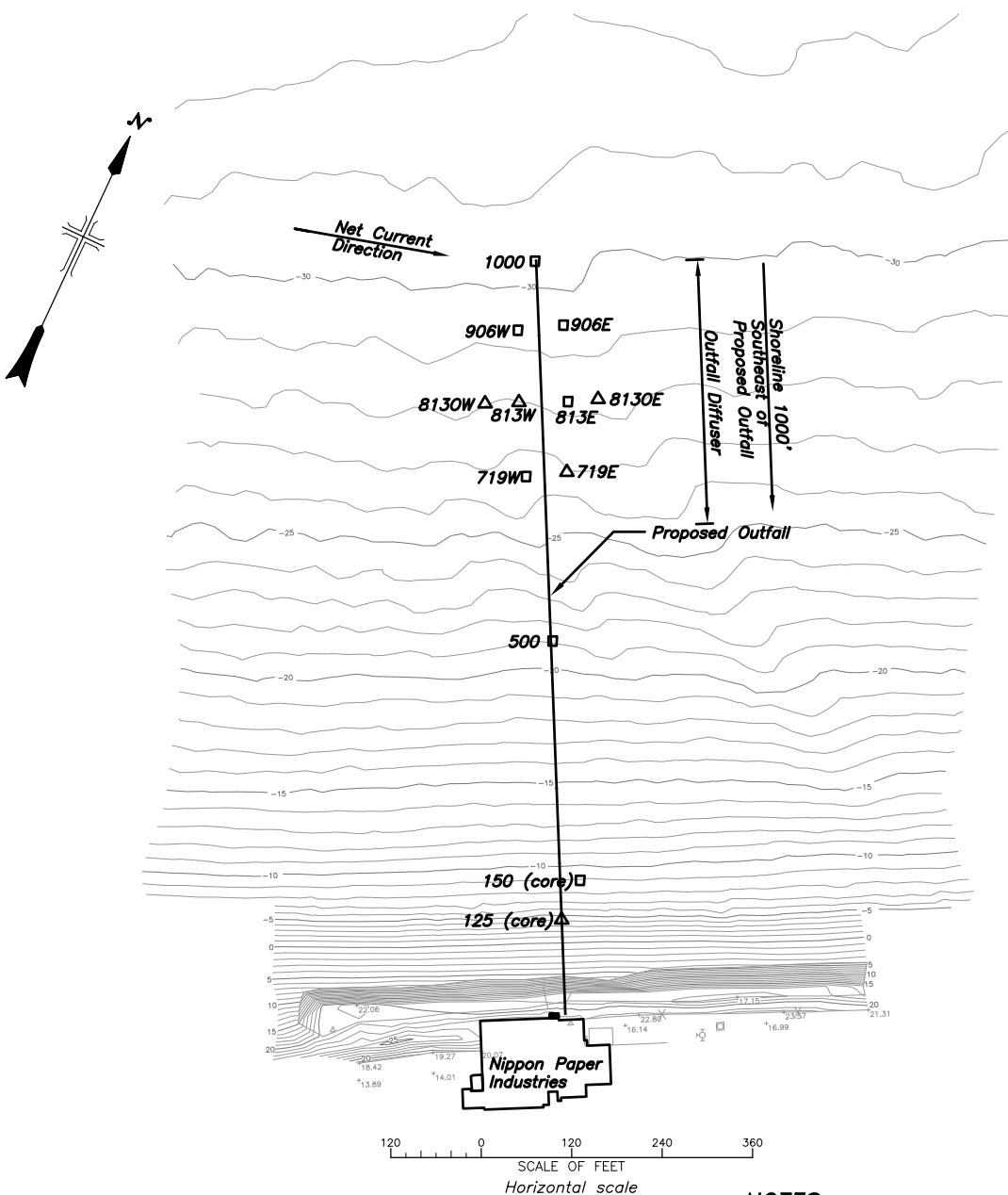


Table 2. DMMP Chemical Testing Summary for Nippon Paper Industries Replacement Outfall Project

CHEMICAL NAME	DMMU ID:								Station-150 (125-02)			Station-500			Station-719W			Station-813E		
	DMMP				SMS				mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ
	Units	SL	BT	ML	Units	SQS	CSL	DMMP	SMS		DMMP	SMS		DMMP	SMS		DMMP	SMS		
Antimony			150	200				0.234			0.106			0.029		j	0.024		j	
Arsenic	mg/kg	57	507.1	700	mg/kg	57	93	1.96			2.02			2.84			2.93			
Cadmium	mg/kg	5.1	11.3	14	mg/kg	5.1	6.7	0.175			0.10			0.024		j	0.018		j	
Chromium	mg/kg	(2)	267	(2)	mg/kg	260	270	13.3		j	15.0		j	14.5		j	8.75		j	
Copper	mg/kg	390	1,027	1,300	mg/kg	390	390	14.1			13.0			13.9			17.7			
Lead	mg/kg	450	975	1,200	mg/kg	450	530	7.15		j	6.13		j	3.56		j	2.29		j	
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.41	0.59	0.019			0.017		j	0.014		j	0.016		j	
Nickel	mg/kg	140	370	370	mg/kg	--	--	13.2		j	13.9		j	15.2		j	9.55		j	
Selenium	mg/kg	(2)	3	(2)	mg/kg	--	--	NA			NA			NA			NA			
Silver	mg/kg	6.1	6.1	8.4	mg/kg	6.1	6.1	0.033			0.032			0.024		u	0.022		u	
Zinc	mg/kg	410	2,783	3,800	mg/kg	410	960	30.6			32.4			27.2			15.7			
TBT ion (porewater)	ug/L	0.15	0.15	ug/L	0.05	0.35	NA			NA			NA			NA				
Naphthalene	ug/kg	2,100		2,400	mg/kg-OC	99	170	2.3	2.23	u	2.3	1.59	u	2.3	1.6	u	2.3	1.3	u	
Acenaphthylene	ug/kg	560		2,000	mg/kg-OC	66	66	1.2	1.17	u	1.2	0.83	u	1.2	0.8	u	1.2	0.7	u	
Acenaphthene	ug/kg	500		2,000	mg/kg-OC	16	57	1.4	1.36	u	1.4	0.97	u	1.4	1.0	u	1.4	0.8	u	
Fluorene	ug/kg	540		3,600	mg/kg-OC	23	79	1.1	1.07	u	1.1	0.76	u	1.1	0.8	u	1.1	0.6	u	
Phenanthrene	ug/kg	1,500		2,100	mg/kg-OC	100	480	2.4	2.33	u	1.4	0.97	u	1.4	1.0	u	1.4	0.8	u	
Anthracene	ug/kg	560		13,000	mg/kg-OC	220	1,200	1.6	1.55	j	1.6	1.10	u	1.6	1.1	u	1.6	0.9	u	
2-Methylnaphthalene	ug/kg	670		1,900	mg/kg-OC	38	64	2.2	2.14	u	2.2	1.52	u	2.2	1.5	u	2.2	1.2	u	
Total LPAH	ug/kg	5,200		29,000	mg/kg-OC	370	780	2.4	2.33	j	10.0	6.90	u	9.9	6.8	u	9.9	5.5	u	
Fluoranthene	ug/kg	1,700	4,600	30,000	mg/kg-OC	160	1,200	3.8	3.69	j	1.6	1.10	u	1.6	1.1	u	1.6	0.9	u	
Pyrene	ug/kg	2,600	11,980	16,000	mg/kg-OC	1,000	1,400	4.1	3.98	j	1.5	1.03	u	1.5	1.0	u	1.5	0.8	u	
Benzo(a)anthracene	ug/kg	1,300		5,100	mg/kg-OC	110	270	1.9	1.84	j	1.7	1.17	u	1.7	1.2	u	1.7	0.9	u	
Chrysene	ug/kg	1,400		21,000	mg/kg-OC	110	460	2.0	1.94	j	1.5	1.03	u	1.5	1.0	u	1.5	0.8	u	
Total Benzo(b+k)fluoranthenes	ug/kg	3,200		9,900	mg/kg/OC	230	450	1.7	1.65	j	1.4	0.97	u	1.4	1.0	u	1.4	0.8	u	
Benzo(a)pyrene	ug/kg	1,600		3,600	mg/kg-OC	99	210	10.0	9.71	uj	1.7	1.17	u	1.7	1.2	u	1.7	0.9	u	
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	mg/kg-OC	34	88	1.5	1.46	u	1.5	1.03	u	1.5	1.0	u	1.5	0.8	u	
Dibenzo(a,h)anthracene	ug/kg	230		1,900	mg/kg-OC	12	33	1.5	1.46	u	1.5	1.03	u	1.5	1.0	u	1.5	0.8	u	
Benzog(h,i,l)perylene	ug/kg	670		3,200	mg/kg-OC	31	78	1.5	1.46	u	1.5	1.03	u	1.5	1.0	u	1.5	0.8	u	
Total HPAH	ug/kg	12,000		69,000	mg/kg-OC	960	5,300	14	13.1	j	10	6.90	u	9.9	6.8	u	9.9	5.5	u	
1,2-Dichlorobenzene	ug/kg	35		110	mg/kg-OC	2.3	2.3	0.28	0.27	u	0.31	0.21	u	0.26	0.2	u	0.24	0.1	u	
1,3-Dichlorobenzene	ug/kg	170			mg/kg-OC	2.3	2.3	0.3	0.29	u	0.34	0.23	u	0.29	0.2	u	0.26	0.1	u	
1,4-Dichlorobenzene	ug/kg	110		120	mg/kg-OC	3.1	9	0.3	0.29	u	0.36	0.25	u	0.3	0.2	u	0.27	0.1	u	
1,2,4-Trichlorobenzene	ug/kg	31		64	mg/kg-OC	0.81	1.8	2.6	2.52	u	2.6	1.79	u	2.6	1.8	u	2.6	1.4	u	
Hexachlorobenzene (HCB)	ug/kg	22	168	230	mg/kg-OC	0.38	2.3	1.20	1.17	u	1.2	0.83	u	1.2	0.8	u	1.2	0.7	u	
Dimethylphthalate	ug/kg	71		1,400	mg/kg-OC	53	53	10.0	9.71	u	10.0	6.90	u	9.9	6.8	u	9.9	5.5	u	
Diethylphthalate	ug/kg	200		1,200	mg/kg-OC	61	110	1.5	1.46	j	1.3	0.90	u	1.5	1.0	u	1.3	0.7	u	
Di-n-butylphthalate	ug/kg	1,400		5,100	mg/kg-OC	220	1,700	7.9	7.67	u	7.9	5.45	u	7.9	5.4	u	7.9	4.4	u	
Butylbenzylphthalate	ug/kg	63		970	mg/kg-OC	4.9	64	3.7	3.59	j	3.2	2.21	u	3.5	2.4	u	3.2	1.8	u	
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	mg/kg-OC	47	78	8.6	8.35	j	50.0	34.5	j	10.0	6.8	j	7.0	3.9	u	
Di-n-octylphthalate	ug/kg	6,200		6,200	mg/kg-OC	58	4,500	1.7	1.65	u	1.7	1.17	u	1.7	1.2	u	1.7	0.9	u	
Phenol	ug/kg	420		1,200	ug/kg	420	1,200	4.8	j		16.0	j		3.4	j		4.2	j		
2-Methylphenol	ug/kg	63		77	ug/kg	63	63	1.5		u	1.5		u	1.5		u	1.5		u	
4-Methylphenol	ug/kg	670		3,600	ug/kg	670	670	1.5		u	1.5		u	1.5		u	1.5		u	
2,4-Dimethylphenol	ug/kg	29		210	ug/kg	29	29	5.5		u	5.5		u	5.5		u	5.5		u	
Pentachlorophenol	ug/kg	400		690	ug/kg	360	690	20.0		u	20.0		u	20.0		u	20.0		u	
Benzyl alcohol	ug/kg	57		87	ug/kg	57	73	20.0		u	2.1		u	2.1		u	2.1		u	
Benzoic acid	ug/kg	650		760	ug/kg	650	650	96.0		u	96.0		u	96.0		u	96.0		u	
Dibenzofuran	ug/kg	540		1,700	mg/kg-OC	15	58	1.2	1.17	u	1.2	0.83	u	1.2	0.8	u	1.2	0.7	u	
Hexachloroethane	ug/kg	600		1,600	mg/kg-OC			3.1	3.01	u	3.1	2.14	u	3.1	2.1	u	3.1	1.7	u	
Hexachlorobutadiene	ug/kg	29		270	mg/kg-OC	3.9	6.2	2.50	2.43	u	2.5	1.72	u	2.5	1.7	u	2.5	1.4	u	
N-Nitrosodiphenylamine	ug/kg	280		130	mg/kg-OC	11	11	1.6	1.55	u	1.6	1.10	u	1.6	1.1	u	1.6	0.9	u	
Trichloroethene	ug/kg	160		1,600	ug/kg	--	--	0.34	0.33	u	0.38	0.26	u	0.32	0.2	u	0.29	0.2	u	
Tetrachloroethene	ug/kg	57		210	ug/kg	--	--	0.33	0.32	u	0.37	0.26	u	0.31	0.2	u	0.28	0.2	u	
Ethylbenzene	ug/kg	10		50	ug/kg	--	--	0.28	0.27	u	0.31	0.21	u	0.26	0.2	u	0.24	0.1	u	

Table 2. DMMP Chemical Testing Summary for Nippon Paper Industries Replacement Outfall Project

CHEMICAL NAME	DMMP ID:				Station-150 (125-02)			Station-500			Station-719W			Station-813E					
					SMS		mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	
	Units	SL	BT	ML	Units	SQS	CSL	DMMP	SMS	DMMP	SMS	DMMP	SMS	DMMP	SMS	DMMP	SMS	VQ	
Total Zylene (sum of o-,m-,p-)	ug/kg	40		160	ug/kg	--	--	0.47	0.46	u	0.52	0.36	u	0.44	0.3	u	0.40	0.2	u
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg	6.9	50	69		--	--	0.17		u	0.17		u	0.17		u	0.29	j	
Aldrin	ug/kg	10				--	--	0.16		u	0.16		u	0.16		u	0.16		u
Chlordane	ug/kg	10	37			--	--	0.10		u	0.10		u	0.12	j		0.10		u
Diieldrin	ug/kg	10				--	--	0.14		u	0.14		u	0.14		u	0.14		u
Heptachlor	ug/kg	10				--	--	0.12		u	0.12		u	0.12		u	0.12		u
Alpha-BHC	ug/kg		10			--	--												
Gamma-BHC (Lindane)	ug/kg	10				--	--	0.08		u	0.08		u	0.08		u	0.08		u
Total PCBs	ug/kg	130	38*	3,100	mg/kg-OC	12	65	2.1	2.04	u	2.1	1.45	u	2.1	1.44	u	7.5	4.14	u
Total TCDD/F (TEQ: 1/2 DL)	ng/kg							0.087			NA			NA			NA		
Total Solids	%																		
Total Volatile Solids	%																		
Total Organic Carbon	%							0.103			0.145			0.146			0.181		
Total Ammonia	mg/kg							0.69			5.6			0.2	j		2.1		
Total Sulfides	mg/kg							3.9		u	0.9		u	0.8		u	0.7		u
Gravel	%							12.0			0.23			13.7			53.2		
Sand	%							84.4			96.0			82.7			50.4		
Silt	%							1.7			1.9			0.3			0.3		
Clay	%							1.2			1.4			0.8			0.3		
Fines (percent silt + clay)	%							2.8			3.3			1.1			0.6		
Bioassay Determination: (P/F)								NA			NA			NA			NA		
BTs exceeded:								No			No			No			No		
Bioaccumulation conducted:								No			No			No			No		
ML Rule exceeded:								No			No			No			No		
PSDDA Determination:								PASS			PASS			PASS			PASS		
DMMU Total Volume:	cy							333			333			not applicable			not applicable		
Rank								H			H			H			H		
Mean Grab (G) / Core (C) sampling depth	ft							2.4			0.32			0.2			0.2		
Maximum sampling depth (mudline) (no-Z-sample)	ft							2.4 (Core)			0.52 (G)			0.2 (G)			0.2 (G)		
DMMU ID:								Station-150 (125-02)			Station-500			Station-719W			Station-813E		

Legend:

PASS = Pass (Suitable for Side Cast Disposal)

SQS = Sediment Quality Standards exceedance (SMS)

CSL = Cleanup Screening Level exceedance (SMS)

* ppm-organic carbon normalized

FD = Field Duplicate

VQ = Validation Qualifier

NA = not analyzed

U = undetected at the reported concentration

J = Estimated Concentration (< reporting limit)

Table 2. DMMP Chemical Testing Summary for Nippon Paper Industries Replacement Outfall Project

CHEMICAL NAME	DMMU ID:								Station-906E			Station-906W			Station-906W (1200: FD)			Station-1000		
	DMMP				SMS				mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ	mg/kg-dry wgt	mg/kg-OC	VQ
	Units	SL	BT	ML	Units	SQS	CSL	DMMP	SMS		DMMP	SMS		DMMP	SMS		DMMP	SMS		
Antimony			150	200				0.028		j	0.029		j	0.025		j	0.015		j	
Arsenic	mg/kg	57	507.1	700	mg/kg	57	93	3.71			2.58			2.88			2.85			
Cadmium	mg/kg	5.1	11.3	14	mg/kg	5.1	6.7	0.025			0.018		j	0.026			0.019		j	
Chromium	mg/kg	(2)	267	(2)	mg/kg	260	270	12.5		j	8.0		j	11.0		j	8.53		j	
Copper	mg/kg	390	1,027	1,300	mg/kg	390	390	11.9			11.4			15.0			11.4			
Lead	mg/kg	450	975	1,200	mg/kg	450	530	3.63		j	2.33		j	3.27		j	2.69		j	
Mercury	mg/kg	0.41	1.5	2.3	mg/kg	0.41	0.59	0.022			0.014		j	0.022			0.014		j	
Nickel	mg/kg	140	370	370	mg/kg	--	--	10.9		j	7.89		j	12.1		j	8.97		j	
Selenium	mg/kg	(2)	3	(2)	mg/kg	--	--	NA			NA			NA			NA			
Silver	mg/kg	6.1	6.1	8.4	mg/kg	6.1	6.1	0.022		u	0.024		u	0.021		u	0.021		u	
Zinc	mg/kg	410	2,783	3,800	mg/kg	410	960	21.7			17.4			22.7			19.2			
TBT ion (porewater)	ug/L	0.15	0.15		ug/L	0.05	0.35	NA			NA			NA			NA			
Naphthalene	ug/kg	2,100		2,400	mg/kg-OC	99	170	2.3	1.1	u	2.3	1.40	u	2.3	1.5	u	2.3	1.5	u	
Acenaphthylene	ug/kg	560		2,000	mg/kg-OC	66	66	1.2	0.5	u	1.2	0.73	u	1.2	0.8	u	1.2	0.8	u	
Acenaphthene	ug/kg	500		2,000	mg/kg-OC	16	57	1.4	0.6	u	1.4	0.85	u	1.4	0.9	u	1.4	0.9	u	
Fluorene	ug/kg	540		3,600	mg/kg-OC	23	79	1.1	0.5	u	1.1	0.67	u	1.1	0.7	u	1.1	0.7	u	
Phenanthrene	ug/kg	1,500		2,100	mg/kg-OC	100	480	1.4	0.6	u	1.5	0.91	j	1.4	0.9	u	1.4	0.90	u	
Anthracene	ug/kg	560		13,000	mg/kg-OC	220	1,200	1.6	0.7	u	1.6	0.98	u	1.6	1.1	u	1.6	1.03	u	
2-Methylnaphthalene	ug/kg	670		1,900	mg/kg-OC	38	64	2.2	1.0	u	2.2	1.34	u	2.2	1.5	u	2.2	1.42	u	
Total LPAH	ug/kg	5,200		29,000	mg/kg-OC	370	780	9.5	4.3	u	1.5	0.91	j	9.9	6.6	u	9.7	6.26	u	
Fluoranthene	ug/kg	1,700	4,600	30,000	mg/kg-OC	160	1,200	1.6	0.7	u	1.6	0.98	u	1.6	1.1	u	1.6	1.03	u	
Pyrene	ug/kg	2,600	11,980	16,000	mg/kg-OC	1,000	1,400	1.5	0.7	u	1.5	0.91	u	1.5	1.0	u	1.5	0.97	u	
Benz(a)anthracene	ug/kg	1,300		5,100	mg/kg-OC	110	270	1.7	0.8	u	1.7	1.04	u	1.7	1.1	u	1.7	1.10	u	
Chrysene	ug/kg	1,400		21,000	mg/kg-OC	110	460	1.5	0.7	u	1.5	0.91	u	1.5	1.0	u	1.5	0.97	u	
Total Benzo(b+k)fluoranthenes	ug/kg	3,200		9,900	mg/kg/OC	230	450	1.4	0.6	u	1.4	0.85	u	1.4	0.9	u	1.4	0.90	u	
Benzo(a)pyrene	ug/kg	1,600		3,600	mg/kg-OC	99	210	1.7	0.8	u	1.7	1.04	u	1.7	1.1	u	1.7	1.10	u	
Indeno(1,2,3-cd)pyrene	ug/kg	600		4,400	mg/kg-OC	34	88	1.5	0.7	u	1.5	0.91	u	1.5	1.0	u	1.5	0.97	u	
Dibenzo(a,h)anthracene	ug/kg	230		1,900	mg/kg-OC	12	33	1.5	0.7	u	1.5	0.91	u	1.5	1.0	u	1.5	0.97	u	
Benz(g,h,l)perylene	ug/kg	670		3,200	mg/kg-OC	31	78	1.5	0.7	u	1.5	0.91	u	1.5	1.0	u	1.5	0.97	u	
Total HPAH	ug/kg	12,000		69,000	mg/kg-OC	960	5,300	9.5	4.3	u	9.9	6.04	u	9.9	6.6	u	9.7	6.26	u	
1,2-Dichlorobenzene	ug/kg	35		110	mg/kg-OC	2.3	2.3	0.24	0.1	u	0.22	0.13	u	0.23	0.2	u	0.23	0.15	u	
1,3-Dichlorobenzene	ug/kg	170			mg/kg-OC	2.3	2.3	0.26	0.1	u	0.24	0.15	u	0.25	0.2	u	0.26	0.17	u	
1,4-Dichlorobenzene	ug/kg	110		120	mg/kg-OC	3.1	9	0.27	0.1	u	0.25	0.15	u	0.26	0.2	u	0.27	0.17	u	
1,2,4-Trichlorobenzene	ug/kg	31		64	mg/kg-OC	0.81	1.8	2.6	1.2	u	2.6	1.59	u	2.6	1.7	u	2.6	1.68	u	
Hexachlorobenzene (HCB)	ug/kg	22	168	230	mg/kg-OC	0.38	2.3	1.2	0.5	u	1.2	0.73	u	1.2	0.8	u	1.2	0.77	u	
Dimethylphthalate	ug/kg	71		1,400	mg/kg-OC	53	53	9.5	4.3	u	9.9	6.04	u	9.9	6.6	u	9.7	6.26	u	
Diethylphthalate	ug/kg	200		1,200	mg/kg-OC	61	110	1.3	0.6	u	1.3	0.79	u	1.3	0.9	u	1.3	0.84	u	
Di-n-butylphthalate	ug/kg	1,400		5,100	mg/kg-OC	220	1,700	7.9	3.6	u	7.9	4.82	u	7.9	5.3	u	7.9	5.10	u	
Butylbenzylphthalate	ug/kg	63		970	mg/kg-OC	4.9	64	3.2	1.5	u	3.2	1.95	u	3.2	2.1	u	3.2	2.06	u	
Bis(2-ethylhexyl)phthalate	ug/kg	1,300		8,300	mg/kg-OC	47	78	7.0	3.2	u	16.0	9.76	j	7.0	4.7	u	7.0	4.52	u	
Di-n-octylphthalate	ug/kg	6,200		6,200	mg/kg-OC	58	4,500	1.7	0.8	u	1.7	1.04	u	1.7	1.1	u	1.7	1.10	u	
Phenol	ug/kg	420		1,200	ug/kg	420	1,200	4.0	j		4.4		j	5.6		j	7.7		j	
2-Methylphenol	ug/kg	63		77	ug/kg	63	63	1.5	u		1.5		u	1.5	1.5	u	1.5		u	
4-Methylphenol	ug/kg	670		3,600	ug/kg	670	670	1.5	u		1.5		u	1.5	1.5	u	1.5		u	
2,4-Dimethylphenol	ug/kg	29		210	ug/kg	29	29	5.5	u		5.5		u	5.5	5.5	u	5.5		u	
Pentachlorophenol	ug/kg	400		690	ug/kg	360	690	20.0	u		20.0		u	20.0	20.0	u	20.0		u	
Benzyl alcohol	ug/kg	57		87	ug/kg	57	73	2.1	u		20.0		u	20.0	20.0	u	21		u	
Benzoic acid	ug/kg	650		760	ug/kg	650	650	96.0	u		96.0		u	96.0	96.0	u	96.0		u	
Dibenzofuran	ug/kg	540		1,700	mg/kg-OC	15	58	1.2	0.55	u	1.2	0.73	u	1.2	0.8	u	1.2	0.8	u	
Hexachloroethane	ug/kg	600		1,600	mg/kg-OC			3.1	1.42	u	3.1	1.89	u	3.1	2.1	u	3.1	2.0	u	
Hexachlorobutadiene	ug/kg	29		270	mg/kg-OC	3.9	6.2	2.5	1.14	u	2.5	1.52	u	2.5	1.7	u	2.5	1.6	u	
N-Nitrosodiphenylamine	ug/kg	280		130	mg/kg-OC	11	11	1.6	0.73	u	1.6	0.98	u	1.6	1.1	u	1.6	1.0	u	
Trichloroethene	ug/kg	160		1,600	ug/kg	--	--	0.29	0.13	u	0.27	0.16	u	0.28	0.2	u	0.29	0.2	u	
Tetrachloroethene	ug/kg	57		210	ug/kg	--	--	0.28	0.13	u	0.26	0.16	u	0.27	0.2	u	0.28	0.2	u	
Ethylbenzene	ug/kg	10		50	ug/kg	--	--	0.24	0.11	u	0.22	0.13	u	0.23	0.2	u	0.23	0.1	u	

Table 2. DMMP Chemical Testing Summary for Nippon Paper Industries Replacement Outfall Project

CHEMICAL NAME	DMMP ID:				Station-906E			Station-906W			Station-906W (1200: FD)			Station-1000					
					Units	SMS	mg/kg-dry wgt	mg/kg-OC	VQ	Units	SMS	mg/kg-dry wgt	mg/kg-OC	VQ	Units	SMS	mg/kg-dry wgt	mg/kg-OC	VQ
	DMMP	SL	BT	ML	DMMP	SMS	DMMP	SMS	DMMP	SL	BT	ML	DMMP	SMS	DMMP	SMS	DMMP	SL	
Total Zylene (sum of o-,m-,p-)	ug/kg	40		160	ug/kg	--	--	0.39	0.18	u		0.37	0.23	u		0.39	0.3	u	
Total DDT (sum of 4,4'-DDD, 4,4'-DDE and 4,4'-DDT)	ug/kg	6.9	50	69	ug/kg	--	--	0.17		u	0.23	j	0.17		u	0.17		u	
Aldrin	ug/kg	10			ug/kg	--	--	0.16		u	0.16	u	0.16		u	0.16		u	
Chlordane	ug/kg	10	37		ug/kg	--	--	0.10		u	0.10	u	0.10		u	0.10		u	
Dieldrin	ug/kg	10			ug/kg	--	--	0.14		u	0.14	u	0.14		u	0.14		u	
Heptachlor	ug/kg	10			ug/kg	--	--	0.12		u	0.96	uj	0.12		u	0.12		u	
Alpha-BHC	ug/kg		10		ug/kg	--	--												
Gamma-BHC (Lindane)	ug/kg	10			ug/kg	--	--	0.08		u	0.08	u	0.08		u	0.08		u	
Total PCBs	ug/kg	130	38*	3,100	mg/kg-OC	12	65	2.1	0.96	u	3.1	1.89	u	2.1	1.40	u	2.1	1.35	u
Total TCDD/F (TEQ: 1/2 DL)	ng/kg							NA			NA			NA			NA		
Total Solids	%																		
Total Volatile Solids	%																		
Total Organic Carbon	%							0.219			0.164			0.150			0.155		
Total Ammonia	mg/kg							0.51		j	0.50	j	0.25	j	0.75				
Total Sulfides	mg/kg							0.7		u	0.7	u	0.7	u	0.7		u		
Gravel	%							49.5			73.8			73.0			45.6		
Sand	%							50.9			27.0			27.6			47.7		
Silt	%							0.2			0.6			0.6			0.3		
Clay	%							0.3			0.1			0.1			0.4		
Fines (percent silt + clay)	%							0.5			0.7			0.7			0.6		
Bioassay Determination: (P/F)								NA			NA			NA			NA		
BTs exceeded:								No			No			No			No		
Bioaccumulation conducted:								No			No			No			No		
ML Rule exceeded:								No			No			No			No		
PSDDA Determination:								PASS			PASS			PASS			PASS		
DMMU Total Volume:	cy							not applicable			not applicable			not applicable			333		
Rank								H			H			H			H		
Mean Grab (G) / Core (C) sampling depth	ft							0.16			0.32			0.32			0.22		
Maximum sampling depth (mudline) (no-Z-sample)	ft							0.16 (G)			0.49 (G)			0.49 (G)			0.22 (G)		
DMMU ID:								Station-906E			Station-906W			Station-906W (1200: FD)			Station-1000		

Legend:

PASS = Pass (Suitable for Side Cast Disposal)

SQS = Sediment Quality Standards exceedance (SMS)

CSL = Cleanup Screening Level exceedance (SMS)

* ppm-organic carbon normalized

FD = Field Duplicate

VQ = Validation Q

NA = not analyzed

U = undetected at th

J = Estimated Conc

Table 3. Summary of Dioxin/Furan Data from the Nippon Paper Industries Outfall Characterization

DMMU ID: Sample ID: Sample Date: Depth (inches):	WHO (05)	Station-125-02 NPI Outfall- 4/6/2010 29 inches			Station-135-02- NPI Outfall- 4/6/2010 29 inches		
Dioxin Furans (ng/kg)	TEF	ng/kg-dw	LQ	TEQ	ng/kg-dw	LQ	TEQ
2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD)	1	0.0197	U	0.00985	0.0172	U	0.0086
1,2,3,7,8-Pentachlorodibenzo-p-dioxin (PeCDD)	1	0.0164	U	0.0082	0.00762	U	0.00381
1,2,3,4,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	0.0199	U	0.000995	0.0238	U	0.00119
1,2,3,6,7,8-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	0.201		0.0201	0.0326		0.00326
1,2,3,7,8,9-Hexachlorodibenzo-p-dioxin (HxCDD)	0.1	0.108		0.0108	0.028	U	0.0028
1,2,3,4,6,7,8-Heptachlorodibenzo-p-dioxin (HpCDD)	0.01	1.31		0.0131	0.0253		0.00025
1,2,3,4,6,7,8,9-Octachlorodibenzo-p-dioxin (OCDD)	0.0003	0.0515	U	7.73E-06	0.062	U	9.3E-06
2,3,7,8-Tetrachlorodibenzofuran (TCDF)	0.1	0.0894	U	0.00447	0.0714	U	0.00714
1,2,3,7,8-Pentachlorodibenzofuran (PeCDF)	0.03	0.0175	U	0.000263	0.0104	U	0.00016
2,3,4,7,8-Pentachlorodibenzofuran (PeCDF)	0.3	0.0456		0.01368	0.0103	U	0.00155
1,2,3,4,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	0.0236	U	0.00118	0.0188	U	0.00188
1,2,3,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	0.0227	U	0.001135	0.0183		0.00183
1,2,3,7,8,9-Hexachlorodibenzofuran (HxCDF)	0.1	0.0315	U	0.001575	0.0258	U	0.00129
2,3,4,6,7,8-Hexachlorodibenzofuran (HxCDF)	0.1	0.0257	U	0.001285	0.0191	U	0.00191
1,2,3,4,6,7,8-Heptachlorodibenzofuran (HpCDF)	0.01	0.034	U	0.00017	0.0403		0.0004
1,2,3,4,7,8,9-Heptachlorodibenzofuran (HpCDF)	0.01	0.0479	U	0.00024	0.0541	U	0.00027
1,2,3,4,5,6,7,8-Octachlorodibenzofuran (OCDF)	0.0003	0.0336	U	5.04E-06	0.0354	U	5.3E-06
Total TEQ (u = 1/2)(Mammal):				0.0871			0.0364
Total TEQ (u=0)(Mammal):				0.0577			0.0057
Total Organic Carbon (TOC), %:				0.103			NA

NA = not analyzed

U = undetected at the detection limit