APPENDIX J

Slip 4 Additional Data Collection

SLIP 4 ADDITIONAL DATA COLLECTION

Duwamish Sediment Other Area and Southwest Bank

Corrective Measure and Habitat Project

Boeing Plant 2, Seattle/Tukwila, Washington

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SLIP 4 ADDITIONAL DATA COLLECTION

Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2, Seattle/Tukwila, Washington

1.0 INTRODUCTION

As part of the Duwamish Sediment Other Area (DSOA) Corrective Measure, EPA identified four small areas within Slip 4 to be dredged (see Figure 1). A review of the Slip 4 data was provided in Appendix N of the Corrective Measure Alternatives Study (AMEC and FSI 2011). The dredge depths in the four areas were a nominal 2, 3, or 4 feet, based on existing data or weight of evidence. EPA also required post-construction/pre-backfill core samples to be collected within the footprint of each of the four dredge areas (Post-Construction Core Sampling Work Plan; AMEC et al. 2012).

Boeing completed the dredging in the four areas in early December 2014, and the post-construction core samples were collected in accordance with the approved Post-Construction Core Sampling Work Plan (AMEC et al. 2012). The results of the post-construction core sampling indicated that elevated concentrations of polychlorinated biphenyls (PCBs) were present at the bottom of the dredge cuts in one of the four areas.

This report describes the results of the initial post-construction coring and additional investigations that were conducted to determine the nature and extent of elevated PCB concentrations within the Boeing-owned portion of Slip 4.

The coordinates for the locations of core samples presented in this report are provided in Table 1.

2.0 DECEMBER 2014 POST-CONSTRUCTION CORE SAMPLES

Results for post-construction core samples collected in December 2014 showed that metals concentrations were below the Sediment Management Standards Sediment Quality Standards (SQS; Washington Administrative Code [WAC] 173-204-320) in all of the dredge areas (Table 2). Total PCB concentrations were below the SQS in three of the four areas (Table 2 and Figure 2). One dredge area had elevated PCB concentrations in all the sample intervals analyzed. The dredge depth in this area was on the order of 4 to 5 feet, and PCB concentrations were elevated at least 2 feet below the bottom of the dredge cut (approximately 6 to 7 feet below the original mudline). These results were not expected, as results from previous core samples collected in the area indicated that elevated PCB concentrations did not extend more than 2 to 3 feet below the previous mudline. It appeared that

elevated PCBs concentrations were confined to what appeared to be recently deposited material, and that the native underlying sediments did not contain PCBs. The core summary logs and sample photographs are provided in Attachment A.

Based on the results from the core samples collected in December 2014, additional investigations of the Slip 4 area were conducted, as described below.

3.0 PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLE COLLECTION

Based on the results of the December 2014 post-construction cores, the Slip 4 Additional Sediment Cores work plan (AMEC 2014) was submitted to and approved by EPA.

Samples were collected at the four locations shown on Figure 3. At locations SD-SL4-003 and SD-SL4-004, elevated concentrations of PCBs extended to approximately 5 feet below the mudline, and at SD-SL4-001 and SD-SL4-002 elevated concentrations of PCBs extended to approximately 8 feet below the mudline (Table 3 and Figure 3). Again, it appeared that elevated PCB concentrations were confined to what appeared to be recently deposited material and that the native underlying sediments did not contain PCBs. The core summary logs and sample photographs are provided in Attachment A.

Subsequent to receiving the analytical results, Boeing learned that at least two earlier dredging events had been conducted in Slip 4 in 1980 and 1996. Based on the plans for the 1980 dredge event, all of Slip 4 outside of the Boeing property was to be dredged to a depth corresponding to -15 feet mean lower low water (MLLW) plus some allowable overdredge depth (probably on the order of 2 feet). In 1996, Slip 4 was to be dredged, adjacent to the former Crowley pier, to a depth corresponding to -15 feet MLLW, again with some allowable overdredge.

The plans do not indicate how far the dredging extended onto the Boeing property, but it is assumed that some dredging to the full dredge depth extended onto the Boeing property.

Results for the Phase 1 Slip 4 Additional core samples indicate that elevated PCB concentrations occurred in sediments between -14 and -20 feet MLLW. The elevation ranges where elevated PCB concentrations were observed are not inconsistent with the earlier proposed navigation dredging depths and allowable over depth.

Based on this information, it was assumed that the depths where elevated PCB concentrations were observed can likely be explained by historic dredging conducted in the slip. This hypothesis is consistent with the physical conceptual site model (CSM) for the DSOA that was presented in the

Corrective Measure Alternatives Study (AMEC and FSI 2011), which suggested that navigation dredging likely influenced the depth of contamination. If the CSM explains the contamination at depth, then it was anticipated that the depth of contamination along the shoreline bank would be less than in the main navigable portion of the slip where the prior samples were collected.

4.0 PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE COLLECTION

A second phase of core sample collection was conducted at the locations shown on Figure 4 (AMEC 2015). Samples were collected along the shoreline and offshore to bound the extent of elevated concentrations of PCBs within a majority of the Boeing-owned portion of Slip 4.

The results from Phase 2 (Table 4 and Figure 4) showed that elevated concentrations of PCBs along the shoreline did not extend below 1 to 2 feet below mudline (SD-SL4-005, SD-SL4-006, SD-SL4-007, SD-SL4-010, and SD-SL4-012), except at SD-SL4-008, where elevated concentrations extended to 6 feet below mudline. Elevated PCB concentrations at offshore locations SD-SL4-009 and SD-SL4-011 extended 8 and 6 feet below mudline, respectively. As with the other two sampling events, it appeared that elevated PCBs concentrations were confined to what appeared to be recently deposited material and that the native underlying sediments did not contain PCBs. The core summary logs and sample photographs are provided in Attachment A.

Except for SD-SL4-008, the vertical extent of elevated PCB concentrations were consistent with the CSM; the depths where elevated PCB concentrations were observed were shallower along the shoreline and deeper offshore.

5.0 DATA QUALITY REVIEW

The chain-of-custody forms are provided in Attachment B. Results of the Stage 2B data validation on the Slip 4 data are reported in Attachment C. A summary of the data validation is presented below.

5.1 PCB ANALYSES

Documentation for the PCB analyses was found to be clear and complete. The calibration data demonstrated acceptable instrument performance, and the laboratory control sample results demonstrated acceptable accuracy and precision. Multiple analysis results were reduced to the most appropriate to use. Some results were estimated due to dual column variability. Except for data replaced by another result, PCB data were acceptable for use as qualified.

5.2 METALS ANALYSES

Documentation for the metals analyses was found to be clear and complete. The calibration data demonstrated acceptable instrument performance, and the method blank, laboratory control sample (LCS), and standard reference material results demonstrated acceptable laboratory precision and accuracy. One zinc result was estimated based on the matrix spike (MS) recovery. The metals data were acceptable for use as qualified.

5.3 GENERAL CHEMISTRY

The documentation for general chemistry was found to be clear and complete. Calibration data indicated acceptable performance, and method blank and LCS results demonstrate acceptable laboratory accuracy. Some data were estimated based on laboratory triplicate, MS/matrix spike duplicate, and MS and standard reference material (SRM) recoveries. The general chemistry results were acceptable for use as qualified.

6.0 SUMMARY

Results of sediment core sampling described in this report showed that the depth of sediments containing elevated PCB concentrations was shallower near the shoreline and deeper offshore (Figure 5), which is consistent with the CSM. The CSM, the depth of elevated PCB concentrations, and the evidence that native sediments were “clean” were used to develop a new dredge plan, which was subsequently implemented with approval by EPA on February 10, 2015.

7.0 REFERENCES

AMEC Environment & Infrastructure, Inc. (AMEC). 2014. Slip 4 Additional Sediment Cores, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

——— 2015. Slip 4 Additional Sediment Cores, Phase 2, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

AMEC Environment & Infrastructure, Inc., and Floyd|Snider, Inc. (AMEC and FSI). 2011. Duwamish Sediment Other Area and Southwest Bank Corrective Measure Alternatives Study, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

AMEC Environment & Infrastructure, Inc., Dalton, Olmsted & Fuglevand, Inc., and Floyd|Snider, Inc. (AMEC et al.). 2012. Post-Construction Core Sampling Work Plan, Appendix F in Final Construction Quality Assurance Project Plan, Duwamish Sediment Other Area and Southwest Bank Corrective Measure and Habitat Project, Boeing Plant 2, Seattle/Tukwila, Washington. Prepared for The Boeing Company, Seattle, Washington.

TABLES

TABLE 1

LOCATION OF CORE SAMPLES COLLECTED IN SLIP 4
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Sample ID	Depth Interval (Feet Below Sediment Surface)
			Easting	Northing		
SD-PCC001	12/9/2014	12:19	1273280	198777	SD-PCC001-A	0 to 0.33
					SD-PCC001-B	0.33 to 1
					SD-PCC001-C	1 to 2
					SD-PCC001-D	2 to 3
SD-PCC002	12/9/2014	11:58	1273255	198752	SD-PCC002-A	0 to 0.33
					SD-PCC002-B	0.33 to 1
					SD-PCC002-C	1 to 2
					SD-PCC002-D	2 to 3
SD-PCC003	12/8/2014	11:55	1273176	198687	SD-PCC003-A	0 to 0.33
					SD-PCC003-B	0.33 to 1
					SD-PCC003-C	1 to 2
					SD-PCC003-D	2 to 3
SD-PCC004	12/8/2014	10:49	1273031	198522	SD-PCC004-A	0 to 0.33
					SD-PCC004-B	0.33 to 1
					SD-PCC004-C	1 to 2
					SD-PCC004-D	2 to 3
SD-PCC005	12/8/2014	11:25	1272971	198515	SD-PCC005-A	0 to 0.33
					SD-PCC005-B	0.33 to 1
					SD-PCC005-C	1 to 2
					SD-PCC005-D	2 to 3

TABLE 1

LOCATION OF CORE SAMPLES COLLECTED IN SLIP 4
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Sample ID	Depth Interval (Feet Below Sediment Surface)
			Easting	Northing		
SD-SL4-001	12/22/2014	9:50	1273119	198630	SD-SL4-001-0000	0 to 1
					SD-SL4-001-0010	1 to 2
					SD-SL4-001-0020	2 to 3
					SD-SL4-001-0030	3 to 4
					SD-SL4-001-0040	4 to 5
					SD-SL4-001-0050	5 to 6
					SD-SL4-001-0060	6 to 7
					SD-SL4-001-0070	7 to 8
					SD-SL4-001-0080	8 to 9
SD-SL4-002	12/22/2014	10:19	1273149	198661	SD-SL4-002-0000	0 to 1
					SD-SL4-002-0010	1 to 2
					SD-SL4-002-0020	2 to 3
					SD-SL4-002-0030	3 to 4
					SD-SL4-002-0040	4 to 5
					SD-SL4-002-0050	5 to 6
					SD-SL4-002-0060	6 to 7
					SD-SL4-002-0070	7 to 8
					SD-SL4-002-0080	8 to 9
SD-SL4-003	12/22/2014	11:24	1273208	198711	SD-SL4-003-0000	0 to 1
					SD-SL4-003-0010	1 to 2
					SD-SL4-003-0020	2 to 3
					SD-SL4-003-0030	3 to 4
					SD-SL4-003-0040	4 to 5
					SD-SL4-003-0050	5 to 6
					SD-SL4-003-0060	6 to 7
					SD-SL4-003-0070	7 to 8
					SD-SL4-003-0080	8 to 9

TABLE 1

LOCATION OF CORE SAMPLES COLLECTED IN SLIP 4
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Sample ID	Depth Interval (Feet Below Sediment Surface)
			Easting	Northing		
SD-SL4-004	12/22/2014	10:49	1273176	198687	SD-SL4-004-0000	0 to 1
					SD-SL4-004-0010	1 to 2
					SD-SL4-004-0020	2 to 3
					SD-SL4-004-0030	3 to 4
					SD-SL4-004-0040	4 to 5
					SD-SL4-004-0050	5 to 6
					SD-SL4-004-0060	6 to 7
					SD-SL4-004-0070	7 to 8
					SD-SL4-004-0080	8 to 9
SD-SL4-005	1/15/2015	10:28	1273224	198693	SD-SL4-005-0000	0 to 1
					SD-SL4-005-0010	1 to 2
					SD-SL4-005-0020	2 to 3
					SD-SL4-005-0030	3 to 4
					SD-SL4-005-0040	4 to 5
					SD-SL4-005-0050	5 to 6
					SD-SL4-005-0060	6 to 7
SD-SL4-006	1/15/2015	9:52	1273191	198667	SD-SL4-006-0000	0 to 1
					SD-SL4-006-0010	1 to 2
					SD-SL4-006-0020	2 to 3
					SD-SL4-006-0030	3 to 4
					SD-SL4-006-0040	4 to 5
					SD-SL4-006-0050	5 to 6
					SD-SL4-006-0060	6 to 7

TABLE 1

LOCATION OF CORE SAMPLES COLLECTED IN SLIP 4
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Sample ID	Depth Interval (Feet Below Sediment Surface)
			Easting	Northing		
SD-SL4-007	1/15/2015	9:27	1273166	198644	SD-SL4-007-0000	0 to 1
					SD-SL4-007-0010	1 to 2
					SD-SL4-007-0020	2 to 3
					SD-SL4-007-0030	3 to 4
					SD-SL4-007-0040	4 to 5
					SD-SL4-007-0050	5 to 6
					SD-SL4-007-0060	6 to 7
					SD-SL4-007-0070	7 to 8
					SD-SL4-007-0080	8 to 9
SD-SL4-008	1/15/2015	11:20	1273138	198611	SD-SL4-008-0000	0 to 1
					SD-SL4-008-0010	1 to 2
					SD-SL4-008-0020	2 to 3
					SD-SL4-008-0030	3 to 4
					SD-SL4-008-0040	4 to 5
					SD-SL4-008-0050	5 to 6
					SD-SL4-008-0060	6 to 7
					SD-SL4-008-0070	7 to 8
					SD-SL4-008-0080	8 to 9
SD-SL4-009	1/14/2015	11:46	1273076	198604	SD-SL4-009-0000	0 to 1
					SD-SL4-009-0010	1 to 2
					SD-SL4-009-0020	2 to 3
					SD-SL4-009-0030	3 to 4
					SD-SL4-009-0040	4 to 5
					SD-SL4-009-0050	5 to 6
					SD-SL4-009-0060	6 to 7
					SD-SL4-009-0070	7 to 8
					SD-SL4-009-0080	8 to 9

TABLE 1

LOCATION OF CORE SAMPLES COLLECTED IN SLIP 4
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Location	Date	Time	Actual State Plane Coordinates (WA SPC North NAD 83, Survey Feet)		Sample ID	Depth Interval (Feet Below Sediment Surface)
			Easting	Northing		
SD-SL4-010	1/14/2015	12:30	1273092	198577	SD-SL4-010-0000	0 to 1
					SD-SL4-010-0010	1 to 2
					SD-SL4-010-0020	2 to 3
					SD-SL4-010-0030	3 to 4
					SD-SL4-010-0040	4 to 5
					SD-SL4-010-0050	5 to 6
					SD-SL4-010-0060	6 to 7
SD-SL4-011	1/14/2015	11:11	1273034	198574	SD-SL4-011-0000	0 to 1
					SD-SL4-011-0010	1 to 2
					SD-SL4-011-0020	2 to 3
					SD-SL4-011-0030	3 to 4
					SD-SL4-011-0040	4 to 5
					SD-SL4-011-0050	5 to 6
					SD-SL4-011-0060	6 to 7
					SD-SL4-011-0070	7 to 8
					SD-SL4-011-0080	8 to 9
					SD-SL4-011-0090	9 to 10
SD-SL4-012	1/15/2015	12:49	1273056	198555	SD-SL4-012-0000	0 to 1
					SD-SL4-012-0010	1 to 2
					SD-SL4-012-0020	2 to 3
					SD-SL4-012-0030	3 to 4
					SD-SL4-012-0040	4 to 5

Abbreviation(s)
NAD 83 = North American Datum of 1983
WA SPC = Washington State Plane Coordinates

TABLE 2

DECEMBER 2014 POST-CONSTRUCTION CORE SAMPLE RESULTS [1,2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample_ID	SD-PCC001-A			SD-PCC001-B			SD-PCC001-C			SD-PCC002-A			SD-PCC002-B			SD-PCC002-C			SD-PCC003-A			SD-PCC003-B			SD-PCC003-C		
		Sample Date	12/9/2014			12/9/2014			12/9/2014			12/9/2014			12/9/2014			12/9/2014			12/8/2014			12/8/2014			12/8/2014		
		Sample Interval	0 to 10 cm			10 cm to 1 ft			1 to 2 ft			0 to 10 cm			10 cm to 1 ft			1 to 2 ft			0 to 10 cm			10 cm to 1 ft			1 to 2 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		0.120			0.081			0.109			1.11			0.902			2.03			1.44			1.50			1.80		
Metals (mg/kg Dry weight)																													
Arsenic	57		1.78			1.31			1.58			3.47			4.38			3.36			11.16			7.31			4.64		
Cadmium	5.1		0.2	U		0.2	U		0.2	U		0.2	U		0.2	U		0.3			1.3			0.8			0.5		
Chromium	260		11.1			12.8			10.8			12.2			15.1			15.7			37.8			26.2			17.7		
Copper	390		10.0			15.3			9.5			13.6			19.3			20.7			49.4			34.7			30.0		
Lead	450		2	U		2	U		2	U		3			4			5			67			58			24		
Mercury	0.41		0.03	U		0.03	U		0.03	U		0.04			0.05			0.03			0.29			0.04			0.07		
Silver	6.1		0.3	U		0.3	U		0.3	U		0.3	U		0.4	U		0.4	U		1.2			0.7			0.4		
Zinc	410		27			30			26			31			34			38			132		J	104			66		
PCBs (µg/kg Dry-Weight)																													
Aroclor 1016	—		3.9	U		3.9	U		3.9	U		3.8	U		3.9	U		3.9	U		6.7	U		3.8	U		3.8	U	
Aroclor 1221	—		3.9	U		3.9	U		3.9	U		3.8	U		3.9	U		3.9	U		6.7	U		3.8	U		3.8	U	
Aroclor 1232	—		3.9	U		9.8	Y	UY	3.9	U		3.8	U		3.9	U		3.9	U		6.7	U		3.8	U		3.8	U	
Aroclor 1242	—		3.9	U		3.9	U		3.9	U		3.8	U		3.9	U		3.9	U		6.7	U		3.8	U		3.8	U	
Aroclor 1248	—		8.6			3.9	U		3.9	U		3.8	U		3.9	U		3.9	U		1700	Y	UY	1200	Y	UY	480	Y	UY
Aroclor 1254	—		26			3.9	U		3.9	U		13			3.9	U		3.9	U		6400			5100			2100		
Aroclor 1260	—		8.1			3.9	U		3.9	U		6.6			3.9	U		3.9	U		840	Y	UY	770	U		150	Y	UY
Total PCBs [3]	130		42.7			9.8	Y	UY	3.9	U		19.6			3.9	U		3.9	U		6400			5100			2100		
Total PCBs (mg/kg-OC) [4]	12		NA			NA			NA			1.8			0.4	U		0.2	U		444			340			117		

TABLE 2

DECEMBER 2014 POST-CONSTRUCTION CORE SAMPLE RESULTS [1,2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample_ID	SD-PCC003-D			SD-PCC004-A			SD-PCC004-B			SD-PCC004-C			SD-PCC005-A			SD-PCC005-B			SD-PCC005-C		
		Sample Date	12/8/2014			12/8/2014			12/8/2014			12/8/2014			12/8/2014			12/8/2014			12/8/2014		
		Sample Interval	2 to 3 ft			0 to 10 cm			10 cm to 1 ft			1 to 2 ft			0 to 10 cm			10 cm to 1 ft			1 to 2 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		0.37			1.49			0.297			0.511			0.584			0.478			0.399		
Metals (mg/kg Dry weight)																							
Arsenic	57		—			6.45			1.17			3.30			2.69			2.35			2.08		
Cadmium	5.1		—			0.3	U		0.2	U		0.3	U		0.3	U		0.3	U		0.3	U	
Chromium	260		—			10.0			9.7			11.6			12.0			13.3			13.4		
Copper	390		—			14.0			11.1			18.7			15.9			18.5			17.9		
Lead	450		—			3	U		2	U		3	U		3			3	U		3	U	
Mercury	0.41		—			0.03	U		0.03	U		0.04			0.03	U		0.02	U		0.03	U	
Silver	6.1		—			0.4	U		0.3	U		0.4	U		0.4	U		0.4	U		0.4	U	
Zinc	410		—			26			21			25			29			28			27		
PCBs (µg/kg Dry-Weight)																							
Aroclor 1016	—		20	U		3.9	U		4.0	U		3.9	U		3.8	U		3.9	U		4.0	U	
Aroclor 1221	—		20	U		3.9	U		4.0	U		3.9	U		3.8	U		3.9	U		4.0	U	
Aroclor 1232	—		20	U		3.9	U		20	Y	UY	3.9	U		3.8	U		3.9	U		4.0	U	
Aroclor 1242	—		20	U		3.9	U		4.0	U		3.9	U		3.8	U		3.9	U		4.0	U	
Aroclor 1248	—		430	Y	UY	16	Y	UY	4.0	U		3.9	U		15	Y	UY	3.9	U		4.0	U	
Aroclor 1254	—		990			34			4.0	U		3.9	U		29			3.9	U		4.0	U	
Aroclor 1260	—		300			8.3			4.0	U		3.9	U		11			3.9	U		4.0	U	
Total PCBs [3]	130		1290			42.3			20	Y	UY	3.9	U		40			3.9	U		4.0	U	
Total PCBs (mg/kg-OC) [4]	12		NA			2.8			NA			0.8	U		6.8			NA			NA		

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   Y = The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
2. Validation qualifiers (Q2) are defined as follows:
   UY = The reporting limit was elevated due to chromatographic overlap with related compounds. The material was analyzed for, but was not detected above, the level of the associated value.
   J = The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.
3. Total PCBs calculated by summing results for detected congeners or, if all not detected, using the highest reporting limit for non-detected congeners.
4. NA: Carbon outside the range for normalization (<0.5 % or >4.0%).

Abbreviation(s)

cm = centimeters
ft = feet
mg/kg Dry-Weight = milligrams per kilogram dry weight
mg/kg-OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
SQS = Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg Dry-Weight = micrograms per kilogram dry weight
WAC = Washington Administrative Code

TABLE 3

PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-001																									
		Sample Date	12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014		
		Sample ID	SD-SL4-001-0000			SD-SL4-001-0010			SD-SL4-001-0020			SD-SL4-001-0030			SD-SL4-001-0040			SD-SL4-001-0050			SD-SL4-001-0060			SD-SL4-001-0070			SD-SL4-001-0080		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		1.030			0.527			1.490			1.160			0.829			1.710			1.670			1.230			1.280		
PCBs (µg/kg Dry-Weight)																													
Aroclor 1016	—		3.9	U		3.8	U		20	U		19	U		20	U		40	U		80	U		38	U		3.9	U	
Aroclor 1221	—		3.9	U		3.8	U		20	U		19	U		20	U		40	U		80	U		38	U		3.9	U	
Aroclor 1232	—		3.9	U		3.8	U		20	U		19	U		20	U		40	U		80	U		38	U		3.9	U	
Aroclor 1242	—		3.9	U		3.8	U		20	U		19	U		20	U		40	U		80	U		38	U		3.9	U	
Aroclor 1248	—		66			84			220			170			150			460			1400			360			3.9	U	
Aroclor 1254	—		120			170			470			480			460			1200			3600			1000			5.1		
Aroclor 1260	—		39		J	76			100		J	88		J	140		J	190		J	500		J	160		J	3.9	U	
Total PCBs [3]	130		225		J	330			790		J	738		J	750		J	1850		J	5500		J	1520		J	5.1		
Total PCBs (mg/kg-OC) [4]	12		22		J	63			53		J	64		J	90		J	108		J	329		J	124		J	0.4		

TABLE 3

PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-002																									
		Sample Date	12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014		
		Sample ID	SD-SL4-002-0000			SD-SL4-002-0010			SD-SL4-002-0020			SD-SL4-002-0030			SD-SL4-002-0040			SD-SL4-002-0050			SD-SL4-002-0060			SD-SL4-002-0070			SD-SL4-002-0080		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		1.300			0.476			0.857			1.210			1.090			0.786			2.210			1.160			1.480		J
PCBs (µg/kg Dry-Weight)																													
Aroclor 1016	—		4	U		12	U		19	U		380	U		19	U		20	U		32	U		20	U		3.8	U	
Aroclor 1221	—		4	U		12	U		19	U		380	U		19	U		20	U		32	U		20	U		3.8	U	
Aroclor 1232	—		4	U		12	U		19	U		380	U		19	U		20	U		32	U		20	U		3.8	U	
Aroclor 1242	—		4	U		12	U		19	U		380	U		19	U		20	U		32	U		20	U		3.8	U	
Aroclor 1248	—		65			81			110			380	U		180			220			2000			200	Y	UY	19	Y	UY
Aroclor 1254	—		140			210			270			1000			540			540			5300			490			3.8	U	
Aroclor 1260	—		48			38			110			7400		J	120			150			850			82			3.8	U	
Total PCBs [3]	130		253			329			490			8400		J	840			910			8150			572			19	Y	
Total PCBs (mg/kg-OC) [4]	12		19.5			NA			57			694		J	77			116			369			49			1.3	Y	

TABLE 3

PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-003																									
		Sample Date	12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014		
		Sample ID	SD-SL4-003-0000			SD-SL4-003-0010			SD-SL4-003-0020			SD-SL4-003-0030			SD-SL4-003-0040			SD-SL4-003-0050			SD-SL4-003-0060			SD-SL4-003-0070			SD-SL4-003-0080		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		2.490			1.970			0.935			0.674			0.096			0.549			0.057			0.680			0.836		
PCBs (µg/kg Dry-Weight)																													
Aroclor 1016	—		20	U		20	U		27	U		20	U		3.9	U		3.9	U		3.9	U		3.8	U		3.8	U	
Aroclor 1221	—		20	U		20	U		27	U		20	U		3.9	U		3.9	U		3.9	U		3.8	U		3.8	U	
Aroclor 1232	—		20	U		20	U		27	U		20	U		3.9	U		3.9	U		3.9	U		3.8	U		3.8	U	
Aroclor 1242	—		20	U		20	U		27	U		20	U		3.9	U		3.9	U		3.9	U		3.8	U		3.8	U	
Aroclor 1248	—		120			88			1200			310			40			3.9	U		3.9	U		3.8	U		3.8	U	
Aroclor 1254	—		250			210			3900			910			120			4.4			3.9	U		3.8	U		3.8	U	
Aroclor 1260	—		92			56			530			120			16			3.9	U		3.9	U		3.8	U		3.8	U	
Total PCBs [3]	130		462			354			5630			1340			176			4.4			3.9	U		3.8	U		3.8	U	
Total PCBs (mg/kg-OC) [4]	12		18.6			18			602			199			NA			0.8			NA			0.6	U		0.5	U	

TABLE 3

PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-004																	
		Sample Date	12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014			12/22/2014		
		Sample ID	SD-SL4-004-0030			SD-SL4-004-0040			SD-SL4-004-0050			SD-SL4-004-0060			SD-SL4-004-0070			SD-SL4-004-0080		
		Sample Interval	3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		1.490			0.151			0.032			0.085			0.137			0.682		
PCBs (µg/kg Dry-Weight)																				
Aroclor 1016	—		20	U		20	U		3.8	U		3.8	U		3.9	U		4	U	
Aroclor 1221	—		20	U		20	U		3.8	U		3.8	U		3.9	U		4	U	
Aroclor 1232	—		20	U		20	U		3.8	U		3.8	U		3.9	U		4	U	
Aroclor 1242	—		20	U		20	U		3.8	U		3.8	U		3.9	U		4	U	
Aroclor 1248	—		700			46			3.8	U		3.8	U		3.9	U		4	U	
Aroclor 1254	—		2500			150			4.5			3.8	U		3.9	U		4	U	
Aroclor 1260	—		420			31			3.8	U		3.8	U		3.9	U		4	U	
Total PCBs [3]	130		3620			227			4.5			3.8	U		3.9	U		4	U	
Total PCBs (mg/kg-OC) [4]	12		243			NA			NA			NA			NA			0.6	U	

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   Y = The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
2. Validation qualifiers (Q2) are defined as follows:
   UY = The reporting limit was elevated due to chromatographic overlap with related compounds. The material was analyzed for, but was not detected above, the level of the associated value.
   J = The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.
3. Total PCBs calculated by summing results for detected congeners or, if all not detected, using the highest reporting limit for non-detected congeners.
4. NA: Carbon outside the range for normalization (<0.5 % or >4.0%).

Abbreviation(s)

ft = feet
mg/kg-OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
SQS = Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg Dry-Weight = micrograms per kilogram dry weight
WAC = Washington Administrative Code

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-005																				
		Sample Date	1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015		
		Sample ID	SD-SL4-005-0000			SD-SL4-005-0010			SD-SL4-005-0020			SD-SL4-005-0030			SD-SL4-005-0040			SD-SL4-005-0050			SD-SL4-005-0060		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		1.780			2.320			0.463			1.640			0.691			0.510			0.047		
PCBs (µg/kg Dry-Weight)																							
Aroclor 1016	—		19	U		19	U		19	U		3.9	U		3.8	U		3.7	U		3.9	U	
Aroclor 1221	—		19	U		19	U		19	U		3.9	U		3.8	U		3.7	U		3.9	U	
Aroclor 1232	—		19	U		19	U		19	U		3.9	U		3.8	U		3.7	U		3.9	U	
Aroclor 1242	—		19	U		19	U		19	U		3.9	U		3.8	U		3.7	U		3.9	U	
Aroclor 1248	—		77	Y	UY	58	Y	UJ	29	Y	UY	3.9	U		3.8	U		3.7	U		3.9	U	
Aroclor 1254	—		170			140			96			3.9	U		3.8	U		3.7	U		3.9	U	
Aroclor 1260	—		57			53			19	U		3.9	U		3.8	U		3.7	U		3.9	U	
Total PCBs [3]	130		227			193			96			3.9	U		3.8	U		3.7	U		3.9	U	
Total PCBs (mg/kg-OC) [4]	12		12.8			8.3			NA			0.2	U		0.5	U		0.7	U		NA	U	

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location		SD-SL4-006																				
		Sample Date		1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015		
		Sample ID		SD-SL4-006-0000			SD-SL4-006-0010			SD-SL4-006-0020			SD-SL4-006-0030			SD-SL4-006-0040			SD-SL4-006-0050			SD-SL4-006-0060		
		Sample Interval		0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft		
				Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—			0.658			0.184			0.061			0.064			0.255			0.296			0.587		
PCBs (µg/kg Dry-Weight)																								
Aroclor 1016	—			20	U		3.7	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Aroclor 1221	—			20	U		3.7	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Aroclor 1232	—			20	U		3.7	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Aroclor 1242	—			20	U		3.7	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Aroclor 1248	—			20	U		3.7	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Aroclor 1254	—			53			5.5			3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Aroclor 1260	—			20	U		3.7	U		3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Total PCBs [3]	130			53			5.5			3.8	U		3.8	U		3.8	U		3.8	U		3.8	U	
Total PCBs (mg/kg-OC) [4]	12			8.1			NA			NA			NA			NA			NA			0.6	U	

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-007																									
		Sample Date	1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015		
		Sample ID	SD-SL4-007-0000			SD-SL4-007-0010			SD-SL4-007-0020			SD-SL4-007-0030			SD-SL4-007-0040			SD-SL4-007-0050			SD-SL4-007-0060			SD-SL4-007-0070			SD-SL4-007-0080		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		1.580			1.150			0.240			0.171			1.220			1.200			1.480			0.869			0.525		
PCBs (µg/kg Dry-Weight)																													
Aroclor 1016	—		3.9	U		3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Aroclor 1221	—		3.9	U		3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Aroclor 1232	—		3.9	U		3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Aroclor 1242	—		3.9	U		3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Aroclor 1248	—		13	P	J	3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Aroclor 1254	—		25			3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Aroclor 1260	—		4.7			3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Total PCBs [3]	130		42.7		J	3.8	U		3.8	U		3.8	U		4	U		3.8	U		3.9	U		3.9	U		3.8	U	
Total PCBs (mg/kg-OC) [4]	12		2.7		J	0.3	U		NA			NA			0.3	U		0.3	U		0.3	U		0.4	U		0.7	U	

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-008																							
		Sample Date	1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015		
		Sample ID	SD-SL4-008-0000			SD-SL4-008-0010			SD-SL4-008-0020			SD-SL4-008-0030			SD-SL4-008-0040			SD-SL4-008-0050			SD-SL4-008-0060			SD-SL4-008-0070		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		0.250			0.202			0.409			1.890			0.888			0.450			1.810			1.320		
PCBs (µg/kg Dry-Weight)																										
Aroclor 1016	—		3.8	U		19	U		3.9	U		20	U		19	U		20	U		3.8	U		3.9	U	
Aroclor 1221	—		3.8	U		19	U		3.9	U		20	U		19	U		20	U		3.8	U		3.9	U	
Aroclor 1232	—		3.8	U		19	U		3.9	U		20	U		19	U		20	U		3.8	U		3.9	U	
Aroclor 1242	—		3.8	U		19	U		3.9	U		20	U		19	U		20	U		3.8	U		3.9	U	
Aroclor 1248	—		21			72	P	J	53			350	P	J	110			40	P	J	32			3.9	U	
Aroclor 1254	—		42			200			110			380			170			91			75			3.9	U	
Aroclor 1260	—		10			61			29			91			78			41			16			3.9	U	
Total PCBs [3]	130		73			333		J	192			821		J	358			172		J	123			3.9	U	
Total PCBs (mg/kg-OC) [4]	12		NA			NA			NA			43		J	40			NA			6.8			0.3	U	

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-009																										
		Sample Date	1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015		
		Sample ID	SD-SL4-009-0000			SD-SL4-009-0010			SD-SL4-009-0020			SD-SL4-009-0030			SD-SL4-009-0040			SD-SL4-009-0050			SD-SL4-009-0060			SD-SL4-009-0070			SD-SL4-009-0080		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		2.350			1.110			1.040			2.580			1.620			1.190			1.530			1.050			0.083		
PCBs (µg/kg Dry-Weight)																													
Aroclor 1016	—		4	U		3.8	U		3.8	U		3.8	U		3.9	U		3.9	U		3.8	U		3.8	U		3.9	U	
Aroclor 1221	—		4	U		3.8	U		3.8	U		3.8	U		3.9	U		3.9	U		3.8	U		3.8	U		3.9	U	
Aroclor 1232	—		4	U		3.8	U		3.8	U		3.8	U		3.9	U		3.9	U		3.8	U		3.8	U		3.9	U	
Aroclor 1242	—		4	U		3.8	U		3.8	U		3.8	U		3.9	U		3.9	U		3.8	U		3.8	U		3.9	U	
Aroclor 1248	—		85			260			240			480			600			1200			1300			660			3.9	U	
Aroclor 1254	—		130			760			680			1800			1700			3200			3800			1900			3.9	U	
Aroclor 1260	—		37			110			140			230			270			470			590			280			3.9	U	
Total PCBs [3]	130		252			1130			1060			2510			2570			4870			5690			2840			3.9	U	
Total PCBs (mg/kg-OC) [4]	12		10.7			102			102			97			159			409			372			270			NA		

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-010																				
		Sample Date	1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015		
		Sample ID	SD-SL4-010-0000			SD-SL4-010-0010			SD-SL4-010-0020			SD-SL4-010-0030			SD-SL4-010-0040			SD-SL4-010-0050			SD-SL4-010-0060		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		0.653			0.717			3.130			1.200			0.462			0.048		J	0.880		J
PCBs (µg/kg Dry-Weight)																							
Aroclor 1016	—		3.9	U		4	U		4	U		3.8	U		4	U		3.9	U		3.8	U	
Aroclor 1221	—		3.9	U		4	U		4	U		3.8	U		4	U		3.9	U		3.8	U	
Aroclor 1232	—		3.9	U		4	U		4	U		3.8	U		4	U		3.9	U		3.8	U	
Aroclor 1242	—		3.9	U		4	U		4	U		3.8	U		4	U		3.9	U		3.8	U	
Aroclor 1248	—		5.8	Y	UY	4	U		4	U		3.8	U		4	U		3.9	U		3.8	U	
Aroclor 1254	—		16			12			4	U		3.8	U		4	U		3.9	U		3.8	U	
Aroclor 1260	—		5			4	U		4	U		3.8	U		4	U		3.9	U		3.8	U	
Total PCBs [3]	130		21			12			4	U		3.8	U		4	U		3.9	U		3.8	U	
Total PCBs (mg/kg-OC) [4]	12		3.2			1.7			0.1	U		0.3	U		NA			NA			0.4	U	UJ

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-011																													
		Sample Date	1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015			1/14/2015		
		Sample ID	SD-SL4-011-0000			SD-SL4-011-0010			SD-SL4-011-0020			SD-SL4-011-0030			SD-SL4-011-0040			SD-SL4-011-0050			SD-SL4-011-0060			SD-SL4-011-0070			SD-SL4-011-0080			SD-SL4-011-0090		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft			5 to 6 ft			6 to 7 ft			7 to 8 ft			8 to 9 ft			9 to 10 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		3.080		J	2.820		J	0.808		J	1.610		J	1.720		J	1.080		J	1.000		J	0.385		J	0.990		J	0.216		J
PCBs (µg/kg Dry-Weight)																																
Aroclor 1016	—		19	U		19	U		19	U		62	U		39	U		20	U		3.8	U		3.8	U		3.9	U		3.9	U	
Aroclor 1221	—		19	U		19	U		19	U		62	U		39	U		20	U		3.8	U		3.8	U		3.9	U		3.9	U	
Aroclor 1232	—		19	U		19	U		19	U		62	U		39	U		20	U		3.8	U		3.8	U		3.9	U		3.9	U	
Aroclor 1242	—		19	U		19	U		19	U		62	U		39	U		20	U		3.8	U		3.8	U		3.9	U		3.9	U	
Aroclor 1248	—		58			69			55			870			1300			740			14			3.8	U		3.9	U		3.9	U	
Aroclor 1254	—		88			110			190			2500			3500			2000			38			3.8	U		3.9	U		3.9	U	
Aroclor 1260	—		45			51			40			400			550			320			7.8			3.8	U		3.9	U		3.9	U	
Total PCBs [3]	130		191			230			285			3770			5350			3060			59.8			3.8	U		3.9	U		3.9	U	
Total PCBs (mg/kg-OC) [4]	12		6.2		J	8.2		J	35		J	234		J	311		J	283		J	6.0		J	NA			0.4	U	UJ	NA		

TABLE 4

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE RESULTS [1, 2]
Slip 4 Additional Data Collection
Duwamish Sediment Other Area and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

Analyte	Sediment Management Standards SQS	Sample Location	SD-SL4-012														
		Sample Date	1/15/2015			1/15/2015			1/15/2015			1/15/2015			1/15/2015		
		Sample ID	SD-SL4-012-0000			SD-SL4-012-0010			SD-SL4-012-0020			SD-SL4-012-0030			SD-SL4-012-0040		
		Sample Interval	0 to 1 ft			1 to 2 ft			2 to 3 ft			3 to 4 ft			4 to 5 ft		
			Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]	Value	Q1 [1]	Q2 [2]
Total Organic Carbon (percent)	—		0.657			0.416			0.354			0.224			1.470		
PCBs (µg/kg Dry-Weight)																	
Aroclor 1016	—		19	U		3.8	U		3.9	U		3.8	U		3.7	U	
Aroclor 1221	—		19	U		3.8	U		3.9	U		3.8	U		3.7	U	
Aroclor 1232	—		19	U		3.8	U		3.9	U		3.8	U		3.7	U	
Aroclor 1242	—		19	U		3.8	U		3.9	U		3.8	U		3.7	U	
Aroclor 1248	—		62	P	J	32			5.8	Y	UY	3.8	U		3.7	U	
Aroclor 1254	—		98			79			18			3.8	U		3.7	U	
Aroclor 1260	—		36		J	18			3.9	U		3.8	U		3.7	U	
Total PCBs [3]	130		196		J	129			18			3.8	U		3.7	U	
Total PCBs (mg/kg-OC) [4]	12		30		J	NA			NA			NA			0.3	U	

Note(s)

1. Laboratory qualifiers (Q1) are defined as follows:
   U = analyte not detected at reporting limit presented.
   Y = The analyte is not detected at or above the reported concentration. The reporting limit is raised due to chromatographic interference. The Y flag is equivalent to the U flag with a raised reporting limit.
   P = The analyte was detected on both chromatographic corumns but the quantified values differ by >40% RPD with no obvious chromatographic interference.
2. Validation qualifiers (Q2) are defined as follows:
   UY = The reporting limit was elevated due to chromatographic overlap with related compounds. The material was analyzed for, but was not detected above, the level of the associated value.
   J = The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.
   UJ = The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
3. Total PCBs calculated by summing results for detected congeners or, if all not detected, using the highest reporting limit for non-detected congeners.
4. NA: Carbon outside the range for normalization (<0.5 % or >4.0%).

Abbreviation(s)

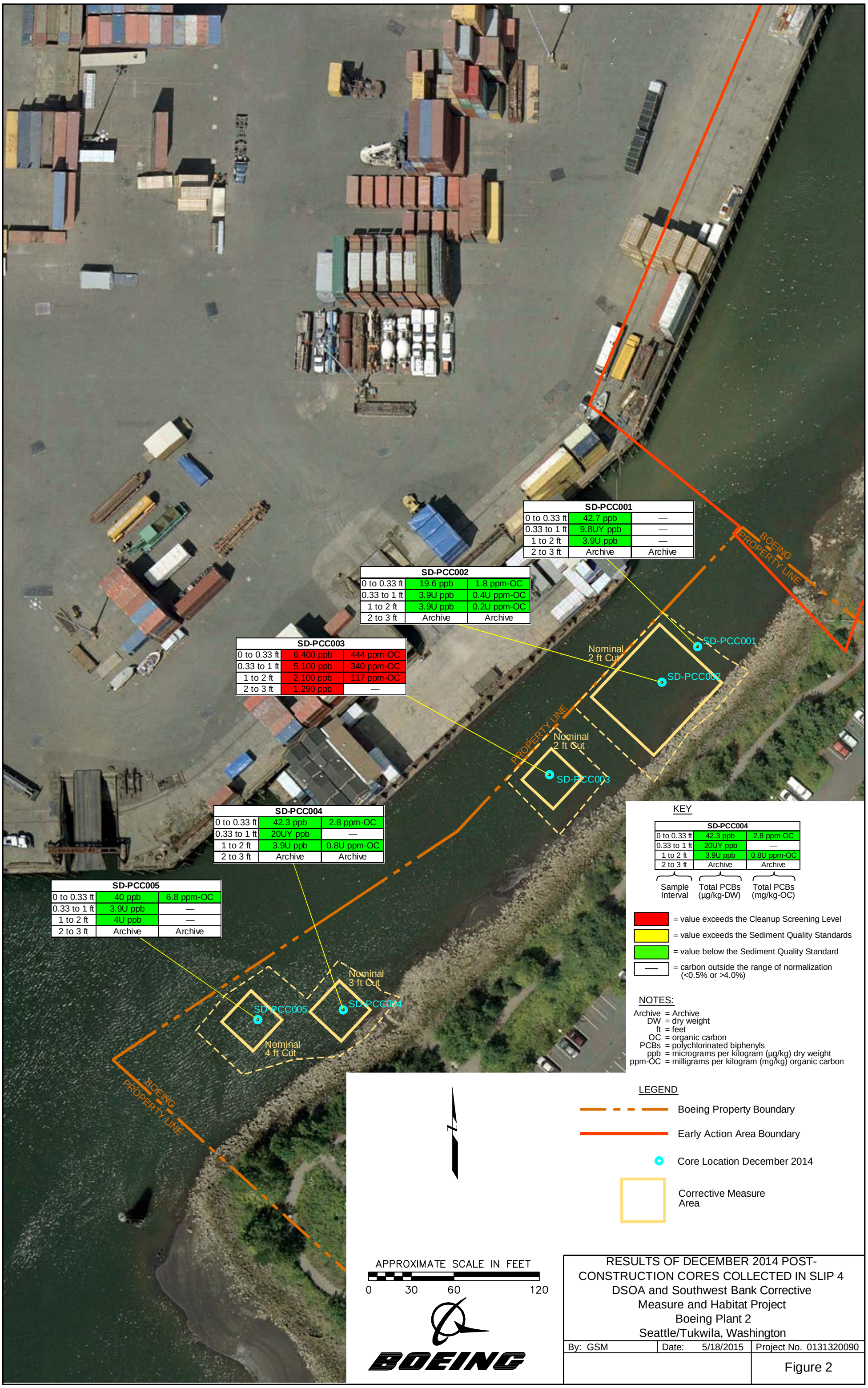
ft = feet
mg/kg-OC = milligrams per kilogram organic carbon
PCBs = polychlorinated biphenyls
RPD = relative percent difference
SQS = Sediment Management Standards Sediment Quality Standards (173-204-320 WAC)
µg/kg Dry-Weight = micrograms per kilogram dry weight
WAC = Washington Administrative Code

FIGURES

PROPOSED SLIP 4 DREDGE AREAS
DSOA and Southwest Bank
Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

By: GSM	Date: 5/18/2015	Project No. 0131320090
		Figure 1

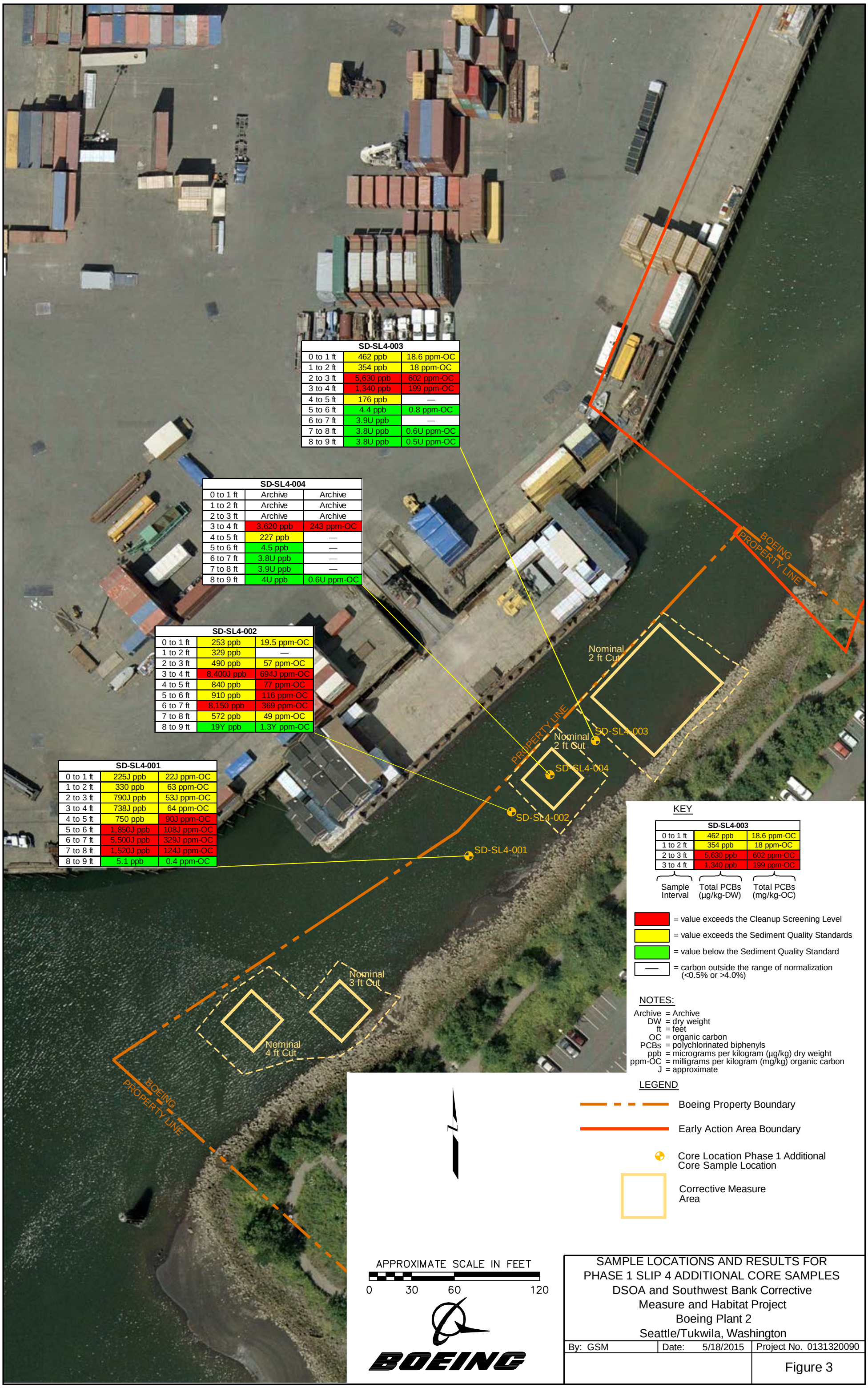
Plot Date: 05/18/15 - 5:27pm, Plotted by: adam.stenberg
Drawing Path: S:\13132_004\DSOA Design\CompletionReport\Slip4Appendix\, Drawing Name: SLIP4-Coring Appendix_051815.dwg



RESULTS OF DECEMBER 2014 POST-CONSTRUCTION CORES COLLECTED IN SLIP 4
DSOA and Southwest Bank Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

By: GSM	Date: 5/18/2015	Project No. 0131320090
		Figure 2

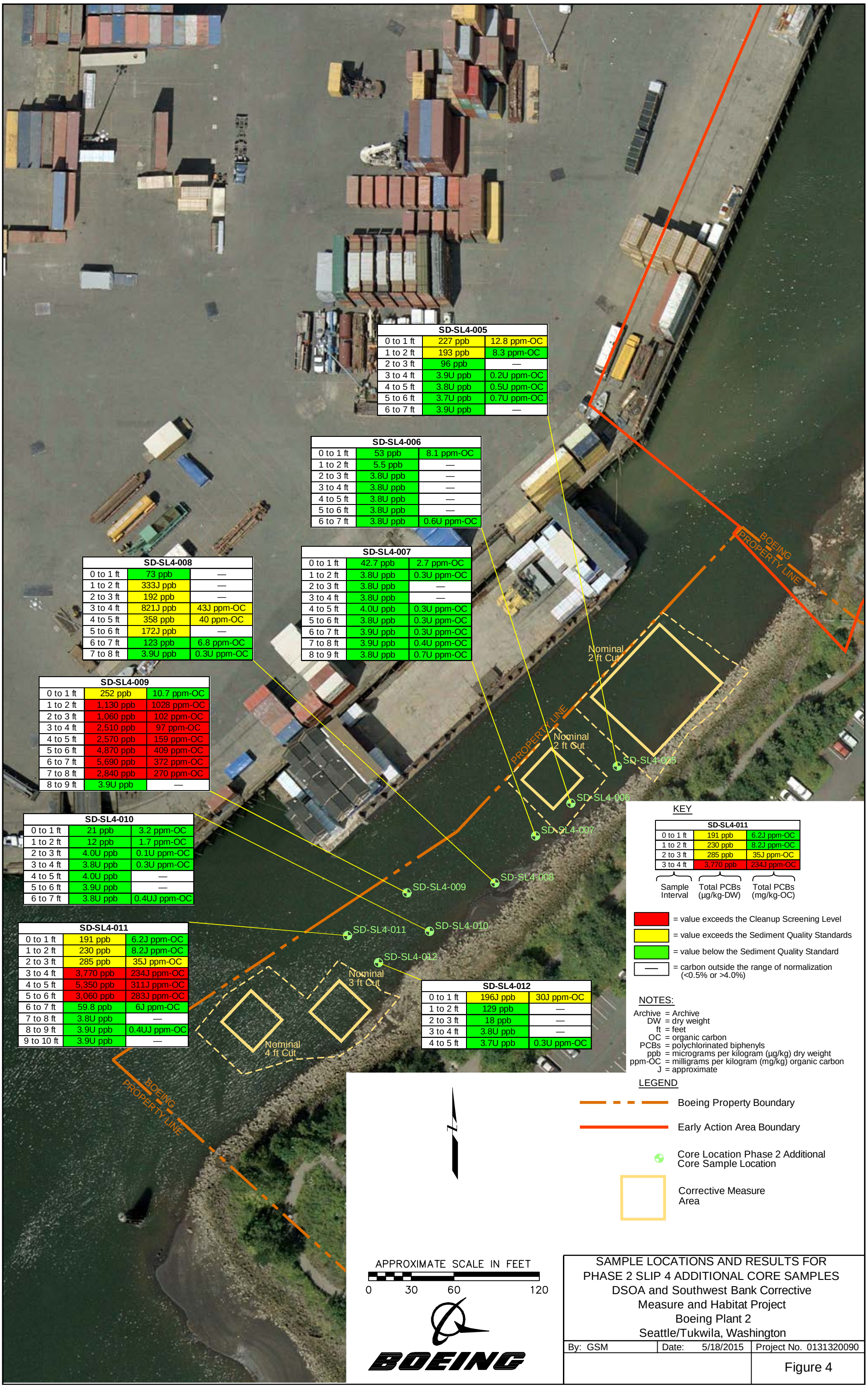
Plot Date: 05/18/15 - 5:29pm, Plotted by: adam.stenberg
Drawing Path: S:\13132_004\DSOA Design\CompletionReport\Slip4Appendix\, Drawing Name: SLIP4-Coring Appendix_051815.dwg



SAMPLE LOCATIONS AND RESULTS FOR PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLES
DSOA and Southwest Bank Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

By: GSM	Date: 5/18/2015	Project No. 0131320090
		Figure 3

Plot Date: 05/18/15 - 5:32pm, Plotted by: adam.stenberg
Drawing Path: S:\13132_004\DSOA Design\CompletionReport\Slip4Appendix\, Drawing Name: SLIP4-Coring Appendix_051815.dwg



SD-SL4-005		
0 to 1 ft	227 ppb	12.8 ppm-OC
1 to 2 ft	193 ppb	8.3 ppm-OC
2 to 3 ft	96 ppb	—
3 to 4 ft	3.9U ppb	0.2U ppm-OC
4 to 5 ft	3.8U ppb	0.5U ppm-OC
5 to 6 ft	3.7U ppb	0.7U ppm-OC
6 to 7 ft	3.9U ppb	—

SD-SL4-006		
0 to 1 ft	53 ppb	8.1 ppm-OC
1 to 2 ft	5.5 ppb	—
2 to 3 ft	3.8U ppb	—
3 to 4 ft	3.8U ppb	—
4 to 5 ft	3.8U ppb	—
5 to 6 ft	3.8U ppb	—
6 to 7 ft	3.8U ppb	0.6U ppm-OC

SD-SL4-007		
0 to 1 ft	42.7 ppb	2.7 ppm-OC
1 to 2 ft	3.8U ppb	0.3U ppm-OC
2 to 3 ft	3.8U ppb	—
3 to 4 ft	3.8U ppb	—
4 to 5 ft	4.0U ppb	0.3U ppm-OC
5 to 6 ft	3.8U ppb	0.3U ppm-OC
6 to 7 ft	3.9U ppb	0.3U ppm-OC
7 to 8 ft	3.9U ppb	0.4U ppm-OC
8 to 9 ft	3.8U ppb	0.7U ppm-OC

SD-SL4-008		
0 to 1 ft	73 ppb	—
1 to 2 ft	333J ppb	—
2 to 3 ft	192 ppb	—
3 to 4 ft	821J ppb	43J ppm-OC
4 to 5 ft	358 ppb	40 ppm-OC
5 to 6 ft	172J ppb	—
6 to 7 ft	123 ppb	6.8 ppm-OC
7 to 8 ft	3.9U ppb	0.3U ppm-OC

SD-SL4-009		
0 to 1 ft	252 ppb	10.7 ppm-OC
1 to 2 ft	1,130 ppb	1028 ppm-OC
2 to 3 ft	1,060 ppb	102 ppm-OC
3 to 4 ft	2,510 ppb	97 ppm-OC
4 to 5 ft	2,570 ppb	159 ppm-OC
5 to 6 ft	4,870 ppb	409 ppm-OC
6 to 7 ft	5,690 ppb	372 ppm-OC
7 to 8 ft	2,840 ppb	270 ppm-OC
8 to 9 ft	3.9U ppb	—

SD-SL4-010		
0 to 1 ft	21 ppb	3.2 ppm-OC
1 to 2 ft	12 ppb	1.7 ppm-OC
2 to 3 ft	4.0U ppb	0.1U ppm-OC
3 to 4 ft	3.8U ppb	0.3U ppm-OC
4 to 5 ft	4.0U ppb	—
5 to 6 ft	3.9U ppb	—
6 to 7 ft	3.8U ppb	0.4UJ ppm-OC

SD-SL4-011		
0 to 1 ft	191 ppb	6.2J ppm-OC
1 to 2 ft	230 ppb	8.2J ppm-OC
2 to 3 ft	285 ppb	35J ppm-OC
3 to 4 ft	3,770 ppb	234J ppm-OC
4 to 5 ft	5,350 ppb	311J ppm-OC
5 to 6 ft	3,060 ppb	283J ppm-OC
6 to 7 ft	59.8 ppb	6J ppm-OC
7 to 8 ft	3.8U ppb	—
8 to 9 ft	3.9U ppb	0.4UJ ppm-OC
9 to 10 ft	3.9U ppb	—

SD-SL4-012		
0 to 1 ft	196J ppb	30J ppm-OC
1 to 2 ft	129 ppb	—
2 to 3 ft	18 ppb	—
3 to 4 ft	3.8U ppb	—
4 to 5 ft	3.7U ppb	0.3U ppm-OC

KEY

SD-SL4-011		
0 to 1 ft	191 ppb	6.2J ppm-OC
1 to 2 ft	230 ppb	8.2J ppm-OC
2 to 3 ft	285 ppb	35J ppm-OC
3 to 4 ft	3,770 ppb	234J ppm-OC
Sample Interval	Total PCBs (µg/kg-DW)	Total PCBs (mg/kg-OC)

= value exceeds the Cleanup Screening Level

= value exceeds the Sediment Quality Standards

= value below the Sediment Quality Standard

— = carbon outside the range of normalization (<0.5% or >4.0%)

NOTES:

Archive = Archive
DW = dry weight
ft = feet
OC = organic carbon
PCBs = polychlorinated biphenyls
ppb = micrograms per kilogram (µg/kg) dry weight
ppm-OC = milligrams per kilogram (mg/kg) organic carbon
J = approximate

LEGEND

Boeing Property Boundary

Early Action Area Boundary

Core Location Phase 2 Additional Core Sample Location

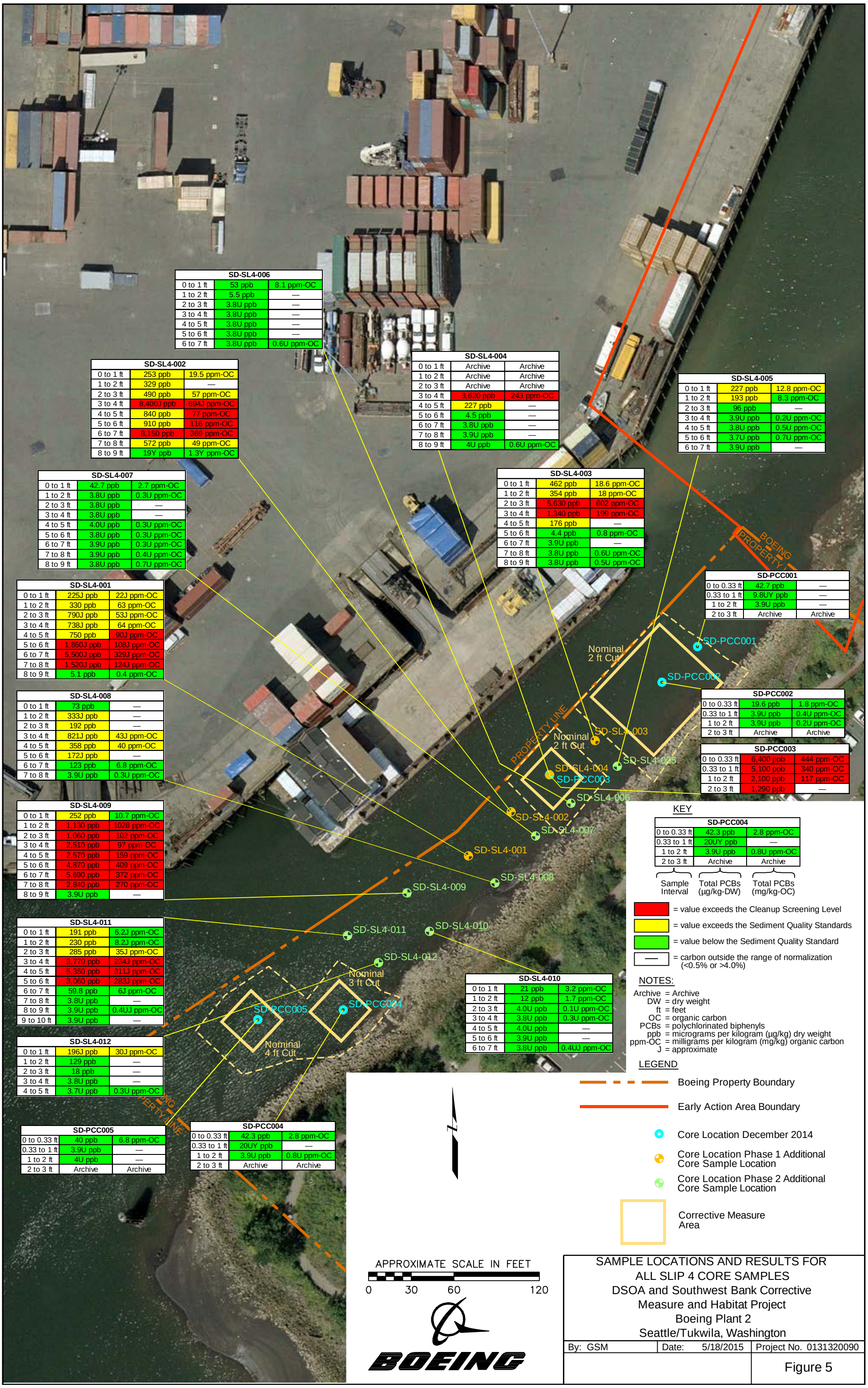
Corrective Measure Area

SAMPLE LOCATIONS AND RESULTS FOR PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLES
DSOA and Southwest Bank Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

By: GSM	Date: 5/18/2015	Project No. 0131320090

Figure 4

Plot Date: 05/19/15 - 11:18am, Plotted by: adam.stenberg
Drawing Path: S:\13132_004\DSOA Design\CompletionReport\Slip4Appendix\, Drawing Name: SLIP4-Coring Appendix_051815.dwg



SD-SL4-006		
0 to 1 ft	53 ppb	8.1 ppm-OC
1 to 2 ft	5.5 ppb	—
2 to 3 ft	3.8U ppb	—
3 to 4 ft	3.8U ppb	—
4 to 5 ft	3.8U ppb	—
5 to 6 ft	3.8U ppb	—
6 to 7 ft	3.8U ppb	0.6U ppm-OC

SD-SL4-002		
0 to 1 ft	253 ppb	19.5 ppm-OC
1 to 2 ft	329 ppb	—
2 to 3 ft	490 ppb	57 ppm-OC
3 to 4 ft	8,400J ppb	694J ppm-OC
4 to 5 ft	840 ppb	77 ppm-OC
5 to 6 ft	910 ppb	116 ppm-OC
6 to 7 ft	8,150 ppb	369 ppm-OC
7 to 8 ft	572 ppb	49 ppm-OC
8 to 9 ft	19Y ppb	1.3Y ppm-OC

SD-SL4-004		
0 to 1 ft	Archive	Archive
1 to 2 ft	Archive	Archive
2 to 3 ft	Archive	Archive
3 to 4 ft	3,620 ppb	243 ppm-OC
4 to 5 ft	227 ppb	—
5 to 6 ft	4.5 ppb	—
6 to 7 ft	3.8U ppb	—
7 to 8 ft	3.9U ppb	—
8 to 9 ft	4U ppb	0.6U ppm-OC

SD-SL4-005		
0 to 1 ft	227 ppb	12.8 ppm-OC
1 to 2 ft	193 ppb	8.3 ppm-OC
2 to 3 ft	96 ppb	—
3 to 4 ft	3.9U ppb	0.2U ppm-OC
4 to 5 ft	3.8U ppb	0.5U ppm-OC
5 to 6 ft	3.7U ppb	0.7U ppm-OC
6 to 7 ft	3.9U ppb	—

SD-SL4-007		
0 to 1 ft	42.7 ppb	2.7 ppm-OC
1 to 2 ft	3.8U ppb	0.3U ppm-OC
2 to 3 ft	3.8U ppb	—
3 to 4 ft	3.8U ppb	—
4 to 5 ft	4.0U ppb	0.3U ppm-OC
5 to 6 ft	3.8U ppb	0.3U ppm-OC
6 to 7 ft	3.9U ppb	0.3U ppm-OC
7 to 8 ft	3.9U ppb	0.4U ppm-OC
8 to 9 ft	3.8U ppb	0.7U ppm-OC

SD-SL4-003		
0 to 1 ft	462 ppb	18.6 ppm-OC
1 to 2 ft	354 ppb	18 ppm-OC
2 to 3 ft	5,630 ppb	602 ppm-OC
3 to 4 ft	1,340 ppb	199 ppm-OC
4 to 5 ft	176 ppb	—
5 to 6 ft	4.4 ppb	0.8 ppm-OC
6 to 7 ft	3.9U ppb	—
7 to 8 ft	3.8U ppb	0.6U ppm-OC
8 to 9 ft	3.8U ppb	0.5U ppm-OC

SD-PCC001		
0 to 0.33 ft	42.7 ppb	—
0.33 to 1 ft	9.8UY ppb	—
1 to 2 ft	3.9U ppb	—
2 to 3 ft	Archive	Archive

SD-SL4-001		
0 to 1 ft	225J ppb	22J ppm-OC
1 to 2 ft	330 ppb	63 ppm-OC
2 to 3 ft	790J ppb	53J ppm-OC
3 to 4 ft	738J ppb	64 ppm-OC
4 to 5 ft	750 ppb	90J ppm-OC
5 to 6 ft	1,850J ppb	108J ppm-OC
6 to 7 ft	5,500J ppb	329J ppm-OC
7 to 8 ft	1,520J ppb	124J ppm-OC
8 to 9 ft	5.1 ppb	0.4 ppm-OC

SD-PCC002		
0 to 0.33 ft	19.6 ppb	1.8 ppm-OC
0.33 to 1 ft	3.9U ppb	0.4U ppm-OC
1 to 2 ft	3.9U ppb	0.2U ppm-OC
2 to 3 ft	Archive	Archive

SD-SL4-008		
0 to 1 ft	73 ppb	—
1 to 2 ft	333J ppb	—
2 to 3 ft	192 ppb	—
3 to 4 ft	821J ppb	43J ppm-OC
4 to 5 ft	358 ppb	40 ppm-OC
5 to 6 ft	172J ppb	—
6 to 7 ft	123 ppb	6.8 ppm-OC
7 to 8 ft	3.9U ppb	0.3U ppm-OC

SD-PCC003		
0 to 0.33 ft	6,400 ppb	444 ppm-OC
0.33 to 1 ft	5,100 ppb	340 ppm-OC
1 to 2 ft	2,100 ppb	117 ppm-OC
2 to 3 ft	1,290 ppb	—

SD-SL4-009		
0 to 1 ft	252 ppb	10.7 ppm-OC
1 to 2 ft	1,130 ppb	1028 ppm-OC
2 to 3 ft	1,060 ppb	102 ppm-OC
3 to 4 ft	2,510 ppb	97 ppm-OC
4 to 5 ft	2,570 ppb	159 ppm-OC
5 to 6 ft	4,870 ppb	409 ppm-OC
6 to 7 ft	5,690 ppb	372 ppm-OC
7 to 8 ft	2,840 ppb	270 ppm-OC
8 to 9 ft	3.9U ppb	—

KEY

SD-PCC004		
0 to 0.33 ft	42.3 ppb	2.8 ppm-OC
0.33 to 1 ft	20UY ppb	—
1 to 2 ft	3.9U ppb	0.8U ppm-OC
2 to 3 ft	Archive	Archive
Sample Interval	Total PCBs (µg/kg-DW)	Total PCBs (mg/kg-OC)

= value exceeds the Cleanup Screening Level

= value exceeds the Sediment Quality Standards

= value below the Sediment Quality Standard

— = carbon outside the range of normalization (<0.5% or >4.0%)

SD-SL4-011		
0 to 1 ft	191 ppb	6.2J ppm-OC
1 to 2 ft	230 ppb	8.2J ppm-OC
2 to 3 ft	285 ppb	35J ppm-OC
3 to 4 ft	3,770 ppb	234J ppm-OC
4 to 5 ft	5,350 ppb	311J ppm-OC
5 to 6 ft	3,060 ppb	283J ppm-OC
6 to 7 ft	59.8 ppb	6J ppm-OC
7 to 8 ft	3.8U ppb	—
8 to 9 ft	3.9U ppb	0.4UJ ppm-OC
9 to 10 ft	3.9U ppb	—

SD-SL4-010		
0 to 1 ft	21 ppb	3.2 ppm-OC
1 to 2 ft	12 ppb	1.7 ppm-OC
2 to 3 ft	4.0U ppb	0.1U ppm-OC
3 to 4 ft	3.8U ppb	0.3U ppm-OC
4 to 5 ft	4.0U ppb	—
5 to 6 ft	3.9U ppb	—
6 to 7 ft	3.8U ppb	0.4UJ ppm-OC

NOTES:

Archive = Archive
DW = dry weight
ft = feet
OC = organic carbon
PCBs = polychlorinated biphenyls
ppb = micrograms per kilogram (µg/kg) dry weight
ppm-OC = milligrams per kilogram (mg/kg) organic carbon
J = approximate

SD-SL4-012		
0 to 1 ft	196J ppb	30J ppm-OC
1 to 2 ft	129 ppb	—
2 to 3 ft	18 ppb	—
3 to 4 ft	3.8U ppb	—
4 to 5 ft	3.7U ppb	0.3U ppm-OC

LEGEND

Boeing Property Boundary

Early Action Area Boundary

Core Location December 2014

Core Location Phase 1 Additional Core Sample Location

Core Location Phase 2 Additional Core Sample Location

Corrective Measure Area

SD-PCC005		
0 to 0.33 ft	40 ppb	6.8 ppm-OC
0.33 to 1 ft	3.9U ppb	—
1 to 2 ft	4U ppb	—
2 to 3 ft	Archive	Archive

SD-PCC004		
0 to 0.33 ft	42.3 ppb	2.8 ppm-OC
0.33 to 1 ft	20UY ppb	—
1 to 2 ft	3.9U ppb	0.8U ppm-OC
2 to 3 ft	Archive	Archive

SAMPLE LOCATIONS AND RESULTS FOR ALL SLIP 4 CORE SAMPLES
DSOA and Southwest Bank Corrective Measure and Habitat Project
Boeing Plant 2
Seattle/Tukwila, Washington

By: GSM | Date: 5/18/2015 | Project No. 0131320090

Figure 5

Plot Date: 05/19/15 - 11:16am, Plotted by: adam.stenberg
Drawing Path: S:\13132_004\DSOA Design\CompletionReport\Slip4Appendix\, Drawing Name: SLIP4-Coring Appendix_051815.dwg

ATTACHMENT A

Slip 4 Investigation Core Summary Logs and Photographs

DECEMBER 2014

POST-CONSTRUCTION CORE SAMPLES

Core Summary Log

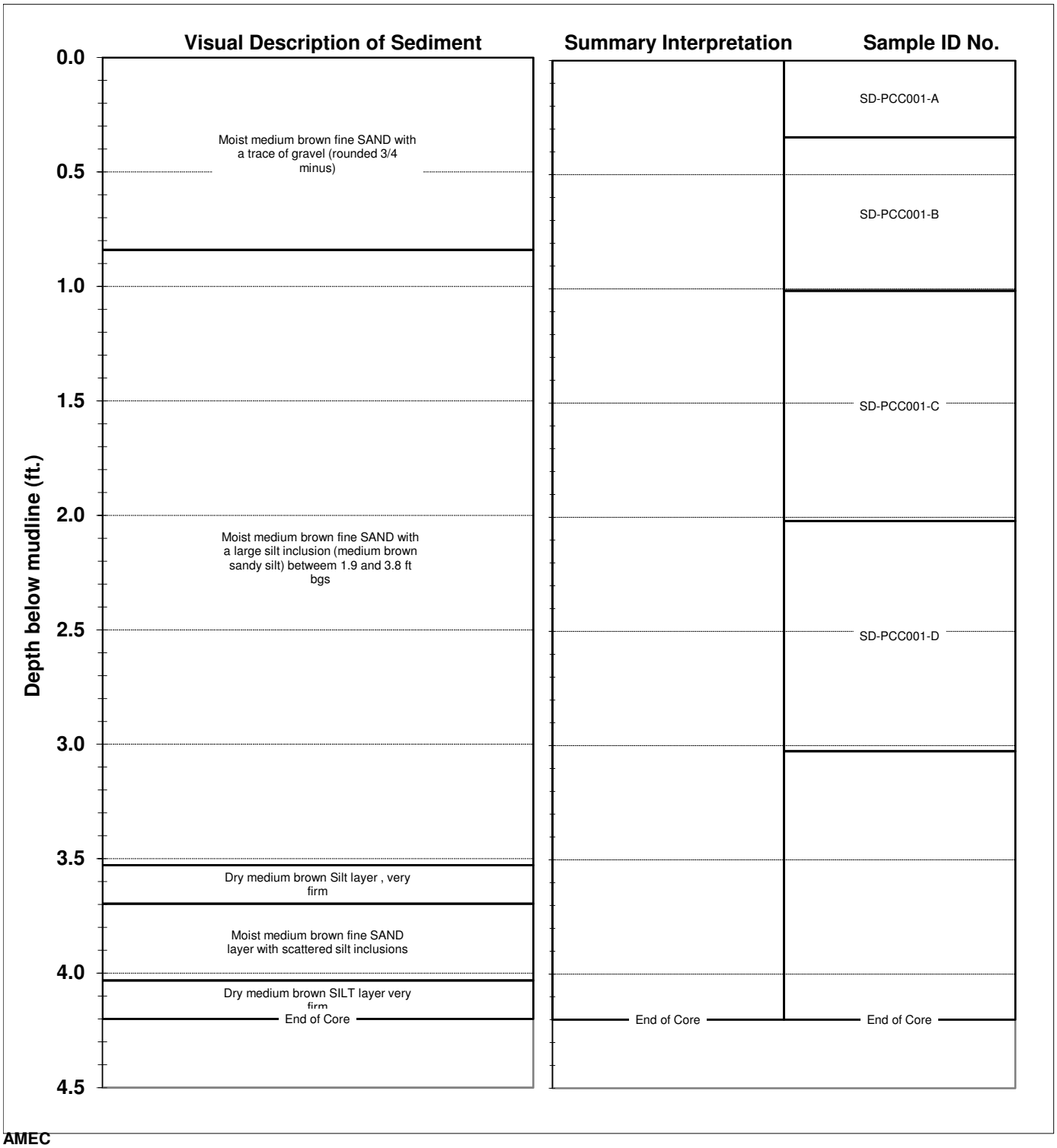
Project: BP2 PC Coring
Project No: 0131320090.CRMN

Station: **SD-PCC001**

Maximum depth of retained sediment: 4.2 ft
Mudline elevation: -12.2 **ft MLLW**
Percent recovery (on-deck): 60%

	Core collection	Laboratory processing
Date:	12/9/2014	12/9/2014
Time:	12:19	15:00

Field Log: R. Gilmour
Summary Log: R. Gilmour



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Station SD-PCC001

Station SD-PCC001

Station SD-PCC001

Core Summary Log

Project: BP2 PC Coring
Project No: 0131320090.CRMN

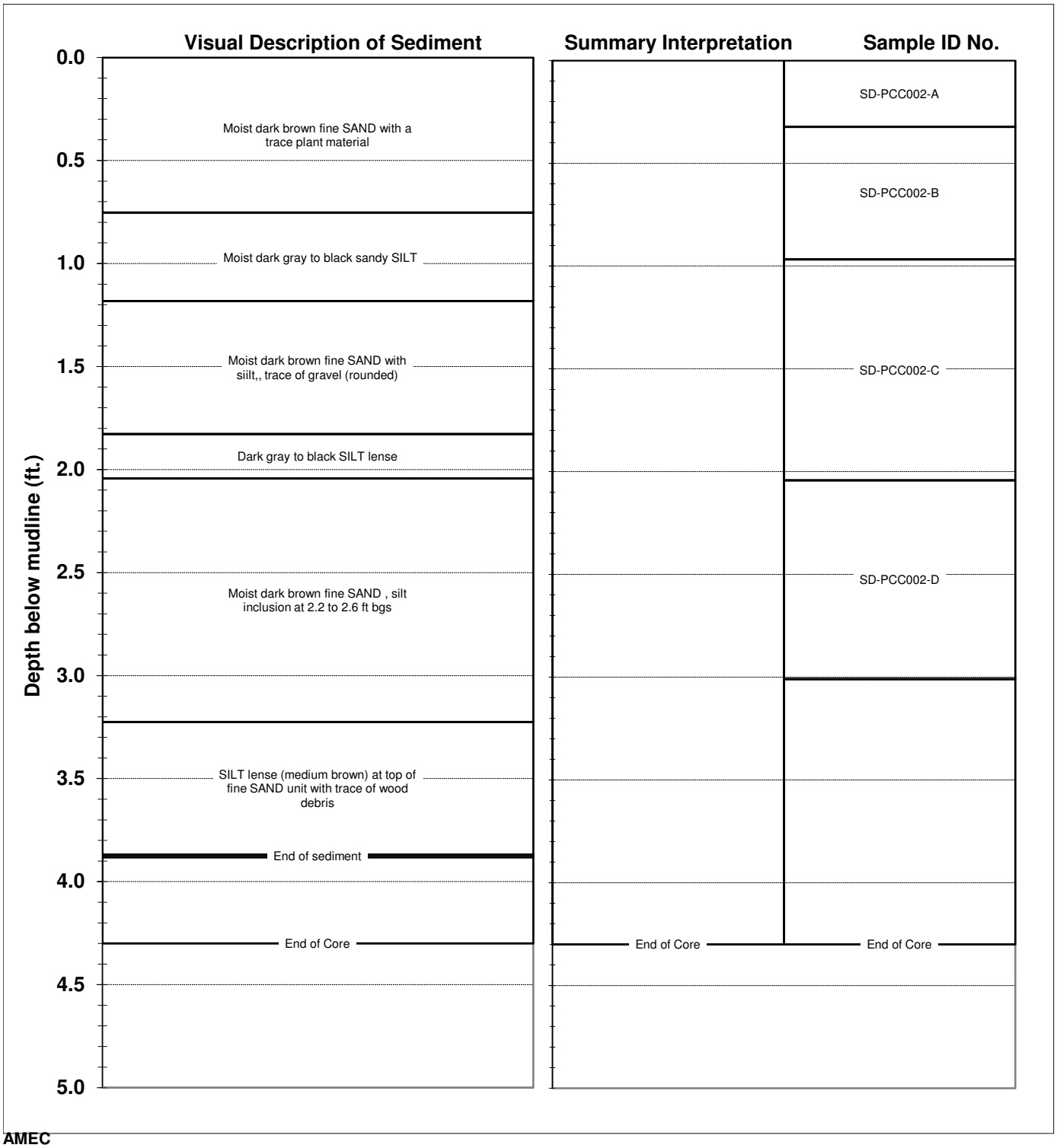
Station: **SD-PCC002**

Maximum depth of retained sediment: 4.3 ft
Percent recovery (on-deck): 93%

Mudline elevation: -14.3 **ft MLLW**

	Core collection	Laboratory processing
Date:	12/9/2014	12/9/2014
Time:	11:58	15:40

Field Log: R. Gilmour
Summary Log: R. Gilmour



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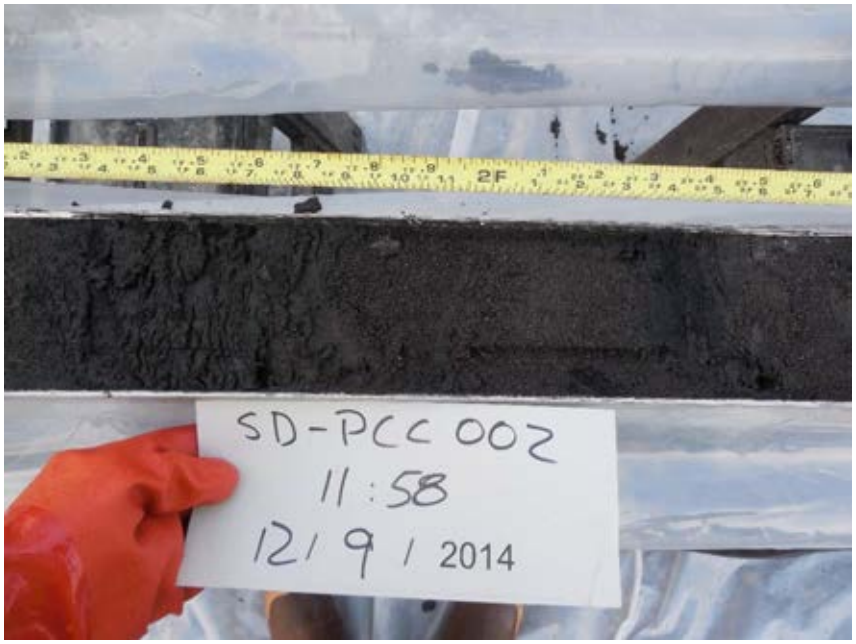
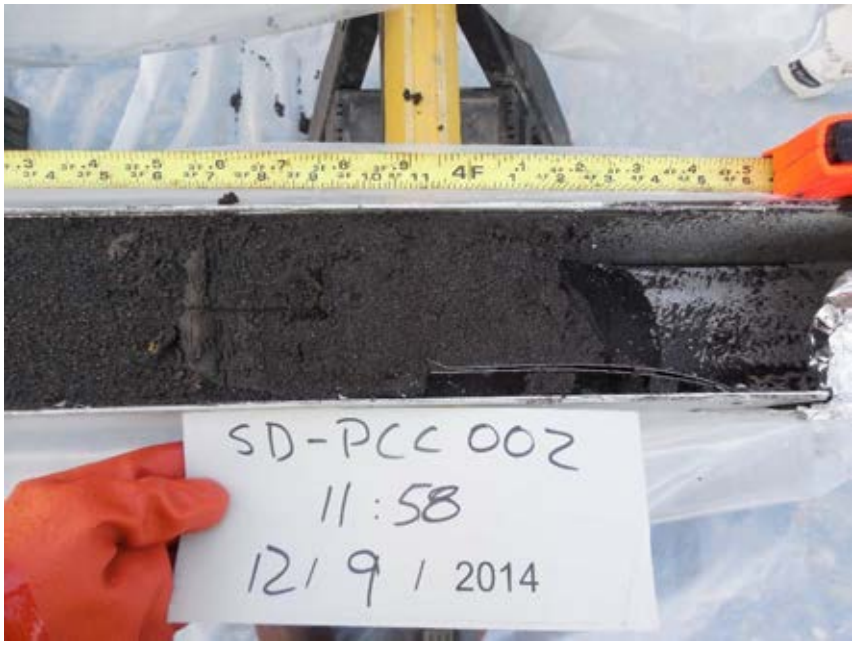
Station SD-PCC002



Station SD-PCC002

Station SD-PCC002



Station SD-PCC002

Core Summary Log

Project: BP2 PC Coring
Project No: 0131320090.CRMN

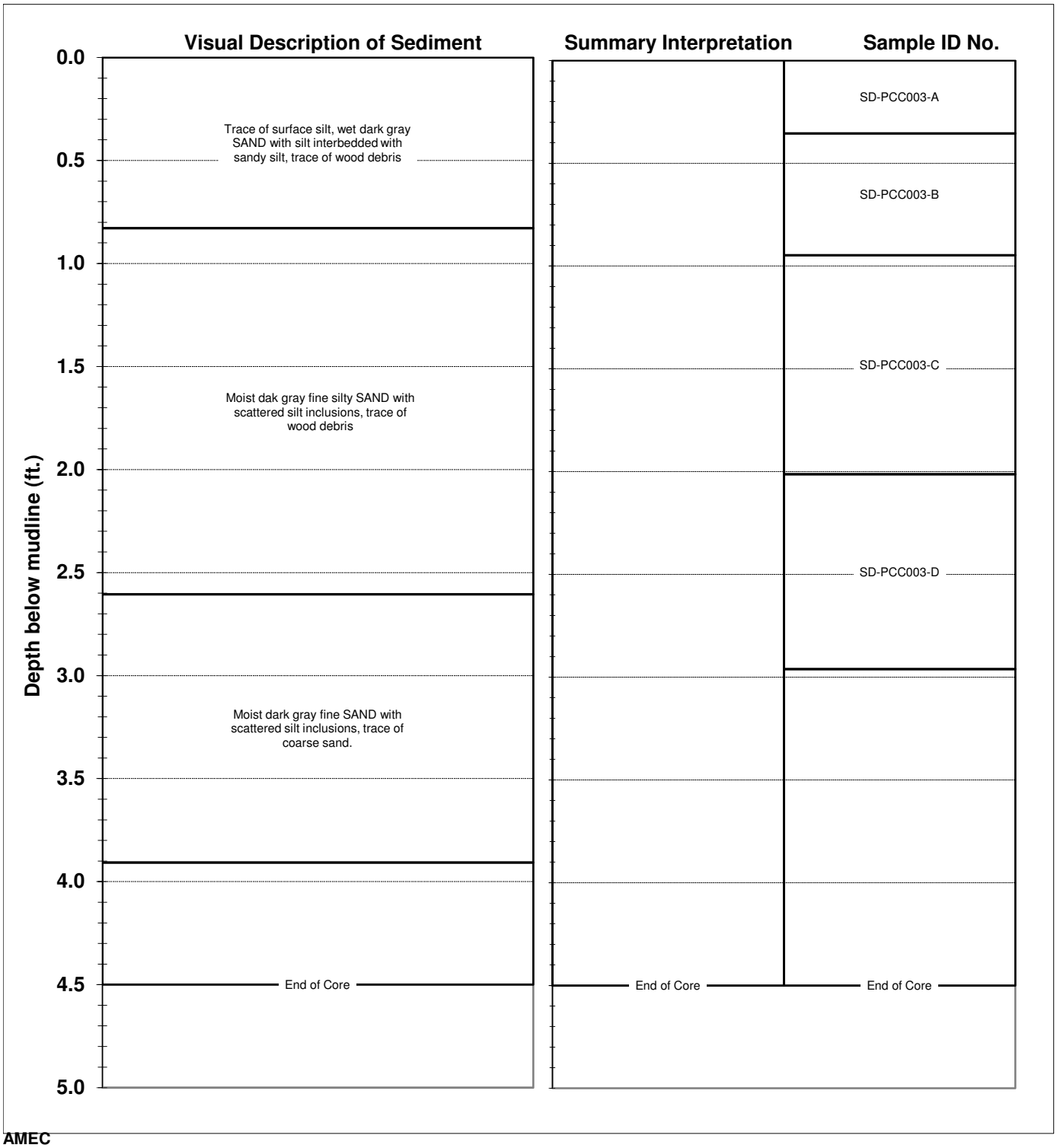
Station: **SD-PCC003**

Maximum depth of retained sediment: 4.5 ft
Percent recovery (on-deck): 84%

Mudline elevation: -14.2 **ft MLLW**

	Core collection	Laboratory processing
Date:	12/8/2014	12/8/2014
Time:	11:55	13:30

Field Log: R. Gilmour
Summary Log: R. Gilmour



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Station SD-PCC003

Station SD-PCC003

Station SD-PCC003

Station SD-PCC003

Core Summary Log

Project: BP2 PC Coring
Project No: 0131320090.CRMN

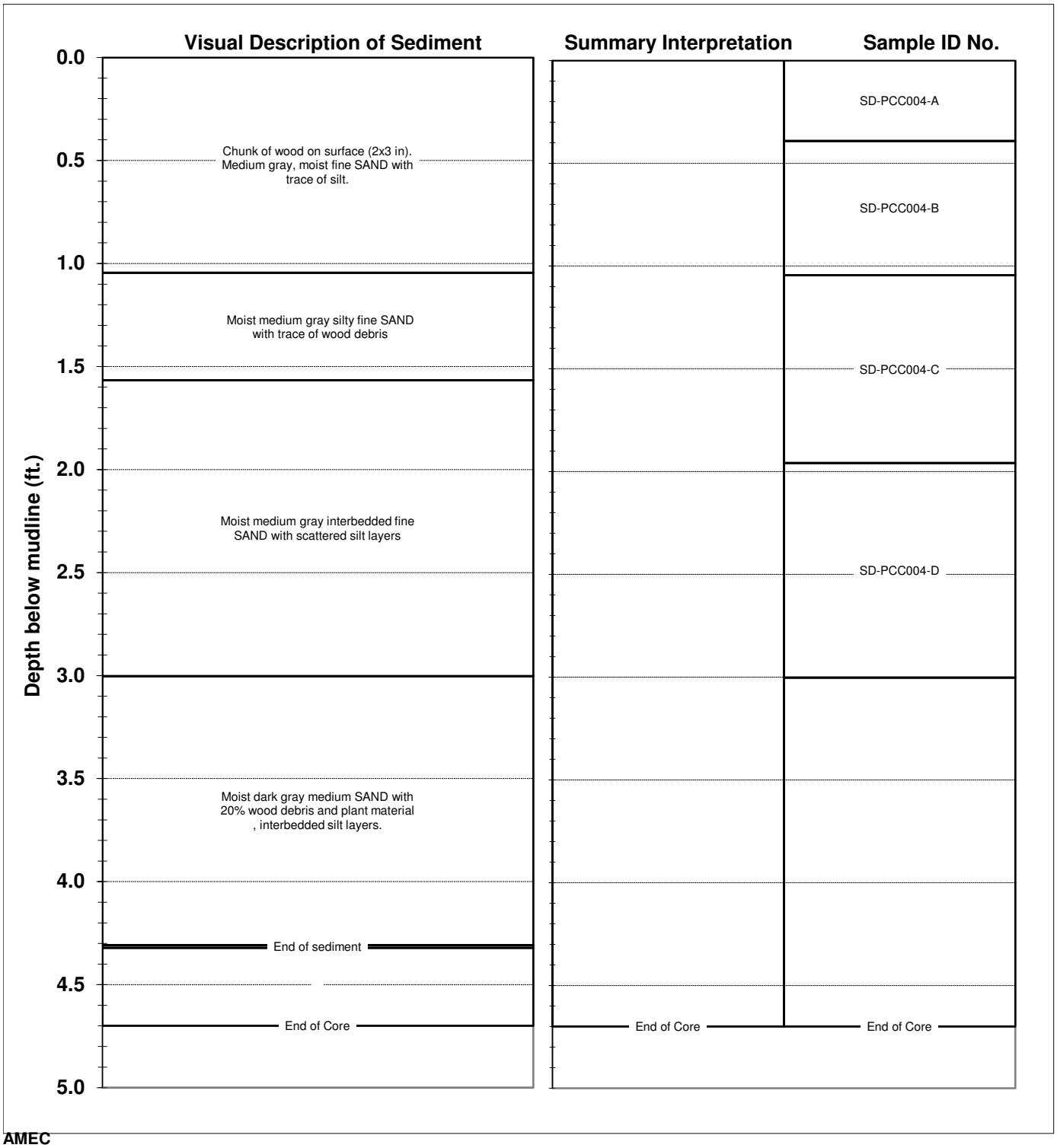
Station: **SD-PCC004**

Maximum depth of retained sediment: 4.7 ft
Percent recovery (on-deck): 77%

Mudline elevation: -12.6 **ft MLLW**

	Core collection	Laboratory processing
Date:	12/8/2014	12/8/2014
Time:	10:49	15:48

Field Log: R. Gilmour
Summary Log: R. Gilmour



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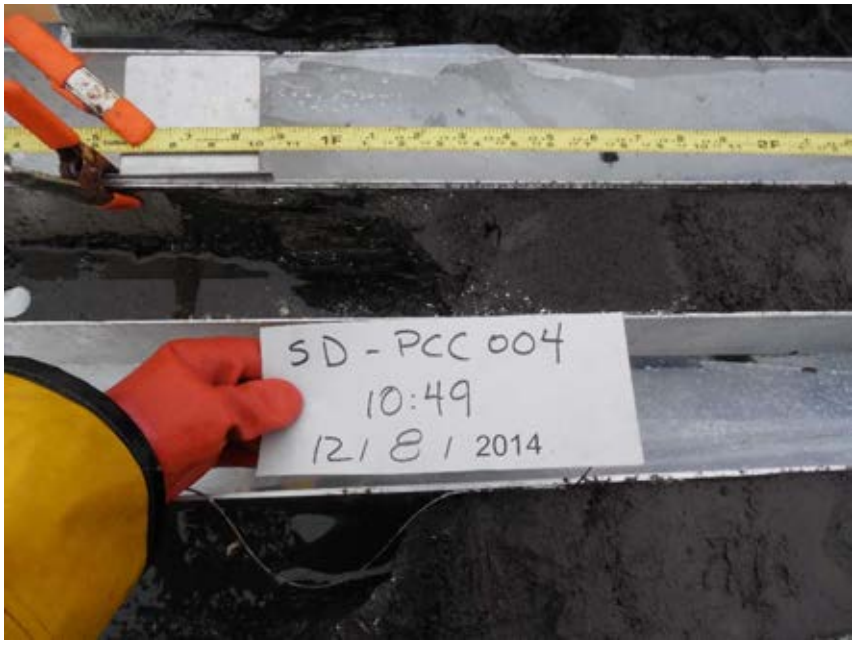
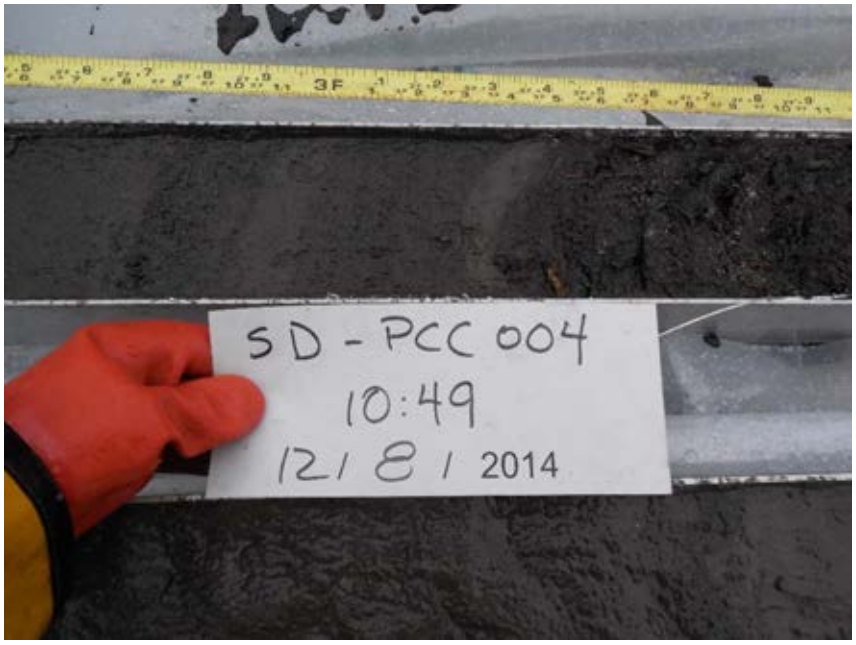


Station SD-PCC004

Station SD-PCC004



Station SD-PCC004

Station SD-PCC004

Core Summary Log

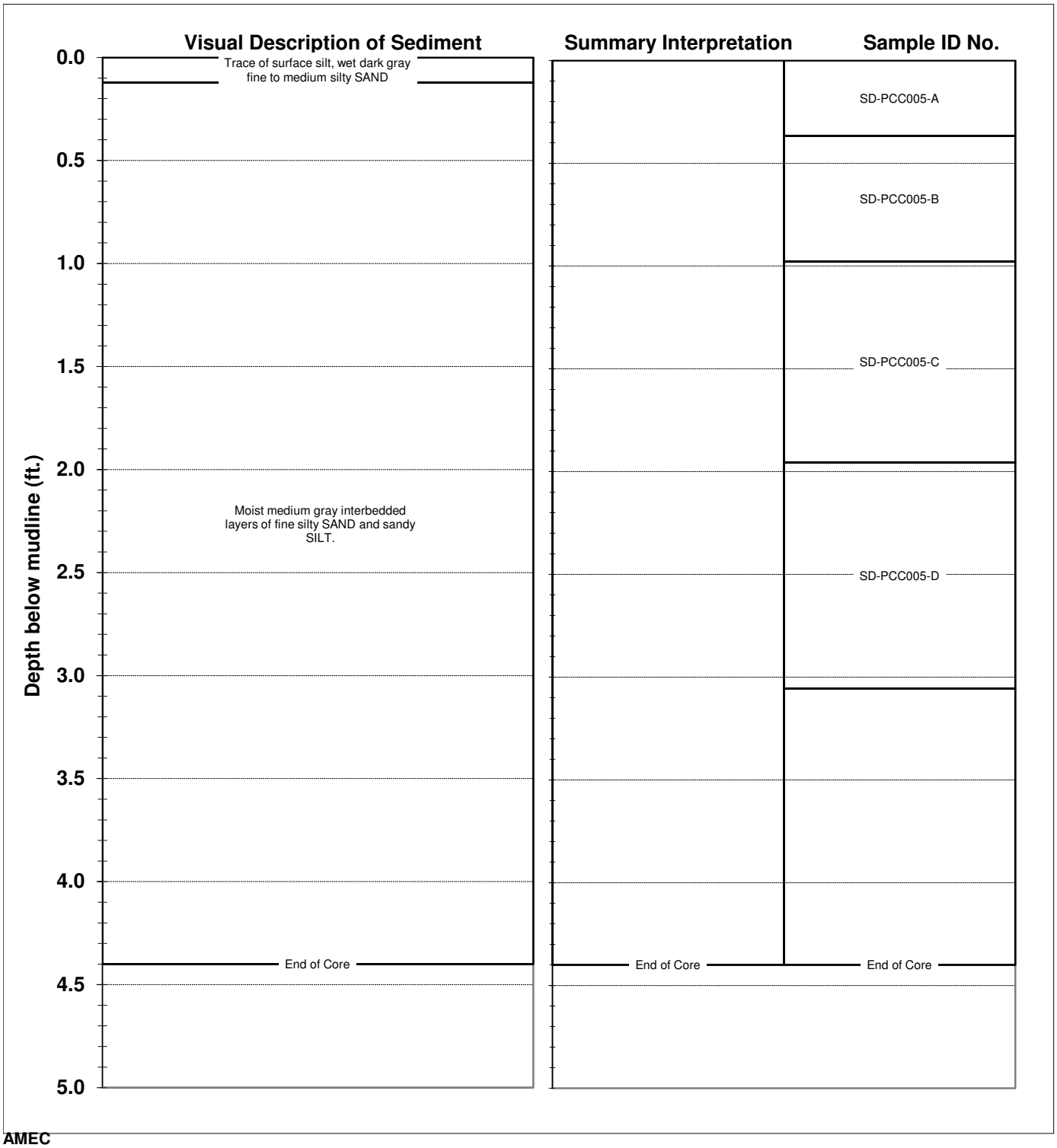
Project: BP2 PC Coring
Project No: 0131320090.CRMN

Station: **SD-PCC005**

Maximum depth of retained sediment: 4.4 ft
Mudline elevation: -19.7 **ft MLLW**
Percent recovery (on-deck): 82%

	Core collection	Laboratory processing
Date:	12/8/2014	12/8/2014
Time:	11:25	16:04

Field Log: R. Gilmour
Summary Log: R. Gilmour



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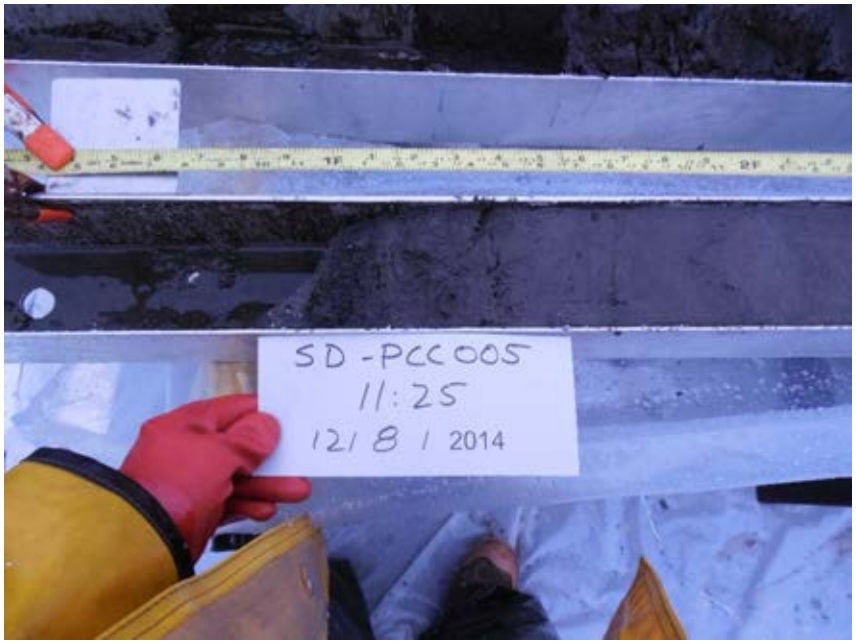
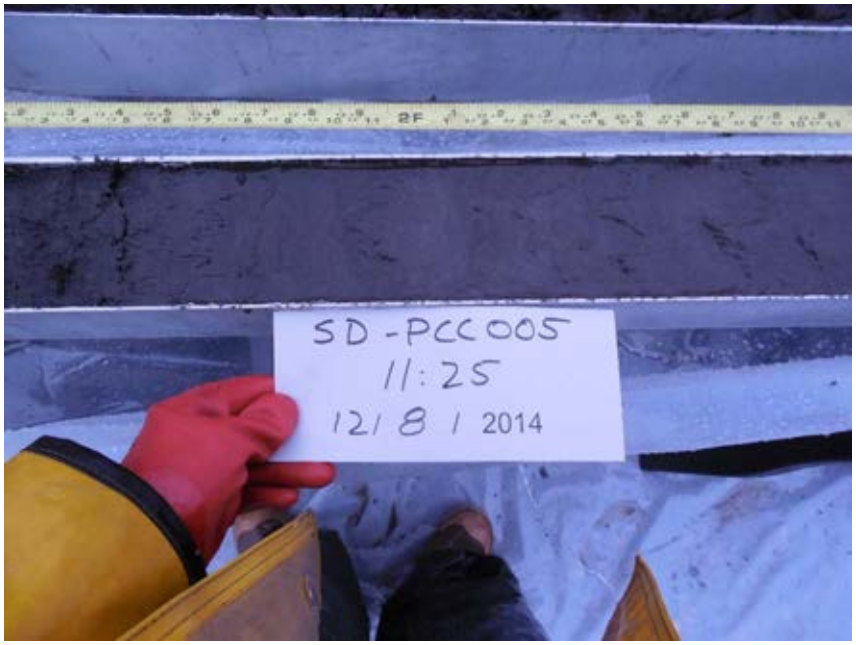
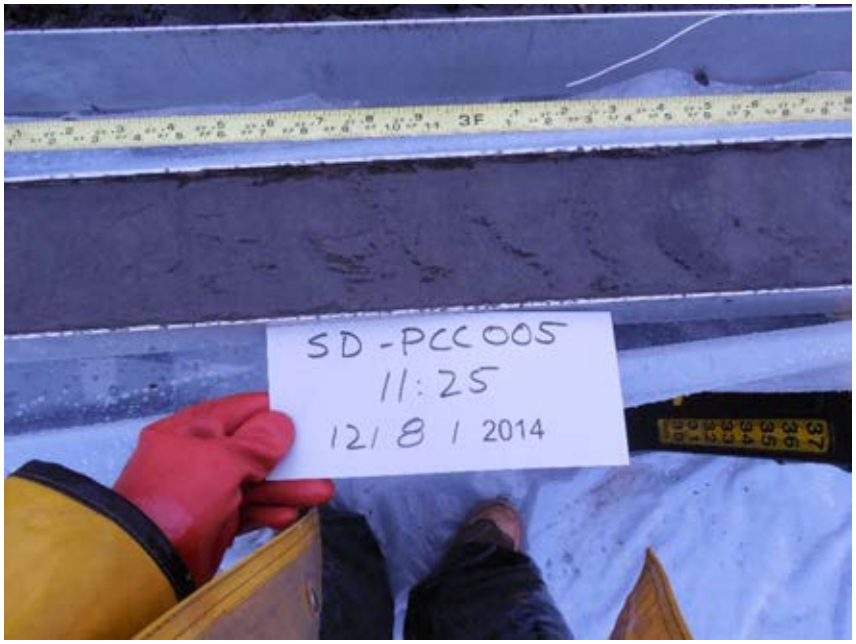


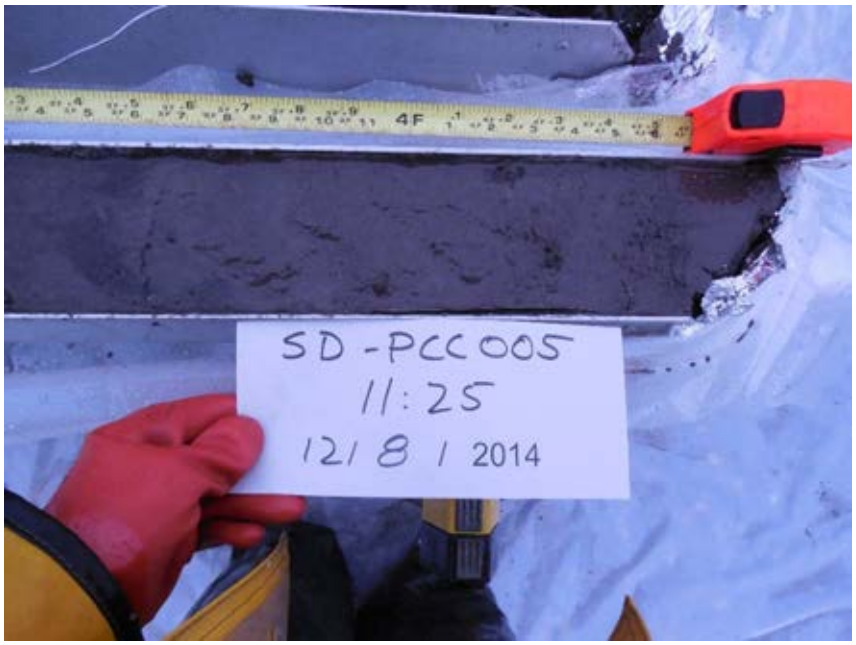
Station SD-PCC005



Station SD-PCC005



Station SD-PCC005



Station SD-PCC005

PHASE 1 SLIP 4 ADDITIONAL CORE SAMPLE COLLECTION

Core Summary Log

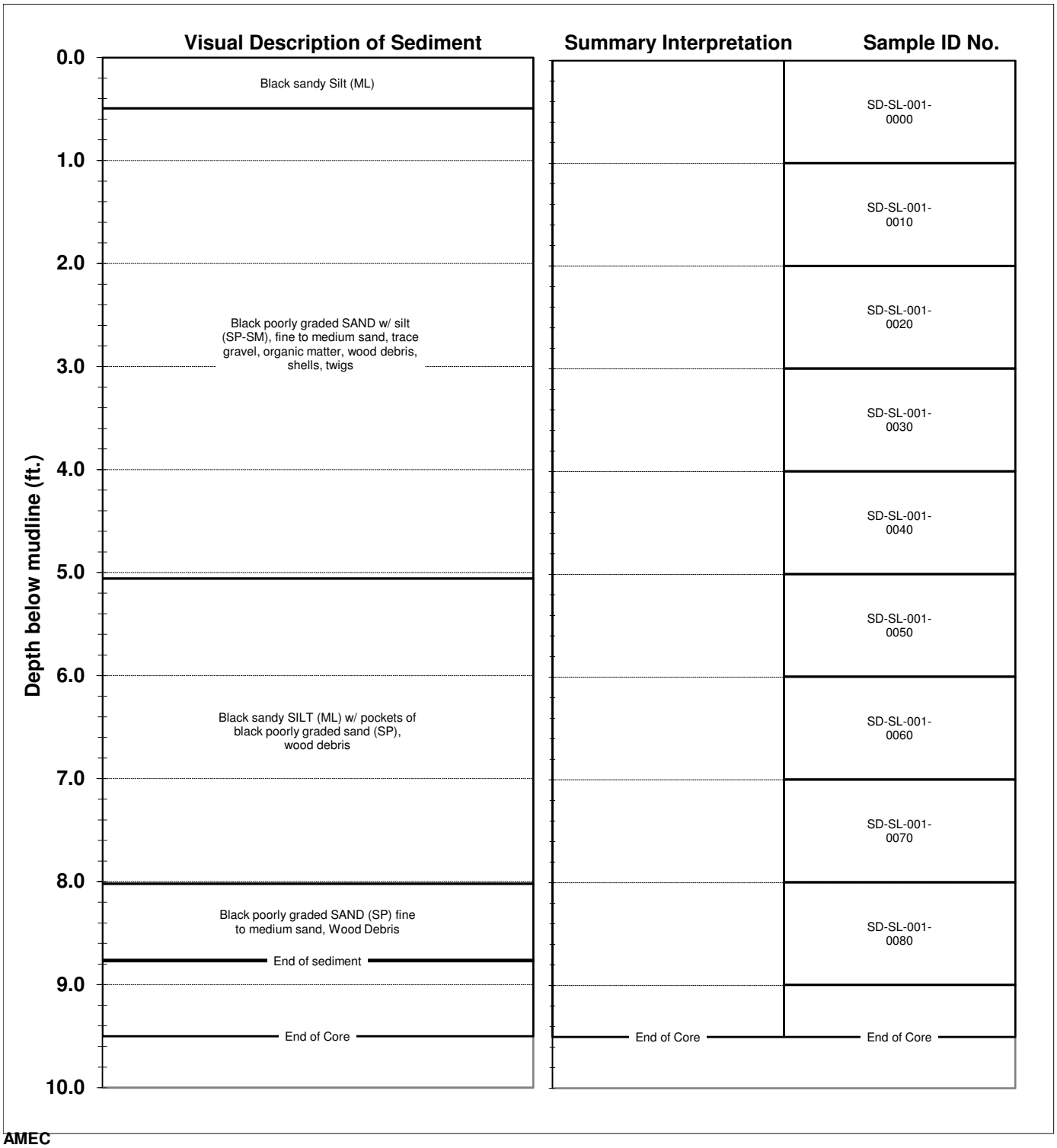
Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

Station: **SD-SL4-001**

Maximum depth of retained sediment: 9.5 ft
Mudline elevation: -8.8 **ft MLLW**
Percent recovery (on-deck): 81%

	Core collection	Laboratory processing
Date:	12/22/2014	NA
Time:	9:50	NA

Field Log: J. Bellamy
Summary Log: R. Gilmour



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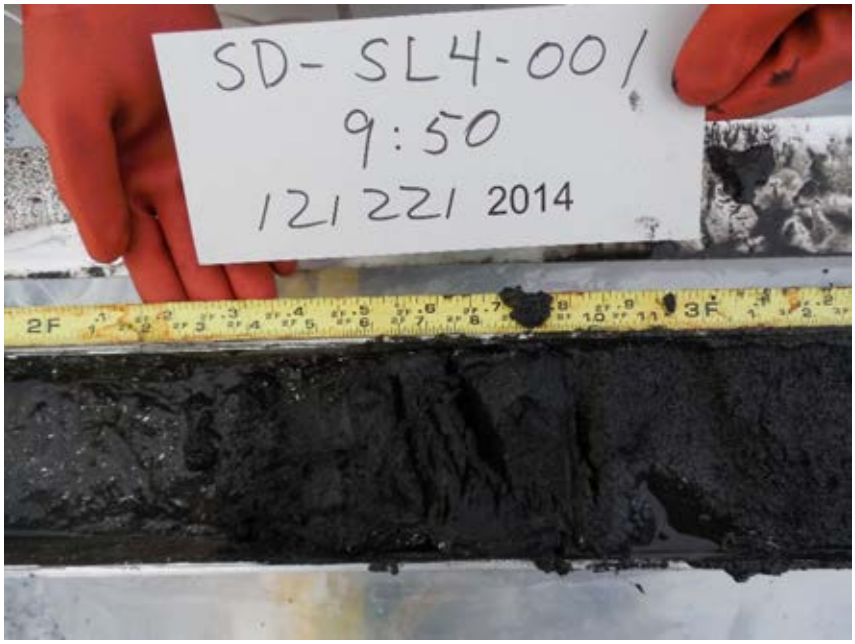


Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Station SD-SL4-001

Core Summary Log

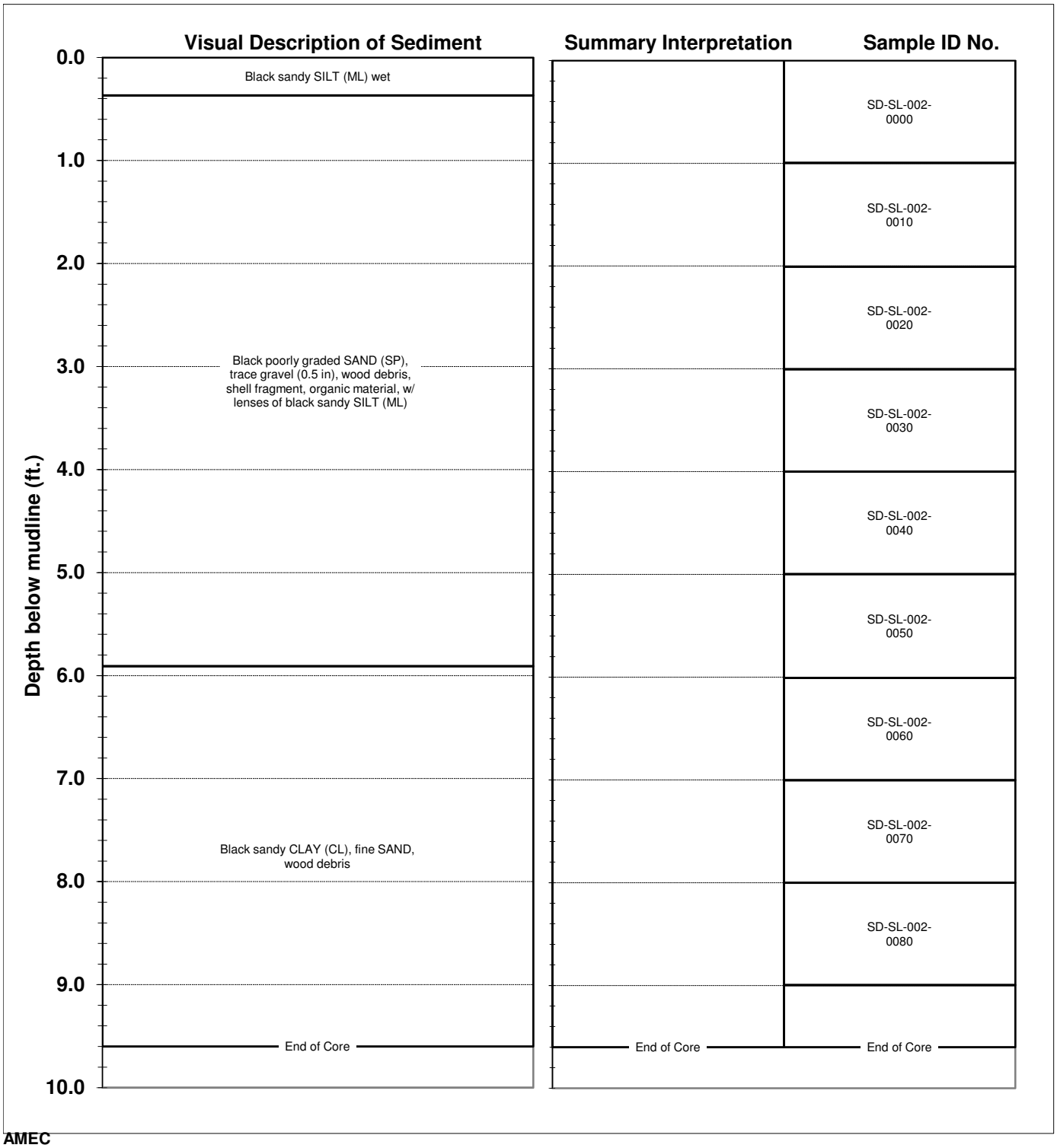
Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

Station: **SD-SL4-002**

Maximum depth of retained sediment: 9.6 ft
Mudline elevation: -9.1 **ft MLLW**
Percent recovery (on-deck): 81%

	Core collection	Laboratory processing
Date:	12/22/2014	NA
Time:	10:19	NA

Field Log: J. Bellamy
Summary Log: R. Gilmour



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Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Station SD-SL4-002

Core Summary Log

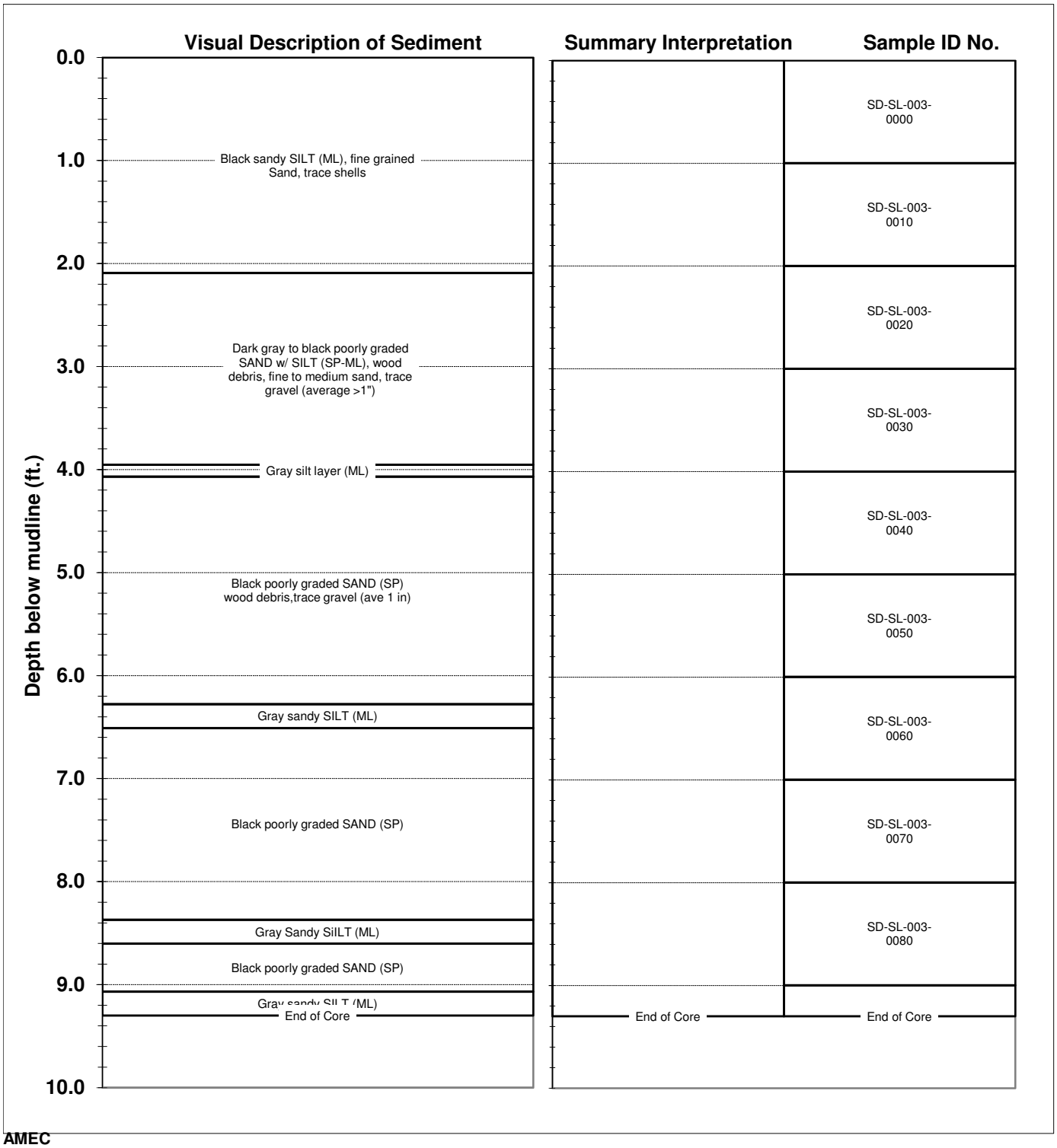
Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

Station: **SD-SL4-003**

Maximum depth of retained sediment: 9.3 ft
Mudline elevation: -10.3 **ft MLLW**
Percent recovery (on-deck): 86%

	Core collection	Laboratory processing
Date:	12/22/2014	N/A
Time:	11:24	N/A

Field Log: J. Bellamy
Summary Log: R. Gilmour



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Station SD-SL4-003

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Station SD-SL4-003

Station SD-SL4-003

Core Summary Log

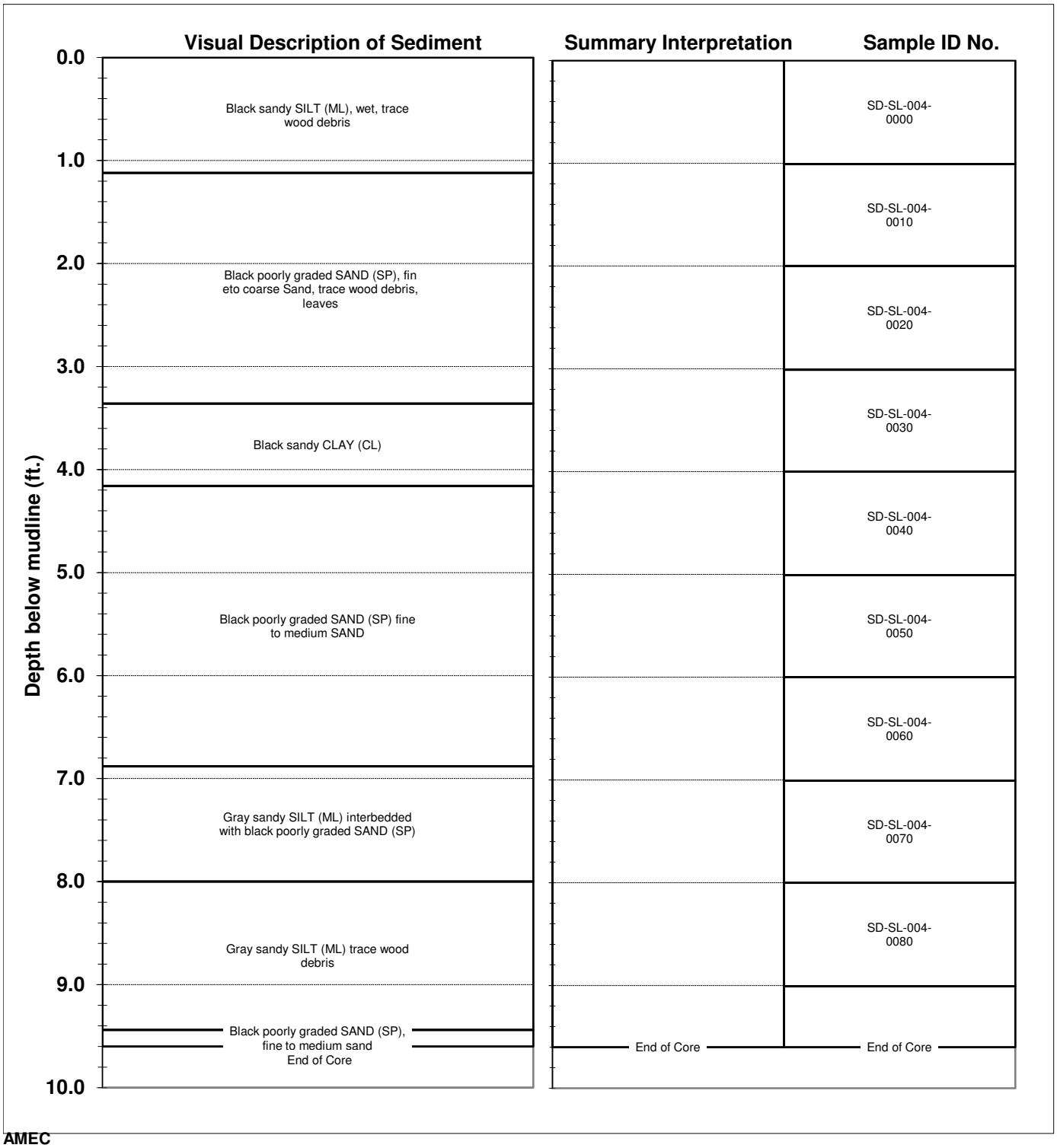
Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

Station: **SD-SL4-004**

Maximum depth of retained sediment: 9.6 ft
Mudline elevation: -13.7 **ft MLLW**
Percent recovery (on-deck): 63%

	Core collection	Laboratory processing
Date:	12/22/2014	NA
Time:	10:49	NA

Field Log: J. Bellamy
Summary Log: R. Gilmour



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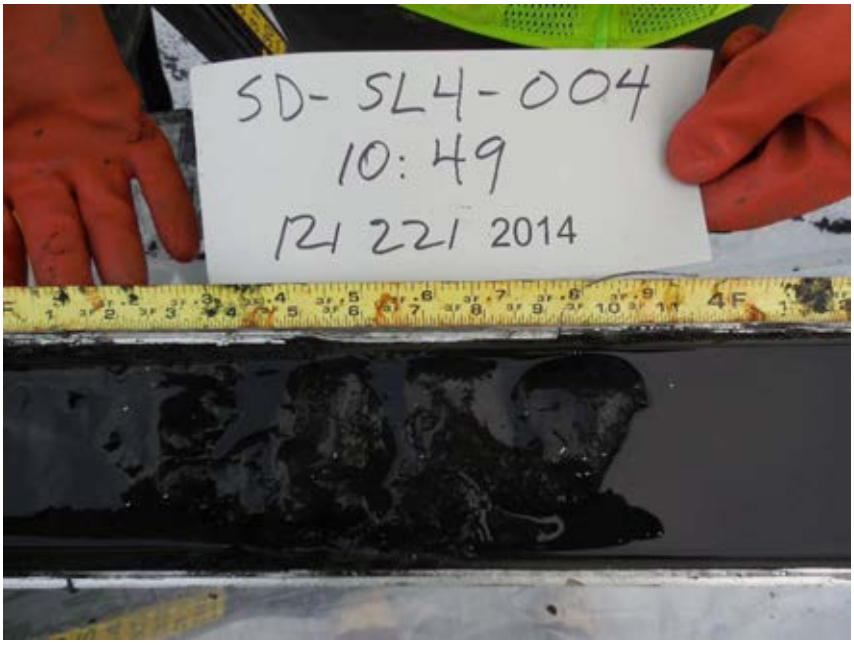
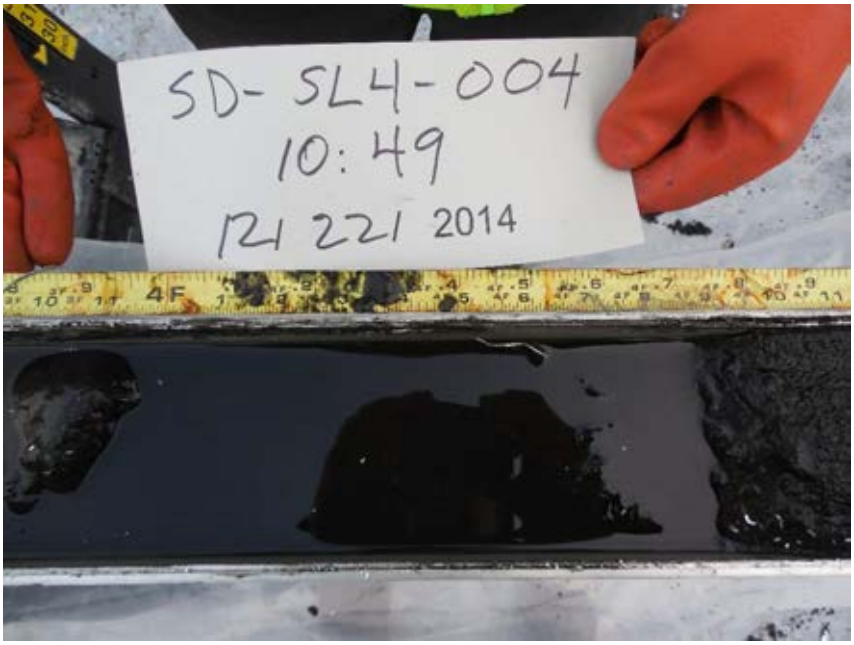
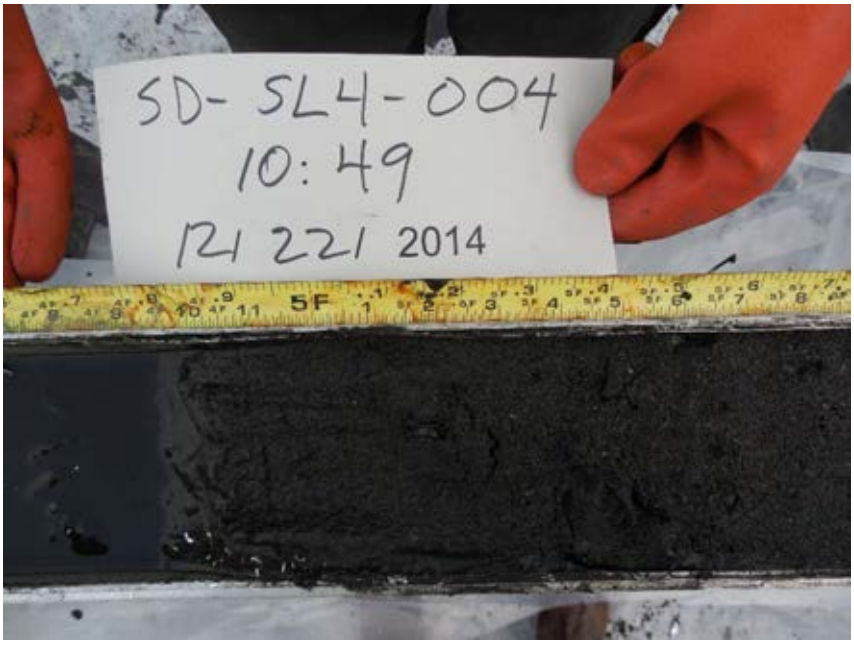


Station SD-SL4-004



Station SD-SL4-004



Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

Station SD-SL4-004

PHASE 2 SLIP 4 ADDITIONAL CORE SAMPLE COLLECTION

Core Summary Log

Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

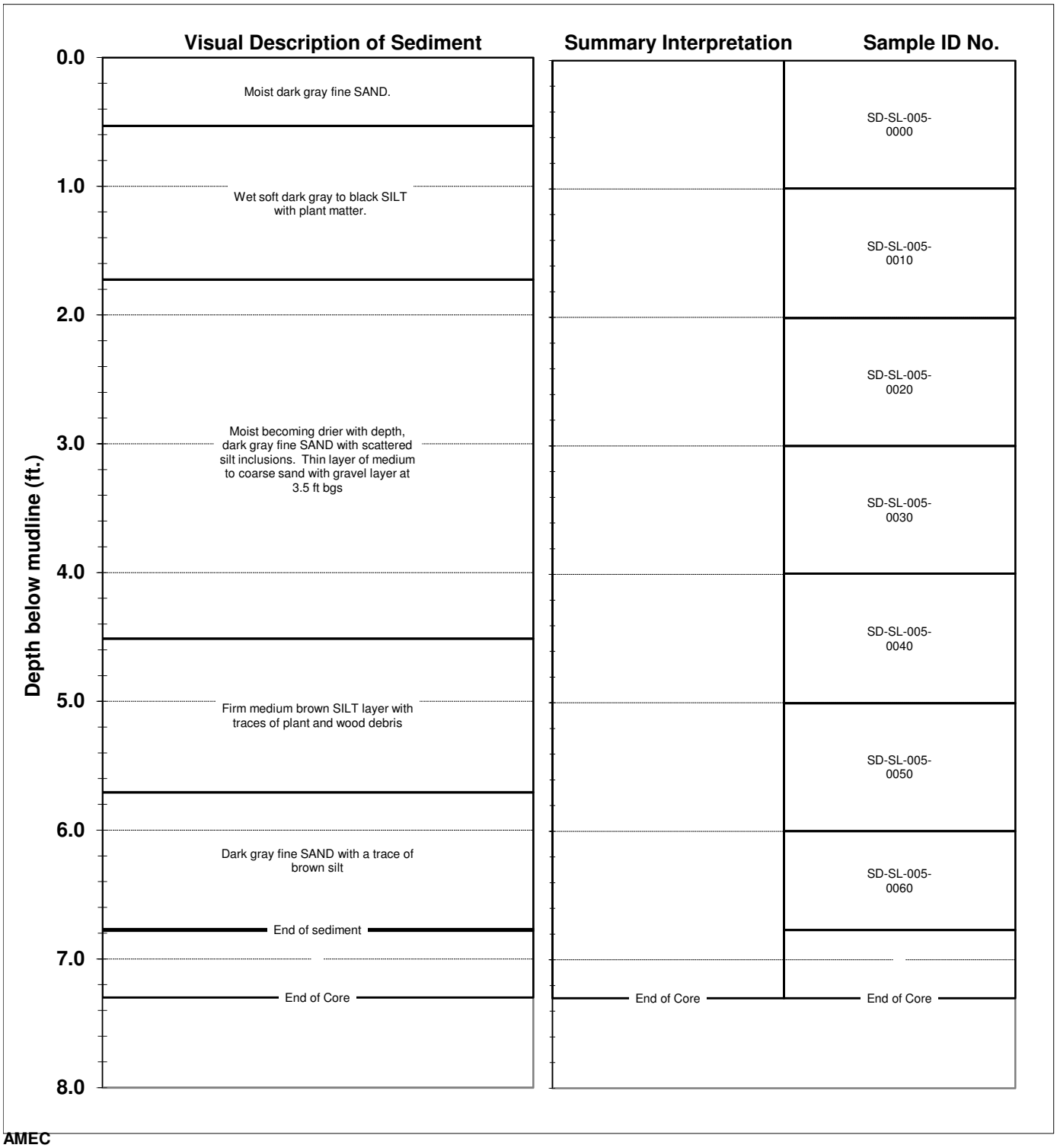
Station: **SD-SL4-005**

Maximum depth of retained sediment: 7.3 ft
Percent recovery (on-deck): 75%

Mudline elevation: -6.5 **ft MLLW**

	Core collection	Laboratory processing
Date:	1/15/2015	1/15/2015
Time:	10:28	15:05

Field Log: R. Gilmour
Summary Log: R. Gilmour



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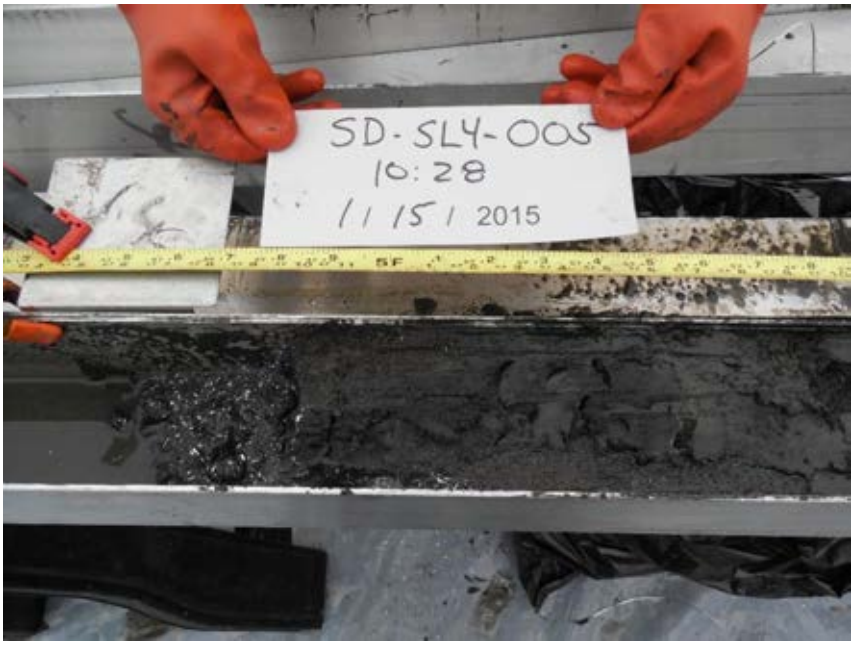
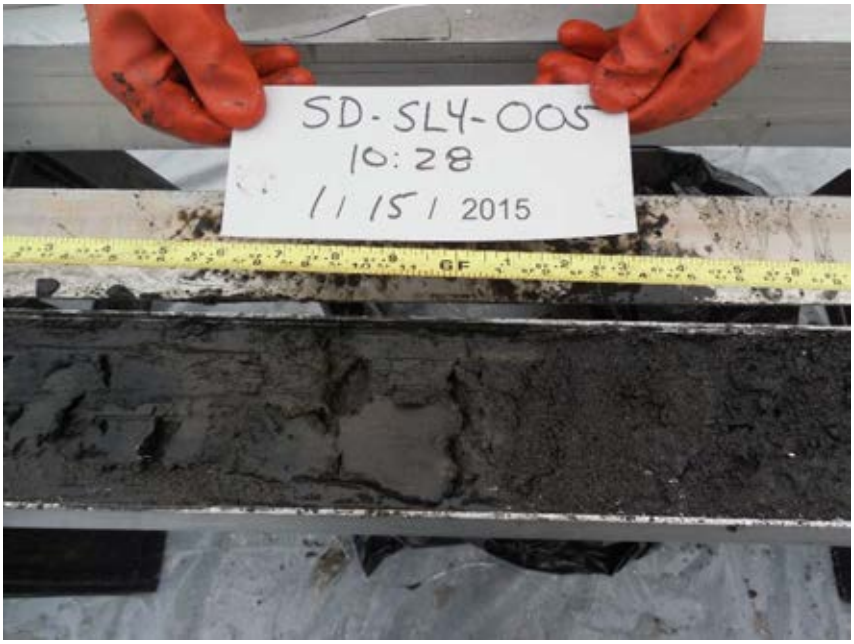
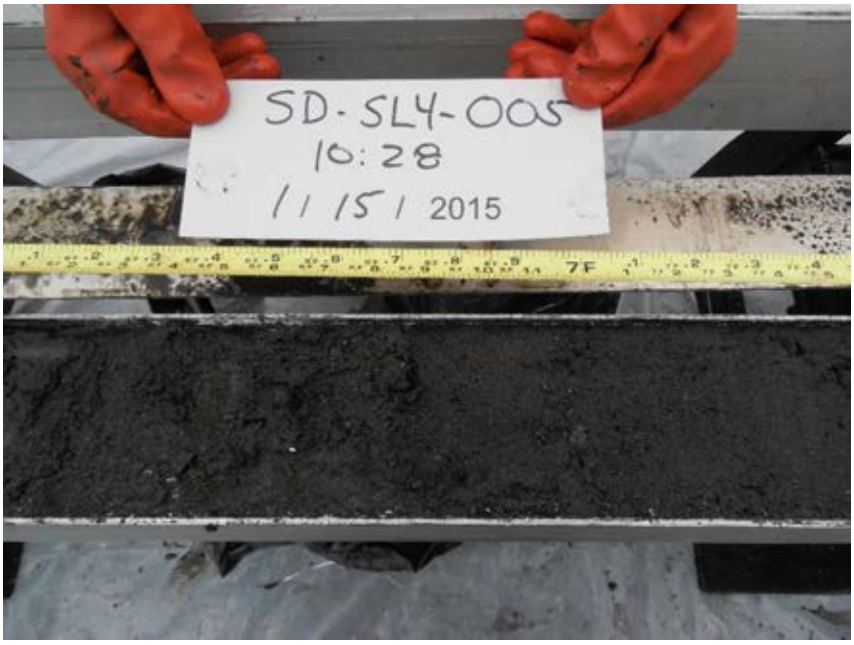


Station SD-SL4-005



Station SD-SL4-005

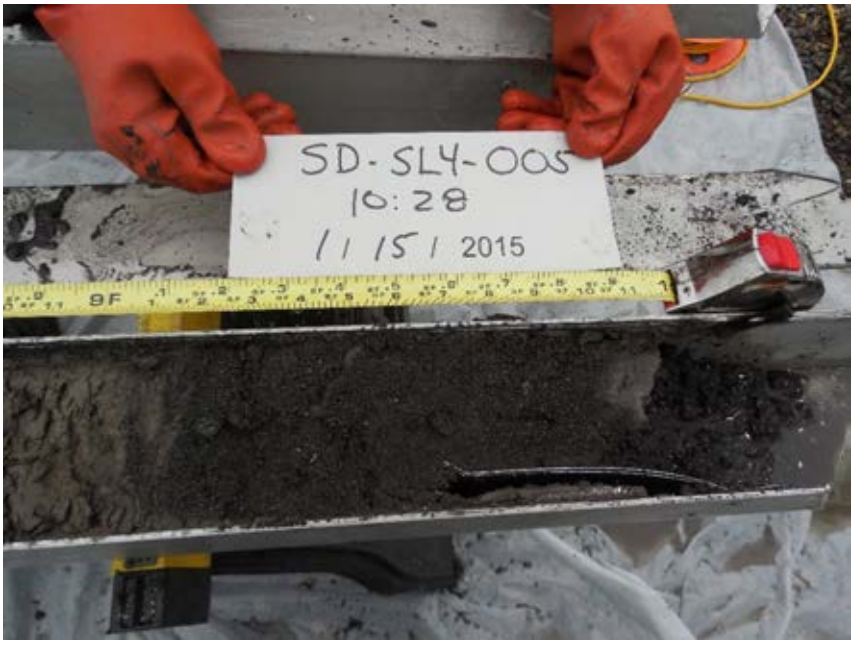


Station SD-SL4-005

Station SD-SL4-005

Station SD-SL4-005

Station SD-SL4-005



Station SD-SL4-005

Core Summary Log

Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

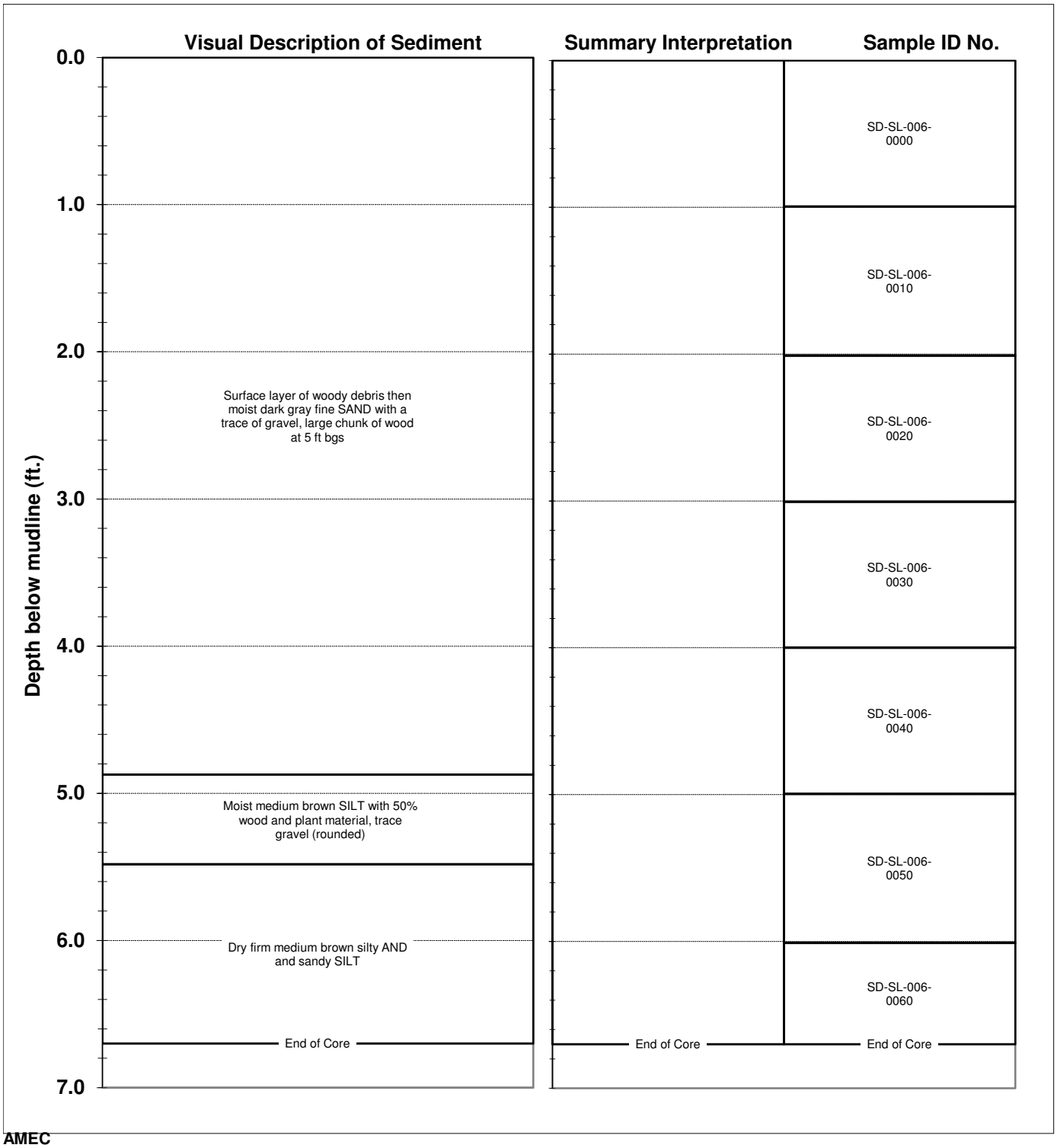
Station: **SD-SL4-006**

Maximum depth of retained sediment: 6.7 ft
Percent recovery (on-deck): 49%

Mudline elevation: -7.5 **ft MLLW**

	Core collection	Laboratory processing
Date:	1/15/2015	1/15/2015
Time:	9:52	15:30

Field Log: R. Gilmour
Summary Log: R. Gilmour



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Station SD-SL4-006

Station SD-SL4-006

Station SD-SL4-006

Station SD-SL4-006

Station SD-SL4-006

Core Summary Log

Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

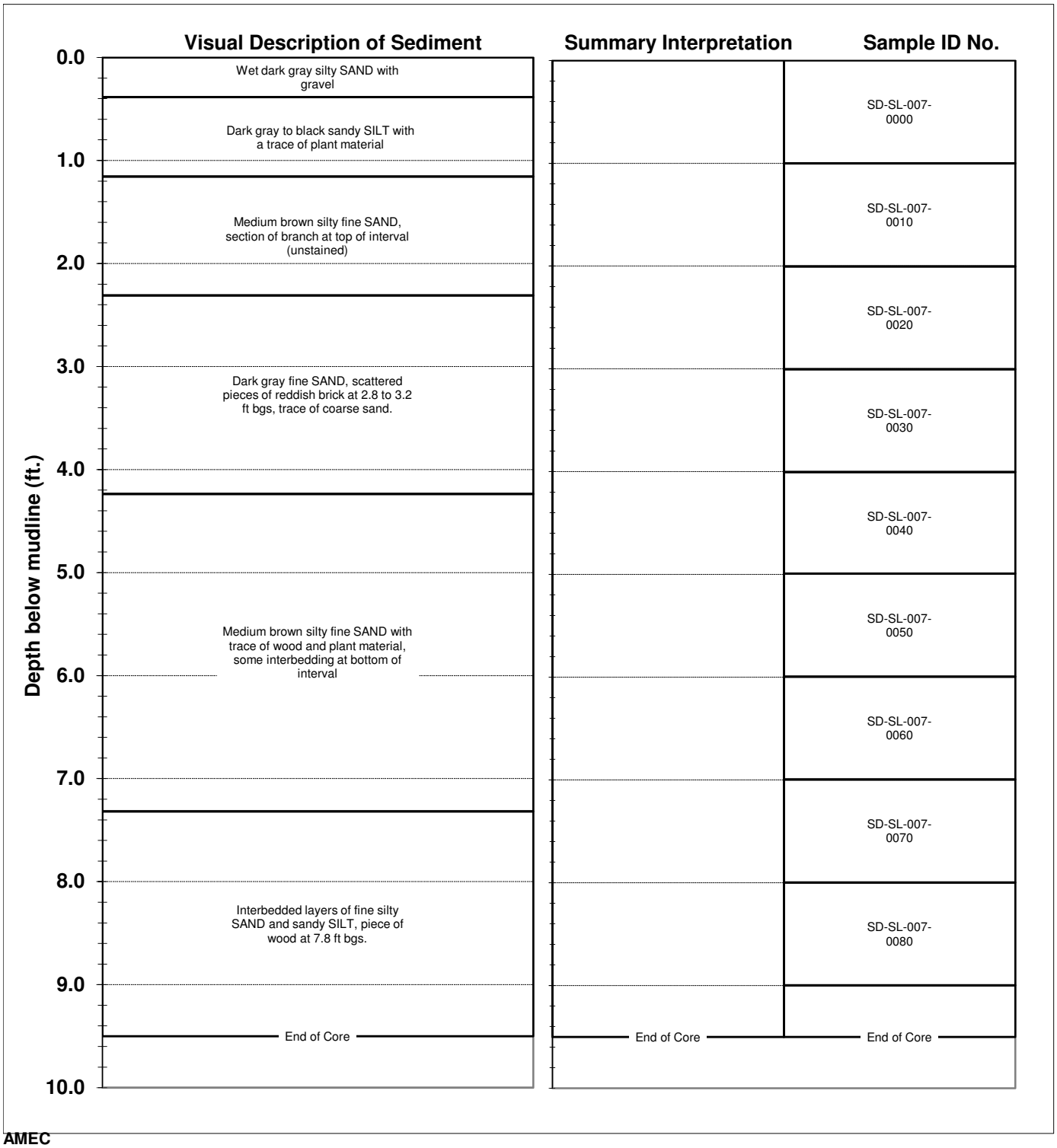
Station: **SD-SL4-007**

Maximum depth of retained sediment: 9.5 ft
Percent recovery (on-deck): 78%

Mudline elevation: -5.2 **ft MLLW**

	Core collection	Laboratory processing
Date:	1/15/2015	1/15/2015
Time:	9:27	15:50

Field Log: R. Gilmour
Summary Log: R. Gilmour



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3500 188th St SW Suite 601
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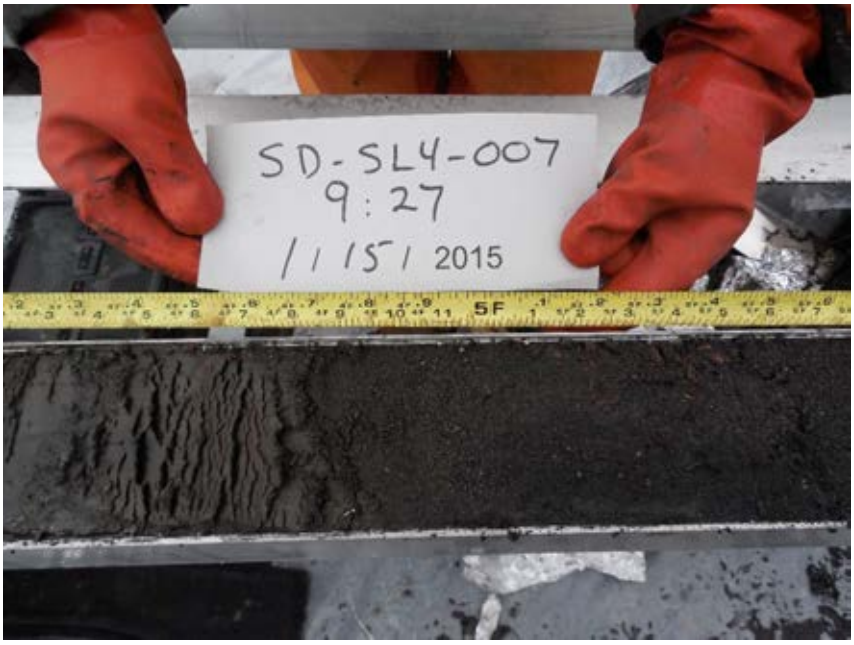
(425) 921-4000
fax (425) 921-4040

Station SD-SL4-007

Station SD-SL4-007



Station SD-SL4-007

Station SD-SL4-007

Station SD-SL4-007

Station SD-SL4-007

Station SD-SL4-007

Station SD-SL4-007

Station SD-SL4-007

Station SD-SL4-007

Core Summary Log

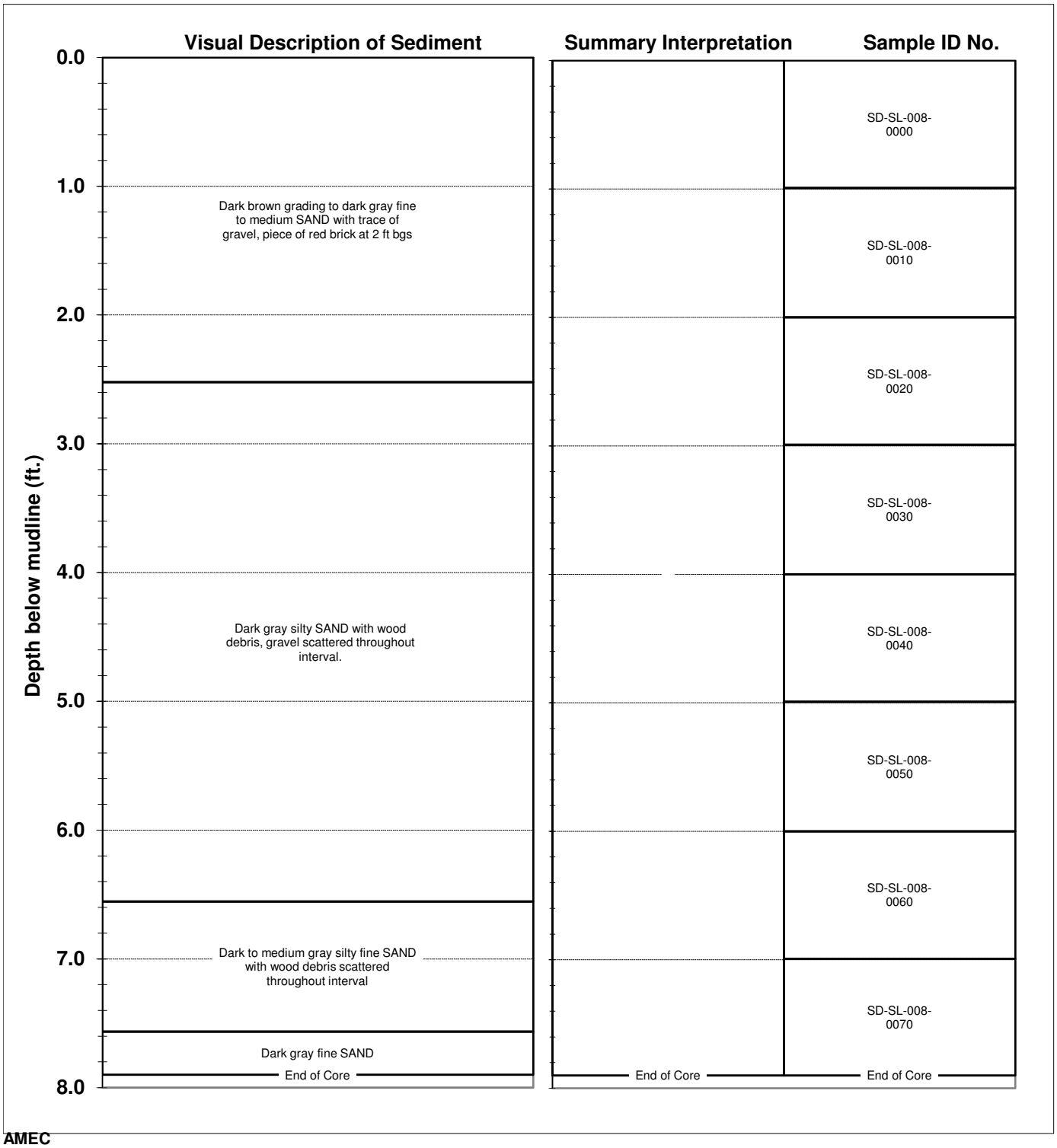
Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

Station: **SD-SL4-008**

Maximum depth of retained sediment: 7.9 ft
Mudline elevation: -3.3 **ft MLLW**
Percent recovery (on-deck): 59%

	Core collection	Laboratory processing
Date:	1/15/2015	1/15/2015
Time:	11:20	16:45

Field Log: R. Gilmour
Summary Log: R. Gilmour



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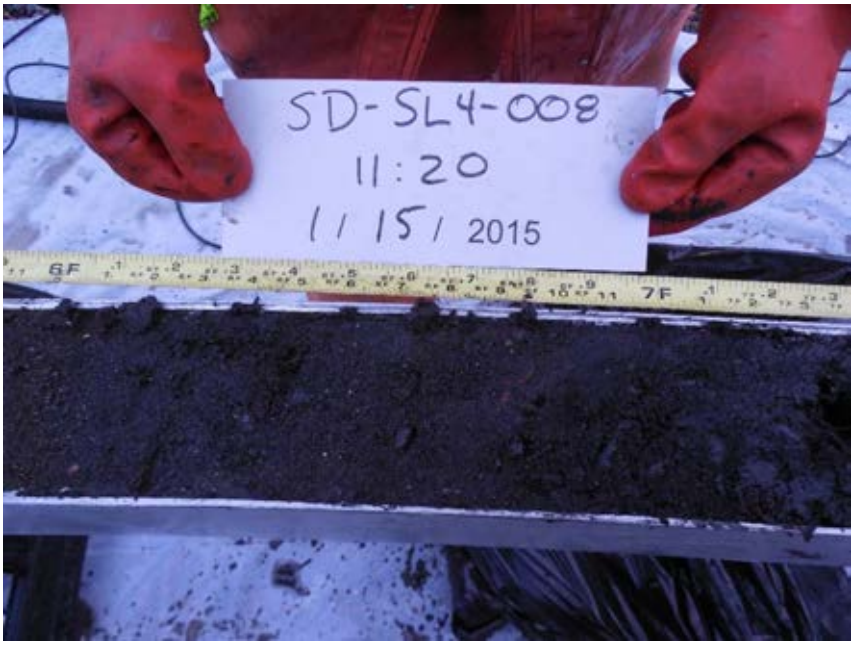
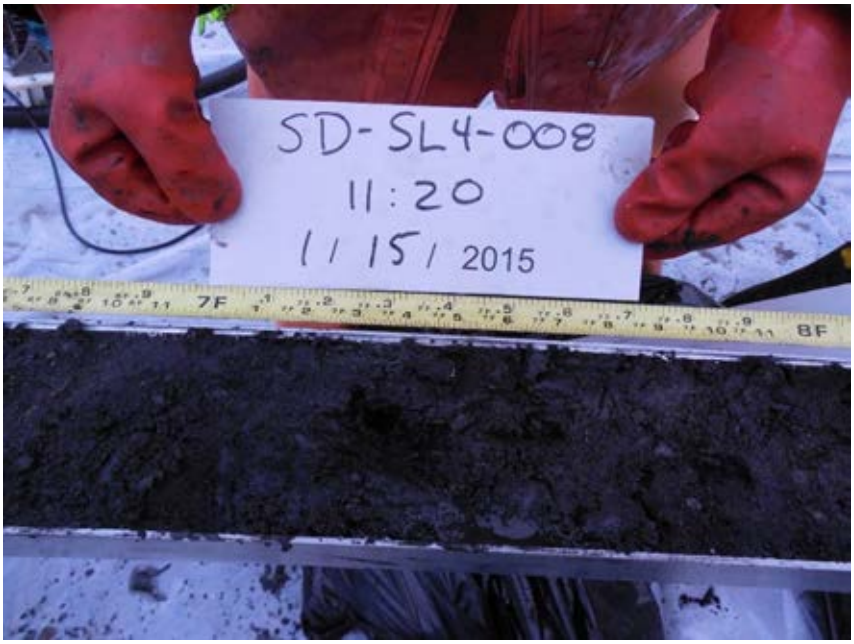
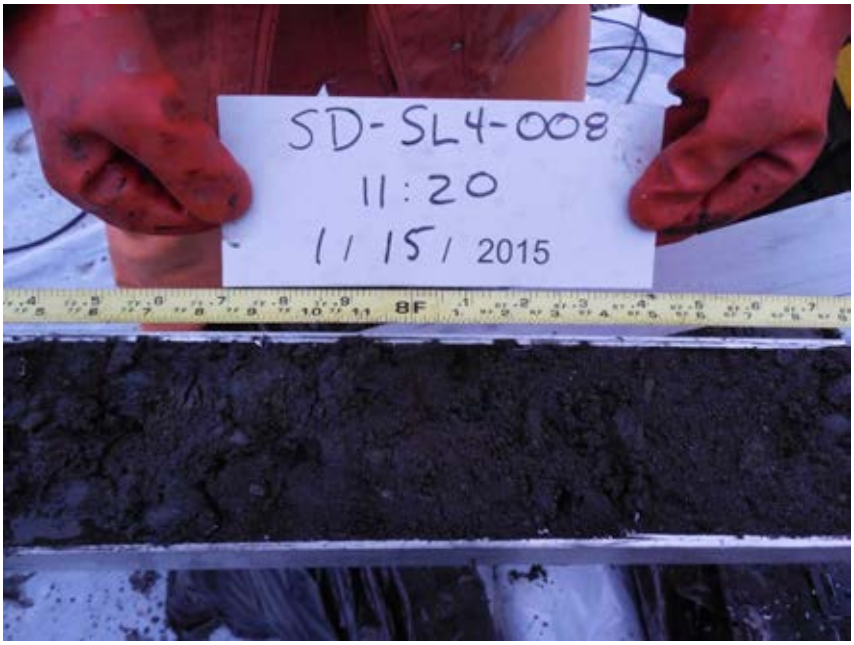
Station SD-SL4-008



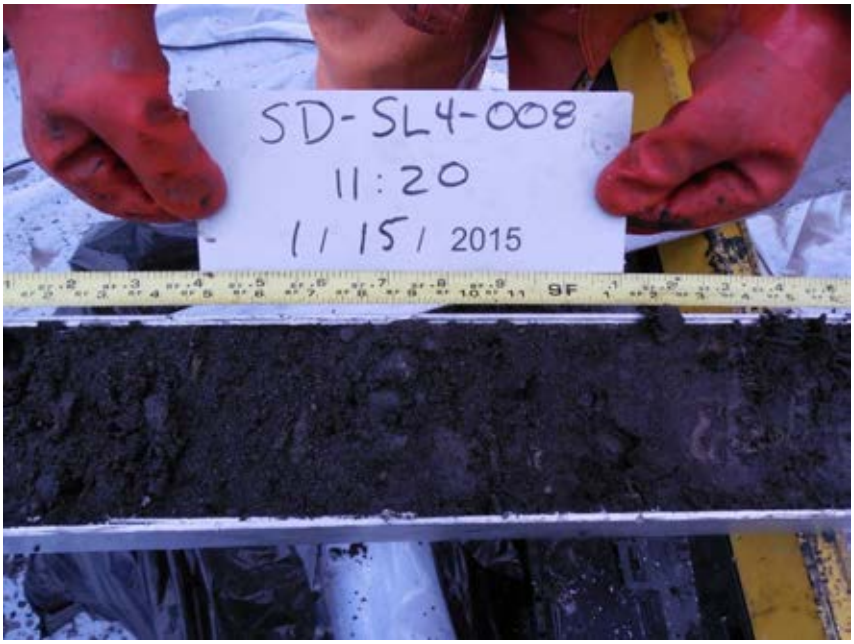
Station SD-SL4-008



Station SD-SL4-008



Station SD-SL4-008



Station SD-SL4-008

Station SD-SL4-008

Station SD-SL4-008

Core Summary Log

Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

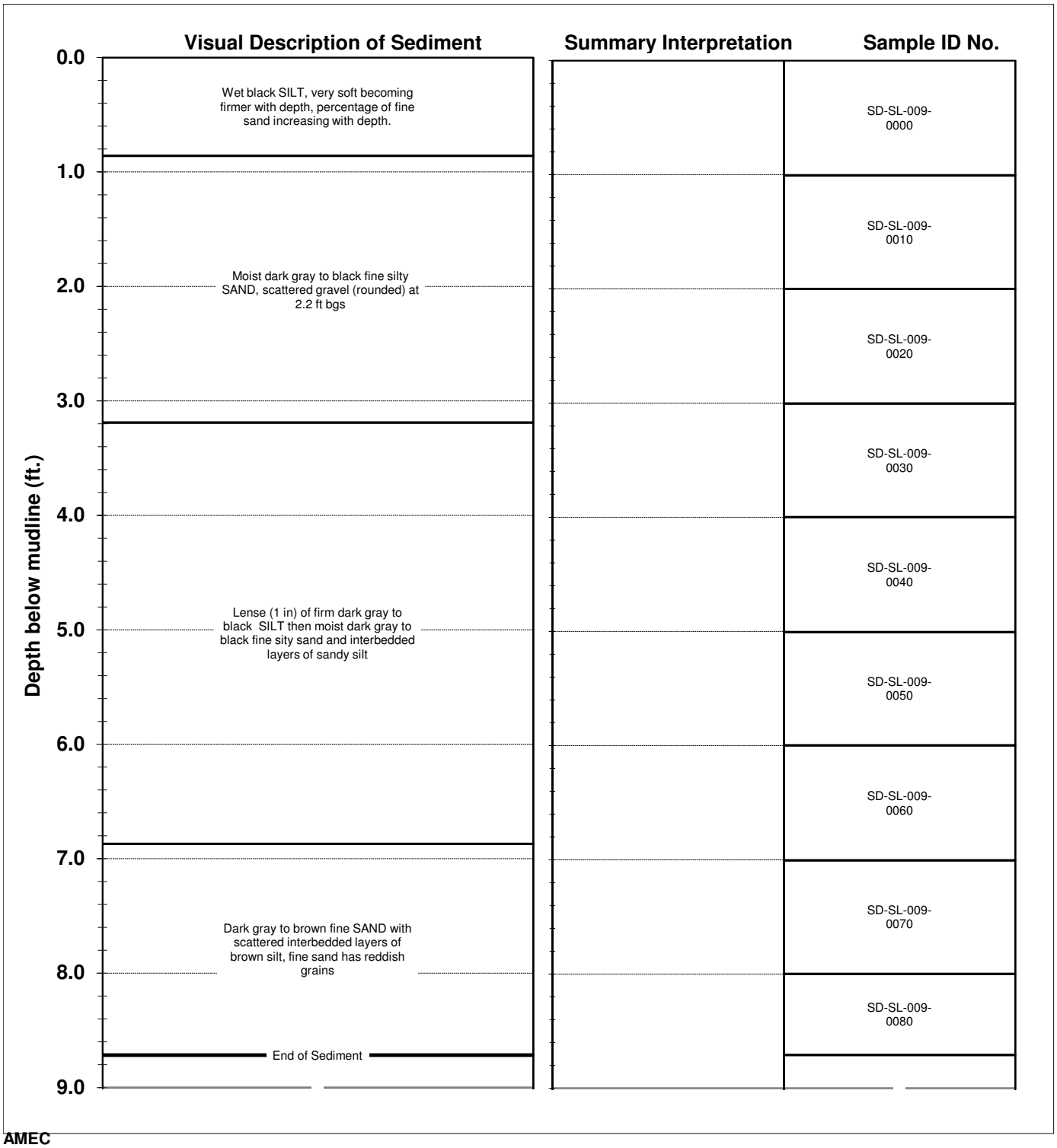
Station: **SD-SL4-009**

Maximum depth of retained sediment: 9.2 ft
Percent recovery (on-deck): 82%

Mudline elevation: -10.0 **ft MLLW**

	Core collection	Laboratory processing
Date:	1/14/2015	N/A
Time:	11:46	N/A

Field Log: R. Gilmour
Summary Log: R. Gilmour



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Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Station SD-SL4-009

Core Summary Log

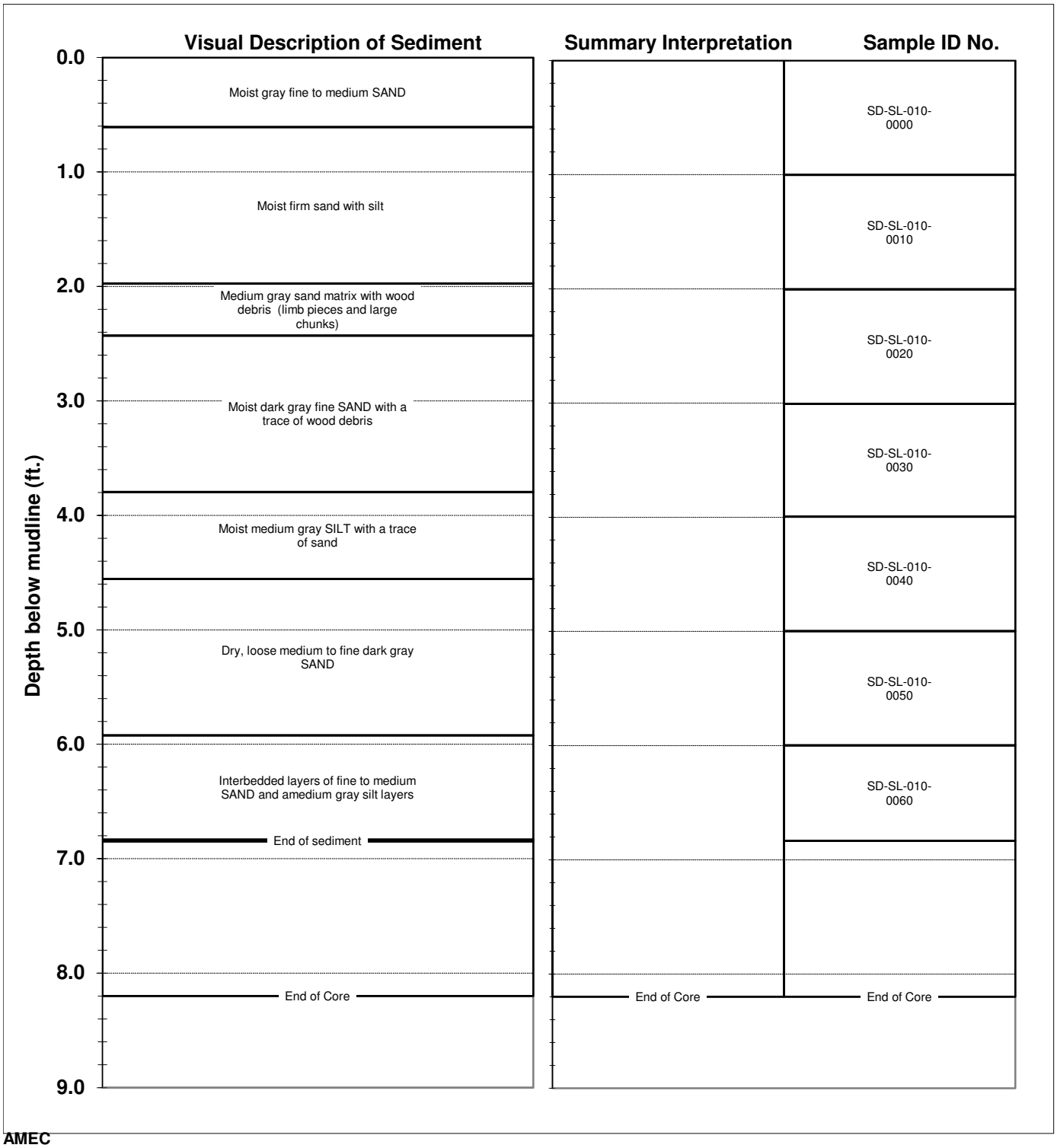
Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

Station: **SD-SL4-010**

Maximum depth of retained sediment: 8.2 ft
Mudline elevation: -4.3 **ft MLLW**
Percent recovery (on-deck): 66%

	Core collection	Laboratory processing
Date:	1/14/2015	1/14/2015
Time:	12:30	16:15

Field Log: R. Gilmour
Summary Log: R. Gilmour



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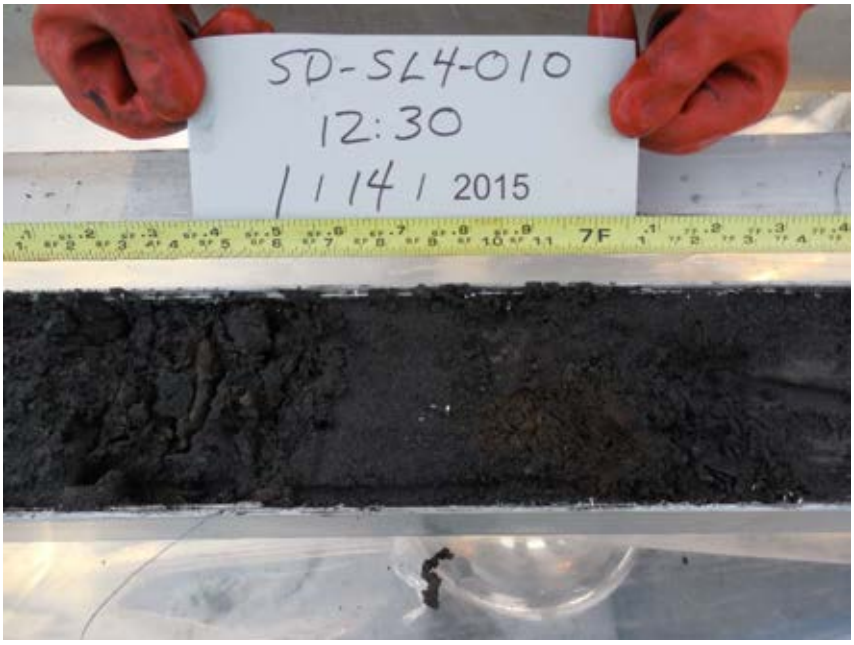
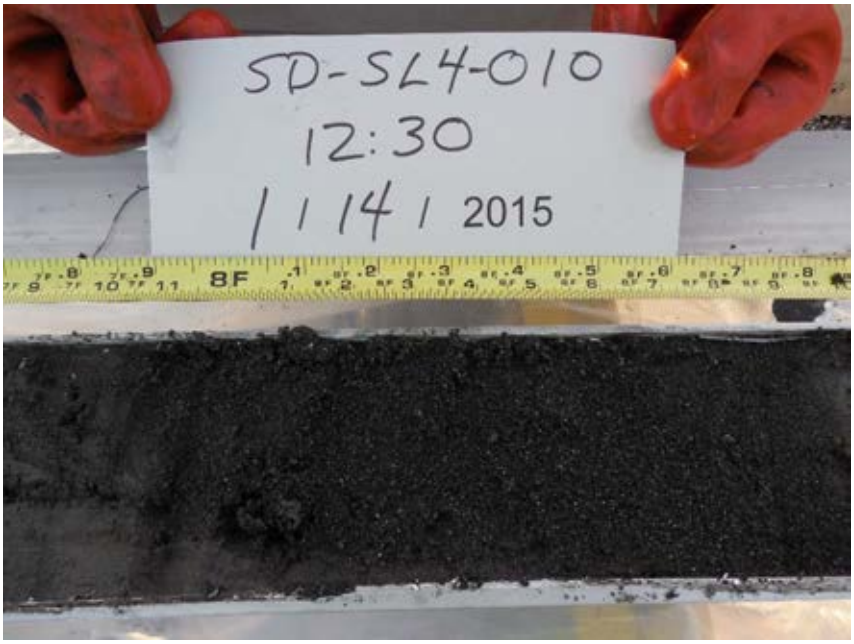
Station SD-SL4-010

Station SD-SL4-010



Station SD-SL4-010

Station SD-SL4-010



Station SD-SL4-010

Station SD-SL4-010

Station SD-SL4-010

Core Summary Log

Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

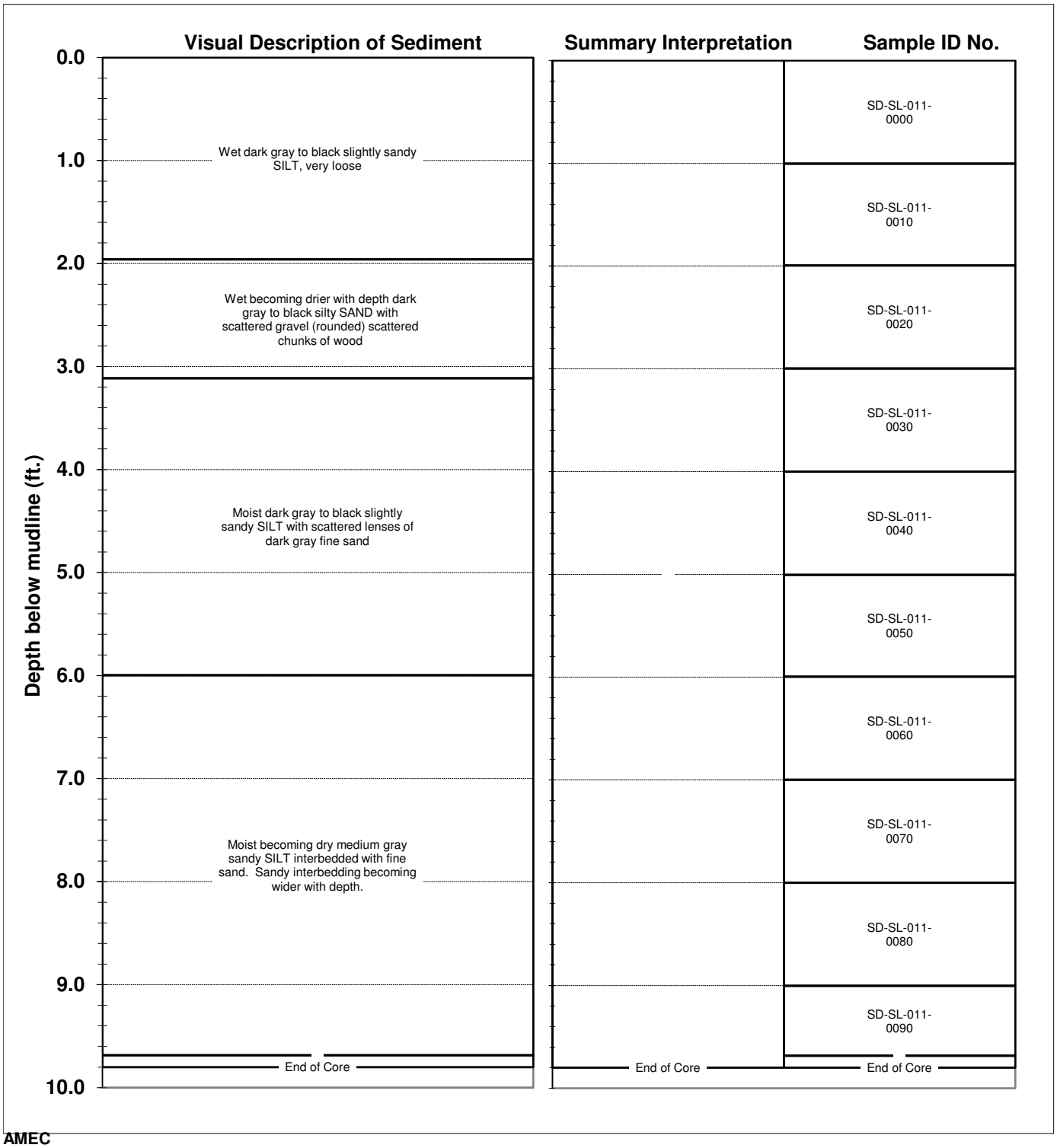
Station: **SD-SL4-011**

Maximum depth of retained sediment: 9.8 ft
Percent recovery (on-deck): 87%

Mudline elevation: -10.9 **ft MLLW**

	Core collection	Laboratory processing
Date:	1/14/2015	1/14/2015
Time:	11:11	15:35

Field Log: R. Gilmour
Summary Log: R. Gilmour



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Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Station SD-SL4-011

Core Summary Log

Project: BP2 Slip 4 Coring
Project No: 0131320090.STMS

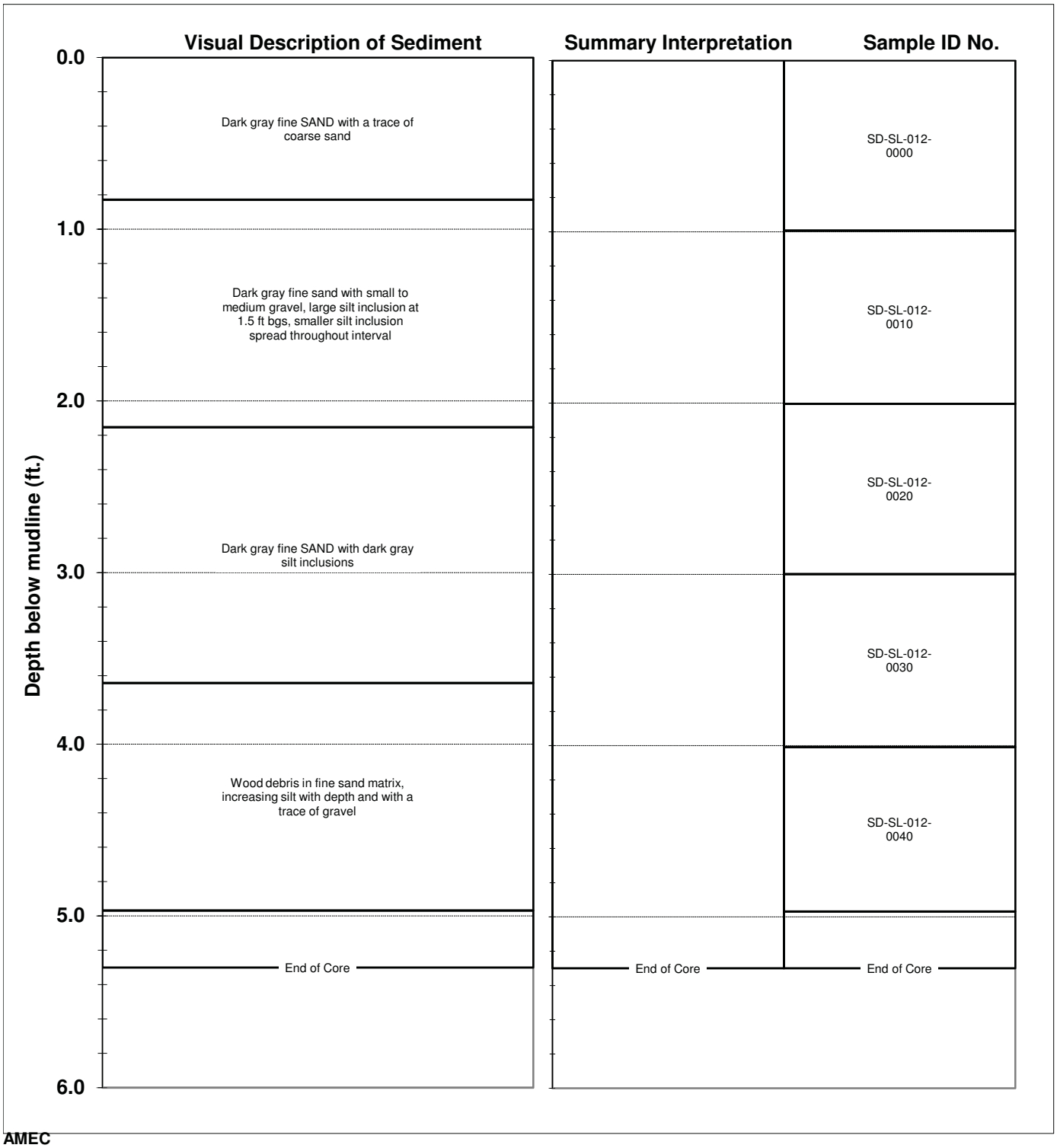
Station: **SD-SL4-012**

Maximum depth of retained sediment: 5.3 ft
Percent recovery (on-deck): 60%

Mudline elevation: -7.2 **ft MLLW**

	Core collection	Laboratory processing
Date:	1/15/2015	1/15/2015
Time:	12:49	16:15

Field Log: R. Gilmour
Summary Log: R. Gilmour



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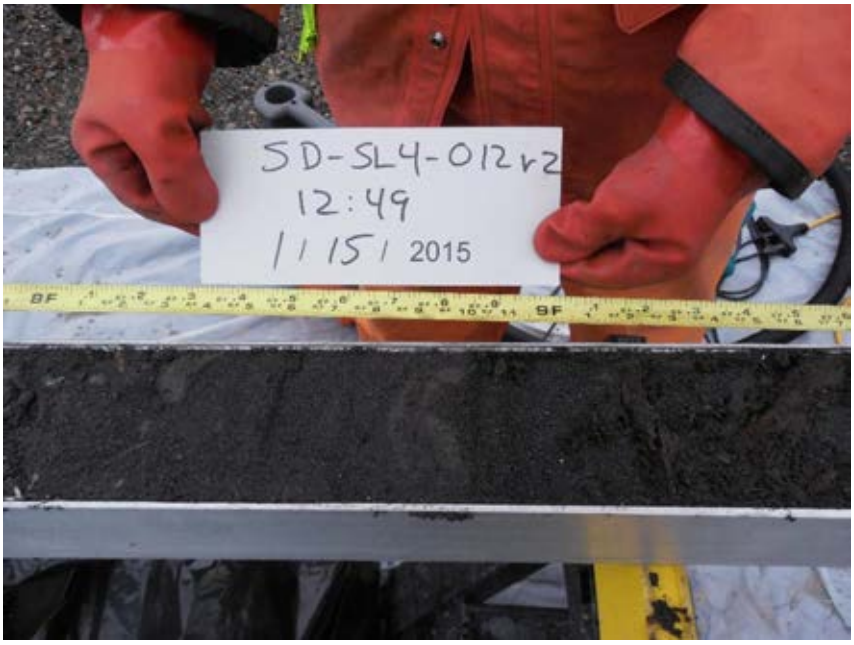
Station SD-SL4-012

Station SD-SL4-012



Station SD-SL4-012

Station SD-SL4-012

ATTACHMENT B

Chain-of-Custody Forms

AMEC
3500 188th St. SW, Suite 601
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CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		SMS Metals (As, Cd, Cr, Cu, Pb, Hg, Ag, Zn) TOC, and PCBs (by Aroclor)	Archive		
AMEC: BP2 PCC Sampling SD-PCC003-A COC Form Date: 12/8/14 Time: 1155	Date: Time:	X			Number of containers
AMEC: BP2 PCC Sampling SD-PCC003-B COC Form Date: 12/8/14 Time: 1155	Date: Time:	X			Number of containers
AMEC: BP2 PCC Sampling SD-PCC003-C COC Form Date: 12/8/14 Time: 1155	Date: Time:	X			Number of containers
AMEC: BP2 PCC Sampling SD-PCC003-D COC Form Date: 12/8/14 Time: 1155	Date: Time:		X		Number of containers
AMEC: BP2 PCC Sampling SD-PCC004-A COC Form Date: 12/8/14 Time: 1049	Date: Time:	X			Number of containers
AMEC: BP2 PCC Sampling SD-PCC004-B COC Form Date: 12/8/14 Time: 1049	Date: Time:	X			Number of containers
AMEC: BP2 PCC Sampling SD-PCC004-C COC Form Date: 12/8/14 Time: 1049	Date: Time:	X			Number of containers

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: Kalmon	Name:
Date: 12/8/14	Date: 12/8/14
Time: 1055	Time: 1155

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Recorded by: _____

Checked by: _____

Place Sample ID Label Here or Write ID Number Here		Analysis Containers: SMS Metals (As, Cd, Cr, Cu, Pb, Hg, Ag, Zn), TOC, and PCBs (by Aroclor)	Archive		Number of containers
AMEC: BP2 PCC Sampling SD-PCC004-D COC Form Date: 12/8/14 Time: 1049	Date: Time:		X		
AMEC: BP2 PCC Sampling SD-PCC005-A COC Form Date: 12/8/14 Time: 1125	Date: Time:	X			
AMEC: BP2 PCC Sampling SD-PCC005-B COC Form Date: 12/8/14 Time: 1125	Date: Time:	X			
AMEC: BP2 PCC Sampling SD-PCC005-C COC Form Date: 12/8/14 Time: 1125	Date: Time:	X			
AMEC: BP2 PCC Sampling SD-PCC005-D COC Form Date: 12/8/14 Time: 1125	Date: Time:		X		
Place Sample ID Label Here or Write ID Number Here	Date: Time:				
Place Sample ID Label Here or Write ID Number Here	Date: Time:				

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis

Relinquished By	Received By
Name: R Gilmore	Name: [illegible]
Date: 12/8/14	Date: 12.8.14
Time: 1655	Time: 1655

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3500 188th St. SW, Suite 601
Lynnwood,WA 98037
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CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		SMS Metals (As, Cd, Cr, Cu, Pb, Hg, Ag, Zn) TOC, and PCBs (by Aroclor)	Archive		
AMEC: BP2 PCC Sampling SD-PCC001-A COC Form Date: 12/9/14 Time: 1219	Date: Time:	✓			Number of containers 1
AMEC: BP2 PCC Sampling SD-PCC001-B COC Form Date: 12/9/14 Time: 1219	Date: Time:	✓			Number of containers 1
AMEC: BP2 PCC Sampling SD-PCC001-C COC Form Date: 12/9/14 Time: 1219	Date: Time:	✓			Number of containers 1
AMEC: BP2 PCC Sampling SD-PCC001-D COC Form Date: 12/9/14 Time: 1219	Date: Time:		✓		Number of containers 1
AMEC: BP2 PCC Sampling SD-PCC002-A COC Form Date: 12/9/14 Time: 1158	Date: Time:	✓			Number of containers 1
AMEC: BP2 PCC Sampling SD-PCC002-B COC Form Date: 12/9/14 Time: 1158	Date: Time:	✓			Number of containers 1
AMEC: BP2 PCC Sampling SD-PCC002-C COC Form Date: 12/9/14 Time: 1158	Date: Time:	X			Number of containers 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: R Cathmus	Name:
Date: 12/9/14	Date: 12/9/14
Time: 1630	Time: 1630

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Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Recorded by: _____

Checked by: _____

AMEC: BP2 PCC Sampling

SD-PCC002-D

COC Form

Date: 12 / 9 / 14 Time: 1158

Sample ID	Date / Time	SMS Metals (As, Cd, Cr, Cu, Pb, Hg, Ag, Zn) TOC, and PCBs (by Aroclor)	Archive		Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: / Time:		X		1
Place Sample ID Label Here or Write ID Number Here	Date: / Time:				
Place Sample ID Label Here or Write ID Number Here	Date: / Time:				
Place Sample ID Label Here or Write ID Number Here	Date: / Time:				
Place Sample ID Label Here or Write ID Number Here	Date: / Time:				
Place Sample ID Label Here or Write ID Number Here	Date: / Time:				
Place Sample ID Label Here or Write ID Number Here	Date: / Time:				

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: R Whitmus	Name:
Date: 12/9/14	Date: 12/9/14
Time: 1630	Time: 1630

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Lynnwood, WA 98037
(425) 921-4000

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

	Date / Time	Analysis Containers: PCBs (by Aroclor) and TOC	Archive		Number of containers
AMEC: Slip 4 Sampling SD-SL4-001-0000 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1
AMEC: Slip 4 Sampling SD-SL4-001-0010 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1
AMEC: Slip 4 Sampling SD-SL4-001-0020 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1
AMEC: Slip 4 Sampling SD-SL4-001-0030 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1
AMEC: Slip 4 Sampling SD-SL4-001-0040 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1
AMEC: Slip 4 Sampling SD-SL4-001-0050 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1
AMEC: Slip 4 Sampling SD-SL4-001-0060 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: RGatmin	Name:
Date: 12/22/14	Date: 12/22/14
Time: 1645	Time: 1645

3600 188th St. SW, Suite 001
Lynnwood, WA 98037
(425) 921-4000

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		PCBs (by Aroclor) and TOC	Archive		
AMEC: Slip 4 Sampling SD-SL4-001-0070 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-001-0080 COC Form Date: 12/22/14 Time: 950	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0000 COC Form Date: 12/22/14 Time: 1019	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0010 COC Form Date: 12/22/14 Time: 1019	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0020 COC Form Date: 12/22/14 Time: 1019	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0030 COC Form Date: 12/22/14 Time: 1019	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0040 COC Form Date: 12/22/14 Time: 1019	Date: Time:	X			Number of containers 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: RGatmann	Name:
Date: 12/22/14	Date: 12/22/14
Time: 1645	Time: 1645

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3500 188th St. SW, Suite 601
Lynnwood,WA 98037
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CHAIN OF CUSTODY

Place Sample ID Label Here
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Recorded by: _____

Checked by: _____

		Analysis Containers			
		PCBs (by Aroclor) and TOC	Archive		
AMEC: Slip 4 Sampling SD-SL4-002-0050 COC Form Date: 12/22/14 Time: 1019	Date: Time:	✓			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0060 COC Form Date: 12/22/14 Time: 1019	Date: Time:	✓			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0070 COC Form Date: 12/22/14 Time: 1019	Date: Time:	✓			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-002-0080 COC Form Date: 12/22/14 Time: 1019	Date: Time:	✓			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-003-0000 COC Form Date: 12/22/14 Time: 1124	Date: Time:	✓			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-003-0010 COC Form Date: 12/22/14 Time: 1124	Date: Time:	✓			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-003-0020 COC Form Date: 12/22/14 Time: 1124	Date: Time:	✓			Number of containers 1

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 12/22/14	Date: 12/22/14
Time: 1645	Time: 1645

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
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CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		PCBs (by Aroclor) and TOC	Archive		
AMEC: Slip 4 Sampling SD-SL4-003-0030 COC Form Date: 12/22/14 Time: 1124	Date: Time:				Number of containers
AMEC: Slip 4 Sampling SD-SL4-003-0040 COC Form Date: 12/22/14 Time: 1124	Date: Time:				Number of containers
AMEC: Slip 4 Sampling SD-SL4-003-0050 COC Form Date: 12/22/14 Time: 1124	Date: Time:				Number of containers
AMEC: Slip 4 Sampling SD-SL4-003-0060 COC Form Date: 12/22/14 Time: 1124	Date: Time:				Number of containers
AMEC: Slip 4 Sampling SD-SL4-003-0070 COC Form Date: 12/22/14 Time: 1124	Date: Time:				Number of containers
AMEC: Slip 4 Sampling SD-SL4-003-0080 COC Form Date: 12/22/14 Time: 1124	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 12/22/14	Date: 12/22/14
Time: 1645	Time: 1645

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		PCBs (by Aroclor) and TOC	Archive		
AMEC: Slip 4 Sampling SD-SL4-004-0000 COC Form Date: 12/22/14 Time: 1049	Date: Time:		X		Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-004-0010 COC Form Date: 12/22/14 Time: 1049	Date: Time:		X		Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-004-0020 COC Form Date: 12/22/14 Time: 1049	Date: Time:		X		Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-004-0030 COC Form Date: 12/22/14 Time: 1049	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-004-0040 COC Form Date: 12/22/14 Time: 1049	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-004-0050 COC Form Date: 12/22/14 Time: 1049	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-004-0060 COC Form Date: 12/22/14 Time: 1049	Date: Time:	X			Number of containers 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 12/22/14	Date: 12/22/14
Time: 1645	Time: 11:45

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		[redacted] TOC, and PCBs (by Aroclor)	Archive		
AMEC: Slip 4 Sampling SD-SL4-005-0000 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-005-0010 COC Form Date: 1/____/15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-005-0020 COC Form Date: 1/ /15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-005-0030 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-005-0040 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-005-0050 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-005-0060 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 1/15/15	Date: 1/15/15
Time: 1778	Time: 1778

AMEC
3500 188th St. SW, Suite 601
Lynnwood, WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Recorded by: _____

Checked by: _____

Place Sample ID Label Here or Write ID Number Here		Analysis Containers: PCBs (by Aroclor) and TOC	Archive		
AMEC: Slip 4 Sampling SD-SL4-004-0070 COC Form Date: 12/12/14 Time: 1649	Date: Time:	X			Number of containers: 1
AMEC: Slip 4 Sampling SD-SL4-004-0080 COC Form Date: 12/[illegible]/14 Time: 1649	Date: Time:	X			Number of containers: 1
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers
Place Sample ID Label Here or Write ID Number Here	Date: Time:				Number of containers

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 12/22/14	Date: 12/22/14
Time: 1645	Time: 1645

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		~~SMS Metals (As, Cd, Cr, Cu, Pb, Hg, Ag, Zn)~~ TOC, and PCBs (by Aroclor)	Archive		
AMEC: Slip 4 Sampling SD-SL4-006-0000 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-006-0010 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-006-0020 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-006-0030 COC Form Date: 1/ ____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-006-0040 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-006-0050 COC Form Date: 1/ /15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-006-0060 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff whitmus@amec com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal neirby@amec com ph 206-838-8469)

Sediment samples are unhomogenized Samples must be thoroughly homogenized before analysis

Relinquished By	Received By
Name: R Cathman	Name:
Date: 1/15/15	Date: 1/15/15
Time: 1738	Time: 1738

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Recorded by: _____

Checked by: _____

Place Sample ID Label Here or Write ID Number Here		Analysis Containers: [redacted]	[redacted] TOC, and PCBs (by Aroclor)	Archive		
AMEC: Slip 4 Sampling SD-SL4-007-0060 COC Form Date: 1/ /15 Time:_____	Date: Time:		X			Number of containers: 1
AMEC: Slip 4 Sampling SD-SL4-007-0070 COC Form Date: 1/____/15 Time:_____	Date: Time:		X			Number of containers: 1
AMEC: Slip 4 Sampling SD-SL4-007-0080 COC Form Date: 1/____/15 Time:_____	Date: Time:		X			Number of containers: 1
Place Sample ID Label Here or Write ID Number Here	Date: Time:					Number of containers:
Place Sample ID Label Here or Write ID Number Here	Date: Time:					Number of containers:
Place Sample ID Label Here or Write ID Number Here	Date: Time:					Number of containers:
Place Sample ID Label Here or Write ID Number Here	Date: Time:					Number of containers:

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 1/15/15	Date: 1/15/15
Time: 1738	Time: 1738

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		[redacted] TOC, and PCBs (by Aroclor)	Archive		
AMEC: Slip 4 Sampling SD-SL4-008-0000 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-008-0010 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-008-0020 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-008-0030 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-008-0040 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-008-0050 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-008-0060 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 11/5/15	Date: 11/5/15
Time: 17:38	Time: 17:3[illegible]

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Place Sample ID Label Here
or Write ID Number Here

Recorded by: _____

Checked by: _____

		Analysis Containers			
		[redacted] TOC, and PCBs (by Aroclor)	Archive		
AMEC: Slip 4 Sampling SD-SL4-008-O070 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-007-O000 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-007-O010 COC Form Date: 1/ /15 Time:	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-007-O020 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-007-O030 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-007-O040 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1
AMEC: Slip 4 Sampling SD-SL4-007-O050 COC Form Date: 1/____/15 Time:_____	Date: Time:	X			Number of containers 1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 1/15/15	Date: 1/15/15
Time: 1738	Time: 1738

AMEC
3500 188th St. SW, Suite 601
Lynnwood,WA 98037
(425) 921-4000

CHAIN OF CUSTODY

Recorded by: _____

Checked by: _____

Place Sample ID Label Here or Write ID Number Here		Analysis Containers: ~~8MS Metals (Hg, Cd, Cr, Cu, Pb, Hg, Ag, Zn)~~	~~Cr, Cu, Pb, Hg, Ag, Zn~~ TOC, and PCBs (by Aroclor)	Archive		Number of containers
AMEC: Slip 4 Sampling SD-SL4-006-0070 COC Form Date: 1/____/15 Time:_____	Date: Time:		X			1
Place Sample ID Label Here or Write ID Number Here	Date: Time:					
AMEC: Slip 4 Sampling SD-SL4-012-0000 COC Form Date: 1/____/15 Time:_____	Date: Time:		X			1
AMEC: Slip 4 Sampling SD-SL4-012-0010 COC Form Date: 1/____/15 Time:_____	Date: Time:		X			1
AMEC: Slip 4 Sampling SD-SL4-012-0020 COC Form Date: 1/____/15 Time:	Date: Time:		X			1
AMEC: Slip 4 Sampling SD-SL4-012-0030 COC Form Date: 1/____/15 Time:	Date: Time:		X			1
AMEC: Slip 4 Sampling SD-SL4-012-0040 COC Form Date: 1/____/15 Time:_____	Date: Time:		X			1

Laboratory Sample Receipt

ARI Project Manager—Kelly Bottem
AMEC Project Manager—Cliff Whitmus (cliff.whitmus@amec.com ph 425-921-4023)
AMEC Laboratory Coordinator—Crystal Neirby (crystal.neirby@amec.com ph. 206-838-8469)

Sediment samples are unhomogenized. Samples must be thoroughly homogenized before analysis.

Relinquished By	Received By
Name: [illegible]	Name: [illegible]
Date: 1/15/15	Date: 1/15/15
Time: 1730	Time: [illegible]

ATTACHMENT C

Data Validation Report

Sayler Data Solutions, Inc.
14257 93rd Court NE Kirkland, Washington 98034 (425) 820-7504 cari@saylerdata.com

DATA VALIDATION REPORT

Boeing Plant 2 Slip 4 Sediment Samples - December 2014 through January 2015

Prepared for:
AMEC Foster Wheeler
3500 188th Street SW, Ste 601
Lynnwood, WA 98037-4763

June 11, 2015

1.0 Introduction

Data Validation was performed on the following sediment samples:

Sample ID	Sample Date/Time	Lab Sample ID	Analyses
SD-PCC001-A	12/09/14 12:19	ZN96A	PCBs, Metals, TOC and TS
SD-PCC001-B	12/09/14 12:19	ZN96B	PCBs, Metals, TOC and TS
SD-PCC001-C	12/09/14 12:19	ZN96C	PCBs, Metals, TOC and TS
SD-PCC002-A	12/09/14 11:58	ZN96D	PCBs, Metals, TOC and TS
SD-PCC002-B	12/09/14 11:58	ZN96E	PCBs, Metals, TOC and TS
SD-PCC002-C	12/09/14 11:58	ZN96F	PCBs, Metals, TOC and TS
SD-PCC003-A	12/08/14 11:55	ZN89A	PCBs, Metals, TOC and TS
SD-PCC003-B	12/08/14 11:55	ZN89B	PCBs, Metals, TOC and TS
SD-PCC003-C	12/08/14 11:55	ZN89C	PCBs, Metals, TOC and TS
SD-PCC003-D	12/08/14 11:55	ZP21A	PCBs, TOC and TS
SD-PCC004-A	12/08/14 10:49	ZN89D	PCBs, Metals, TOC and TS
SD-PCC004-B	12/08/14 10:49	ZN89E	PCBs, Metals, TOC and TS
SD-PCC004-C	12/08/14 10:49	ZN89F	PCBs, Metals, TOC and TS
SD-PCC005-A	12/08/14 11:25	ZN89G	PCBs, Metals, TOC and TS
SD-PCC005-B	12/08/14 11:25	ZN89H	PCBs, Metals, TOC and TS
SD-PCC005-C	12/08/14 11:25	ZN89I	PCBs, Metals, TOC and TS
SD-SL4-001-0000	12/22/14 09:50	ZQ52A	PCBs, TOC and TS
SD-SL4-001-0010	12/22/14 09:50	ZQ52B	PCBs, TOC and TS
SD-SL4-001-0020	12/22/14 09:50	ZQ52C	PCBs, TOC and TS
SD-SL4-001-0030	12/22/14 09:50	ZQ52D	PCBs, TOC and TS
SD-SL4-001-0040	12/22/14 09:50	ZQ52E	PCBs, TOC and TS
SD-SL4-001-0050	12/22/14 09:50	ZQ52F	PCBs, TOC and TS
SD-SL4-001-0060	12/22/14 09:50	ZQ52G	PCBs, TOC and TS
SD-SL4-001-0070	12/22/14 09:50	ZQ52H	PCBs, TOC and TS
SD-SL4-001-0080	12/22/14 09:50	ZQ52I	PCBs, TOC and TS
SD-SL4-002-0000	12/22/14 10:19	ZQ52J	PCBs, TOC and TS
SD-SL4-002-0010	12/22/14 10:19	ZQ52K	PCBs, TOC and TS
SD-SL4-002-0020	12/22/14 10:19	ZQ52L	PCBs, TOC and TS
SD-SL4-002-0030	12/22/14 10:19	ZQ52M	PCBs, TOC and TS

Sample ID	Sample Date/Time	Lab Sample ID	Analyses
SD-SL4-002-0040	12/22/14 10:19	ZQ52N	PCBs, TOC and TS
SD-SL4-002-0050	12/22/14 10:19	ZQ53A	PCBs, TOC and TS
SD-SL4-002-0060	12/22/14 10:19	ZQ53B	PCBs, TOC and TS
SD-SL4-002-0070	12/22/14 10:19	ZQ53C	PCBs, TOC and TS
SD-SL4-002-0080	12/22/14 10:19	ZQ53D	PCBs, TOC and TS
SD-SL4-003-0000	12/22/14 11:24	ZQ53E	PCBs, TOC and TS
SD-SL4-003-0010	12/22/14 11:24	ZQ53F	PCBs, TOC and TS
SD-SL4-003-0020	12/22/14 11:24	ZQ53G	PCBs, TOC and TS
SD-SL4-003-0030	12/22/14 11:24	ZQ53H	PCBs, TOC and TS
SD-SL4-003-0040	12/22/14 11:24	ZQ53I	PCBs, TOC and TS
SD-SL4-003-0050	12/22/14 11:24	ZQ53J	PCBs, TOC and TS
SD-SL4-003-0060	12/22/14 11:24	ZQ53K	PCBs, TOC and TS
SD-SL4-003-0070	12/22/14 11:24	ZQ53L	PCBs, TOC and TS
SD-SL4-003-0080	12/22/14 11:24	ZQ53M	PCBs, TOC and TS
SD-SL4-004-0030	12/22/14 10:49	ZQ53N	PCBs, TOC and TS
SD-SL4-004-0040	12/22/14 10:49	ZQ53O	PCBs, TOC and TS
SD-SL4-004-0050	12/22/14 10:49	ZQ53P	PCBs, TOC and TS
SD-SL4-004-0060	12/22/14 10:49	ZQ53Q	PCBs, TOC and TS
SD-SL4-004-0070	12/22/14 10:49	ZQ53R	PCBs, TOC and TS
SD-SL4-004-0080	12/22/14 10:49	ZQ53S	PCBs, TOC and TS
SD-SL4-005-0000	01/15/15 10:28	ZT01A	PCBs, TOC and TS
SD-SL4-005-0010	01/15/15 10:28	ZT01B	PCBs, TOC and TS
SD-SL4-005-0020	01/15/15 10:28	ZT01C	PCBs, TOC and TS
SD-SL4-005-0030	01/15/15 10:28	ZT01D	PCBs, TOC and TS
SD-SL4-005-0040	01/15/15 10:28	ZT01E	PCBs, TOC and TS
SD-SL4-005-0050	01/15/15 10:28	ZT01F	PCBs, TOC and TS
SD-SL4-005-0060	01/15/15 10:28	ZT01G	PCBs, TOC and TS
SD-SL4-006-0000	01/15/15 09:52	ZT01H	PCBs, TOC and TS
SD-SL4-006-0010	01/15/15 09:52	ZT01I	PCBs, TOC and TS
SD-SL4-006-0020	01/15/15 09:52	ZT01J	PCBs, TOC and TS
SD-SL4-006-0030	01/15/15 09:52	ZT01K	PCBs, TOC and TS
SD-SL4-006-0040	01/15/15 09:52	ZT01L	PCBs, TOC and TS
SD-SL4-006-0050	01/15/15 09:52	ZT01M	PCBs, TOC and TS
SD-SL4-006-0060	01/15/15 09:52	ZT01N	PCBs, TOC and TS
SD-SL4-007-0000	01/15/15 09:27	ZT02E	PCBs, TOC and TS
SD-SL4-007-0010	01/15/15 09:27	ZT02F	PCBs, TOC and TS
SD-SL4-007-0020	01/15/15 09:27	ZT02G	PCBs, TOC and TS
SD-SL4-007-0030	01/15/15 09:27	ZT02H	PCBs, TOC and TS
SD-SL4-007-0040	01/15/15 09:27	ZT02I	PCBs, TOC and TS
SD-SL4-007-0050	01/15/15 09:27	ZT02J	PCBs, TOC and TS
SD-SL4-007-0060	01/15/15 09:27	ZT02A	PCBs, TOC and TS
SD-SL4-007-0070	01/15/15 09:27	ZT02B	PCBs, TOC and TS
SD-SL4-007-0080	01/15/15 09:27	ZT02C	PCBs, TOC and TS
SD-SL4-008-0000	01/15/15 11:20	ZT02K	PCBs, TOC and TS
SD-SL4-008-0010	01/15/15 11:20	ZT02L	PCBs, TOC and TS
SD-SL4-008-0020	01/15/15 11:20	ZT02M	PCBs, TOC and TS
SD-SL4-008-0030	01/15/15 11:20	ZT02N	PCBs, TOC and TS
SD-SL4-008-0040	01/15/15 11:20	ZT02O	PCBs, TOC and TS
SD-SL4-008-0050	01/15/15 11:20	ZT02P	PCBs, TOC and TS
SD-SL4-008-0060	01/15/15 11:20	ZT02Q	PCBs, TOC and TS
SD-SL4-008-0070	01/15/15 11:20	ZT02D	PCBs, TOC and TS
SD-SL4-009-0000	01/14/15 11:46	ZS77A	PCBs, TOC and TS

Sample ID	Sample Date/Time	Lab Sample ID	Analyses
SD-SL4-009-0010	01/14/15 11:46	ZS77B	PCBs, TOC and TS
SD-SL4-009-0020	01/14/15 11:46	ZS77C	PCBs, TOC and TS
SD-SL4-009-0030	01/14/15 11:46	ZS77D	PCBs, TOC and TS
SD-SL4-009-0040	01/14/15 11:46	ZS77E	PCBs, TOC and TS
SD-SL4-009-0050	01/14/15 11:46	ZS77F	PCBs, TOC and TS
SD-SL4-009-0060	01/14/15 11:46	ZS77G	PCBs, TOC and TS
SD-SL4-009-0070	01/14/15 11:46	ZS77H	PCBs, TOC and TS
SD-SL4-009-0080	01/14/15 11:46	ZS77I	PCBs, TOC and TS
SD-SL4-010-0000	01/14/15 12:30	ZS77N	PCBs, TOC and TS
SD-SL4-010-0010	01/14/15 12:30	ZS77J	PCBs, TOC and TS
SD-SL4-010-0020	01/14/15 12:30	ZS77K	PCBs, TOC and TS
SD-SL4-010-0030	01/14/15 12:30	ZS77L	PCBs, TOC and TS
SD-SL4-010-0040	01/14/15 12:30	ZS77M	PCBs, TOC and TS
SD-SL4-010-0050	01/14/15 12:30	ZS78A	PCBs, TOC and TS
SD-SL4-010-0060	01/14/15 12:30	ZS78B	PCBs, TOC and TS
SD-SL4-011-0000	01/14/15 11:11	ZS78C	PCBs, TOC and TS
SD-SL4-011-0010	01/14/15 11:11	ZS78D	PCBs, TOC and TS
SD-SL4-011-0020	01/14/15 11:11	ZS78E	PCBs, TOC and TS
SD-SL4-011-0030	01/14/15 11:11	ZS78F	PCBs, TOC and TS
SD-SL4-011-0040	01/14/15 11:11	ZS78G	PCBs, TOC and TS
SD-SL4-011-0050	01/14/15 11:11	ZS78H	PCBs, TOC and TS
SD-SL4-011-0060	01/14/15 11:11	ZS78I	PCBs, TOC and TS
SD-SL4-011-0070	01/14/15 11:11	ZS78J	PCBs, TOC and TS
SD-SL4-011-0080	01/14/15 11:11	ZS78K	PCBs, TOC and TS
SD-SL4-011-0090	01/14/15 11:11	ZS78L	PCBs, TOC and TS
SD-SL4-012-0000	01/15/15 12:49	ZT01P	PCBs, TOC and TS
SD-SL4-012-0010	01/15/15 12:49	ZT01Q	PCBs, TOC and TS
SD-SL4-012-0020	01/15/15 12:49	ZT01R	PCBs, TOC and TS
SD-SL4-012-0030	01/15/15 12:49	ZT01S	PCBs, TOC and TS
SD-SL4-012-0040	01/15/15 12:49	ZT01T	PCBs, TOC and TS

Analyses were performed by Analytical Resources, Inc. in Tukwila, Washington.

Validation: A summary validation was performed for these analyses. Validation was performed by Cari Sayler. Data qualifiers are summarized in section 5.0 of this report.

Analytical methods: Table 1 and table 2 of the QAPP specify the following analytical methods:

Analysis	Method
Polychorinated Biphenyls	EPA 8082 with 3665B/3660B cleanups
Metals(except mercury)	EPA 6010
Mercury	EPA 7471A
Total Organic Carbon	EPA 9060
Total Solids	160.1

These following methods were used: The most recent version of the methods for PCB (8082A) was used. ICP metals were analyzed by method 200.8 or 6010C. Total Organic Carbon (TOC) analyses were performed by Plumb, 1981, and total solids analyses were performed by EPA method 2540G. These are considered acceptable substitutions. Additionally, PCB cleanups included silica gel in addition to the specified sulfur and acid cleanups.

Sample Receipt: Sample chain-of-custodies and sample log-in documentation were reviewed. All requested analyses were performed.

The cooler receipt temperatures measured at upon receipt at the laboratory ranged from 1.7 to 14.2 °C. No qualifiers are assigned due to the temperatures outside the target range of 2 to 6 because the PCB, Metals, TOC, and total solids analytes are not highly susceptible to degradation and the samples were refrigerated or frozen at the laboratory.

Sample number transcription: Sample IDs in the electronic data deliverable (EDD) were compared to the chain-of-custody for each sample. Sample SD-SL4-001-0000 contained an extra 'S' (SSD-SL4-001-0000). The correct identifier has been used throughout this report. All other sample IDs matched the chain of custody.

2.0 PCB Analyses

Quality control analysis frequencies: The QAPP specifies that the following quality control samples be analyzed one per analytical batch or one per twenty samples, whichever is more frequent: method blank, and laboratory control sample (LCS). A matrix spike (MS) and MS duplicate (MSD) must be analyzed one per twenty samples and a regional reference material (RRM) must be analyzed one per fifty samples. In addition, surrogate compounds must be measured in each field and quality control sample. No field duplicates were required for the Slip 4 samples.

A method blank and LCS/LCSD were analyzed with each batch. 5 MS/MSD pairs and 2 RRM samples were analyzed with these 111 field samples. However, all sediment samples were initially grouped together at the laboratory and 17 MS/MSD pairs and 6 RRM samples were analyzed with 289 samples and field duplicates meeting laboratory overall frequency requirements. No qualifiers are assigned based on the Slip 4 MS/MSD and RRM frequencies being slightly below the target levels.

Holding times: Refrigerated sediment samples must be extracted within 14 days of collection. Frozen sediment samples must be extracted within 1 year of collection. Extracts must be analyzed within 40 days of extraction. These holding times were met.

Instrument calibration: Data usability criteria for calibrations include minimum correlation coefficients (R^2) of 0.990 or maximum RSDs of $\pm$20% for each initial calibration, and maximum % differences of $\pm$25% for each continuing calibration. These criteria were met with the following exceptions:

Lab SDG	Standard ID	Aroclor peak	Difference (%)
ZN89	12/02/14 07:37 ZB5	Aroclor 1016-4	27.2
ZQ52	01/02/15 10:30 ZB5	Aroclor 1016-1	30.7
ZQ52	01/02/15 10:30 ZB5	Aroclor 1016-3	31.7
ZQ52	01/02/15 10:30 ZB5	Aroclor 1016-4	30.6
ZQ52	01/02/15 16:40 ZB5	Aroclor 1260-1	29.1
ZQ52	01/02/15 16:40 ZB5	Aroclor 1260-2	29.9
ZQ52	01/02/15 16:40 ZB5	Aroclor 1260-5	25.5
ZQ52	01/02/15 19:51 ZB5	Aroclor 1016-1	26.0
ZQ52	01/02/15 19:51 ZB5	Aroclor 1016-3	25.5
ZQ52	01/02/15 22:42 ZB5	Aroclor 1016-1	25.3
ZQ52	01/03/15 13:46 ZB5	Aroclor 1016-1	25.4

Lab SDG	Standard ID	Aroclor peak	Difference (%)
ZQ52	01/03/15 13:46 ZB5	Aroclor 1016-3	26.5
ZQ52	01/03/15 13:46 ZB5	Aroclor 1016-4	25.9
ZQ52	01/05/15 08:29 ZB5	Aroclor 1254-4	25.3
ZQ52	01/05/15 08:29 ZB5	Aroclor 1254-5	27.1
ZQ52	01/05/15 08:48 ZB5	Aroclor 1016-1	32.2
ZQ52	01/05/15 08:48 ZB5	Aroclor 1016-2	25.9
ZQ52	01/05/15 08:48 ZB5	Aroclor 1016-3	32.9
ZQ52	01/05/15 08:48 ZB5	Aroclor 1016-4	31.7
ZQ52	01/05/15 14:13 ZB5	Aroclor 1016-1	26.0

Aroclor 1016 was not detected in the associated samples, and no qualifiers are required. The average percent difference for Aroclor 1254 (22.2) is within limits and no qualifiers are assigned. The Aroclor 1260 results associated with the 01/02/15 16:40 ZB5 standard are qualified as estimated.

Laboratory blank results: Criteria for blanks are that analyte concentrations must be below the RL, or below 10% of the lowest associated sample concentration. These criteria were met.

Surrogate recoveries: QAPP control limits were 34-141%. Surrogate recoveries are not evaluated in samples with dilution factors of 10 or more. The remaining surrogate recoveries were within QAPP and laboratory control limits.

LCS recoveries: QAPP control limits were 37-116%. LCS recoveries were within QAPP and laboratory control limits.

RRM recoveries: RRM Aroclor 1260 results were 100 and 140 ug/kg. Both of the SRMs were within the advisory limits of 38-167%.

MS recoveries: QAPP control limits were 37-116%. Control limits do not apply when the native concentration exceeds four times the amount spiked. Remaining MS recoveries were within QAPP and laboratory control limits.

MS/MSD RPDs: QAPP control limits were 50%. RPDs were within QAPP and laboratory control limits.

Multiple reported results: Unless quality control results warrant the rejection of one result, multiple reported results are evaluated according to the following guidelines

(1) If both results are non-detects, the lower reporting limit was selected.
(2) If one result was not detected and the other detected, the detection was selected.
(3) If both results were detections, the following additional criteria were applied:
    (a) If one result was off-scale and one was on-scale, the on-scale result was selected.
    (b) If associated QC results indicated high bias, the lower concentration result was selected.
    (c) If associated QC results indicated no, low, or mixed biases, the higher concentration result was selected.

This approach is conservative, and is considered most protective of the environment. The results not selected as the best result to report are qualified R1, rejected due to the availability of better results. Samples with dilutions were reduced to a single result.

Laboratory flags: Various results are flagged Y to indicate elevated reporting limits. These results are qualified "UY" to clarify that the aroclor was not detected. Various results were flagged P to indicate the dual column RPD exceeded 40%. These results are qualified as estimated.

Reporting limits: RLs for various aroclors were elevated above 20 ug/Kg due to chromatographic overlap with other aroclors and necessary dilution. These samples also contained detected aroclors and the impact on the total PCB value was minimal. No qualifiers are assigned on the basis of elevated reporting limits.

Overall assessment: Documentation was found to be clear and complete. Calibration data demonstrate acceptable instrument performance. Laboratory control sample results demonstrate acceptable accuracy and precision. Multiple analysis results were reduced to the most appropriate to use. Results were estimated due to dual column variability.

Except for data replaced by another result, PCB data are acceptable for use as qualified.

3.0 Metals Analyses

Quality control analysis frequencies: The QAPP specifies that the following quality control samples be analyzed one per analytical batch or one per twenty samples, whichever is more frequent: method blank, and laboratory control sample (LCS). A matrix spike (MS) and laboratory duplicate must be analyzed one per twenty samples. No field duplicates were required for the Slip 4 samples.

These frequencies were met.

Holding times: Total or dissolved mercury samples must be analyzed within 28 days of collection. Other metals samples must be analyzed with 180 days. These criteria were met.

Instrument calibration: Functional guidelines criteria for calibration verifications is a maximum % difference of ±10% for ICP metals and ±15% for mercury. QAPP criterion for calibration verifications is ±10% for ICP metals and ±20% for mercury. Criteria for calibration blanks are that analyte concentrations must be between the negative RL and the positive RL. Functional guidelines criterion for detection limit standard recovery is 70-130%, and the QAPP specifies this standard must be within one RL of the true value. These criteria were met.

Laboratory blank results: The criterion for method blanks is that analyte concentrations must be below the PQL, or below 10% of the lowest associated sample concentration. This criterion was met.

LCS recoveries: QAPP control limits were 80-120%. LCS recoveries were within QAPP and laboratory control limits.

SRM recoveries: SRM concentrations were within the advisory range.

MS recoveries: QAPP control limits were 75-125% for ICP metals and 80-120% for mercury. Functional guidelines criteria for both ICP metals and mercury are 75-125%. MS recoveries are not evaluated when the native concentration exceeds four times the spike amount. The remaining MS recoveries were within QAPP and laboratory control limits with the following exception:

QC ID	Analyte	% Recovery	Lab Control Limit
SD-PCC003-A MS	Zinc	379	75 - 125

The zinc result is qualified as estimated in the native sample.

Laboratory duplicate RPDs: QAPP control limits were <20%. For duplicates with concentrations above five times the reporting limit, RPDs were within QAPP and laboratory control limits. For sample/duplicate pairs with concentrations below five times the reporting limit, absolute differences were within the reporting limit.

Reporting limits: Some RLs were elevated above QAPP levels due to dry weight calculation or sample dilution:

Analyte	Highest Reported RL (mg/kg)	QAPP specified RL (mg/kg)	SMS SQS (mg/kg)
Cadmium	0.3	0.2	5.1
Lead	3	2	450
Silver	0.4	0.3	6.1
Mercury	0.030	0.025	0.41

Each elevated RL was below the screening level and the impact on data use is minimal. No qualifiers are assigned on the basis of elevated reporting limits.

Overall assessment: Documentation was found to be clear and complete. Calibration data demonstrate acceptable instrument performance. Method blank, LCS, and SRM results demonstrate acceptable laboratory precision and accuracy. One zinc result was estimated based on the MS recovery.

Metals data are acceptable for use as qualified.

4.0 General Chemistry Analyses

Quality control analysis frequencies: For total organic carbon, a method blank, SRM, and LCS were analyzed in each batch. Five of the six batches also included a MS and a laboratory triplicate. For total solids, each batch included a method blank and laboratory triplicate. . No field duplicates were required for the Slip 4 samples.

Quality control samples were sufficient to evaluate precision and accuracy as appropriate for the method.

Holding times: Holding times are as follows:

Analysis	Holding time if refrigerated	Holding time if frozen
TOC	28 days	6 months
Total Solids	14 days	6 months

Samples were analyzed within the holding times.

Instrument calibration: Instrument calibration criteria are as follows:

Analysis	Criteria
TOC	Initial calibration $R^2 > 0.990$ Continuing calibration recovery within 90-110%
Total Solids	Calibration mass within ± 0.1 g

These criteria were met.

Laboratory blank results: Criteria for method blanks are that analyte concentrations must be below the PQL, or below 10% of the lowest associated sample concentration. This criterion was met for all method blanks.

LCS recoveries: Control limits were 75-125% for TOC. These criteria were met.

SRM results: Control limits were 80-120% for TOC. These criteria were met with the following exception:

QC ID	Analyte	% Recovery	Lab Control Limit
SRM011815_1155	Total Organic Carbon	76.9	80 - 120

The total organic carbon result is qualified as estimated in the associated samples.

MS recoveries: Control limits were 75-125% for TOC. These criteria were met with the following exceptions:

QC ID	Analyte	% Recovery	Lab Control Limit
SD-SL4-004-0080MS	Total Organic Carbon	67.8	75 - 125
SD-SL4-002-0040MS	Total Organic Carbon	131.7	75 - 125

The total organic carbon result is qualified as estimated in the native samples.

Laboratory duplicate and triplicate results: Control limits were 20% for TOC and total solids. These criteria were met with the following exception:

QC ID	Analyte	RSD	Lab Control Limit
SD-SL4-004-0080LT	Total Organic Carbon	26.8	20.0

The total organic carbon result is qualified as estimated in sample SD-SL4-004-0080.

Overall assessment: Documentation was found to be clear and complete. Calibration data indicate acceptable performance. Method blank and LCS results demonstrate acceptable laboratory accuracy. Data were estimated based on laboratory triplicate and MS/MSD variability, and MS and SRM recoveries.

General chemistry results are acceptable for use as qualified.

5.0 Qualifier Summary Table

Client ID	Analyte(s)	Qualifier	Reason
PCB Analyses			
SD-PCC001-B	Aroclor 1232	UY	Clarification of Y flag
SD-PCC003-A	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available

Client ID	Analyte(s)	Qualifier	Reason
SD-PCC003-A DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-PCC003-A DL	Aroclor 1248, Aroclor 1260	UY	Clarification of Y flag
SD-PCC003-B	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-PCC003-B DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-PCC003-B DL	Aroclor 1248	UY	Clarification of Y flag
SD-PCC003-C	Aroclor 1248, Aroclor 1254	R1	Another result available
SD-PCC003-C	Aroclor 1260	UY	Clarification of Y flag
SD-PCC003-C DL	All except Aroclor 1248, Aroclor 1254	R1	Another result available
SD-PCC003-C DL	Aroclor 1248	UY	Clarification of Y flag
SD-PCC003-D	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-PCC003-D DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-PCC003-D DL	Aroclor 1248	UY	Clarification of Y flag
SD-PCC004-A	Aroclor 1248	UY	Clarification of Y flag
SD-PCC004-B	Aroclor 1232	UY	Clarification of Y flag
SD-PCC005-A	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-001-0010	Aroclor 1260	J	High continuing calibration results
SD-SL4-001-0020	Aroclor 1260	J	High continuing calibration results
SD-SL4-001-0030	Aroclor 1260	J	High continuing calibration results
SD-SL4-001-0040	Aroclor 1260	J	High continuing calibration results
SD-SL4-001-0050	Aroclor 1260	J	High continuing calibration results
SD-SL4-001-0060	Aroclor 1260	J	High continuing calibration results
SD-SL4-001-0070	Aroclor 1260	J	High continuing calibration results
SD-SL4-002-0060	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-002-0060 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-002-0070	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-002-0080	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-003-0020	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-003-0020 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-004-0030	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-004-0030 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-005-0000	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-005-0010	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-005-0020	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-007-0000	Aroclor 1248	J	High dual column RPD
SD-SL4-008-0010	Aroclor 1248	J	High dual column RPD
SD-SL4-008-0030	Aroclor 1248	J	High dual column RPD
SD-SL4-008-0050	Aroclor 1248	J	High dual column RPD
SD-SL4-009-0010	Aroclor 1248, Aroclor 1254	R1	Another result available
SD-SL4-009-0010 DL	All except Aroclor 1248, Aroclor 1254	R1	Another result available
SD-SL4-009-0020	Aroclor 1248, Aroclor 1254	R1	Another result available
SD-SL4-009-0020 DL	All except Aroclor 1248, Aroclor 1254	R1	Another result available
SD-SL4-009-0030	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-009-0030 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-009-0040	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-009-0040 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-009-0050	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-009-0050 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-009-0060	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-009-0060 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available

Client ID	Analyte(s)	Qualifier	Reason
SD-SL4-009-0070	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-009-0070 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-010-0000	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-011-0040	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-011-0040 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-011-0050	Aroclor 1248, Aroclor 1254, Aroclor 1260	R1	Another result available
SD-SL4-011-0050 DL	Aroclor 1016, Aroclor 1221, Aroclor 1232, Aroclor 1242	R1	Another result available
SD-SL4-012-0000	Aroclor 1248	J	High dual column RPD
SD-SL4-012-0020	Aroclor 1248	UY	Clarification of Y flag
SD-SL4-001-0000	Aroclor 1260	J	High continuing calibration results
Metals Analyses			
SD-PCC003-A	Zinc	J	High MS recovery
General Chemistry Analyses			
SD-SL4-002-0040	Total Organic Carbon	J	High MS recovery
SD-SL4-004-0080	Total Organic Carbon	J	High lab triplicate RPD, Low MS recovery
SD-SL4-010-0050	Total Organic Carbon	J	Low RM recovery
SD-SL4-010-0060	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0000	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0010	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0020	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0030	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0040	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0050	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0060	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0070	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0080	Total Organic Carbon	J	Low RM recovery
SD-SL4-011-0090	Total Organic Carbon	J	Low RM recovery

6.0 Abbreviations and Definitions

DV Qualifier	Definition
U	The material was analyzed for, but was not detected above the level of the associated value.
UY	The reporting limit was elevated due to chromatographic overlap with related compounds. The material was analyzed for, but was not detected above the level of the associated value.
J	The analyte was positively identified. The associated numerical value is the approximate concentration of the analyte in the sample.
N	The analysis indicates the presence of an analyte for which there is presumptive evidence to make a tentative identification.
UJ	The material was analyzed for, but was not detected. The associated value is an estimate and may be inaccurate or imprecise.
R	The sample result is rejected. The presence or absence of the analyte cannot be verified and data are not usable.
R1	This sample result has been rejected in favor of a more accurate and/or precise result. The other result should be used.

Abbreviation	Definition
ARI	Analytical Resources, Inc.
DV	Data validation

Abbreviation	Definition
LCS	Laboratory control sample
LCSD	Laboratory control sample duplicate
MS	Matrix spike
MSD	Matrix spike duplicate
NA	Not Applicable
RL	Reporting limit
RPD	Relative percent difference
RRM	Regional reference material
RSD	Relative standard deviations
SRM	Standard reference material

7.0 References

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