APPENDIX A
SCHEDULE OF PALOS VERDES PILOT CAP MONITORING ACTIVITIES

Table A-1. Schedule of Palos Verdes Pilot Cap Monitoring Activities

On site days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Date:	21-Jul	22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul	30-Jul	31-Jul	1-Aug	2-Aug	3-Aug	4-Aug	5-Aug	6-Aug	7-Aug	8-Aug	9-Aug
VESSELS:																				
Sea World UCLA																				
Yellowfin	Red = Vessel Used																			
Sea Watch	Blue = Vessel Not Used				Sea Watch	Sea Watch	Sea Watch	Sea Watch					Sea Watch	Sea Watch		Sea Watch			Sea Watch	Sea Watch
Tuna						Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna
Bottom Scratcher													Bottom Scratcher						Bottom Scratcher	
Total Vessel Usage Days: 58					**1**	**1**	**1**	**2**	**0**	**0**	**1**	**1**	**3**	**2**	**0**	**1**	**0**	**1**	**3**	**2**
NATCO OPERATIONS	Capping cell:												LU						SU	
	Disposal technique:												Conventional (1 load)						Conventional (1 load)	
																			load 1	

CELL LU

Conventional placement of fine material	Task Number of Fredette (2000)	Number of Surveys Planned														**Cell LU Event 1 Initial Placement Fine Material**							
Video imagery of bottom surge	2	2		Travel	Mobilize lab	Mobilize lab		Assemble	Assemble	Sea test						2i							
Hopper dredge operations monitoring	3	N							Travel	Assemble	Install	Training	Test	Test	Test	Record							
Hopper dredge sediment sampling	4	12		Travel	Mobilize lab	Mobilize lab									Training	LU-1							
Flex samples and surveys	5	N		Travel	Mobilize lab	Mobilize lab																	
Sediment profile & plan view photography	6	5		Travel	Mobilize lab	Assemble	Test		Sea test	6A							6Biii						
Moored current and OBS arrays	6	2										Assemble	Assemble	Test	Deploy	6Bi	Recover						
Plume surveying with ADCP	6	2							Travel	Assemble	Seatest				Mobilize	6Bii							
Plume surveying with CTD & water sampling	6	2		Travel	Mobilize lab	Mobilize lab	Test	Sea test							Mobilize	6Bii							
Sediment coring	6	4		Travel	Mobilize lab	Mobilize lab												Mobilize	6Biv				
Side-scan sonar surveying	6	2		Travel	Mobilize lab	Mobilize lab			Assemble														Mobilize
Subbottom profile surveying	6	1		Travel	Mobilize lab	Mobilize lab																	
Near-surface plume transport survey	11	3		Travel	Mobilize lab	Mobilize lab																	
ADCP mooring (30 days)	14	1									Travel	Assemble	Test	Test			Deploy	Record	Record	Record	Record	Record	Record

CELL SU

Conventional placement of fine material	Task Number of Fredette (2000)	Number of Surveys Planned																				**Cell SU Event 4 Initial Placement Fine Material**	
Video imagery of bottom surge	2	1																				2ii	
Hopper dredge operations monitoring	3	N																				Record	
Hopper dredge sediment sampling	4	7																				SU-1	
Flex samples and surveys	5	N																					
Sediment profile & plan view photography	8	4							Mobilize		8A												8Biii
Moored current and OBS arrays	8	1																		Test	Assemble	Deploy	8Bi	Recover
Plume surveying with ADCP	8	1																				Mobilize	8Bii	
Plume surveying with CTD & water sampling	8	1																				Mobilize	8Bii	
Sediment coring	8	3																					Mobilize
Side-scan sonar surveying	8	2																					Mobilize
Subbottom profile surveying	8	1																					
Near-surface plume transport survey	11	0																					

CELL LD

Spreading of coarse material	Task Number of Fredette (2000)	Number of Surveys Planned																					
Video imagery of bottom surge	2	1																					
Hopper dredge operations monitoring	3	N																					
Hopper dredge sediment sampling	4	5																					
Flex samples and surveys	5	N																					
Sediment profile & plan view photography	7	3																					
Moored current and OBS arrays	7	1																					
Plume surveying with ADCP	7	1																					
Plume surveying with CTD & water sampling	7	1																					
Sediment coring	7	1																					
Side-scan sonar surveying	7	2																					
Subbottom profile surveying	7	0																					
Near-surface plume transport survey	11	0																					

21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39
10-Aug	11-Aug	12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug	27-Aug	28-Aug
					UCLA Vessel				UCLA Vessel			UCLA Vessel						
Sea Watch		Sea Watch	Sea Watch	Sea Watch	Sea Watch		Sea Watch					Sea Watch						Sea Watch
Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna	Tuna (transit)	
2	**1**	**0**	**2**	**2**	**3**	**1**	**2**	**1**	**1**	**0**	**0**	**3**	**0**	**1**	**1**	**1**	**0**	**1**
		Dredge	LU		LD			SU				LU	LU	LU	LU and SU	SU	SU	LD
		Inoperable	Conventional (4 loads)		Spreading (1 load)			Convent. (4 loads)				Continuous	Continuous	Continuous	Continuous/Continuous	Continuous	Continuous	Spreading
			loads 2-5		load 1			loads 2-5				loads 6-12	loads 13-18	loads 19-23	loads 24-25/ loads 6-10	loads 11-17	loads 18-21	loads 2-6

Cell LU
Event 3A
Interim Placement
Fine Material

			2iii									Flex video						Demobilize
			Record								Record	Record	Record	Record	Record			
			LU-2,3									LU-4,5	LU-6, 7	LU-8				
							6Ciiia	Complete 6Ciiia							6Ciiib			
Test	Deploy		6Ci	Recover									Demobilize					
	Mobilize		6Cii															
	Mobilize		6Cii															
							6Civa											
6Bv									Flex sidescan survey							Flex side-scan		
Record	Record		Record	Record	Record	Recover	Deploy	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record

								Record							Record	Record	Record	
								SU-2,3							SU-4	SU-5, 6	SU-7	
							8Biii (make-ups)					8Ciiia		Complete 8Ciiia	Complete 8Ciiia			
8Biv												8Civ						
8Bv									Flex sidescan survey									

Cell LD
Event 2
Initial Placement
Coarse Material

					2iv							Flex video						
Record Event 0					Record													Record
LD-0					LD-1													LD-2,3
				7A				7Bii						Complete 7Bii				
				Deploy	7Bi	Recover												
					7Bii													
					7Bii													
							7Biv											
									7Bv									
																		11i

40	41	42	43	44 Holiday	45 Holiday	46 Holiday	47	48	49	50	51	52	53	54	55	56	57	
29-Aug	30-Aug	31-Aug	1-Sep	2-Sep	3-Sep	4-Sep	5-Sep	6-Sep	7-Sep	8-Sep	9-Sep	10-Sep	11-Sep	12-Sep	13-Sep	14-Sep	15-Sep	24-Spet
	Yellowfin		Yellowfin					Yellowfin	Yellowfin							Yellowfin		
Sea Watch	Sea Watch	Sea Watch					Sea Watch		Sea Watch	Sea Watch	Sea Watch	Sea Watch		Sea Watch	Sea Watch		Sea Watch	Sea Watch
1	**2**	**1**	**1**	**0**	**0**	**0**	**1**	**1**	**2**	**1**	**1**	**1**	**0**	**1**	**1**	**1**	**1**	**1**
LD	LU	LU	LU	LU						LC		LU	LU	LU	LU	LU		
Spreading	Continuous	Continuous	Continuous	Continuous						1 Pump-out load		Continuous	Continuous	Continuous	Continuous	Continuous		
loads 7-9	loads 26-29	loads 30-34	loads 35-40	loads 41-45								loads 46-49	loads 50-55	loads 57-61	loads 64-66	loads 67-71		

	Record	Record	Record	Record								Record	Record	Record	Record	Record		
	LU-9, 10	LU-11, 12	LU-13, 14									LU-15	LU-16	LU-17	LU-18	LU-19		
							6Di		6Di completion						Flex SPI farfield			
6Civb									6Diii								Flex coring	
								6Div								Flex sidescan		
								6Dii								Flex subbottom		
												11ii		11iii				
Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Record	Recover

		8Di	Complete 8Di												Flex SPI farfield
6 Flex cores									8Diii						
								8Div							
								8Dii							

Record	
	7Di
	7Dii

CELL LC

Pump-out of fine material

	Record							
	LC-1							
Flex SPI		Flex SPI pumpout						
	Flex plumesurvey							
								Flex coring

APPENDIX B
DATA QUALITY ASSESSMENT

DATA QUALITY ASSESSMENT

A comprehensive quality assurance/quality control (QA/QC) program was followed during the capping and post-cap phases of the U.S. Army Corps of Engineer's (USACE) Palos Verdes (PV) Shelf Pilot Capping Project, to ensure that analytical results and the decisions based on these results are representative of the environmental conditions at PV. The monitoring program is multifaceted, involving a variety of sampling techniques to characterize biological, chemical, and physical conditions on the sea floor and the water before, during, and after the controlled placement of the cap material in specific locations. Woods Hole Group Environmental Laboratories, (WHG) of Raynham, Massachusetts performed the analytical work in accordance with the U.S. Environmental Protection Agency (EPA) *Test Methods for Evaluating Solid Waste, Physical/Chemical Methods SW846.* The following were used during the evaluation of the QC data: QC requirements contained within the guidelines and specifications presented in *the Project Work Plan for the PV Pilot Capping Project*: *Interim and Post-Cap Monitoring Activites,* Q*uality Assurance Project Plan (QAPP)* (SAIC 2000); EPA Contract Laboratory Program (CLP) *Statement of Work (SOW) for Organic Analysis*; and EPA CLP *National Functional Guidelines for Organic Data Review* (EPA 1994). All tables referenced throughout the text are presented at the end of this section.

1 DATA VALIDATION METHODOLOGY

Environmental (i.e., sediment and seawater) samples and field QC blanks (i.e., equipment rinsate blanks, tool rinsate samples, bottle reference blank, and field blanks) collected during the PV Shelf Pilot Capping Project were analyzed for 4,4-DDE using EPA SW846 method 8081A.

Two sediment and one seawater data packages obtained during the Phase III sampling program were validated in accordance with the EPA CLP *National Functional Guidelines for Organic Data Review* (February 1994) as modified for SW846 methods. Samples were reviewed for holding times, blank contamination, calibrations, surrogates, matrix spike/matrix spike duplicates (MS/MSDs), laboratory control samples (LCSs), internal standards, laboratory duplicates, detection limits, error determination, and confirmed identification data. Calculations of reported results were verified from the raw data. The data packages were reviewed for content to ensure that the necessary forms and raw data required to validate the sample results were present. Laboratory QC forms were reviewed to ensure that the QC results fell within the appropriate QC limits. In addition, summary results for hand-transcribed forms and computer-generated forms were recalculated from raw data to verify that the algorithms were used and the data transcriptions were correct. Analytical results were checked and recalculated from raw data. Data validation qualifiers were applied as necessary. This information is summarized and presented in Section 3.

During the data validation for the remaining data, a modified CLP National Functional Guidelines validation occurred. As such, CLP Forms 1 to 10 were reviewed to ensure that the QC results fell within the appropriate QC limits for holding times, blank contamination, calibrations, surrogates, MS/MSDs, LCSs, internal standards, laboratory, detection limits, and any other required QC data. Any resulting data validation qualifiers were applied and are summarized in Section 3.

A quality assurance check of the data validation reports generated on the PV Shelf Pilot Capping Project DDE analysis was performed. All technical criteria identified in the EPA CLP *National Functional Guidelines for Organic Data Review* (1994) were considered while reviewing the data validation reports that received the QA check. The following lot-specific data validation reports were reviewed: ETRs 44281, 44280, 44686, 44687, and 44688 (all full validation); and ETRs 44657 and 44268 (forms review validation). The lots that received full validation had calculations checked from the raw data, while the forms review validation reports were checked against the CLP-like generated forms

generated by the laboratory. The quality assurance review of the data validation found the validation process to be acceptable. No deviations from National Functional Guidelines were found during the review, and the quality assurance review concurred with the findings of the initial data validation process.

2 DATA VALIDATION REPORT

Environmental and field QC samples collected during the PV Shelf Pilot Capping Project were submitted to WHG for 4,4'-DDE analysis using EPA SW846 method 8081A. Technical criteria identified in the *National Functional Guidelines for Organic Data Review* (EPA 1994) were used to validate the data as described in Section 1. A data validation report was generated for each sample lot generated by the laboratory. The following definitions provide brief explanations of the data validation qualifiers assigned to results in the data review process:

- ***U***—The analyte was analyzed for, but was not detected above, the reported sample quantitation limit. These results are qualitatively acceptable and will be used in the risk assessment.
- ***J***—The analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample. These results are qualitatively acceptable, but estimates, and will be used in the risk assessment.
- ***N***—The analysis indicates the presence of an analyte for which there is presumptive evidence to make a "tentative identification."
- ***NJ***—The analysis indicates the presence of an analyte that has been "tentatively identified" and the associated numerical value represents its approximate concentration.
- ***UJ***—The analyte was not detected above the reported sample quantitation limit. However, the reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample. These results are qualitatively acceptable, but estimates, and will be used in the risk assessment.
- ***R***—The sample results were rejected due to serious deficiencies in the ability to analyze the sample and meet QC criteria. The presence or absence of the analyte cannot be verified. These results will not be used in the risk assessment.

All data validation qualifiers applied by SAIC to all data (i.e., detected and nondetected values), as necessary, are contained in Table 1.

3 LABORATORY QUALITY CONTROL ASSESSMENT

This section summarizes the lot-specific data validation reports for the PV Shelf Capping Project sampling events.

3.1 Technical Holding Times

Based on an evaluation of all environmental samples and field QC blanks, all technical holding time criteria were met.

3.2 Instrument Performance Checks

The performance evaluation mixture (PEM) was analyzed at the proper frequency and position sequence as specified in EPA SW846 method 8081 with the following exceptions listed below.

Two PEM analyses exceeded the individual percent breakdowns for 4,4'-DDT of 20 percent. As a result, 15 positive seawater results reported in data packages 44657, 44686, 44687, and 44488 were qualified as presumptively present at an approximated quantity "NJ."

3.3 Initial Calibration Results

Initial calibration of each instrument used to analyze the samples collected during the PV Shelf Pilot Capping Project sampling events was conducted in accordance with EPA SW846 method 8081A. Based on an evaluation of the initial calibration analyses conducted, all initial calibration requirements were met, with the exceptions summarized below.

The surrogate compounds decachlorobiphenyl (DCB) and 2,4,5-tetrachloro-m-xylene (TCX) exceeded the percent relative standard deviation (%RSD) QC limit of 20 percent in many initial calibrations analyzed with sediment and seawater samples. Because all associated surrogate recoveries were acceptable, no data validation qualifiers were applied.

3.4 Continuing Calibration Verification Results

Continuing calibration verification (CCV) of each instrument used to analyze the samples collected during the PV Shelf Pilot Capping Project sampling event was conducted in accordance with EPA SW846 method 8081A. Based on an evaluation of the continuing calibrations conducted for all analyses, all continuing calibration criteria requirements were met, with the exceptions summarized below and in Table 1. Tables 2 and 3 summarize all CCV outliners.

4,4'-DDE exceeded the percent difference (%D) QC limit of 15 percent in three CCVs analyzed with the seawater samples. As a result, one nondetected 4,4'-DDE result was qualified as estimated "UJ" and 18 4,4'-DDE positive results were qualified as estimated "J."

4,4'-DDE exceeded the %D QC limit of 15 percent in one CCV analyzed with the sediment samples. As a result, nine 4,4'-DDE positive results were qualified as estimated "J."

The %D for surrogates DCB and TCX in many CCVs analyzed with seawater and sediment samples exceeded the QC limit of 15 percent. Because all associated surrogate recoveries were acceptable, no data validation qualifiers were applied.

3.5 Method Blank Results

Method blanks were analyzed with each analytical batch of samples in accordance with EPA SW846 method 8081A. The method blank results for both sediment and seawater sample were below the method detection limits. Equipment rinsate blank and field blank samples analyses are discussed in Section 4.

3.6 Surrogate Results

Surrogate compounds for sediment and seawater samples were analyzed in accordance with EPA SW846 method 8081A. Tables 4 and 5 summarize surrogate recovery results for sediment, seawater and field QC blank samples. Deviations are listed below and in Table 1.

For seawater, two TCX recoveries (of 120 total values) were below the lower control limit (LCL) of 30 percent. As a result, the 4,4'-DDE result in SU 1D BOT 3 (44686-0-7) was qualified as estimated "J."

For sediment, one DCB recovery (of 236 total values) was above the upper control limit (UCL) of 150 percent. As a result, the positive 4,4'-DDE result in SU-B-C5-D1-C (44281-10) was qualified as estimated "J."

3.7 Matrix Spike/Matrix Spike Duplicate Results

MS/MSD analyses were conducted to assess the accuracy and precision of the analytical system and to evaluate the matrix effect of the sample upon the analytical methodology based upon the percent recovery of each compound. The control limits for percent recoveries and relative percent differences (RPDs) in sediment and water samples were described in EPA SW846 method 8081A and Section 2 of the QAPP (SAIC 2000). No formal validation action is recommended according to the guidelines based only on MS/MSD analyses. Tables 6 and 7 summarize the MS/MSD results for sediment and seawater samples. Recoveries and reproducibilities of the spiked compounds were within acceptable ranges with the exceptions listed below.

Two seawater 4,4'-DDE percent recovery values (of 8 total values) were outside the control limits. No data validation qualifiers were applied based on seawater MS/MSD results as all other QC criteria were met.

Fifteen sediment percent recovery values (of 24 total values) and 3 sediment RPD values (of 12 total values) were outside the QC limits. Based on sediment MS/MSD results associated with low LCS results, the data validation qualifier "J" was applied to 4,4'-DDE results detected in sediment samples LU-B-C6-D1-C (44285-05) and LU-B-C1-D1-F (44285-12).

3.8 Laboratory Control Sample Results

The LCS monitors the overall accuracy and performance of all steps in the analysis, including sample preparation, and was prepared and analyzed in accordance with EPA SW846 method 8081A. Tables 8 and 9 summarize all LCS results for sediment and seawater samples. Recoveries of the LCS compounds were within acceptable ranges with the exceptions listed below and in Table 1.

Four sediment LCS results (of 14 total values) were below the LCL of 75 percent. As a result, fifty-three 4,4'-DDE positive results were qualified as estimated "J."

Three water LCS results (of 11 total values) were below the LCL of 75 percent. As a result, 12 4,4'-DDE positive results were qualified as estimated "J," and 4 4,4'-DDE nondetected results in 4 field QC blank samples (i.e., Tool Rinsate [44828-2], LC 1D Field Blank [44837-06], LC 1D Rinsate [44837-07], and Tool Rinsate 2 [44835-03]) were qualified as unusable "R."

3.9 Target Compound Identification

The 4,4'-DDE results that were reported as detects satisfied all qualitative and quantitative identification criteria specified in EPA SW846 method 8081A with the exceptions summarized below.

4,4'-DDE in LU-3D Rinsate (44702-14), LU-2D Field Blank (44703-03), and Rinsate 1C (44703-03) were considered as estimated "J" due to a greater than 40 %D between both columns.

In some cases, the reported compound concentration was within $\pm$ 5 percent of that which was obtained after recalculation. The difference in reporting was due to rounding rules applied during reporting of the results involved in calculating that compound (e.g., response factors, percent solids, volumes, and weight). This is considered to have no impact, and as such, no data validation qualifiers were applied.

Gas chromatography/mass spectrometry (GS/MS) confirmation was performed for 10 percent of the sediment samples. Ten out of 23 sediment samples were analyzed beyond the prescribed holding time of 40 days between date of extraction and date of analysis. For these 10 samples, the surrogate recoveries were still acceptable suggesting that the extracts were not compromised by the holding time exceedances. For all sediment samples, 4,4'-DDE was confirmed based on GS/MS identification and quantification technique. The agreement between GC/MS and gas chromatography (GC)-electron capture detector (GC-ECD) measurements exceeded the 50 percent RPD target for two sediment samples SD-B-C2-D1-A (44262-03) (60 percent) and LD-B-C1-D2-C (44268-01) (89 percent). As a result, 4,4'-DDE reported by GC-ECD in these two sediment samples was qualified as estimated "J" to indicate that GC/MS confirmation exceeded the target for agreement.

Thirteen Regional Reference Materials (RRMs) were analyzed for 4,4'-DDE with results falling within 35 percent of the mean consensus value of 10,100 µg/Kg dry weight and a range of 6,560 to 15, 300 µg/Kg.

3.10 Reporting Limits

All reporting limit criteria specified in EPA SW846 method 8081A were met.

3.11 System Performance

Based on instrument performance indicators, all analytical systems remained within parameters throughout the duration of all of the seawater and sediment sample analysis with the exceptions summarized in Sections 3.1 through 3.10.

4 FIELD QUALITY CONTROL ASSESSMENT

During all activities conducted as part of the PV Shelf Pilot Capping Project sampling program, QC samples were collected to gauge the impacts from various components of field activities. Field QC samples were obtained to determine the degree of cross-contamination, ensure successful decontamination procedures, or determine the effects of media heterogeneity on results. Seventeen equipment rinsate blanks, 2 tool rinsate blanks, 1 hopper rinsate, 7 field blanks, and 1 bottle reference blank were collected and analyzed for 4,4'-DDE using the same laboratory techniques as those used for the environmental samples. All equipment rinsate blanks and field blanks provide a measure of various

cross-contamination, decontamination efficiency, and any other potential error that can be introduced from sources other than the sample.

4.1 Equipment Rinsate Blanks

The data validation qualifier "U" was applied to two 4,4'-DDE results detected in two seawater samples (LU 3D BTD 4 and LU 3D BTD 6) due to associated equipment rinsate blank results. Therefore, results qualified as "U" in these samples may be biased high due to equipment rinsate blank contamination and should be considered nondetects.

4.2 Field Blanks

The data validation qualifier "U" was applied to two 4,4'-DDE results detected in two seawater samples (LU 3D BTD 4 and LU 3D BTD 6) due to associated field blank results. Therefore, results qualified as "U" in these samples may be biased high due to field blank contamination and should be considered nondetects.

4.3 Field Duplicates

Duplicate sample pairs were collected to ascertain the contribution of variability (i.e., precision) due to environmental media and sampling precision technique. The RPD between field duplicate analysis results traditionally has been used to evaluate field duplicate results. Data have not been qualified based on the results of field duplicates, since the EPA CLP *National Functional Guidelines for Organic Data Review* does not include control limits for RPD values.

RPD values were calculated for 4,4´-DDE that was detected in sediment field duplicate samples collected during sampling activities. RPDs in sediments ranged from 2.2 to 71 percent. These QC results demonstrate normal variability for the 4,4'-DDE in sediment media and are considered to have no adverse impact on the overall data quality.

Table 1. Data Validation Qualifiers and Rreason for Qualficiation
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activities

Site ID	Laboratory ID	Site Type	Target Compound	Method	Matrix	Data Validation Qualifier	Reason for Qualification
Blank							
Bottle Reference	44835-04	Bottle Blank	4,4'-DDE	8081A	Water	R	11
LC 1B BOT 1	44835-01	Seawater	4,4'-DDE	8081A	Water	J	11
LC 1B BOT 2	44835-02	Seawater	4,4'-DDE	8081A	Water	J	11
LC 1D Field Blank	44837-06	Field Blank	4,4'-DDE	8081A	Water	R	11
LC 1D Rinsate	44837-07	Rinastes	4,4'-DDE	8081A	Water	R	11
LD 1B BOT 2	44728-02	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1B BOT 3	44728-03	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTA 6	44735-05	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTB 9	44726-08	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTC 14	44727-09	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTC 4	44727-04	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTD 9	44725-04	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTE 2	44735-06	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTE 4	44735-07	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D BTF 1	44725-05	Seawater	4,4'-DDE	8081A	Water	J	4
LD 1D Rinsate	44728-04	Rinsate	4,4'-DDE	8081A	Water	UJ	4
LD 1DBTB 2	44726-02	Seawater	4,4'-DDE	8081A	Water	J	4
LD HOP 1	44729-01	Sediment	4,4'-DDE	8081A	Soil	J	11
LD HOP 2	44798-02	Sediment	4,4'-DDE	8081A	Soil	J	11
LD HOP 3	44798-01	Sediment	4,4'-DDE	8081A	Soil	J	11
LD-1B BOT 1	44728-01	Seawater	4,4'-DDE	8081A	Water	J	4
LD-B-C7-D2-C	44268-01	Sediment	4,4'-DDE	8081A	Water	J	33
LU 1D BTA 4	44657-01	Seawater	4,4'-DDE	8081A	Water	J	11
LU 1D BTA 5	44657-02	Seawater	4,4'-DDE	8081A	Water	J	11
LU 1D BTB 12	44657-06	Seawater	4,4'-DDE	8081A	Water	NJ	11, 32
LU 1D BTB 4	44657-05	Seawater	4,4'-DDE	8081A	Water	NJ	11, 32
LU 1D BTB 5	44657-03	Seawater	4,4'-DDE	8081A	Water	NJ	11, 32
LU 1D BTC 11	44657-08	Seawater	4,4'-DDE	8081A	Water	NJ	11, 32
LU 1D BTC 13	44657-04	Seawater	4,4'-DDE	8081A	Water	NJ	11, 32
LU 1D BTC 3	44657-07	Seawater	4,4'-DDE	8081A	Water	NJ	11, 32
LU 2B BOT 1	44705-01	Seawater	4,4'-DDE	8081A	Water	J	4
LU 2B BOT 2	44705-02	Seawater	4,4'-DDE	8081A	Water	J	4
LU 2B BOT 3	44705-03	Seawater	4,4'-DDE	8081A	Water	J	4
LU 2D Field Blank	44703-02	Field Blank	4,4'-DDE	8081A	Water	J	15
LU 3B BOT 1	44706-01	Seawater	4,4'-DDE	8081A	Water	J	4
LU 3B BOT 2	44706-02	Seawater	4,4'-DDE	8081A	Water	J	4
LU 3B BOT 3	44706-03	Seawater	4,4'-DDE	8081A	Water	J	4
LU 3D BTD 4	44709-04	Seawater	4,4'-DDE	8081A	Water	U	8, 27
LU 3D BTD 6	44709-05	Seawater	4,4'-DDE	8081A	Water	U	8, 27
LU 3D rinsate	44702-14	Rinsate	4,4'-DDE	8081A	Water	J	15
LU-B-C1-D1-A	44267-07	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C1-D1-B	44284-08	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C1-D1-C	44285-09	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C1-D1-D	44285-10	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C1-D1-E	44285-11	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C1-D1-F	44285-12	Sediment	4,4'-DDE	8081A	Soil	J	10, 11
LU-B-C2-D2-A	44285-01	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C2-D2-D	44285-02	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C2-D2-E	44285-03	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C2-D2-F	44285-04	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C3-D1-A	44284-11	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C3-D1-B	44284-12	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C3-D1-C	44285-16	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C3-D1-D	44285-17	Sediment	4,4'-DDE	8081A	Soil	J	11

Table 1. Data Validation Qualifiers and Rreason for Qualficiation
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activities

Site ID	Laboratory ID	Site Type	Target Compound	Method	Matrix	Data Validation Qualifier	Reason for Qualification
LU-B-C3-D1-E	44285-18	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C4-D1-A	44284-09	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C4-D1-B	44284-10	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C4-D1-C	44285-13	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C4-D1-D	44285-14	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C4-D1-E	44285-15	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C6-D1-B	44284-06	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C6-D1-C	44285-05	Sediment	4,4'-DDE	8081A	Soil	J	10, 11
LU-B-C6-D1-D	44285-06	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C6-D1-E	44285-07	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C6-D1-F	44285-08	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C7-D1-A	44284-13	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C7-D1-B	44284-14	Sediment	4,4'-DDE	8081A	Soil	J	4
LU-B-C7-D1-C	44285-19	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C7-D1-D	44285-20	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C7-D1-E	44285-21	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C8-D1-C	44285-22	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C8-D1-D	44285-23	Sediment	4,4'-DDE	8081A	Soil	J	11
LU-B-C8-D1-D	44285-24	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 52 A 1	44828-07	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 52 A 3	44828-08	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 52 A 4	44828-09	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 55 A 1	44828-10	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 55 A 11	44828-13	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 55 A 3	44828-11	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 55 A 4	44828-12	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 56 A 1	44828-16	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 56 A 13	44828-19	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 56 A 3	44828-17	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 56 A 4	44828-18	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 57 A 1	44828-14	Sediment	4,4'-DDE	8081A	Soil	J	11
LUC 57 A 4	44828-15	Sediment	4,4'-DDE	8081A	Soil	J	11
Rinsate 1C	44703-03	Rinsate	4,4'-DDE	8081A	Water	J	15
SD-B-C2-D1-A	44262-03	Sediment	4,4'-DDE	8081A	Water	J	33
SU 1B BOT 1	44686-05	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1B BOT 2	44686-06	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1B BOT 3	44686-07	Seawater	4,4'-DDE	8081A	Water	NJ	9, 32
SU 1B BTB 11	44688-05	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTA 2	44688-02	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTB 1	44688-04	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTC 4	44687-04	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTC 7	44687-07	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTD 1	44686-01	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTD 10	44686-04	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 1D BTD 2	44686-03	Seawater	4,4'-DDE	8081A	Water	NJ	32
SU 45 A 4	44838-02	Sediment	4,4'-DDE	8081A	Soil	J	11
SU-B-C5-D1-C	44281-10	Sediment	4,4'-DDE	8081A	Soil	J	9
SU-B-C9-D1-E	44281-20	Sediment	4,4'-DDE	8081A	Soil	J	11
SU-B-C9-D1-F	44281-21	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 46 A 1	44828-03	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 46 A 14	44828-06	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 46 A 3	44828-04	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 46 A 4	44828-05	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 46 A 4	44828-05	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 47 A 1	44838-03	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 47 A 3	44838-04	Sediment	4,4'-DDE	8081A	Soil	J	11

Table 1. Data Validation Qualifiers and Rreason for Qualficiation
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activities

Site ID	Laboratory ID	Site Type	Target Compound	Method	Matrix	Data Validation Qualifier	Reason for Qualification
SUC 47 A 4	44838-05	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 49 A 1	44828-01	Sediment	4,4'-DDE	8081A	Soil	J	11
SUC 49 A 4	44828-02	Sediment	4,4'-DDE	8081A	Soil	J	11
Tool Rinsate 1	44828-20	Rinsate	4,4'-DDE	8081A	Water	R	11
Tool Rinsate 2	44835-03	Rinaste	4,4'-DDE	8081A	Water	J	11

Footnotes:
Data Validation Qualifiers:
U -analyte was analyzed for, but was not detected above the reported sample quantitation limit.
J - analyte was positively identified; the associated numerical value is the approximate concentration of the analyte in the sample
UJ-analyte was not detected above the reported sample quantitation limit. The reported quantitation limit is approximate and may or may not represent the actual limit of quantitation necessary to accurately and precisely measure the analyte in the sample.
NJ-the analysis indicates the presence of the analyte that has been tentatively identified and the associated numerical value represents its approximate concntration.
R - sample result is rejected due to serious deficiencies in the ablity to analyze the sample and met quality control criteria. The presence or absence of the analyte cannot be verified.
Reason for Qualification:
4-Continuing calibration check %difference outside the QC limits.
8-rinsate blank contamination.
9-Surrogate results outside the QC limits.
11-Laboratory control sample outside QC limits
15-Greater than 40 percent difference for detected concentration of single respond for pesticides between the two GC columns.
32-4,4'-DDT breakdown outside QC limit
33-GC/MS confirmation did not meet QC criteria.

Table 4. Surrogate Recovery QC Summary: Sediments
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activites

Surrogate	Total Number Analyses*	Percent Recovery Range	Control Limits	Number Within Control Limits	Number Outside Control Limits
TCX	236	34-150	30-150	236	0
DCB	236	42-170	30-150	235	1

* Sediment Environmental Samples, Method Blanks, LCSs, Equipment Rinsate Blanks, Field Blanks, and MS/MSD Samples.

Table 5. Surrogate Recovery QC Summary: Water
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activites

Surrogate	Total Number Analyses*	Percent Recovery Range	Control Limits	Number Within Control Limits	Number Outside Control Limits
TCX	120	18-110	30-150	118	2
DCB	120	32-99	30-150	120	0

* Seawater Environmental Samples, Method Blanks, equipment rinsates blanks, field blanks, LCSs, and MS/MSD Samples.

Table 6. MS/MSD QC Summary: Sediment
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activites

	ACCURACY					PRECISION				
MS/MSD Compound	MS/MSD Calculated Recoveries	Percent Recovery Range	Control Limits	Number Within Control Limits	Number Outside Control Limits	MS/MSD Calculated RPD	Max RPD	RPD Limit	Number Within Control Limits	Number Outside Control Limits
4,4'-DDE	24	0-482	75-125	9	15	12	80	30	9	3

Table 7. MS/MSD QC Summary: Water
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activites

	ACCURACY					PRECISION				
MS/MSD Compound	MS/MSD Calculated Recoveries	Percent Recovery Range	Control Limits	Number Within Control Limits	Number Outside Control Limits	MS/MSD Calculated RPD	Max RPD	RPD Limit	Number Within Control Limits	Number Outside Control Limits
4,4'-DDE	8	72-111	75-125	6	2	4	19	30	4	0

Table 8. LCS QC Summary: Sediment
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activites

LCS Compound	Total Number Analyses	Percent Recovery Range	Control Limits	Number Within Control Limits	Number Outside Control Limits
4,4'-DDE	14	61-93	75-125	10	4

Table 9. LCS QC Summary: Water
Palos Verdes Pilot Capping Projects, Interim and Post-Cap Monitoring Activites

LCS Compound	Total Number Analyses	Percent Recovery Range	Control Limits	Number Within Control Limits	Number Outside Control Limits
4,4'-DDE	11	59-90	75-125	8	3

DATA QUALITY OBJECTIVES

This section summarized the results of the data quality assessment conducted for the analytical data associated with the samples collected during the monitoring the capping and post-cap phases of the U.S. Army Corps of Engineer's (USAEC) Palos Verdes (PV) Shelf Pilot Capping Project to ensure that analytical results and the decisions based on these results are representative of the environmental conditions at the site. The evaluation of the quality control (QC) data was evaluated using the guidelines summarized in Section 2 of the Data Quality Assessment (DQA). The following sections summarize the data quality objectives (DQOs) as defined in the PV Shelf Pilot Capping Quality Assurance Project Plan (QAPP) for the precision, accuracy, representativeness, comparability, and completeness (PARCC) parameters obtained during the PV Shelf Pilot Capping Project. All data validation qualifiers applied to the data are presented in Table 1 of the DQA.

1.0 Precision

Precision is defined in Section 2 of the QAPP and was evaluated based on the analysis of two different types of QC samples: matrix spike/matrix spike duplicates (MS/MSDs) and field duplicate sample analyses.

The first type of QC sample used to assess the analytical precision of the data quality was the relative percent differences (RPDs) of the MS/MSD samples. All MS/MSDs were in the control limits specified within Section 2 of the QAPP with the following exceptions. Three sediment RPD values were outside the control limit of 30 percent. Based on MS/MSD results associated with low laboratory control sample (LCS) results, the data validation qualifier "J" was applied to 4,4'-DDE results detected in sediment samples LU-B-C6-D1-C (44285-05) and LU-B-C1-D1-F (44285-12). These qualified data points are considered acceptable, but estimates, and will be used to support further recommendations.

The second type of QC sample, field duplicate samples, was included to evaluate field precision. Duplicate sample pairs were collected to ascertain the contribution of variability (i.e., precision) due to environmental media and sampling precision technique. Data have not been qualified based on the results of field duplicates, since the Environmental Protection Agency (EPA) Contract Laboratory Program (CLP) *National Functional Guidelines for Organic Data Review* do not include control limits for RPD values. No specific control limits for field duplicates were established in part because the natural heterogeneity of the environmental media was much greater than the variability imparted by field and laboratory activities.

RPD values were calculated for 4,4´-DDE that was detected in sediment field duplicate samples collected during sampling activities. RPDs in sediments range from 2.2 to 71 percent. These QC results demonstrate normal variability for the 4,4'-DDE in sediment media and are considered to have no adverse impact on the overall data quality.

Based on an evaluation of the MS/MSDs and field duplicate results, the overall precision is acceptable. As a result, the laboratory DQO for precision is considered to have been met.

2.0 Accuracy

Analytical accuracy is defined in Section 2 of the QAPP and was measured through the use of surrogates, MS/MSDs, LCSs, and Regional Reference Material (RRM) sediment samples.

The first type of QC sample used to assess the accuracy of the data quality was the percent recoveries of the surrogates for 4,4'-DDE analyses. All technical data review criteria were met for surrogates with the following exceptions.

Two seawater tetrachloro-m-xylene (TCX) recoveries were below the lower control limit (LCL) of 30 percent and one sediment decachlorobiphenyl (DCB) recovery was above the upper control limit (UCL) of 150 percent. The data validation qualifier "J" was applied to 4,4'-DDE results in SU 1D BOT 3 (44686-0-7) and SU-B-C5-D1-C (44281-10). These qualified data points are considered acceptable, but estimates, and will be used to support further recommendations.

All MS/MSDs were within the control limits of 75-125 percent with the following exceptions. Two seawater percent recovery values and 15 sediment percent recovery values were outside the control limits. Based on MS/MSD results associated with low LCS results, the data validation qualifier "J" was applied to 4,4'-DDE positive results detected in LU-B-C6-D1-C (44285-05) and LU-B-C1-D1-F (44285-12). These qualified data points are considered acceptable, but estimates, and will be used to support further recommendations

The LCS was the third QC type used to assess analytical accuracy. Based on an evaluation of the data, all criteria were met with the following exceptions. Four sediment LCS results and three water LCS results were below the LCL of 75 percent. The data validation qualifier "J" was applied to 53 sediment and 12 seawater data points due to low LCS results. These qualified data points are considered acceptable, but estimates, and will be used to support further recommendations. Four nondetected 4,4'-DDE values in Tool Rinsate (44828-2), LC 1D Field Blank (44837-06), LC 1D Rinsate (44837-07), and Tool Rinsate 2 (44835-03) were qualified as unusable "R" due to extremely low LCS results, and will not be used to support further recommendations.

The RRM sediment samples were the fourth QC type used to assess analytical accuracy. The RRM sediment samples were analyzed for 4,4'-DDE with results falling within 35 percent of the mean consensus value of 10,100 μg/Kg dry weight and a range of 6,560 to 15, 300 μg/Kg.

All supporting QC information cited above also was qualitatively evaluated with respect to the analytical accuracy DQO. Based on the evaluation of the surrogates, MS/MSDs, LCS, and RRM results summarized in DQA, laboratory accuracy has been determined to be acceptable for all analyses, and as such, the analytical DQO for accuracy has been met, except where noted.

Method blank analysis was conducted with each analytical lot of environmental samples analyzed. 4,4'-DDE was not detected in any method blanks analyzed with sediment and seawater samples.

Field QC blanks (i.e., equipment rinsate blanks, tool rinsate blanks, hopper rinsate, field blanks, and bottle reference blank) were obtained to determine the degree of cross-contamination or ensure successful decontamination procedures. 4,4'-DDE was detected in one equipment rinsate blank and one field blank at a concentration above the method detection limit. The data validation qualifier "U" was

applied to two 4,4'-DDE results detected in seawater samples LU 3D BTD 4 and LU 3D BTD 6 to indicate that these 4,4'-DDE results may be biased high due to equipment rinsate and field blank contamination and should be considered nondetects.

Based on an evaluation of the compounds detected in the field QC blanks, the overall accuracy is acceptable, except where noted. As a result, the field DQO for accuracy is considered to have been met.

3.0 Representativeness

Factors that affect the representativeness of the analytical data include improper preservation, holding times, use of standard analytical methods, and matrix or compound interference. Holding times and preservation criteria are based on the most restrictive holding times recommended by EPA for drinking water analyses and have been adopted as the DQO for the PV Shelf Pilot Capping Project for seawater and sediment matrices. Sample representativeness was ensured during the PV Shelf Pilot Capping Project by collecting sufficient samples of a population medium, properly distributed with respect to location and time. Representativeness was assessed by reviewing the sampling techniques, equipment, and sample containers used during the PV Shelf Pilot Capping Project, in addition to evaluating the RPD values calculated from the duplicate samples. The reproducibility of a representative set of samples reflects the degree of heterogeneity of the sampled medium, as well as the effectiveness of the sample collection techniques. Intervals for sediment sampling were chosen to obtain the strata with the highest concentrations of contaminants in order to achieve the most conservative representation and optimize the number of samples required. Based on the evaluation of the sample precision and accuracy, the samples collected during the PV Shelf Pilot Capping Project are considered representative of the environmental condition at the site.

4.0 Comparability

Comparability was ensured by the analysis of EPA reference materials, establishing that the analytical procedures used were generating valid data. To optimize comparability, gas chromatography/mass spectrometry (GS/MS) confirmation was performed for 10 percent of the sediment samples. 4,4'-DDE was confirmed based on GS/MS identification and quantification technique for all sediment samples. The agreement between GC/MS and gas chromatography (GC)-electron capture detector (ECD) measurements exceeded the 50 percent RPD target for sediment samples SD-B-C2-D1-A (44262-03) (60 percent) and LD-B-C1-D2-C (44268-01) (89 percent). The data validation qualifier "J" was applied to 4,4'-DDE results reported by GC-ECD in these sediment samples to indicate that GC/MS confirmation exceeded the target for agreement.

5.0 Completeness

Completeness measures the amount of valid data obtained from the laboratory analysis process and sampling. For data to be considered valid, they must have met all acceptance criteria, including accuracy and precision, as well as any other criteria specified by the analytical methods used. Furthermore, project completeness was defined as the percentage of data used to determine the extent of the contamination above standards and upon which recommendations for further study were to be based. For analytical data to be considered usable to determine the extent of the contamination above standards, each data point must be satisfactorily validated. DQOs for the PV Shelf Pilot Capping Project were set at 100 percent for the field sampling and laboratory completeness. Based on the evaluation of the field and laboratory QC results presented in the DQA, 100 percent of the sediment and seawater sample data collected during the PV Shelf Pilot Capping Project were used as the basis for all recommendations presented in this report. Based on the evaluation of the results presented in Sections 3 and 4 of the DQA, 85.7 percent of the data collected during the PV Shelf Pilot Capping Project were used as the basis for evaluations presented in this report.

APPENDIX C
PALOS VERDES BACKGROUND ANALYSES SUMMARIES

Palos Verdes Background Analyses Summary Cell LU

Sample ID	Rep.	Interval	Grain Size	Bulk Density		Atterberg Limits			p,p'DDE	Shear Strength
				wet	dry	LL	PL	PI		
			(%)	(g/cc)	(g/cc)	(%)	(%)		(ppm)	(kPa)
LU-B-C1-D1	A	0-4	X	1.75	1.16	-	-	-	1.20	8.47
LU-B-C1-D1	B	4-8	X	1.78	1.21	-	-	-	1.30	6.69
LU-B-C1-D1	C	8-12	X	1.76	1.19	-	-	-	1.30	2.61
LU-B-C1-D1	D	12-16	X	1.74	1.14	-	-	-	1.40	5.88
LU-B-C1-D1	E	16-20	X	1.73	1.12	-	-	-	1.20	1.67
LU-B-C1-D1	F	8-12	-	-	-	-	-	-	1.00	-
LU-B-C1-D1	G	16-20	X	-	-	-	-	-	-	-
LU-B-C1-D2	A	0-10	-	1.81	1.26	38	33	5	-	9.44
LU-B-C1-D2	B	10-20	-	1.73	1.15	38	31	7	-	7.55
LU-B-C1-D2	B	10-20	-	-	-	-	-	-	-	6.69
LU-B-C1-D2	C	0-10	-	1.82	1.26	-	-	-	-	-
LU-B-C2-D2	A	0-4	X	1.76	1.20	-	-	-	1.30	5.88
LU-B-C2-D2	B	4-8	X	1.77	1.21	-	-	-	1.10	6.69
LU-B-C2-D2	B	4-8	-	-	-	-	-	-	-	6.69
LU-B-C2-D2	C	8-12	X	1.76	1.20	-	-	-	0.85	6.69
LU-B-C2-D2	D	12-16	X	1.78	1.22	-	-	-	0.77	23.53
LU-B-C2-D2	D	12-16	-	-	-	-	-	-	-	6.69
LU-B-C2-D2	E	16-20	X	1.77	1.20	-	-	-	0.78	5.12
LU-B-C2-D2	F	0-4	-	-	-	-	-	-	0.64	-
LU-B-C2-D2	G	16-20	-	1.76	1.18	-	-	-	-	-
LU-B-C3-D1	A	0-4	X	1.73	1.13	-	-	-	2.00	1.67
LU-B-C3-D1	B	4-8	X	1.79	1.25	-	-	-	2.10	5.12
LU-B-C3-D1	C	8-12	X	1.74	1.18	-	-	-	1.60	3.76
LU-B-C3-D1	D	12-16	X	1.79	1.24	-	-	-	2.00	3.76
LU-B-C3-D1	E	16-20	X	1.73	1.15	-	-	-	2.60	2.61
LU-B-C3-D1	F	16-20	X	-	-	-	-	-	-	-
LU-B-C4-D1	A	0-4	X	1.69	1.09	-	-	-	2.20	5.12
LU-B-C4-D1	B	4-8	X	1.75	1.18	-	-	-	2.50	5.12
LU-B-C4-D1	C	8-12	X	1.75	1.18	-	-	-	2.20	1.28
LU-B-C4-D1	D	12-16	X	1.73	1.14	-	-	-	2.90	1.67
LU-B-C4-D1	E	16-20	X	1.70	1.08	-	-	-	3.20	10.46
LU-B-C4-D1	F	8-12	-	1.77	1.20	-	-	-	-	-
LU-B-C5-D1	A	0-4	X	1.77	1.22	-	-	-	1.20	15.06
LU-B-C5-D1	B	4-8	X	1.80	1.24	-	-	-	1.10	6.69
LU-B-C5-D1	C	8-12	X	1.79	1.24	-	-	-	0.82	3.76
LU-B-C5-D1	D	12-16	X	1.76	1.17	-	-	-	0.97	1.67
LU-B-C5-D1	E	16-20	X	1.73	1.14	-	-	-	1.60	6.69
LU-B-C6-D1	A	0-4	X	1.79	1.23	-	-	-	1.20	0
LU-B-C6-D1	A	0-4	-	-	-	-	-	-	-	23.53
LU-B-C6-D1	B	4-8	X	1.78	1.22	-	-	-	1.00	6.69
LU-B-C6-D1	C	8-12	X	1.77	1.21	-	-	-	0.75	6.69
LU-B-C6-D1	D	12-16	X	1.76	1.18	-	-	-	0.93	12.65
LU-B-C6-D1	E	16-20	X	1.78	1.20	-	-	-	1.00	5.12

LU-B-C6-D1	F	8-12	-	-	-	-	-	-	0.92	-
LU-B-C6-D1	G	16-20	X	-	-	-	-	-	-	-
LU-B-C6-D2	A	0-10	-	1.80	1.29	34	32	2	-	9.44
LU-B-C6-D2	A	0-10	-	-	-	-	-	-	-	5.12
LU-B-C6-D2	B	10-20	-	1.79	1.26	39	32	7	-	6.69
LU-B-C6-D2	C	0-10	-	1.82	1.29	-	-	-	-	-
LU-B-C7-D1	A	0-4	X	1.74	1.16	-	-	-	1.60	6.69
LU-B-C7-D1	B	4-8	X	1.76	1.20	-	-	-	2.50	3.76
LU-B-C7-D1	C	8-12	X	1.77	1.21	-	-	-	2.30	20.49
LU-B-C7-D1	D	12-16	X	1.74	1.15	-	-	-	2.60	15.06
LU-B-C7-D1	E	16-20	X	1.70	1.09	-	-	-	3.50	3.76
LU-B-C7-D1	F	0-4	X	-	-	-	-	-	-	-
LU-B-C7-D1	G	16-20	-	1.72	1.10	-	-	-	-	-
LU-B-C8-D1	A	0-4	X	1.74	1.18	-	-	-	1.90	10.46
LU-B-C8-D1	B	4-8	X	1.74	1.16	-	-	-	2.40	6.69
LU-B-C8-D1	C	8-12	X	1.75	1.16	-	-	-	1.90	5.88
LU-B-C8-D1	D	12-16	X	1.74	1.17	-	-	-	2.10	6.69
LU-B-C8-D1	E	16-20	X	1.71	1.11	-	-	-	2.90	3.76
LU-B-C8-D1	F	8-12	X	-	-	-	-	-	-	-
LU-B-C9-D1	A	0-4	X	1.75	1.18	-	-	-	0.87	0.94
LU-B-C9-D1	B	4-8	X	1.80	1.26	-	-	-	0.95	2.61
LU-B-C9-D1	C	8-12	X	1.82	1.28	-	-	-	1.50	5.12
LU-B-C9-D1	D	12-16	X	1.78	1.22	-	-	-	1.00	6.69
LU-B-C9-D1	E	16-20	X	1.73	1.15	-	-	-	1.30	1.67
LU-B-C9-D1	F	8-12	X	-	-	-	-	-	0.97	-

Average		**1.76**	**1.19**	**37**	**32**	**5**	**1.59**	**6.69**
Minimum		**1.75**	**1.16**	**34**	**34**	**34**	**0.64**	**0.00**
Maximum		**1.82**	**1.29**	**39**	**39**	**39**	**3.50**	**23.53**
Standard Deviation		**0.03**	**0.05**	**2.22**	**0.82**	**2.36**	**0.73**	**5.02**

Palos Verdes Post 45 Analyses Summary Cell LU

Sample ID	Depth of Analysis	Grain Size	Bulk Density wet (g/cc)	Bulk Density dry (g/cc)	Specific Gravity (T_x/20°C)	Water Content (%)	Atterberg Limits LL (%)	Atterberg Limits PL (%)	Atterberg Limits PI	p,p'DDE (ppm)	Shear Strength (kPa)
LUC51A1	0-15cm	X	-	-	-	-	NP	NP	NP	-	-
LUC51A1	4cm	-	1.82	1.27	-	-	-	-	-	-	-
LUC51A2	15-30cm	X	-	-	-	44	40	33	7	-	-
LUC51A11	6cm	-	1.81	1.27	-	-	-	-	-	-	-
LUC52A1	0-4cm	X	-	-	2.72	25	-	-		0.044	-
LUC52A1	3cm	-	1.75	1.4	-	-	-	-	-	-	-
LUC52A2	4-6cm	-	-	-	-	-	-	-	-	0.028	-
LUC52A3	6-12cm	X	-	-	2.7	33	-	-		0.019	-
LUC52A3	9cm	-	1.84	1.46	-	-	-	-	-	-	-
LUC52A4	16-20cm	X	-	-	2.61	55	-	-	-	5	1.67
LUC52A4	18cm	-	1.66	1.05	-	-	-	-	-	-	-
LUC52A5	20-24cm	-	-	-	-	-	-	-	-	A	0.94
LUC52A6	35cm	-	-	-	-	-	-	-	-	-	39.76
LUC52A7	39cm	A	-	-	A	A	-	-	A	-	15.06
LUC53A1	0-13cm	X	1.76	1.18	-	39	NP	NP	NP	-	-
LUC53A11	6cm	-	1.77	1.2	-	-	-	-	-	-	-
LUC54A1	0-13cm	X	1.75	1.17	-	43	NP	NP	NP	-	-
LUC54A11	5cm	-	1.82	1.21	-	-	-	-	-	-	-
LUC55A1	0-6cm	X	-	-	2.73	26	-	-	-	0.0039	-
LUC55A1	3cm	-	1.85	1.46	-	-	-	-	-	-	-
LUC55A2	7-11cm	-	-	-	-	-	-	-	-	0.017	-
LUC55A3	11-15cm	X	-	-	2.71	23	-	-	-	0.43	-
LUC55A3	13cm	-	1.99	1.64	-	-	-	-	-	-	-
LUC55A4	20-24cm	X	-	-	2.67	38	-	-	-	1.0	10.46
LUC55A4	22cm	-	1.79	1.23	-	-	-	-	-	-	-
LUC55A5	24-28cm	-	-	-	-	-	-	-	-	A	15.06
LUC55A15	24-28cm	-	-	-	-	-	-	-	-	-	23.53
LUC56A1	0-4cm	X	-	-	2.71	24	-	-	-	0.082	-
LUC56A1	3cm		1.92	1.48	-	-	-	-	-	-	-
LUC56A2	4-6cm		-	-	-	-	-	-	-	0.066	-
LUC56A3	6-10cm	X	-	-	2.68	26	-	-	-	0.14	-
LUC56A3	9cm		1.86	1.35	-	-	-	-	-	-	-
LUC56A4	13-17cm	X	-	-	2.65	47	-	-	-	1.6	5.12
LUC56A4	15cm	-	1.69	1.06	-	-	-	-	-	-	-
LUC56A5	17-21cm	-	-	-	-	-	-	-	-	A	10.46
LUC56A15	17-21cm	-	-	-	-	-	-	-	-	-	5.12
LUC57A1	0-6cm	X	-	-	2.67	43	-	-	-	0.94	-
LUC57A1	3cm	-	1.75	1.17	-	-	-	-	-	-	-
LUC57A4	6-12cm	X	-	-	2.67	39	-	-	-	1.3	0.94
LUC57A4	9cm	-	1.75	1.17	-	-	-	-	-	-	-

LUC57A5	12-18cm	A	-	-	A	A	-	-	A	A	6.69
LUC57A15	12-18cm	-	-	-	-	-	-	-	-	-	2.61
LUC57A14	6-12cm	X	-	-	2.68	39	-	-	-	-	-
LUC58A1	0-13cm	X	-	-	-	44	38	30	8	-	-
LUC58A1	3cm	-	1.61	0.98	-	-	-	-	-	-	-
LUC59A1	0-13cm	X	-	-	-	50	NP	NP	NP	-	-
LUC59A1	3cm	-	1.79	1.22	-	-	-	-	-	-	-

Average	**1.79**	**1.26**	**2.68**	**36.27**	**39**	**31.5**	**7.5**	**0.76**	**10.57**
Minimum	**1.61**	**0.98**	**2.61**	**23.00**	**38**	**30**	**7**	**0.00**	**0.94**
Maximum	**1.99**	**1.64**	**2.73**	**55.00**	**40**	**33**	**8**	**5.00**	**39.76**
Standard Deviation	**0.09**	**0.17**	**0.03**	**9.81**	**1.41**	**2.12**	**0.71**	**1.34**	**11.04**

Palos Verdes Post 71 Analyses Summary Cell LU

Sample ID	Depth of Analysis	Grain Size	Bulk Density wet (g/cc)	Bulk Density dry (g/cc)	Specific Gravity (T_x/20°C)	Water Content (%)	Atterberg Limits LL (%)	Atterberg Limits PL (%)	Atterberg Limits PI	p,p'DDE (ppm)	Shear Strength (kPa)
LUA60A1	0-6cm	X	-	-	2.73	29	-	-	-	0.011	-
LUA60A1	3cm	-	1.87	1.34	-	-	-	-	-	-	-
LUA60A3	6-10cm	X	-	-	2.71	27	-	-	-	0.052	-
LUA60A3	9cm	-	-	-	2.67	44	-	-	-	-	-
LUA60A4	18-22cm	X	1.81	1.24	-	-	-	-	-	0.67	-
LUA60A5	22-26cm	A	-	-	A	A	-	-	A	A	-
LUA61A1	0-6cm	X	-	-	2.75	46	-	-	-	0.0034	-
LUA61A1	3cm/A	-	1.64	1	-	-	-	-	-	-	-
LUA61A3	10-15cm	X	-	-	2.71	26	-	-	-	0.12	-
LUA61A3	9cm/A	-	1.78	1.21	-	-	-	-	-	-	-
LUA61A4	22-27cm	X	-	-	2.68	41	-	-	-	1.9	-
LUA61A4	25cm/A	-	1.6	1.04	-	-	-	-	-	-	-
LUA61A5	27-32cm	A	-	-	A	A	-	-	A	A	-
LUA64A1	0-4cm	X	-	-	2.73	25	-	-	-	0.048	-
LUA64A3	4-9cm	X	-	-	2.7	26	-	-	-	0.15	-
LUA64A4	12-16cm	X	-	-	2.7	42	-	-	-	0.43	-
LUA64A5	16-20cm	A	-	-	A	A	-	-	A	A	-
Average			**1.74**	**1.17**	**2.71**	**34.00**	-	-	-	**0.34**	-
Minimum			**1.60**	**1.00**	**2.67**	**25.00**	-	-	-	**0.00**	-
Maximum			**1.87**	**1.34**	**2.75**	**46.00**	-	-	-	**1.90**	-
Standard Deviation			**0.12**	**0.14**	**0.03**	**8.94**	-	-	-	**0.61**	-

Palos Verdes Background Analyses Summary Cell SU

Sample ID	Rep.	Interval	Grain Size	Bulk Density		Atterberg Limits			p,p'DDE	Shear Strength
				wet	dry	LL	PL	PI		
			(%)	(g/cc)	(g/cc)	(%)	(%)		(ppm)	(kPa)
SU-B-C1-D1	A	0-4cm	X	1.53	0.81	-	-	-	6.80	0.94
SU-B-C1-D1	B	4-8cm	X	1.45	0.72	-	-	-	6.00	5.12
SU-B-C1-D1	C	8-12cm	X	1.44	0.71	-	-	-	4.80	11.53
SU-B-C1-D1	D	12-16cm	X	1.35	0.60	-	-	-	15.00	10.46
SU-B-C1-D1	E	16-20cm	X	1.36	0.60	-	-	-	33.00	*6.69
SU-B-C1-D1	F	16-20cm	X	-	-	-	-	-	4.10	-
SU-B-C1-D2	A	0-9cm	-	1.41	0.67	83	38	45	-	2.12
SU-B-C1-D2	B	9-19cm	-	1.35	0.58	102	41	61	-	1.28
SU-B-C1-D2	B	12cm	-	-	-	-	-	-	-	3.76
SU-B-C1-D2	C	15cm	-	1.30	0.51	-	-	-	-	*1.67
SU-B-C2-D1	A	0-4cm	X	1.51	0.81	-	-	-	9.00	*23.53
SU-B-C2-D1	B	4-8cm	X	1.49	0.76	-	-	-	8.90	8.47
SU-B-C2-D1	C	8-12cm	X	1.39	0.63	-	-	-	5.00	16.34
SU-B-C2-D1	D	12-16cm	X	1.28	0.50	-	-	-	17.00	20.49
SU-B-C2-D1	E	16-20cm	X	1.36	0.59	-	-	-	17.00	15.06
SU-B-C3-D1	A	0-4cm	X	1.52	0.82	-	-	-	4.30	16.34
SU-B-C3-D1	B	4-8cm	X	1.41	0.64	-	-	-	5.90	12.65
SU-B-C3-D1	C	8-12cm	X	1.32	0.53	-	-	-	11.00	23.53
SU-B-C3-D1	D	12-16cm	X	1.25	0.44	-	-	-	75.00	*3.76
SU-B-C3-D1	D	12-16cm	-	-	-	-	-	-	-	*0.94
SU-B-C3-D1	E	16-20cm	X	1.30	0.49	-	-	-	64.00	*1.67
SU-B-C3-D2	A	0-8cm	-	1.44	0.69	94	34	50	-	1.67
SU-B-C3-D2	B	8-16cm	-	1.30	0.49	147	54	93	-	3.76
SU-B-C3-D2	C	8-16cm	-	1.30	0.49	-	-	-	-	2.61
SU-B-C4-D2	A	0-4cm	X	1.57	0.89	-	-	-	4.40	N/A
SU-B-C4-D2	B	4-8cm	X	1.41	0.64	-	-	-	5.00	15.06
SU-B-C4-D2	C	8-12cm	X	1.33	0.55	-	-	-	9.80	12.65
SU-B-C4-D2	D	12-16cm	X	1.32	0.54	-	-	-	26.00	11.53
SU-B-C4-D2	E	16-20cm	X	1.31	0.51	-	-	-	94.00	*7.55
SU-B-C4-D2	F	8-12cm	-	1.35	0.59	-	-	-	5.20	-
SU-B-C5-D1	A	0-4cm	X	1.48	0.77	-	-	-	5.50	3.76
SU-B-C5-D1	B	4-8cm	X	1.48	0.74	-	-	-	8.10	7.55
SU-B-C5-D1	C	8-12cm	X	1.40	0.67	-	-	-	6.40	5.88
SU-B-C5-D1	D	12-16cm	X	1.38	0.61	-	-	-	15.00	23.53
SU-B-C5-D1	E	16-20cm	X	1.31	0.48	-	-	-	42.00	*6.69
SU-B-C6-D1	A	0-4cm	X	1.50	0.79	-	-	-	9.30	*12.65
SU-B-C6-D1	B	4-8cm	X	1.43	0.69	-	-	-	9.10	5.12
SU-B-C6-D1	C	8-12cm	X	1.42	0.68	-	-	-	4.30	6.69
SU-B-C6-D1	D	12-16cm	X	1.37	0.62	-	-	-	12.00	5.88
SU-B-C6-D1	E	16-20cm	X	1.31	0.53	-	-	-	43.00	15.06
SU-B-C6-D1	F	8-12cm	-	1.38	0.61	-	-	-	-	-
SU-B-C7-D2	A	0-4cm	X	1.48	0.76	-	-	-	4.80	1.67

SU-B-C7-D2	B	4-8cm	X	1.44	0.67	-	-	-	9.50	0.94
SU-B-C7-D2	C	8-12cm	X	1.25	0.43	-	-	-	29.00	2.12
SU-B-C7-D2	D	12-16cm	X	1.24	0.41	-	-	-	110.00	2.61
SU-B-C7-D2	E	16-20cm	X	1.29	0.47	-	-	-	60.00	5.88
SU-B-C8-D1	A	0-4cm	X	1.48	0.77	-	-	-	4.40	*13.83
SU-B-C8-D1	B	4-8cm	X	1.39	0.62	-	-	-	10.00	8.47
SU-B-C8-D1	C	8-12cm	X	1.35	0.54	-	-	-	22.00	0.94
SU-B-C8-D1	D	12-16cm	X	1.33	0.49	-	-	-	84.00	1.28
SU-B-C8-D1	E	16-20cm	X	1.47	0.74	-	-	-	19.00	*41.82
SU-B-C8-D1	E	16-20cm	-	-	-	-	-	-	-	*41.82
SU-B-C9-D1	A	0-4cm	X	1.49	0.80	-	-	-	5.40	13.83
SU-B-C9-D1	B	4-8cm	X	1.46	0.75	-	-	-	6.00	16.34
SU-B-C9-D1	C	8-12cm	X	1.40	0.66	-	-	-	14.00	20.49
SU-B-C9-D1	D	12-16cm	X	1.38	0.61	-	-	-	21.00	5.88
SU-B-C9-D1	D	12-16cm	-	-	-	-	-	-	-	13.83
SU-B-C9-D1	E	16-20cm	X	1.32	0.54	-	-	-	45.00	13.83
SU-B-C9-D1	F	16-20cm	X						42.00	

Average	1.39	0.63	107	42	62	22.30	8.84
Minimum	1.24	0.41	83	34	45	4.30	0.94
Maximum	1.57	0.89	147	54	93	110.00	41.82
Standard Deviation	0.08	0.12	28.10	8.66	21.56	26.07	9.10

* Suspect data points

**Specific Gravity and Water Content were NOT analyzed in the Background survey

Palos Verdes Post 21Cell SU Survey Analyses Summary

Sample ID	Interval	Grain Size	Bulk Density wet	Bulk Density dry	Specific Gravity	Water Content	Atterberg Limits LL	Atterberg Limits PL	Atterberg Limits PI	p,p'DDE	Shear Strength
		(%)	(g/cc)	(g/cc)	(T_x/20°C)	(%)	(%)	(%)		(ppm)	(kPa)
SUC42A1	0-14cm	X	-	-	-	132	108	45	63	-	-
SUC42A1	3cm	-	1.51	0.78	-	-	-	-	-	-	-
SUC42A2	30-45cm	X	-	-	-	42	37	31	6	-	-
SUC43B1	0-13cm	X	-	-	-	101	86	40	46	-	-
SUC43B1	7cm	-	1.48	0.75	-	-	-	-	-	-	-
SUC43B2	30-45cm	X	-	-	-	99	78	39	39	-	-
SUC44B1	0-13cm	X	-	-	-	94	95	40	55	-	-
SUC44B1	5cm	-	1.49	0.77	-	-	-	-	-	-	-
SUC44B2	26-36cm	X	-	-	-	46	41	33	8	-	-
SUC45A1	0-6cm	X	-	-	2.5	98	-	-	-	9.6	65.35
SUC45A1	3cm	-	1.44	0.71	-	-	-	-	-	-	-
SUC45A4	6-12cm	X	-	-	2.47	138	-	-	-	29	20.49
SUC45A4	9cm	-	1.33	0.52	-	-	-	-	-	-	-
SUC45A5	12-18cm	A	-	-	A	A	-	-	-	A	30.22
SUC45A14	6-12cm	X	-	-	2.32	133	-	-	-	-	-
SUC46A1	0-4cm	X	-	-	2.71	22	-	-	-	0.042	NA
SUC46A1	2cm	-	1.95	1.56	-	-	-	-	-	-	-
SUC46A3	4-8cm	X	-	-	2.69	41	-	-	-	5.8	15.06
SUC46A3	8cm	-	1.43	0.69	-	-	-	-	-	-	-
SUC46A4	10-14cm	X	-	-	2.52	122	-	-	-	32	12.65
SUC46A4	15cm	-	1.58	0.92	-	-	-	-	-	-	-
SUC46A5	14-18cm	A	-	-	A	A	-	-	-	A	-
SUC46A14	10-14cm	X	-	-	2.48	101	-	-	-	-	-
SUC47A1	0-4cm	X	-	-	2.74	47	-	-	-	0.03	NA
SUC47A1	2cm	-	1.73	1.14	-	-	-	-	-	-	-
SUC47A3	4-8cm	X	-	-	2.64	63	-	-	-	2.2	3.76
SUC47A3	6cm	-	1.5	0.8	-	-	-	-	-	-	-
SUC47A4	10-14cm	X	-	-	2.5	99	-	-	-	6.6	5.12
SUC47A4	12cm	-	1.41	0.65	-	-	-	-	-	-	-
SUC47A5	14-18cm	A	-	-	A	A	-	-	-	A	2.61
SUC48B1	0-13cm	x	1.47	0.7	-	138	122	50	72	-	-
SUC48B2	30-43cm	x	-	-	-	45	37	31	6	-	-
SUC49A1	0-6cm	X	-	-	2.55	85	-	-	-	5.7	*0.94
SUC49A1	3cm	-	1.48	0.73	-	-	-	-	-	-	-
SUC49A4	6-12cm	X	-	-	2.43	110	-	-	-	6.8	failed
SUC49A4	9cm	-	1.35	0.53	-	-	-	-	-	-	-
SUC50A1	0-15cm	X	1.49	0.77	-	116	93	40	53	-	-
SUC50A2	30-41cm	X	-	-	-	37	41	32	9	-	-
Average			1.51	0.80	2.55	86.77	73.80	38.10	35.70	9.78	17.36
Minimum			1.33	0.52	2.32	22.00	37.00	31.00	6.00	0.03	0.94
Maximum			1.95	1.56	2.74	138.00	122.00	50.00	72.00	32.00	65.35
Standard Deviation			0.15	0.26	0.13	36.80	32.21	6.37	26.03	11.36	20.39

Palos Verdes Background Analyses Summary Cell LD

Sample ID	Rep.	Interval	Grain Size	Bulk Density		Atterberg Limits			p,p'DDE	Shear Strength
				wet	dry	LL	PL	PI		
			(%)	(g/cc)	(g/cc)	(%)	(%)		(ppm)	(kPa)
LD-B-C1-D2	A	0-4	X	1.67	1.04	-	-	-	1.5	10.46
LD-B-C1-D2	B	4-8	X	1.72	1.12	-	-	-	1.5	20.49
LD-B-C1-D2	C	8-12	X	1.66	1.02	-	-	-	0.81	15.06
LD-B-C1-D2	C	-	-	-	-	-	-	-	-	12.65
LD-B-C1-D2	D	12-16	X	1.73	1.11	-	-	-	1.1	12.65
LD-B-C1-D2	D	-	-	-	-	-	-	-	-	15.06
LD-B-C1-D2	E	16-20	X	1.73	1.11	-	-	-	0.86	10.46
LD-B-C1-D2	E	-	-	-	-	-	-	-	-	20.49
LD-B-C1-D3	A	0-5	-	1.61	0.94	41	29	12	-	3.76
LD-B-C1-D3	B	5-15	-	1.69	1.08	43	29	14	-	10.46
LD-B-C2-D1	A	0-4	X	1.71	1.08	-	-	-	1.1	6.69
LD-B-C2-D1	B	4-8	X	1.73	1.11	-	-	-	0.88	17.67
LD-B-C2-D1	C	8-12	X	1.64	0.98	-	-	-	1	1.67
LD-B-C2-D1	D	12-16	X	1.73	1.09	-	-	-	1.1	26.77
LD-B-C2-D1	E	16-20	X	1.73	1.14	-	-	-	1.5	23.53
LD-B-C3-D1	A	0-4	X	1.67	1.03	-	-	-	1.1	*30.22
LD-B-C3-D1	B	4-8	X	1.70	1.08	-	-	-	1.8	15.06
LD-B-C3-D1	C	8-12	X	1.74	1.14	-	-	-	1.4	12.65
LD-B-C3-D1	D	12-16	X	1.69	1.07	-	-	-	1	17.67
LD-B-C3-D1	E	16-20	X	1.72	1.12	-	-	-	0.97	17.67
LD-B-C3-D1	F	16-20	-	1.72	1.11	-	-	-	-	-
LD-B-C4-D1	A	0-4	X	1.70	1.07	-	-	-	2.2	6.69
LD-B-C4-D1	B	4-8	X	1.75	1.17	-	-	-	2.1	*50.61
LD-B-C4-D1	C	8-12	X	1.69	1.08	-	-	-	1.7	12.65
LD-B-C4-D1	D	12-16	X	1.64	1.02	-	-	-	2.2	23.53
LD-B-C4-D1	E	16-20	X	1.71	1.07	-	-	-	2.3	33.88
LD-B-C5-D1	A	0-4	X	1.72	1.09	-	-	-	1	8.47
LD-B-C5-D1	B	4-8	X	1.68	1.05	-	-	-	1.7	20.49
LD-B-C5-D1	C	8-12	X	1.70	1.02	-	-	-	1.4	8.47
LD-B-C5-D1	D	12-16	X	1.66	1.01	-	-	-	1.5	33.88
LD-B-C5-D1	E	16-20	X	1.74	1.11	-	-	-	1.6	37.74
LD-B-C6-D1	A	0-4	X	1.80	1.21	-	-	-	1.1	3.76
LD-B-C6-D1	B	4-8	X	1.78	1.21	-	-	-	1.4	15.06
LD-B-C6-D1	C	8-12	X	1.73	1.12	-	-	-	1.6	12.65
LD-B-C6-D1	D	12-16	X	1.71	1.09	-	-	-	1.7	10.46
LD-B-C6-D1	E	16-20	X	1.71	1.11	-	-	-	1.8	46.11
LD-B-C6-D1	F	4-8	X	-	-	-	-	-	-	-
LD-B-C6-D2	A	0-8	-	1.74	1.12	40	31	9	-	15.06
LD-B-C6-D2	B	8-16	-	1.71	1.11	43	30	13	-	12.65
LD-B-C6-D2	C	8-12	-	1.73	1.13	-	-	-	-	-
LD-B-C6-D2	D	12-16	-	-	-	-	-	-	-	-
LD-B-C6-D2	E	16-20	-	-	-	-	-	-	-	-
LD-B-C6-D2	C	8-16	-	X	-	-	-	-	-	-

LD-B-C7-D1	A	0-4	X	1.74	1.13	-	-	-	1.9	8.47
LD-B-C7-D1	B	4-8	X	1.79	1.22	-	-	-	1.7	12.65
LD-B-C7-D1	C	8-12	X	1.75	1.15	-	-	-	1.6	3.76
LD-B-C7-D1	D	12-16	X	1.70	1.09	-	-	-	1.7	8.47
LD-B-C7-D1	E	16-20	X	1.71	1.11	-	-	-	2.2	23.53
LD-B-C7-D1	F	8-12		1.74	1.13	-	-	-	-	-
LD-B-C8-D2	A	0-4	X	1.68	1.06	-	-	-	1.3	3.76
LD-B-C8-D2	B	4-8	X	1.77	1.18	-	-	-	1.9	8.47
LD-B-C8-D2	C	8-12	X	1.73	1.13	-	-	-	1.7	10.46
LD-B-C8-D2	D	12-16	X	1.74	1.13	-	-	-	2.1	15.06
LD-B-C8-D2	E	16-20	X	1.76	1.15	-	-	-	2.7	12.65
LD-B-C9-D1	A	0-4	X	1.78	1.20	-	-	-	0.75	3.76
LD-B-C9-D1	B	4-8	X	1.80	1.25	-	-	-	1.2	5.12
LD-B-C9-D1	C	8-12	X	1.79	1.23	-	-	-	1.1	12.65
LD-B-C9-D1	D	12-16	X	1.73	1.12	-	-	-	1.3	23.53
LD-B-C9-D1	E	16-20	X	1.72	1.10	-	-	-	1.6	12.65
LD-B-C9-D1	F	12-16	-	1.73	1.12	-	-	-	-	-
LD-B-C9-D1	G	8-12	X	-	-	-	-	-	-	-

Average	1.72	1.11	42	30	12	1.50	15.05
Minimum	1.61	0.94	40	29	9	0.75	1.67
Maximum	1.80	1.25	43	31	14	2.70	46.11
Standard Deviation	0.04	0.06	1.5	0.96	2.16	0.45	9.37

* suspect data points removed from Figure 5.11-3

Palos Verdes Background Analyses Summary Cell SD

Sample ID	Rep.	Interval	Grain Size (%)	Bulk Density wet (g/cc)	Bulk Density dry (g/cc)	Atterberg Limits LL (%)	Atterberg Limits PL (%)	Atterberg Limits PI	p,p'DDE (ppm)	Shear Strength (kPa)
SD-B-C1-D1	A	0-4	X	1.59	0.91	-	-	-	3.6	3.76
SD-B-C1-D1	B	4-8	X	1.50	0.78	-	-	-	9.2	5.12
SD-B-C1-D1	C	8-12	X	1.48	0.70	-	-	-	4.9	12.65
SD-B-C1-D1	D	12-16	X	1.36	0.57	-	-	-	17	17.67
SD-B-C1-D1	E	16-20	X	1.40	0.62	-	-	-	35	17.67
SD-B-C1-D1	F	12-16	-	1.35	0.54	-	-	-	15	-
SD-B-C1-D2	A	0-8	-	1.53	0.79	74	34	40	-	5.12
SD-B-C1-D2	B	8-16	-	1.41	0.64	123	47	76	-	6.69
SD-B-C1-D2	B	8-16	-	-	-	-	-	-	-	17.67
SD-B-C1-D2	C	8-16	-	1.33	0.57	-	-	-	-	15.06
SD-B-C2-D1	A	0-4	X	1.64	0.98	-	-	-	6.3	8.47
SD-B-C2-D1	B	4-8	X	1.54	0.84	-	-	-	6.5	10.46
SD-B-C2-D1	C	8-12	X	1.52	0.80	-	-	-	4.1	6.69
SD-B-C2-D1	D	12-16	X	1.40	0.65	-	-	-	2.9	37.74
SD-B-C2-D1	D	12-16	-	-	-	-	-	-	-	39.76
SD-B-C2-D1	E	16-20	X	1.37	0.58	-	-	-	8.8	32.02
SD-B-C2-D1	F	8-12	-	1.51	0.79	-	-	-	6.2	
SD-B-C3-D2	A	0-4	X	1.47	0.77	-	-	-	5.9	7.55
SD-B-C3-D2	B	4-8	X	1.37	0.63	-	-	-	7.2	10.46
SD-B-C3-D2	C	8-12	X	1.34	0.55	-	-	-	23	6.69
SD-B-C3-D2	D	12-16	X	1.26	0.45	-	-	-	93	10.46
SD-B-C3-D2	E	16-20	X	1.32	0.48	-	-	-	88	10.46
SD-B-C3-D2	F	8-12	-	1.28	0.46	-	-	-	16	-
SD-B-C3-D2	E	16-20	X	-	-	-	-	-	-	-
SD-B-C4-D1	A	0-4	X	1.60	0.94	-	-	-	3.2	26.77
SD-B-C4-D1	B	4-8	X	1.60	0.91	-	-	-	5.9	*60.22
SD-B-C4-D1	C	8-12	X	1.48	0.75	-	-	-	4.7	23.53
SD-B-C4-D1	D	12-16	X	1.30	0.50	-	-	-	15	12.65
SD-B-C4-D1	E	16-20	X	1.25	0.43	-	-	-	45	12.65
SD-B-C4-D1	F	16-20	X	-	-	-	-	-	34	-
SD-B-C5-D1	A	0-4	X	1.65	0.98	-	-	-	4.1	8.47
SD-B-C5-D1	B	4-8	X	1.56	0.86	-	-	-	6.1	17.67
SD-B-C5-D1	C	8-12	X	1.55	0.85	-	-	-	3.2	26.77
SD-B-C5-D1	D	12-16	X	1.50	0.77	-	-	-	5.6	23.53
SD-B-C5-D1	E	16-20	X	1.43	0.60	-	-	-	13	*10.46
SD-B-C5-D1	F	16-20	X	-	-	-	-	-	15	-
SD-B-C6-D1	A	0-4	X	1.58	0.86	-	-	-	6.2	*11.52
SD-B-C6-D1	B	4-8	X	1.49	0.78	-	-	-	9.3	8.47
SD-B-C6-D1	C	8-12	X	1.51	0.77	-	-	-	6.4	-
SD-B-C6-D1	D	12-16	X	1.45	0.70	-	-	-	6.1	6.69
SD-B-C6-D1	E	16-20	X	1.40	0.61	-	-	-	12	10.46
SD-B-C6-D1	F	8-12	X	-	-	-	-	-	-	-

SD-B-C6-D2	A	0-6	-	1.54	0.84	67	34	33	-	4.42
SD-B-C6-D2	B	6-12	-	1.49	0.77	86	33	53	-	2.61
SD-B-C6-D2	C	6-12	-	1.50	0.77	-	-	-	-	*0.42
SD-B-C6-D2	C	6-12	-	-	-	-	-	-	-	8.47
SD-B-C7-D1	A	0-4	X	1.58	0.84	-	-	-	6.9	6.69
SD-B-C7-D1	B	4-8	X	1.31	0.53	-	-	-	15	15.06
SD-B-C7-D1	C	8-12	X	1.25	0.42	-	-	-	72	10.46
SD-B-C7-D1	D	12-16	X	1.29	0.49	-	-	-	82	26.77
SD-B-C7-D1	E	16-20	X	1.31	0.52	-	-	-	32	23.53
SD-B-C7-D1	F	4-8	-	1.57	0.85	-	-	-	12	-
SD-B-C8-D1	A	0-4	X	1.55	0.84	-	-	-	5	10.46
SD-B-C8-D1	B	4-8	X	1.47	0.76	-	-	-	15	10.46
SD-B-C8-D1	C	8-12	X	1.39	0.61	-	-	-	15	33.88
SD-B-C8-D1	D	12-16	X	1.34	0.56	-	-	-	66	10.46
SD-B-C8-D1	E	16-20	X	1.30	0.51	-	-	-	90	10.46
SD-B-C8-D1	F	16-20	X	-	-	-	-	-	92	-
SD-B-C9-D1	A	0-4	-	1.55	0.85	-	-	-	5.6	3.76
SD-B-C9-D1	B	4-8	X	1.56	0.84	-	-	-	9.1	5.12
SD-B-C9-D1	B	4-8	-	-	-	-	-	-	-	8.47
SD-B-C9-D1	C	8-12	X	1.39	0.62	-	-	-	6.7	8.47
SD-B-C9-D1	D	12-16	X	1.45	0.72	-	-	-	9.6	20.49
SD-B-C9-D1	E	16-20	X	1.27	0.48	-	-	-	55	37.74
SD-B-C9-D1	F	16-20	X	-	-	-	-	-	63	-

Average	1.44	0.70	88	37	51	20.31	14.10
Minimum	1.25	0.42	67	33	33	2.90	3.76
Maximum	1.65	0.98	123	47	76	93.00	39.76
Standard Deviation	0.11	0.16	24.93	6.68	18.91	25.66	9.75

* suspect data points

Shear strength summary data does not include suspect data points