

Date: 12-31-14

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: N. Reynolds & M. Salmon

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.			Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition	Rock Type (USCS Group)	Comment
				Fines	Sand	Gravel									
				Cobbles	Sand	Silt	Clay	Fine							

30" OD temp casing w/ 28" inner

12-30-14	0		2.5Y6/3 light yellowish brown	X																								
12-31-14	5	4.1 Spm	2.5Y6/2 light brownish gray	X	X	100		XX																				
1-1-15 10:19	10	11.4 ft rate = 3.2 ft/min	2.5Y6/3 light yellowish brown	X	X	100		XX	XX 32	X	XX X																	
1-1-15 10:19	15	11.8 ft rate = 3.2 ft/min	2.5Y6/3 light yellowish brown	X		100		XX				X	XX X															
	19		2.5Y 6/2 light brownish gray	X	X	100		XX Tr	Tr Tr 23	X	Tr X XX X																	
	20		2.5Y 6/2 light brownish gray		X 5 frags			XX Tr Tr Tr	Tr Tr 23	X	XX X XX X																	

Sampling Method: Grab from cyclone (every 5 vert ft or lith change)

Drilling Contractor: *Boat Longyear*Drilling Rig Type: *DR-40 Dual Rotary (19° angle)*Drilling Method: *Dual Rotary Flooded reverse circulation*

Descriptive Location: CEMEX Plant (Marina, CA)

Date:

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPNSP Test Slant Well

Name: ECW & M. Salmon + C. Shaw

(TVD) Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.		Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementa- tion	Mineral Composition	Rock Type (USCS Group)	Comment																
				Fines	Sand																									
			Dry	Cobbles	Gravel	Sand	Silt	Clay	Fine	Medium	Coarse	Max	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded	None	Low	Medium	High	None	Weak	Moderate	Strong	Quartz	Feldspar	Mica

20		2.5Y 7/4 Pale Brown	X	1/4 100	1/4 X 1/4 1/4	X	XXX	X	X	X	X	X	X	SP	SAND: M Sub-SubR Sand; w/trace f&c Aug-SubR Sand; w/ trace Aug- SubR F gravel to 14mm
25		2.5Y 7/4 pale brown	X	100	XX	X	XX	X	X	X	X	X	X	SP	SAND: 100% FM Sand, Finer than 20-25ft sample. SubA-SubR.
28	1-16-15	2.5Y 6/4 light yellowish brown	X	100	XXX	XX	XX	X	X	X	X	X	X	SP	SAND: 100% FMC Sand, well to medium sorted, sub-A to sub-R.
30	1-16-15	2.5Y 7/4 pale brown	X	100	XXX 5XX	XX	X	X	X	X	X	X	X	SP	SAND: 100% FMC Sand, well to medium sorted. Sub A to Sub R. Trace gravel @ 5mm. Overall finer than 28-30 sample
33	1-17-15	2.5Y 5/4 Light Olive Brown	X	100	XXX 13X	XX	X	X	X	X	X	X	X	SP	SAND: 100% FMC, pred FM, subA-subR Sand; Trace f, Aug- SubR gravel to 13mm.
35	1-17-15	2.5Y 5/4 Light Olive Brown	X	100	XXX 13X	XX	X	X	X	X	X	X	X	SP	SAND: 100% FMC, pred FM, subA-subR Sand; Trace f, Aug- SubR gravel to 13mm.
38		2.5Y 5/4 Light Olive Brown	X	100	XXX 13X	XX	X	X	X	X	X	X	X	SP	SAND: 100% FMC, pred FM, subA-subR Sand; Trace f, Aug- SubR gravel to 13mm.

Drilling Contractor: Boart Longyear

Sampling Method: Grab from cyclone every 5 TVD ft or 1/4th change

Drilling Rig Type: Foremost DR-40 Dual Rotary
19° Angle

Descriptive Location: CEMEX Plant (Marina, CT)

Drilling Method:

Dual Rotary Flooded Reverse Circulation

Date:

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: M. Salmon + C. Shaw +

(ft)	Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content		Particle % Dist.		Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition			Rock Type (USCS Group)	Comment						
				Dry	Moist	Saturated	Fines	Sand	Gravel	Fine	Medium	Coarse	Max	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded				
				Cobbles	Gravel	Sand	Silt	Clay	Fine	Coarse	Max	Well	Medium	Poor	None	Low	Medium	High	None	Weak	Moderate	Strong		
38			2.5Y S1/4 light olive brown	X	Tv	100																	SP	SAND: 100% FMC Sand; pred MC, sub-A; Sub-12 sand; Trace F, sub-A is sub-2 gravel to 7 mm
43			2.5Y S1/3 light olive brown	X	Tv	100																	SP	SAND: 100% FMC Sand pred MC, sub A is sub-2 sand; Trace F, sub A is sub-2 gravel to 12 mm
48			2.5Y 6/4 Light yellowish Brown	X	Tv	100																	SP	SAND: 100% FMC; Pred. M; Ang-SubR; Sand. Trace FC; sub A-SubR gravel to 38 mm
53			2.5Y 7/4 Pale Brown	X	Tv	100																	SP	SAND: 100% FMC Sand; Pred. M; Ang-SubR - Trace F gravel, subA-SubR to 19mm.
55			2.5Y 6/4 Light Yellowish Brown	X	Tv	100																	SP	SAND: 100% FMC Sand; Pred. FM; Ang-SubR. Trace FC gravel; Ang-SubR to 28mm.
60			2.5Y 6/4 Light Yellowish Brown	X	Tv	100																	SP	SAND: 100% FMC Sand; Pred. FM; Ang-SubR. Trace FC gravel; Ang-SubR to 28mm.

Drilling Contractor: Boart Longyear
 Drilling Rig Type: Foremost DR-40 Dual Rotary (19° angle)
 Drilling Method: Dual Rotary Flooded Reverse circulation
 Sampling Method: Grab from cyclone (every 5 vert ft or lith change)
 Descriptive Location: CEMEX Plant (Marina, CA)

Date:

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: C. Shaw

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.		Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition	Rock Type (USCS Group)	Comment															
Dry	Moist		Saturated	Fines	Sand	Gravel																							
Cobbles	Gravel		Sand	Silt	Clay	Fine	Medium	Coarse	Fine	Coarse	Max	Well	Medium	Poor															
									Angular	Sub-Angular	Sub-Rounded	Rounded	None	Low	Medium	High	Moderate	Strong	Quartz	Feldspar	Mica	Amphibole	Evaporites	Other	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	

60		10YR 5/4 yellowish brown	X	100	xx	x	xx	x.	x	xx	x	x			SP	SAND: 100% FM sand; sub A-sub R. Finer than previous sample.
65		10YR 5/4 yellow brown	X	100	xxx>>xx	xx	xx	x	x	xx	>x			SP	SAND: 100% FM sand, sub A-sub R; Trace FC to 40mm gravel -Gold Flecks (mica)	
70		2.5Y 5/3 light olive brown	X	100	xx>>xx	xx	xx	x	x	xxxx	x			SP	SAND: 100% FM sand, sub A-sub R; Trace FC to 30mm gravel -Gold Flecks (mica)	
73		"	+	100	+f	+	+x	+	+	++	xx	+		SP	SAND: 100% F sand w/ trace M grains. Sub A- sub R. tr siltstone -Gold Flecks (mica)	
78		"		100	+f										SP	SAND: 100% F sand w/ tr M & coarse grains. sub A-sub R. tr F gravel to 8mm. Tr siltstone -Gold Flecks (mica)
83		"		100	+f	+f	+f	+							SP	-Gold Flecks (mica)

Drilling Contractor: Boart Longyear

Drilling Rig Type: Foremost DRL-40 Dual Rotary Description:
Drilling Method: Dual Rotary Flooding (19° angle)
Reverse Circulation

Sampling Method: Grab from Cyclone (every 5 vert ft or lith change)

Descriptive Location: CEMEX Plant (Marina, CA)

Date: 1-21-15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MWSP Test Slant Well

Name: Elw t coral Show

Drilling Contractor: Boart Longyear

Sampling Method: Grab from cyclone (every 5 vert ft or 1 min charge)

Drilling Contractor: Boart Longyear
Drilling Rig Type: Foresight DR240 Dual Rotary
(~19° angle)

Descriptive Location: CEMEX Plant (Marina, CA)

Drilling Method: Dual rotary Floated Reverse Circulation

GEOSCIENCE, Support Services, Inc.

Date: 1-22-15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: ECW + CLS

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.		Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition	Rock Type (USCS Group)	Comment																						
				Dry	Moist	Saturated	Cobbles	Gravel	Sand	Silt	Clay	Fine	Medium	Coarse	Max	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded	None	Low	Medium	High	None	Weak	Moderate	Strong	Quartz	Feldspar	Mica	Amphibole	Evaporites	Other

105		2.5Y 6/3 light yellowish brown	X	200	80	X X X	X X 54	X X X	X	X	X	X X X X	X X X X	X	SP	SAND W/GRAVEL 80% FMC sand A- subA. 20% FC gravel to 54 mm. tr chert																	
110		2.5Y 5/3 light olive brown	X	100	100	X X X	X X X	X	X X	X	X	X X X X	X X X X	X	SP	SAND: 100% FM Sand w/trace coarse, sub A; sub B, tr FCTo 30mm gravel trace chert																	
115		2.5Y 5/3 light olive brown	X	100	100	XX		X	XX	X	X	X X X X	X X X X	X	SP	SAND: 100% FM sand, sub A; sub B tr silt																	
120		2.5Y 5/3 light olive brown	X	100	100	XX		X	XX	X	X	X X X X	X X X X	X	SP	SAND: 100% FM sand, sub A; sub B tr silt.																	
125		2.5Y 6/3 light yellowish brown	X	100	100	X + X	X 13	X	XX	Gravel	X	X X X X	X X X X	X	SP	SAND: 100% F sand w/ tr M & C; tr sub B to Rnd gravel to 13mm; tr silt.																	
130		2.5Y 6/3 light yellowish brown																															

Drilling Contractor: BOART LONGYEAR

Sampling Method: GRAB from shaker

Drilling Rig Type: Foremost DR40 Slant 18.5°

Descriptive Location: CEMEX

Drilling Method: RC Flooded Rotary

GEOSCIENCE, Support Services, Inc.

Date: 1-25-15 / Sun

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPW SP Test Slant Well

GRADATION

Name: NZR, AIAO, ECW

Drilling Contractor: Boart Longyear

Drilling Rig Type: ~~Foremost DR-40~~ Slant ~18.5°

Drilling Method: RC Flooded Rotary

Sampling Method: Grab from Cyclone/Shaker

Descriptive Location: CEMEX, Marina, CA

Date: 1-26-15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: ECW + NRR

Drilling Contractor:

Sampling Method:

Drilling Rig Type:

Descriptive Location:

Drilling Method:

GEOSCIENCE, Support Services, Inc.

Date: 1-26 - 15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MP w SP Test Slant Well

Name: NRR & ECW

Drilling Contractor:

Sampling Method:

Drilling Rig Type:

Descriptive Location:

Drilling Method:

Date: 1-27-15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: ECW & MS

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.	Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition	Rock Type (USCS Group)	Comment	
Dry	Fines		Sand	Gravel										
Moist	Cobbles		Clay	Silt										
			Fine	Medium	Coarse	Max	Well	Medium	Poor	None	Low	Medium	High	Alteration Visible
			Coarse	Medium	Fine		Rounded	Sub-Angular	Angular	Weak	Moderate	Strong	Other	Grading Analysis
			Max	Coarse	Medium		Poor	Sub-Rounded	Sub-Angular	None	Strong	Quartz	Feldspar	Well Graded
												Mica	Amphibole	Fat Clay
												Evaporites	Other	

Drilling Contractor:

Sampling Method:

Drilling Rig Type:

Descriptive Location:

Drilling Method:

Date: 1-27-15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPwSP TCst Slant Well

Name: FCW & MS

Drilling Contractor:

Sampling Method:

Drilling Rig Type:

Descriptive Location:

Drilling Method:

Date: 1-27-15

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name: MPWSP Test Slant Well

Name: ECW

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.			Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition		Rock Type (USCS Group)	Comment				
				Cobbles	Gravel	Sand							Angular	Sub-Angular	Sub-Rounded	Rounded	None	Weak		
				Angular	Sub-Angular	Sub-Rounded							None	Low	Medium	High	None	Moderate		
200		2.5Y4/3 olive brown		J		X	100	75	f				XX						SP	SAND: 100% F sand subA-subR. weakly Some cemented F sand balls. Tr silt.
205		"				X	100	75											SP	SAND: 100% F Sand subA - subR Tr silt.
210		"		J		X	100	75											SP	same J
215		"		J		X	100	75											SP	same J
220		"				X														
225		"		X		X	100	75	X				X	XX	XX	X	X	XX	SP	Same

Drilling Contractor: Boart Longyear

Drilling Rig Type: foremost DR40

Drilling Method: Reverse Circulation

Plumbed Rotory 18.5° Slant

Sampling Method: Grab from shaker

Descriptive Location:

CEMEX

Date:

BOREHOLE LITHOLOGICAL LOG

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Well Number/Name:

Name: _____

Sample Depth (ft)	Drilling Rate (ft/hr)	Color: Munsell Name and Class	Moisture Content	Particle % Dist.		Grain Size	Grain Size	Sorting	Grain Shape	Plasticity	Cementation	Mineral Composition	Alteration Visible	Grading Analysis	Well Graded	Fat Clay	Rock Type (USCS Group)	Name:
Dry	Moist		Saturated	Cobbles	Fines	Sand	Gravel										Comment	
Gravel			Sand	Fine	Medium	Coarse	Fine	Coarse	Maxi	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded	None	
Silt			Clay	Fine	Medium	Coarse	Maxi	Maxi	Maxi	Low	Medium	High	None	Weak	Moderate	Strong	Quartz	
Cobbles			Sand	Fine	Medium	Coarse	Maxi	Maxi	Maxi	Well	Medium	Poor	Angular	Sub-Angular	Sub-Rounded	Rounded	None	
Clay			Fine	Medium	Coarse	Maxi	Maxi	Maxi	Maxi	Low	Medium	High	None	Weak	Moderate	Strong	Feldspar	
Fine			Medium	Coarse	Maxi	Maxi	Maxi	Maxi	Maxi	Medium	High	Very High	Angular	Sub-Angular	Sub-Rounded	Rounded	Mica	
Medium			Coarse	Maxi	Maxi	Maxi	Maxi	Maxi	Maxi	High	Very High	Extremely High	Angular	Sub-Angular	Sub-Rounded	Rounded	Amphibole	
Coarse			Maxi	Maxi	Maxi	Maxi	Maxi	Maxi	Maxi	Very High	Extremely High	Extremely High	Angular	Sub-Angular	Sub-Rounded	Rounded	Evaporites	
Maxi			Maxi	Maxi	Maxi	Maxi	Maxi	Maxi	Maxi	Extremely High	Extremely High	Extremely High	Angular	Sub-Angular	Sub-Rounded	Rounded	Other	

Drilling Contractor:

Sampling Method:

Drilling Rig Type:

Descriptive Location:

Drilling Method: