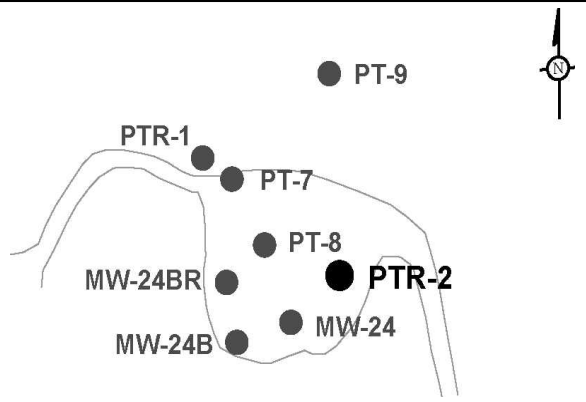


LOG OF BORING PTR-2

PG&E Topock Site Needles, California

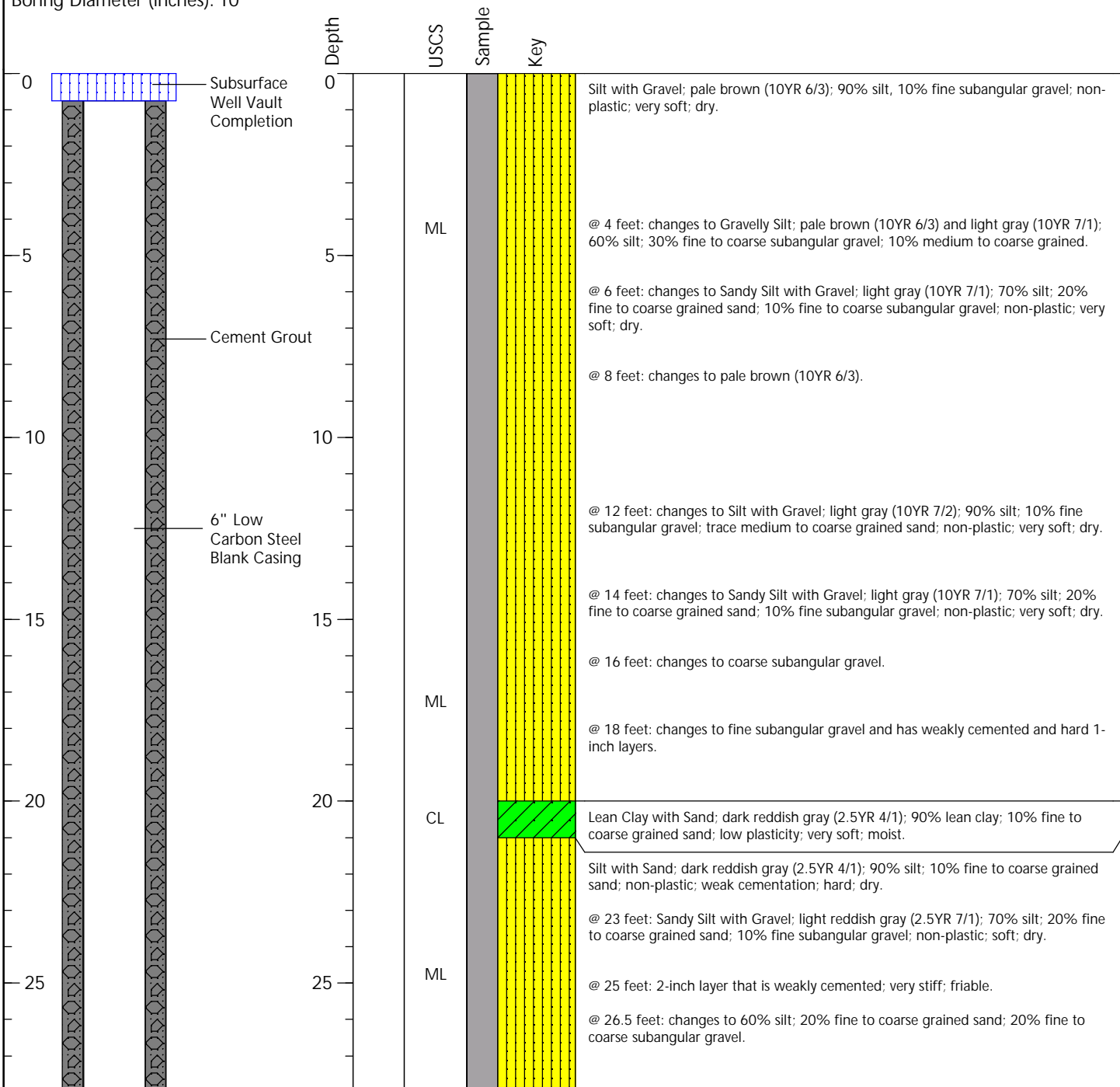


Project No.: RC000689.0004 Date Started: 22 May 2007
 Logged by: B. Bardsley/ B. Evans Date Completed: 2 June 2007
 Drilling Co.: WDC Drilling Method: Rotosonic/Mud Rotary
 Drillers: Rivera, West, Sakioka, Villegas Sample Method: 4" x 6" Core Rod
 Well Permit #2007040410 Driller's License: C57-283326

WELL CONSTRUCTION

LITHOLOGIC DESCRIPTION

Boring Diameter (inches): 10



LOG OF BORING PTR-2 (Continued)

WELL CONSTRUCTION	Depth	USCS	Sample	Key	LITHOLOGIC DESCRIPTION	
	30	ML			@ 29 feet: changes to 70% silt; 20% fine to coarse grained sand; 10% fine to coarse subangular gravel. @ 32 feet: 2-inch layer that is weakly cemented; very stiff.	
	35				SM	Silty Sand with Gravel; dark reddish gray (2.5YR 4/1); 70% fine to coarse grained sand; 20% silt; 10% fine subangular gravel; moist.
	40	ML			Sandy Silt with Gravel; light reddish gray (2.5YR 7/1); 50% silt; 30% fine to coarse grained sand; 20% fine to coarse subangular gravel; non-plastic; very soft; dry. @ 37 feet: changes to Silt with Sand; 90% silt; 10% fine to coarse grained sand. Contains weakly cemented 1-inch layers; friable; very stiff.	
	45				SM	Silty Sand; red (2.5YR 4/8); 80% fine to coarse grained sand; 20% silt; trace fine subangular gravel; dry. Contains weakly cemented layers up to 3-inches; friable; very stiff. @ 41 feet: increasing to 10% fine to coarse subangular gravel. @ 43 feet: larger percentage of material is light reddish gray (2.5YR 7/1). @ 45 feet: changes to Silty Sand with Gravel; dark reddish gray (2.5YR 4/1); 70% fine to coarse grained sand; 20% silt; 10% fine to coarse subangular gravel; dry.
	50	ML				Sandy Silt with Gravel; light reddish gray (2.5YR 7/1); 60% silt; 30% fine to coarse grained sand; 10% fine subangular gravel; non-plastic; very soft; dry. Contains weakly cemented layers; very stiff; friable.
	55	SM				Silty Sand with Gravel; very dark grayish brown (10YR 3.2); 20% silt; 60% fine to coarse grained sand; 20% fine subangular gravel; no plasticity; moist.
	60	SP				Poorly Graded Sand with Gravel; dark reddish gray (2.5YR 3/1); 85% medium to coarse grained sand; 15% fine subangular gravel; moist.
	60	ML				Silt with Sand; light reddish gray (2.5YR 7/1); 90% silt; 10% medium to coarse grained sand; moderately cemented; friable; non-plastic; very stiff; dry. @ 55 feet: Sandy Silt with Gravel; dark reddish gray (2.5YR 4/1); 60% silt; 30% fine to coarse grained sand; 10% fine to coarse gravel; non-plastic; moist.
	60	SM				Silty Sand with Gravel; reddish gray (2.5YR 5/1); 50% fine to very coarse grained sand; 30% coarse subangular gravel; 20% silt; non-plastic; dense; moist.
	60	ML				Sandy Silt with Gravel; weak red (2.5YR 5/2); 60% silt; 30% fine to medium coarse grained sand; 10% fine to medium grained subangular gravel; non-plastic; dense; dry.
	60	CL				Lean Clay with Gravel; dark grayish brown (10YR 4/2); 80% lean clay; 10% fine subangular gravel; 10% fine grained sand; low plasticity; moist.
	60	ML				Sandy Silt with Gravel; reddish gray (2.5YR 6/1); 70% silt; 20% fine to coarse grained sand; 10% subangular gravel; dense; crumbly; dry.

LOG OF BORING PTR-2 (Continued)

WELL CONSTRUCTION	Depth	USCS	Sample	Key	LITHOLOGIC DESCRIPTION
<p style="text-align: center;">Cement Grout</p> <p style="text-align: center;">6" Low Carbon Steel Blank Casing</p>	65	ML			@ 65 feet: light reddish gray (2.5YR 7/1); solid pieces very dense; brittle; hard. Increased amount of gravel; dark greenish gray (GLE Y1 4/1); crystalline.
	70	CL			Sandy Clay; dark reddish gray (2.5YR 4/1); 70% clay; 30% medium to coarse grained sand; trace subangular gravel; low plasticity; moist.
		SM			Silty Sand with Gravel; dark reddish gray (2.5YR 3/1); 50% fine to coarse grained sand; 30% silt; 20% fine to medium subangular gravel; loose with dense pieces; dry.
	75	ML/SM			Sandy Silt with Gravel; weak red (2.5YR 4/2); 50% silt; 30% fine to coarse grained sand; 20% fine to coarse subangular gravel; non-plastic; dense to soft; dry-moist. Contains some white cemented layers (0.25 to 1-inch thick). @ 75 feet: light brownish gray (10YR 6/2); 50% fine to coarse grained sand; 30 to 40% silt; 10 to 20% angular to subangular gravel; dense; dry. Sand and gravel are dark greenish gray, crystalline. Contains cemented white material.
	80	CL			Clay with Gravel; greenish gray (GLE Y1 6/1); 80 to 90% powdery clay; 10 to 20% fine to very coarse subangular gravel; cobbles up to 3-inch diameter; loose; dry.
		ML			Sandy Silt with Gravel; light reddish grey (2.5YR 7/1); 50% silt; 30 to 40% fine to very coarse grained subangular sand; 10 to 20% fine to coarse sand; loose with hard brittle pieces; dry; heavily cemented with white material. @ 83 feet: decreasing gravel; increasing sand; moist.
	85	CL			Silty Sand with Gravel; dark grayish brown (10YR 4/2); 70% clay; 20% fine to coarse subangular to angular gravel; 10% fine to coarse grained sand; loose; moist.
		ML			Sandy Silt with Gravel; reddish grey (2.5YR 6/1); 60 to 70% silt; 20% fine to coarse grained sand; 10 to 20% fine to coarse subangular-angular gravel; non-plastic; loose; dry to moist. @ 87 feet: becoming dark grayish brown (10YR 4/2); wet.
	90	CL			Lean Clay with Gravel; dark grayish brown (10YR 4/2); 80% clay; 20% fine to coarse angular-subangular gravel; medium plasticity; medium stiff; moist to wet.
	95	ML			Sandy Silt with Gravel; reddish gray (2.5YR 6/1); 70% silt; 20% fine to coarse angular to subangular gravel; 10% fine to coarse sand; loose with harder cemented pieces; moist.
	100	CL			Lean Clay with Gravel; light brownish gray (10YR 6/2); 90% powdery clay; 10% fine to coarse angular to subangular gravel; medium plasticity; dry.
		100			

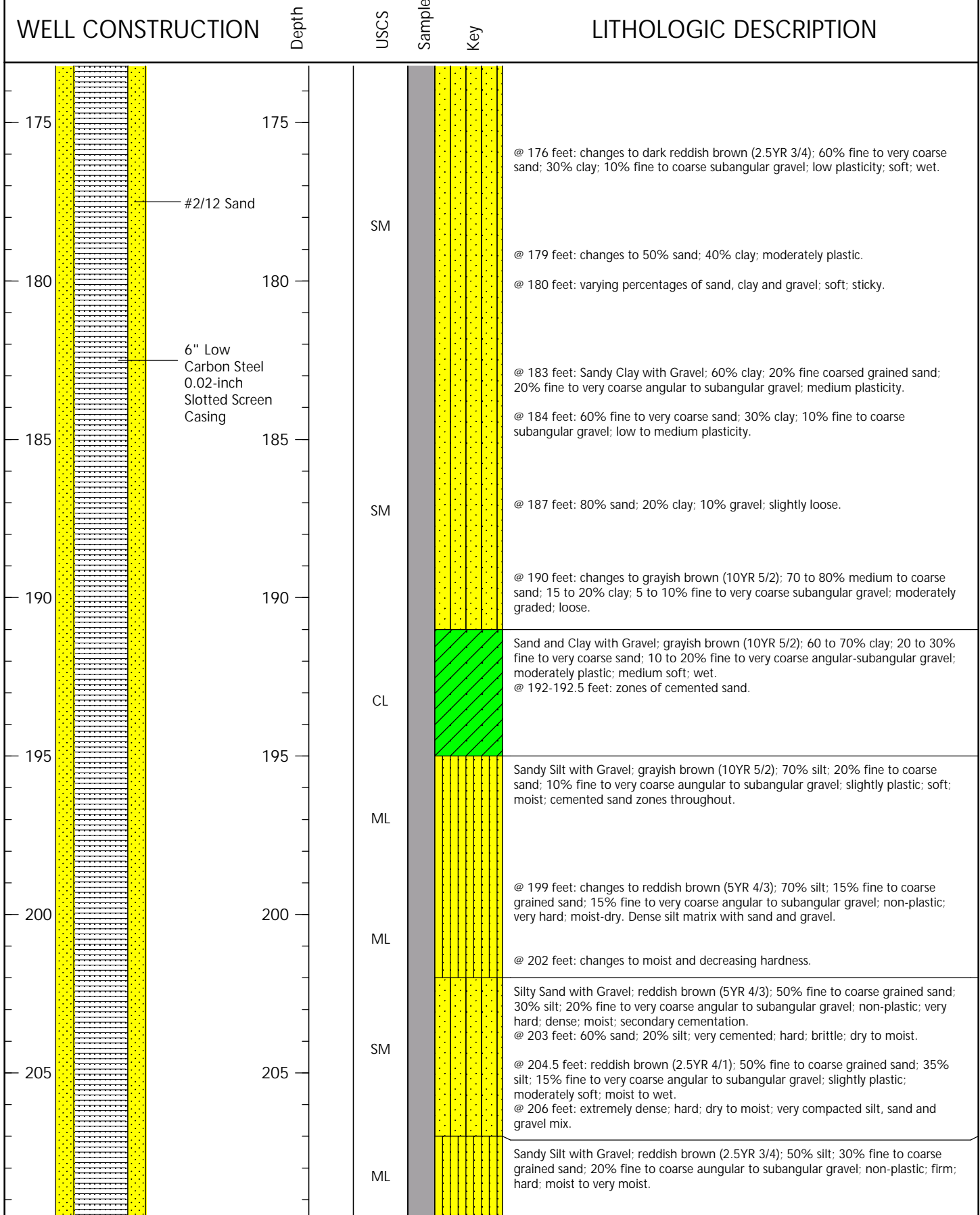
LOG OF BORING PTR-2 (Continued)

WELL CONSTRUCTION	Depth	USCS	Sample	Key	LITHOLOGIC DESCRIPTION
<p style="text-align: center;">Cement Grout</p> <p style="text-align: center;">6" Low Carbon Steel Blank Casing</p> <p style="text-align: center;">Bentonite Seal</p> <p style="text-align: center;">#2/12 Sand</p> <p style="text-align: center;">6" Low Carbon Steel 0.02-inch Slotted Screen Casing</p>	105	ML			grained sand; 10 to 20% fine to coarse subangular to angular gravel; non-plastic; loose; dry to moist.
		CL			Lean Clay; dark grayish brown (10YR 9/2); 80% clay; 10% fine to coarse sand; 10% fine to coarse angular to subangular gravel; medium plasticity; wet.
		ML			Sandy Silt with Gravel; light brownish gray (10YR 6/2); 60% silt; 20% fine to coarse grained sand; 20% fine to coarse angular to subangular gravel; non-plastic; loose with cemented pieces; dry. @ 105 feet: clay increases; slightly plastic; moist to wet.
		SM			Silty Sand with Gravel; dark reddish grey (5YR 4/2); 50% fine to very coarse grained sand; 40% silt; 10% fine to coarse angular to subangular gravel; very well graded; stiff; moist to wet.
		ML			Sandy Silt with Gravel; dark reddish gray (5YR 4/2); 60-70% silt; 20-30% fine to coarse grained sand; 10% fine to coarse angular to subangular gravel; well graded gravel; stiff; moist to wet. @ 111 feet: changes to Sandy Silt; dark grayish brown (10YR 4/2); 70% silt; 30% fine to coarse grained sand; trace fine gravel; well graded; non-plastic; sporadic cementing; stiff; moist. @ 113 feet: increasing gravel.
		SM			Silty Sand with Gravel; dark grayish brown (10YR 4/2) mottled with reddish brown (2.5YR 4/3); 50% fine to very coarse grained sand; 40% silt; 10% fine to very coarse angular to subangular gravel; well graded; minor cementing; stiff; moist.
		ML			Sandy Silt with Gravel; reddish brown (5YR 4/3); 60 to 70% silt; 20 to 30% fine to coarse grained sand; 10% fine to coarse angular to subangular gravel; well graded; firm; stiff; very moist.
		SM			Silty Sand with Gravel; reddish brown (5YR 4/3); 50 to 60% fine to coarse grained sand; 40 to 50% silt; 10% fine to very coarse angular to subangular gravel; well graded; minor cementing; very stiff; dense; very moist. @ 119.5 feet: interbedded silt layers 0.8 to 1-inch thick; grayish brown (10YR 5/2). @ 122 feet: varying percentages of silt and sand.
		ML			Sandy Silt to Silty Sand with Gravel; varying percentages; very moist; interbedded silt layers.
		SM			Silty Sand with Gravel; reddish brown (5YR 4/3); 50 to 60% fine to very coarse grained sand; 30 to 40% silt; 10% fine to coarse subangular gravel; very well graded; medium stiff; loose; wet.
		GW			Sand and Gravel; multicolored grains; 60 to 70% medium to very coarse sand; 30 to 40% fine to very coarse subangular gravel; well graded coarse mix; loose; wet.
		ML			Sandy Silt with Gravel; reddish brown (5YR 4/3); 60% silt; 30% medium to very coarse grained sand; 10% fine to coarse angular to subangular gravel; moderately stiff; wet. @ 132.8 feet: variable percentages of sand and silt; 30 to 90% gravel and cobbles.
		SM			Silty Sand; grayish brown (10YR 5/2); 60-70% medium to very coarse grained sand; 20% silt; 10 to 20% fine to very coarse angular to subangular gravel; well graded with gravel; loose to medium stiff; loose; wet.
		ML			Silty Sand with Gravel; grayish brown (10YR 5/2); 60 to 70% medium to very coarse grained sand; 20% silt; 10 to 20% fine to very coarse angular to subangular gravel; slightly plastic; medium stiff; sticky; wet.

LOG OF BORING PTR-2 (Continued)

WELL CONSTRUCTION	Depth	USCS	Sample	Key	LITHOLOGIC DESCRIPTION
	140	ML			@ 135 feet: Sandy Silt with Gravel; dark grayish brown (10YR 4/2); 60% silt; 20% fine to very coarse subangular to subrounded gravel; 20% fine to coarse sand; very stiff; dense; moist.
		SM			Silty Sand with Gravel; dark grayish brown (10YR 4/2); 60% fine to medium coarse grained sand; 30% silt; 10% fine to very coarse angular to subangular gravel; moderately graded; moderately stiff and dense; moist.
		ML			Sandy Silt with Gravel; dark grayish brown (10YR 4/2); 60% silt; 20% fine to very coarse subangular to subrounded gravel; 20% fine to coarse sand; very stiff; dense; moist. @ 141.5 feet: changes to light brownish gray (10YR 6/2); 50% silt; 50% fine to very coarse angular gravel and rock fragments; loose; dry.
	145				@ 142.5 feet: changes to brown (7.5YR 4/3); 60% silt; 30% fine to very coarse angular/subangular gravel; 10% fine to coarse sand; very stiff and dense; moist. @ 145 feet: 40% coarse angular gravel; moist.
		CL			Sandy Clay with Silt and Gravel; dark grayish brown (10YR 4/2); 40% clay; 30% silt; 20% fine to coarse grained sand; 10% fine to very coarse gravel; slightly plastic; soft; sticky; moist to wet. @ 149 feet: increasingly more silty and dense.
	150	SM			Silty Sand with Gravel; dark grayish brown (10YR 4/2); 50% medium to very coarse grained sand; 30% silt; 20% fine to very coarse angular to subangular gravel; very stiff; very dense; moist. @ 150 feet: some white cementation.
		ML			Sandy Silt with Gravel; grayish brown (10YR 5/2); 70% silt; 20% fine to coarse angular to subangular gravel; non-plastic; firm; very dense; moist; cemented with white material.
		CL			Clay with Gravel; greenish gray (GLE Y1 6/1); 80% powdery clay; 20% fine to very coarse angular gravel; loose; dry.
	155	ML			Sandy Silt with Gravel; gray (10YR 5/1) mottled with brown (10YR 5/3); 70% silt; 10 to 20% fine to very coarse sand; 10 to 20% fine to very coarse angular to subangular gravel; non-plastic; very firm; dense; moist to dry. Some silt layering: 3 1-inch thick silt light brownish gray (10YR 6/2).
		CL			Sandy Silty Lean Clay; grayish brown (10YR 5/2) mottled with dark red (10YR 3/6); 70% clay; 20% fine to coarse sand; trace fine to very coarse angular gravel; medium plasticity; slightly soft; moist to wet.
	160	SM			Silty Sand with Gravel; grayish brown (10YR 5/2); 60% fine to very coarse grained sand; 20% silt; 20% fine to coarse angular to subangular gravel; well graded; loose with cemented pieces; moist to dry.
		CL			Clay with Gravel; greenish gray (GLE Y1 6/1); 80% powdery clay; 20% fine to very coarse angular gravel; loose; moist. @ 160.5 feet: changes to Sandy Clay with Gravel; dark reddish gray (5YR 4/2); 60% clay; 15% fine to coarse grained sand; 15% fine to coarse angular to subangular gravel; 10% silt; medium plasticity; soft; very moist to wet. Sand and gravel percentages vary in clay matrix. @ 163 feet: changes to Sandy Clay; 20 to 30% silt; non-plastic; firm with brittle pieces; moist to dry. @ 164 feet: Sandy Clay with Gravel; brown (7.5YR 4/2); 60 to 70% clay; 15% fine to coarse grained sand; 15% fine to very coarse angular to subangular gravel; medium plasticity; firm; densely packed sand and gravel in silt matrix; very moist to wet. @ 166-167 feet: sand and gravel percentages increasing to 25%; color changes to reddish brown (5YR 4/3).
	165	CL			
	170	SM			Clayey Sand with Gravel; reddish brown (5YR 4/3); 60% fine to coarse grained sand; 20% fine to coarse angular to subangular gravel densely packed in a 20% clay matrix; very firm; hard; very dense; moist. Secondary cementation with white material. @ 171 to 175 feet: interbedded silt layers; 100% silt; brown (7.5YR 4/3); 0.5-inch thick and less; 2-4-inch spacing; sand and gravel percentages varying; some mottling caused by reddish brown (5YR 4/4) clay.

LOG OF BORING PTR-2 (Continued)



LOG OF BORING PTR-2 (Continued)

