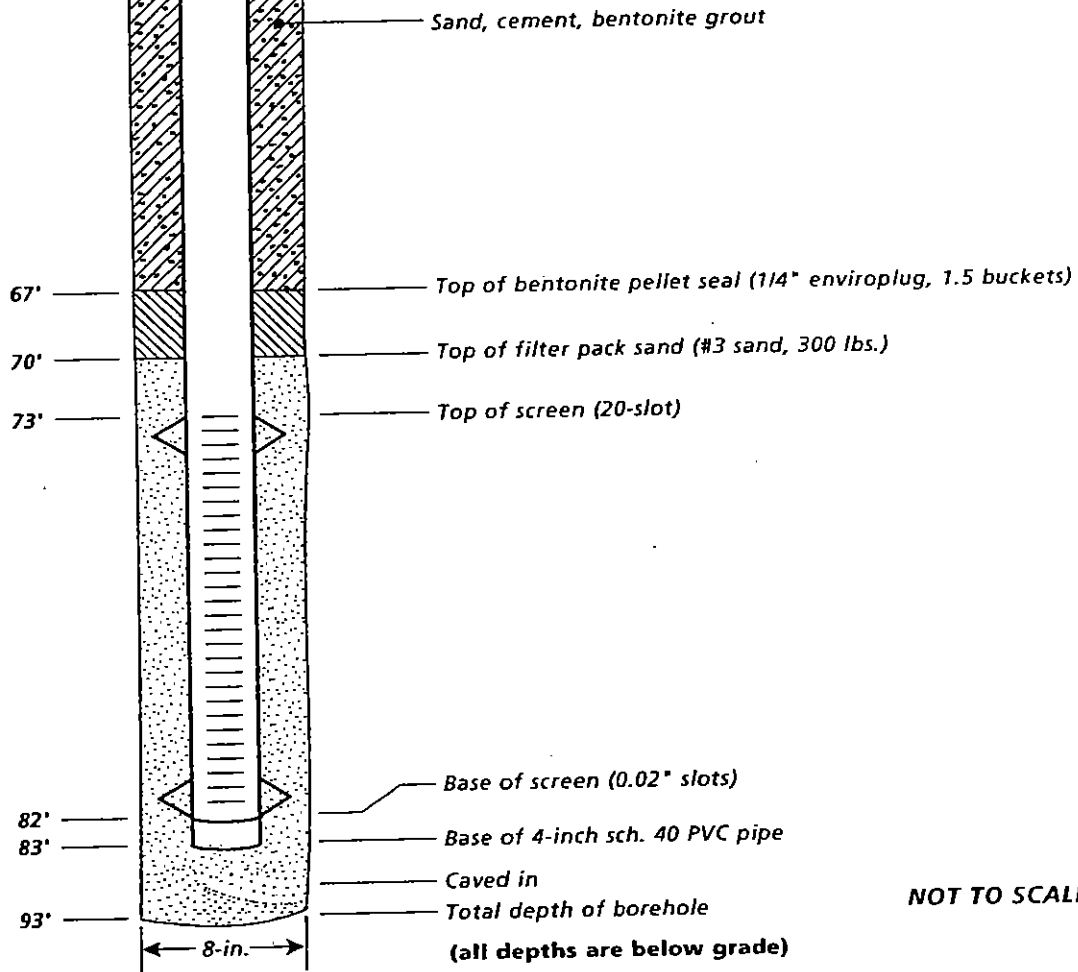


Drilling Contractor:	<u>Boart Longyear</u>
Drilling Method:	<u>Sonic</u>
Logger:	<u>R.E. Lambert</u>
Completion Date:	<u>06/06/03</u>
PVC Casing Elevation:	<u>460.53</u>
<i>(in feet above MSL)</i>	



**Well Completion Diagram for MW-34-80**  
PG&E Topock



# LITHOLOGIC LOG

Well Number MW-34-80

Elevation of concrete pad 458.65 (in feet)

Drilling contractor / method Boart Longyear, Sonic

Completion date 6/6/03

Logger R. Lambert

Location 2,102,535 (northing); 7,616,445 (easting)

Borehole diameter 8 in., 4-inch PVC

COMPLETION DIAGRAM	DEPTH BELOW SURFACE (in feet)	SOIL DESCRIPTION (name, color, particle size, distribution, consistency (hard, soft, etc), moisture content; structure, etc.)	USCS	SAMPLE NUMBERS and COMMENTS
		Sand, moderate brown, loose, fine-grained, moist just below surface, twigs.	SP	Spud 10:36 on 6/5/03 (10YR 5/4)
		Silt to fine sand, dusky yellowish brown, organic rich, wet. <i>Note: All reported colors are from wet samples.</i>	<del>SP</del> ML <del>SP</del>	(10YR 2/2) MW-34-06 (for grain size, 84.9% silt) (Hole caving)
	10	Sand, dark yellowish brown, medium- to coarse-grained.		11:10 (10YR 4/2)
		Sand, dusky yellowish brown, fine-grained, (10YR 2/2). Sand, moderate yellowish brown, medium- to coarse-grained.	<del>SP</del> SP	Adding water due to flowing sand. (10YR 5/4)
	20	Sand, tan, fine-grained.		MW-34-20 (97% fine- to medium-grained sand)
				(Break for lunch, 11:45 - 13:07)
				(10YR 4/2)
	30	Sand, dark yellowish brown, medium- to coarse-grained, loose.		13:28
		Gravelly, medium-grained sand with cobbles, 1/2- to 2-in. diameter, subrounded to rounded.	SW	MW-34-41, 13:46 (33% gravel; 47% medium-grained sand; 6% silt)
	40	Silty clay, dark yellowish brown, 1 foot thick, soft. Coarse-grained sand to gravelly sand, <10% gravel, < 1-inch diameter, subangular to rounded.	CL / ML <del>SP</del> SW	
		Sand grades coarser, cobbles to 2.5 inches; sand is medium- to very coarse-grained.		MW-34-50 (Lost much of the core; 83% fine- to medium-grained sand; 11% gravel)
	50			14:20
		Sand with cobbles, dark yellowish brown, medium- to fine-grained sand, subrounded cobbles to 3-inch diameter, 10 - 40% cobbles (of mixed lithology).	<del>SP</del> SW	MW-34-63 (28% gravel, 70% fine- to medium-grained sand (14:35 to 15:40 down to get more pipe)
60	Sand, dark yellowish brown, coarse- to very coarse-grained section above a section of medium- to coarse-grained sand.	<del>SP</del> SW		
70			16:20 (5YR 3/2)	
	4-inch piece of wood, olive gray; coarse-grained sand at top, medium- to coarse-grained below.	SP	(5YR 4/4)	
	Sand, moderate brown.			
	Gravelly sand, cobbles to 4-inch diameter, skip graded (which is typical here).	SW		
	80			

# LITHOLOGIC LOG

Well Number MW-34-80

Elevation of concrete pad 458.65 (in feet)

Drilling contractor / method Boart Longyear, Sonic

Completion date 6/6/03

Logger R. Lambert

Location 2,102,535 (northing); 7,616,445 (easting)

Borehole diameter 8 in., 4-inch PVC

COMPLETION DIAGRAM	DEPTH BELOW SURFACE (in feet)	SOIL DESCRIPTION (name, color, particle size, distribution, consistency (hard, soft, etc), moisture content; structure, etc.)	USCS	SAMPLE NUMBERS and COMMENTS
	80	Gravelly sand to sandy gravel, moderate yellowish brown, increasing cobbles.	<del>SW</del> <del>GW</del>	(10YR 5/4) MW-34-82, 16:40 (74% gravel, 23% fine- to medium-grained sand)
		Cobbles in fine, silty, sand matrix, olive gray, very dense.	<del>SM</del>	(5Y 4/1) Base of alluvial aquifer?
	90	Gets drier, cobbles to 4-inch diameter in sand. Very coarse sand and gravel, dark reddish brown to very dusky red	<del>SW</del>	(10R 3/4) Wet.
				(10R 2/2) <b>TD 93'</b> 17:15 (Very hard drilling)
	100			
	110			
	120			
	130			
	140			
	150			
	160			

**SOIL BORING LOG**

<b>PROJECT NAME:</b> PG&E Topock, Interim Measures, Phase 2 (2005)		<b>HOLE DEPTH (ft):</b> 116.0	<b>DRILLING CONTRACTOR:</b> Prosonic Corp. Phoenix, AZ	
<b>SURFACE ELEVATION:</b> 458.9 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,102,530.55	<b>EASTING (CCS NAD 27 Z 5):</b> 7,616,452.40	<b>DATE STARTED:</b> 01/27/2005	<b>DATE COMPLETED:</b> 01/29/2005
<b>DRILLING METHOD:</b> Rotasonic		<b>WATER LEVEL (ft):</b>	<b>DRILLING EQUIPMENT:</b> Track Mounted Sonic	
<b>LOCATION:</b> Adjacent to MW-34-55 on Colorado River floodplain.			<b>LOGGED BY:</b> B. Moayyad, T. McDonald	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
5		Box 1	7	SP	<p><b>POORLY GRADED SAND (SP)</b> - dk grayish brn 10YR4/2, 98% sand, 2% fines with some organic matter and roots, loose, moist</p> <p>- pale brn 10YR6/3, 95% m sand, massive</p> <p>- yellowish brn 10YR5/4, moist to wet, bottom 8" transition with mottling with dark gray 10YR4/1</p> <p>- dk grayish brn 10YR4/2, wet, massive</p> <p>- transition zone and mottling coincides with water tube at approx 8.5 to 9 ft bgs</p> <p>- 99% f sand, 1% fines</p> <p>- color shift to yellowish brn 10YR5/4</p>	<p>collect bag samples for archive description and potential grain-size testing.</p> <p>collect bag sample: MW34-GS-4</p> <p>collect bag sample: MW34-GS-8</p>
10		Box 2 Box 3 Box 4	10			
15						
20						
25		Box 4 Box 5 Box 6	10	SP	<p><b>POORLY GRADED SAND (SP)</b> - dk grayish brn 10YR4/2, 99% f-m sand, 1% fines with some organic matter and roots, loose, moist</p> <p>- brn 10YR5/3</p> <p>- 99% vf sand, 1% fines</p>	<p>collect bag sample: MW34-GS-16</p>
30						
35		Box 6 Box 7 Box 8	10			<p>collect bag sample: MW34-GS-30</p>

**SOIL BORING LOG**

<b>PROJECT NAME:</b> PG&E Topock, Interim Measures, Phase 2 (2005)		<b>HOLE DEPTH (ft):</b> 116.0		<b>DRILLING CONTRACTOR:</b> Prosonic Corp. Phoenix, AZ	
<b>SURFACE ELEVATION:</b> 458.9 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,102,530.55	<b>EASTING (CCS NAD 27 Z 5):</b> 7,616,452.40	<b>DATE STARTED:</b> 01/27/2005		<b>DATE COMPLETED:</b> 01/29/2005
<b>DRILLING METHOD:</b> Rotasonic		<b>WATER LEVEL (ft):</b>		<b>DRILLING EQUIPMENT:</b> Track Mounted Sonic	
<b>LOCATION:</b> Adjacent to MW-34-55 on Colorado River floodplain.				<b>LOGGED BY:</b> B. Moayyad, T. McDonald	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
40					<p><b>POORLY GRADED SAND (SP)</b> - dk grayish brn 10YR4/2, 99% f-m sand, 1% fines with some organic matter and roots, loose, moist</p> <p>- 70-80% qtz, 20-30% mafic grains</p> <p>- 96% sand, 3% gravel, 1% fines</p>	
45		Box 8 Box 9 Box 10	10	SP	<p><b>POORLY GRADED SAND WITH GRAVEL (SP)</b> - brn 10YR5/3, 87% sand, 15% rnd to well rnd gravel &lt;1cm to 6cm, 4% silt, igneous, metamorphic, vesicular basalt, quartzite, soft, wet, massive, carbonate</p> <p>- dk gray 2.5YR2/1, 60% silt, 40% vf sand, soft, wet, massive</p>	collect bag sample: MW34-GS-42.2
				SP	<p><b>POORLY GRADED SAND (SP)</b> - brn 10YR5/3, 95% rnd to well rnd sand, 5% fines, 3% rnd to well rnd gravel, igneous and metamorphic, soft, wet, gravel with vesicular basalt, carbonate, massive</p>	collect bag sample: MW34-GS-43
50			0	ML	<p><b>SILTY CLAY (ML)</b> - brn 10YR5/3 - 7.5YR5/3, 98% fines, 2% sand, very abrupt boundary, sticky, plastic, fine grain layer</p>	
55		Box 11	5	SP	<p><b>POORLY GRADED SAND (SP)</b> - brn 10YR4/3, 92% rnd sand, 5% subrnd gravel up to 1", 3% fines, qtz, some mafic, wet</p> <p>- 10YR5/3, 90% rnd sand, 10% subrnd f gravel up to 1 cm, qtzite, mafic, darker/coarser than above</p> <p>- 896% sand, 4% f gravel up to 1/2" subrnd to subang, less mafic</p> <p>- 10YR5/3, subang to subrnd gravel</p> <p>- 90% subrnd to rnd sand, coarsening, 10% rnd gravel up to 2 1/2", carbonate/granitic</p> <p>- 96% subrnd to rnd sand, 4% gravel up to 1", 5"mm cobble</p>	took sample at 13:05: MW34-GS-50
60					<p>- no gravel</p>	
65		Box 12 Box 13	10.45	SW	<p>- occasional silty clay lenses 2-4" thick</p> <p><b>WELL GRADED SAND WITH GRAVEL (SW)</b> - 80% rnd f sand, 15% fines, 5% subang to subrnd gravel up to 1"</p>	took sample at 13:40: MW34-GS-65
70					<p><b>POORLY GRADED SAND (SP)</b> - brn 7.5YR5/4, 90% f sand, 8% c sand, 2% fines, rnd, loose, wet</p> <p>- becomes more gray in color near wood</p>	

**SOIL BORING LOG**

<b>PROJECT NAME:</b> PG&E Topock, Interim Measures, Phase 2 (2005)		<b>HOLE DEPTH (ft):</b> 116.0		<b>DRILLING CONTRACTOR:</b> Prosonic Corp. Phoenix, AZ	
<b>SURFACE ELEVATION:</b> 458.9 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,102,530.55	<b>EASTING (CCS NAD 27 Z 5):</b> 7,616,452.40	<b>DATE STARTED:</b> 01/27/2005		<b>DATE COMPLETED:</b> 01/29/2005
<b>DRILLING METHOD:</b> Rotosonic		<b>WATER LEVEL (ft):</b>		<b>DRILLING EQUIPMENT:</b> Track Mounted Sonic	
<b>LOCATION:</b> Adjacent to MW-34-55 on Colorado River floodplain.				<b>LOGGED BY:</b> B. Moayyad, T. McDonald	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
75		Box 14 Box 15	9	SP	<b>POORLY GRADED SAND (SP)</b> - brn 7.5YR5/4, 90% f sand, 8% c sand, 2% fines, rnd, loose, wet  - large wood fragments >6", no sediment, charcoal appearance  - 98% sand, <2% fines, coarse, subrnd, f qtz sand	sample collected at 14:35: MW34-GS-73
				GW	<b>WELL GRADED GRAVEL WITH SAND AND SILT (GW)</b> - brn 7.5YR5/3, 70% gravel up to 5", 20% sand, 10% fines, rnd to subrnd, medium, wet	
80				SP	<b>POORLY GRADED SAND (SP)</b> - brn 7.5YR5/2, 95% f rnd qtz sand, 5% silt, some mafics, loose, wet	
85		Box 16 Box 17	9.5	GW	<b>WELL GRADED GRAVEL WITH SAND AND COBBLES (GW)</b> - brn 7.5YR5/3, 60% rnd gravel up to 5", 35% subrnd qtz sand, 5% fines, igneous and metamorphic, wet  - 60% gravel with 15% cobbles	sample collected at 15:00: MW-34P-GS-80
90				GW	<b>SILTY SANDY GRAVEL (GW)</b> - 55% sand, 43% gravel up to 6", 2% fines	drilling becomes much harder below 87 ft
95		Box 18 Box 19	9	SW	<b>WELL GRADED SAND WITH GRAVEL (SW)</b> - very dk gray 7.5YR3/4, 70% sand, 15% rnd f-m gravel, 15% clay and silt, wet  - dark gray/brn silty sand, becomes hard with 10-15% clay and silt fines  - becomes reddish brn 5YR4/4 by 95 ft  - 87% sand, 10% gravel, 3% fines	cobbles fall from core at 89, difficulty removing core barrel due to hard material
100				SW	<b>WELL GRADED SAND WITH SILT AND GRAVEL (SW)</b> - weak red 10YR4/4, 70% sand, 15% silt, 15% gravel, medium density <b>CONGLOMERATE (BR)</b> - weak red 10YR4/4, conglomerate consists or 60% subang gravel up to 2.7", 25% subang sand, 15% silty fines, hard, dry.	possible reworked Miocene Conglomerate Top Miocene Conglomerate 98 ft
105		Box 20 Box 21	8.1			sample collected at 16:40: MW-34D-GS-102

**SOIL BORING LOG**

<b>PROJECT NAME:</b> PG&E Topock, Interim Measures, Phase 2 (2005)		<b>HOLE DEPTH (ft):</b> 116.0	<b>DRILLING CONTRACTOR:</b> Prosonic Corp. Phoenix, AZ	
<b>SURFACE ELEVATION:</b> 458.9 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,102,530.55	<b>EASTING (CCS NAD 27 Z 5):</b> 7,616,452.40	<b>DATE STARTED:</b> 01/27/2005	<b>DATE COMPLETED:</b> 01/29/2005
<b>DRILLING METHOD:</b> Rotosonic		<b>WATER LEVEL (ft):</b>	<b>DRILLING EQUIPMENT:</b> Track Mounted Sonic	
<b>LOCATION:</b> Adjacent to MW-34-55 on Colorado River floodplain.			<b>LOGGED BY:</b> B. Moayyad, T. McDonald	

DEPTH BGS (feet)	SAMPLE			USCS CODE	SOIL DESCRIPTION  SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	COMMENTS  DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES, DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
	INTERVAL	TYPE/NUMBER	RECOVERY (ft)			
110		Box 22	9	BR	<p><b>CONGLOMERATE (BR)</b> - weak red 10YR4/4, conglomerate consists or 60% subang gravel up to 2.7", 25% subang sand, 15% silty fines, hard, dry.</p> <p>- carbonate cement evident, weak to moderate induration</p>	<p>- core is shattered by vibration and is moist due to injected water, otherwise dry</p> <p>no bag sample taken</p>
115					<p>Boring Terminated at 116 ft</p> <p><b>ABBREVIATIONS</b>                      cc = continuous core run                      brn = brown                      lt = light                      dk = dark                      vf = very fine-grained                      f = fine-grained                      m = medium-grained                      c = coarse-grained                      vc = very coarse-grained                      ang = angular                      subang = subangular                      subrnd = subrounded                      rnd = rounded                      br = bedrock formation                      ss = sandstone                      conglom = conglomerate                      comptd = compacted                      qtz = quartz</p>	