

PROJECT NUMBER:  315024.IM.02  BORING NUMBER: TW-1						
		SOIL BORING LO	G			
PROJECT NAME: PG&E Topock IM Investi	gation (Phase 5 2004)	HOLE DEPTH (ft): 312.0	DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA			
SURFACE ELEVATION: 621.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,173.17	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	<b>DATE AND TIME STA</b> 11/11/2003 10:1	RTED: 5:00 AM	<b>DATE AND TIM</b> 11/13/2003	E COMPLETED: 5:00:00 PM
DRILLING METHOD: Mud Rotary		WATER LEVEL (ft):	DRILLING EQUIPME Speedstar		th 94-mm Punch (	Core
LOCATION: PG & E Topock	Facility		LOGGED BY:	mas / R. F	dwards	

LOCATION: PG	& E To	opock Fac	cility		LOGGED BY:	D. Thomas / R. Edwards			
		SAMPLE			SOIL DESCRIPTION	COMMENTS			
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	USCS CODE	SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATIONS DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.			
 			<u> </u>		<b>SILTY SAND WITH GRAVEL (SM)</b> - light brown, 40% well-graded gravel, 40% m-f sand, 20% silt, loose, dry, some broken from drilling.	10 1/2 surface casing installed to a depth of 20' using Air Rotary Casing Hammer (ARCH). Soil logging imprecise in this interval due to mixing of cuttings.			
5				SM		Much drill chatter in this interval.  Exterior of casing sealed with hydrated bentonite at surface. Interior of casing sealed at bottom prior to advancement of 6 5/8 bit.			
  						Pilot boring drilled with mud rotary; soil descriptions to 160' from drill cuttings.			
<b>20</b>					<b>POORLY GRADED GRAVEL (GP)</b> - m ang sand up to 1/4, trace fine sand and silt, freshly broken.	Drill chatter.			
25 				GP	- c. ang sand up to 3/8 gravel				
30 				SC	CLAYEY SAND (SC) 70-75% m-c ang sand, 15-20% lt brn clay, 10% f ang gravel to 1/4, some fine sand.	-			
35						CHORALIII			



SHEET 2 of 10						PROJECT NUMI	BER:		BORIN	G NUMBER:
						315024	.IM.02			TW-1
PROJECT NAM						HOLE DEPTH (ft):	G LOG	DRILLING CONTRAC	TOD:	
PG&E Topo	ck IM I					312.0	_	WDC Exploration	and Wells	
SURFACE ELEV 621.0 ft.		N:	NORTH: 2,1	ING (CCS 01,173.17	NAD 27 Z 5):	<b>EASTING (CCS NAD 27</b> 7,615,150.78	' Z 5):	<b>DATE AND TIME STA</b> 11/11/2003 10:1	<b>RTED:</b> 5:00 AM	<b>DATE AND TIME COMPLETED:</b> 11/13/2003 5:00:00 PM
DRILLING MET Mud R	HOD:					WATER LEVEL (ft):		DRILLING EQUIPME Speedstar		th 94-mm Punch Core
LOCATION: PG		pock Fa	cility					LOGGED BY:	mas / R. E	
	S	AMPLE				SOIL DESCRIPTION				COMMENTS
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	USCS CODE	PERCENT CON	SOIL NAME, USCS SYMBO MPOSITION, GRADING, GRA ITY/CONSISTENCY, STRUC	OL, COLOR, AIN SHAPE, TURE, MOI	, MINERALOGY, STURE.	DRILLING DAILY ST REFUSAL	OBSERVATIONS AND OPERATIONS, ART AND END TIMES , DRILL RATE, S, SAMPLING AND TESTING NOTES.
  	I		<b>E</b>	SW-SC	10% clay, 5% content.	DED SAND WITH CLAY (\$6 of ang gravel, overall dec	creasing pa	rticle size and clay		
- - 					WELL-GRAD	<b>DED SAND (SW)</b> m-c ang	g sand, trac	ce vf ang gravel.		
<b>45</b> 										
50										
- 60  										
- 65  										
70										
										CH2MHILL

SHEET 3 of 10						PROJECT NUMBER:		BORII	NG NUMBER:
						315024.IM.02			TW-1
PROJECT NAMI	F.					SOIL BORING LO HOLE DEPTH (ft):	DRILLING CONTRAC	CTOR:	
PG&E Topo	ck IM I	_	-		-	312.0	WDC Exploratio	n and Well	ls, Montclair, CA
SURFACE ELEV 621.0 ft.		N:   N	1 <b>ORTH</b> 2,1	I <b>NG (CCS</b> 01,173.17	NAD 27 Z 5):	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	11/11/2003 10:	<b>ARTED:</b> 15:00 AM	<b>DATE AND TIME COMPLETED:</b> 11/13/2003 5:00:00 PM
DRILLING MET Mud R	HOD:	•				WATER LEVEL (ft):	DRILLING EQUIPME	NT:	with 94-mm Punch Core
LOCATION: PG		pock Fac	cility				LOGGED BY:	omas / R.	
		AMBLE				SOIL DESCRIPTION	D. III	Ullias / K.	COMMENTS
DEDTH DCC		AMPLE	I	USCS		JOIL DESCRIPTION			COMMENTS
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	CODE	PERCENT COI DENS	SOIL NAME, USCS SYMBOL, COLO MPOSITION, GRADING, GRAIN SHAI SITY/CONSISTENCY, STRUCTURE, M	R, PE, MINERALOGY, OISTURE.	DRILLIN DAILY S REFUSA	G OBSERVATIONS AND OPERATIONS, START AND END TIMES , DRILL RATE, LLS, SAMPLING AND TESTING NOTES.
			_		WELL-GRAD	<b>DED SAND (SW)</b> m-c ang sand, to	race vf ang gravel.		
 75									
80									
					- orange	streaking			
_									
85									
90					- orange	streaking			
					3				
95					- orange	streaking			
100				SW					
				SVV	- orange	streaking			
_									
_									
105					- orange	and white streaking			



SHEET 4 of 10						PROJECT NUMBER 315024.IM		BORIN	IG NUMBER: TW-1
						SOIL BORING			
PROJECT NAM PG&E Topo	E:	Invection	tion (Dh	nace 5 200/	1)	HOLE DEPTH (ft):	DRILLING CONT		- Mantalain CA
SURFACE ELE	OITAV		NORTH	ING (CCS	NAD 27 Z 5):	312.0 EASTING (CCS NAD 27 Z 5	): DATE AND TIME	STARTED:	, Montclair, CA  DATE AND TIME COMPLETED:
621.0 ft DRILLING ME			2,1	.01,173.17		7,615,150.78 <b>WATER LEVEL (ft):</b>	11/11/2003 DRILLING EQUI	10:15:00 AM PMENT:	11/13/2003 5:00:00 PM
Mud I	Rotary		-1114					ith 94-mm Punch Core	
LOCATION: PG	I & E IC	ороск гас	cility				. Thomas / R. E	Edwards	
	9	SAMPLE				SOIL DESCRIPTION	l		COMMENTS
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	USCS CODE		SOIL NAME, USCS SYMBOL, CO MPOSITION, GRADING, GRAIN S SITY/CONSISTENCY, STRUCTURE		DAILY S	G OBSERVATIONS AND OPERATIONS, FART AND END TIMES , DRILL RATE, S, SAMPLING AND TESTING NOTES.
					WELL-GRA	DED SAND (SW) m-c ang san	d, trace vf ang gravel.		
_									
_									
110	_					and white shooting			
_	-				- orange	and white streaking			
	-								
-	-								
	-								
115					- orange	and white streaking			
_									
-	-			SW					
_	-								
 120	-								
						ange, and white streaks in cuttin	gs, mostly m-c ang		
-					sand, sor	me fines, trace gravel up to 1/4			
125									
-									
130					- trace of	f silt			
-	-								
-									
	-								
135	-								
-	-								
-									

- orange and white streaking



SHEET 5 of 10		PROJECT NUMBER: 315024.IM.02		BORING NUMBER: TW-1				
		SOIL BORING LO	G					
PROJECT NAME: PG&E Topock IM Investi	gation (Phase 5 2004)	HOLE DEPTH (ft): 312.0	DRILLING CONTRACT WDC Exploration		, Montclair, CA			
SURFACE ELEVATION: 621.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,173.17	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	<b>DATE AND TIME STAI</b> 11/11/2003 10:11	<b>RTED:</b> 5:00 AM	<b>DATE AND TIM</b> 11/13/2003	5:00:00 PM		
DRILLING METHOD: Mud Rotary		WATER LEVEL (ft):	DRILLING EQUIPMEN Speedstar 3		th 94-mm Punch	Core		
LOCATION: PG & E Topock F	acility		LOGGED BY:	mas / R. E	dwards			

LOCATION: PG	8 E To	opock Fac	cility			LOGGED BY: D. Tho	omas / R. Edwards
		SAMPLE			SOIL DESCRIPTION		COMMENTS
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	USCS CODE	SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE DENSITY/CONSISTENCY, STRUCTURE, MOI	, MINERALOGY, STURE.	DRILLING OBSERVATIONS AND OPERATIONS, DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			_		WELL-GRADED SAND (SW) m-c ang sand, trac	ce vf ang gravel.	
145					- orange and white streaking		
	-						
150					- m-c ang sand with some fine sands and silt		Mud Properties (155' during borehole
	-						ream) viscosity = 37 seconds density = 9.2 lbs/gallon
							half press filter test = 3.4 mL in 7.5 min with firm 1-mm cake
155					- trace vf ang gravel		Mud properties at 155' during borehole
- 							ream
160					- brown, 80% angular sand, 20% subangular	to angular gravel	Start 94 mm coring at 10' intervals.
					up to 2, medium dense, wet		First core met refusal after 8.
165	-						
-							
170	-				SILTY SAND (SM) - brown matrix with red, orar	nge white dk and lt	First attempted SimulProbe
					green clasts, 70% well-graded ang sand, 30% silt, wet.	medium dense,	groundwater sample (no recovery).  Continue with 94 mm coring.
	-			SM			
175	-						



SHEET 6 of 10						PROJECT NUMBER:		BORIN	NG NUMBER: TW-1
						315024.IM.02			I AA-T
PROJECT NAMI	<u>.                                      </u>					SOIL BORING LO	DRILLING CONTRAC	TOD:	
PG&E Topo		nvestiga	tion (Ph	ase 5 2004	<del>l</del> )	312.0	WDC Exploratio		
SURFACE ELEV 621.0 ft.		N: N		ING (CCS 01,173.17	NAD 27 Z 5):	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	<b>DATE AND TIME STA</b> 11/11/2003 10:	<b>ARTED:</b> 15:00 AM	<b>DATE AND TIME COMPLETED:</b> 11/13/2003 5:00:00 PM
DRILLING MET Mud R	HOD:			,		WATER LEVEL (ft):	DRILLING EQUIPME	NT:	vith 94-mm Punch Core
LOCATION: PG		pock Fac	cility				LOGGED BY:	omas / R. I	
		AMPLE				SOIL DESCRIPTION	D. 111	Ullias / K. I	COMMENTS
DEPTH BGS			<u>≻</u>	USCS		SOIL DESCRIPTION			СОММЕНТЭ
(feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	CODE	DENS	SOIL NAME, USCS SYMBOL, COLC MPOSITION, GRADING, GRAIN SHA EITY/CONSISTENCY, STRUCTURE, M	PE, MINERALOGY, IOISTURE.	DAILY S	G OBSERVATIONS AND OPERATIONS, TART AND END TIMES , DRILL RATE, LS, SAMPLING AND TESTING NOTES.
  - 180				SW		<b>DED SAND (SW)</b> - m-c ang sand,			
   185				SM		<b>D WITH GRAVEL (SM)</b> - color var sand, 15-20% silt, 10-15% angular , wet.		3 atter	mpts for a total of 6' core.
			,	SW	WELL GRAD	<b>DED SAND (SW)</b> - m-c ang sand,	trace vf ang gravel.		
- 195 					WELL GRAD sand, 20% cl	DED SAND WITH CLAY (SW-SC) lay in layers.	ı - 80% well-graded ang		
				SW-SC	SILTY SANI	D WITH GRAVEL (SM) - color va	ies widely with minerals		
  				SM	present, 60%	well graded ang sand, 15-20% sil soft to medium firm, wet.			
						<b>DED SAND (SW)</b> - orange streaks ing gravel to 3/16.	in cuttings, m-c ang		



SHEET 7 of 10				PROJECT NUMBER: 315024.IM.02				BORING NUMBER: TW-1		
				SOIL BORING LO	)G					
PROJECT NAME: PG&E Topock		ation (Phase 5 2004)		HOLE DEPTH (ft): 312.0		C Exploration		s, Montclair, CA		
SURFACE ELEVA 621.0 ft. M		NORTHING (CCS N 2,101,173.17	NAD 27 Z 5):	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	DATE ANI 11/11/2003	TIME STA 3 10:1	<b>RTED:</b> 15:00 AM	<b>DATE AND TII</b> 11/13/2003	ME COMPLETED: 5:00:00 PM	
DRILLING METH Mud Rot			,	WATER LEVEL (ft):	DRILLING	<b>EQUIPME</b> Speedstar		th 94-mm Punch	Core	
LOCATION: PG &	E Topock F	acility			LOGGED I		omas / R. E	dwards		

LOCATION: PG	& E T	opock Fac	cility			LOGGED BY: D. Tho	omas / R. Edwards
	:	SAMPLE			SOIL DESCRIPTION		COMMENTS
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	USCS CODE	SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, DENSITY/CONSISTENCY, STRUCTURE, MOI	, MINERALOGY, ISTURE.	DRILLING OBSERVATIONS AND OPERATIONS DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
			_		<b>WELL GRADED SAND (SW)</b> - orange streaks in sand, trace ang gravel to 3/16.	cuttings, m-c ang	
				SW			
					- red-orange clay		Loss of circulation briefly.
 <b>220</b>							
					WELL GRADED GRAVEL WITH SAND (GW) - 6 angular sand, 15-20% silt, 15% f ang gravel to 1/4 clay, loose to medium firm, wet.		- 41% gravel in core sample based on grain size analysis
					asy, case a meaan may rea		
 225				GW			
_				GW			
230					WELL COADED CAND (CV)	200	
					WELL GRADED SAND (SW) - some ang gravel t	to 3/16.	
235				SW			
240					CLAYEY SAND (SC) - medium brn, 65% well-gra	aded ang sand, 35%	
 					medium plasticity fines, trace of ang gravel to 3/16 - becoming reddish	6, soft, wet.	
  -				SC			
245							

SHEET 8 of 10		PROJECT NUMBER: 315024.IM.02		BORIN	G NUMBER: TW-1	
		SOIL BORING LO	3			
PROJECT NAME: PG&E Topock IM Investig	ation (Phase 5 2004)	HOLE DEPTH (ft): 312.0	DRILLING CONTRACT WDC Exploration		, Montclair, CA	
SURFACE ELEVATION: 621.0 ft. MSL	<b>NORTHING (CCS NAD 27 Z 5):</b> 2,101,173.17	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	<b>DATE AND TIME STA</b> 11/11/2003 10:1	<b>RTED:</b> 5:00 AM	DATE AND TIM 11/13/2003	<b>1E COMPLETED:</b> 5:00:00 PM
DRILLING METHOD: Mud Rotary		WATER LEVEL (ft):	DRILLING EQUIPMENT Speedstar		th 94-mm Punch	Core
LOCATION: PG & E Topock F	acility		LOGGED BY: D. Tho	mas / R. E	dwards	

LOCATION: PG & E TOPOCK Facility					LOGGED B1:	o. Thomas / R. Edwards
			SOIL DESCRIPTION	COMMENTS		
DEPTH BGS (feet)	INTERVAL	TYPE/ NUMBER	RECOVERY (ft)	USCS CODE	SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATIONS DAILY START AND END TIMES , DRILL RATE, REFUSALS, SAMPLING AND TESTING NOTES.
					WELL GRADED SAND (SW) - slight red color, trace gravel to 3/16	
					- 15% fines, ang gravel	
  				SW	10 % intest ding graves	
<b>255</b>					- 25% f ang gravel to 1/8	
					SANDY CLAY (CL) - (10YR 4/4), 60% fines, 40% well-graded ang sand, soft, medium plasticity, wet.	Large rock in shoe blocked collection of core.
				CL		- C09 core contains dense, stiff clayey sand, red in color, not consolidated
   				SC	CLAYEY SAND (SC) wet, loose, 70% well-graded, angular sand, 30% fines. Becoming red, stiff to friable.	Mud Properties at (270' during borehole ream) Viscosity = 38 seconds Density = 9.3 lbs/gallon Half press filter test = 4.0 mL in 7.5 min with firm 1.5-mm firm cake
 					<b>SANDY MUDSTONE</b> - reddish (2.5YR 4/6), 70% fines, 30% f-m and sand, consolidated.	Density = 9.3 lbs/gallon
						Contact with consolidated bedrock interpreted from core, geophysical logs, and change in drilling fluid color at 275'  Sand content = 0.5%  Drill cuttings and mud return changed to red in color (notes at 275'); bedrock contact suspected between 270' and
280						275'



SHEET 9 of 10		PROJECT NUMBER: 315024.IM.02	BORING NUMBER: TW-1								
SOIL BORING LOG											
PROJECT NAME: PG&E Topock IM Investigation (Phase 5 2004)		HOLE DEPTH (ft): 312.0	DRILLING CONTRACTOR: WDC Exploration and Wells, Montclair, CA								
SURFACE ELEVATION: 621.0 ft. MSL	NORTHING (CCS NAD 27 Z 5): 2,101,173.17	<b>EASTING (CCS NAD 27 Z 5):</b> 7,615,150.78	<b>DATE AND TIME STA</b> 11/11/2003 10:1	<b>RTED:</b> 5:00 AM	<b>DATE AND TIM</b> 11/13/2003	5:00:00 PM					
DRILLING METHOD: Mud Rotary		WATER LEVEL (ft):	DRILLING EQUIPMENT: Speedstar 30K Rig with 94-mm Punch Core								
LOCATION: PG & E Topock	acility	LOGGED BY:									

	s	SAMPLE			SOIL DESCRIPTION	COMMENTS		
DEPTH BGS (feet)	INTERVAL	INTERVAL TYPE/ NUMBER		USCS CODE	SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.	DRILLING OBSERVATIONS AND OPERATION DAILY START AND END TIMES , DRILL RAT REFUSALS, SAMPLING AND TESTING NOTE		
_			RECOVERY (ft)	BR	<b>SANDY MUDSTONE</b> - reddish (2.5YR 4/6), 70% fines, 30% f-m ang sand, consolidated.	Mud Properties at (during borehole ream)		
_					- consolidated, sandy to silty	Viscosity = 43 seconds Density = 9.1 lbs/gallon		
_ _ 285						Full press filter test = 5.7 mL in 7.5 min with firm 2/32-inch firm cake Sand content = 0.6%		
_						Core collected at 281' is consolidated bedrock (I.e., Red Fanglomerate).		
-								
290					CLAYEY SANDSTONE - medium brown, 70% well-graded ang sand,			
-					30% fines.			
-								
295								
-								
- 300								
				BR				
-								
305								
-								
-								
310					SANDY MUDSTONE - medium brown with white calcareous streaks,			
-				BR	Forms Towningted at 212 ft	Pilot boring terminated at 312' bgs.		
					Boring Terminated at 312 ft			
	1				ABBREVIATIONS			



IEET 10 of 10					PROJECT NUMBER: 315024.IM.02	<u>.</u>	BORIN	IG NUMBER: TW-1		
					SOIL BORING LO		'			
PROJECT NAME:		etigation (Pk	nase 5 2004	1)	HOLE DEPTH (ft):	DRILLING CONTR		Montalair CA		
PG&E Topock IM Investigation (Phase 5 2004)  SURFACE ELEVATION: NORTHING (CCS NAD 27 Z 5		•		DATE AND TIME S						
621.0 ft. MSL 2,101,173.17  DRILLING METHOD:			7,615,150.78  WATER LEVEL (ft):	11/11/2003 1 DRILLING EQUIPM	0:15:00 AM <b>1ENT:</b>	11/13/2003 5:00:00 PM				
Mud Rotary  LOCATION: PG & E Topock Facility				<u></u> 7		ar 30K Rig with 94-mm Punch Core				
LOCATION: PG 8	k E Topoc	ск ғасіііту				D. T	homas / R. E	omas / R. Edwards		
	SAM	SAMPLE		SOIL DESCRIPTION			COMMENTS			
DEPTH BGS (feet)	INTERVAL TVDE	NUMBER RECOVERY (ft)	USCS CODE	SOIL NAME, USCS SYMBOL, COLOR, PERCENT COMPOSITION, GRADING, GRAIN SHAPE, MINERALOGY, DENSITY/CONSISTENCY, STRUCTURE, MOISTURE.		R, PE, MINERALOGY, DISTURE.	DRILLING OBSERVATIONS AND OPERATION DAILY START AND END TIMES , DRILL RAT REFUSALS, SAMPLING AND TESTING NOTE			
	X .			f = fine-c m = mec c = coars vc = very ang = an subang = subrnd = rnd = rot br = bed ss = sand conglom	k r fine-grained grained dium-grained se-grained r coarse-grained gular = subangular = subrounded unded rock formation dstone = conglomerate = compacted					