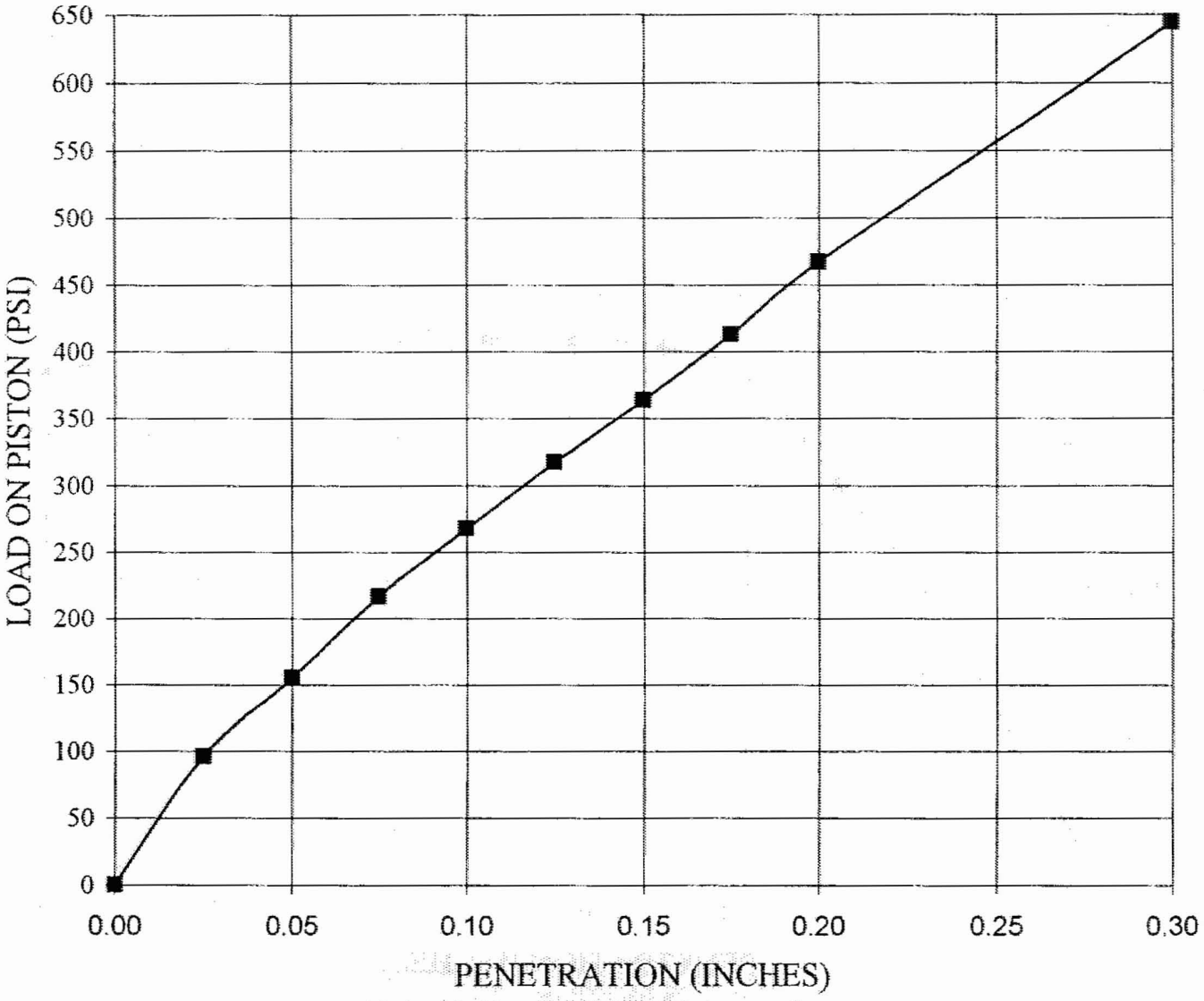
UNSOAKED CBR



CALIFORNIA BEARING RATIO

ASTM D-1883

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.:	06120048.00	Date:	9/29/2006

Boring No.	Depth (ft)	Sample Description
TP-C-723	2.5-3.5	Clayey SAND, dark brown

CBR (Unsoaked):	**26.8**	Soaking Time:	N/A
Surcharge:	50 PSF	Swell:	N/A

DRY DENSITY, PCF		MOISTURE CONTENT, %	
Before Soaking:	126.3	Before Soaking:	7.2
After Soaking:	N/A	After Soaking:	N/A
Max. Dry Density:	132.8	Optimum Moisture:	7.3

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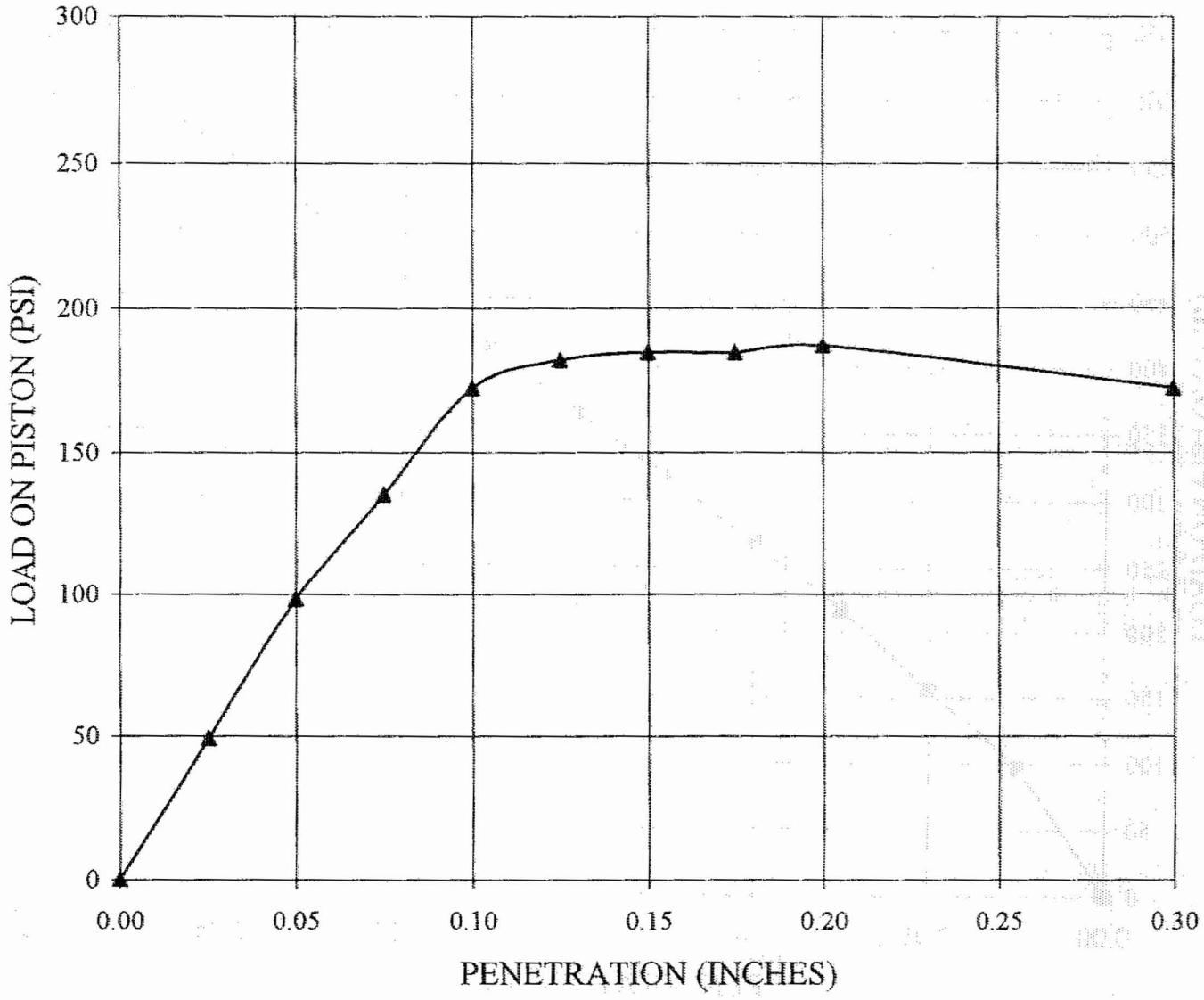
SOAKED CBR



CALIFORNIA BEARING RATIO

ASTM D-1883

Project:	Constellation Energy Group COLA Project, Calvert Cliffs NuclearPower Plant (CCNPP), Calvert County, Maryland	Contract No.:	06120048.00	Date:	9/29/2006

Boring No.	Depth (ft)	Sample Description
TP-C-723	2.5-3.5	Clayey SAND, dark brown

CBR (Soaked):	**17.2**	Soaking Time:	4 Days
Surcharge:	50 PSF	Swell:	0.5%

DRY DENSITY, PCF		MOISTURE CONTENT, %	
Before Soaking:	126.3	Before Soaking:	7.2
After Soaking:	125.5	After Soaking:	9.2
Max. Dry Density:	132.8	Optimum Moisture:	7.3

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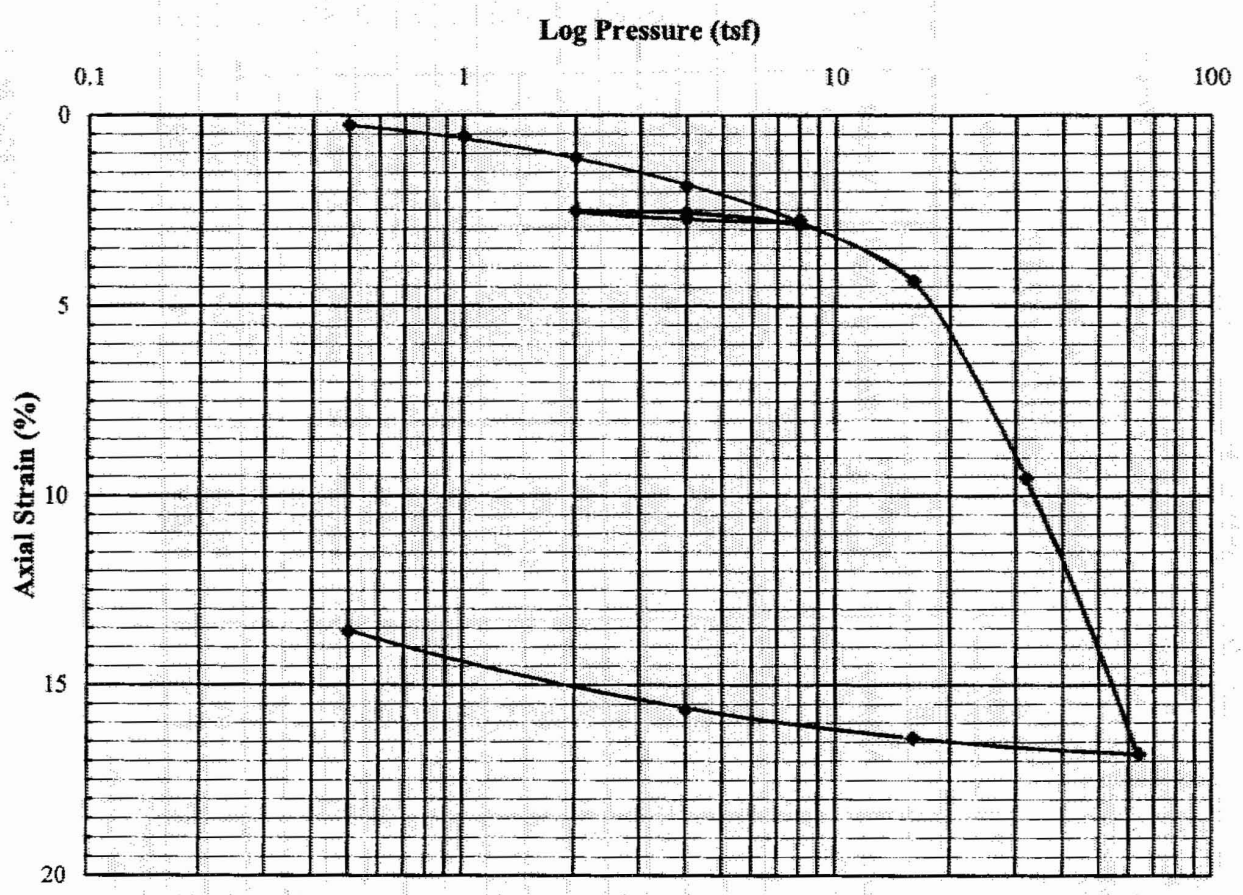
CONSOLIDATION RESULTS



REVISED FORM FOR
NCR NO. 25237-NCR-028
2/12/07

Probable Preconsolidation Pressure (Pp), tsf:	*20*			**Recompression Ratio (Cεr):**	*0.005*
Type of Specimen:	*Tube Sample*			**Compression Ratio (Cεc):**	*0.243*
Description:	*FAT CLAY (CH), contains mica - gray*				**Initial** / **Final**
				Water Content, %	*36.4* / *28.6*
LL: *76*	**PI:** *46*	**Gs:** *2.68*	**P_c' (tsf):** *5.15*	**Void Ratio**	*1.01* / *0.73*
% < No. 200: *99.5*		**Test Method:**	*ASTM D2435 Method A*	**Saturation, %**	*97* / *100*
Test Condition:	*Inundated @ 1 tsf*			**Dry Unit Weight, pcf**	*83.3* / *96.4*

Remarks: Coefficient of Consolidation, Cv, equals 2448, 591, and 1764 ft2/yr at average pressures of 6, 12, and 24 tsf (square root of time method).

Average Water Content of Trimmings, %: *35.3*

Project: Calvert Cliffs Nuclear Power Plant

Location:	*Calvert County, MD*		
Boring:	*B-301*	**Schnabel No.:**	*06120048*
Depth:	*158.5-159.6 ft*	**Elevation:**	*-61.7 to -62.8*
Date:	*10/13/2006*	**Reviewed by:**	*CJS*

Schnabel
Schnabel Engineering

Consolidation Test Report

Consolidation Test Data Sheet

Consolidometer ID: 5

10/13/06

REVISED FORM FOR
NCR NO. 25237-NCR-028
2/12/2007

Schnabel Contract: *06120048*

Test Method: *ASTM D2435 Method A*

Project: *Calvert Cliffs Nuclear Power Plant*

Test Condition: *Inundated @ 1 tsf*

Initial Height of Specimen (H_o), in.: 0.7499

Boring No.: *B-301*

Height of Solids (H_s), in.: 0.3737

Depth: *158.5-159.6 ft*

Seating Press. (tsf): 0.05

Initial Dial Gauge Reading (D_o), in.: 0.0000

Reviewed by: CJS

Pressure, P (tsf)	TimeReadings Required	Date Load Applied	Time Load Applied	Load Applied By	A Final[1] Dial Reading, D_{fi} x 10^{-4} in.	B Apparatus Correction[2], D_{ci} x 10^{-4} in.	C Cumulative Change in Height[3], ΔH_i in.	D Height of Voids[4], H_{vi} in.	Vertical Strain[5], ε_i (%)	Void Ratio[6], e_i
0.5		9/13/2006	9:00	DWC	31	12	0.0019	0.3743	0.25	1.002
1		9/14/2006	9:00	DWC	63	21	0.0042	0.3720	0.56	0.996
2		9/15/2006	9:00	DWC	117	33	0.0084	0.3678	1.12	0.984
4		9/16/2006	9:00	CJS	179	40	0.0139	0.3623	1.85	0.970
8		9/18/2006	9:15	CJS	258	50	0.0208	0.3554	2.77	0.951
4		9/19/2006	9:25	CJS	244	40	0.0204	0.3558	2.72	0.952
2		9/20/2006	9:25	CJS	222	33	0.0189	0.3573	2.52	0.956
4		9/21/2006	9:25	CJS	233	40	0.0193	0.3569	2.57	0.955
8		9/22/2006	9:25	CJS	265	50	0.0215	0.3547	2.87	0.949
16		9/25/2006	9:30	DWC	389	63	0.0326	0.3436	4.35	0.920
32		9/26/2006	9:25	DWC	791	76	0.0715	0.3047	9.53	0.815
64		9/27/2006	9:25	DWC	1349	87	0.1262	0.2500	16.83	0.669
16		9/28/2006	9:25	DWC	1293	63	0.1230	0.2532	16.40	0.678
4		9/29/2006	9:25	DWC	1214	40	0.1174	0.2588	15.66	0.693
0.5		10/2/2006	9:25	DWC	1031	12	0.1019	0.2743	13.59	0.734

Notes:
1. "Final" based on test method; 24 hrs for Method A, end of primary for Method B.
2. Correction value, for the current pressure, from the consolidometer's calibration curve.
3. $\Delta H = D_{fi} - D_o - D_{ci}$ = Col. A - D_o - Col. B
4. $H_{vi} = (H_o - H_s) - \Delta H$
5. $\varepsilon_i = (\Delta H / H_o) \times 100$ = (Col. C / H_o) x 100
6. $e_i = H_{vi} / Hs$ = Col. D / Hs

Consol 8/2006 Rev. 1

Schnabel
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Load Time Readings

10/13/06

Project: Calvert Cliffs Nuclear Power Plant
Schnabel Contract: 06120048
Boring No.: B-301 Depth: 158.5-159.6 ft

Consol. ID: 5 Reviewed by: CJS

Elapsed Time (min.)	Dial Guage Readings (inches)					
	8 tsf Initial Load 9/18/2006	16 tsf Initial Load 9/25/2006	32 tsf Load 9/26/2006	X tsf Load Date	X tsf Load Date	X tsf Load Date
0.1	0.0229	0.0329	0.0521			
0.25	0.0232	0.0335	0.0550			
0.5	0.0234	0.0339	0.0568			
1	0.0237	0.0343	0.0586			
2	0.0238	0.0346	0.0603			
4	0.0240	0.0350	0.0621			
8	0.0242	0.0353	0.0638			
15	0.0244	0.0357	0.0655			
30	0.0246	0.0361	0.0675			
60	0.0247	0.0365	0.0694			
120	0.0250	0.0370	0.0715			
240	0.0252	0.0375	0.0737			
480	0.0254	0.0380	0.0761			
720	0.0254	0.0383	0.0770			
960	0.0255	0.0385	0.0778			
1200	0.0256	0.0386	0.0785			
1440	0.0258	0.0389	0.0791			
1680						
1920						
2160						
2400						
2640						
2880						

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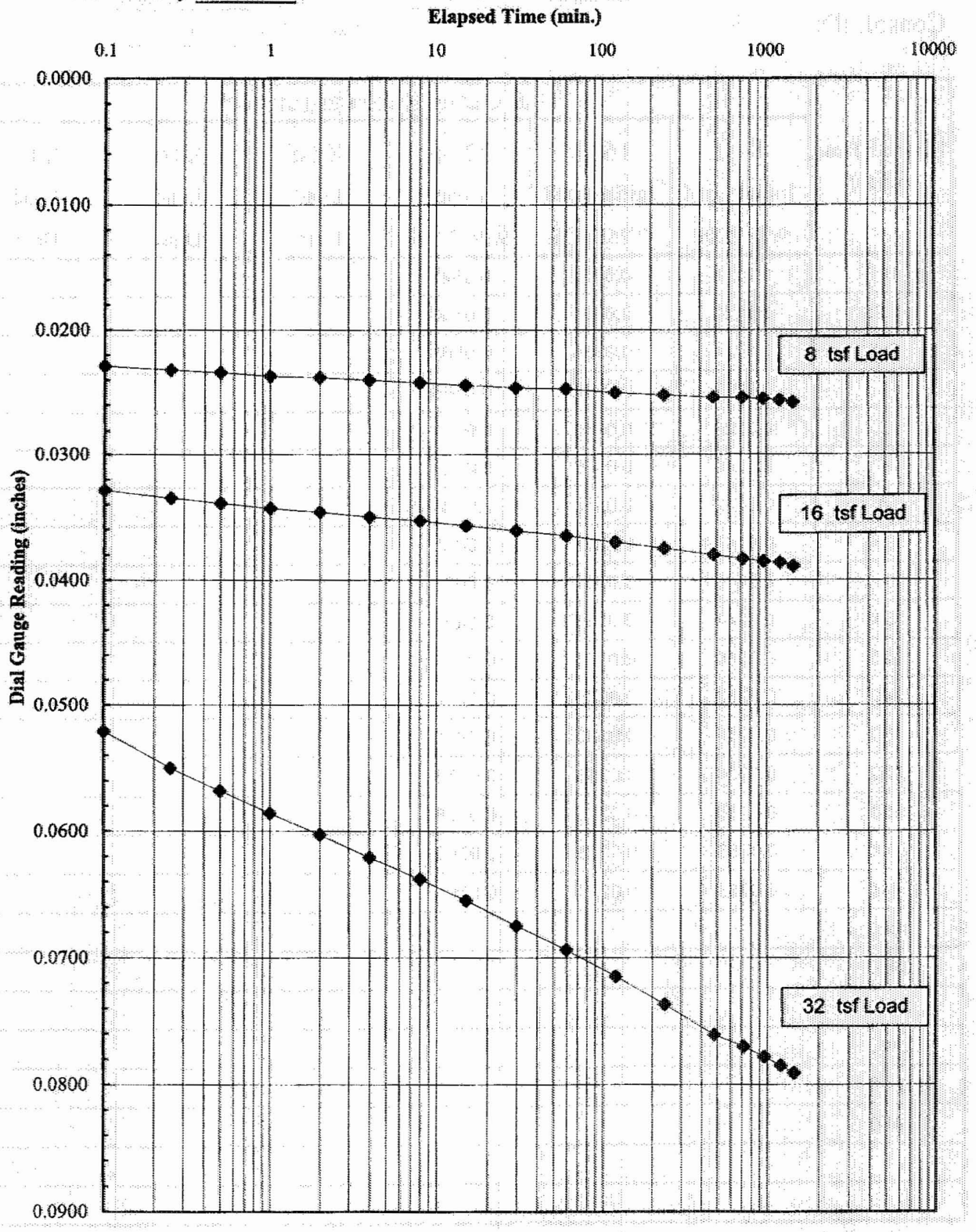
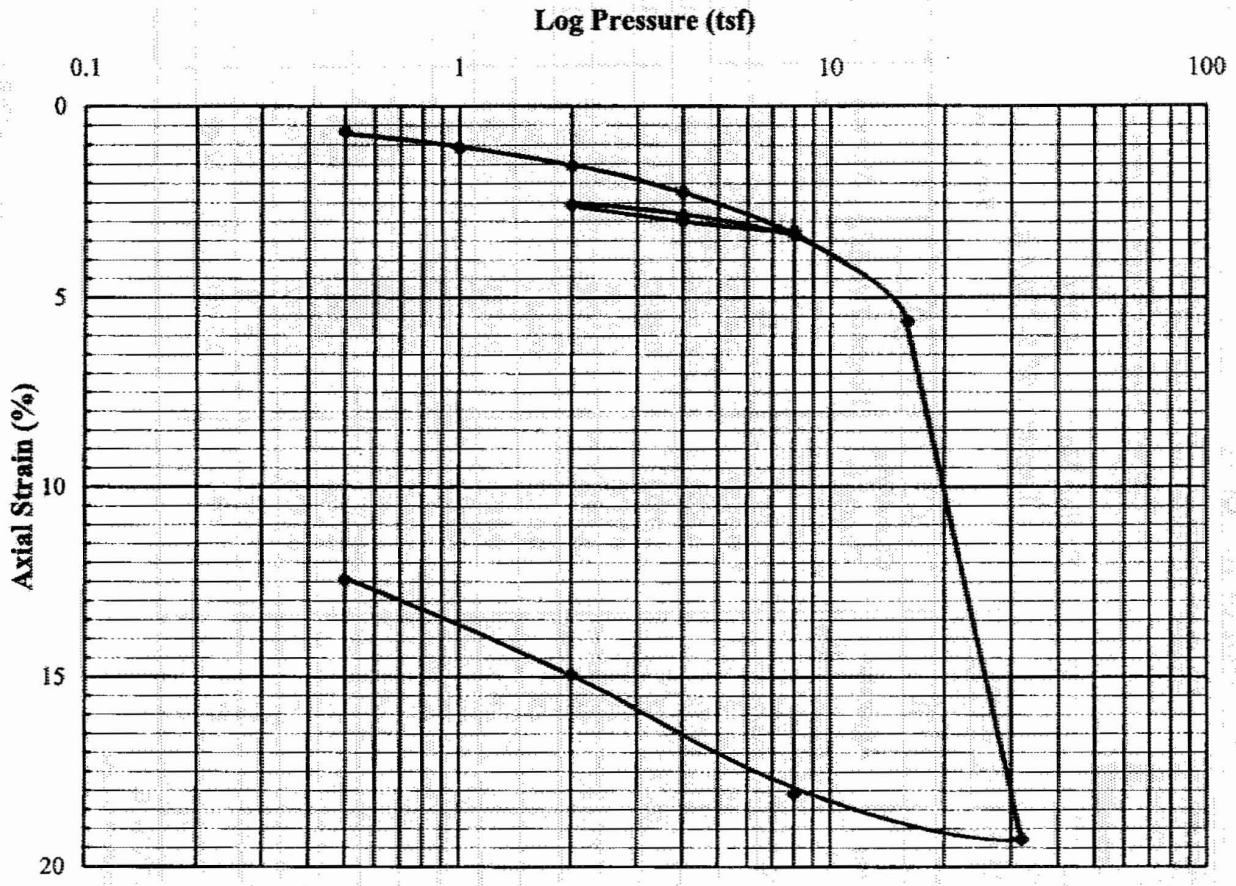
Consolidation Time Curves

10/13/06

Project: Calvert Cliffs Nuclear Power Plant
Schnabel Contract: 06120048
Boring No.: B-301 Depth: 158.5-159.6 ft

Reviewed by: CJS





REVISED FORM FOR
NCR NO. 25237-NCR-028
2/12/07

Probable Preconsolidation Pressure (Pp), tsf:	*16*	**Recompression Ratio (Cεr):**	*0.012*
Type of Specimen:	*Tube Sample*	**Compression Ratio (Cεc):**	*0.453*
Description:	*SANDY FAT CLAY (CH) - gray*		

	Initial	Final
Water Content, %	66.4	56.8
Void Ratio	1.82	1.46
Saturation, %	96	100
Dry Unit Weight, pcf	58.0	66.3

LL:	*112*	**PI:**	*73*	**Gs:**	*2.62*
P_c' (tsf):	*5.45*				
% < No. 200:	*66.2*	**Test Method:**	*ASTM D2435 Method A*		
Test Condition:	*Inundated @ 1 tsf*				

Remarks: Coefficient of Consolidation, Cv, equals 3037, 754, and 110 ft2/yr at average pressures of 3, 12, and 24 tsf (square root of time method).

Average Water Content of Trimmings, %: *64.9*

Project: Calvert Cliffs Nuclear Power Plant

Location:	*Calvert County, MD*		
Boring:	*B-301*	**Schnabel No.:**	*06120048*
Depth:	*168.5-170.4 ft*	**Elevation:**	*-71.7 to -73.6*
Date:	*10/14/2006*	**Reviewed by:**	*CJS*

Schnabel
Schnabel Engineering

Consolidation Test Report

Consol 8/2006 Rev. 1

Consolidation Test Data Sheet

Consolidometer ID: 2

10/14/06

REVISED FORM FOR
NCR NO. 25237-NCR-028
2/12/2007

Schnabel Contract: *06120048*

Test Method: *ASTM D2435 Method A*

Project: *Calvert Cliffs Nuclear Power Plant*

Test Condition: *Inundated @ 1 tsf*

Initial Height of Specimen (H_o), in.: 0.7611

Boring No.: *B-301*

Height of Solids (H_s), in.: 0.2703

Depth: *168.5-170.4 ft*

Seating Press. (tsf): 0.05

Initial Dial Gauge Reading (D_o), in.: 0.0000

Reviewed by: CJS

Pressure, P (tsf)	Time Readings Required	Date Load Applied	Time Load Applied	Load Applied By	A: Final[1] Dial Reading, D_{fi} x 10^{-4} in.	B: Apparatus Correction[2], D_{ci} x 10^{-4} in.	C: Cumulative Change in Height[3], ΔH_i in.	D: Height of Voids[4], H_{vi} in.	Vertical Strain[5], ε_i (%)	Void Ratio[6], e_i
0.5		9/12/2006	9:15	DWC	61	11	0.0050	0.4858	0.66	1.797
1		9/13/2006	9:15	DWC	97	15	0.0082	0.4826	1.08	1.785
2		9/14/2006	9:15	DWC	139	21	0.0118	0.4790	1.55	1.772
4		9/15/2006	9:15	DWC	198	28	0.0170	0.4738	2.23	1.753
8		9/16/2006	9:15	CJS	283	36	0.0247	0.4661	3.25	1.724
4		9/18/2006	9:20	CJS	255	28	0.0227	0.4681	2.98	1.732
2		9/19/2006	9:30	CJS	216	21	0.0195	0.4713	2.56	1.744
4		9/20/2006	9:30	CJS	244	28	0.0216	0.4692	2.84	1.736
8		9/21/2006	9:30	CJS	290	36	0.0254	0.4654	3.34	1.722
16		9/22/2006	9:35	CJS	474	45	0.0429	0.4479	5.64	1.657
32		9/25/2006	9:35	DWC	1525	57	0.1468	0.3440	19.29	1.273
8		9/27/2006	9:35	DWC	1412	36	0.1376	0.3532	18.08	1.307
2		9/28/2006	9:30	DWC	1158	21	0.1137	0.3771	14.94	1.395
0.5		9/29/2006	9:30	DWC	959	11	0.0948	0.3960	12.46	1.465

Notes:
1. "Final" based on test method; 24 hrs for Method A, end of primary for Method B.
2. Correction value, for the current pressure, from the consolidometer's calibration curve.
3. $\Delta H = D_{fi} - D_o - D_{ci}$ = Col. A - D_o - Col. B
4. $H_{vi} = (H_o - H_s) - \Delta H$
5. $\varepsilon_i = (\Delta H / H_o) \times 100 = (\text{Col. C} / H_o) \times 100$
6. $e_i = H_{vi} / Hs$ = Col. D / Hs

Consol 8/2006 Rev. 1

Schnabel
Schnabel Engineering

Load Time Readings

10/14/06

Project: Calvert Cliffs Nuclear Power Plant
Schnabel Contract: 06120048
Boring No.: B-301 Depth: 168.5-170.4 ft

Consol. ID: 2 Reviewed by: CJS

Elapsed Time (min.)	Dial Guage Readings (inches)					
	4 tsf Reload 9/20/2006	16 tsf Load 9/22/2006	32 tsf Load 9/23/2006	X tsf Load Date	X tsf Load Date	X tsf Load Date
0.1	0.0235	0.0352	0.0591			
0.25	0.0239	0.0368	0.0638			
0.5	0.0239	0.0380	0.0686			
1	0.0239	0.0388	0.0745			
2	0.0240	0.0394	0.0816			
4	0.0240	0.0400	0.0895			
8	0.0240	0.0407	0.0977			
15	0.0240	0.0413	0.1055			
30	0.0241	0.0419	0.1137			
60	0.0241	0.0427	0.1216			
120	0.0242	0.0435	0.1293			
240	0.0242	0.0444	0.1365			
480	0.0245	0.0456	0.1434			
720	0.0245	0.0463	0.1467			
960	0.0244	0.0467	0.1490			
1200	0.0244	0.0471	0.1509			
1440	0.0244	0.0474	0.1525			
1680		0.0478	0.1539			
1920		0.0480	0.1551			
2160		0.0481	0.1559			
2400		0.0484	0.1567			
2640		0.0487	0.1574			
2880		0.0488	0.1580			

Schnabel Engineering

Consolidation Time Curves

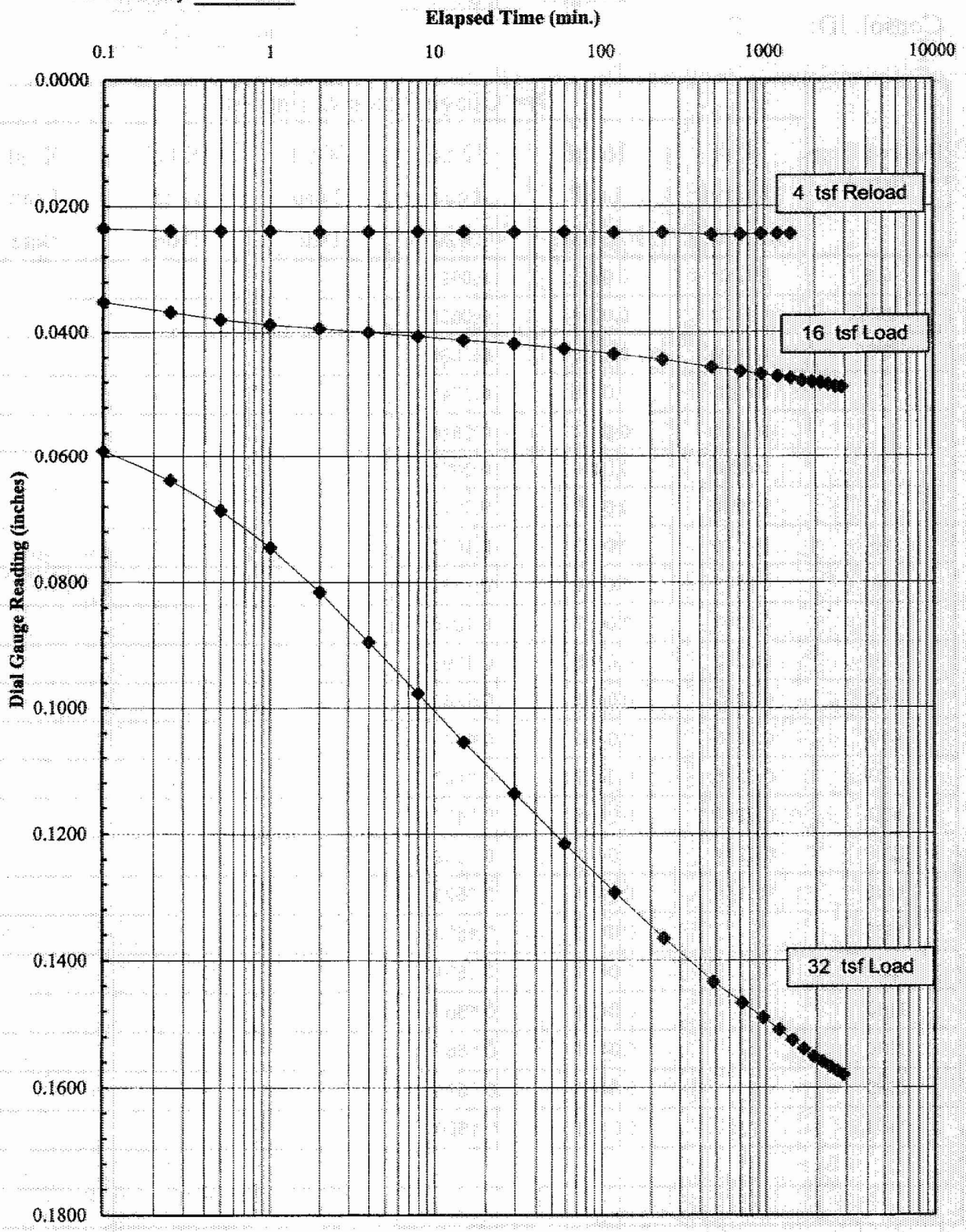
10/14/06

Project: Calvert Cliffs Nuclear Power Plant

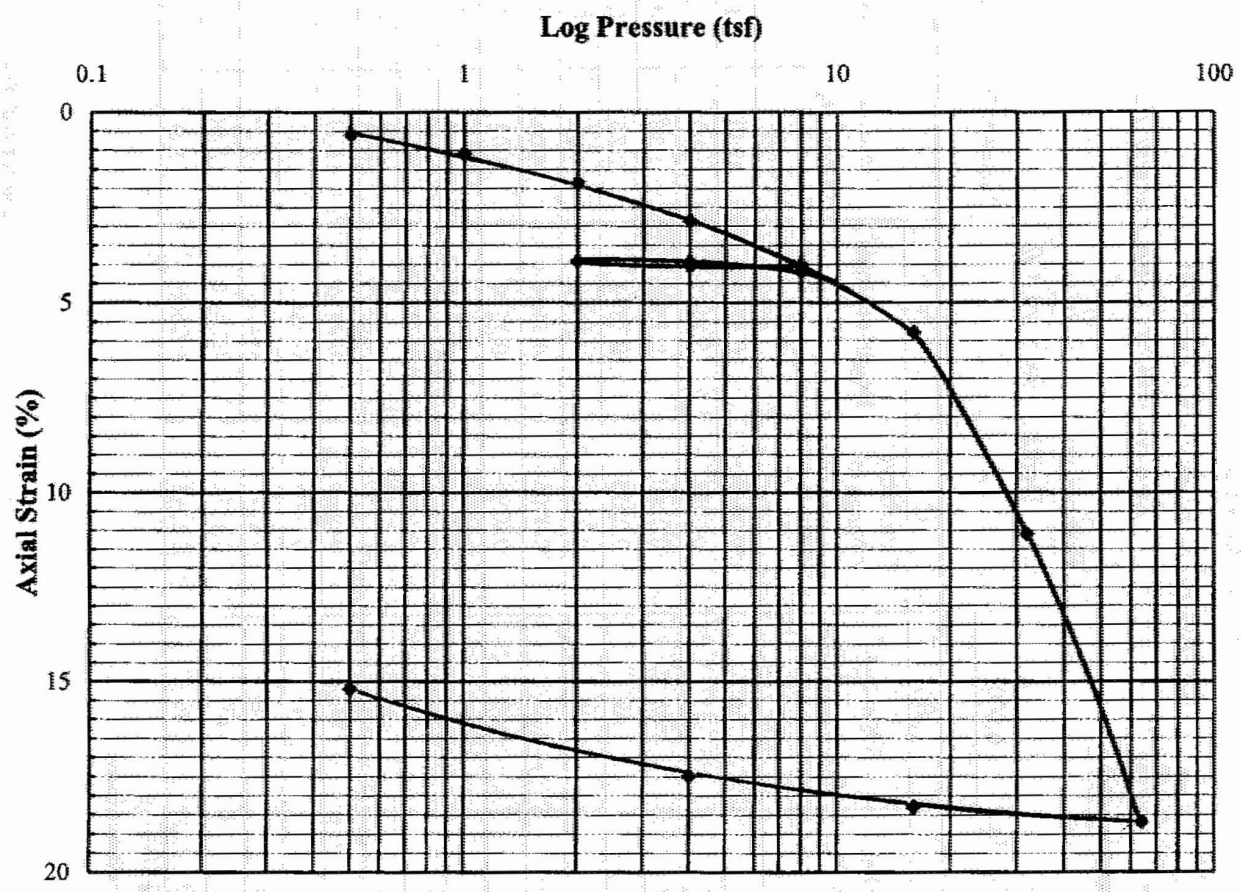
Schnabel Contract: 06120048

Boring No.: B-301 Depth: 168.5-170.4 ft

Reviewed by: CJS



Consol 8/2006 Rev. 1



REVISED FORM FOR
NCR NO. 25237-NCR-028
2/12/07

Probable Preconsolidation Pressure (Pp), tsf:	*20*			**Recompression Ratio (Cεr):**	*0.003*
Type of Specimen:	*Tube Sample*			**Compression Ratio (Cεc):**	*0.251*
Description:	*Fine CLAYEY SAND (SC), contains shell fragments - light gray*				**Initial** / **Final**
LL: *79*	**PI:** *51*	**Gs:** *2.65*	**P_c' (tsf):** *3.25*	**Water Content, %**	*37.7* / *28.9*
% < No. 200:	*47.3*	**Test Method:**	*ASTM D2435 Method A*	**Void Ratio**	*1.03* / *0.72*
Test Condition:	*Inundated @ 1 tsf*			**Saturation, %**	*97* / *100*
				Dry Unit Weight, pcf	*81.6* / *96.2*

Remarks: Coefficient of Consolidation, Cv, equals 2988 and 2703 ft2/yr at average pressures of 3 and 24 tsf (square root of time method).

Average Water Content of Trimmings, %: *37.2*

Project: Calvert Cliffs Nuclear Power Plant

Location:	*Calvert County, MD*		
Boring:	*B-304*	**Schnabel No.:**	*06120048*
Depth:	*98.5-99.5 ft*	**Elevation:**	*-30.5 to -31.5*
Date:	*10/17/2006*	**Reviewed by:**	*CJS*

Schnabel
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Consolidation Test Report

Consolidation Test Data Sheet

Consolidometer ID: 4

10/17/06

REVISED FORM FOR
NCR NO. 25237-NCR-028
2/12/2007

Schnabel Contract: *06120048*

Test Method: *ASTM D2435 Method A*

Project: *Calvert Cliffs Nuclear Power Plant*

Test Condition: *Inundated @ 1 tsf*

Initial Height of Specimen (H_o), in.: 0.7522

Boring No.: *B-304*

Height of Solids (H_s), in.: 0.3713

Depth: *98.5-99.5 ft*

Seating Press. (tsf): 0.05

Initial Dial Gauge Reading (D_o), in.: 0.0001

Reviewed by: CJS

Pressure, P (tsf)	TimeReadings Required	Date Load Applied	Time Load Applied	Load Applied By	A Final[1] Dial Reading, D_{fi} x 10^{-4} in.	B Apparatus Correction[2], D_{ci} x 10^{-4} in.	C Cumulative Change in Height[3], ΔH_i in.	D Height of Voids[4], H_{vi} in.	Vertical Strain[5], ε_i (%)	Void Ratio[6], e_i
0.5		9/16/2006	8:55	CJS	82	36	0.0045	0.3764	0.60	1.014
1		9/18/2006	9:05	CJS	128	45	0.0082	0.3727	1.09	1.004
2		9/19/2006	9:10	CJS	199	58	0.0140	0.3669	1.86	0.988
4		9/20/2006	9:10	CJS	285	69	0.0215	0.3594	2.86	0.968
8		9/21/2006	9:10	CJS	388	84	0.0303	0.3506	4.03	0.944
4		9/22/2006	9:15	CJS	375	69	0.0305	0.3504	4.05	0.944
2		9/25/2006	9:45	DWC	354	58	0.0295	0.3514	3.92	0.946
4		9/26/2006	9:45	DWC	367	69	0.0297	0.3512	3.95	0.946
8		9/27/2006	9:40	DWC	400	84	0.0315	0.3494	4.19	0.941
16		9/28/2006	9:40	DWC	540	104	0.0435	0.3374	5.78	0.909
32		9/29/2006	9:40	DWC	960	123	0.0836	0.2973	11.11	0.801
64		10/2/2006	9:15	DWC	1549	143	0.1405	0.2404	18.68	0.647
16		10/3/063	9:15	DWC	1481	104	0.1376	0.2433	18.29	0.655
4		10/4/2006	9:15	DWC	1385	69	0.1315	0.2494	17.48	0.672
0.5		10/5/2006	9:15	DWC	1180	36	0.1143	0.2666	15.20	0.718

Notes:
1. "Final" based on test method; 24 hrs for Method A, end of primary for Method B.
2. Correction value, for the current pressure, from the consolidometer's calibration curve.
3. $\Delta H = D_{fi} - D_o - D_{ci}$ = Col. A - D_o - Col. B
4. $H_{vi} = (H_o - H_s) - \Delta H$
5. $\varepsilon_i = (\Delta H / H_o) \times 100$ = (Col. C / H_o) x 100
6. $e_i = H_{vi} / Hs$ = Col. D / Hs

Consol 8/2006 Rev. 1

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Schnabel Engineering

Load Time Readings

10/17/06

Project: Calvert Cliffs Nuclear Power Plant
Schnabel Contract: 06120048
Boring No.: B-304 Depth: 98.5-99.5 ft
Consol. ID: 4 Reviewed by: CJS

Elapsed Time (min.)	Dial Guage Readings (inches)					
	4 tsf Initial Load 9/20/2006	32 tsf Load 9/29/2006	X tsf Load Date	X tsf Load Date	X tsf Load Date	X tsf Load Date
0.1	0.0256	0.0687				
0.25	0.0259	0.0711				
0.5	0.0261	0.0728				
1	0.0263	0.0744				
2	0.0264	0.0759				
4	0.0266	0.0776				
8	0.0268	0.0793				
15	0.0270	0.0811				
30	0.0272	0.0832				
60	0.0273	0.0853				
120	0.0276	0.0877				
240	0.0279	0.0902				
480	0.0281	0.0926				
720	0.0281	0.0939				
960	0.0282	0.0948				
1200	0.0283	0.0955				
1440	0.0285	0.0960				
1680		0.0965				
1920		0.0969				
2160		0.0973				
2400		0.0976				
2640		0.0979				
2880		0.0983				