Schnabel Engineering

Consolidation Time Curves

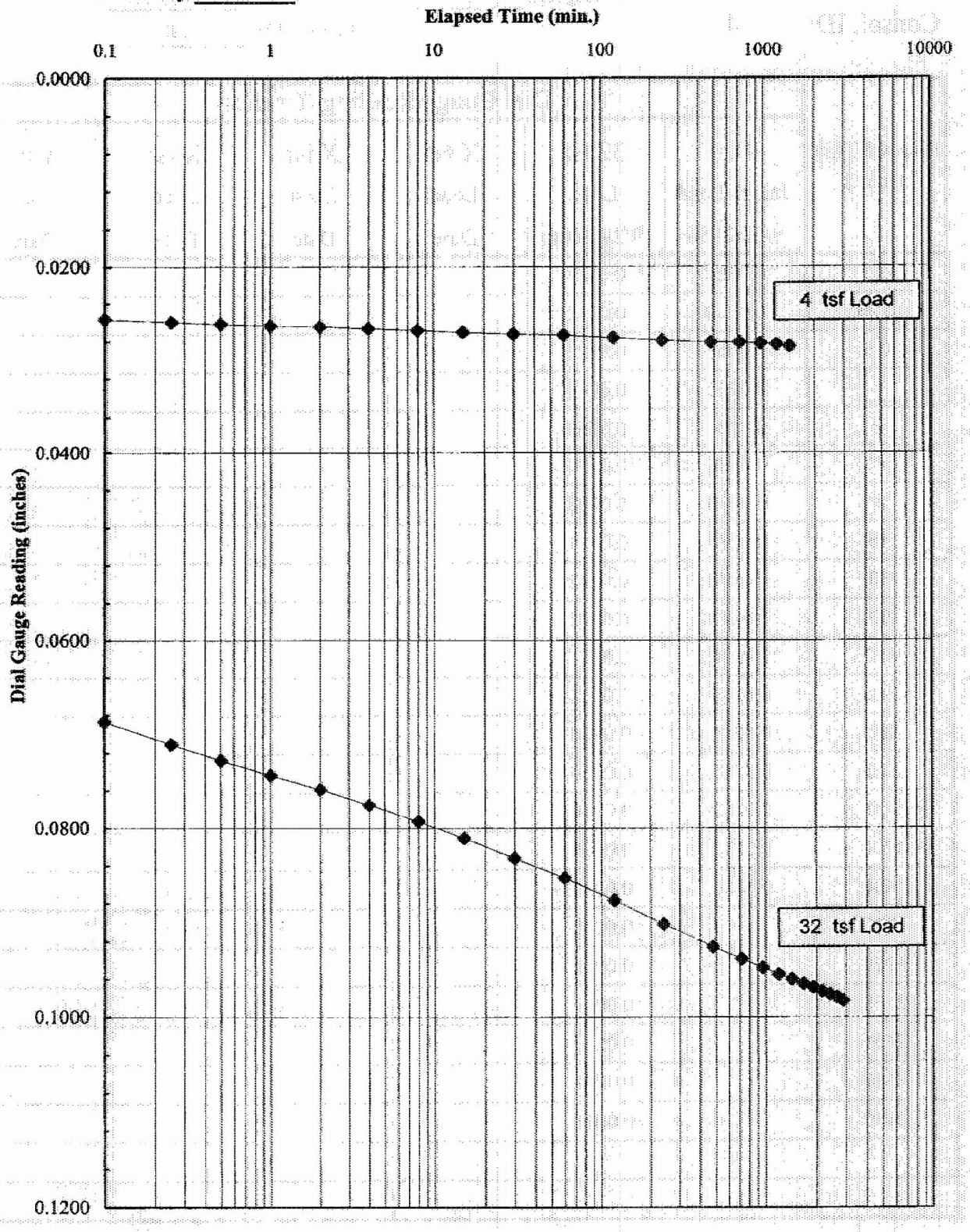
10/17/06

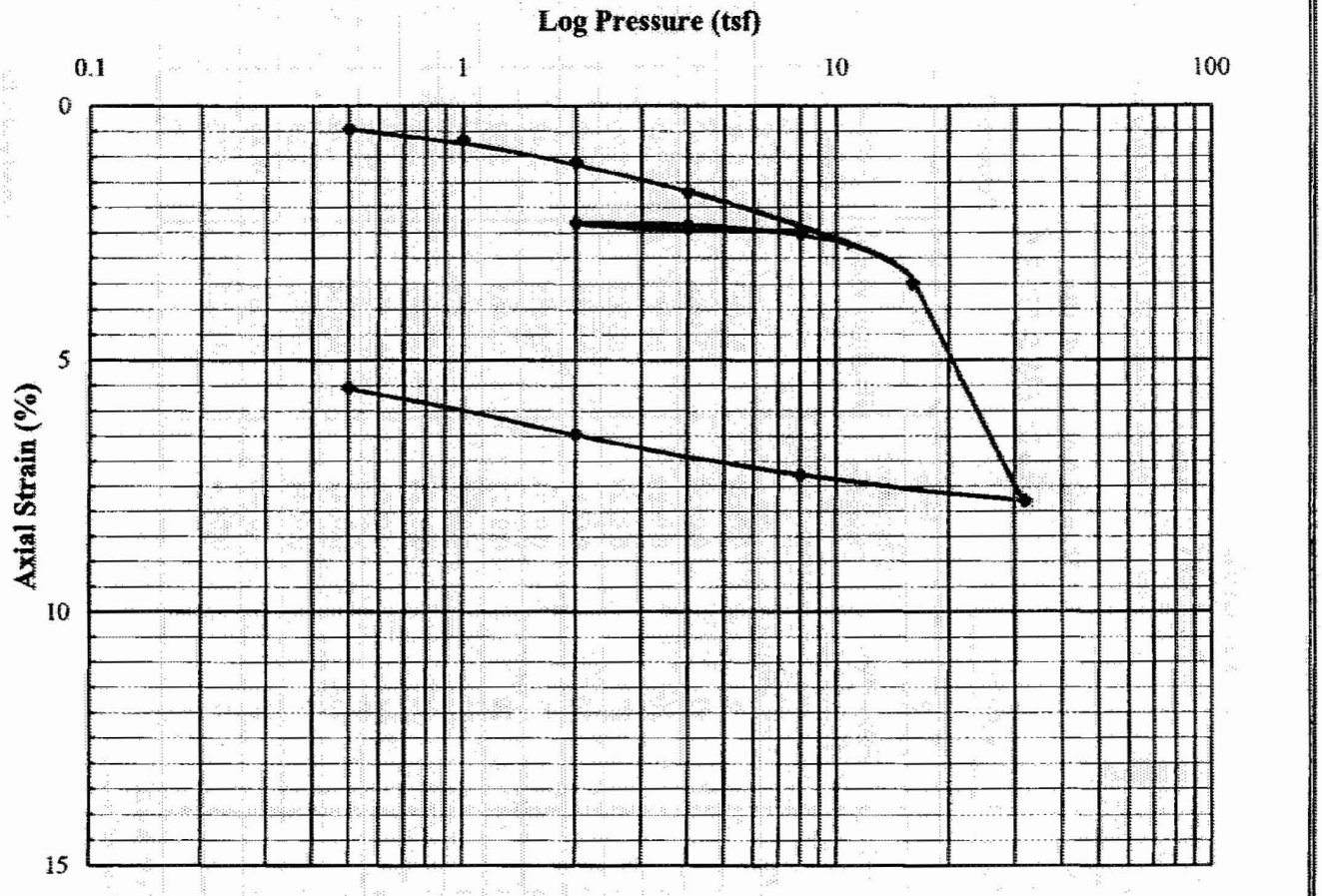
Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-304 Depth: 98.5-99.5 ft

Reviewed by: CJS





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

Probable Preconsolidation Pressure (Pp), tsf:	*16*				**Recompression Ratio (Cer):**		*0.003*
Type of Specimen:	*Tube Sample*				**Compression Ratio (Cec):**		*0.143*
Description:	*Fine CLAYEY SAND (SC) - dark gray*					**Initial**	**Final**
					Water Content, %	*35.2*	*33.1*
LL: *43*	**PI:** *17*	**Gs:** *2.65*	**P_o' (tsf):** *4.35*		**Void Ratio**	*0.95*	*0.84*
% < No. 200: *45.7*		**Test Method:** *ASTM D2435 Method A*			**Saturation, %**	*98*	*100*
Test Condition: *Inundated @ 1 tsf*					**Dry Unit Weight, pcf**	*84.8*	*89.8*

Remarks: Coefficient of Consolidation, Cv, equals 2943 and 5076 ft2/yr at average pressures of 3 and 12 tsf (square root of time method).

Average Water Content of Trimmings, %: *33.7*

Schnabel Engineering

Project: Calvert Cliffs Nuclear Power Plant

Location:	*Calvert County, MD*		
Boring:	*B-304*	**Schnabel No.:**	*06120048*
Depth:	*138.5-139.3 ft*	**Elevation:**	*-70.5 to -71.3*
Date:	*10/17/2006*	**Reviewed by:**	*CJS*

Consolidation Test Report

Consolidation Test Data Sheet

Consolidometer ID: 3

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.: 0.7468

Boring No.: *B-304*

Height of Solids (H_s), in.: 0.3832

Depth: *138.5-139.3 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		9/18/2006	9:25	CJS	40	6	0.0034	0.3602	0.46	0.940
1		9/19/2006	9:35	CJS	63	13	0.0050	0.3586	0.67	0.936
2		9/20/2006	9:35	CJS	103	20	0.0083	0.3553	1.11	0.927
4		9/21/2006	9:35	CJS	154	27	0.0127	0.3509	1.70	0.916
8		9/22/2006	9:40	CJS	219	36	0.0183	0.3453	2.45	0.901
4		9/25/2006	9:40	DWC	208	27	0.0181	0.3455	2.42	0.902
2		9/26/2006	9:40	DWC	193	20	0.0173	0.3463	2.32	0.904
4		9/27/2006	9:35	DWC	204	27	0.0177	0.3459	2.37	0.903
8		9/28/2006	9:35	DWC	225	36	0.0189	0.3447	2.53	0.899
16		9/29/2006	9:35	DWC	305	44	0.0261	0.3375	3.50	0.881
32		10/2/2006	9:10	DWC	635	53	0.0582	0.3054	7.79	0.797
8		10/3/2006	9:10	DWC	580	36	0.0544	0.3092	7.28	0.807
2		10/4/2006	9:10	DWC	503	20	0.0483	0.3153	6.47	0.823
0.5		10/5/2006	9:10	DWC	420	6	0.0414	0.3222	5.54	0.841

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

Schnabel Engineering

Load Time Readings

10/17/06

Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-304 Depth: 138.5-139.3 ft

Consol. ID: 3 Reviewed by: CJS

Elapsed Time (min.)	Dial Guage Readings (inches)					
	4 tsf Reload 9/27/2006	16 tsf Load 9/29/2006	X tsf Load Date	X tsf Load Date	X tsf Load Date	X tsf Load Date
0.1	0.0202	0.0275				
0.25	0.0202	0.0278				
0.5	0.0202	0.0280				
1	0.0202	0.0281				
2	0.0202	0.0283				
4	0.0202	0.0285				
8	0.0203	0.0287				
15	0.0203	0.0288				
30	0.0203	0.0291				
60	0.0203	0.0294				
120	0.0203	0.0296				
240	0.0203	0.0299				
480	0.0204	0.0303				
720	0.0204	0.0303				
960	0.0204	0.0304				
1200	0.0204	0.0305				
1440	0.0204	0.0305				
1680		0.0306				
1920		0.0307				
2160		0.0308				
2400		0.0309				
2640		0.0309				
2880		0.0309				

Schnabel Engineering

Consolidation Time Curves

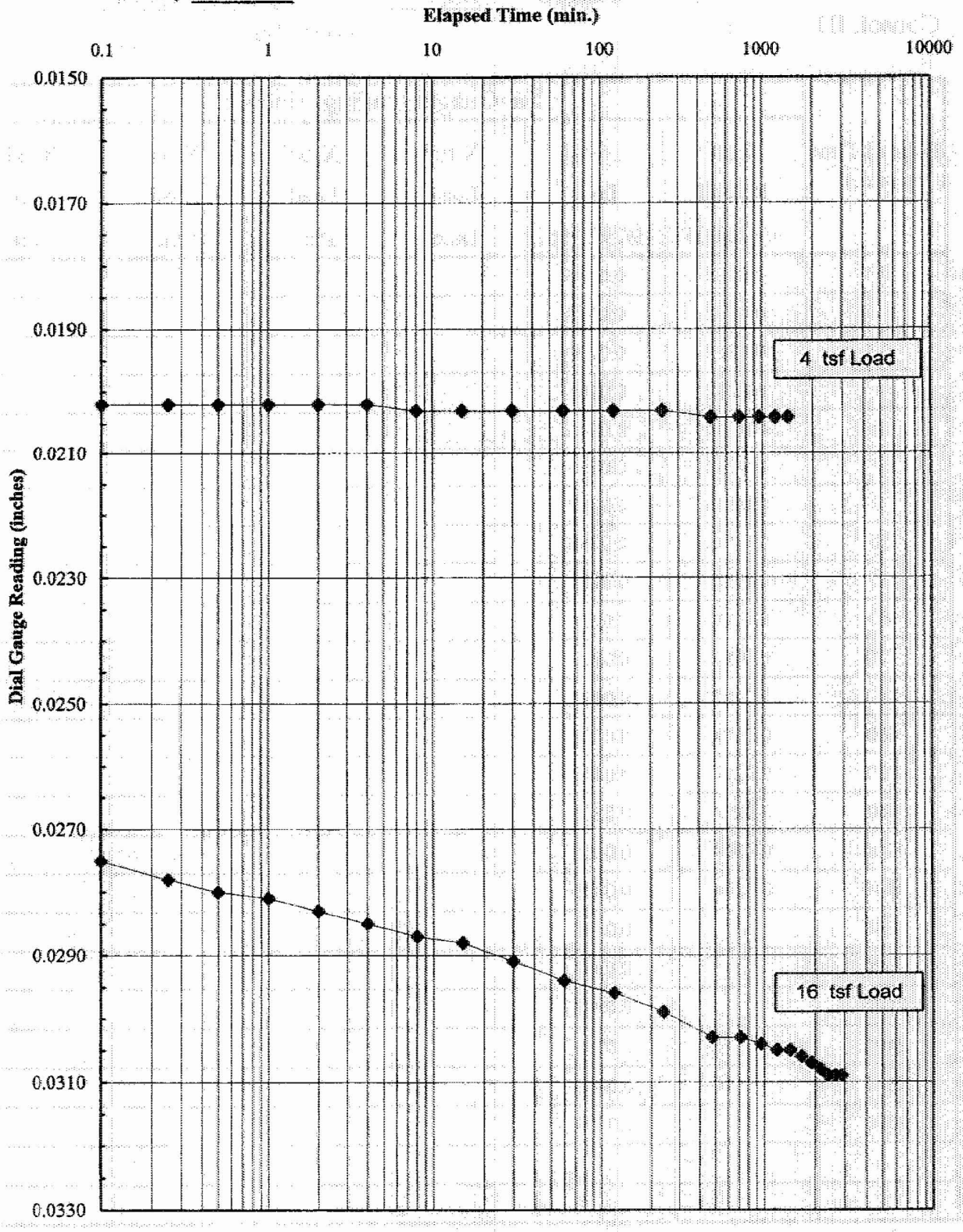
10/17/06

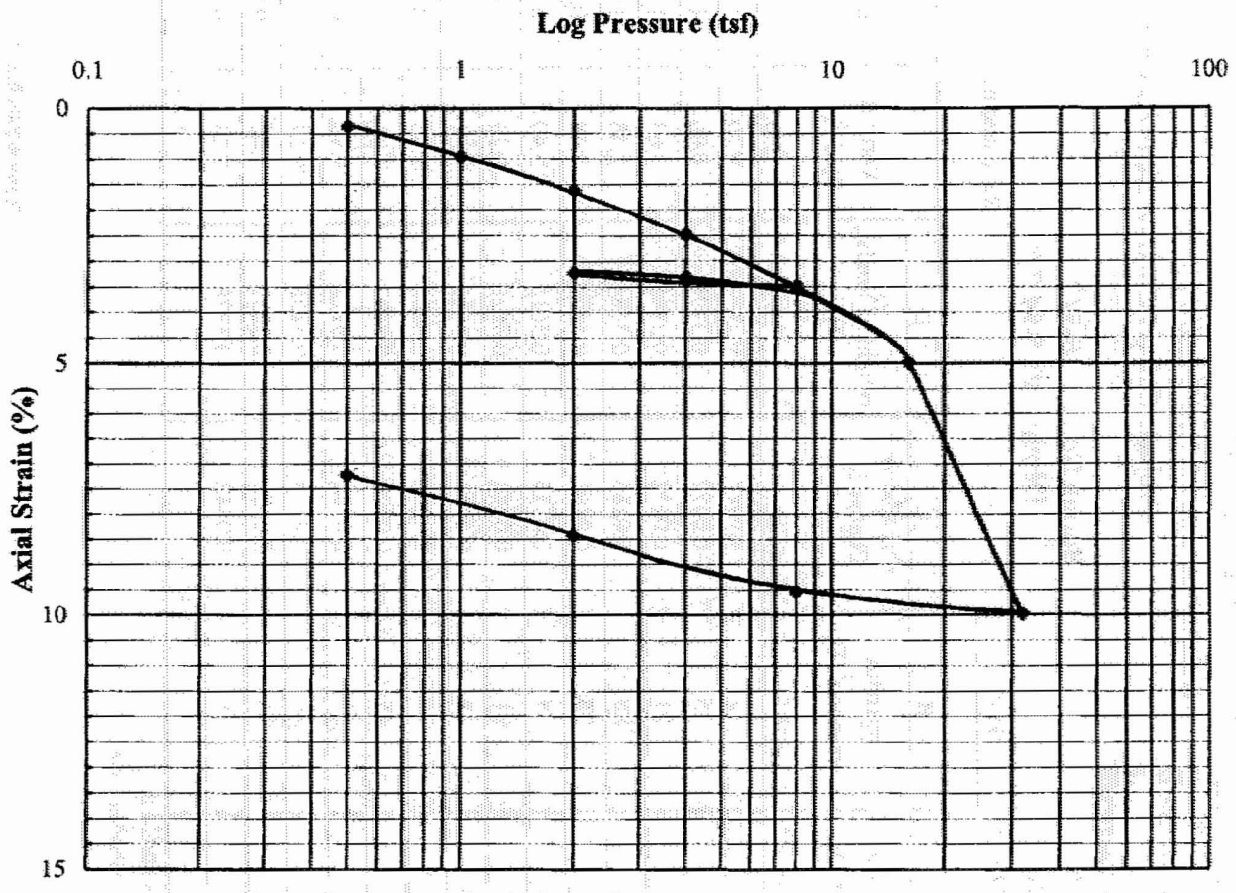
Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-304 Depth: 138.5-139.3 ft

Reviewed by: CJS





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

Probable Preconsolidation Pressure (Pp), tsf:	*16*	**Recompression Ratio (Cer):**	*0.005*
Type of Specimen:	*Tube Sample*	**Compression Ratio (Cec):**	*0.166*
Description:	*Sandy LEAN CLAY (CL), contains shells - gray*		

	Initial	**Final**
Water Content, %	*37.7*	*34.8*
Void Ratio	*1.07*	*0.92*
Saturation, %	*95*	*100*
Dry Unit Weight, pcf	*81.2*	*87.5*

LL:	*49*	**PI:** *24*	**Gs:** *2.69*
% < No. 200:	*NA*	**Test Method:**	*ASTM D2435 Method A*
Test Condition:	*Inundated @ 0.5 tsf*		

Remarks: Coefficient of Consolidation, Cv, equals 2010 ft2/yr at an average pressure of 24 tsf (square root of time method).

Average Water Content of Trimmings, %: *35.7*

Schnabel Engineering

Project: Calvert Cliffs Nuclear Power Plant

Location:	*Calvert County, MD*		
Boring:	*B-313*	**Schnabel No.:**	*06120048*
Depth:	*93.5-94.7 ft*	**Elevation:**	*-42.8 to -44.0*
Date:	*11/21/2006*	**Reviewed by:**	*CJS*

Consolidation Test Report

Consolidation Test Data Sheet

Consolidometer ID: 2

11/21/06

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 @ 0.5 tsf*

Initial Height of Specimen (H_o), in.: 0.7496

Boring No.: *B-313*

Height of Solids (H_s), in.: 0.3626

Depth: *93.5-94.7 ft*

Seating Press. (tsf): 0.05

Initial Dial Gauge Reading (D_o), in.: -0.0002

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		10/20/2006	9:05	DWC	36	11	0.0027	0.3843	0.36	1.060
1		10/21/2006	9:05	DWC	85	15	0.0072	0.3798	0.96	1.048
2		10/23/2006	9:05	DWC	141	21	0.0122	0.3748	1.63	1.034
4		10/24/2006	9:05	DWC	212	28	0.0186	0.3684	2.48	1.016
8		10/25/2006	9:05	DWC	295	36	0.0261	0.3609	3.48	0.995
4		10/26/2006	9:05	DWC	281	28	0.0255	0.3615	3.40	0.997
2		10/27/2006	9:05	DWC	261	21	0.0242	0.3628	3.23	1.001
4		10/31/2006	9:05	DWC	274	28	0.0248	0.3622	3.31	0.999
8		11/1/2006	9:05	DWC	300	36	0.0266	0.3604	3.55	0.994
16		11/2/2006	9:05	DWC	416	45	0.0373	0.3497	4.98	0.965
32		11/3/2006	9:05	DWC	803	57	0.0748	0.3122	9.98	0.861
8		11/4/2006	9:05	CJS	741	28	0.0715	0.3155	9.54	0.870
2		11/6/2006	9:05	DWC	650	21	0.0631	0.3239	8.42	0.893
0.5		11/7/2006	9:05	DWC	551	11	0.0542	0.3328	7.23	0.918

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 Engineering

Load Time Readings

11/21/06

Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-313 Depth: 93.5-94.7 ft

Consol. ID: 2 Reviewed by: CJS

Elapsed Time (min.)	Dial Guage Readings (inches)					
	4 tsf Reload 10/31/2006	32 tsf Load 11/3/2006	X tsf Load Date	X tsf Load Date	X tsf Load Date	X tsf Load Date
0.1	0.0271	0.0556				
0.25	0.0272	0.0577				
0.5	0.0272	0.0590				
1	0.0272	0.0603				
2	0.0272	0.0616				
4	0.0272	0.0629				
8	0.0272	0.0644				
15	0.0272	0.0660				
30	0.0272	0.0678				
60	0.0273	0.0699				
120	0.0273	0.0722				
240	0.0274	0.0747				
480	0.0274	0.0771				
720	0.0274	0.0783				
960	0.0274	0.0791				
1200	0.0274	0.0798				
1440	0.0274	0.0803				
1680						
1920						
2160						
2400						
2640						
2880						

Schnabel Engineering

Consolidation Time Curves

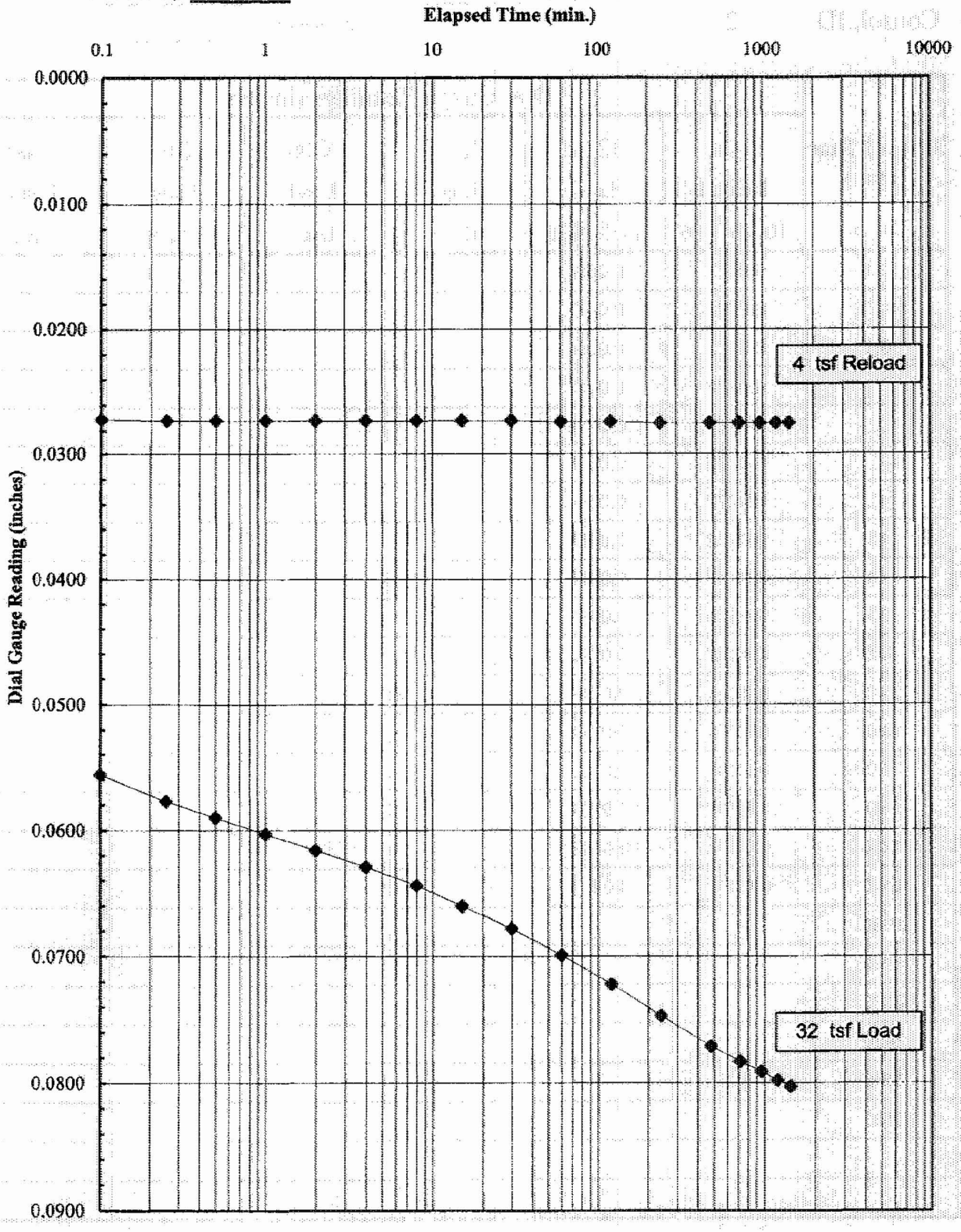
11/21/06

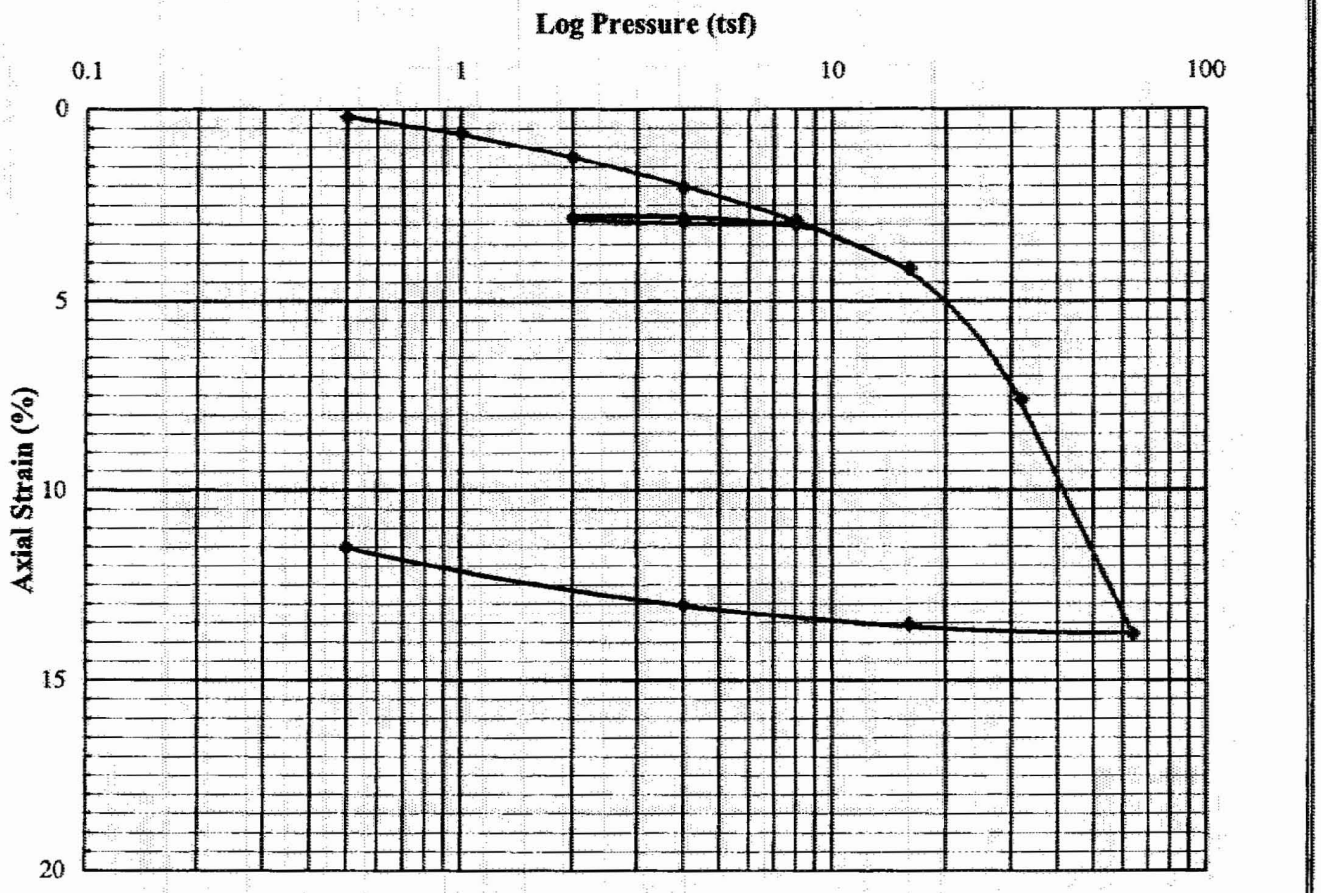
Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-313 Depth: 93.5-94.7 ft

Reviewed by: CJS





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

Probable Preconsolidation Pressure (Pp), tsf:	*23*				**Recompression Ratio (Cεr):**		*0.002*
Type of Specimen:	*Tube Sample*				**Compression Ratio (Cεc):**		*0.205*
Description:	*Fine CLAYEY SAND (SC) - dark green gray*					**Initial**	**Final**
					Water Content, %	*35.5*	*29.0*
LL: *44*	**PI:** *18*	**Gs:** *2.67*	**P_c' (tsf):** *3.85*		**Void Ratio**	*0.98*	*0.75*
% < No. 200: *NA*		**Test Method:** *ASTM D2435 Method A*			**Saturation, %**	*97*	*100*
Test Condition: *Inundated @ 1 tsf*					**Dry Unit Weight, pcf**	*84.3*	*95.3*

Remarks: Coefficient of Consolidation, Cv, equals 1265 ft2/yr at an average pressure of 24 tsf (square root of time method).

Average Water Content of Trimmings, %: *35.5*

Schnabel Engineering

Project: Calvert Cliffs Nuclear Power Plant

Location:	*Calvert County, MD*		
Boring:	*B-313*	**Schnabel No.:**	*06120048*
Depth:	*123.5-124.3 ft*	**Elevation:**	*-72.8 to -73.6*
Date:	*11/21/2006*	**Reviewed by:**	*CJS*

Consolidation Test Report

Consolidation Test Data Sheet

Consolidometer ID: 4

11/21/06

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.: 0.7506

Boring No.: *B-313*

Height of Solids (H_s), in.: 0.3800

Depth: *123.5-124.3 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		10/26/2006	9:15	DWC	52	36	0.0016	0.3690	0.21	0.971
1		10/27/2006	9:15	DWC	92	45	0.0047	0.3659	0.63	0.963
2		10/28/2006	9:15	CJS	152	58	0.0094	0.3612	1.25	0.951
4		10/30/2006	9:15	DWC	222	69	0.0153	0.3553	2.04	0.935
8		10/31/2006	9:15	DWC	302	84	0.0218	0.3488	2.90	0.918
4		11/1/2006	9:15	DWC	289	69	0.0220	0.3486	2.93	0.918
2		11/2/2006	9:15	DWC	272	58	0.0214	0.3492	2.85	0.919
4		11/3/2006	9:15	DWC	283	69	0.0214	0.3492	2.85	0.919
8		11/4/2006	9:15	CJS	310	84	0.0226	0.3480	3.01	0.916
16		11/6/2006	9:15	DWC	416	104	0.0312	0.3394	4.16	0.893
32		11/7/2006	9:15	DWC	704	132	0.0572	0.3134	7.62	0.825
64		11/8/2006	9:15	DWC	1179	143	0.1036	0.2670	13.80	0.703
16		11/9/2006	9:15	DWC	1121	104	0.1017	0.2689	13.55	0.708
4		11/10/2006	9:15	DWC	1048	69	0.0979	0.2727	13.04	0.718
0.5		11/11/2006	9:15	DWC	901	36	0.0865	0.2841	11.52	0.748

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

Schnabel Engineering

Load Time Readings

11/21/06

Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-313 Depth: 123.5-124.3 ft

Consol. ID: 4 Reviewed by: CJS

Elapsed Time (min.)	Dial Guage Readings (inches)					
	4 tsf Reload 11/3/2006	32 tsf Load 11/7/2006	X tsf Load Date	X tsf Load Date	X tsf Load Date	X tsf Load Date
0.1	0.0283	0.0526				
0.25	0.0283	0.0549				
0.5	0.0283	0.0559				
1	0.0283	0.0571				
2	0.0283	0.0578				
4	0.0283	0.0588				
8	0.0283	0.0600				
15	0.0283	0.0610				
30	0.0283	0.0622				
60	0.0283	0.0634				
120	0.0283	0.0652				
240	0.0283	0.0666				
480	0.0283	0.0682				
720	0.0283	0.0690				
960	0.0283	0.0695				
1200	0.0283	0.0701				
1440	0.0283	0.0704				
1680						
1920						
2160						
2400						
2640						
2880						

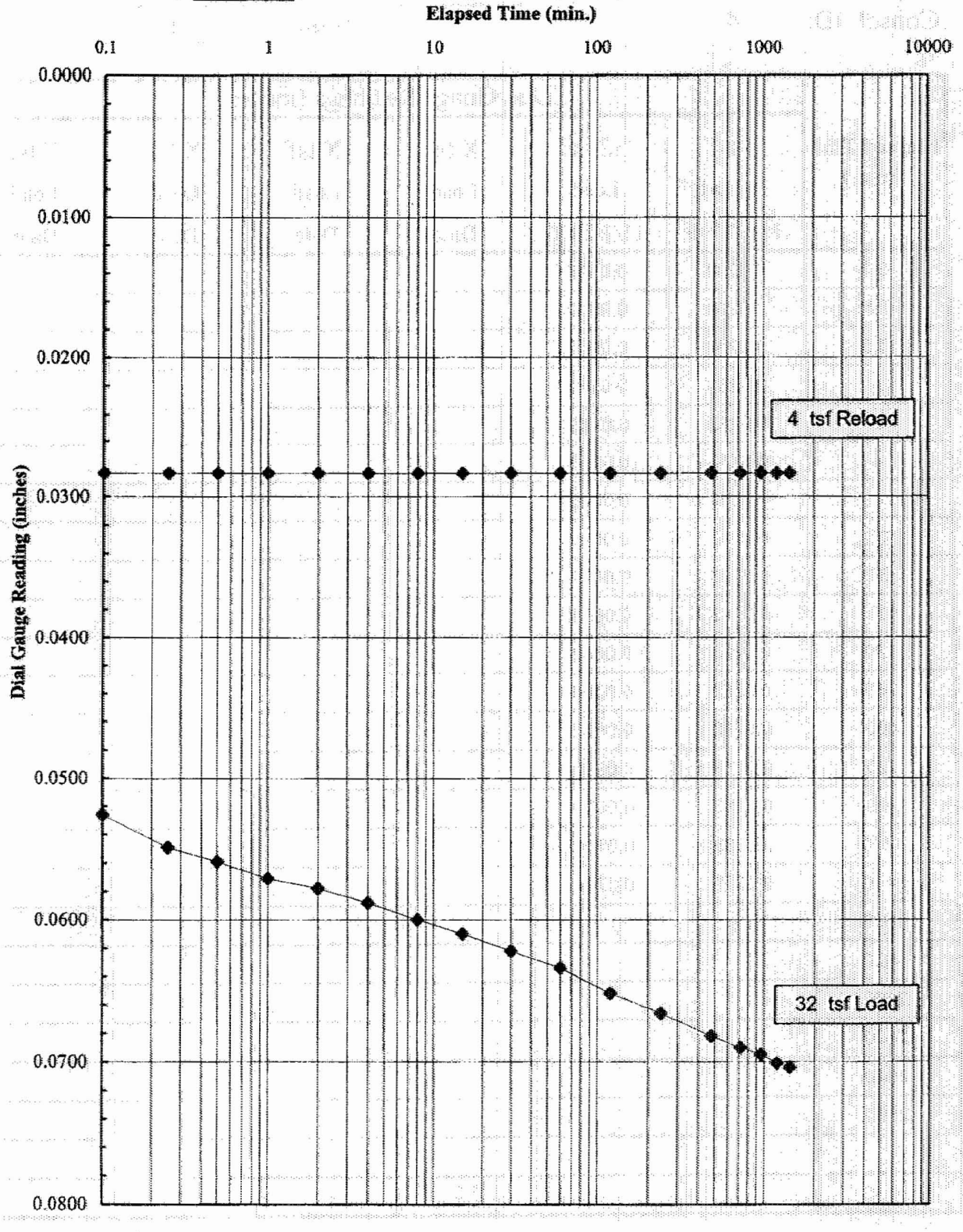
Schnabel Engineering

Consolidation Time Curves

11/21/06

Project: Calvert Cliffs Nuclear Power Plant

Schnabel Contract: 06120048

Boring No.: B-313 Depth: 123.5-124.3 ft

Reviewed by: CJS