

EXXON COAL AND MINERALS COMPANY

POST OFFICE BOX 1314 • HOUSTON, TEXAS 77251-1314

MINING COORDINATION & RESOURCE MANAGEMENT

May 4, 1987

Re: Radioactive Material
License No. 8-1431

Texas Department of Health
Bureau of Radiation Control
Division of Licensing, Registration
and Standards
1100 West 49th Street
Austin, Texas 78756-3189

Attention: Mr. Warren D. Snell, Chief
Uranium and Nuclear Waste Management Program

Gentlemen:

Subject: Ray Point Tailings Basin Reclamation - Weekly Progress Report No. 20
(week ending 5/2/87)

In accordance with License Condition No. 22(c), progress of tailings basin reclamation activities for the subject time period is summarized below.

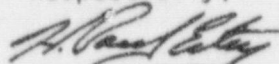
Earthmoving operations were sustained for seven days during the report period. The major effort was on placing compacted fill over the interior of the tailings basin. Copies of WWL daily reports generated during the week are attached.

Two TDH representatives were on site 4/29/87; they reviewed WWL's nuclear density gage license and procedures, and performed some soil sampling. Bill Price of TDH was on site 4/28/87 to observe tailings basin reclamation operations.

Earthmoving work during the forthcoming week will be concentrated on placing compacted cover over the interior of the tailings basin.

If you have any questions regarding this information, please call me at either (512) 786-2586 or (713) 978-5438.

Respectfully,



H. Paul Estey
Supervisory Reclamation Engineer
Felder Reclamation Project
P. O. Box 827
Three Rivers, Texas 78071

HPE:st
Attachments (as noted) 5579R
c - J. D. Patton
L. L. Miller

9801050028 870504
PDR WASTE
WM-183 PDR



Water, Waste & Land, Inc.
CONSULTING ENGINEERS & SCIENTISTS
Creekside Two Building
2629 Redwing Road, Suite 200
Fort Collins, CO 80526

DAILY REPORT

Project: EXXON-FELDER RECLAMATION
Project # 2066
Name: G. GRAHAM

Date: 4/27/87
Weather: SUNNY 90°

WORK PERFORMED: CONTRACTOR PLACING AND COMPACTING FILL IN
TAILINGS BASIN.

TESTING PERFORMED: FIELD DENSITY AND MOISTURE TESTS. 11 TESTS
TAKEN ALL PASSED.

INSTRUCTIONS: _____

COMMENTS: 4 SCRAPERS AND 2 COMPACTORS WORKING TODAY. FILL
PLACEMENT AND COMPACTION GOING FASTER. SOUTH EMBANKMENT
SLURRY IS FLATTER THAN REQUIRED BUT STILL NEEDS WORK TO
SMOOTH IRREGULARITIES BEFORE ALLOWING TOPSOIL PLACEMENT.

SIGNED: *G. Graham*

NUCLEAR DENSITY GAUGE DATA SHEET

1 3

STANDARD COUNT		
DENSITY STD. COUNT	DS	7584
MOISTURE STD. COUNT	MS	2736

PROJECT 2066

DATE 4/27/87

EXXON-FELDER

GAUGE OPERATOR G. GRAHAM

			CHECK		CHECK		CHECK		
TEST NUMBER			1-4-27	1-4-27	2-4-27	2-4-27	3-4-27	3-4-27	4-4-27
LOCATION			F+15	F+15	G+85	G+85	J+0	J+0	L+30
STATION			6+60	6+60	5+95	5+95	4+60	4+60	3+50
OFFSET									
ELEVATION			4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT
MODE/DEPTH			6"	1'	6"	1'	6"	1'	1'
DENSITY COUNT	DC	FROM GAUGE	7611	1328	7687	1399	7689	1531	1227
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	1.003	.175	1.014	.184	1.014	.202	.162
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	129.2	129	128.5	127.5	128.5	124.5	131.75
MOISTURE COUNT	MC	FROM GAUGE	1183	1218	1191	1188	1018	1031	1203
MOISTURE COUNT RATIO	MR	$MR = MC \div MS$	.432	.445	.435	.434	.372	.377	.440
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	16.8	17.3	17	16.9	14.2	14.4	17.2
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	112.4	111.7	111.5	110.6	114.3	110.1	114.55
MOISTURE CONTENT (%)	W	$W = \gamma_H \div \gamma_{DRY}$	15	15.5	15.2	15.2	12.4	13.1	15
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113	113	113
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	99.5	99	99	98	101	97.5	101

NUCLEAR DENSITY GAUGE DATA SHEET

2 3

STANDARD COUNT		
DENSITY STD. COUNT	DS	7584
MOISTURE STD. COUNT	MS	2736

PROJECT 2066

DATE 4/27/87

EXXON - FELDER

GAUGE OPERATOR G. G.

			CHECK				CHECK		
TEST NUMBER			5-4-27	5-4-27	6-4-27	7-4-27	7-4-27	8-4-27	9-4-27
LOCATION			N+50	N+50	N+05	K+90	K+90	J+25	I+00
STATION			2+00	2+00	3+10	4+10	4+10	5+00	6+20
OFFSET									
ELEVATION			4 TH LIFT	4 TH LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT
MODE/DEPTH			6"	1'	1'	6"	1'	6"	6"
DENSITY COUNT	DC	FROM GAUGE	8236	1298	1590	7060	1167	8325	7887
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	1.086	.171	.210	.931	.154	1.098	1.040
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	125.1	130	123	133	133.5	124.5	127.25
MOISTURE COUNT	MC	FROM GAUGE	1090	1105	985	1252	1197	1077	1232
MOISTURE COUNT RATIO	MR	$MR = MC \div MS$	.398	.404	.360	.458	.438	.394	.450
MOISTURE CONTENT (PCE)	γ_H	FROM MOISTURE TABLE AT MR	15.3	15.6	13.7	17.9	17.1	15.2	17.6
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_M$	109.8	114.4	109.3	115.1	116.4	109.3	109.65
MOISTURE CONTENT (%)	W	$W = \gamma_M \div \gamma_{DRY}$	13.9	13.6	12.5	15.6	14.7	14	16
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113	113	113
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	97	101	97	102	103	97	97

NUCLEAR DENSITY GAUGE DATA SHEET

3-3

STANDARD COUNT		
DENSITY STD. COUNT	DS	7584
MOISTURE STD. COUNT	MS	2736

PROJECT 2066

DATE 4/27/87

EXXON - FELDER

GAUGE OPERATOR G. G

TEST NUMBER			10-4-87	11-4-87					
LOCATION			G+10	D+90					
STATION			7+10	8+05					
OFFSET									
ELEVATION			3 RD LIFT	3 RD LIFT					
MODE/DEPTH			6"	6"					
DENSITY COUNT	DC	FROM GAUGE	7739	7115					
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	1.020	.938					
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	128.25	132.6					
MOISTURE COUNT	MC	FROM GAUGE	1093	1239					
MOISTURE COUNT RATIO	MR	$MR = MC \div MS$	.399	.451					
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	15.4	17.65					
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	112.85	114.9					
MOISTURE CONTENT (%)	W	$W = \gamma_H \div \gamma_{DRY}$	13.7	15.3					
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113					
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19					
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	100	102					



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DAILY REPORT

Project: EXXON-FELDER RECLAMATION
Project # 2066
Name: G. GRAHAM

Date: 4/28/85
Weather: PLY CLOUDY
85°

WORK PERFORMED: CONTRACTOR PLACING AND COMPACTING FILL IN TAILINGS
Basin.

TESTING PERFORMED: FIELD DENSITY AND MOISTURE TESTS. 8 OUT OF
9 TESTS PASSED, FAILING TEST TO BE CHECKED AGAIN AFTER ADDITIONAL
COMPACTION. TEST #4-4-28, EVEN THOUGH PASSING @ 95.6 % COMPACTION,
WAS COMPACTED AGAIN AND RETESTED @ 99 % COMPACTION. PROCTOR AND ID TESTS.
INSTRUCTIONS: WILL PERFORM SAND CONE TESTS WITH BILL PRICE (TDH)
NEXT WEEK TO CALIBRATE GAUGES.

COMMENTS: COMPACTION GOING MUCH BETTER WITH SECOND COMPACTOR
WORKING. A THIRD COMPACTOR IS ALSO EXPECTED THIS WEEK. BILL PRICE
(TDH) ON SITE TODAY. FOUR LOCATIONS WERE TESTED WITH EACH
OF OUR GAUGES TESTING THE SAME PLACE, TDH GAUGE WAS CONSISTENTLY
2-3 % LOWER IN PERCENT COMPACTION, AND APPROX. 1.5% HIGHER MOISTURE.
SAMPLES WERE TAKEN @ EACH TEST LOCATION AND WILL BE LAB EVALUATED FOR
% MOISTURE.

SIGNED: Jay S. [Signature]



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COMPACTION TEST

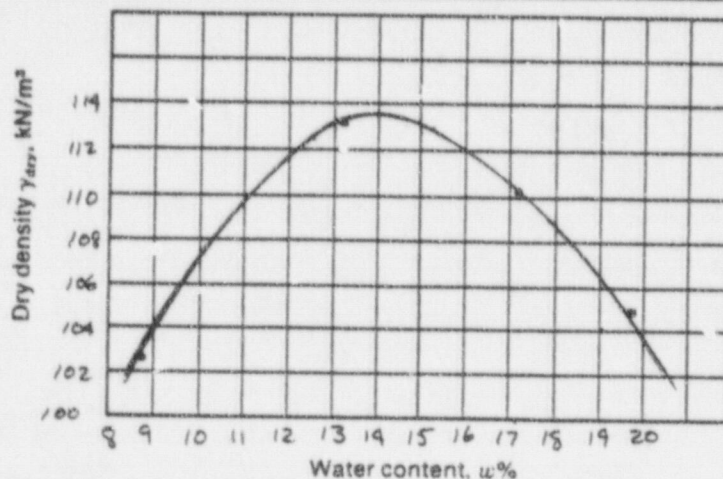
Project EXXON - FELDER RECLAMATION Job No. 2066
Location of Project RAY POINT Boring No. _____ Sample No. _____
Description of Soil MIXTURE RED & WHITE CLAYEY SAND
Test Performed By _____ Date of Test 4/28/87
Blows/Layer 25 No. of Layers 3 Wt. of Hammer 5.5 lb
Mold dimensions: Diam. _____ cm Ht. _____ cm Vol. 1/30 ft³ cm³

Water Content Determination

Sample no.	1	2	3	4	5	6
Moisture can no.	5	11	4	3		
Wt. of can + wet soil	104.6	105.0	102.9	104.9		
Wt. of can + dry soil	97.8	95.3	91.0	91.2		
Wt. of water	6.8	9.7	11.9	13.7		
Wt. of can	20.8	21.0	21.5	21.2		
Wt. of dry soil	77	74.3	69.5	70		
Water content, w%	8.8	13.1	17.1	19.7		

Density Determination

Assumed water content						
Water content, w%						
Wt. of soil + mold	13.15	13.70	13.73	13.62		
Wt. of mold	9.43					
Wt. of soil in mold, g	3.72	4.27	4.3	4.19		
Wet density, kN/m ³	111.6	128.1	129.0	125.7		
Dry density γ , kN/m ³	102.6	113.3	110.2	105.0		



$\gamma_{max} = 113.5$
 $\% W_{opt} = 14$



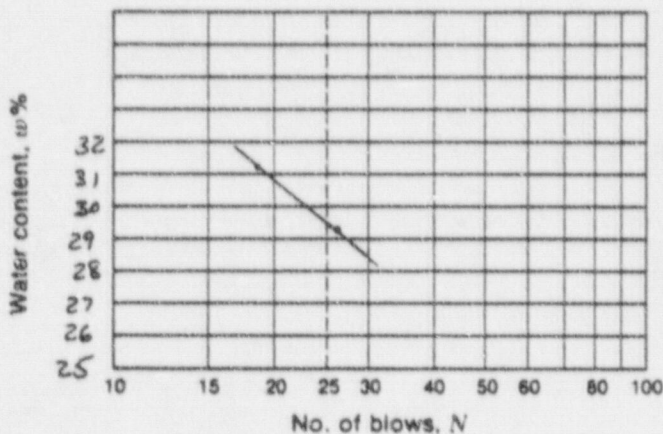
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ATTERBERG LIMITS DETERMINATION

Project EXXON-FELDER RECLAMATION Job No. 2066
Location of Project RAY POINT Boring No. _____ Sample No. _____
Description of Soil MIXTURE RED & WHITE CLAYEY SAND
Depth of Sample _____ Tested By G. GRAHAM Date 4/28/87

Liquid Limit Determination

Can no.	7	5			
Wt. of wet soil + can	17.56	20.35			
Wt. of dry soil + can	15.57	17.57			
Wt. of can	8.78	8.65			
Wt. of dry soil	6.79	8.92			
Wt. of moisture	1.99	2.78			
Water content, w%	29.3	31.2			
No. of blows, N	26	18			



Flow index $F_i =$ _____
Liquid limit = 29.5
Plastic limit = 14
Plasticity index $I_p =$ 15.5

200 WASH

Bowl wgt 195.1
Bowl + Sample 406.2
Bowl + Sand 286.2

% Passing 200 = 57.7

Plastic Limit Determination

Can no.	9			
Wt. of wet soil + can	12.23			
Wt. of dry soil + can	11.80			
Wt. of can	8.73			
Wt. of dry soil	3.07			
Wt. of moisture	.43			
Water content, w% = w_p	14			

NUCLEAR DENSITY GAUGE DATA SHEET

1 of

STANDARD COUNT		
DENSITY STD. COUNT	DS	7723
MOISTURE STD. COUNT	MS	2731

PROJECT 2066

DATE 4/28/87

EXXON - FELDER

GAUGE OPERATOR G. GRAHAM

			RETEST						
TEST NUMBER			1-4-28	2-4-28	3-4-28	4-4-28	4-4-28	5-4-28	6-4-28
LOCATION			K+5	I+10	F+80	E+80	E+80	F+60	E+80
STATION			5+70	7+10	8+05	9+05	9+05	6+60	9+90
OFFSET									
ELEVATION			3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	6 TH LIFT	2 ND LIFT
MODE/DEPTH			6"	6"	6"	6"	6"	6"	6"
DENSITY COUNT	DC	FROM GAUGE	7424	7336	7346	8373	8123	7603	7743
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	.961	.950	.951	1.084	1.052	.984	1.003
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	131.3	131.9	131.8	125.2	126.7	130.1	129.2
MOISTURE COUNT	MC	FROM GAUGE	1113	1276	1332	1194	1064	1281	998
MOISTURE COUNT RATIO	MR	$MR = MC \div MS$	.408	.467	.488	.437	.390	.469	.365
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	15.75	18.3	19.25	17	15.0	18.4	13.9
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_M$	115.55	113.6	112.35	108.2	111.7	111.7	115.3
MOISTURE CONTENT (%)	W	$W = \gamma_M \div \gamma_{DRY}$	13.6	16.1	17	15.7	13.4	16.5	12.1
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113	113	113
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	102	100.5	99.5	95.6	99	99	99

NUCLEAR DENSITY GAUGE DATA SHEET

STANDARD COUNT		
DENSITY STD. COUNT	DS	7723
MOISTURE STD. COUNT	MS	2731

PROJECT 2066

DATE 4/28/87

EXON - FELDER

GAUGE OPERATOR G. G.

TEST NUMBER			7-4-28	8-4-28	9-4-28				
LOCATION			G+50	H+70	K+10				
STATION			8+20	8+00	6+80				
OFFSET									
ELEVATION			3 RD LIFT	3 RD LIFT	3 RD LIFT				
MODE/DEPTH			6"	6"	6"				
DENSITY COUNT		DC	7095	7727	9229				
DENSITY COUNT RATIO		DR = $DC \div DS$	.919	1.000	1.195				
WET DENSITY (PCF)		γ_{WET}	133.7	129.3	120.1				
MOISTURE COUNT		MC	1075	1310	1313				
MOISTURE COUNT RATIO		MR = $MC \div MS$	.394	.480	.481				
MOISTURE CONTENT (PCF)		γ_{H_2O}	5.2	18.9	18.9				
DRY DENSITY (PCF)		$\gamma_{DRY} = \gamma_{WET} - \gamma_{H_2O}$	118.5	110.4	101.2				
MOISTURE CONTENT (%)		$W = \frac{\gamma_{H_2O}}{\gamma_{DRY}} \times 100$	12.8	17.1	18.7				
MAX OBTAINABLE DRY DENSITY (PCF)		γ_{MAX}	113	113	113				
OPTIMUM MOISTURE CONTENT (%)		W_{OPT}	12-19	12-19	12-19				
RELATIVE COMPACTION (%)		P = $\frac{\gamma_{DRY}}{\gamma_{MAX}} \times 100$	105	98	90				



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DAILY REPORT

Project: EXXON-FELDER RECLAMATION
Project # 2066
Name: G. GRAHAM

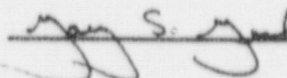
Date: 4/29/81
Weather: 95° SUNNY
WINDY

WORK PERFORMED: CONTRACTOR PLACING AND COMPACTING FILL.

TESTING PERFORMED: 20 FIELD DENSITY TESTS TAKEN ALL PASSED.
TEST 15-4-29 TEST @ 95% COMPACTION, ALL OTHERS WELL ABOVE. 5-4-29
WILL BE ROLLED AGAIN & RETESTED TOMORROW. MOISTURE ANALYSIS OF
SAMPLES TAKEN YESTERDAY WITH BILL PRICE (TDH). RESULTS ATTACHED.

INSTRUCTIONS: _____

COMMENTS: MOISTURE TESTS OF SAMPLES TAKEN WITH BILL PRICE ON 4/28/81 WERE
COMPLETED AND ARE ATTACHED. THE RESULTS SHOW TDH GAUGE READS HIGHER MOISTURE
THAN BOTH W.W.L. GAUGE AND LAB RESULTS. HIGHER MOISTURE READINGS WOULD
ACCOUNT, IN PART, FOR THE LOWER DRY DENSITY READINGS OF THE TDH. GAUGE.
SOME OF THE DIFFERENCE BETWEEN LAB AND GAUGE MOISTURE TESTS, IS DUE TO
MOISTURE LOSS DURING TIME BETWEEN SAMPLING AND TESTING. CLINT STRACHAN
OF W.W.L. ON SITE TODAY AND TOMORROW.

SIGNED: 

NUCLEAR DENSITY GAUGE DATA SHEET

STANDARD COUNT		
DENSITY STD. COUNT	DS	7723
MOISTURE STD. COUNT	MS	2716

PROJECT 2066DATE 4/29/87EXXON - FELDERGAUGE OPERATOR G. GRAHAM

RETEST

TEST NUMBER			9-4-28	1-4-29	2-4-29	3-4-29	4-4-29	5-4-29	6-4-29
LOCATION			K+10	K+0	I+15	H+35	G+0	I+10	I+40
STATION			6+80	8+20	8+80	9+80	10+10	10+50	10+0
OFFSET									
ELEVATION			3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	2 ND LIFT
MODE/DEPTH			6"	6"	6"	6"	6"	6"	6"
DENSITY COUNT	DC	FROM GAUGE	7515	7619	6480	7399	6813	7577	7700
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	.973	.987	.889	.958	.882	.981	.997
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	130.7	130.0	138.75	131.5	135.75	130.25	129.45
MOISTURE COUNT	MC	FROM GAUGE	1259	1202	1315	1122	1237	1213	1013
MOISTURE COUNT RATIO	MR	$MR = MC \div MS$	.464	.443	.485	.413	.455	.447	.373
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	18.2	17.3	19.15	16	17.8	17.45	14.25
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	112.5	112.7	119.6	115.5	117.9	112.8	115.2
MOISTURE CONTENT (%)	W	$W = \gamma_H \div \gamma_{DRY}$	16.1	15.4	16.0		15.1	15.5	12.4
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	111	113	113	113
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	99.5	100	106	102	104	100	102

NUCLEAR DENSITY GAUGE DATA SHEET

2 of 3

STANDARD COUNT		
DENSITY STD. COUNT	DS	7721
MOISTURE STD. COUNT	MS	2716

PROJECT 2066

DATE 4/29/87

EXCEL - FELDER

GAUGE OPERATOR G.G.

TEST NUMBER		7-4-29	8-4-29	9-4-29	10-4-29	11-4-29	12-4-29	13-4-29
LOCATION		J+80	K+40	I+90	E+10	H+40	J+40	L+60
STATION		9+15	9+80	10+40	6+95	6+00	4+70	3+60
OFFSET								
ELEVATION		2 ND LIFT	1 ST LIFT	1 ST LIFT	5 TH LIFT	5 TH LIFT	5 TH LIFT	5 TH LIFT
MODE/DEPTH		6"	6"	6"	6"	6"	6"	6"
DENSITY COUNT	DC	7322	7708	7868	7270	7396	6980	7699
DENSITY COUNT RATIO	DR = DC ÷ DS	.948	.998	1.019	.942	.958	.904	.997
WET DENSITY (PCF)	γ_{WET}	132.0	129.4	129.3	132.4	131.5	134.5	129.5
MOISTURE COUNT	MC	1254	1308	1229	1220	1118	1154	1054
MOISTURE COUNT RATIO	MR = MC ÷ MS	.462	.482	.452	.449	.412	.425	.388
MOISTURE CONTENT (PCF)	γ_{H}	18.15	19	17.7	17.5	16	16.5	14.9
DRY DENSITY (PCF)	γ_{DRY}	113.85	110.4	110.6	114.9	115.5	118	114.6
MOISTURE CONTENT (%)	$W = \frac{\gamma_H}{\gamma_{DRY}} \div \gamma_{MAX}$	15.9	17.2	16	15.2	13.9	14	13
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	113	113	113	113	113	113	113
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P	101	98	98	102	102	104.5	101

NUCLEAR DENSITY GAUGE DATA SHEET

303

STANDARD COUNT		
DENSITY STD. COUNT	DS	7721
MOISTURE STD. COUNT	MS	2716

PROJECT 2066

DATE 4/29/87

EXON - FELDER

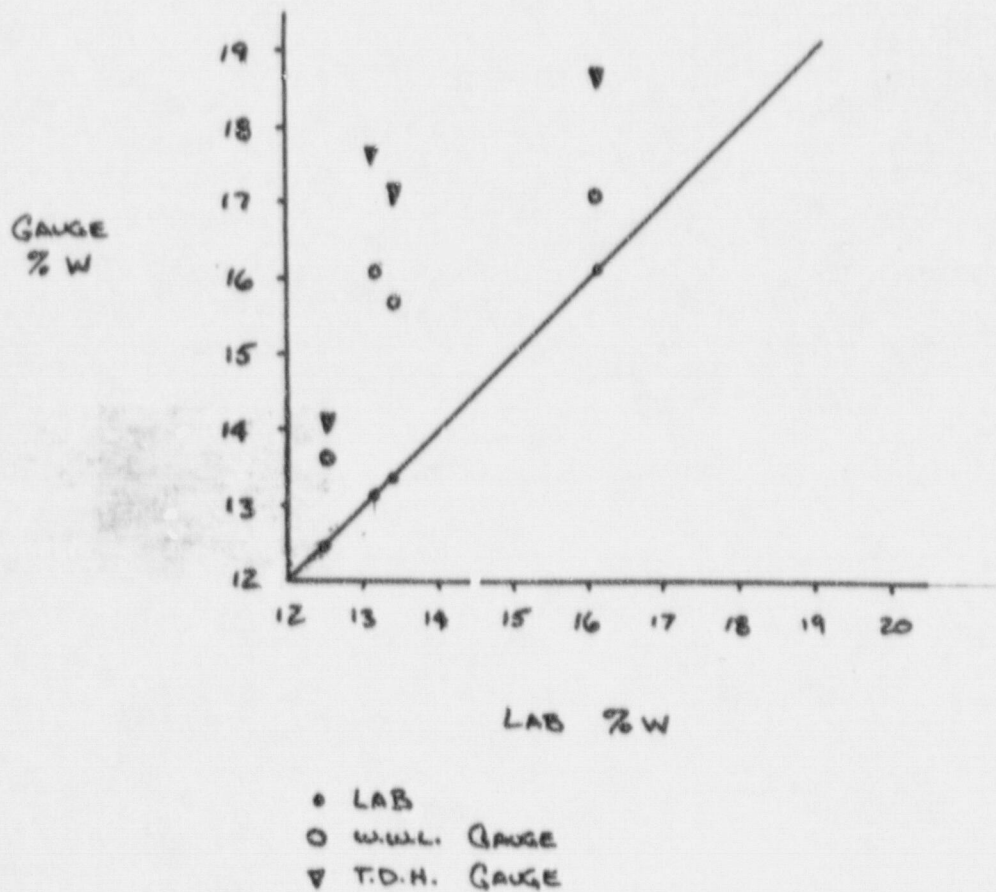
GAUGE OPERATOR G.G.

TEST NUMBER			14-4-29	15-4-29	16-4-29	17-4-29	18-4-29	19-4-29	20-4-29
LOCATION			0+00	0+15	M+10	K+10	I+15	G+00	E+00
STATION			1+50	1+70	3+90	5+25	6+15	7+25	8+50
OFFSET									
ELEVATION			5 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT
MODE/DEPTH			6"	6"	6"	6"	6"	6"	6"
DENSITY COUNT	DC	FROM GAUGE	6865	8400	8052	6873	8023	7639	8352
DENSITY COUNT RATIO	DR	DR = DC ÷ DS	.890	1.088	1.043	.890	1.039	.989	1.082
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	135.3	125	127	135.3	127.3	129.9	125.25
MOISTURE COUNT	MC	FROM GAUGE	1162	1238	1008	1058	1277	1060	951
MOISTURE COUNT RATIO	MR	MR = MC ÷ MS	.429	.456	.371	.389	.470	.390	.325
MOISTURE CORRECT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	16.7	17.8	14.2	15	18.4	15.0	13.25
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	119.6	107.2	112.8	120.3	108.9	114.9	112
MOISTURE CONTENT (%)	W	$W = \frac{\gamma_H}{\gamma_{DRY}} \times 100$	14.1	16.6	12.6	12.5	16.9	13.1	12
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113	113	113
OPTIMUM MOISTURE CONTENT (%)	W _{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P	$P = \frac{\gamma_{DRY}}{\gamma_{MAX}} \times 100$	105	95	100	106.5	96	102	99

4/29/87

LAB MOISTURE RESULTS - SAMPLES TAKEN 4/28/87
AT LOCATIONS FIELD TESTED USING W.W.L. AND T.D.H.
NUCLEAR DENSITY GAUGE.

SAMPLE	1-4-28	2-4-28	3-4-28	4-4-28
a. WET WT + CAN	109.8	117.3	123.0	121.3
b. CAN WT.	21.5	21.2	21.1	21.2
c. DRY WT. + CAN	100.0	106.1	109.8	109.5
d. WT. WATER (a-c)	9.8	11.2	14.2	11.8
e. DRY WT. (c-b)	78.5	84.9	87.7	88.3
f. % MOISTURE LAB	12.5	13.2	16.2	13.4
W.W.L. GAUGE	13.6	16.1	17.1	15.7
T.D.H. GAUGE	14.1	17.7	18.7	17.1





Water, Waste & Land, Inc.
CONSULTING ENGINEERS & SCIENTISTS
Creekside Two Building
2629 Redwing Road, Suite 200
Fort Collins, CO 80526

DAILY REPORT

Project: EXXON - FELDER RECLAMATION
Project # 2066
Name: G. GRAHAM

Date: 4/30/87
Weather: 80° SUNNY

WORK PERFORMED: CONTRACTOR PLACING AND COMPACTING FILL. SOME
ADDITIONAL TOPSOIL STRIPPED IN BORROW AREA TO EXPOSE FILL.

TESTING PERFORMED: FIELD DENSITY } MOISTURE TESTS. PROCTOR &
ID TESTS.

INSTRUCTIONS:

COMMENT: COMPACTED FILL MATERIAL BEING PLACED TODAY APPEARS
MUCH MORE CLAYEY THAN THE WHITE OR RED CLAYEY SAND. UPON VISUAL
INSPECTION THE MATERIAL APPEARS TO BE EMBANKMENT MTRL (CATARHOLA
CLAY). PROCTOR SHOWS $\gamma_{max} = 16.5$, $\%W_{opt} = 20\%$. PI IS ALSO
HIGHER THAN RECENT TESTING OF THE WHITE CLAYEY SAND, 60% PASSES
THE #200 SIEVE.

SIGNED: May S. Gal



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Fort Collins, CO 80526

COMPACTION TEST

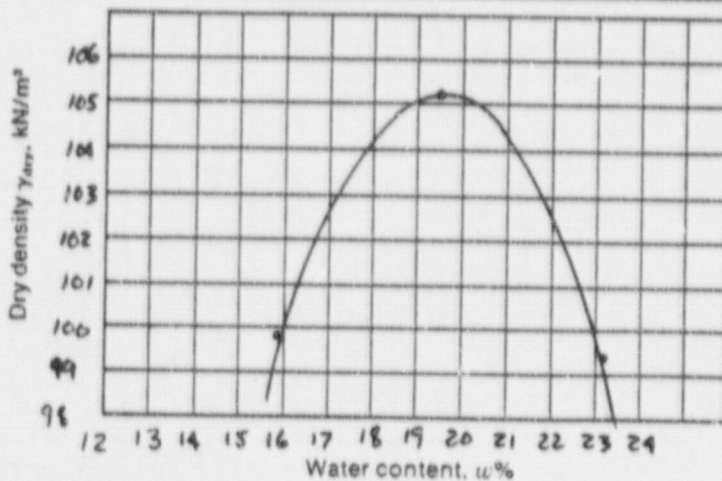
Project EXXON - FELDER RECLAMATION Job No. 2066
Location of Project RAY POINT Boring No. _____ Sample No. _____
Description of Soil MIXTURE - CATAMOUNA CLAY & WHITE CLAYEY SAND
Test Performed By _____ Date of Test 4/30/87
Blows/Layer 25 No. of Layers 3 Wt. of Hammer 5.5 lb
Mold dimensions: Diam. _____ cm Ht. _____ cm Vol. 1/30 ft³ cm³

Water Content Determination

Sample no.	1	2	3	4	5	6
Moisture can no.	12	7	11			
Wt. of can + wet soil	100.9	103.4	100.6			
Wt. of can + dry soil	90.0	90	95.7			
Wt. of water	10.9	13.4	14.9			
Wt. of can	21.3	21.2	21.1			
Wt. of dry soil	68.7	68.8	64.6			
Water content, w %	15.9	19.5	23.1			

Density Determination

Assumed water content						
Water content, w %						
Wt. of soil + mold	13.29	13.62	13.51			
Wt. of mold	9.43	9.43	9.43			
Wt. of soil in mold, g	3.86	4.19	4.08			
Wet density, kN/m ³	115.8	125.7	122.9			
Dry density γ , kN/m ³	99.9	105.2	99.43			





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CONSULTING ENGINEERS & SCIENTISTS

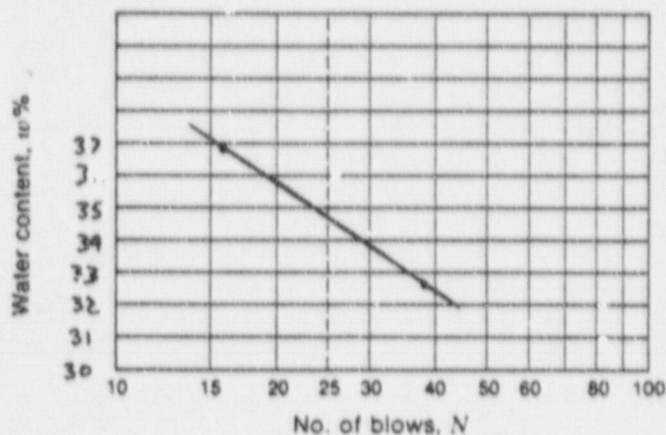
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ATTERBERG LIMITS DETERMINATION

Project EXXON - FELDER RECLAMATION Job No. 2066
Location of Project RAY POINT Boring No. _____ Sample No. _____
Description of Soil MIXTURE - CATAOULA CLAY & WHITE CLAYEY SAND
Depth of Sample _____ Tested By G. GRAHAM Date 4/30/87

Liquid Limit Determination

Can no.	<u>5</u>	<u>3</u>			
Wt. of wet soil + can	<u>18.51</u>	<u>20.48</u>			
Wt. of dry soil + can	<u>16.06</u>	<u>17.24</u>			
Wt. of can	<u>8.55</u>	<u>8.45</u>			
Wt. of dry soil	<u>7.51</u>	<u>8.79</u>			
Wt. of moisture	<u>2.45</u>	<u>3.24</u>			
Water content, w%	<u>32.6</u>	<u>36.9</u>			
No. of blows, N	<u>38</u>	<u>16</u>			



Flow index F_i = _____

Liquid limit = 35

Plastic limit = 11

Plasticity index I_p = 24

200 WASH

Bowl wgt 195.0

Bowl & Sample 312.7

Bowl & Sand 292.6

60% PASSING 200 SIEVE

Plastic Limit Determination

Can no.	<u>11</u>			
Wt. of wet soil + can	<u>10.6</u>			
Wt. of dry soil + can	<u>10.39</u>			
Wt. of can	<u>8.51</u>			
Wt. of dry soil	<u>1.88</u>			
Wt. of moisture	<u>.21</u>			
Water content, w% = w_p	<u>11.2</u>			

NUCLEAR DENSITY GAUGE DATA SHEET

1053

STANDARD COUNT		
DENSITY STD. COUNT	DS	7579
MOISTURE STD. COUNT	MS	2736

PROJECT 2666

DATE 4/30/87

ERRON - FELDER

GAUGE OPERATOR G. GAYMAN

TEST NUMBER	LOCATION	STATION	OFFSET	ELEVATION	MODE/DEPTH	RETEST		CHECK		4-4-30		4-4-30		4-4-30		4-4-30	
						15-4-29	1-4-30	1-4-30	2-4-30	3-4-30	4-4-30	4-4-30	4-4-30	4-4-30	4-4-30	4-4-30	4-4-30
						0+15	K+05	K+05	I+00	G+00	F+20	G+00	F+20	G+00	F+20	G+00	G+00
						1+70	6+05	6+05	7+25	8+00	9+25	9+00	9+25	9+00	9+25	9+00	9+00
						4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT	4 TH LIFT
						6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"	6"
DENSITY COUNT	DC				FROM GAUGE	7818	7430	1180	7556	7445	7688	7791	7688	7791	7688	7791	7791
DENSITY COUNT RATIO	DR				DR = DC ÷ DS	1.031	.980	.156	.997	.982	1.014	1.030	1.014	1.030	1.014	1.030	1.030
WET DENSITY (PCF)	γ_{WET}				FROM DENSITY TABLE AT DR	127.7	130.4	133	129.55	130.25	128.5	127.75	128.5	127.75	128.5	127.75	127.75
MOISTURE COUNT	MC				FROM GAUGE	1175	1374	1478	1254	1400	1163	1122	1163	1122	1163	1122	1122
MOISTURE COUNT RATIO	MR				MR = MC ÷ MS	.429	.502	.540	.458	.512	.425	.410	.425	.410	.425	.410	.410
MOISTURE CONTENT (PCF)	γ_H				FROM MOISTURE TABLE AT MR	16.7	19.8	21.5	17.95	20.3	16.5	15.8	16.5	15.8	16.5	15.8	15.8
DRY DENSITY (PCF)	γ_{DRY}				$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	111	110.6	121.5	111.6	110	112	111.95	112	111.95	112	111.95	111.95
MOISTURE CONTENT (%)	M				$M = \frac{\gamma_H}{\gamma_{DRY}} \times 100$	15	18	17.7	16.1	18.5	14.7	14	14.7	14	14.7	14	14
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}				FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113	113	113	113	113	113	113	113
OPTIMUM MOISTURE CONTENT (%)	w_{OPT}				FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	12-19	12-19	12-19	12-19	12-19	12-19
RELATIVE COMPACTION (%)	P				$P = \frac{\gamma_{DRY}}{\gamma_{MAX}} \times 100$	98	93	107	99	97	99	99	99	99	99	99	99

2 of 3

NUCLEAR DENSITY GAUGE DATA SHEET

STANDARD COUNT		
DENSITY STD. COUNT	DS	7579
MOISTURE STD. COUNT	MS	2736

PROJECT 2066DATE 4/30/87

EXXON - FELDER

GAUGE OPERATOR G.G.

TEST NUMBER			6-4-30	7-4-30	8-4-30	9-4-30	10-4-30	11-4-30	11-4-30
LOCATION			H+00	I+05	K+25	K+10	I+20	H+30	H+30
STATION			9+00	8+10	7+25	8+75	9+70	10+60	10+60
OFFSET									
ELEVATION			4 TH LIFT	4 TH LIFT	4 TH LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT	3 RD LIFT
MODE/DEPTH			6"	6"	6"	6"	6"	7861	6"
DENSITY COUNT	DC	FROM GAUGE	7776	6951	7714	7175	8647	1.037	7861
DENSITY COUNT RATIO	DR	DR = DC ÷ DS	1.026	.917	1.017	.949	1.141	127.4	1.017
WET DENSITY (PCF)	Y _{WET}	FROM DENSITY TABLE AT DR	128.0	133.7	128.5	132	122.5	1340	127.4
MOISTURE COUNT	MC	FROM GAUGE	1038	1274	1407	1263	1150	.490	1340
MOISTURE COUNT RATIO	MR	MR = MC ÷ MS	.379	.466	.514	.462	.420	19.3	.490
MOISTURE CONTENT (PCF)	Y _H	FROM MOISTURE TABLE AT MR	14.5	18.3	20.3	18.1	16.3	110.1	19.3
DRY DENSITY (PCF)	Y _{DRY}	Y _{DRY} = Y _{WET} - Y _H	113.5	115.4	108.2	113.9	106.2	17.5	110.1
MOISTURE CONTENT (%)	W	W = Y _H ÷ Y _{DRY}	12.8	15.9	18.8	15.9	15.3		17.5
MAX OBTAINABLE DRY DENSITY (PCF)	Y _{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113		113
OPTIMUM MOISTURE CONTENT (%)	W _{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19		12-19
RELATIVE COMPACTION (%)	P	P = Y _{DRY} ÷ Y _{MAX}	100	102	96	101	94		97.5

NUCLEAR DENSITY GAUGE DATA SHEET

3 OF 3

STANDARD COUNT		
DENSITY STD. COUNT	DS	7579
MOISTURE STD. COUNT	MS	2736

PROJECT 2066

DATE 4/30/87

EXXON - FELDER

GAUGE OPERATOR GG

TEST NUMBER			12-4-30						
LOCATION			I+50						
STATION			10+30						
OFFSET									
ELEVATION			2 ND LIFT	2 ND LIFT					
MODE/DEPTH			6"	6"					
DENSITY COUNT	DC	FROM GAUGE	6917	7738					
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	.913	1.021					
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	134	128.2					
MOISTURE COUNT	MC	FROM GAUGE	1192	1148					
MOISTURE COUNT RATIO	MR	$MR = MC \div MS$	.436	.419					
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	17	16.25					
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	117	111.95					
MOISTURE CONTENT (%)	W	$W = \gamma_H \div \gamma_{DRY}$	14.5	14.5					
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113					
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19					
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	104	99					



Water, Waste & Land, Inc.
CONSULTING ENGINEERS & SCIENTISTS
Creekside Two Building
2629 Redwing Road, Suite 200
Fort Collins, CO 80526

DAILY REPORT

Project: EMON-FELDER RECLAMATION
Project # 2066
Name: G. RAHAM

Date: 5/1/87
Weather: 85° CLOUDY

WORK PERFORMED: CONTRACTOR PLACING AND COMPACTING FILL

TESTING PERFORMED: FIELD DENSITY AND MOISTURE TESTS, PROCTOR AND
1D TESTS.

INSTRUCTIONS:

COMMENTS: AS WITH YESTERDAY, PROCTOR AND 1D TESTS SHOWS MATERIAL
MORE CLAYEY THAN THE WHITE CLAYEY SAND BEING PLACED AS FILL.
 $\gamma_{max} = 103$, $\%w_{opt} = 21$, 65% PASSING 200 SIEVE. WHERE THIS MATERIAL
IS VISUALLY IDENTIFIED DURING FIELD TESTS, 4/30/87 PROCTOR VALUES
WILL BE USED ($\gamma_{max} = 105$, $\%w_{opt} = 20\%$). IN NO CASE WILL DRY DENSITY BE
LESS THAN 105 PCF. WHERE THIS MATERIAL IS NOT DEFINITELY IDENTIFIED
THE LONG RANGE AVERAGE OF 113 PCF MAX DRY DENSITY WILL CONTINUE TO BE USED.

SIGNED: Jay S. [Signature]

COMPACTION TEST

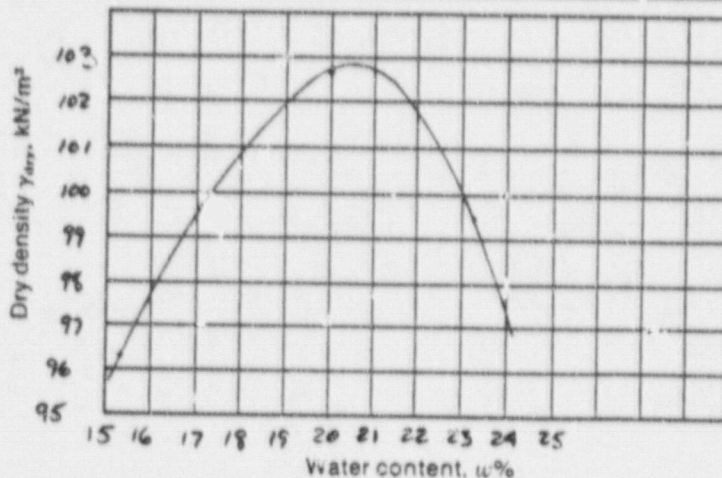
Project EXXON - FELDER RECLAMATION Job No. 2066
Location of Project RAY POINT Boring No. _____ Sample No. _____
Description of Soil MIXTURE - CATAMOWA CLAY, WHITE & RED CLAYEY SAND
Test Performed By G. GRAHAM Date of Test 5/1/97
Blows/Layer 25 No. of Layers 3 Wt. of Hammer 5.5 lb
Mold dimensions: Diam. _____ cm Ht. _____ cm Vol. 1/30 ft³ cm³

Water Content Determination

Sample no.	1	2	3	4	5	6
Moisture can no.	8	10	1			
Wt. of can + wet soil	95.5	92.7	100.0			
Wt. of can + dry soil	85.6	80.7	85.1			
Wt. of water	9.9	12.0	14.9			
Wt. of can	21.0	21.0	21.1			
Wt. of dry soil	64.6	59.7	64			
Wt. or content, w%	15.3	20.0	23.3			

Density Determination

Assumed water content						
Water content, w%						
Wt. of soil + mold	13.13	13.54	13.52			
Wt. of mold	9.43	9.43	9.43			
Wt. of soil in mold, g	3.7	4.11	4.09			
Wet density, kN/m ³	111	123.3	122.7			
Dry density γ , kN/m ³	96.3	102.75	99.5			



$$\gamma_{max} = 103$$

$$\% W_{opt} = 21$$

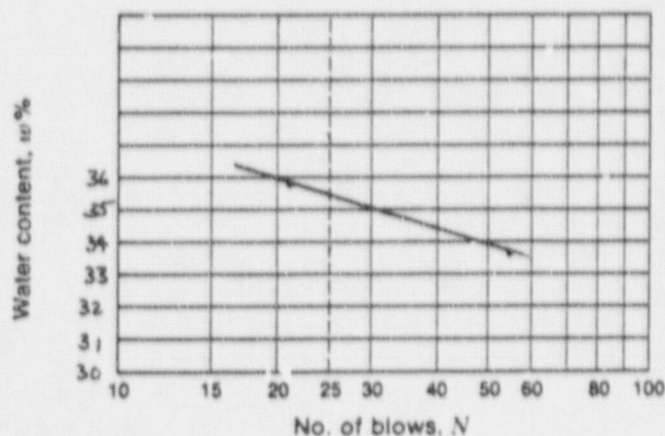


ATTERBERG LIMITS DETERMINATION

Project EXXON - FELDER RECLAMATION Job No. 2066
Location of Project RAY POINT Boring No. _____ Sample No. _____
Description of Soil MIXTURE - CATAPHEULA CLAY & WHITE CLAYEY SAND
Depth of Sample _____ Tested By G. GRAHAM Date 5/1/87

Liquid Limit Determination

Can no.	7	2				
Wt. of wet soil + can	16.95	18.97				
Wt. of dry soil + can	14.79	16.37				
Wt. of can	8.77	8.64				
Wt. of dry soil	6.02	7.73				
Wt. of moisture	2.16	2.6				
Water content, w%	35.9	33.6				
No. of blows, N	21	55				



Flow index F_i = _____

Liquid limit = 35.5

Plastic limit = 12

Plasticity index I_p = 23.5

200 WASH

Bowl wgt 196.0

Bowl & SAMPLE 310.5

65% PASSING 200 SIEVE

Plastic Limit Determination

Can no.	1			
Wt. of wet soil + can	11.10			
Wt. of dry soil + can	10.84			
Wt. of can	8.66			
Wt. of dry soil	2.18			
Wt. of moisture	.26			
Water content, w% = w_p	12			

NUCLEAR DENSITY GAUGE DATA SHEET

1 of 2

STANDARD COUNT		
DENSITY STD. COUNT	DS	7583
MOISTURE STD. COUNT	MS	2729

PROJECT 2066

DATE 5/1/87

ERRON - FELDER

GAUGE OPERATOR G. GRAHAM

			RETEST	CHECK		CHECK		CHECK	
TEST NUMBER			10-4-30	1-5-1	1-5-1	2-5-1	2-5-1	3-5-1	3-5-1
LOCATION			I+20	D+90	D+90	G+35	G+35	J+40	J+40
STATION			9+70	7+25	7+25	5+90	5+90	4+40	4+40
OFFSET									
ELEVATION			3 RD LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT
MODE/DEPTH			6"	6"	1'	6"	1'	6"	1'
DENSITY COUNT	DC	FROM GAUGE	8645	7080	1109	8203	1263	7423	1091
DENSITY COUNT RATIO	DR	$DR = DC \div DS$	1.140	.934	.146	1.082	.166	.979	.145
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	122.5	132.8	135	125.25	131	130.4	136.5
MOISTURE COUNT	MC	FROM GAUGE	981	1382	1277	1377	1410	1437	1448
MOISTURE COUNT RATIO	MR	$MR = MC \div DC$	.359	.506	.468	.505	.517	.527	.531
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	13.7	2.0	18.35	20	20.5	20.9	21.1
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	108.8	112.8	116.65	105.25	110.5	109.5	114.4
MOISTURE CONTENT (%)	W	$W = \gamma_H \div \gamma_{DRY}$	12.7	17.7	15.7	19	18.5	19	18.4
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	105 ⁽¹⁾	113	105 ⁽¹⁾	113
OPTIMUM MOISTURE CONTENT (%)	W_{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	20	12-19	20	12-19
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	96	100	103	100	97	104	101.2

(1) 4/30 PROCTOR - WHITE CLAYEY SAND & CATAMOUA CLAY MIXED.

202

STANDARD COUNT		
DENSITY STD. COUNT	DS	7583
MOISTURE STD. COUNT	MS	2729

PROJECT 133004 2066

STANDARD COUNT

DENSITY STD. COUNT

DS

7583

MOISTURE STD. COUNT

MS

2729

PROJECT 133004 2066

STANDARD COUNT

Exxon - Felder

3	
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STANDARD COUNT

(R1)

DENSITY STD. COUNT

DS

758

MOISTURE STD. COUNT

MS

2729

TEST NUMBER	4-5-1	4-5-1	4-5-1	5-5-1	5-5-1	6-5-1	CHECK
LOCATION	L+50	L+50	L+50	N+25	N+25	K+40	K+40
STATION	3+00	3+00	3+00	2+50	2+50	4+40	4+40
OFFSET							
ELEVATION	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT	6 TH LIFT
MODE/DEPTH	6"	1'	1'	6"	1'	6"	1'
DENSITY COUNT	7214	1136	1136	7503	1252	8371	1362
DENSITY COUNT RATIO	.951	.150	.150	.989	.165	1.104	.179
WET DENSITY (PCF)	132.9	134.5	134.5	129.8	131.1	124.1	128.9
MOISTURE COUNT	1384	1358	1358	1564	1469	938	990
MOISTURE COUNT RATIO	.507	.497	.497	.573	.536	.344	.362
MOISTURE CONTENT (%)	20.1	19.7	19.7	22.9	21.3	13.0	13.8
DRY DENSITY (PCF)	112.9	114.8	114.8	106.1	109.8	111.1	114.2
MOISTURE CONTENT (%)	17.8	12.2	12.2	21.5	19	12	12
MAX OBTAINABLE DRY DENSITY (PCF)	113	113	113	105 ⁽³⁾	113	113	113
OPTIMUM MOISTURE CONTENT (%)	19	12-19	12-19	20	12-19	12-19	12-19
RELATIVE COMPACTION (%)	100	102	102	101	96	98	101



Water, Waste & Land, Inc.
CONSULTING ENGINEERS & SCIENTISTS
Creekside Two Building
2629 Redwing Road, Suite 200
Fort Collins, CO 80526

DAILY REPORT

Project: EXXON - FELDER RECLAMATION
Project # 2066
Name: G. GRAHAM

Date: 5/2/87
Weather: SUNNY 90°

WORK PERFORMED: CONTRACTOR PLACING AND COMPACTING FILL, AND
GRADING EMBANKMENT MATERIAL TO BE USED AS COMPACTED FILL.

TESTING PERFORMED: FIELD DENSITY AND MOISTURE TESTS. RED CLAYEY
SAND PLACED TODAY WAS SAMPLED AND WILL BE LAB TESTED TO DETERMINE
MAXIMUM DRY DENSITY AND OPTIMUM WATER CONTENT.

INSTRUCTIONS:

COMMENTS: MATERIAL PLACED TODAY WAS DOMINANTLY RED CLAYEY
SAND. THIS MATERIAL WAS SAMPLED FOR PROCTOR AND ID TESTS, THE
TEST WILL BE COMPLETED TOMORROW AND RESULTS WILL BE USED FOR
FIELD TESTS OF THIS MATERIAL. AREAS TESTED TODAY WHICH FAILED
WILL BE COMPACTED FURTHER AND RETESTED USING LAB RESULTS. RED
CLAYEY SAND IS COMING OUT OF BORROW AREA WITH MORE MOISTURE THAN
WHITE CLAYEY SAND.

SIGNED:

May S. [Signature]

NUCLEAR DENSITY GAUGE DATA SHEET

STANDARD COUNT		
DENSITY STD. COUNT	DS	7571
MOISTURE STD. COUNT	MS	2723

PROJECT 2066

DATE 5/2/87

ERRON - FELDER

GAUGE OPERATOR G. GRAHAM

TEST NUMBER			1-5-2	2-5-2	3-4-2	4-5-2	5-5-2	6-5-2	
LOCATION			N+90	L+95	J+90	I+30	G+70	E+50	
STATION			2+80	3+95	5+80	7+10	8+90	9+00	
OFFSET									
ELEVATION			5 TH LIFT	5 TH LIFT	5 TH LIFT	5 TH LIFT	5 TH LIFT	5 TH LIFT	
MODE/DEPTH			6"	6"	6"	6"	6"	6"	
DENSITY COUNT	DC	FROM GAUGE	7740	8014	7653	6971	8229	8377	
DENSITY COUNT RATIO	DR	DR = DC ÷ DS	1.022	1.058	1.010	.921	1.087	1.106	
WET DENSITY (PCF)	γ_{WET}	FROM DENSITY TABLE AT DR	123.1	126.4	128.75	133.5	125	124.1	
MOISTURE COUNT	MC	FROM GAUGE	1466	1265	1426	1479	1500	1425	
MOISTURE COUNT RATIO	MR	MR = MC ÷ MS	.536	.466	.524	.543	.551	.523	
MOISTURE CONTENT (PCF)	γ_H	FROM MOISTURE TABLE AT MR	21.3	18.3	20.8	21.6	22	20.75	
DRY DENSITY (PCF)	γ_{DRY}	$\gamma_{DRY} = \gamma_{WET} - \gamma_H$	106.8	108.1	107.95	111.9	103	103.35	
MOISTURE CONTENT (%)	W	$W = \gamma_H \div \gamma_{DRY}$	19.9	16.9	19.2	19.3	21.4	20	
MAX OBTAINABLE DRY DENSITY (PCF)	γ_{MAX}	FROM PROCTOR CURVE FOR SOIL	113	113	113	113	113	113	
OPTIMUM MOISTURE CONTENT (%)	W _{OPT}	FROM PROCTOR CURVE FOR SOIL	12-19	12-19	12-19	12-19	12-19	12-19	
RELATIVE COMPACTION (%)	P	$P = \gamma_{DRY} \div \gamma_{MAX}$	94.5	96	96	99	91	91.5	