PDR
40-6659

Getty

Petrotomics Company | P. O. Box 2509, Shirley Basin, Wyoming 82615 • Telephone: (307) 234-9341

J. H. Whitman, Manager

March 6, 1979

EXPRESS MAIL

Mr. R. A. Scarano, Section Leader
Uranium Mill Licensing Section
U. S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, MD 20916

Applicant.....................
Check No. 894216.............
Amount/Fee Category 3500.-3A.
Type of Fee.. minor amdt....
Date Check Rec'd.. 3/13/79.....
Received By...... [illegible].....

Ref: License # SUA-551

Dear Mr. Scarano:

Enclosed is our check in the amount of $3,500.00 to cover the estimated cost to the Nuclear Regulatory Commission to evaluate for approval our request for some minor amendments to our Source Material License, SUA-551.

Because the amount of study required for evaluation of proposed changes in the enlargement of our tailings da[illegible] greater than the evaluation required for other minor license ame[illegible]nts (a proposed heap leach operation and a resolution of the rip-rap issue for the dam as discussed by Messrs. Killillay and Linehan by telephone on March 5, 1979) we are sending attached hereto eight copies of the data relative to the dam changes. The details concerning the other amendments will follow within ten days to two weeks.

The proposed modifications to the manner of construction of the tailings dam are as were discussed with your group (Messrs. Linehan, Kane and Garcia) in Silver Spring by Mr. Robert E. Killillay on February 21, 1979. At that time it was indicated to Mr. Killillay that our proposed construction was more desirable than the system which had been previously approved, hence we anticipate that you should have minimal problems with this approval.

7903290244

The details, engineering design, etc., for the redesign of the dam were done for us by Chen and Associates, Inc. Copies of their geotechnical report, with the revised construction specifications and drawings, are herewith transmitted to you. In an effort to expedite your evaluation, we are also sending, at the same time, two copies of these materials to Mr. Lillard of the Albuquerque District, Corps of Engineers. We need your approval at the earliest possible date so that we can finish this project during the summer work season of 1979.

Please do not hesitate to contact us relative to any matters concerning this project.

Sincerely yours,

J. H. Whitman

JHW:ps
Enclosures (8 reports - 1 check)

cc: Mr. D. L. Lillard, Room 7002
Albuquerque District, Corps of Engineers
517 Gold Avenue SW
Albuquerque, NM 87102
Enclosures (2 reports)

Fowler

"LICENSE AMENDMENTS"

~~4~~ 12194

Docket No. 40-6659

William O. Miller, License Fee Management Branch, ADM

MATERIALS LICENSE AMENDMENT CLASSIFICATION

Applicant: Petrotomics

License No: SUA-551 Fee Category: 2A

Application Dated: 3/6/79 and 3/15/79 Received: 3/9/79 supplement received 3/13/79

Applicant's Classification: "minor safety & environ."

The above application for amendment has been reviewed by NMSS in accordance with §170.31 of Part 170, and is classified as follows:

1. Safety and Environmental Amendments to Licenses in Fee Categories 1A through 1H, 2A, 2B, 2C, and 4A

   (a) ___ Major safety and environmental

   (b) X Minor safety and environmental

   (c) ___ Safety and environmental (Categories 1D through 1G only)

   (d) ___ Administrative

2. Justification for reclassification: _____

3. The application was filed (a) ___ pursuant to written NRC request and the amendment is being issued for the convenience of the Commission, or (b) ___ Other (State reason): _____

Signature D J Fouchard

Division of Fuel Cycle & Material Safety

Date 3/13/79

Getty

40-6659

Minerals Company . P. O. Box 2509 Sheridan, Wyoming 82801 . Telephone (307) 731-9311

Manager

March 13, 1979

Received 3/13/79

JJT

Mr. R. A. Scarano, Section Leader
Uranium Mill Licensing Section
U. S. Nuclear Regulatory Commission
7915 Eastern Avenue
Silver Spring, MD 20016

Attention: Mr. John Linehan

Ref: License # SUA-551

Dear Mr. Scarano:

Please refer to my letter of March 6, 1979 relative to amendments to our source material license.

Please be advised that we do not now intend that our proposed heap leach operation is to be considered as an amendment to be included in the payment of $3,500.00 sent to you with the March 6, 1979 letter. Any amendment which may be required for heap leaching will be handled as a separate matter.

Sincerely yours,

J H Whitman

J. H. Whitman

JHW:ps

chen and associates, inc.
CONSULTING ENGINEERS

SOIL & FOUNDATION ENGINEERING

900 EAST F STREET • CASPER, WYOMING 82601 • 307/234-2126
96 S. ZUNI • DENVER, COLORADO 80223 • 303/744-7105

March 4, 1979

Subject: Redesign of proposed addition to the existing Petrotomics Company Tailings Dam, Shirley Basin, Wyoming

Job No. 5179W

Petrotomics Company
P. O. Box 2509
Shirley Basin, Wyoming 82615

Attention: Mr. R. Azocar
Mine Technical Supervisor

Dear Mr. Azocar:

A redesign has been prepared for the proposed addition to the existing Petrotomics Company Tailings Dam, Shirley Basin, Wyoming. We previously prepared a design for a homogeneous embankment in 1977 on which construction was started during the summer of 1978. During construction it was found that preparation of the claystone for compaction in the embankment was a very time consuming process. The embankment may be safely constructed as originally designed or as redesigned.

The redesign changes the embankment to a zoned embankment with silty sandstone being placed in the outer shells. The embankment contains a claystone core to be constructed from the claystone materials stockpiled during the last construction season.

Transmitted with this letter is the geotechnical report, revised construction specifications, and revised construction drawings for the construction of a zoned addition to the existing Petrotomics Company Tailings Dam.

We are prepared to resume construction control at the site when requested.

HAROLD HOLLINGSWORTH, JR. REGISTERED 1062 PROFESSIONAL ENGINEER STATE OF WYOMING

Sincerely yours,

CHEN AND ASSOCIATES, INC.

BY Harold Hollingsworth
Harold Hollingsworth, Jr., P.E.

HH:bec
Enclosure

chen and associates, inc.
CONSULTING ENGINEERS

SOIL & FOUNDATION ENGINEERING

900 EAST F STREET • CASPER, WYOMING 82601 • 307/234-2126
96 S. ZUNI • DENVER, COLORADO 80223 • 303/744-7105

March 4, 1979

Subject: Redesign of the proposed addition to the existing Petrotomics Tailings Dam, Shirley Basin, Wyoming

Job No. 5179W

Petrotomics Company
P. O. Box 2509
Shirley Basin, Wyoming 82615

Attention: Mr. R. Azocar
Mine Technical Supervisor

Dear Mr. Azocar:

An additional ggeotechnical investigation has been conducted for the proposed addition to the existing Petrotomics Company Tailings Dam to redesign the proposed addition as a zoned embankment. The figures in this report have been numbered to correspond to the figure numbers in the original geotechnical report. A homogeneous embankment using claystone fill was designed during 1977. Construction of the embankment addition was started during the summer of 1978. At the close of the construction season, the foundation for the embankment had been prepared, the diaphragm cutoff wall installed, the keyway trench constructed, the downstream drainage blanket constructed, and claystone fill placed to the heavy dashed line shown in Fig. 57A, attached. To speed construction during the coming construction season, it was decided to investigae changing the embankment to a zoned embankment with a claystone core and sandstone shells.

Zone 2 Shell Materials: Three samples of material to be considered for use in the Zone 2 shells of the embankment were obtained during January, 1979. The first material was a very sandy siltstone-claystone from Dump Area #2. The gradation, Atterberg limits, and moisture-density relationship in accordance with ASTM D698-70, Method A, for this material are presented in Fig. 36A. The second material sampled was a clayey-silty sandstone from North Pit 42 - #1. The gradation, Atterberg limits, and moisture-density relationship in accordance with ASTM D698-70, Method A, are presented in Fig. 36B. The third material sampled was a silty sandstone from Pit 33-1. The gradation, Atterberg limits, and moisture-density relationship in accordance with ASTM D698-70, Method A, are presented in Fig. 36C. The test results are summarized in Table III, revised. The samples represent a wide range of materials. The

material from the dump area had the highest -200 content and the highest Atterberg limits. We understand you do not wish to use this material in the embankment. The material from Pit 33-1 had a much lower -200 content and a lower plasticity index. To further investigate the properties of these materials, the permeability was determined in the remolded condition. Each of the materials had a coefficient of permeability of 0.07 feet per year as measured by the laboratory constant head permeability test. These test results are also summarized in Table III. The strength parameters for remolded specimens of the silty sandstone from Pit 33-1 were determined by triaxial shear testing in the consolidated-undrained condition. These test results are presented in Fig. 56A. The test results are summarized in Table IV, revised.

Suitability of the Proposed Zone 2 Shell Materials: The embankment was originally designed as a homogeneous embankment with 2.5:1 side slopes and a horizontal downstream drainage blanket. The claystone fill proposed for use in the embankment had a permeability of less than 1 foot per year. The proposed materials to be placed in the Zone 2 shells will also have a permeability of less than 1 foot per year. We feel the downstream drainage blanket, as constructed, will still serve its intended purpose. In the original evaluation of the proposed embankment, a cohesion value of 750 psf and a friction angle of 4.5 degrees was used for the UU shear strength of the embankment and a cohesion of 1,000 psf and a friction angle of 7 degrees was used for the consolidated-undrained shear strength of the proposed embankment. Testing done during the original investigation on remolded samples of the sandstone indicated the cohesion ranging from 0 to 1,750 psf and a friction angle ranging from 22 to 26 degrees for the UU shear strength. Testing done on the proposed borrow samples for this investigation indicated a cohesion of 300 psf and a friction angle of 25 degrees for the consolidated-undrained shear strength. Therefore, we conclude the embankment will be stable with the Zone 2 materials intended for use with side slopes of 2.5:1 as originally designed. We do not feel that another slope analysis of the embankment is warranted.

Proposed Construction: We propose that the addition to the existing Petrotomics Tailings Dam embankment be constructed as shown in Fig. 57A attached. The centerline of the dam and the slopes should be left as originally designed. The top width of the dam should be changed to 24 feet. The dam should consist of a Zone 1 interior core constructed with claystone materials from the stockpiled materials with a top width of 12 feet and 1:1 side slopes. Zone 2 upstream and downstream shells should be constructed with silty sandstone from the proposed mine area. The shells may be constructed with any of the materials sampled from the mine or dump area and tested during this program or the previous investigation. The material should be placed in 9-inch lifts at a moisture content within the range of 2.0 percent dry to 2.0 percent wet of optimum and compacted to at least 95% standard Proctor density.

If we can be of further service in the preparation of the design of the embankment or its submittal to the NRC for approval, please call.

Sincerely yours,

CHEN AND ASSOCIATES, INC.

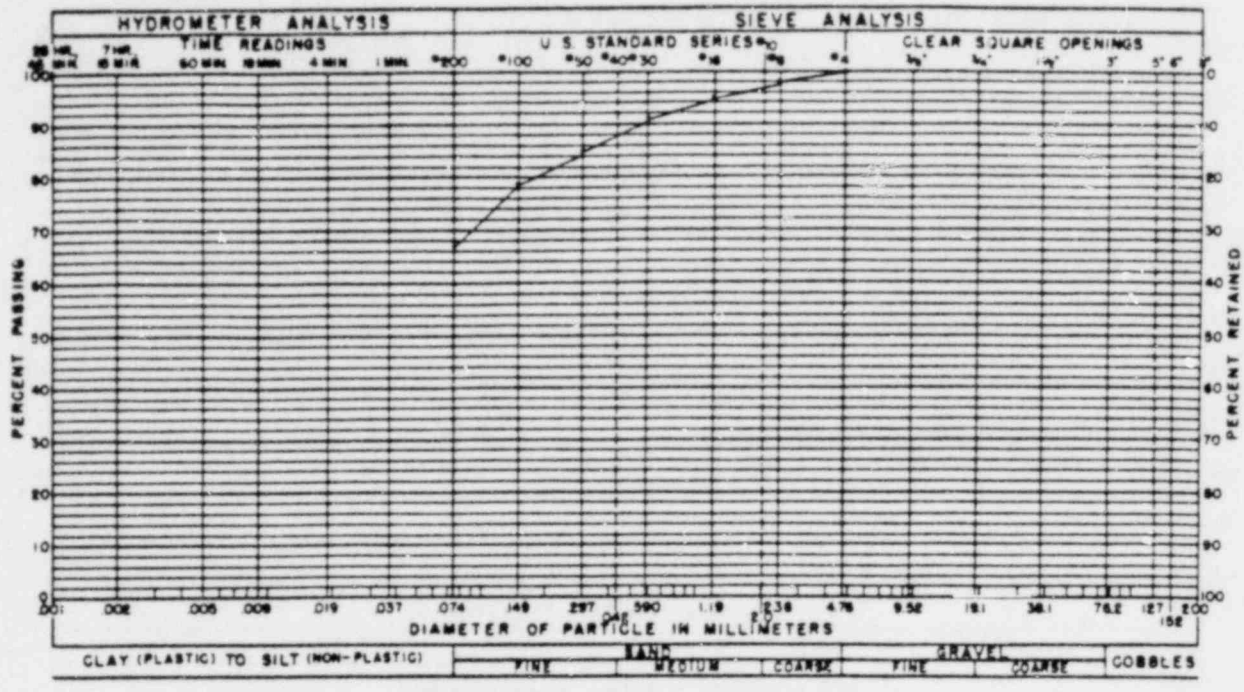
BY Harold Hollingsworth
Harold Hollingsworth, Jr., P.E.

HH:bec
Enclosure

CHEN AND ASSOCIATES

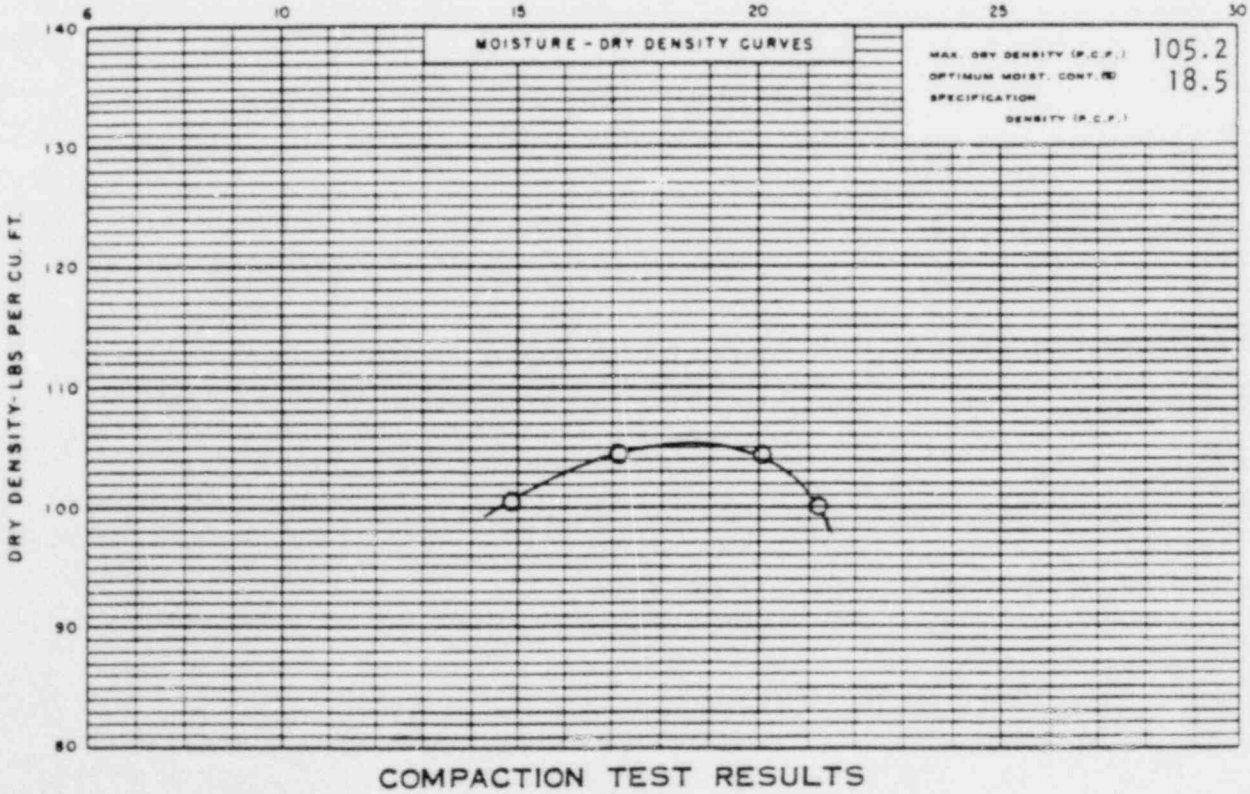
Consulting Engineers

Soil and Foundation Engineering



GRADATION TEST RESULTS

GRAVEL	2%	SAND	31 %	SILT AND CLAY	67%
LIQUID LIMIT	37 %	PLASTICITY INDEX	15 %		



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Very Sandy Siltstone-Claystone from Dump Area #2

#5179W

Fig. 36A

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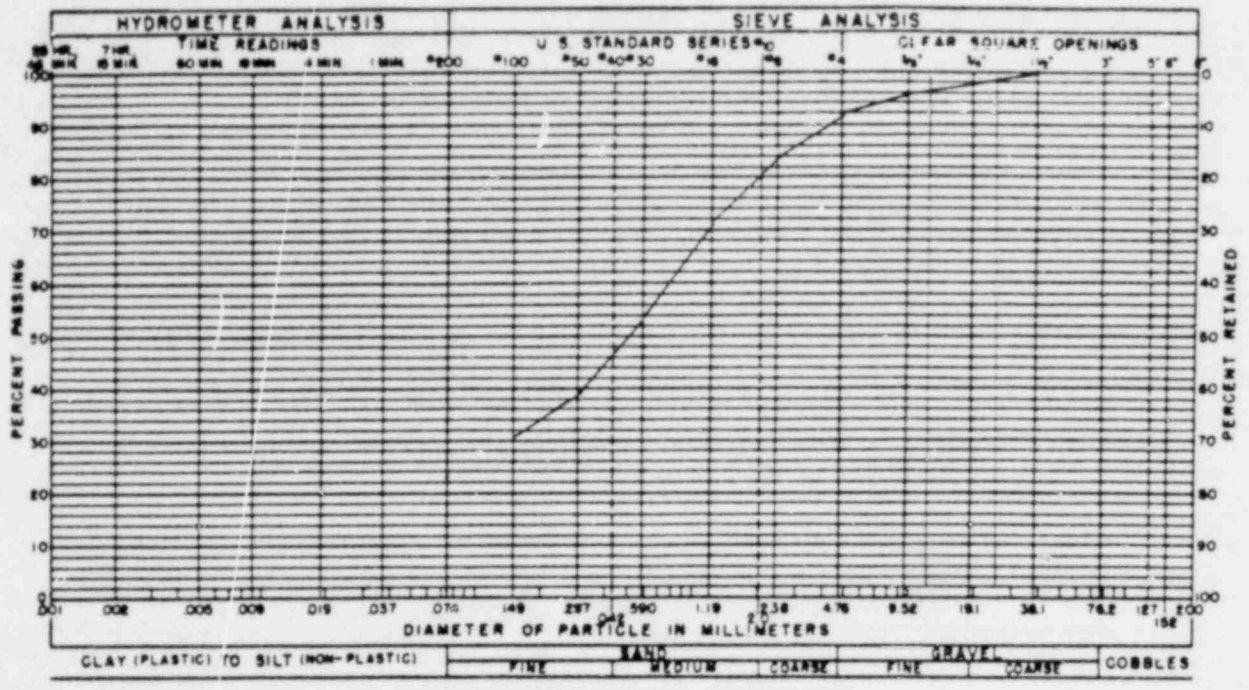
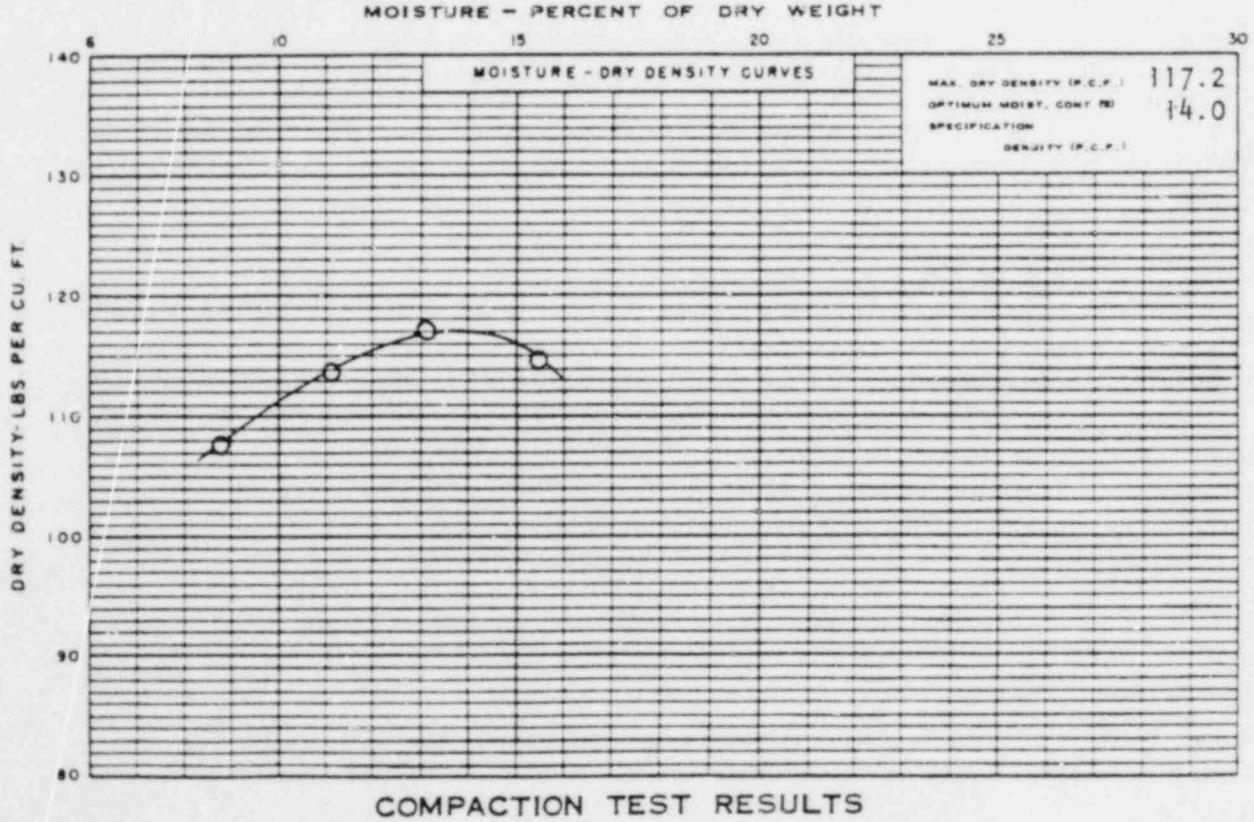
Soil and Foundation Engineering



GRADATION TEST RESULTS

GRAVEL	8 %	SAND	69 %	SILT AND CLAY	23 %
LIQUID LIMIT	34 %	PLASTICITY INDEX	12 %		



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Clayey-Silty Sandstone - North Pit 42 - #1

#5179W

Fig. 36B CA-3

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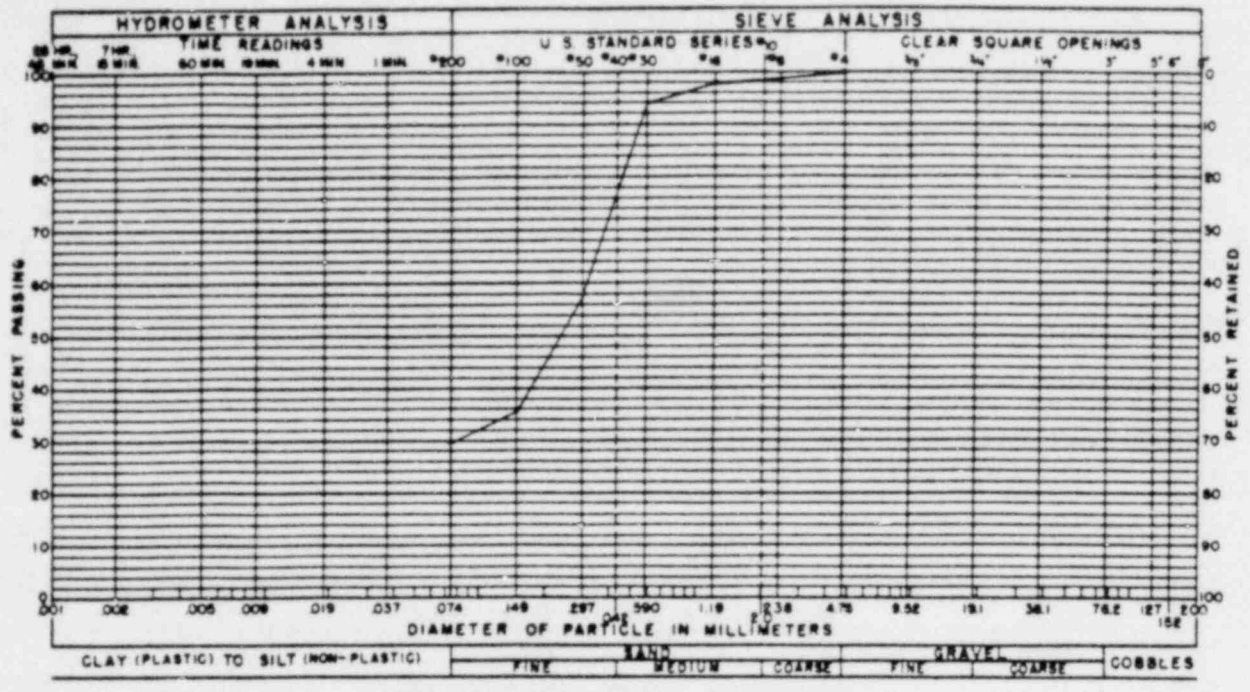
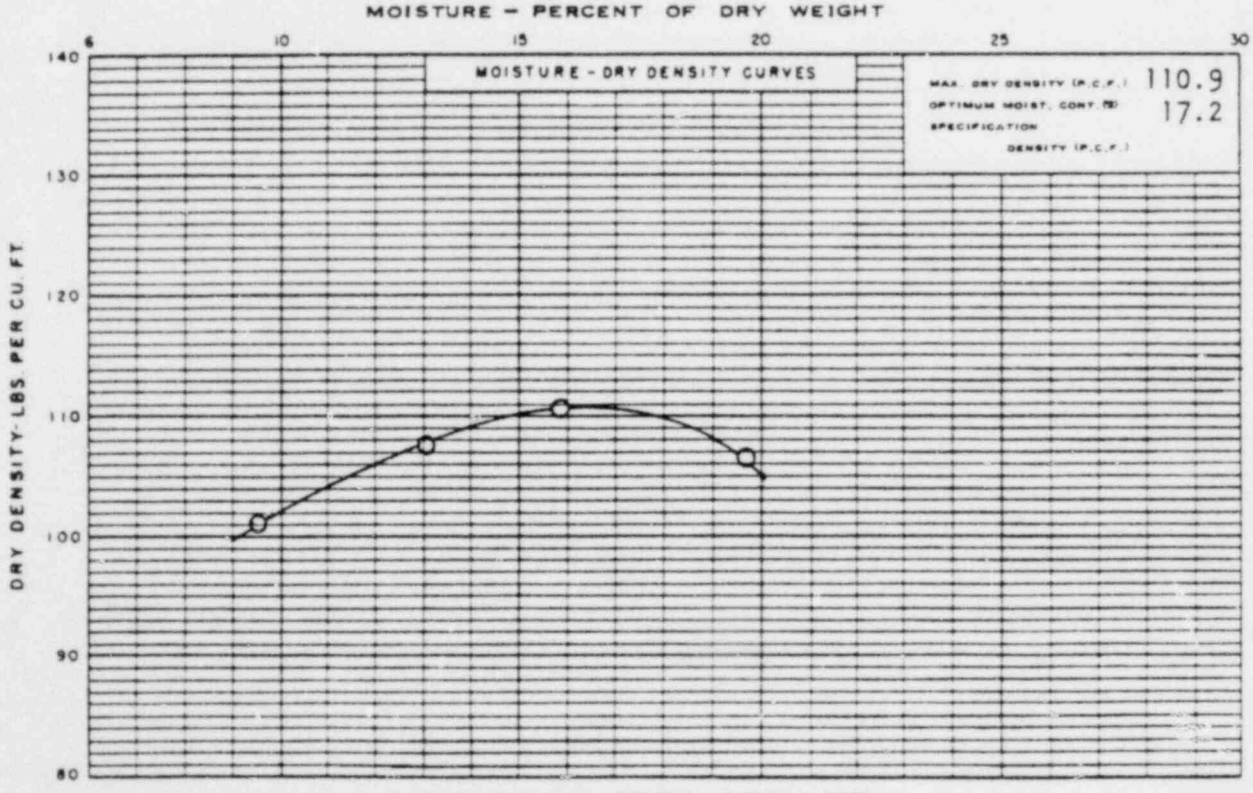
Soil and Foundation Engineering



GRADATION TEST RESULTS

GRAVEL 1 % SAND 70 % SILT AND CLAY 29 %

LIQUID LIMIT 31% PLASTICITY INDEX 5%



COMPACTION TEST RESULTS

COMPACTION TEST PROCEDURE ASTM D698-70, Method A

SAMPLE OF Silty Sandstone - Pit 33 - 1

#5179W

Fig. 36C

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Consulting Soil and Foundation Engineers

TEST NUMBER	1	2	3
LOCATION	Remolded Silty Sandstone Sample Pit 33-1		
HEIGHT - INCH	5.0	5.0	5.0
DIAMETER - INCH	2.0	2.0	2.0
WATER CONTENT - %	17.2	18.2	16.5
DRY DENSITY - pcf	104.5	103.2	105.1
CONSOL. LOAD - ksf	8.6	11.5	14.4
$\bar{\sigma}_1$ - ksf	1.6	2.4	2.98
$\bar{\sigma}_3$ - ksf	4.49	6.97	8.1

TYPE OF SPECIMEN: Remolded

SOIL DESCRIPTION: Silty Sandstone - Pit 33-1

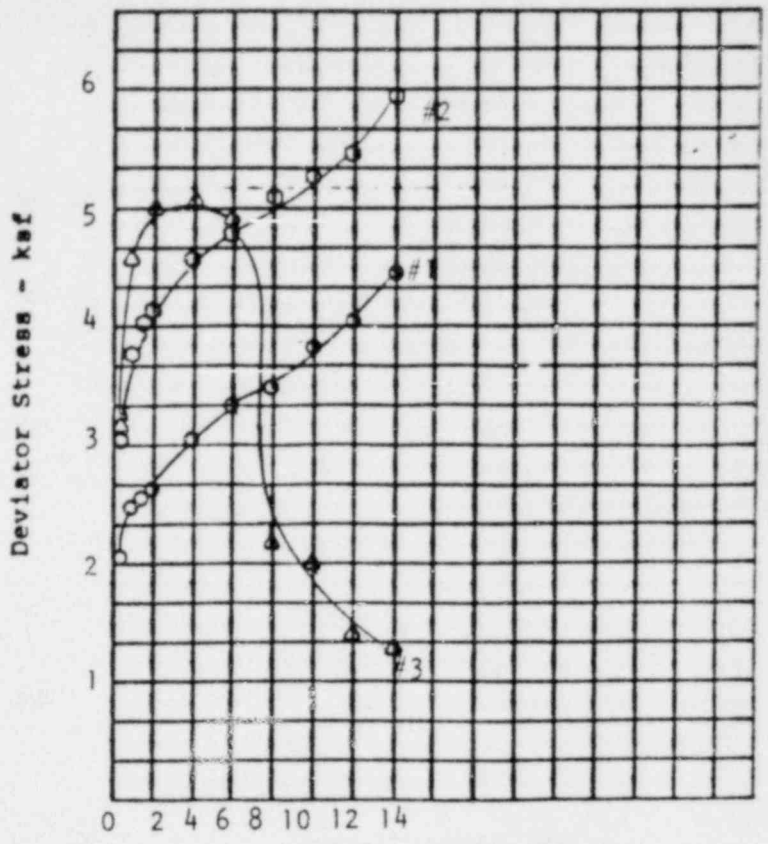
TYPE OF TEST: Consolidated-Undrained

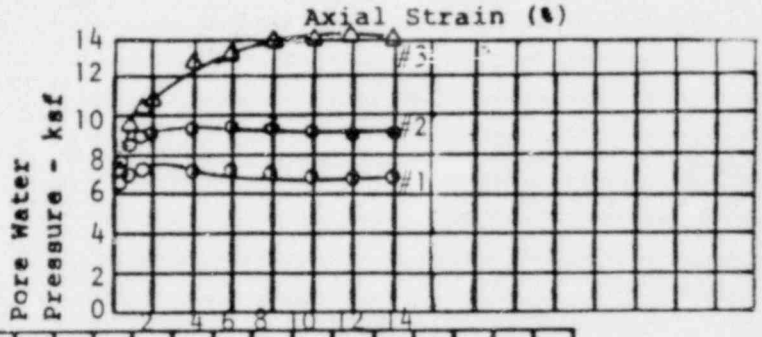
Saturated

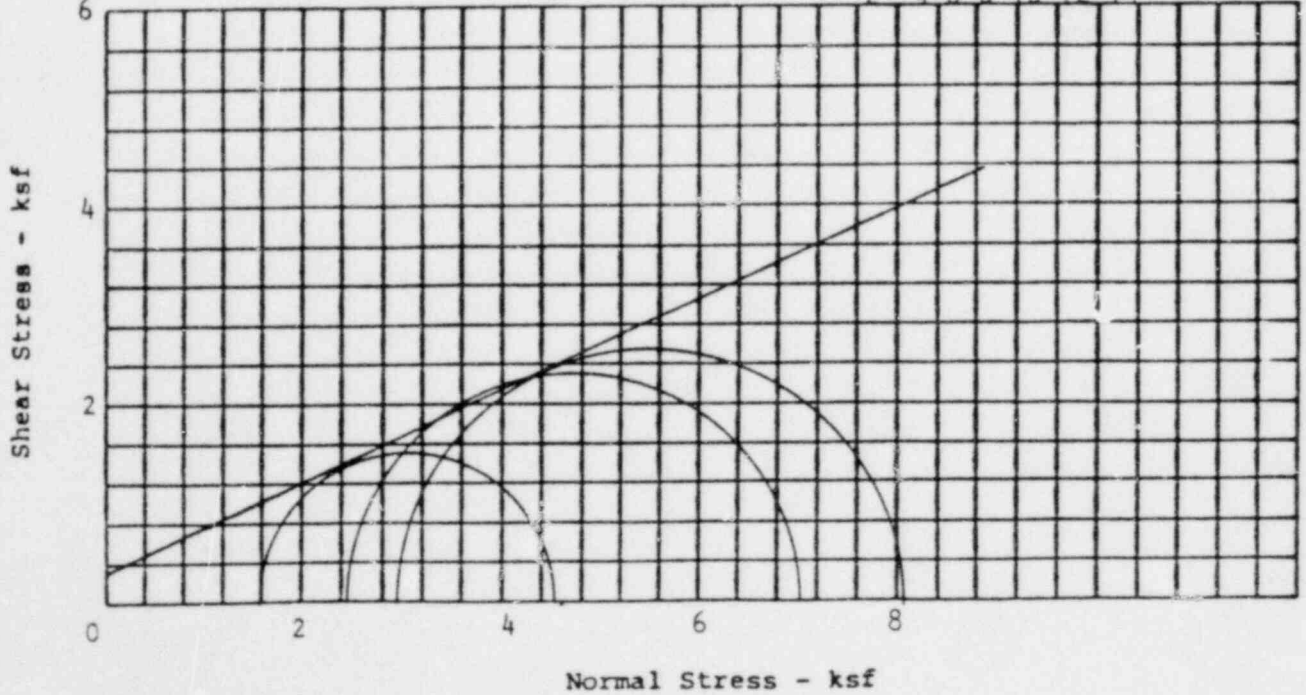
TAN Ø: 0.466

Ø: 25°

COHESION - ksf: 0.3



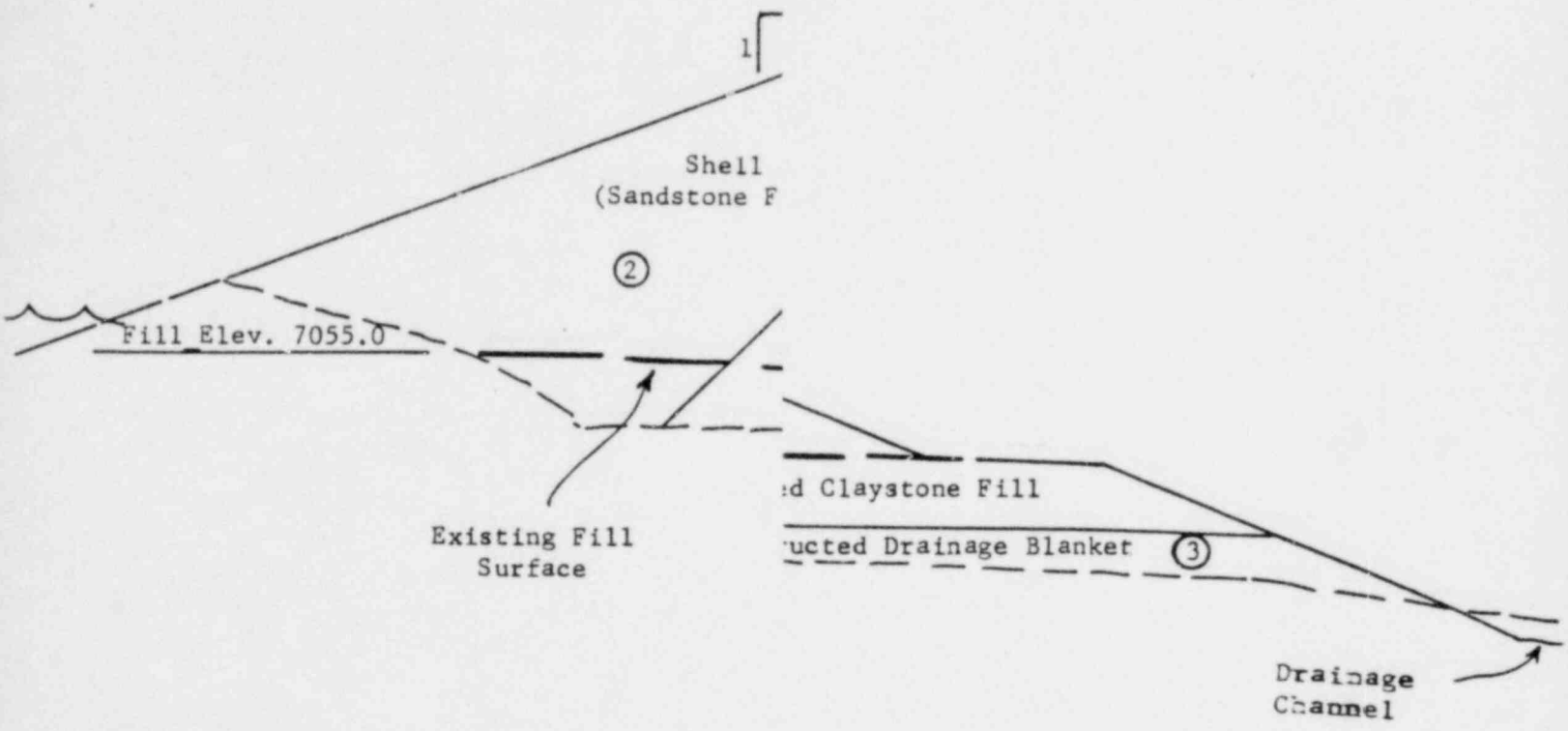




TRIAXIAL SHEAR TEST RESULTS

#5179W

Fig: 56A



XIMUM EMBANKMENT SECTION
E: 1" - 20'

#5179W

Fig. 57A

JOB NO. 5179W

CHEN AND ASSOCIATES

TABLE III

SUMMARY OF ENGINEERING INDEX PROPERTIES - EXISTING EMBANKMENT AND BORROW

HOLE	DEPTH (FEET)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (PCF)	ATTERBERG LIMITS		REMOLDED PERMEABILITY (ft./yr.)	GRADATION ANALYSIS			SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)		+4 (%)	-4 +200 (%)	-200 (%)	
										EXISTING EMBANKMENT
TH-1	14.0	24.9	95.6	57	35		0	2	98	Claystone fill
TH-1	19.0	20.4	105.5	40	16		1	7	92	Claystone fill
										BORROW
Mine area				48	23		0	39	61	Sandy clay
Mine area				66	35		0	18	82	Claystone
Mine area	Bench 7100			62	33		0	5	95	Claystone
Mine area	Bench 7140			67	32		0	15	85	Siltstone
Mine area	Bench 7060			48	18		0	16	84	Siltstone
Mine area	South side			58	23		0	4	96	Siltstone
Mine area	Bench 7060			69	35		0	15	85	Siltstone
Mine area	Bench 7060				NP		0	81	19	Sandstone
Mine area	Bench 7060				NP		0	84	16	Sandstone
Dump Area	#2	10.9		37	15	0.07	2	31	67	Very Sandy Siltstone-Claystone
North Pit	42 - #1	12.0		34	12		8	69	23	Clayey-Silty Sandstone
Pit 33 - 1		11.5		31	5	0.07	1	70	29	Silty Sandstone

(Revised 3/2/79)

TABLE IV

SUMMARY OF SHEAR STRENGTH PARAMETERS

Material	Dry Density (pcf)	Friction Angle (ϕ)	Cohesion (psf)	Type of Test*	Sample Type†	Location Hole and Depth
Silt-Clay	96.5	17	1500	CD	Shelby-Undisturbed	S-2 @ 2.0'
Silt-Clay	97.4	8	1700	CU	California-Undisturbed	S-2 @ 2.0'
Silt-Clay	96.2	12	900	UU	Shelby-Undisturbed	S-2 @ 2.0'
Slightly Silty Sand	116.4	38	800	CD	Shelby-Undisturbed	S-8 @ 2.0'
Slightly Silty Sand	98.4	34	0	CU	California-Undisturbed	S-8 @ 4.0'
Slightly Silty Sand	116.9	32	600	UU	Shelby-Remolded	
Siltstone	92.0	12	1800	CD	Shelby-Undisturbed	S-4 @ 16.0'
Siltstone	96.3	7 *	800	CU	Shelby-Undisturbed	N-4 @ 35.0'
Siltstone	91.3	11	900	UU	Shelby-Undisturbed	S-4 @ 16.0'
Sandstone	117.5	53	1000	CD	Shelby-Undisturbed	S-4 @ 10.5'
Sandstone	117.5	22	1750	UU	Shelby-Remolded	S-4 @ 10.5'
Sandstone	117.5	47	4000	CD	Shelby-Undisturbed	N-4 @ 5.5'
Sandstone	117.4	41	0	CU	California-Undisturbed	N-4 @ 4.0'
Sandstone	101.2	26	0	UU	Shelby-Remolded	N-4 @ 5.5'
Existing Embankment	105.5	9	3300	CD	Shelby-Undisturbed	TH-1 @ 19.0'
Existing Embankment	96.9	7	1200	CU	California-Undisturbed	TH-1 @ 14.0'
Existing Embankment	105.2	9	1100	UU	Shelby-Undisturbed	TH-1 @ 19.0'
Siltstone Borrow	93.5	25	600	CD	Bag-Remolded	Borrow Area
Siltstone Borrow	91.5	7	1000	CU	Bag-Remolded	Borrow Area
Siltstone Borrow	93.5	4	750	UU	Bag-Remolded	Borrow Area
Silty Sandstone	104.3	25	300	CU	Bag-Remolded	Pit 33-1

NOTES:

* CD - Consolidated Drained Direct Shear Test. Shear strength parameters are effective stress values. Samples were run saturated.

CU - Consolidated Undrained Triaxial Shear Test with pore pressure measurements. Shear strength parameters are given effective stress values. Samples were run saturated.

UU - Unconsolidated Undrained Triaxial Shear Test. Shear strength parameters are total stress values. Samples were run at their natural moisture content.

† Undisturbed foundation samples were obtained with a California sampler and 5-inch diameter Shelby tubes. Some samples were disturbed when extruded from the Shelby tubes. The disturbed samples were remolded to their natural density and moisture content prior to testing. Remolded borrow samples were compacted to 100% standard density at optimum moisture content.

** Each specimen failed on slickensided joint surface.

#5179W

(Revised 3/2/79)