70-6621

Regulatory File Cy.

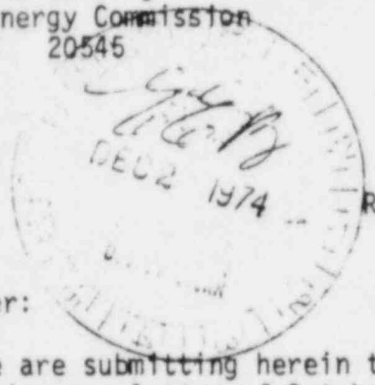
PETROTOMICS COMPANY

GETTY OIL COMPANY • MANAGING PARTNER

P. O. DRAWER 2459 • CASPER, WYOMING 82601

November 19, 1974

Mr. James R. Miller, Chief
Fuel Fabrication and Reprocessing Branch No. 2
Directorate of Licensing
U. S. Atomic Energy Commission
Washington, DC 20545



RE: SUA-551

Dear Mr. Miller:

We are submitting herein the information and data which you requested in your letter of October 1, 1974, in connection with the renewal of the Source Material License for our milling operation (License No. SUA-551).

In accordance with our telephone conversation of October 25, 1974 relative to the requirements as set forth in your letter, we wish to state that our facility and the procedures which we use therein, are the same as outlined in our application for renewal in March of 1973. Re-submittal and updating of that application is therefore not deemed to be necessary. Additionally, as explained in our telephone conversation, at this time we are in the process of temporarily suspending milling operations due to a lack of ore for feed. Appropriate personnel will be retained at the mill during the suspension of active operations and we will adhere to all regulations and requirements pertinent to our license and to all other laws and regulations governing our operations. As the suspension of milling is for an indefinite period of time and operations may be resumed in the near future, depending upon market conditions, the retained personnel will maintain the facility in an operable condition. When milling is resumed after this temporary suspension, the facility and procedures will be the same as before the suspension and as are outlined in our license and application for renewal.

So that you may have the information which you need to evaluate the impact of our operation on the environment, we are enclosing data pertinent to those sections of "Interim Guidelines for Preparing Environmental Information for Nuclear Facilities (Preliminary)" which appear to be applicable to this operation.

A/100

☆U.S. GOVERNMENT PRINTING OFFICE: 1973 - 499-795

FROM	DATE OF DOCUMENT	DATE RECEIVED	NO.
[redacted] Petrotomics Company Casper, WY	Nov. 19, 1974	Nov. 25, 1974	2311
	LTR X	MEMO	REPORT	OTHER
TO:	ORIG 1	CC	OTHER
James R. Miller	ACTION NECESSARY ☐	CONCURRENCE ☐	DATE ANSWERED
	NO ACTION NECESSARY ☐	COMMENT ☐	BY
CLASS	POST OFFICE	FILE CODE: Docket No. 40-4659	
	REG. NO.		

DESCRIPTION: Ltr. pertaining to our ltr. dated Oct. 1, 1974 in connection with the removal of their license ...

ENCLOSURES: Environmental Info (10 cys)

REFERRED TO	DATE	RECEIVED BY	DATE
Miller [redacted] 4 cys	12-2		
Distribution			
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		2311 eob	

Mail & remove

REMARKS

U. S. ATOMIC ENERGY COMMISSION — MAIL CONTROL FORM — FORM AEC-32 (8-70)

Local Climatological Data

Annual Summary With Comparative Data

1975

CASPER, WYOMING

Narrative Climatological Summary

Casper is located in the central portion of Wyoming in the valley of the North Platte River. The country immediately surrounding Casper is mostly rolling and hilly with considerable flat prairie land in each direction except toward the south where Casper Mountain rises some 3,500 feet above the valley floor. The prairie land is used mainly for grazing.

The National Weather Service Office is located at Natrona County International Airport, some eight miles west-northwest of the Casper Post Office and about 200 feet higher in elevation.

The climate of Casper is rather dry due to the effective barrier to moisture from the Pacific Ocean offered by the Cascades, Sierra Nevada, and the Rocky Mountains when winds are from the west and northwest. The bulk of the annual precipitation is received from moisture laden easterly winds, particularly during spring months. Most of this precipitation is in the form of rain although occasional heavy wet snowfalls in spring months are not uncommon, but these snows are short-lived. Summer precipitation is almost exclusively from thundershower activity and under normal conditions provides sufficient moisture to maintain growth of rangeland grasses. Seasonal snowfall averages about 72 inches, but the water content of winter snow is low owing to the cold temperatures at which it usually occurs. The very dry strong west and southwest winds following these winter snows, tend to clear the snow from the rangelands thereby permitting winter grazing of livestock.

The dryness of the air has a considerable modifying effect in preventing discomfort during the warm summer months as well as during periods of subzero temperatures in the winter. The average maximum temperature during summer months is 82°, while during the winter, the average minimum temperature is 15°. The average temperature is 67° in the summer and 26° in the winter. Extreme temperatures in these respective seasons have reached as high as 104° and as low as -40° within the period of record.

In the city of Casper, average minimum temperatures in winter are 2° lower than those at the Weather Station, while maximum temperatures in summer have slightly higher values. Extreme temperatures in the city have reached as high as 105° in summer and as low as -37° in winter.

The winter season is not unduly severe, contrary to lay belief. Strong pressure gradients and the effects of local terrain keep much of the cold air sweeping down from the north from penetrating too deeply into this area, resulting in fewer days with frigid temperatures than in areas as close as 20-30 miles north and east of Casper.

The average number of days throughout the year with one hundredth of an inch of precipitation is near 90, most of which occur during the spring and summer. Consequently the absence of rain clouds or clouds usually associated with precipitation results in bright days with considerable sunshine throughout the winter season. The average length of the growing season is 129 days, with the average date of the last freezing temperature in spring May 22, and the first freezing temperature in fall September 28.

noaa NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION / ENVIRONMENTAL DATA SERVICE / NATIONAL CLIMATIC CENTER ASHEVILLE, N.C.

chen and associates, inc.
CONSULTING ENGINEERS

SOIL & FOUNDATION ENGINEERING
96 S. ZUNI • DENVER, COLORADO 80223 • 303/744-7105
1924 EAST FIRST STREET • CASPER, WYOMING 82601 • 307/234-2126

September 30, 1976

Subject: Stability Analysis for Proposed Addition to Tailings Dam, Getty Oil Company Shirley Basin Mine Site, Carbon County, Wyoming.

Job No. 5179W

Getty Oil Company
P. O. Box 2459
Casper, Wyoming 82601

Gentlemen:

We have completed the stability analysis on the subject tailings dam. The results are summarized on the attached figure.

The stability analysis was run by the modified Fellenius method. The results indicate a minimum factor of safety of 1.26 for the upstream embankment at post-construction. The analyses shown consider a horizontal acceleration of .05g. Based on the performance of the existing embankment, the method of analysis and the proposed use of the upstream reservoir, we believe this is a conservative result. Values used in the analysis were sent to you previously in our letter of September 23, 1976.

If there are any questions or we can be of further service, please let us know.

Sincerely,

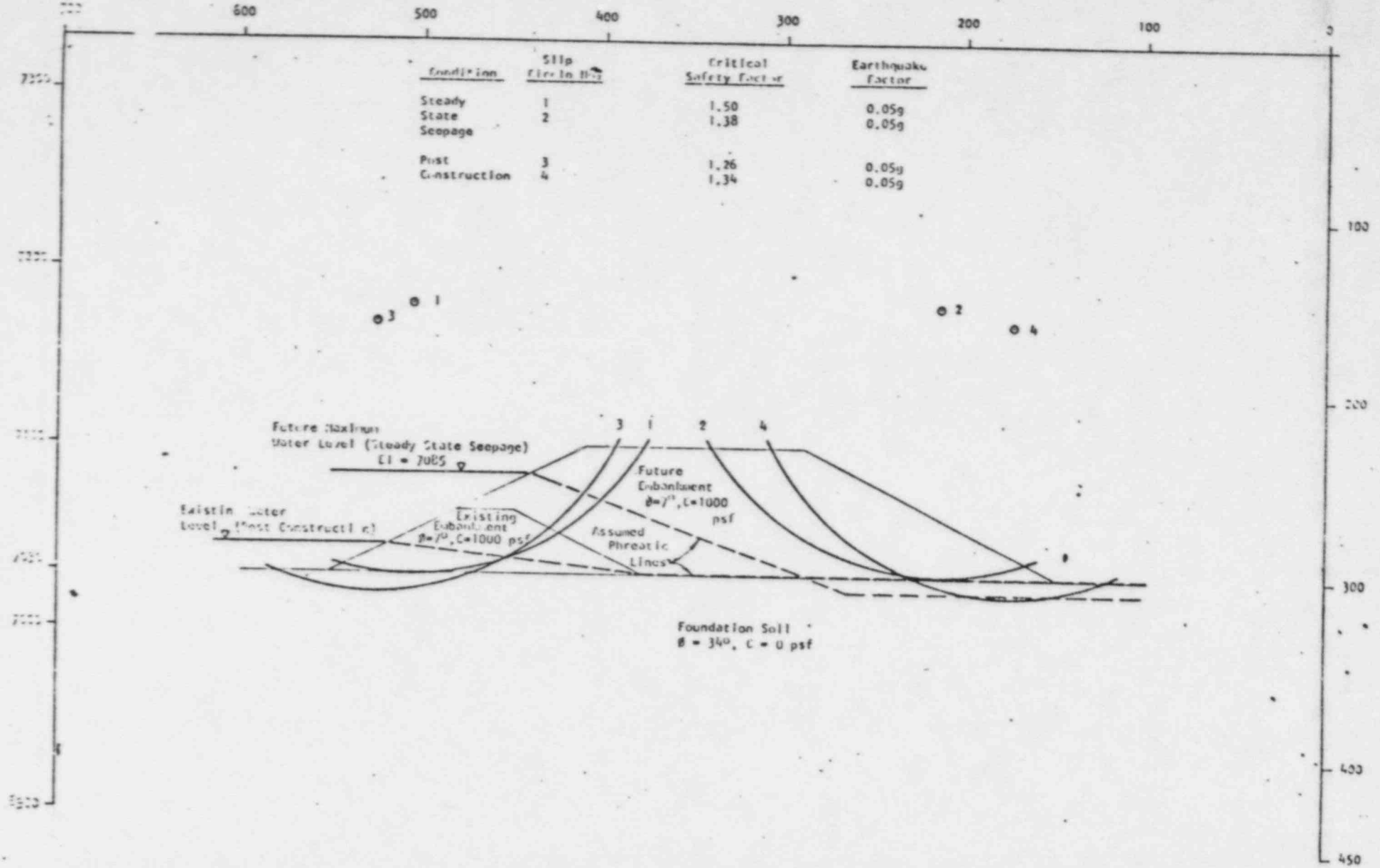
CHEN AND ASSOCIATES, INC.

By Richard C. Hepworth
Richard C. Hepworth, P. E.

RICHARD C. HEPWORTH REGISTERED PROFESSIONAL ENGINEER 6539 STATE OF COLORADO

RCH/bn
Encl.
cc: Getty Oil Co. - California

A/102


600
500
400
300
200
100
0
100
200
300
400
450
Condition
Slip Circle No.
Critical Safety Factor
Earthquake Factor
Steady State Seepage
1
1.50
0.05g
Post Construction
2
1.38
0.05g
3
1.26
0.05g
4
1.34
0.05g
1
2
3
4
Future Maximum Water Level (Steady State Seepage) El = 7085
Existing Water Level (Post Construction)
Existing Embankment β=70°, C=1000 psf
Future Embankment β=70°, C=1000 psf
Assumed Phreatic Lines
Foundation Soil β = 34°, C = 0 psf

D. REFERENCES

1. Cedergrin, Harry R. (1967), Seepage, Drainage, and Flow Nets, John Wiley and Sons, Inc., New York.

2. Design of Small Dams, Second Edition - U. S. Department of the Interior, Bureau of Reclamation, 1974.

3. Earth Manual, Second Edition - U. S. Department of the Interior, Bureau of Reclamation, 1974.

4. Engineering and Design Stability of Earth and Rock-Fill Dams - EM 1110-2-1902, April 1, 1970.

5. Harshman, E. N. (1972), Geology and Uranium Deposits, Shirley Basin Area, Wyoming, U.S.G.S. Professional Paper 745, U. S. Government Printing Office, Washington.

6. Nuclear Regulatory Commission Source Material License SUA-551 for ---- Petrotomics Company, Shirley Basin Uranium Mill, December 15, 1975.

7. Regulatory Guides as follows:

   1.70 (U.S.N.R.C.)
   3.5 (U.S.A.E.C.?)
   3.11 (U.S.A.E.A.)

8. Report on: Design of Proposed Tailings Dam and Seepage Evaluation, Shirley Basin Mine near Shirley Basin, Wyoming for Utah International, Inc. by Dames & Moore, Job No. 0961-067-06, April 15, 1975.

9. Sears, M.B. et al (1975) Correlation of Radioactive Waste Treatment Costs and the Environmental Impact of Waste Effluents in the Nuclear Fuel Cycle for Use in Establishing "As Low As Practicable" Guides - Milling of Uranium Ores, ORNL-TM-4903, Vol. 1.

10. Soil and Foundation Investigation for the Proposed Addition to the Existing Tailings Pond Embankment at the Getty Oil Company Shirley Basin Mine Site, Carbon County, Wyoming - Chen & Associates, Inc. August 27, 1976.

11. Thickened Discharge - A New Approach to Tailings Disposal by Eli I. Robinsky (date unknown).

REFERENCE MAP (Not Enclosed)

Harshman, E. N., (1968), Geologic Map of the Shirley Basin Area, Albany, Carbon, Converse, and Natrona Counties, Wyoming, Department of the Interior, U.S.G.S.
Map 1-539, Miscellaneous Geologic Investigations.

PART IV - MAPS AND DRAWINGS

FIGURE

1. WYOMING MAP
2. SHIRLEY BASIN AREA[1]
3. SKETCH LOCATION MAP
4. GENERALIZED STRATIGRAPHIC SECTION
5. STRATIGRAPHIC AND STRUCTURAL CROSS SECTION THROUGH TAILINGS IMPOUNDMENT AREA
6. DRAINAGE BELOW DAM AREA
7. SKETCH OF PRESENT DAM[2]
8. TOPOGRAPHIC MAP W/PROPOSED DAM
9. TYPICAL SECTION OF PROPOSED DAM

1. Harshman, E. N., 1972, USGS pp 745, page 4.
2. Beardshear, G. T., (1961) 1962 License No. SUA-551, Exhibit A-1.

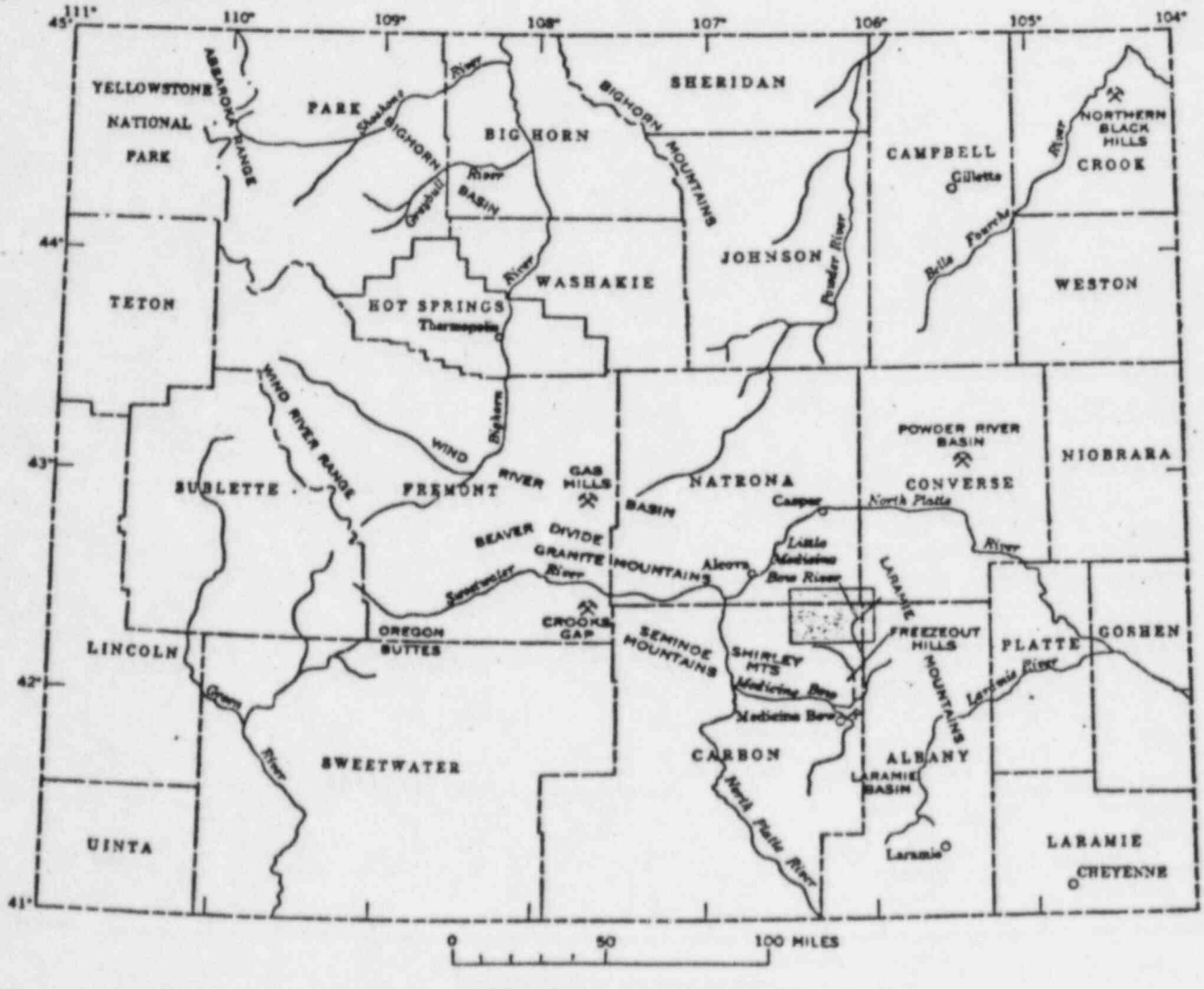


FIGURE 1.—Shirley Basin area (shaded), Wyoming.

484-170 O - 72 - 2

Figure 1

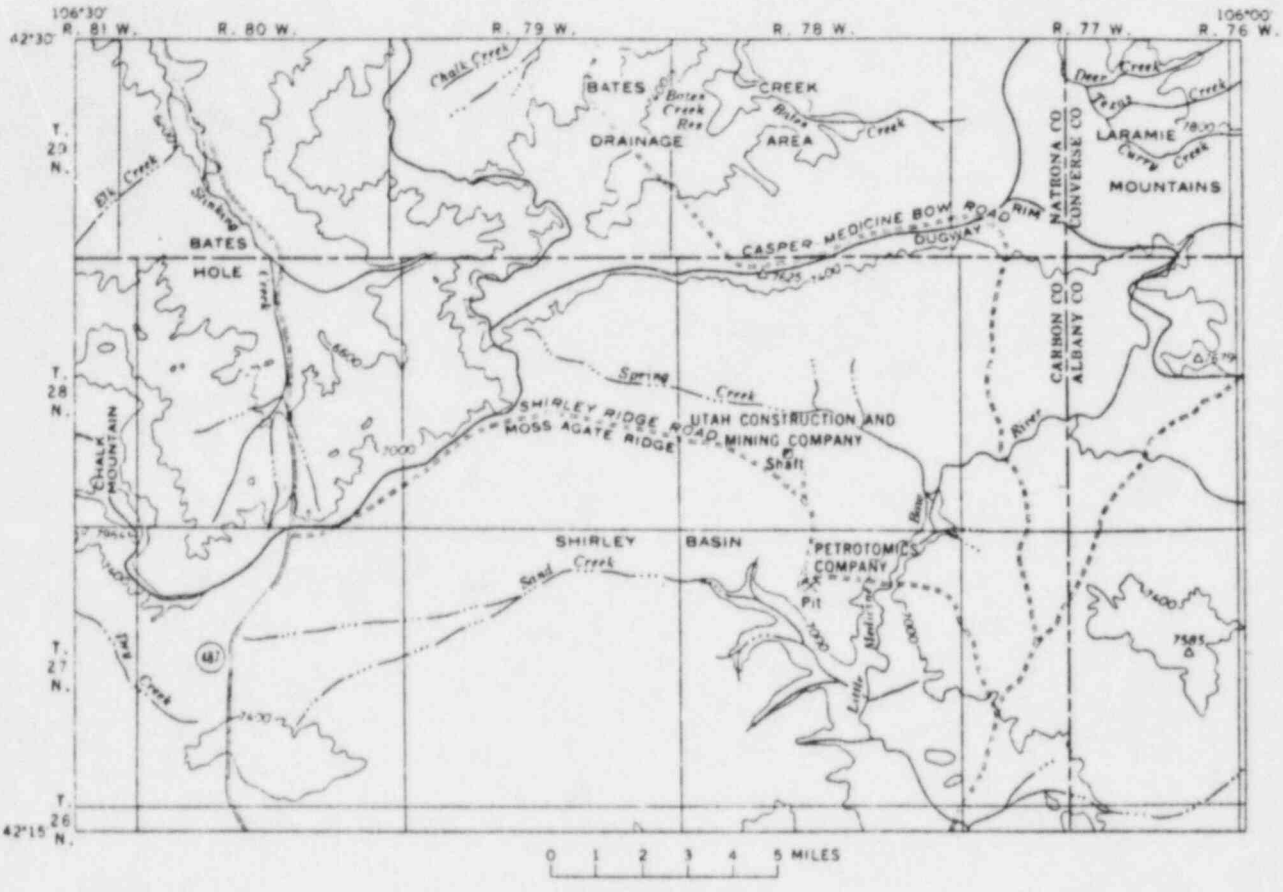
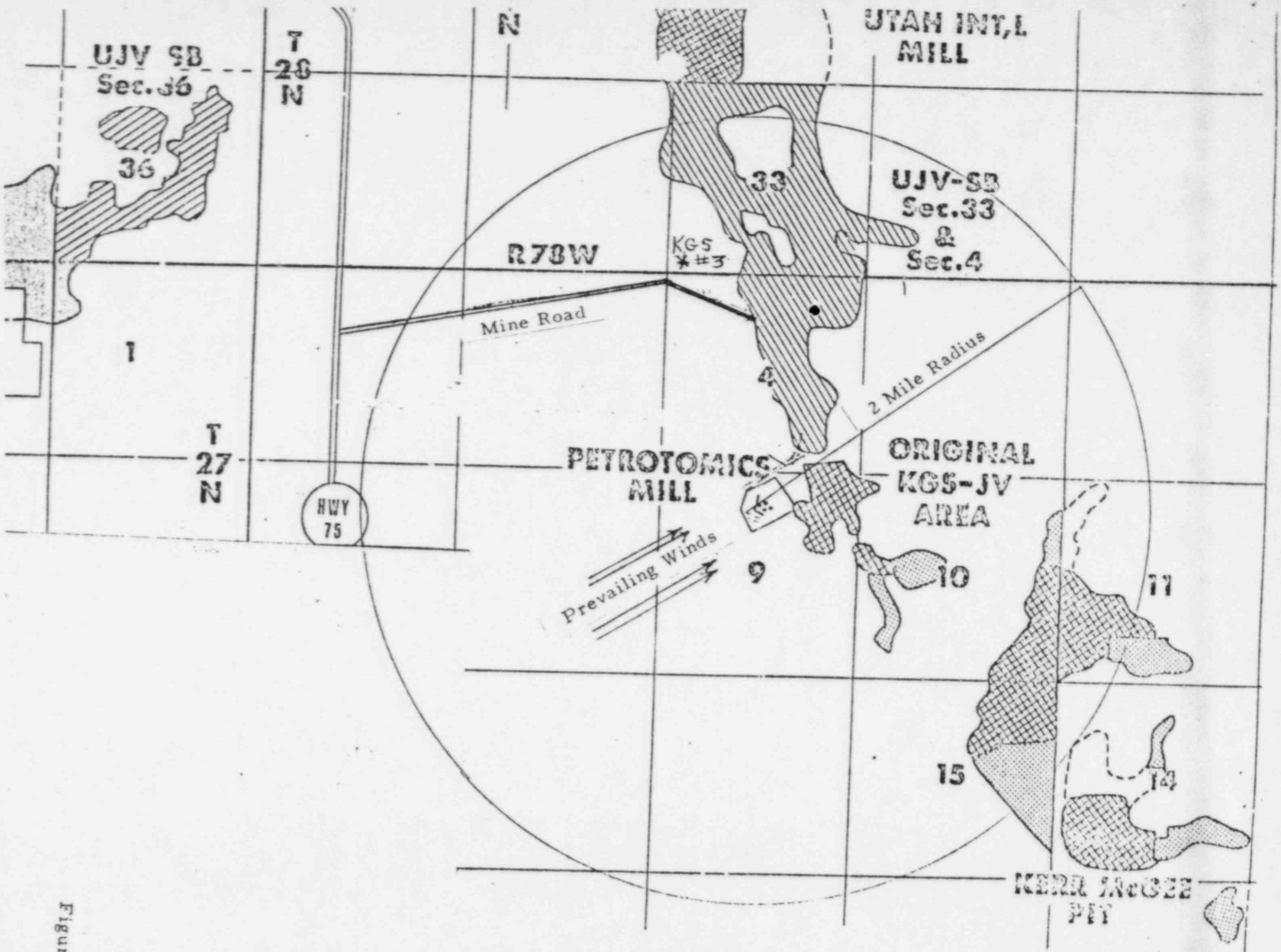


FIGURE 2. — Limits of the Shirley Basin area, and some of the geographic features described in this report.

Figure 2


UJV SB
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T
26
N
36
N
UTAH INT'L
MILL
33
UJV-SB
Sec. 33
&
Sec. 4
R78W
KGS
#3
Mine Road
1
4
2 Mile Radius
T
27
N
PETROTOMICS
MILL
ORIGINAL
KGS-JV
AREA
HWY
75
Prevailing Winds
9
10
11
15
14
KERR McGEE
PIT

Figure 3

GENERALIZED STRATIGRAPHIC SECTION

SHIRLEY BASIN

CARBON COUNTY, WYOMING

Wind River Formation Eocene

Scale 1"- 100'

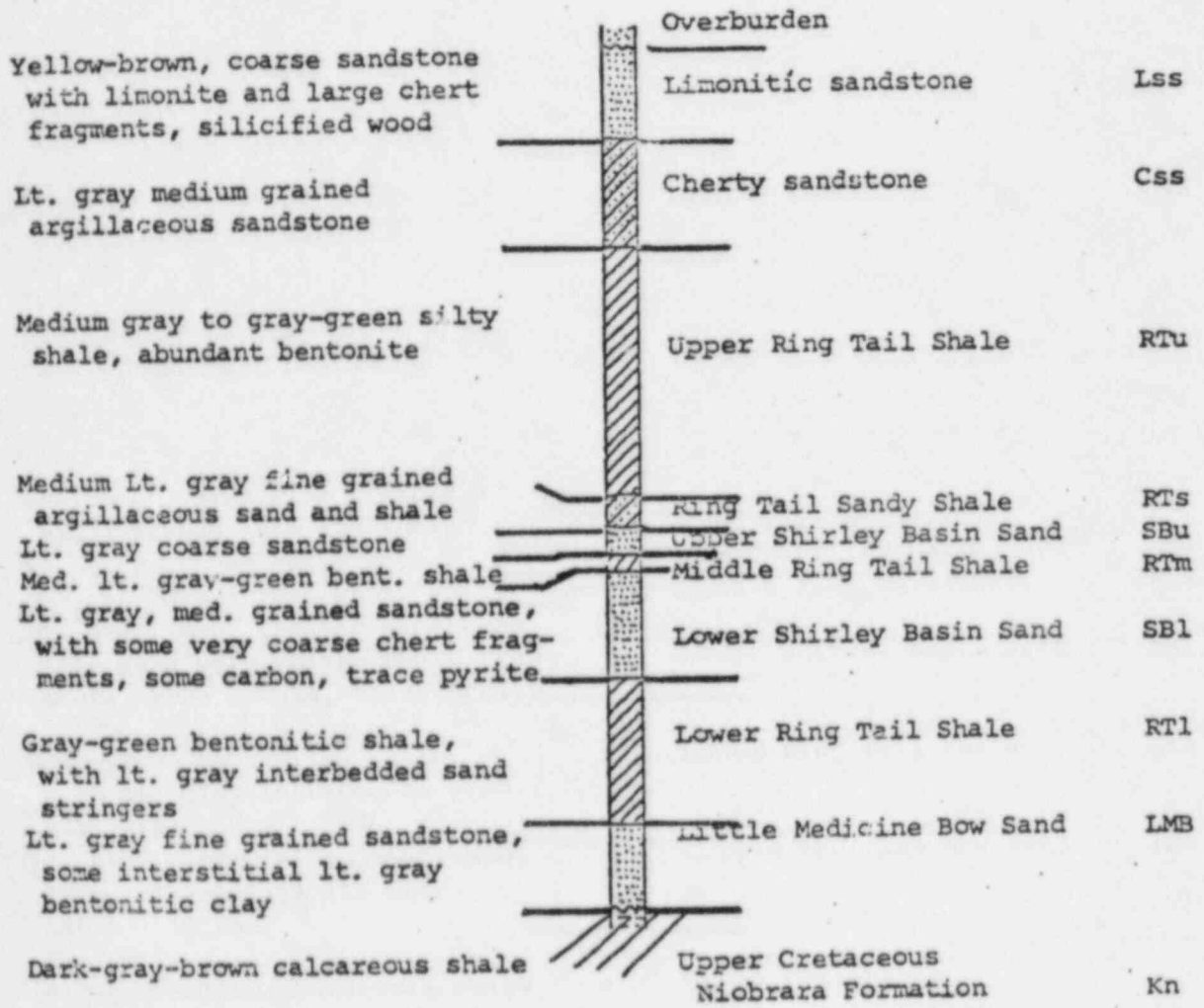

FIGURE 1

Figure 4

After R. D. Cypert

For Cross-Section Line BB,
See Figure 7.

STRATIGRAPHIC AND STRUCTURAL CROSS-SECTION OF TAILINGS DAM

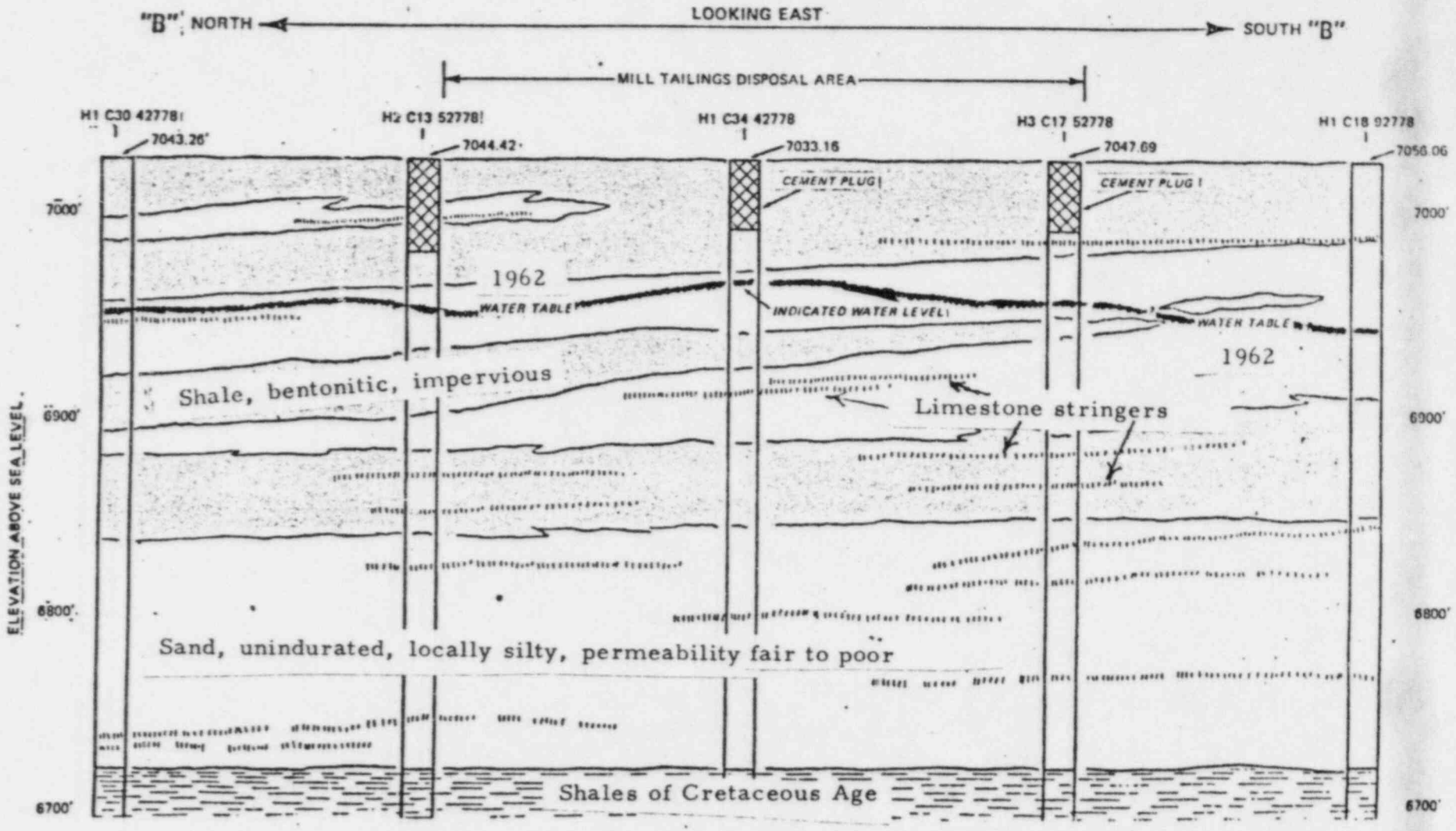

Figure 5

chen and associates, inc.
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96 S. ZUNI • DENVER, COLORADO 80223 • 303/744-7105
1924 EAST FIRST STREET • CASPER, WYOMING 82601 • 307/234-2126

September 23, 1976

Subject: Additional Field Investigation and Laboratory Testing of the Embankment and Foundation Soils for the proposed addition to the existing Tailings Dam Embankment, Getty Oil Company Shirley Basin Mine Site, Carbon County, Wyoming

Job No. 5179W

Getty Oil Company
P. O. Box 2459
Casper, Wyoming 82601

Gentlemen:

As requested, we drilled one additional exploratory hole in the existing embankment at the subject site on September 14, 1976. The exploratory hole was drilled to obtain samples of the existing embankment soils. The location of the exploratory hole is presented in Figure 1. The log is presented in Figure 2A.

The additional laboratory testing consisted of moisture content, dry density, gradation, Atterberg limits, and shear strength parameters as determined by the triaxial shear test in the consolidated, undrained condition for two representative samples of the foundation soils, a representative sample of the proposed embankment soil, and a representative sample of the existing embankment soil. The gradation and Atterberg limits test results are presented in Figures 12 and 13 attached. The shear strength values for the foundation soils are presented in Figures 14 and 15. The shear strength values for the existing embankment soil are presented in Figure 16. The values for the proposed fill material are presented in Figure 17. The test results are summarized in Table IIA.

We are currently doing a stability analysis of the proposed embankment addition and will transmit the results to you when the stability analysis is finished. A sketch showing the physical dimensions and assumptions used in the analysis is attached.

Sincerely yours,

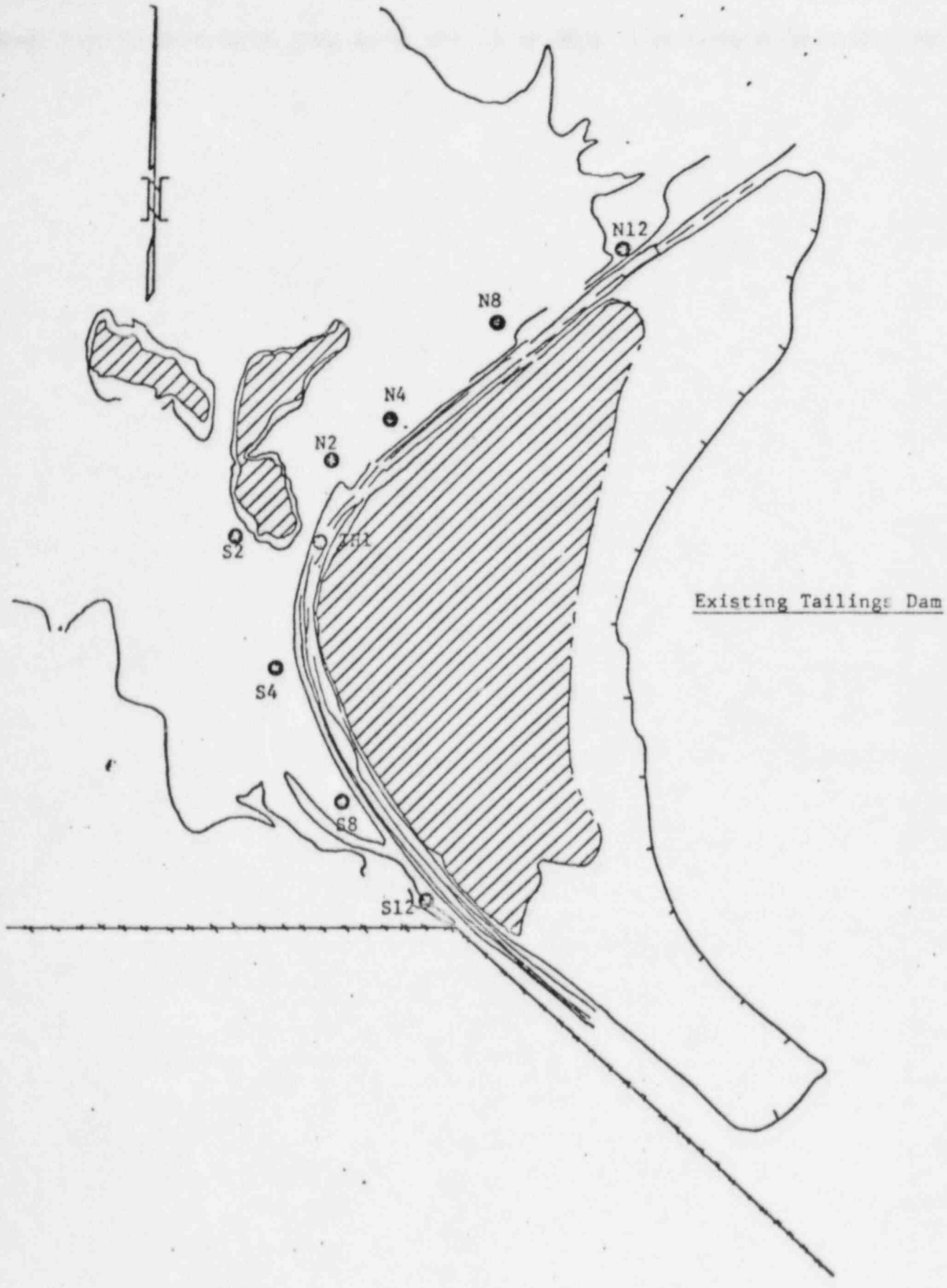
CHEN AND ASSOCIATES, INC.

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

HAROLD HOLLINGSWORTH, JR. REGISTERED 1962 PROFESSIONAL ENGINEER STATE OF WYOMING

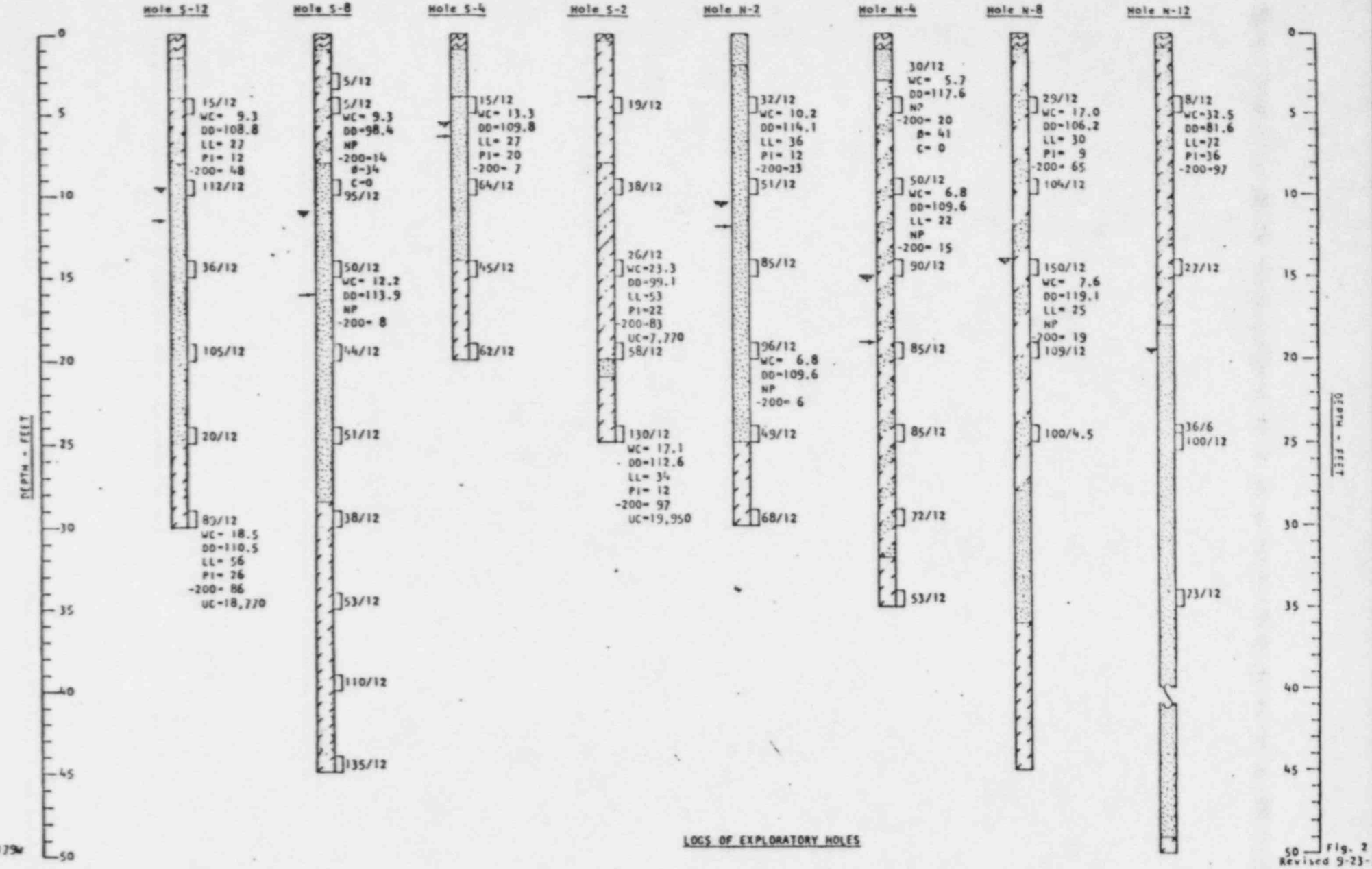
HH:bec
Attachment
cc: Getty Oil Co. - California

A/103



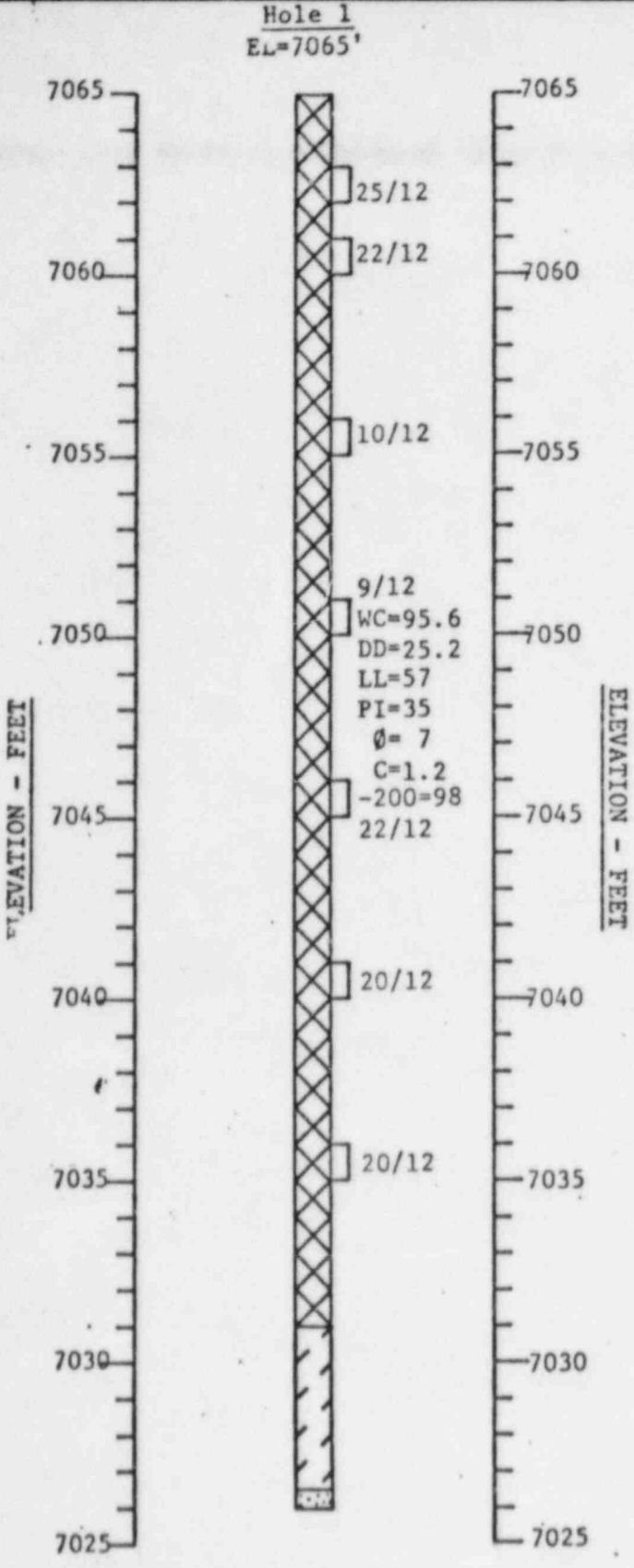
LOCATION OF EXPLORATORY HOLES
SCALE: 1" = 40'

Revised 9-



LOGS OF EXPLORATORY HOLES

Fig. 2
Revised 9-23-



Legend:

Fill, existing tailings dam embankment, claystone, firm, grey and brown, moist.

Clay (CL), sandy to very sandy, medium stiff, brown, moist.

Sand (SP),clean, loose, coarse grained, brown, moist.

25/12 Undisturbed drive sample. The symbol 25/12 indicates that 25 blows of a 140 lb. hammer falling 30 inches were required to drive the sample 12 inches

Notes:

(1) Test hole was drilled on September 14, 19 with a 4 inch diameter continuous flight power auger.

(2) No free water was encountered in the exploratory hole at the time of drilling.

(3) WC = Water Content (%)
DD = Dry Density (pcf)
LL = Liquid Limit (%)
PI = Plasticity Index (%)
Ø = Angle of Internal Fiction
C = Cohesion (psf)
-200 = Passing #200 Sieve (%)

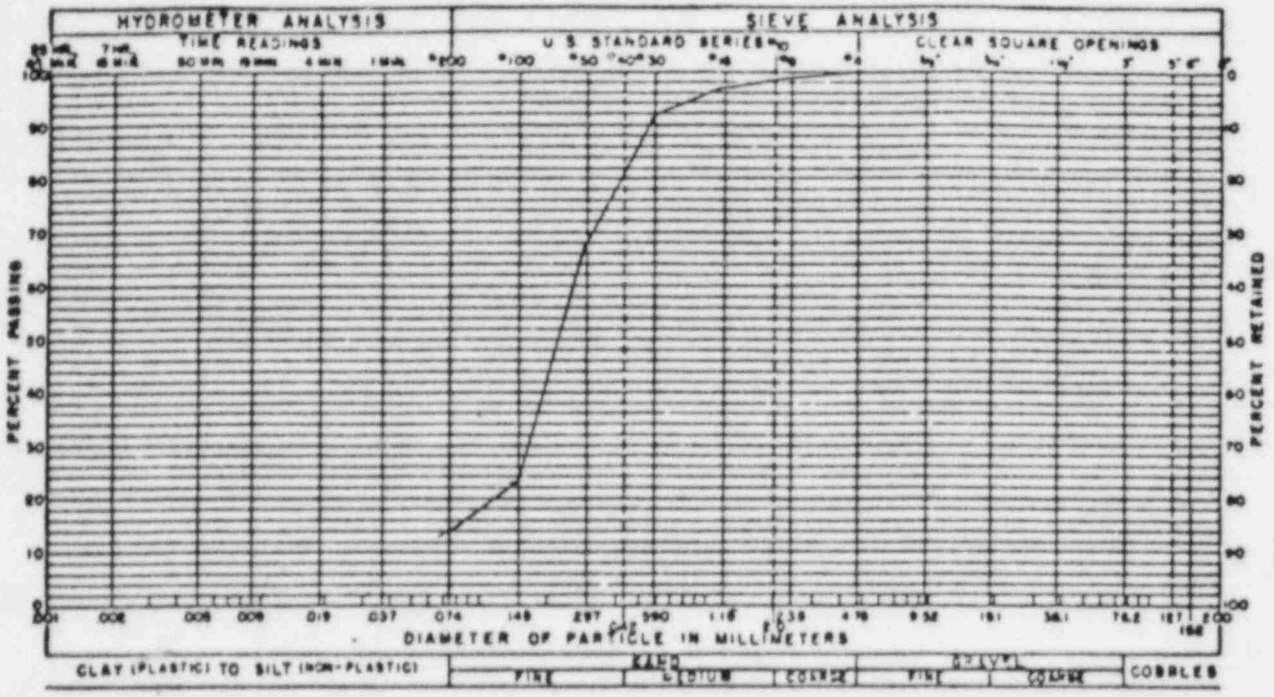
LOG OF EXPLORATORY HOLE, LEGEND AND NOTES

05179W

Fig. 2A

CHEN AND ASSOCIATES

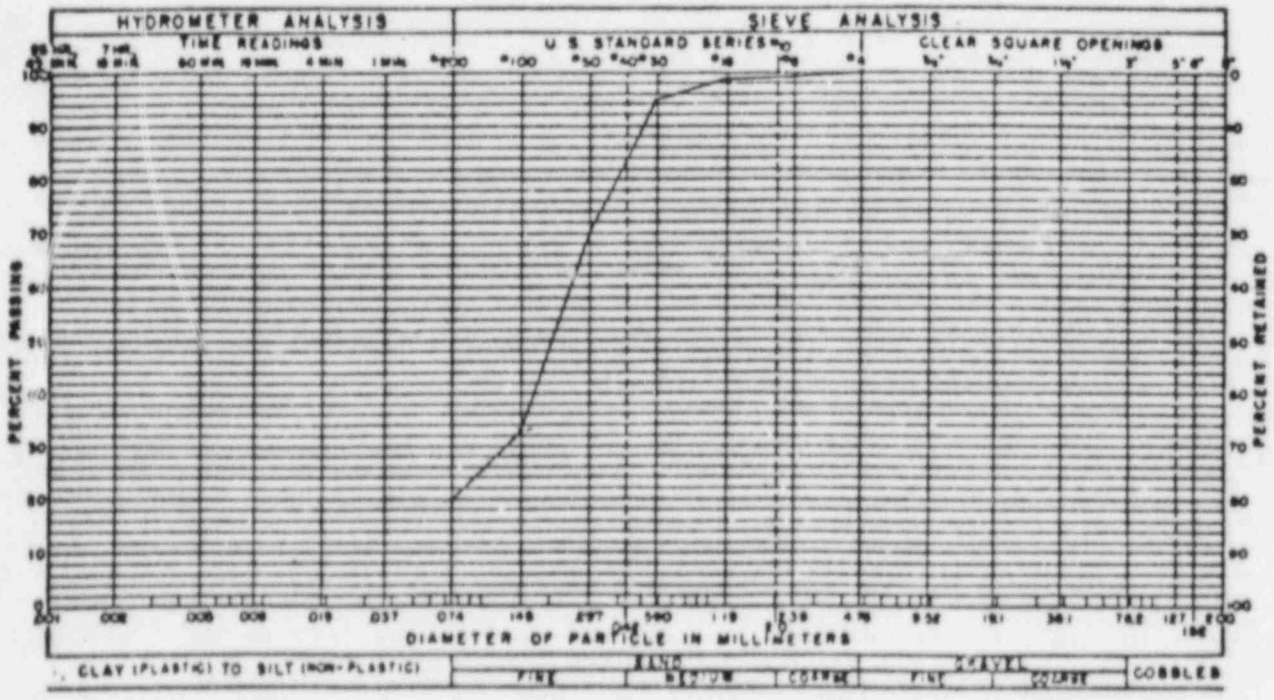
Consulting Soil and Foundation Engineers



GRAVEL 0 % SAND 86% SILT AND CLAY 14 %

LIQUID LIMIT % PLASTICITY INDEX N.P.%

SAMPLE OF Silty Sand FROM Hole S-8 at depth 4'-0"



GRAVEL 0% SAND 80 % SILT AND CLAY 20 %

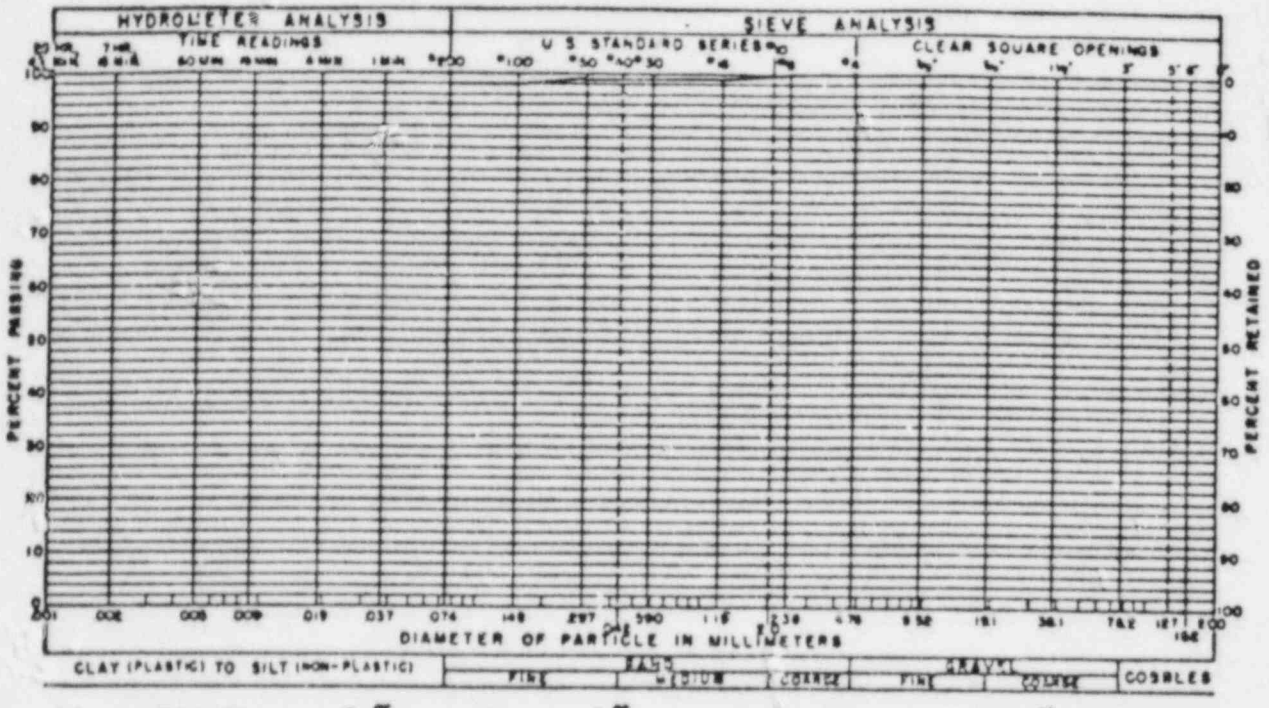
LIQUID LIMIT % PLASTICITY INDEX N.P.%

SAMPLE OF Weathered Sandstone FROM Hole N-4 at Depth 4'-0"

GRADATION TEST RESULTS

CHEN AND ASSOCIATES

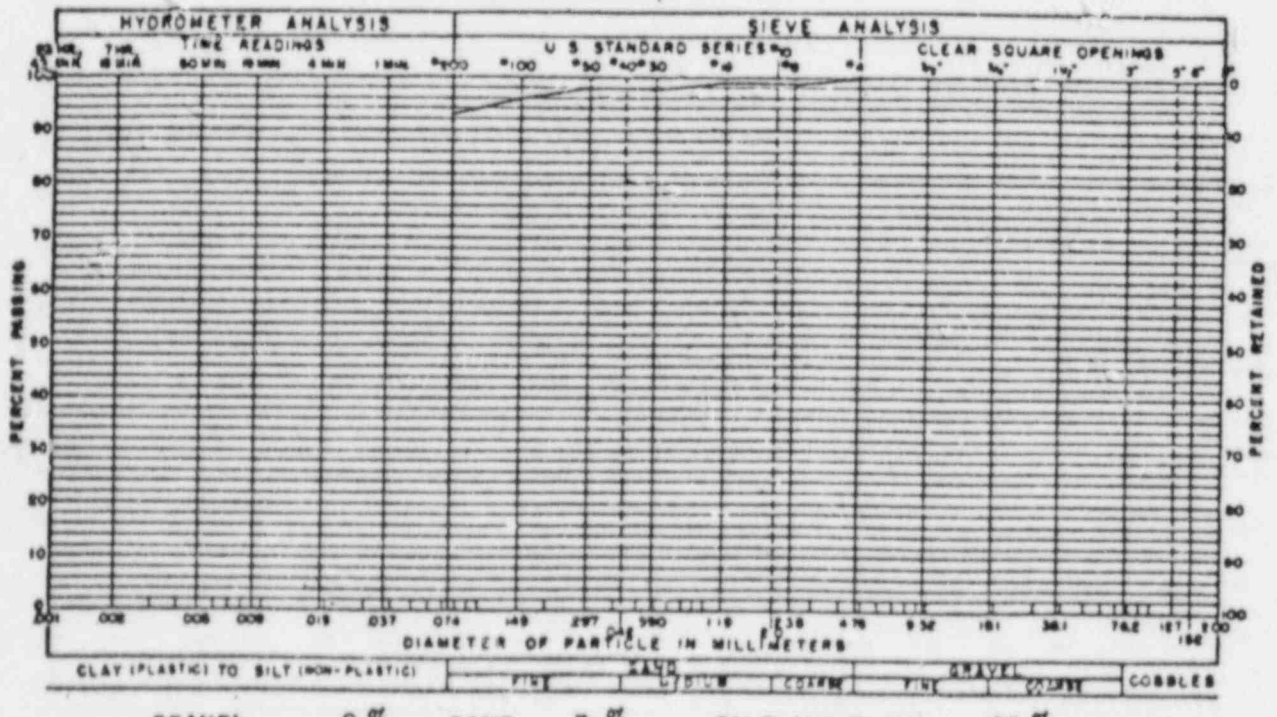
Consulting Soil and Foundation Engineers



GRAVEL 0 % SAND 2 % SILT AND CLAY 98 %

LIQUID LIMIT 57 % PLASTICITY INDEX 35 %

SAMPLE OF Claystone Fill FROM Hole 1 at depth 14'-0"
(existing embankment)



GRAVEL 0 % SAND 7 % SILT AND CLAY 93 %

LIQUID LIMIT 52 % PLASTICITY INDEX 30 %

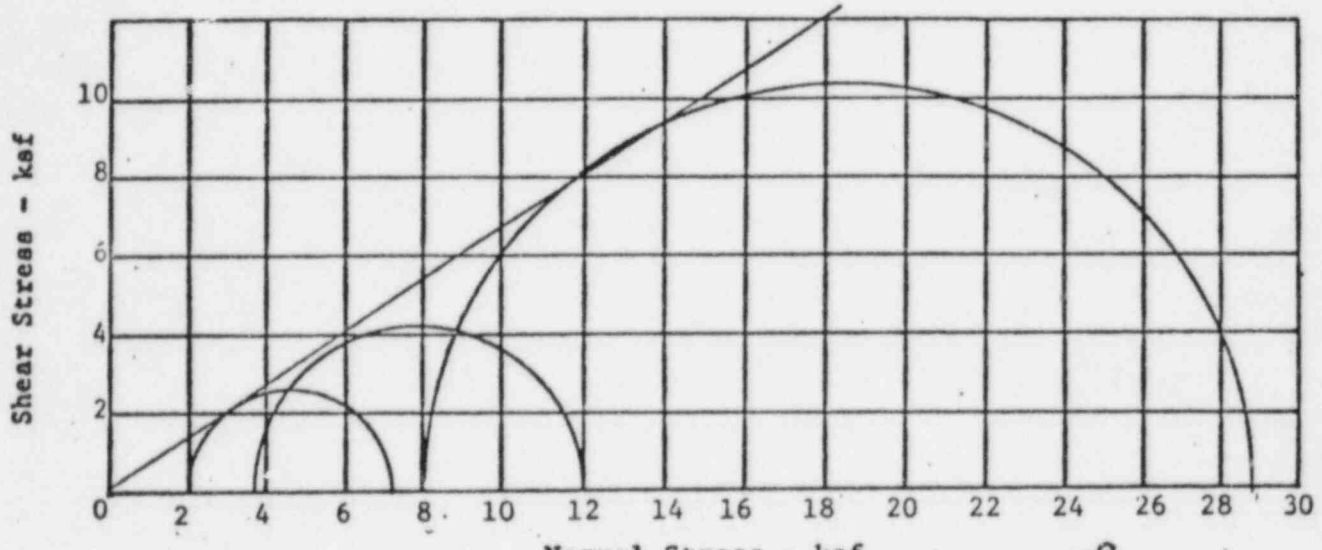
SAMPLE OF Claystone FROM Proposed Borrow

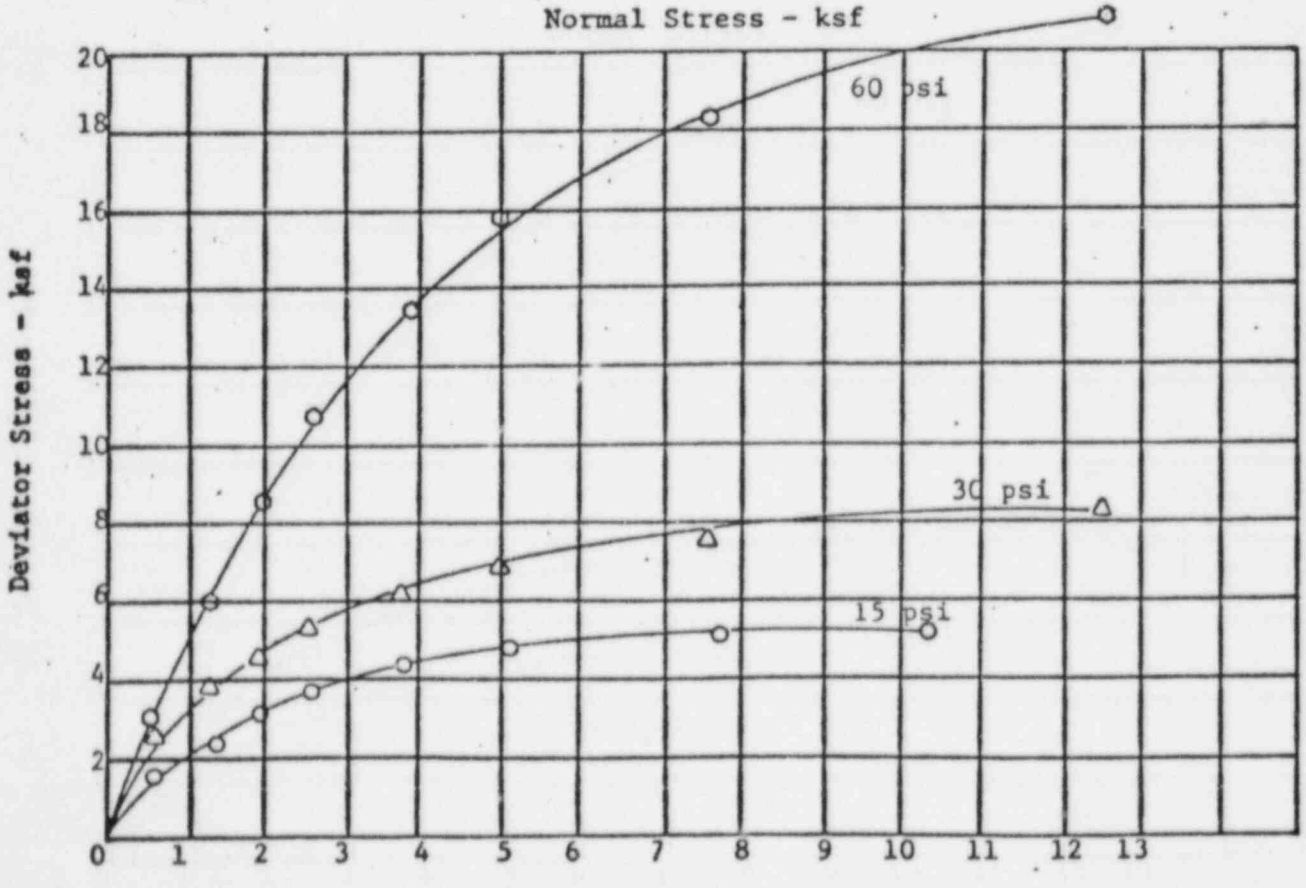
GRADATION TEST RESULTS

Test Number	1	2	3	4
Sample	Hole S-8 @ 4'-0"			
Height - inches	3.87	4.00	3.95	
Diameter - inches	1.94	1.94	1.94	
Water Content - %	9.3	9.3	9.3	
Dry Density - pcf	92.9	100.0	98.4	
Consol Pres - ksf	2.16	4.32	8.64	
$\bar{\sigma}_1$ - ksf	7.17	12.01	28.93	
$\bar{\sigma}_3$ - ksf	1.96	3.71	8.03	

TRIAXIAL SHEAR TEST RESULT

Job No. 5179W
Saturated Consolid
Type of Test Undrained
Type of Sample California
Tan Ø 0.675
Ø 34°
Cohesion - ksf 0
Type of Soil Silty Sand





Test Number	1	2	3	4
Sample	Hole	1 @ 14	-0"	
Height - inches	3.57	3.60	3.97	
Diameter - inches	1.94	1.94	1.94	
Water Content - %	24.9	25.0	25.2	
Dry Density - pcf	95.9	95.8	95.6	
Consol Pres - ksf	2.16	4.32	8.64	
σ_1 - ksf	5.2	8.00	13.80	
σ_3 - ksf	2.16	4.32	8.64	

TRIAXIAL SHEAR TEST RESULT

Job No. 5179W

Type of Test Saturated, Consolid Undrained

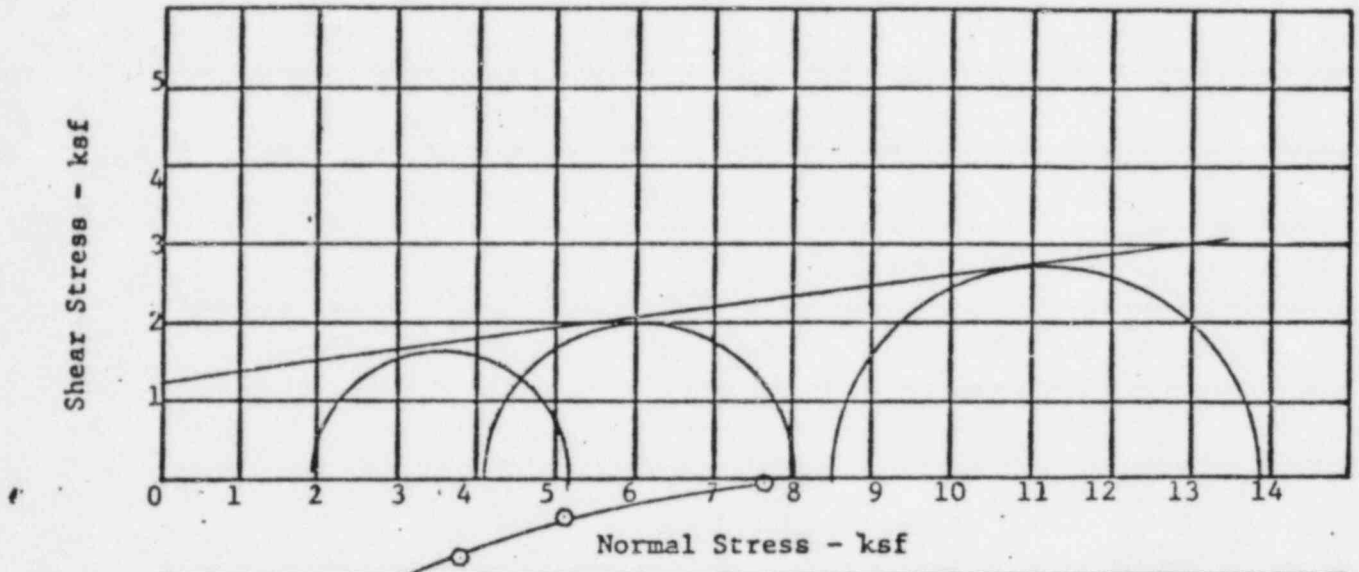
Type of Sample California

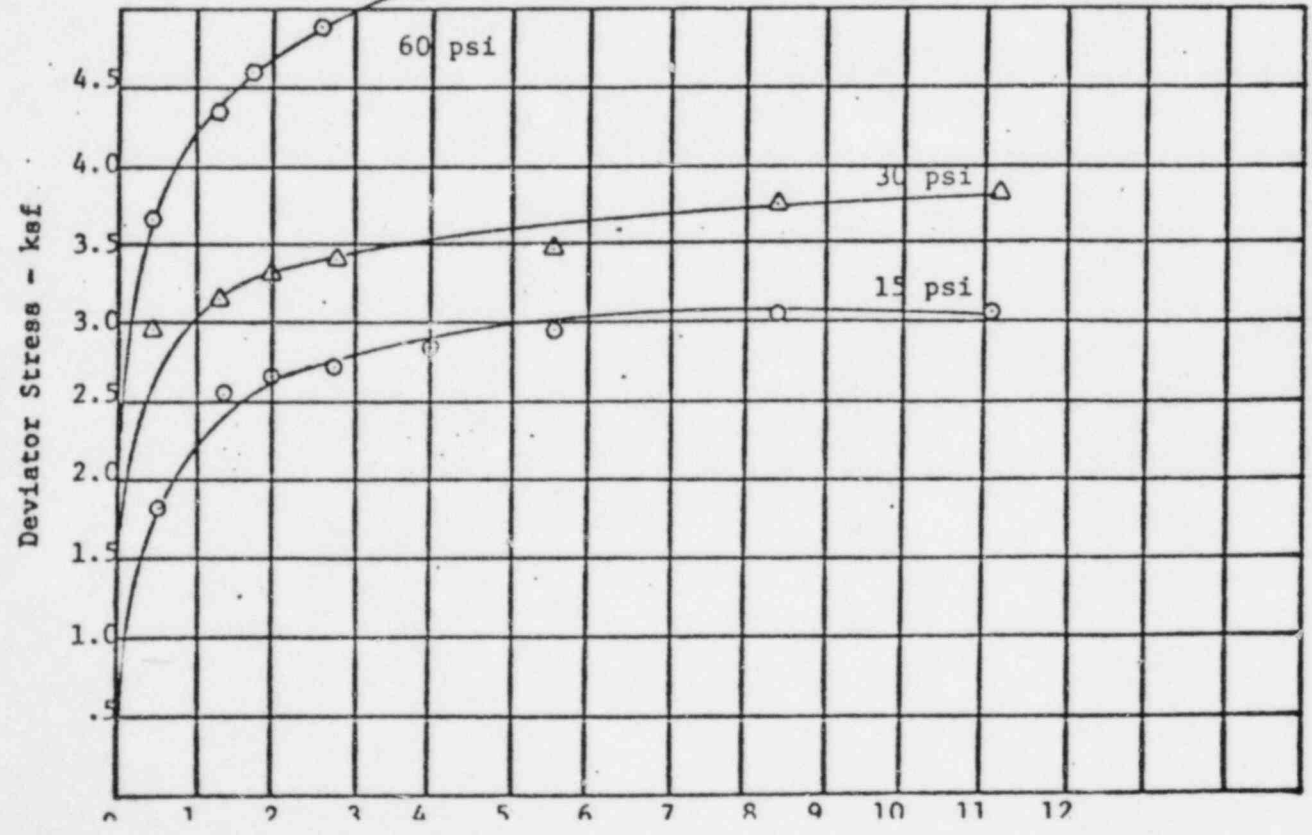
Tan Ø 0.123

Ø 7°

Cohesion - ksf 1.2

Type of Soil Claystone Fill





Test Number	1	2	3	4
Sample		Claystone	Borrow	
Height - inches	5.00	5.00	5.00	
Diameter - inches	1.94	1.94	1.94	
Water Content - %	29.6	27.6	27.0	
Dry Density - pcf	91.5	91.9	91.7	
Consol Pres - ksf	2.16	4.32	8.64	
$\bar{\sigma}_1$ - ksf	3.60	7.4	12.60	
$\bar{\sigma}_3$ - ksf	1.14	4.32	8.64	

TRIAXIAL SHEAR TEST RESULTS

Job No. 5179W

Type of Test Saturated, Consolida Undrained

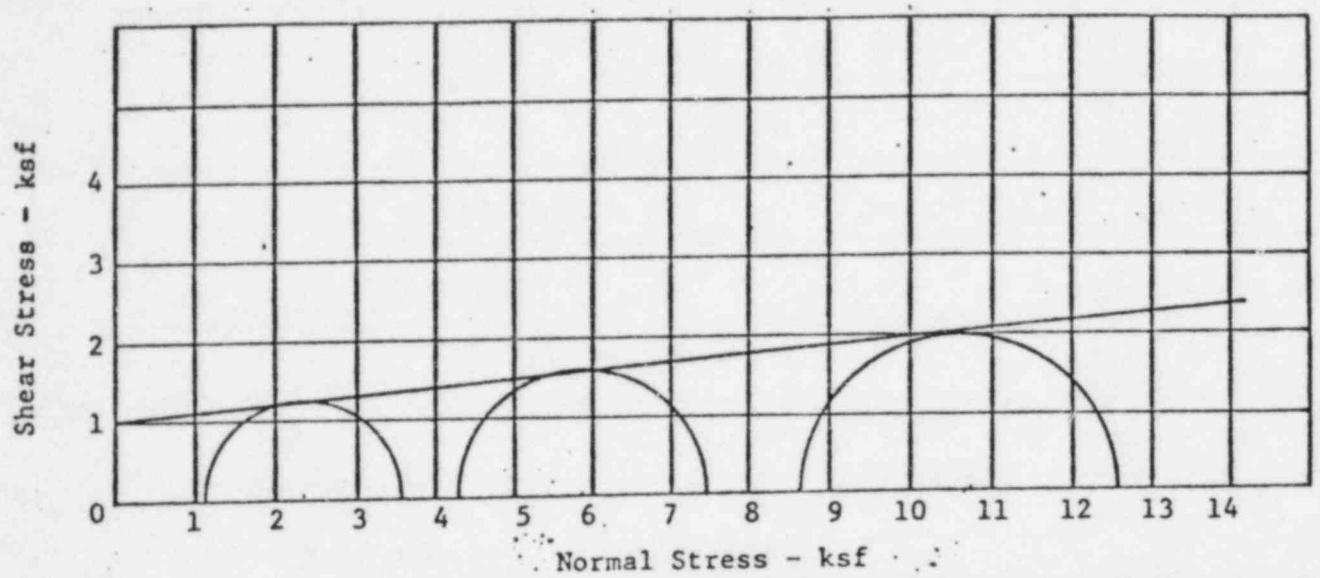
Type of Sample Remolded

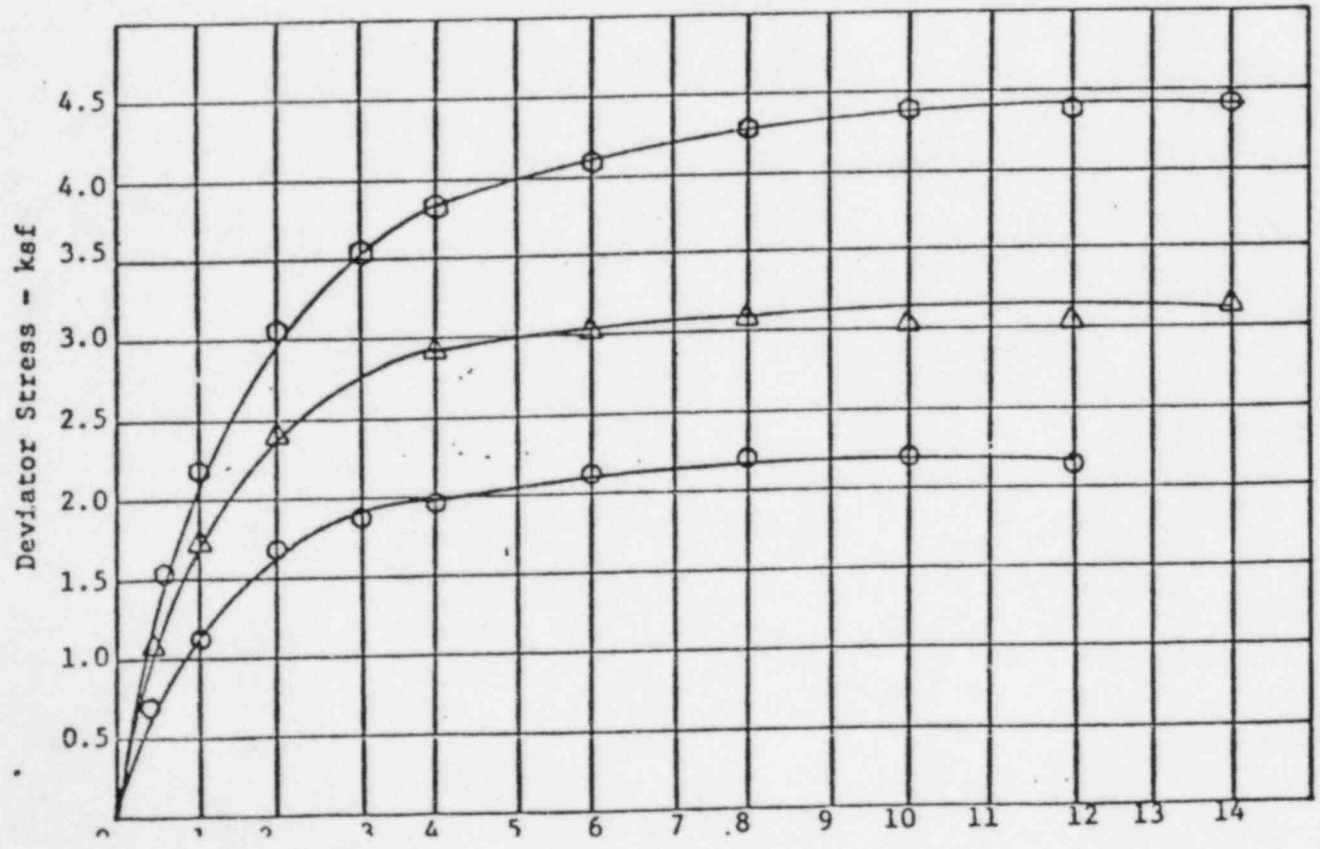
Tan Ø 0.123

Ø 7°

Cohesion - ksf 1.0

Type of Soil Claystone





Test Number	1	2	3	4
Sample	Hole N-4 @ 4'-0"			
Height - inches	3.90	3.88	3.95	
Diameter - inches	1.94	1.94	1.94	
Water Content - %	5.7	5.7	5.7	
Dry Density - pcf	117.4	117.6	123.5	
Consol Pres - ksf	2.16	4.32	8.64	
$\bar{\sigma}_1$ - ksf	11.23	18.95	54.95	
$\bar{\sigma}_3$ - ksf	1.85	4.32	8.64	

TRIAXIAL SHEAR TEST RESULTS

Job No. 5179W

Type of Test Saturated, Consolid. Undrained

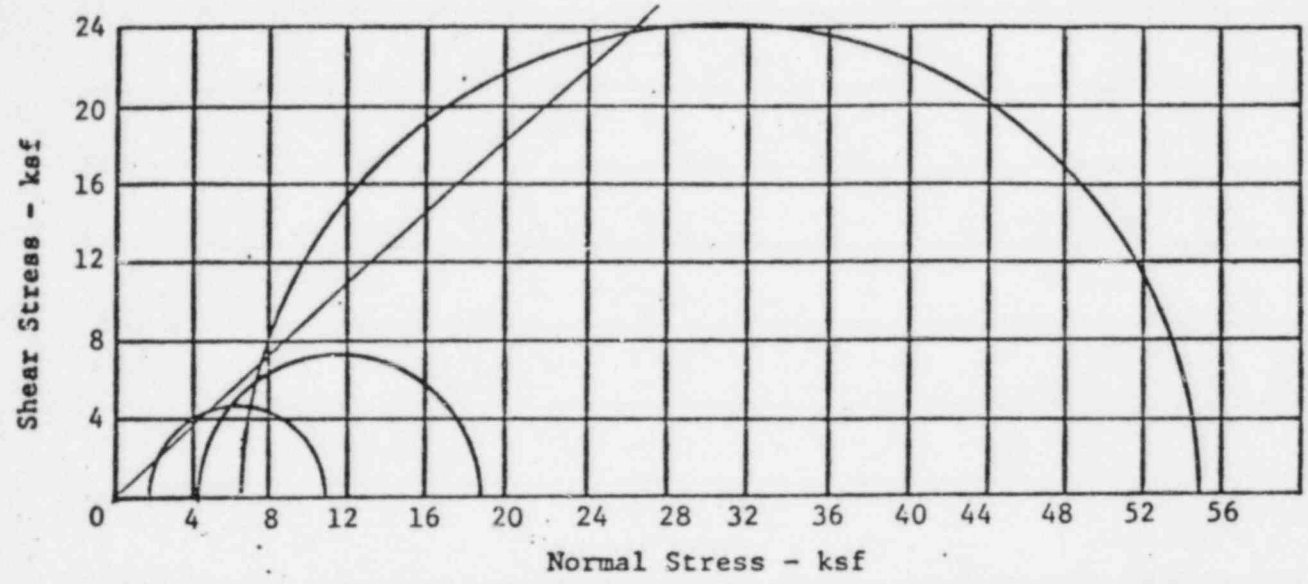
Type of Sample California

Tan Ø 0.869

Ø 41°

Cohesion - ksf 0

Type of Soil Weathered Sandsto



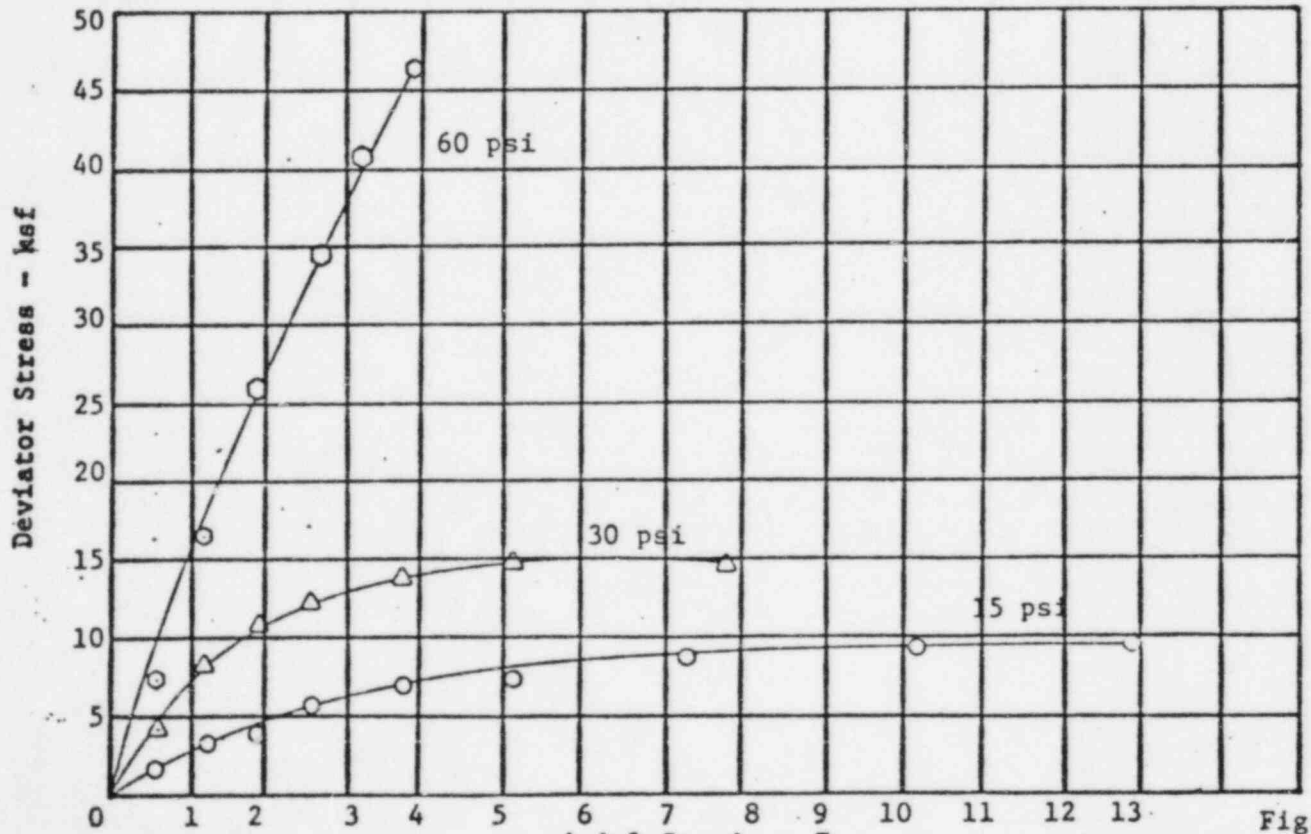


Fig. 1

Test Number	1	2	3	4
Sample	Claystone		Borrow	
Height - inches	5.00	5.00	5.00	
Diameter - inches	1.94	1.94	1.94	
Water Content - %	29.6	27.6	27.0	
Dry Density - pcf	91.5	91.9	91.7	
Consol Pres - ksf	2.16	4.32	8.64	
$\bar{\sigma}_1$ - ksf	3.60	7.4	12.60	
$\bar{\sigma}_3$ - ksf	1.14	4.32	8.64	

TRIAXIAL SHEAR TEST RESULTS

Job No. 5179W

Type of Test Saturated, Consolida Undrained

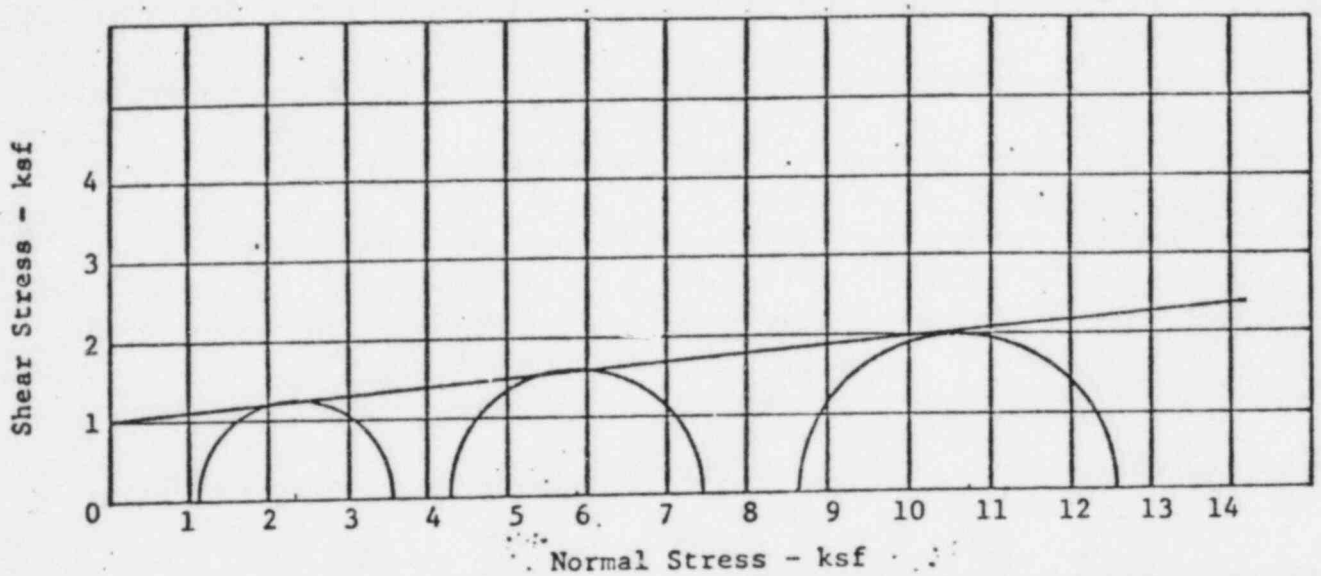
Type of Sample Remolded

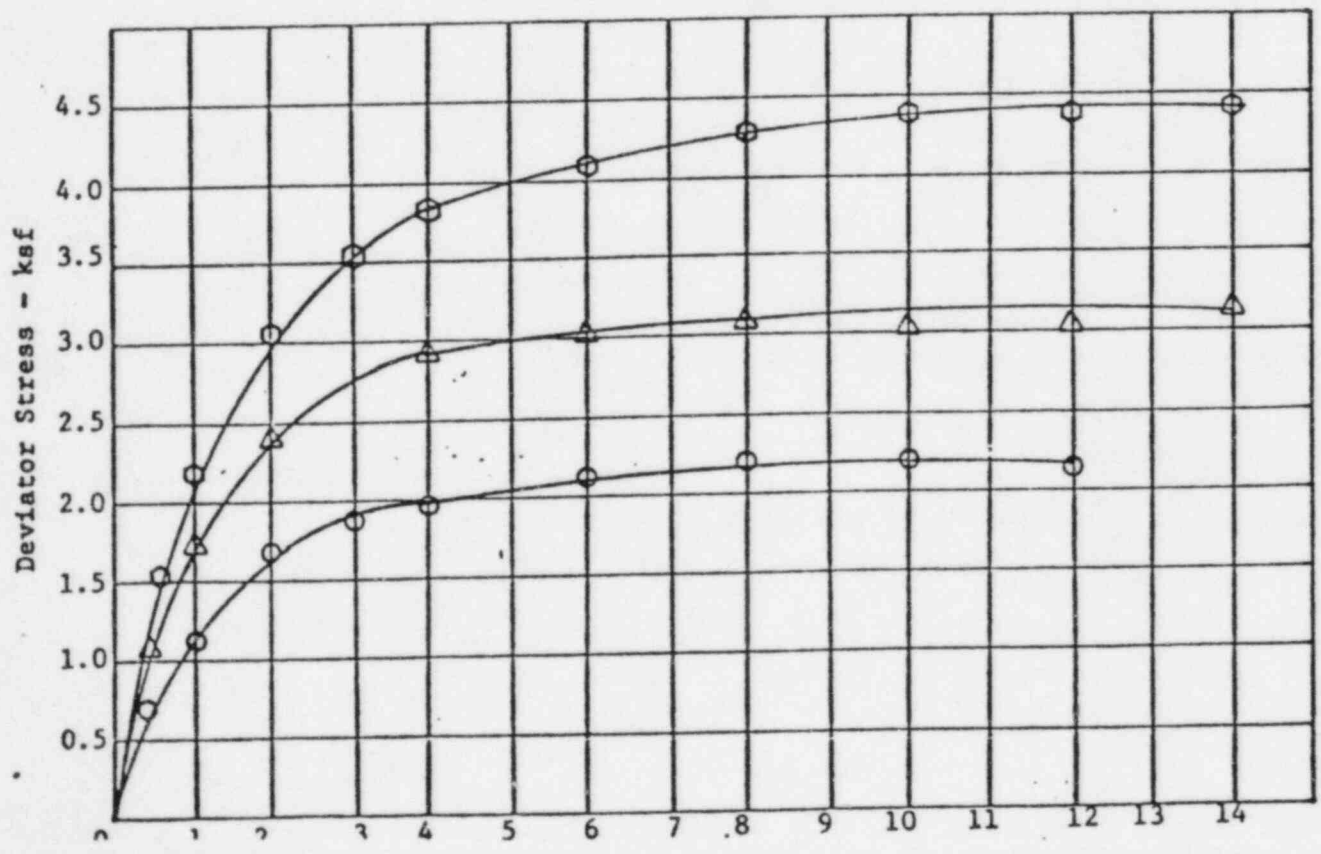
Tan Ø 0.123

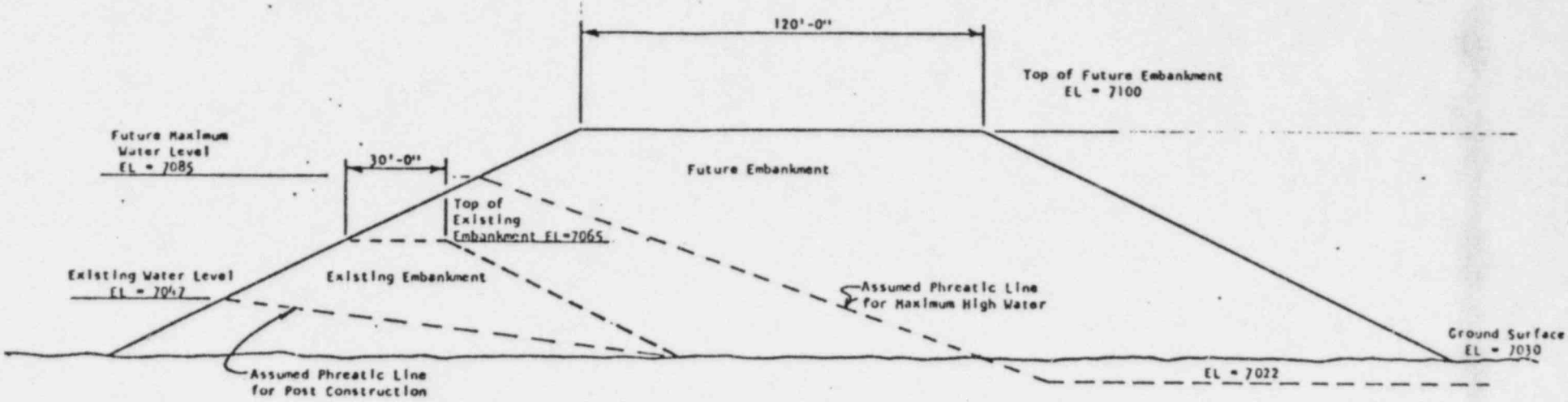
Ø 7°

Cohesion - ksf 1.0

Type of Soil Claystone







Soil Properties:

Future Embankment

DD_{max} = 93.5 pcf
WC = 27.2 %
Tan ϕ = 0.123
C = 1.0 ksf

Existing Embankment

DD = 95.6 pcf
WC = 25.2 %
Tan ϕ = 0.123
C = 1.2 ksf

Foundation Soil

DD = 98.4 pcf
WC = 9.2 %
Tan ϕ = 0.675
C = 0

CONDITIONS FOR STABILITY ANALYSIS
SCALE: 1" = 30'

FIGURE 9

#12,000

Fig. 18

Job No. 5179W

CHEN AND . OCIATES

TABLE IIA

SUMMARY OF LABORATORY TEST RESULTS

TRIAXIAL SHEAR

HOLE	DEPTH (FEET)	MOISTURE CONTENT (%)	DRY DENSITY (PCF)	ATTERBERG LIMITS		UNCONFINED COMPRESSIVE STRENGTH (PSF)	TRIAXIAL SHEAR		PASSING No. 200 U.S. SIEVE (%)	SOIL TYPE
				LIQUID LIMIT (%)	PLASTICITY INDEX (%)		FRICTION ANGLE (DEGREES)	COHESION (KSF)		
S-8	4	9.3	98.4		NP		34	0	14	Silty Sand
N-4	4	5.7	117.6		NP		41	0	20	Weathered Sandstone
1	14	25.2	95.6	57	35		7	1.2	98	Claystone Fill
Borrow		27.0	91.7	52	30		7	1.0	93	Claystone Borrow

C. STABILITY ANALYSIS

1. Letter of Submittal from Chen et al (1 page).

2. Summary of Analysis (1 page).