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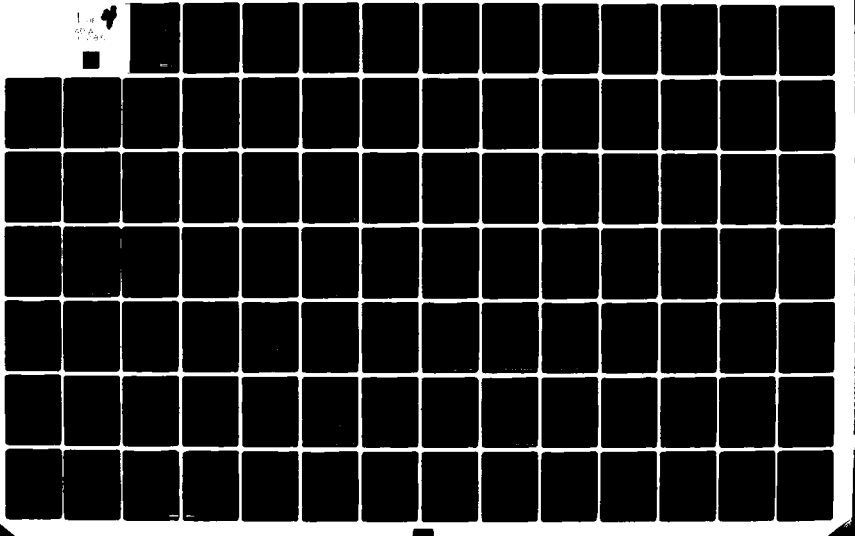

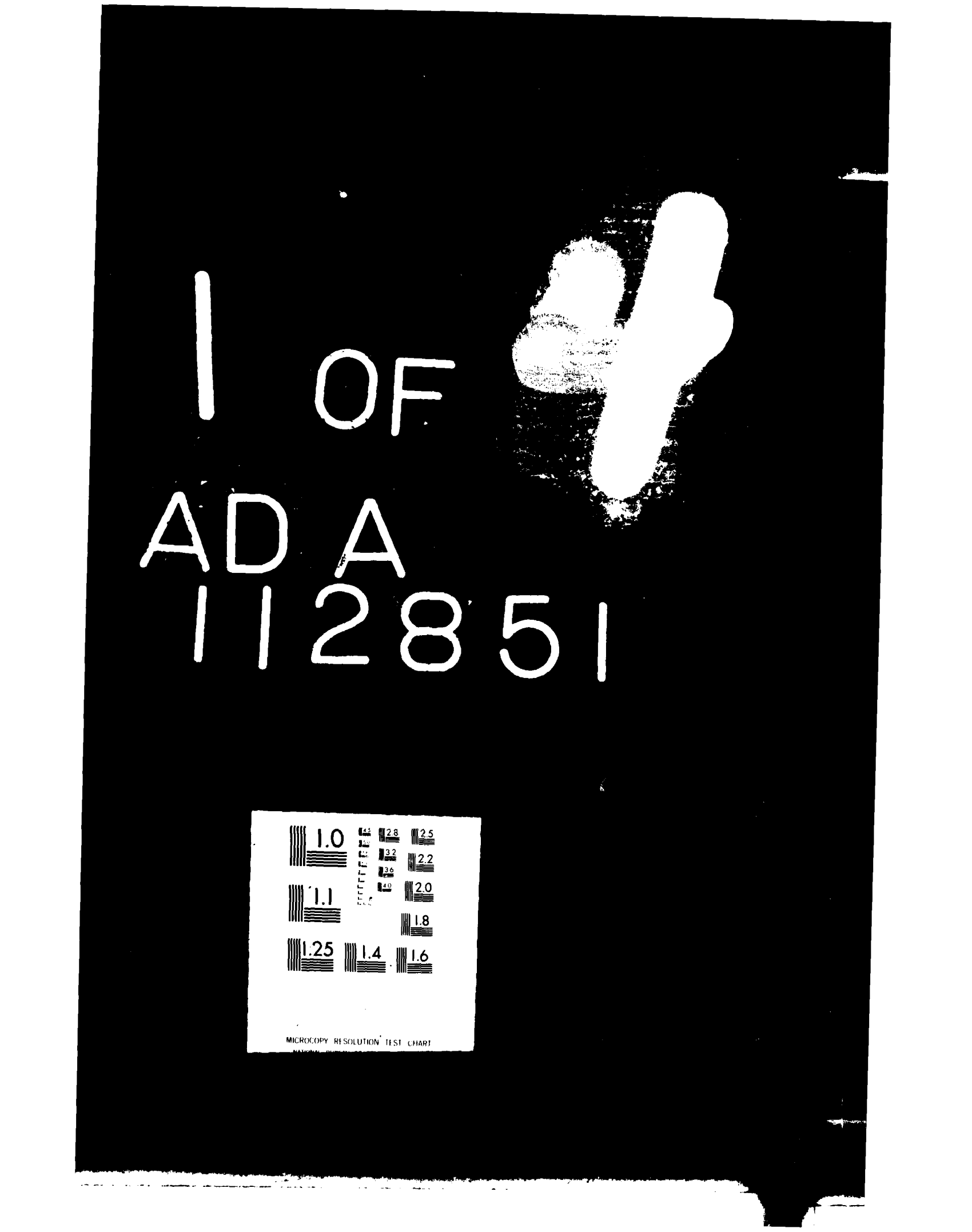
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MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION

VERIFICATION STUDY
DRY LAKE VALLEY, NEVADA
VOLUME II-GEOTECHNICAL DATA

PREPARED FOR
BALLISTIC MISSILE OFFICE (BMO)
NORTON AIR FORCE BASE, CALIFORNIA

FUGRO NATIONAL, INC.
Consulting Engineers and Geologists

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MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION

VERIFICATION STUDY - DRY LAKE VALLEY, NEVADA

VOLUME II - GEOTECHNICAL DATA

Prepared for:

U.S. Department of the Air Force
Ballistic Missile Office (BMO)
Norton Air Force Base, California 92409

Prepared by:

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Long Beach, California 90807

14 March 1980

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20. ABSTRACT *(Continue on reverse side if necessary and identify by block number)*

This report contains the field & lab test results from the investigation of Dry Lake Valley. Included are basic data consisting of trench and boring logs, sieve analyses, compaction tests, and seismic refraction surveys.

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FOREWORD

This volume of geotechnical data was compiled for the Department of the Air Force, Ballistic Missile Office (BMO), in compliance with Contract No. F04704-80-C-0006, CDRL Item D04A2. It contains the field data and laboratory test results from the investigation of Dry Lake Valley. A synthesis of these data is available in Volume I (FN-TR-27-DL-I).

The data is each section of this volume are preceded by an explanation of the format and terms used in the compilation.

TABLE OF CONTENTS

SECTION 1.0

GEOLOGIC STATION DATA

1.0 EXPLANATIONS OF GEOLOGIC STATION DATA

Geologic stations were established at selected locations throughout the CDP at which detailed descriptions of surficial basin-fill deposits or rock were recorded. Locations of all geologic stations are shown in Drawing II-1-1, Activity Location Map (in pocket). All data taken on surficial basin-fill units at these stations are listed in Table II-1-1 and an explanation of the column headings in the table is given below. At stations where rock descriptions were made, only geologic unit designations are listed. A general explanation of all geologic unit symbols used in Verification Studies is included at the end of this section.

Column Heading Table II-1-1	Explanation
Station Number	Geologic stations are numbered sequentially. Where more than one geologic field team worked in a CDP, stations made by each team are differentiated with a letter (A, B, or C) following the station number.
Geologic Unit	Generic geologic unit only, i.e. the grain-size designation (f, s, g, c) is omitted from surficial basin-fill units. The letter B in the unit designation indicates a buried deposit not exposed at the surface.
MPS MM	Average maximum particle size in millimeters.
Grain Size (%B, %C, %G, %S, %F)	Estimated particle size distribution using the Unified Soil Classification System. Percentages of boulders (%B) and cobbles (%C) are based on the entire deposit, whereas percentages of gravel (%G), sand (%S) and fines (%F) are taken only on the fraction composed of particles less than 3 inches (76 mm) in diameter.
USCS	Soil class according to the Unified Soil Classification System.

Munsell Color	Soil color based on Munsell Soil Color Chart.
Source Rock Types(s)	Rock types of coarse clasts listed in order of abundance.
* Physical Properties	Data listed in columns 6 through 15 address specific soil properties. These are listed below in parentheses following the column heading number and are also listed at the bottom of Table 1-1. Data are coded with each numerical entry referring to a specific soil condition as listed below.
6 (Grain Shape)	1) Angular, 2) Subangular, 3) Subrounded, 4) Rounded, 5) Well rounded
7 (Moisture Content)	1) Dry, 2) Moist, 3) Wet
8 (Plasticity of Fines)	1) None, 2) Low, 3) Medium, 4) High
9 (Consistency)	Coarse grained: 1) Very Loose, 2) Loose, 3) Medium Dense, 4) Dense, 5) Very Dense, Fine grained: 1)Soft, 2) Firm, 3) Stiff, 4) Hard
10 (Structure)	1) Stratified Tabular, 2) Stratified Other (lensed, cross bedded, discontinuous beds), 3) Nonstratified
11 (Cementation Induration)	1) None, 2) Weak, 3) Moderate, 4) Strong
12 (Depth to Cemented Layers)	Depth to layer (in centimeters) exhibiting cementation induration described in Column 11 (above)
13 (Weathering of clasts)	1) Fresh, 2) Slight, 3) Moderate, 4) Very
14 (Soil Profile Development)	1) None (A-C profile), 2) Poor (incipient B-horizon), 3) Well (prominant B-horizon)
15 (Caliche Development)	1) Stage I, 2) Stage II, 3) Stage III, 4) Stage IV, 5) None

Drainage

DP (M)	Average depth of drainages (in meters)
WD (M)	Average width of drainages (in meters)
Slope (%)	Average slope of ground surface (in percent grade)
Sample	Number of samples taken

GENERALIZED GEOLOGIC UNITS

Explanation

Surficial Basin-fill Units

A1 Younger Fluvial Deposits - Major modern stream channel and flood-plain deposits.

A2 Older Fluvial Deposits - Older incised stream channel and flood-plain deposits in elevated terraces bordering major modern drainages.

A3 Eolian Deposits - Wind-blown deposits of sand occurring as either thin sheets (A3s) or dunes (A3d).

A4 Playa and Lacustrine Deposits - Deposits occurring in modern, active playas (A4) or in either inactive playas or older lake beds and abandoned shorelines associated with extinct lakes (A4o).

A5 Alluvial Fan Deposits - Alluvial deposits consisting of debris flow and water-laid alluvium near mountain fronts, grading into predominantly water-laid alluvium deposited in shifting distributary channels near the basin center. Younger (A5y), intermediate (A5i), and older (A5o) alluvial fans are differentiated by surface soil development, terrain conditions, and present depositional/erosional environment.

Grain sizes of these deposits (except A3 deposits, which are exclusively sandy) are indicated by a single letter (f, s, g, or c) following the geologic unit symbol. These letters indicate the predominant grain size and range of soil types according to the Unified Soil Classification System.

f - fine-grained (ML, CL, MH, CH)

s - sands (SP, SW, SM, SC)

g - gravels (GP, GW, GM, GC)

c - coarse grained with greater than 30 percent boulders and cobbles (generally GP, GW, GM, GC)

ROCK UNITS

I Igneous (undifferentiated). Rocks formed by solidification of a molten or partially molten mass.

I1 Intrusive - Plutonic rocks formed by solidification of molten material beneath the surface (e.g., granite, granodiorite, diorite, gabbro).

I2 Extrusive (intermediate and acidic) - Volcanic rocks of intermediate and acidic compositon formed by solidification of molten material at or near the surface, (e.g., rhyolite, latite, dacite, andesite).

I3 Extrusive (basic) - Volcanic rocks of basic composition, generally formed by solidification of molten materials at or near the surface (e.g., basalt).

I4 Extrusive (pyroclistic) - Rocks formed by accumulation of volcanic ejecta (e.g., ash, tuff, welded tuff, agglomerate).

S Sedimentary (undifferentiated) - Rocks formed by accumulation of clastic solids, organic solids and/or chemically precipitated minerals.

S1 Arenaceous and/or Siliceous Rocks - Composed of sand size particles (e.g., sandstone, orthoquartzite) or of cryptocrystalline silica (e.g., opal, chert).

S2 Carbonate Rocks - Composed predominantly of calcium carbonate detritus or chemical precipitates (e.g., limestone, dolomite, chalk).

S3 Argillaceous Rocks - Composed of clay and silt-sized particles (e.g., siltstone, shale, claystone).

S4 Evaporite Rocks - Precipitated from solution as a result of evaporation (e.g., halite, gypsum, anhydrite, sylvite).

S5 Coarse Clastic Rocks - Composed of gravel sized or larger clasts (e.g., conglomerate, breccia).

M Metamorphic (undifferentiated) - Rocks formed through recrystallization in the solid state of preexisting rocks by heat and pressure (e.g., gneiss, schist, hornfels, metaquartzite).

STATION NUMBER	GEOL UNIT	MPS MM	GRAIN SIZE %B	%C	%G	%S	%F	USCS	MUNSELL COLOR	SOURCE ROCK TYPE(S)	*PHYSICAL PROPERTIES 6	7	8	9	10	11	12	13	14	15	TERRAIN DRAINAGE DP(M)	DD(M)	SLOPE (%)	SAMPLE
NDLG01	ASI	050						SM		S2	2	1	1	3	3	3		2	2	2	1.0			
NDLG02	ASY	250						SM		T2 S2	2			2										
NDLG04	ASY	125						SM		T2 S2	2	1	1	3	3	2			1	1				
NDLG05	ASY	075						GM			2	1	2	4	2	3		1			1.0	001		
NDLG07	ASI	255						GP		S2 I2		1	1	4	2	4		3			3.5	006		
NDLG08	ASI	025						SM		T2 S2	2	2	2	2	3	2			2	3				
NDLG09	ASI	125								S2 I2 I1	2	2	2		3	2			2	2	3.0			
NDLG10	ASI	180						SM		S2	2	1	1	3	3	3		2	2	2	3.0			
NDLG11	ASI							GM		T2 S2 I1	2	2	1	3	2	2		3		1			09	
NDLG13	ASO	200						SP			2	2	2	3	3	2		3	1	4	4.5			
NDLG15	ASI							SM		S2 I2	2	1	2	3	3				2	2				
NDLG15A	ASI	060	00	00	10	085	005	SP-SM	10.0YR4/4	S2	2	2	1	2	3	2	051	2	1	1	.5	001	02	
NDLG16	ABD							SM		S2 I2	2	1	2	2	3	2		3	1	1				
NDLG17	ASI	100						SM		S2 I2 S5	2		2	2	3	3		3	2	4				
NDLG18	ASO	150						SM		S2 I2	2	2	2	2	3	3		3	2	4				
NDLG20	ASY	205						GM		S2 S5 T1 I2	2	1	2	3	2			5			1.2	001		
NDLG22	ASI	075						GM		S2 I2	2	2	2	3	3	2		3	1	2				
NDLG23	ASY	050						SM								2			1	1				
NDLG24	ASI	125						SM		S2 I2	2	1	2	2	3	3		3	1	1				
NDLG25	ASO	100						GM		S2 I2	2	1	2	3	3	3		3		3	6.0			
NDLG26	ASO	100						ML		S2 I2	2	1	2	1	3	2		3	1	3	7.5			
NDLG27	ABD	001						ML				2	3	3	3	3								
NDLG28	ASY	050						SM		S2	2	1	2	2	3	2			1	2	1.5			
NDLG29	ASI	165						GM		S2	2	1	2	2	2	2		3	1	2				
NDLG30	ASI	015						SM						2		2				2				
NDLG31	ASI	065						SM						2					1	3	1.0			
NDLG32	ASY	050						SM		T2 S2		2	2	3	3	3				1	.0			
NDLG33	A2							SM-SC		T2 S2	2	2	2	3	3			3	1	1				
NDLG34	ASI							SM-SC		S2 I2											1.0		05	
NDLG36	ASY							SP		T2	4	2	1	4	3	1		3	1	5				
NDLG37	ASI	180						ML		T2 S2	2	1	2	3				3	1	3				
NDLG38	ASI	075						SM		T2 S2	2	1	2	2	3	2		3	2	1			01	
NDLG39	ASI	150						SM		T2	2	2	2	3	3	3		3	1	1	1.0		01	
NDLG40	ASI	365						GM-GW		T2 S2	2	1	2	4	2	4		3						
NDLG41	ASY	025						ML		T2 S2	2	2	2	3	3				1	1				
NDLG42	ASO	125						SM		T2 S2	2	1	2	2	3	3	011	4	1	4				
NDLG43	ASI	100						SM		T2	2	2	2	2	3	3		4	1	2				
NDLG44	ASI	280						SM		T2 S2		1	1	1	2	2			1	1	1.5			
NDLG45	ASI	075						SM		T2	2	1	2	2	3	2		3	1	2				
NDLG46	ABD	003						SP		S5	4	1	2	1	3	3				5				
NDLG47	ASY	075						SM		T2	2	1	2	2	3	2		2	1	1				
NDLG50	ASI	050						SM		T2	2	1	2	2	3	3		3	2	3				
NDLG51	ASY	205						SM		T2	2	1		3	2	2		3	1	1				
NDLG52	ASI	255						GM		T2 S5	2	1		2	2			3	1		3.0	068		
NDLG53	ASY	050						SM		T2 S2	2	1	2	2	3	2		2	1	1				
NDLG54	ASI	115						SP		T2	2	1	2	2	3	3		3		4				
NDLG55	AST							SM		T2	3	1	1	2	3	2		3	2	2				
NDLG56	ASI							SM		T2	2	1	2	2	3	2				2				
NDLG60	A4							MH				2	3	3	3	2								
NDLG61	ASY	003						SM								2				5				

*PHYSICAL PROPERTIES :

6 = GRAIN SHAPE
7 = MOISTURE CONTENT
8 = PLASTICITY FINES
9 = CONSISTENCY
10 = STRUCTURE
11 = CEMENTATION-INDURATION
12 = DEPTH TO CEMENTED LAYER(CM)
13 = WEATHERING OF CLASTS
14 = SOIL PROFILE DEVELOPMENT
15 = CALICHE DEVELOPMENT

GEOLOGIC STATION DATA
DRY LAKE VALLEY, NEVADA

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TABLE II-1-1

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SECTION 2.0

GROUND WATER DATA

2.0 EXPLANATIONS OF GROUND-WATER DATA

Existing ground-water data in Dry Lake Valley were collected from all available sources. These data were updated where possible from measurements taken during Fugro field operations, and all data are shown in Table II-2-1. Locations of water wells and boreholes in which water-level measurements were available are shown in Drawing II 1-1. Well numbers listed in the left hand column of Table II-2-1 refer to well locations shown on Drawing II-1-1. Actual well numbers giving location according to the Bureau of Land Management Land Survey System are shown in the second column.

Water levels generally refer to the static ground-water table in the unconfined basin-fill aquifer. Perched conditions or levels in artesian aquifers are noted where known.

WELL NO.	WELL LOCATION NUMBER*	ELEVATION OF GROUND SURFACE-FEET (METERS) ABOVE M.S.L.	DEPTH OF WELL-FEET (METERS)	WATER LEVEL			REFERENCES**/ REMARKS
				DEPTH BELOW GROUND SURFACE-FEET (METERS)	DATE MEASURED	ELEVATION-FEET (METERS) ABOVE M.S.L.	
W1	3N/64E-2b	5520 (1682)	380 (116)	76 (23)	--	5444 (1659)	1, 3/In Rock
W2	3N/64E-20b1	5067 (1544)	380 (116)	317 (97)	1960	4750 (1448)	2
W3	3N/64E-23c***	5165 (1574)	1000 (305)	772 (235)	1979	4393 (1339)	4
W4	3N/65E-21d	5451 (1661)	51 (16)	45 (14)	1962	5406 (1648)	1, 2, 3/ Near Shal. Rock
W5	2N/64E-3b	4980 (1518)	742 (226)	664 (202)	1963	4316 (1316)	2
W6	2N/65E-6b1	5075 (1547)	376 (115)	Dry	--	<4699 (<1432)	2
W7	1N/64E-24a1	4710 (1436)	515 (157)	398 (121)	1959	4312 (1314)	2
W8	1N/64E-34ca	4649 (1417)	515 (157)	428 (130)	1959	4221 (1287)	3
W9	1N/65E-2a1	5660 (1725)	12 (4)	10 (3)	--	5650 (1722)	2/In Rock
W10	3S/63E-22db	5440 (1658)	-- (--)	3 (1)	1966	5437 (1657)	3/In Rock
W11	3S/64E-12bdd***	4635 (1413)	1300 (396)	383 (117)	1980	4252 (1296)	5

*Mount Diablo Baseline and Meridian

**References:

1. United States Geological Survey, 1978
2. Eakin, T. E., 1968
3. Nevada State Engineers Office, 1957-1967
4. Air Force Weapons Laboratory, and Waterways Experiment Station, 1979
5. Fugro National, Inc., 1979

***Approximate Well Location Number

NOTE: All wells tap unconfined alluvial aquifers except where noted. Where published data are lacking or inaccurate, ground surface elevations are taken from topographic maps.

GROUND-WATER DATA
DRY LAKE VALLEY, NEVADA

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TABLE II-2-1

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SECTION 3.0

SEISMIC REFRACTION DATA

3.0 EXPLANATIONS OF SEISMIC REFRACTION DATA

Note: There is no seismic refraction line designated as DL-S-3. Each figure shows seismic wave travel times plotted versus surface distance between the energy source (shot) and the detector (geophone) for a single seismic line. Distances are measured along the line from geophone number 1 which is designated as zero distance. Distances to the right (on the paper) of geophone 1 are positive. The direction arrow gives the approximate direction along the geophone array from geophone 1 to geophone 24.

Travel Time Versus Distance Graph (Upper Half of Figure)

This is a travel time versus distance graph. The abscissa represents distance; the ordinate, time. The six vertical lines represent the locations of shots (designated as F, G, H, I, J, and K). The symbol, X, denotes travel times at geophones that were located to the right of a shot. The symbol, ⊙, denotes travel times that were located to the left of shots.

Velocity Cross Section (Lower Half of Figure)

This is an interpreted velocity cross section beneath the seismic line. The top line represents the ground-surface profile. The short vertical lines crossing the top line mark the geophone positions. The depth scale is plotted relative to a point on the line which was arbitrarily chosen as "zero elevation" at the time the line was surveyed. The additional lines across the cross section represent the interpreted boundaries between layers of material with different compressional wave

velocities. These boundaries are commonly called "refractors". The velocity interpreted to be representative of each layer is shown.

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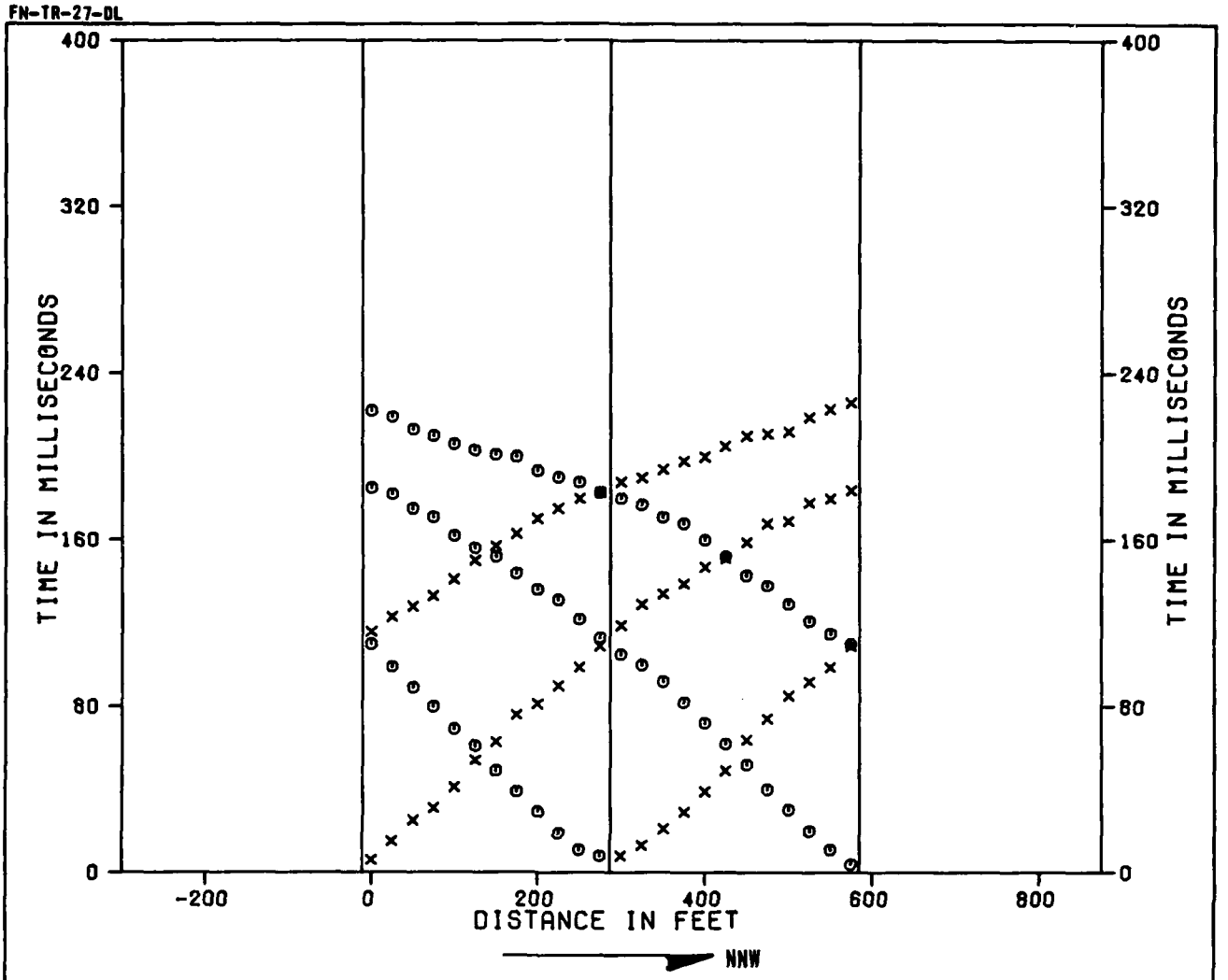

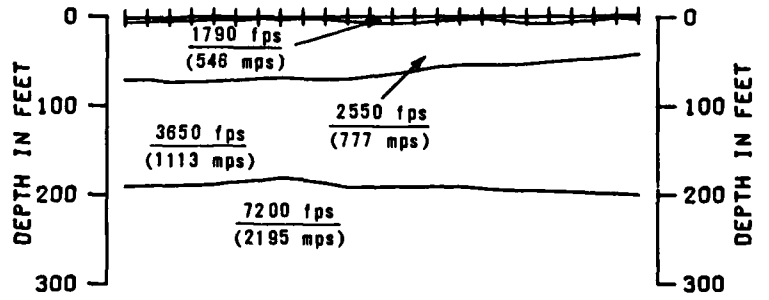

0 METERS 100

DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-1
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

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FIGURE
II-3-1

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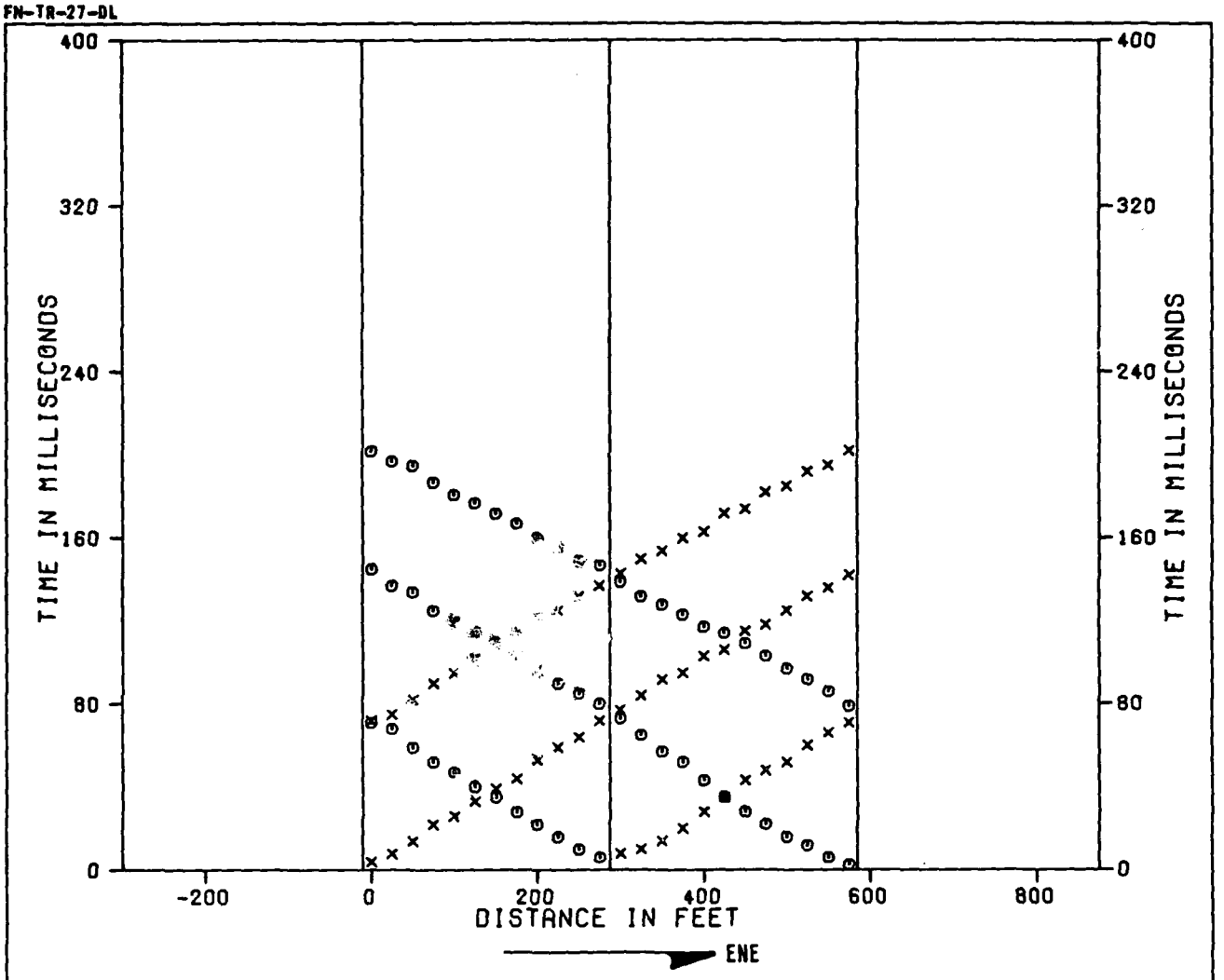

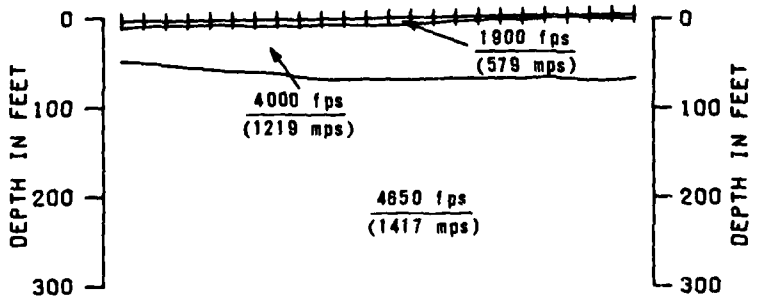

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DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-2
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

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FIGURE
II-3-2

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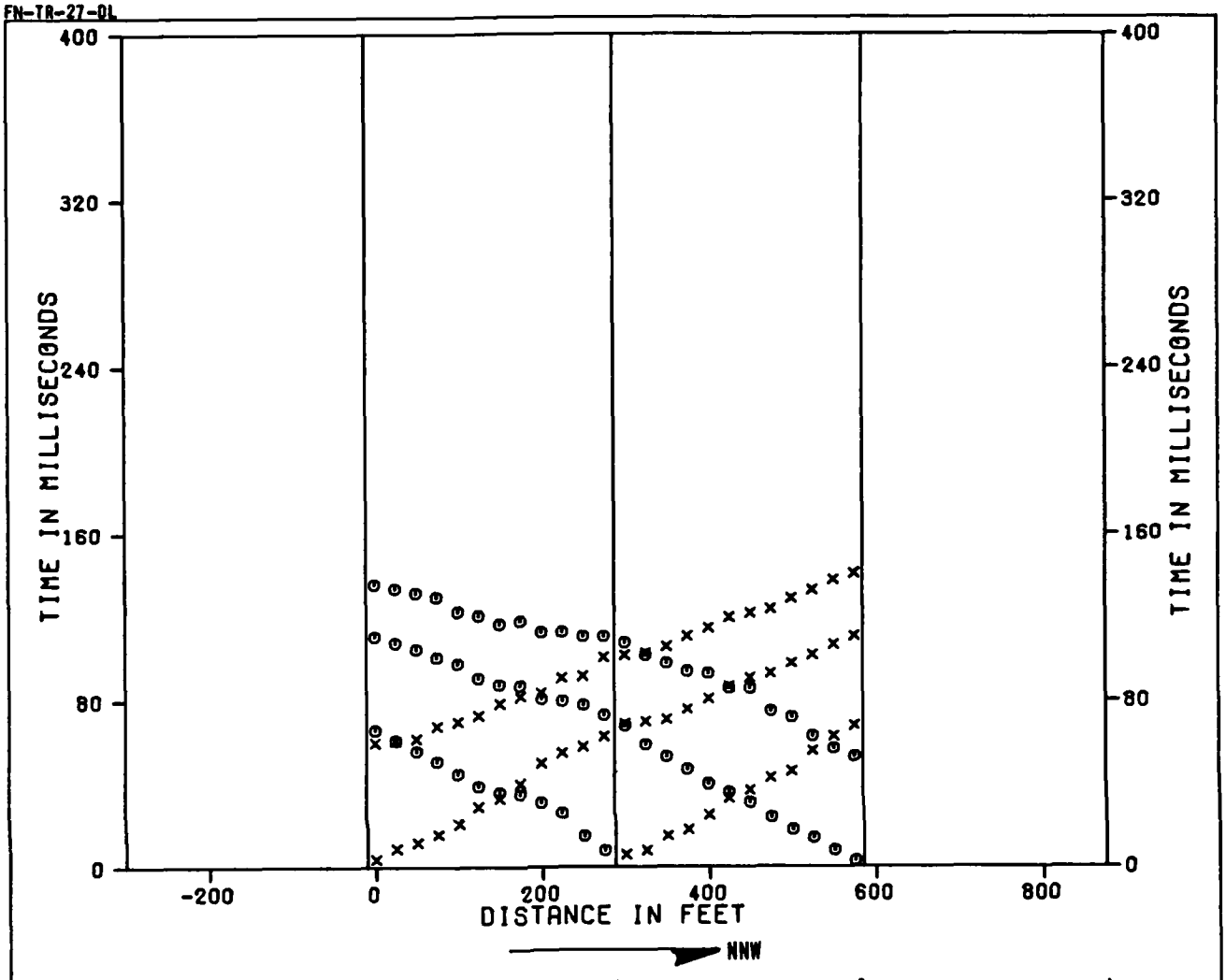

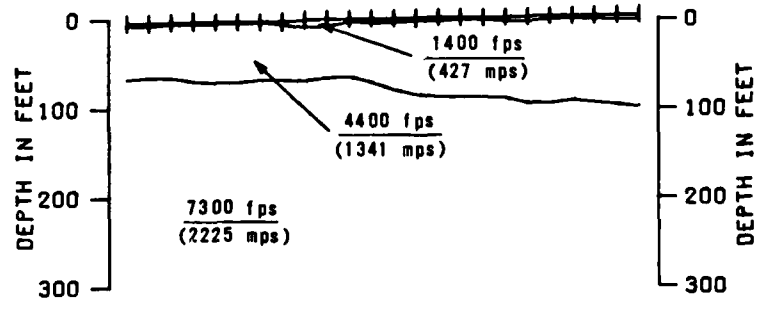

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DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-4
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

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FIGURE
II-3-3

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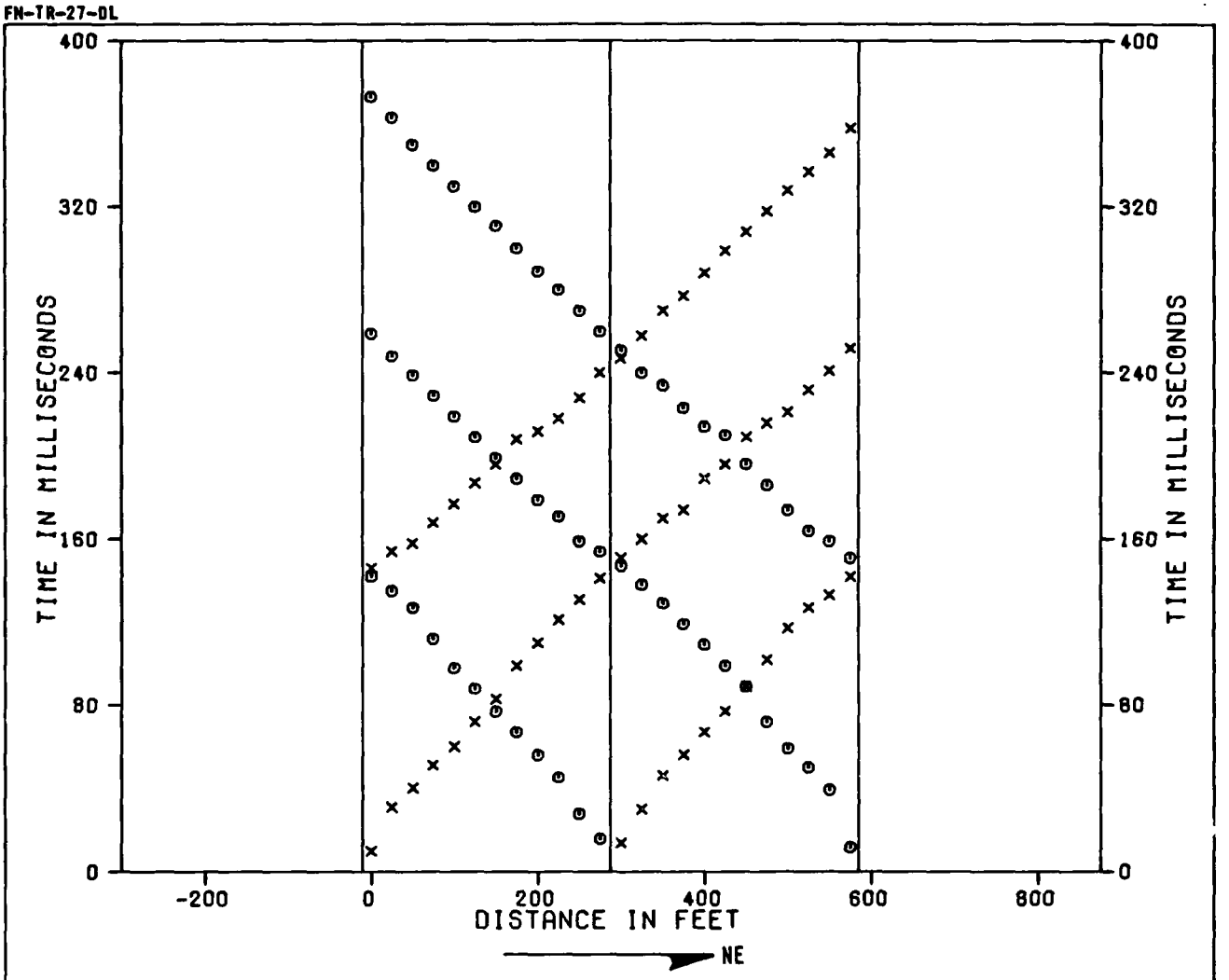
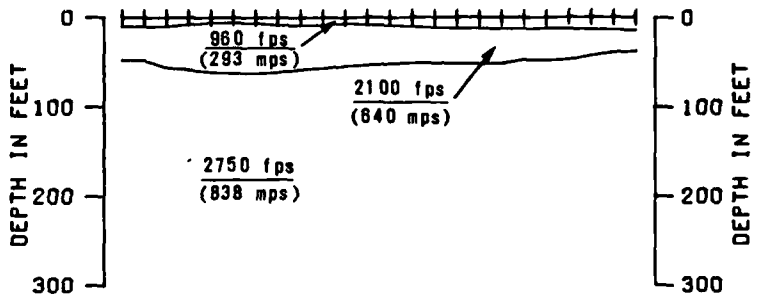
14 MAR 80

FN-TR-27-DL





0 METERS 100

DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-5
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

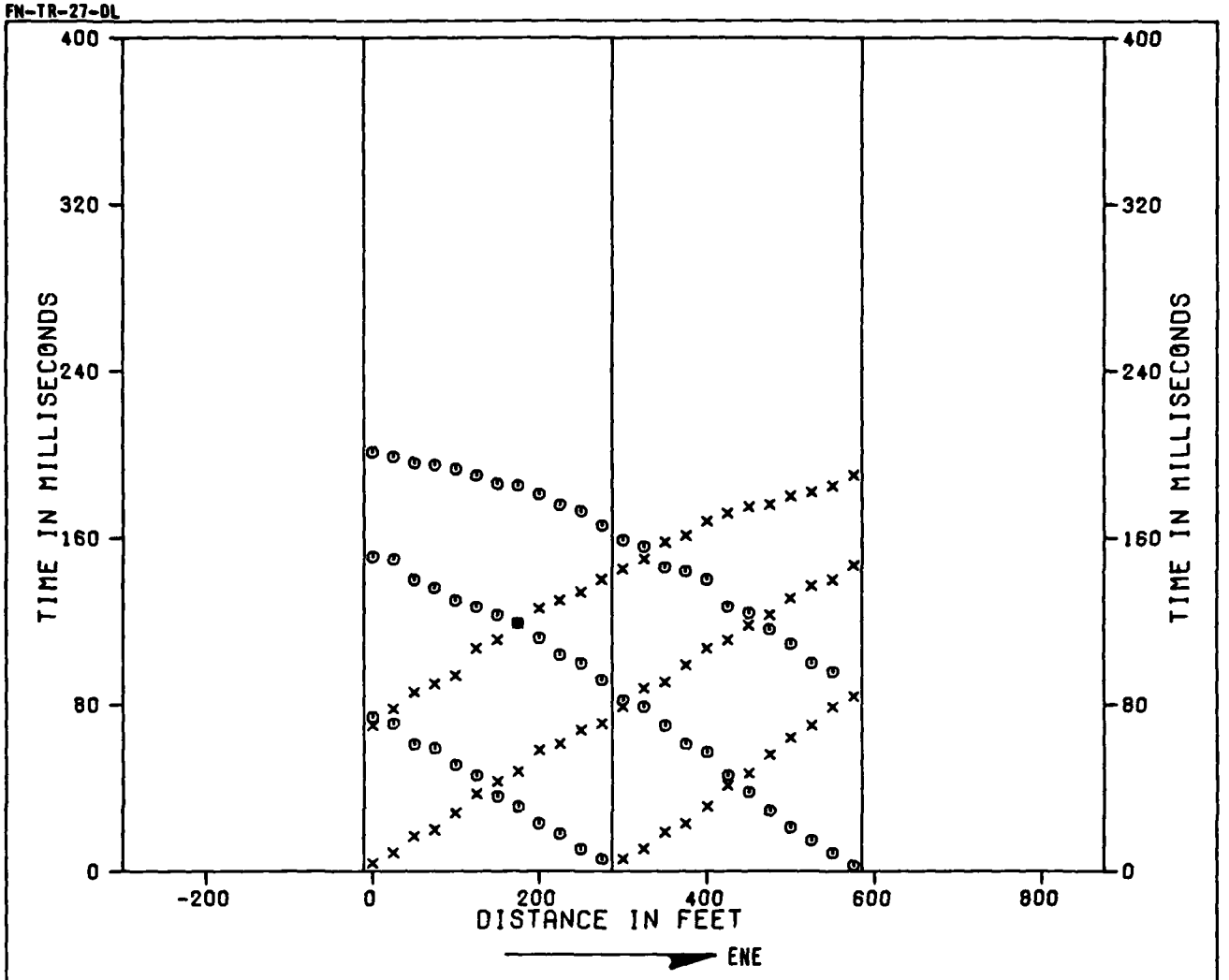
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

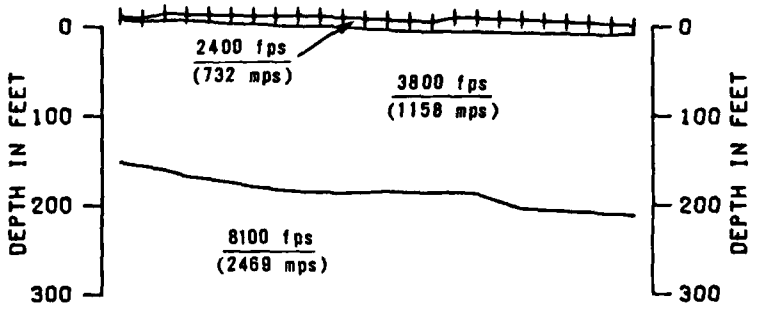
FIGURE
II-3-4

FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL





0 METERS 100

DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-6
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

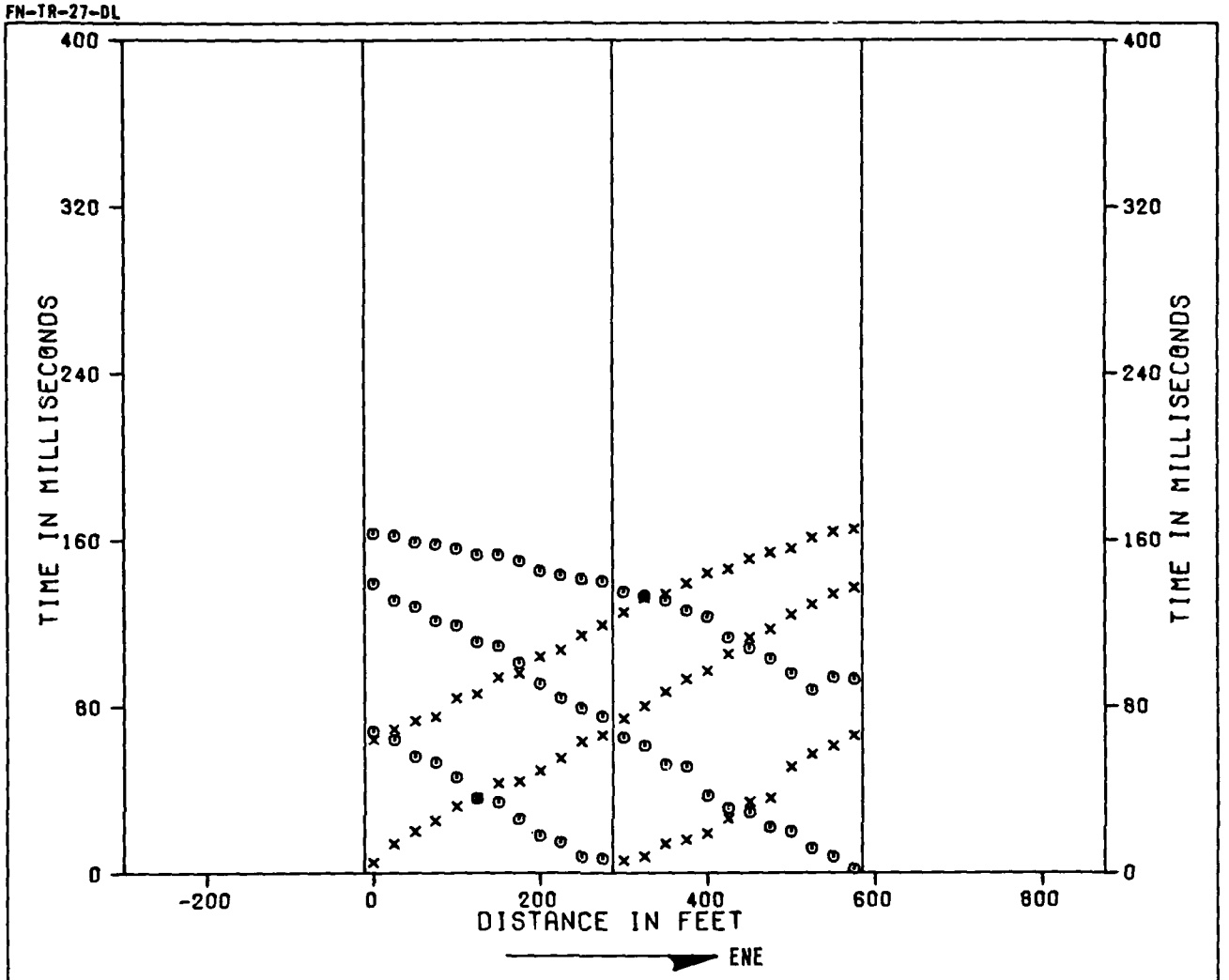
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

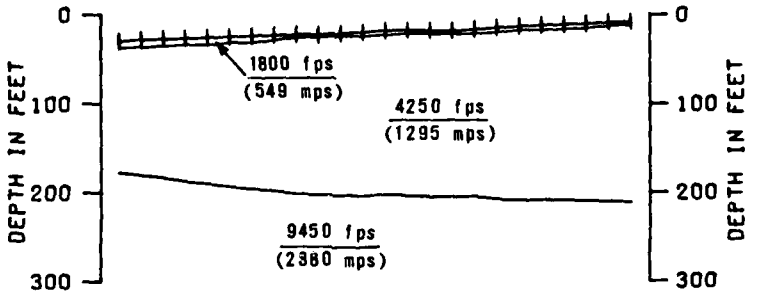
FIGURE
II-3-5

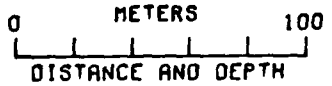
UGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-7
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

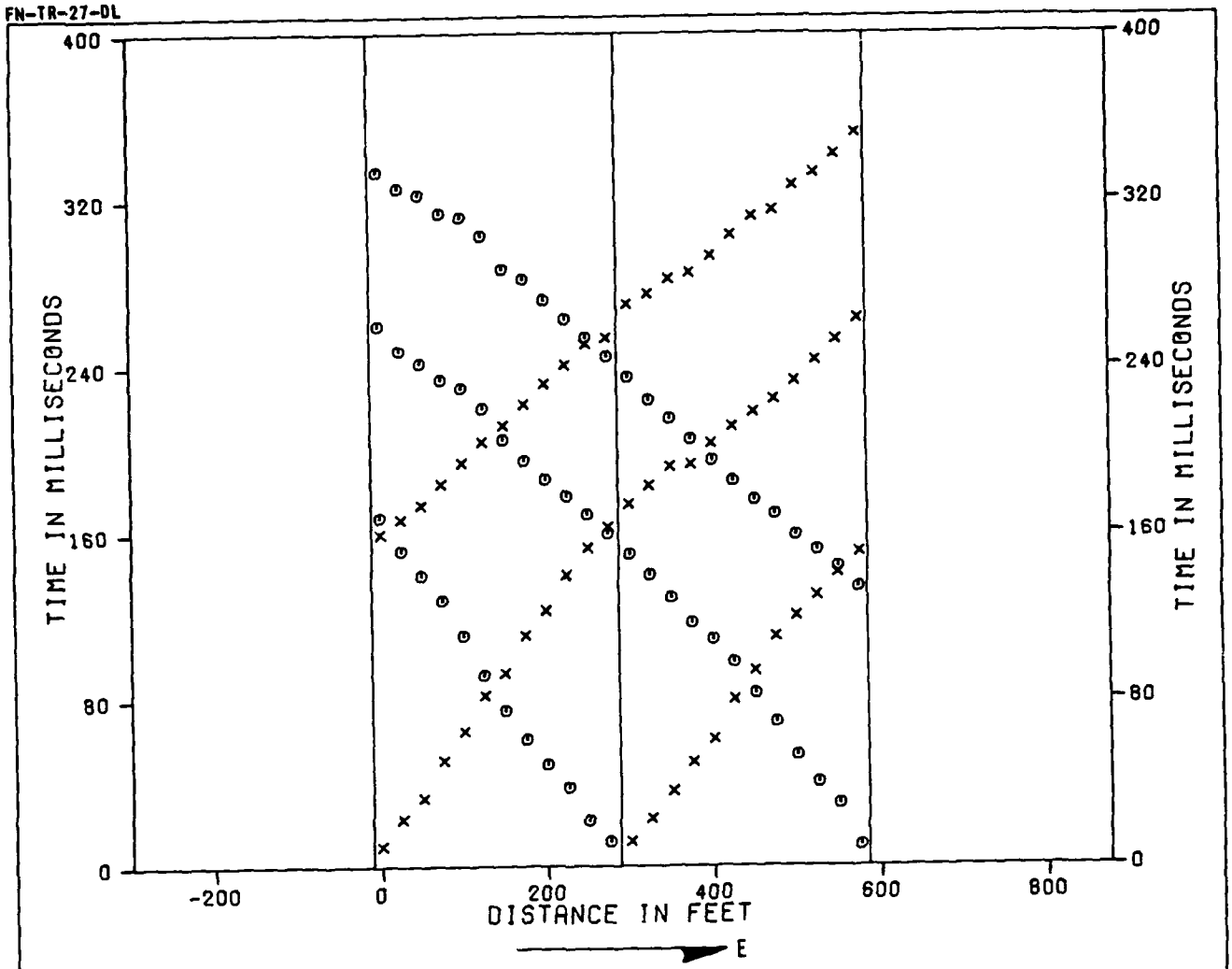
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

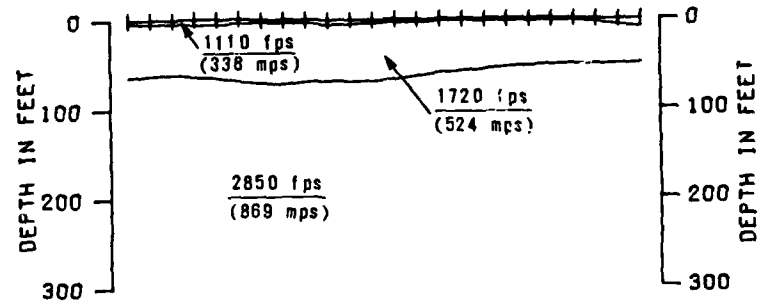
FIGURE
II-3-6

UGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL





0 METERS 100

DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-8
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

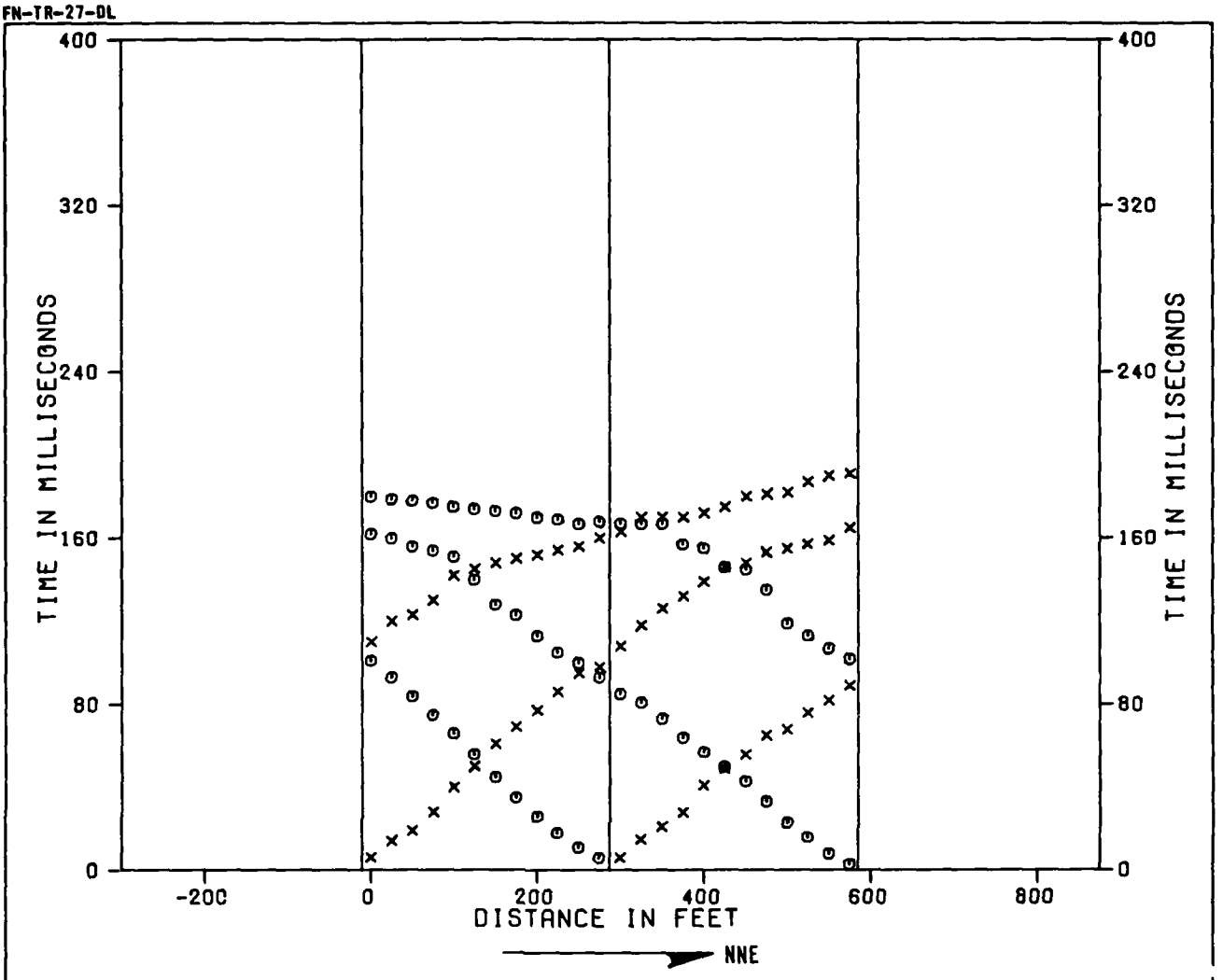
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

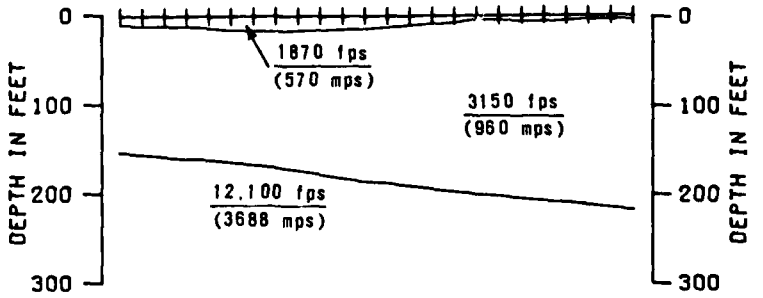
FIGURE
II-3-7

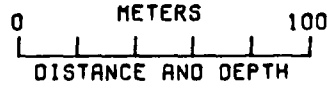
FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-9
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

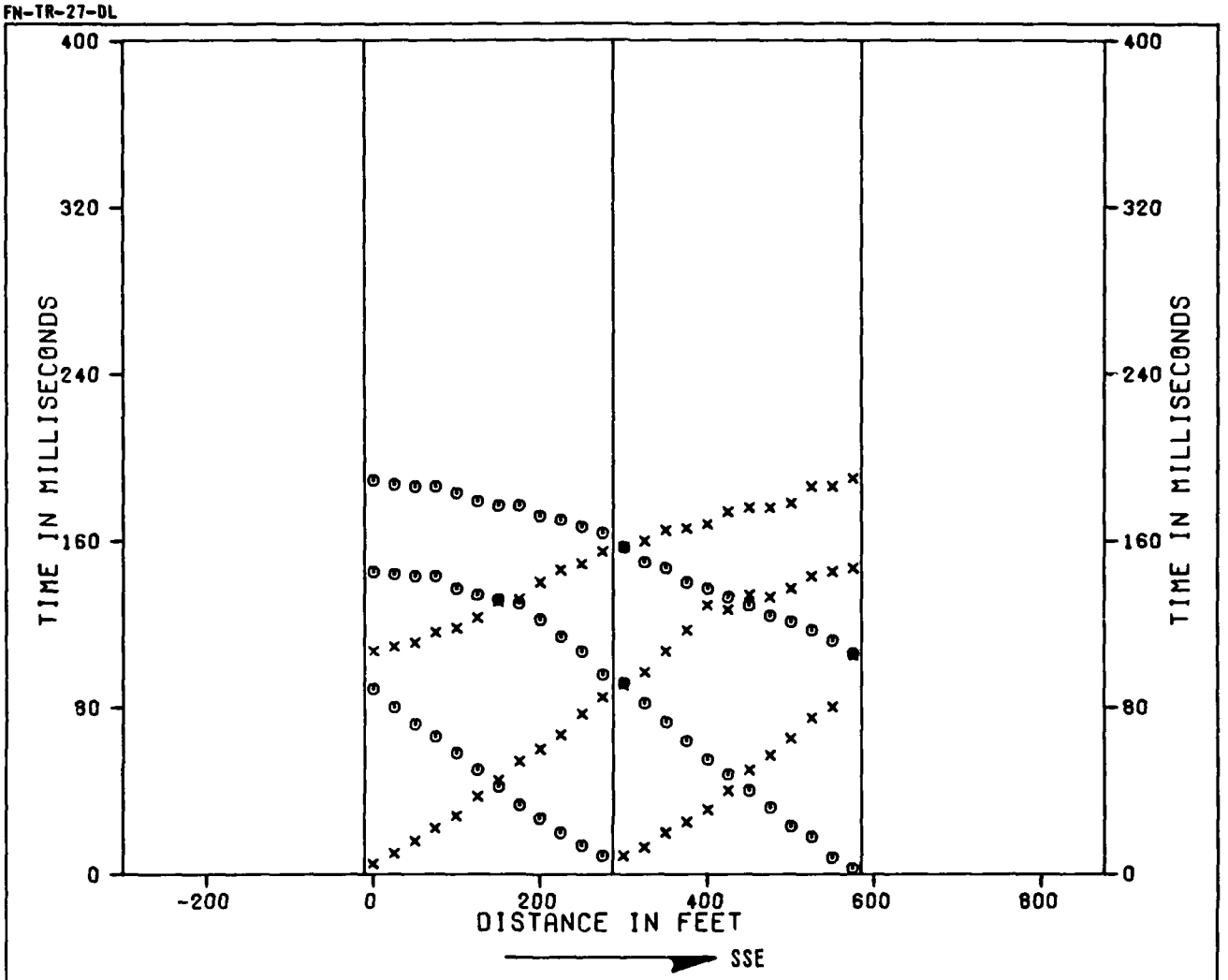
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

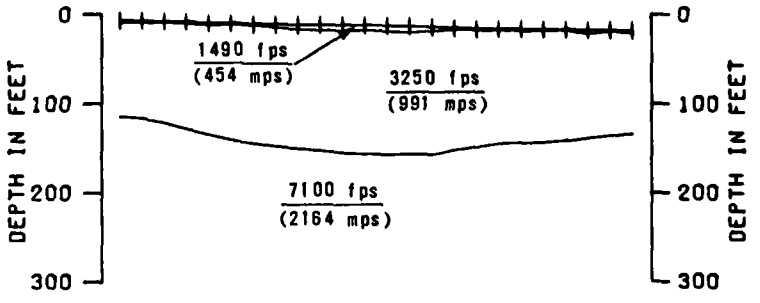
FIGURE
II-3-8

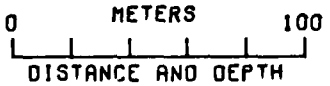
FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-11
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

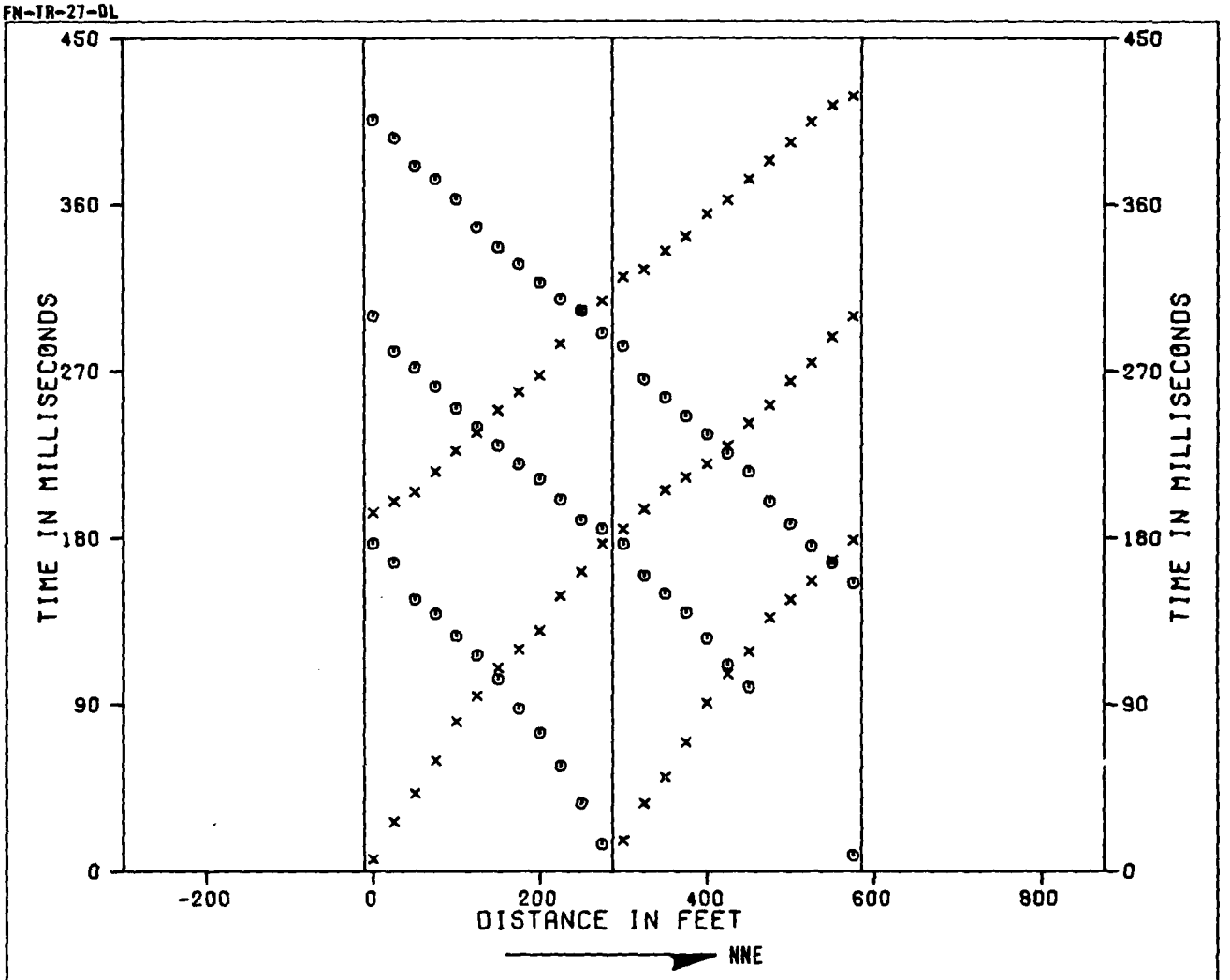
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

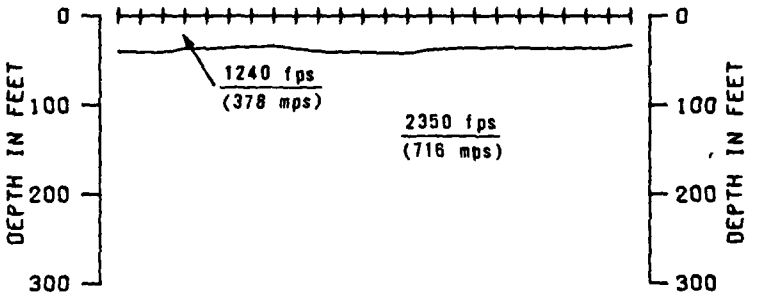
FIGURE
II-3-10

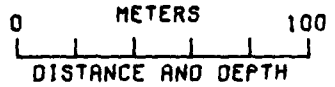
FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-12
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

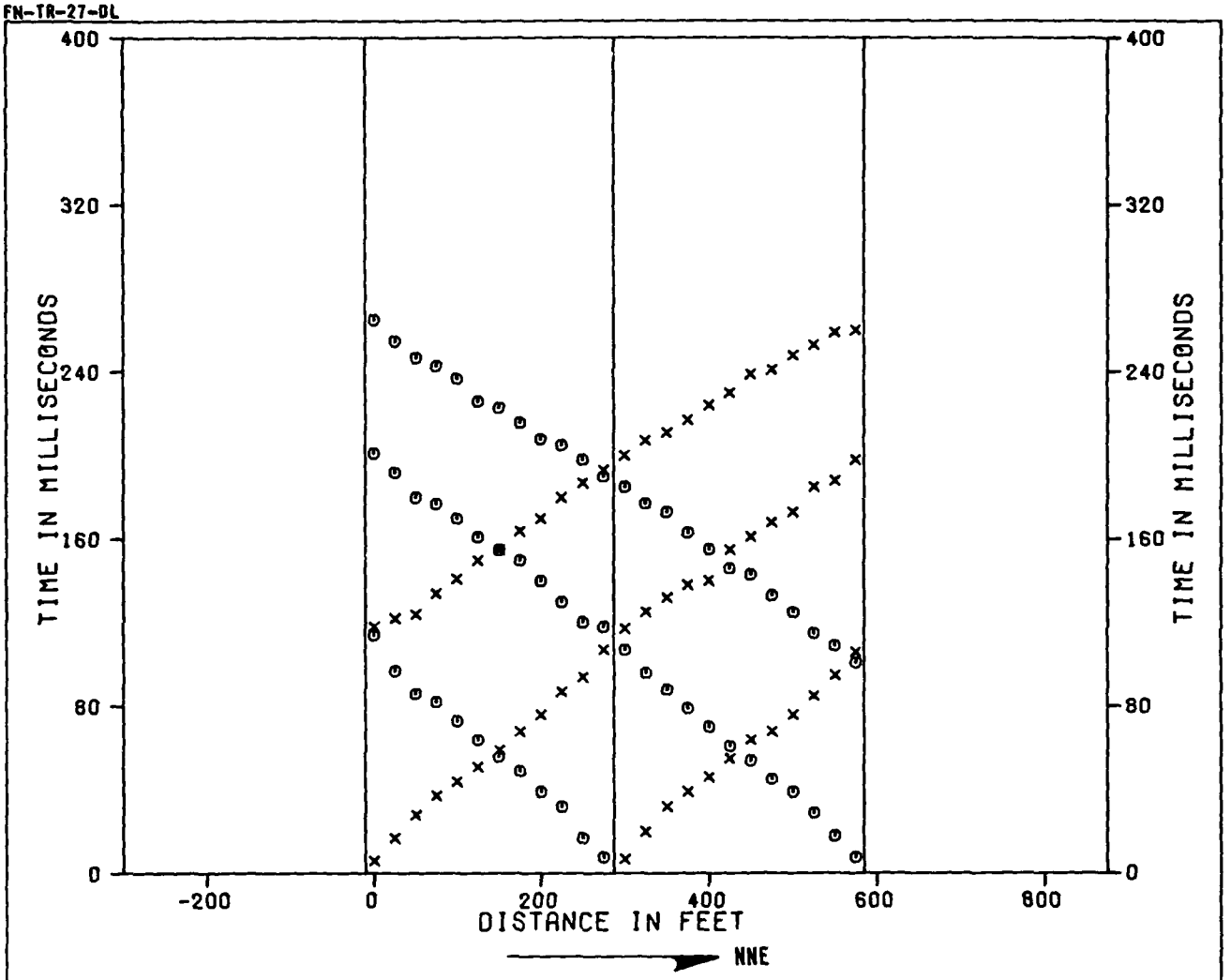
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

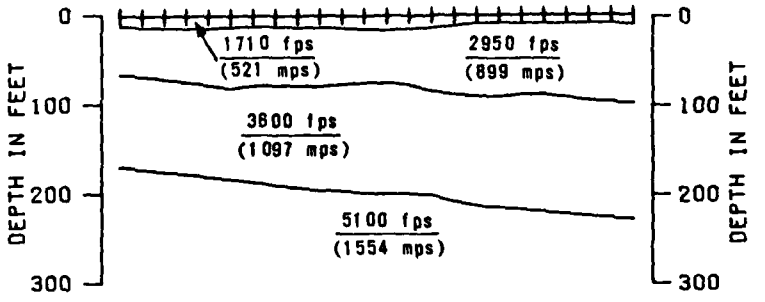
FIGURE
II-3-11

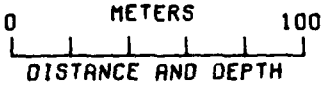
FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-13
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

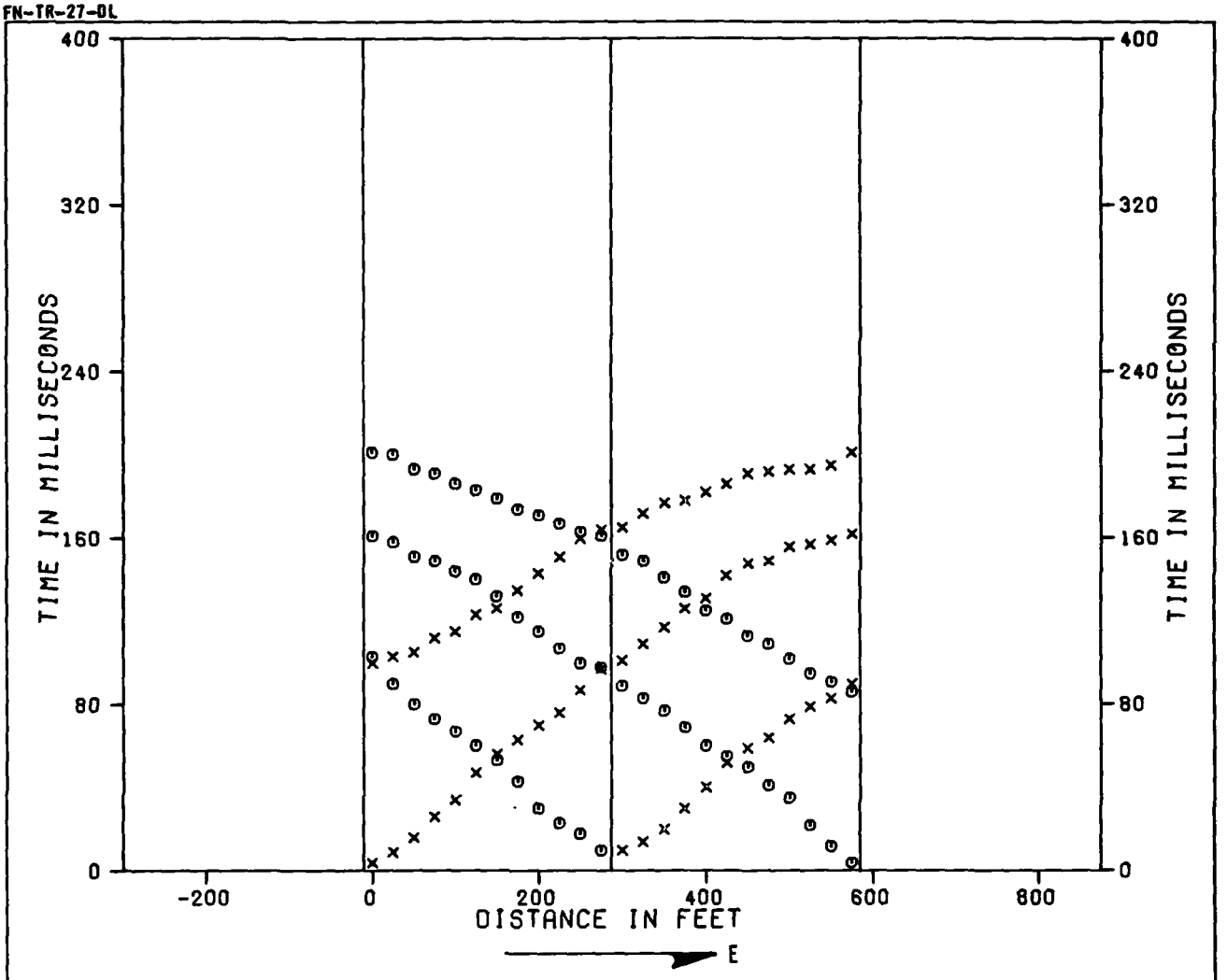
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

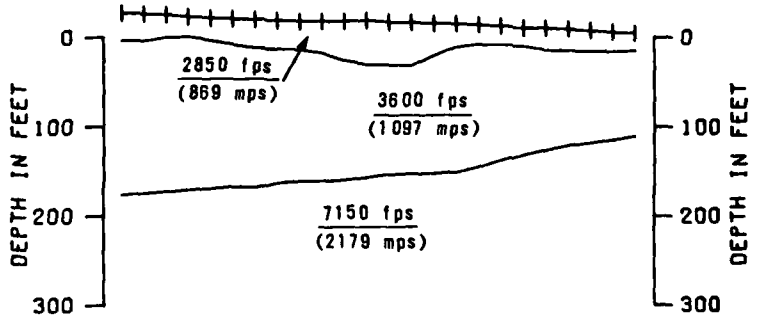
FIGURE
II-3-12

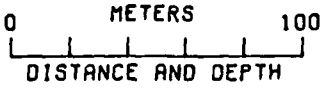
FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS
⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-14
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

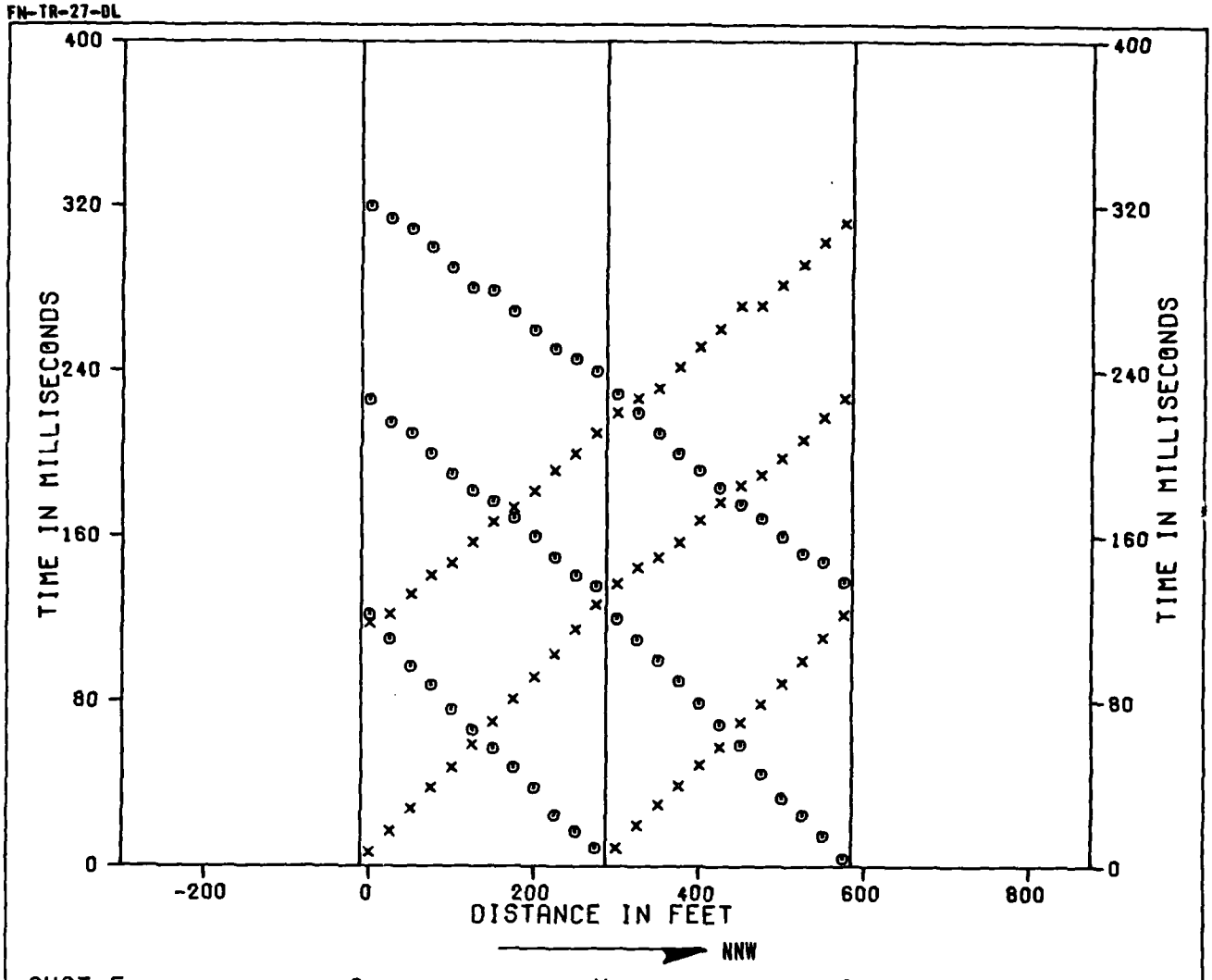
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

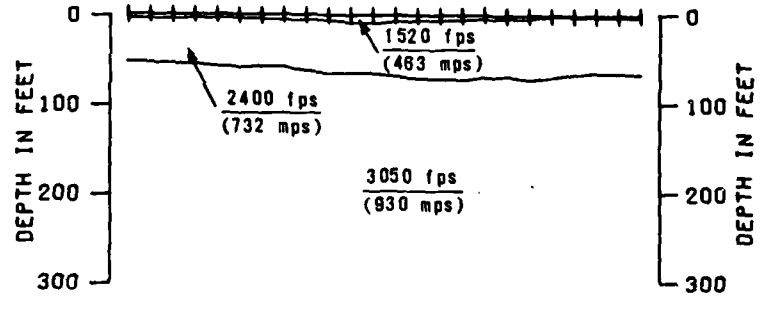
FIGURE
II-3-13

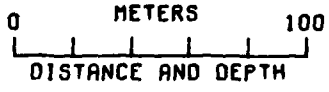
FUGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-15
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

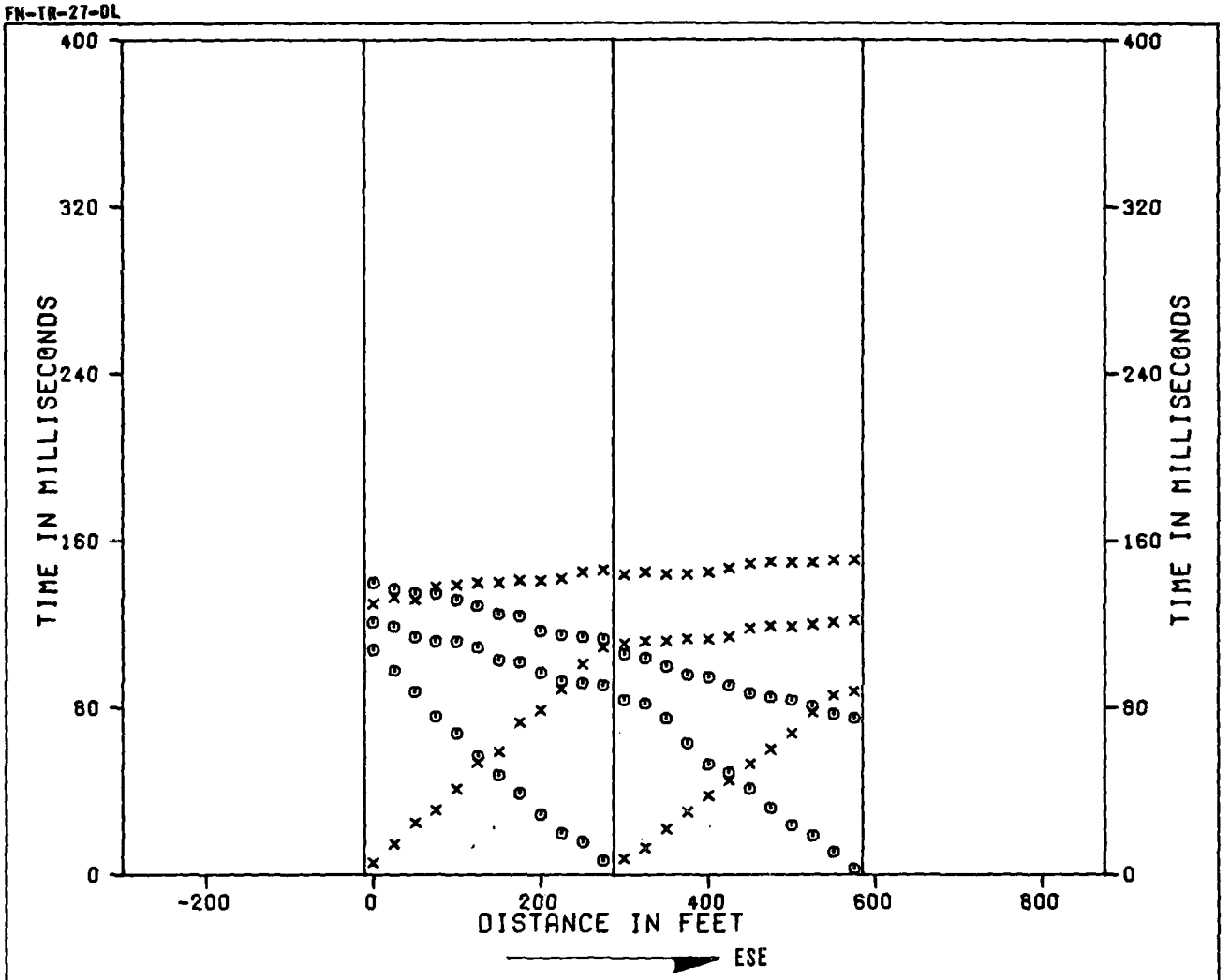
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

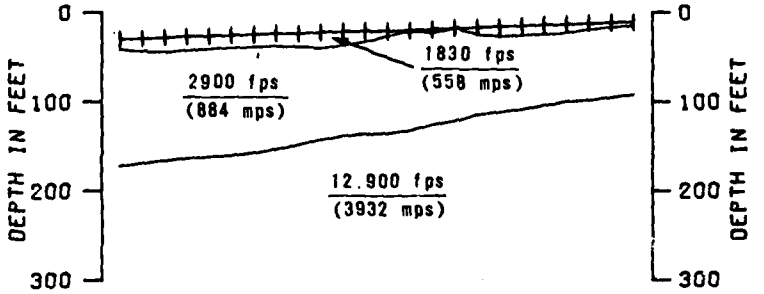
FIGURE
II-3-14

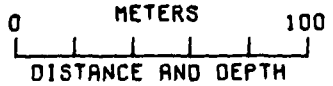
UGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL







× TIMES TO RIGHT OF SHOTS
⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-16
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

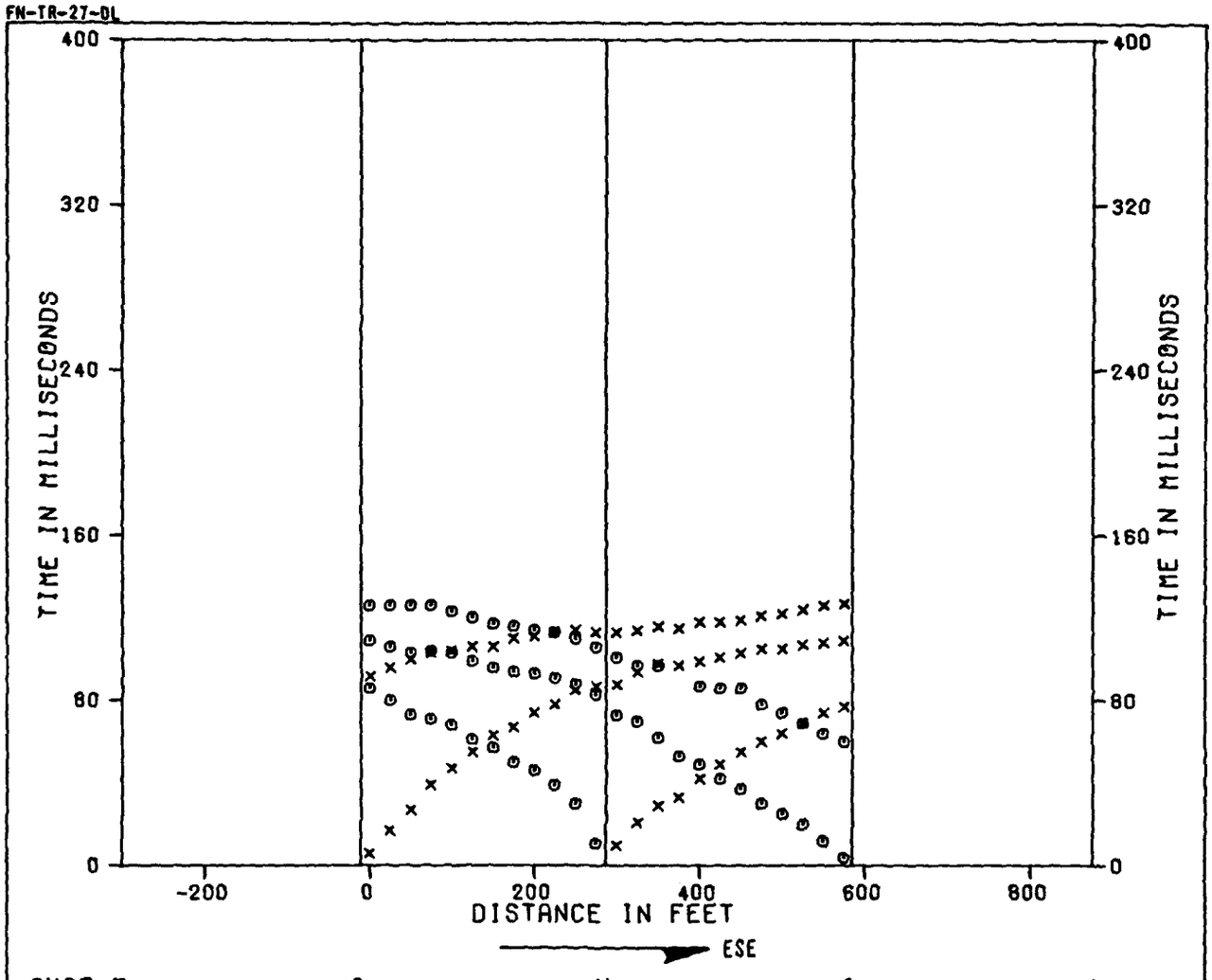
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

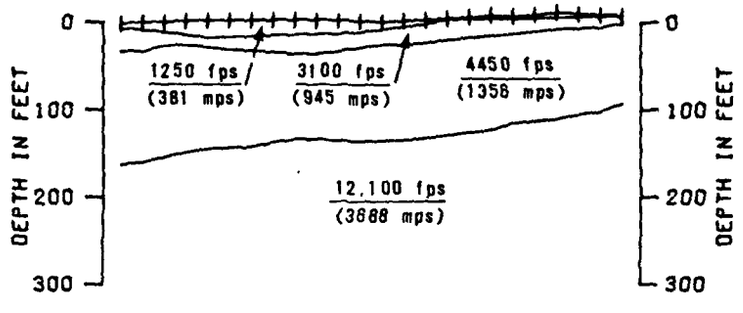
FIGURE
II-3-15

UGRO NATIONAL, INC.

14 MAR 80

FN-TR-27-DL





0 METERS 100

DISTANCE AND DEPTH

× TIMES TO RIGHT OF SHOTS

⊙ TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE DL-S-17
TIME DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

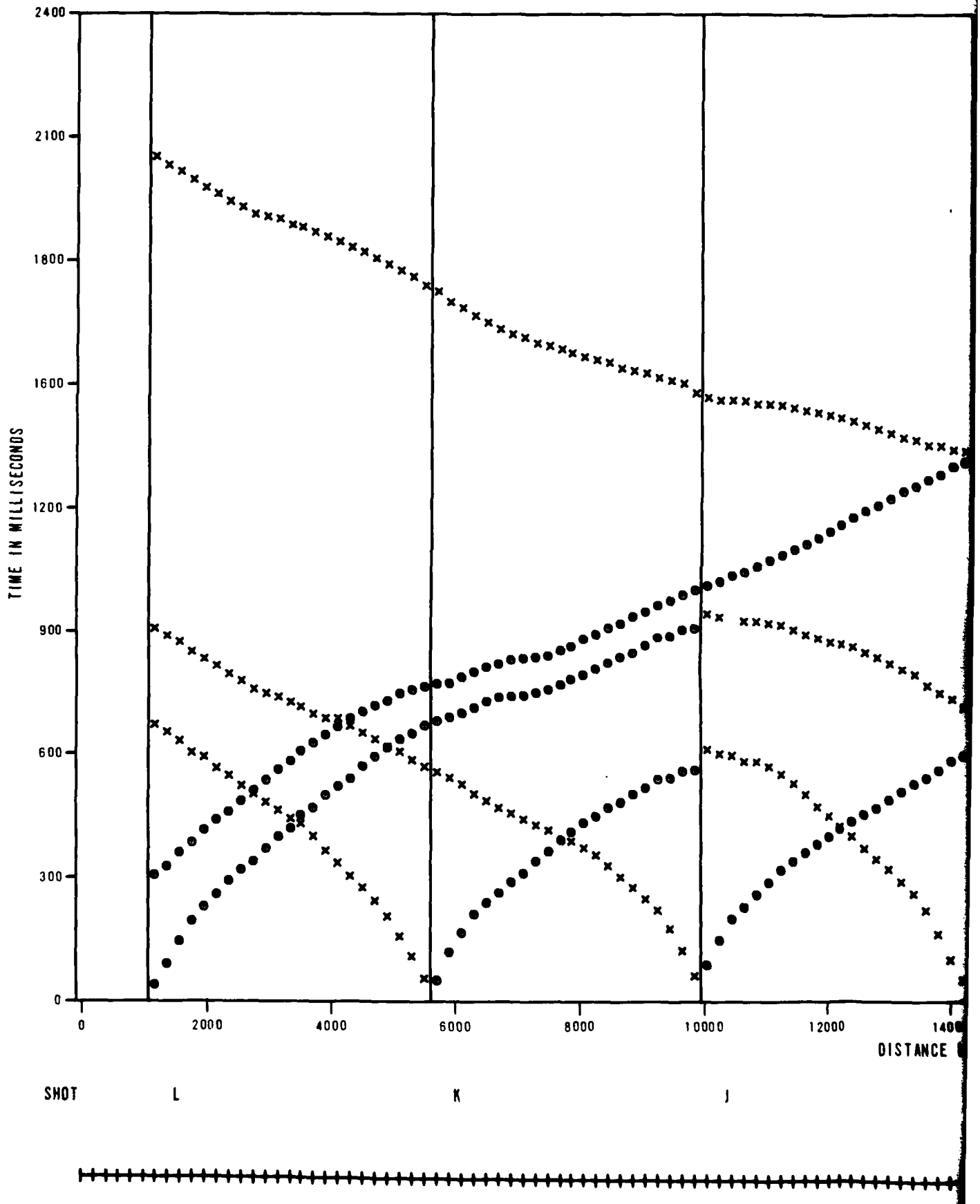
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

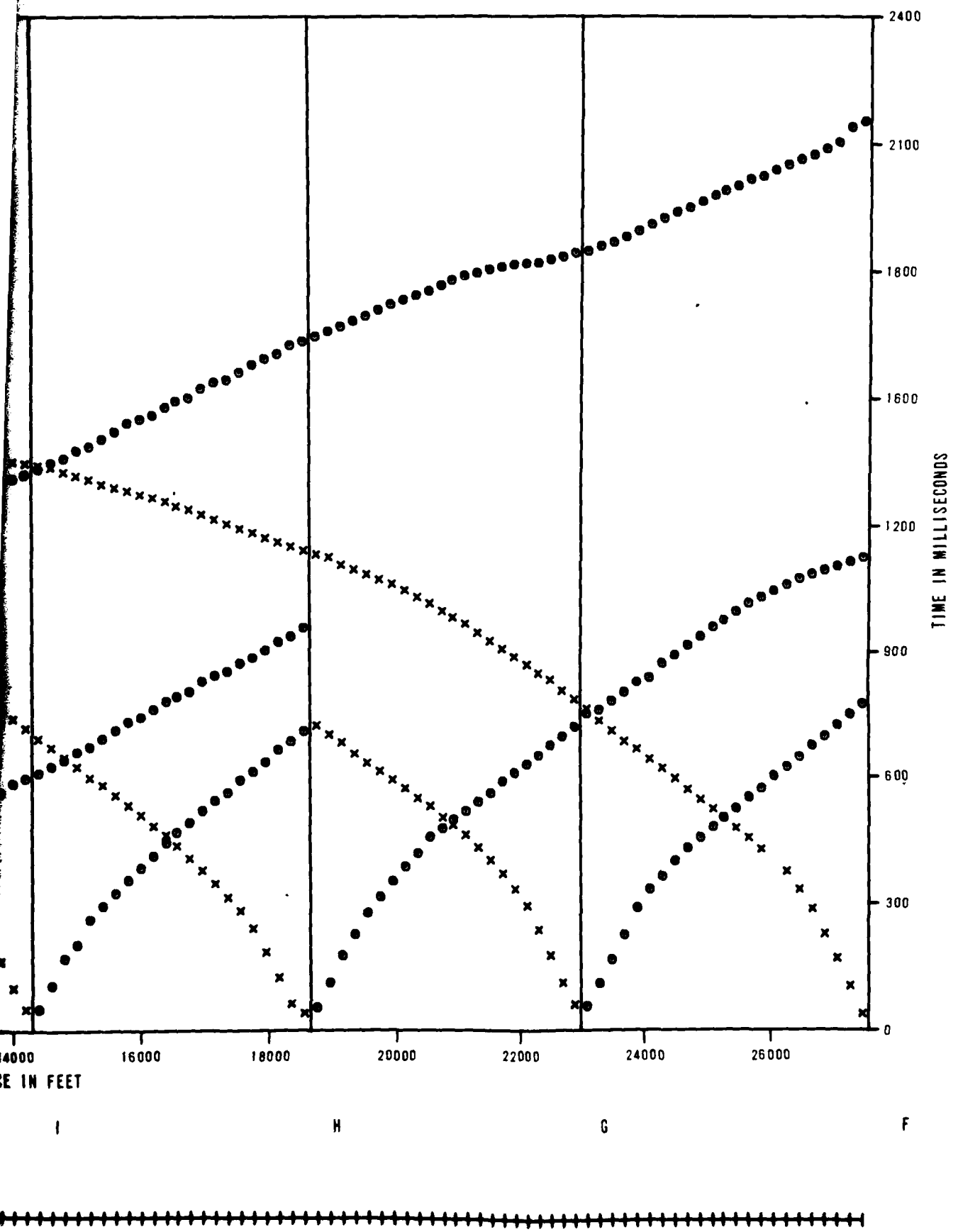
FIGURE
II-3-16

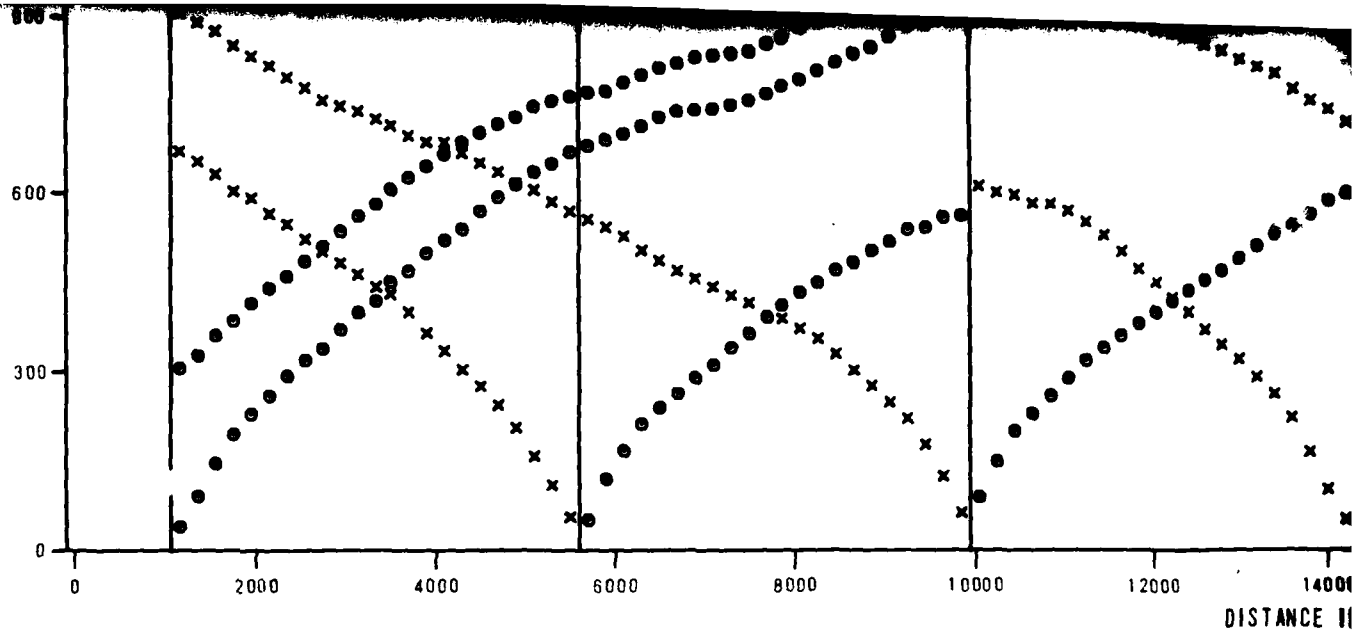
UBRO NATIONAL, INC.

14 MAR 80

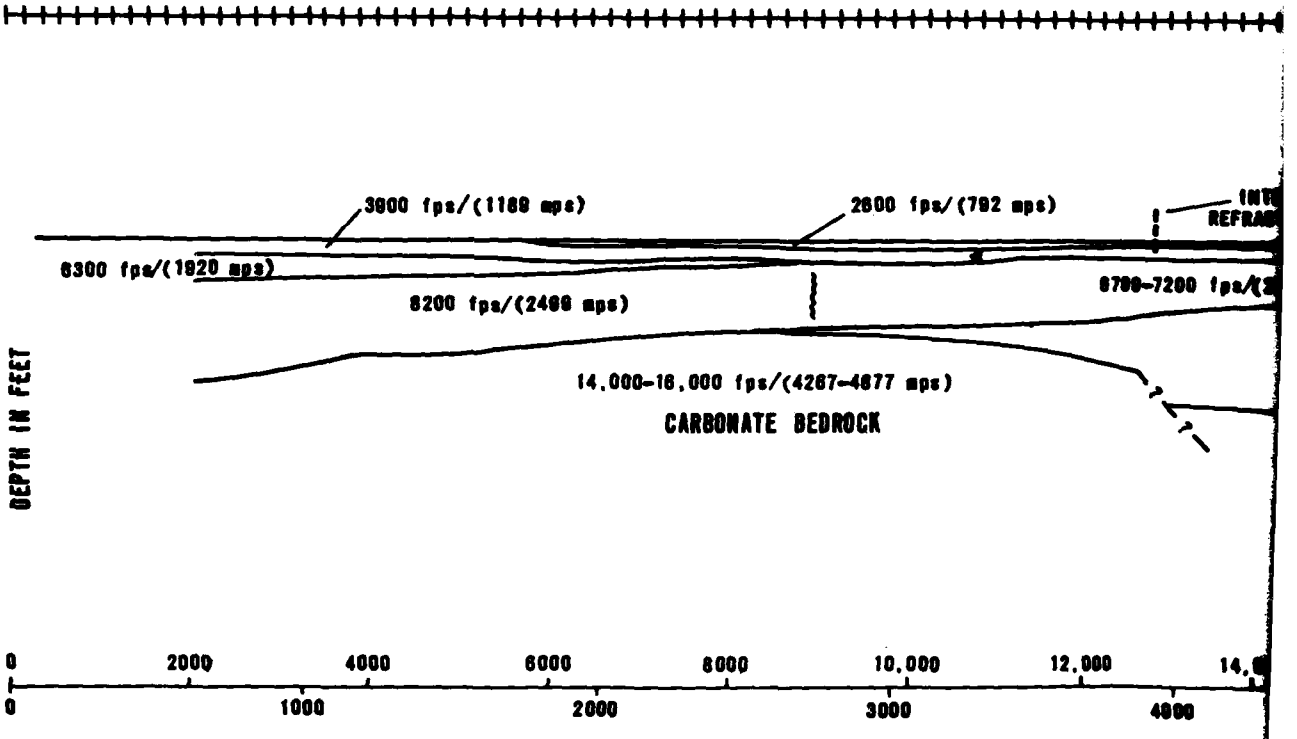
FN-TR-27-DL

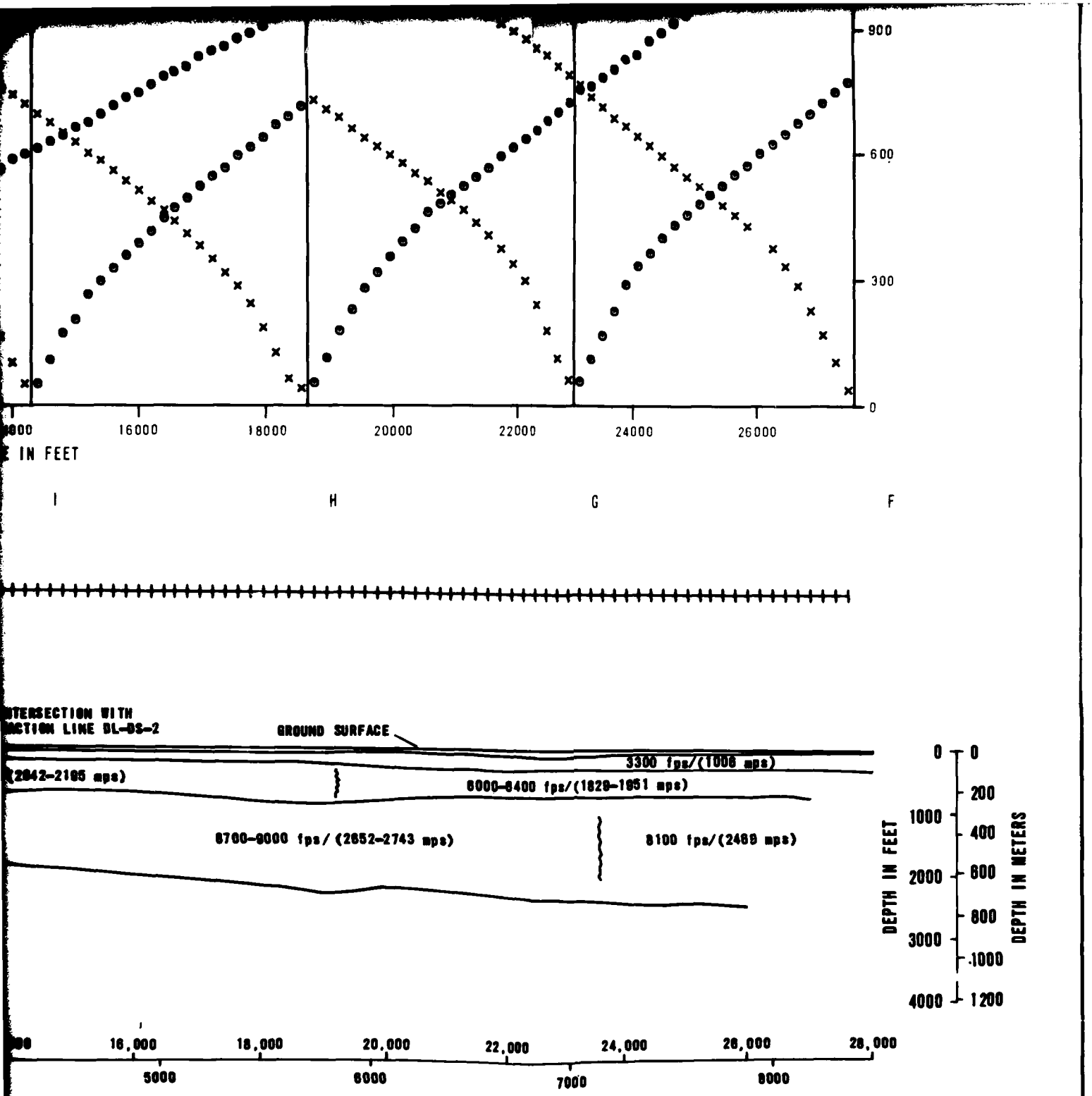

2400
2100
1800
1600
1200
900
600
300
0
TIME IN MILLISECONDS
0
2000
4000
6000
8000
10000
12000
DISTANCE
SHOT
L
K
J


2400
2100
1800
1600
1200
900
600
300
0
TIME IN MILLISECONDS
14000
16000
18000
20000
22000
24000
26000
CE IN FEET
I
H
G
F


900
600
300
0
0
2000
4000
6000
8000
10000
12000
14001
DISTANCE II

SHOT L K J


3800 fps/(1158 mps)
2600 fps/(792 mps)
INTE
REFRAC
6300 fps/(1920 mps)
8200 fps/(2498 mps)
6700-7200 fps/(2
14,000-16,000 fps/(4267-4877 mps)
CARBONATE BEDROCK
DEPTH IN METERS
0
200
400
600
800
1000
1200
DEPTH IN FEET
0
1000
2000
3000
4000
DISTANCE IN FEET
0
2000
4000
6000
8000
10,000
12,000
14,
DISTANCE IN METERS
0
1000
2000
3000
4000

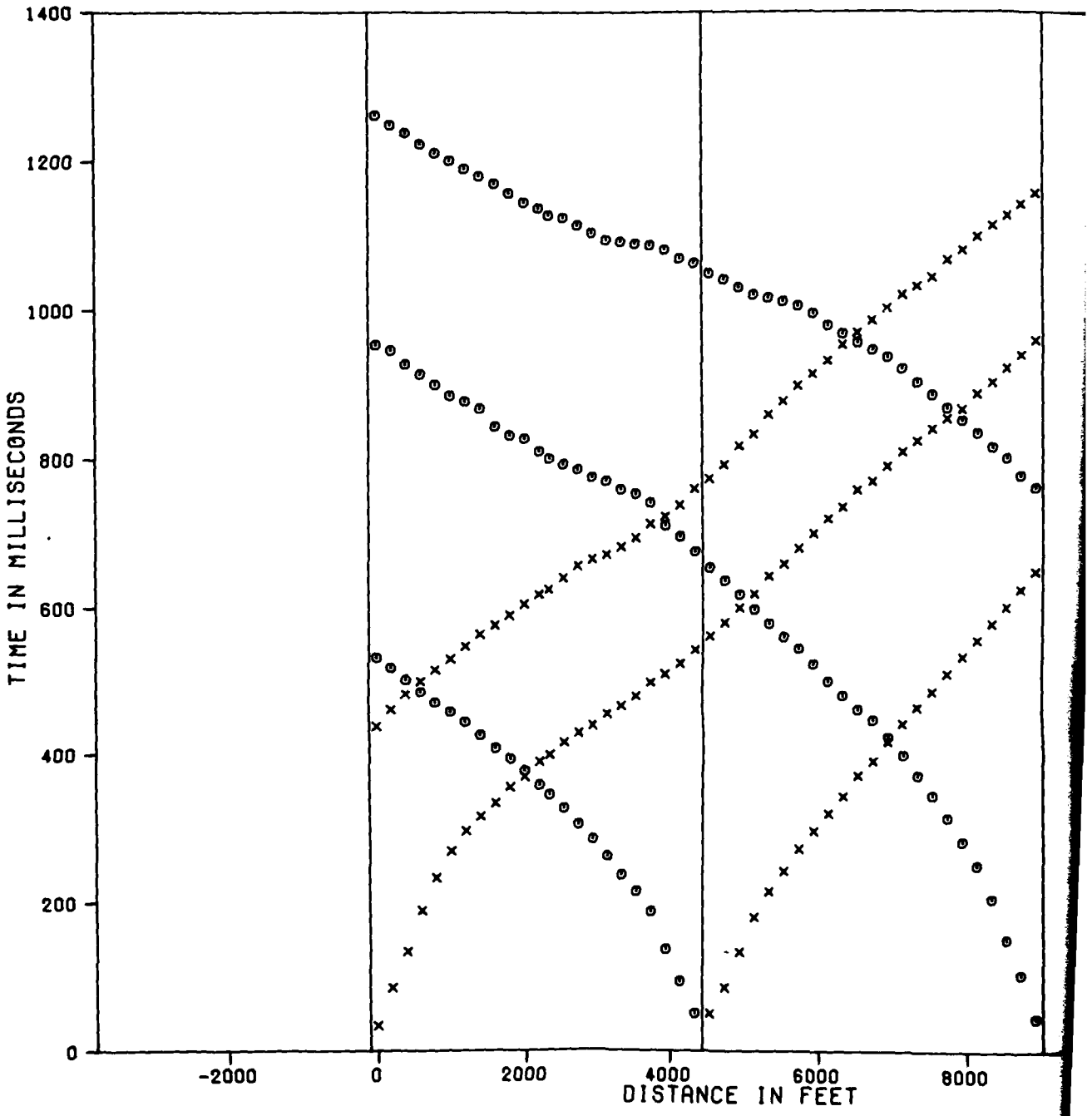


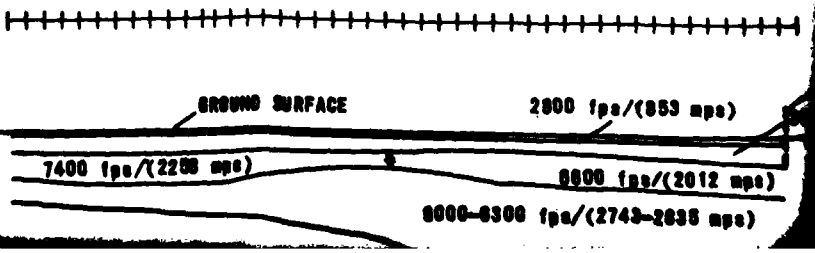
SEISMIC REFRACTION LINE DL-DS-1
TIME-DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

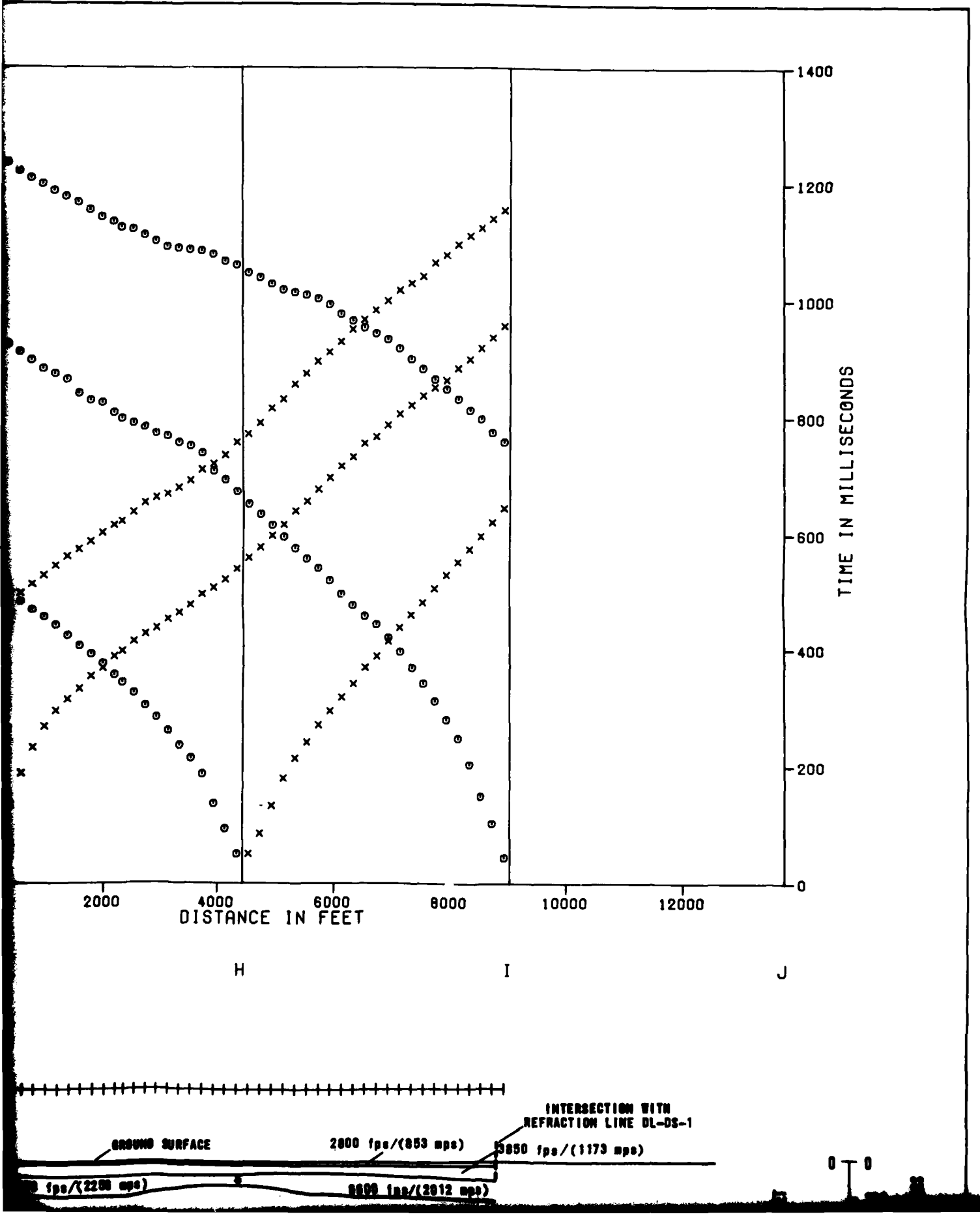
FIGURE
II-3-17

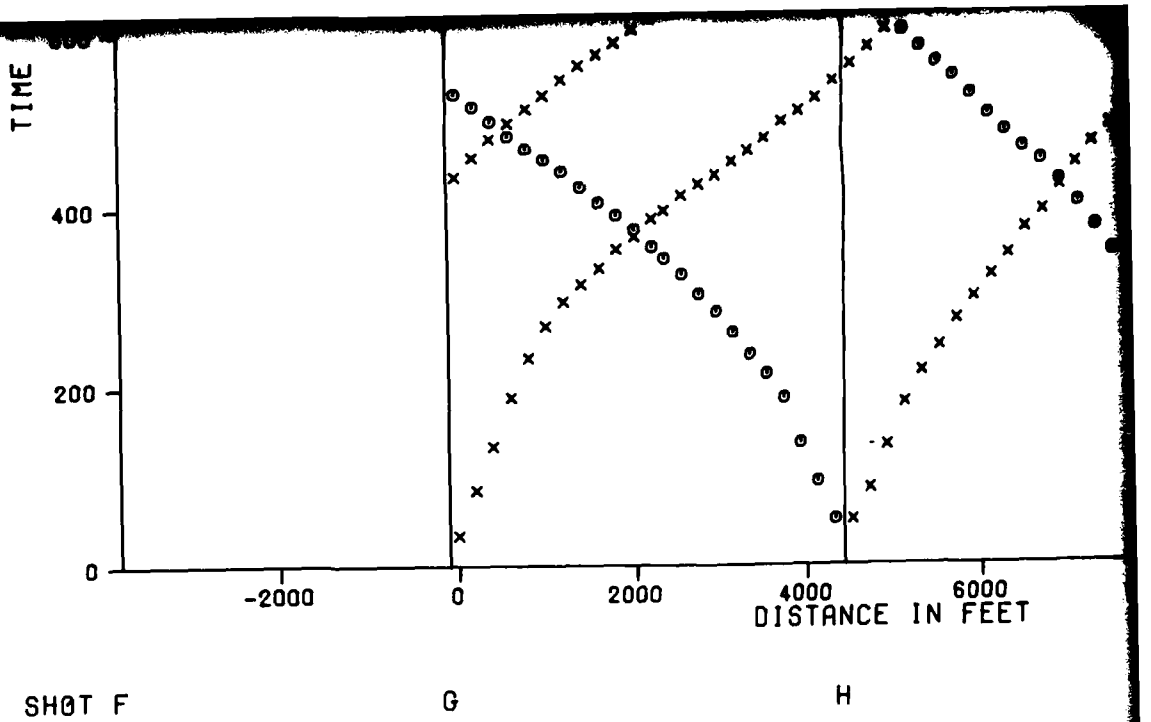
WOODWARD NATIONAL, INC.


1400
1200
1000
800
600
400
200
0
TIME IN MILLISECONDS
-2000
0
2000
4000
6000
8000
DISTANCE IN FEET
SHOT F
G
H
I

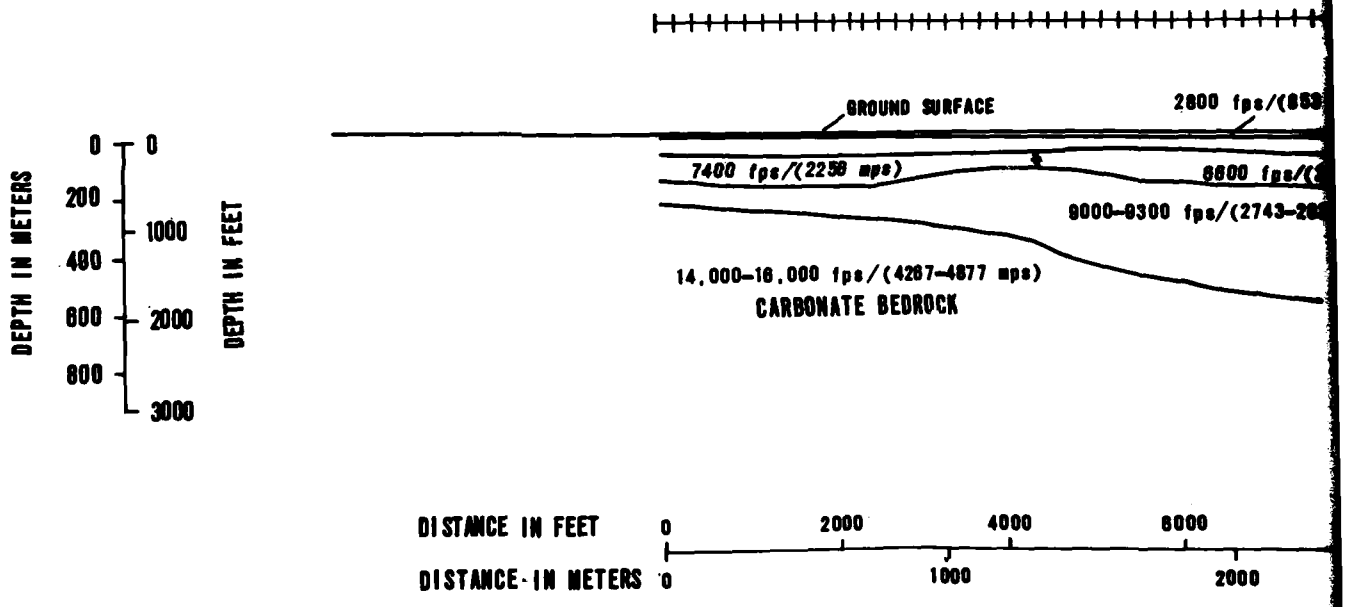

GROUND SURFACE
2900 fps/(883 mps)
7400 fps/(2256 mps)
9800 fps/(2012 mps)
9000-9300 fps/(2743-2835 mps)


0
0
200

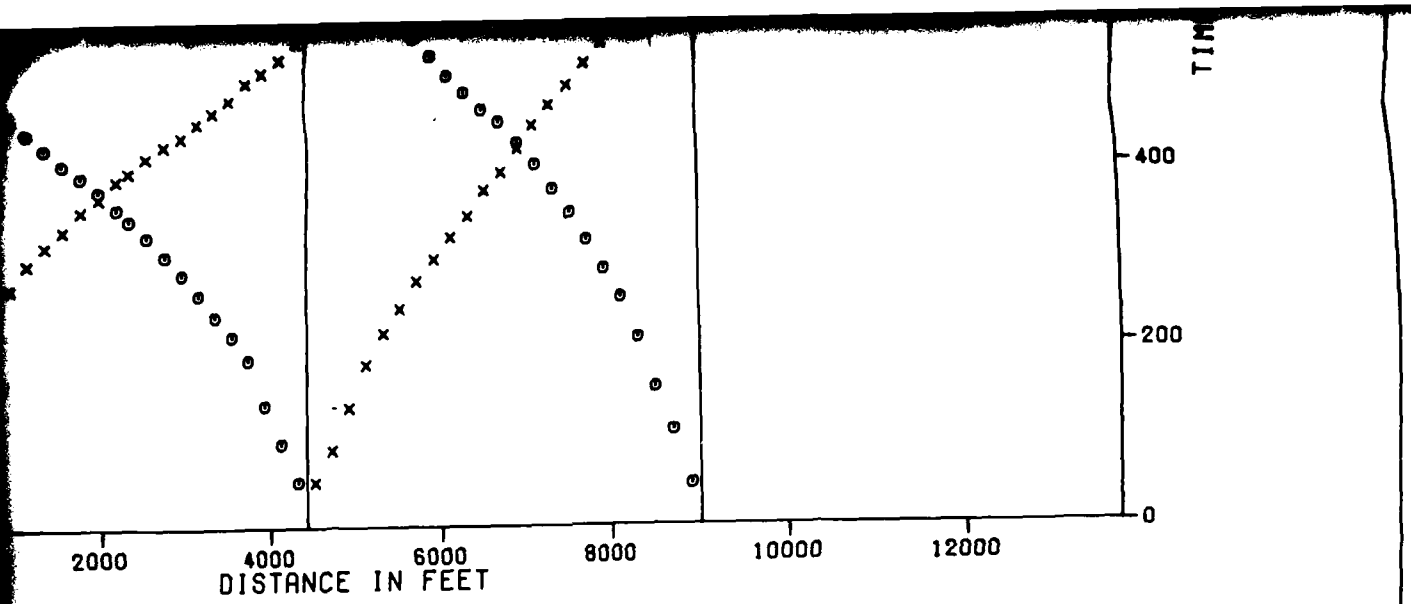

1400
1200
1000
800
600
400
200
0
TIME IN MILLISECONDS
2000
4000
6000
8000
10000
12000
DISTANCE IN FEET
H
I
J
INTERSECTION WITH
REFRACTION LINE DL-DS-1
GROUND SURFACE
2800 fps/(853 mps)
fps/(2256 mps)
0 0



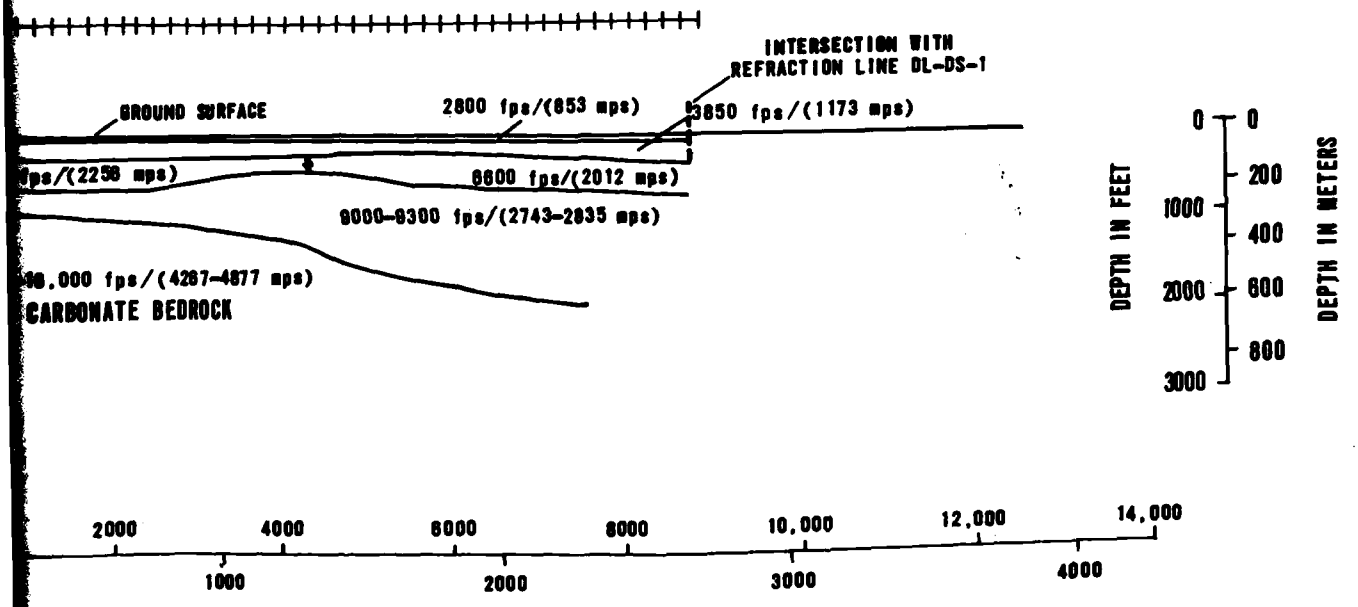
SHOT F G H



14 MAR 80



H I J



SEISMIC REFRACTION LINE DL-DS 2
TIME-DISTANCE DATA AND VELOCITY PROFILE
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-3-18

FUGRO NATIONAL, INC.

SECTION 4.0

BORING LOGS

4.0 EXPLANATIONS OF BORING, TRENCH, AND TEST PIT LOGS

Note: The boring scheduled for the location numbered DL-B-3 was not drilled.

All data from borings, trenches, and test pits are presented on standard Fugro National logs in Sections 4.0 and 5.0. Explanations of the column headings on the logs are as follows:

A. Designations - Borings, trenches, and test pits are identified as follows:

DL-B-1
DL - abbreviation for the site (e.g., DL-Dry Lake)
B - abbreviation for activity (e.g., B-boring, T-trench, P-test pit)
1 - number of activity

B. Sample Type - Different sampling techniques were used and the symbols are explained at the bottom of the boring logs. For details of sampling techniques, see Section A5.0 of Appendix A in Volume I. Horizontal lines, to scale, indicate the depth where sampling was attempted.

C. Percent Recovery - The numbers shown represent the ratio (in percent) of the soil sample recovered in the sampler to the full penetration of the sampler.

D. N Value - Corresponds to standard penetration resistance, which is number of blows required to drive a standard split-spoon sampler for the second and third of three 6-inch (15 cm) increments with a 140-pound (63.5 kg) hammer falling 30 inches (76 cm) (ASTM D 1586-67).

E. Depth - Corresponds to depth below ground surface in meters and feet.

F. Lithology - Graphic representation of the soil and rock types.

G. USCS - Unified Soil Classification System (see Table 4-1 for complete details) symbols.

H. Soil Description - Except in cases where samples were classified based on laboratory test data, the descriptions are based on visual classification. The procedures outlined in ASTM D 2487-69, Classification of Soils for Engineering Purposes, and D 2488-69, Description of Soils (Visual-Manual Procedure) were followed. Solid lines across the column indicate known change in strata at the depth shown.

Definitions of some of the terms and criteria to describe soils and conditions encountered during the exploration follow.

Gradation : A coarse-grained soil is well graded if it has a wide range in grain size and substantial amounts of most intermediate particle sizes.

Poorly graded indicates that the soil consists predominantly of one size (uniformly graded) or has a wide range of sizes with some intermediate sizes obviously missing (gap-graded).

Moisture :

Dry	- no feel of moisture
Slightly Moist	- much less than normal moisture
Moist	- normal moisture for soil
Very Moist	- much greater than normal moisture
Wet	- for soils below the water table

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UNIFIED SOIL CLASSIFICATION SYSTEM

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TABLE II-4-1

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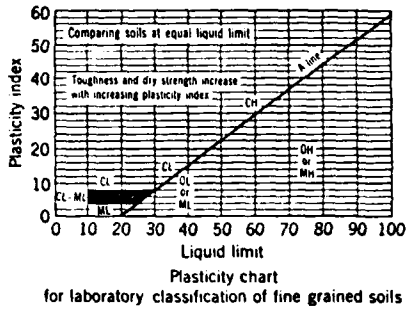
Field Identification Procedures (Excluding particles larger than 3 in. and basing fractions on estimated weights)				Group Symbols [a]	Typical Names	Information Required for Describing Soils	Laboratory Classification Criteria
Coarse-grained soils More than half of material is *larger than No. 200 sieve size*[b] (The No. 200 sieve size is about the smallest particle visible to naked eye)	**Gravels** More than half of coarse fraction is larger than No. 4 sieve size (For visual classification, the ¼ in. size may be used as equivalent to the No. 4 sieve size)	Clean gravels (little or no fines)	Wide range in grain size and substantial amounts of all intermediate particle sizes	*GW*	Well graded gravels, gravel-sand mixtures, little or no fines	Give typical name; indicate approximate percentages of sand and gravel; maximum size; *angularity*, surface condition, and hardness of the coarse grains; local or geologic name and other pertinent descriptive information; and symbols in parentheses For undisturbed soils add *information* on stratification, degree of *compactness*, cementation, moisture conditions and drainage characteristics Example: *Silty sand*, gravelly; about 20% hard, angular gravel particles ½-in. maximum size; rounded and subangular sand grains *coarse to fine*, about 15% nonplastic fines with low dry strength; well compacted and moist in place; alluvial sand; (*SM*)	Use grain size curve in identifying the fractions as given under field identification *Determine percentages of gravel and sand from grain size curve* Depending on percentage of fines (fraction smaller than *No.* 200 sieve size) coarse grained soils are classified as follows: Less than 5% — *GW, GP, SW, SP* More than 12% — *GM, GC, SM, SC* 5% to 12% — *Borderline* cases requiring use of dual symbols $C_U = \frac{D_{60}}{D_{10}}$ Greater than 4 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *GW* *Atterberg limits below* "A" line, or *PI* less than 4 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits above "A" line, with *PI* greater than 7 $C_U = \frac{D_{60}}{D_{10}}$ Greater than 6 $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ Between 1 and 3 Not meeting all gradation requirements for *SW* Atterberg limits below "A" line or *PI* less than 5 — Above "A" line with *PI* between 4 and 7 are *borderline* cases requiring use of dual symbols Atterberg limits below "A" line with *PI* greater than 7
			Predominantly one size or a range of sizes with some intermediate sizes missing	*GP*	Poorly graded gravels, gravel-sand mixtures, little or no fines		
		Gravels with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures see *ML* below)	*GM*	Silty gravels, poorly graded *gravel-sand-silt mixtures*		
			Plastic fines (for identification procedures, see *CL* below)	*GC*	Clayey gravels, poorly graded gravel-sand-clay mixtures		
	Sands More than half of coarse fraction is smaller than No. 4 sieve size	Clean sands (little or no fines)	Wide range in grain sizes and substantial amounts of all intermediate particle sizes	*SW*	Well graded sands, gravelly sands, little or no fines		
			Predominantly one size or a range of sizes with some intermediate sizes missing	*SP*	Poorly graded sands, gravelly sands, little or no fines		
		Sands with fines (appreciable amount of fines)	Nonplastic fines (for identification procedures, see *ML* below)	*SM*	Silty sands, poorly graded sand-silt mixtures		
			Plastic fines (for identification procedures, see *CL* below)	*SC*	Clayey sands, poorly graded sand-clay mixtures		
Fine-grained soils More than half of material is *smaller* than No. 200 sieve size (The No. 200 sieve size is about the smallest particle visible to naked eye)	Identification Procedures on Fraction Smaller than No. 40 Sieve Size						
		Dry Strength (crushing characteristics)	Dilatancy (reaction to shaking)	Toughness (consistency near plastic limit)			
	Silts and clays *liquid limit* less than 50	None to slight	Quick to slow	None	*ML*	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with slight *plasticity*	
		Medium to high	None to very slow	Medium	*CL*	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, *lean clays*	
		Slight to medium	Slow	Slight	*OL*	Organic silts and organic silt-*clays of low plasticity*	
	Silts and clays *liquid limit* greater than 50	Slight to medium	Slow to none	Slight to medium	*MH*	Inorganic silts, micaceous or diatomaceous *fine sandy or silty soils*, elastic silts	
		High to very high	None	High	*CH*	Inorganic clays of high plasticity, fat clays	
		Medium to high	None to very slow	Slight to medium	*OH*	Organic clays of medium to high plasticity	
Highly Organic Soils		Readily identified by colour, odour, spongy feel and frequently by fibrous texture			*Pt*	Peat and other highly organic soils	



Plasticity chart
for laboratory classification of fine grained soils

From Wagner, 1957.

[a] *Boundary classifications*. Soils possessing characteristics of two groups are designated by combinations of group symbols. For example *GW-GC*, well graded gravel-sand mixture with clay binder.

[b] All sieve sizes on this chart are U.S. standard.

Field Identification Procedure for Fine Grained Soils or Fractions

These procedures are to be performed on the minus No. 40 sieve size particles, approximately ¼₆ in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the tests.

Dilatancy (Reaction to shaking):

After removing particles larger than No. 40 sieve size, prepare a pat of moist soil with a volume of about *one-half cubic inch*. Add enough water if necessary to make the soil soft but not sticky.

Place the pat in the open palm of one hand and shake horizontally, striking vigorously against the other hand several times. A positive reaction consists of the appearance of water on the surface of the pat which changes to a livery consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during shaking and of its disappearance during squeezing assist in *identifying the character of the fines in a soil*.

Very fine clean sands give the quickest and most distinct reaction whereas *a plastic clay has no reaction*. Inorganic silts, such as a typical rock flour, show a moderately quick reaction.

Dry Strength (Crushing characteristics):

After removing particles larger than No. 40 sieve size, mould a pat of soil to the consistency of putty, adding water if necessary. Allow the pat to dry completely by oven, sun or air drying, and then test its strength by breaking and crumbling between the fingers. This strength is a measure of the character and quantity of the colloidal fraction contained in the soil. The dry strength increases with increasing plasticity.

High dry strength is characteristic for clays of the *CH group*. A typical inorganic silt possesses only very slight dry strength. Silty fine sands and *silts have about the same slight dry strength*, but can be distinguished by the feel when powdering the dried specimen. Fine sand feels gritty whereas a typical silt has the smooth feel of flour.

Toughness (Consistency near plastic limit):

After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size, is moulded to the consistency of putty. If too dry, water must be added and *if sticky, the specimen* should be spread out in a thin layer and allowed to lose some moisture by evaporation. *Then the specimen is* rolled out by hand on a smooth surface or between the palms into a thread about one-eight inch in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens, finally loses its plasticity, and crumbles when the plastic limit is reached.

After the thread crumbles, the pieces should be lumped together and a slight kneading action continued *until the lump crumbles*.

The tougher the thread near the plastic limit and the stiffer the lump when *it finally crumbles, the more* potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of coherence of the lump below the plastic limit indicate either inorganic clay of low plasticity, or materials such as kaolin-type clays and organic clays which occur below the A-line.

Highly organic clays have a very weak and spongy feel at the plastic *limit*.

Consistency: Consistency descriptions of coarse-grained soils (GW, GP, GM, GC, SW, SP, SM, SC) are as follows.

Consistency	N Value (ASTM D 1586-67)
Very Loose	0 - 4
Loose	4 - 10
Medium Dense	10 - 30
Dense	30 - 50
Very Dense	>50

Consistency descriptions of fine-grained soils (ML, CL, MH, CH,) are as follows:

Consistency	Shear Strength (ksf)	Shear Strength (kn/m^2)	Field Guide
Very Soft	0.25	12	Sample with height equal to twice the diameter, sags under own weight
Soft	0.25-0.50	12 - 24	Can be squeezed between thumb and forefinger
Firm	0.50-1.00	24-48	Can be molded easily with fingers
Stiff	1.00-2.00	48-96	Can be imprinted with slight pressure from fingers
Very Stiff	2.00-4.00	96-192	Can be imprinted with considerable pressure from fingers
Hard	over 4.00	over 192	Cannot be imprinted by fingers

Grain Shape: Angular - particles have sharp edges and relatively plane sides with unpolished surfaces.

Subangular - particles are similar to angular but have somewhat rounded edges.

Subrounded - particles exhibit nearly plane sides but have well-rounded corners and edges.

Rounded - particles have smoothly curved sides and no edges.

Calcareous : Containing calcium carbonate; presence of calcium carbonate is commonly identified on the basis of reaction with dilute hydrochloric acid.

Caliche : Soils cemented by calcium carbonate and/or other soluble minerals by upward-moving solutions.

Degree of Cementation: (Stages of development of caliche profile)

Stage	Gravelly Soils	Nongravelly Soils
I	Thin, discontinuous pebble coatings	Few filaments or faint coatings
II	Continuous pebble coatings, some interpebble fillings	Few to abundant nodules, flakes, filaments
III	Many interpebble fillings	Many nodules and internodular fillings
IV	Laminar horizon overlying plugged horizon	Increasing carbonate impregnation

Secondary Material : Example - Sand with trace to some silt

Trace - 5-12% (by dry weight)
Little - 13-20% (by dry weight)
Some - >20% (by dry weight)

Plasticity : Plasticity index is the range of water content, expressed as a percentage of the weight of the oven-dried soil, through which the soil is plastic. It is defined as the liquid limit minus the plastic limit. Descriptive ranges used on the logs include:

Nonplastic	(PI, 0 - 4)
Slightly Plastic	(PI, 4 - 15)
Medium Plastic	(PI, 15 - 30)
Highly Plastic	(PI, >30)

Cobbles and Boulders : A cobble is a rock fragment, usually rounded by weathering or abrasion, with an average diameter ranging between 3 and 12 inches (8 and 30 cm).

A boulder is a rock fragment, usually rounded by weathering or abrasion, with an average diameter of 12 inches (30 cm) or more.

I. Remarks - This column was provided on boring and trench logs for comments regarding drilling difficulty, number and size of cobbles or boulders encountered, loss of drilling fluid in the boring, trench wall stability, and other conditions encountered during drilling and excavations.

J. Dry Density and Moisture Content - The boring logs include a graphical display of laboratory test results for dry density (ASTM D 2937-71) in pounds per cubic foot and kilograms cubic meter and moisture content (ASTM D 2216-71) in percent from representative samples taken during drilling. The symbols are explained at the bottom of the boring logs.

K. Sieve Analysis - The numbers represent the percentage by dry weight (ASTM D 422-63) of each of the following soil components:

GR - Gravel, rock particles that will pass a 3-inch (76 mm) sieve and are retained on No. 4 (4.75 mm) sieve.

SA - Sand, soil particles passing No. 4 sieve and retained on No. 200 (0.075 mm) sieve.

FI - Fines, silt or clay, soil particles passing No. 200 sieve.

L. Atterberg Limits (LL and PI) -

LL - Liquid Limit, the water content corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).

PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).

PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.

NP - Nonplastic.

M. Miscellaneous Information -

Elevations - indicated elevations on the logs are estimated from topographic maps of the study area, within an accuracy of half the contour interval.

Surficial Geologic Unit - indicates the surficial geologic unit in which the activity is located.

Date Drilled - indicates the period from beginning to completion of the activity.

Drilling Method - signifies the type of drilling procedure used such as rotary wash.

Hole Diameter - nominal size of boring drilled.

Water Level - indicates depth from ground surface to water table where encountered.

Trench Length - length at ground surface of final trench excavation.

Trench Orientation - bearing of longitudinal trench centerline.

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SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS
			0	0		SM	SILTY SAND, light brown, fine to medium, poorly graded, dense to very dense, subangular to subrounded, calcareous; trace to some nonplastic silt.	
	73	43						
			3	10				
	53	58						
	57	>100				SC	CLAYEY SAND, brown, fine to medium, poorly graded, very dense, subangular to subrounded, calcareous; little slightly plastic clay.	
			6	20		SM		
	60	73				CL		
	57	>100				SW-SC	SILTY SAND, brown, fine to medium, poorly graded, very dense, subangular, calcareous; little silt; trace gravel.	
			9	30		SM	GRAVELLY SAND, brown, fine to coarse, well graded, dense, subrounded, calcareous; trace slightly plastic clay; lens of slightly plastic clay (22.0'-23.5').	
	40	44						
			12	40				cobble
	NR						Interbedded layers of SILTY SAND and SAND:	
			15	50		SW-SM	SILTY SAND (SM): brown, fine to coarse, poorly graded, dense to very dense, subrounded, calcareous; trace to some nonplastic silt; trace fine gravel.	
	47	67						
			18	60			SAND (SW-SM): gray, fine to coarse, well graded, dense to very dense, angular to subrounded, calcareous; trace nonplastic silt; trace fine gravel.	
	67	>100						
			21	70		SM		
	33	>100						
			24	80				
	60	>100						

▲(pcf)
80 90 100 110 120 130 14
5 10 15 20 25 30 3
● (%)

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LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
	SM	SILTY SAND, light brown, fine to medium, poorly graded, dense to very dense, subangular to subrounded, calcareous; trace to some nonplastic silt.		●	0	71	29		NP
	SC	CLAYEY SAND, brown, fine to medium, poorly graded, very dense, subangular to subrounded, calcareous; little slightly plastic clay.		●	0	58	42		
	SM								
	CL								
	SW-SC	SILTY SAND, brown, fine to medium, poorly graded, very dense, subangular, calcareous; little silt; trace gravel.		●	46	47	7		
	SM	GRAVELLY SAND, brown, fine to coarse, well graded, dense, subrounded, calcareous; trace slightly plastic clay; lens of slightly plastic clay (22.0'-23.5').	cobble		8	65	27		NP
	SW-SM	Interbedded layers of SILTY SAND and SAND: SILTY SAND (SM): brown, fine to coarse, poorly graded, dense to very dense, subrounded, calcareous; trace to some nonplastic silt; trace fine gravel. SAND (SW-SM): gray, fine to coarse, well graded, dense to very dense, angular to subrounded, calcareous; trace nonplastic silt; trace fine gravel.		●	8	85	7		NP
	SM			●	0	76	24		NP

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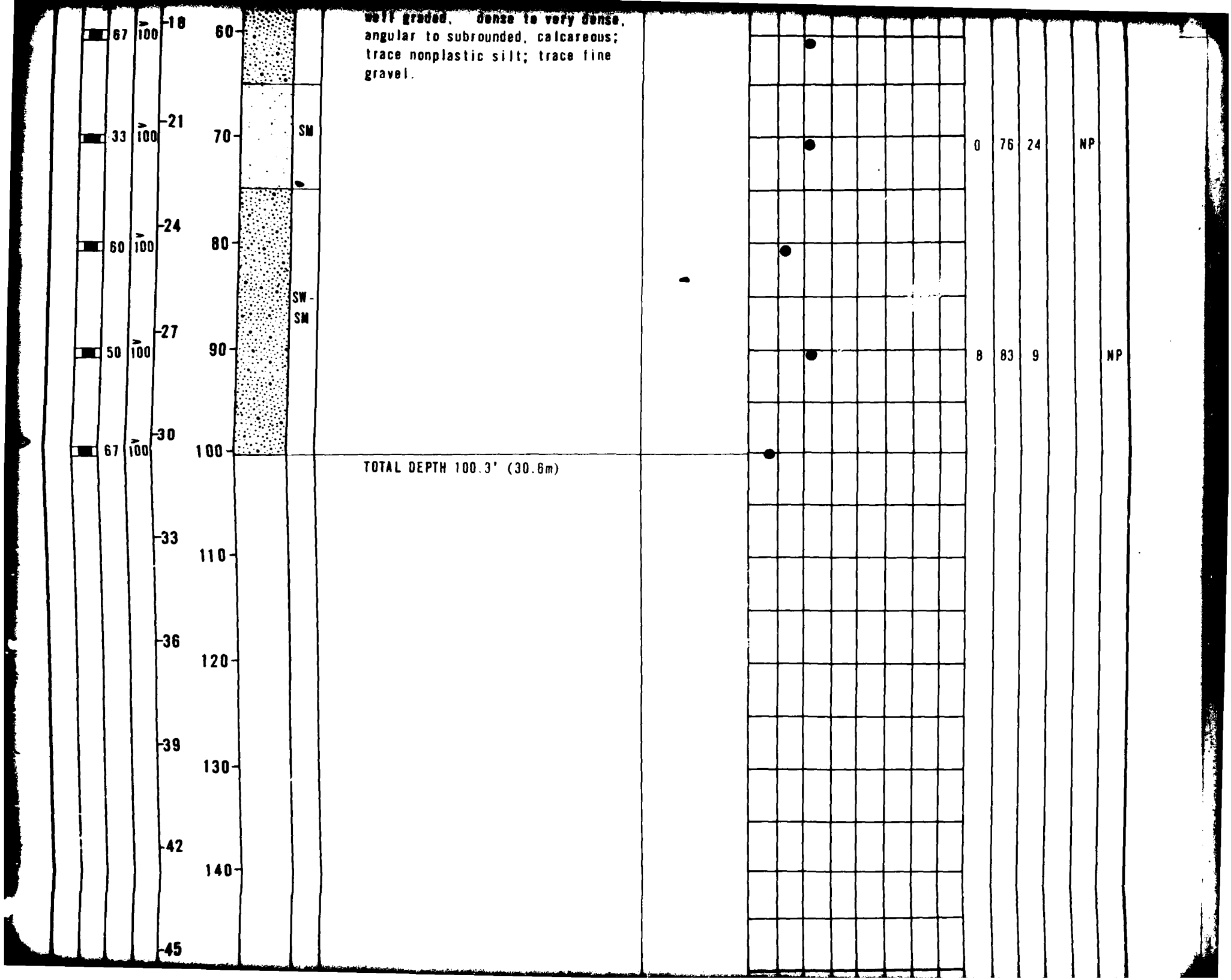
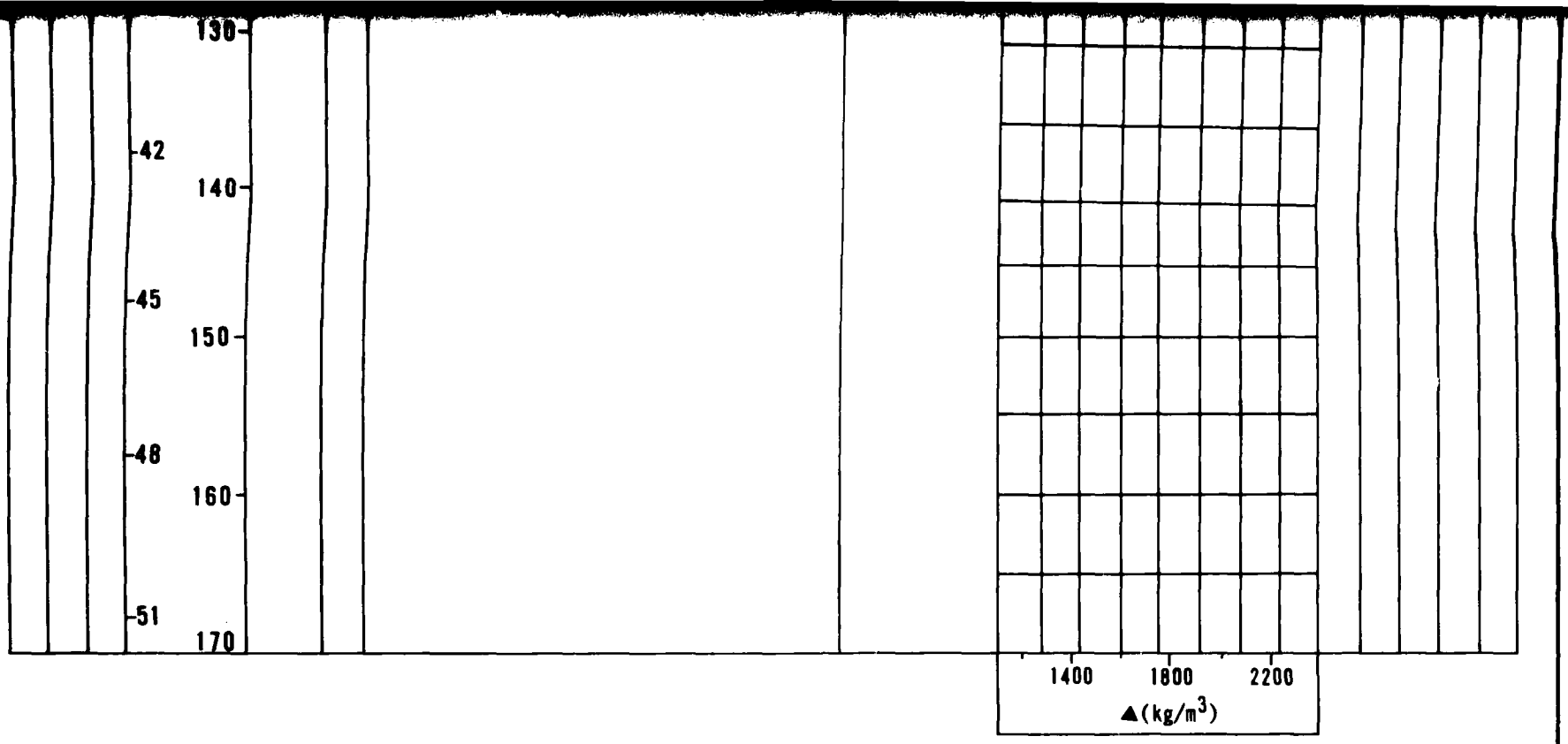
FN-TR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	GR	SA	FI	LL	PI
			0	0			SILTY SAND, light brown, fine to medium, poorly graded, dense to very dense, subangular to subrounded, calcareous; trace to some nonplastic silt.							
	73	43				SM				0	71	29		NP
			3	10										
	53	58												
	57	100/				SC	CLAYEY SAND, brown, fine to medium, poorly graded, very dense, subangular to subrounded, calcareous; little slightly plastic clay.			0	58	42		
			6	20		SM								
	60	73												
						CL								
	57	100/				SW-SC	SILTY SAND, brown, fine to medium, poorly graded, very dense, subangular, calcareous; little silt; trace gravel.			46	47	7		
			9	30										
	40	44				SM	GRAVELLY SAND, brown, fine to coarse, well graded, dense, subrounded, calcareous; trace slightly plastic clay; lens of slightly plastic clay (22.0'-23.5').			8	65	27		NP
								cobble						
	NR		12	40										
							Interbedded layers of SILTY SAND and SAND:							
							SILTY SAND (SM): brown, fine to coarse, poorly graded, dense to very dense, subrounded, calcareous; trace to some nonplastic silt; trace fine gravel.							
	47	67	15	50		SW-SM				8	85	7		NP
							SAND (SW-SM): gray, fine to coarse, well graded, dense to very dense, angular to subrounded, calcareous;							
	67	100/	18	60										


well graded, dense to very dense, angular to subrounded, calcareous; trace nonplastic silt; trace fine gravel.
SM
SW-SM
TOTAL DEPTH 100.3' (30.6m)
67 >100
33 >100
60 >100
50 >100
67 >100
0 76 24 NP
8 83 9 NP
18
21
24
27
30
33
36
39
42
45
60
70
80
90
100
110
120
130
140



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION	:	5100' (1554m)
SURFICIAL GEOLOGIC UNIT	:	A2
DATE DRILLED	:	12-13 July 1977
DRILLING METHOD	:	Rotary Wash
HOLE DIAMETER	:	4 7/8" (124mm)
WATER LEVEL	:	Not Encountered

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LOG OF BORING DL-4-1
DRY LAKE VALLEY, NEVADA

FIGURE II-4-1

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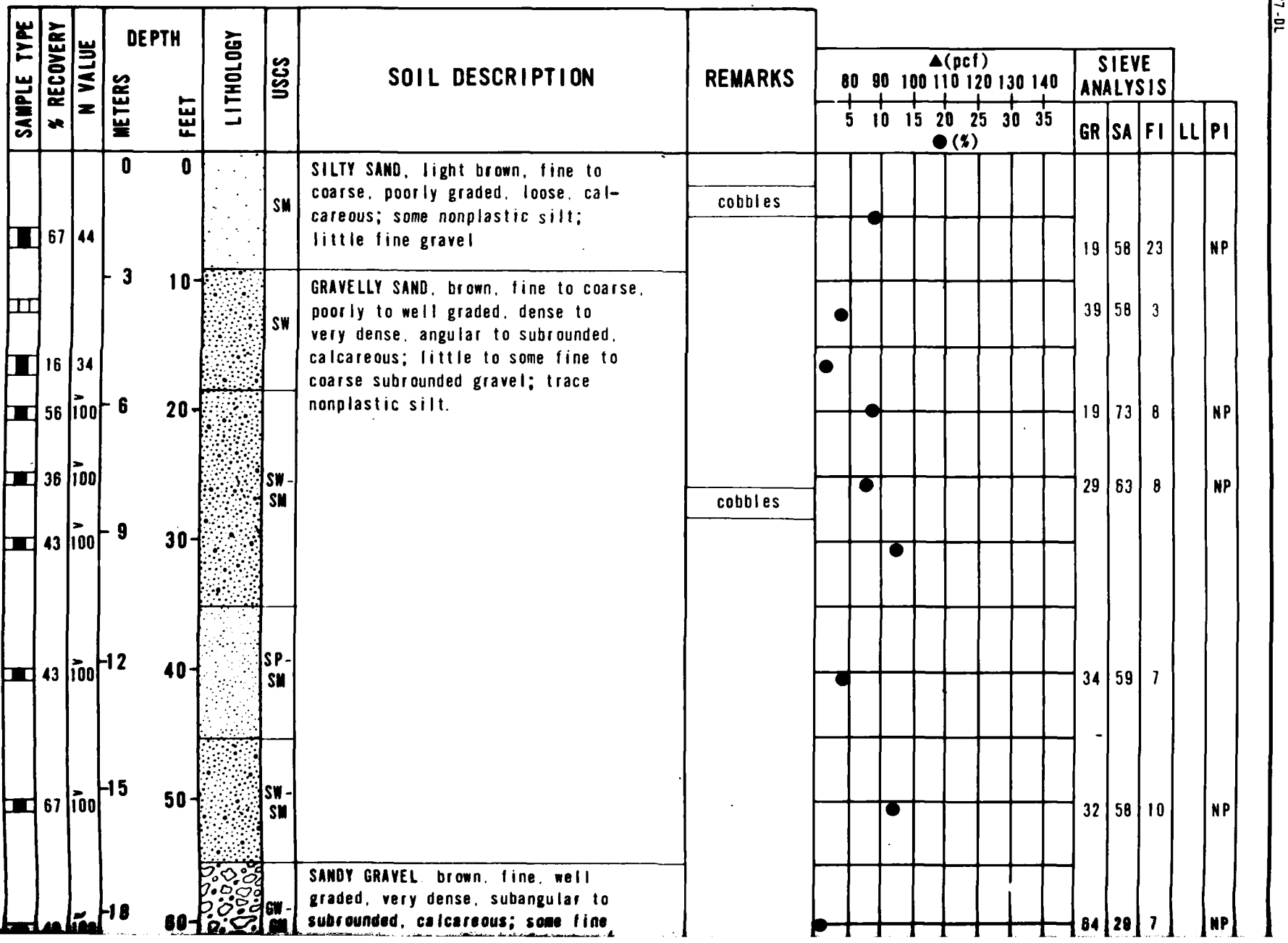
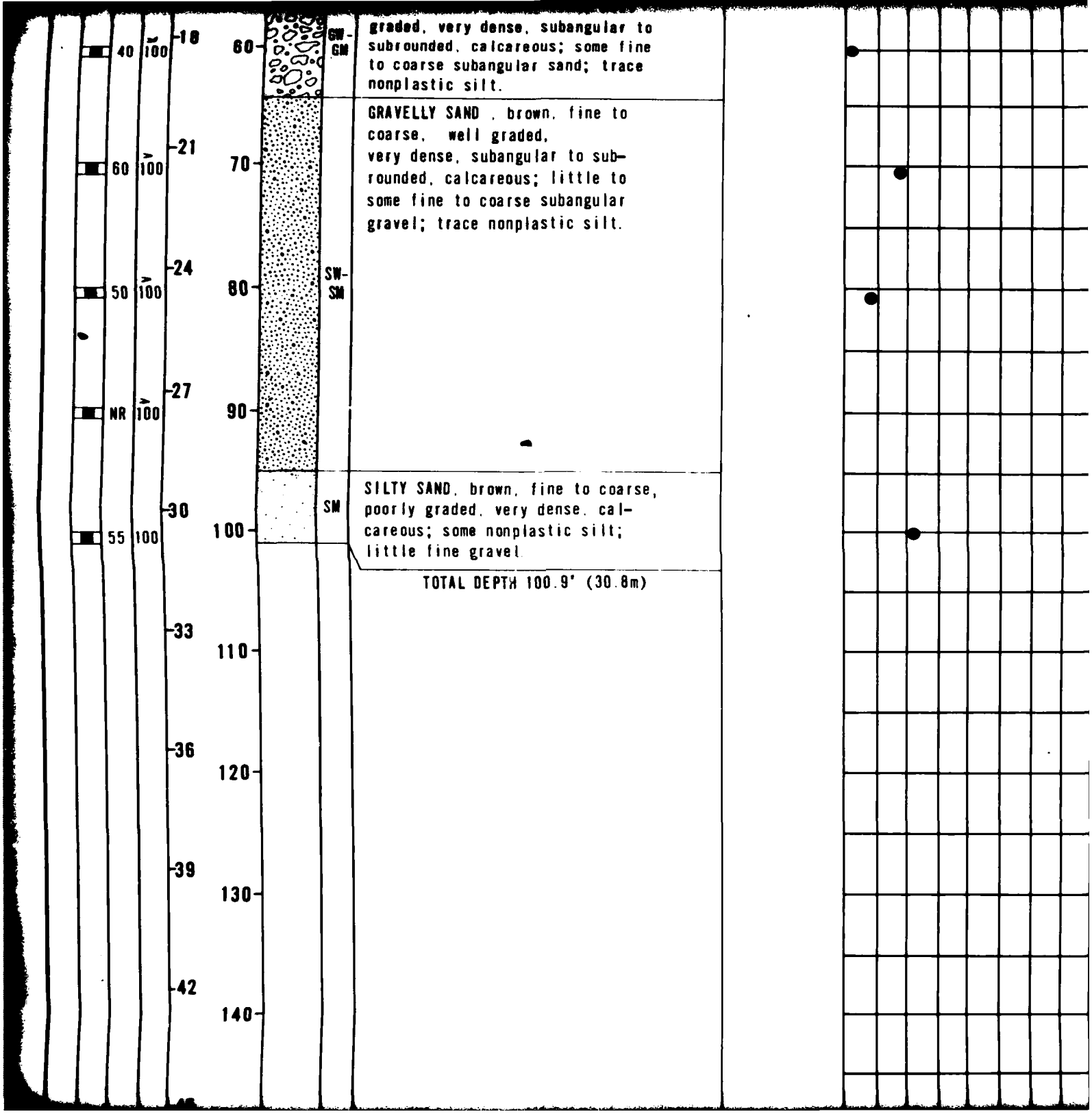
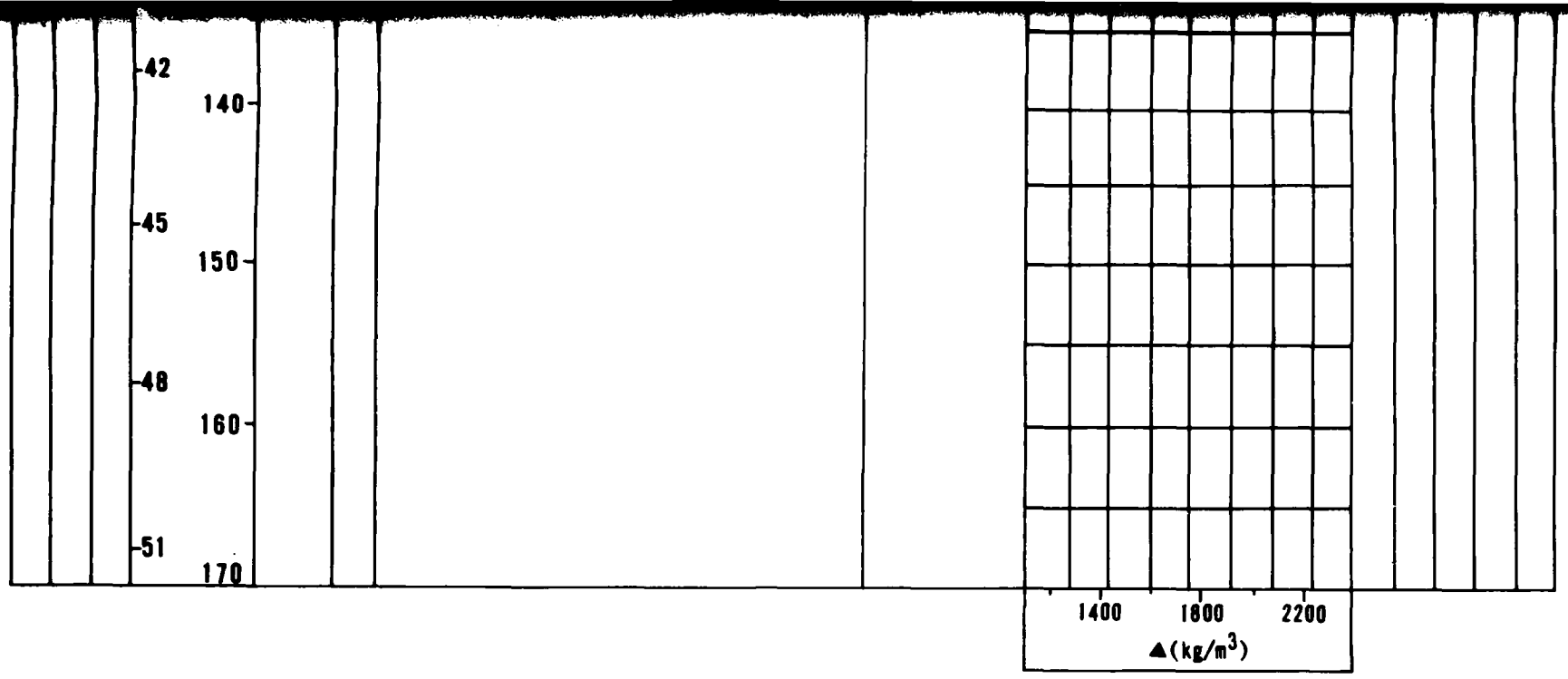



40 ▸100
60 ▸100
50 ▸100
NR ▸100
55 100
18
21
24
27
30
33
36
39
42
60
70
80
90
100
110
120
130
140
GW-GM
SW-SM
SM
graded, very dense, subangular to subrounded, calcareous; some fine to coarse subangular sand; trace nonplastic silt.
GRAVELLY SAND , brown, fine to coarse, well graded, very dense, subangular to subrounded, calcareous; little to some fine to coarse subangular gravel; trace nonplastic silt.
SILTY SAND, brown, fine to coarse, poorly graded, very dense, calcareous; some nonplastic silt; little fine gravel
TOTAL DEPTH 100.9' (30.8m)



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION	: 5125' (1562m)
SURFICIAL GEOLOGIC UNIT	: Ā5y
DATE DRILLED	: 11 July 1977
DRILLING METHOD	: Rotary Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

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LOG OF BORING DL-B-2
DRY LAKE VALLEY, NEVADA

FIGURE II-4-2

AFV-08

3

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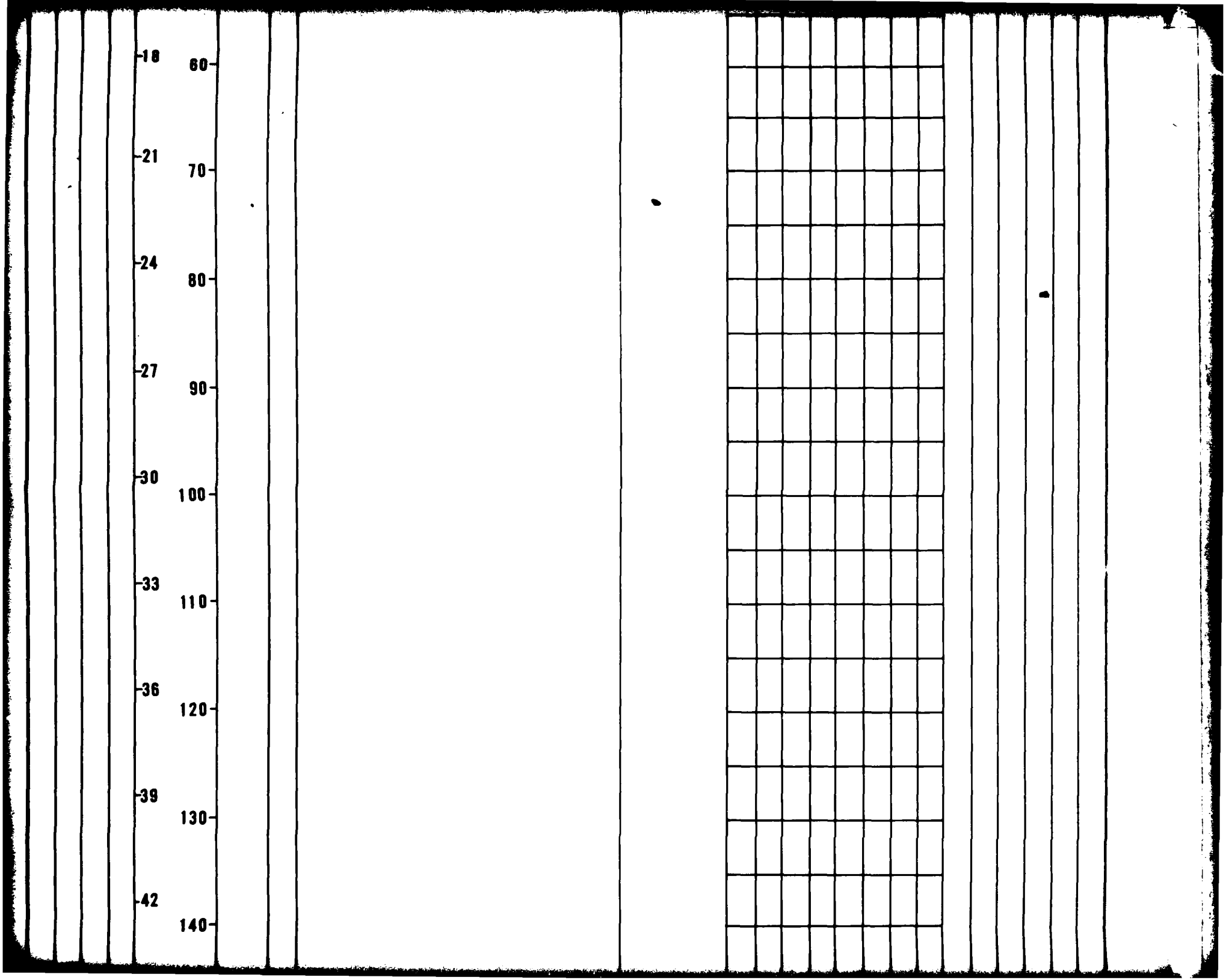
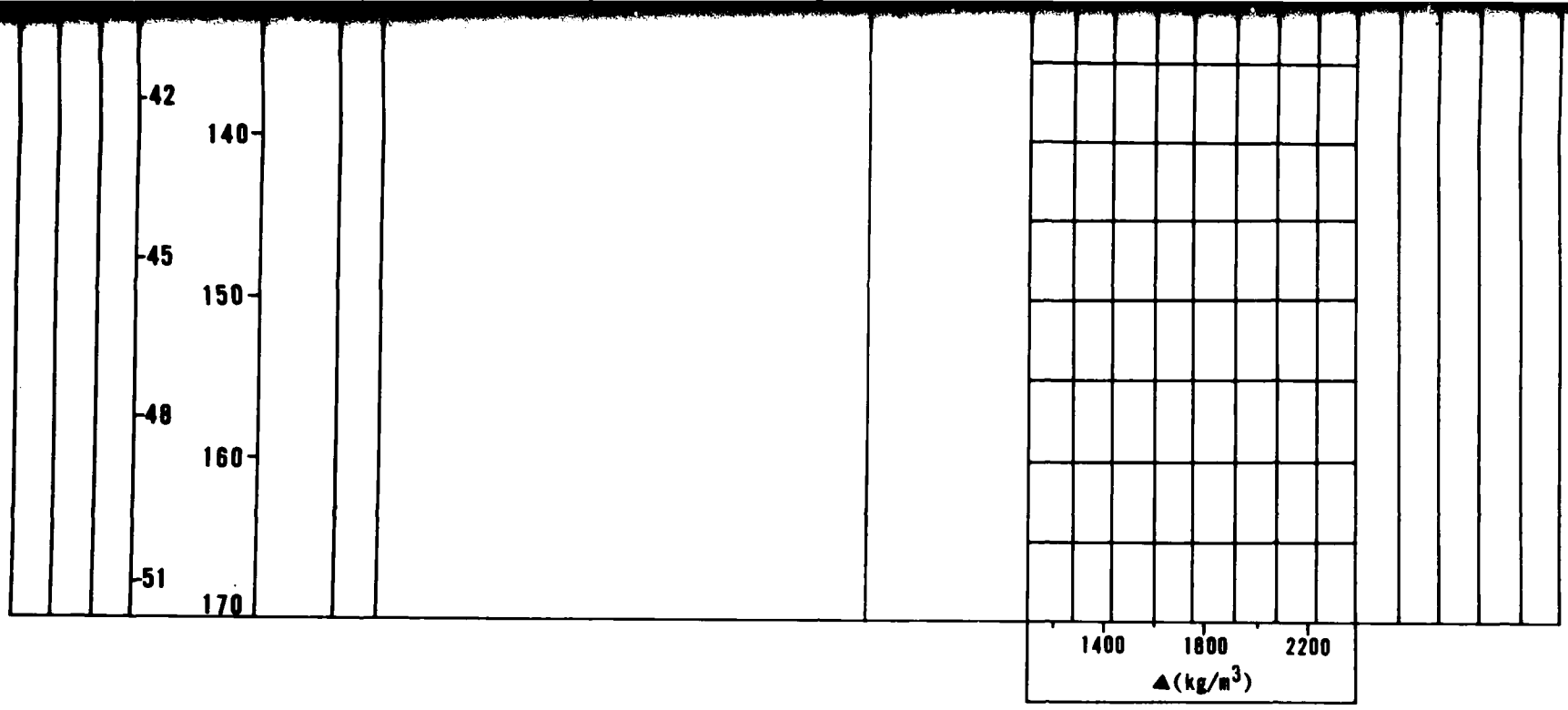
FN-TR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0		SM	SILTY SAND, brown, fine to coarse, poorly graded, loose, angular; some silt; some gravel.		●	28	34	38		
						GP-GM	SANDY GRAVEL, light brown, fine to coarse, poorly graded, dense, angular, calcareous some fine to coarse angular sand; trace to little non-plastic silt.	cobbies	●	60	29	11		NP
			3	10		GM			●	56	27	17		NP
			6	20		SM	Interbedded layers of GRAVELLY SAND and SILTY SAND: GRAVELLY SAND (SM); light brown to gray, fine to coarse poorly graded dense, subangular, calcareous; some fine subangular gravel; little nonplastic silt. SILTY SAND (SM); light brown to gray fine to coarse, poorly graded. dense, subangular, calcareous; some nonplastic silt; little fine subangular gravel.		●	28	58	14		NP
			9	30					●	20	60	20		
			12	40					●	38	43	19		NP
										14	58	28		
							TOTAL DEPTH 44.5' (13.6m)							
			15	50										
			18	60										


18
21
24
27
30
33
36
39
42
60
70
80
90
100
110
120
130
140



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 5205' (1586m)
SURFICIAL GEOLOGIC UNIT	: A5i
DATE DRILLED	: 6 July 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-8-4
DRY LAKE VALLEY, NEVADA

FIGURE II-4-3

AFY-88

CHECKED BY _____ APPROVED BY _____

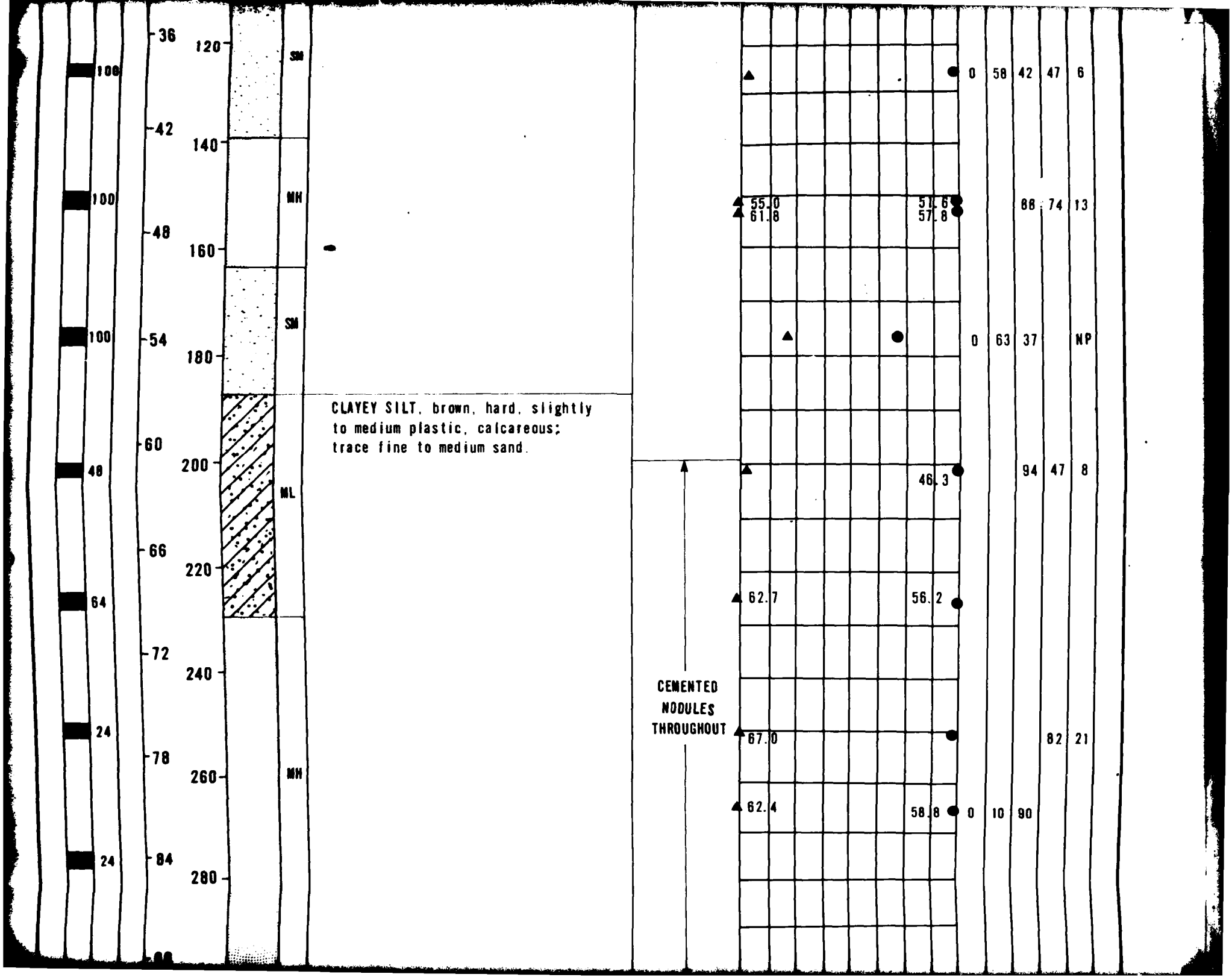
FN-TR-27-DL

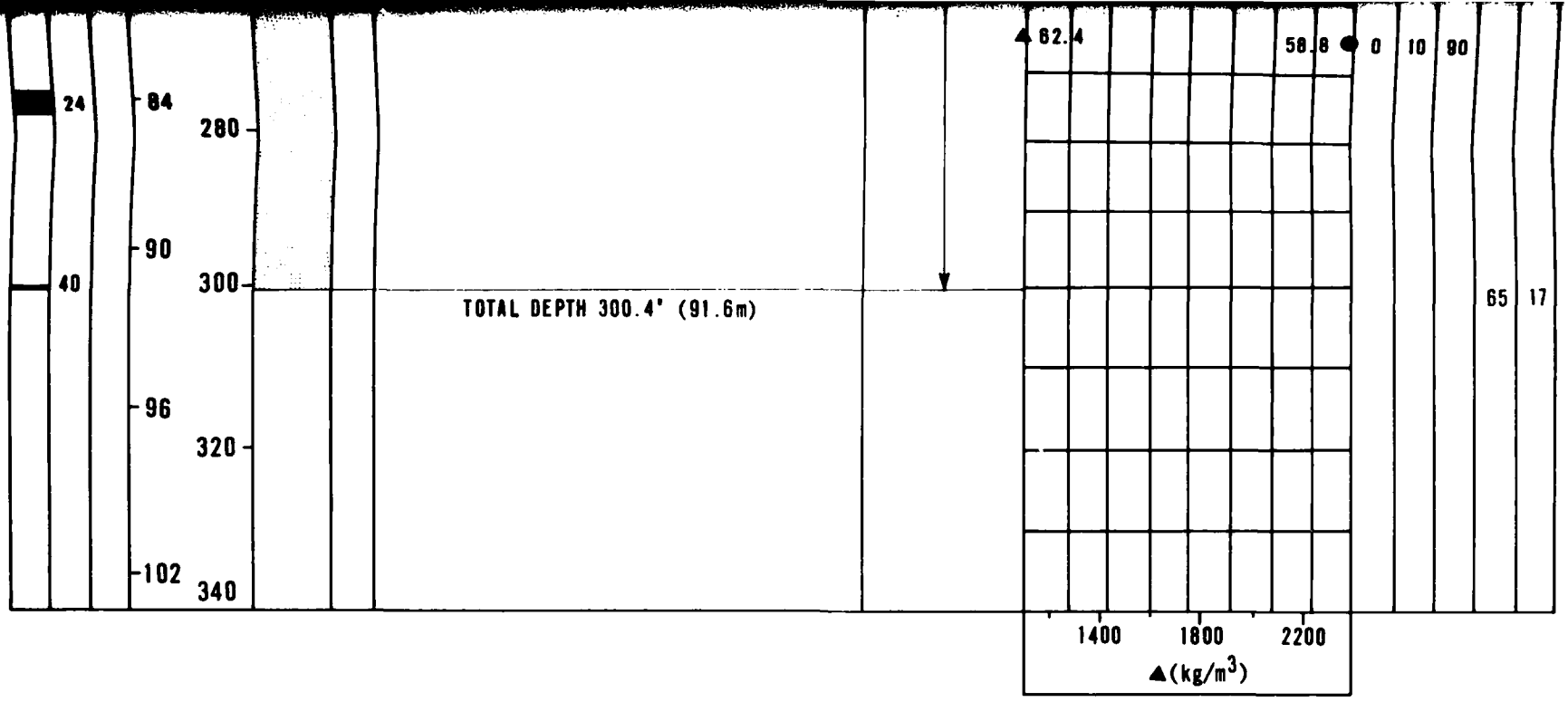
SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS
	100	65	0	0		CH	CLAY, light gray, hard, highly plastic, calcareous; trace fine to medium sand.	
	60							
	72					MH	Interbedded layers of SAND and SILT;	
	100		6	20			SAND;	
	100					SM	SILTY SAND (SM); light brown, fine to medium, poorly graded, dense, subrounded, calcareous; some nonplastic to slightly plastic silt.	
	100					MH		
	100		12	40		ML	SILT; SANDY SILT (ML) and SILT (MH); light gray, hard, slightly plastic, calcareous; trace to some fine to medium sand.	
	100							
	24		18	60		SM		
	100							
	100		24	80				
	100							
	60		30	100		ML		
			36	120				

▲(pcf) 80 90 100 110 120 130 140

● (%) 5 10 15 20 25 30 35

SIEVE ANALYSIS GR	SA	FI	LL	PI
0	10	90	66	41
			95	60
		78	97	28
			93	29
		73	64	17
0	59	41		
		81	69	14
		89	46	1
0	62	38		
0	68	32		NP
3	42	55		


36
42
48
54
60
66
72
78
84
120
140
160
180
200
220
240
260
280
100
100
100
48
64
24
24
SM
MH
SM
ML
MH
CLAYEY SILT, brown, hard, slightly to medium plastic, calcareous; trace fine to medium sand.
CEMENTED NODULES THROUGHOUT
55.0
61.8
51.6
57.8
46.3
62.7
56.2
67.0
62.4
58.8
0 58 42 47 6
88 74 13
0 63 37 NP
94 47 8
82 21
0 10 90



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4580' (1396m)
SURFICIAL GEOLOGIC UNIT	: A4o
DATE DRILLED	: 28-30 June 1977
DRILLING METHOD	: Rotary Air
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-B-5
DRY LAKE VALLEY, NEVADA

FIGURE

AFV-08

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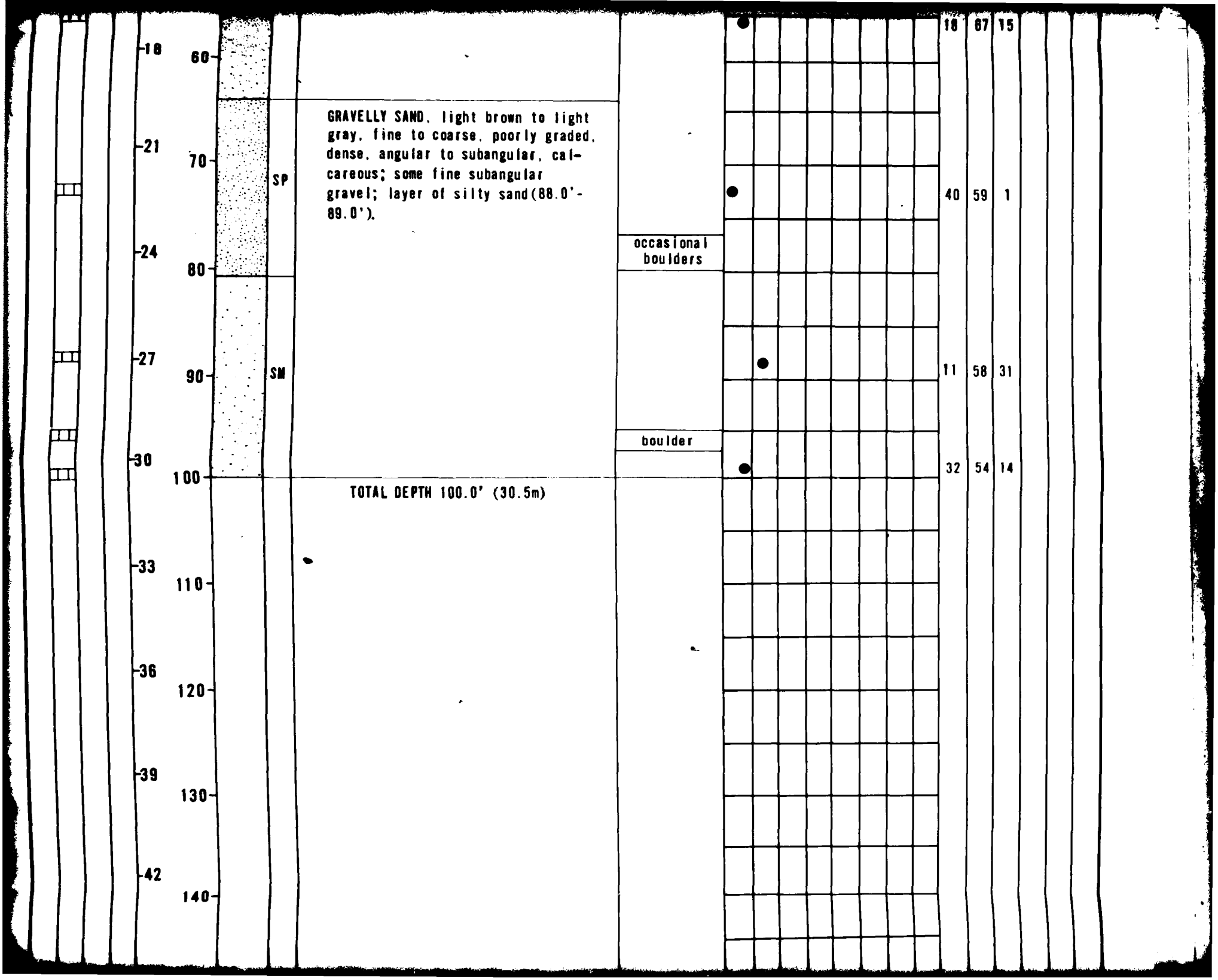
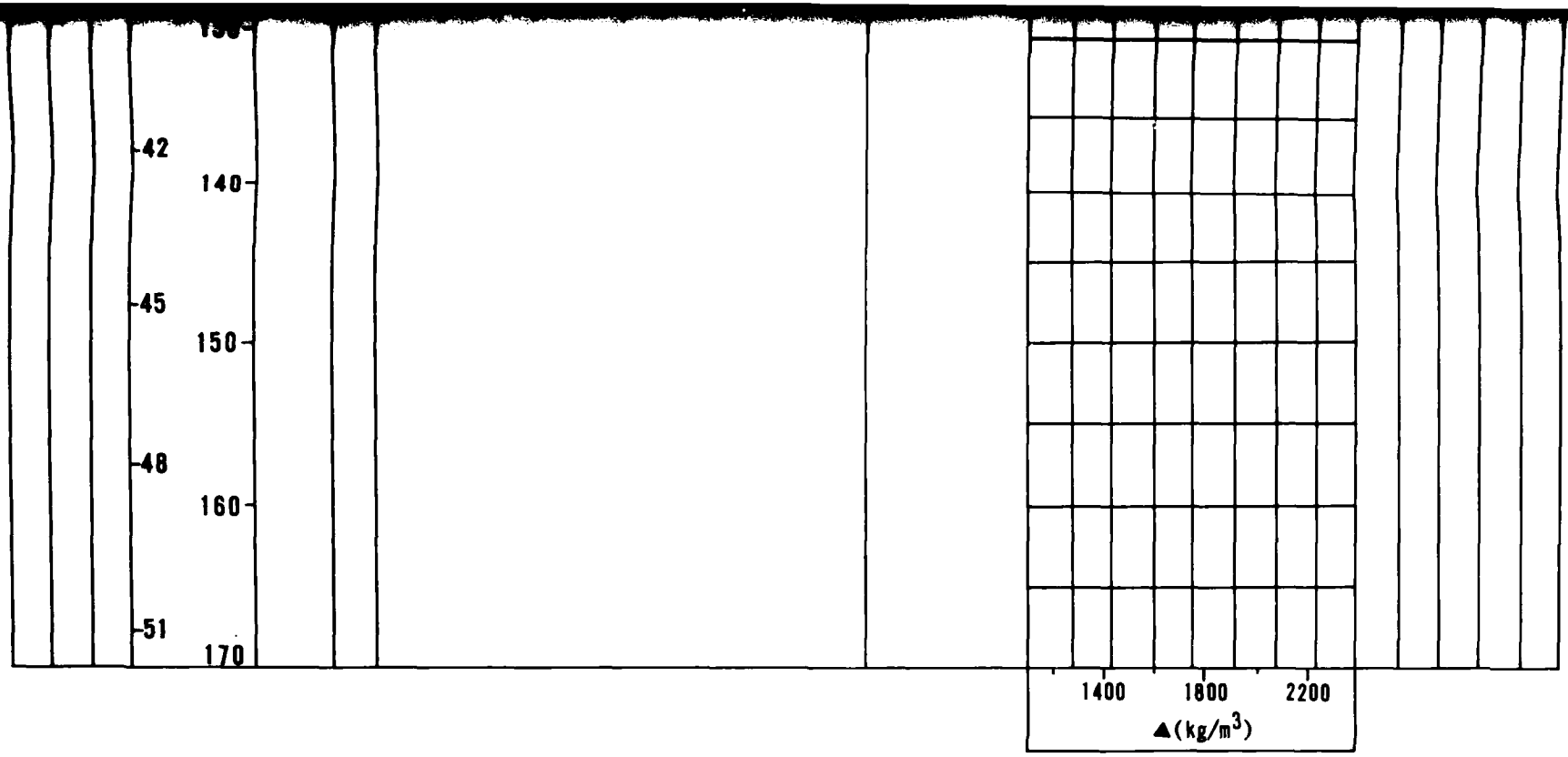
FN-1R-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	GR	SA	FI	LL	PI
			0	0		SM	GRAVELLY SAND, light brown, fine to coarse, well graded, loose to medium dense, angular to subrounded, calcareous; little to some fine to coarse subrounded gravel; trace to some nonplastic silt; layer of silty sand (13.0'-14.0').		●	28	51	21		
						SW-SM			●	13	77	10		NP
			3	10					●	14	69	17		
			6	20					●					
			9	30		SM			●					
			12	40					●	22	60	18		
			15	50					●					
			18							18	67	15		


18
60
21
70
24
80
27
90
30
100
33
110
36
120
39
130
42
140
SP
SM
GRAVELLY SAND, light brown to light gray, fine to coarse, poorly graded, dense, angular to subangular, calcareous; some fine subangular gravel; layer of silty sand(88.0'-89.0').
occasional boulders
boulder
TOTAL DEPTH 100.0' (30.5m)
18 67 15
40 59 1
11 58 31
32 54 14



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 5180' (1579m)
SURFICIAL GEOLOGIC UNIT	: A5i
DATE DRILLED	: 19 July 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-8-8
DRY LAKE VALLEY, NEVADA

FIGURE II-4-5

AFV-06

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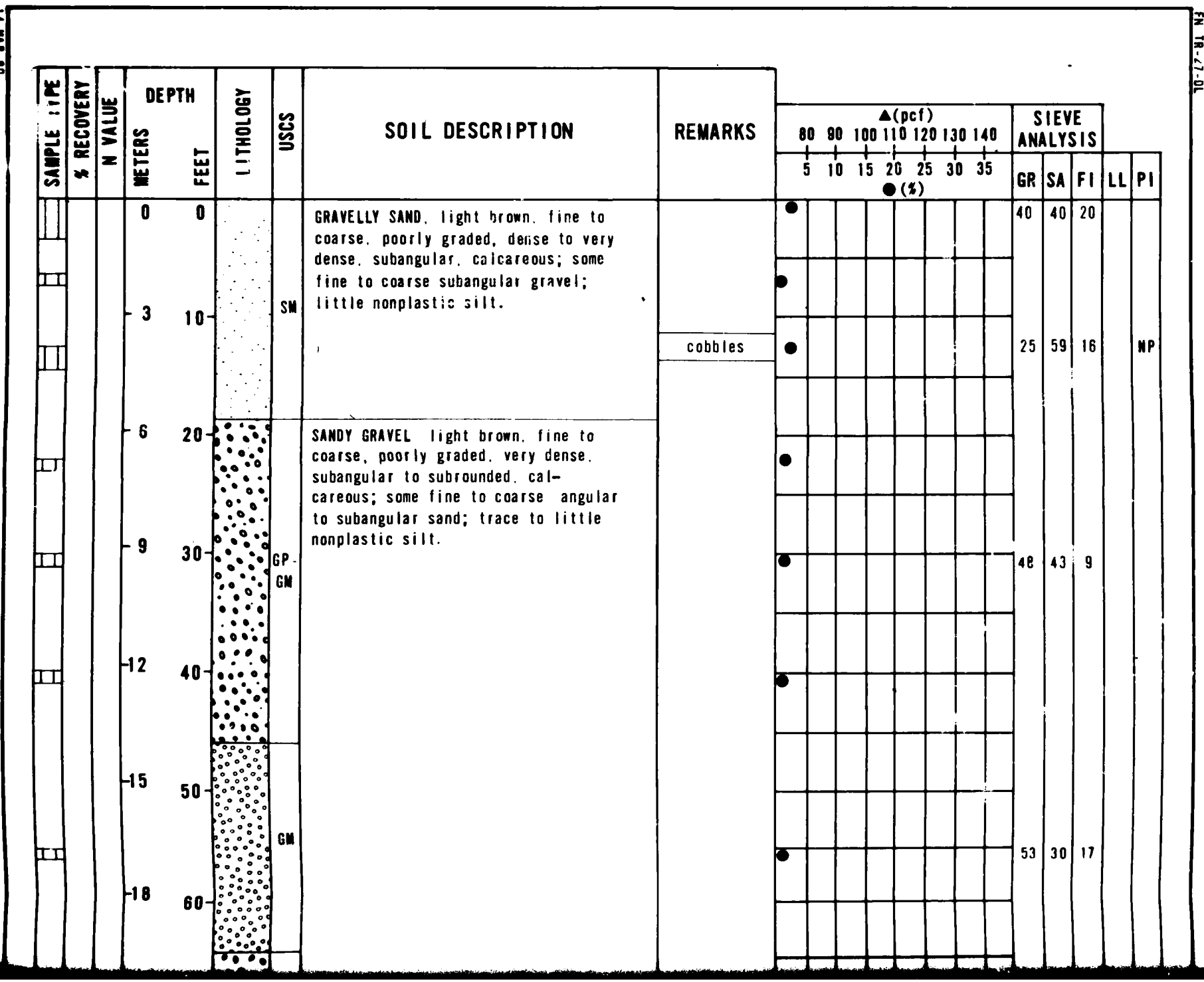
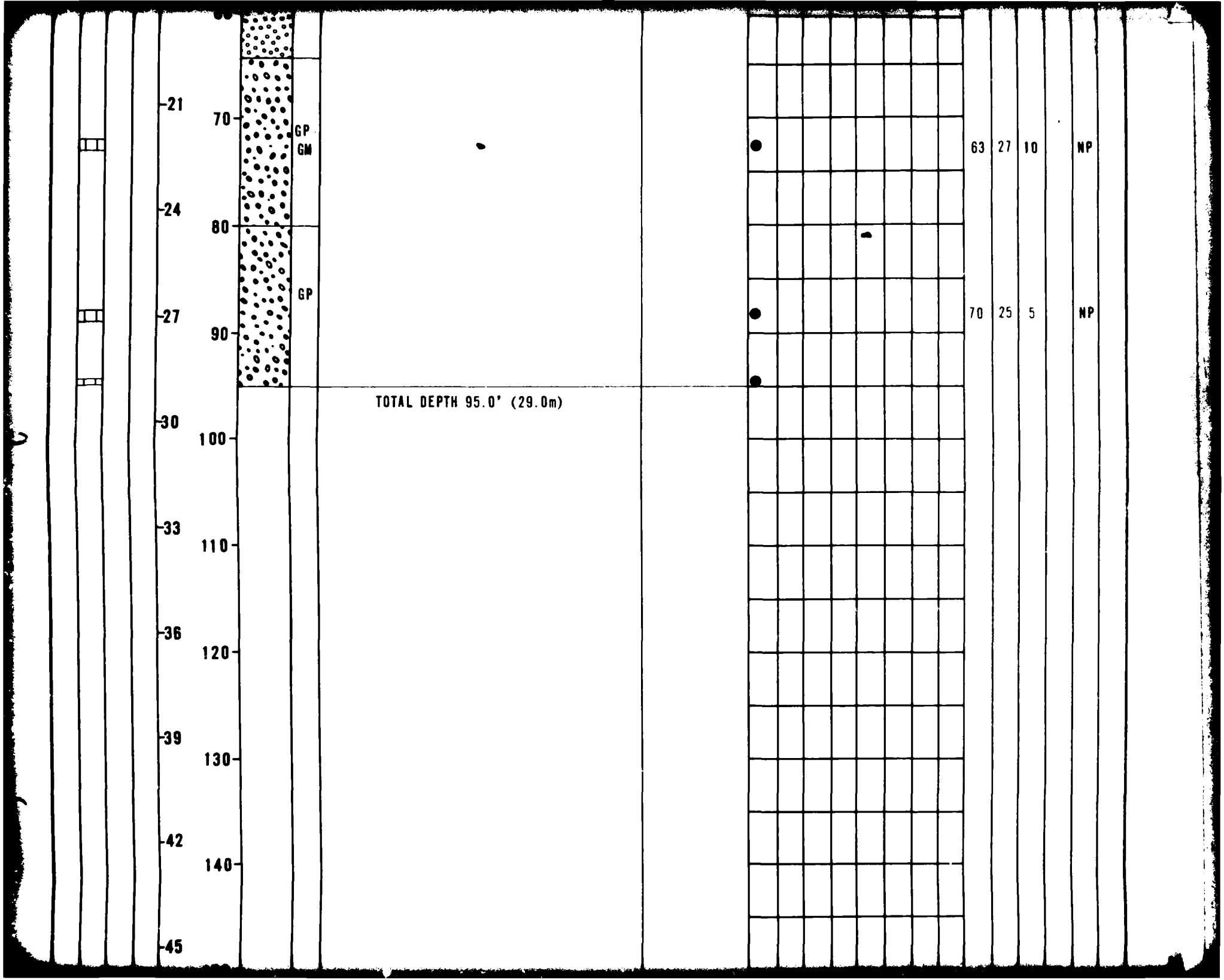
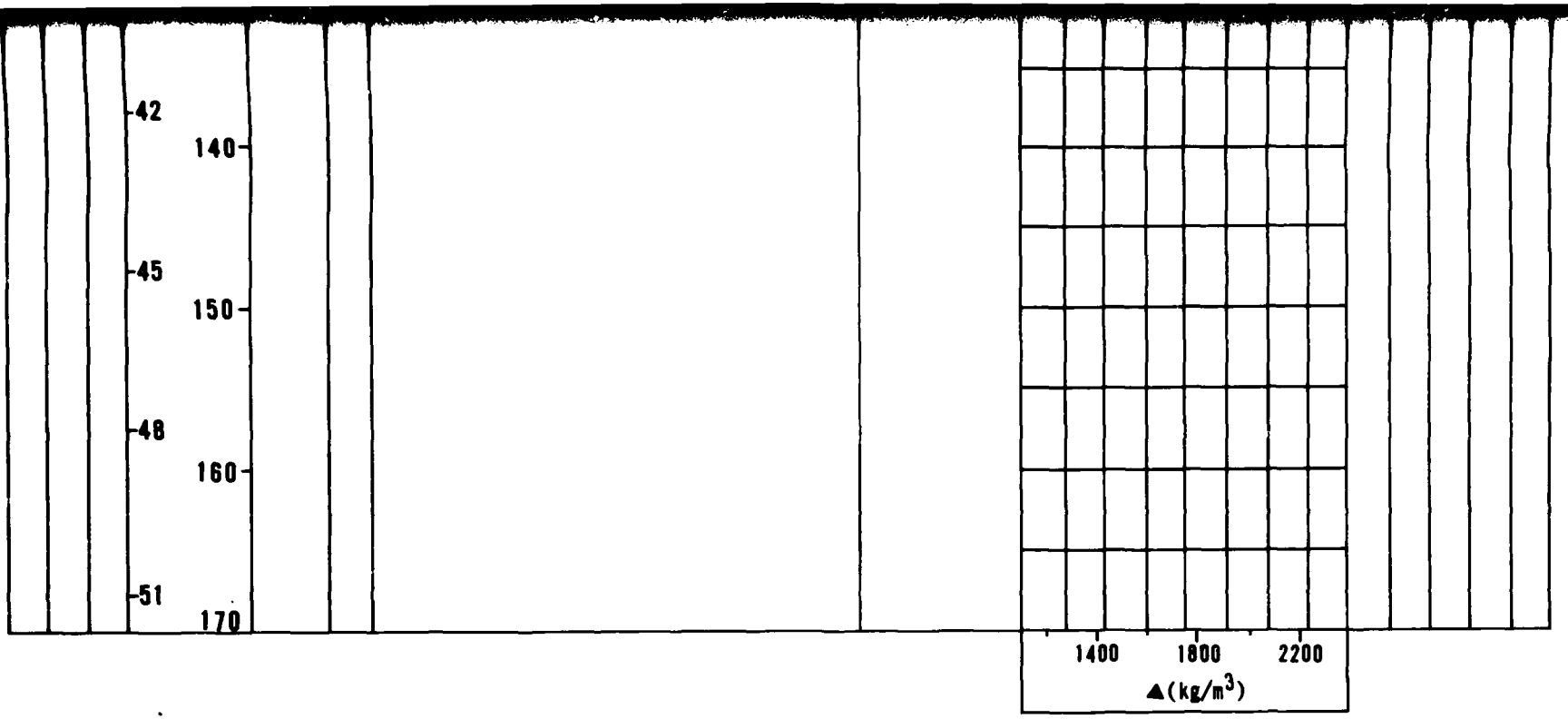



21
24
27
30
33
36
39
42
45
70
80
90
100
110
120
130
140
GP
GM
GP
TOTAL DEPTH 95.0' (29.0m)
63 27 10 NP
70 25 5 NP



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4940' (1506m)
SURFICIAL GEOLOGIC UNIT	: A5i
DATE DRILLED	: 1 July 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

LOG OF BORING DL-8-7
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-4-6

FUGRO NATIONAL, INC.

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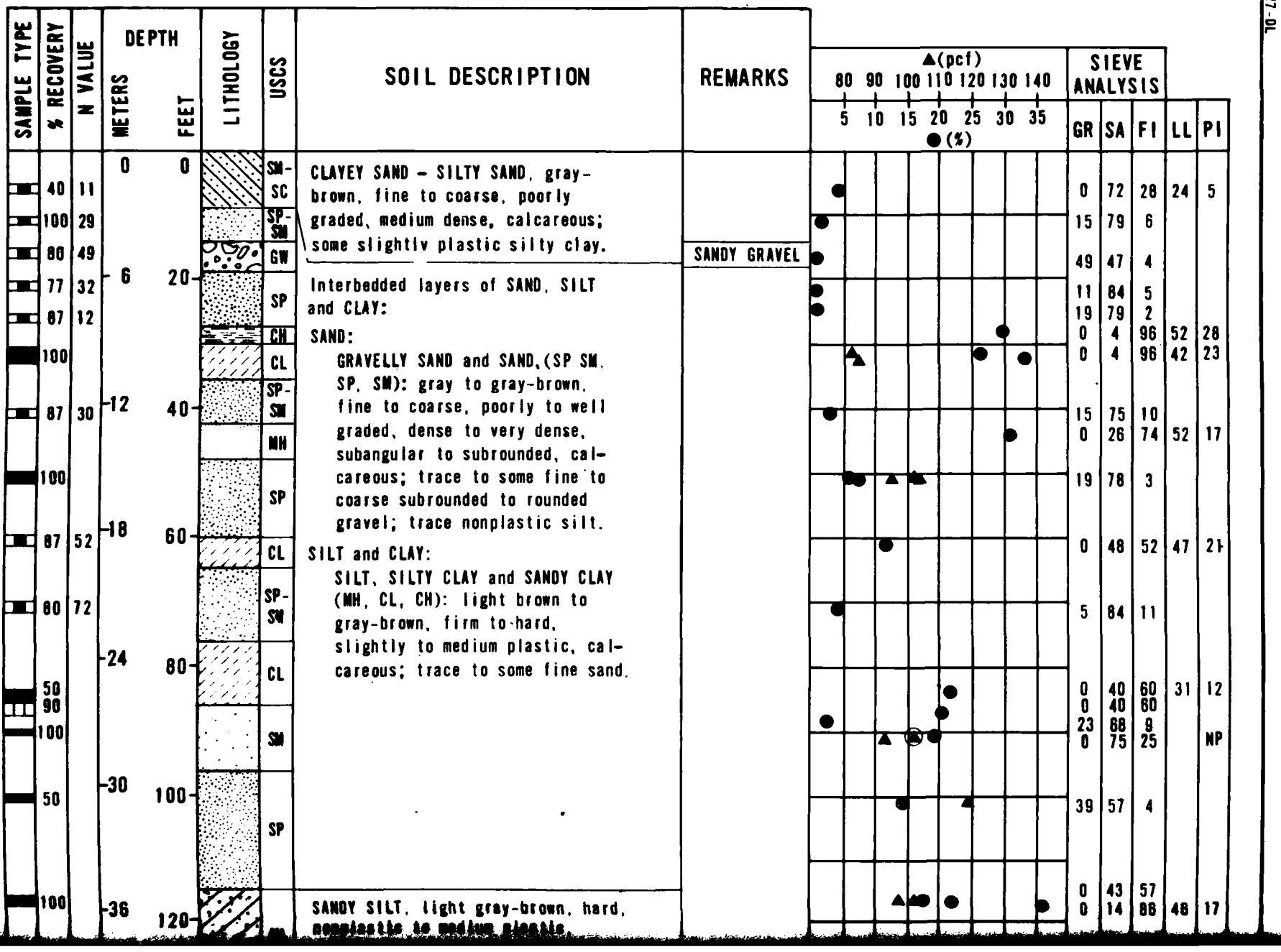
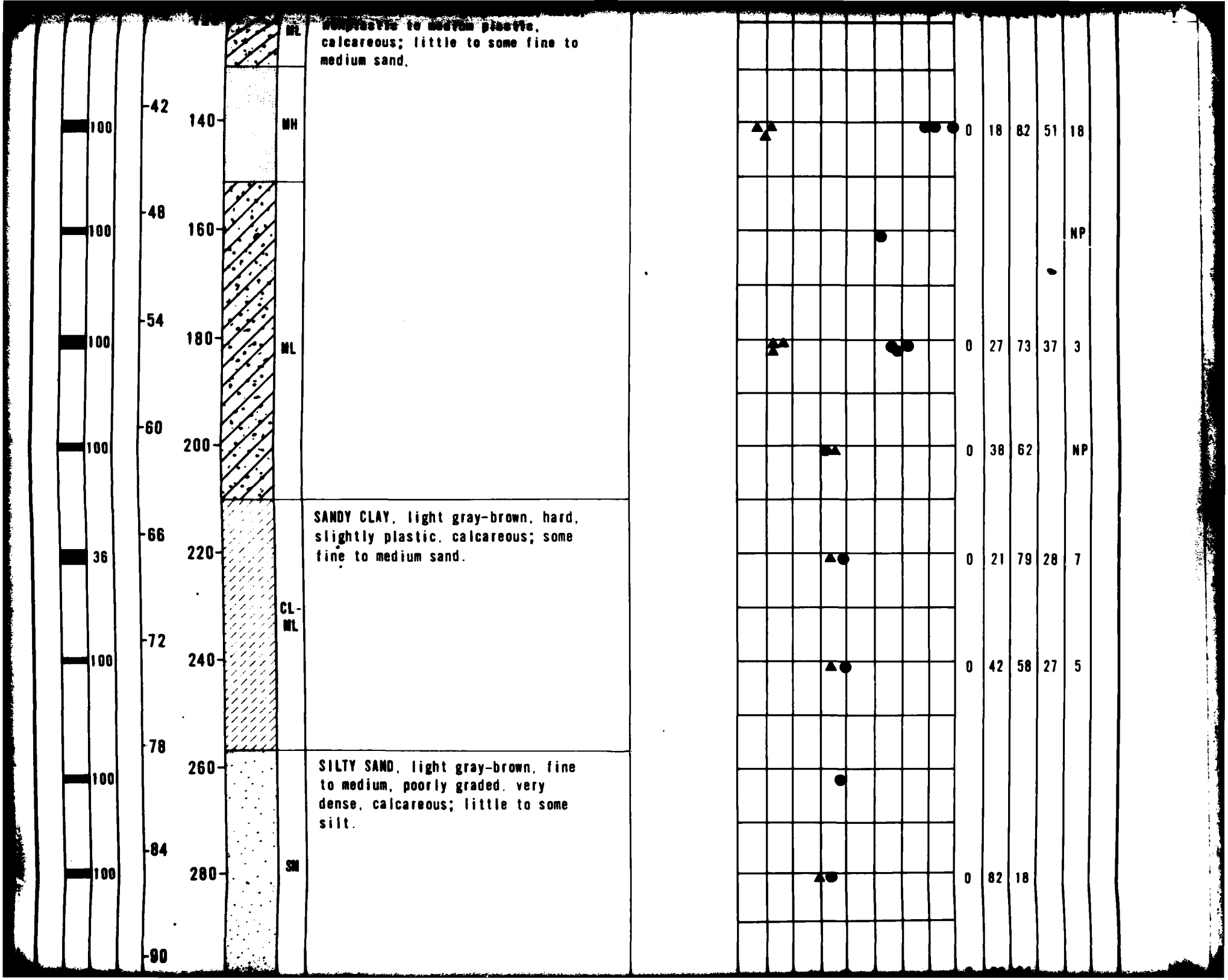
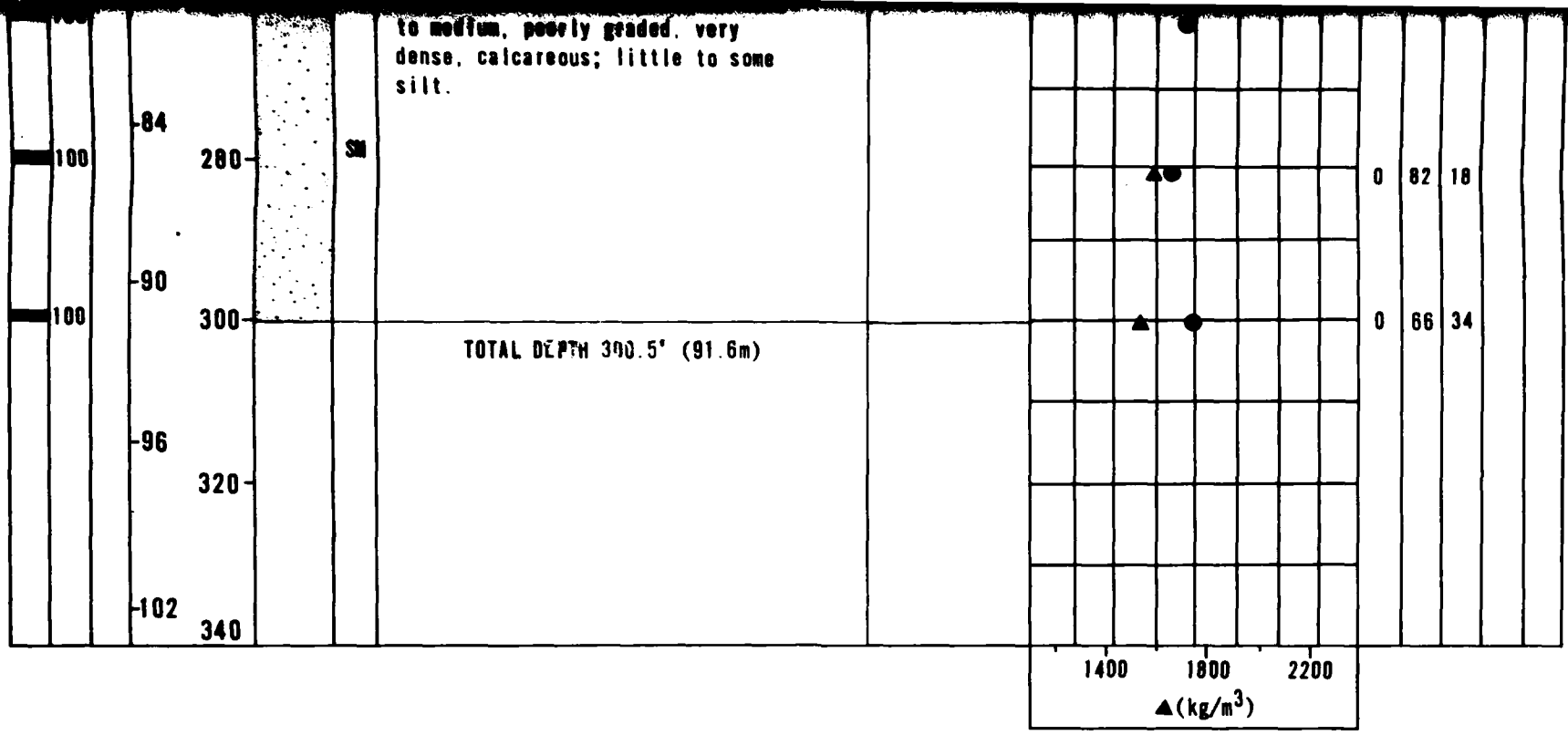



ML
nonplastic to medium plastic, calcareous; little to some fine to medium sand.
MH
ML
SANDY CLAY, light gray-brown, hard, slightly plastic, calcareous; some fine to medium sand.
CL-ML
SILTY SAND, light gray-brown, fine to medium, poorly graded, very dense, calcareous; little to some silt.
SM
100
100
100
100
36
100
100
100
42
48
54
60
66
72
78
84
90
140
160
180
200
220
240
260
280
0 18 82 51 18
NP
0 27 73 37 3
0 38 62 NP
0 21 79 28 7
0 42 58 27 5
0 82 18



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4770' (1454m)
SURFICIAL GEOLOGIC UNIT	: A1
DATE DRILLED	: 8-10 July 1977
DRILLING METHOD	: Rotary Air/Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

LOG OF BORING 01-80
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-4-7

AFV-00

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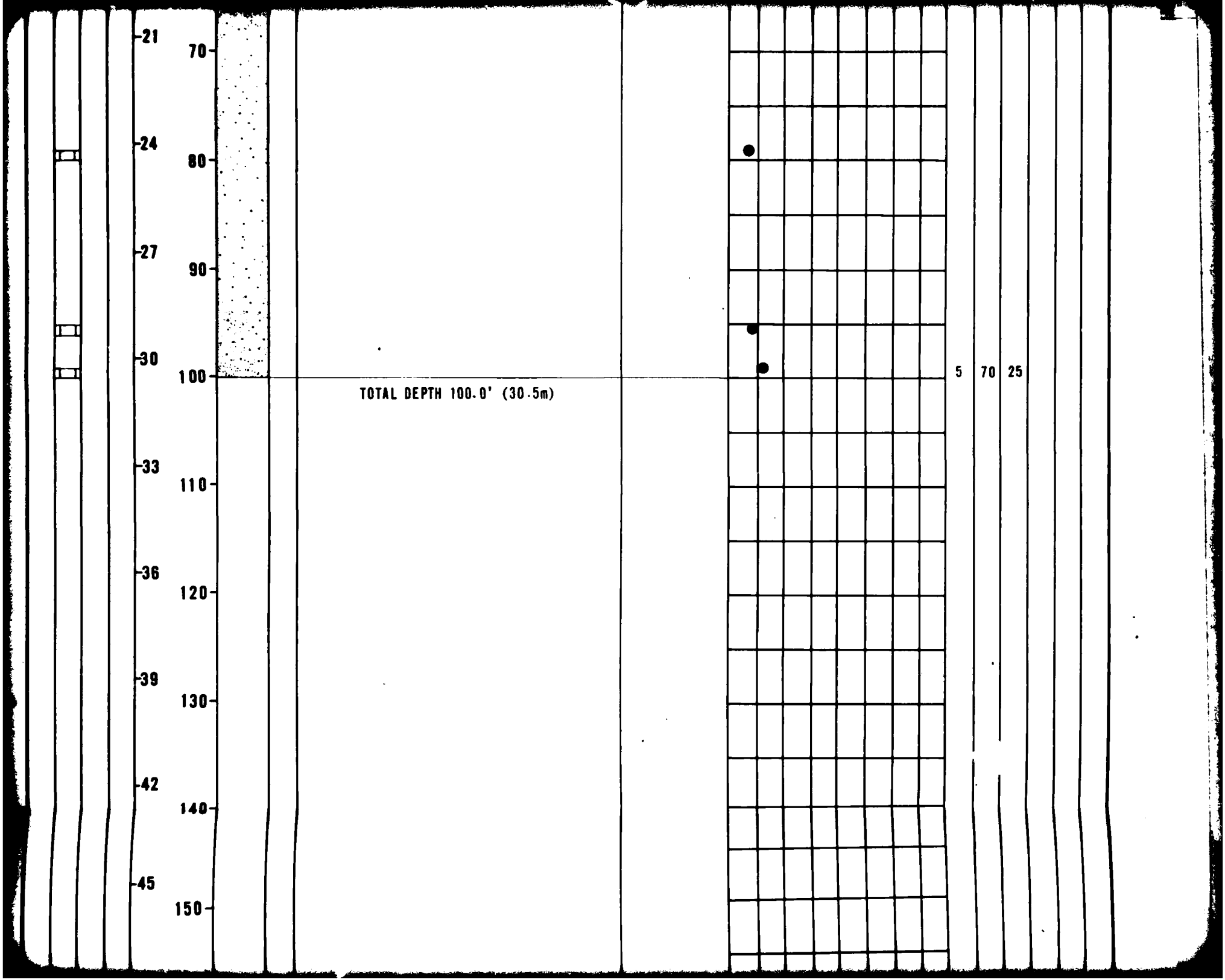
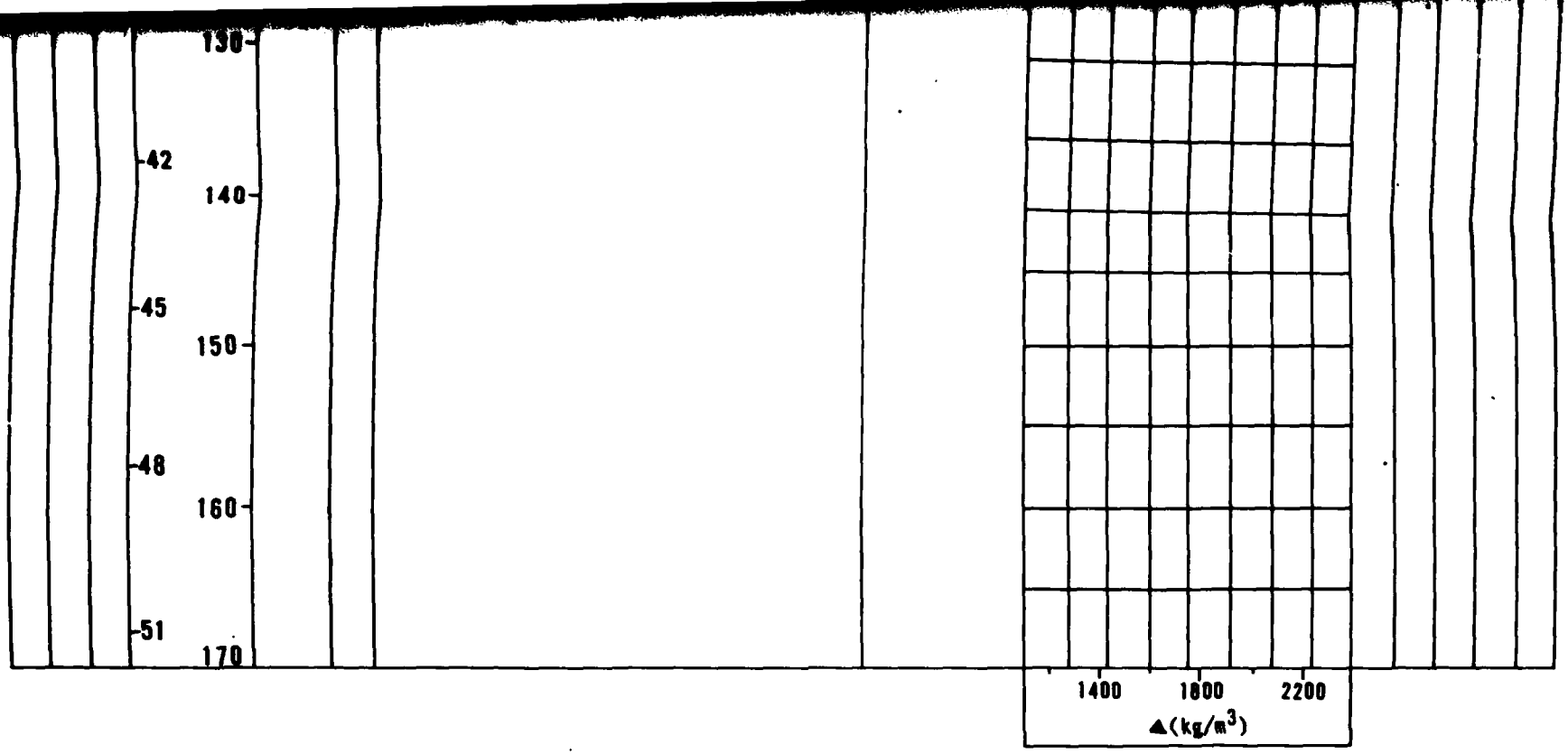
FN-TR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0			SILTY SAND, light gray, fine to coarse, poorly graded, medium dense to very dense, subangular to sub-rounded, calcareous; some silt; trace fine angular to subangular gravel; occasional lenses of gravelly sand throughout.							
			3	10						7	65	28		
			6	20						4	66	30		
			9	30		SM								
			12	40										
			15	50										
			18	60										


21
24
27
30
33
36
39
42
45
70
80
90
100
110
120
130
140
150
TOTAL DEPTH 100.0' (30.5m)
5
70
25



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4880' (1487m)
SURFICIAL GEOLOGIC UNIT	: A5y
DATE DRILLED	: 20 July 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-8-9
DRY LAKE VALLEY, NEVADA

FIGURE II-4-8

AFY-80

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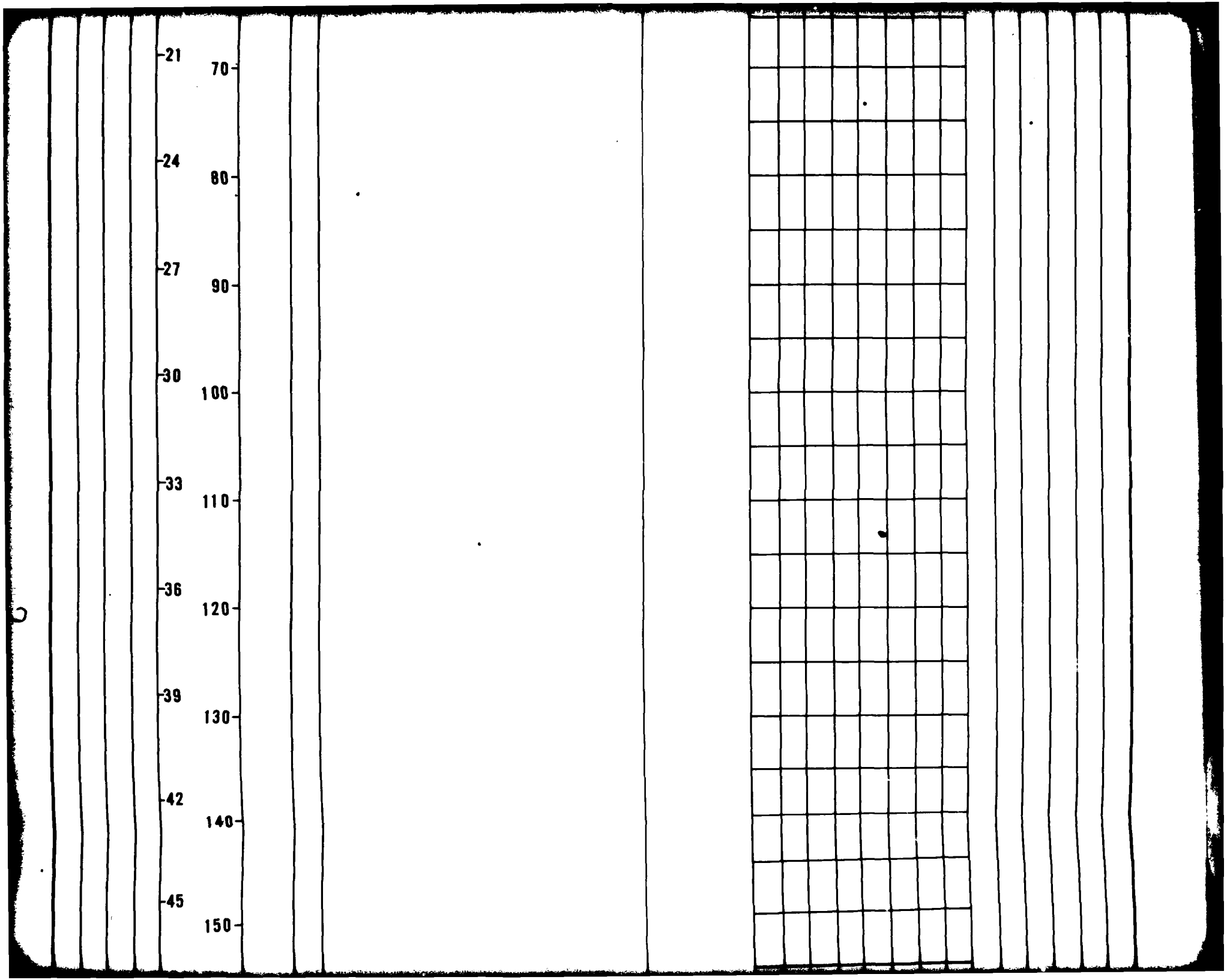
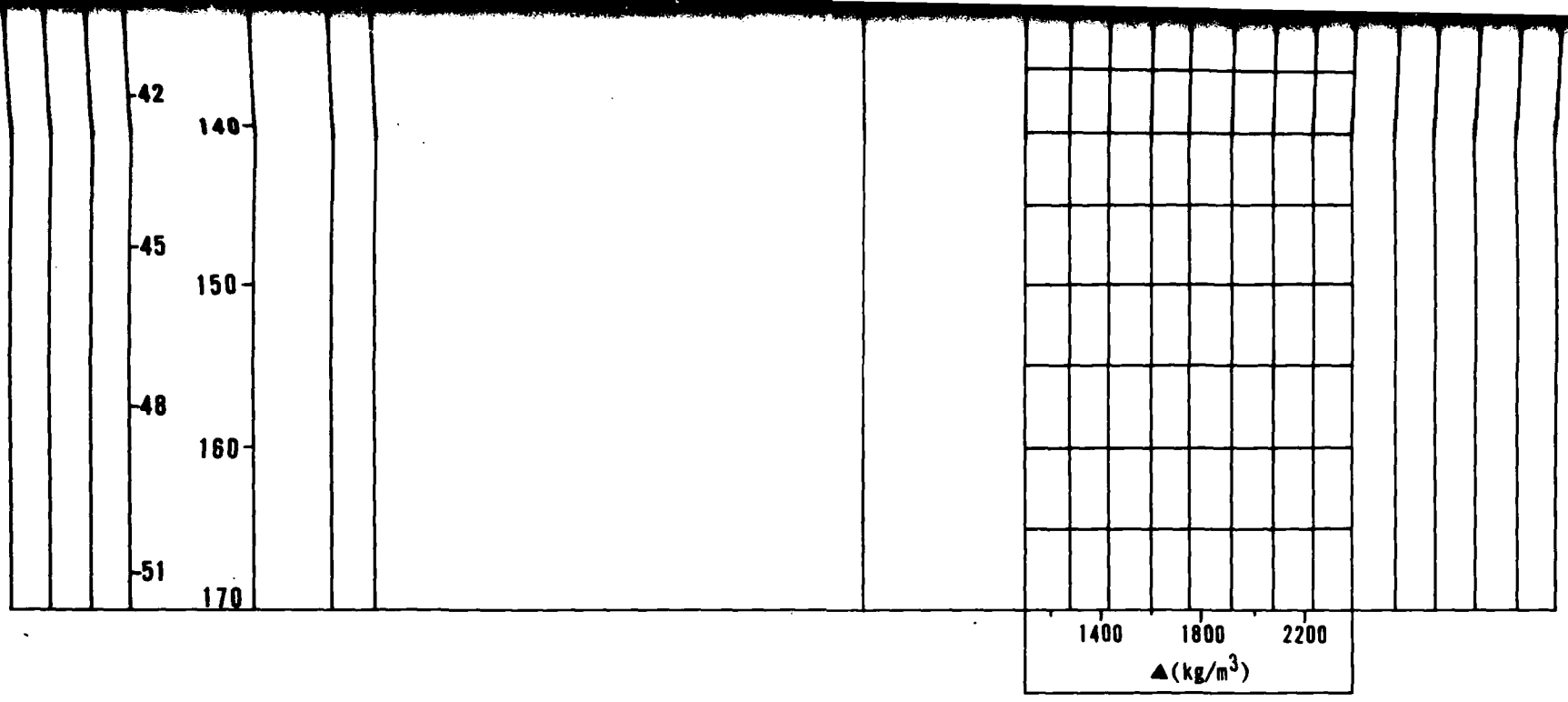
FN-IR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0		GM	SANDY GRAVEL, gray, fine to coarse, poorly graded, medium dense to very dense, subangular to subrounded, calcareous; some fine to coarse subrounded sand; trace to little nonplastic to slightly plastic silt.		●	32	30	38		
						GP-GM								
			3	10					●	74	20	6		NP
								boulder						
			6	20		GM-GC			●	52	32	16	21	5
							TOTAL DEPTH 23.0' (7.0m)							
			9	30										
			12	40										
			15	50										
			18	60										


21
24
27
30
33
36
39
42
45
70
80
90
100
110
120
130
140
150



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION	:	5595' (1705m)
SURFICIAL GEOLOGIC UNIT	:	A5i
DATE DRILLED	:	30 June 1977
DRILLING METHOD	:	Becker Percussion
HOLE DIAMETER	:	5 1/2" (140mm)
WATER LEVEL	:	Not Encountered

LOG OF BORING DL-9-10
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-4-9

FUGRO NATIONAL, INC.

AFV-86

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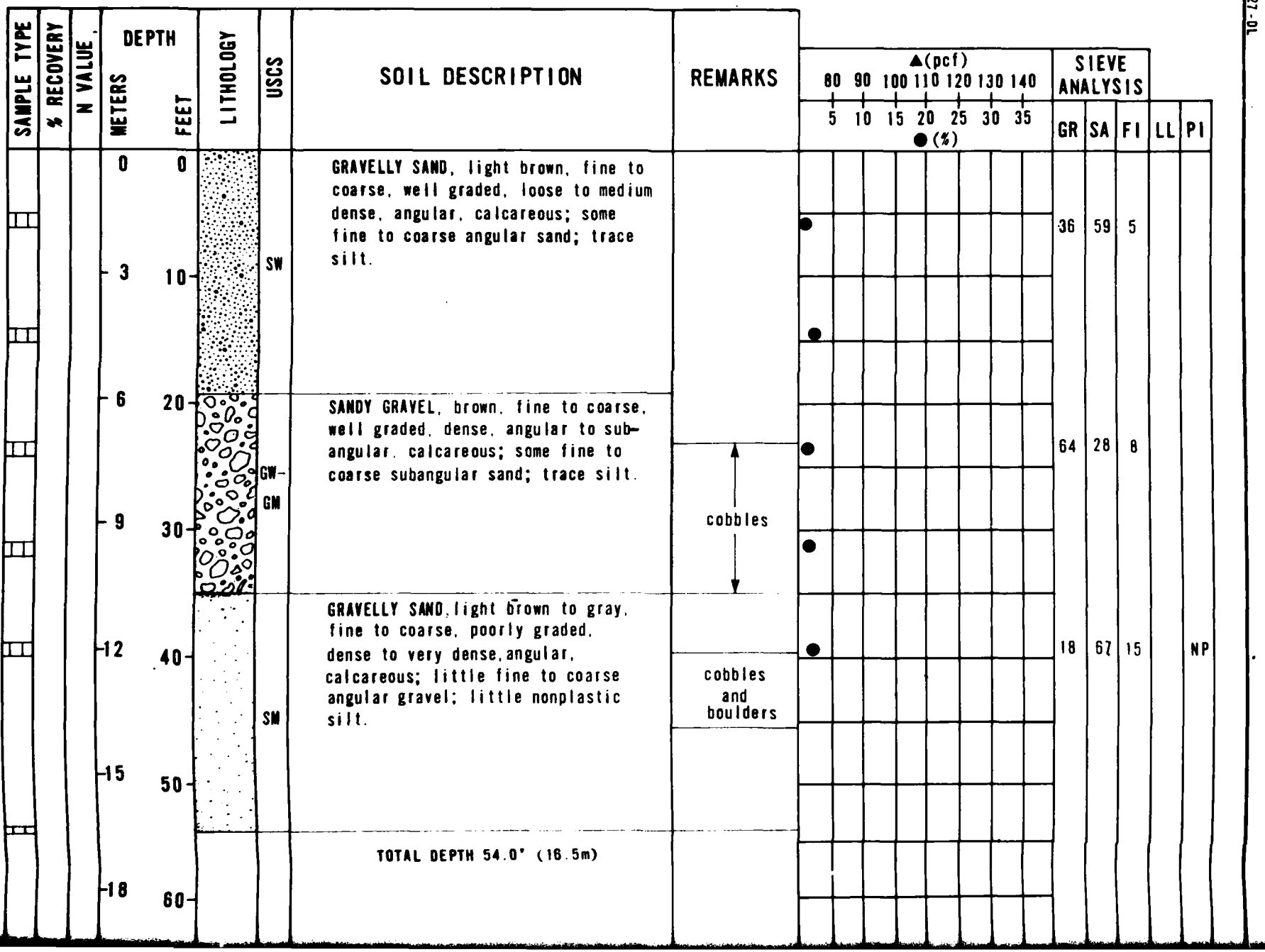
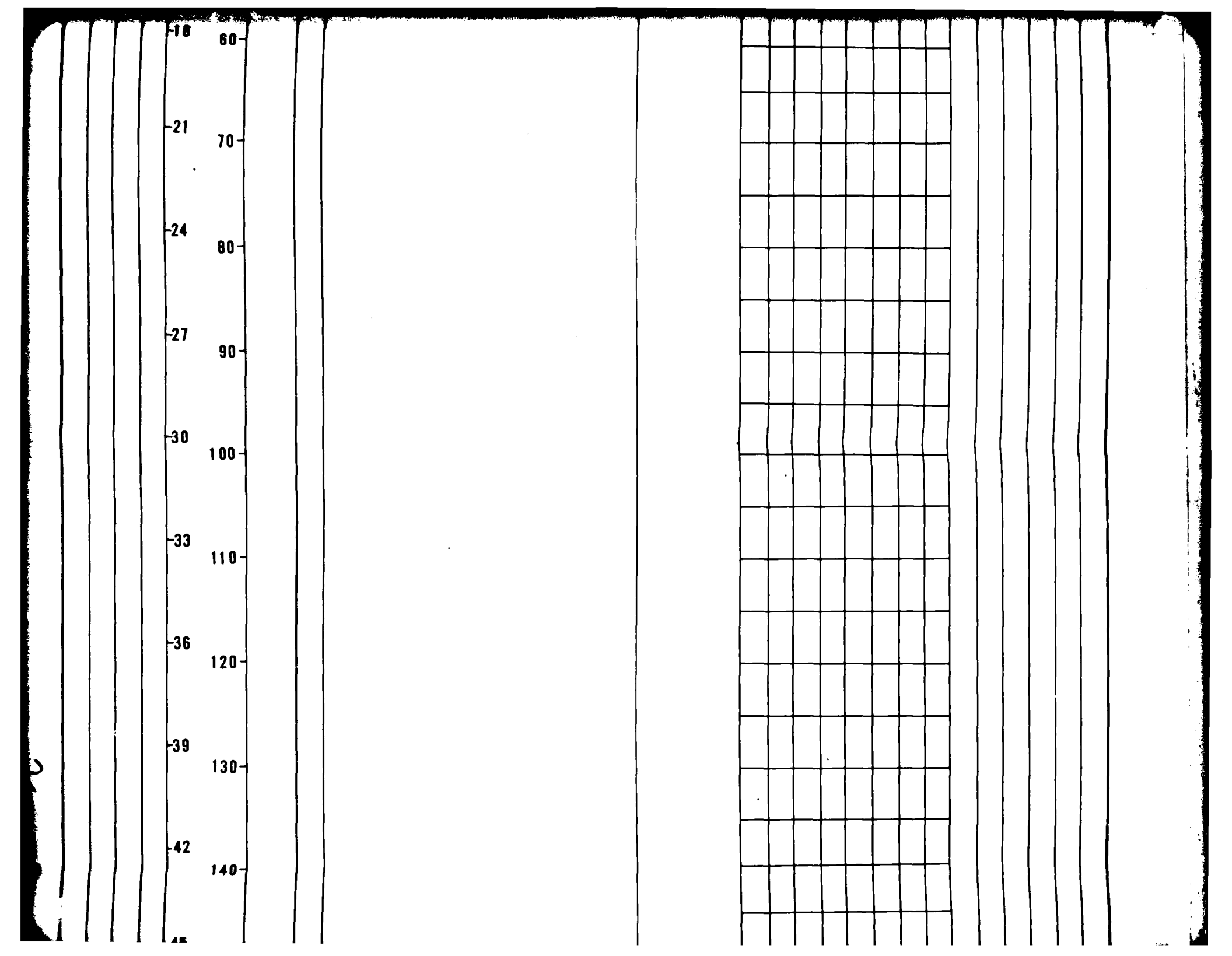
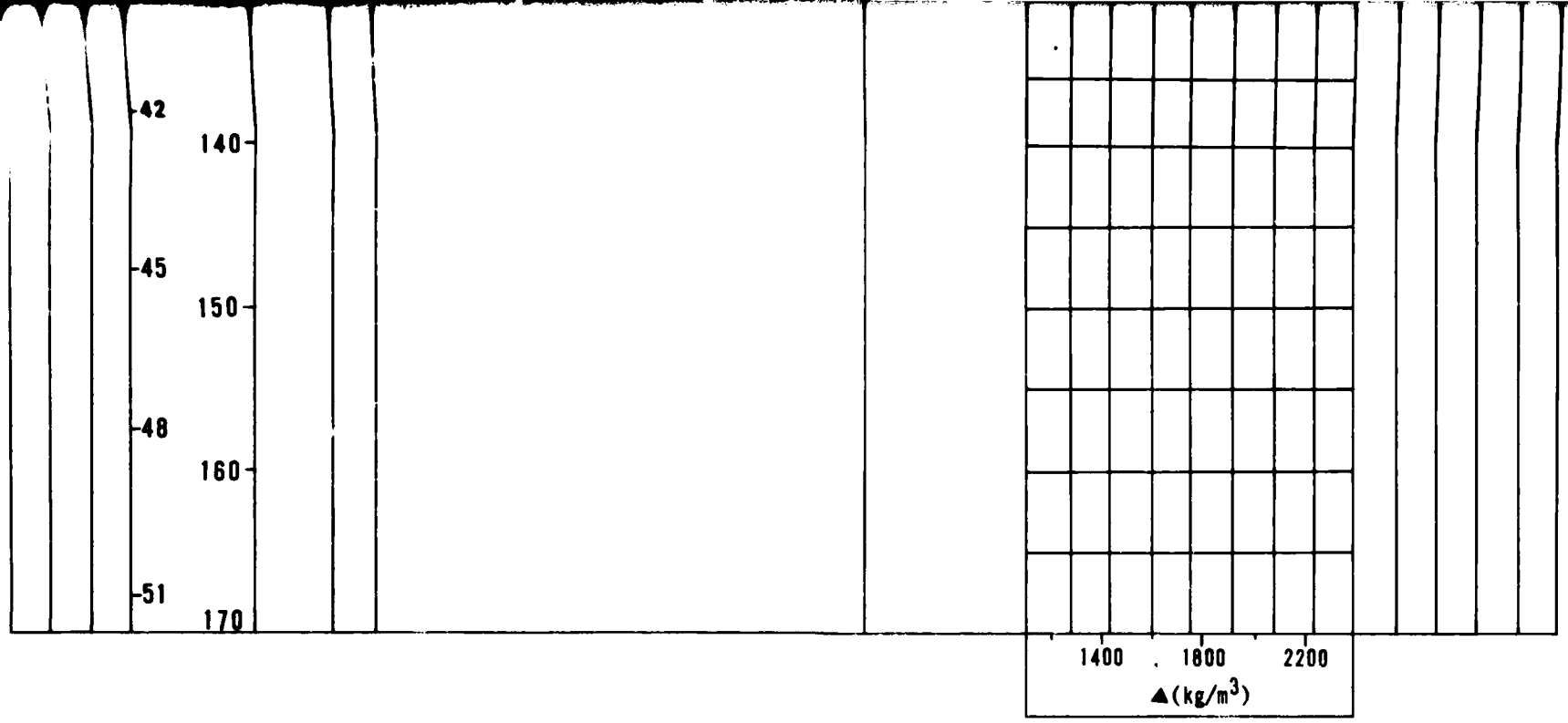



18
60
21
70
24
80
27
90
30
100
33
110
36
120
39
130
42
140



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4905' (1495m)
SURFICIAL GEOLOGIC UNIT	: A5y
DATE DRILLED	: 19 July 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-4-10

LOG OF BORING DL-B-11
DRY LAKE VALLEY, NEVADA

AFT-06

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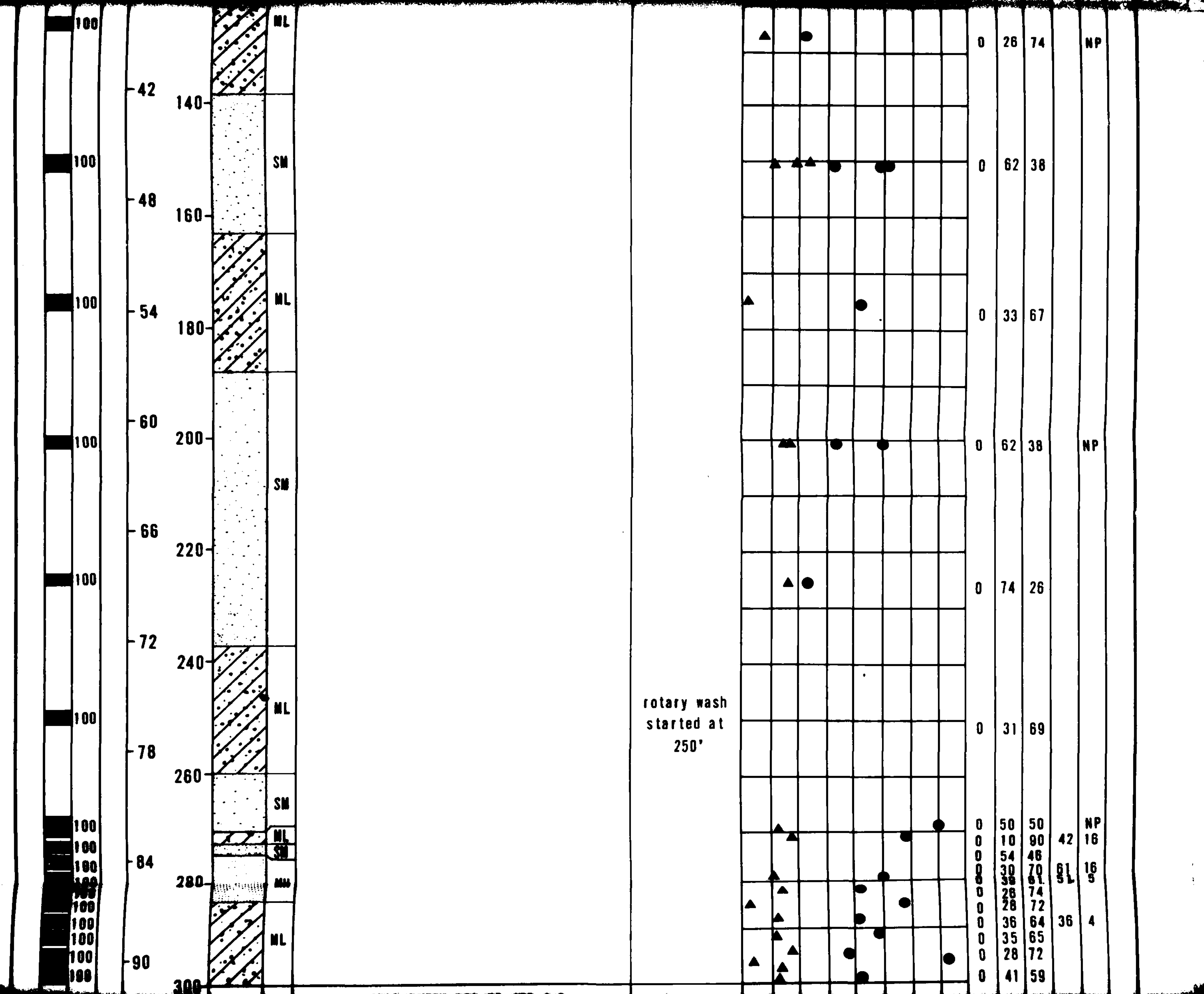
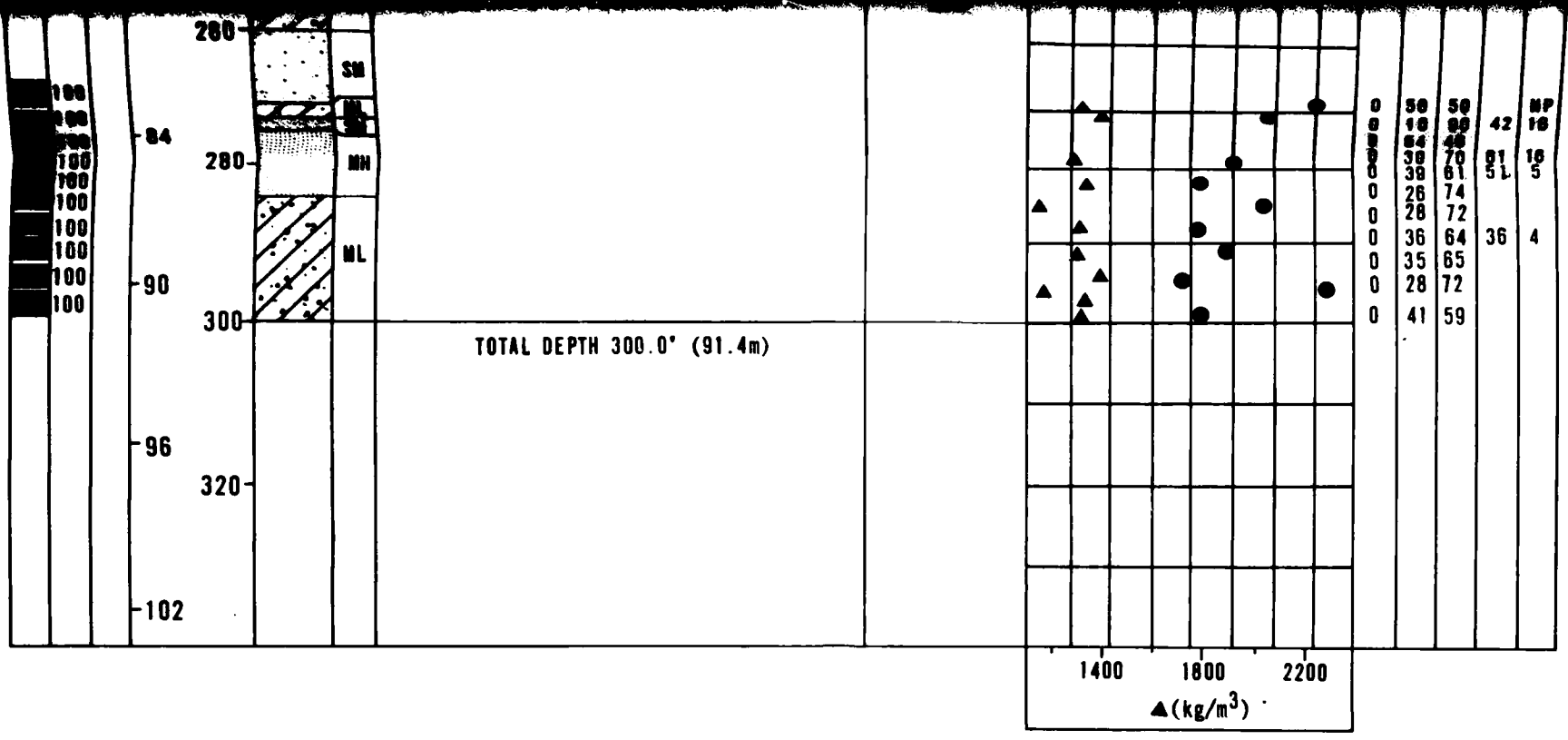
FN-TR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	GR	SA	FI	LL	PI
	53	45	0	0		ML	Interbedded layers of SILTY SAND and SANDY SILT;							
	82					GP-GM	SILTY SAND (SW-SM, SM): gray brown fine to medium, poorly to well graded, dense, subrounded, calcareous; trace to some nonplastic silt.			0	34	66		NP
	67	52	6	20		SW-SM		drill hole caving		54	36	10		
										2	87	10		NP
	67	41								10	85	5		
	100									0	31	69		NP
	84		12	40		ML								
										0	40	60		
	100					SM	SANDY SILT (ML, MH); gray brown, soft to hard, nonplastic to slightly plastic, calcareous; some fine to medium sand; lense of sandy gravel (GP-GM) (13.0'-15.0').							
										9	76	24		
	100		18	60										
										0	29	71		NP
	100					ML								
										0	33	67		
	100		24	80										
										9	41	59		NP
	100													
										0	28	72		
	100		30	100		SM								
										0	71	29		
	100		36	120		ML								



100
100
100
100
100
100
100
100
100
100
42
48
54
60
66
72
78
84
90
140
160
180
200
220
240
260
280
300
ML
SM
ML
SM
ML
SM
ML
SM
ML
rotary wash started at 250'
0 26 74 NP
0 62 38
0 33 67
0 62 38 NP
0 74 26
0 31 69
0 50 50 NP
0 10 90 42 16
0 54 46
0 30 70 61 16
0 39 61 SL 5
0 26 74
0 28 72
0 36 64 36 4
0 35 65
0 28 72
0 41 59



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4650' (1417m)
SURFICIAL GEOLOGIC UNIT	: A4d
DATE DRILLED	: 30 June & 5-7 July 1977
DRILLING METHOD	: Rotary Air/Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

LOG OF BORING DL-B-12
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-4-11

FUGRO NATIONAL, INC.

APV-83

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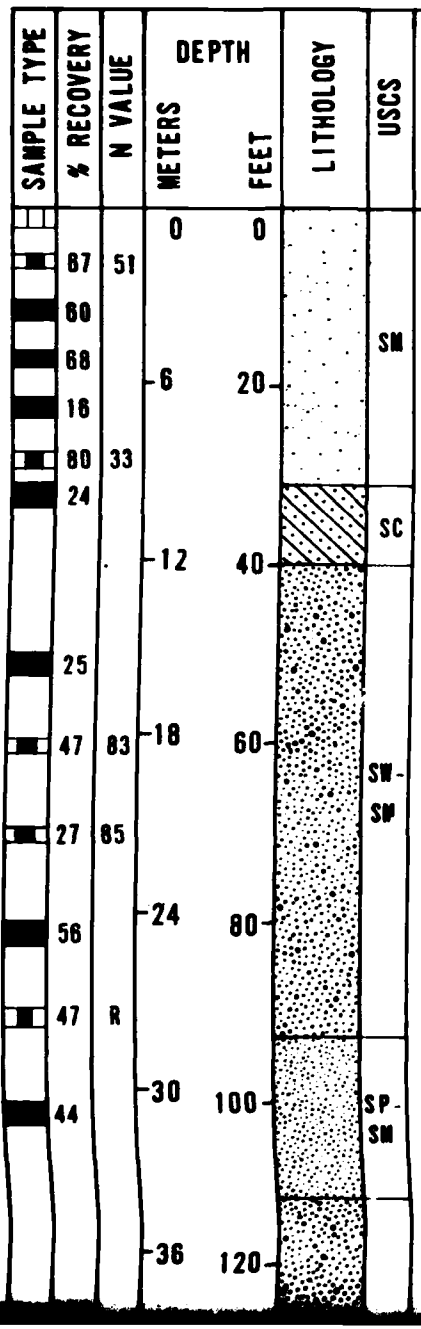
14 MAR 80

FN-TR-27-OL



SOIL DESCRIPTION

Interbedded layers of SILTY SAND, GRAVELLY SAND and SAND:

SILTY SAND (SM): light brown to brown, fine to coarse, poorly graded, dense, angular to subangular, calcareous; some nonplastic silt; trace to little gravel; layer of clayey sand (31.0'-40.0').

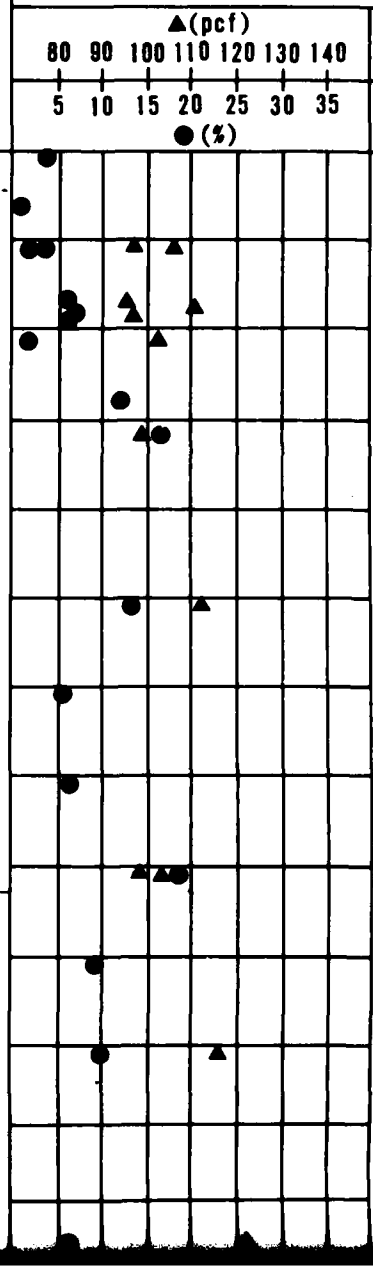
GRAVELLY SAND (SP-SM, SW-SM); light brown to brown, fine to coarse, poorly to well graded dense to very dense, angular to subangular, calcareous; some fine to coarse subrounded gravel; trace nonplastic silt.

SAND (SW-SM): brown fine to coarse well graded, dense to very dense, angular to subangular, calcareous; trace nonplastic silt; trace fine gravel.

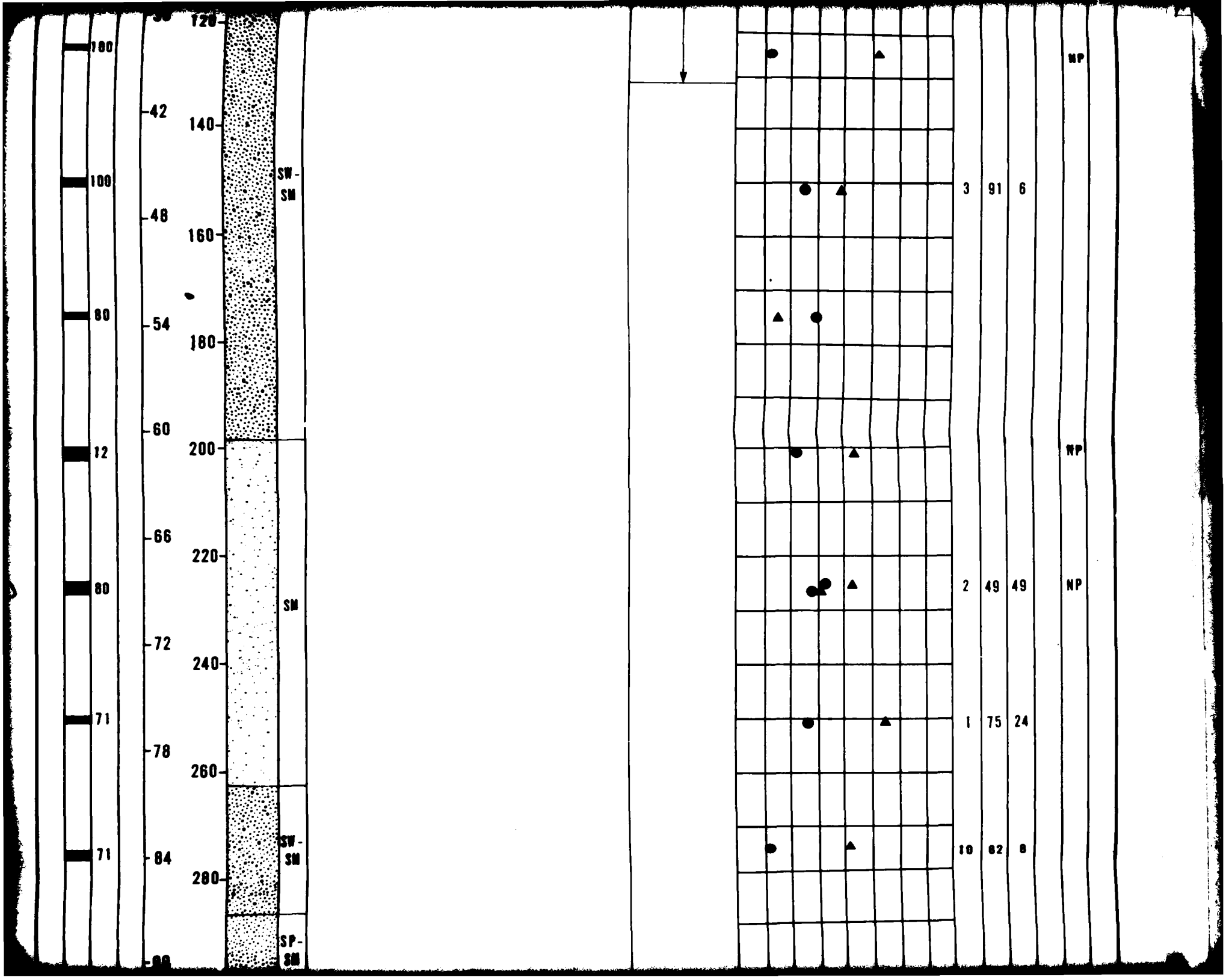
REMARKS

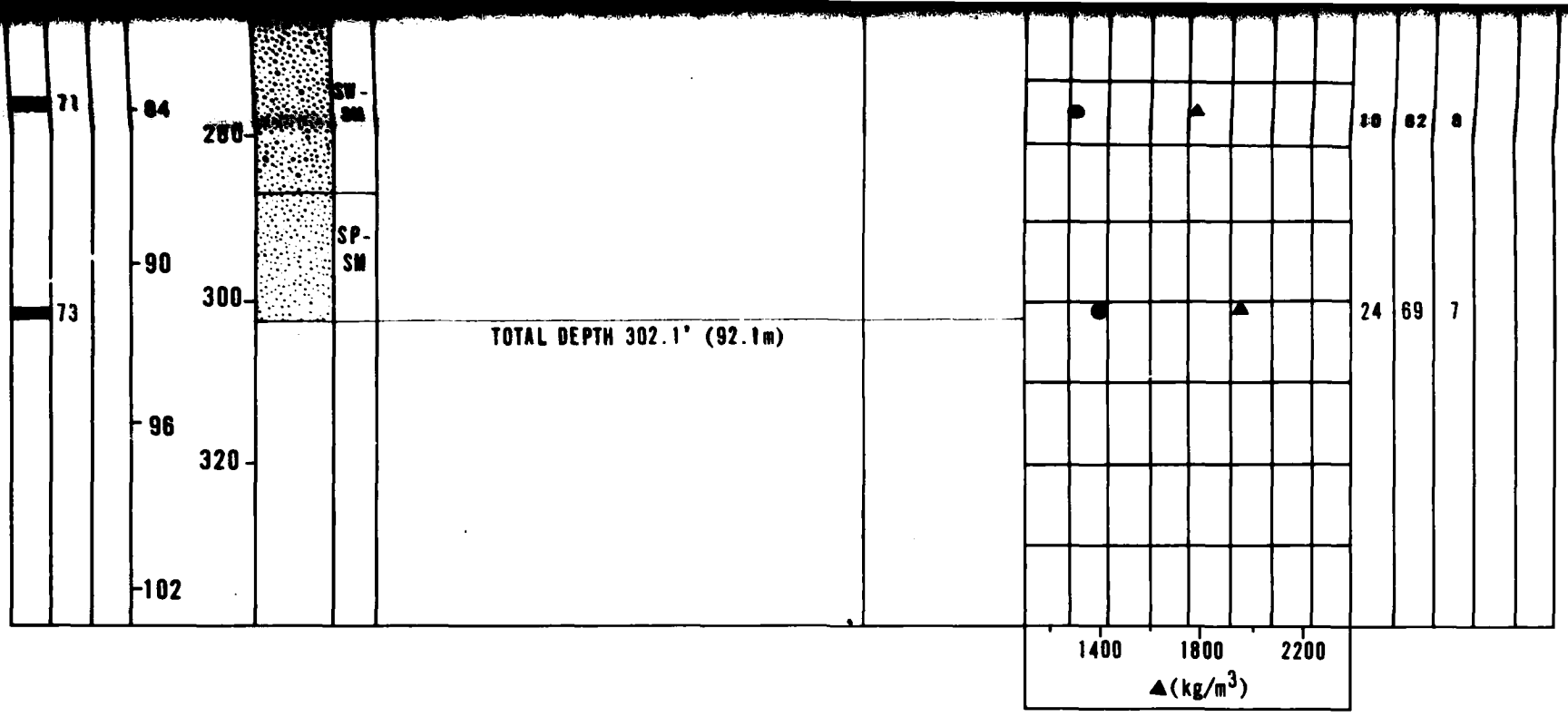
Rotary wash started at 23'

Irregular drill chatter



SIEVE ANALYSIS				
GR	SA	FI	LL	PI
17	58	25		NP
				NP
1	76	23		
4	67	29		NP
24	45	31		
0	62	38	27	10
5	86	9		
40	52	8		NP


100
100
80
12
80
71
71
42
48
54
60
66
72
78
84
120
140
160
180
200
220
240
260
280
SW-SM
SM
SW-SM
SP-SM
3 91 6
2 49 49
1 75 24
10 82 8
NP
NP
NP



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4970' (1515m)
SURFICIAL GEOLOGIC UNIT	: A2
DATE DRILLED	: 8-9 July 1977
DRILLING METHOD	: Rotary Air/Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

LOG OF BORING DL-8-13
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-4-12

FUGRO NATIONAL, INC.

AFV-08

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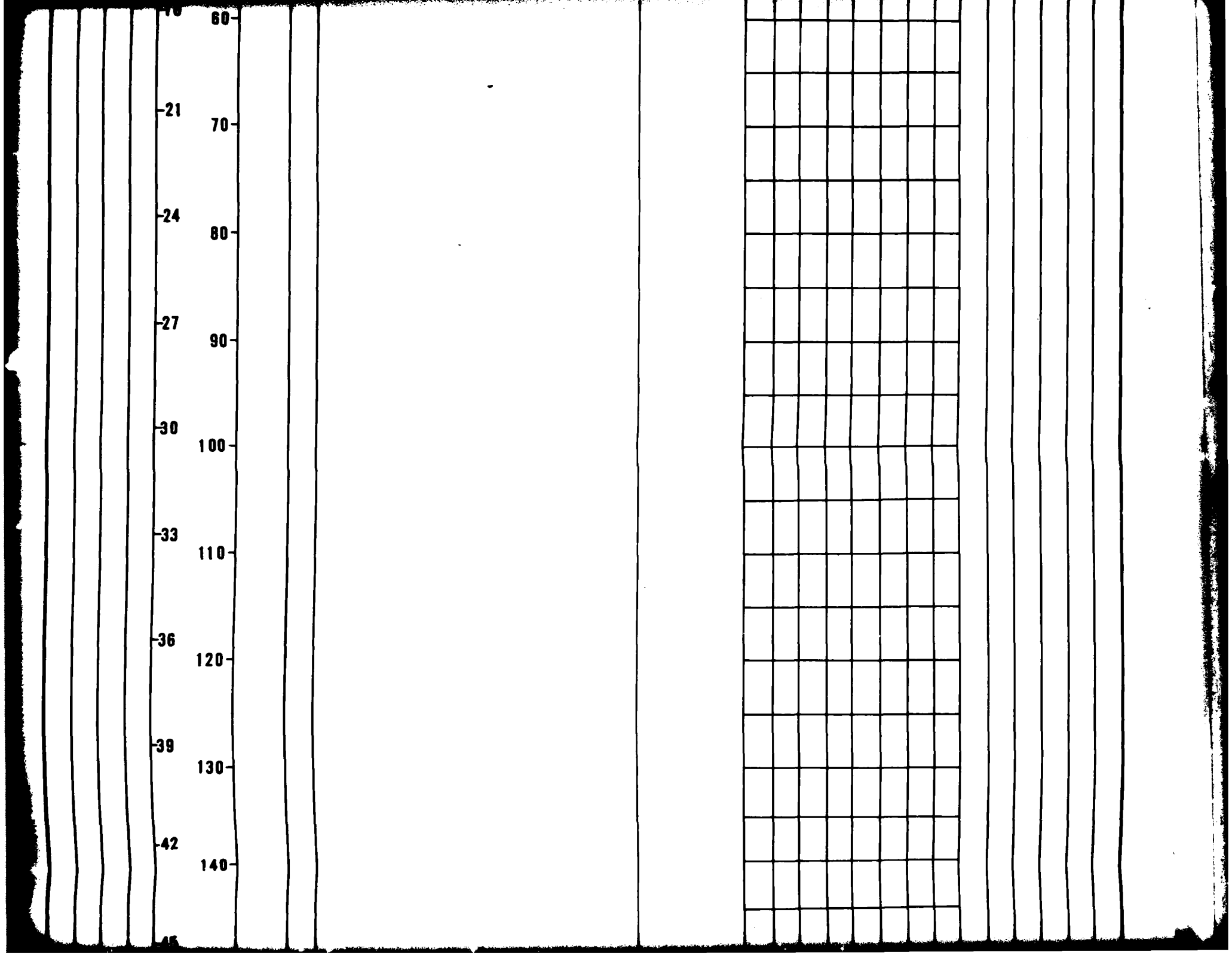
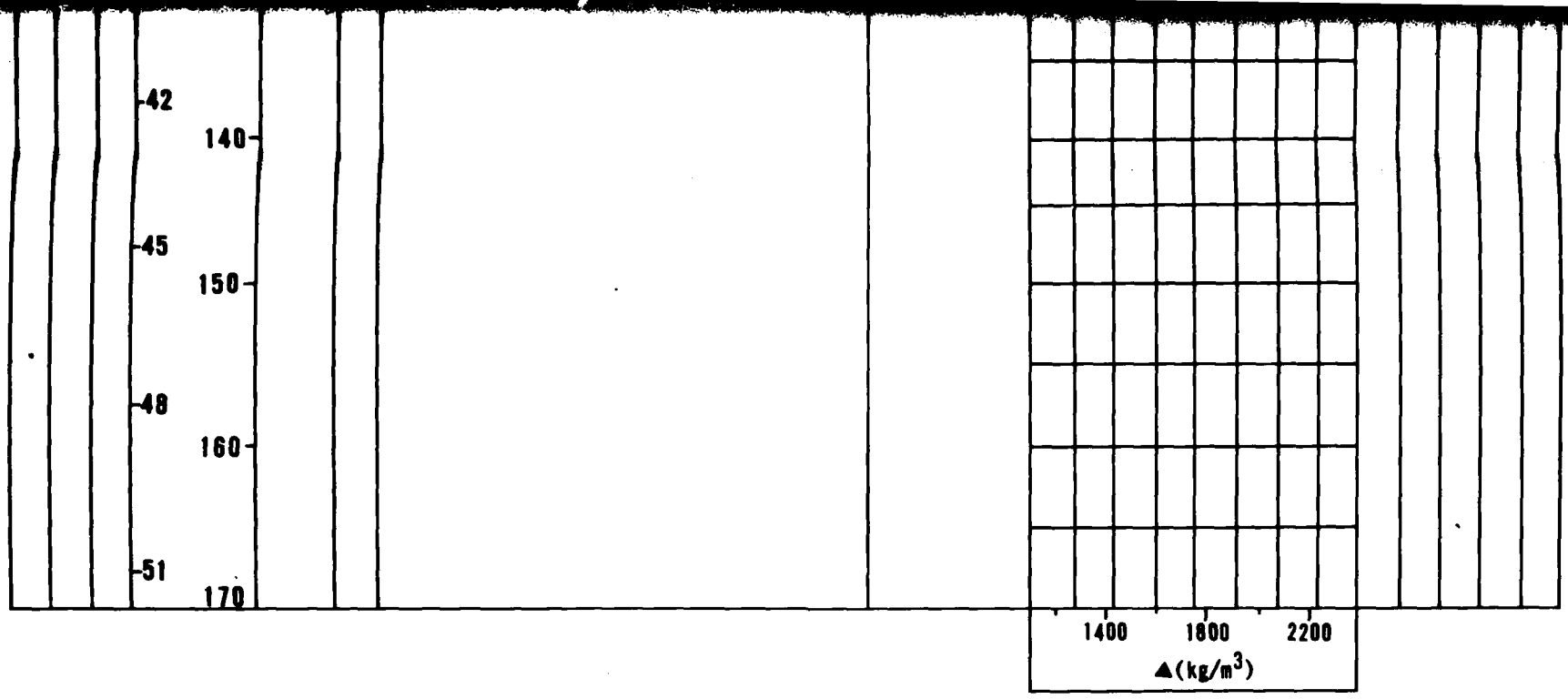
FN-TR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0		GM	SILTY SAND, light brown, fine to coarse, poorly graded, medium dense to dense, subangular, calcareous; little nonplastic silt; trace fine subangular gravel; layer of sandy gravel (0.0'–4.0'); layer of gravelly sand (6.0'–7.0').			53	31	16		
			3	10						21	62	17		
			6	20		SM				7	80	13		
			9	30			TOTAL DEPTH 31.0' (9.4m)							
			12	40										
			15	50										
			18	60										


60
21
70
24
80
27
90
30
100
33
110
36
120
39
130
42
140



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 5055' (1541m)
SURFICIAL GEOLOGIC UNIT	: A5i
DATE DRILLED	: 6 July 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

LOG OF BORING DL-B-14
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-4-13

FUGRO NATIONAL, INC.

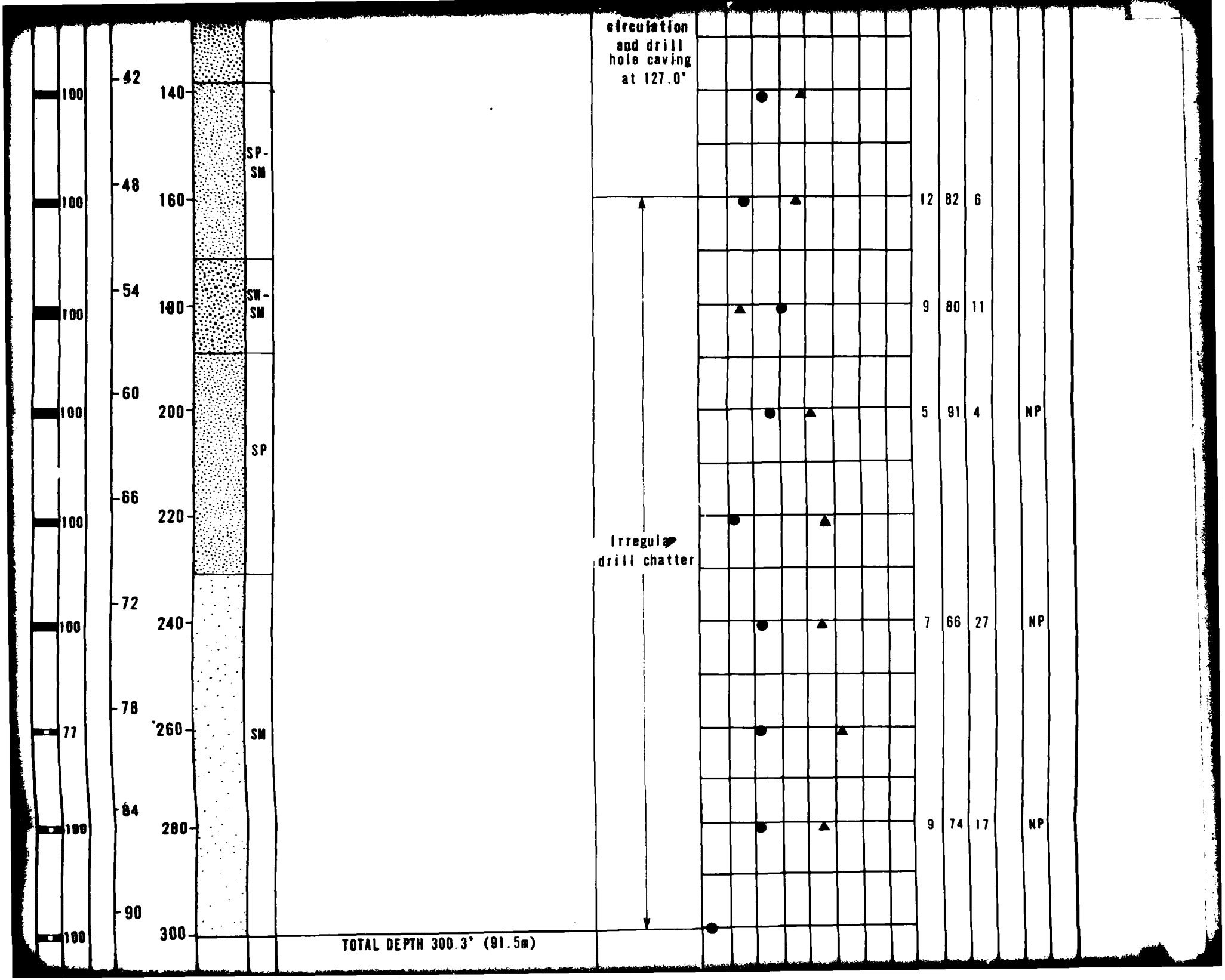
AFT-BB

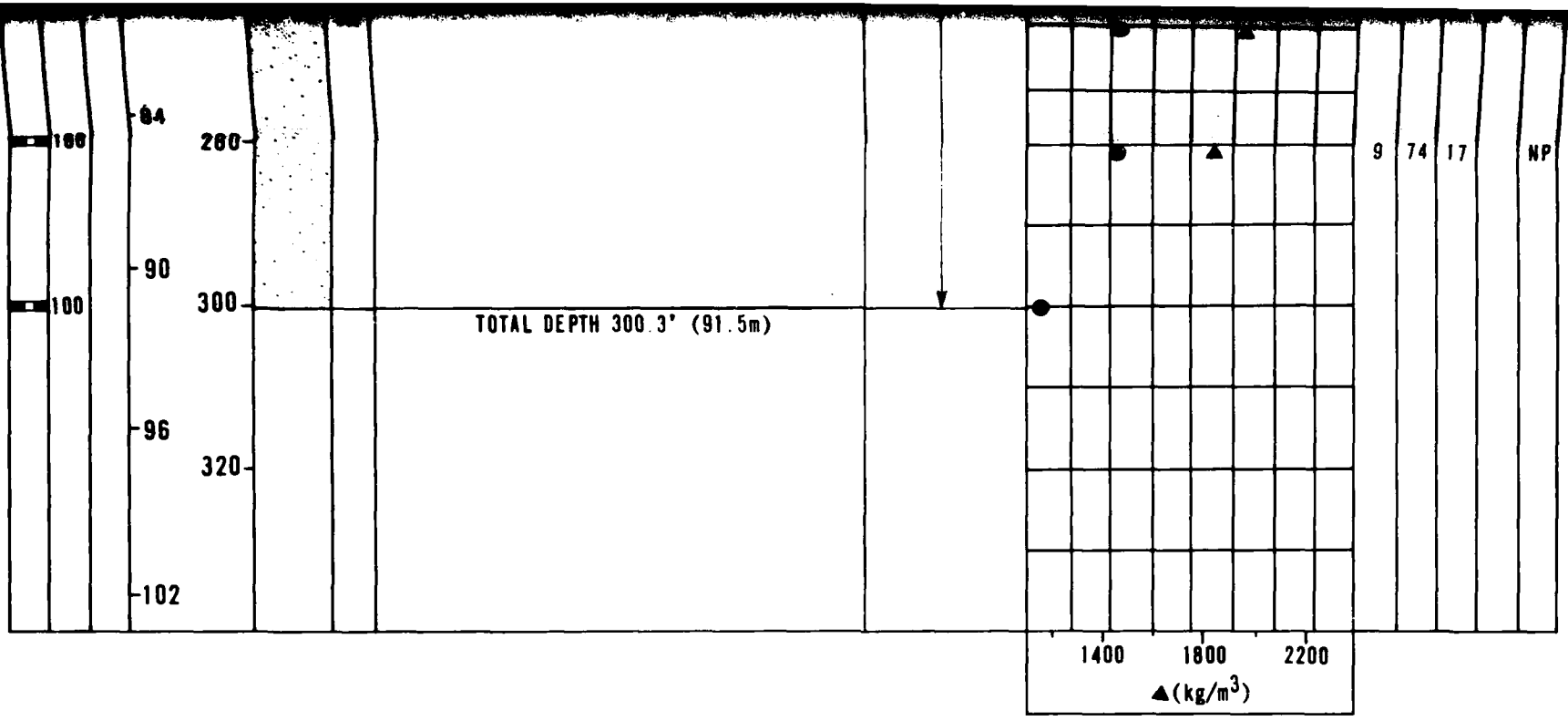
3

CHECKED BY _____ APPROVED BY _____

FN-1R-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0		SW-SM	Interbedded layers of SAND, GRAVELLY SAND, and SILTY SAND:							
	67	34								6	83	11		NP
	67	44												
	100	R					SAND and GRAVELLY SAND (SW, SM, SP-SM SP): light gray brown, fine to coarse poorly to well graded, medium dense to very dense, subangular to subrounded, calcareous; trace to some fine gravel; trace nonplastic silt			4	72	24		
	100	49	6	20		SM								
	53	31								4	83	13		NP
	80	51				SP-SM				4	89	7		
			12	40			SILTY SAND (SM): gray to brown, fine to coarse, poorly graded, medium dense to very dense, subangular to subrounded, calcareous; little to some nonplastic silt; trace fine gravel.							
	80	85												
	68									4	81	15		
	85					SM				4	83	13		NP
			18	60										NP
	52													
	87									1	75	24		
	70													
			24	80										
	60					SP				25	71	4		NP
	80									1	63	36		NP
	54					SM								
	40		30	100										
			36	120										
	80					SP		Loss of circulation		12	87	1		NP


circulation and drill hole caving at 127.0'
Irregular drill chatter
SP-SM
SW-SM
SP
SM
SM
100
100
100
100
100
77
100
100
42
48
54
60
66
72
78
84
90
140
160
180
200
220
240
260
280
300
12 82 6
9 80 11
5 91 4 NP
7 66 27 NP
9 74 17 NP
TOTAL DEPTH 300.3' (91.5m)



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4630' (1411m)
SURFICIAL GEOLOGIC UNIT	: A2
DATE DRILLED	: 11-13 July 1977
DRILLING METHOD	: Rotary Air/Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-B-15
DRY LAKE VALLEY, NEVADA

FIGURE
II-4-14

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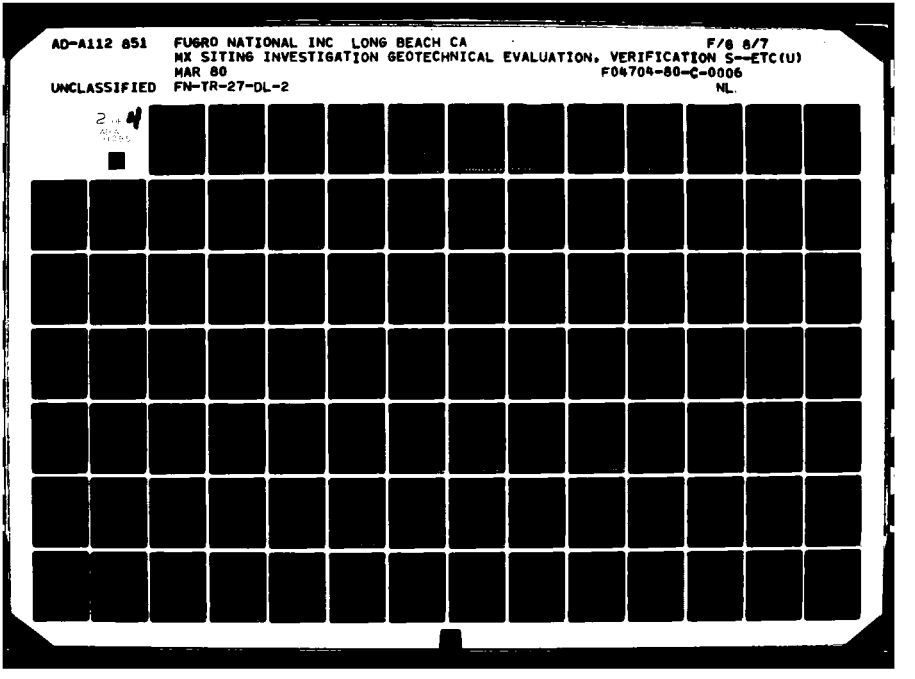
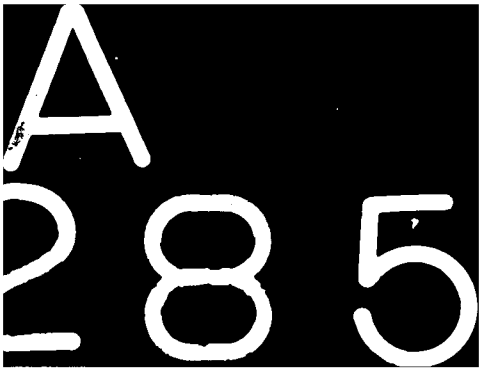
14 MAR 80

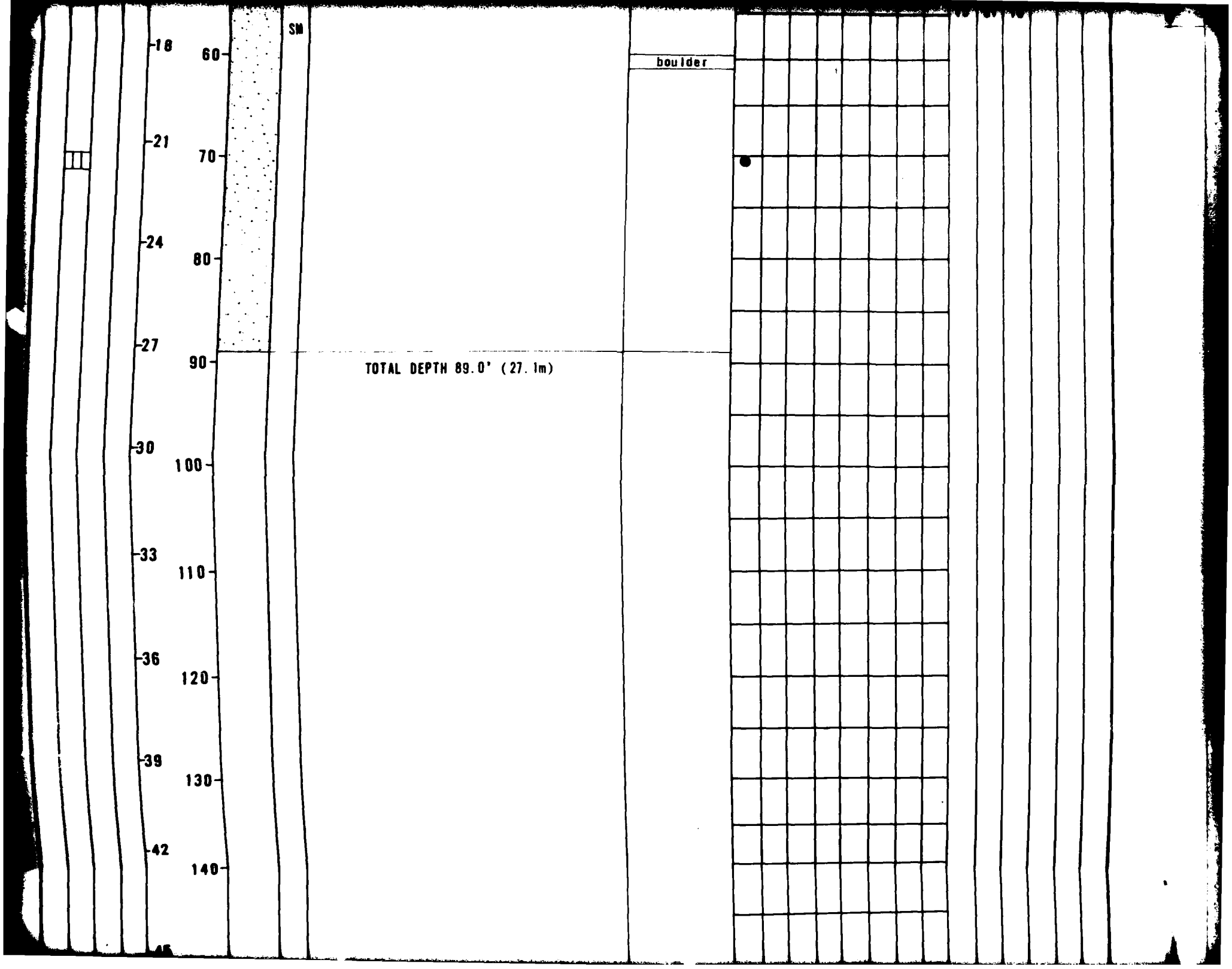
FN-TR-27-DL

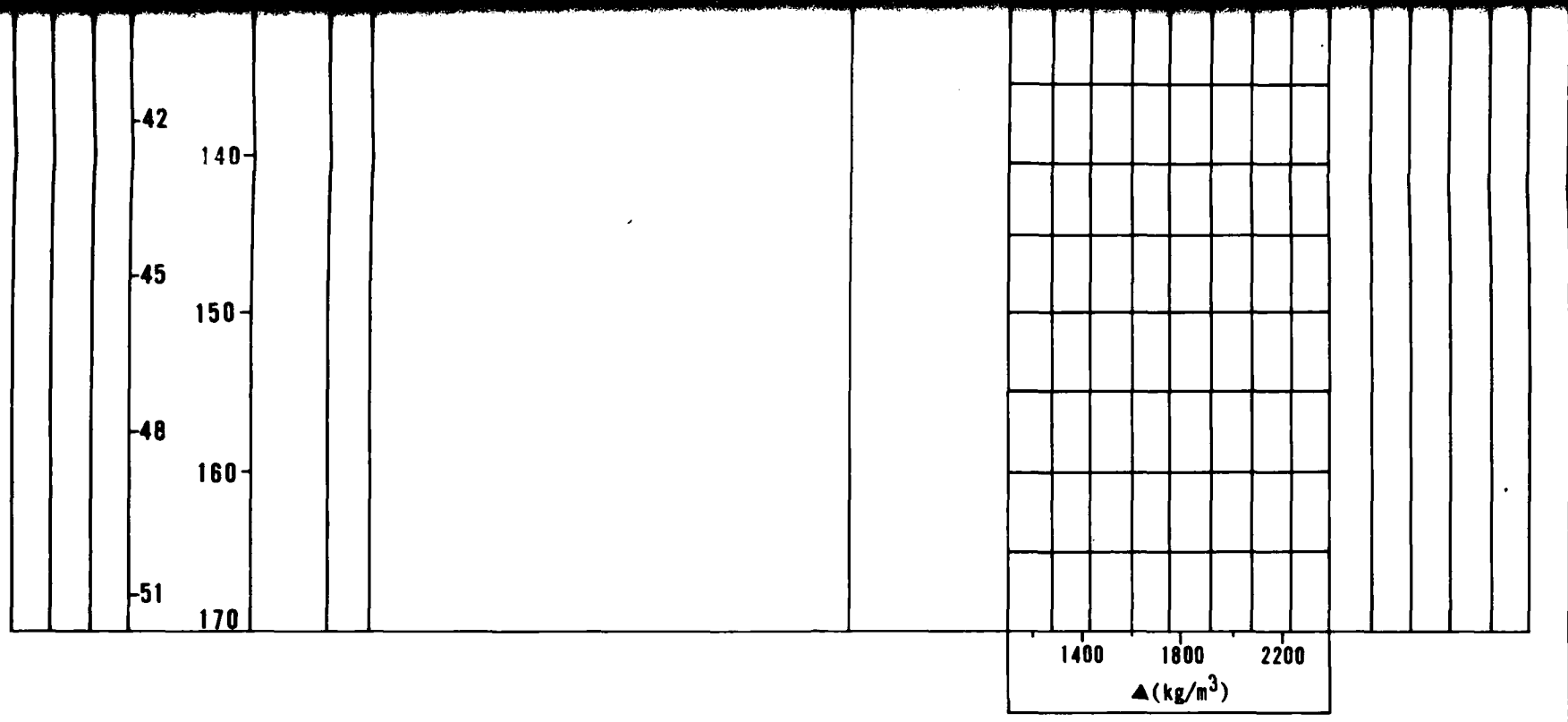
SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ●(%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0			GRAVELLY SAND, light brown, fine to coarse, poorly graded, medium dense to dense, subangular, little to some fine to coarse gravel; little to some nonplastic silt.			35	44	21		
	50					SM				26	60	14		
			3	10										
							SANDY GRAVEL, light brown, fine to coarse, poorly graded, very dense, angular to subrounded calcareous; some fine to coarse sand; little nonplastic silt.			51	35	14		
			6	20		GM								
			9	30			SILTY SAND, light brown, fine to coarse, poorly graded, medium dense to dense, angular to subangular calcareous; little silt; little fine gravel.							
			12	40										
			15	50						15	67	18		
			18	60		SM		boulder						

AD-A112 851 FUGRO NATIONAL INC LONG BEACH CA F/G 8/7
MX SITING INVESTIGATION GEOTECHNICAL EVALUATION, VERIFICATION S--ETC(U)
MAR 80 F04704-80-C-0006
UNCLASSIFIED FN-TR-27-DL-2 NL




A
285


SM
boulder
TOTAL DEPTH 89.0' (27.1m)
18
21
24
27
30
33
36
39
42
60
70
80
90
100
110
120
130
140



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4885' (1489m)
SURFICIAL GEOLOGIC UNIT	: A5i
DATE DRILLED	: 28 June 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-B-16
DRY LAKE VALLEY, NEVADA

FIGURE II-4-15

AFV-80

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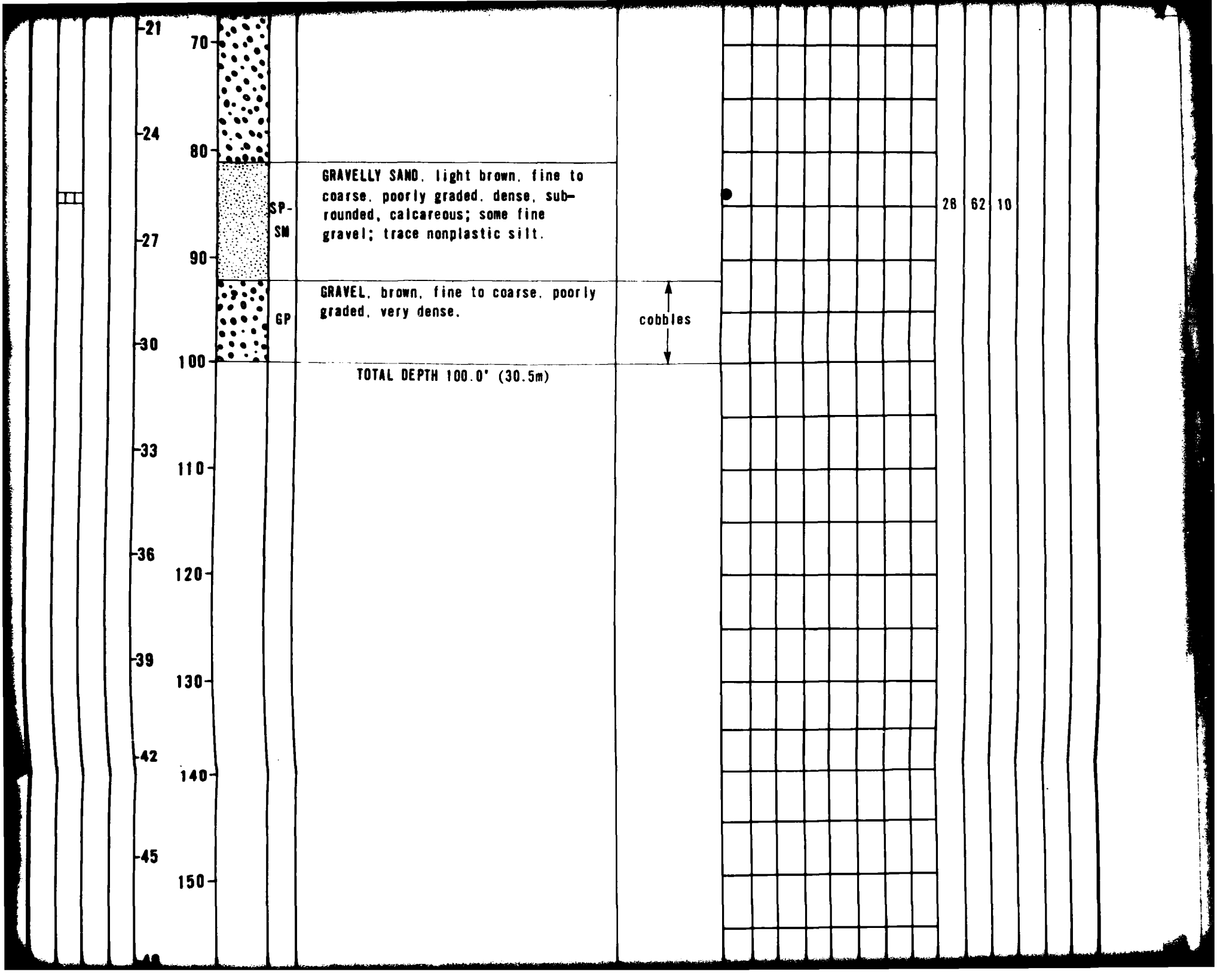
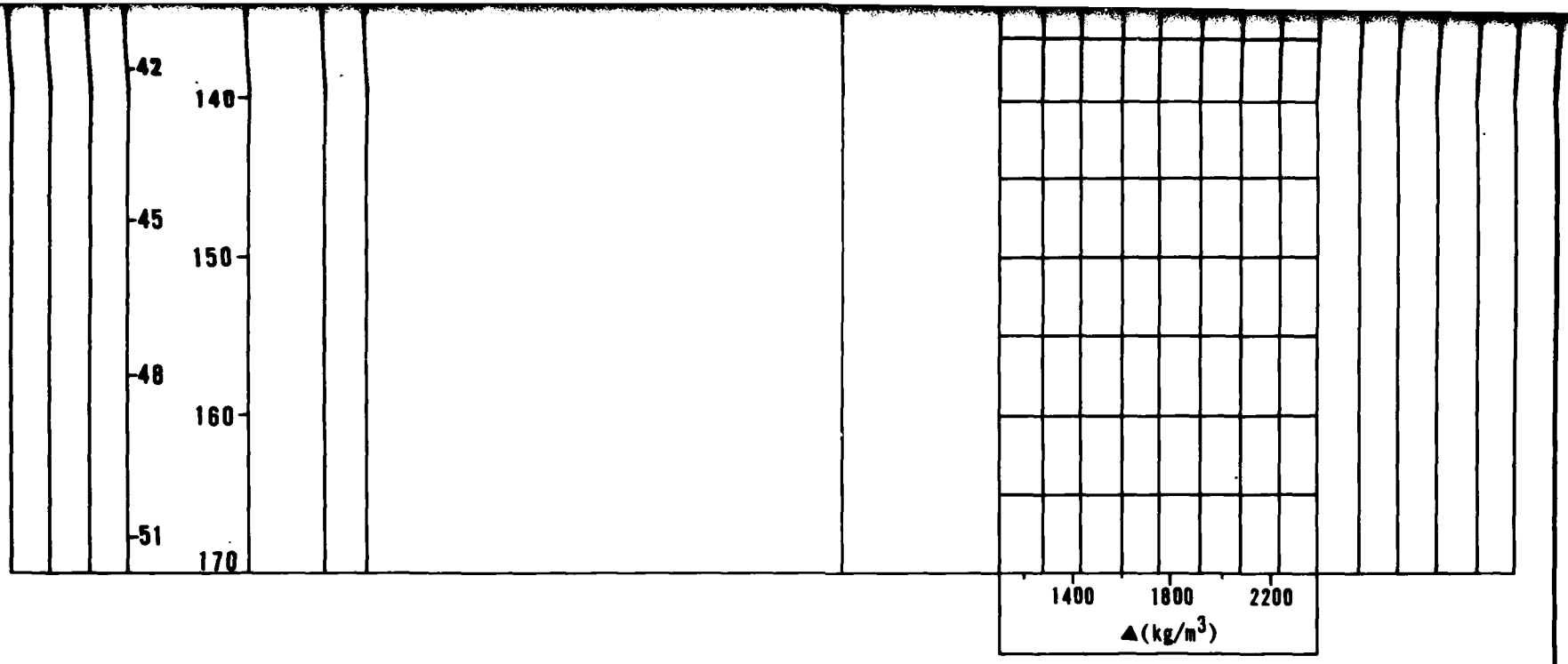
FN-TR-27-DL

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲(pcf) 80 90 100 110 120 130 140 / ● (%) 5 10 15 20 25 30 35	SIEVE ANALYSIS GR	SA	FI	LL	PI
			0	0			SANDY GRAVEL, light brown, fine to coarse, poorly graded, loose, angular to subangular, calcareous; some fine to coarse angular sand; some non-plastic silt.							
			3	10		GM				50	29	21		
	33													
			6	20		ML	SANDY SILT, light brown, soft, non-plastic, calcareous; some fine to medium sand.			3	26	68		
			9	30		SM	SILTY SAND, white, fine to coarse, poorly graded, medium dense, angular calcareous; some nonplastic silt; little fine gravel.			16	57	27		
			12	40			GRAVEL, gray, fine to coarse, poorly graded very dense, subrounded.	cobbles		98	1	1		
			15	50										
			18	60		GP		cobbles						


21
70
24
80
GRAVELLY SAND, light brown, fine to coarse, poorly graded, dense, sub-rounded, calcareous; some fine gravel; trace nonplastic silt.
SP-SM
27
90
GRAVEL, brown, fine to coarse, poorly graded, very dense.
GP
cobbles
30
100
TOTAL DEPTH 100.0' (30.5m)
33
110
36
120
39
130
42
140
45
150
28
62
10



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION	: 4805' (1465m)
SURFICIAL GEOLOGIC UNIT	: A1
DATE DRILLED	: 29 June 1977
DRILLING METHOD	: Becker Percussion
HOLE DIAMETER	: 5 1/2" (140mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

LOG OF BORING DL-B-17
DRY LAKE VALLEY, NEVADA

FIGURE II-4-18

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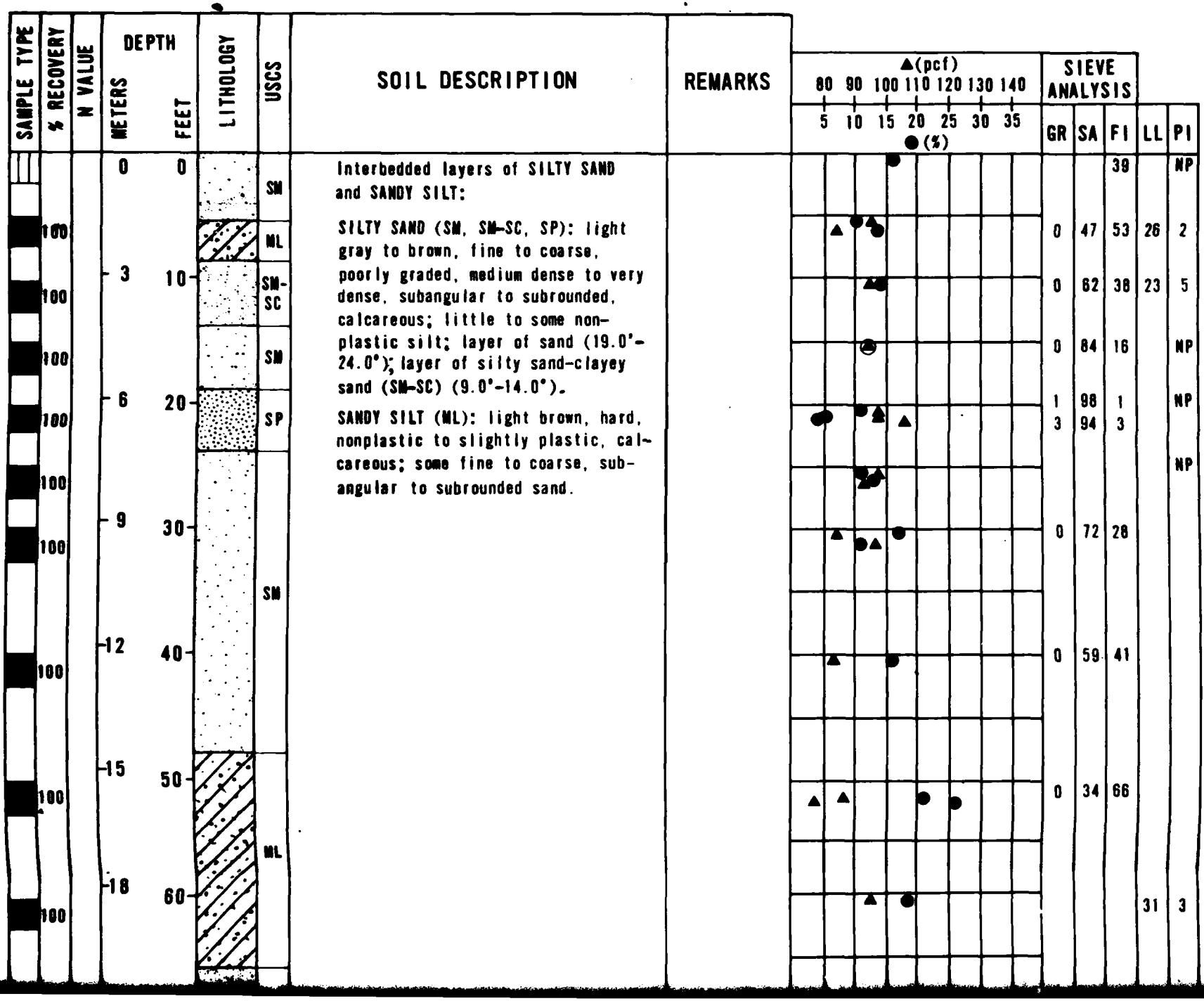
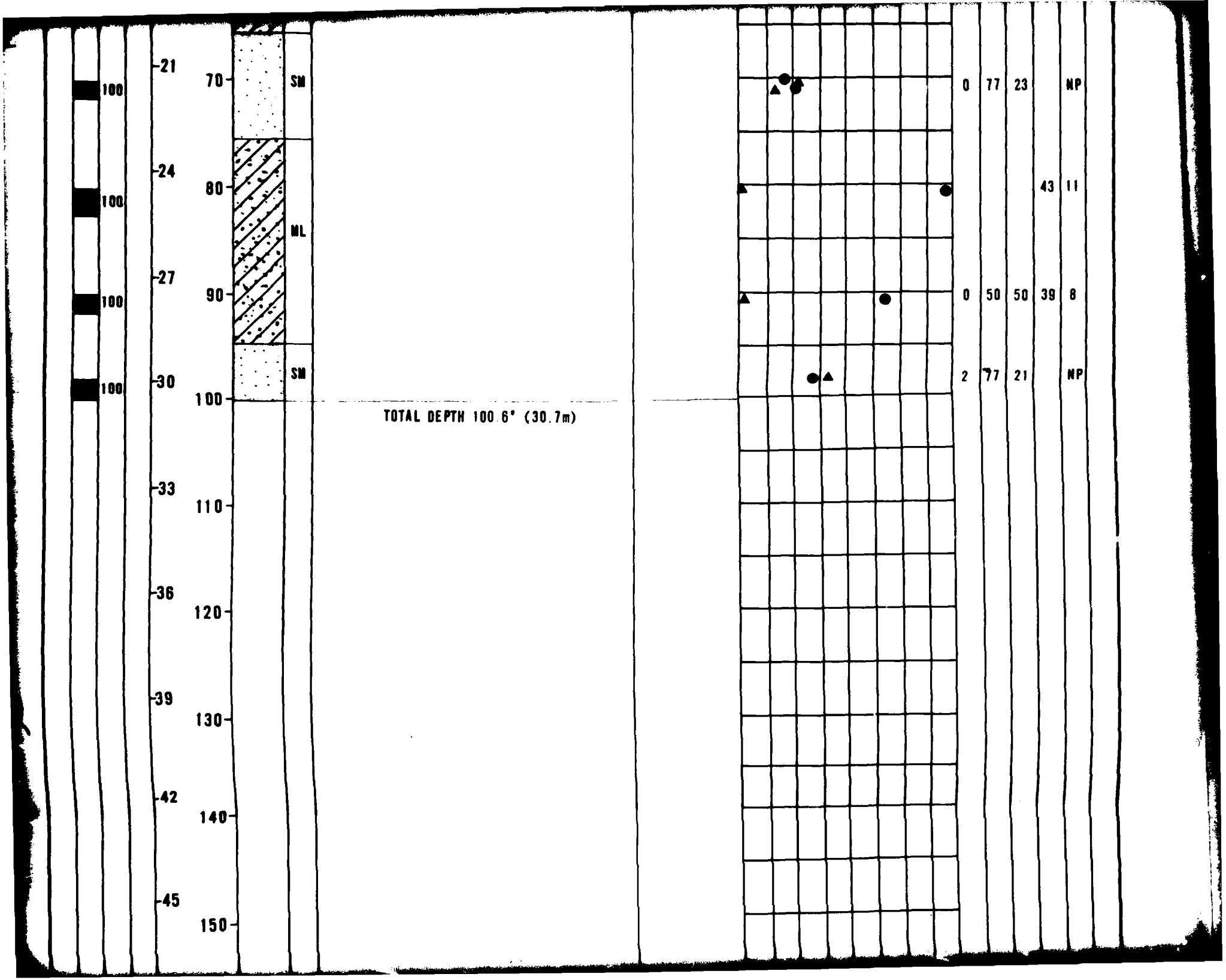
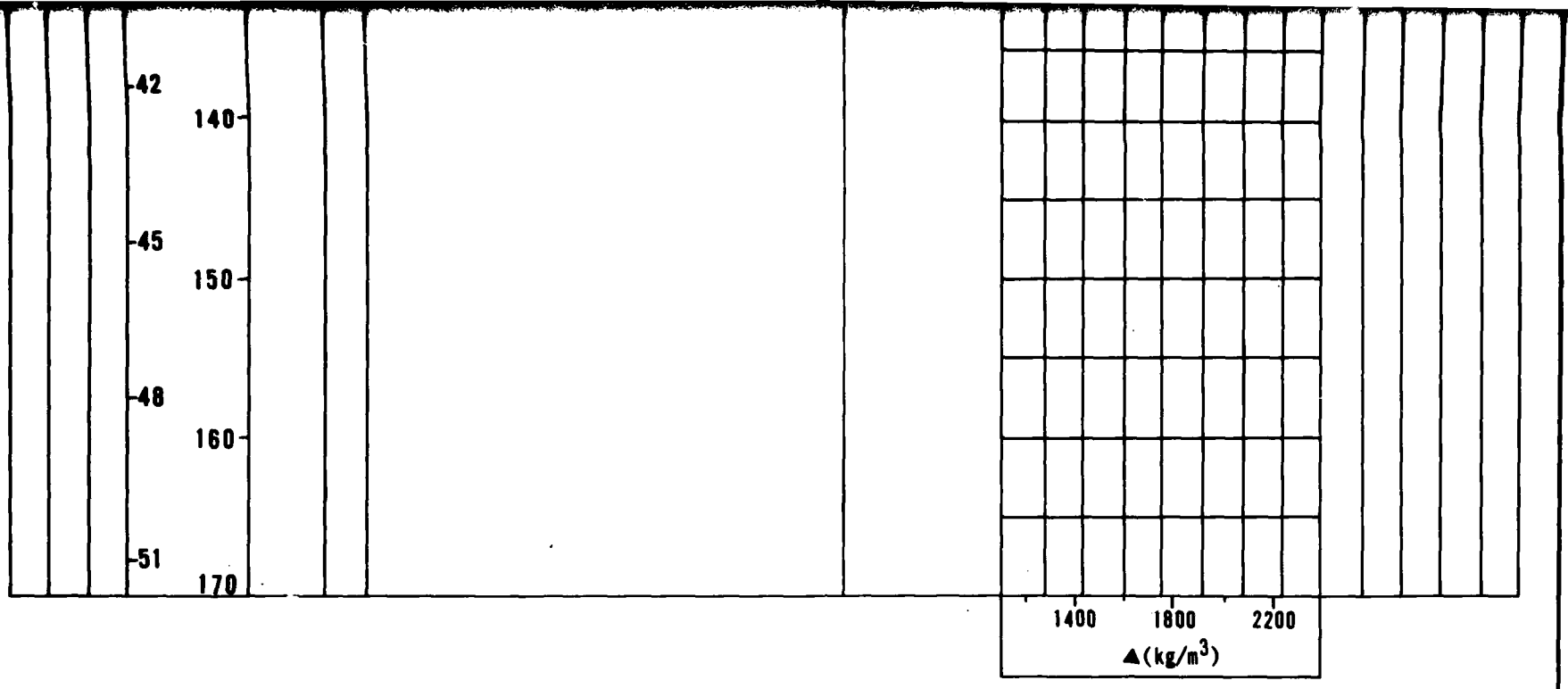



100
100
100
100
21
24
27
30
33
36
39
42
45
70
80
90
100
110
120
130
140
150
SM
ML
SM
TOTAL DEPTH 100.6' (30.7m)
0 77 23 NP
43 11
0 50 50 39 8
2 77 21 NP



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

BORING DETAILS

ELEVATION	: 4585' (1398m)
SURFICIAL GEOLOGIC UNIT	: A5y
DATE DRILLED	: 23-24 July 1977
DRILLING METHOD	: Rotary Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

FUGRO NATIONAL, INC.

LOG OF BORING DL-B-18
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
D-4-17

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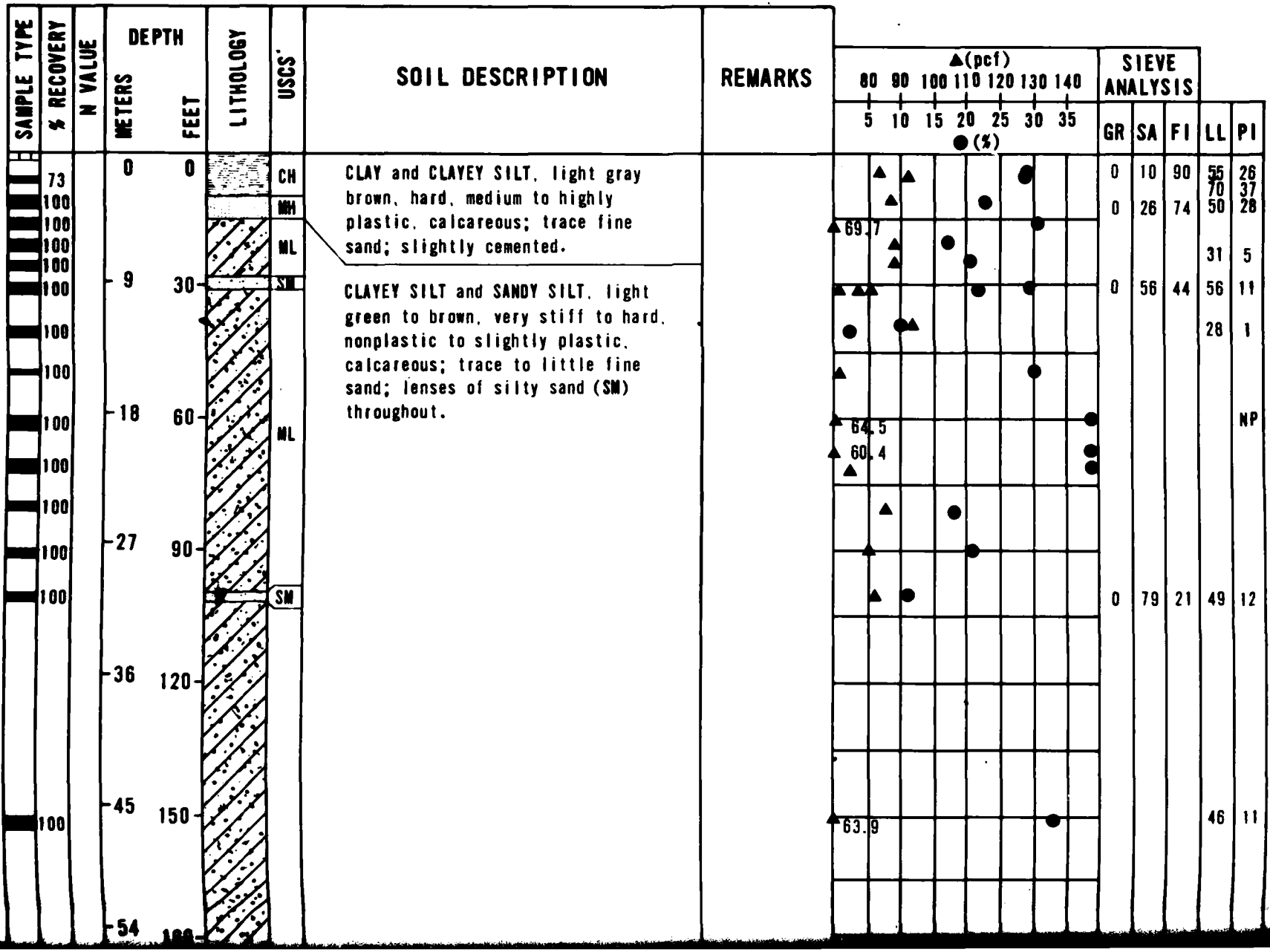
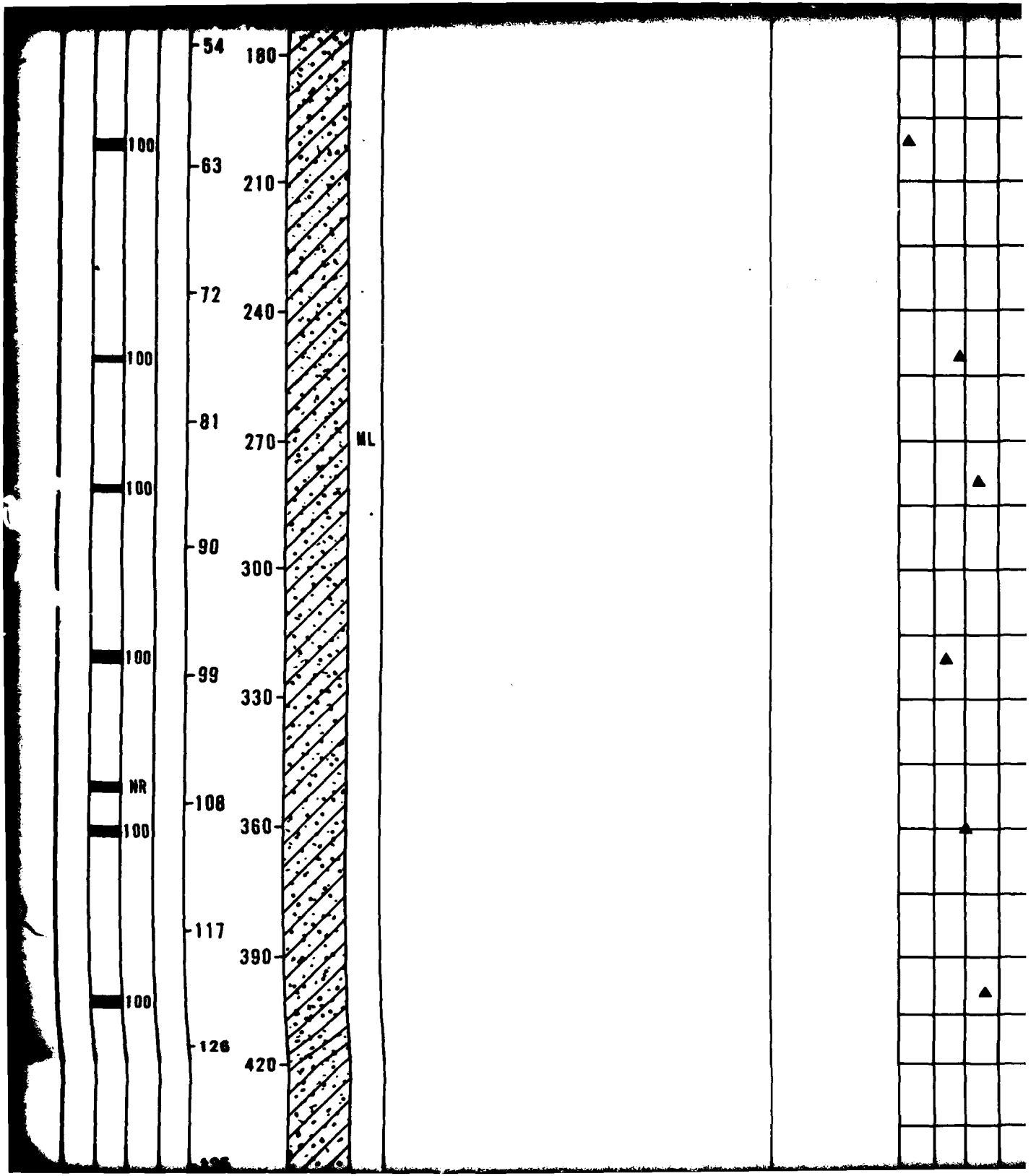
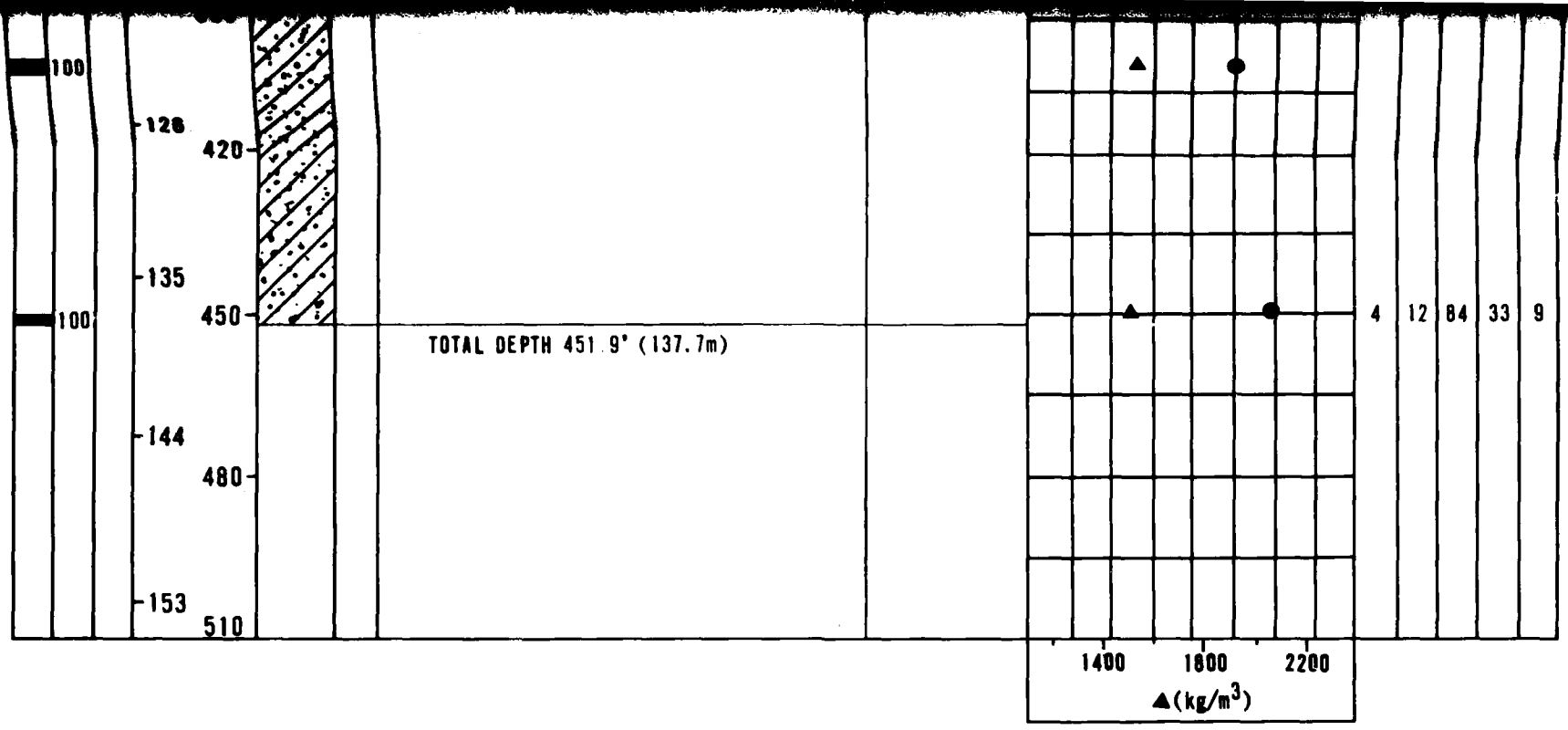



54
63
72
81
90
99
108
117
126
180
210
240
270
300
330
360
390
420
ML
100
100
100
100
NR
100
100



EXPLANATION

- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- CORE SAMPLE
- N – STANDARD PENETRATION RESISTANCE
- ▲ – DRY UNIT WEIGHT (ASTM: D-2937-71)
- ● – MOISTURE CONTENT (ASTM: D-2216-71)
- NR – NO RECOVERY

BORING DETAILS

ELEVATION	: 4590' (1399m)
SURFICIAL GEOLOGIC UNIT	: A4o
DATE DRILLED	: 21-23 July 1977
DRILLING METHOD	: Rotary Air Wash
HOLE DIAMETER	: 4 7/8" (124mm)
WATER LEVEL	: Not Encountered

LOG OF BORING DL-8-18
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-4-18

FUGRO NATIONAL, INC.

AFV-00

SECTION 5.0

TRENCH AND TEST PIT LOGS

5.0 EXPLANATIONS OF TRENCH AND TEST PIT LOGS

See Section 4.0, "Boring Logs", for explanations.

FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0			loose	SILTY SAND, light brown, fine to coarse, poorly graded, slightly moist, subangular to subrounded, calcareous; little silt; trace fine gravel.		10	70	20		NP
		2										
	1											
		4		SM	medium dense		vertical walls stable					
	2	6										
		8										
	3	10		SP	medium dense	GRAVELLY SAND, gray, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some fine gravel.	sloughing	22	76	2		
		12										
	4					GRAVELLY SAND, brown, fine to coarse, well graded, slightly moist, subangular, calcareous; some fine to coarse gravel; trace silt.						
		14		SW-SM	very dense		vertical walls stable	30	60	10	29	6
	5	16										
					dense							
		18				TOTAL DEPTH 18.0' (5.5m)						
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 5100' (1554m)
DATE EXCAVATED : 23 August 1977
SURFICIAL GEOLOGIC UNIT : A2
TRENCH LENGTH : 58.0' (17.7m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-1
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-1

FUGRO NATIONAL, INC.

14 MAR 80

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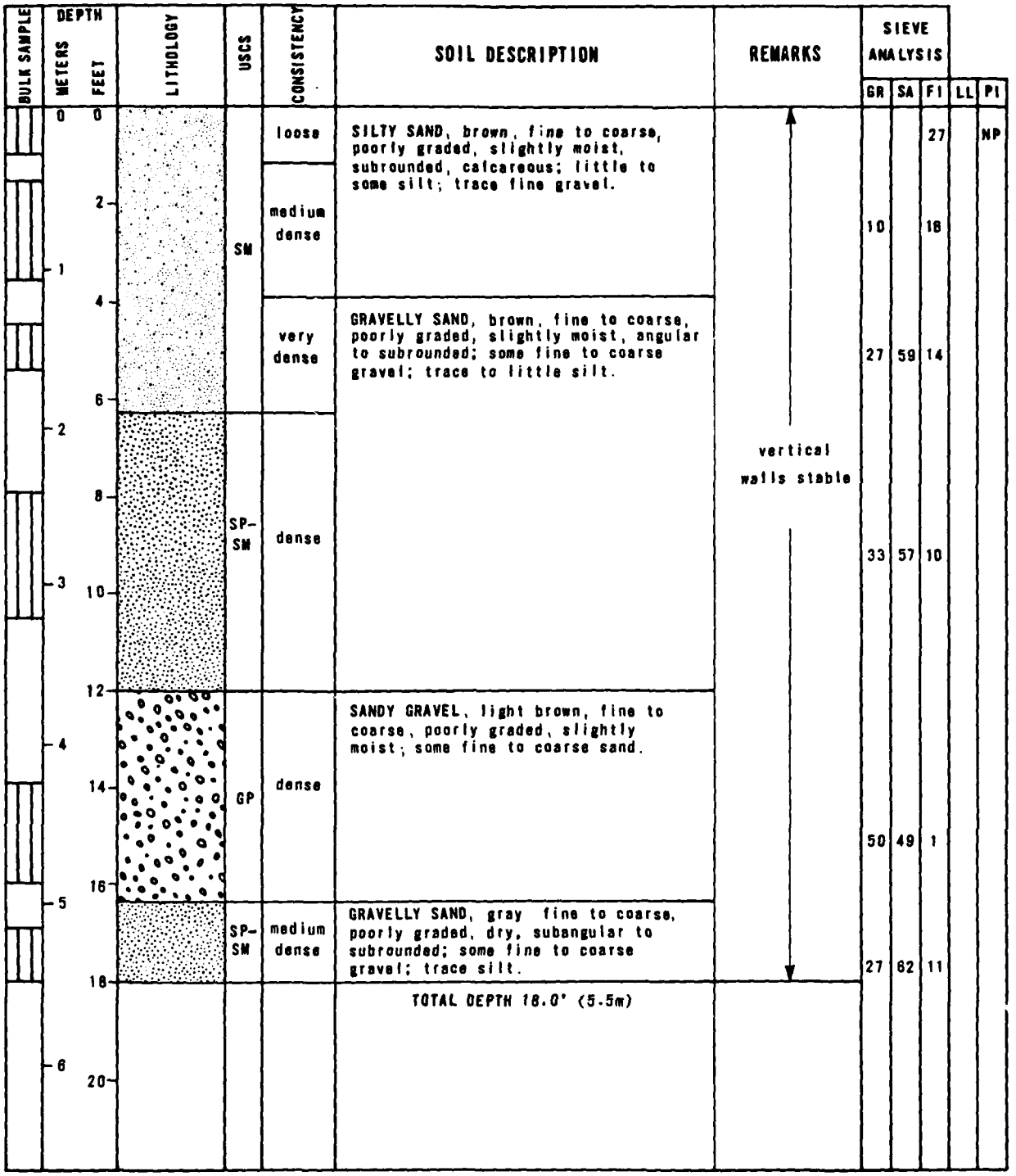
FN-TR-27-DL



TRENCH DETAILS

SURFACE ELEVATION : 5125' (1562m)
DATE EXCAVATED : 24 August 1977
SURFICIAL GEOLOGIC UNIT : A5y
TRENCH LENGTH : 57.0' (17.7m)
TRENCH ORIENTATION : NE-SW

LOG OF TRENCH DL-T-2
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-2

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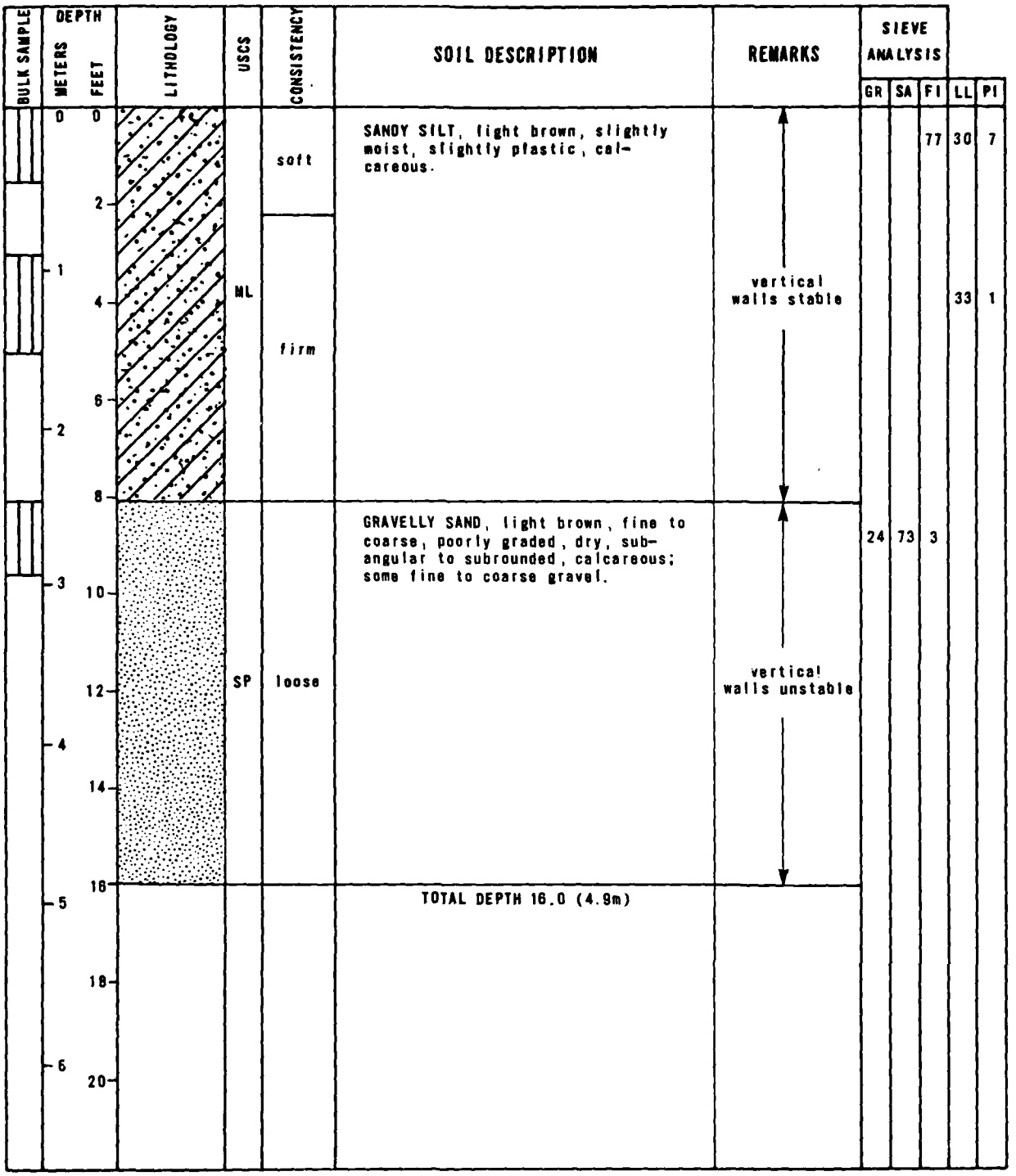

TRENCH DETAILS

SURFACE ELEVATION : 4770' (1454m)
DATE EXCAVATED : 24 August 1977
SURFICIAL GEOLOGIC UNIT : A1
TRENCH LENGTH : 60.0'(18.3m)
TRENCH ORIENTATION : E-W

LOG TRENCH DL-T-3
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE
II-5-3

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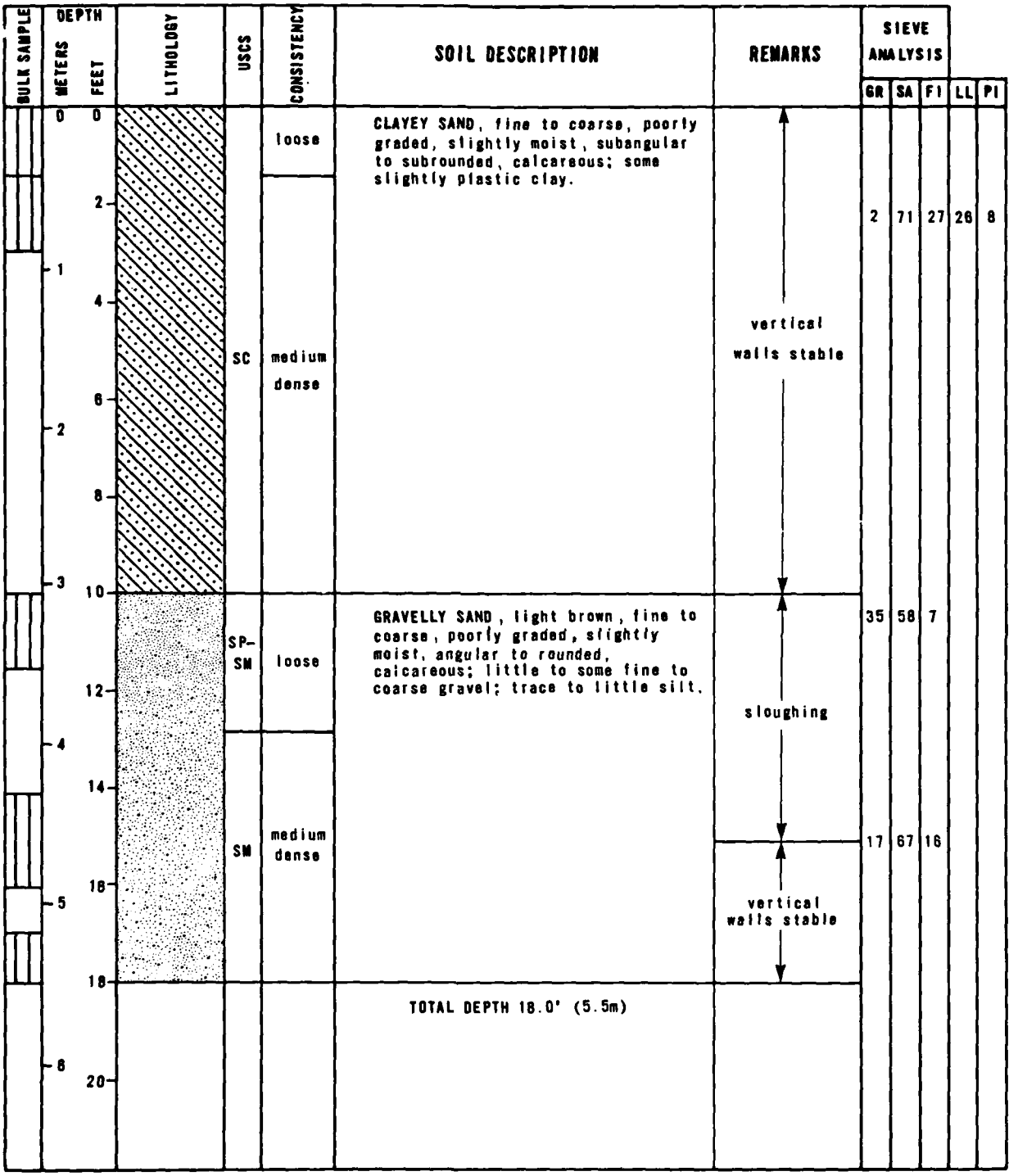

TRENCH DETAILS

SURFACE ELEVATION : 4880' (1487m)
DATE EXCAVATED : 24 August 1977
SURFICIAL GEOLOGIC UNIT : A5y
TRENCH LENGTH : 58.0'(17.7m)
TRENCH ORIENTATION : N-S

LOG OF TRENCH DL-T-4
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-4

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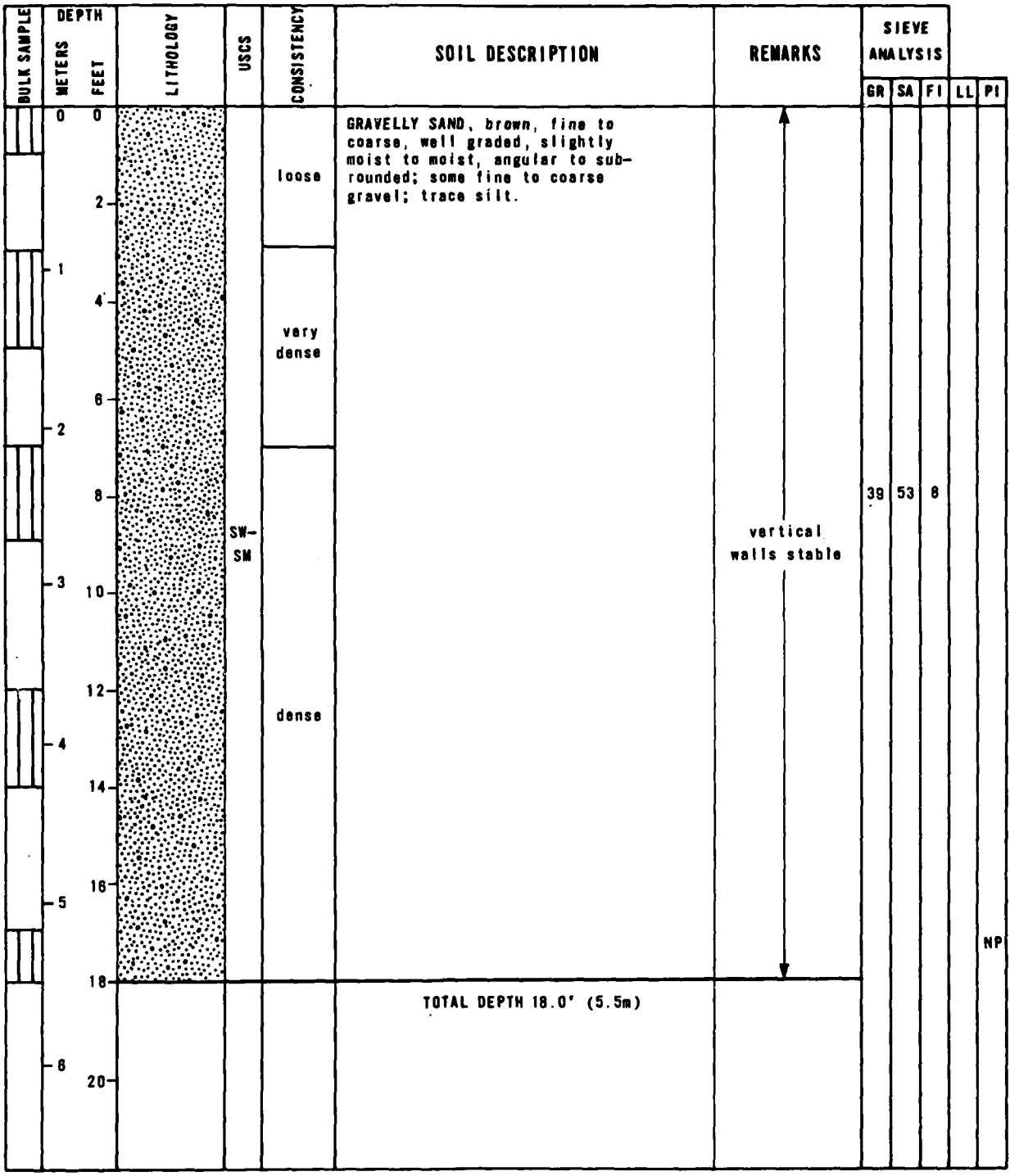

TRENCH DETAILS

SURFACE ELEVATION : 4905' (1495m)
DATE EXCAVATED : 23 August 1977
SURFICIAL GEOLOGIC UNIT : A5y
TRENCH LENGTH : 67.0'(20.4m)
TRENCH ORIENTATION : NW-SE

LOG OF TRENCH DL-T-5
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-5

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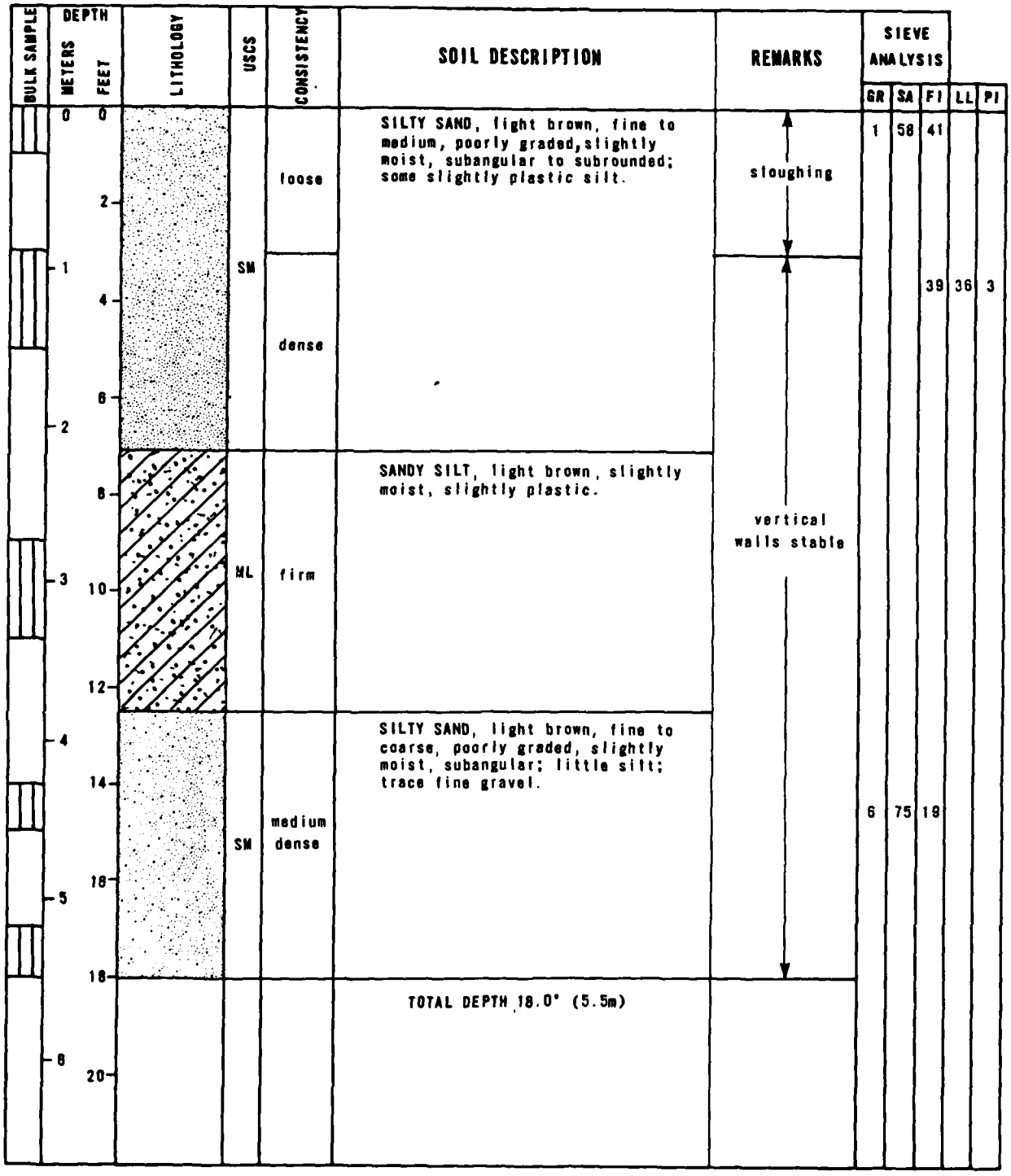

TRENCH DETAILS

SURFACE ELEVATION : 4650' (1417m)
DATE EXCAVATED : 22 August 1977
SURFICIAL GEOLOGIC UNIT : A4e
TRENCH LENGTH : 59.0'(18.0m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-6
DRY LAKE VALLEY NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-6

FUGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SC	loose	CLAYEY SAND, brown, fine to medium, poorly graded, moist, subangular, calcareous; some slightly plastic clay.	vertical walls stable			43	19	9
		2										
	1	4		SM	medium dense	SILTY SAND, light brown, fine to coarse, poorly graded, slightly moist, angular to subrounded, calcareous; little silt; trace fine gravel.		12	75	13		
	2	6										
		8										
	3	10										
		12										
	4	14										
		16										
	5	18		SP-SM	dense	GRAVELLY SAND, gray, fine to coarse, poorly graded, slightly moist, subangular, calcareous; little fine gravel; trace silt.		18	77	5		
						TOTAL DEPTH 18.0' (5.5m)						
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 4630' (1411m)
DATE EXCAVATED : 21 August 1977
SURFICIAL GEOLOGIC UNIT : A2s
TRENCH LENGTH : 70.0' (21.3m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-7
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-7

FUGRO NATIONAL, INC.

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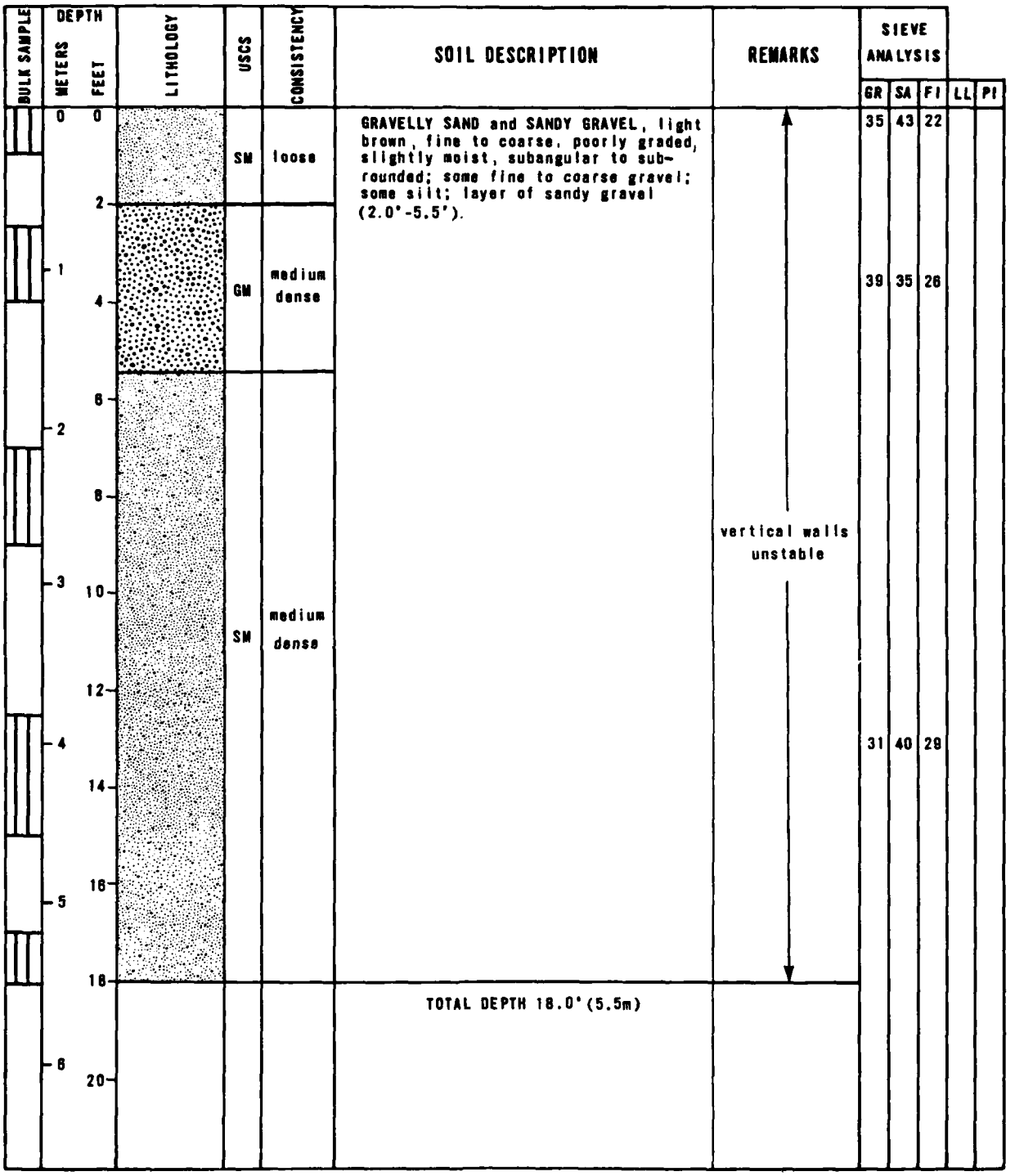

TRENCH DETAILS

SURFACE ELEVATION : 4805' (1465m)
DATE EXCAVATED : 22 August 1977
SURFICIAL GEOLOGIC UNIT : A1
TRENCH LENGTH : 50.0' (15.2m)
TRENCH ORIENTATION : NE-SW

LOG OF TRENCH DL-T-8
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-8

UGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0										
		2				SILTY SAND, light brown, fine to coarse, poorly graded, dry, sub-angular, calcareous; some non-plastic silt.	vertical walls unstable	3	64	33		
	1	4		SM	medium dense							
		6										
	2	8										
		10		SP	medium dense	GRAVELLY SAND, dark brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; little fine angular to subangular *gravel*; stage I caliche (9.0'-12.0').	vertical walls *stable*					
	3	12										
	4	14		ML	hard	SANDY SILT, light brown, dry, slightly plastic, calcareous; some fine to coarse angular to sub-angular sand; stage III caliche (12.0'-14.0').						
						TOTAL DEPTH 14.0' (4.3m)						
	5	16										
		18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 4850' (1478m)
DATE EXCAVATED : 23 OCTOBER 1979
SURFICIAL GEOLOGIC UNIT : A2
TRENCH LENGTH : 18.0' (4.9m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-9
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-9

FUGRO NATIONAL, INC.

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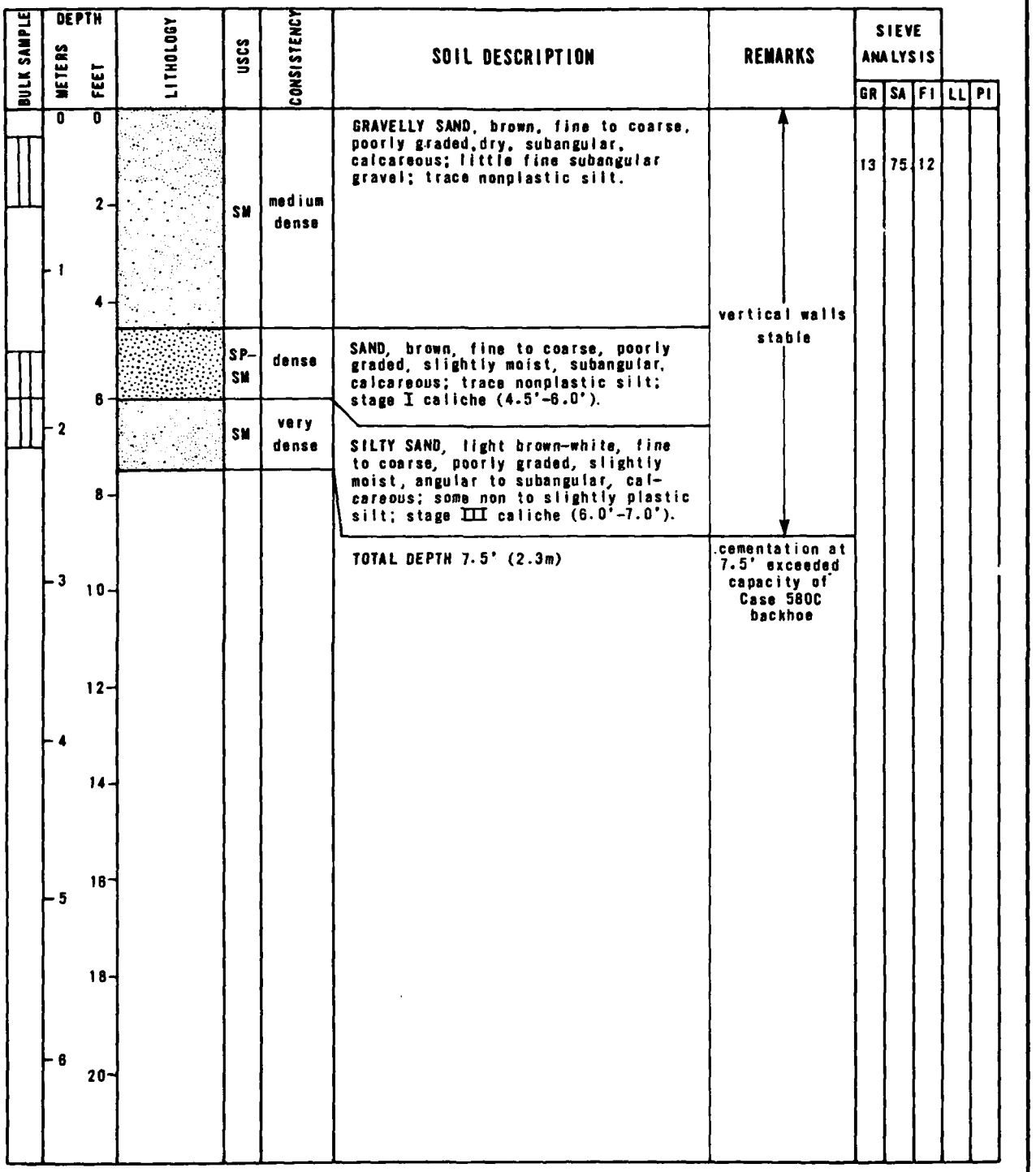
FN-TR-27-DL



TRENCH DETAILS

SURFACE ELEVATION	: 4965' (1513m)
DATE EXCAVATED	: 23 OCTOBER 1979
SURFICIAL GEOLOGIC UNIT	: A2
TRENCH LENGTH	: 12.0' (3.7m)
TRENCH ORIENTATION	: N-S

LOG OF TRENCH DL-T-10
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-10

UGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		CL	firm	SANDY CLAY, light brown, slightly moist, medium plastic, calcareous; some fine to coarse subangular sand.	vertical walls unstable	2	21	77	32	16
	1	2										
		4										
	2	6		SM	dense	SILTY SAND, light brown, fine, poorly graded, slightly moist, subangular, calcareous; some nonplastic silt.	vertical walls stable					
		8										
	3	10		SM	dense	SILTY SAND, light brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some slightly plastic silt; little fine to coarse subangular gravel; occasional cobbles to 6" size; stage I caliche (8.0'-14.0').						
		12										
	4	14				TOTAL DEPTH 14.0' (4.3m)						
		16										
	5											
		18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION :4720' (1439m)
DATE EXCAVATED :2 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT :A5y
TRENCH LENGTH :25.0' (7.6m)
TRENCH ORIENTATION :E-W

LOG OF TRENCH DL-T-11
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-11

UGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0				SANDY GRAVEL, brown, fine to coarse, poorly graded, dry, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded sand; trace nonplastic silt; occasional cobbles to 24" size.		56	34	10		
		2										
	1	4										
		6		GP-GM	dense		vertical walls stable					
	2	8										
	3	10										
		12										
	4	14				TOTAL DEPTH 14.0' (4.3m)						
		16										
	5	18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION :4765' (1452m)
DATE EXCAVATED :3 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT :A5y
TRENCH LENGTH :20.0' (6.1m)
TRENCH ORIENTATION :NW-SE

LOG OF TRENCH DL-T-12
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-12

FUGRO NATIONAL, INC.

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0				GRAVELLY SAND, brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; some fine to coarse subangular gravel; little nonplastic silt.		42	45	13		
		2										
	1	4										
		6		SM	medium dense		vertical walls stable					
	2											
		8										
	3	10										
		12										
	4											
		14				TOTAL DEPTH 14.0' (4.3m)						
	5	16										
		18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 4720' (1439m)
DATE EXCAVATED : 3 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT: A5i
TRENCH LENGTH : 50.0' (15.3m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-13
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-13

UGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		CH	firm	SILTY CLAY, olive-brown, slightly moist, highly plastic, calcareous; trace fine sand.	vertical walls stable	0	11	89	67	37
		2										
	1	4										
		6		SM	dense	SILTY SAND, gray, fine to medium, poorly graded, slightly moist, sub-angular to subrounded, calcareous; some nonplastic silt.						
	2	8			very dense							
	3	10				TOTAL DEPTH 9.0' (2.7m)						
		12										
	4	14										
		16										
	5	18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 4585' (1398m)
DATE EXCAVATED : 4 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT : A4o
TRENCH LENGTH : 14.0' (4.3m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-14
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-14

FUGRO NATIONAL, INC.

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0										
		2				SILTY SAND, brown, fine to medium, poorly graded, dry, subangular, calcareous; some nonplastic silt; lenses of slightly plastic clay (0.5"–0.8").						
	1	4		SM	medium dense							
		6					vertical walls stable					
	2											
		8				SAND, gray-brown, fine to coarse, poorly graded, dry, subangular to subrounded, calcareous.						
	3	10		SP	medium dense							
		12										
	4											
		14				TOTAL DEPTH 14.0' (4.3m)						
		16										
	5											
		18										
	6											
		20										

TRENCH DETAILS

SURFACE ELEVATION : 4610' (1405m)
DATE EXCAVATED : 5 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT : A4o
TRENCH LENGTH : 16.0' (4.9m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-15
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-15

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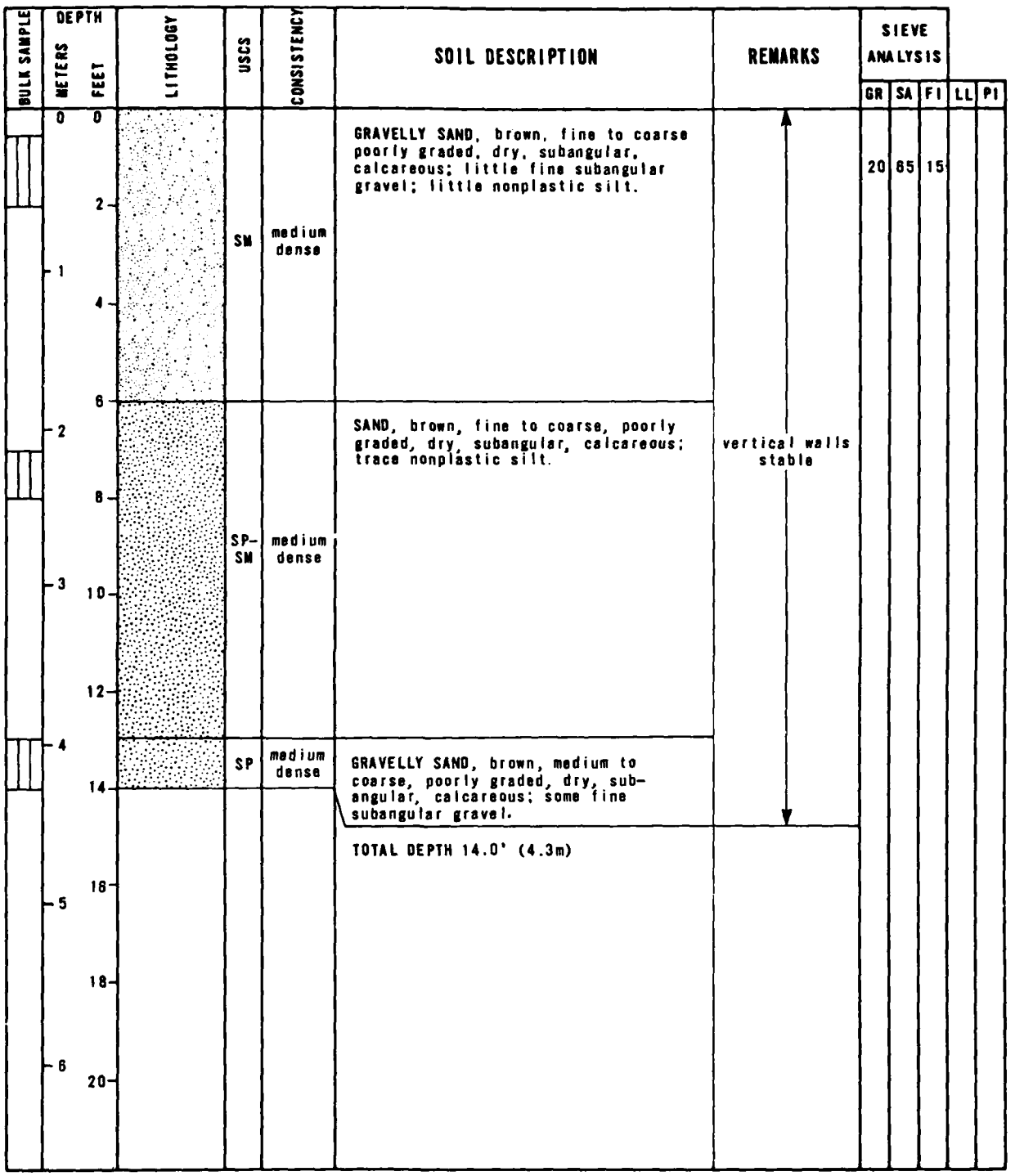

TRENCH DETAILS

SURFACE ELEVATION : 4800' (1463m)
DATE EXCAVATED : 5 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT : A5y
TRENCH LENGTH : 16.0' (4.9m)
TRENCH ORIENTATION : E-W

LOG OF TRENCH DL-T-16
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-16

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0			medium dense	SILTY SAND, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; little non-plastic silt; little fine angular to subangular gravel; stage III-IV caliche (2.0'-6.0').	vertical walls stable	17	64	19		
		2										
	1			SM								
		4			dense							
		6				GRAVELLY SAND, brown, fine to coarse, poorly graded, slightly moist, sub-angular, calcareous; some fine sub-angular gravel; some cobbles to 10" size (10.0'-14.0').						
	2											
		8										
	3	10		SP	dense							
		12										
	4											
		14				TOTAL DEPTH 14.0' (4.3m)						
		16										
	5											
		18										
	6											
		20										

TRENCH DETAILS

SURFACE ELEVATION : 4960' (1512m)
DATE EXCAVATED : 8 NOVEMBER 1979.
SURFICIAL GEOLOGIC UNIT : A5i
TRENCH LENGTH : 16.0' (4.9m)
TRENCH ORIENTATION : N-S

LOG OF TRENCH DL-T-17
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-17

UGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, dark brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; little nonplastic silt; stage I caliche (2.5'-4.0').	vertical walls stable	2	77	21		
	1	2			dense							
		4		SP	medium dense	SAND, dark brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous.						
	2	6										
	3	8										
		10										
		12										
	4	14		SM	dense	SILTY SAND, gray-brown, fine to medium, poorly graded, slightly moist, subangular, calcareous; some nonplastic silt.						
						TOTAL DEPTH 14.0' (4.3m)						
	5	16										
		18										
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 4795' (1462m)
DATE EXCAVATED : 14 NOVEMBER 1979
SURFICIAL GEOLOGIC UNIT : A5y
TRENCH LENGTH : 16.0' (4.9m)
TRENCH ORIENTATION : NE-SW

LOG OF TRENCH DL-T-18
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-18

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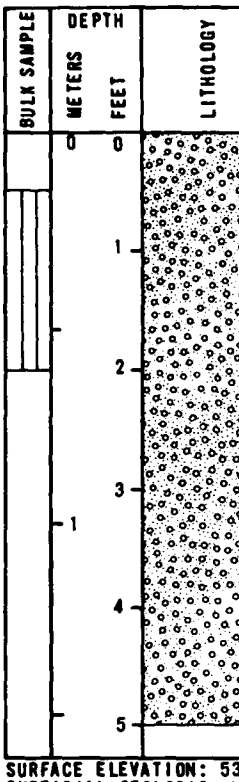
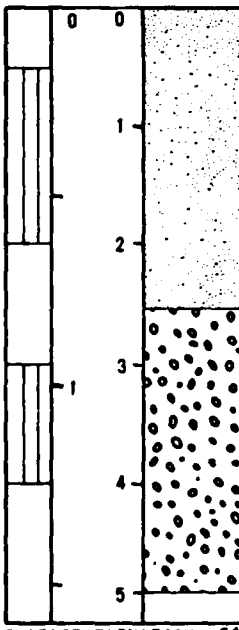


BULK SAMPLE	DEPTH METERS	DEPTH FEET	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0	GM	loose	SANDY GRAVEL, light brown, fine to coarse, poorly graded, dry, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded sand; little nonplastic silt; trace cobbles and boulders to 18" size.	sloughing	49	31	20		
	1	1									
	2	2									
	3	3									
	4	4									
	5	5			TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5340' (1628m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-1



DEPTH METERS	DEPTH FEET	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
0	0	SM	medium dense	SILTY SAND, light brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some nonplastic silt; trace fine angular to subangular gravel; stage I caliche (0.5'-2.5').	sloughing	12	62	26		
1	1									
2	2									
3	3	GP	medium dense	SANDY GRAVEL, brown, fine to coarse, poorly graded, dry, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded sand.						
4	4									
5	5			TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5170' (1578m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-2

LOGS OF TEST PITS DL-P-1 AND DL-P-2
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE BMO

FIGURE II-5-19

UGRO NATIONAL, INC.

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, light brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some nonplastic silt.	vertical walls stable					
		1										
		2										
	1	3		SM	dense	GRAVELLY SAND, light brown-white, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some fine to coarse angular to subangular gravel; little nonplastic silt; stage II caliche (1.5'-5.0').						
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5095' (1553m)
SURFICIAL GEOLOGIC UNIT: A2

LOG OF TEST PIT DL-P-3

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, dark brown to light brown-white, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some nonplastic silt; stage I-II caliche (2.0'-3.5').	vertical walls stable					
		1										
		2			dense							
	1	3			very dense							
		4				TOTAL DEPTH 3.5' (1.1m)	cementation at 3.5' exceeded capacity of Case 580C backhoe					
		5										

SURFACE ELEVATION: 5235' (1596m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-4

LOGS OF TEST PITS DL-P-3 AND DL-P-4
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-20

FUGRO NATIONAL, INC.

14 MAR 80

AFV-03

FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0										
		1		SM	medium dense	SILTY SAND, dark brown, fine to coarse, poorly graded, dry, subangular, calcareous; some nonplastic silt.	vertical walls stable					
		2										
	1	3		SP-SM	dense	SAND, light brown-white, fine to coarse, poorly graded, dry, angular to subangular, calcareous; trace nonplastic silt; trace fine to coarse angular gravel; stage I caliche (2.0'-5.0').						
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5015' (1529m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-5

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0										
		1		ML	stiff	SANDY SILT, light brown, slightly moist, nonplastic, calcareous; some fine subangular sand.	vertical walls stable	0	22	78		NP
		2										
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4810' (1466m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-6

LOGS OF TEST PITS DL-P-5 AND DL-P-6
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-21

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14 MAR 80

AFV-03

FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0				SANDY GRAVEL, light brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; little fine to coarse angular to subangular sand; stage II-III caliche (0.0'-5.0').						
		1										
		2		GP	very dense		vertical walls stable					
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5100' (1554m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-7

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0				SILTY SAND, light brown, fine to coarse, poorly graded, dry, sub-angular to subrounded, calcareous; some nonplastic silt.						
		1										
		2		SM	medium dense		vertical walls stable					
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4950' (1509m)
SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT DL-P-8

LOGS OF TEST PITS DL-P-7 AND DL-P-8
DRY LAKE VALLEY, NEVADA

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FIGURE
II-5-22

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SC	medium dense	CLAYEY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; some slightly plastic clay; trace fine subangular gravel.	vertical walls stable	5	60	35		
		1										
		2		SM	very dense	SILTY SAND, light brown-white, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some nonplastic silt; stage IV caliche (2.0'-3.0').						
	1	3				TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					
		4										
		5										

SURFACE ELEVATION: 5060' (1542m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-9

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS
	0	0		SM	loose	Interbedded layers of SILTY SAND and SAND: SILTY SAND (SM); brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some nonplastic silt; trace fine angular to subangular gravel. SAND (SP); brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous.	sloughing
		1					
		2					
	1	3		SP	loose		
		4		SM	loose		
		5				TOTAL DEPTH 5.0' (1.5m)	

SURFACE ELEVATION: 4715' (1437m)
SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT DL-P-10

LOGS OF TEST PITS DL-P-9 AND DL-P-10
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE
II-5-23

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, light brown, fine to medium, poorly graded, slightly moist, subangular, calcareous; little nonplastic silt.	vertical walls stable	0	80	20		
		1										
		2										
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4645' (1416m)
SURFICIAL GEOLOGIC UNIT: A4o

LOG OF TEST PIT DL-P-11

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		GW	dense	SANDY GRAVEL, brown, fine to coarse, well graded, dry, angular to subangular, calcareous; some fine to coarse, angular to subangular sand trace nonplastic silt; stage II caliche (0.5'-2.5'); stage IV caliche (2.5'-3.0').	vertical walls stable	60	35	5		
		1										
		2			very dense							
	1	3				TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					
		4										
		5										

SURFACE ELEVATION: 5140' (1567m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT DL-P-12

LOGS OF TEST PITS DL-P-11 AND DL-P-12
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE II-5-24

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		GP-GM	dense	SANDY GRAVEL, brown, fine to coarse, poorly graded, dry, subangular, calcareous; some fine to coarse subangular sand; trace nonplastic silt; stage IV caliche (3.0'-3.5').	vertical walls stable	61	29	10		
		1			very dense							
	1	2										
		3										
		4				TOTAL DEPTH 3.5' (1.1m)	cementation at 3.5' exceeded capacity of Case 580C backhoe					
		5										

SURFACE ELEVATION: 4950' (1509m)
SURFICIAL GEOLOGIC UNIT: A5I

LOG OF TEST PIT DL-P-13

	0	0		ML	firm	CLAYEY SILT, brown, slightly moist, slightly plastic, calcareous; little fine subangular sand.	vertical walls stable					
		1										
	1	2										
		3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4700' (1433m)
SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT DL-P-14

LOGS OF TEST PITS DL-P-13 AND DL-P-14
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE
II-5-25

FUGRO NATIONAL, INC.

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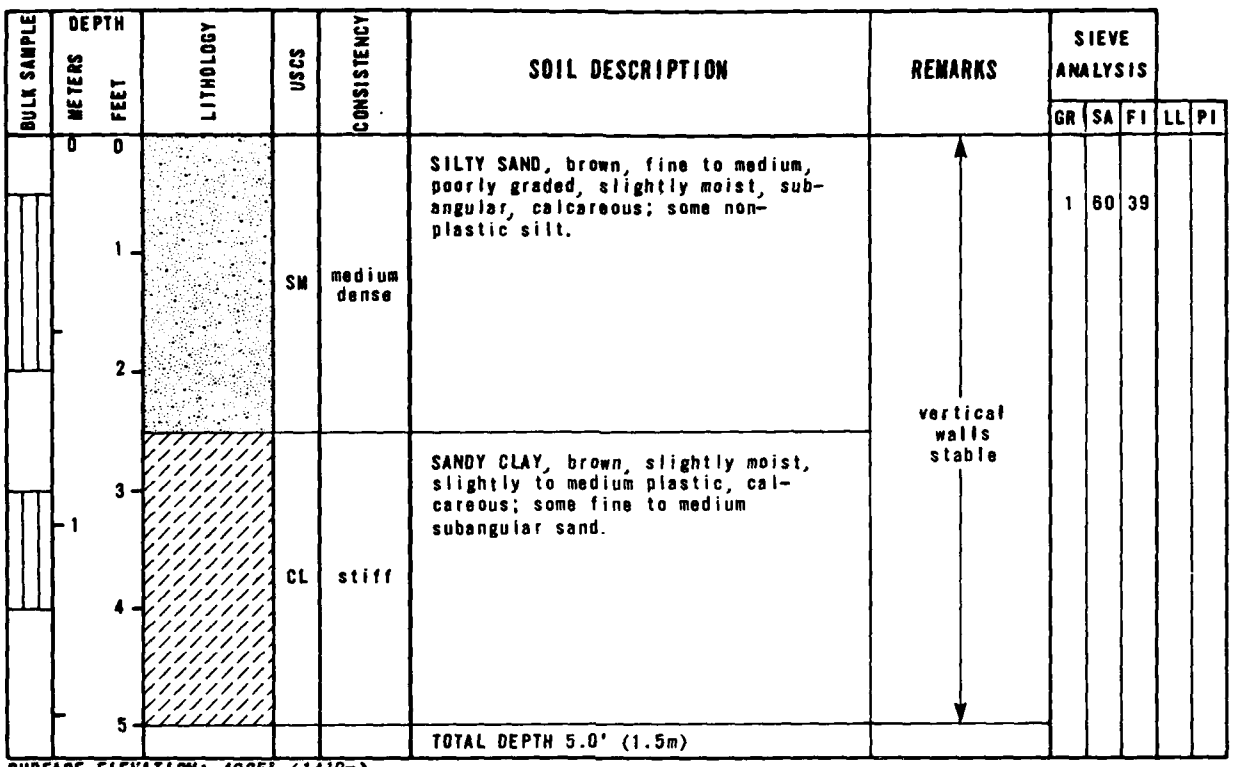
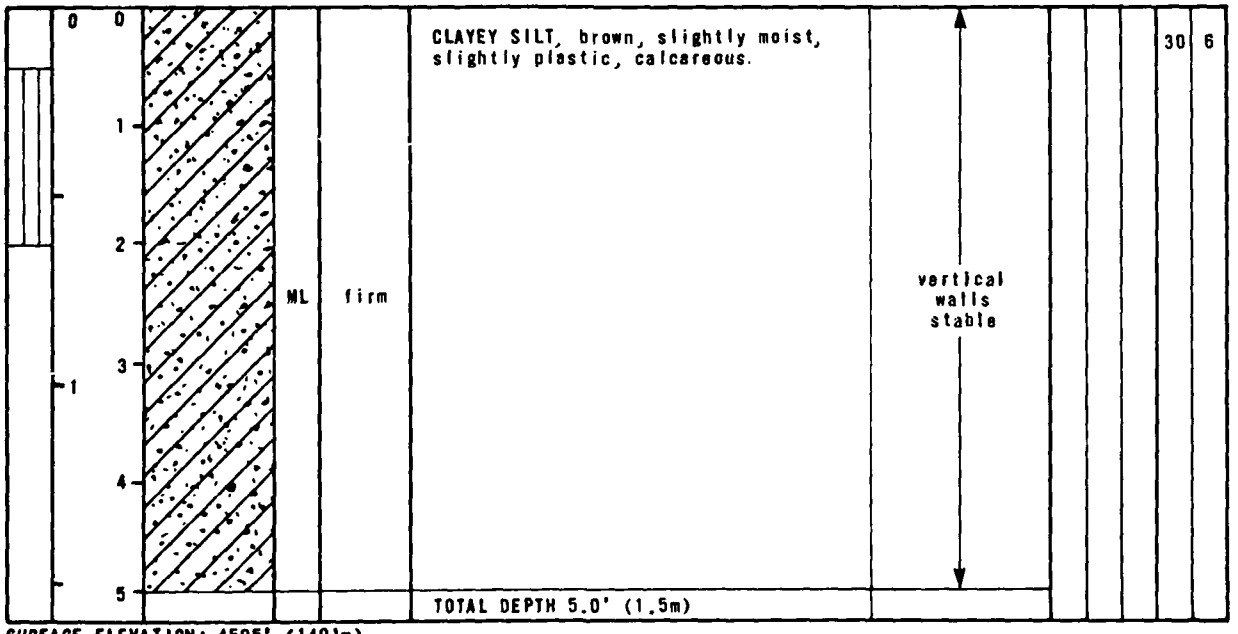
FN-TR-27-DL



SURFACE ELEVATION: 4625' (1410m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-15



SURFACE ELEVATION: 4595' (1401m)
SURFICIAL GEOLOGIC UNIT: A4o

LOG OF TEST PIT DL-P-16

LOGS OF TEST PITS DL-P-15 AND DL-P-16
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-26

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0				GRAVELLY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; some fine to coarse subangular gravel; some nonplastic silt.		34	40	26		
		1										
		2		SM	medium dense		sloughing					
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4655' (1419m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-17

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0				SILTY SAND, brown, fine to medium, poorly graded, dry, subrounded, calcareous; little nonplastic silt.						
		1										
		2		SM	medium dense		vertical walls stable					
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4585' (1398m)
SURFICIAL GEOLOGIC UNIT: A4o

LOG OF TEST PIT DL-P-18

LOGS OF TEST PITS DL-P-17 AND DL-P-18
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-27

FUGRO NATIONAL, INC.

14 MAR 80

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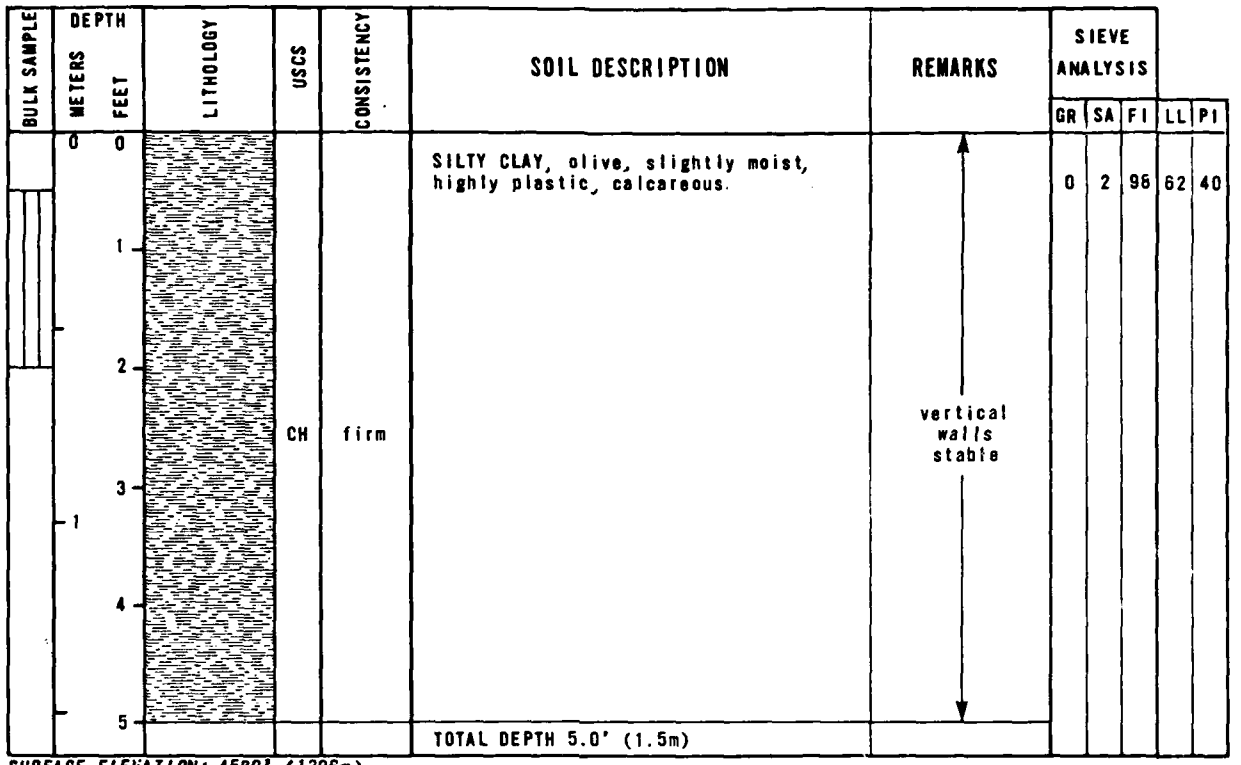
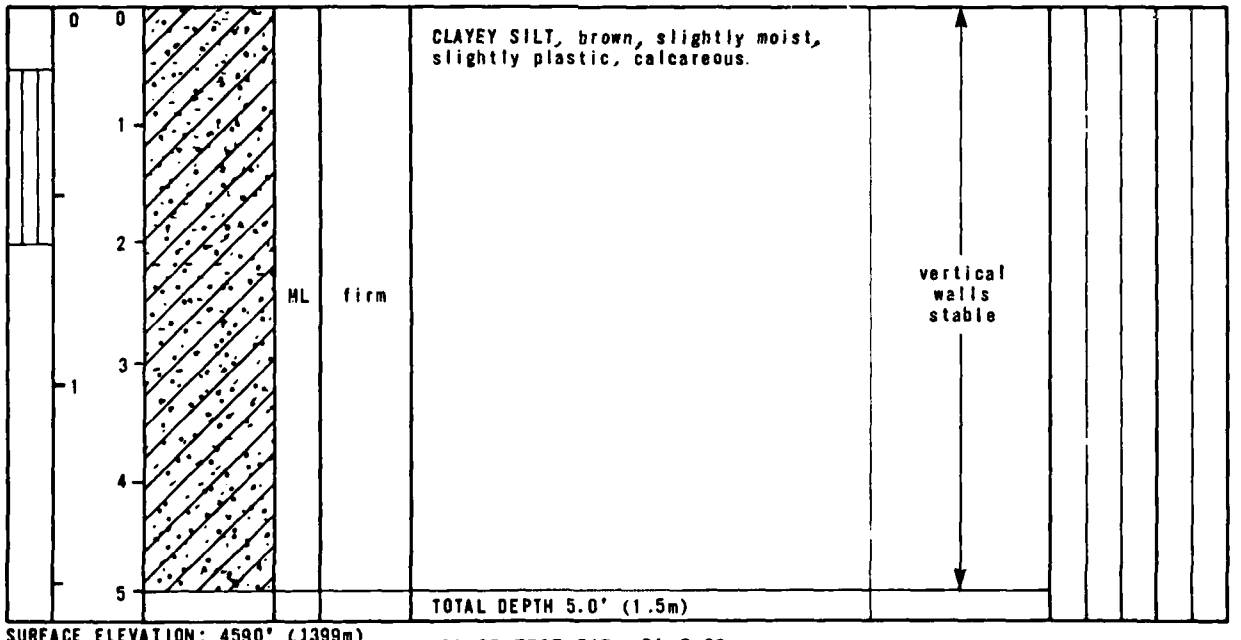
FN-TR-27-DL



SURFACE ELEVATION: 4580' (1396m)
SURFICIAL GEOLOGIC UNIT: A4

LOG OF TEST PIT DL-P-19



SURFACE ELEVATION: 4590' (1399m)
SURFICIAL GEOLOGIC UNIT: A4o

LOG OF TEST PIT DL-P-20

LOGS OF TEST PITS DL-P-19 AND DL-P-20
DRY LAKE VALLEY, NEVADA

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FIGURE
II-5-28

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; some nonplastic silt; little fine subangular gravel; occasional cobbles to 5" size (1.5'-2.0').	sloughing	17	54	29		
	1	1										
		2										
		3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4680' (1426m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-21

	0	0		SW-SM	dense	GRAVELLY SAND, brown to white, fine to coarse, poorly graded slightly moist, angular to subangular, calcareous; little fine to coarse angular to subangular gravel; trace nonplastic silt; stage IV caliche (1.0'-2.5') and (3.5'-4.0'); occasional cobbles and boulders to 14" size.	vertical walls stable	24	65	11		
	1	1			very dense							
		2			dense							
		3			very dense							
		4				TOTAL DEPTH 4.0' (1.2m)	cementation at 4.0' exceeded capacity of Case 580C backhoe					
		5										

SURFACE ELEVATION: 4935' (1504m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT DL-P-22

LOGS OF TEST PITS DL-P-21 AND DL-P-22
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-29

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FN-TR-27-DL

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	GRAVELLY SAND, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some fine angular to subangular gravel; little nonplastic silt; stage I caliche (0.5'-2.5').	vertical walls stable					
		1										
		2										
	1	3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4925' (1501m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT DL-P-23

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SW-SM	medium dense	GRAVELLY SAND, brown, fine to coarse, well graded, dry, subangular, calcareous; some fine to coarse subangular gravel; trace nonplastic silt.	vertical walls stable	24	71	5		
		1										
		2										
	1	3										
		4		SM	dense	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some nonplastic silt; trace fine subangular gravel.						
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5075' (1547m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT DL-P-24

LOGS OF TEST PITS DL-P-23 AND DL-P-24
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-5-30

FUGRO NATIONAL, INC.

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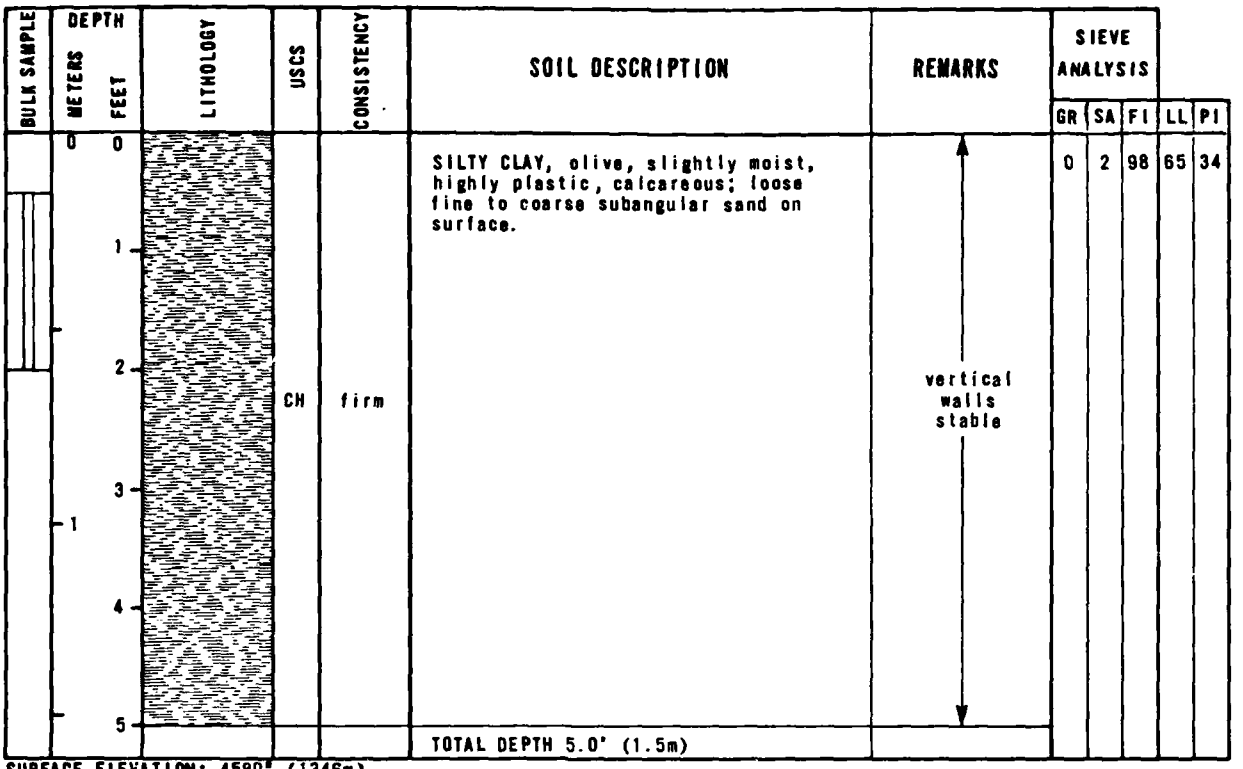
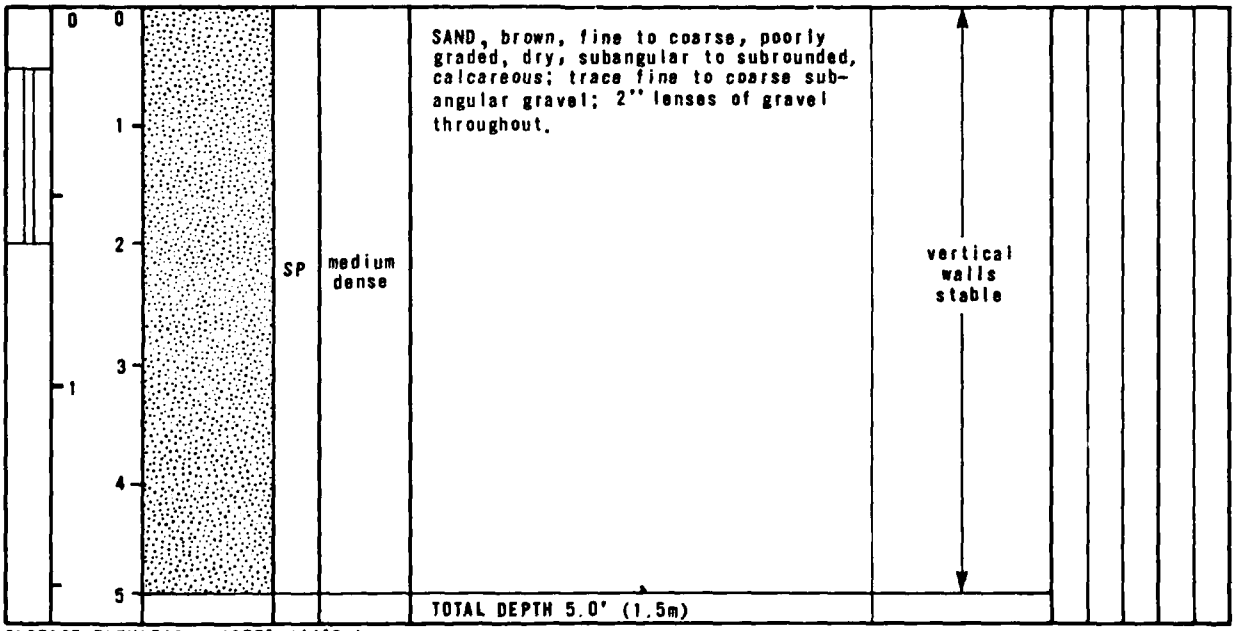
FN-TR-27-DL



SURFACE ELEVATION: 4580' (1346m)
SURFICIAL GEOLOGIC UNIT: A4a

LOG OF TEST PIT DL-P-25



SURFACE ELEVATION: 4655' (1419m)
SURFICIAL GEOLOGIC UNIT: A5y

LOG OF TEST PIT DL-P-26

LOGS OF TEST PITS DL-P-25 AND DL-P-26
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-5-31

UGRO NATIONAL, INC.

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BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; little nonplastic silt; pockets of white silty sand; some nonplastic silt (3.0'-5.0').	vertical walls stable					
		1										
	1	2										
		3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4750' (1448m)
SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT DL-P-27

BULK SAMPLE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS GR	SA	FI	LL	PI
	0	0			medium dense	SAND, brown, fine to coarse, poorly graded, slightly moist, subangular calcareous; trace nonplastic silt.	vertical walls stable					
		1		SP-SM	medium dense	GRAVELLY SAND, brown, fine to coarse, poorly graded, slightly moist, angular to subangular, calcareous; little to some fine angular to subangular gravel; trace nonplastic silt.		13	81	6		
	1	2										
		3										
		4										
		5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 4875' (1486m)
SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT DL-P-28

LOGS OF TEST PITS DL-P-27 AND DL-P-28
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE
II-5-32

FUGRO NATIONAL, INC.

SECTION 6.0

SURFICIAL SAMPLE LOGS

6.0 EXPLANATIONS OF SURFICIAL SAMPLE LOGS

Finalized logs of the surficial samples are presented in this section. Explanations of the column headings on the logs are as follows:

A. Designations - Surficial samples are identified as follows:

DL-CS-1
DL - abbreviation for the valley (e.g., DL - Dry Lake)
CS - abbreviation for surficial sample
1 - number of activity

B. Ground Surface Elevation - Indicated elevations on the logs are estimated from topographic maps of the study area within an accuracy of half the contour interval.

C. Surficial Geologic Unit - Indicates the surficial geologic unit in which the activity is located.

D. Depth - Indicates depth interval for which soil description is given.

E. USCS - Unified Soil Classification Symbol; see Table II-4-1 of Section 4.0, "Boring Logs", for details of USCS.

F. Soil Description - Soil is described based on field visual descriptions and/or laboratory test results. See Section 4.0, "Boring Logs", for procedures of soil description.

G. Sieve Analysis, LL and PI - These are from results of laboratory tests. See Section 4.0, "Boring Logs", for explanation.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
DL-CS-1	5190 (1582)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, subangular to subrounded, calcareous; some nonplastic silt; trace fine to coarse angular to subangular gravel.					
DL-CS-2	5125 (1562)	A5y	0.0-2.0 (0.0-0.6)	SM-SC	SILTY SAND-CLAYEY SAND, dark brown, fine to coarse, poorly graded, subangular to subrounded, calcareous; some slightly plastic clay and silt; trace fine subangular to subrounded gravel.	6	66	28	21	6
DL-CS-4	4970 (1515)	A1	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, dark brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-6	4970 (1515)	A2	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some non to slightly plastic silt; little fine to coarse subangular gravel.					
DL-CS-8	5000 (1524)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-12	5100 (1554)	A2	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to medium, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-13	5095 (1553)	A2	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-14	5110 (1558)	A5y	0.0-2.0 (0.0-0.6)	SC	CLAYEY SAND, dark brown, fine to coarse, poorly graded, subangular, calcareous; some slightly plastic clay.	1	68	31	32	15
DL-CS-15	5190 (1582)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, dark brown, fine to medium, poorly graded, subangular to subrounded, calcareous; little nonplastic silt.	2	78	20		NP
DL-CS-17	5300 (1615)	A5y	0.0-2.0 (0.0-0.6)	SC	CLAYEY SAND, dark brown, fine to coarse, poorly graded, subangular, calcareous; some slightly plastic clay.					
DL-CS-18	5170 (1576)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, subangular to subrounded, calcareous; some nonplastic silt; little fine subangular to subrounded gravel.	14	49	37		NP

LOGS OF SURFICIAL SOIL SAMPLES,
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-6-1 1 OF 5

UGRO NATIONAL, INC.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
DL-CS-19	5225 (1593)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; little nonplastic silt; trace fine angular to subangular gravel.					
DL-CS-21	5305 (1617)	A5f	0.0-1.0 (0.0-0.3)	SC	CLAYEY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some slightly plastic clay; trace fine angular to subangular gravel.	5	53	42		
			1.0-2.0 (0.3-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; some nonplastic silt, stage I caliche (1.0'-2.0').					
DL-CS-22	4905 (1495)	A2	0.0-2.0 (0.0-0.6)	SM	GRAVELLY SAND, dark brown, fine to coarse, poorly graded, subangular, calcareous; some fine to coarse subangular gravel; little slightly plastic silt.	25	55	20		
DL-CS-24	4815 (1468)	A2	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to medium, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-25	4770 (1454)	A1	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to medium, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-26	4745 (1446)	A1	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, brown, slightly to nonplastic, calcareous; some fine to medium subangular sand; stage II caliche (1.0'-2.0').					
DL-CS-27	4725 (1440)	A1	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, light brown, slightly plastic, calcareous; some fine to medium subangular sand.	2	39	59	35	9
DL-CS-29	4950 (1508)	A5y	0.0-2.0 (0.0-0.6)	GM	SANDY GRAVEL, light brown, fine to coarse, poorly graded, subangular to subrounded, calcareous; some fine to coarse angular to subangular sand; trace nonplastic silt; trace cobbles to 9" size.	53	32	15		
DL-CS-32	4765 (1452)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded subangular, calcareous; some nonplastic silt; trace fine subangular gravel.					

LOGS OF SURFICIAL SOIL SAMPLES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE II-6-1
2 OF 5

FUGRO NATIONAL, INC.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
DL-CS-36	4895 (1492)	A5i	0.0-2.0 (0.0-0.6)	GM	SANDY GRAVEL, brown, fine, poorly graded, subangular, calcareous; some fine to coarse subangular sand; little nonplastic silt.					
DL-CS-37	4790 (1460)	A5y	0.0-2.0 (0.0-0.6)	GM	SANDY GRAVEL, brown, fine to coarse, poorly graded, subangular to subrounded, calcareous; some fine to coarse subangular sand; little nonplastic silt.	55	31	14		
DL-CS-38	4760 (1451)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt; trace fine subangular gravel.	10	52	38		NP
DL-CS-39	4685 (1428)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-41	4650 (1417)	A1/A4o	0.0-2.0 (0.0-0.6)	CL	SANDY CLAY, light brown, slightly plastic, calcareous; some fine subangular sand.	0	38	62	27	10
DL-CS-42	4650 (1417)	A4o	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, light brown, nonplastic, calcareous; some fine subangular sand.					
DL-CS-43	4645 (1416)	A4o	0.0-2.0 (0.0-0.6)	ML	SANDY SILT, light brown, nonplastic, calcareous; some fine to medium subangular sand, stage III caliche (1.0'-2.0').					
DL-CS-44	4660 (1420)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; some slightly plastic silt; stage II caliche (1.0'-2.0').					
DL-CS-46	4810 (1466)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some non to slightly plastic silt; trace fine subangular gravel; stage II caliche at 2.0'.	9	57	34		
DL-CS-50	4690 (1430)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to medium, poorly graded, subangular, calcareous; some nonplastic silt.					
DL-CS-51	4615 (1407)	A4o	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to medium, poorly graded, subangular to subrounded, calcareous; some nonplastic silt.					

LOGS OF SURFICIAL SOIL SAMPLES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE III-6-1
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FUGRO NATIONAL, INC.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
DL-CS-53	4635 (1413)	A5y	0.0-2.0 (0.0-0.6)	MH	CLAYEY SILT, brown, highly plastic, calcareous.	0	3	97	74	34
DL-CS-55	5130 (1564)	A5i	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt; trace fine angular to subangular gravel.					
DL-CS-57	4770 (1454)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some to little nonplastic silt; trace fine subangular gravel (1.0'-2.0').					
DL-CS-60	4705 (1434)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt; trace fine subangular gravel.					
DL-CS-64	4585 (1398)	A4o	0.0-1.0 (0.0-0.3)	CL	SANDY CLAY, red-brown, slightly plastic, calcareous; some fine to medium subangular to subrounded sand.					
			1.0-2.0 (0.3-0.6)	SP	SAND, gray-brown, fine to medium, poorly graded, subangular to subrounded, calcareous.					
DL-CS-66	4595 (1401)	A5y	0.0-2.0 (0.0-0.6)	CL	SILTY CLAY, brown, slightly plastic, calcareous; some fine to medium subangular sand.	0	24	76	24	8
DL-CS-69	4820 (1469)	A5i	0.0-2.0 (0.0-0.6)	SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some fine subangular gravel; some nonplastic silt.					
DL-CS-70	4655 (1419)	A5y	0.0-2.0 (0.0-0.6)	SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some fine to coarse subangular gravel; little nonplastic silt.	36	54	12		
DL-CS-72	4590 (1399)	A4o	0.0-2.0 (0.0-0.6)	CL	SILTY CLAY, brown, medium plastic, calcareous.					
DL-CS-74	4630 (1411)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to medium, poorly graded, subangular, calcareous; some nonplastic silt.					

LOGS OF SURFICIAL SOIL SAMPLES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE II-6-1
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FUGRO NATIONAL, INC.

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
DL-CS-76	4780 (1457)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular to subangular, calcareous; some nonplastic silt; trace fine angular gravel; stage I caliche (1.0'-2.0').					
DL-CS-80	4810 (1466)	A5i	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some nonplastic silt; trace fine subangular gravel.					
DL-CS-83	4840 (1475)	A5y	0.0-2.0 (0.0-0.6)	SM	SILTY SAND, dark brown, fine to medium, poorly graded, subangular, calcareous; little nonplastic silt.					
DL-CS-84	4925 (1501)	A5i	0.0-2.0 (0.0-0.6)	SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some fine to coarse subangular gravel; some nonplastic silt.	25	53	22		
DL-CS-85	4800 (1463)	A5i	0.0-2.0 (0.0-0.6)	SM	GRAVELLY SAND, brown, fine to coarse, poorly graded, subangular, calcareous; some fine to coarse angular to subangular gravel; little nonplastic silt.					

LOGS OF SURFICIAL SOIL SAMPLES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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FIGURE II-6-1
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FUGRO NATIONAL, INC.

SECTION 7.0

LABORATORY TEST RESULTS

7.0 EXPLANATIONS OF LABORATORY TEST RESULTS

Laboratory test results are presented in this section. Table II-7-1 contains a summary of laboratory test results. This table contains results of sieve analysis; plasticity data; in-situ dry unit weight, moisture content, degree of saturation, and void ratio for drive and Pitcher samples; results of compaction tests; and specific gravity of solids. Other tests such as triaxial compression, unconfined compression, direct shear, consolidation, chemical, and California Bearing Ratio (CBR) are indicated on the table. Tables II-7-2 through II-7-6 and Figures II-7-1 through II-7-6 present results of triaxial compression, unconfined compression, direct shear, chemical, and CBR tests.

All tests were performed in general accordance with the American Society for Testing and Materials (ASTM) procedures. The following list presents the ASTM designations for the tests performed during the investigation.

Type of Test	ASTM Designations
Particle Size Analysis	D 422-63
Liquid Limit	D 423-66
Plastic Limit	D 424-59
Unit Weight	D 2937-71
Moisture Content	D 2216-71
Compaction	D 1557-70
Specific Gravity of Solids	D 854-58
Triaxial	D 2850-70
Unconfined Compression	D 2166-66
Direct Shear	D 3080-72
Consolidation	D 2435-70
Test for Alkalinity (pH)	D 1067-70
Water Soluble Sodium	D 1428-64
Water Soluble Chloride	D 512-67
Water Soluble Sulphate	D 516-68
Water Soluble Calcium	D 511-72
Calcium Carbonate	D 1126-67
California Bearing Ratio (CBR)	D 1883-73

Explanation for the tables and figures presented in this section are as follows.

A. Activity Number - Boring, trench, test pit, or surficial sample designation.

B. Sample Number - Prefix indicates the type of sample; explanation is at the bottom of the table.

C. Sample Interval - This is the depth range measured from ground surface over which the sample was obtained.

D. Percent Finer by Weight - Presents the results of laboratory particle size analysis (ASTM D 422-63) performed on representative soil samples at the depth indicated. The numbers represent the percent (by dry weight) of the total sample weight passing through each sieve size indicated.

E. Atterberg Limits (ASTM D 423-66 and D 424-59)

LL - Liquid Limit, the water content (as percent of soil dry weight) corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).

PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).

PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.

NP - Nonplastic.

F. USCS - Unified Soil Classification Symbols are given here; see Table II-4.1 in Section 4.0, "Boring Logs", for complete details of USCS system.

G. In Situ - Presents results of tests on drive and Pitcher samples.

Dry Unit Weight - indicates dry unit weight of soil determined as per ASTM D 2937-71

Moisture Content - weight of water reported in percent of dry weight of soil sample (ASTM D 2216-71)

Saturation - the degree of saturation in a soil sample is defined as the ratio (in percent) of the volume of water to the volume of all voids in the soil

Void Ratio - the numerical ratio of the volume of voids to the volume of solids in a soil specimen

H. Compacted - Indicates results of laboratory maximum dry density and optimum moisture content test as per ASTM D 1557-70.

I. Specific Gravity of Solids (ASTM D 854-58) - Indicates the ratio of (1) the weight in air of a given volume of soil solids at a stated temperature, to (2) the weight in air of an equal volume of distilled water at a stated temperature.

J. Triaxial - The triaxial compression tests were performed in accordance with the procedures of ASTM D 2850-70. The following explanations and definitions apply.

Triaxial Compression Test - a cylindrical specimen of soil is surrounded by a fluid in a pressure chamber and subjected to an isotropic pressure. An additional compressive load is then applied, directed along the axis of the specimen called the axial load.

Consolidated-Drained (CD) Test - a triaxial compression test in which the soil was first consolidated under an all-around confining stress (test chamber pressure), and was then compressed (and hence sheared) by increasing the vertical stress. "Drained" indicates that excess pore water pressure generated by strains are permitted to dissipate by the free movement of pore water during consolidation and compression.

Consolidated-Undrained (CU) Test - a triaxial compression test in which essentially complete consolidation under the confining (chamber) pressure is followed by a shear test at constant water content.

Confining Pressure (σ_3) - the isotropic chamber pressure applied to the soil specimen during consolidation and compression.

Maximum Deviator Stress ($\sigma_1-\sigma_3$) - the difference between the major and minor principal stresses in the specimen at failure. The major principal stress on the specimen is equal to the unit axial load plus the chamber pressure and the minor principal stress on the specimen is equal to the chamber pressure.

Strain Rate - axial strain, ε, at a given stress level is defined as the ratio of the change in length (ΔL) of the specimen to the original length of the specimen (L_o). The rate of strain was controlled during the test so that this ratio increased at equal increments for each minute of testing.

Back Pressure - pressure in excess of atmospheric applied to the pore water of a soil sample. Back pressure is usually applied to (1) increase saturation of the sample, or (2) simulate the actual in-situ pressure regime.

K. Unconfined Compression - Test procedures were as described in ASTM D 2166-66. Unconfined compressive strength is defined as the load per unit area at which an unconfined prismatic or cylindrical specimen of soil will fail in a simple compression test. In these methods, unconfined compressive strength is taken as the maximum load attained per unit area or the load per unit area at 20 percent axial strain, whichever occurred first during the performance of a test.

L. Direct Shear - The procedures of ASTM D 3080-72 were followed for direct shear testing. In this test, soil under an applied normal load is stressed to failure by moving one section of the soil container (shear box) relative to the

other section. Normal stress is the value of load per unit area acting perpendicular to the plane of shearing. Maximum shear strength is defined as the maximum resistance (ksf) of a soil to shearing (tangential) stresses.

M. Consolidation (ASTM D 2435-70) - A consolidation test is a test in which a cylindrical soil specimen is laterally confined in a ring and compressed between porous plates. The term "consolidation", as used here, indicates the gradual reduction in volume of the soil mass resulting from an increase in compressive stress (axial load per unit area).

N. Chemical - The chemical tests performed on soil samples included: pH; water soluble sodium, chloride, sulphate, calcium; and calcium carbonate content. pH is an index of the acidity or alkalinity of a soil in terms of the logarithm of the reciprocal of the hydrogen ion concentration. ASTM test procedure designations for these chemical tests are included in the list on the first page of these Explanations.

O. CBR - California Bearing Ratio (CBR) is the ratio (in percent) of the resistance to penetration developed by a subgrade soil to that developed by a standard crushed-rock base material. The procedures for conducting a CBR test were as outlined in ASTM D 1883-73. The materials tested for CBR were also analyzed for particle size distribution (ASTM D 422-63) and compaction characteristics (ASTM D 1557-70). The term "percentage of maximum density" indicates the ratio (as a percentage) of the compacted sample

dry unit weight to maximum dry density obtained in the laboratory from ASTM D 1557-70, "Moisture-Density Relations of Soils Using 10-pound (4.5 kg) Hammer and 18-inch (457 mm) Drop."

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT											
				STANDARD SIEVE OPENING							U S STANDARD SIEVE NO.				
				BLDRS.	COBBLES		GRAVEL				SAND				
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	100	2
DL-B-1	SS-1	6.0-7.5	1.83-2.29									100	74	40	2
	SS-2	11.0-12.5	3.35-3.81												
	SS-3	15.0-15.7	4.57-4.79								100	93	75	53	
	SS-4	20.0-21.5	6.10-6.55												
	SS-5	25.0-25.7	7.62-7.83					100	88	74	54	35	18	10	
	SS-6	30.0-31.5	9.14-9.60						100	96	92	85	57	37	2
	SS-7	50.0-51.5	15.24-15.70						100	99	92	85	32	11	
	SS-8	60.0-60.9	18.29-18.56												
	SS-9	70.0-70.6	21.34-21.52									100	67	34	2
	SS-10	80.0-80.5	24.38-24.54												
	SS-11	90.0-90.8	27.43-27.68						100	97	92	86	50	15	
	SS-12	100.0-100.3	30.48-30.57												
DL-B-2	SS-1	6.0-7.5	1.83-2.29						100	94	81	73	63	37	2
	b-2	11.0-13.5	3.35-4.11						100	99	61	39	7	4	3
	SS-3	16.0-17.5	4.88-5.33												
	SS-4	20.0-20.9	6.10-6.37						100	98	81	58	22	11	8
	SS-5	25.0-26.1	7.62-7.96						100	87	71	57	31	13	8
	SS-6	30.0-30.7	9.14-9.36												
	SS-7	40.0-40.7	12.19-12.41						100	87	66	52	28	12	7
	SS-8	50.0-50.3	15.24-15.33						100	89	68	43	24	13	10
	SS-9	60.0-60.5	18.29-18.44						100	48	36	27	16	9	7
	SS-10	70.0-70.5	21.34-21.49							100	85	53	19	11	7
	SS-11	80.0-80.4	24.38-24.51						100	85	64	44	15	8	5
	SS-12	100.0-100.9	30.48-30.75						100	98	86	75	60	47	33
DL-B-4	b-1A	0.0-1.7	0.00-0.52						100	85	72	64	55	47	38
	SS-1	6.0-7.0	1.83-2.13				100	69	51	40	36	25	18	14	11
	SS-2	14.0-15.0	4.27-4.57				100	83	71	52	44	37	30	23	17
	SS-3	22.0-23.0	6.71-7.01						100	81	72	66	49	22	14
	SS-4	30.0-31.0	9.14-9.49					100	95	86	80	72	48	28	20
	SS-5	38.0-39.0	11.58-11.89												
	SS-6	40.0-42.0	12.19-12.80					100	95	78	62	51	32	23	19
	SS-7	44.0-44.5	13.41-13.56						100	91	86	78	58	36	28
DL-B-5	b-1	0.0-2.0	0.00-0.61									100	98	93	90
	SS-1	5.0-6.5	1.52-1.98												
	P-2	10.0-10.6	3.05-3.23												78
	P-2	10.6-11.3	3.23-3.44												
	P-2	10.6-11.3	3.23-3.44												
	P-3	15.0-15.3	4.57-4.66												73
	P-3	15.3-15.9	4.66-4.85												
	P-3	15.9-16.6	4.85-5.06												

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

ATTERBERG LIMITS (b)			USCS (c)	DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL	UNCONFINED COMPRESSI
LL	PL	PI		(pcf)	(kg/m^3)				(pcf)	(kg/m^3)				
		NP	SM			7.7								
			SM			7.2								
			SC			12.3								
			SM			9.4								
			SW-SC			6.3								
		NP	SM			8.0								
		NP	SW-SM			14.6								
			SW-SM			10.3								
		NP	SM			11.1								
			SW-SM			7.4								
		NP	SW-SM			11.5								
			SW-SM			4.6								
		NP	SM			8.5								
			SW			4.7								
			SW			2.0								
		NP	SW-SM			9.4								
		NP	SW-SM			7.8								
			SW-SM			12.5								
			SP-SM			4.8								
		NP	SW-SM			12.3								
		NP	GW-GM			1.5								
			SW-SM			9.4								
		NP	SW-SM			4.2								
		NP	SM			11.4								
			SM			3.1								
		NP	GP-GM			0.4								
		NP	GM			1.0								
		NP	SM			1.5								
			SM			2.1								
			SM			2.5								
		NP	SM			3.7								
			SM											
66	25	41	CH			25.8								
95	35	60	CH			27.9								
97	69	28	MH											
			MH											
93	65	29	MH									2.61		

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USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
	DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
	(pcf)	(kg/m^3)				(pcf)	(kg/m^3)								
SM			7.7												
SM			7.2												
SC			12.3												
SM			9.4												
W-SC			6.3												
SM			8.0												
W-SM			14.6												
SW-SM			10.3												
SM			11.1												
SW-SM			7.4												
SW-SM			11.5												
SW-SM			4.6												
SM			8.5												
SW			4.7												
SW			2.0												
SW-SM			9.4											*	
SW-SM			7.8												
SW-SM			12.5												
SP-SM			4.8												
SW-SM			12.3												
GW-GM			1.5												
SW-SM			9.4												
SW-SM			4.2												
SM			11.4												
SM			3.1												
GP-GM			0.4												
GM			1.0											*	
SM			1.5												
SM			2.1												
SM			2.5												
SM			3.7												
SM															
CH			25.8												
CH			27.9												
MH															
MH														*	
MH									2.61						
MH															
MH											-			*	
MH	77.0	1233	31.6	71.9	1.19						*				

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
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FUGRO NATIONAL, INC.

AFV-01

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT									
				STANDARD SIEVE OPENING							U S STANDARD		
				BLDRS.	COBBLES		GRAVEL				SAND		
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40
DL-B-5	P-4	21.3-21.7	6.49-6.61										
	P-5	25.0-25.7	7.62-7.83										
	P-5	26.3-26.7	8.02-8.14									100	74
	P-5	26.7-27.3	8.14-8.32										
	P-6	30.0-30.7	9.14-9.36										
	P-6	30.7-31.3	9.36-9.54										
	P-6	31.3-31.8	9.54-9.69										
	P-6	31.8-32.5	9.69-9.91										
	P-7	41.3-41.8	12.59-12.74										
	P-8	51.3-51.8	15.64-15.79									100	78
	P-11	80.7-81.3	24.60-24.78										
	P-11	81.3-81.8	24.78-24.93									100	81
	P-13	100.1-100.8	30.51-30.72							100	97	95	88
	P-14	126.3-126.9	38.50-38.68									100	87
	P-15	150.8-151.4	45.96-46.15										
	P-15	151.4-151.9	46.15-46.30										
	P-15	151.9-152.6	46.30-46.51										
	P-16	176.3-176.8	53.74-53.89									100	76
	P-17	200.7-201.0	61.17-61.26										
	P-18	225.1-225.8	68.61-68.82										
	P-19	250.0-250.4	76.20-76.32										
	P-20	275.0-275.4	83.82-83.94									100	98
	P-21	300.0-300.3	91.44-91.56										

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

CHECKED BY _____ APPROVED BY _____

PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL
ILT OR CLAY						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)						
.005	.001	LL	PL	PI		(pcf)	(kg/m³)				(pcf)	(kg/m³)							
					MH	74.4	1192	33.9	72.5	1.26									
					SM	72.8	1166	41.4	85.3	1.31								*	
28	18				SM														
					SM	73.0	1169	33.0	68.9	1.31						*			
					MH														
					MH	75.0	1201	16.9	38.6	1.25									*
		69	55	14	MH														
					MH	78.3	1254	25.7	60.2	1.15									
		46	45	1	ML	73.5	1177	24.1	50.4	1.29									
15	8				SM	73.4	1176	22.2	46.4	1.29									
					SM	83.1	1331	11.1	29.1	1.03									*
10	5			NP	SM	80.2	1285	11.1	27.1	1.10									
					ML	81.5	1305	22.1	56.0	1.07									
20	10	47	41	6	SM	73.1	1171	39.3	81.3	1.30									
					MH	55.0	881	51.6	72.0	2.06									
		74	61	13	MH														
					MH	61.8	990	57.8	90.4	1.73									
18	10			NP	SM	86.9	1392	28.3	81.5	0.94									
		47	39	8	ML	73.1	1171	46.3	95.7	1.31									
					ML	62.7	1004	56.2	90.0	1.69									
		82	61	21	MH	67.0	1073	39.9	71.2	1.54									
32	12				MH	62.4	1000	58.8	93.4	1.70									
		65	48	17	MH														

SUMMARY OF LABORATORY T
DRY LAKE VALLEY, N

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE -

FUGRO NATIO

IN-SITU				COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
UNIT WT (kg/m³)	MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY (pcf)	MAXIMUM DRY DENSITY (kg/m³)	OPTIMUM MOISTURE (%)							
1192	33.9	72.5	1.26										
1166	41.4	85.3	1.31								*		
1169	33.0	68.9	1.31						*				
												*	
1201	16.9	38.6	1.25										
1254	25.7	60.2	1.15										
1177	24.1	50.4	1.29										
1176	22.2	46.4	1.29										
1331	11.1	29.1	1.03									*	
1285	11.1	27.1	1.10										
1305	22.1	56.0	1.07										
1171	39.3	81.3	1.30										
881	51.6	72.0	2.06										
990	57.8	90.4	1.73										
1392	28.3	81.5	0.94										
1171	46.3	95.7	1.31										
1004	56.2	90.0	1.69										
1073	39.9	71.2	1.54										
1000	58.8	93.4	1.70										

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
2 of 12

FUGRO NATIONAL, INC.

AFV-01

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING							US STANDARD SIEVE			
				BLDRS.	COBBLES		GRAVEL				SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	100
DL-B-6	b-1A	0.0-1.4	0.00-0.43					100	95	89	72	58	38	26
	b-1	5.0-6.0	1.52-1.83						100	92	87	81	45	18
	b-2	13.0-14.0	3.96-4.27						100	99	86	58	33	22
	b-3	21.0-22.0	6.40-6.71											
	b-4	31.0-32.0	9.45-9.75											
	b-5	39.0-40.0	11.89-12.19						100	91	78	58	34	23
	b-6	55.0-56.0	16.76-17.07						100	97	82	62	32	20
	b-7	72.0-73.0	21.95-22.25						100	85	60	31	3	1
	b-8	88.0-89.0	26.82-27.13						100	99	89	77	56	43
	b-10	99.0-100.0	30.18-30.48						100	91	68	47	29	20
DL-B-7	b-1A	0.0-1.5	0.00-0.46						100	76	60	49	38	25
	b-1	6.0-7.0	1.83-2.13											
	b-2	12.0-13.0	3.66-3.96					100	95	88	75	63	44	24
	b-3	22.0-23.0	6.71-7.01											
	b-4	30.0-31.0	9.14-9.45					100	92	70	52	41	27	1
	b-5	40.0-41.0	12.19-12.50											
	b-6	55.0-56.0	16.76-17.07					100	62	55	47	36	24	1
	b-7	72.0-73.0	21.95-22.25					100	77	54	37	27	20	1
	b-8	88.0-89.0	26.82-27.13					100	88	58	30	18	12	
	b-9	94.5-95.0	28.80-28.96											
DL-B-8	SS-1	5.0-5.3	1.52-1.62								100	97	75	4
	SS-1	5.3-5.6	1.62-1.71											
	SS-2	10.0-11.0	3.05-3.35						100	97	85	75	43	1
	SS-3	15.0-16.2	4.57-4.94					100	94	72	51	34	13	
	SS-4	20.0-21.2	6.10-6.46						100	95	89	76	25	
	SS-5	25.0-25.7	7.62-7.83						100	96	81	62	17	
	SS-5	25.7-26.3	7.84-8.02									100	99	
	P-6	30.1-30.8	9.17-9.39											
	P-6	31.4-31.7	9.57-9.66									100	99	
	SS-7	40.0-40.7	12.19-12.41					100	99	95	85	66	38	
	SS-7	40.7-41.3	12.41-12.59									100	95	
	P-8	50.0-50.7	15.24-15.45											
	P-8	50.6-51.0	15.42-15.54					100	96	92	81	60	20	
	P-8	51.0-51.6	15.54-15.73											
	SS-9	60.0-61.3	18.29-18.68									100	82	
	SS-10	70.0-71.2	21.34-21.70							100	95	85	39	
	P-11	84.5-85.0	25.76-25.91								100	99	90	
	P-12	85.1-86.0	25.94-26.21								100	99	90	

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

CHECKED BY _____ APPROVED BY _____

PERCENT FINER BY WEIGHT										ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPAC
VE OPENING			U S STANDARD SIEVE NO.					PARTICLE SIZE (mm)						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSIT
GRAVEL			SAND				SILT OR CLAY												
1½"	3/4"	3/8"	4	10	40	100	200	.005	.001	LL	PL	PI		(pcf)	(kg/m³)				(pcf)
100	95	89	72	58	38	26	21	6	2				SM			9.5			
	100	92	87	81	45	18	10					NP	SW-SM			1.9			
	100	99	86	58	33	22	17	5	2				SM			3.8			
													SM			4.1			
													SM			3.1			
	100	91	78	58	34	23	18	7	4				SM			2.5			
	100	97	82	62	32	20	15						SM			2.8			
	100	85	60	31	3	1	1						SP			1.2			
	100	99	89	77	56	43	31	7	6				SM			6.9			
	100	91	68	47	29	20	14						SM			4.5			
	100	76	60	49	38	25	20	3	1				SM			3.1			
													SM			0.5			
100	95	88	75	63	44	24	16	4	3			NP	SM			1.7			
													GP-GM			0.5			
100	92	70	52	41	27	14	9						GP-GM			0.5			
													GP-GM			0.5			
100	62	55	47	36	24	18	17						GM			0.7			
100	77	54	37	27	20	14	10					NP	GP-GM			0.3			
100	88	58	30	18	12	7	5					NP	GP			0.5			
													GP			0.3			
			100	97	75	42	28						SM-SC			4.3			
										24	19	5	SM-SC						
	100	97	85	75	43	10	6						SP-SM			1.4			
100	94	72	51	34	13	6	4						GW			0.7			
	100	95	89	76	25	7	5						SP			1.3			
	100	96	81	62	17	4	2						SP			1.5			
				100	99	97	96	60	30	52	24	28	CH			29.9			
													CL	82.5	1322	27.5	71.4	1.04	
				100	99	97	96	62	29	42	19	23	CL	84.0	1346	34.2	92.0	1.00	
100	99	95	85	66	38	20	10	8	1				SP-SM			3.2			
				100	95	84	74	30	11	52	35	17	MH			31.1			
													SP	102.6	1643	7.0	29.3	0.64	
100	96	92	81	60	20	4	3						SP	102.1	1635	5.7	23.8	0.64	
													SP	95.7	1533	5.3	18.9	0.76	
				100	82	66	52	22	15	47	26	21	CL			11.8			
		100	95	85	39	16	11						SP-SM			4.1			
			100	99	90	72	60			31	19	12	CL			21.0			
			100	99	90	71	60	22	8				CL			20.4			

ication System

been performed
in this report

ERBERG TS (b)		USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
			DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
PL	PI		(pcf)	(kg/m³)				(pcf)	(kg/m³)								
		SM			9.5												
	NP	SW-SM			1.9												
		SM			3.8												
		SM			4.1												
		SM			3.1												
		SM			2.5												
		SM			2.8												
		SP			1.2												
		SM			6.9												
		SM			4.5												
		SM			3.1												
		SM			0.5												
	NP	SM			1.7												
		GP-GM			0.5												
		GP-GM			0.5												
		GP-GM			0.5												
		GM			0.7												
	NP	GP-GM			0.3												
	NP	GP			0.5												
		GP			0.3												
		SM-SC			4.3												
19	5	SM-SC															
		SP-SM			1.4												
		GW			0.7												
		SP			1.3												
		SP			1.5												
24	28	CH			29.9												
		CL	82.5	1322	27.5	71.4	1.04								*		
19	23	CL	84.0	1346	34.2	92.0	1.00										
		SP-SM			3.2												
35	17	MH			31.1												
		SP	102.6	1643	7.0	29.3	0.64					*					
		SP	102.1	1635	5.7	23.8	0.64										
		SP	95.7	1533	5.3	18.9	0.76					*					
26	21	CL			11.8												
		SP-SM			4.1												
19	12	CL			21.0												
		CL			20.4												

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
3 of 12

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING							US STANDARD SIEV			
				BLDRS.	COBBLES		GRAVEL				SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	1
DL-B-8	P-13	86.5-87.5	26.37-26.67						100	85	77	65	37	1
	P-14	90.0-90.6	27.43-27.61											
	P-14	90.6-90.8	27.61-27.68								100	97	81	3
	P-15	100.0-100.5	30.48-30.63					100	88	75	61	45	16	7
	P-16	118.0-118.7	35.97-36.18											
	P-16	118.7-118.9	36.18-36.24									100	92	7
	P-16	118.9-119.1	36.24-36.30									100	98	9
	P-17	140.0-140.7	42.67-42.89											
	P-17	140.7-141.2	42.89-43.04								100	99	97	8
	P-17	141.2-141.8	43.04-43.22											
	P-18	160.0-160.5	48.77-48.92											
	P-19	180.0-180.6	54.86-55.05											
	P-19	180.6-181.2	55.06-55.23											
	P-19	181.2-181.5	55.23-55.32									100	94	9
	P-20	200.0-200.6	60.96-61.14									100	91	7
	P-21	220.0-220.1	67.06-67.09											
	P-21	220.1-220.8	67.09-63.30									100	97	8
	P-22	240.0-240.5	73.15-73.30									100	90	7
	P-23	262.0-262.5	79.86-80.01											
	P-24	280.0-280.5	85.34-85.50									100	96	4
	P-25	300.0-300.4	91.44-91.56									100	92	5
DL-B-9	b-1	7.0-8.0	2.13-2.44						100	99	93	87	70	4
	b-2	15.0-16.0	4.57-4.88											
	b-3	23.0-24.0	7.01-7.32						100	99	96	90	68	3
	b-4	31.0-32.0	9.45-9.75											
	b-5	47.0-48.0	14.33-14.63											
	b-6	63.0-64.0	19.20-19.51							100	99	97	69	3
	b-7	79.0-80.0	24.08-24.38											
	b-8	95.0-96.0	28.96-29.26											
	b-9	99.0-100.0	30.18-30.48						100	97	95	93	73	3
DL-B-10	b-1A	0.0-2.0	0.00-0.61						100	85	68	58	52	4
	b-1	6.0-7.0	1.83-2.13					100	60	41	26	14	9	8
	b-3	21.5-22.5	6.55-6.86					100	89	65	48	33	22	1
DL-B-11	b-1	5.0-6.0	1.52-1.83					100	92	77	64	38	14	6
	b-2	14.0-15.0	4.27-4.57											
	b-3	23.0-24.0	7.01-7.32					100	62	46	36	31	20	1
	b-4	31.0-32.0	9.45-9.75											
	b-5	39.0-40.0	11.89-12.19					100	92	88	82	73	46	2
	b-6	53.5-54.0	16.31-16.46											

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

PERCENT FINER BY WEIGHT										ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACT	
OPENING			U S STANDARD SIEVE NO					PARTICLE SIZE (mm)						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY	
GRAVEL			SAND				SILT OR CLAY													
1½"	3/4"	3/8"	4	10	40	100	200	.005	.001	LL	PL	PI		(pcf)	(kg/m³)				(pcf)	(kg/m
	100	85	77	65	37	18	9						SM			3.4				
												NP	SM	101.09	1632	16.2	66.9	0.65		
			100	97	81	34	25						SM	92.4	1480	24.1	79.0	0.82		
00	88	75	61	45	16	7	4						SP	119.3	1911	14.2	93.0	0.41		
													ML	101.2	1621	16.9	68.6	0.60		
				100	92	71	57	33	12				ML	98.1	1571	22.7	85.4	0.72		
				100	98	90	86	38	15	46	29	17	ML			35.5				
													MH	80.6	1291	34.1	87.9	1.01		
			100	99	97	89	82			51	33	18	MH	77.3	1238	39.2	89.7	1.18		
													MH	80.8	1294	36.6	91.1	1.09		
												NP	MH			25.4				
													ML	82.6	1323	27.8	72.2	1.04		
													ML	85.0	1320	30.7	84.4	0.98		
				100	94	90	73	16	8	37	34	3	ML	83.4	1336	31.9	84.4	1.02		
				100	91	75	62	14	10			NP	ML	105.8	1695	16.3	74.3	0.59		
													CL-ML	103.8	1663	19.1	82.8	0.62		
				100	97	87	79	34	14	27	20	7	CL-ML							
				100	90	73	58	14	2	27	22	5	CL-ML	104.7	1677	19.8	87.8	0.61		
													SM			18.8				
				100	96	44	18						SM	99.8	1599	15.7	61.6	0.96		
				100	92	58	34	2	0				SM	96.2	1541	19.9	71.5	0.75		
	100	99	93	87	70	40	28	6	2				SM			9.6				
													SM			2.8				
	100	99	96	90	68	39	30	11	5				SM			6.0				
													SM			6.0				
													SM			4.8				
		100	99	97	69	31	19						SM			5.2				
													SM			3.9				
													SM			4.6				
	100	97	95	93	73	37	25	9	2				SM			5.1				
	100	85	68	58	52	46	38	5	2				GM			2.3				
00	60	41	26	14	9	8	6					NP	GP-GM			0.2				
00	89	65	48	33	22	18	16			21	16	5	GM-GC			0.5				
00	92	77	64	38	14	6	5						SW			1.8				
													SW			2.2				
00	62	46	36	31	20	12	8						GW-GM			1.6				
													GW-GM			1.3				
00	92	88	82	73	46	24	15					NP	SM			1.9				
													SM			0.7				

tion System

performed
this report

2

ERG (b)		USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
			DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
	PI		(pcf)	(kg/m³)				(pcf)	(kg/m³)								
		SM			3.4												
	NP	SM	101.09	1632	16.2	66.9	0.65							*			
		SM	92.4	1480	24.1	79.0	0.82										
		SP	119.3	1911	14.2	93.0	0.41										
		ML	101.2	1621	16.3	68.6	0.60						*				
		ML	98.1	1571	22.7	85.4	0.72										
	17	ML			35.5												
		MH	80.6	1291	34.1	87.9	1.01				2.59	*					
	18	MH	77.3	1238	39.2	89.7	1.18										
		MH	80.8	1294	36.6	91.1	1.09										
	NP	MH			25.4												
		ML	82.6	1323	27.8	72.2	1.04					*					
		ML	85.0	1320	30.7	84.4	0.98						*				
	3	ML	83.4	1336	31.9	84.4	1.02										
	NP	ML	105.8	1695	16.3	74.3	0.59										
		CL-ML	103.8	1663	19.1	82.8	0.62										
	7	CL-ML															
	5	CL-ML	104.7	1677	19.8	87.8	0.61										
		SM			18.8												
		SM	99.8	1599	15.7	61.6	0.96										
		SM	96.2	1541	19.9	71.5	0.75										
		SM			9.6												
		SM			2.8												
		SM			6.0												
		SM			6.0												
		SM			4.8												
		SM			5.2												
		SM			3.9												
		SM			4.6												
		SM			5.1												
		GM			2.3												
	NP	GP-GM			0.2												
	5	GM-GC			0.5												
		SW			1.8												
		SW			2.2												
		GW-GM			1.6												
		GW-GM			1.3												
	NP	SM			1.9												
		SM			0.7												

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
4 of 12

FUGRO NATIONAL, INC.

AFV-01

BORING NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT									
				STANDARD SIEVE OPENING							U S STANDARD SI		
				BLDRS.	COBBLES		GRAVEL				SAND		
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40
DL-B-12	SS-1	5.0-5.8	1.52-1.77										
	P-2	10.1-10.7	3.08-3.27										
	P-2	10.7-10.9	3.26-3.32									100	92
	P-2	10.9-11.6	3.32-3.54										
	B-3	13.5-14.5	4.11-4.42					100	87	59	46	31	14
	SS-4	15.0-16.0	4.57-4.88							100	98	91	59
	SS-6	26.0-27.0	7.92-8.23						100	95	90	80	38
	P-7	31.7-32.3	9.66-9.85										
	P-7	32.3-32.6	9.85-9.94									100	93
	P-7	32.6-33.3	9.94-10.15										
	P-8	40.7-40.8	12.41-12.44									100	75
	P-9	51.3-51.8	15.64-15.79								100	90	55
	P-10	60.7-60.9	18.50-18.56									100	89
	P-11	70.7-71.3	21.55-21.73										
	P-11	71.3-71.5	21.73-21.79									100	95
	P-12	81.3-81.7	24.78-24.90									100	92
	P-13	91.1-91.3	27.77-27.83									100	99
	P-14	100.1-100.7	30.51-30.69										
	P-14	101.4-101.9	30.91-31.06								100	99	68
	P-15	126.3-126.8	38.50-38.65									100	94
	P-16	150.0-150.7	45.72-45.93										
	P-16	150.7-151.3	45.93-46.12										
	P-16	151.3-151.8	46.12-46.27								100	97	77
	P-17	176.4-176.8	53.77-53.89									100	92
	P-18	200.1-200.7	60.99-61.17										
	P-18	201.3-201.5	61.36-61.42								100	90	50
	P-19	225.8-226.0	68.82-68.88									100	96
	P-20	251.4-251.6	76.63-76.69									100	99
	P-21	269.7-269.9	82.20-82.27									100	99
	P-22	270.8-271.2	82.54-82.66									100	99
	P-23	274.3-274.5	83.61-83.67								100	96	68
	P-24	276.0-276.7	84.12-84.34										
	P-24	277.3-277.5	84.52-84.58									100	94
	P-25	280.3-280.5	85.44-85.50							100	99	98	87
	P-26	283.3-283.8	86.35-86.50									100	98
	P-27	286.3-286.8	87.26-87.42								100	99	88
	P-28	289.3-289.6	88.18-88.27									100	96
	P-29	292.3-292.6	89.09-89.18									100	92
	P-30	294.0-294.7	89.61-89.82										
	P-30	294.7-295.3	89.82-90.01										
	P-30	295.3-295.6	90.01-90.10									100	96
	P-31	298.3-298.6	90.92-91.01										100

NOTES:

(a) Sample types
SS - Standard split spoon
P - Pitcher
D - Fugro Driv.
B - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System; Table A-1

(d) *Indicates that test has been performed and results are included in this report.

			ML	74.5	1193	17.4	37.2	1.26
		NP	ML	76.8	1230	18.6	42.0	1.20
			ML	84.2	1349	13.8	37.3	1.00
			ML					
			SM	82.8	1326	18.3	47.8	1.04
		NP	ML	76.7	1229	20.6	46.4	1.20
			ML	75.6	1211	18.9	41.6	1.23
			ML					
		NP	ML	75.0	1201	21.4	46.5	1.25
			ML	99.5	1594	13.8	53.9	0.69
			SM	81.3	1302	14.7	37.1	1.07
			SM	78.6	1259	20.4	48.2	1.14
		NP	ML	78.3	1254	11.5	26.9	1.15
			SM	89.2	1429	16.6	50.3	0.89
			SM	93.2	1493	23.7	79.3	0.81
			SM	80.9	1296	24.8	62.0	1.08
			ML	73.1	1171	21.1	43.6	1.30
			SM	87.7	1405	16.2	47.6	0.92
		NP	SM	88.5	1418	25.0	74.7	0.90
			SM	87.5	1402	12.1	35.4	0.93
			ML					
		NP	SM	82.7	1325	34.9	91.0	1.04
42	26	16	ML	87.9	1408	29.3	86.3	0.92
			SM					
			MH	81.2	1301	24.9	62.4	1.08
61	45	16	MH					
51	46	5	MH					
			MH	84.2	1349	20.4	55.0	1.00
			ML	73.7	1181	28.8	60.3	1.29
36	31	4	ML	82.2	1317	20.4	52.6	1.05
			ML	80.9	1296	24.2	60.2	1.08
			ML	87.8	1406	18.2	53.5	0.92
			ML	76.6	1227	36.8	82.9	1.20
			ML					

82.8	1326	18.3	47.8	1.04
76.7	1229	20.6	46.4	1.20
75.6	1211	18.9	41.6	1.23
75.0	1201	21.4	46.5	1.25
99.5	1594	13.8	53.9	0.69
81.3	1302	14.7	37.1	1.07
78.6	1259	20.4	48.2	1.14
78.3	1254	11.5	26.9	1.15
89.2	1429	16.6	50.3	0.89
93.2	1493	23.7	79.3	0.81
80.9	1296	24.8	62.0	1.08
73.1	1171	21.1	43.6	1.30
87.7	1405	16.2	47.6	0.92
88.5	1418	25.0	74.7	0.90
87.5	1402	12.1	35.4	0.93
82.7	1325	34.9	91.0	1.04
87.9	1408	29.3	86.3	0.92
81.2	1301	24.9	62.4	1.08

	P-3	16.7-16.9	5.09-5.15				
	P-3	16.9-17.5	5.15-5.33				
	P-4	21.0-21.3	6.40-6.49				
	SS-5	27.5-28.7	8.38-8.75				
	P-6	31.0-31.5	9.45-9.60				
	P-7	50.0-50.3	15.24-15.33				
	SS-8	60.0-60.7	18.29-18.50				
	SS-9	70.0-70.4	21.34-21.46				
	P-10	80.0-80.7	24.38-24.60				
	P-10	80.7-81.4	24.13-24.32				
	SS-11	90.0-90.7	27.43-27.65				
	P-12	100.0-100.7	30.48-30.69				
	P-12	100 7-100.9	30.69-30.75				
	P-13	125.0-125.4	38.10-38.22				
	P-14	150.0-150.4	45.72-45.84				
	P-15	175.4-175.7	53.46-53.55				
	P-16	200.0-200.3	60.96-61.05				
	P-17	225.0-225.7	68.58-68.79				
	P-17	225.7-226.2	68.79-68.95				
	P-18	250.0-250.7	76.20-76.41				
	P-18	250.7-250.9	76.41-76.47				
	P-19	275.7-275.9	84.03-84.09				
	P-20	301.1-301.6	91.78-91.93				
DL-B-14	b-1A	0.0-1.5	0.00-0.46				
	b-1	6.0-7.0	1.83-2.13				

1 2

T	STANDARD SIEVE NO.			PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED
	SAND			SILT OR CLAY						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)			
	40	100	200	.005	.001	LL	PL	PI		(pcf)	(kg/m³)				(pcf)	(kg/m³)				
	52	29	25	7	1			NP	SM			4.0								
								NP	SM			0.6								
	72	32	23	10	6				SM	106.1	1700	4.1	18.8	0.59						
									SM	97.8	1567	3.9	14.6	0.72						
	69	35	29						SM	96.7	1549	6.7	24.4	0.74						
									SM	97.5	1562	7.4	27.4	0.73						
									SM	110.2	1765	6.5	33.2	0.53						
								NP	SM	101.1	1619	2.8	11.3	0.67						
	64	40	31						SM			12.6								
	77	50	38			27	17	10	SC	99.9	1600	16.5	64.9	0.69						
	38	14	9						SW-SM	111.6	1788	13.7	72.6	0.51						
									SW-SM			5.2								
									SW-SM			5.9								
									SW-SM	97.9	1568	18.3	68.5	0.72						
									SW-SM	103.8	1663	18.7	81.0	0.62						
									SW-SM			9.9								
	22	11	8					NP	SP-SM											
									SP-SM	115.8	1855	10.1	59.9	0.45						
								NP	SW-SM	121.4	1945	6.0	41.8	0.39						
	36	10	6						SW-SM	109.1	1748	12.5	62.0	0.54						
									SW-SM	85.7	1373	14.5	40.5	0.97						
								NP	SM	113.8	1823	11.1	62.4	0.48						
	90	68	49					NP	SM	101.8	1631	14.4	59.4	0.66						
									SM	112.8	1807	16.3	89.2	0.49						
	69	35	24						SM											
									SM	123.9	1985	13.3	99.8	0.36						
	28	11	8						SW-SM	123.0	1970	6.1	44.5	0.37						
	14	9	7	3	1				SP-SM	121.7	1949	9.3	65.3	0.38						
	28	19	16						GM			4.8								
	45	26	17	4	2				SM			1.5								
									SM			1.0								
	38	20	13	4	1				SM			0.9								
												0.4								

SUMM

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ERG (b) PI	USCS (c)	IN-SITU DRY UNIT WEIGHT (pcf)	IN-SITU DRY UNIT WEIGHT (kg/m³)	IN-SITU MOISTURE CONTENT (%)	IN-SITU SATURATION (%)	IN-SITU VOID RATIO	COMPACTED MAXIMUM DRY DENSITY (pcf)	COMPACTED MAXIMUM DRY DENSITY (kg/m³)	COMPACTED OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
NP	SM			4.0												
NP	SM			0.6												
	SM	106.1	1700	4.1	18.8	0.59										
	SM	97.8	1567	3.9	14.6	0.72										
	SM	96.7	1549	6.7	24.4	0.74										
	SM	97.5	1562	7.4	27.4	0.73										
	SM	110.2	1765	6.5	33.2	0.53										
NP	SM	101.1	1619	2.8	11.3	0.67										
	SM			12.6												
10	SC	99.9	1600	16.5	64.9	0.69										
	SW-SM	111.6	1788	13.7	72.6	0.51										
	SW-SM			5.2												
	SW-SM			5.9												
	SW-SM	97.9	1568	18.3	68.5	0.72							*			
	SW-SM	103.8	1663	18.7	81.0	0.62										
	SW-SM			9.9												
NP	SP-SM															
	SP-SM	115.8	1855	10.1	59.9	0.45										
NP	SW-SM	121.4	1945	6.0	41.8	0.39										
	SW-SM	109.1	1748	12.5	62.0	0.54										
	SW-SM	85.7	1373	14.5	40.5	0.97										
NP	SM	113.8	1823	11.1	62.4	0.48										
NP	SM	101.8	1631	14.4	59.4	0.66							*			
	SM	112.8	1807	16.3	89.2	0.49										
	SM															
	SM	123.9	1985	13.3	99.8	0.36										
	SW-SM	123.0	1970	6.1	44.5	0.37										
	SP-SM	121.7	1949	9.3	65.3	0.38										
	GM			4.8												
	SM			1.5												
	SM			1.0												
	SM			0.9												
				0.4												

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
6 of 12

FUGRO NATIONAL, INC.

AFV-01

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING							U S STANDARD SIE			
				BLDRS.	COBBLES		GRAVEL				SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	
DL-B-15	SS-1	5.0-6.0	1.52-1.83							100	94	72	29	
	SS-2	10.0-10.5	3.05-3.20											
	SS-2	10.5-11.0	3.20-3.35											
	SS-3	15.0-16.0	4.57-4.88							100	96	83	51	
	SS-4	20.0-21.0	6.10-6.40											
	SS-5	25.0-25.8	7.62-7.86							100	96	87	51	
	SS-6	30.0-31.2	9.14-9.51							100	96	81	31	
	SS-7	40.0-41.2	12.19-12.56											
	P-8	50.0-50.7	15.24-15.45							100	96	89	64	
	P-8	51.3-51.5	15.64-15.70											
	P-9	53.2-53.6	16.22-16.34							100	96	89	48	
	P-10	60.3-60.7	18.38-18.50											
	P-11	70.0-70.8	21.34-21.58							100	99	89	57	
	P-12	71.5-72.2	21.79-22.01											
	P-13	81.7-82.3	24.90-25.09					100	87	82	75	59	22	
	P-14	90.1-90.8	27.46-27.68											
	P-15	91.6-92.3	27.92-28.13							100	99	90	71	
	P-16	101.7-102.4	31.00-31.21											
	P-17	121.1-121.4	36.91-37.00							100	88	67	10	
	P-18	140.0-140.3	42.67-42.76											
	P-19	160.0-160.7	48.77-48.98						100	97	88	65	23	
	P-20	181.4-181.6	55.29-55.35							100	91	69	36	
	P-21	200.0-200.7	60.96-61.17							100	95	82	39	
	P-22	220.0-220.5	67.06-67.21											
	P-23	240.0-240.7	73.15-73.37							100	93	86	70	
	D-24	260.0-260.5	79.25-79.40											
	D-25	280.1-280.8	85.37-85.59						100	96	91	78	53	
	D-26	300.0-300.3	91.44-91.53											

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

ENT FINER BY WEIGHT									ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED		
	U S STANDARD SIEVE NO.					PARTICLE SIZE (mm)							DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)
	SAND				SILT OR CLAY								(pcf)	(kg/m³)				(pcf)	(kg/m³)	
"	3/8"	4	10	40	100	200	.005	.001	LL	PL	PI									
	100	94	72	29	15	11						SW-SM			1.9					
											NP	SM			1.9					
												SM			3.3					
	100	96	83	51	32	24	6	2				SM			3.2					
												SM			4.8					
	100	96	87	51	22	13					NP	SM			2.2					
	100	96	81	31	9	7						SP-SM			2.6					
												SM			2.7					
	100	96	89	64	26	15						SM			4.3					
												SM	104.9	1680	5.2	23.2	0.61			
	100	96	89	48	19	13					NP	SM	88.5	1418	5.7	17.0	0.90			
											NP	SM	94.7	1517	7.7	26.7	0.78			
	100	99	89	57	30	24	4	1				SM	105.4	1688	6.8	30.7	0.60			
												SM	131.5	2106	10.8	103.7	0.28			
	82	75	59	22	8	4					NP	SP	101.2	1621	6.0	24.4	0.67			
											NP	SM	97.4	1560	8.4	31.1	0.73			
	100	99	90	71	47	36	6	2				SM	89.1	1427	9.6	29.1	0.89			
												SM	100.4	1608	3.6	14.3	0.68			
	100	88	67	10	2	1					NP	SP	88.2	1413	3.9	11.6	0.91			
												SP-SM	108.5	1738	11.8	57.6	0.55			
D	97	88	65	23	9	6						SP-SM	105.5	1690	8.9	40.3	0.60			
	100	91	69	36	15	11	3	1				SW-SM	86.8	1390	15.1	43.3	0.94			
	100	95	82	39	7	4					NP	SP	112.2	1797	13.9	74.8	0.50			
												SP	118.8	1903	6.4	41.3	0.42			
	100	93	86	70	39	27					NP	SM	115.3	1847	12.1	70.8	0.46			
												SM	121.4	1945	11.3	78.7	0.39			
D	96	91	78	53	28	17					NP	SM	115.6	1852	11.2	66.1	0.46			
												SM			1.7					

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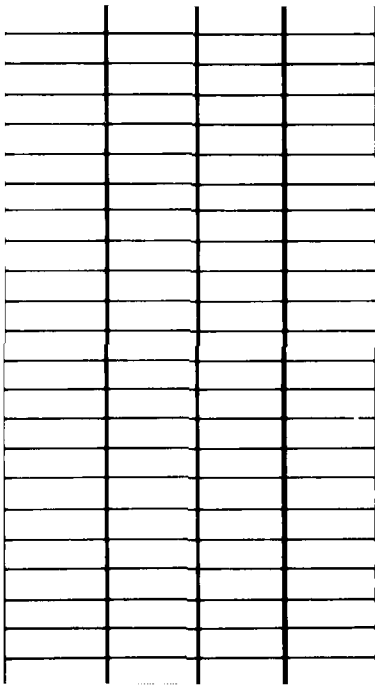

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING							U S STANDARD SIEVE NO			
				BLDRS.	COBBLES		GRAVEL				SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	100
DL-B-16	b-1	0.0-1.5	0.00-0.46					100	79	70	65	55	37	26
	D-1	5.0-5.5	1.52-1.68											
	b-2	7.0-9.0	2.13-2.74					100	92	85	74	58	34	19
	b-3	10.0-11.0	3.05-3.35											
	b-4	15.0-16.0	4.57-4.88					100	91	83	49	23	18	15
	b-5	23.5-24.5	7.16-7.47											
	b-6	31.5-32.5	9.60-9.91											
	b-7	40.0-40.5	12.19-12.34											
	b-8	54.5-55.5	16.61-16.92						100	95	85	74	43	25
	b-9	70.5-71.5	21.49-21.79											
DL-B-17	b-1	6.5-7.5	1.98-2.29											
	b-2	10.5-11.5	3.20-3.51				100	73	65	57	50	46	39	29
	D-3	16.0-16.5	4.88-5.03											
	b-4	23.5-24.5	7.16-7.47						100	98	97	97	95	72
	b-5	31.5-32.5	9.60-9.91						100	95	84	72	56	39
	b-6	40.0-40.5	12.19-12.34					100	46	8	2	2	1	1
	b-7	54.5-55.5	16.61-16.92											
	b-9	84.0-85.0	25.60-25.91						100	91	72	42	21	14
DL-B-18	b-1	0.0-2.0	0.00-0.61											
	P-1	5.0-5.7	1.52-1.74											
	P-1	6.3-6.8	1.92-2.07									100	89	67
	P-2	11.3-11.9	3.44-3.63									100	78	47
	P-3	16.3-16.8	4.97-5.12								100	99	87	34
	P-4	20.0-20.6	6.10-6.28											
	P-4	20.6-21.2	6.28-6.46											
	P-4	21.2-21.3	6.46-6.49							100	99	96	50	4
	P-4	21.3-21.4	6.49-6.52							100	97	83	30	5
	P-5	25.0-25.7	7.62-7.83											
	P-5	26.3-26.6	8.02-8.11											

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

1 2

CLE (mm) AY .001	ATTERBERG LIMITS (b) LL	PL	PI	USCS (c)	IN-SITU DRY UNIT WEIGHT (pcf)	(kg/m³)	MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	COMPACTED MAXIMUM DRY DENSITY (pcf)	(kg/m³)	OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
2				SM			4.5												
				SM	102.1	1635	5.7	23.7	0.65										
2				SM			4.2												
				SM			2.1												
1				GM			1.0												
				GM			2.8												
				SM			1.8												
				SM			1.3												
3				SM			1.6												
				SM			1.7												
				GM			0.4												
4				GM			1.2												
				GM	97.8	1567	4.9	18.3	0.72										
				ML			2.8												
4				SM			0.3												
				GP			0.2												
				GP			0.5												
4				SP-SM			0.9												
			NP	SM			15.9												
				SM	95.3	1527	10.3	36.2	0.77						*				
8	26	23	2	ML	84.1	1347	13.6	36.6	1.00										
7	23	19	5	SM-SC	93.2	1493	14.3	47.8	0.81										
			NP	SM	92.9	1488	12.2	40.5	0.81										
				SP	98.1	1571	10.3	38.8	0.72					*					
				SP	98.1	1571	6.2	23.3	0.72					*					
			NP	SP	105.2	1685	4.3	19.3	0.60										
				SP															
				SM	94.6	1515	13.4	46.4	0.78								*		
			NP	SM	97.3	1559	10.3	38.0	0.73										

SUMMARY OF LABORATORY TEST RESULT
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FUGRO NATIONAL

2

IN-SITU					COMPACTED										
DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (4)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
(pcf)	(kg/m^3)				(pcf)	(kg/m^3)								
		4.5												
102.1	1635	5.7	23.7	0.65										
		4.2												
		2.1												
		1.0												
		2.8												
		1.8												
		1.3												
		1.6												
		1.7												
		0.4												
		1.2												
97.8	1567	4.9	18.3	0.72										
		2.8												
		0.3												
		0.2												
		0.5												
		0.9												
		15.9												
95.3	1527	10.3	36.2	0.77						*				
84.1	1347	13.6	36.6	1.00										
93.2	1493	14.3	47.8	0.81										
92.9	1488	12.2	40.5	0.81										
98.1	1571	10.3	38.8	0.72					*					
98.1	1571	6.2	23.3	0.72					*					
105.2	1685	4.3	19.3	0.60										
94.6	1515	13.4	46.4	0.78								*		
97.3	1559	10.3	38.0	0.73										

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
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FUGRO NATIONAL, INC.

AFV-01

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING							U S STANDARD SIEVE NO			
				BLDRS.	COBBLES		GRAVEL				SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	100
DL-B-18	P-6	30.0-30.7	9.14-9.36											
	P-6	31.3-31.9	9.54-9.72								100	99	69	39
	P-7	41.3-41.8	12.59-12.74								100	97	69	56
	P-8	50.0-50.7	15.24-15.45								100	98	85	74
	P-8	51.3-51.9	15.64-15.82											
	P-9	61.2-61.5	18.65-18.75											
	P-10	70.0-70.6	21.34-21.52								100	98	87	49
	P-10	70.6-70.8	21.52-21.58											
	P-11	80.0-80.7	24.38-24.60											
	P-11	81.3-81.8	24.78-24.93											
	P-12	90.8-91.0	27.68-27.74									100	87	68
	P-13	99.3-99.8	30.27-30.42							100	98	92	58	32
DL-B-19	b-1	0.0-2.0	0.00-0.61									100	97	93
	P-1	5.4-6.1	1.65-1.86											
	P-1	6.1-6.4	1.86-1.95											
	P-2	10.0-10.7	3.05-3.26									100	96	84
	P-3	16.3-16.7	4.97-5.09											
	P-4	20.0-20.7	6.10-6.31											
	P-5	26.0-26.6	7.92-8.11											
	P-6	30.0-30.7	9.14-9.36									100	80	55
	P-6	30.7-31.3	9.36-9.54											
	P-6A	31.3-31.9	9.54-9.72											
	P-6B	31.3-31.9	9.54-9.72											
	P-7	40.0-40.7	12.19-12.41											
	P-7	41.2-41.4	12.56-12.62											
	P-8	50.0-50.7	15.24-15.45											
	P-9	60.0-60.7	18.29-18.50											
	P-10	70.0-70.7	21.34-21.55											
	P-10	71.8-72.4	21.88-22.07											
	P-11	80.0-80.7	24.38-24.60											
	P-12	90.0-90.7	27.43-27.65											
	P-13	100.0-100.7	30.48-30.69									100	74	46
	P-14	150.0-150.7	45.72-45.93											
	P-15	200.0-200.7	60.96-61.16											
	P-16	250.0-251.1	76.47-76.54											
	P-17	280.0-280.7	85.34-85.56											
	P-18	320.0-322.3	97.54-98.24											
	P-19	360.0-360.7	109.73-109.94										100	97
	P-20	400.0-400.7	121.92-122.13											
	P-21	450.0-450.7	137.16-137.37						100	99	96	93	88	87

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

ARD SIEVE NO.			PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION
			SILT OR CLAY						DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)			
40	100	200	.005	.001	LL	PL	PI		(pcf)	(kg/m³)				(pcf)	(kg/m³)				
								SM	83.3	1334	17.1	45.2	1.02						
69	39	28						SM	97.2	1557	10.9	40.1	0.73						
69	56	41						SM	83.9	1344	15.6	41.8	1.01						
85	74	66						ML	84.7	1357	20.9	57.0	0.99						*
								ML	78.7	1261	25.5	60.4	1.14						
					31	29	3	ML	94.6	1515	18.7	64.7	0.78						
87	49	23						SM	90.8	1454	8.6	27.1	0.86						
							NP	SM	82.1	1315	10.2	26.2	1.05						
								ML	70.8	1134	38.1	74.6	1.38						
					43	31	11	ML											
87	68	50	17	7	39	31	8	ML	70.2	1124	27.7	53.4	1.40						
58	32	21					NP	SM	103.9	1664	14.2	61.7	0.62						
97	93	90	33	15	55	29	26	CH						102.5	1642	21.5			
					70	33	37	CH	84.8	1358	28.3	77.4	0.99						
								CH	92.0	1474	29.4	95.5	0.83						
96	84	74	22	10	58	30	28	CH	87.1	1395	22.4	64.7	0.93						*
								MH	69.7	1116	30.5	58.1	1.42						
					31	26	5	ML	88.3	1414	17.5	52.0	0.91						
								SM	88.1	1411	21.4	63.3	0.91						
80	55	44	11	5	56	45	11	SM											
								SM	70.5	1129	29.3	56.9	1.39						
								SM	81.4	1304	22.3	56.3	1.07						
								SM	78.1	1251	22.5	57.5	1.16					*	
					28	27	1	ML	94.1	1507	10.6	36.2	0.79						
								ML			3.6								
								ML	71.6	1147	30.3	60.5	1.35						
							NP	ML	64.5	1033	37.6	63.0	1.61						
								ML	60.4	968	37.9	56.2	1.79						
								ML	74.7	1197	36.4	78.3	1.26						*
								ML	86.1	1379	18.8	53.1	0.96						
								ML	81.2	1301	20.7	52.0	1.07						
74	46	21	3	2	49	37	12	SM	82.4	1320	10.8	27.9	1.04						
					46	35	11	ML	63.9	1024	32.6	53.8	1.64						
								ML	72.9	1168	39.5	81.3	1.31						
								ML	88.1	1411	32.1	95.0	0.91						
					27	23	4	ML	93.2	1493	28.3	94.6	0.81						
								ML	83.6	1339	29.9	79.5	1.02						
100	97	94	30	9				ML	90.4	1448	30.4	95.0	0.86						
								ML	95.9	1536	24.7	88.1	0.76						
88	87	84	28	12	33	24	9	ML	93.8	1503	28.8	97.7	0.80						

SUMMARY
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USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
	DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
	(pcf)	(kg/m³)				(pcf)	(kg/m³)								
SM	83.3	1334	17.1	45.2	1.02							*			
SM	97.2	1557	10.9	40.1	0.73										
SM	83.9	1344	15.6	41.8	1.01										
ML	84.7	1357	20.9	57.0	0.99						*				
ML	78.7	1261	25.5	60.4	1.14										
ML	94.6	1515	18.7	64.7	0.78										
SM	90.8	1454	8.6	27.1	0.86										
SM	82.1	1315	10.2	26.2	1.05										
ML	70.8	1134	38.1	74.6	1.38										
ML															
ML	70.2	1124	27.7	53.4	1.40										
SM	103.9	1664	14.2	61.7	0.62										
CH						102.5	1642	21.5						*	
CH	84.8	1358	28.3	77.4	0.99										
CH	92.0	1474	29.4	95.5	0.83										
CH	87.1	1395	22.4	64.7	0.93						*				
MH	69.7	1116	30.5	58.1	1.42										
ML	88.3	1414	17.5	52.0	0.91										
SM	88.1	1411	21.4	63.3	0.91										
SM															
SM	70.5	1129	29.3	56.9	1.39										
SM	81.4	1304	22.3	56.3	1.07								*		
SM	78.1	1251	22.5	57.5	1.16					*					
ML	94.1	1507	10.6	36.2	0.79										
ML			3.6												
ML	71.6	1147	30.3	60.5	1.35										
ML	64.5	1033	37.6	63.0	1.61										
ML	60.4	968	37.9	56.2	1.79										
ML	74.7	1197	36.4	78.3	1.26						*				
ML	86.1	1379	18.8	53.1	0.96										
ML	81.2	1301	20.7	52.0	1.07										
SM	82.4	1320	10.8	27.9	1.04										
ML	63.9	1024	32.6	53.8	1.64										
ML	72.9	1168	39.5	81.3	1.31										
ML	88.1	1411	32.1	95.0	0.91										
ML	93.2	1493	28.3	94.6	0.81										
ML	83.6	1339	29.9	79.5	1.02										
ML	90.4	1448	30.4	95.0	0.86										
ML	95.9	1536	24.7	88.1	0.76										
ML	93.8	1503	28.8	97.7	0.80										

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

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2.44-3.20				
4.27-4.88				
5.18-5.49				
0.00-0.46				
0.91-1.52				
2.44-2.90				
0.00-0.46				
0.46-0.91				
3.05-3.51				
4.27-4.88				
5.18-5.49				
0.00-3.0				
0.91-1.52				
2.13-2.74				
3.66-4.27				
5.18-5.49				
0.00-0.30				
0.91-1.52				
2.74-3.35				
4.27-4.57				

/ 2

ARD SIEVE NO.			PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION
		SILT OR CLAY							DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)			
40	100	200	.005	.001	LL	PL	PI		(pcf)	(kg/m³)				(pcf)	(kg/m³)				
								SM			5.1								
50	28	20	4	2			NP	SM			5.9						2.60		
27	4	2						SP			3.0								
22	12	10	5	2	29	23	6	SW-SM			4.9						2.63		
		27					NP	SM			6.0								
66	31	16	5	2				SM			4.2						2.67		
46	24	14						SM			4.1								
49	22	10	2	1				SP-SM			3.6								
6	2	1						GP			3.1								
50	22	11						SP-SM			3.9								
		77			30	23	7	ML			8.8								
					33	32	1	ML			10.3								
44	7	3						SP			2.3								
											6.3								
63	35	27	9	2	26	17	8	SC			5.3								
28	11	7						SP-SM			4.5			122.8	1967	11.2			
45	22	16	5	2				SM			4.9						2.66		
								SM			5.2								
								SW-SM			4.6								
								SW-SM			3.3								
20	10	8	2	1				SW-SM			6.3						2.64		
								SW-SM			6.5								
							NP	SW-SM			6.3								
83	57	41	12	2				SM			8.5			109.1	1748	16.5			
		39			36	33	3	SM			4.4								
								ML			5.4								
62	31	19	4	1				SM			11.6						2.66		
								SM			8.4								
		43			19	10	9	SC			9.3			124.0	1986	10.5			
								SM			3.6								
46	18	13	5	2				SM			3.6						2.61		
								SM			3,5								
31	8	5						SP			1.9								
43	30	22						SM			4.8								
48	26	26	4	2				GM			3.3						2.66		
								SM			3,6								

1 2

PI	USCS (c)	IN-SITU DRY UNIT WEIGHT (pcf)	IN-SITU DRY UNIT WEIGHT (kg/m^3)	IN-SITU MOISTURE CONTENT (%)	IN-SITU SATURATION (%)	IN-SITU VOID RATIO	COMPACTED MAXIMUM DRY DENSITY (pcf)	COMPACTED MAXIMUM DRY DENSITY (kg/m^3)	COMPACTED OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
	SM			5.1												
NP	SM			5.9						2.60						
	SP			3.0												
6	SW-SM			4.9						2.63						*
NP	SM			6.0												
	SM			4.2						2.67						
	SM			4.1												
	SP-SM			3.6												
	GP			3.1												
	SP-SM			3.9												
7	ML			8.8												*
1	ML			10.3												*
	SP			2.3											*	
				6.3												
8	SC			5.3												
	SP-SM			4.5			122.8	1967	11.2							
	SM			4.9						2.66						
	SM			5.2												
	SW-SM			4.6												
	SW-SM			3.3												
	SW-SM			6.3						2.64						*
	SW-SM			6.5												
NP	SW-SM			6.3												
	SM			8.5			109.1	1748	16.5							
3	SM			4.4											*	
	ML			5.4												
	SM			11.6						2.66						
	SM			8.4												*
9	SC			9.3			124.0	1986	10.5							
	SM			3.6												
	SM			3.6						2.61						*
	SM			3,5												
	SP			1.9												
	SM			4.8												*
	GM			3,3						2.66						
	SM			3.6												

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

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FUGRO NATIONAL, INC.

AFV-01

0.5-2.0	0.15-0.61					100
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					100
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61				100	88
0.5-2.0	0.15-0.61				100	92
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					
0.5-2.0	0.15-0.61					100

			SM					
			SM					
32	16	16	CL					
			GP-GM					
			SM					
67	30	37	CH					
			SM					
			SM					
			SM					
			SM					
			GM					
			SM					
		NP	ML					
			SC					
			SM					

108.0	1730	19.8			
101.3	1623	22.0			
118.0	1890	12.0			

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT										
				STANDARD SIEVE OPENING							U S STANDARD SIE			
				BLDRS.	COBBLES		GRAVEL				SAND			
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	
DL-P-19	B-1	0.5-2.0	0.15-0.61										100	
DL-P-21	b-1	0.5-2.0	0.15-0.61					100	95	91	83	74	57	
DL-P-22	b-1	2.5-3.5	0.76-1.07					100	92	87	76	61	33	
DL-P-24	b-1	0.5-2.0	0.15-0.61					100	94	87	76	55	17	
DL-P-25	b-1	0.5-2.0	0.15-0.61										100	
DL-P-28	b-1	0.75-2.0	0.23-0.61						100	98	87	66	31	
DL-CS-2	b-1	0.5-2.0	0.15-0.61						100	99	94	89	71	
DL-CS-14	B-1	0.5-2.0	0.15-0.61							100	99	96	72	
DL-CS-15	b-1	0.5-2.0	0.15-0.61						100	98	98	95	76	
DL-CS-18	b-1	0.5-2.0	0.15-0.61					100	98	95	86	79	65	
DL-CS-21	b-1	0.5-2.0	0.15-0.61						100	99	95	91	77	
DL-CS-22	B-1	0.5-2.0	0.15-0.61					100	88	81	75	68	46	
DL-CS-27	b-1	0.5-2.0	0.15-0.61							100	98	96	80	
DL-CS-29	b-1	0.5-2.0	0.15-0.61					100	72	60	47	39	31	
DL-CS-37	b-1	0.5-2.0	0.15-0.61					100	95	67	45	33	25	
DL-CS-38	b-1	0.5-2.0	0.15-0.61						100	94	90	86	79	
DL-CS-41	b-1	0.5-2.0	0.15-0.61									100	97	
DL-CS-46	b-1	0.5-2.0	0.15-0.61						100	95	91	84	67	
DL-CS-53	b-1	0.5-2.0	0.15-0.61									100	99	
DL-CS-66	b-1	0.5-2.0	0.15-0.61								100	99	95	
DL-CS-70	b-1	0.5-2.0	0.15-0.61					100	92	78	64	54	36	
DL-CS-84	b-1	0.5-2.0	0.15-0.61					100	91	82	75	67	42	

NOTES:

(a) Sample types
- SS - Standard split spoon
- P - Pitcher
- D - Fugro Drive
- B,b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

(d) * Indicates that test has been performed and results are included in this report

1 2

RD SIEVE NO.			PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION
		SILT OR CLAY							DRY UNIT WEIGHT		MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)			
40	100	200	.005	.001	LL	PL	PI		(pcf)	(kg/m^3)				(pcf)	(kg/m^3)				
00	99	98	49	36	62	22	40	CH						96.5	1546	:26.0			
57	38	29						SM											
33	16	11						SW-SM											
17	7	5						SW-SM											
00	99	98			65	31	34	CH											
31	10	6						SP-SM											
71	38	28			21	15	6	SM-SC											
72	39	31			32	17	15	SC						121.0	1938	12.0			
76	33	20					NP	SM									2.60		
65	50	37					NP	SM											
77	52	42						SC											
46	25	20						SM											
80	66	59			35	26	9	ML											
31	21	15						GM											
25	18	14						GM											
79	57	38					NP	SM											
97	80	62			27	17	10	CL											
67	43	34						SM											
99	99	97	25	18	74	40	34	MH											
95	85	76			24	16	8	CL											
36	18	12						SM											
42	27	22						SM											

SUMMARY
DRY

MX SITE
DEPARTMENT OF

2

PG (b) PI	USCS (c)	IN-SITU DRY UNIT WEIGHT (pcf)	IN-SITU DRY UNIT WEIGHT (kg/m^3)	IN-SITU MOISTURE CONTENT (%)	IN-SITU SATURATION (%)	IN-SITU VOID RATIO	COMPACTED MAXIMUM DRY DENSITY (pcf)	COMPACTED MAXIMUM DRY DENSITY (kg/m^3)	COMPACTED OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
40	CH						96.5	1546	26.0							*
	SM															
	SW-SM															
	SW-SM															
34	CH															
	SP-SM															
6	SM-SC															
15	SC						121.0	1938	12.0							*
NP	SM									2.60					*	
NP	SM															
	SC															
	SM															
9	ML															
	GM															
	GM															
NP	SM															
10	CL															
	SM															
34	MH															
8	CL															
	SM															
	SM															

SUMMARY OF LABORATORY TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-1
12 of 12

14 MAR 80

FN-TR-27-DL

BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	TYPE OF TEST	DRY DENSITY		MOISTURE CONTENT	CONFINING PRESSURE (σ_3)		MAXIMUM DEVIATOR STRESS ($\sigma_1-\sigma_3$)		STRAIN RATE	BACK PRESSURE	
		FEET	METERS			pcf	kg/m³	(%)	ksf	kN/m²	ksf	kN/m²	(%/min)	ksf	kN/m²
DL-B-8	P-8	50.0-50.7	15.24-15.45	SP	CD	102.6	1643	7.0	4.9	235	17.1	819	0.11	0	0
	P-8	51.0-51.6	15.54-15.73	SP	CD	95.7	1533	5.3	9.8	469	35.1	1680	0.11	0	0
	P-17	140.0-140.7	42.67-42.89	MH	CD	80.6	1291	34.1	14.0	670	25.8	1235	0.10	0	0
	P-19	180.0-180.6	54.86-55.05	ML	CD	82.6	1323	27.8	27.8	1331	53.7	2571	0.11	0	0
DL-B-12	P-7	31.7-32.3	9.66-9.85	ML	CD	74.5	1193	17.4	3.7	177	18.8	900	0.10	0	0
	P-7	32.6-33.3	9.94-10.15	ML	CD	84.2	1349	13.8	7.5	359	29.5	1412	0.10	0	0
DL-B-18	P-4	20.0-20.6	6.10-6.28	SP	CD	98.1	1571	10.3	2.0	96	11.3	541	0.10	0	0
	P-4	20.6-21.2	6.28-6.46	SP	CD	98.1	1571	6.2	3.5	168	14.7	704	0.09	0	0
DL-B-19	P-6	31.3-31.9	9.54-9.72	SM	CD	78.1	1251	22.5	6.6	316	40.2	1925	0.09	0	0

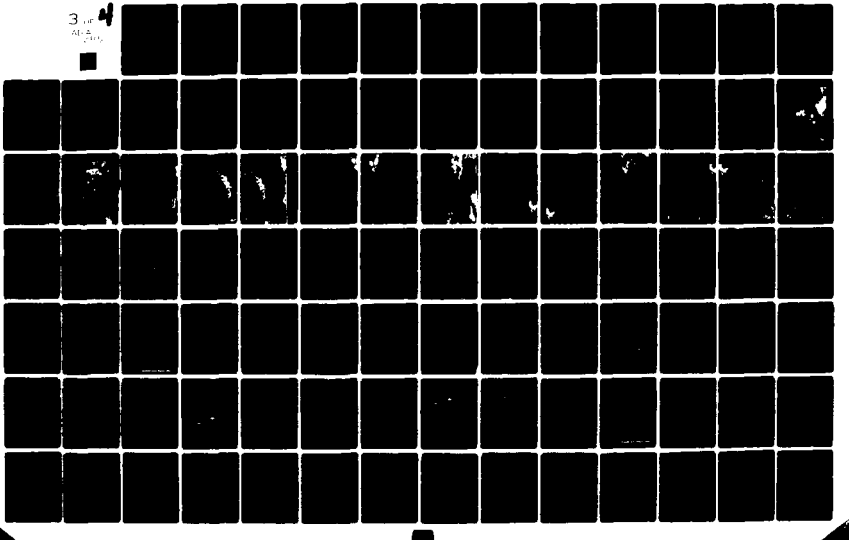
SUMMARY OF TRIAXIAL COMPRESSION TEST RESULTS
DRY LAKE VALLEY, NEVADA

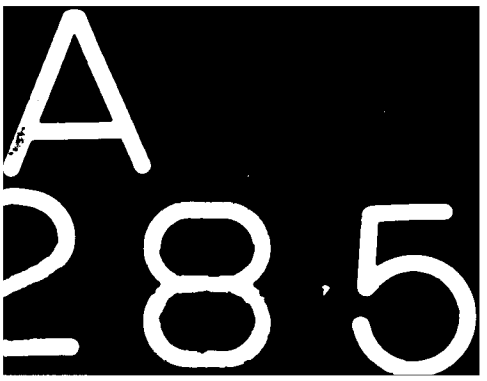
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-2

FUGRO NATIONAL, INC.

AD-A112 851 FUGRO NATIONAL INC LONG BEACH CA F/G 8/7
MX SITING INVESTIGATION GEOTECHNICAL EVALUATION. VERIFICATION S--ETC(U)
MAR 80 F04704-80-C-0006
UNCLASSIFIED FN-TR-27-DL-2 NL

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CHECKED BY _____ APPROVED BY _____

14 MAR 80

FN-18-27-01

BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	UNCONFINED COMP. STRENGTH		DRY DENSITY		MOISTURE CONTENT (%)	DEGREE OF SATURATION (%)	HEIGHT/ DIAMETER
		FEET	METERS		ksf	kN/m^2	pcf	kg/m^3			
DL-B-5	P-3	15.3-15.9	4.66-4.85	MH	10.8	517	70.5	1129	40.5	78.7	2.00
	P-5	26.7-27.3	8.14-8.32	SM	7.2	345	73.0	1169	33.0	68.1	2.40
DL-B-8	P-16	118.0-118.7	35.97-36.18	ML	4.2	201	101.2	1621	15.9	68.6	2.40
	P-19	180.6-181.2	55.05-55.23	ML	2.1	101	85.0	1320	30.7	84.4	2.40
DL-B-12	P-2	10.9-11.6	3.32-3.54	ML	2.4	115	82.5	1281	14.1	36.6	2.40
	P-11	70.7-71.3	21.55-21.73	ML	4.6	220	75.6	1211	18.9	41.6	2.40
	P-16	150.7-151.3	45.93-46.12	SM	15.1	723	93.2	1493	23.7	79.2	2.20
	P-30	294.7-295.3	89.82-90.01	ML	9.5	455	76.6	1227	36.8	82.9	2.20
DL-B-18	P-1	5.0-5.7	1.52-8.69	SM	3.2	153	95.3	1527	10.3	36.0	2.40
	P-8	50.0-50.7	15.24-15.45	ML	6.7	321	84.7	1357	20.9	57.0	2.40
DL-B-19	P-2	10.0-10.7	3.05-3.26	CH	8.2	393	87.1	1395	22.4	64.7	2.40
	P-10	71.8-72.4	21.88-22.07	ML	6.8	326	74.7	1197	36.4	78.3	2.40

SUMMARY OF UNCONFINED COMPRESSION TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-3

WOODWARD-CLYDE CONSULTANTS

AFV-09

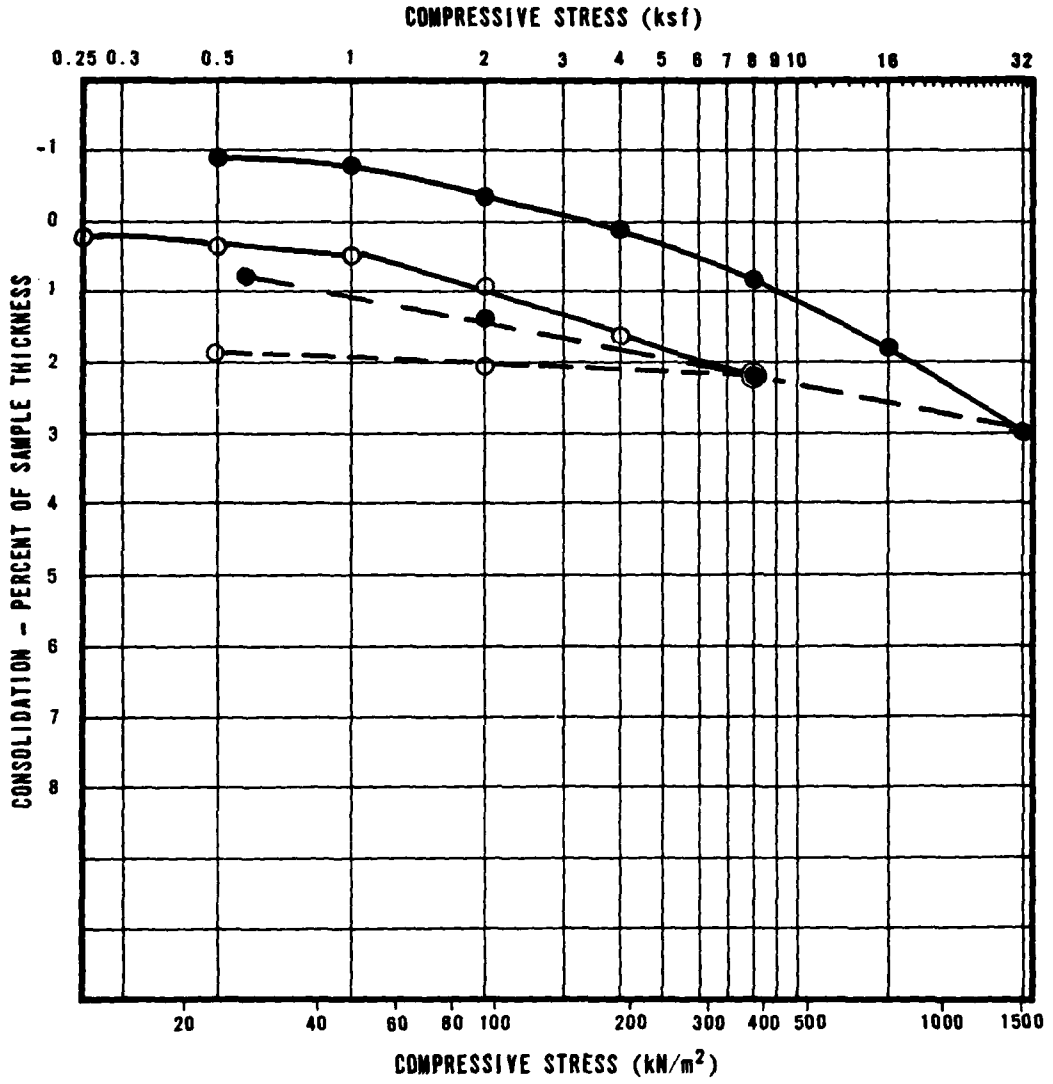
BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	NORMAL STRESS		MAXIMUM SHEAR STRENGTH	
		FEET	METERS		ksf	kN/m^2	ksf	kN/m^2
DL-B-8	P-14	90.0-90.6	27.43-27.61	SM	9.0	431	6.35	306
DL-B-13	P-10	80.0-80.7	24.38-24.60	SW-SM	8.5	407	5.68	273
	P-17	225.0-225.7	68.58-68.79	SP-SC	12.0	575	8.18	393
DL-B-18	P-6	30.0-30.7	9.14-9.36	SM	3.0	144	3.68	177

DIRECT SHEAR TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-4

UGRO NATIONAL, INC.



SYMBOL	BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	INITIAL DRY DENSITY		INITIAL MOISTURE CONTENT (%)	INITIAL VOID RATIO	INITIAL DEGREE OF SATURATION (%)
			FEET	METERS		pcf	kN/m³			
○	DL-B-5	P-5	25.0-25.7	7.62-7.83	MH	72..	9	41.4	1.31	85.3

○ AT FIELD MOISTURE

● AFTER ADDITION OF WATER

——— COMPRESSION

– – – REBOUND

CONSOLIDATION TEST RESULTS
DRY LAKE VALLEY, NEVADA

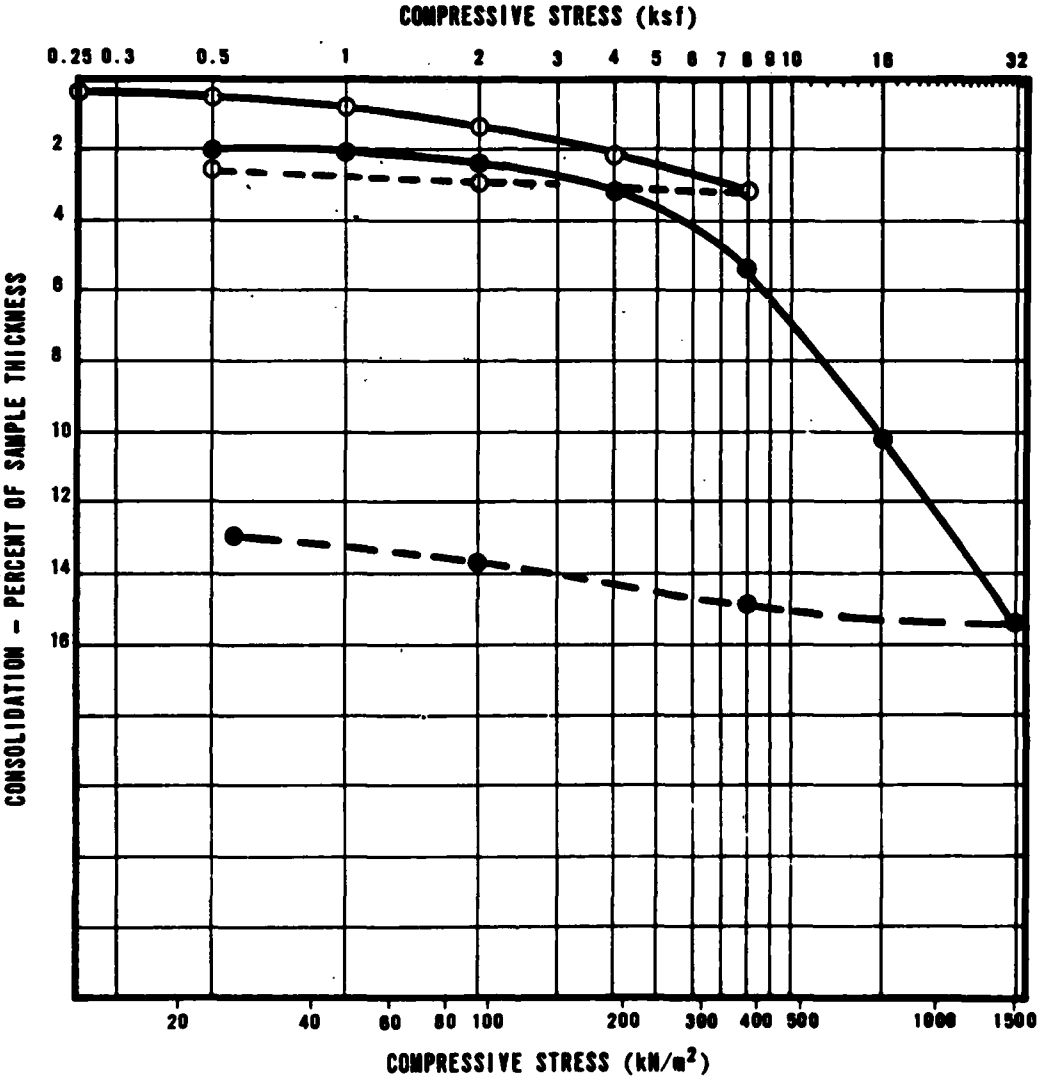
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-7-1

FUGRO NATIONAL, INC.

14 MAR 80

AFV-02



SYMBOL	BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	INITIAL DRY DENSITY		INITIAL MOISTURE CONTENT (%)	INITIAL VOID RATIO	INITIAL DEGREE OF SATURATION (%)
			FEET	METERS		pcf	kg/m³			
○	DL-B-8	P-8	30.1-30.8	9.17-9.39	CL	82.5	1322	27.5	1.04	71.4

○ AT FIELD MOISTURE

● AFTER ADDITION OF WATER

——— COMPRESSION

– – – REBOUND

CONSOLIDATION TEST RESULTS
DRY LAKE VALLEY, NEVADA

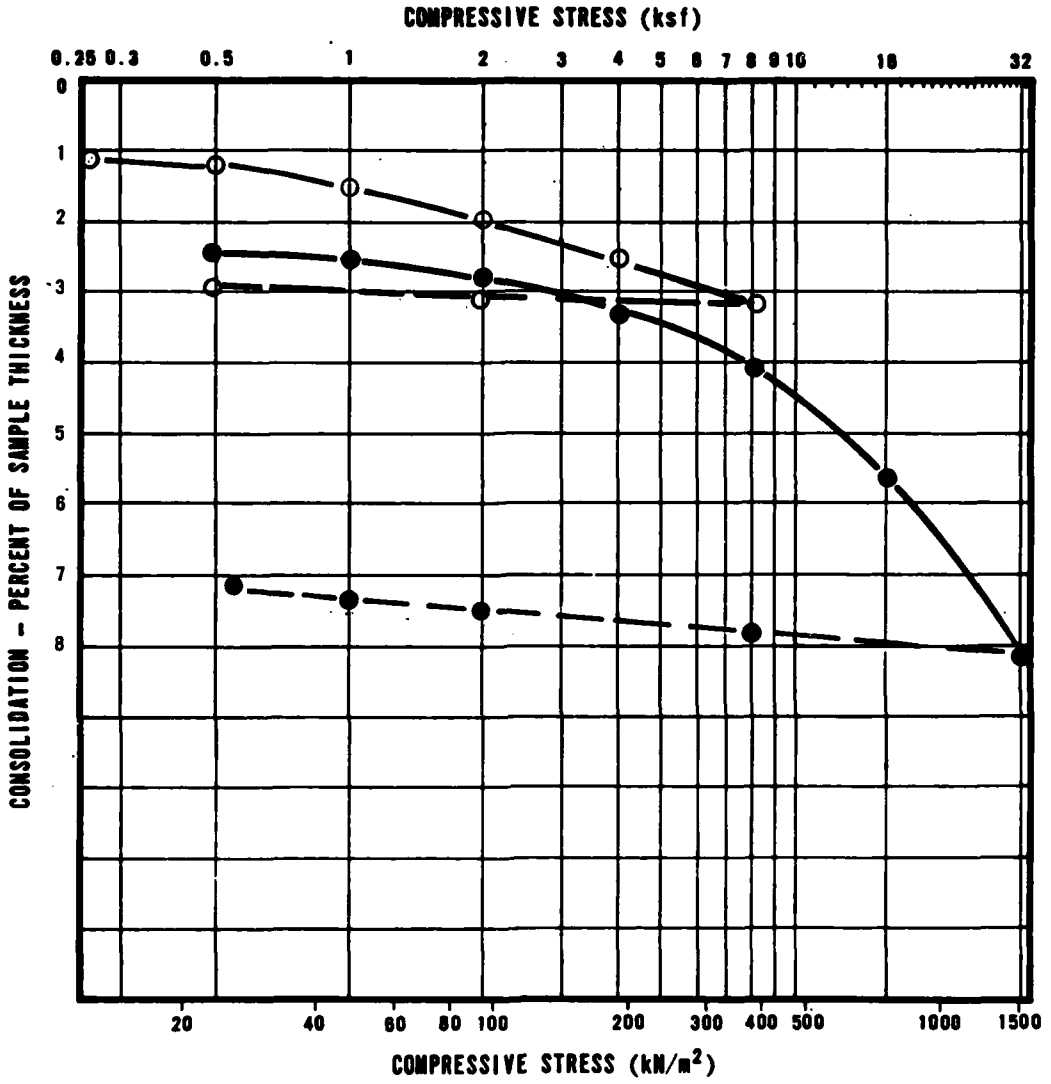
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-2

FUGRO NATIONAL, INC.

14 MAR 80

AFV-02



SYMBOL	BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	INITIAL DRY DENSITY		INITIAL MOISTURE CONTENT (%)	INITIAL VOID RATIO	INITIAL DEGREE OF SATURATION (%)
			FEET	METERS		pcf	kg/m³			
○	DL-B-18	P-5	25.0-25.7	7.62-7.83	SM	94.6	1515	13.4	0.78	46.4

○ AT FIELD MOISTURE

● AFTER ADDITION OF WATER

——— COMPRESSION

– – – REBOUND

CONSOLIDATION TEST RESULTS
DRY LAKE VALLEY, NEVADA

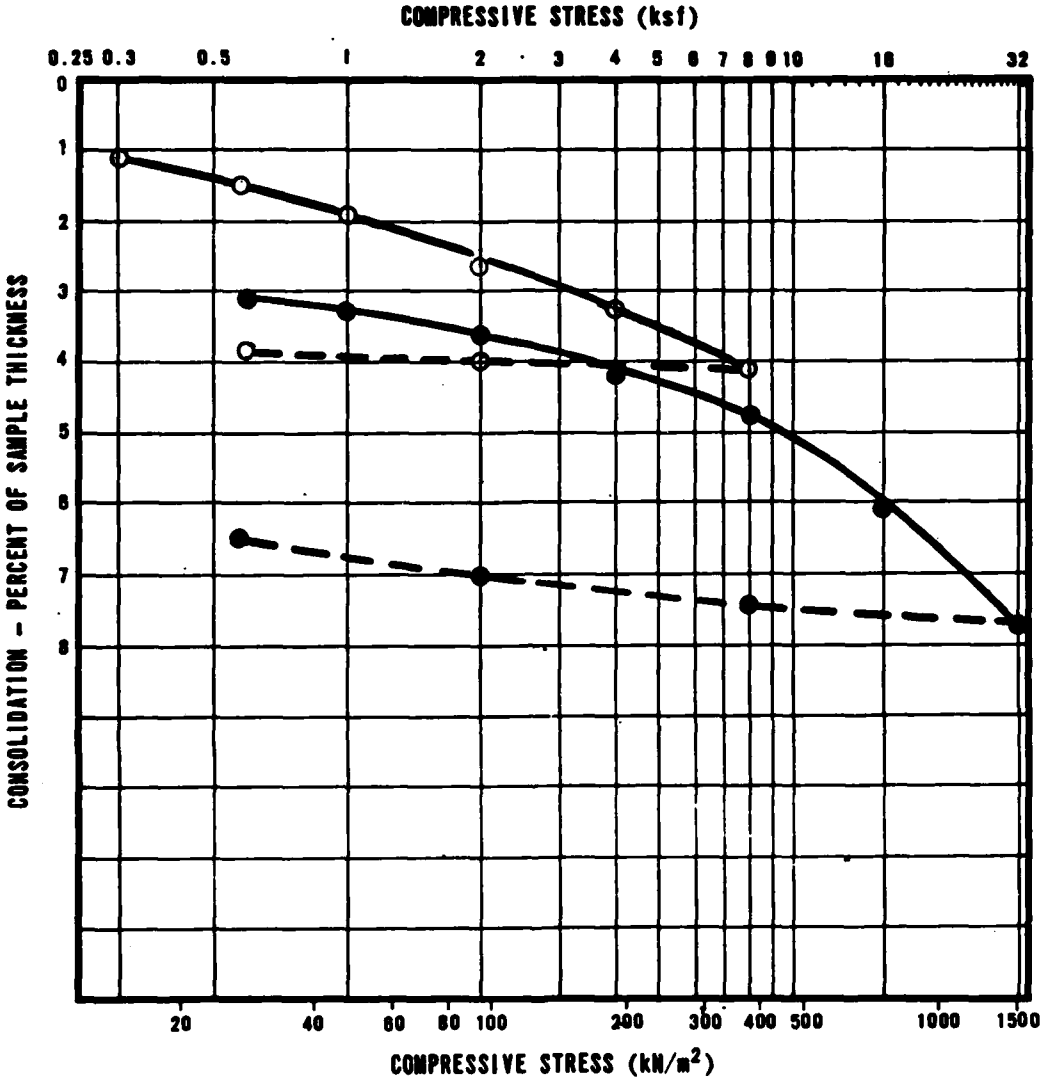
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-7-3

FUGRO NATIONAL, INC.

14 MAR 80

AFV-82



SYMBOL	BORING NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	INITIAL DRY DENSITY		INITIAL MOISTURE CONTENT (%)	INITIAL VOID RATIO	INITIAL DEGREE OF SATURATION (%)
			FEET	METERS		pcf	kg/m³			
○	DL-B-19	P-6	31.3-31.9	9.54-9.72	SM	81.4	1304	22.3	1.07	56.3

○ AT FIELD MOISTURE

● AFTER ADDITION OF WATER

——— COMPRESSION

– – – REBOUND

CONSOLIDATION TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-4

FUGRO NATIONAL, INC.

14 MAR 80

AFV-02

14 MAR 80

FN-TR-27-0L

BORING/ TRENCH NO.	SAMPLE NO.	SAMPLE INTERVAL		SOIL TYPE	pH	WATER SOLUBLE				CALCIUM CARBONATE
		FEET	METERS			SODIUM	CHLORIDE	SULPHATE	CALCIUM	
						mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
DL-B-2	SS-4	20.0-21.2	6.10-6.46	SW-SM	6.7	53	10	39	34	85
DL-B-4		14.0-15.0	4.27-4.57	GM	7.1	30	33	29	93	233
DL-B-5	P-2	10.6-11.3	3.23-3.44	MH	NDA	NDA	1040	222	37	NDA
	P-3	15.3-15.9	4.66-4.85	MH	7.7	6350	8150	1750	148	365
	P-6	30.0-30.7	9.14-9.36	MH	7.9	3210	4750	936	211	526
	P-11	80.6-81.3	24.57-24.78	SM	8.2	1500	1480	675	10	25
DL-B-12	P-2	10.1-10.7	3.08-3.26	ML	6.9	375	223	620	88	220
	P-30	294.7-295.3	89.82-90.01	ML	7.8	521	24	16	41	103
DL-B-19	b-1	0.0-1.6	0.00 - 0.49	CH	7.9	1000	836	450	36	90
DL-T-3	B-3	8.0-9.5	2.44-2.90	SP	6.5	155	76	200	118	295
DL-T-6	B-2	3.0-5.0	0.91-1.52	SM	7.1	250	219	690	82	205
DL-CS-15	b-1	0.5-2.0	0.15-0.61	SM	8.1	3	5	2	66	162
DL-CS-19	b-1	0.5-2.0	0.15-0.61	SM	8.1	8	5	1	50	160

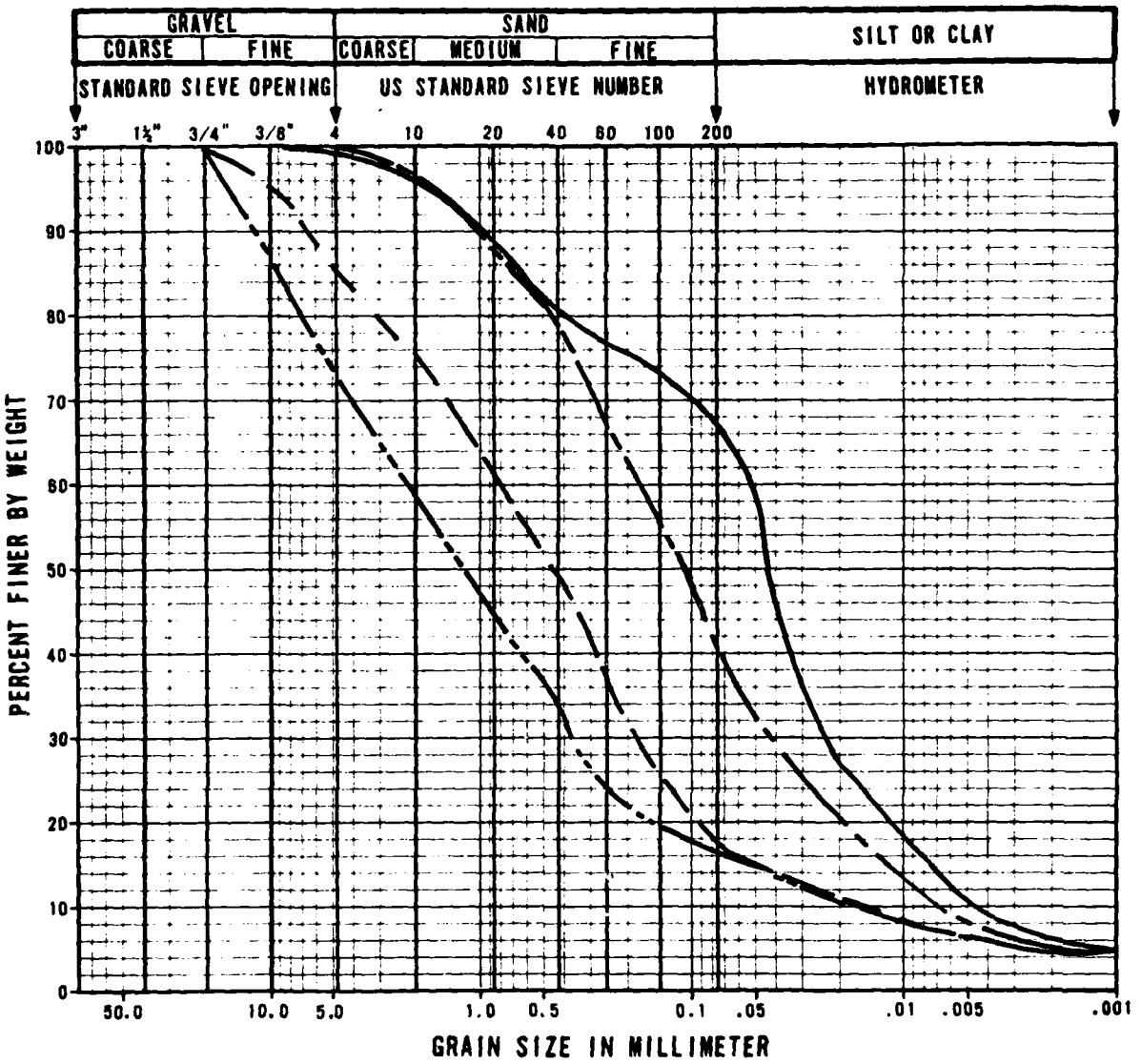
NDA - NO DATA AVAILABLE

SUMMARY OF CHEMICAL TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-5

FUGRO NATIONAL, INC.



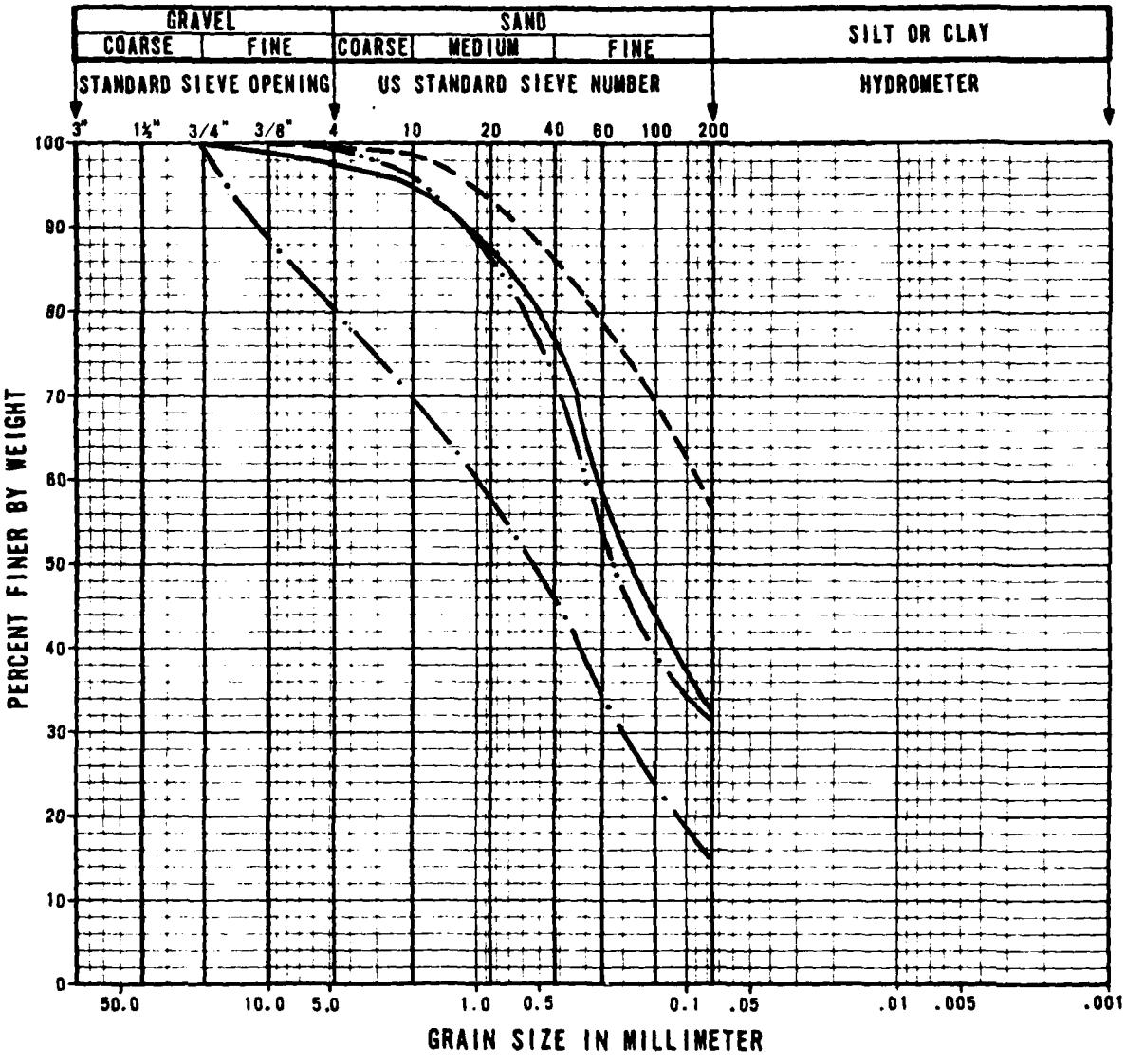
SYMBOL	COMPOSITE SAMPLE NUMBER	ACTIVITY NUMBER	SAMPLE INTERVAL		SOIL TYPE
			FEET	METERS	
——	A	DL-T-3	0.0 - 1.8	0.00 - 0.55	ML
		DL-T-3	3.0 - 5.0	0.91 - 1.52	
— —	B	DL-T-8	0.0 - 1.0	0.00 - 0.30	SM
		DL-T-7	8.0 - 10.0	2.44 - 3.05	
— — —	C	DL-T-6	17.0 - 18.0	5.18 - 5.49	SM
		DL-T-6	BLEND		
— · — · —	D	DL-T-5	7.0 - 9.0	2.13 - 2.74	SM
		DL-T-1	14.5 - 15.5	4.42 - 4.72	

GRAIN SIZE CURVES, CBR TESTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - SAMSO

FIGURE
II-7-5
1 OF 3

FUGRO NATIONAL, INC.



SYMBOL	COMPOSITE SAMPLE NUMBER	TRENCH NUMBER	SAMPLE INTERVAL		SOIL TYPE
			FEET	METERS	
———	E	DL-T-9	0.5-2.0	0.15-0.61	SM
— —	F	DL-T-15	0.5-2.0 BLEND	0.15-0.61	CL
—·—	G	DL-T-16	0.5-2.0	0.15-0.61	SM
—··—	H	DL-CS-14	0.5-2.0	0.15-0.61	SC

GRAIN SIZE CURVES, CBR TESTS
DRY LAKE VALLEY, NEVADA

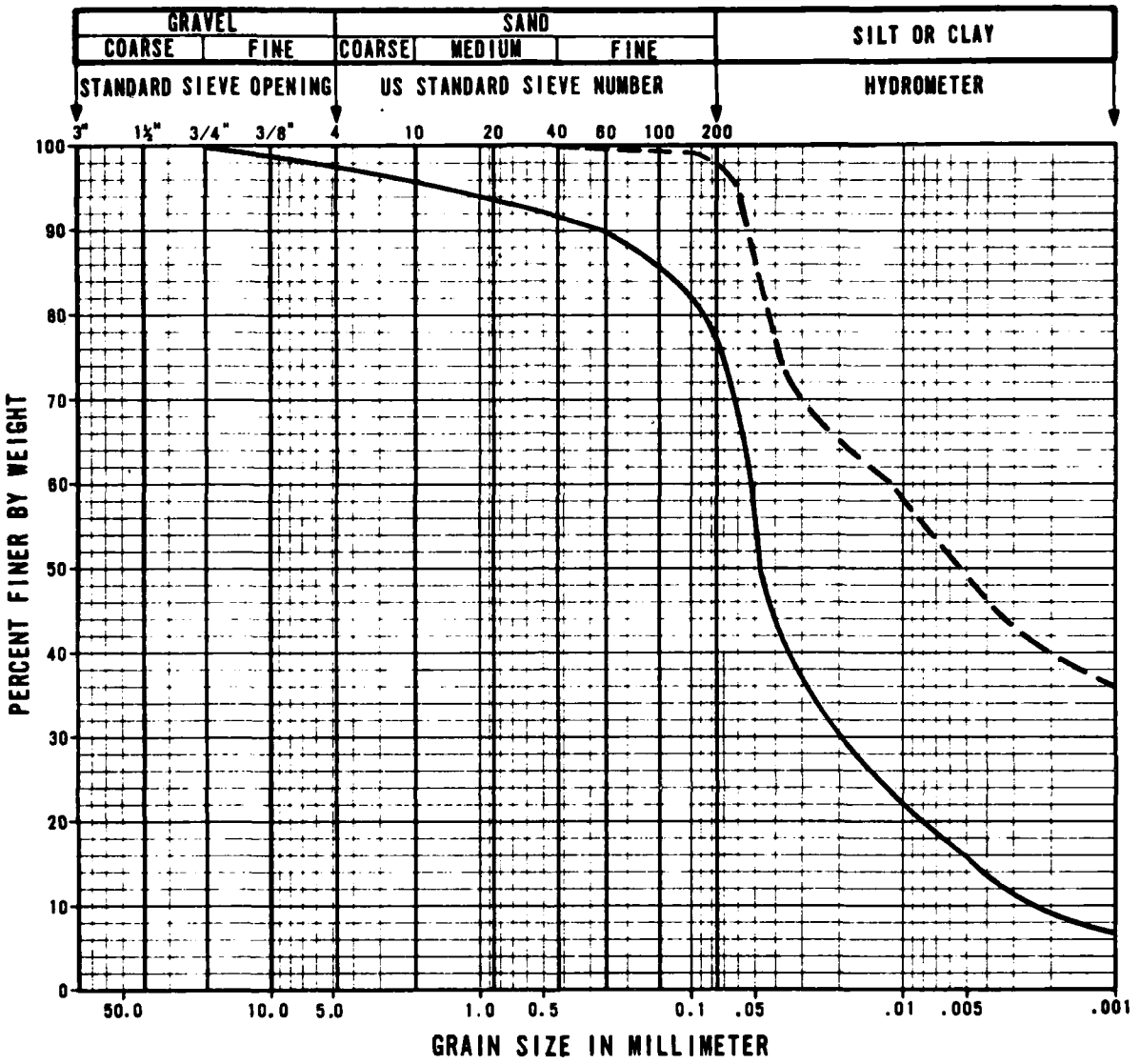
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-5
2 OF 3

FUGRO NATIONAL, INC.

14 MAR 80

AFV-12



SYMBOL	COMPOSITE SAMPLE NUMBER	TRENCH NUMBER	SAMPLE INTERVAL		SOIL TYPE
			FEET	METERS	
——	I	DL-T-11	0.5-2.0	0.15-0.61	CL
— —	J	DL-P-19	0.5-2.0	0.15-0.61	CH

GRAIN SIZE CURVES, CBR TESTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-5
3 OF 3

FUGRO NATIONAL, INC.

14 MAR 80

FN-IR-27-01

COMPOSITE SAMPLE NUMBER	SOIL TYPE	PERCENT PASSING #200	ATTERBERG LIMITS		SPECIFIC GRAVITY	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	COMPACTED DRY DENSITY		COMPACTED MOISTURE (%)	PERCENT OF MAXIMUM DRY DENSITY	CBR (%)
			LL	PI		pcf	kg/m³		pcf	kg/m³			
A	ML	68	24	2	2.59	110.8	1775	16.5	106.2	1701	14.2	95.8	8
									98.2	1573	15.0	88.6	3
									90.3	1446	14.7	81.5	2
B	SM	16			2.57	128.5	2058	8.5	119.4	1913	8.6	92.9	26
									113.9	1825	8.8	88.6	11
C	SM	41			2.55	108.5	1738	18.0	102.7	1645	18.1	94.7	53
									97.7	1565	18.4	90.0	21
									90.6	1451	18.4	83.5	11
D	SM	16			2.60	124.0	1986	10.0	116.7	1869	9.3	94.1	70
									109.8	1759	9.5	88.6	24

CALIFORNIA BEARING RATIO
(CBR) TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-6
1 OF 3

WOODWARD-CLYDE CONSULTANTS

14 MAR 80

FN-TR-27-OL

COMPOSITE SAMPLE NUMBER	SOIL TYPE	PERCENT PASSING #200	ATTERBERG LIMITS		SPECIFIC GRAVITY	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)	COMPACTED DRY DENSITY		COMPACTED MOISTURE (%)	PERCENT OF MAXIMUM DRY DENSITY	CBR (%)
			LL	PI		pcf	kg/m³		pcf	kg/m³			
E	SM	33				122.4	1961	10.3	118.9	1905	10.4	97.1	67
									114.9	1841	10.7	93.9	38
									107.1	1716	10.4	87.5	13
F	CL	56				101.3	1623	22.0	97.6	1564	22.9	96.3	37
									94.4	1512	23.0	93.2	23
									88.5	1418	22.5	87.4	11
G	SM	15				118.0	1890	12.0	116.5	1866	12.4	98.7	65
									113.9	1825	12.3	96.5	49
									109.1	1748	11.6	92.5	23
H	SC	31	32	15		121.0	1938	12.0	118.2	1894	12.1	97.7	37
									106.5	1706	11.8	88.0	8

CALIFORNIA BEARING RATIO (CBR) TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-6
2 OF 3

FUGRO NATIONAL, INC.

AFV-13

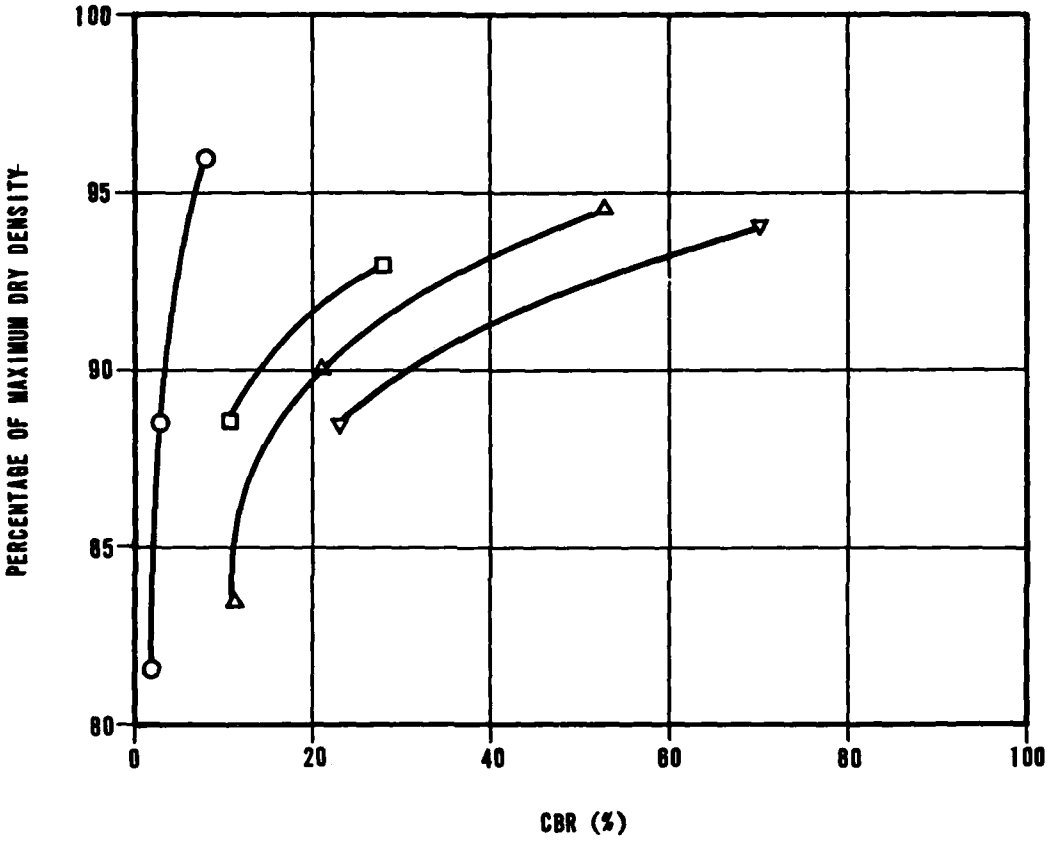
COMPOSITE SAMPLE NUMBER	SOIL TYPE	PERCENT PASSING #200	ATTERBERG LIMITS LL	ATTERBERG LIMITS PI	SPECIFIC GRAVITY	MAXIMUM DRY DENSITY pcf	MAXIMUM DRY DENSITY kg/m3	OPTIMUM MOISTURE (%)	COMPACTED DRY DENSITY pcf	COMPACTED DRY DENSITY kg/m3	COMPACTED MOISTURE (%)	PERCENT OF MAXIMUM DRY DENSITY	CBR (%)
									100.7	1613	20.7	93.2	19
									99.9	1600	20.6	92.5	13
1	CL	77	32	16		108.0	1730	19.8	94.4	1512	20.7	87.4	9
									94.4	1512	26.4	97.8	5
									87.6	1403	26.7	90.8	4
J	CH	98	62	40		96.5	1546	26.0	78.6	1259	26.3	81.5	1

CALIFORNIA BEARING RATIO (CBR) TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

TABLE II-7-6
3 OF 3

FUGRO NATIONAL, INC.



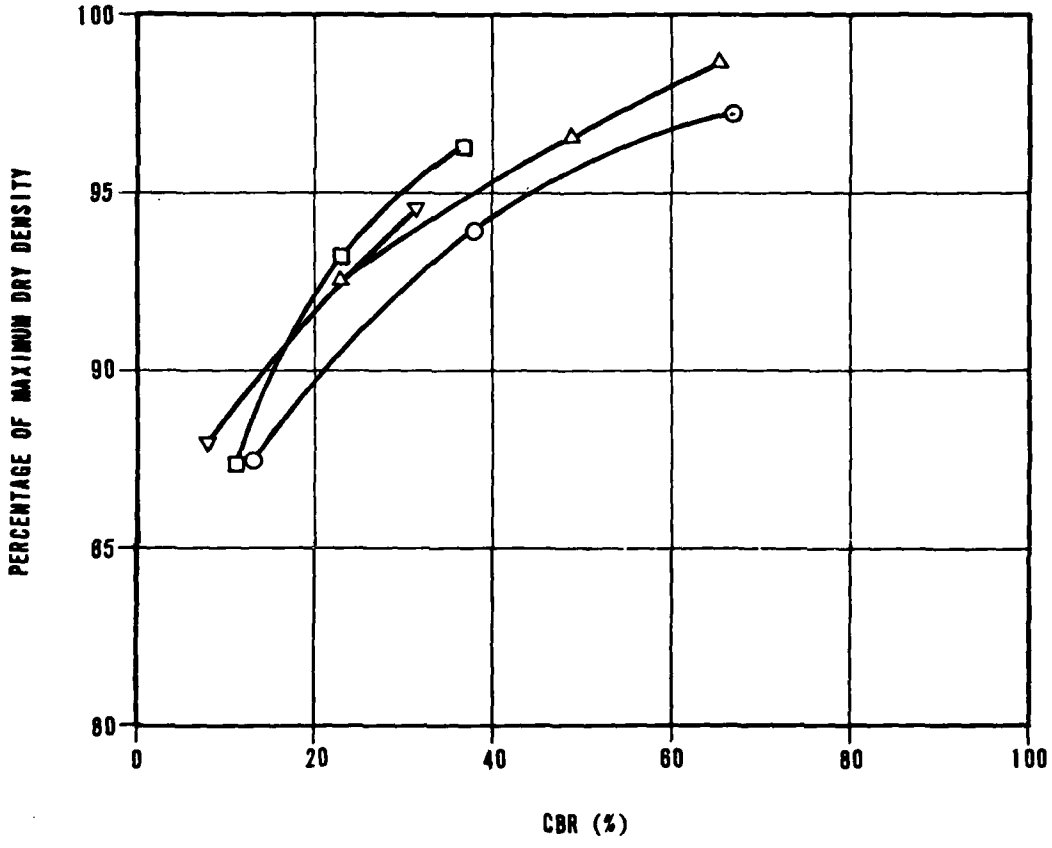
SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
○	A	ML
□	B	SM
△	C	SM
▽	D	SM

CALIFORNIA BEARING RATIO
(CBR) CURVES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-6
1 OF 3

FUGRO NATIONAL, INC.



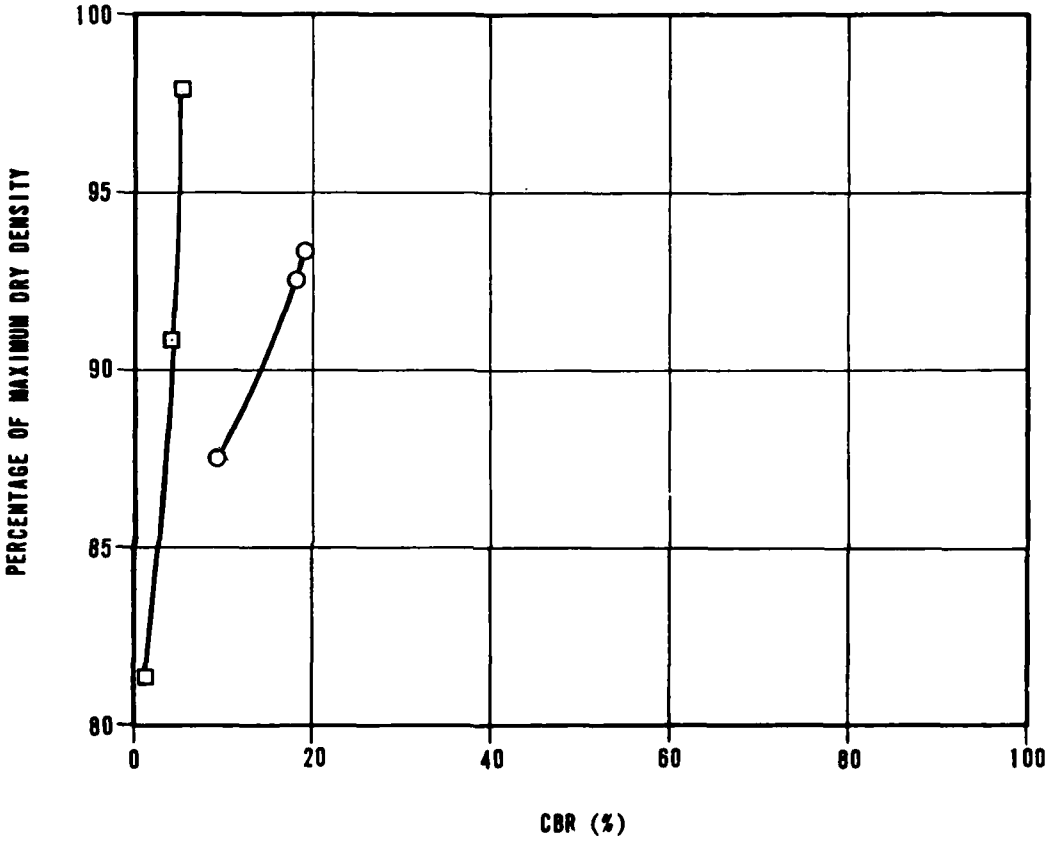
SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
○	E	SM
□	F	CL
△	G	SM
▽	H	SC

CALIFORNIA BEARING RATIO (CBR) CURVES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-6
2 OF 3

FUGRO NATIONAL, INC.



SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
○	I	CL
□	J	CH

CALIFORNIA BEARING RATIO (CBR) CURVES
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE
II-7-6
3 OF 3

FUGRO NATIONAL, INC.

SECTION 8.0

CONE PENETROMETER TEST RESULTS

8.0 EXPLANATION OF CONE PENETROMETER TEST RESULTS

The results of all cone penetrometer tests are presented in this section. Explanations of the test results are as follows:

A. Depth - Corresponds to depth below ground surface.

B. Friction Resistance - The resistance to penetration developed by the friction sleeve, equal to the vertical force applied to the sleeve divided by its surface area. This resistance is the sum of friction and adhesion.

C. Cone Resistance - The resistance to penetration developed by the cone, equal to the vertical force applied to the cone divided by its horizontally projected area.

D. Friction Ratio - The ratio of friction resistance to cone resistance.

E. Designation - Each cone penetrometer test is identified by a number: for example C-1.

C - abbreviation for the CPT
1 - number of the test

F. Surface Elevation - Indicated elevations on the drawings are estimated from topographic maps of the study area and are accurate within one-half the contour interval.

G. Surficial Geologic Unit - Indicates the surficial geologic unit in which the test was located.

H. Soil Column - A graphical presentation of the soil type versus depth at each cone penetrometer test location. The Unified Soil Classification Symbol for each different soil type is listed immediately to the left of the soil column. Immediately below the soil column, the activity number for

the corresponding boring, trench, test pit, or surficial soil sample at each CPT location is given.

SECTION 9.0

DOWNHOLE SEISMIC VELOCITY DATA

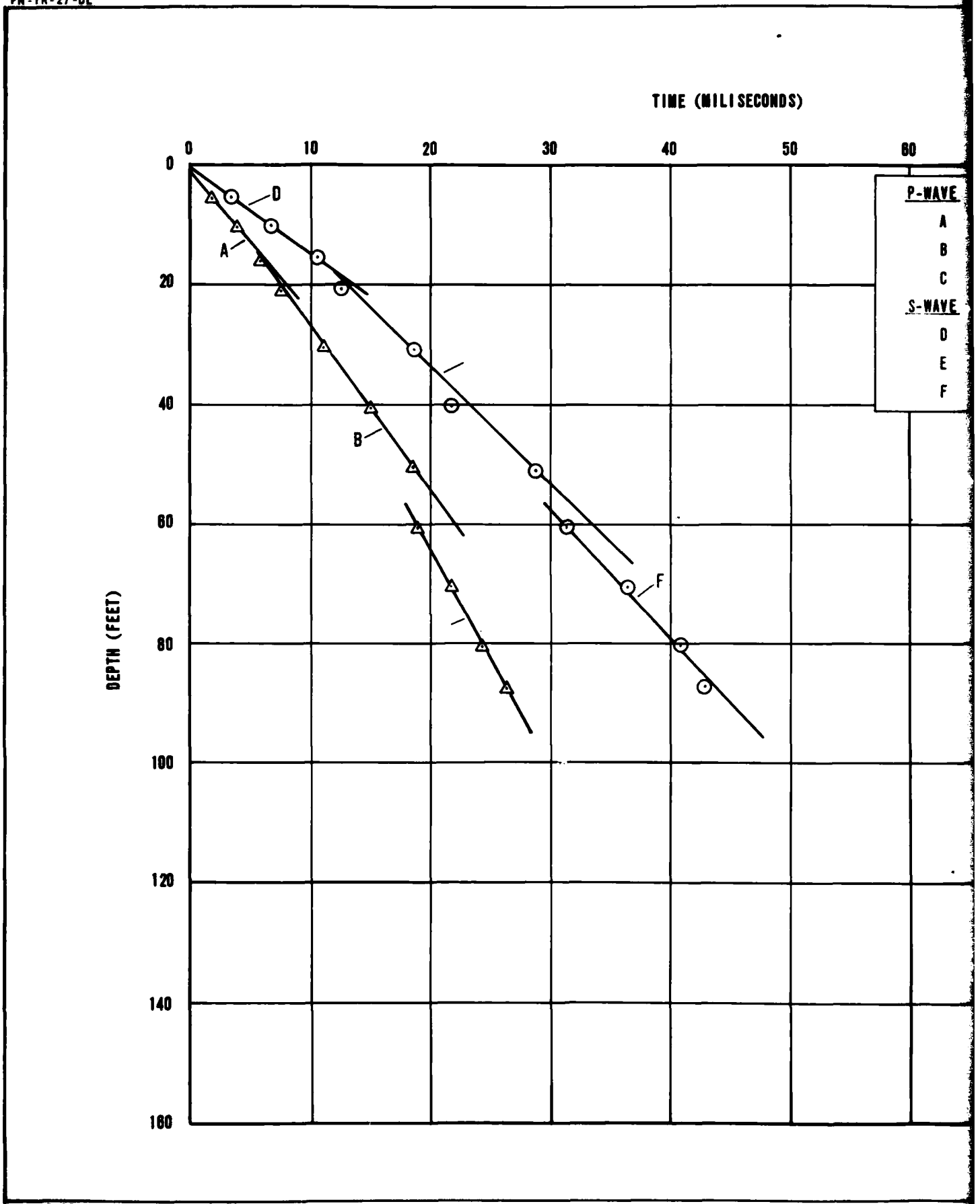
9.0 EXPLANATION OF DOWNHOLE SEISMIC VELOCITY GRAPHS

The corrected (see Appendix A4.2.0 in Volume I) travel times for the compressional and shear waves are plotted on the same coordinate system. The X-axis represents travel time in milliseconds and the y-axis represents depth. Compressional wave travel times are plotted as triangles and shear wave travel times are shown as circles.

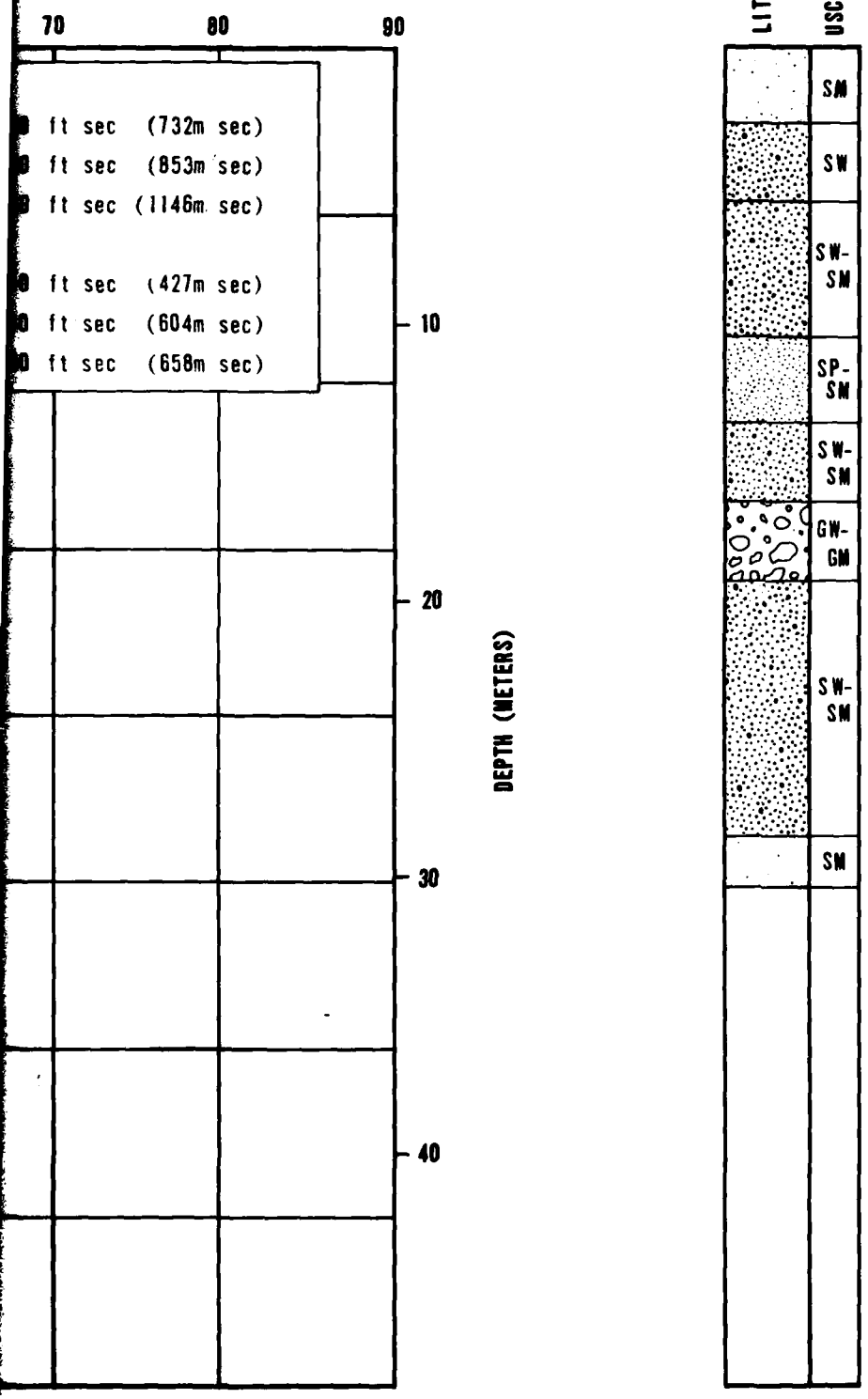
The velocity profile is interpreted by fitting straight lines through groups of points. Each line segment shown is labeled with a letter. The velocities calculated from the slopes of the line segments are tabulated in the upper right hand corner of the graph.

A simiplified log of the borings is shown to the right of the time versus depth graph.

FN-TR-27-DL



14 MAR 80



EXPLANATION

△ COMPRESSIONAL WAVE DATA

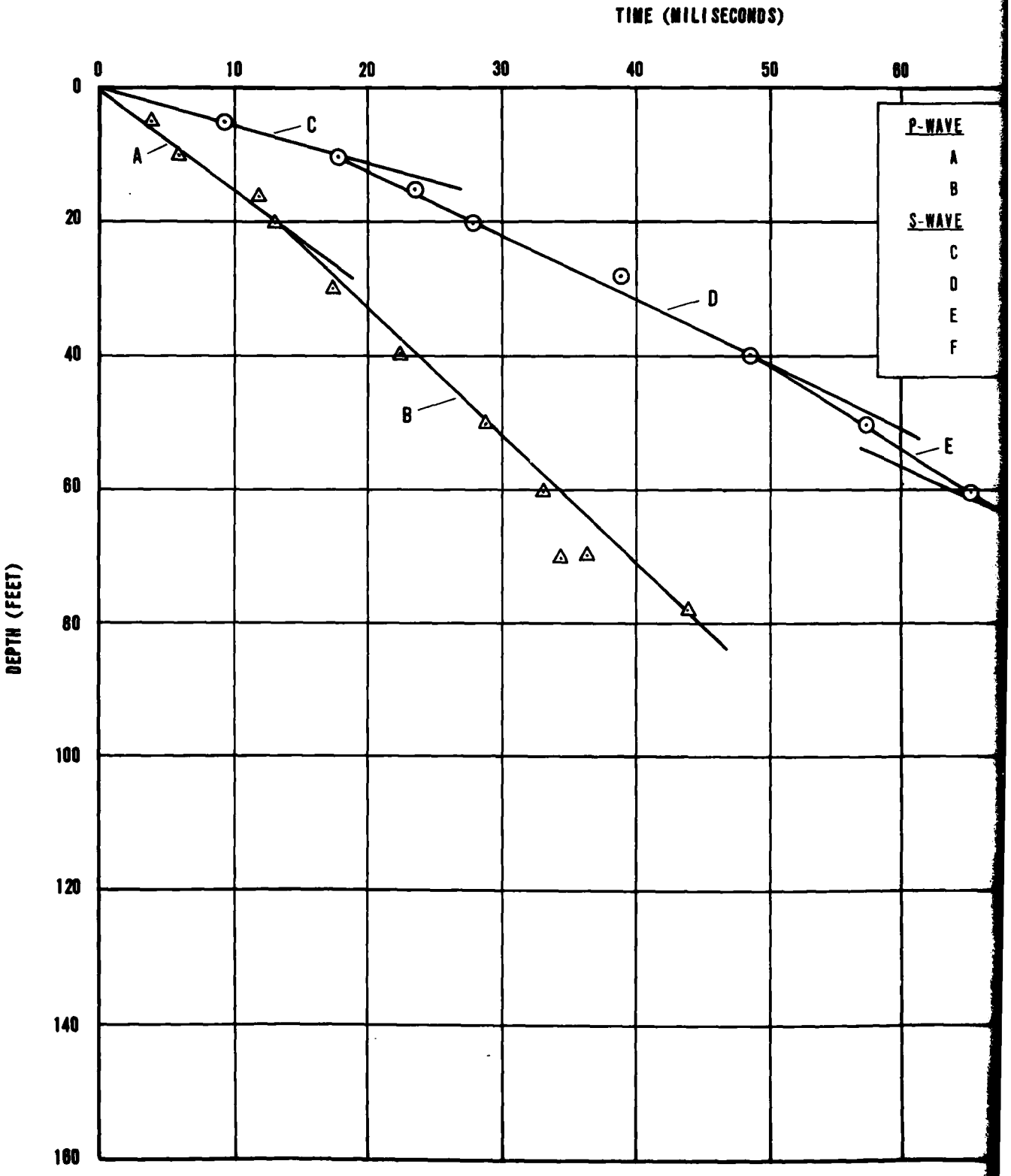
⊙ SHEAR WAVE DATA

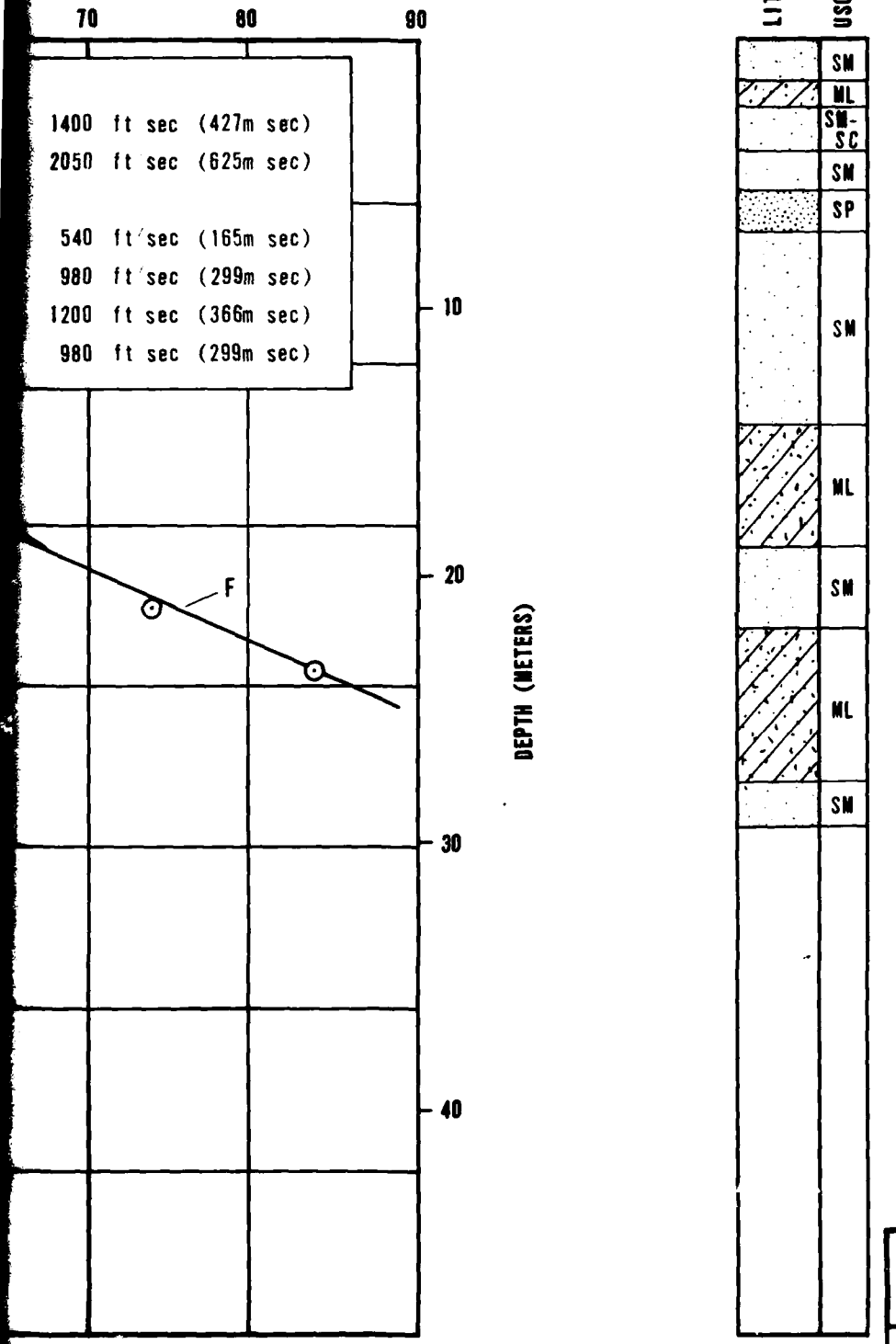
TIME VERSUS DEPTH GRAPH
DOWNHOLE SEISMIC VELOCITY SURVEY
BORING DL-B-2

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE II-B-1

FUGRO NATIONAL, INC.


TIME (MILISECONDS)
0
10
20
30
40
50
60
DEPTH (FEET)
0
20
40
60
80
100
120
140
160
A
B
C
D
E
P-WAVE
A
B
S-WAVE
C
D
E
F



EXPLANATION

△ COMPRESSIONAL WAVE DATA

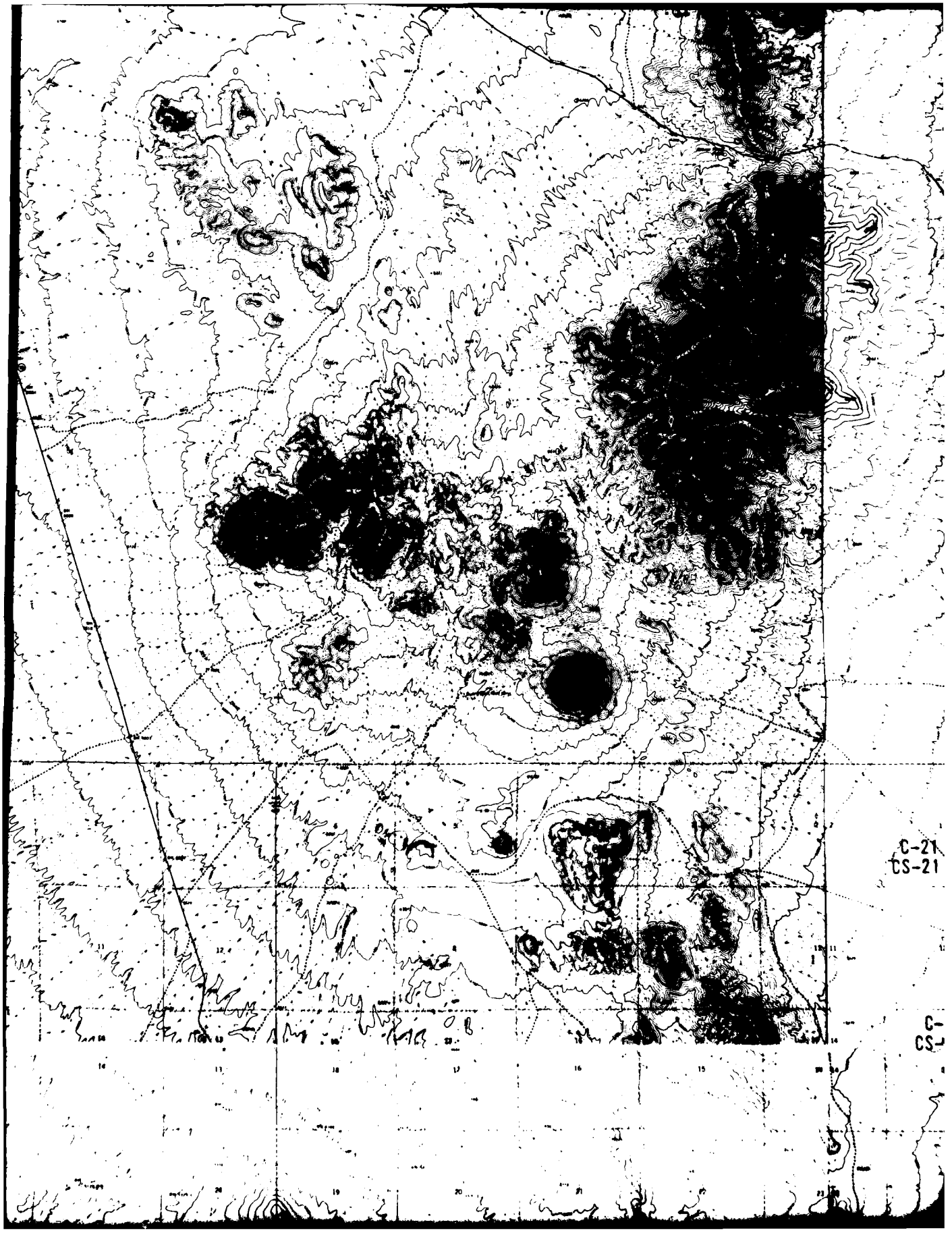
⊙ SHEAR WAVE DATA

TIME VERSUS DEPTH GRAPH
DOWNHOLE SEISMIC VELOCITY SURVEY
BORING DL-B-18

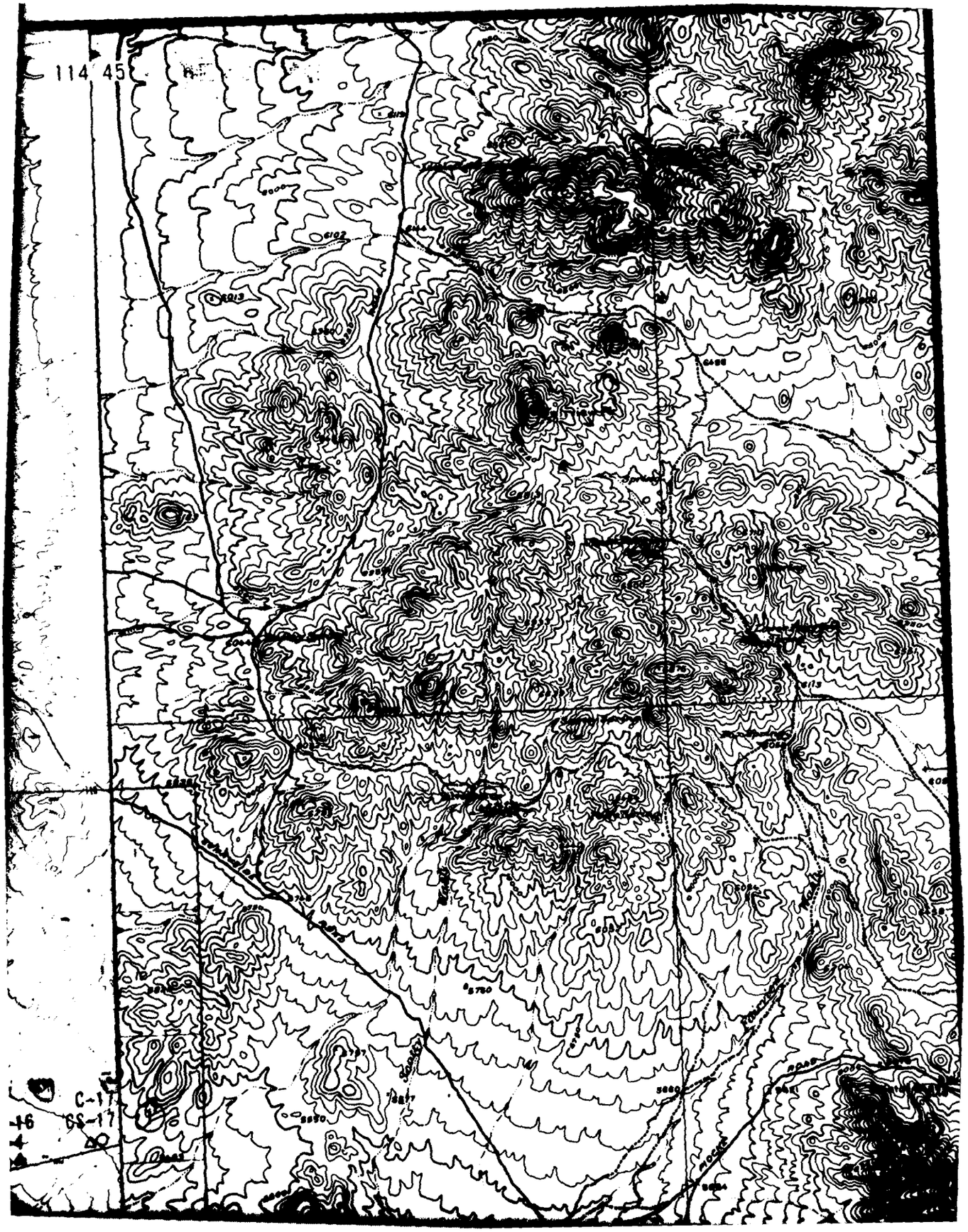
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

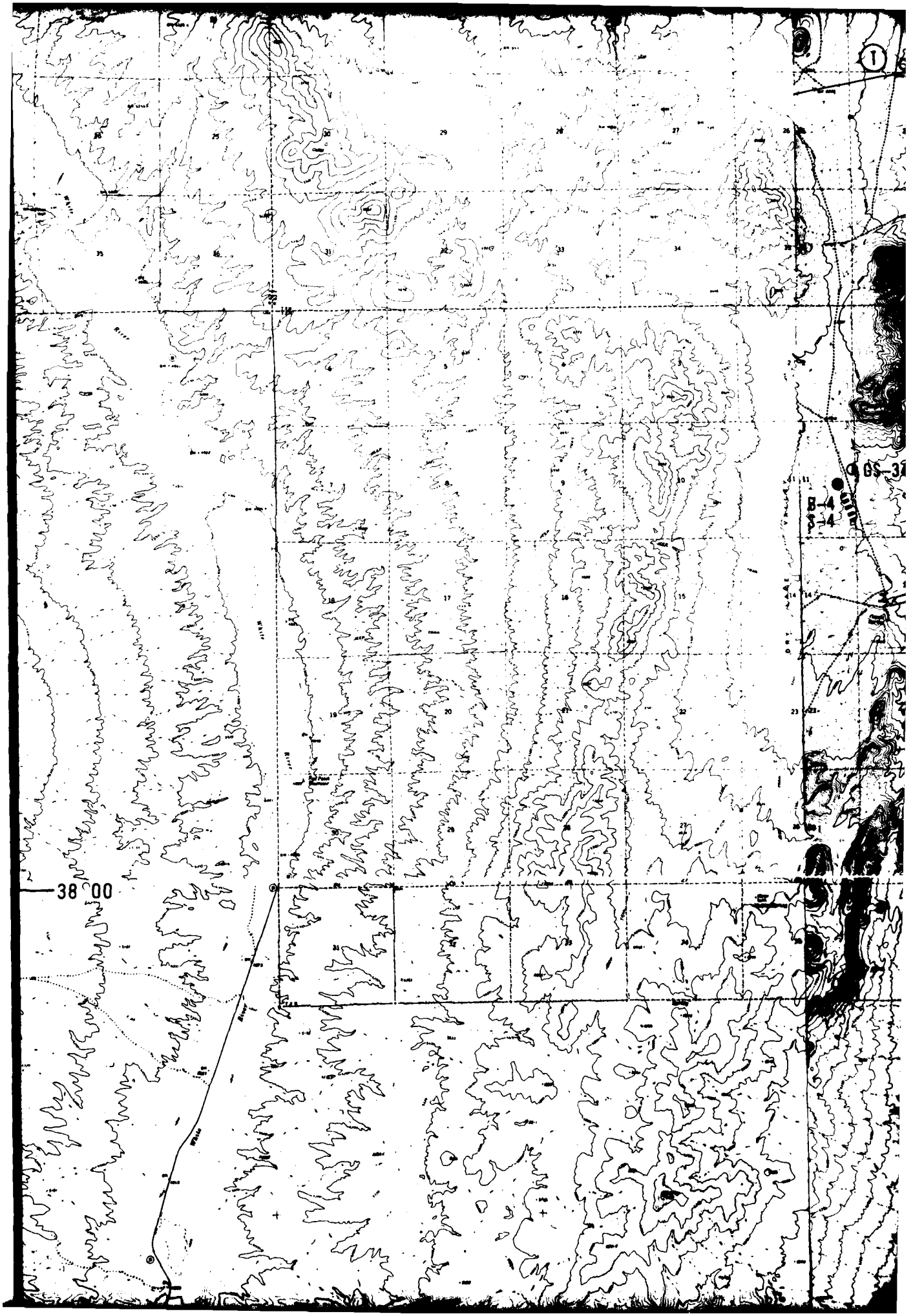
FIGURE
II-B-2

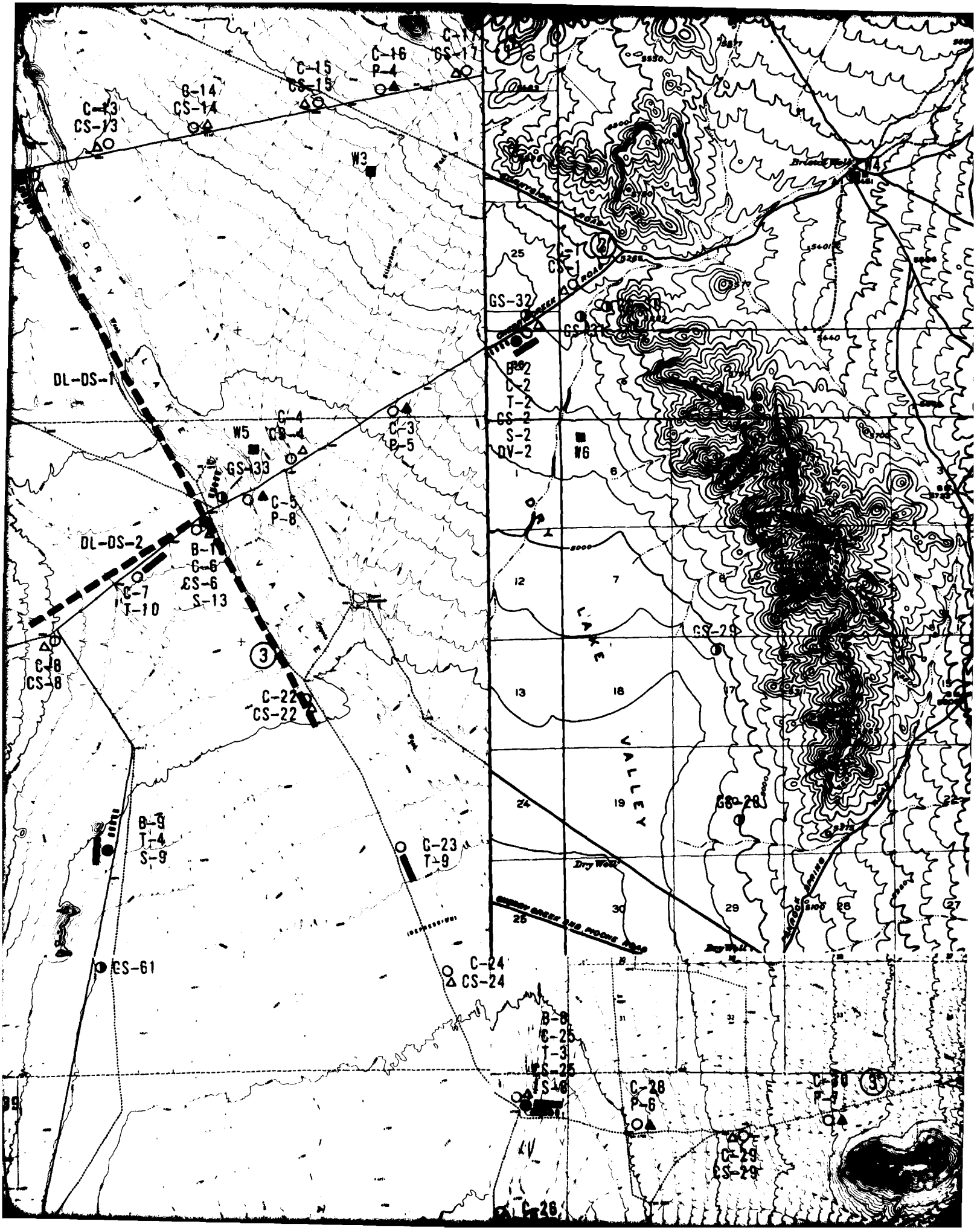
FUGRO NATIONAL, INC.

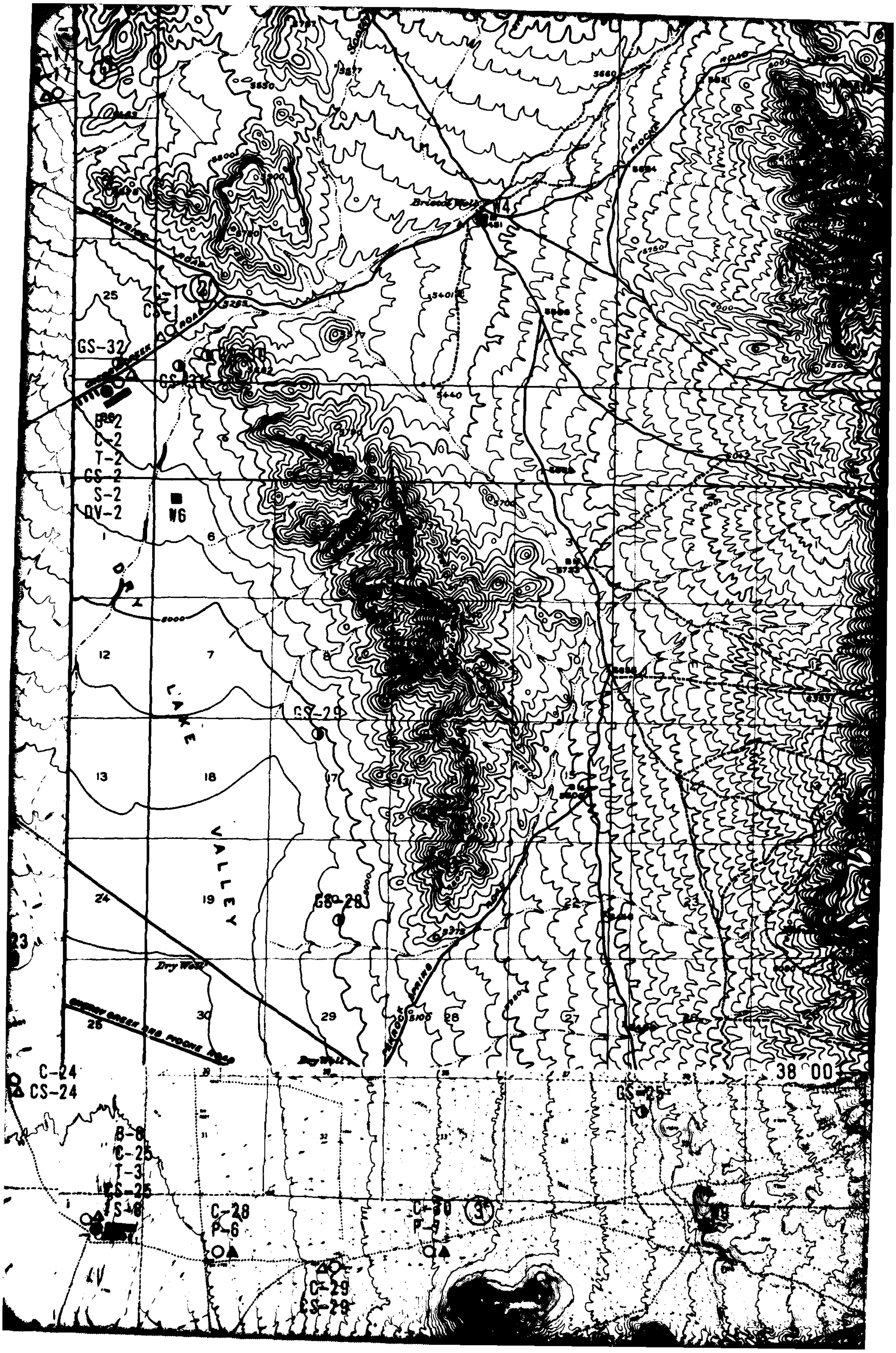

C-21
CS-21
C-
CS-


114°45'
MULESHOE VALLEY
C-20
P-1
W1
C-21
CS-21
C-19
CS-19
C-18
CS-18
W2
C-13
CS-13
C-14
CS-14
C-15
CS-15
C-16
P-4
C-17
CS-17

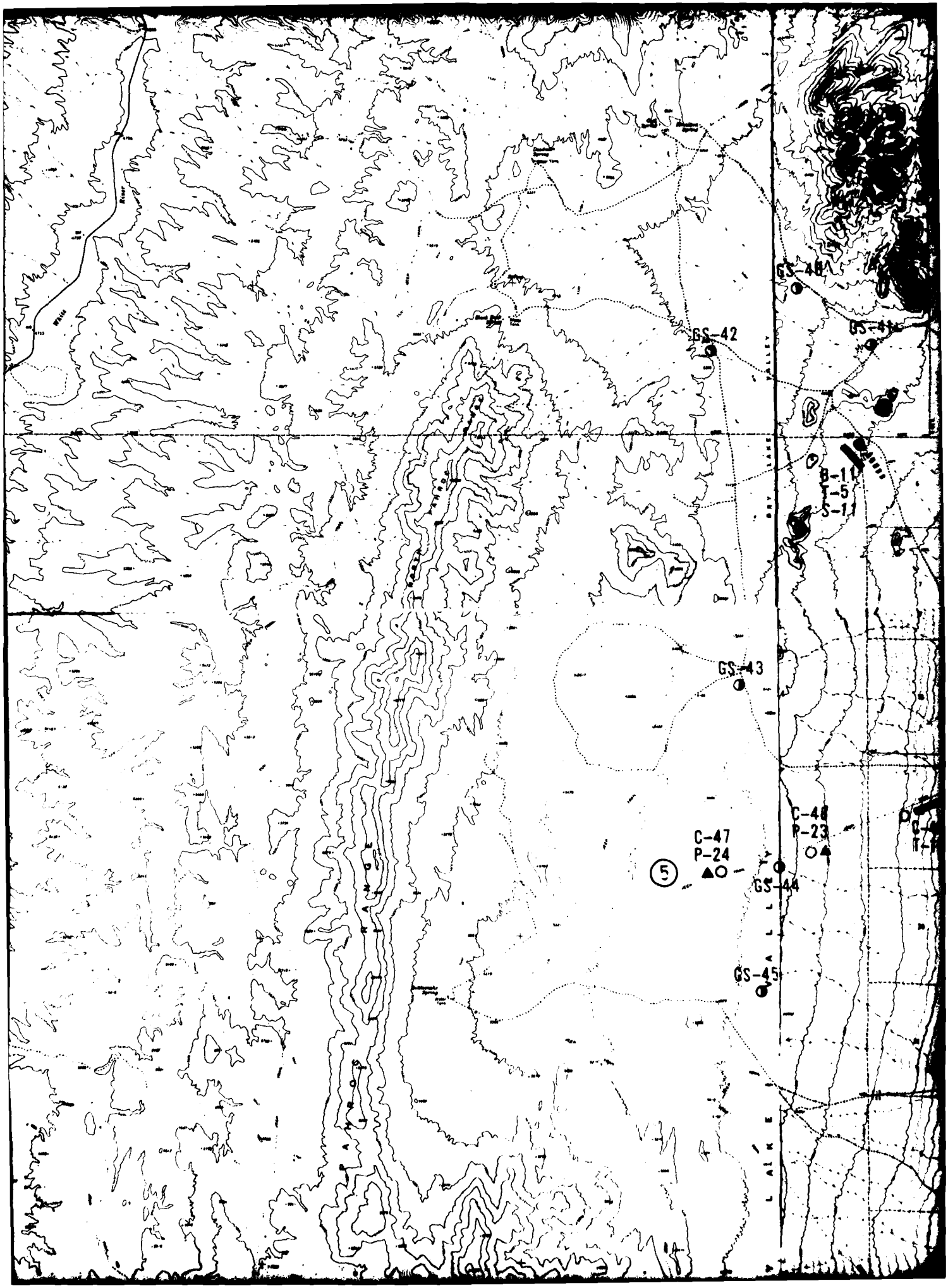

114° 45'
C-17
+6 GS-17

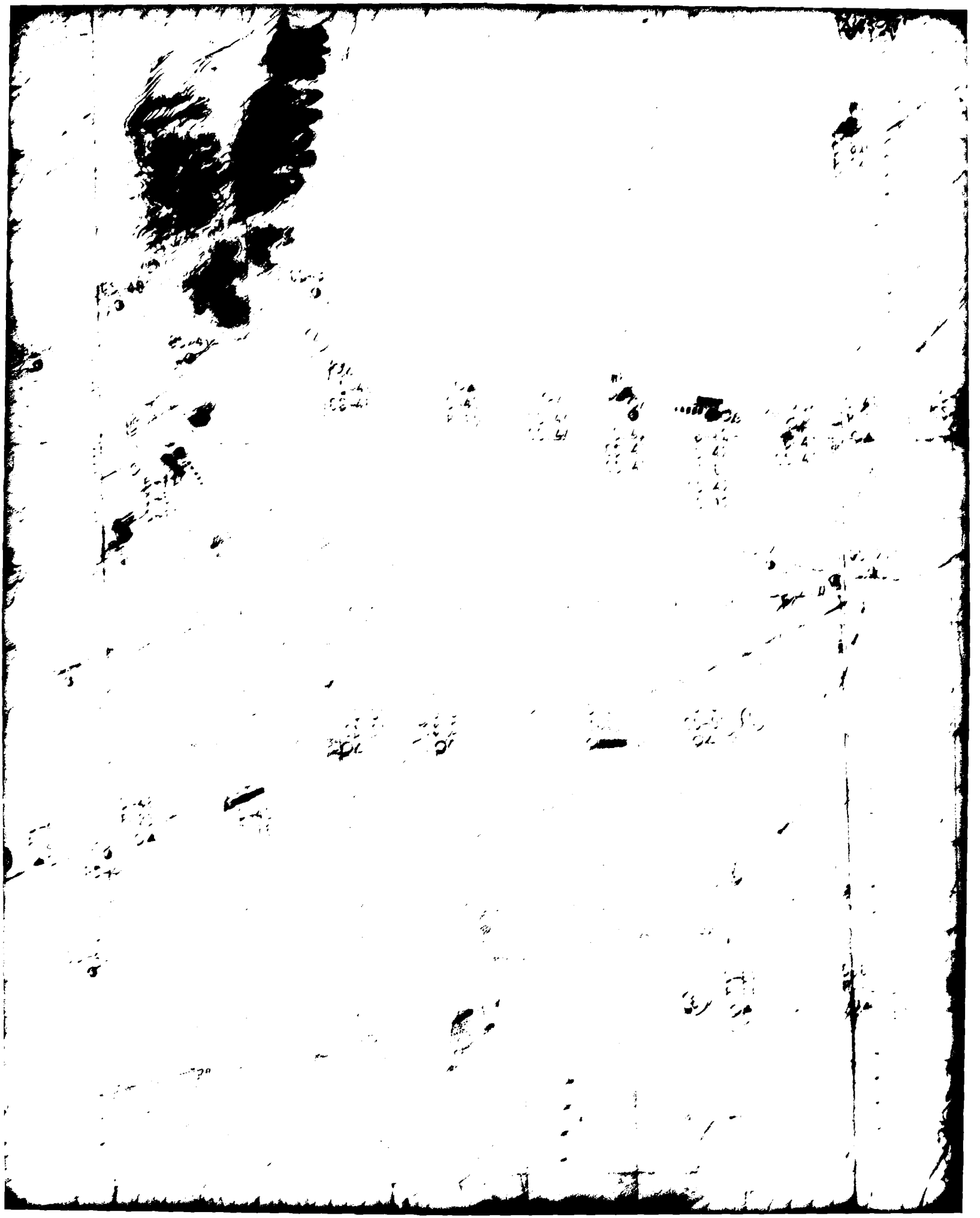

1
GS-37
B-4
S-4
38°00

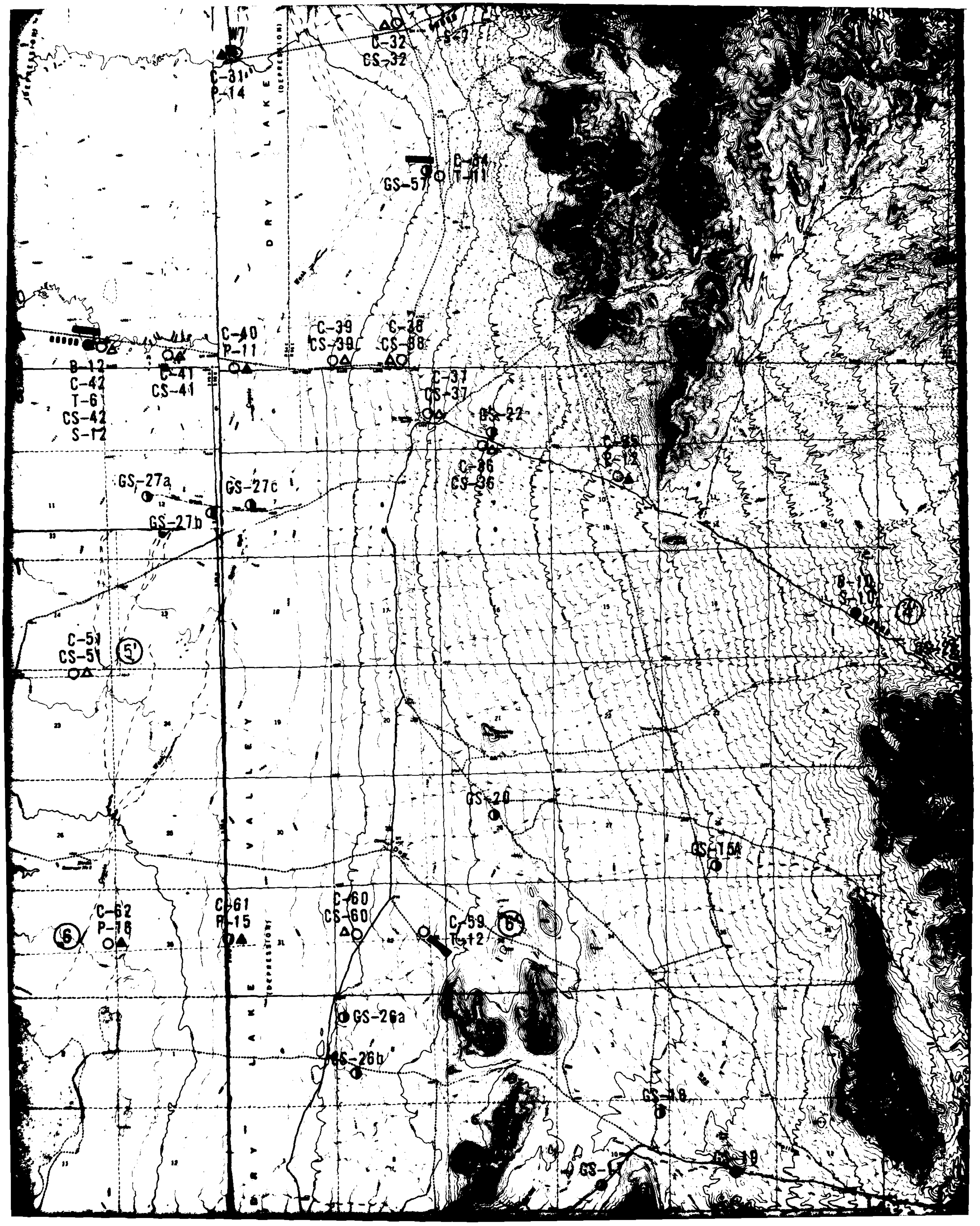

C-16
P-4
C-15
CS-15
C-14
CS-14
C-13
CS-13
W3
W4
GS-32
GS-31
B-2
C-2
T-2
CS-2
S-2
DV-2
W6
DL-DS-1
C-4
CS-4
W5
C-3
P-5
GS-33
C-5
P-8
DL-DS-2
B-1
C-6
ES-6
S-13
C-7
T-10
C-18
CS-18
C-22
CS-22
GS-29
GS-28
LAKE
VALLEY
B-9
T-4
S-9
C-23
T-9
GS-61
C-24
CS-24
B-8
C-25
T-3
ES-25
TS-1
C-28
P-6
C-29
ES-29
C-30
P-7
C-26



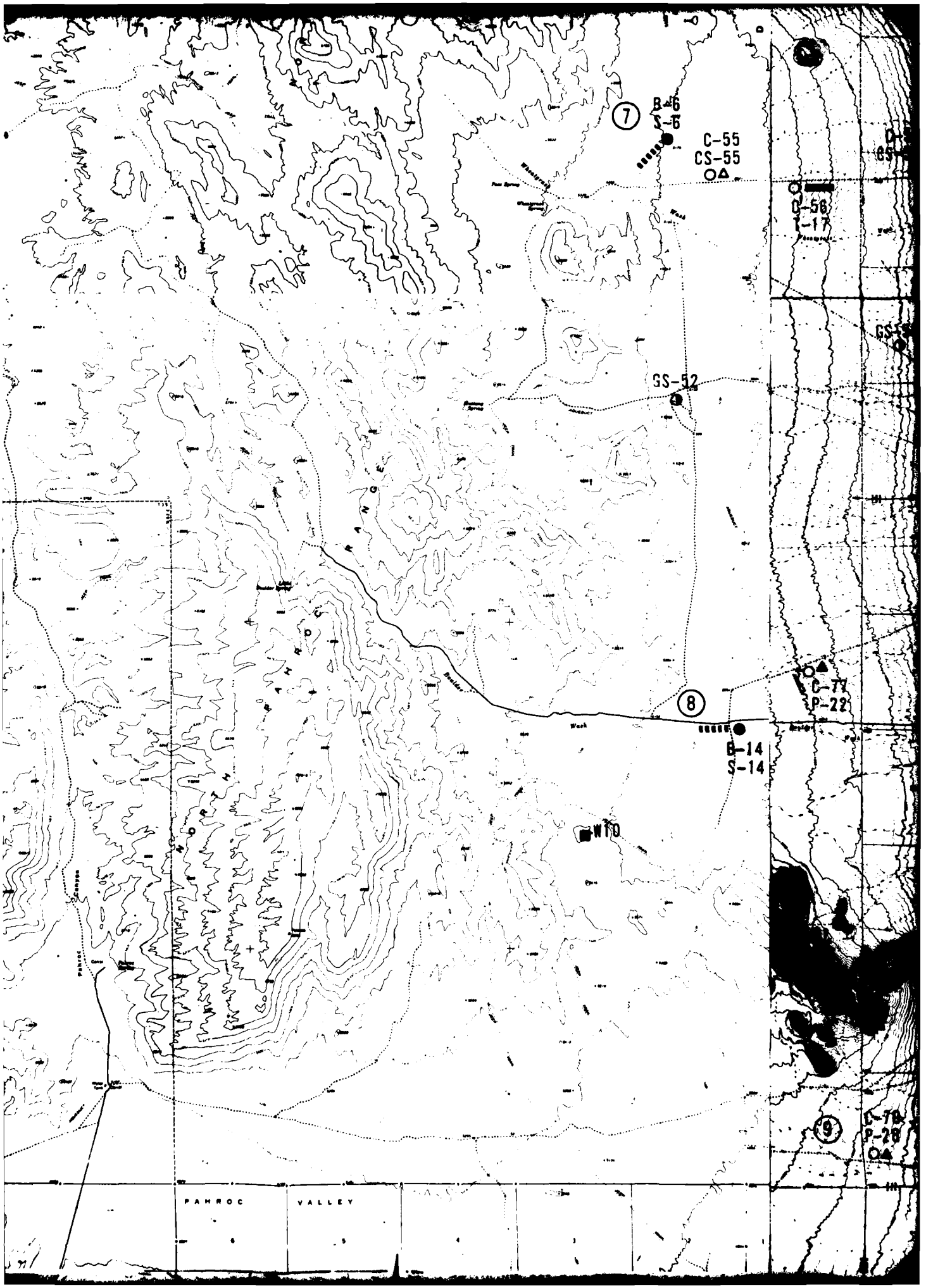
GS-32
GS-31
CS-1
B-2
C-2
T-2
GS-2
S-2
DV-2
W6
DRY
LAKE
VALLEY
GS-29
GS-28
Dry Well
C-24
CS-24
B-8
C-25
T-3
CS-25
C-28
P-6
C-30
P-9
C-29
CS-29
GS-25
38°00'

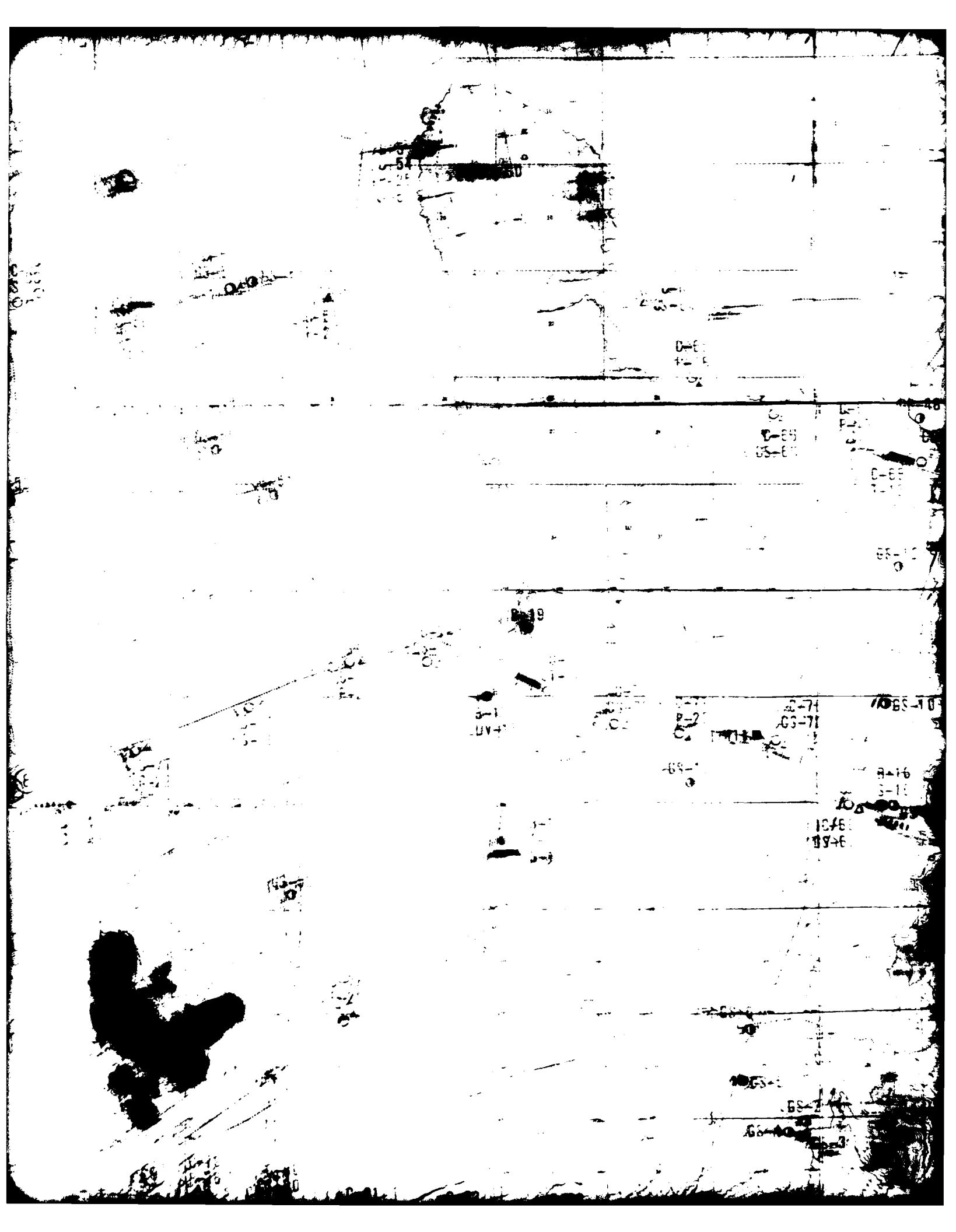

GS-48
GS-41
GS-42
B-11
T-5
S-11
GS-43
C-46
P-23
C-47
P-24
5
GS-44
GS-45
LAKE

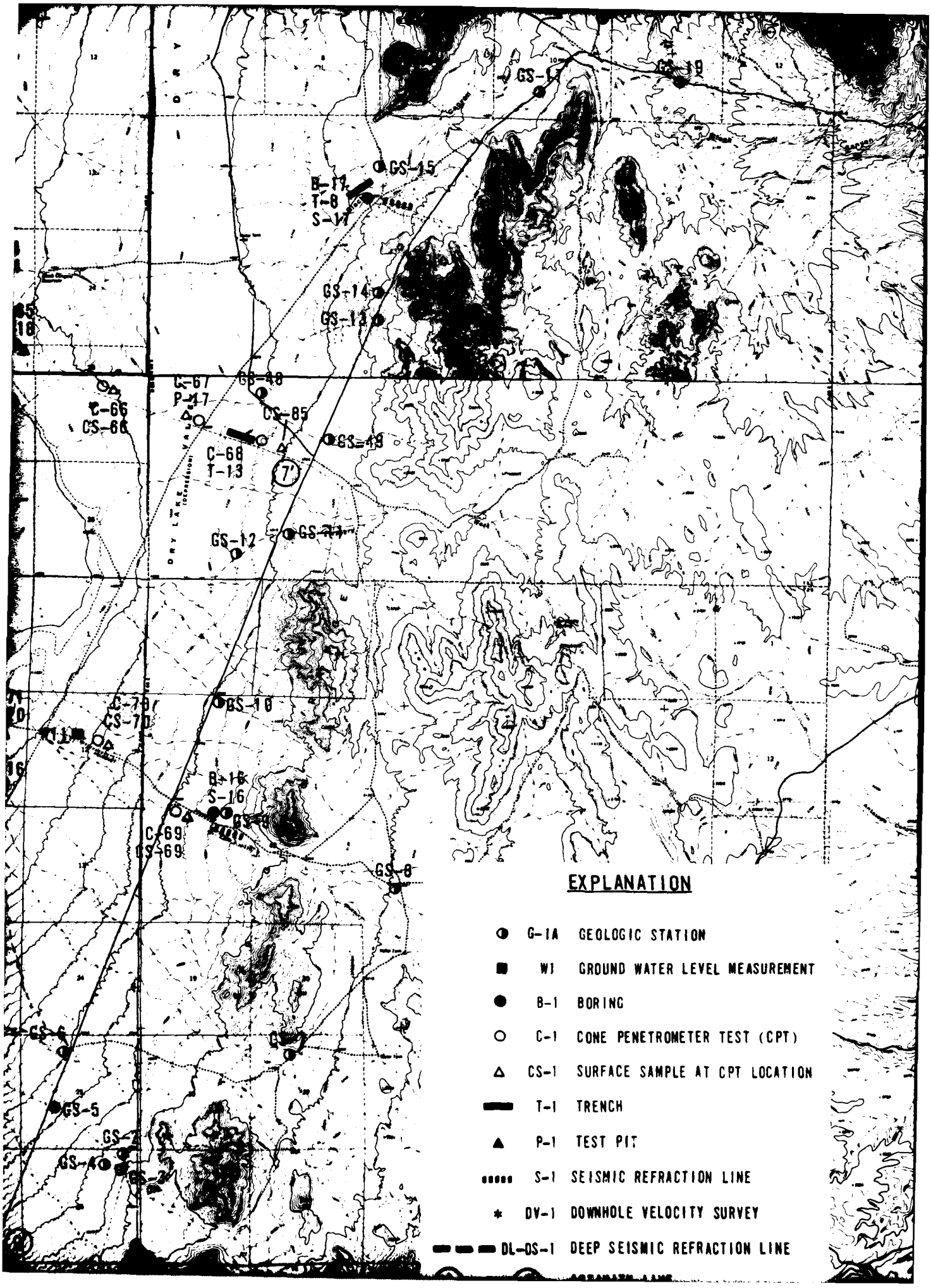


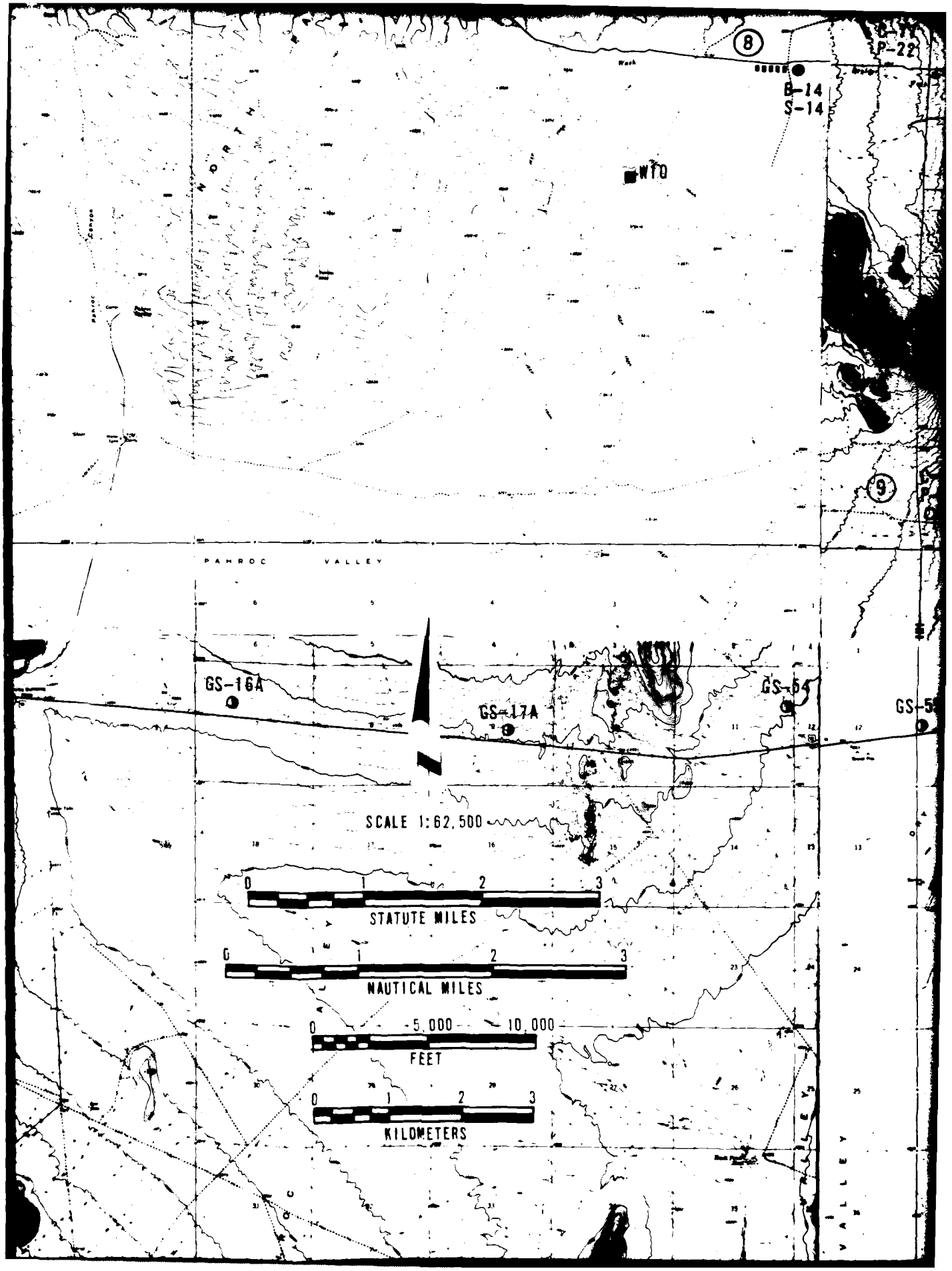


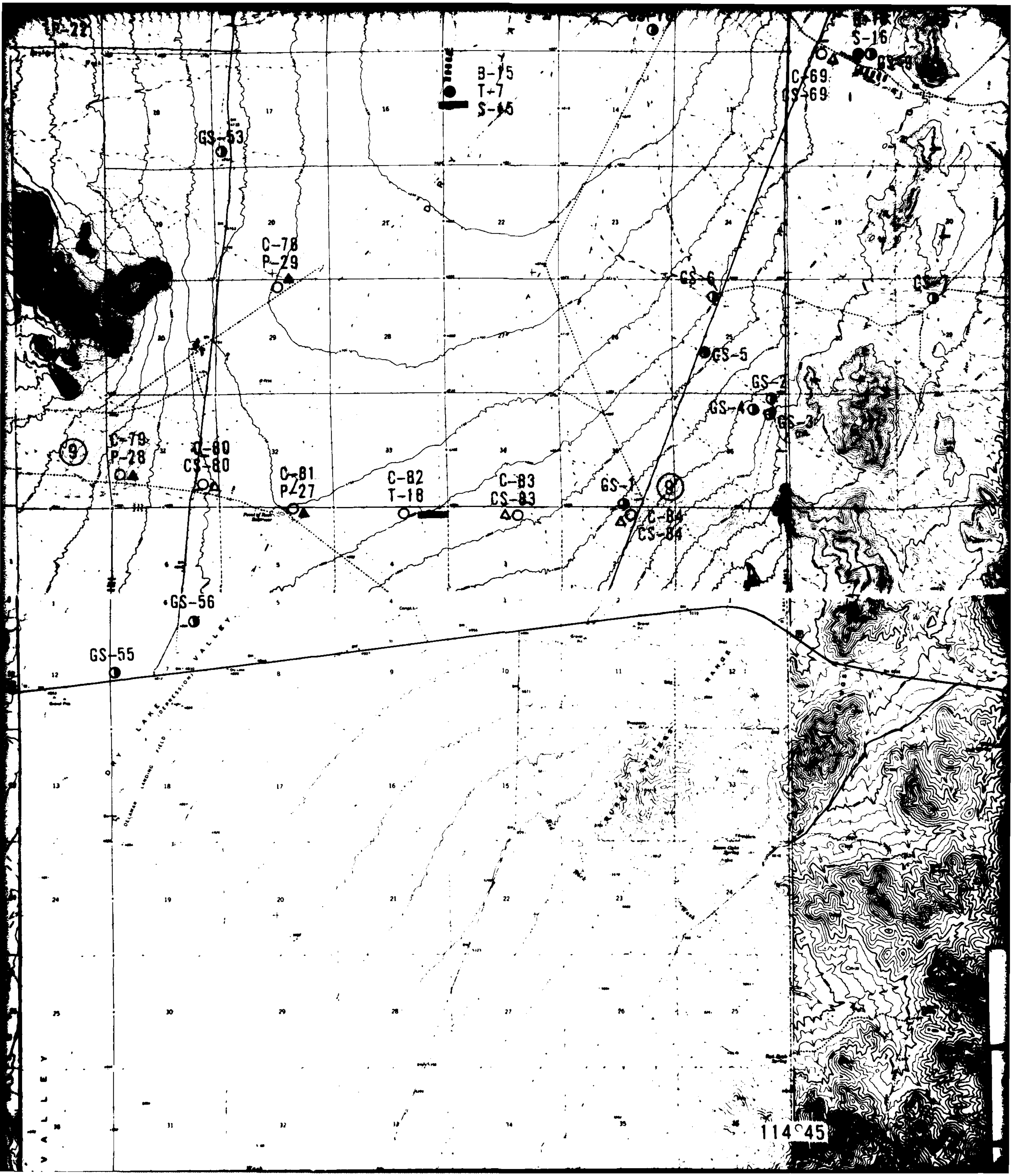
C-32
CS-32
W7
C-31
P-14
DRY LAKE (DEPRESSION)
C-84
T-11
GS-57
C-39
CS-39
C-38
CS-38
C-40
P-11
B-12
C-42
T-6
CS-42
S-12
C-41
CS-41
C-37
CS-37
GS-22
C-36
CS-36
GS-27a
GS-27c
GS-27b
B-10
S-10
C-51
CS-51
GS-20
GS-15A
C-62
P-16
C-61
P-15
C-60
CS-60
C-59
T-12
GS-26a
GS-26b
DRY LAKE VALLEY
GS-18
GS-19


7
B-6
S-6
C-55
CS-55
C-56
I-17
GS-52
8
C-77
P-22
B-14
S-14
WTO
9
C-78
P-28
PAHROC
VALLEY

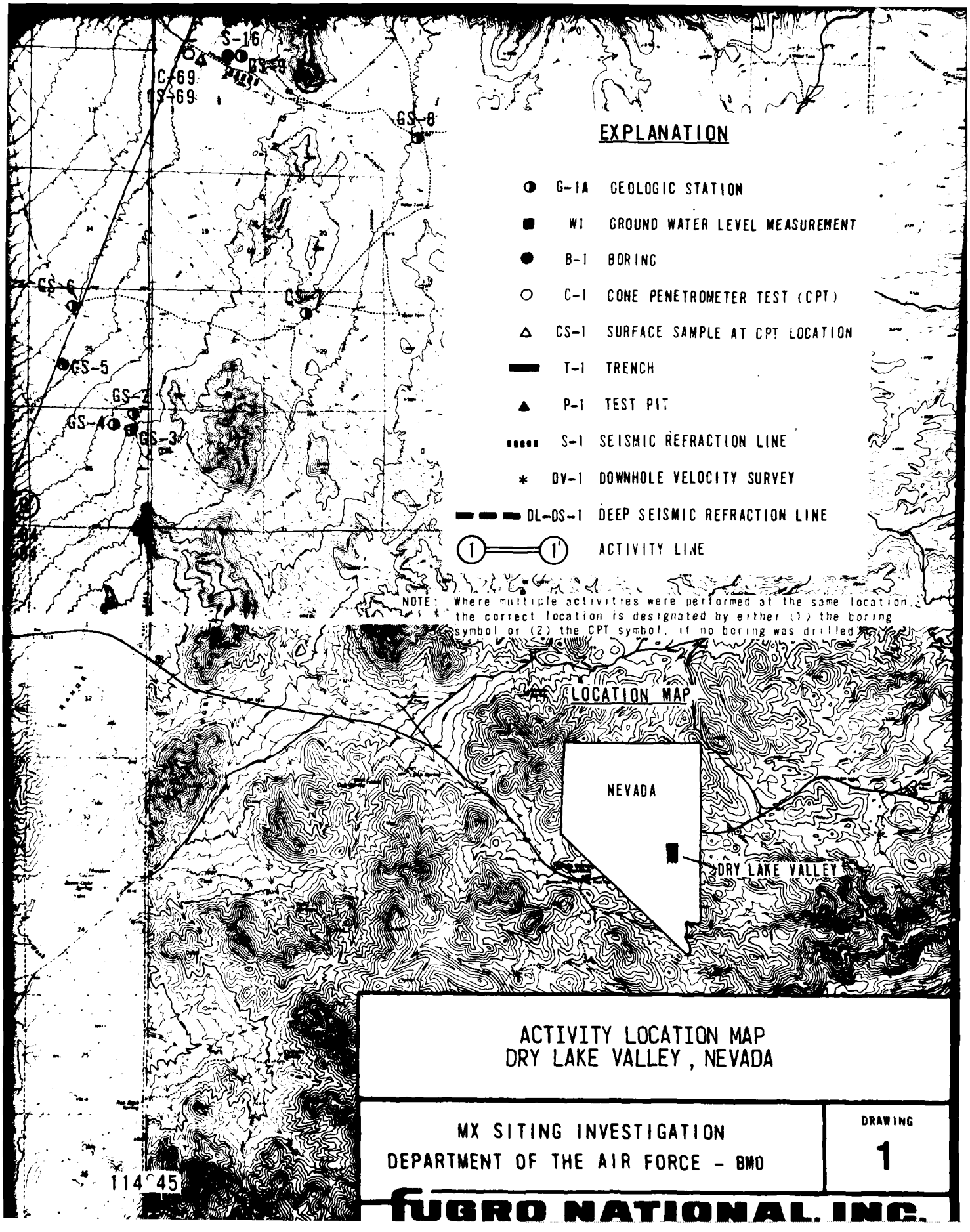



GS-17
GS-19
GS-15
B-17
T-8
S-17
GS-14
GS-13
C-67
P-17
GS-18
C-66
CS-66
CS-85
GS-19
C-68
T-13
GS-12
GS-11
C-70
CS-70
GS-10
B-16
S-16
C-69
CS-69
GS-8
GS-6
GS-5
GS-4
EXPLANATION
G-1A GEOLOGIC STATION
W1 GROUND WATER LEVEL MEASUREMENT
B-1 BORING
C-1 CONE PENETROMETER TEST (CPT)
CS-1 SURFACE SAMPLE AT CPT LOCATION
T-1 TRENCH
P-1 TEST PIT
S-1 SEISMIC REFRACTION LINE
DV-1 DOWNHOLE VELOCITY SURVEY
DL-OS-1 DEEP SEISMIC REFRACTION LINE


8
P-22
B-14
S-14
WTO
9
PAHROC VALLEY
GS-16A
GS-17A
GS-5
SCALE 1:62,500
0 1 2 3
STATUTE MILES
0 1 2 3
NAUTICAL MILES
0 5,000 10,000
FEET
0 1 2 3
KILOMETERS



S-16
C-69
CS-69
GS-53
C-78
P-29
GS-6
GS-5
GS-2
GS-4
GS-3
C-79
P-28
C-80
CS-80
C-81
P-27
C-82
T-18
C-83
CS-83
GS-1
C-84
CS-84
GS-56
GS-55
VALLEY
RANGE
V A L L E Y
114°45

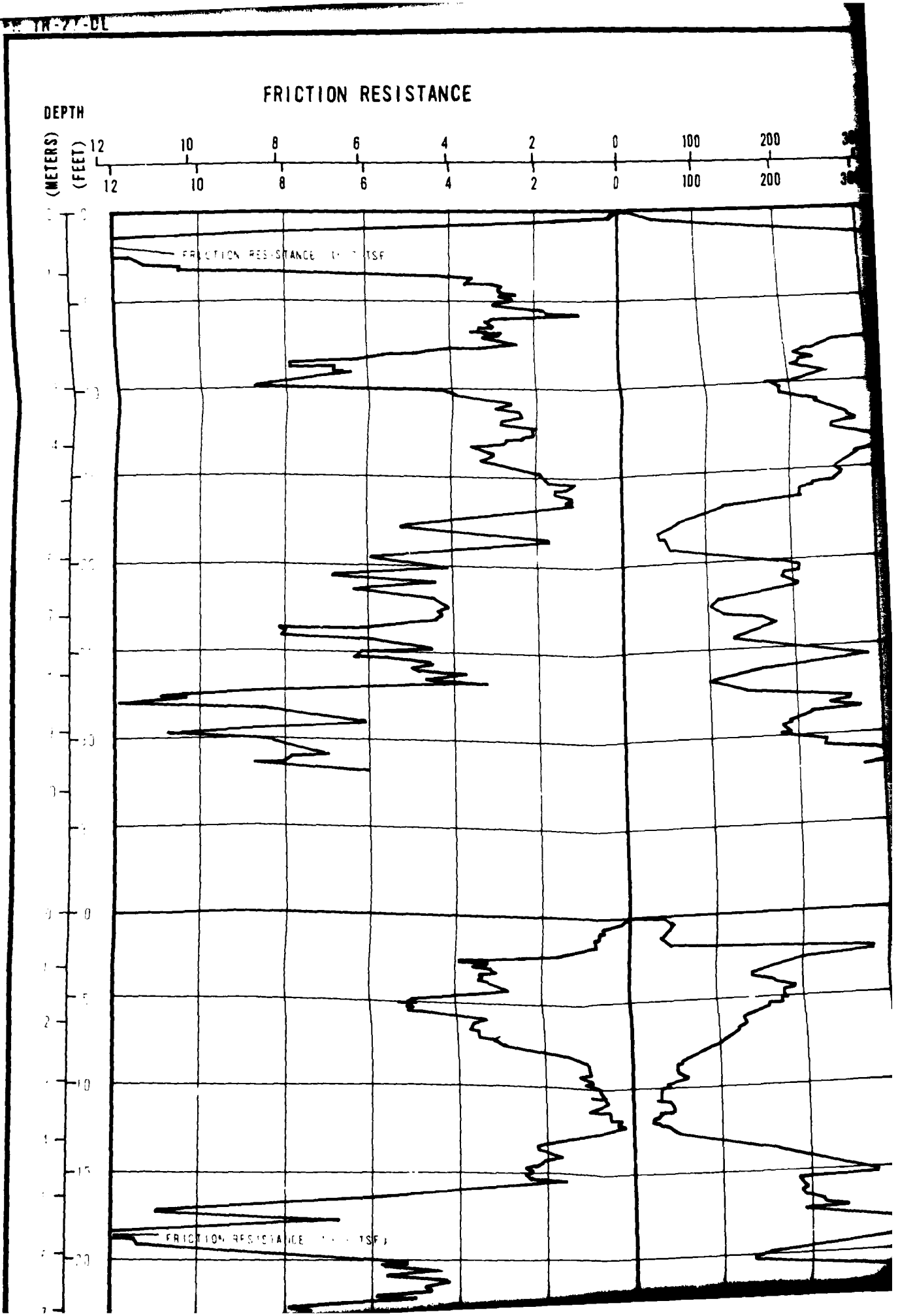


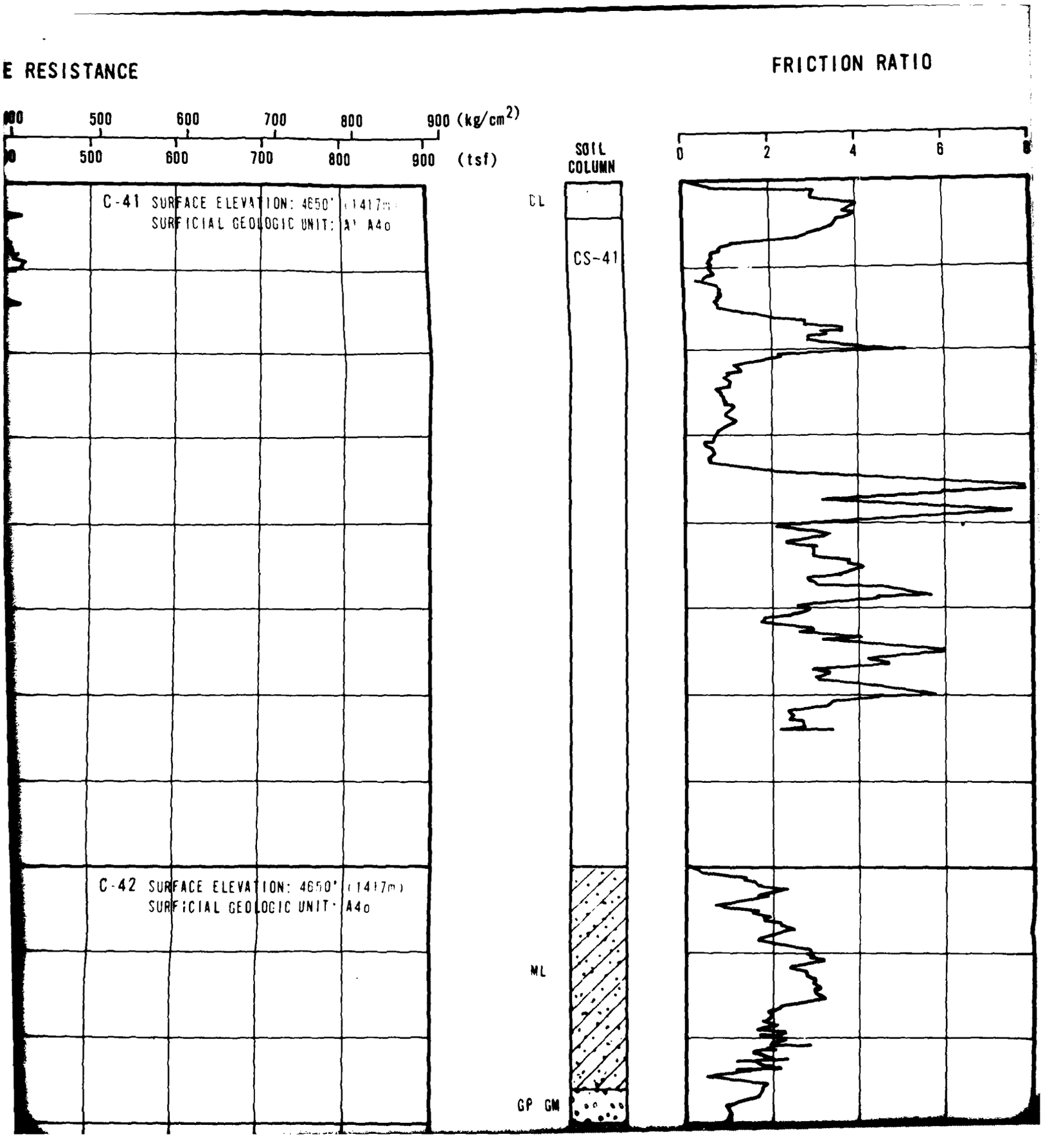
ACTIVITY LOCATION MAP
DRY LAKE VALLEY, NEVADA

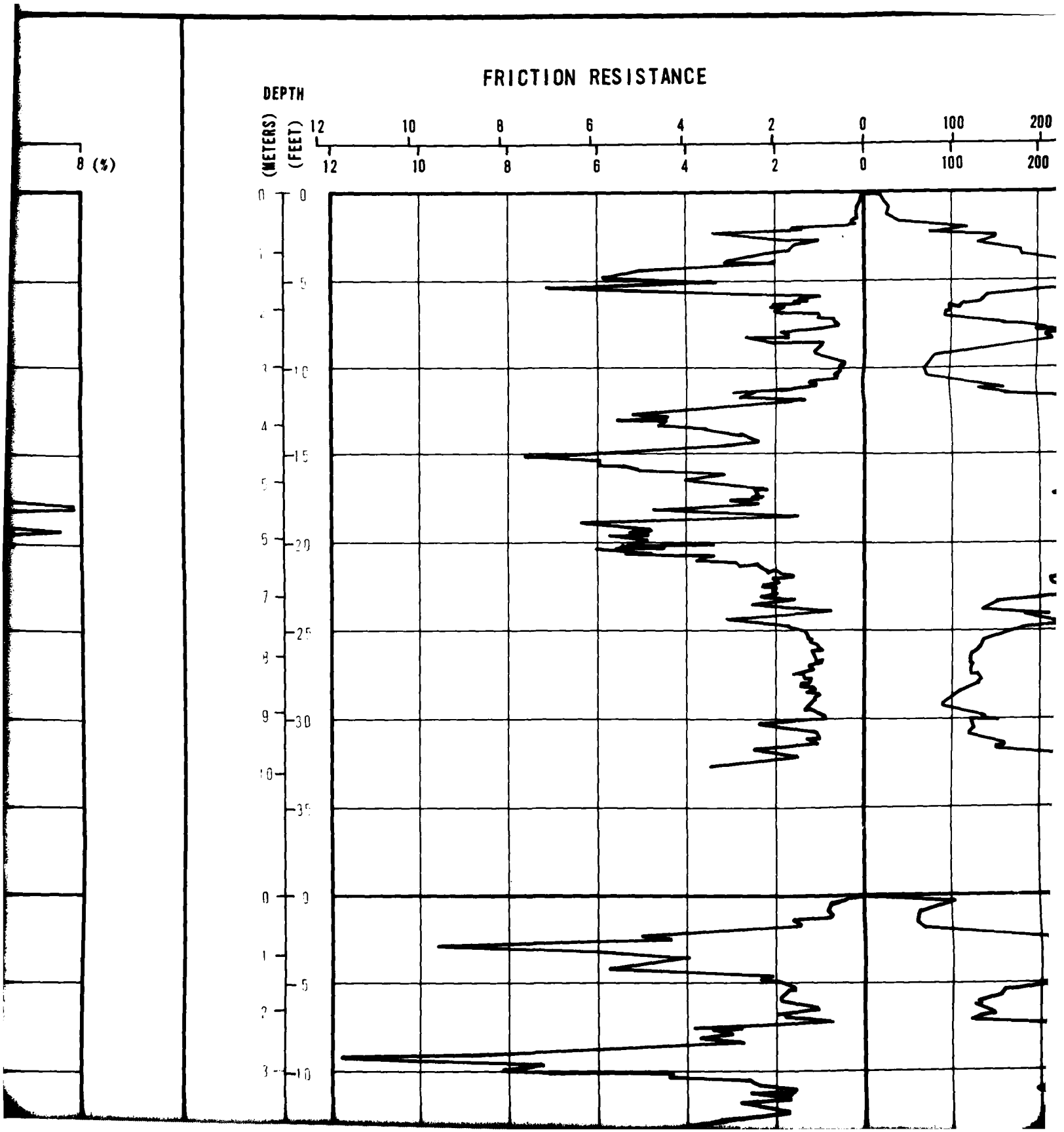
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

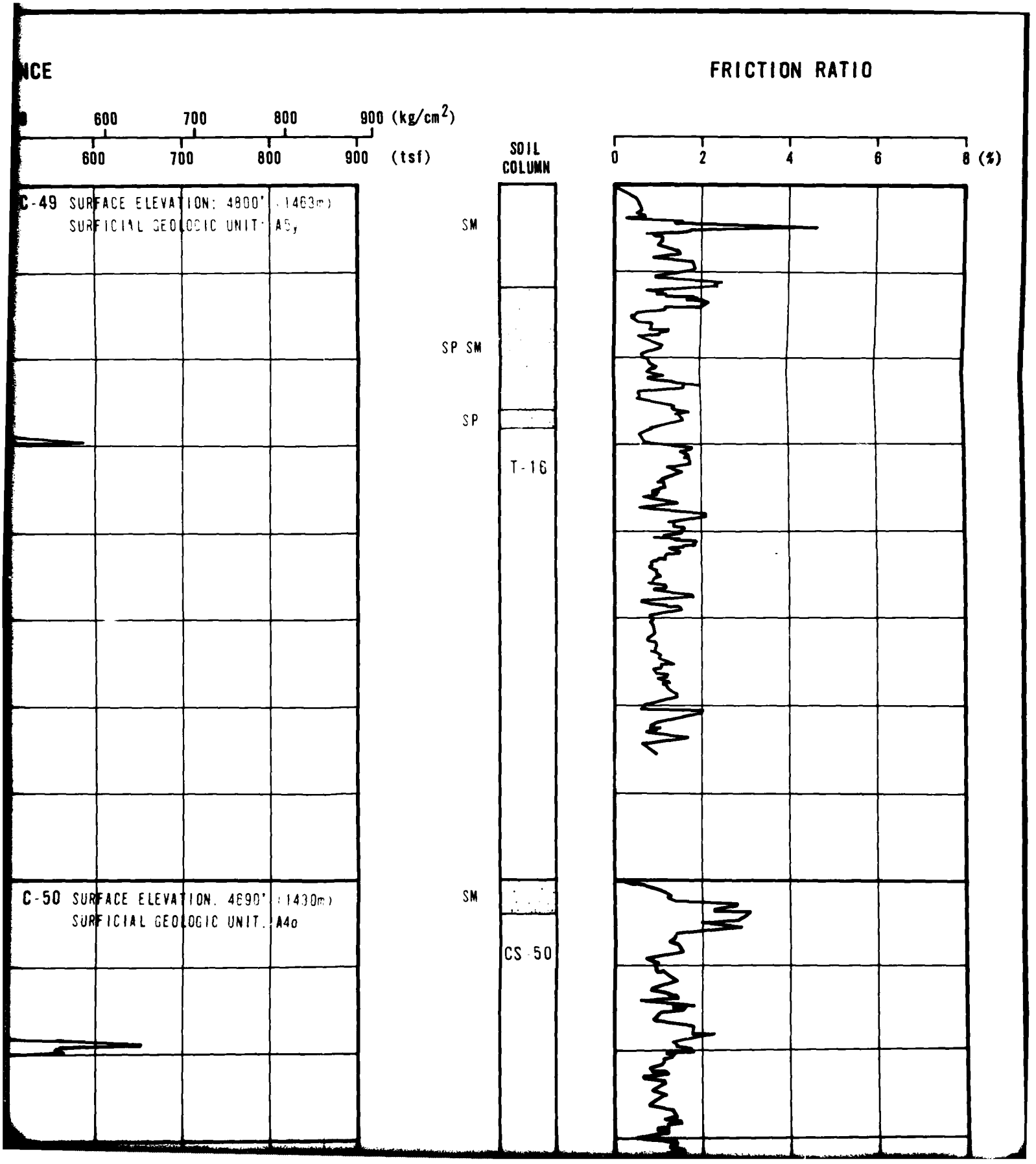
DRAWING
1

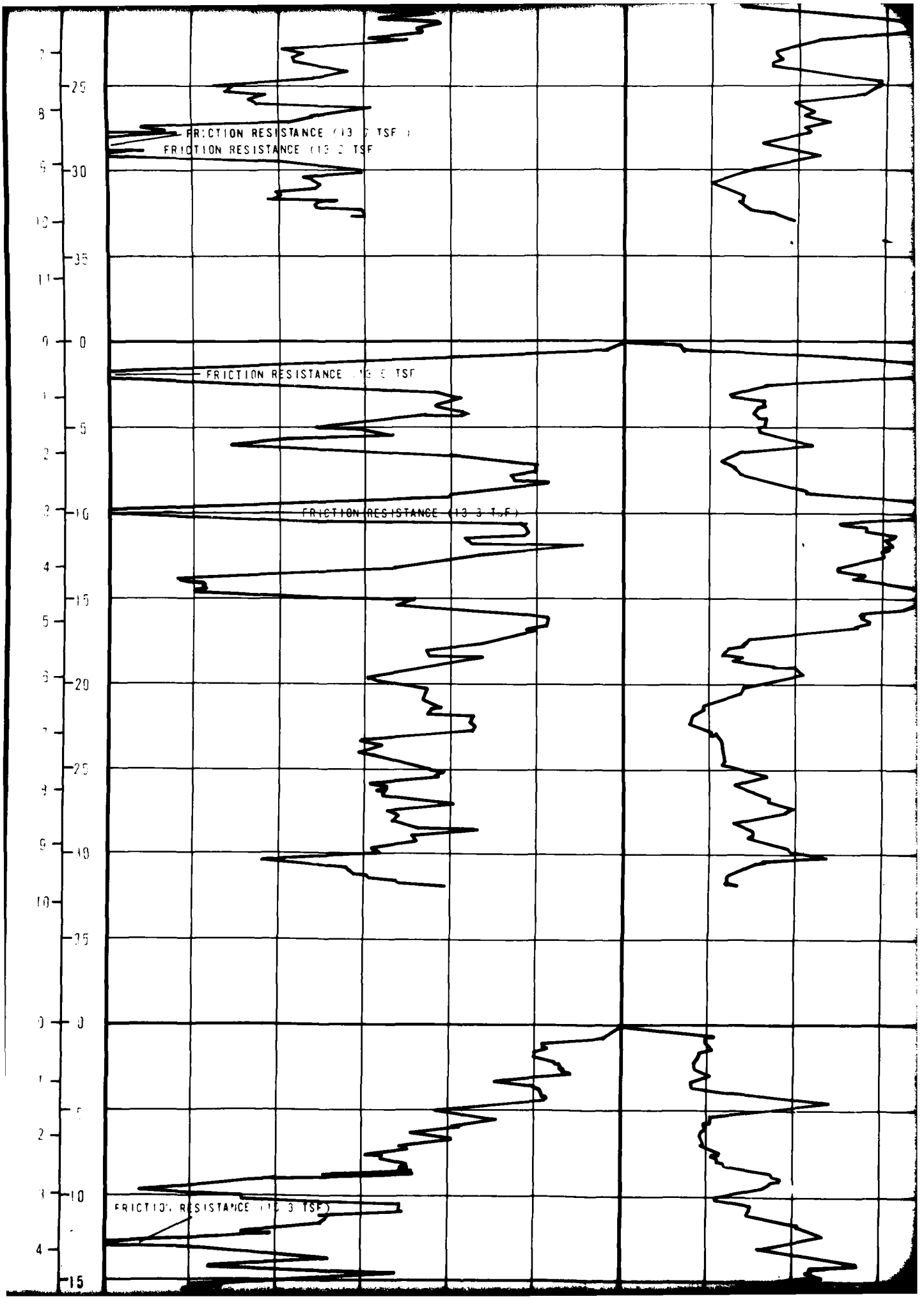
FUGRO NATIONAL, INC.

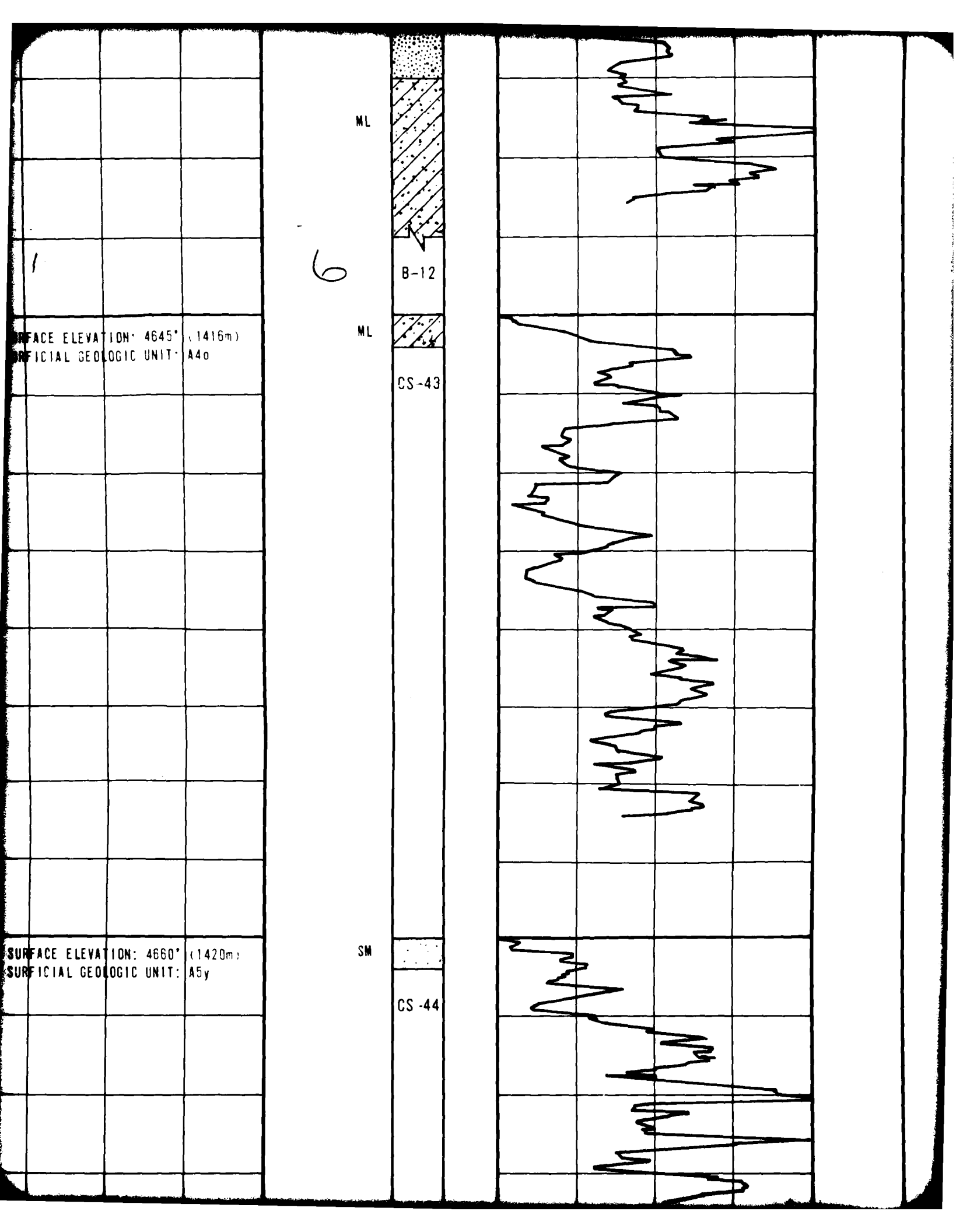

FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
200
FRICTION RESISTANCE
TSF


E RESISTANCE
FRICTION RATIO
500
600
700
800
900 (kg/cm2)
500
600
700
800
900 (tsf)
SOIL COLUMN
0
2
4
6
C-41 SURFACE ELEVATION: 4650' (1417m)
SURFICIAL GEOLOGIC UNIT: A1 A4o
CL
CS-41
C-42 SURFACE ELEVATION: 4650' (1417m)
SURFICIAL GEOLOGIC UNIT: A4o
ML
GP GM


8 (%)
DEPTH
(METERS)
(FEET)
FRICTION RESISTANCE
12
10
8
6
4
2
0
100
200

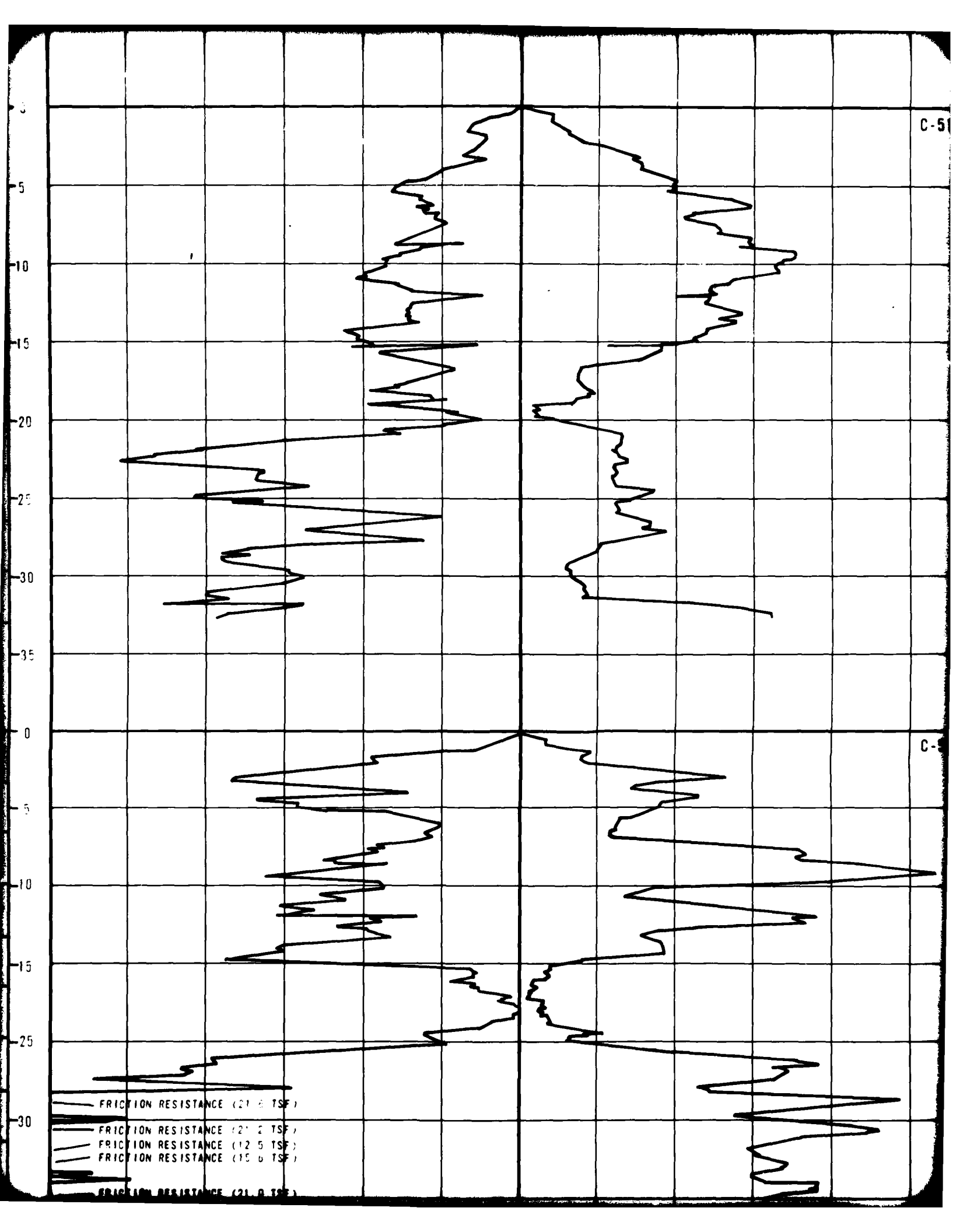

NCE
FRICTION RATIO
600
700
800
900 (kg/cm²)
600
700
800
900 (tsf)
SOIL COLUMN
0
2
4
6
8 (%)
C-49 SURFACE ELEVATION: 4800' (1463m)
SURFICIAL GEOLOGIC UNIT: A5,
SM
SP SM
SP
T-16
C-50 SURFACE ELEVATION. 4690' (1430m)
SURFICIAL GEOLOGIC UNIT. A4o
SM
CS-50

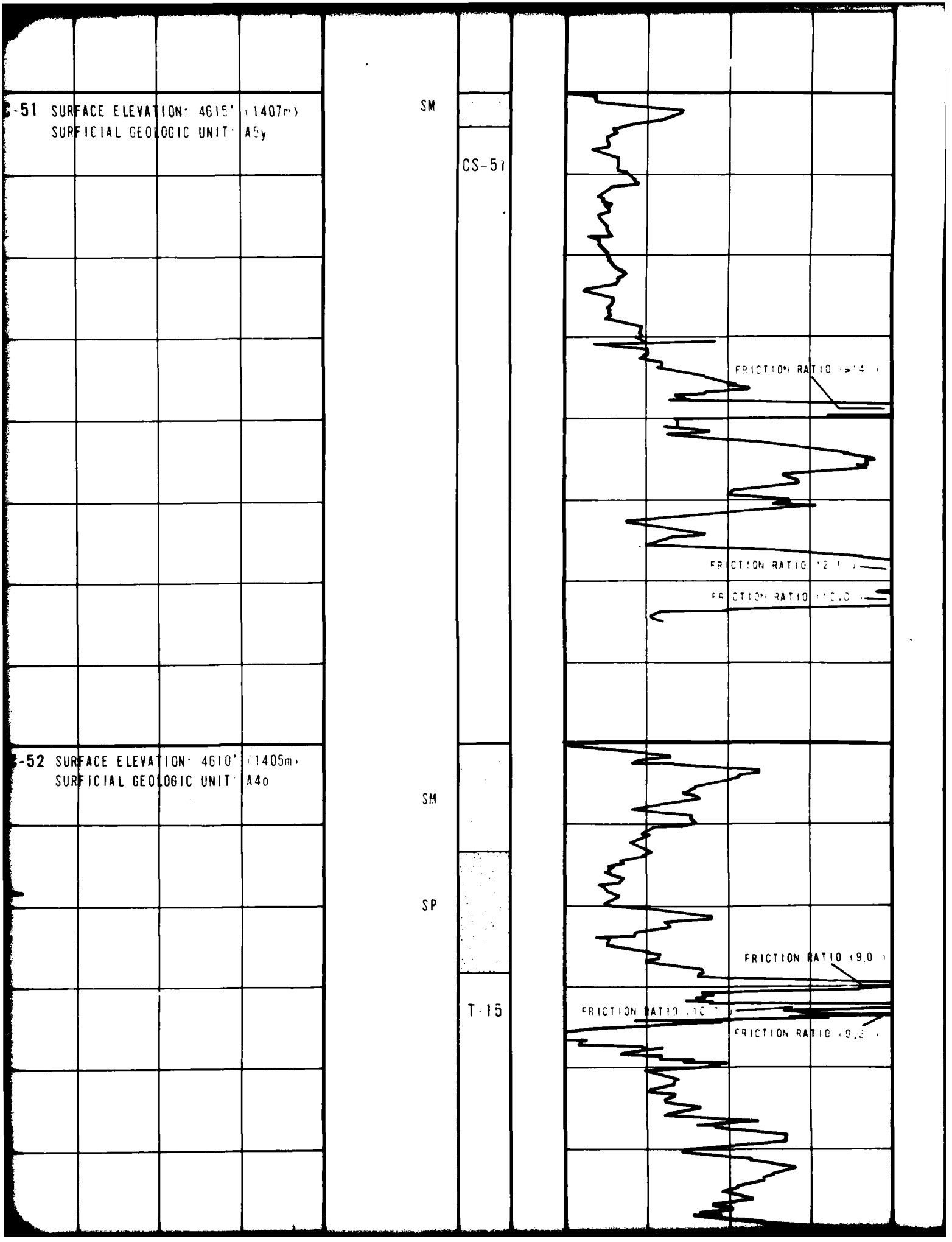

FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
25
30
35
0
5
10
15
20
25
30
35
0
5
10
15

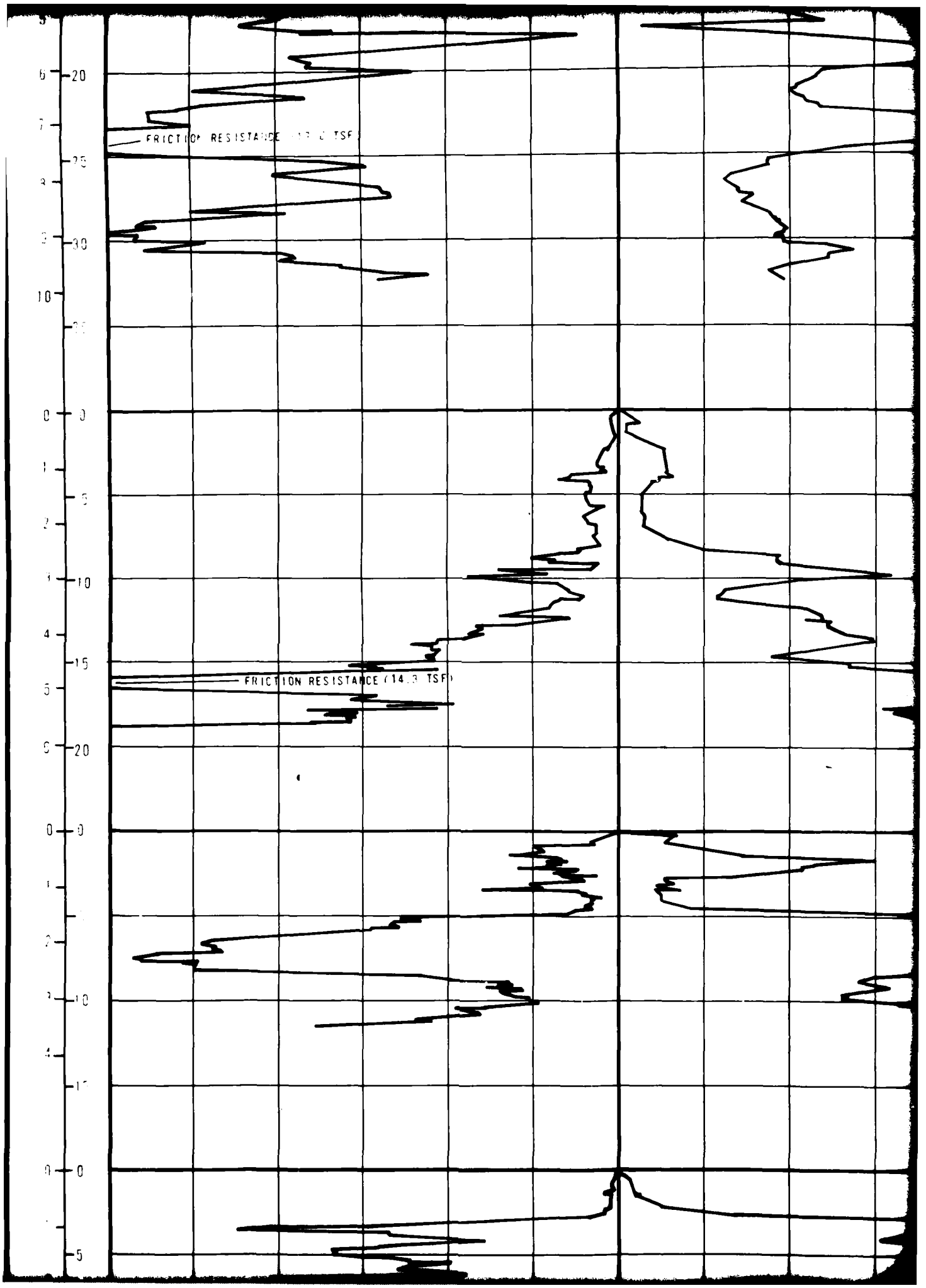


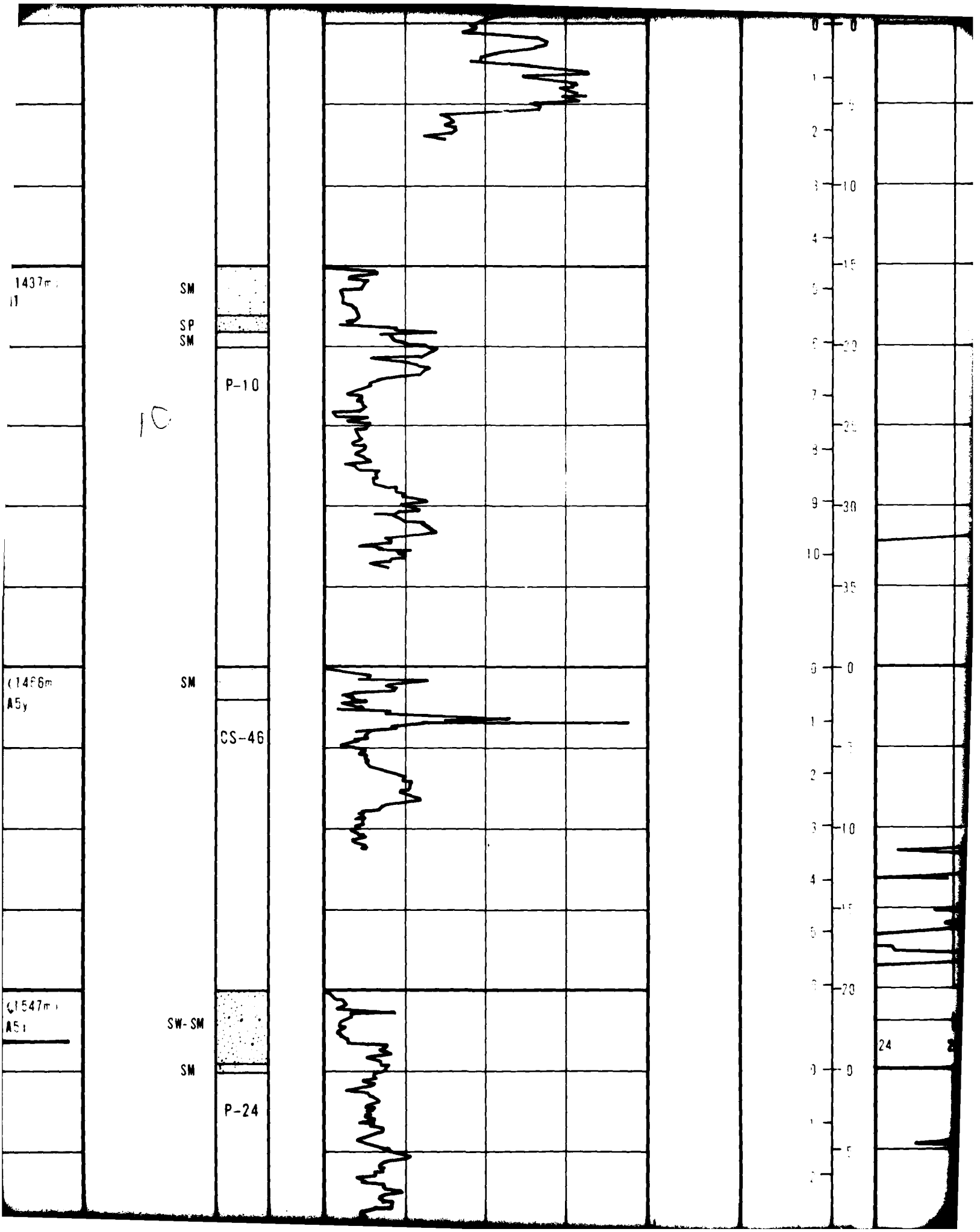
SURFACE ELEVATION: 4645' (1416m)
SURFICIAL GEOLOGIC UNIT: A4o

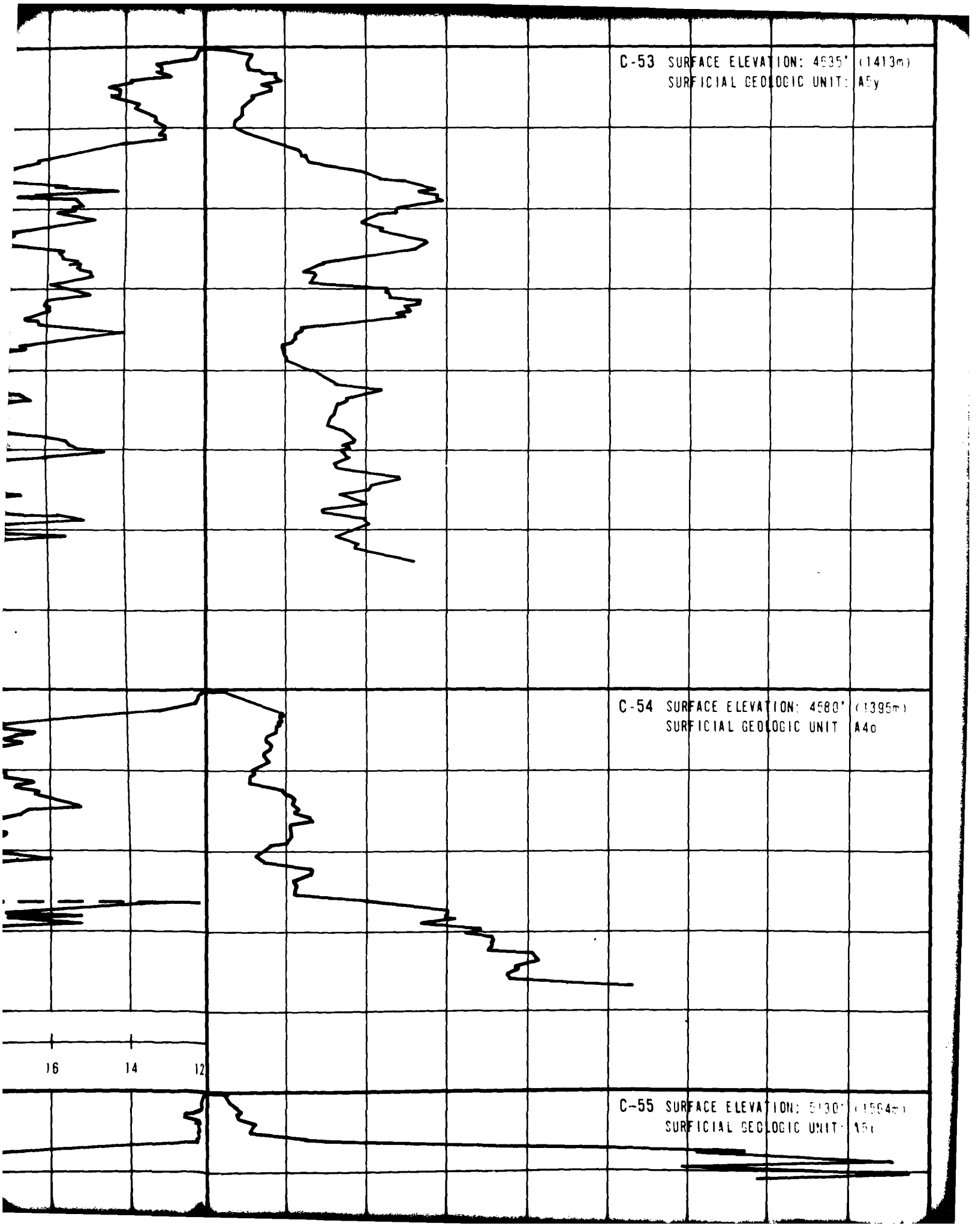
SURFACE ELEVATION: 4660' (1420m)
SURFICIAL GEOLOGIC UNIT: A5y

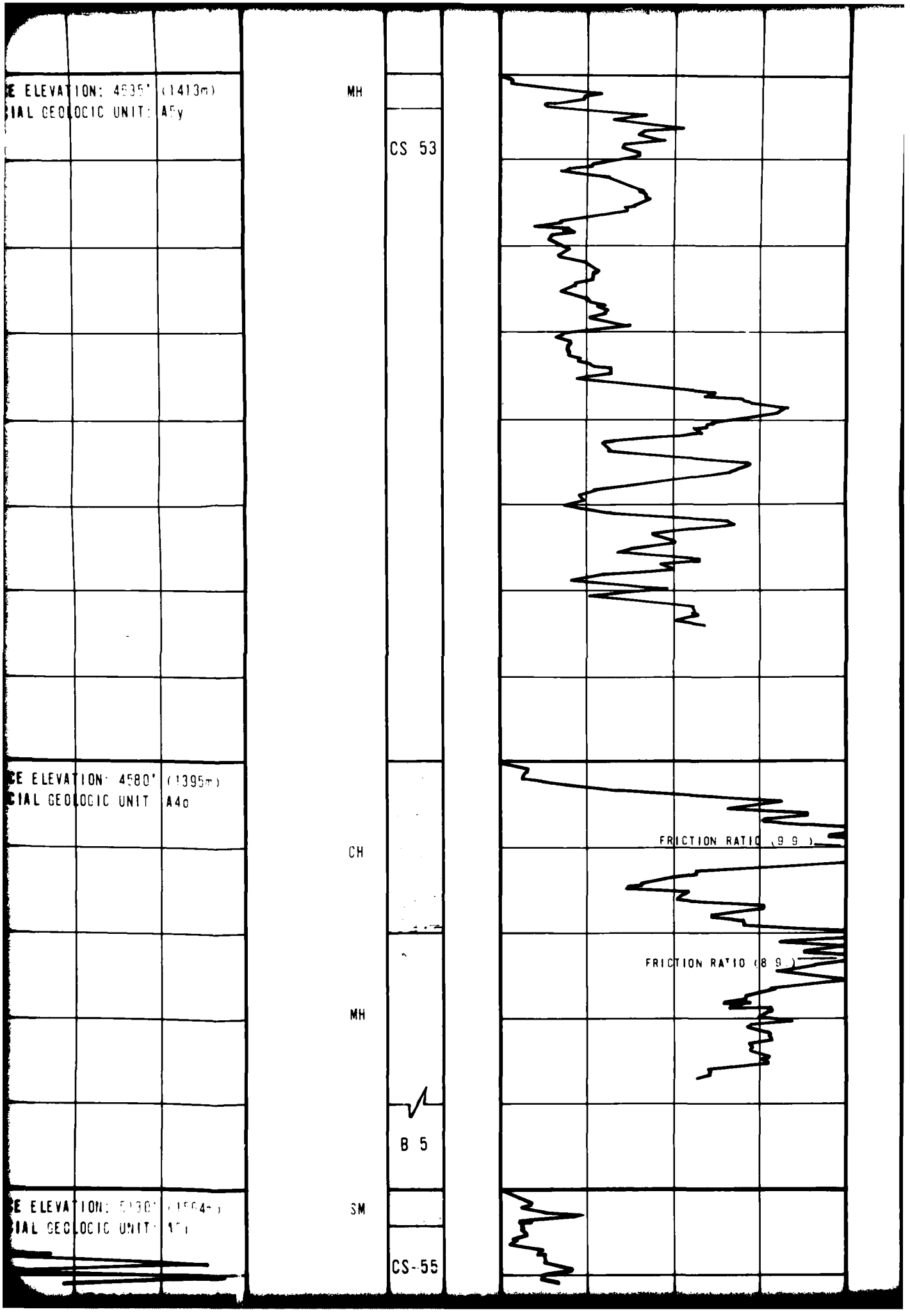

C-51
C-
FRICTION RESISTANCE (21.8 TSF)
FRICTION RESISTANCE (21.2 TSF)
FRICTION RESISTANCE (12.5 TSF)
FRICTION RESISTANCE (15.6 TSF)
FRICTION RESISTANCE (21.8 TSF)

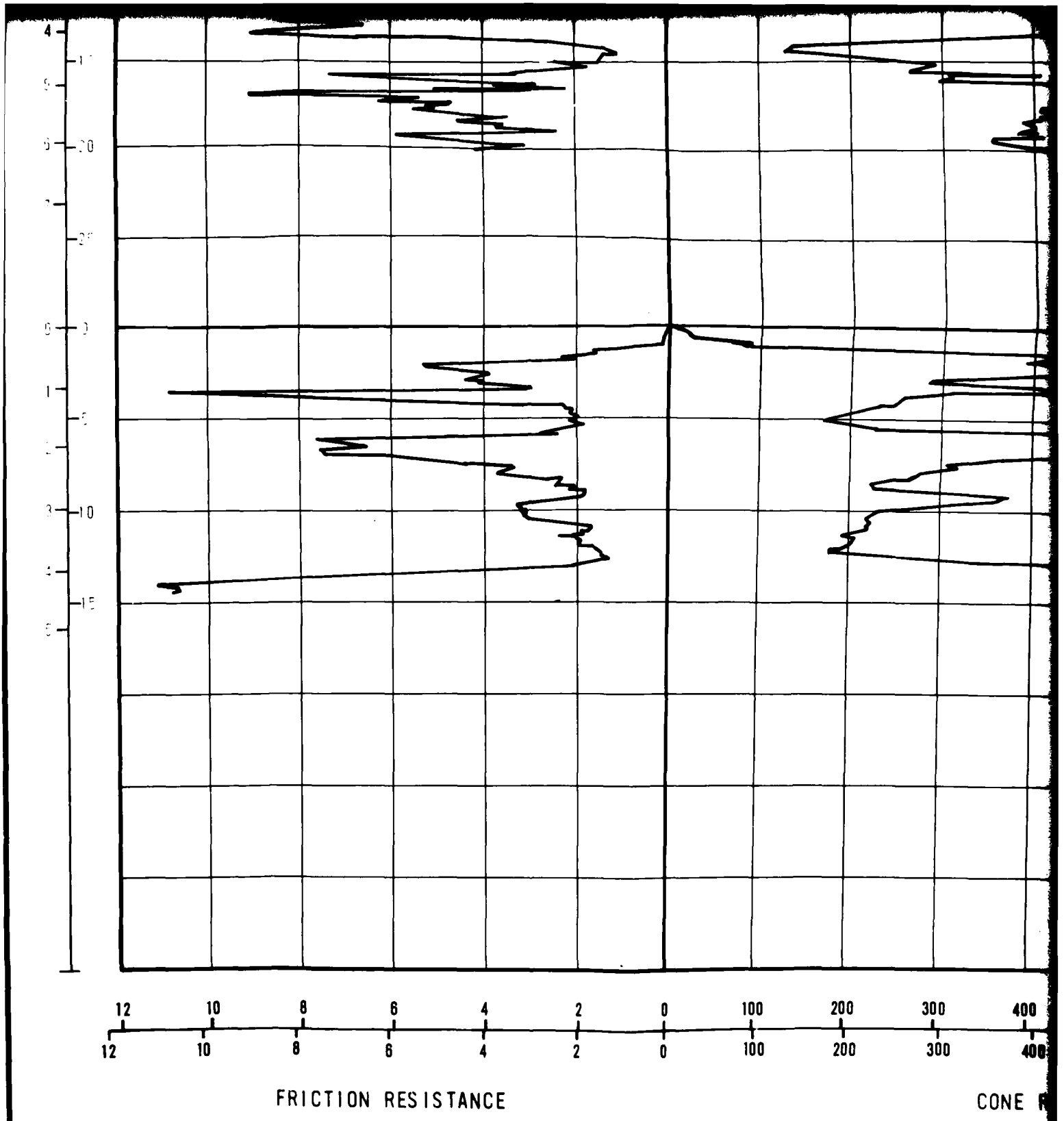

-51 SURFACE ELEVATION: 4615' (1407m)
SURFICIAL GEOLOGIC UNIT: A5y
SM
CS-51
FRICTION RATIO (>14)
FRICTION RATIO (2.1)
FRICTION RATIO (10.0)
-52 SURFACE ELEVATION: 4610' (1405m)
SURFICIAL GEOLOGIC UNIT: A4o
SM
SP
FRICTION RATIO (9.0)
T-15
FRICTION RATIO (10.2)
FRICTION RATIO (9.3)

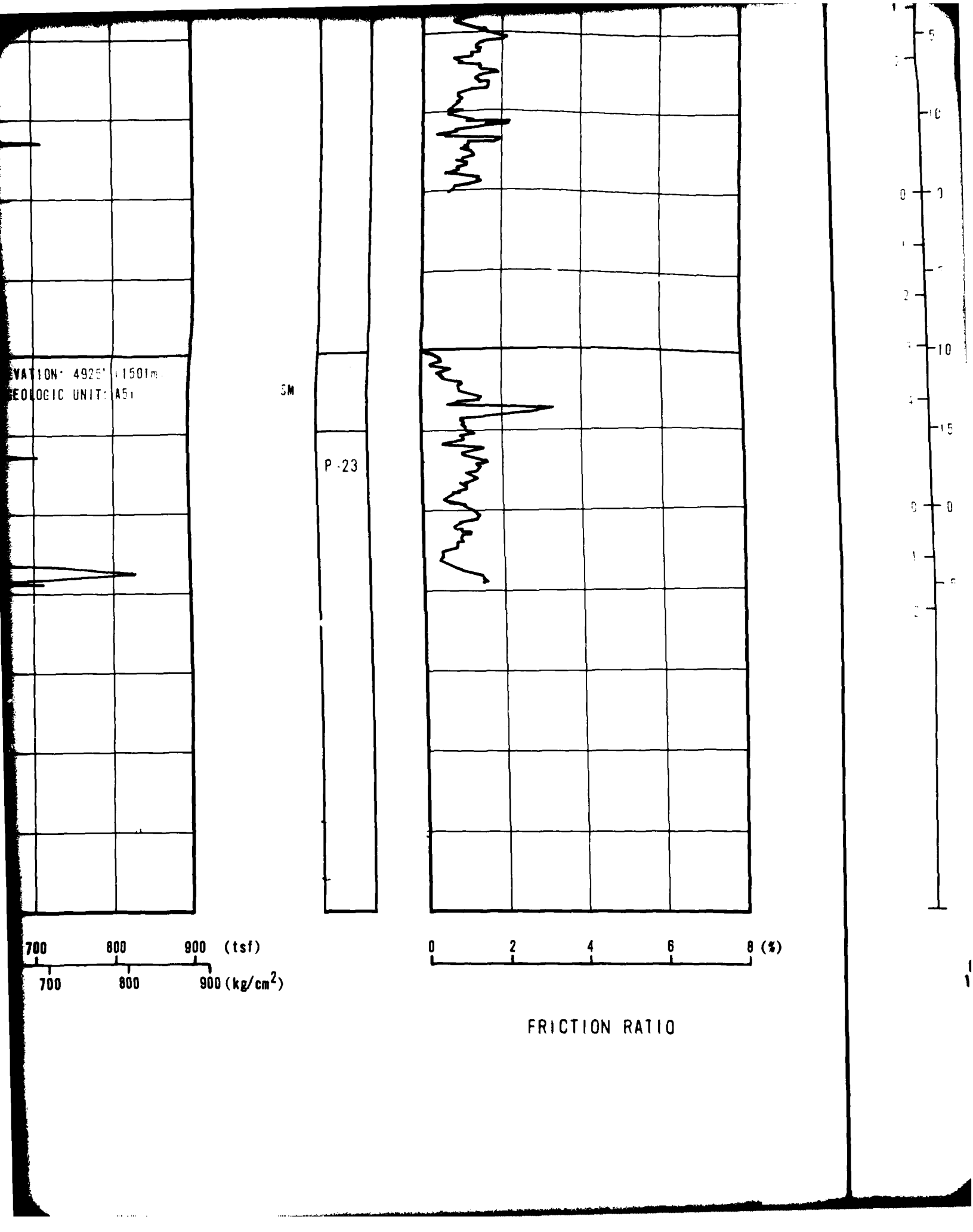

FRICTION RESISTANCE
FRICTION RESISTANCE (14.3 TSF)

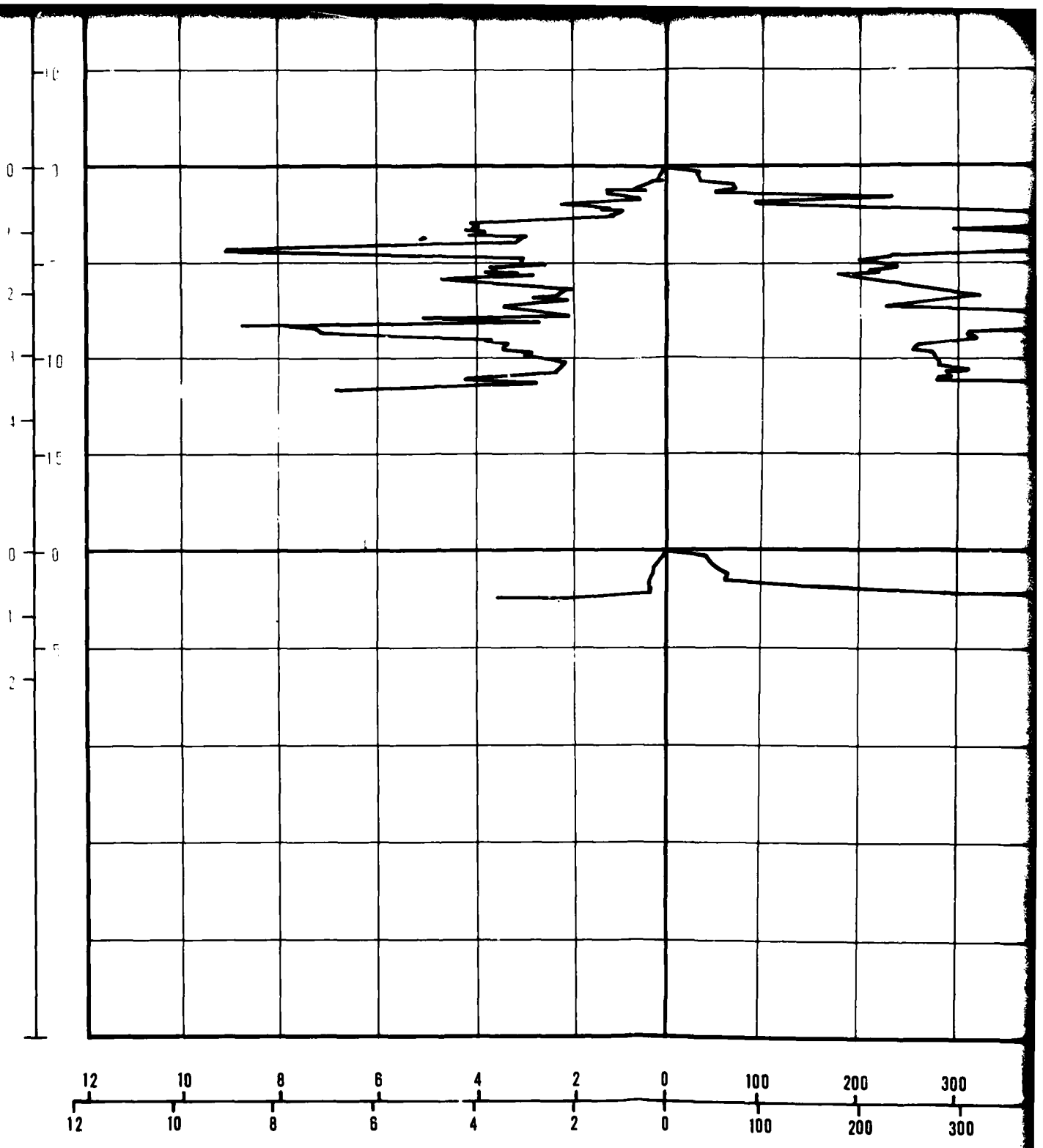

1437m
SM
SP
SM
P-10
SM
CS-46
SW-SM
SM
P-24
24

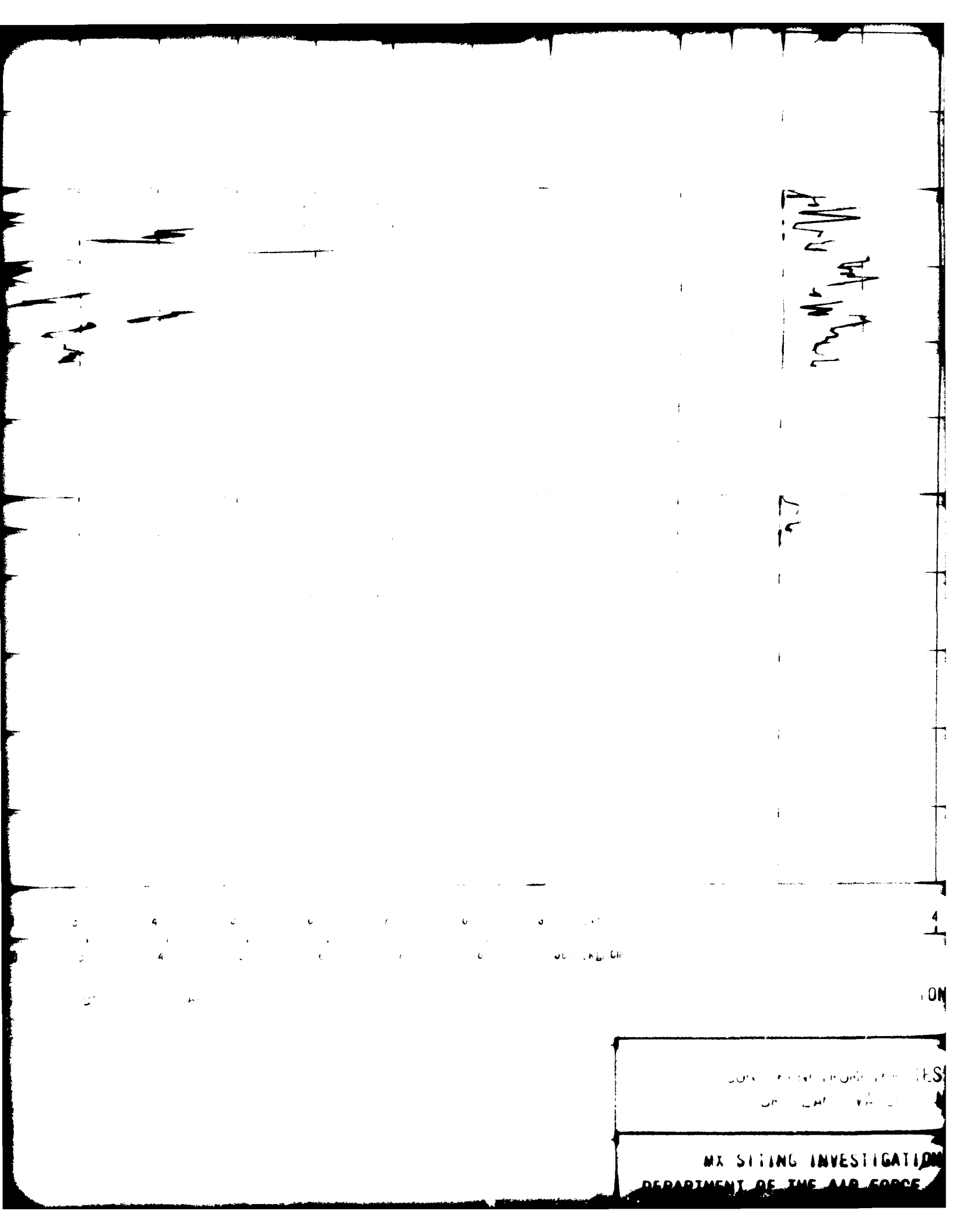

C-53 SURFACE ELEVATION: 4635' (1413m)
SURFICIAL GEOLOGIC UNIT: A5y
C-54 SURFACE ELEVATION: 4580' (1395m)
SURFICIAL GEOLOGIC UNIT A4o
16
14
12
C-55 SURFACE ELEVATION: 5130' (1564m)
SURFICIAL GEOLOGIC UNIT: A5t


E ELEVATION: 4635' (1413m)
IAL GEOLOGIC UNIT: A5y
MH
CS 53
E ELEVATION: 4580' (1395m)
IAL GEOLOGIC UNIT A4o
CH
FRICTION RATIO (9 9)
FRICTION RATIO (8 9)
MH
B 5
SM
CS-55

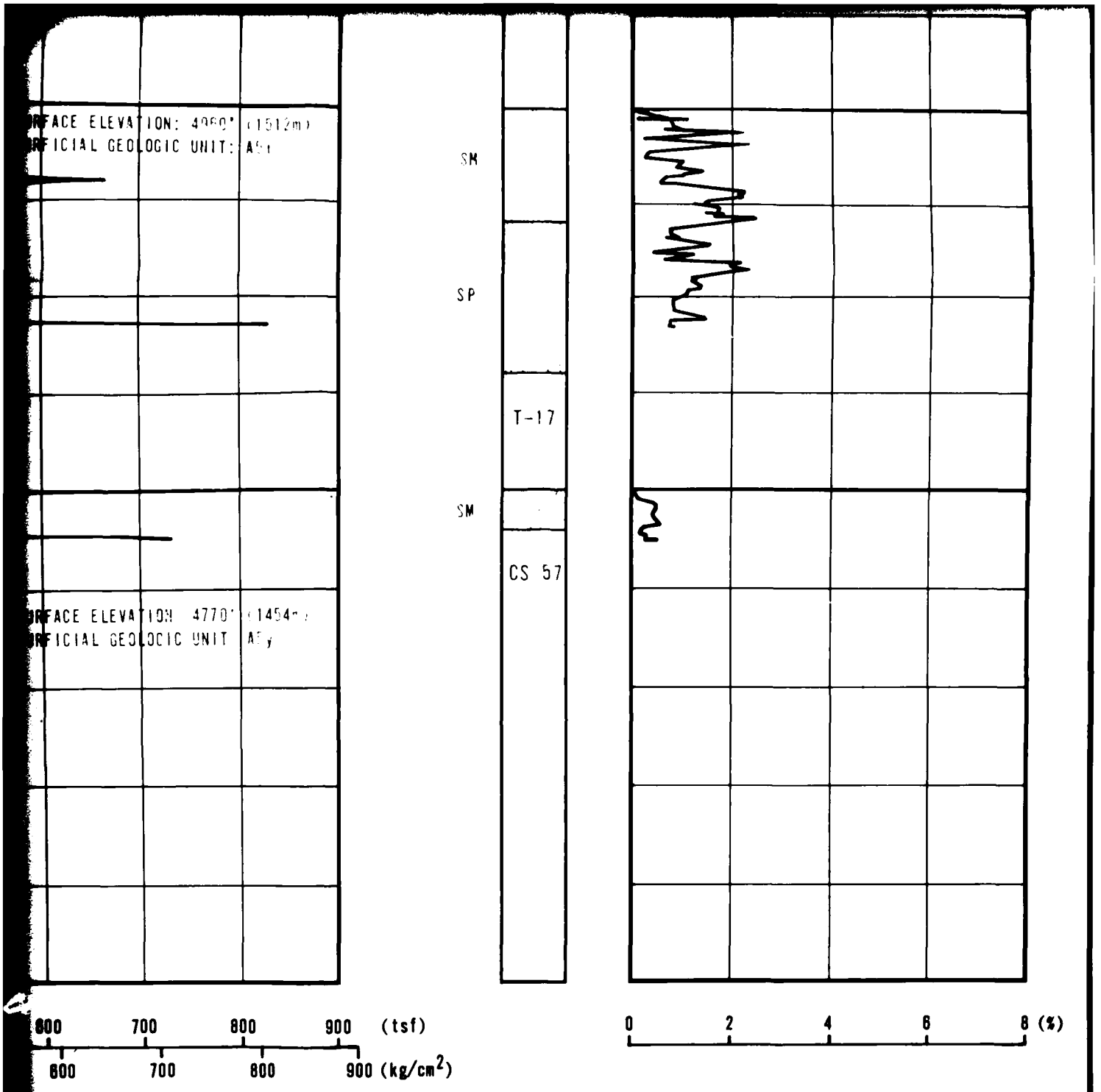

4
20
10
15
12 10 8 6 4 2 0 100 200 300 400
12 10 8 6 4 2 0 100 200 300 400
FRICTION RESISTANCE
CONE


EVATION: 4925' (1501m)
GEOLOGIC UNIT: A5
SM
P-23
700 800 900 (tsf)
700 800 900 (kg/cm²)
0 2 4 6 8 (%)
FRICTION RATIO


12 10 8 6 4 2 0 100 200 300
12 10 8 6 4 2 0 100 200 300
FRICTION RESISTANCE
CONE R



MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE



CONE PENETROMETER TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

DRAWING
II-8-1
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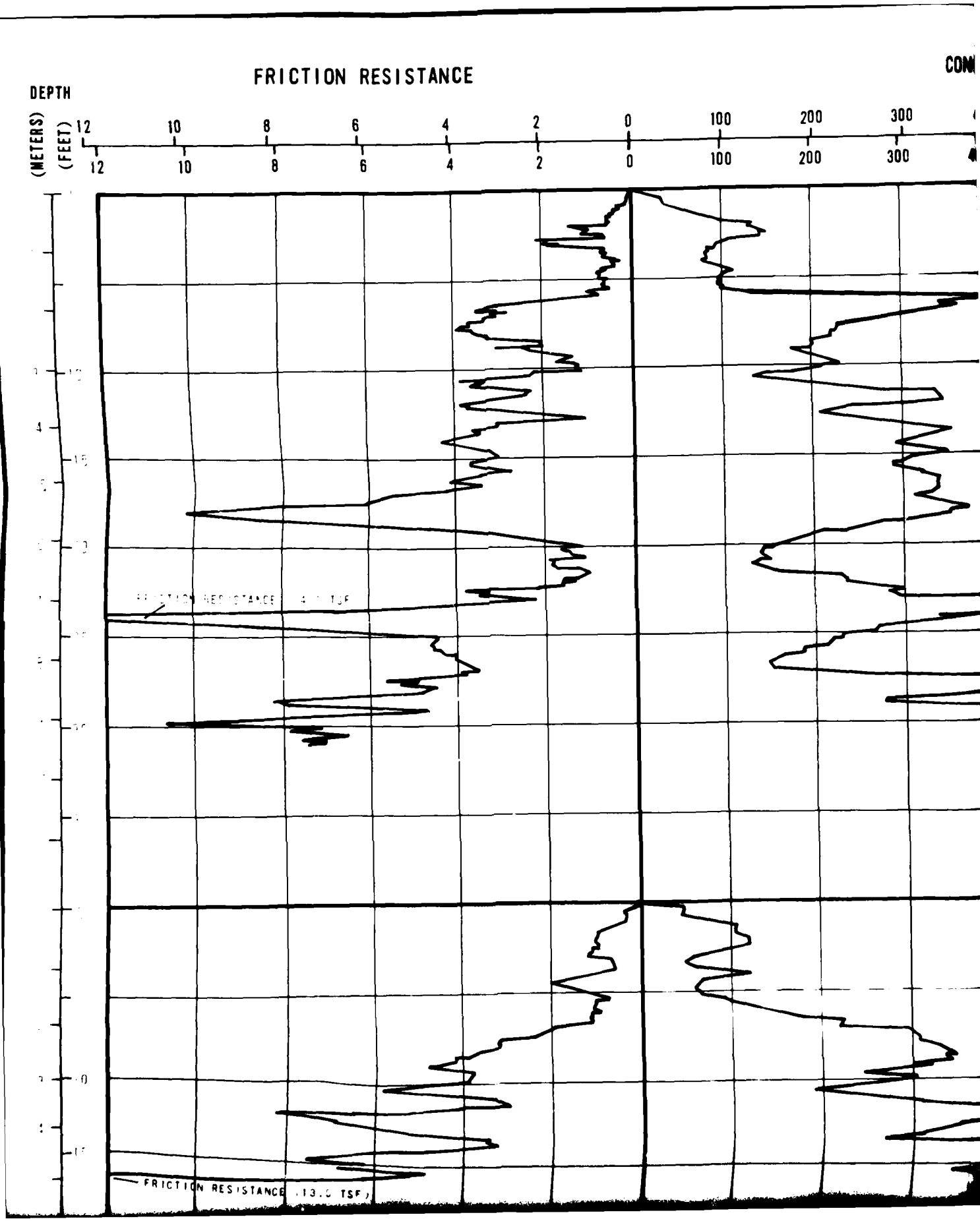
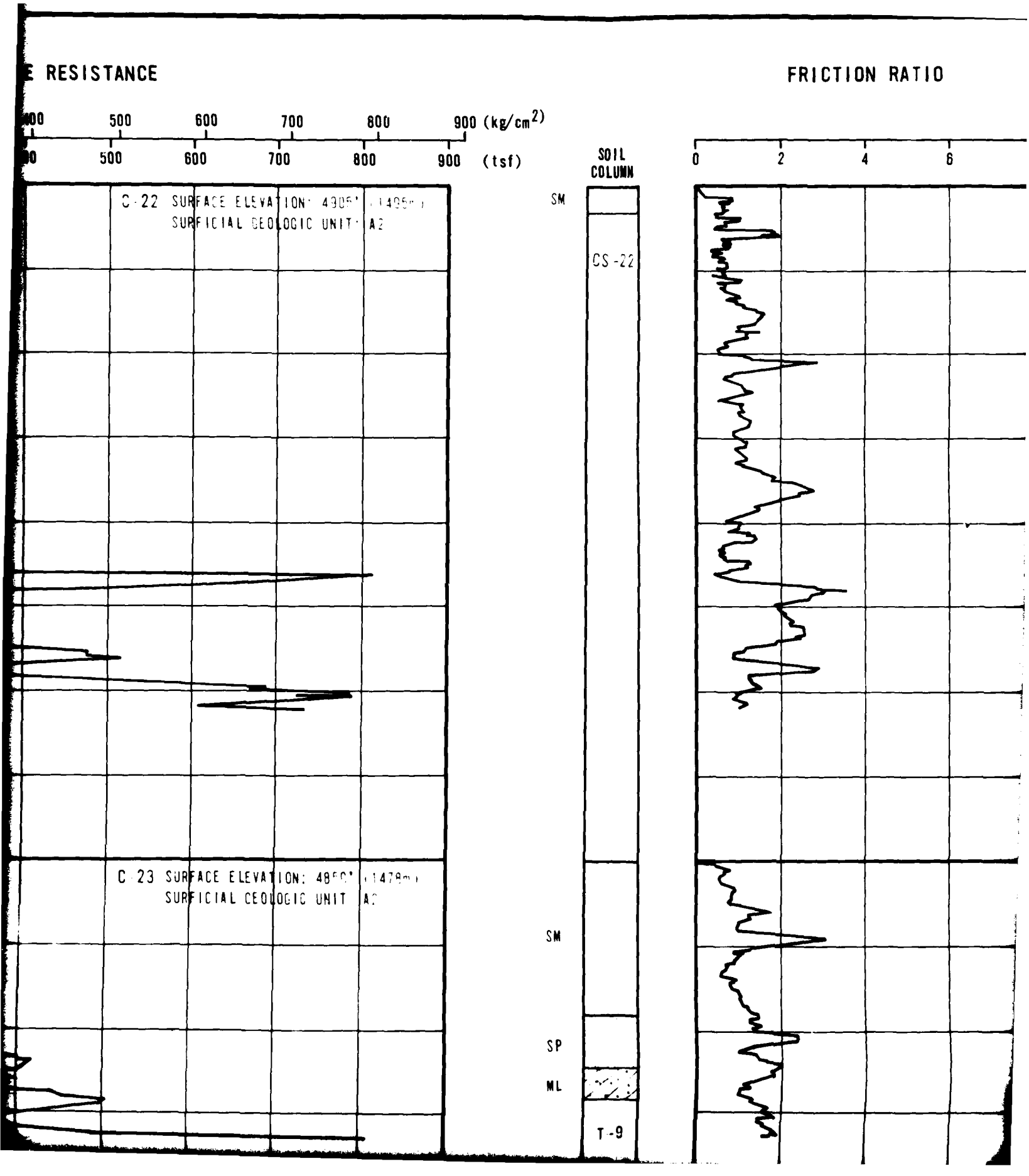
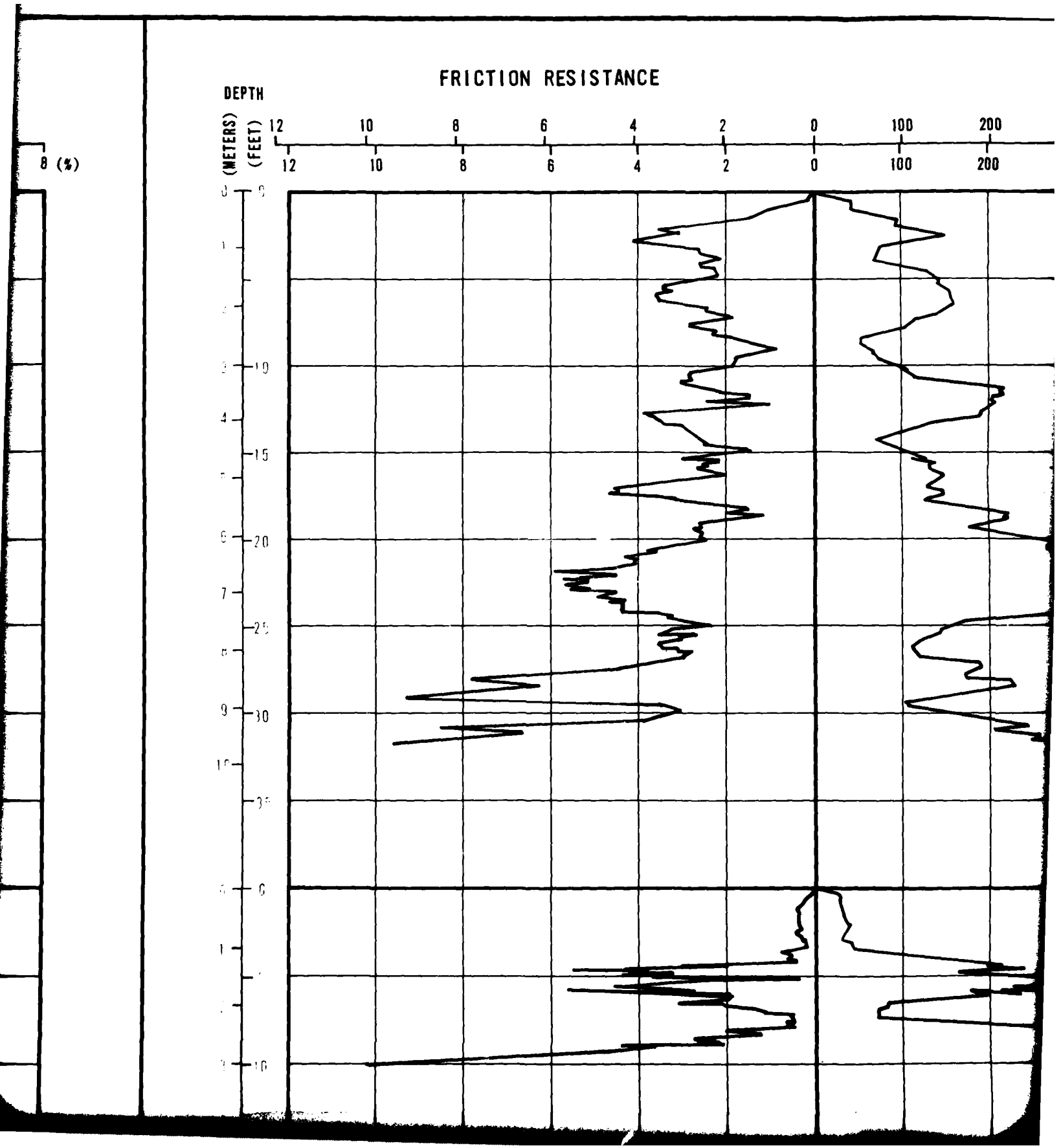
FUGRO NATIONAL, INC.


FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
200
300
FRICTION RESISTANCE (13.0 TSF)


E RESISTANCE
FRICTION RATIO
500
600
700
800
900 (kg/cm2)
500
600
700
800
900 (tsf)
SOIL COLUMN
0
2
4
6
C-22 SURFACE ELEVATION: 4805' (1465m)
SURFICIAL GEOLOGIC UNIT: A2
C 23 SURFACE ELEVATION: 4850' (1478m)
SURFICIAL GEOLOGIC UNIT: A2
SM
CS-22
SM
SP
ML
T-9


8 (%)
FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
200
0
10
15
20
25
30
0
10

CONE RESISTANCE

FRICTIO

300 400 500 600 700 800 900 (kg/cm^2)

300 400 500 600 700 800 900 (tsf)

SOIL COLUMN

0 2

C 31 SURFACE ELEVATION 47[illegible]

SURFICIAL GEOLOGIC UNIT: A[illegible]

ML

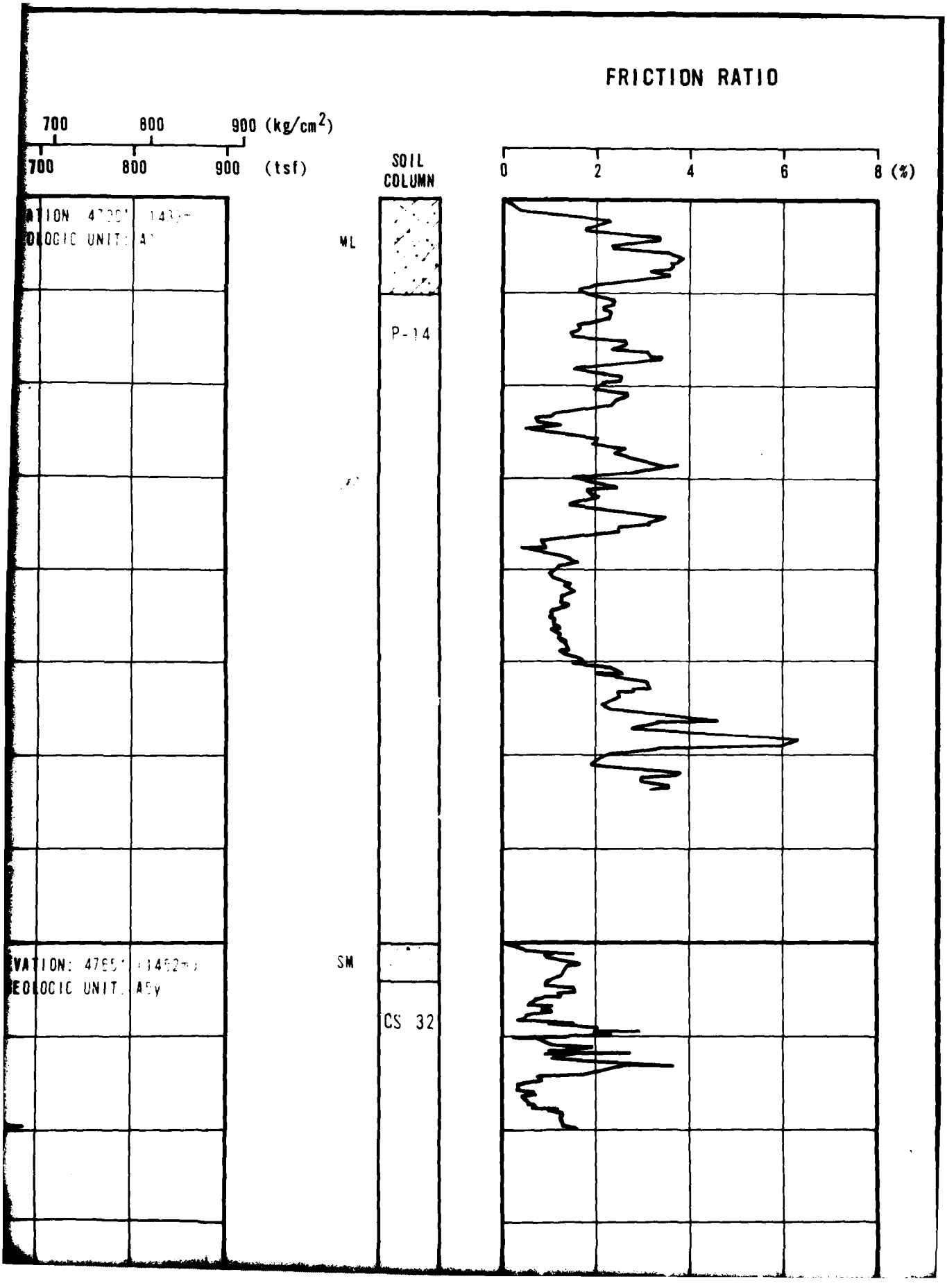
P-14

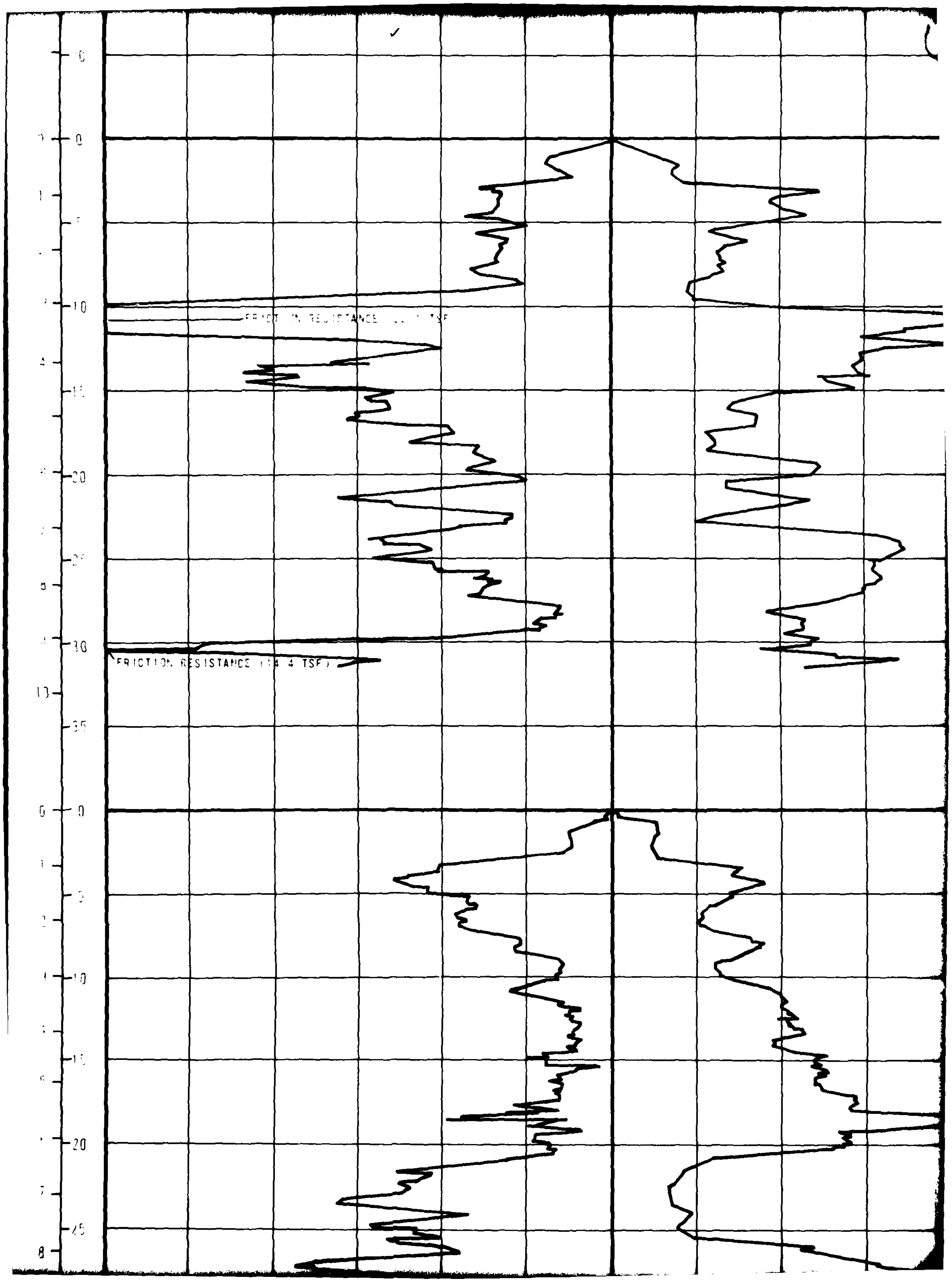
C-32 SURFACE ELEVATION: 47[illegible]

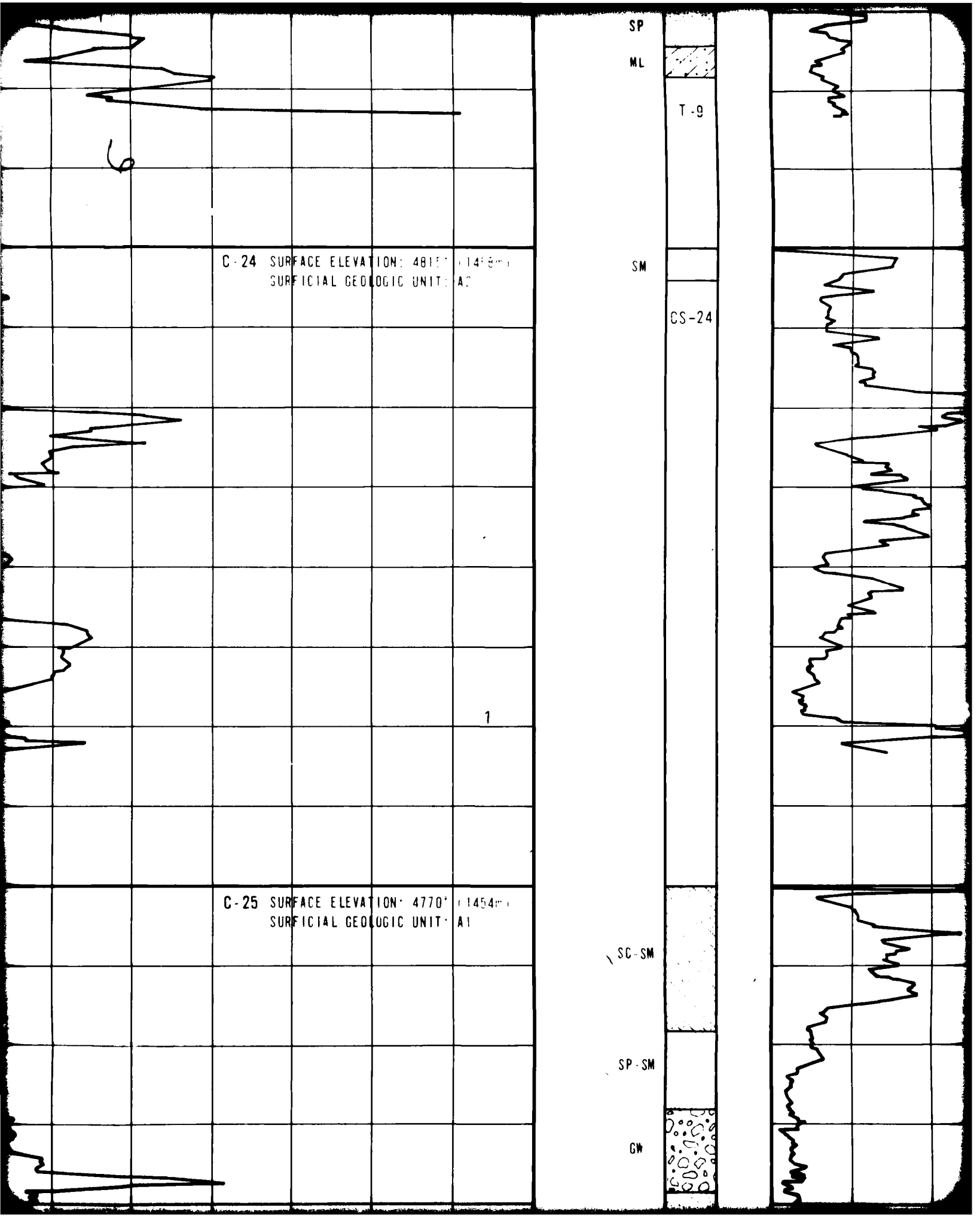
SURFICIAL GEOLOGIC UNIT: A[illegible]

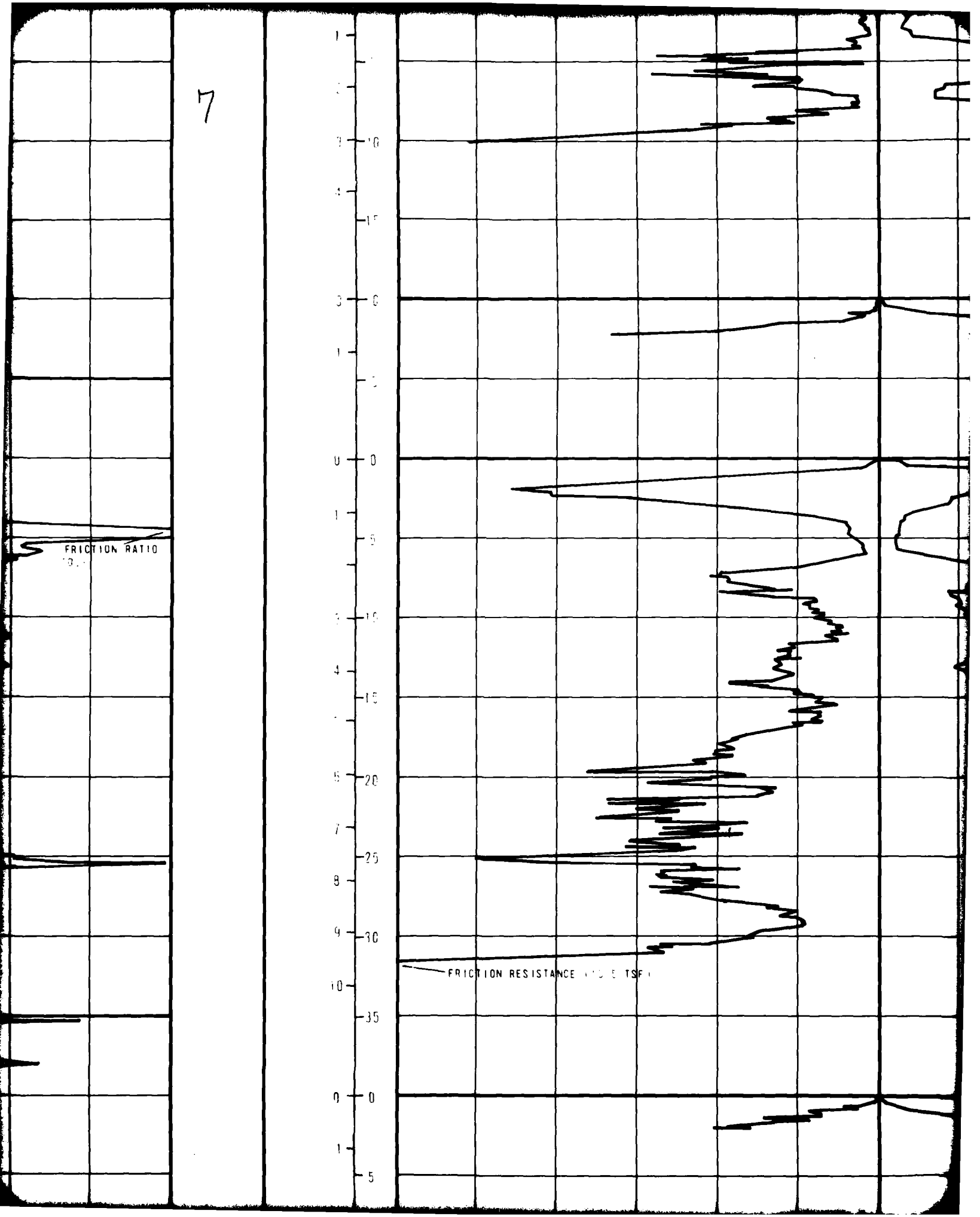
SM

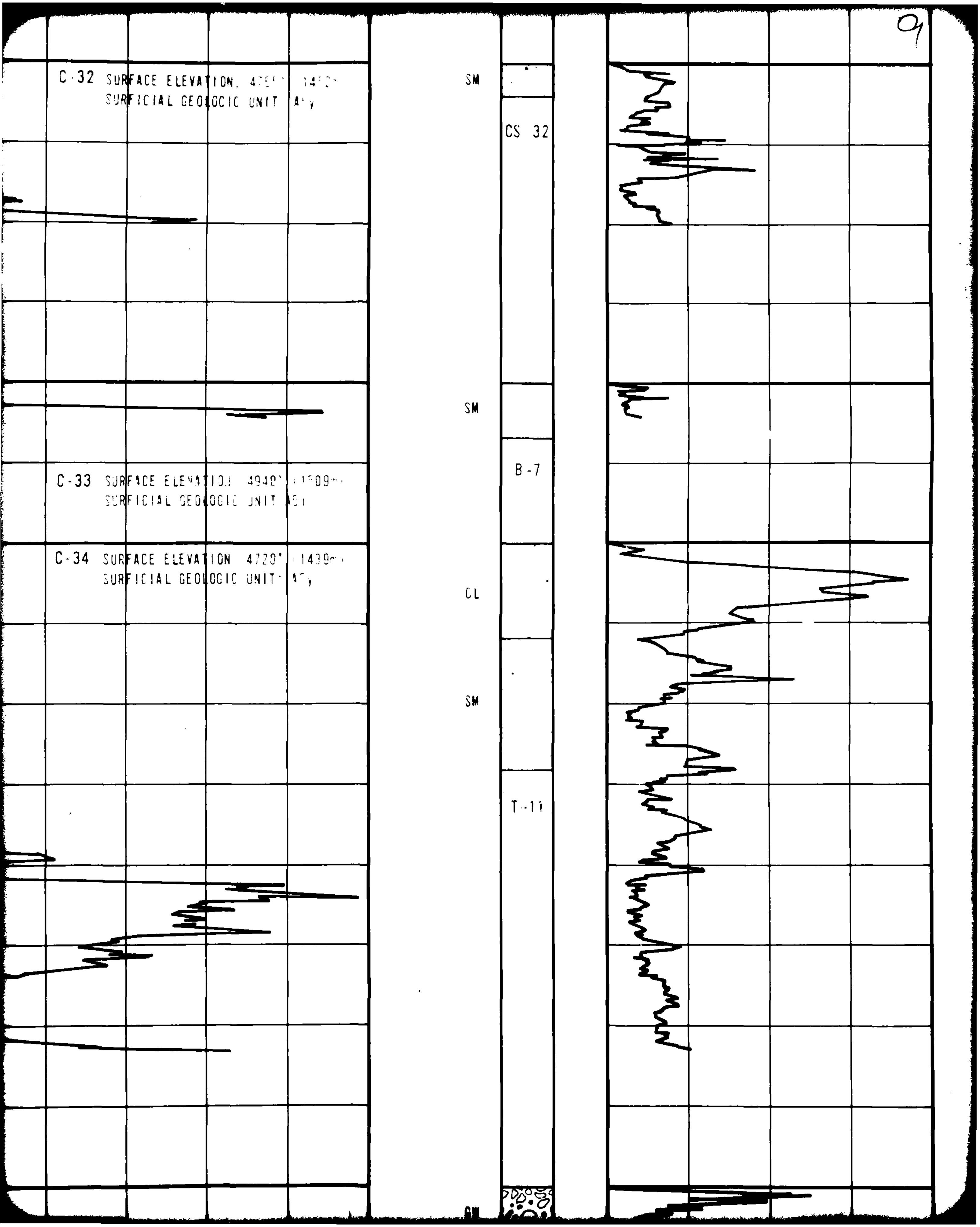
CS 32

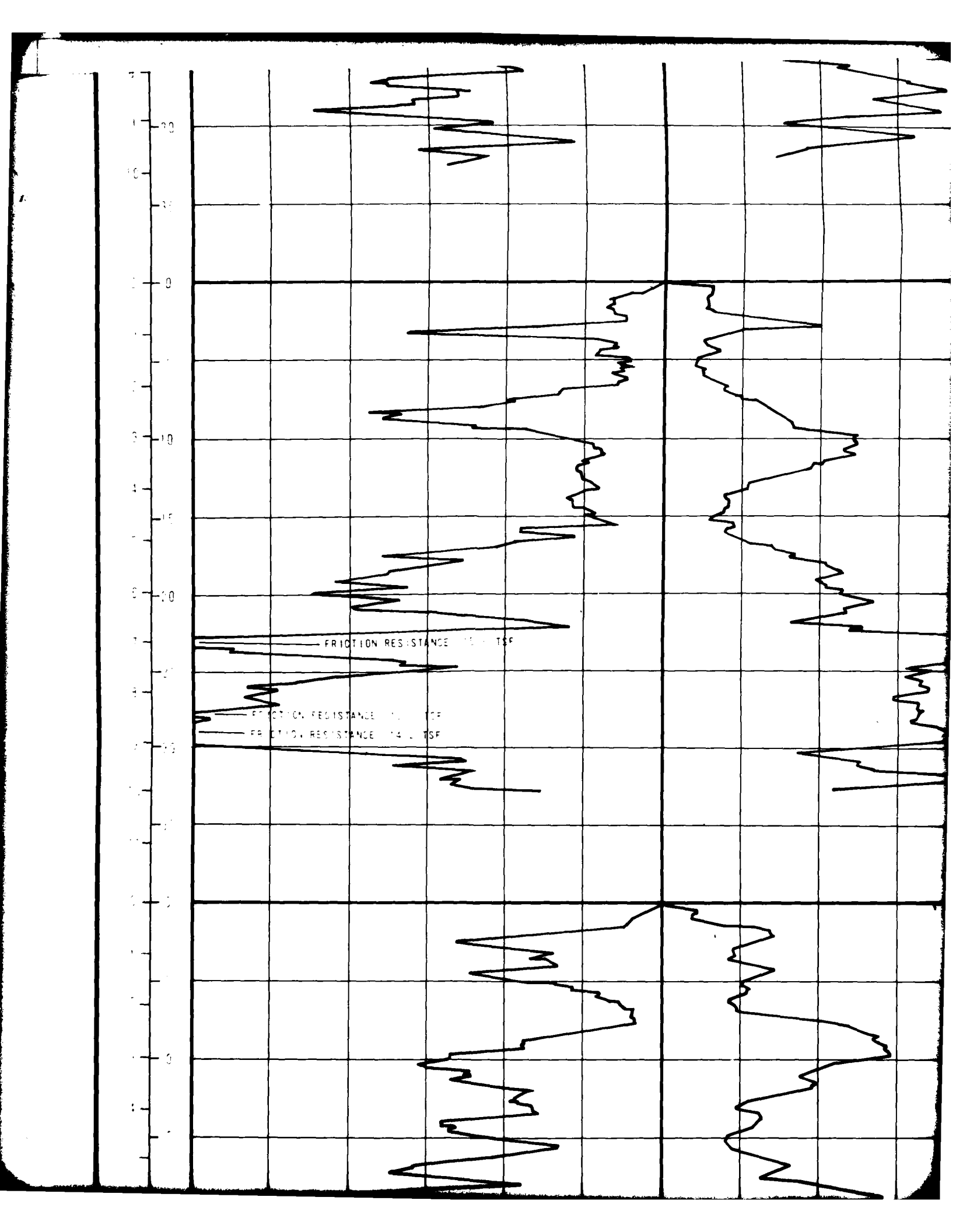

FRICTION RATIO
700
800
900 (kg/cm²)
700
800
900 (tsf)
SOIL COLUMN
0
2
4
6
8 (%)
ML
P-14
SM
CS 32

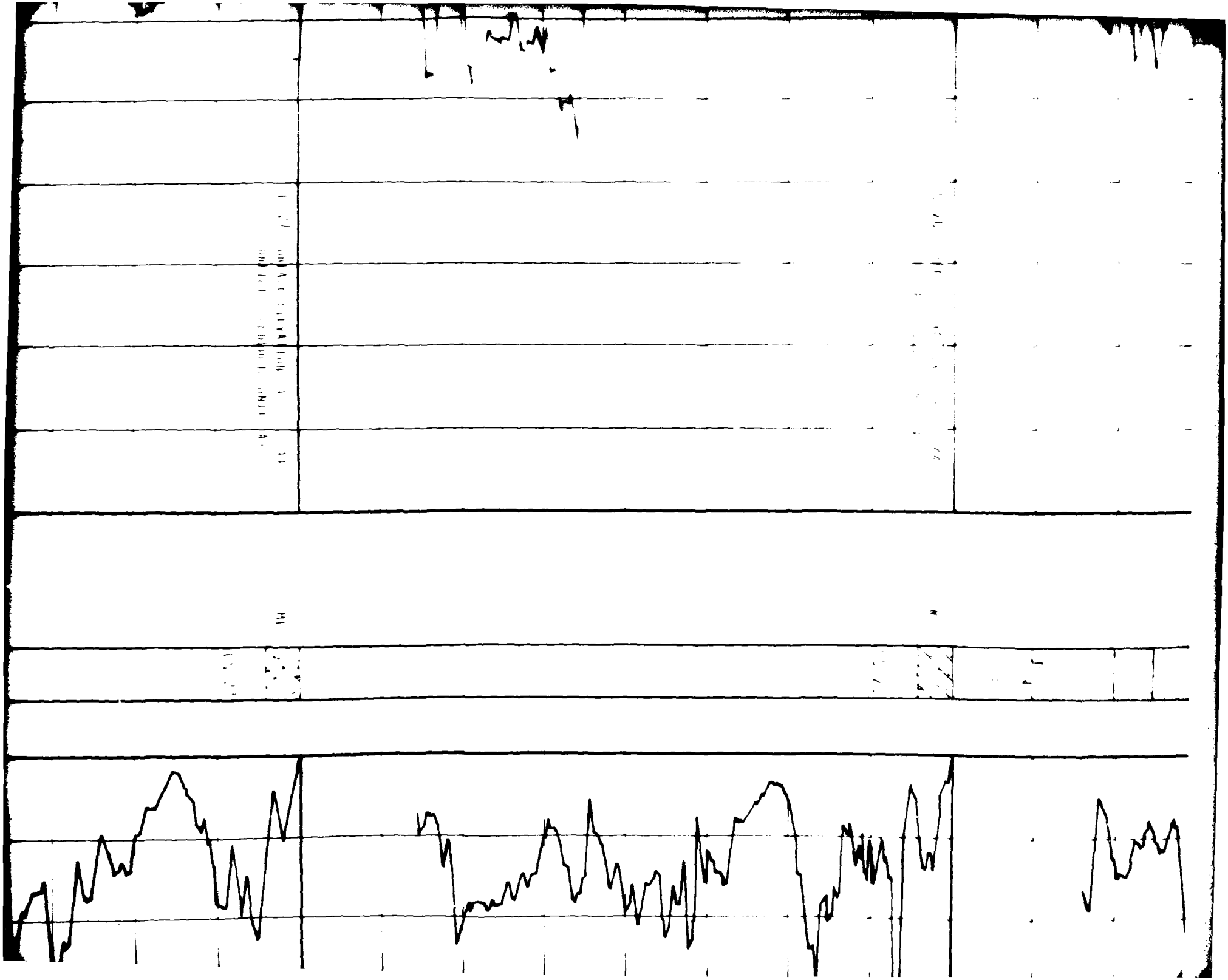

0
10
20
30
0
10
20
FRICTION RESISTANCE

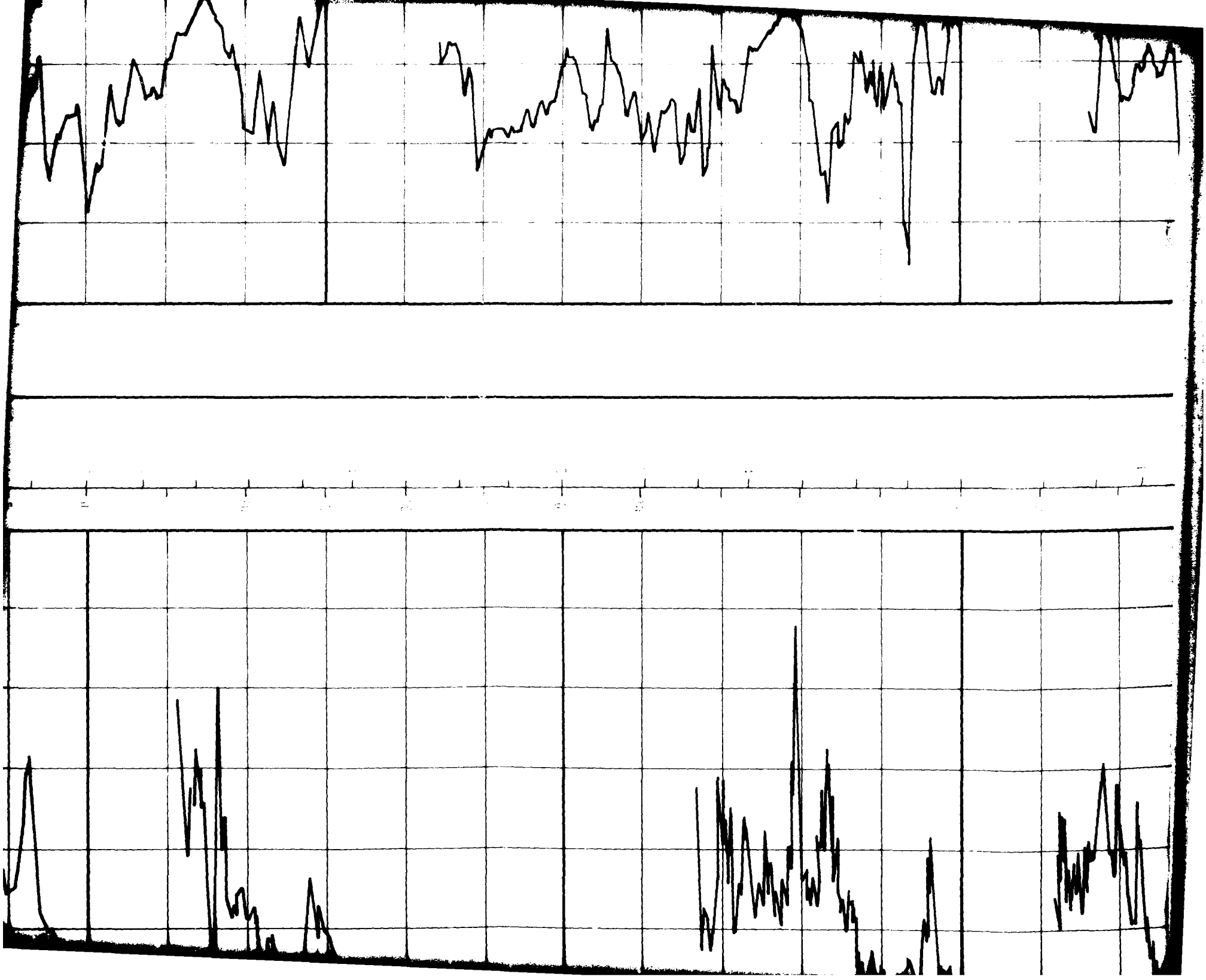

SP
ML
T-9
C-24 SURFACE ELEVATION: 481
SURFICIAL GEOLOGIC UNIT: A
SM
CS-24
C-25 SURFACE ELEVATION: 4770' (1454m)
SURFICIAL GEOLOGIC UNIT: A1
SC-SM
SP-SM
GW

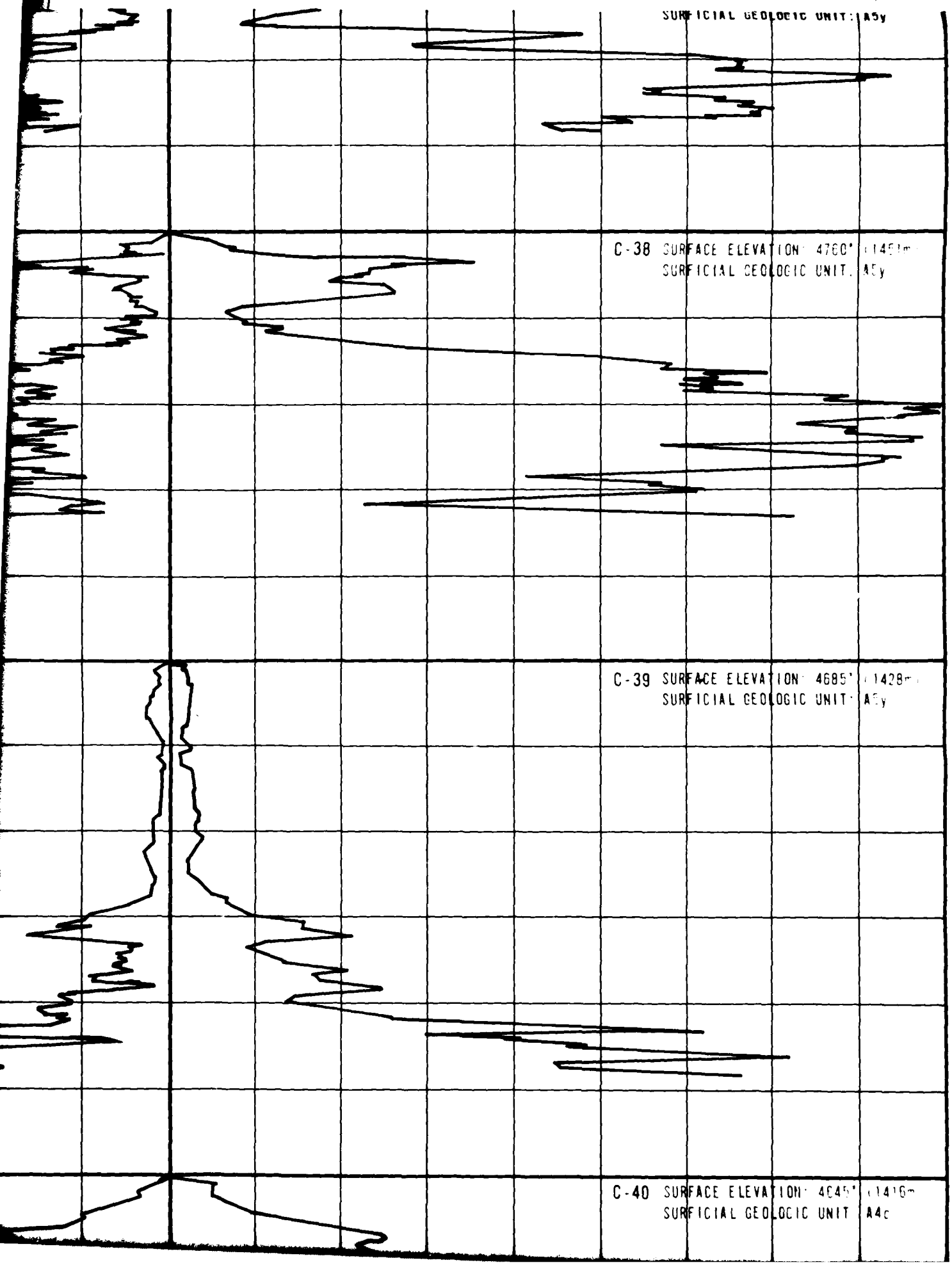

7
FRICTION RATIO
FRICTION RESISTANCE

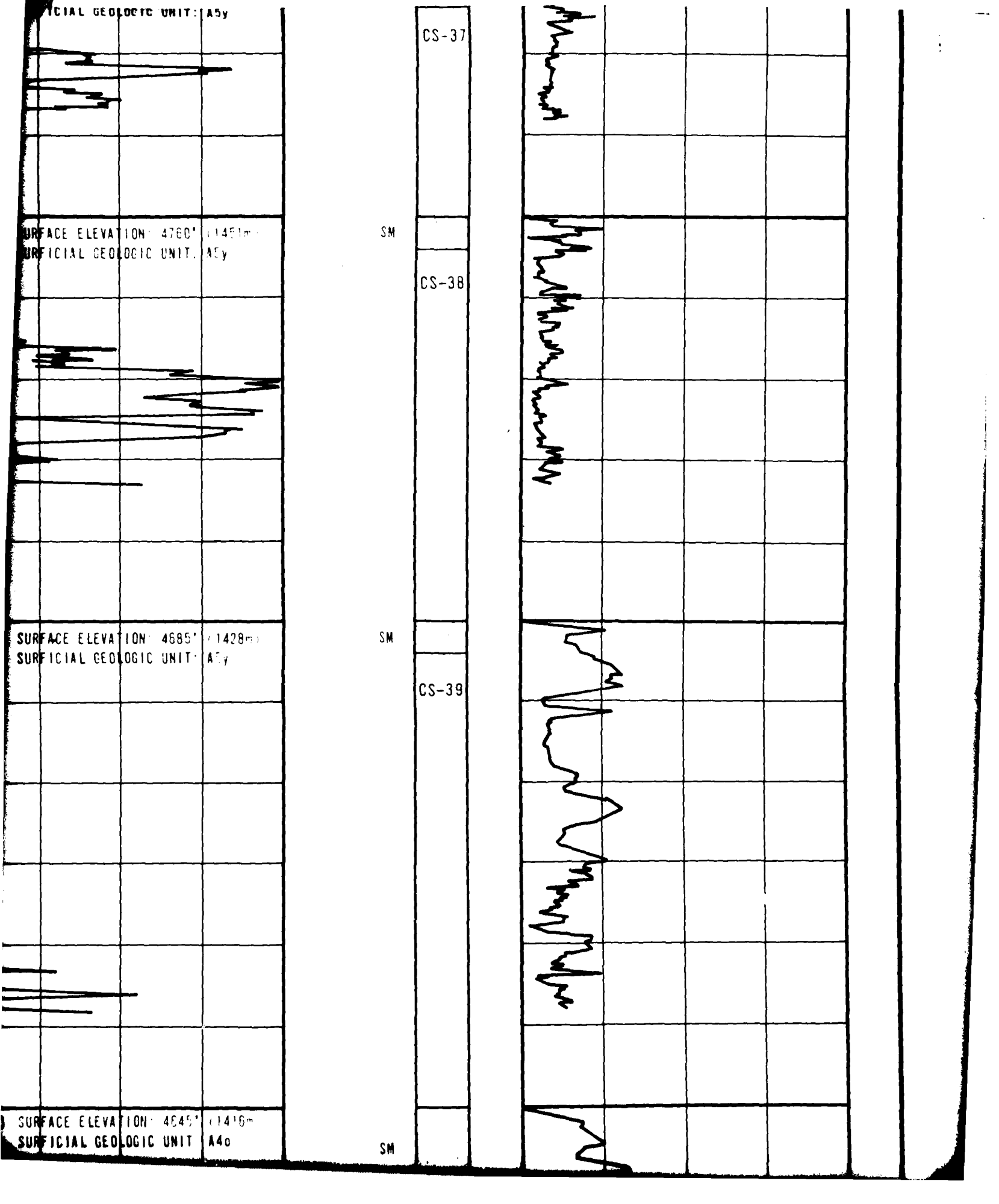

9
C-32 SURFACE ELEVATION
SURFICIAL GEOLOGIC UNIT
SM
CS 32
SM
B-7
C-33 SURFACE ELEVATION 4940'
SURFICIAL GEOLOGIC UNIT
C-34 SURFACE ELEVATION 4720' (1439m)
SURFICIAL GEOLOGIC UNIT
CL
SM
T-11
GM

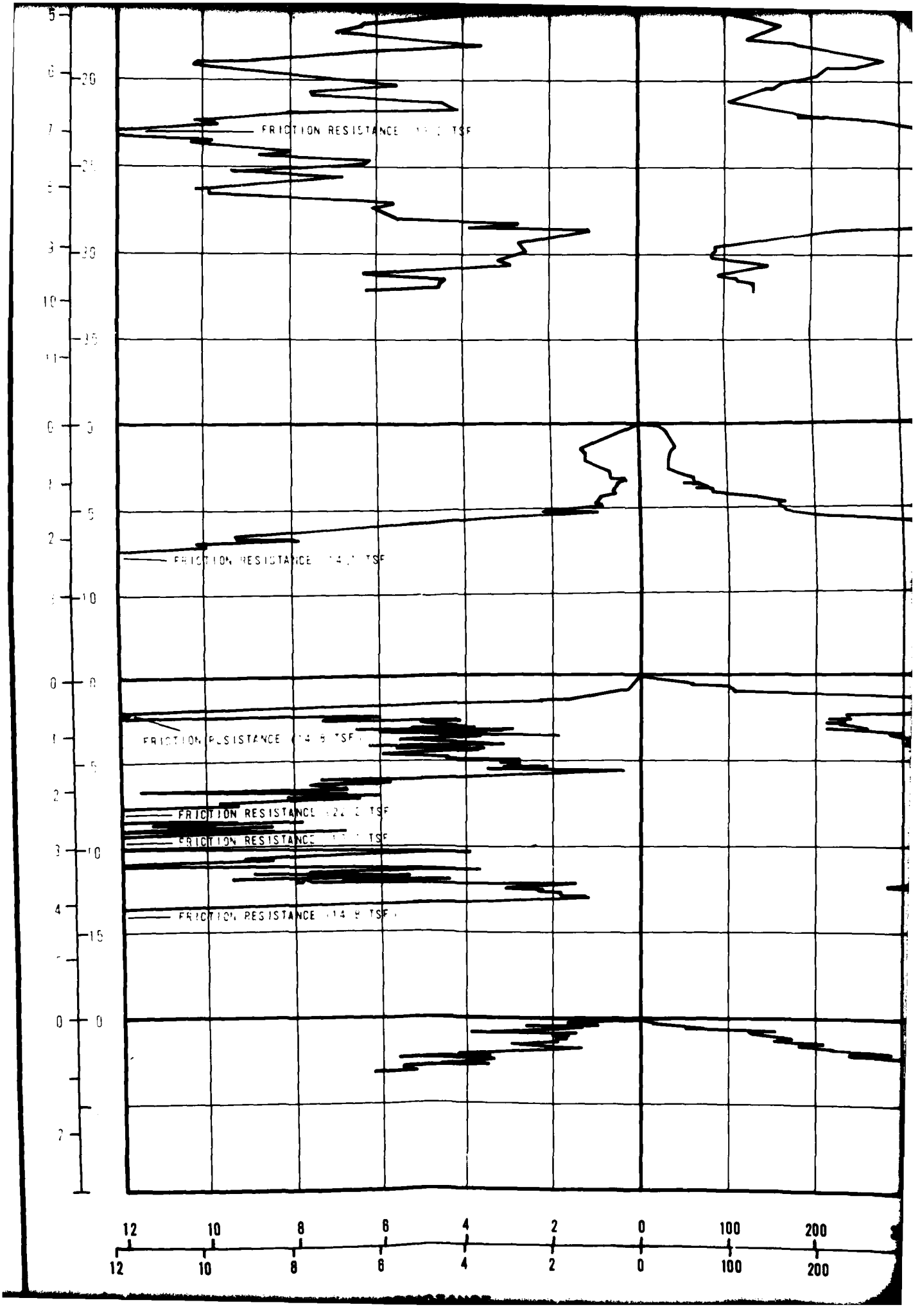

FRICTION RESISTANCE
TSF
TSF
TSF

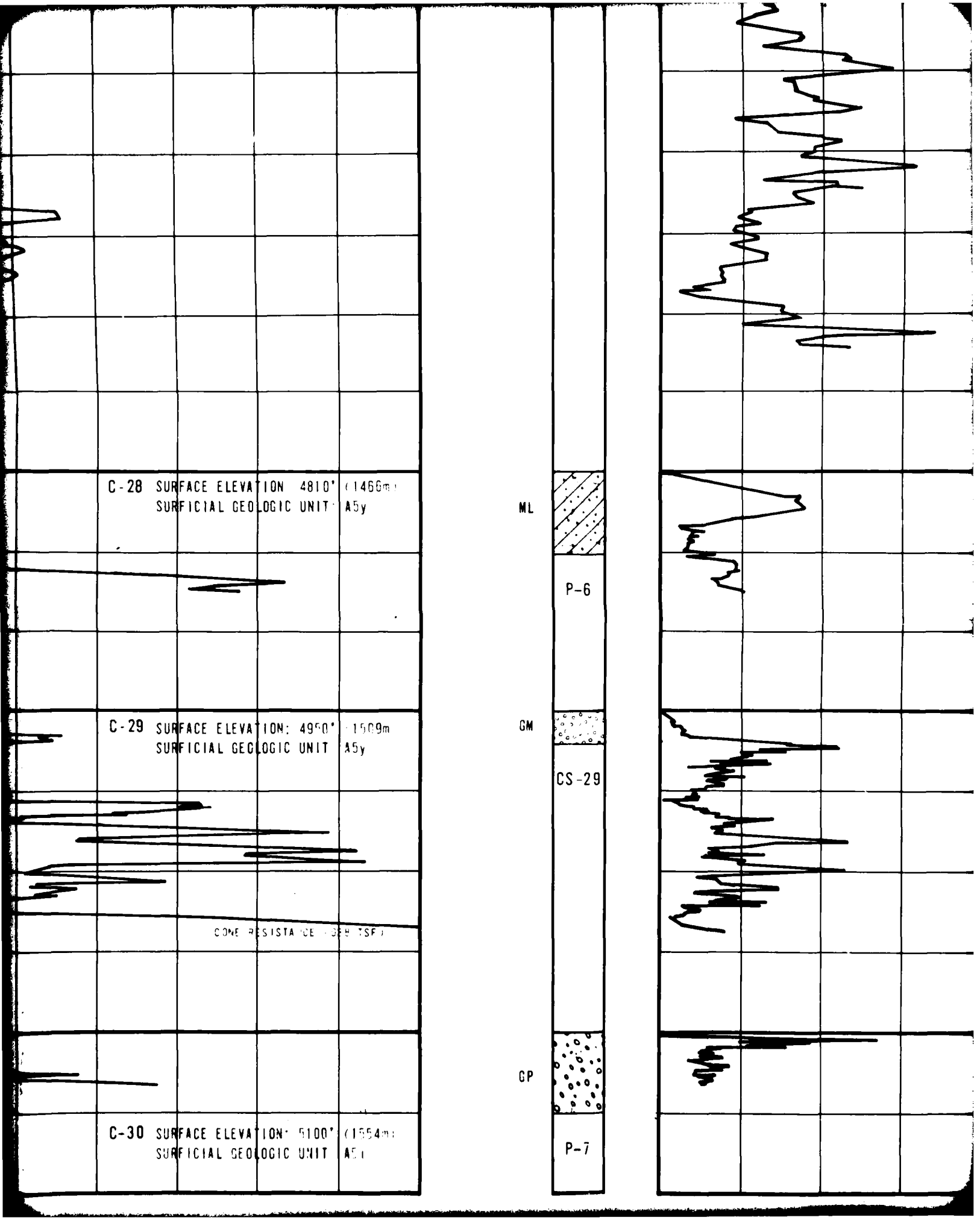


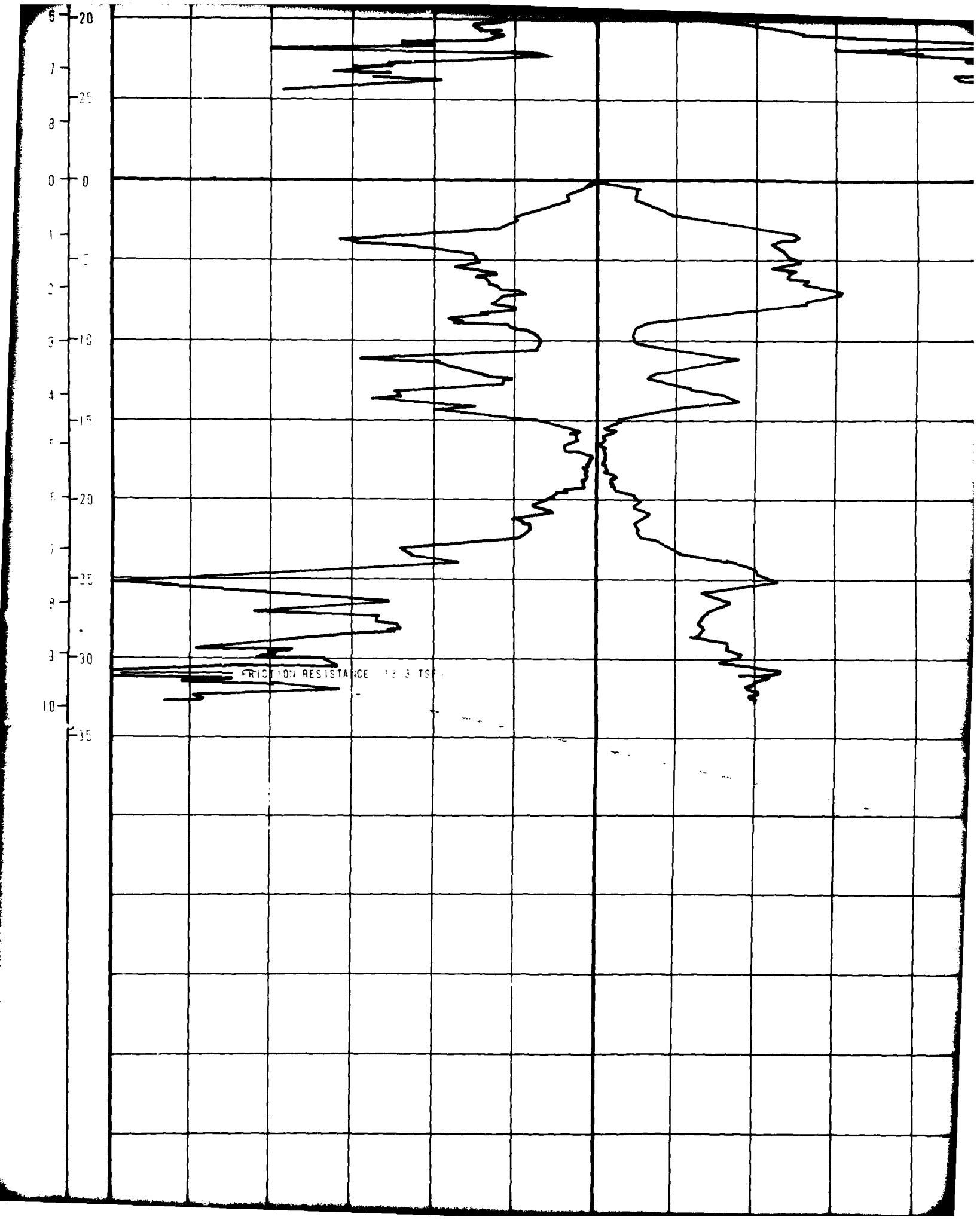


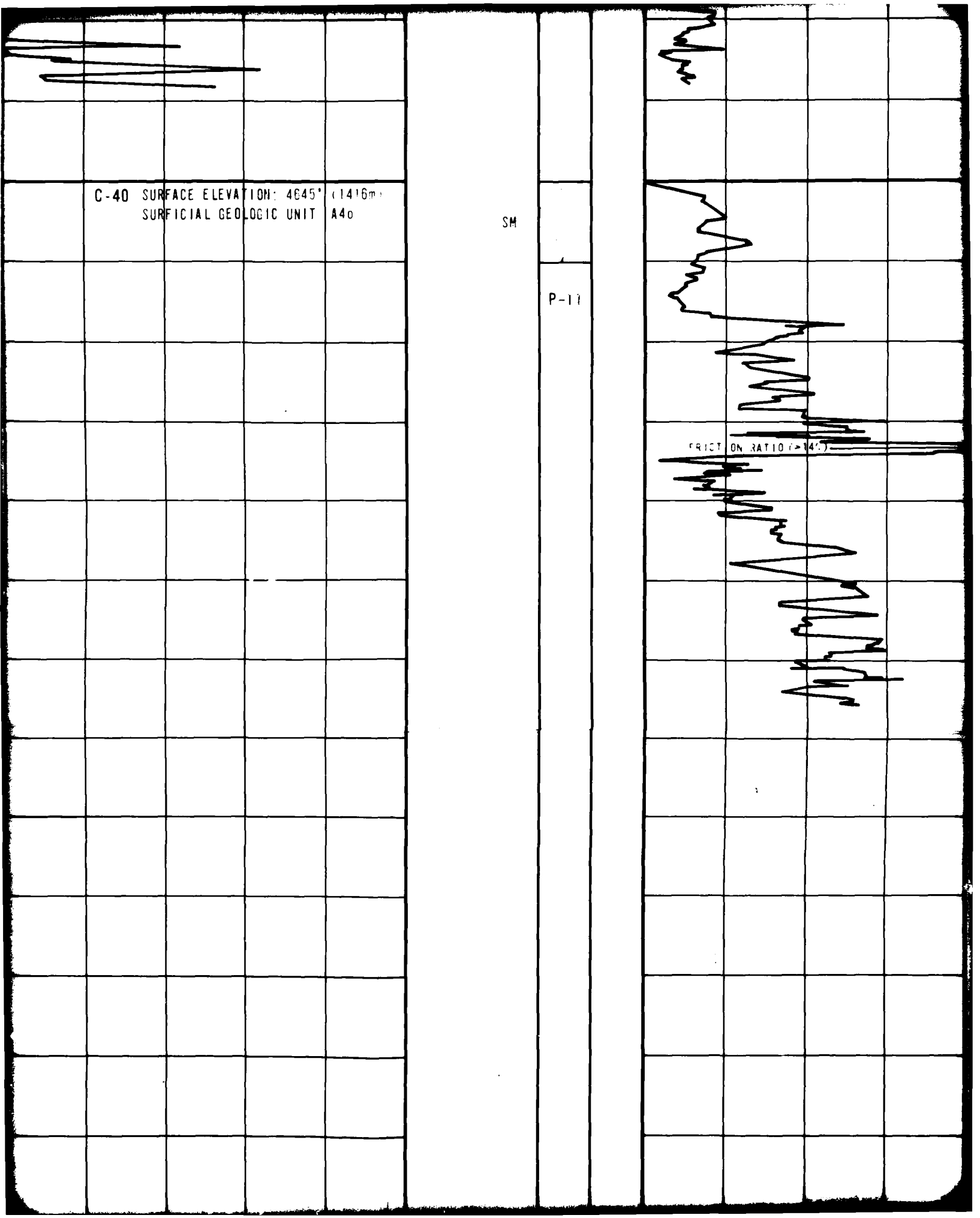

SURFICIAL GEOLOGIC UNIT: A5y
C-38 SURFACE ELEVATION: 4780' (1451m)
SURFICIAL GEOLOGIC UNIT: A5y
C-39 SURFACE ELEVATION: 4685' (1428m)
SURFICIAL GEOLOGIC UNIT: A5y
C-40 SURFACE ELEVATION: 4645' (1416m)
SURFICIAL GEOLOGIC UNIT: A4c

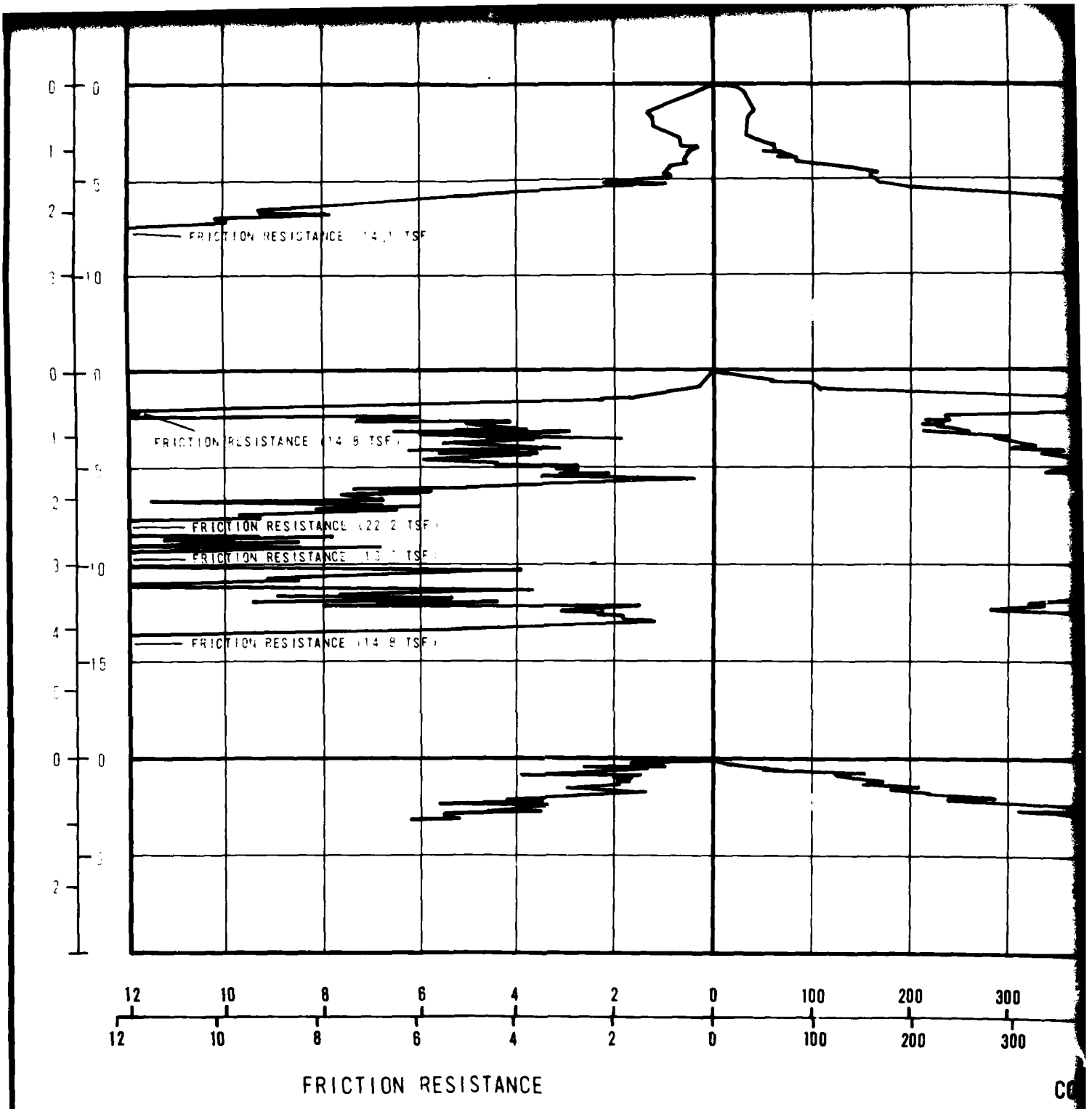

ICIAL GEOLOGIC UNIT: A5y
CS-37
SM
URFACE ELEVATION: 4760' (1451m)
URFICIAL GEOLOGIC UNIT: A5y
CS-38
SM
SURFACE ELEVATION: 4685' (1428m)
SURFICIAL GEOLOGIC UNIT: A5y
CS-39
SURFACE ELEVATION: 4645' (1416m)
SURFICIAL GEOLOGIC UNIT: A4o
SM

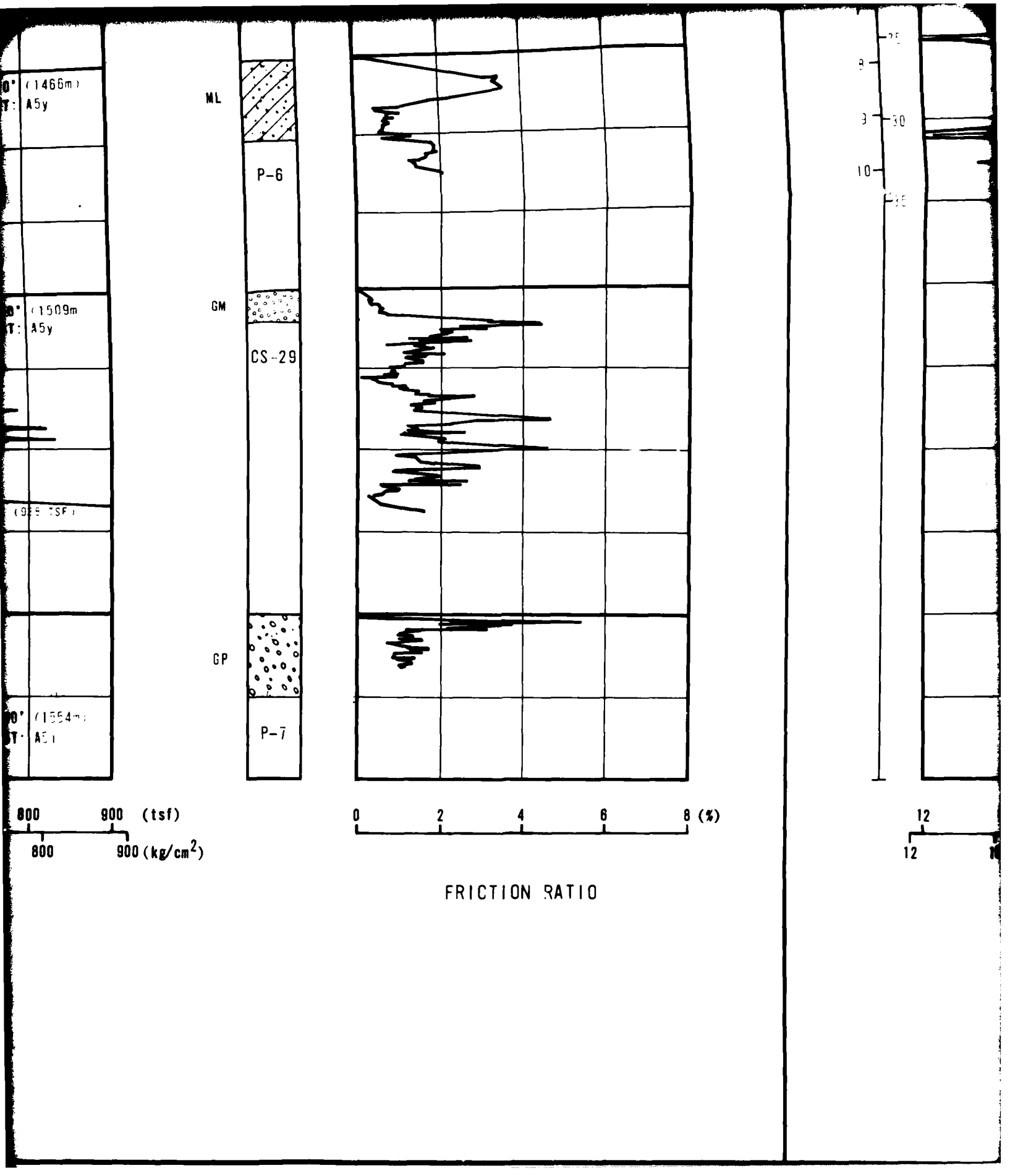

FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
12 10 8 6 4 2 0 100 200
12 10 8 6 4 2 0 100 200

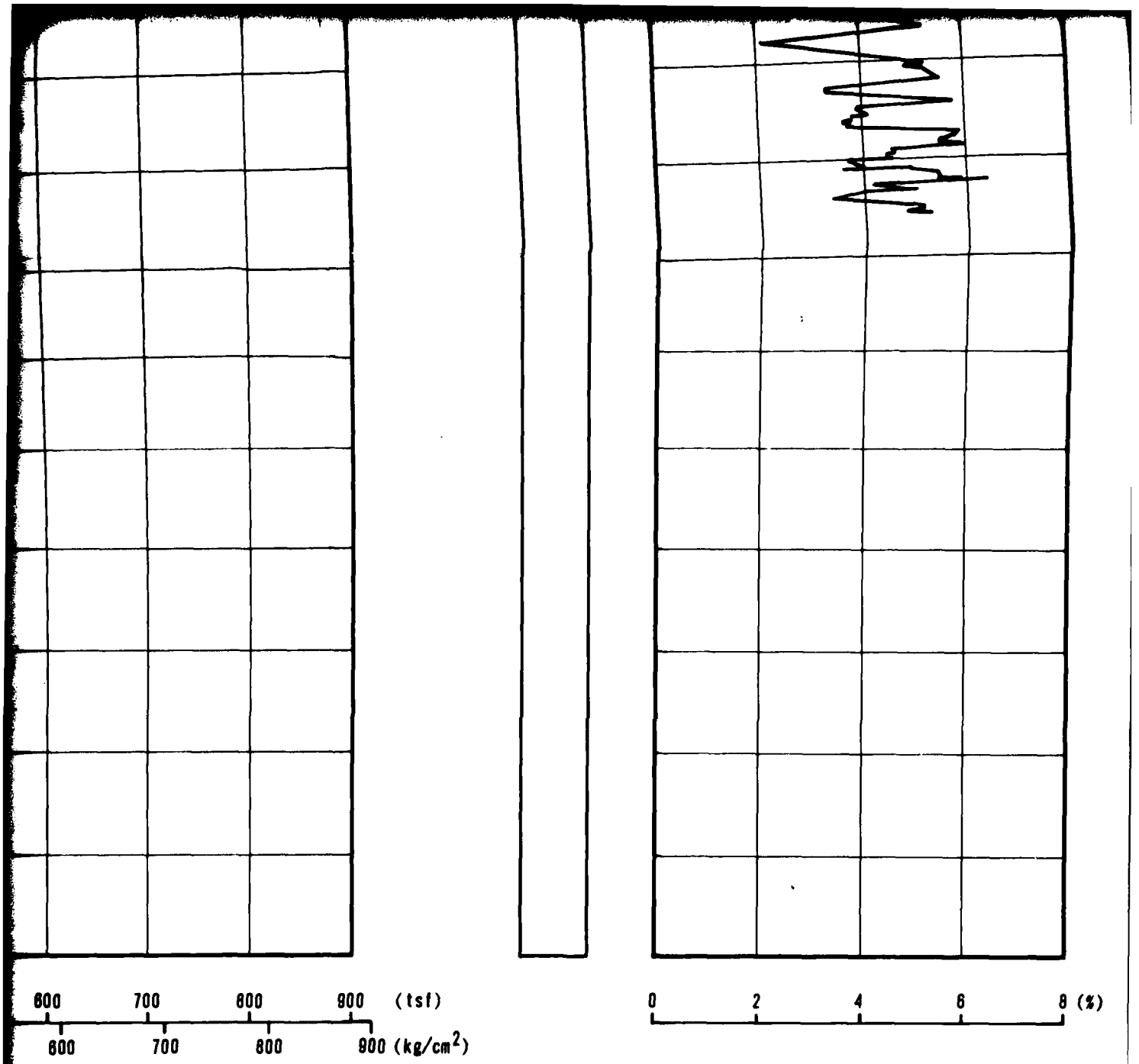

C-28 SURFACE ELEVATION 4810' (1466m)
SURFICIAL GEOLOGIC UNIT A5y
ML
P-6
C-29 SURFACE ELEVATION: 4950' (1509m
SURFICIAL GEOLOGIC UNIT A5y
GM
CS-29
CONE RESISTANCE (0-50 TSF)
GP
C-30 SURFACE ELEVATION: 5100' (1554m)
SURFICIAL GEOLOGIC UNIT A5y
P-7


FRICTION RESISTANCE


C-40 SURFACE ELEVATION: 4645' (1416m)
SURFICIAL GEOLOGIC UNIT A4o
SM
P-11
FRICTION RATIO (%)


FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
12 10 8 6 4 2 0 100 200 300
12 10 8 6 4 2 0 100 200 300
FRICTION RESISTANCE


(1466m)
A5y
(1509m
A5y
ML
P-6
GM
CS-29
GP
P-7
800
900 (tsf)
800
900 (kg/cm²)
0
2
4
6
8 (%)
FRICTION RATIO
12



CONE PENETROMETER TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
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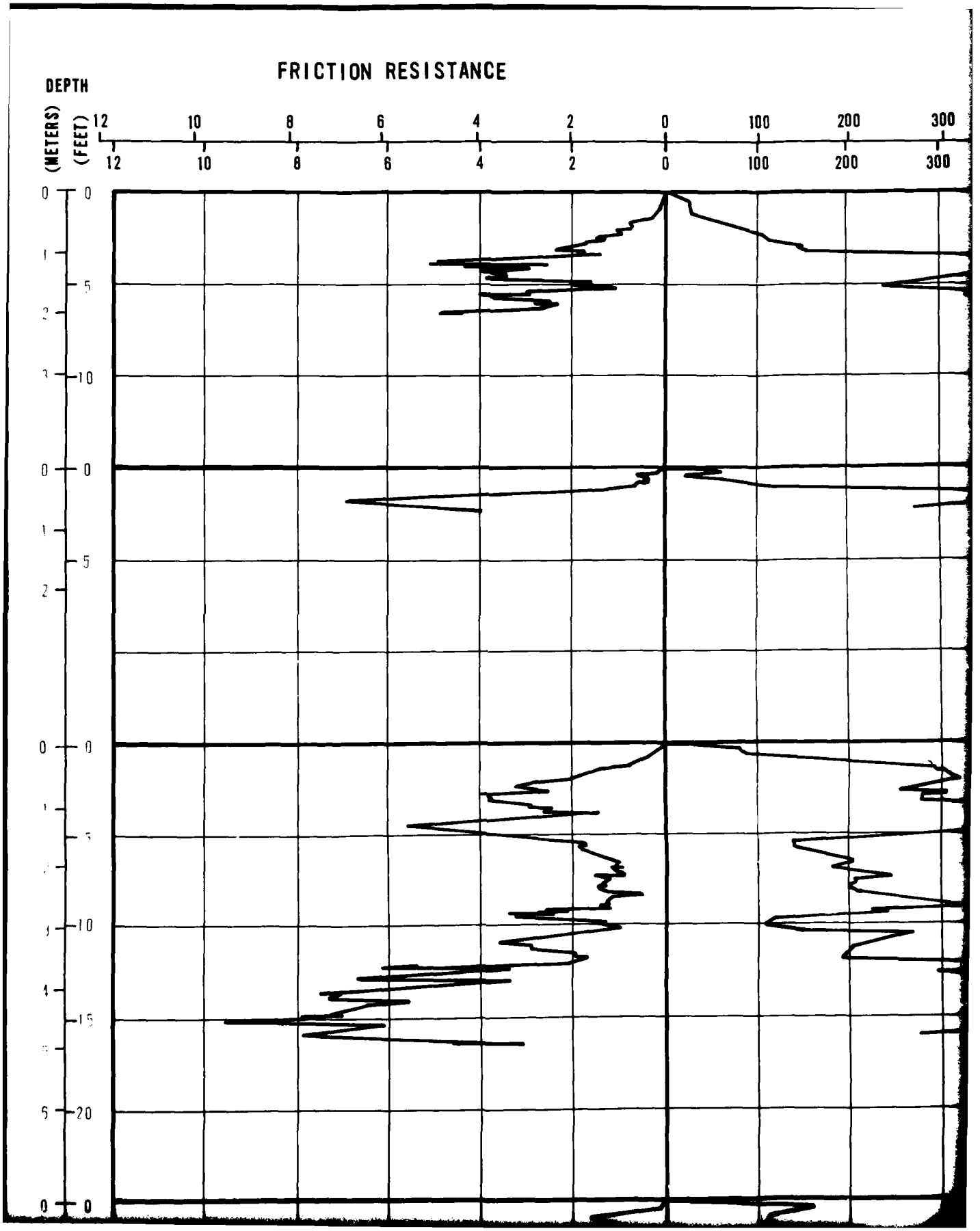
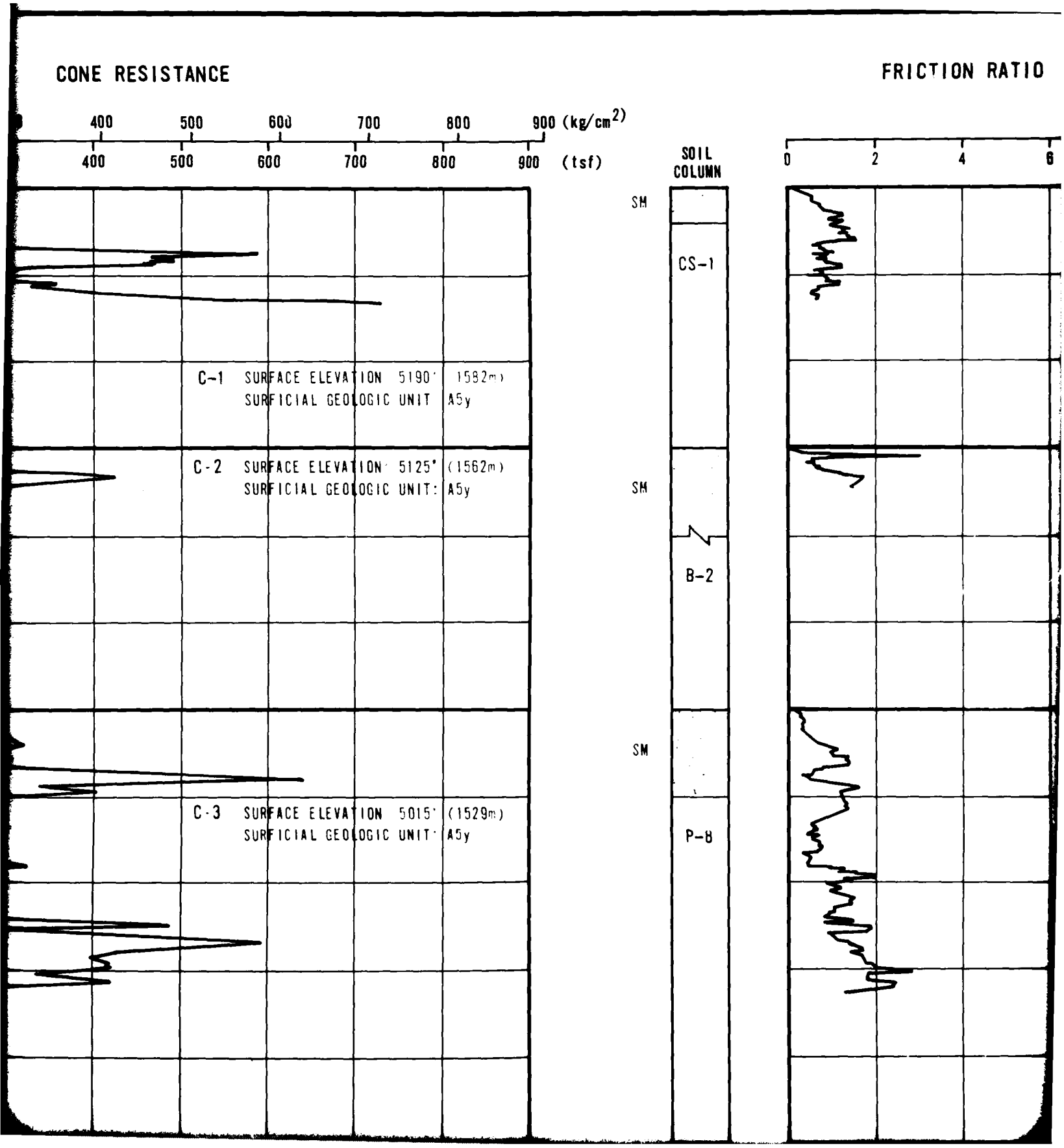
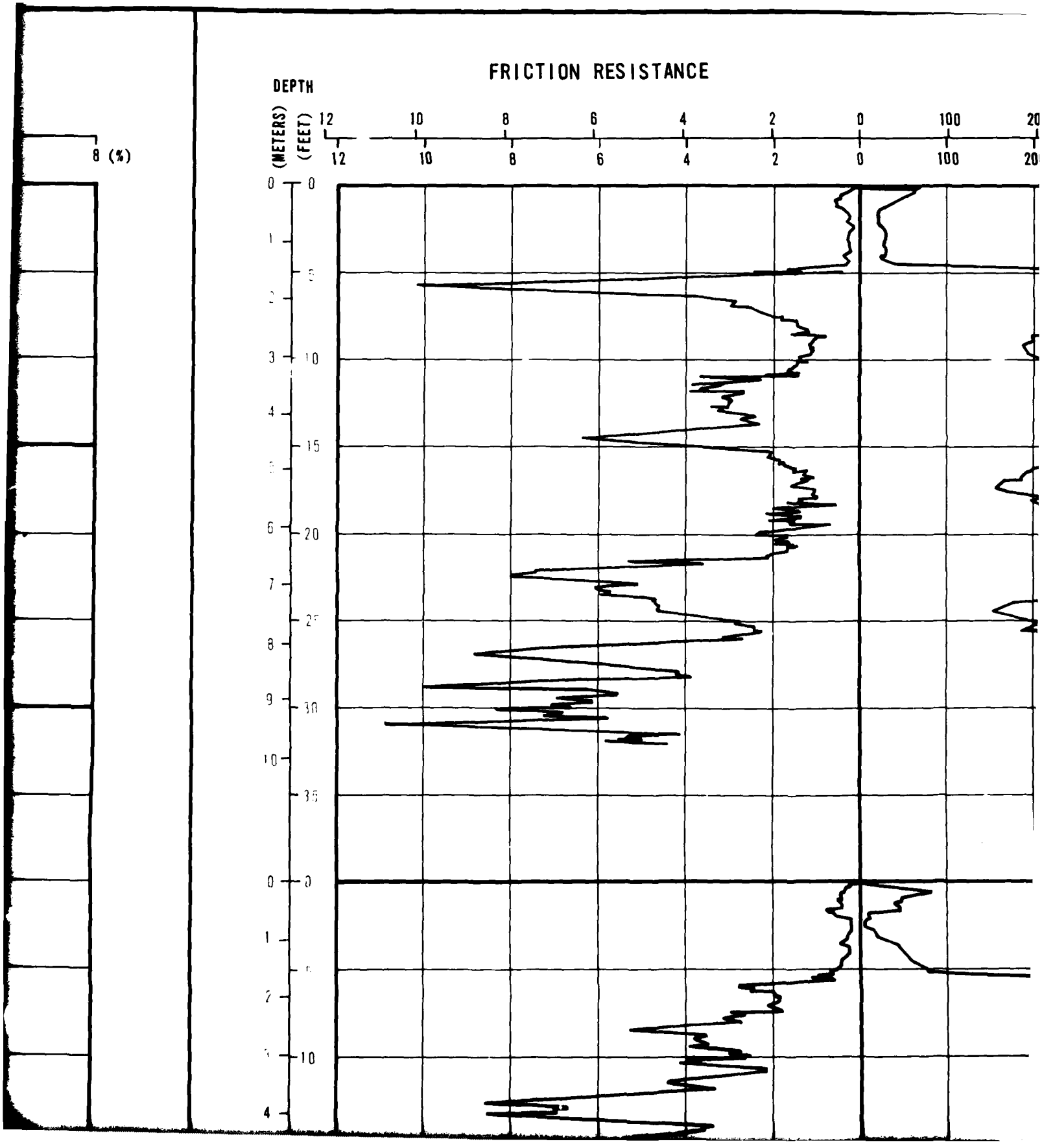
FUGRO NATIONAL, INC.


FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
200
300
0
1
2
3
4
5
6
0
5
10
15
20


CONE RESISTANCE
FRICTION RATIO
400 500 600 700 800 900 (kg/cm2)
400 500 600 700 800 900 (tsf)
SOIL COLUMN
0 2 4 6
C-1 SURFACE ELEVATION 5190' (1582m)
SURFICIAL GEOLOGIC UNIT A5y
C-2 SURFACE ELEVATION 5125' (1562m)
SURFICIAL GEOLOGIC UNIT: A5y
C-3 SURFACE ELEVATION 5015' (1529m)
SURFICIAL GEOLOGIC UNIT: A5y
SM
CS-1
SM
B-2
SM
P-8


8 (%)
FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
20
0
1
2
3
4
6
7
8
9
10
0
1
2
4
10
15
20
25
30
35

CONE RESISTANCE

FRICTION R

300 400 500 600 700 800 900 (kg/cm^2)

300 400 500 600 700 800 900 (tsf)

SOIL COLUMN

0 2 4

C-11 SURFACE ELEVATION 5095' (1553m)
SURFICIAL GEOLOGIC UNIT A2

SM

P-3

C-12 SURFACE ELEVATION 5100' (1554m)
SURFICIAL GEOLOGIC UNIT: A2

SM

CE

FRICTION RATIO

600 700 800 900 (kg/cm^2)

600 700 800 900 (tsf)

SOIL COLUMN

0 2 4 6 8 (%)

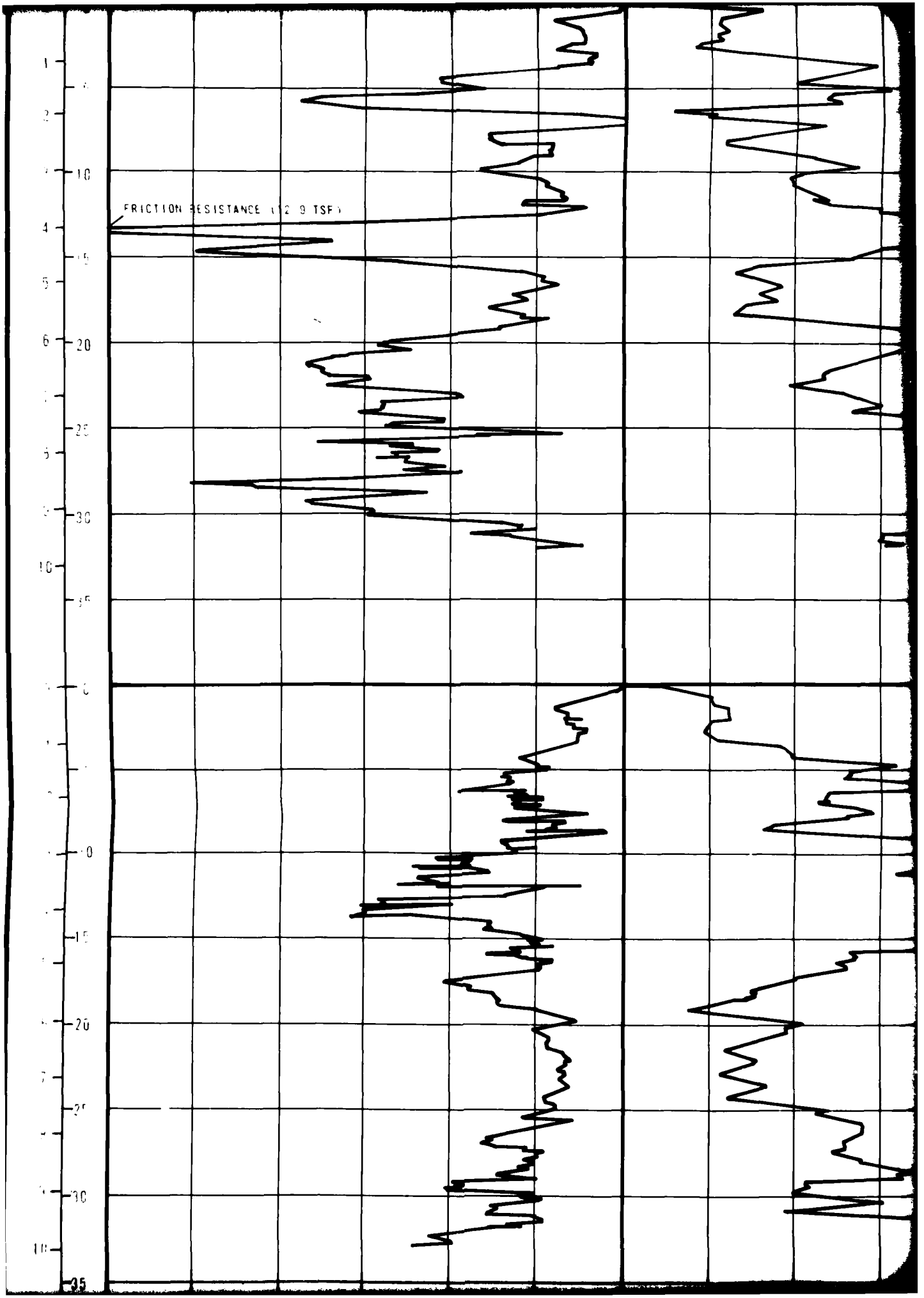
-11 SURFACE ELEVATION 5095' (1553m)
SURFICIAL GEOLOGIC UNIT A2

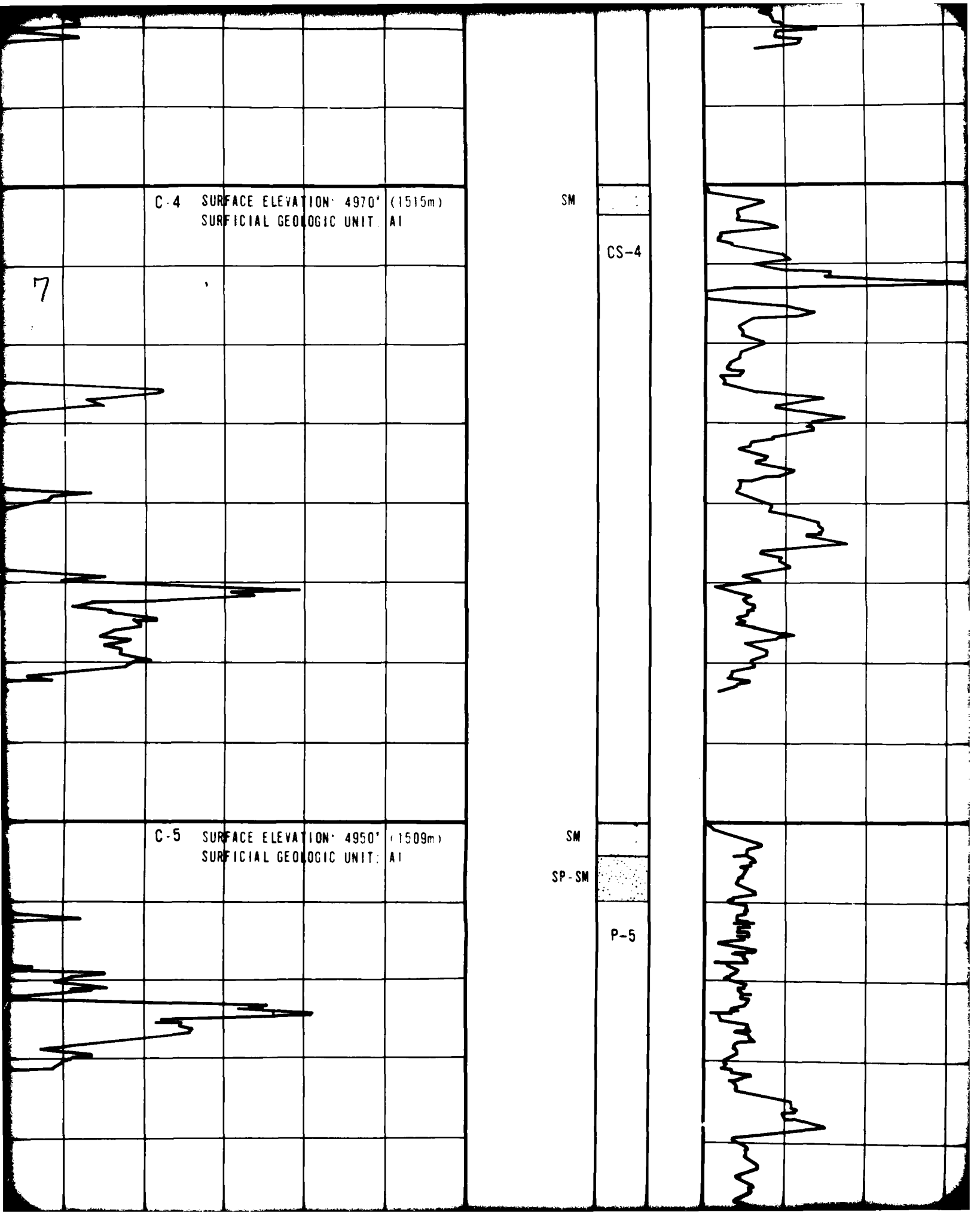
SM

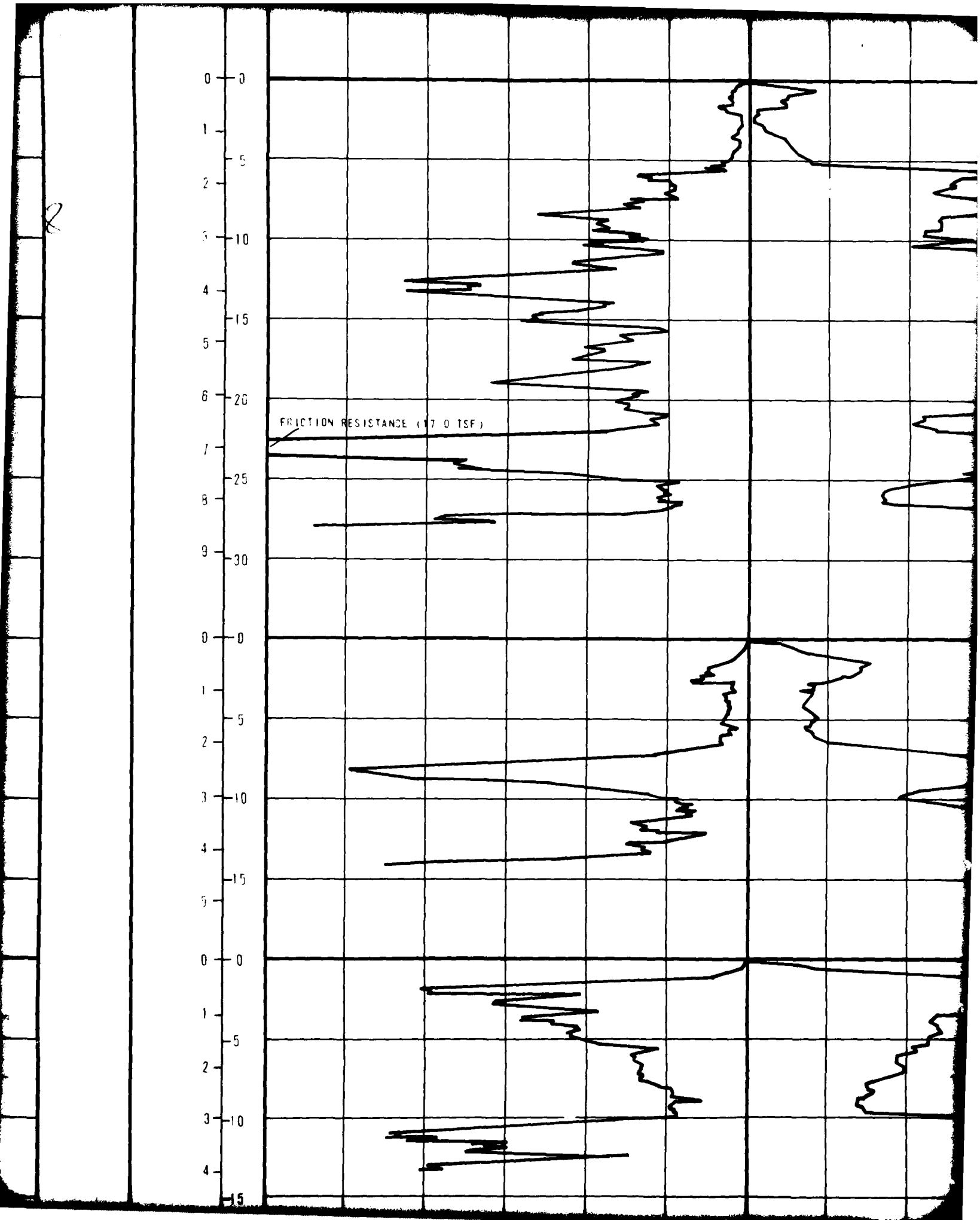
P-3

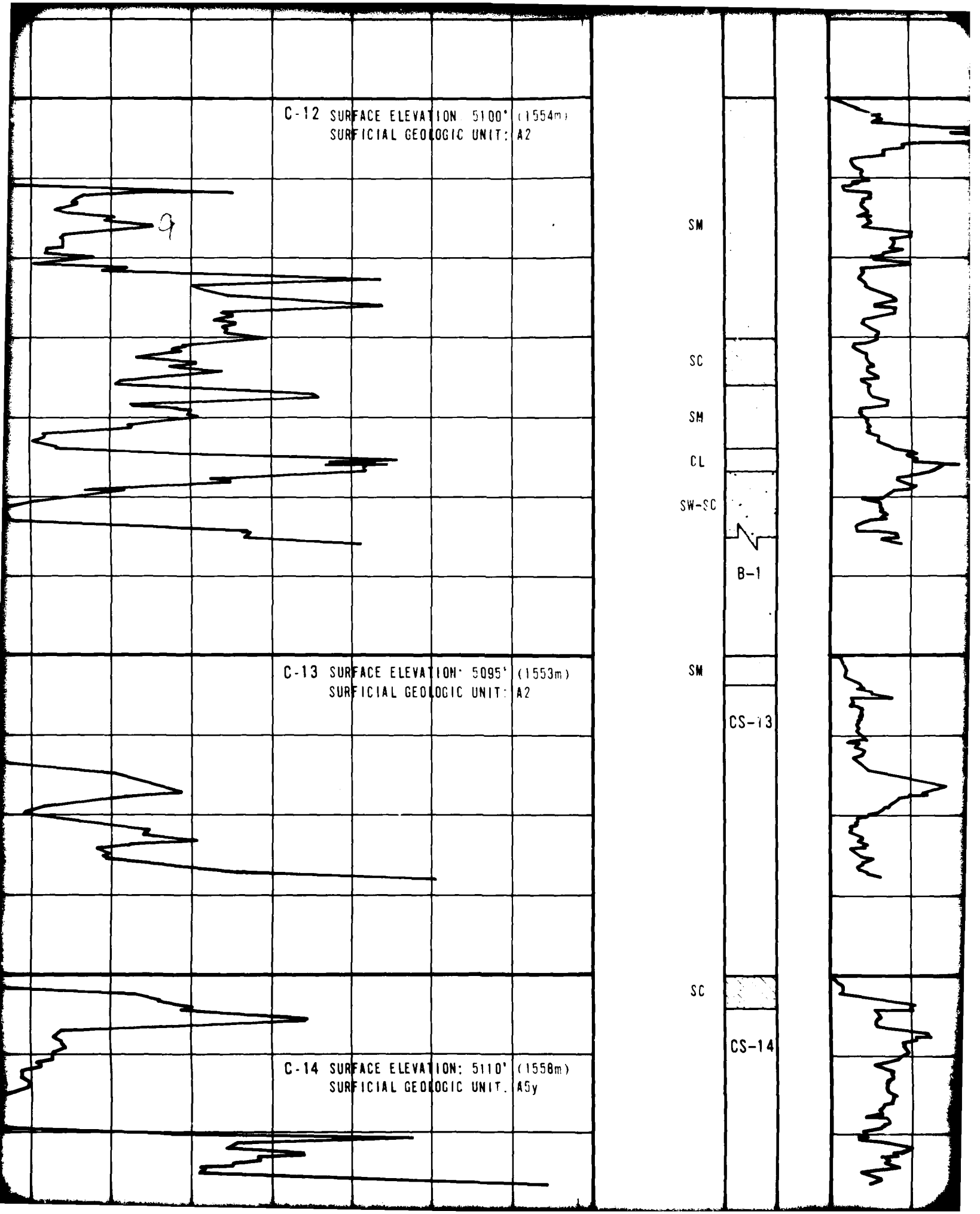
-12 SURFACE ELEVATION 5100' (1554m)
SURFICIAL GEOLOGIC UNIT: A2

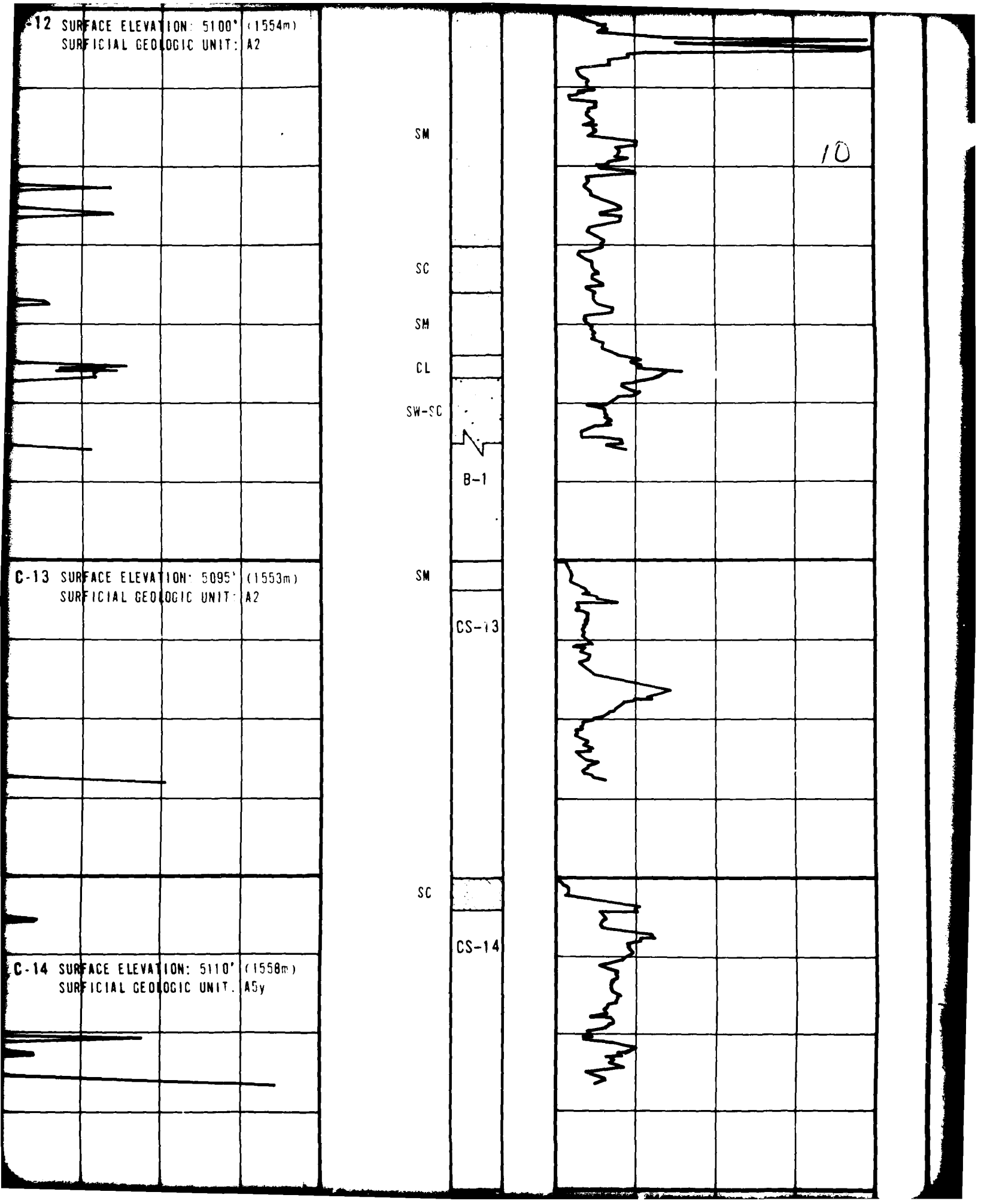
SM

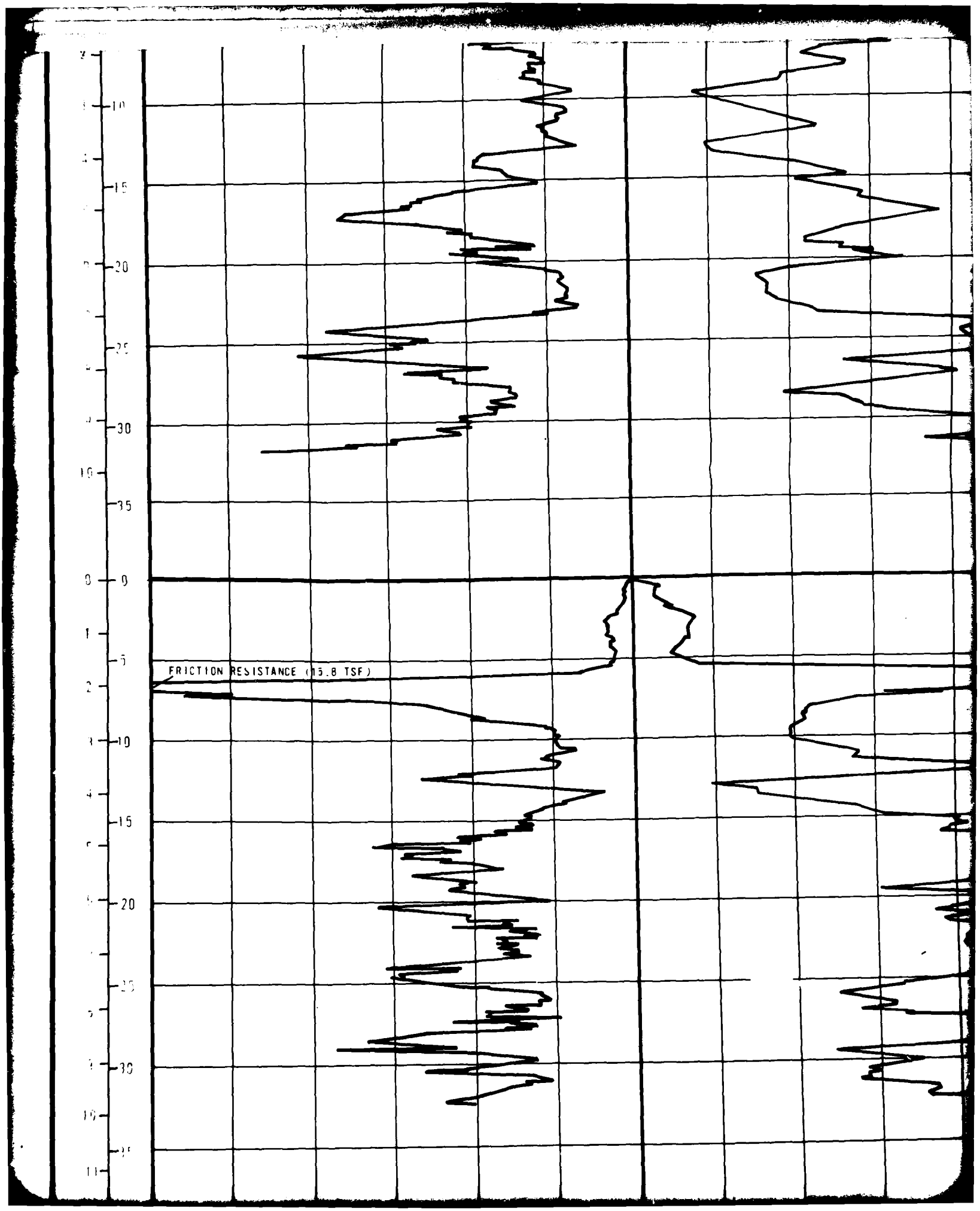

FRICTION RESISTANCE (12.9 TSF)

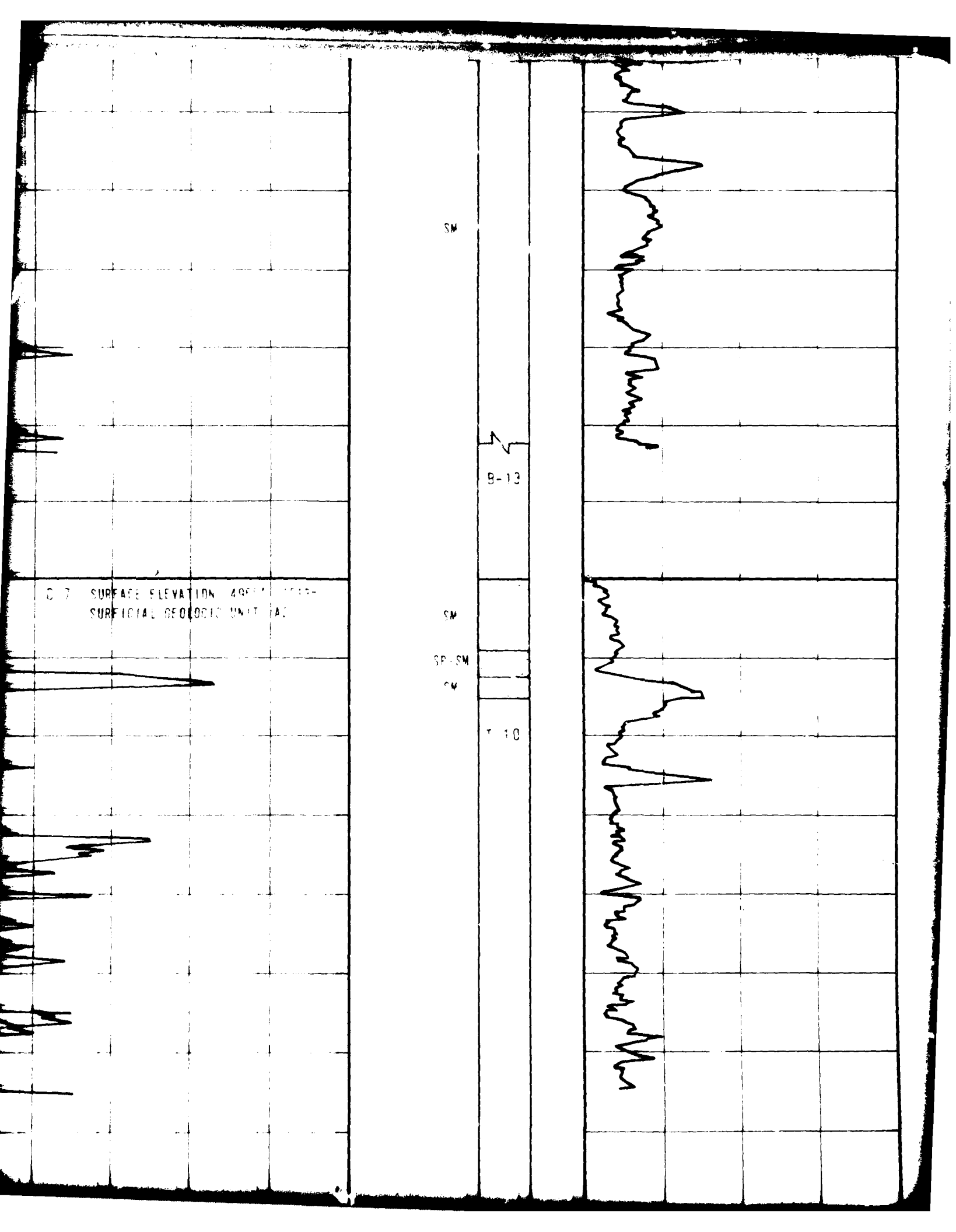

C-4 SURFACE ELEVATION: 4970' (1515m)
SURFICIAL GEOLOGIC UNIT: A1
SM
CS-4
C-5 SURFACE ELEVATION: 4950' (1509m)
SURFICIAL GEOLOGIC UNIT: A1
SM
SP-SM
P-5

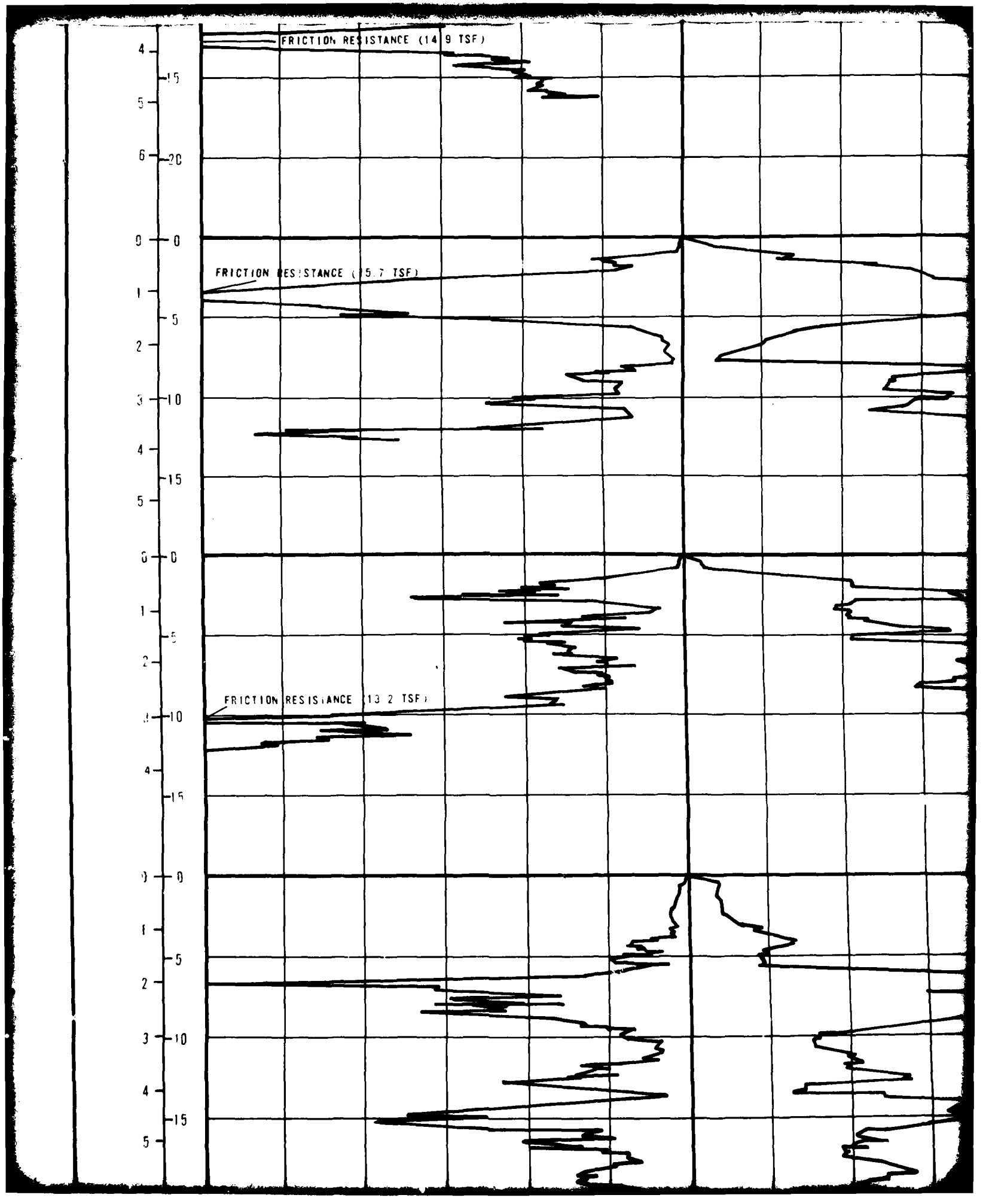

FRICTION RESISTANCE (17.0 TSF)


C-12 SURFACE ELEVATION 5100' (1554m)
SURFICIAL GEOLOGIC UNIT: A2
SM
SC
SM
CL
SW-SC
B-1
C-13 SURFACE ELEVATION: 5095' (1553m)
SURFICIAL GEOLOGIC UNIT: A2
SM
CS-13
SC
CS-14
C-14 SURFACE ELEVATION: 5110' (1558m)
SURFICIAL GEOLOGIC UNIT: A5y


-12 SURFACE ELEVATION: 5100' (1554m)
SURFICIAL GEOLOGIC UNIT: A2
SM
SC
SM
CL
SW-SC
B-1
C-13 SURFACE ELEVATION: 5095' (1553m)
SURFICIAL GEOLOGIC UNIT: A2
SM
CS-13
SC
CS-14
C-14 SURFACE ELEVATION: 5110' (1558m)
SURFICIAL GEOLOGIC UNIT. A5y
10


FRICTION RESISTANCE (15.8 TSF)

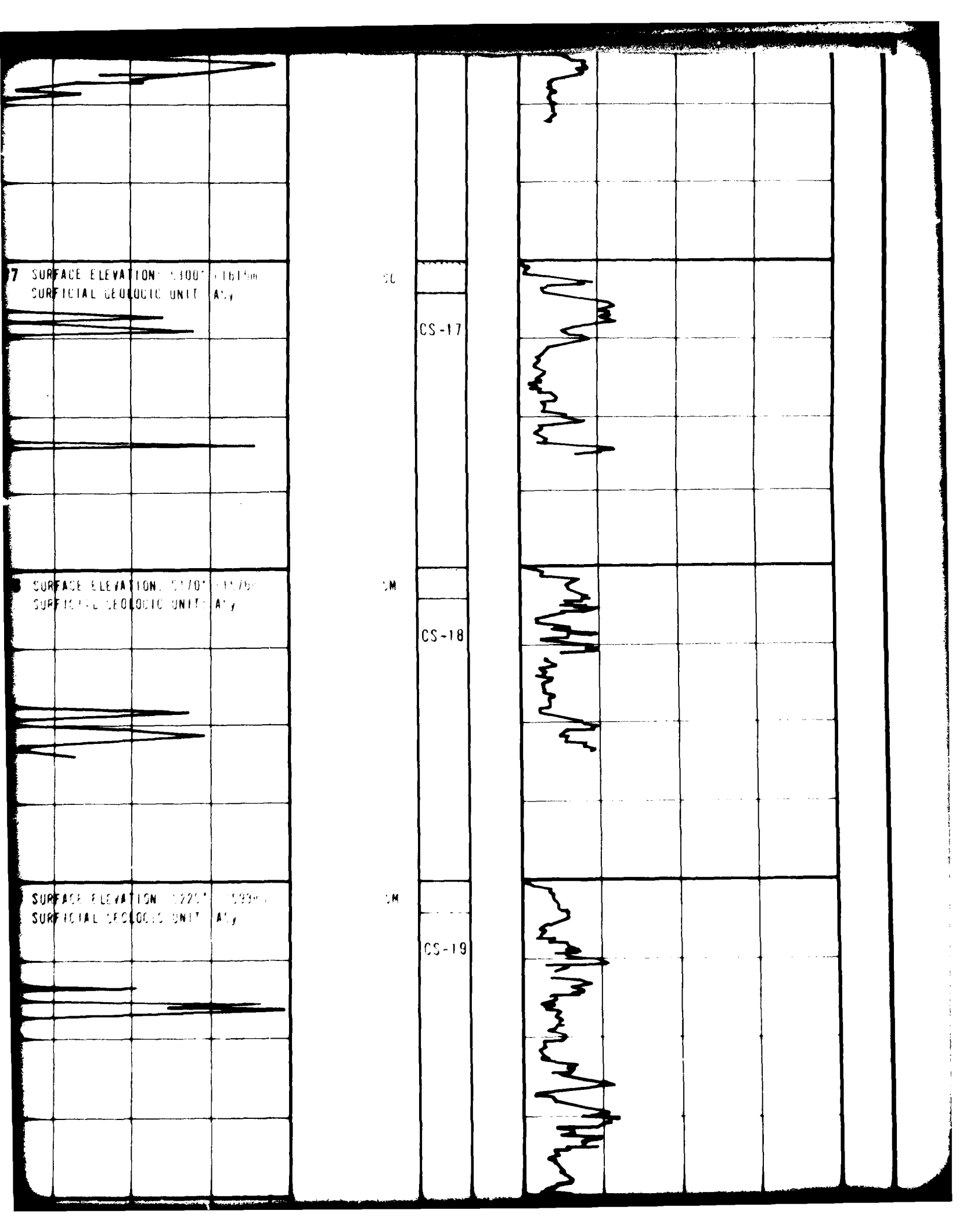

SM
B-13
SURFACE ELEVATION
SURFICIAL GEOLOGIC UNIT
SM
SP-SM
SM
T-10

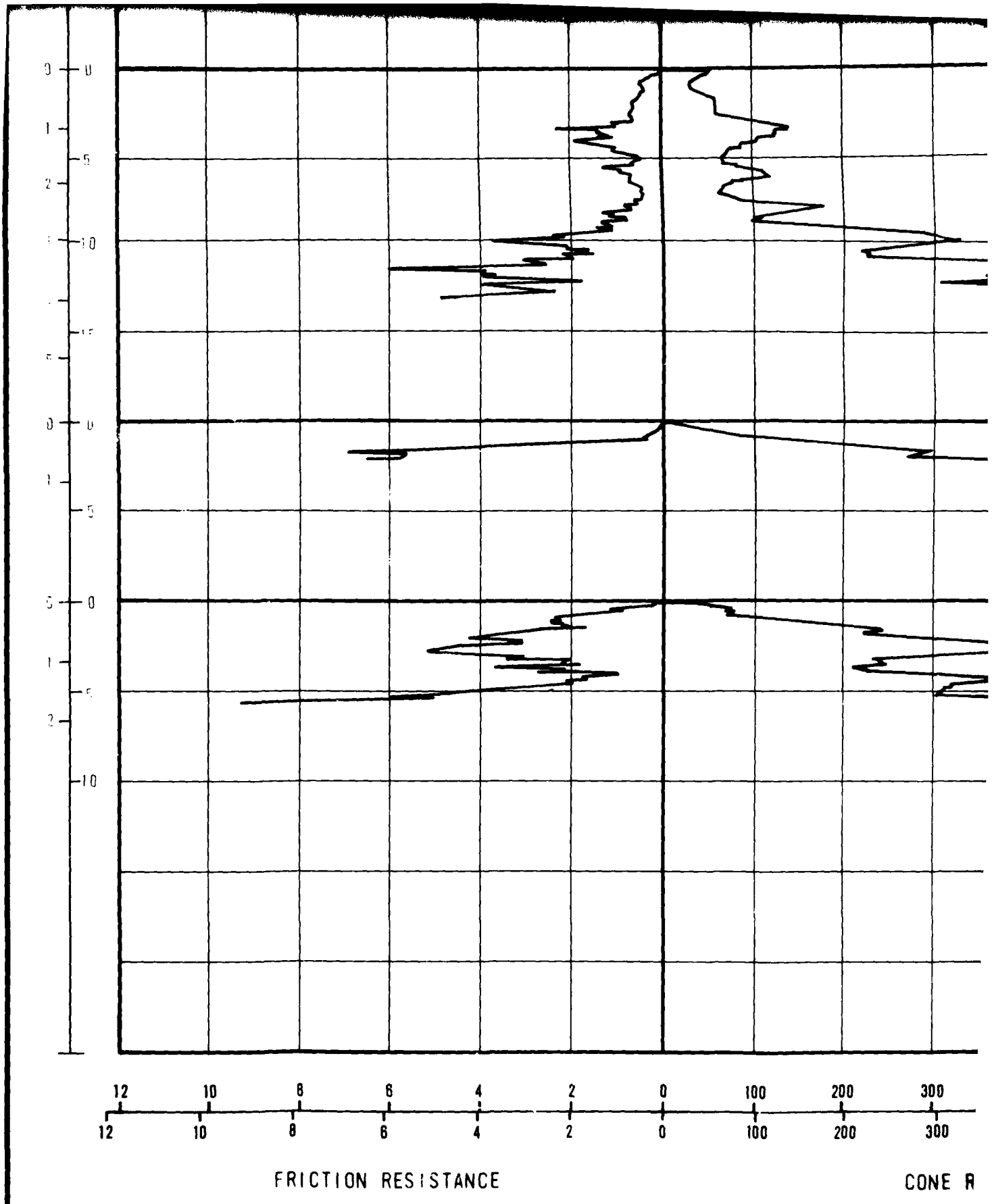

FRICTION RESISTANCE (14.9 TSF)
FRICTION RESISTANCE (15.7 TSF)
FRICTION RESISTANCE (13.2 TSF)

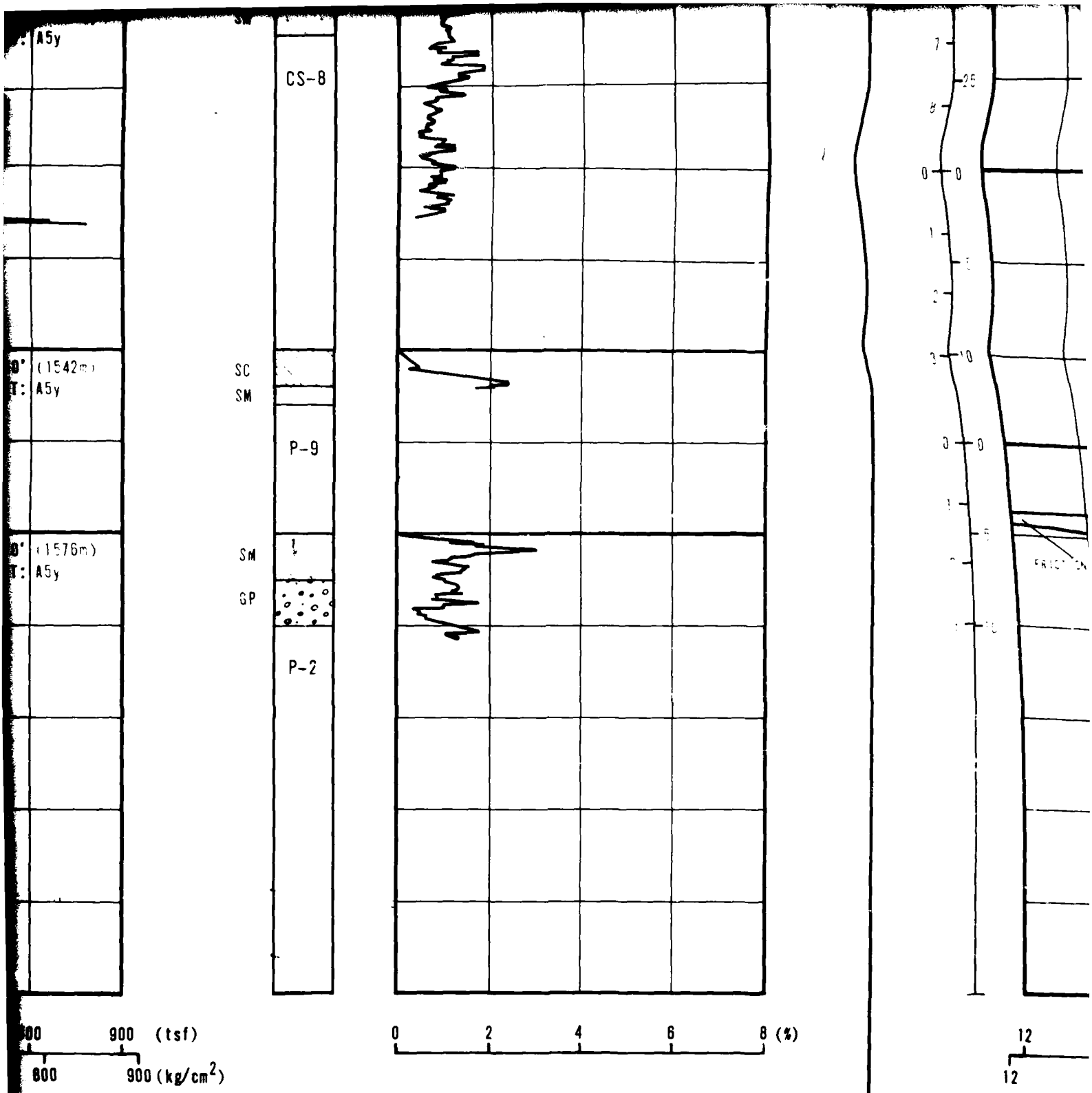
CS-17

CS-18

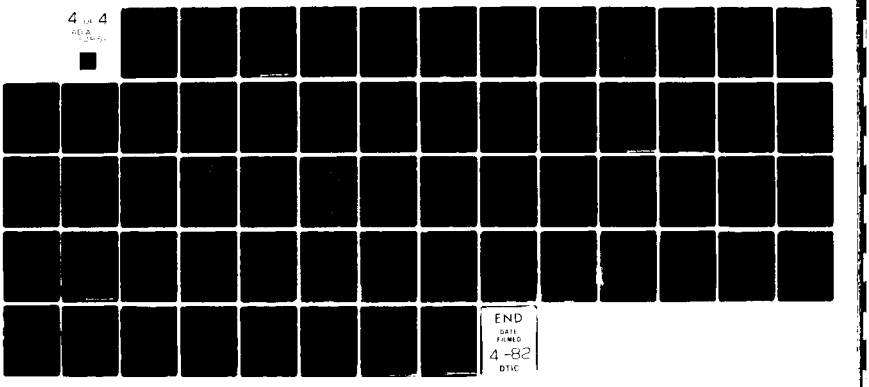
CS-19

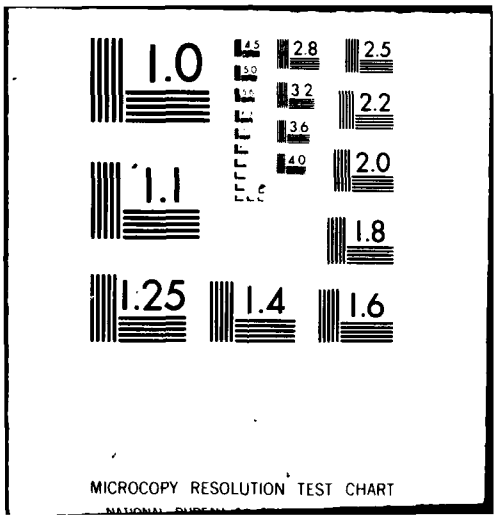

7 SURFACE ELEVATION: 5300' (1615m)
SURFICIAL GEOLOGIC UNIT: Ay
SC
CS-17
SURFACE ELEVATION: 5270' (1606m)
SURFICIAL GEOLOGIC UNIT: Ay
SM
CS-18
SURFACE ELEVATION: 5225' (1593m)
SURFICIAL GEOLOGIC UNIT: Ay
SM
CS-19

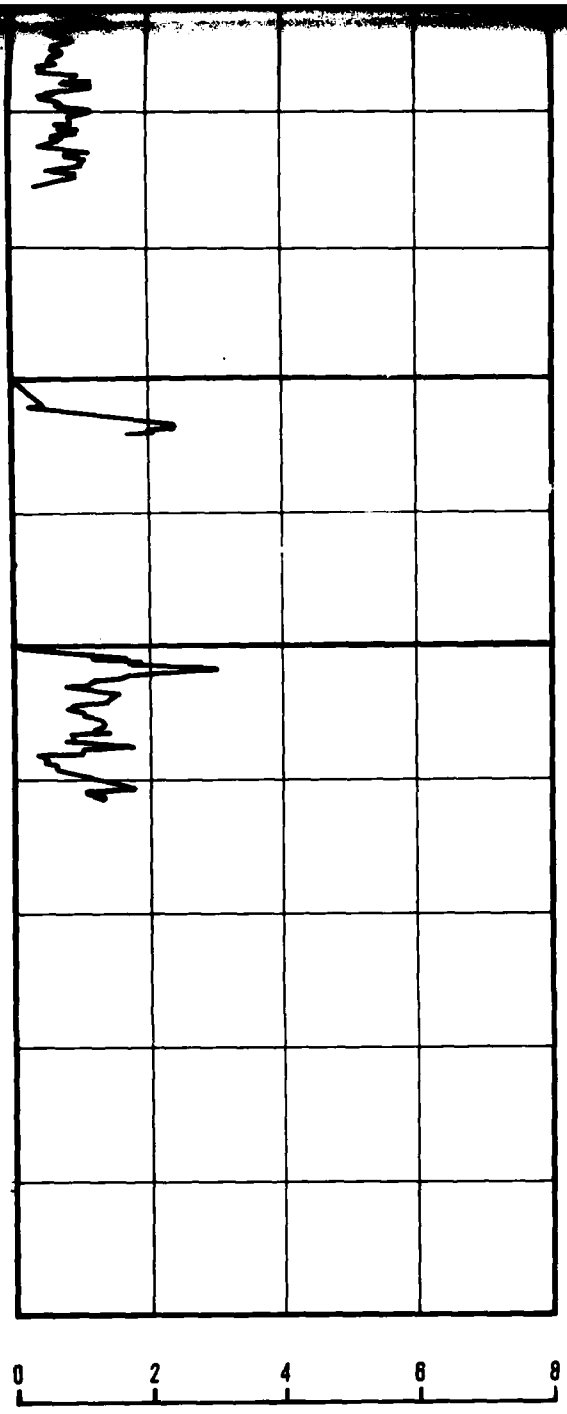

0
1
2
3
0
1
2
3
0
1
2
3
0
5
10
0
5
0
5
10
12
10
8
6
4
2
0
100
200
300
12
10
8
6
4
2
0
100
200
300
FRICTION RESISTANCE
CONE R


A5y
CS-8
SC
SM
P-9
SM
GP
P-2
(1542m)
A5y
(1576m)
A5y
900 (tsf)
800 900 (kg/cm²)
0 2 4 6 8 (%)
12
12
FRICTION RATIO

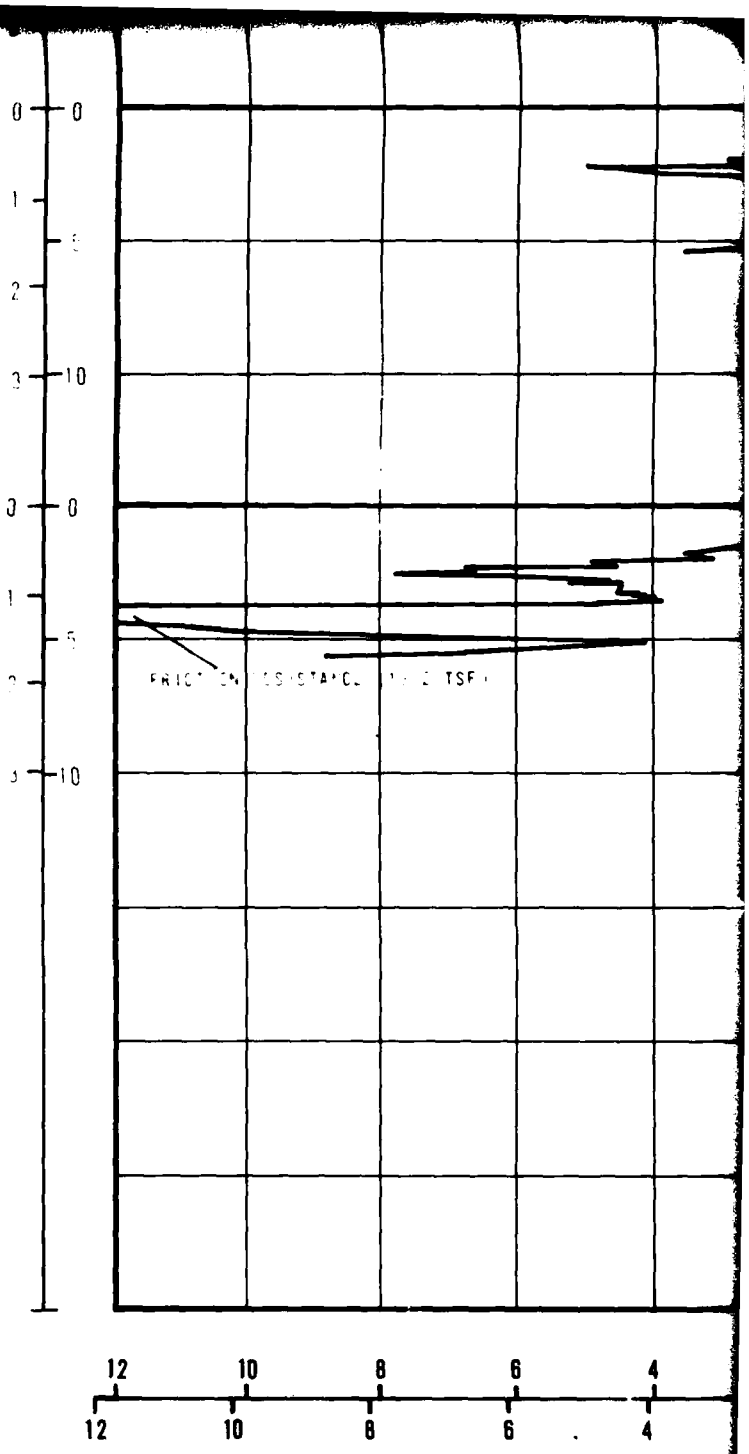
AD-A112 851 FUGRO NATIONAL INC LONG BEACH CA F/G 8/7
MX SITING INVESTIGATION GEOTECHNICAL EVALUATION. VERIFICATION S--ETC(U)
MAR 80 F04704-80-C-0006
UNCLASSIFIED FN-TR-27-DL-2 NL



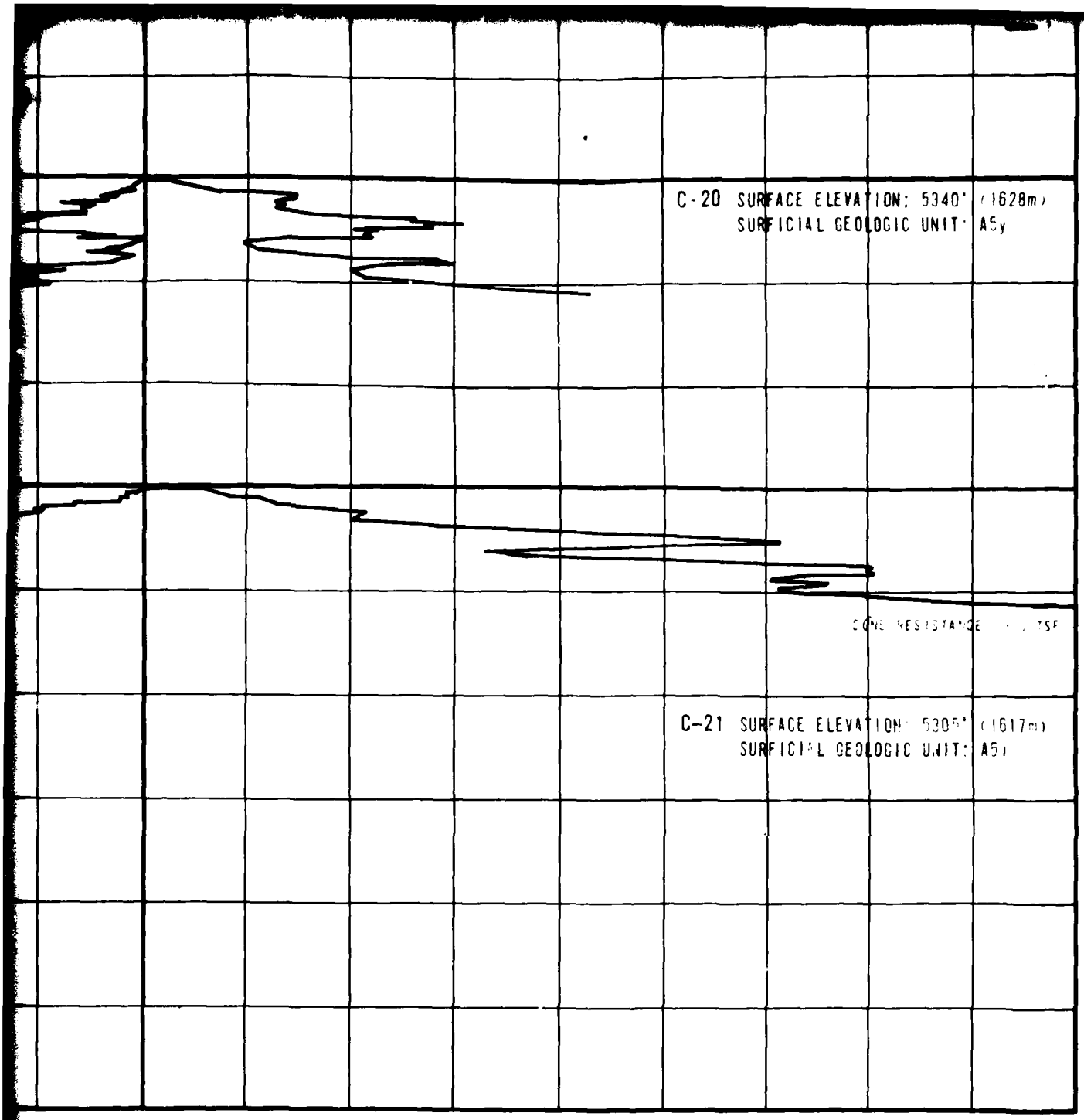

1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
MICROCOPY RESOLUTION TEST CHART



FRICTION RATIO

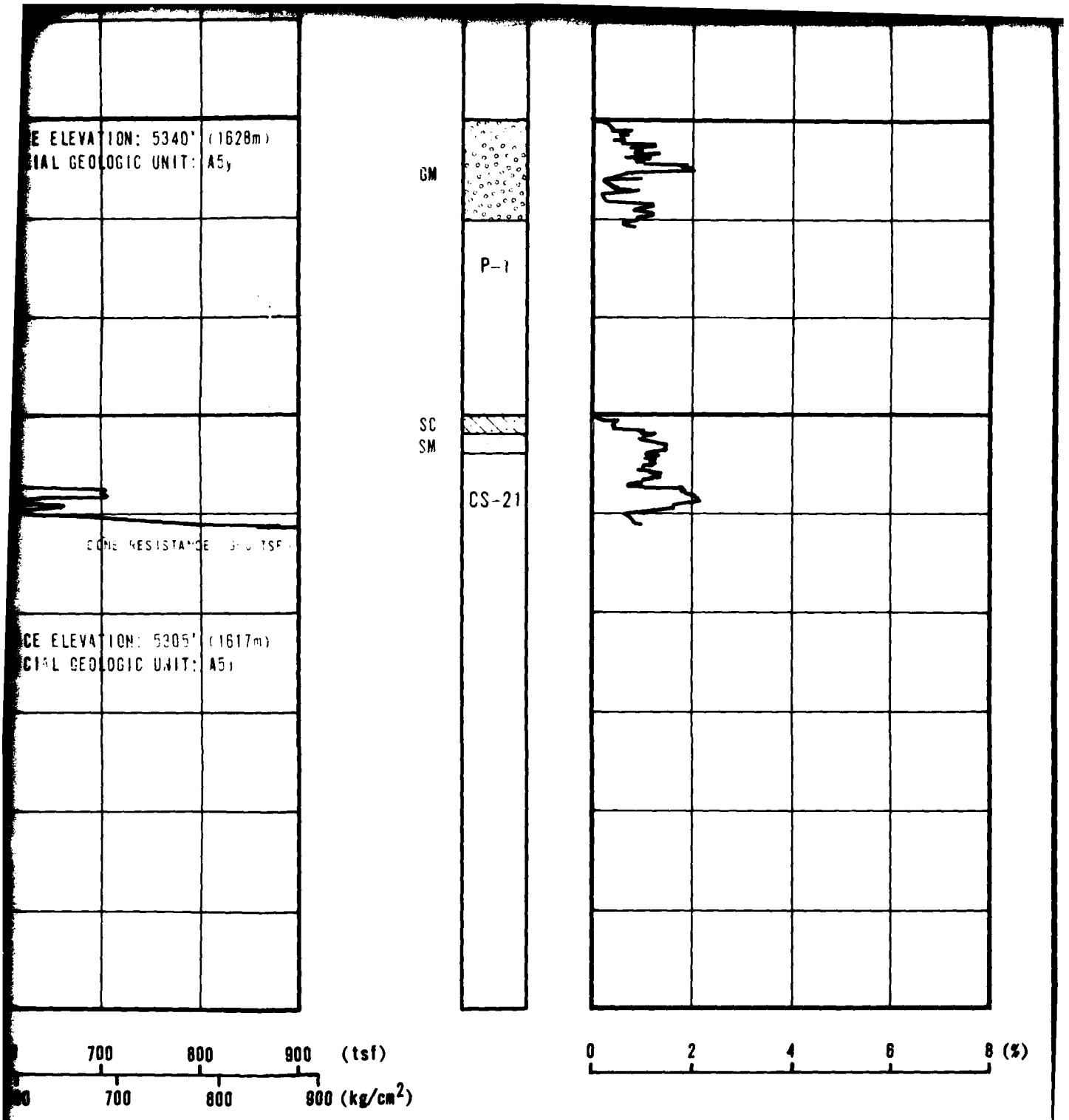


FRICTION RESISTANCE



CONE RESISTANCE

DEP

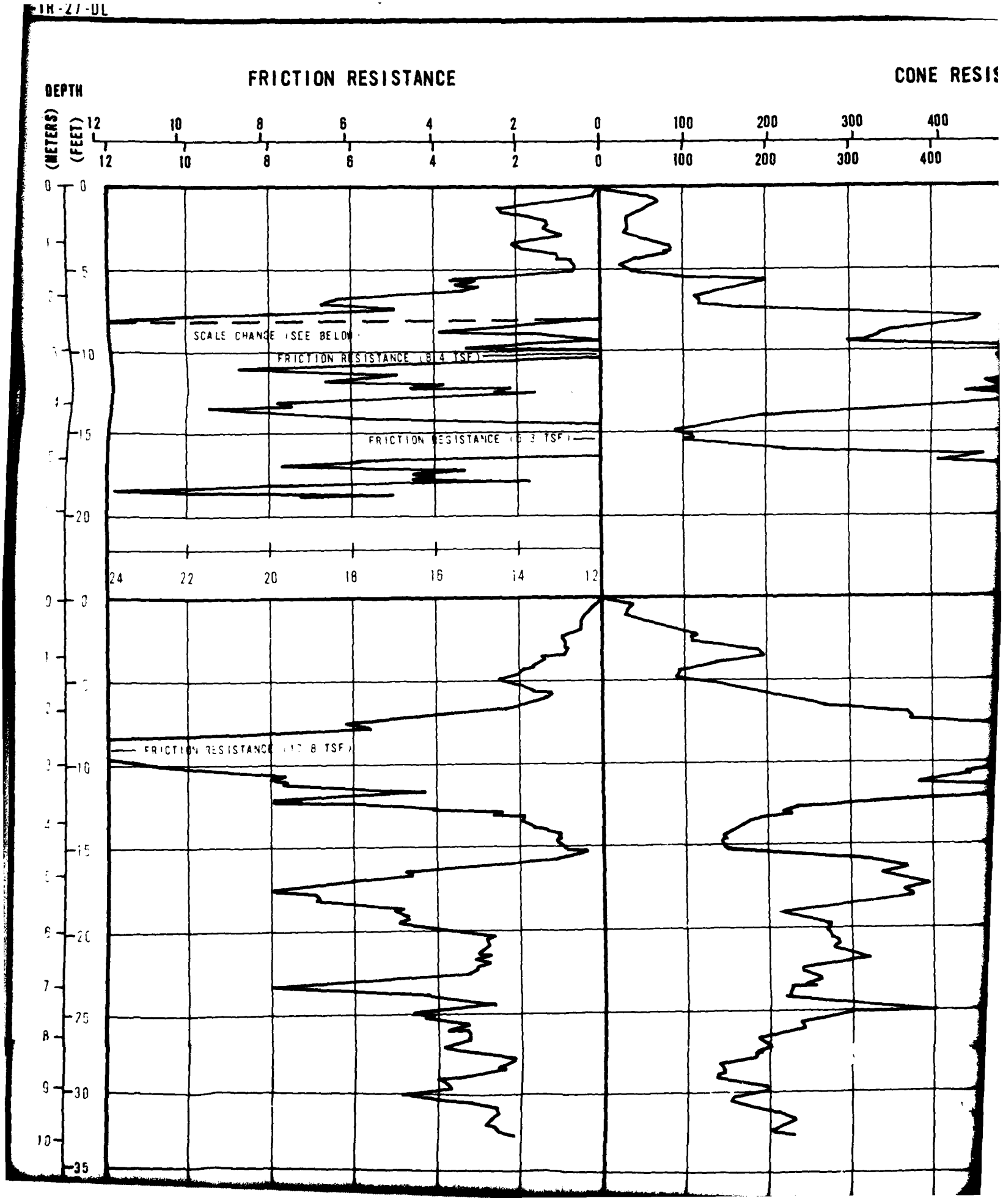


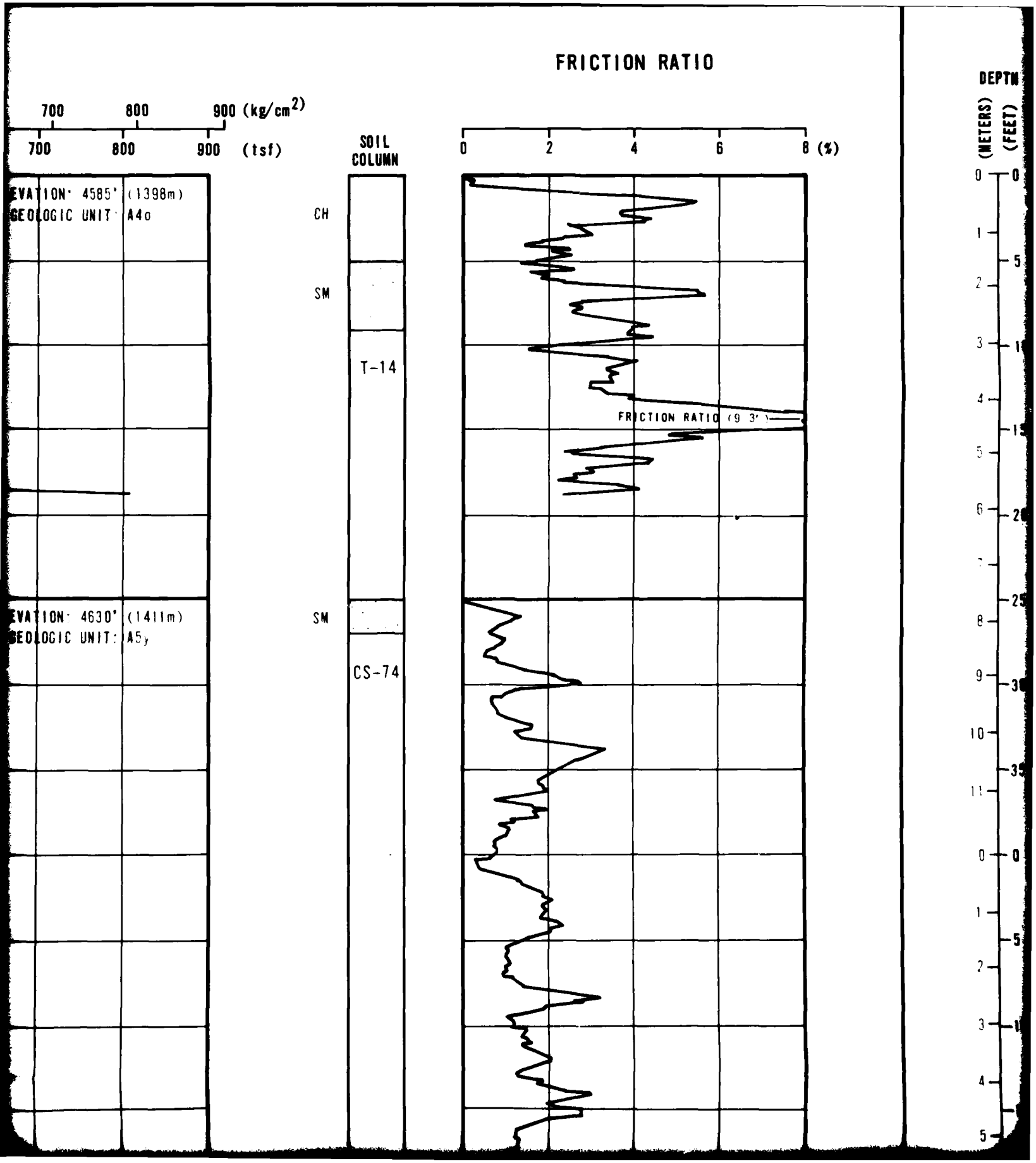
CONE PENETROMETER TEST RESULTS
DRY LAKE VALLEY, NEVADA

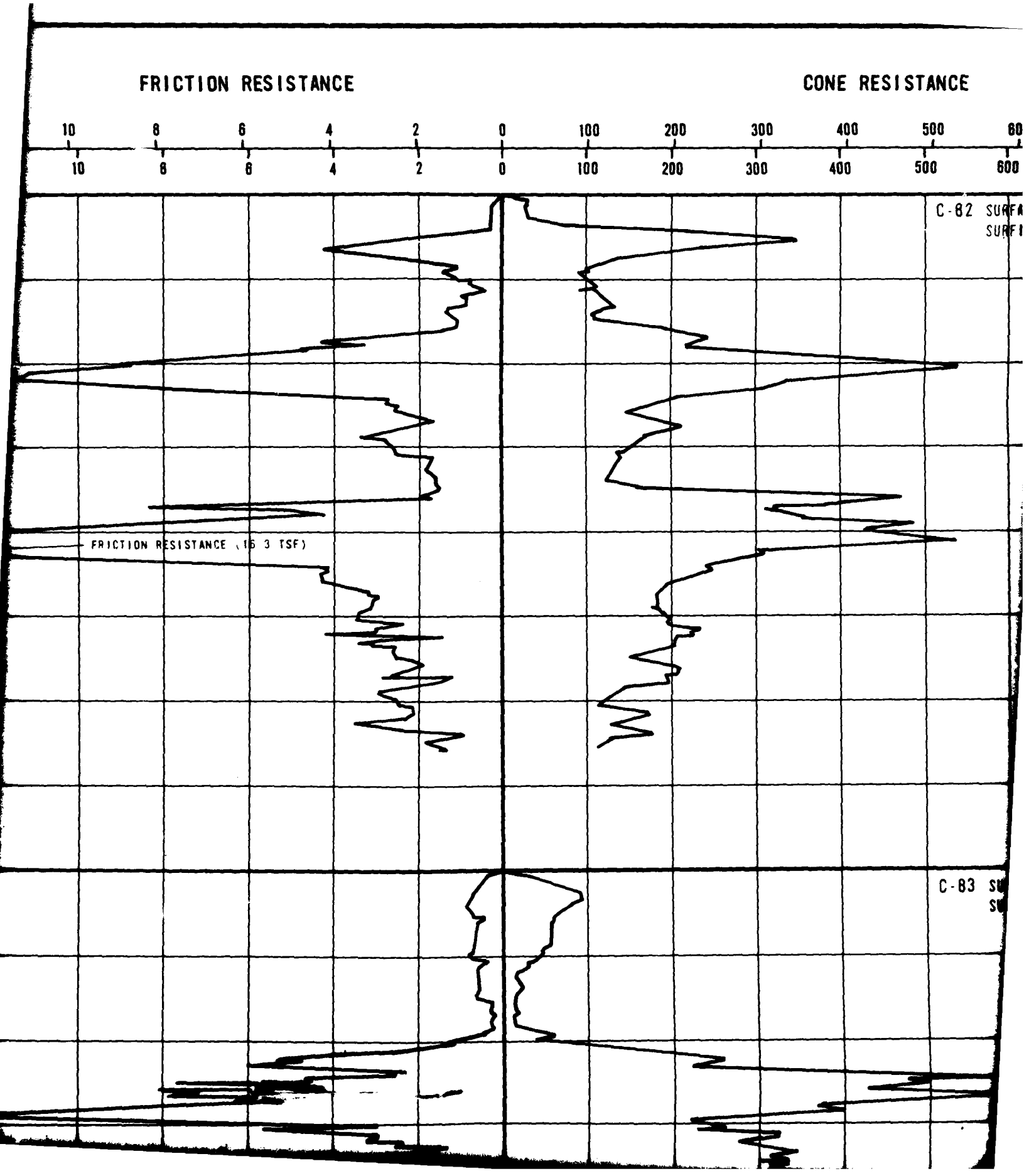
MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

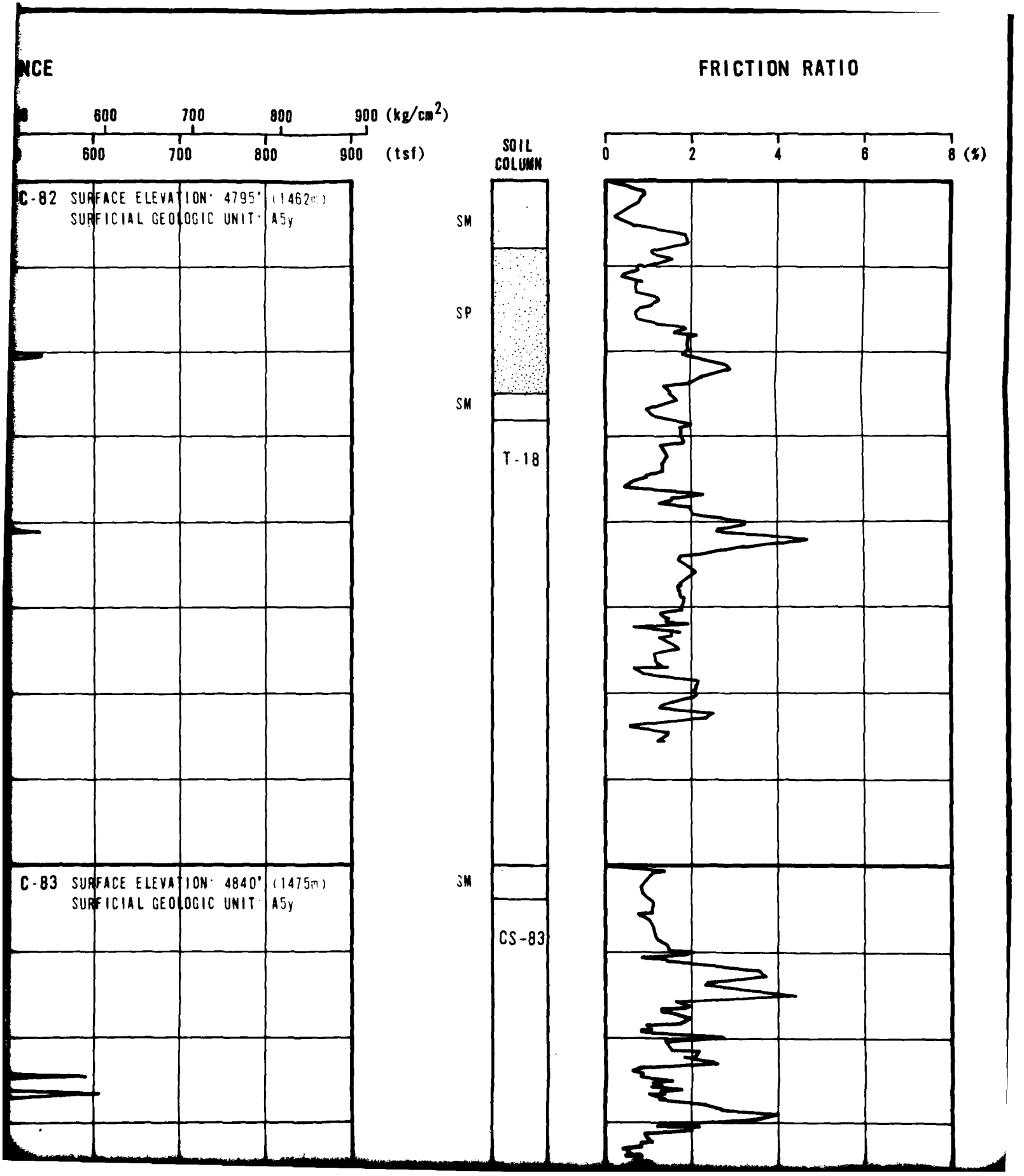
DRAWING
II-8-1
1 of 5

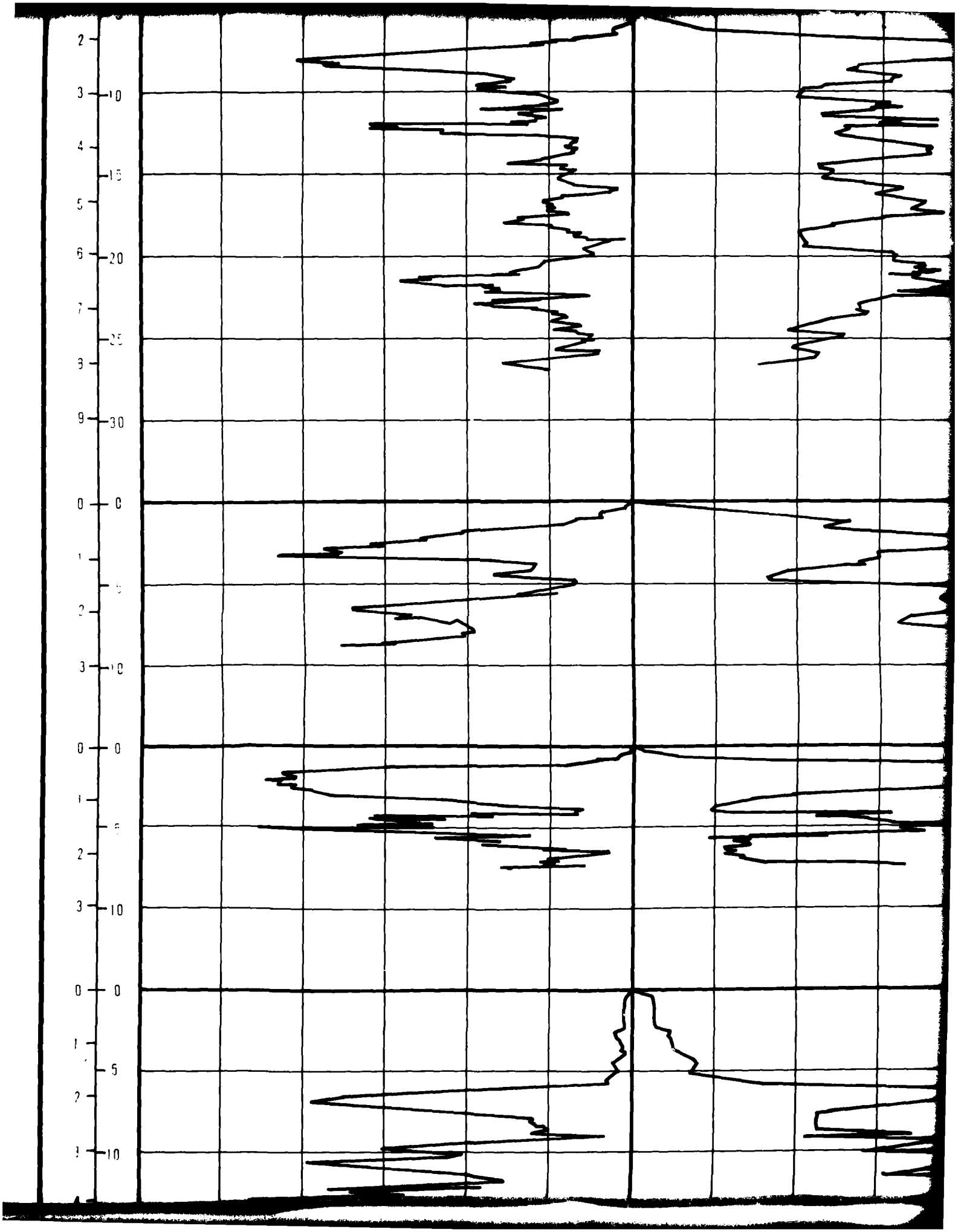
FUGRO NATIONAL, INC.

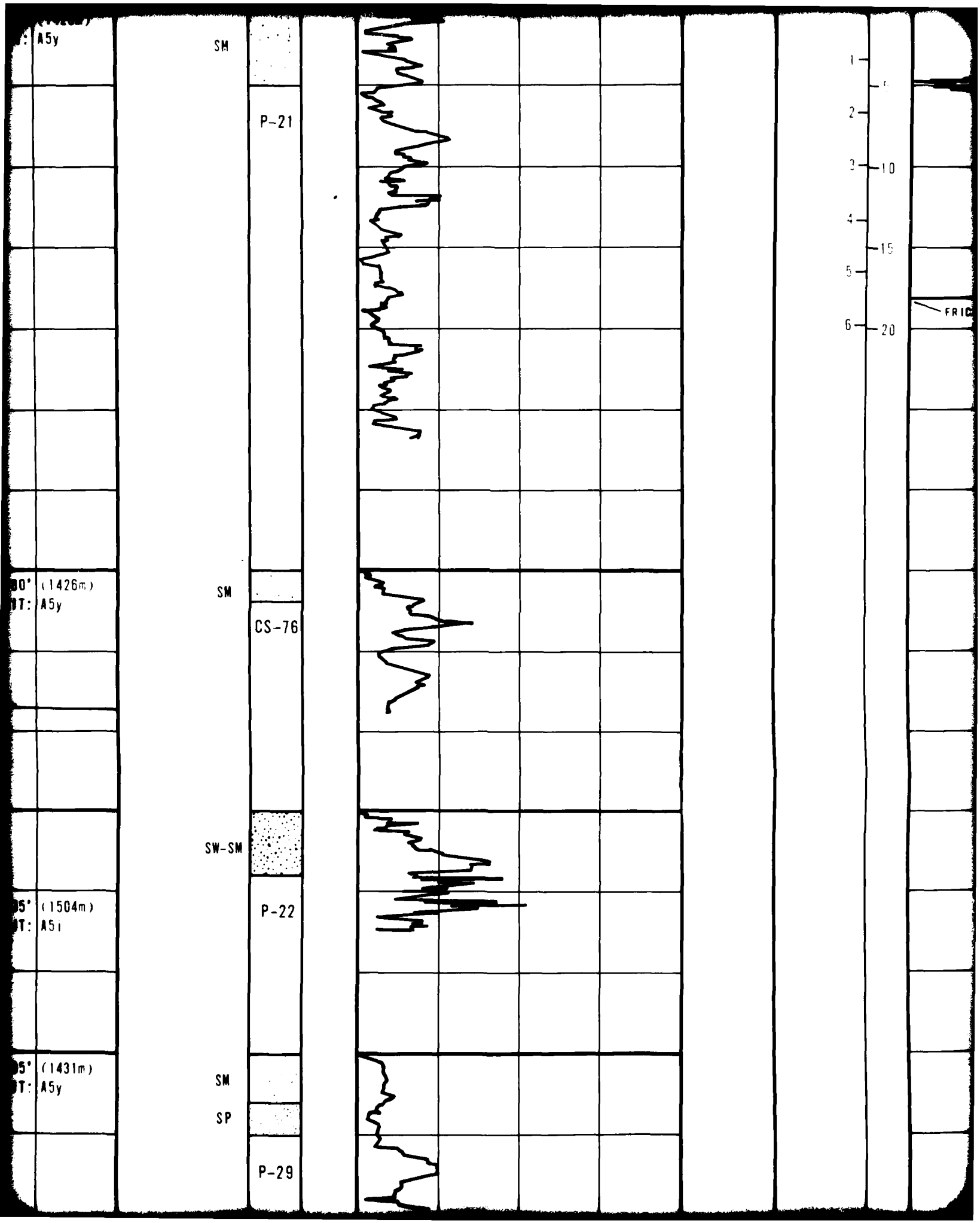

FRICTION RESISTANCE
CONE RESIS
DEPTH
(METERS)
(FEET)
12 10 8 6 4 2 0
100 200 300 400
SCALE CHANGE (SEE BELOW)
FRICTION RESISTANCE (8.4 TSF)
FRICTION RESISTANCE (8.3 TSF)
24 22 20 18 16 14 12
FRICTION RESISTANCE (12.8 TSF)
0 5 10 15 20 25 30 35

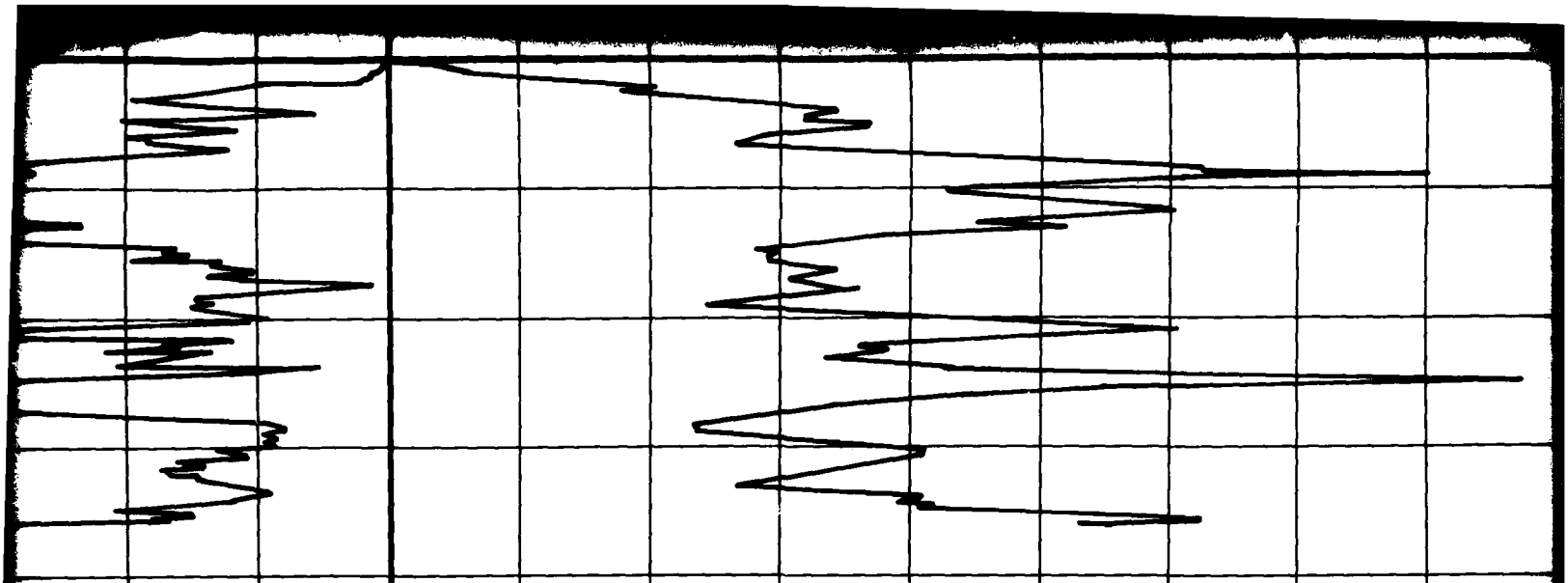

FRICTION RATIO
700
800
900 (kg/cm2)
700
800
900 (tsf)
SOIL COLUMN
0
2
4
6
8 (%)
DEPTH
(METERS)
(FEET)
EVATION: 4585' (1398m)
GEOLOGIC UNIT: A4o
CH
SM
T-14
FRICTION RATIO (9 3')
EVATION: 4630' (1411m)
GEOLOGIC UNIT: A5y
SM
CS-74
0
1
2
3
4
5
0
5
1
1
2
2
3
3
4
4
5
5
6
6
7
7
8
8
9
9
10
10
11
11
0
0
1
1
2
2
3
3
4
4
5
5


FRICTION RESISTANCE
CONE RESISTANCE
10 8 6 4 2 0 100 200 300 400 500 600
C-82 SURFA
SURFA
FRICTION RESISTANCE (16 3 TSF)
C-83 SU
SU

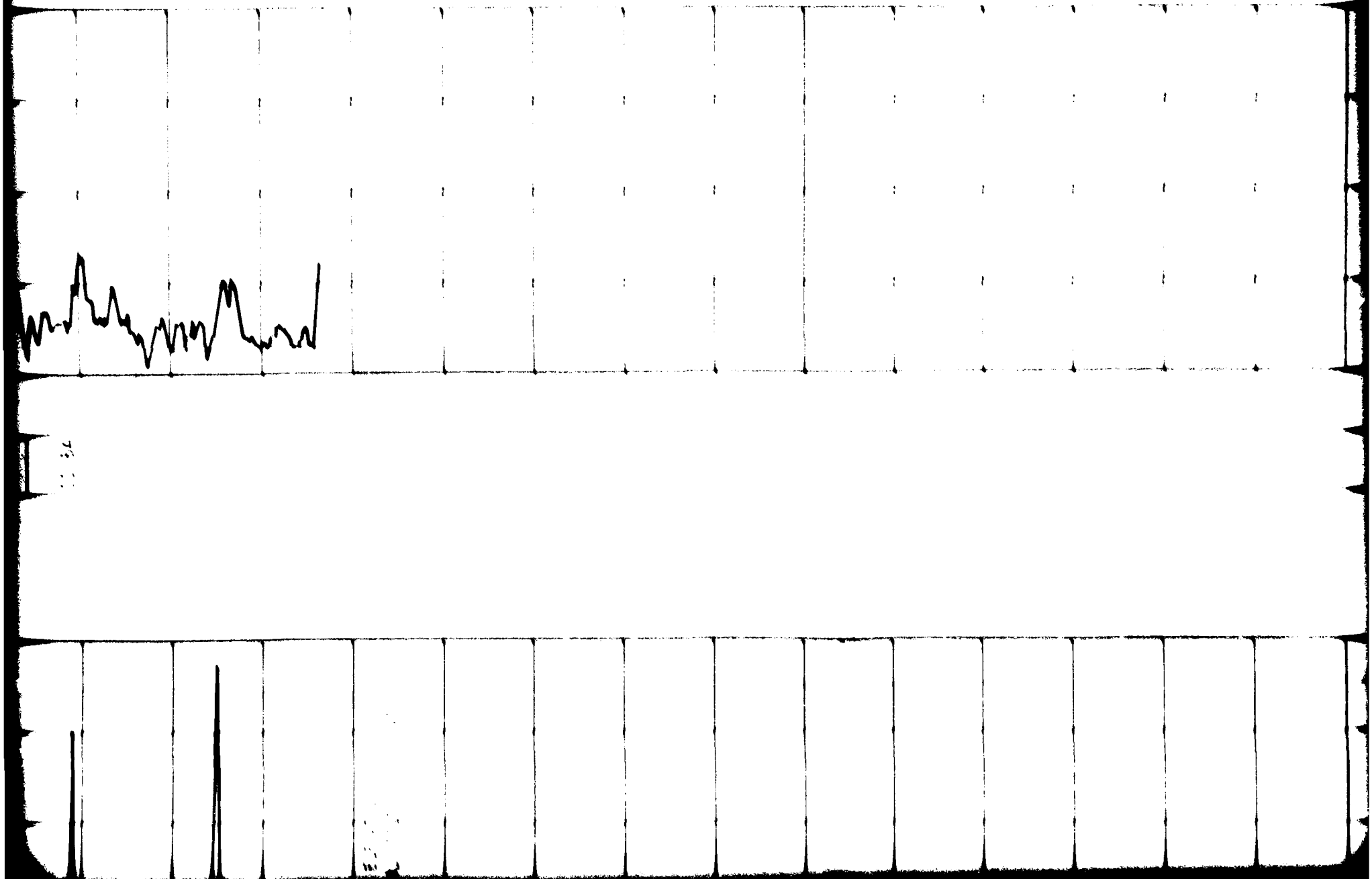

NCE
600
700
800
900 (kg/cm²)
600
700
800
900 (tsf)
C-82 SURFACE ELEVATION: 4795' (1462m)
SURFICIAL GEOLOGIC UNIT: A5y
C-83 SURFACE ELEVATION: 4840' (1475m)
SURFICIAL GEOLOGIC UNIT: A5y
SOIL COLUMN
SM
SP
SM
T-18
SM
CS-83
FRICTION RATIO
0
2
4
6
8 (%)

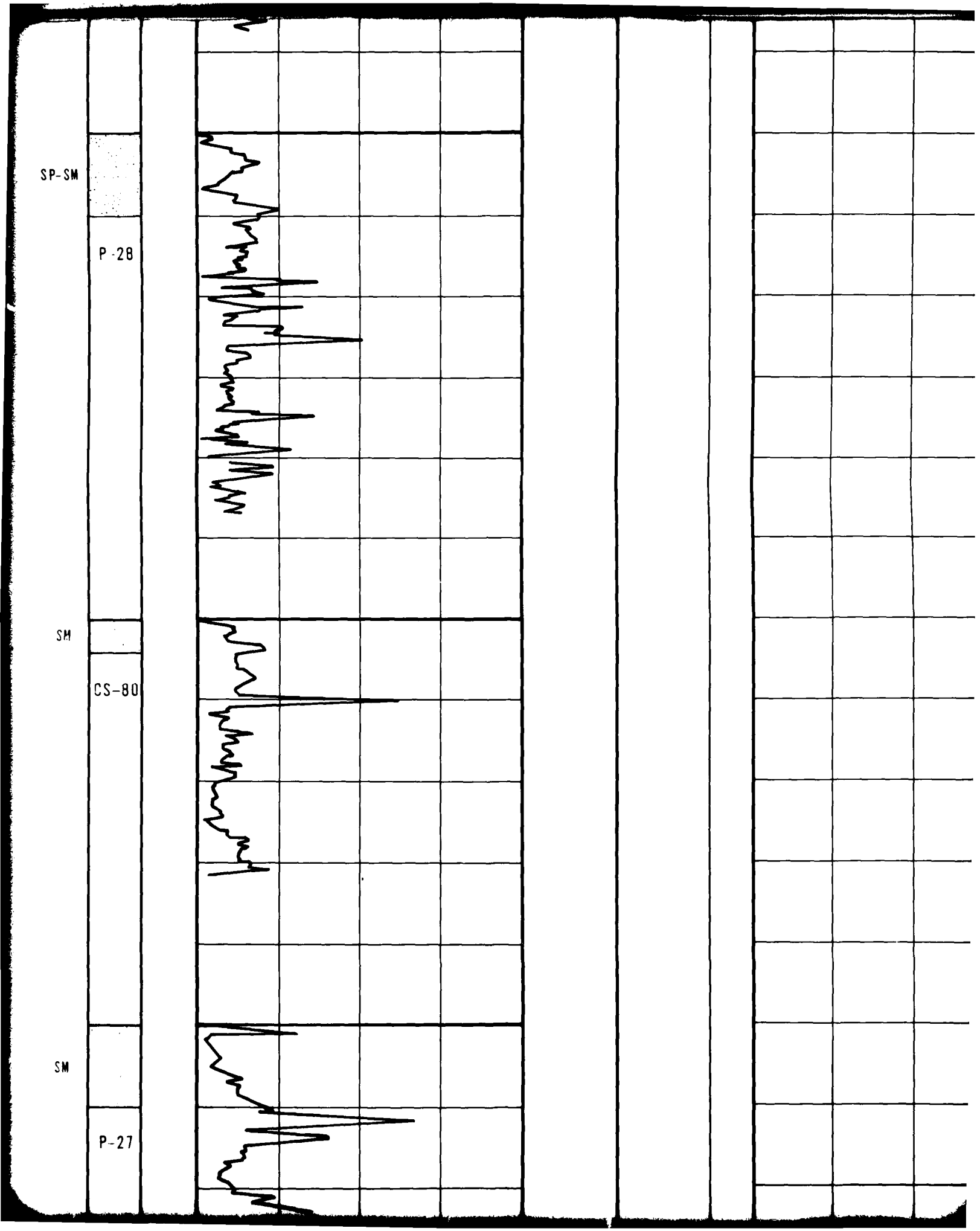


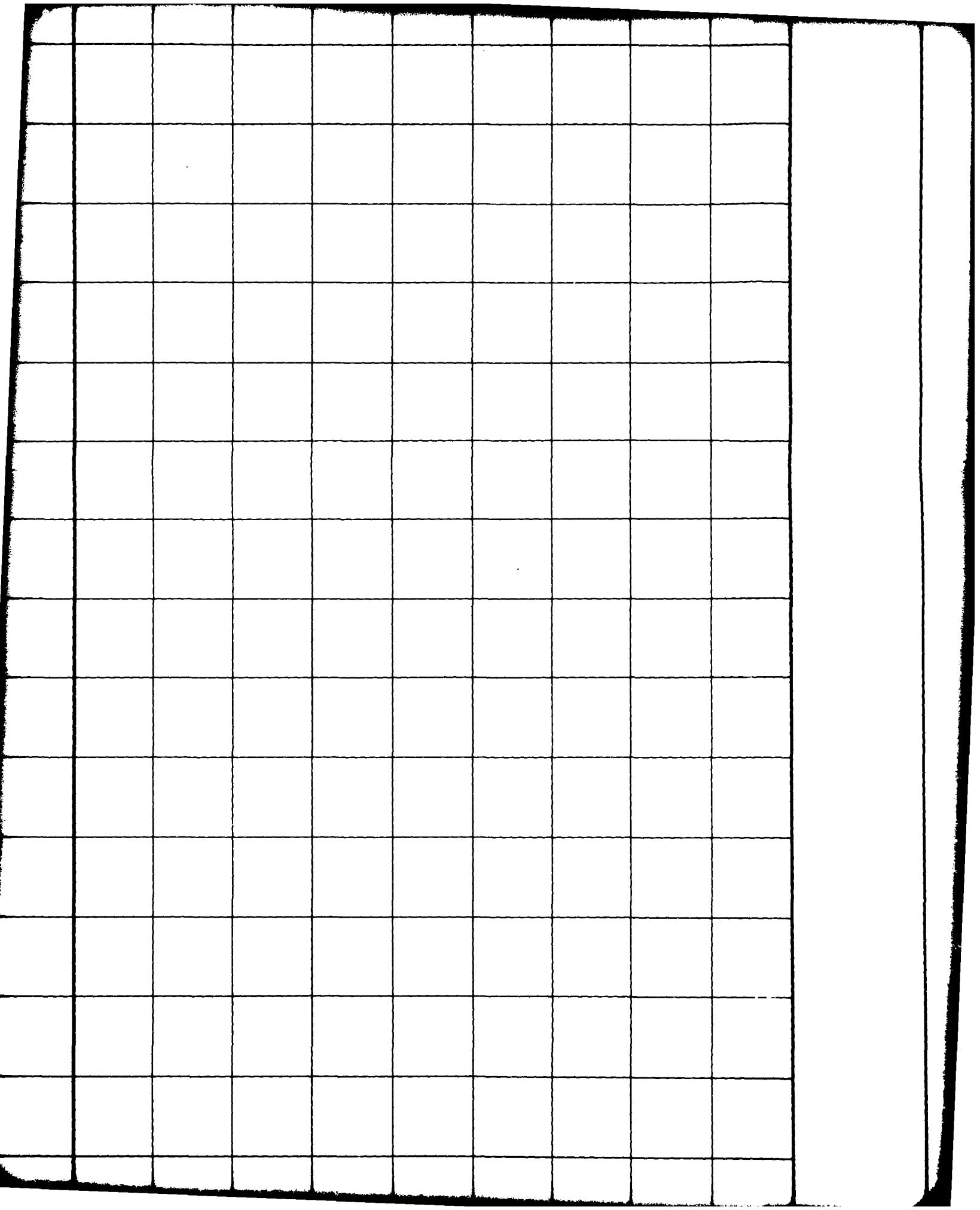

A5y
SM
P-21
(1426m)
A5y
SM
CS-76
SW-SM
(1504m)
A5ı
P-22
(1431m)
A5y
SM
SP
P-29
1
2
3
4
5
6
10
15
20
FRIC

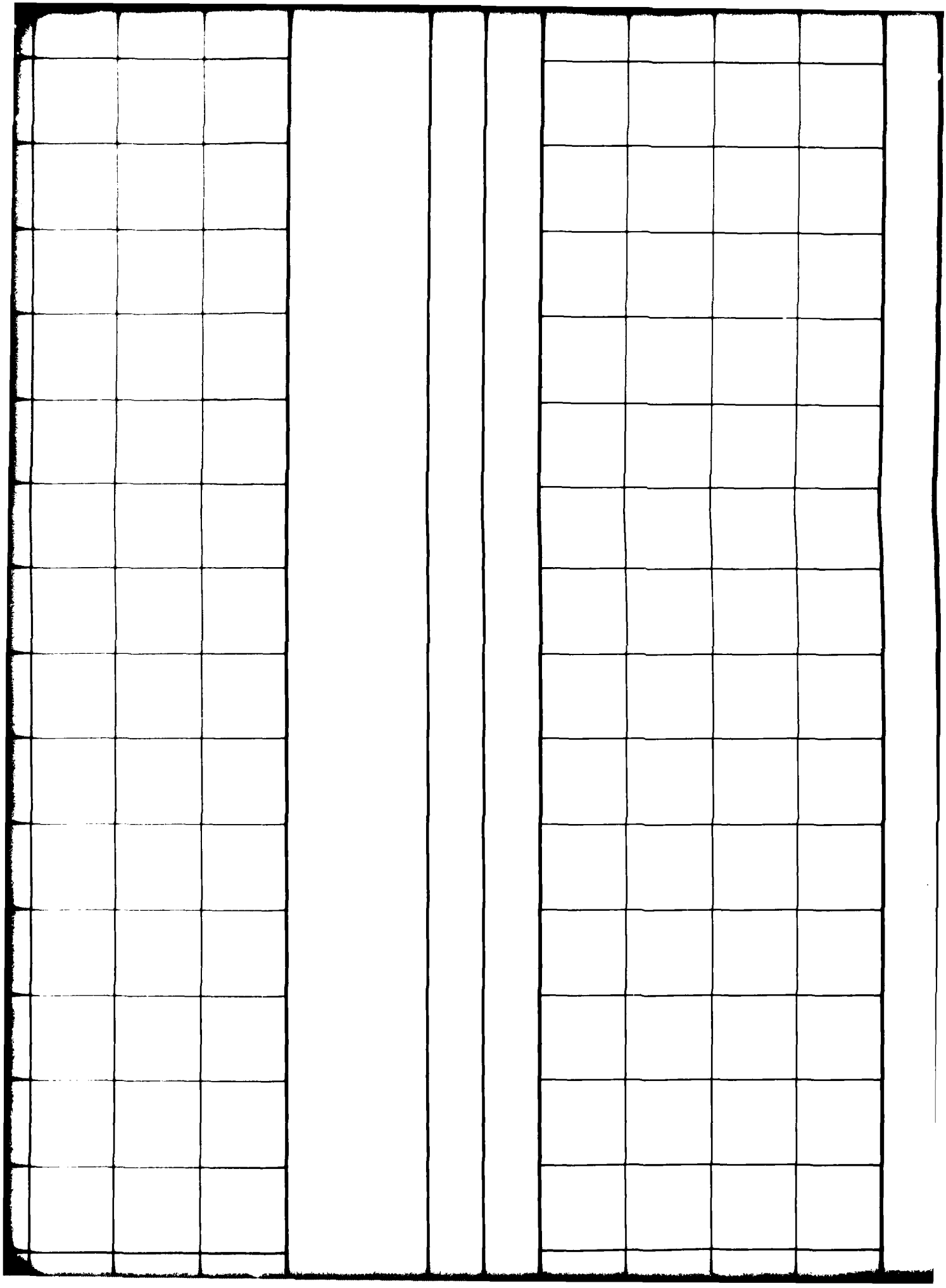


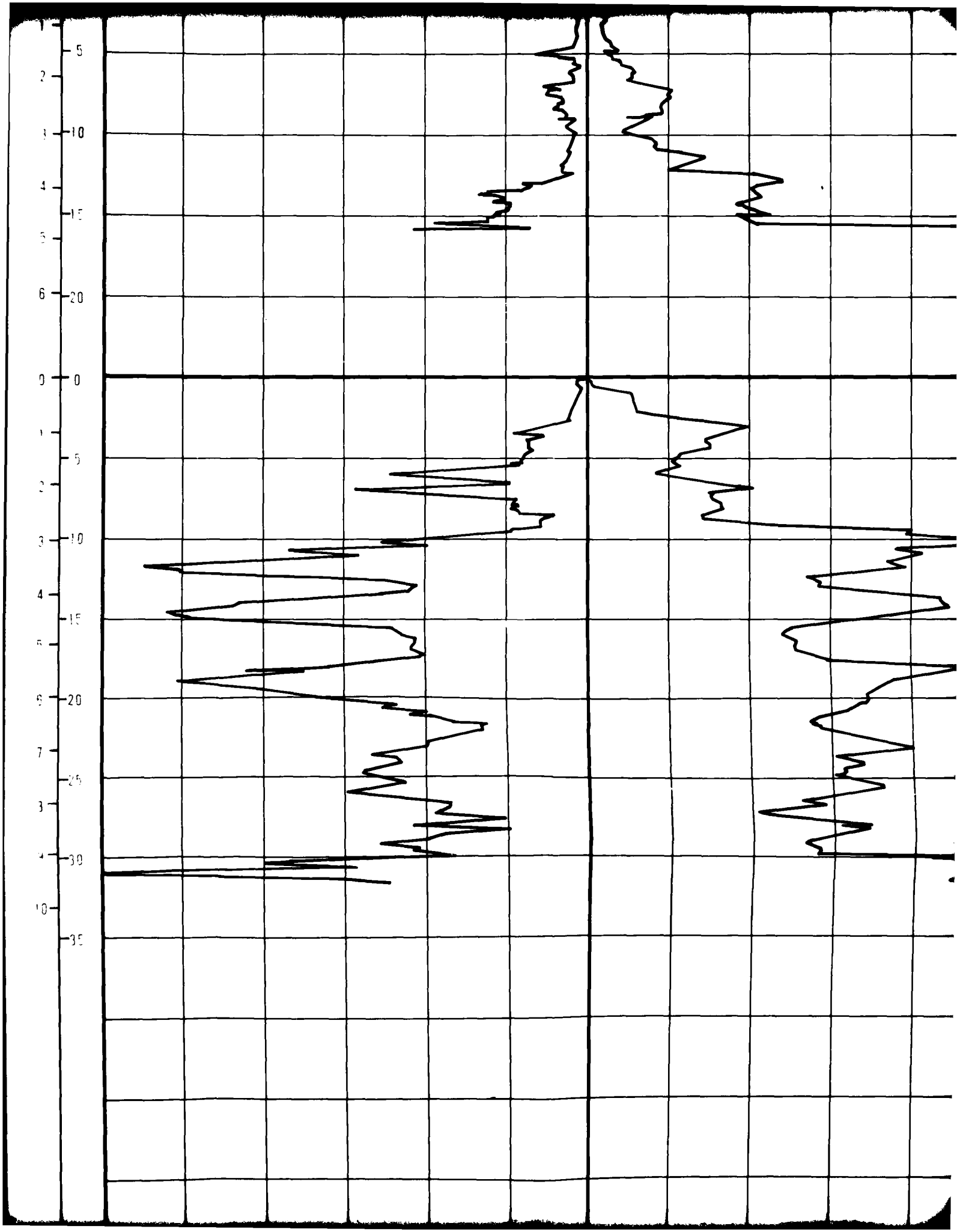
C-84 SURFACE ELEVATION: 4925' (1501m)
SURFICIAL GEOLOGIC UNIT: Af

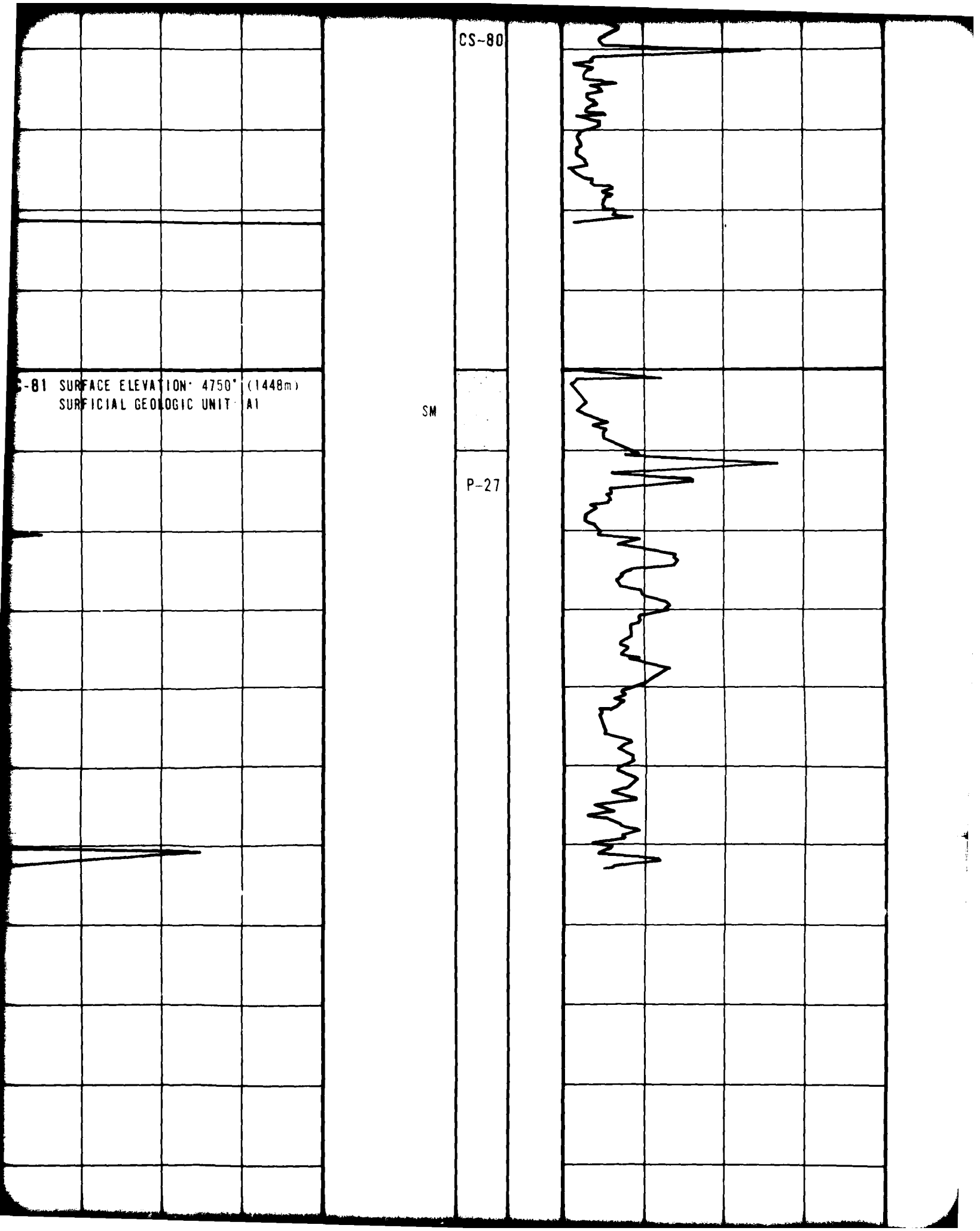


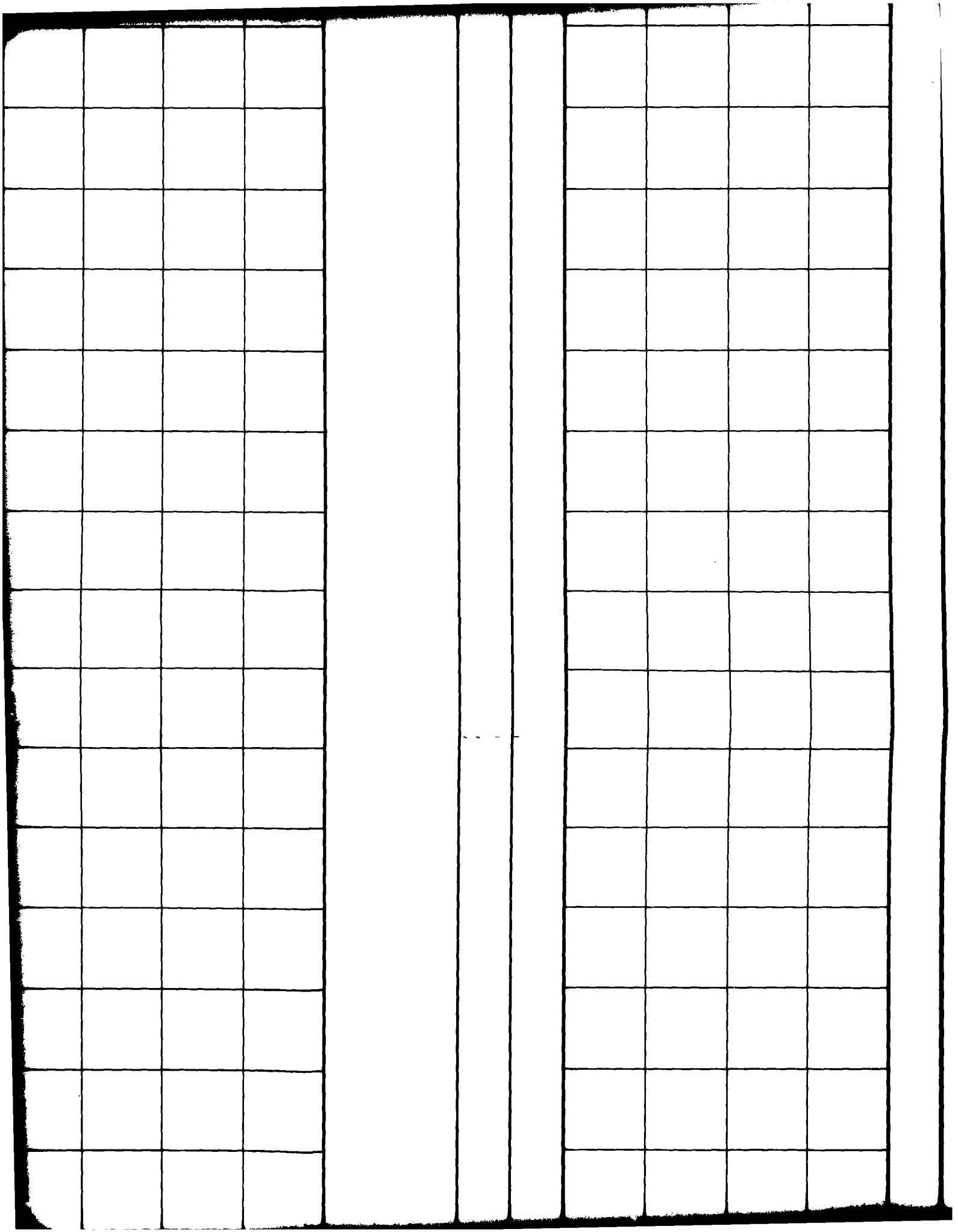

SP-SM
P-28
SM
CS-80
SM
P-27

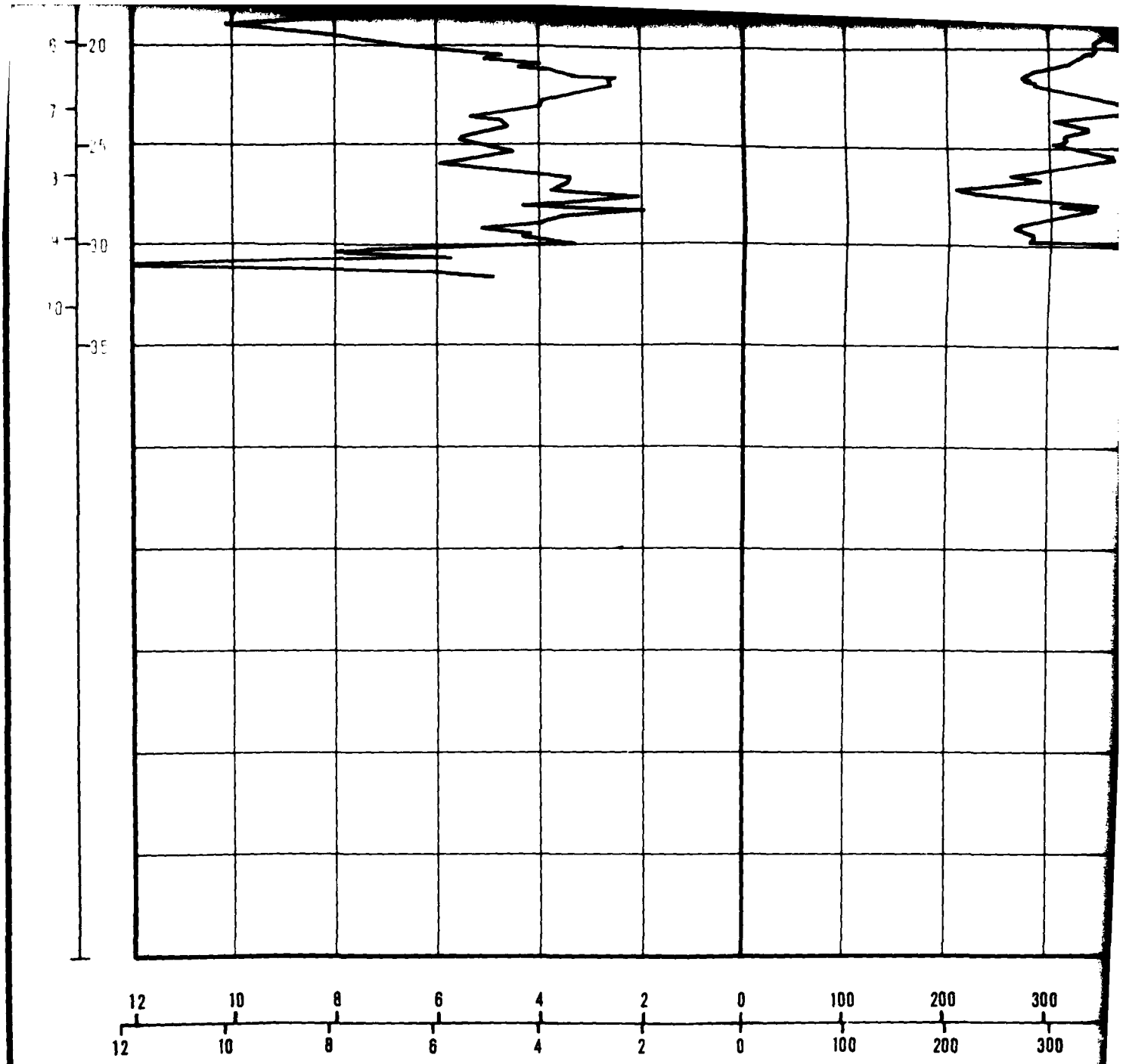


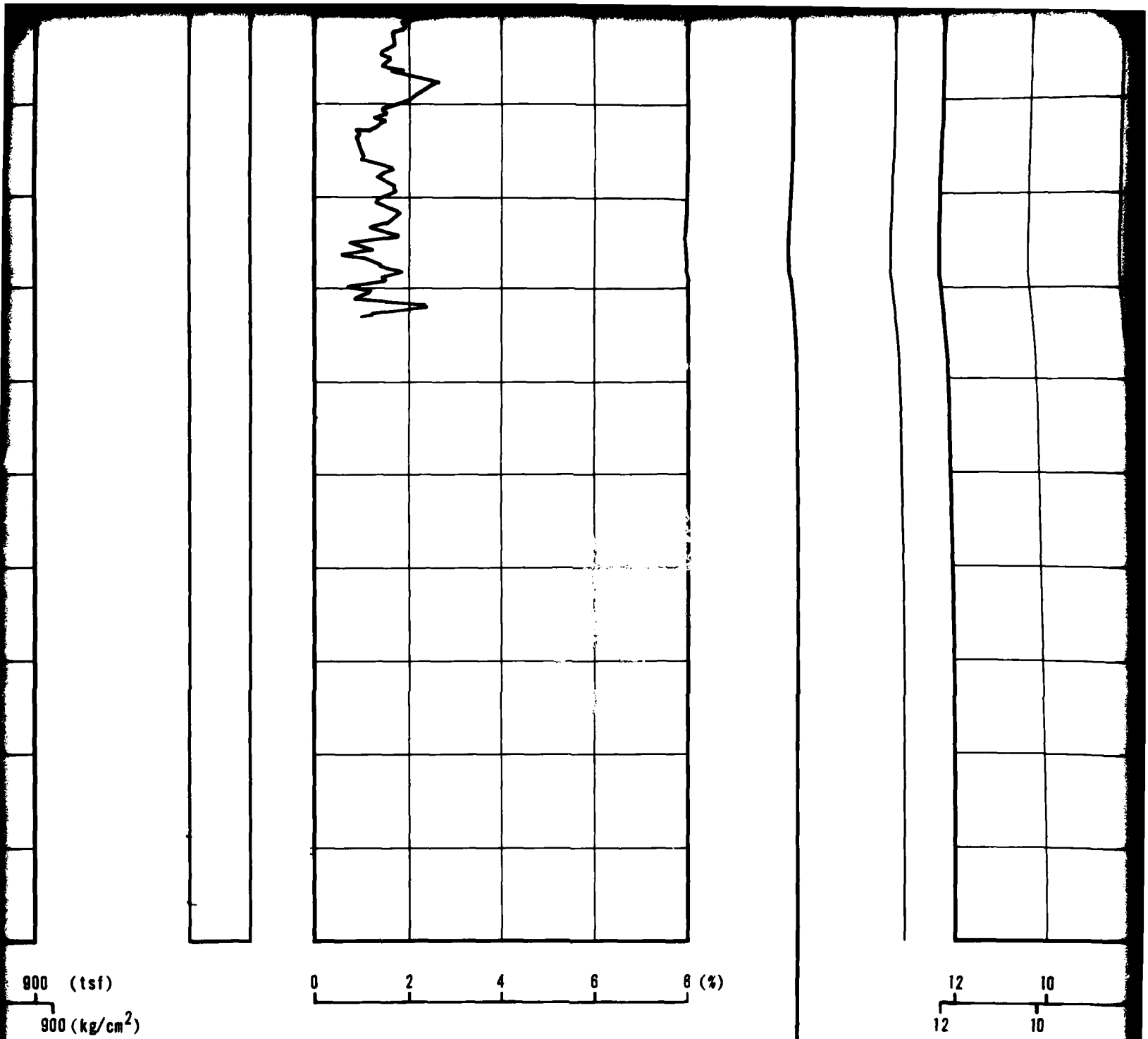


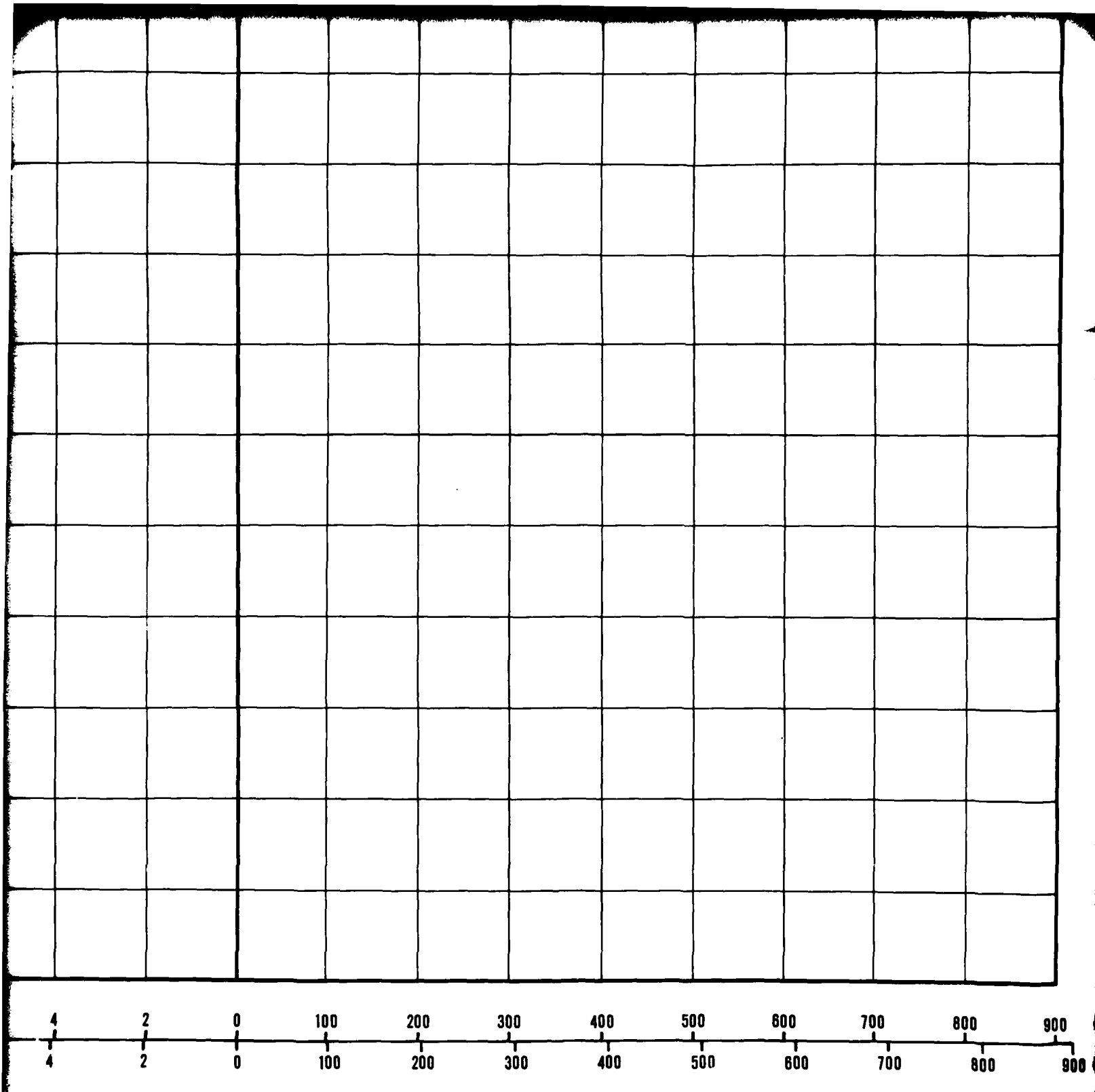



CS-80
-81 SURFACE ELEVATION: 4750' (1448m)
SURFICIAL GEOLOGIC UNIT: A1
SM
P-27



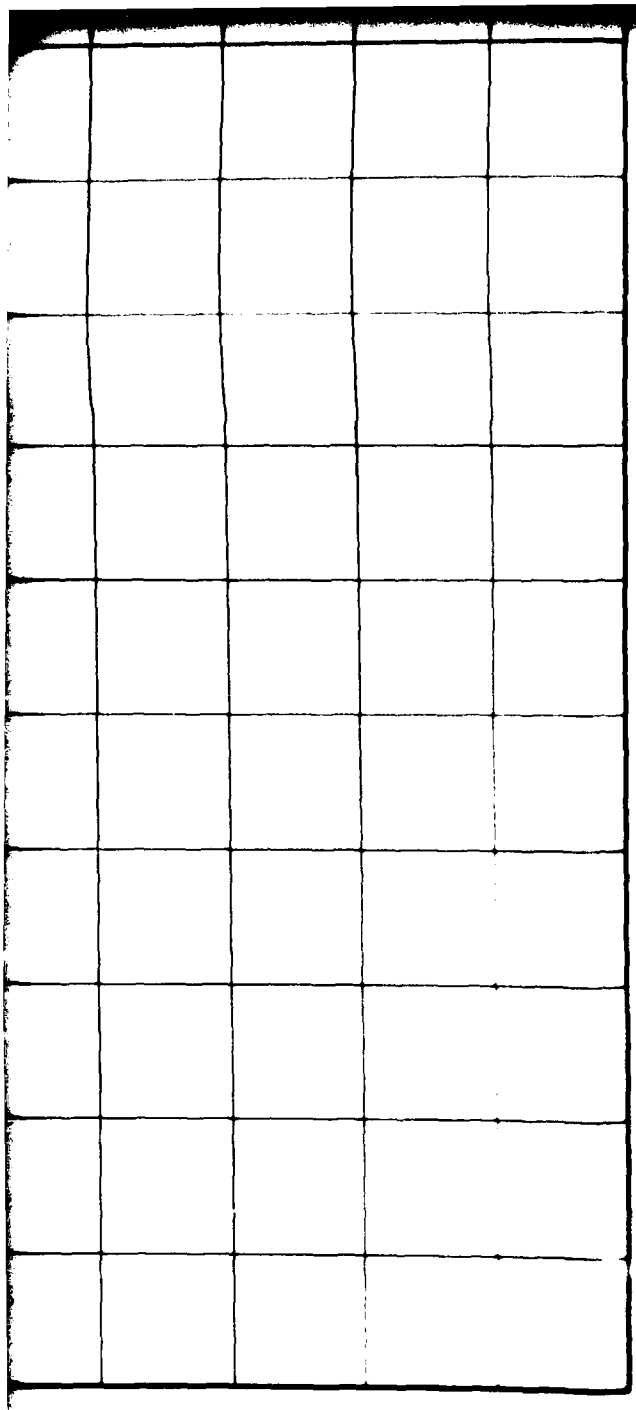

20
30
35
12 10 8 6 4 2 0 100 200 300
12 10 8 6 4 2 0 100 200 300
FRICTION RESISTANCE

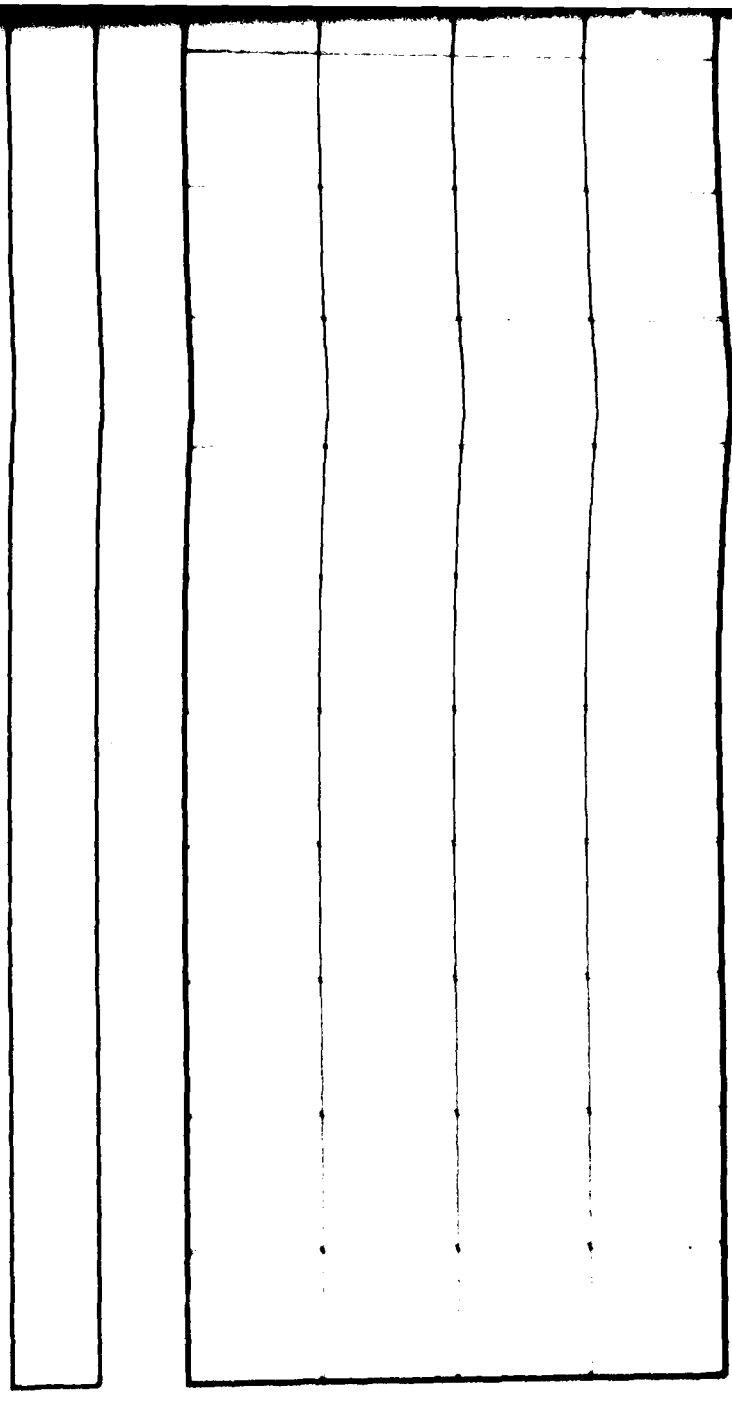

900 (tsf)
900 (kg/cm²)
0 2 4 6 8 (%)
12 10
12 10
FRICTION RATIO



STANCE

CONE RESISTANCE





500 600 700 800

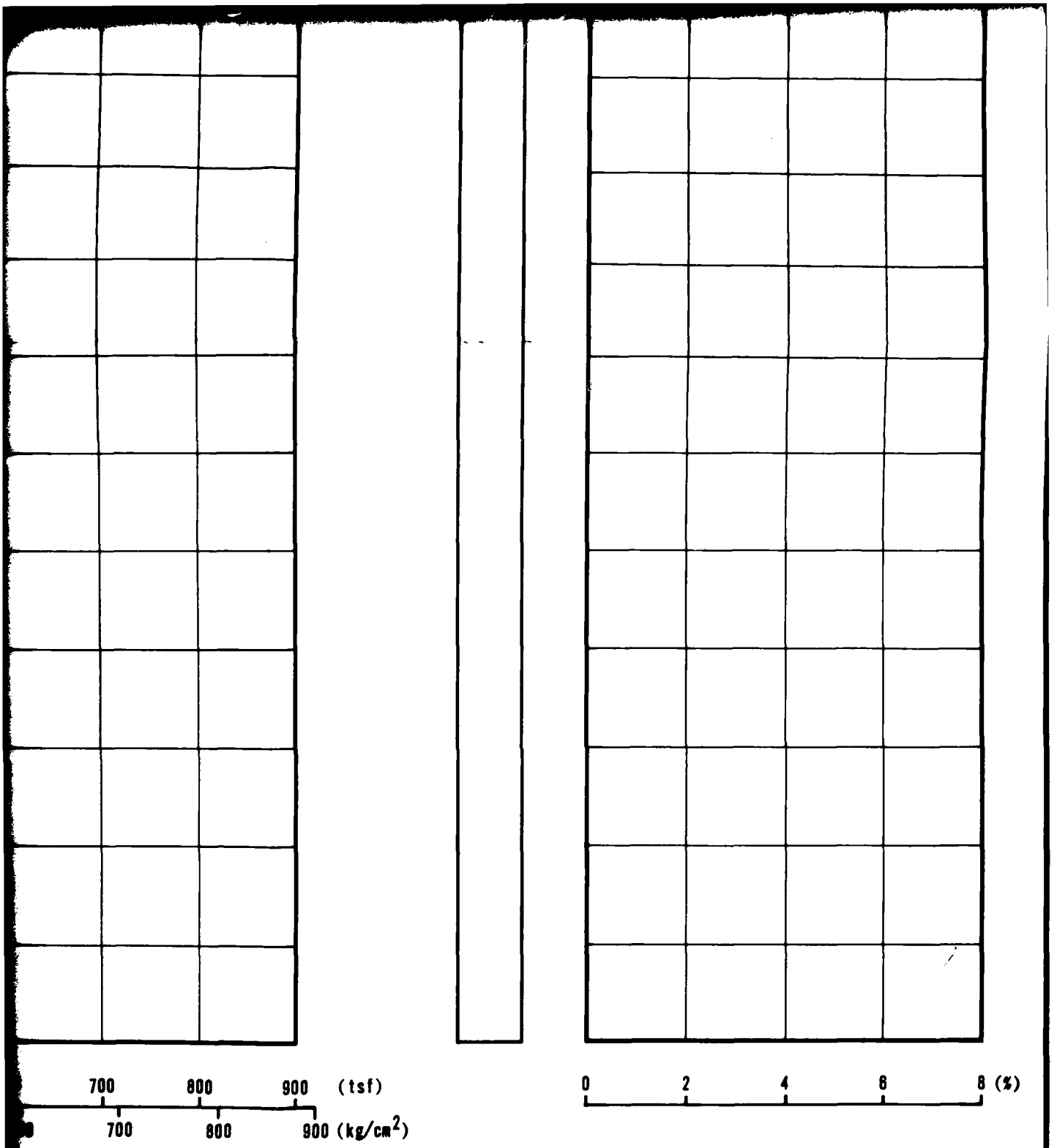
500 600 700 800

ESISTANCE

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

II-8

TURNER NATIONAL INC



CONE PENETROMETER TEST RESULTS
DRY LAKE VALLEY, NEVADA

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

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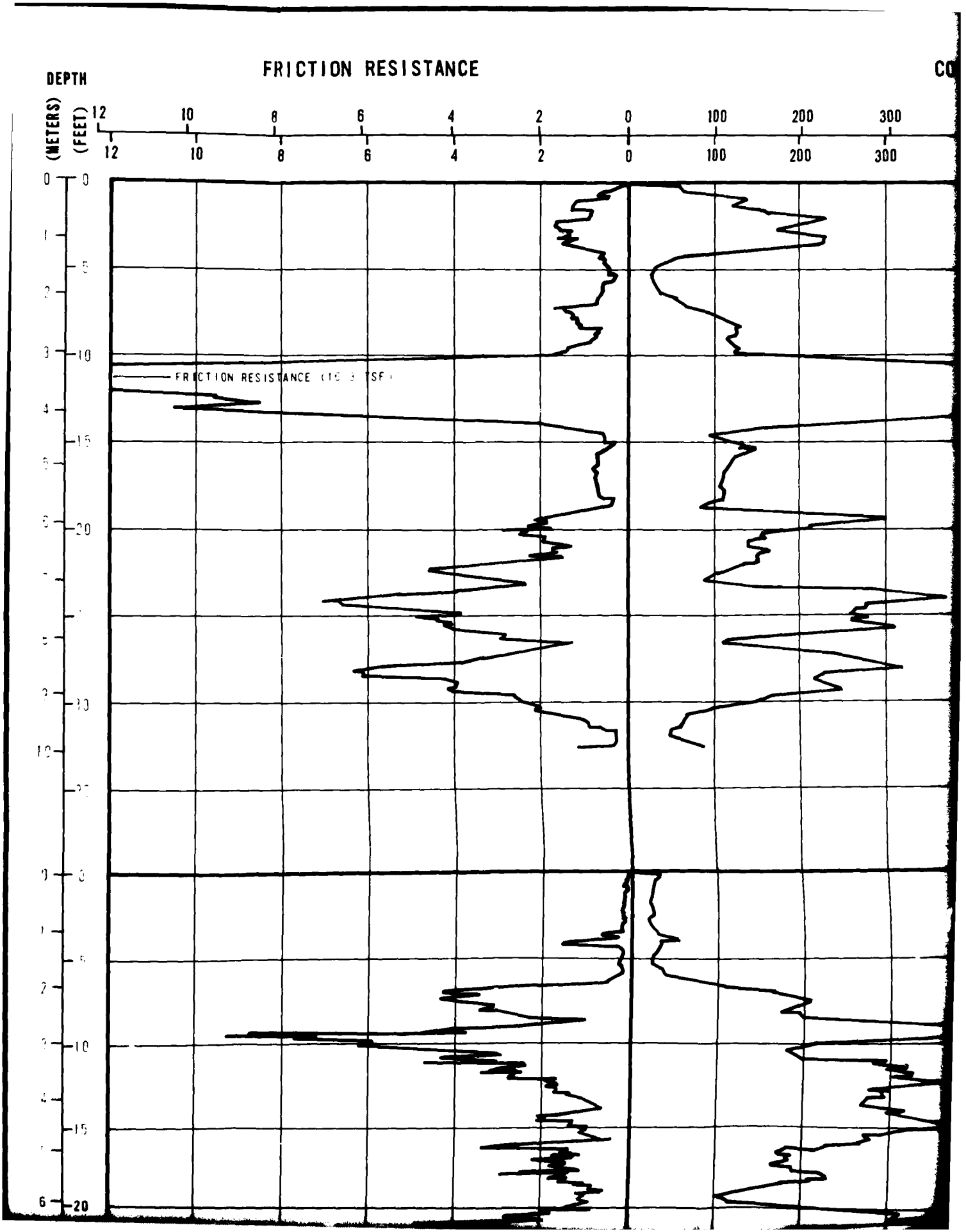
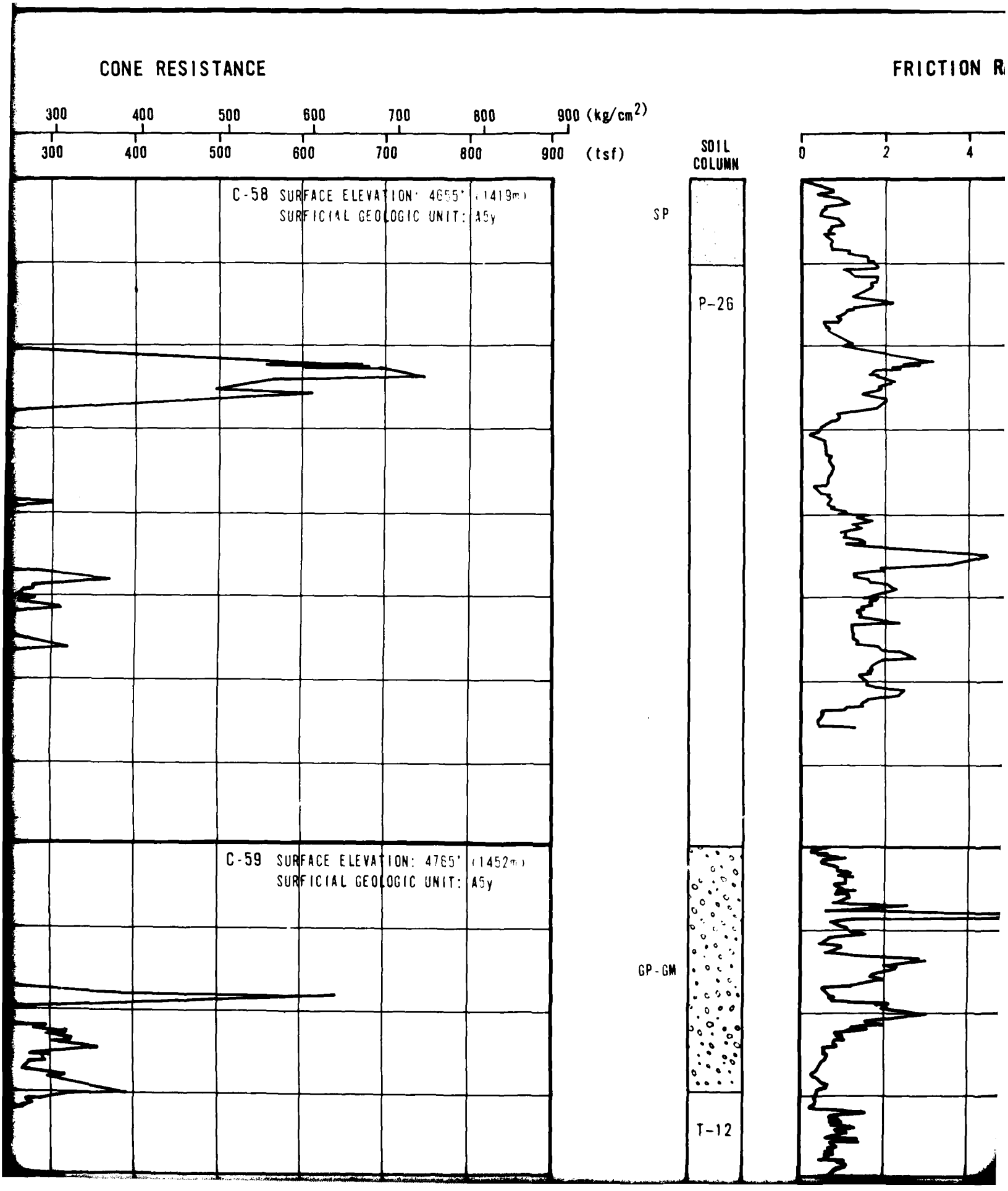
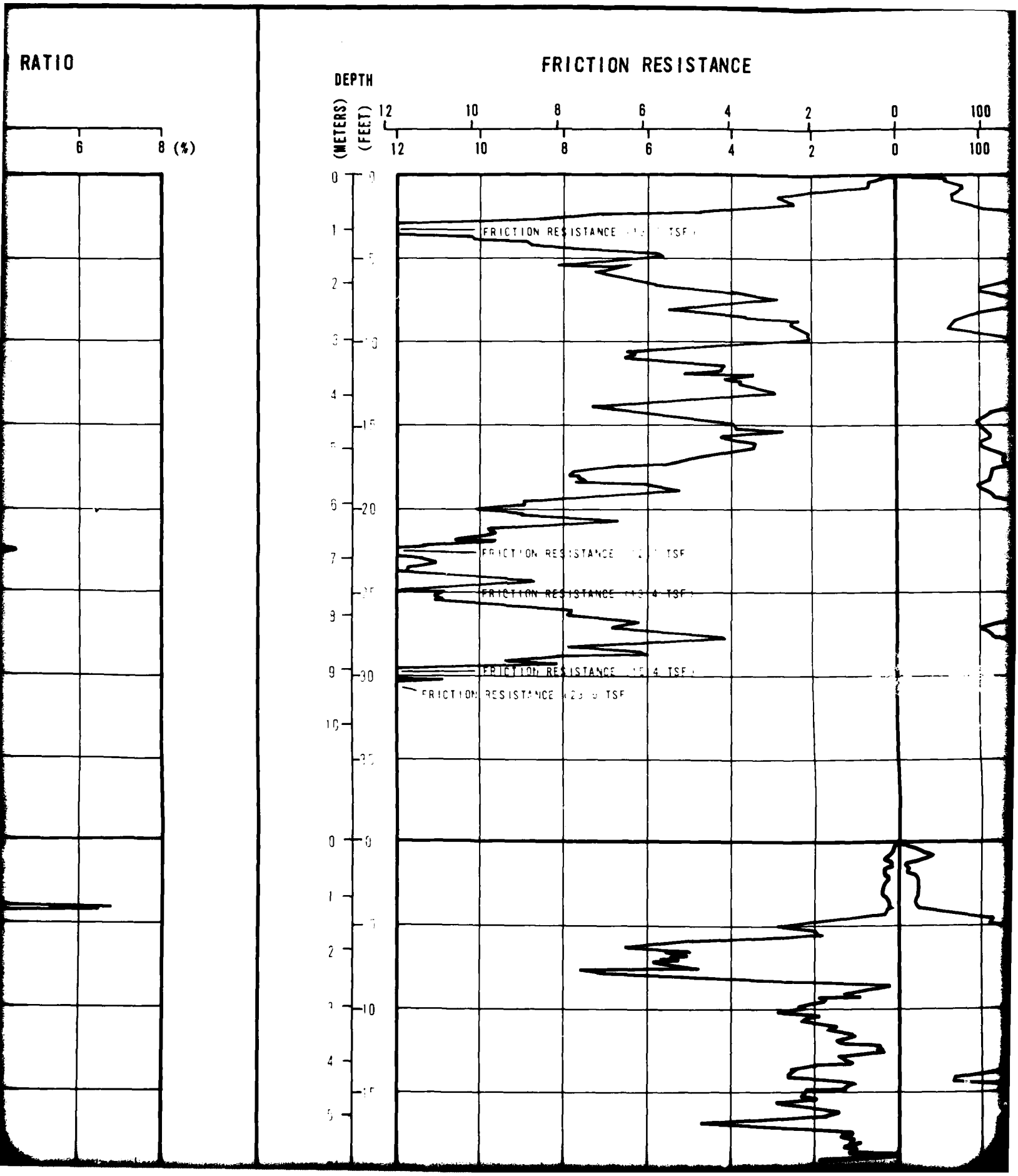
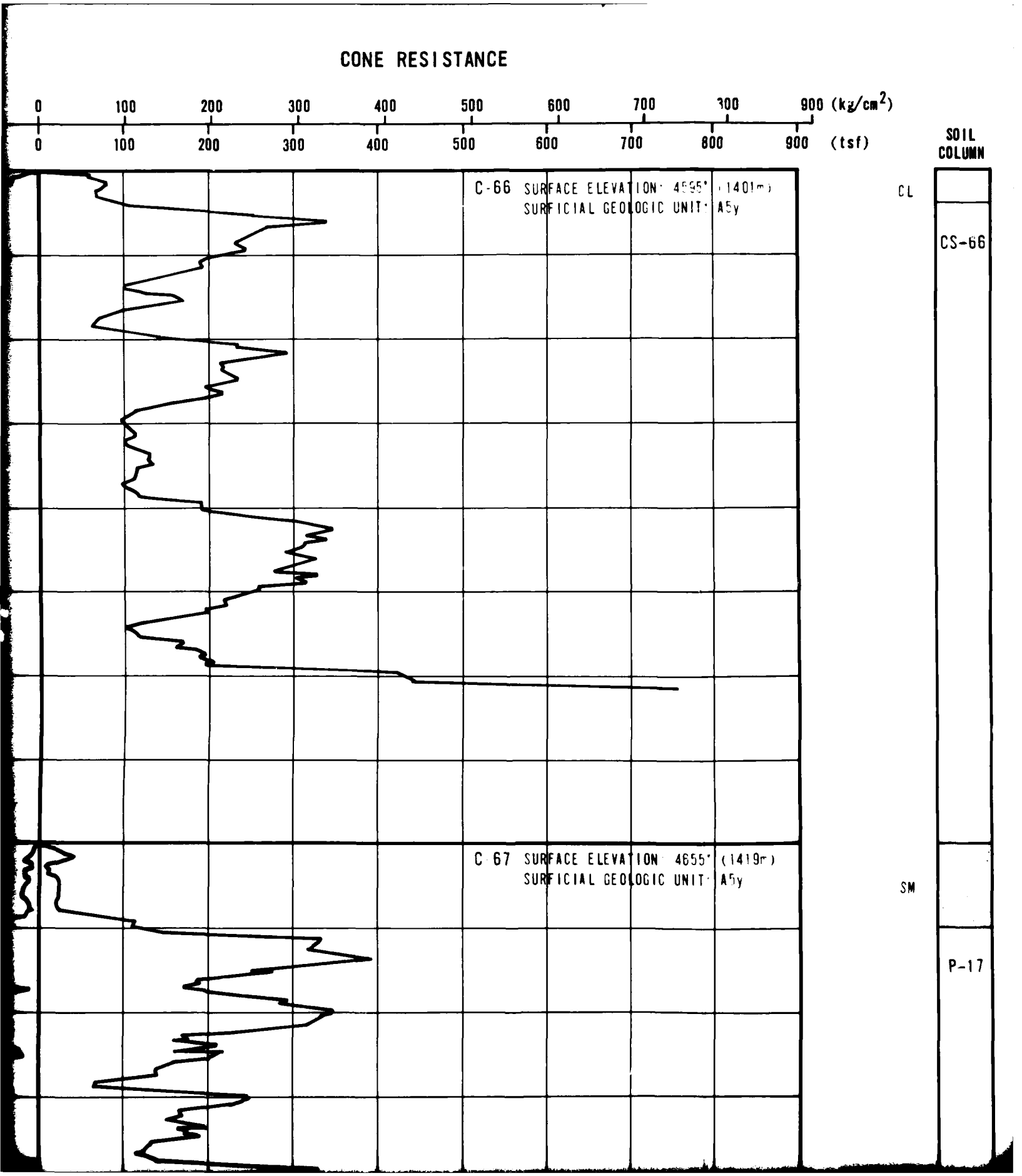
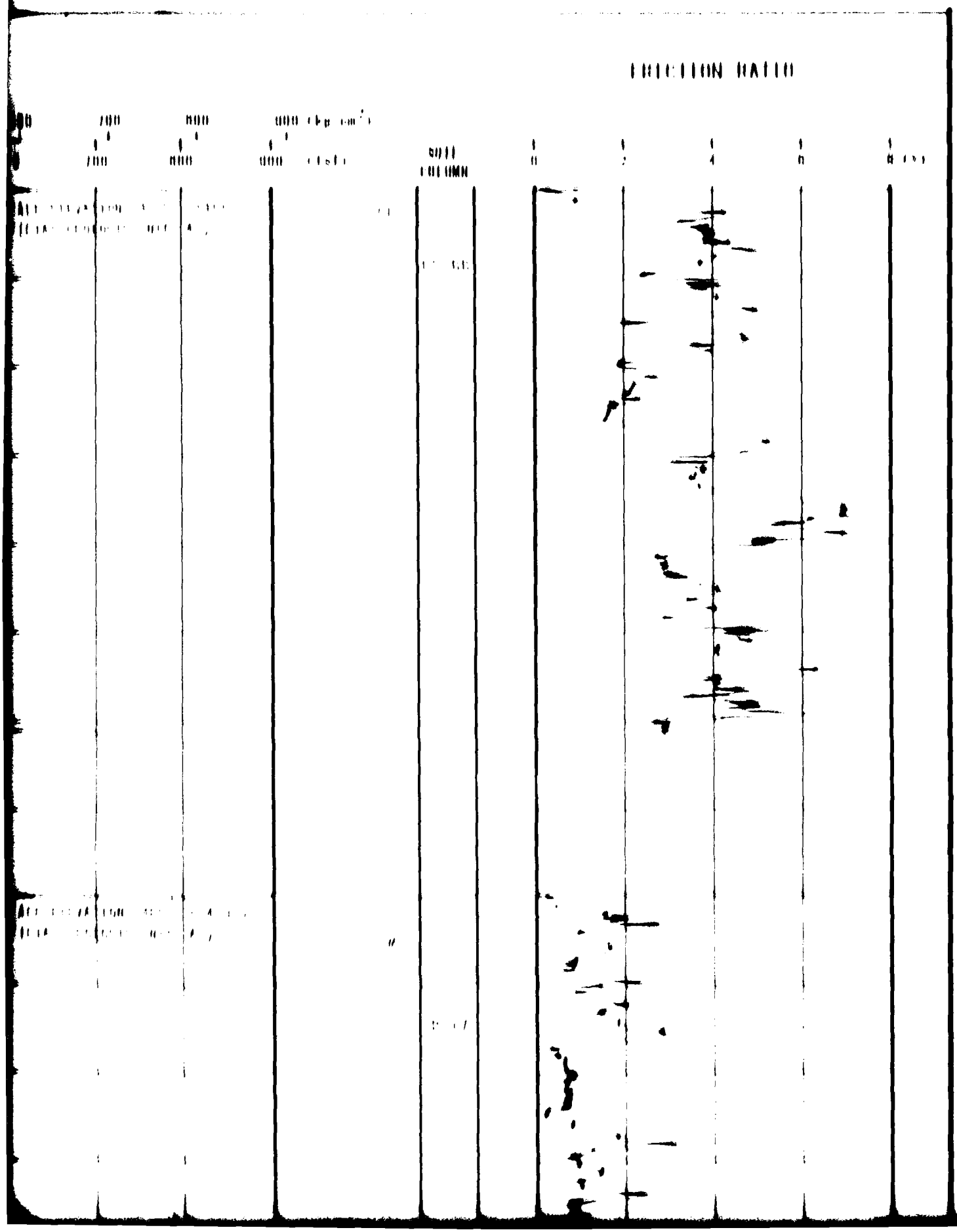
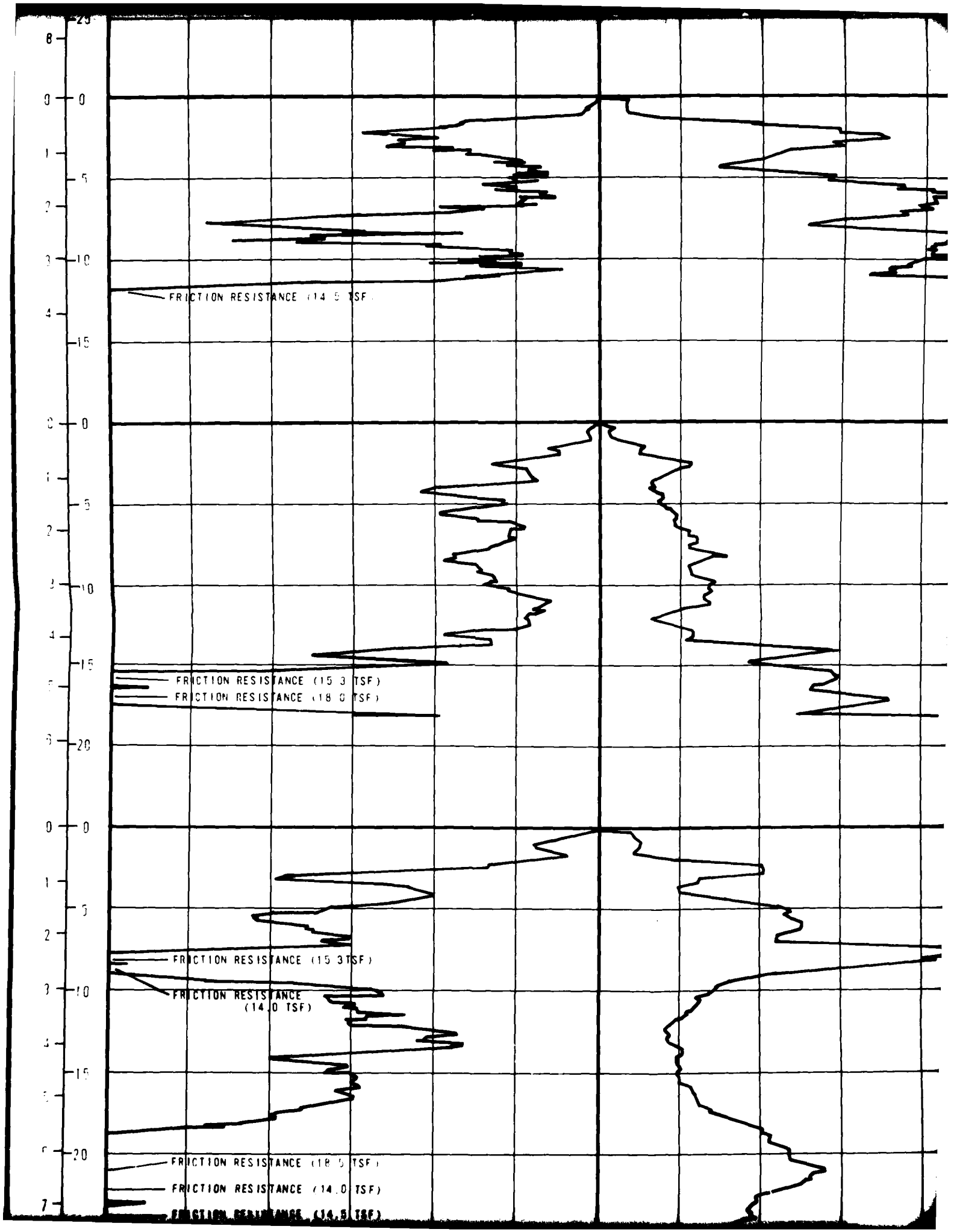

FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
200
300
FRICTION RESISTANCE

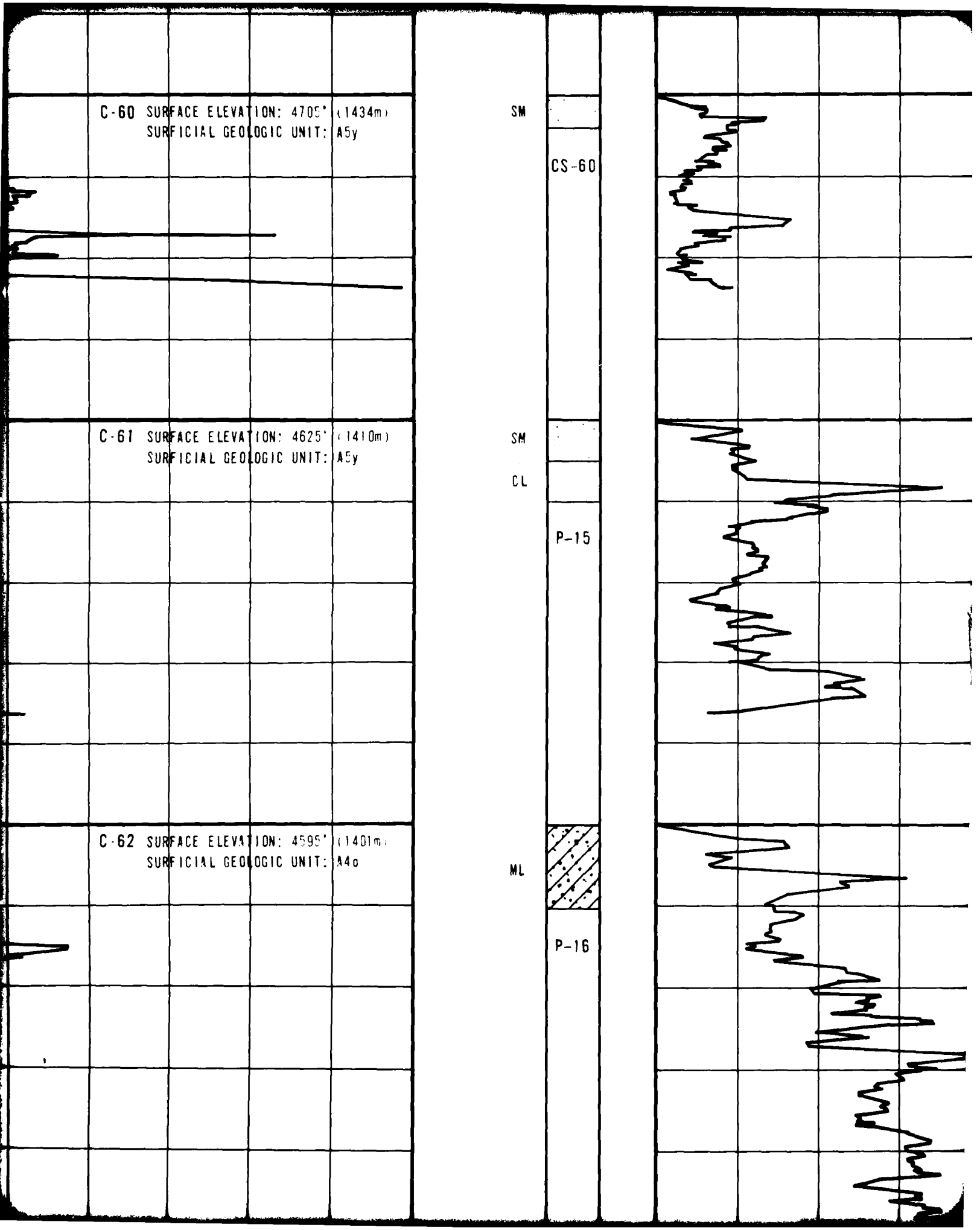

CONE RESISTANCE
FRICTION R
300
400
500
600
700
800
900 (kg/cm2)
300
400
500
600
700
800
900 (tsf)
SOIL COLUMN
0
2
4
C-58 SURFACE ELEVATION: 4655' (1419m)
SURFICIAL GEOLOGIC UNIT: A5y
SP
P-26
C-59 SURFACE ELEVATION: 4765' (1452m)
SURFICIAL GEOLOGIC UNIT: A5y
GP-GM
T-12

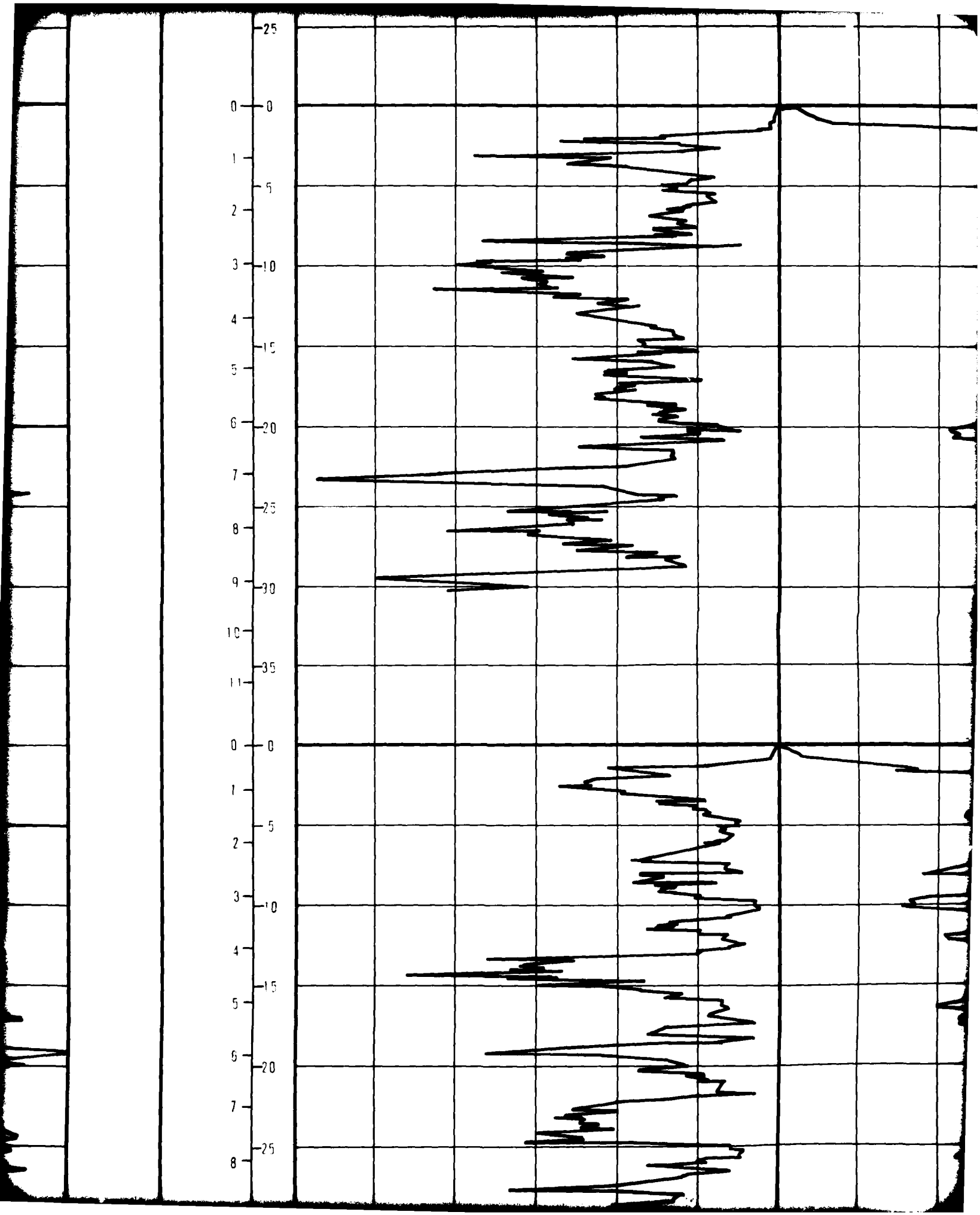

RATIO
6
8 (%)
FRICTION RESISTANCE
DEPTH
(METERS)
(FEET)
12
10
8
6
4
2
0
100
FRICTION RESISTANCE
TSF
FRICTION RESISTANCE
TSF
FRICTION RESISTANCE
TSF
FRICTION RESISTANCE
TSF
FRICTION RESISTANCE
TSF

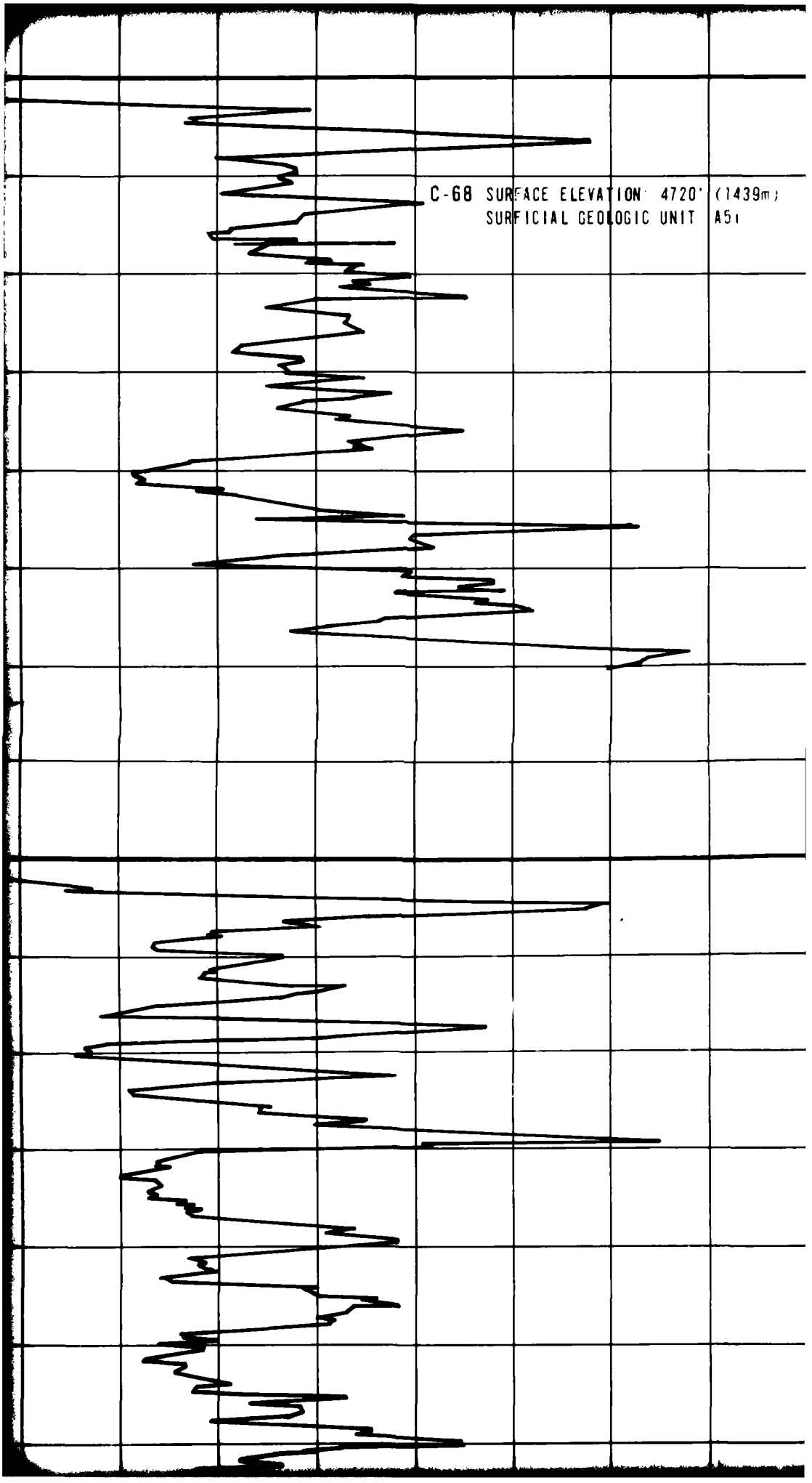

CONE RESISTANCE
0 100 200 300 400 500 600 700 800 900 (kg/cm²)
0 100 200 300 400 500 600 700 800 900 (tsf)
SOIL COLUMN
C-66 SURFACE ELEVATION 4595' (1401m)
SURFICIAL GEOLOGIC UNIT: A5y
CL
CS-66
C-67 SURFACE ELEVATION 4655' (1419m)
SURFICIAL GEOLOGIC UNIT: A5y
SM
P-17

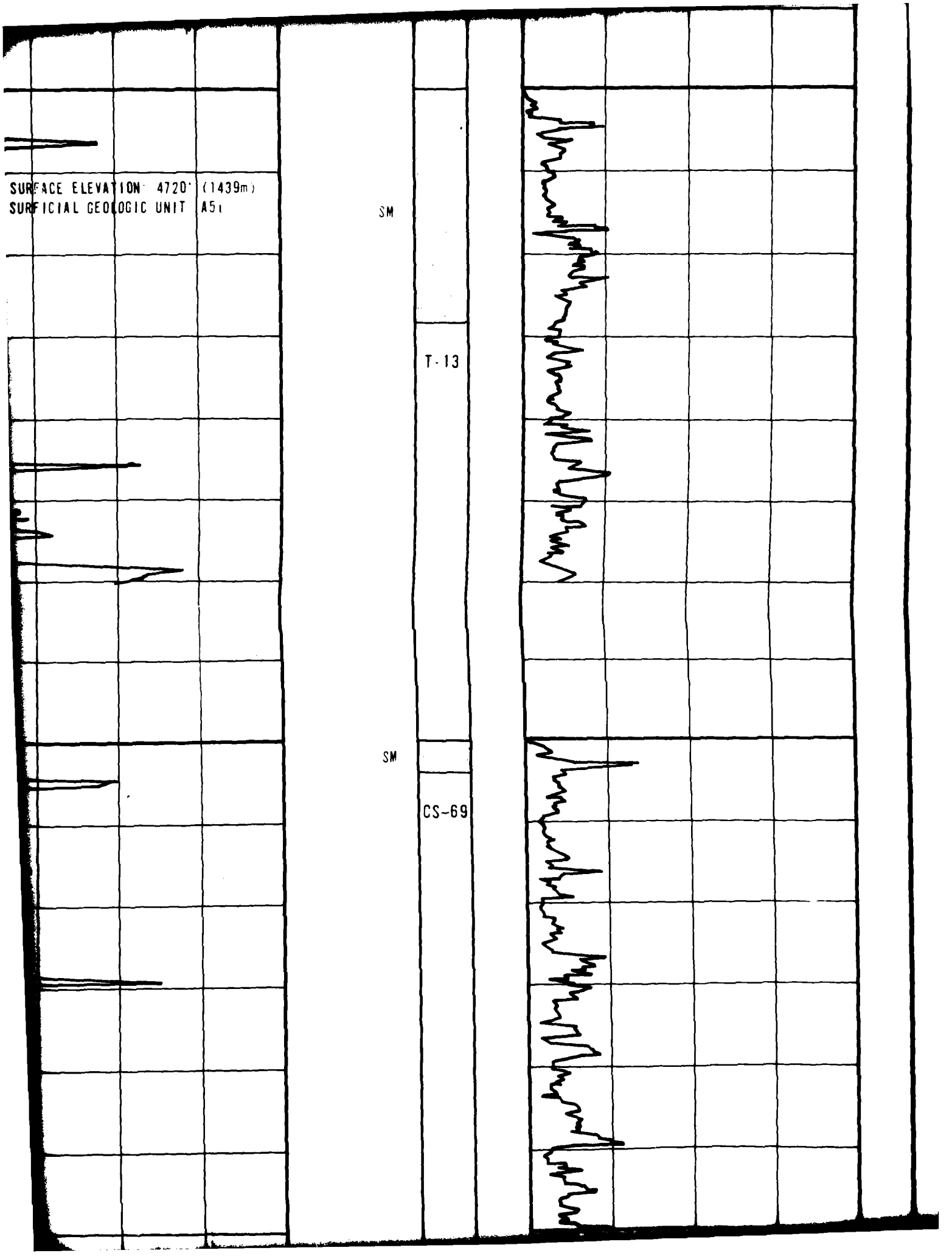

FRICTION RATIO

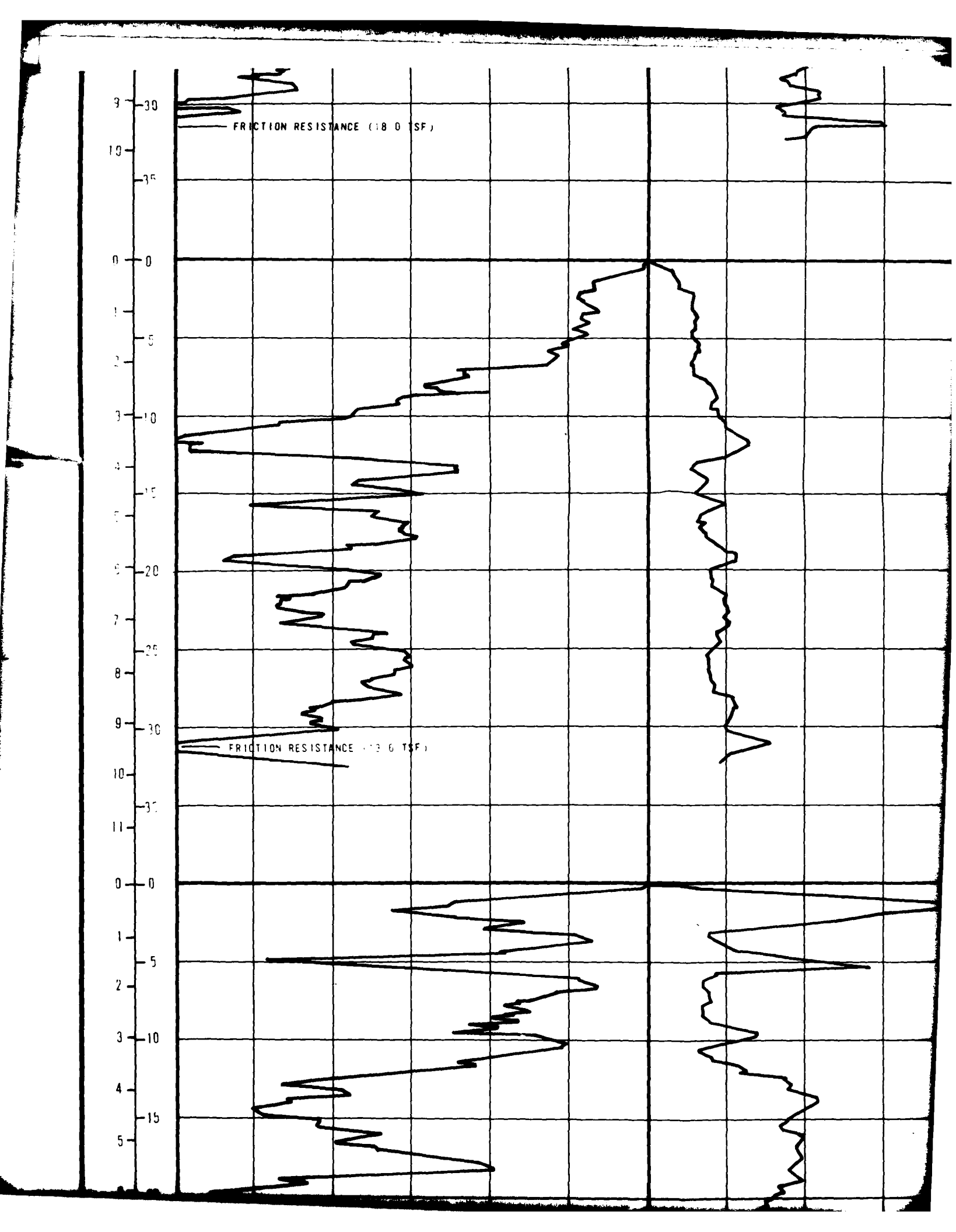

FRICTION RESISTANCE (14.5 TSF)
FRICTION RESISTANCE (15.3 TSF)
FRICTION RESISTANCE (18.0 TSF)
FRICTION RESISTANCE (15.3 TSF)
FRICTION RESISTANCE
(14.0 TSF)
FRICTION RESISTANCE (18.5 TSF)
FRICTION RESISTANCE (14.0 TSF)
FRICTION RESISTANCE (14.5 TSF)

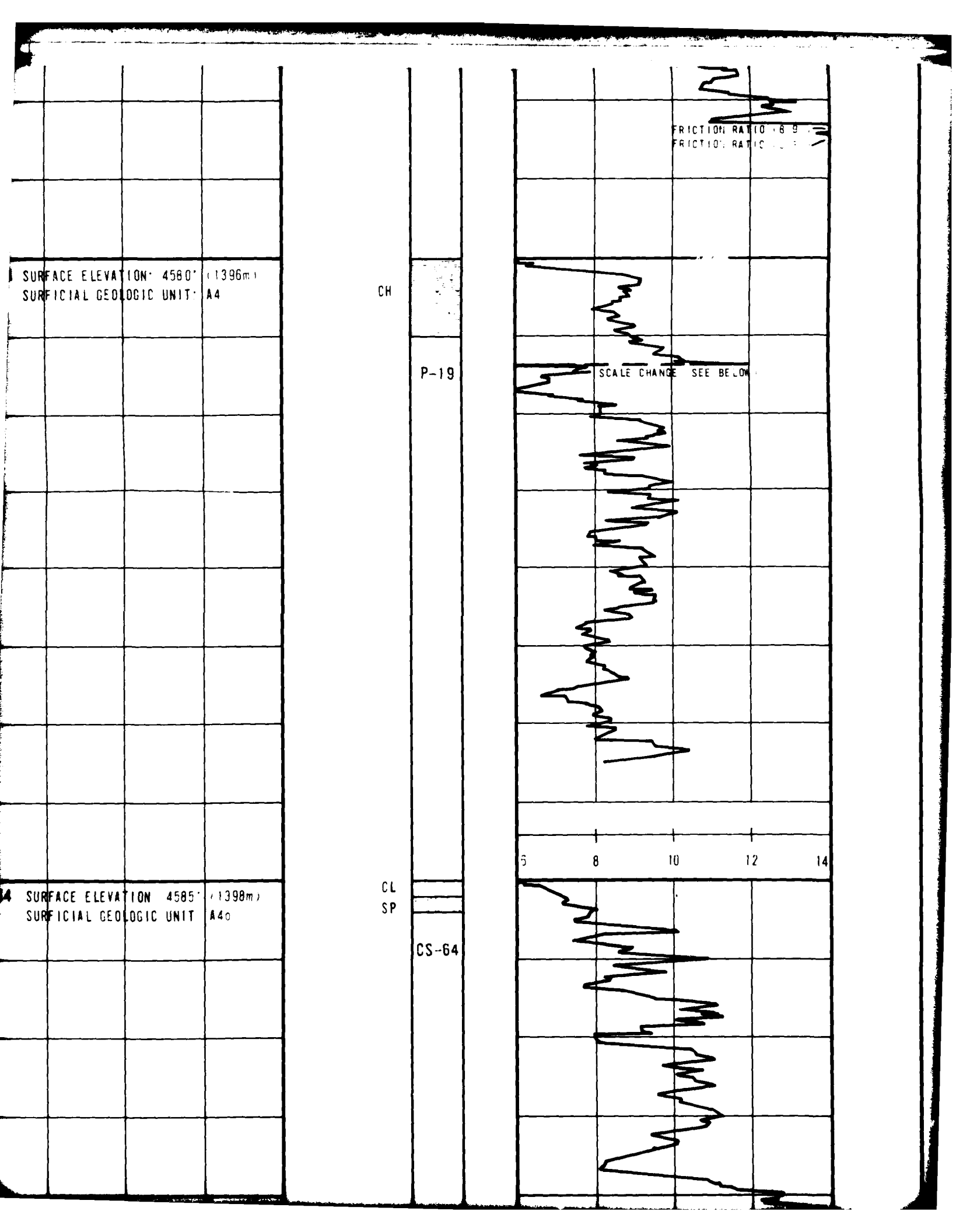

C-60 SURFACE ELEVATION: 4705' (1434m)
SURFICIAL GEOLOGIC UNIT: A5y
SM
CS-60
C-61 SURFACE ELEVATION: 4625' (1410m)
SURFICIAL GEOLOGIC UNIT: A5y
SM
CL
P-15
C-62 SURFACE ELEVATION: 4595' (1401m)
SURFICIAL GEOLOGIC UNIT: A4o
ML
P-16

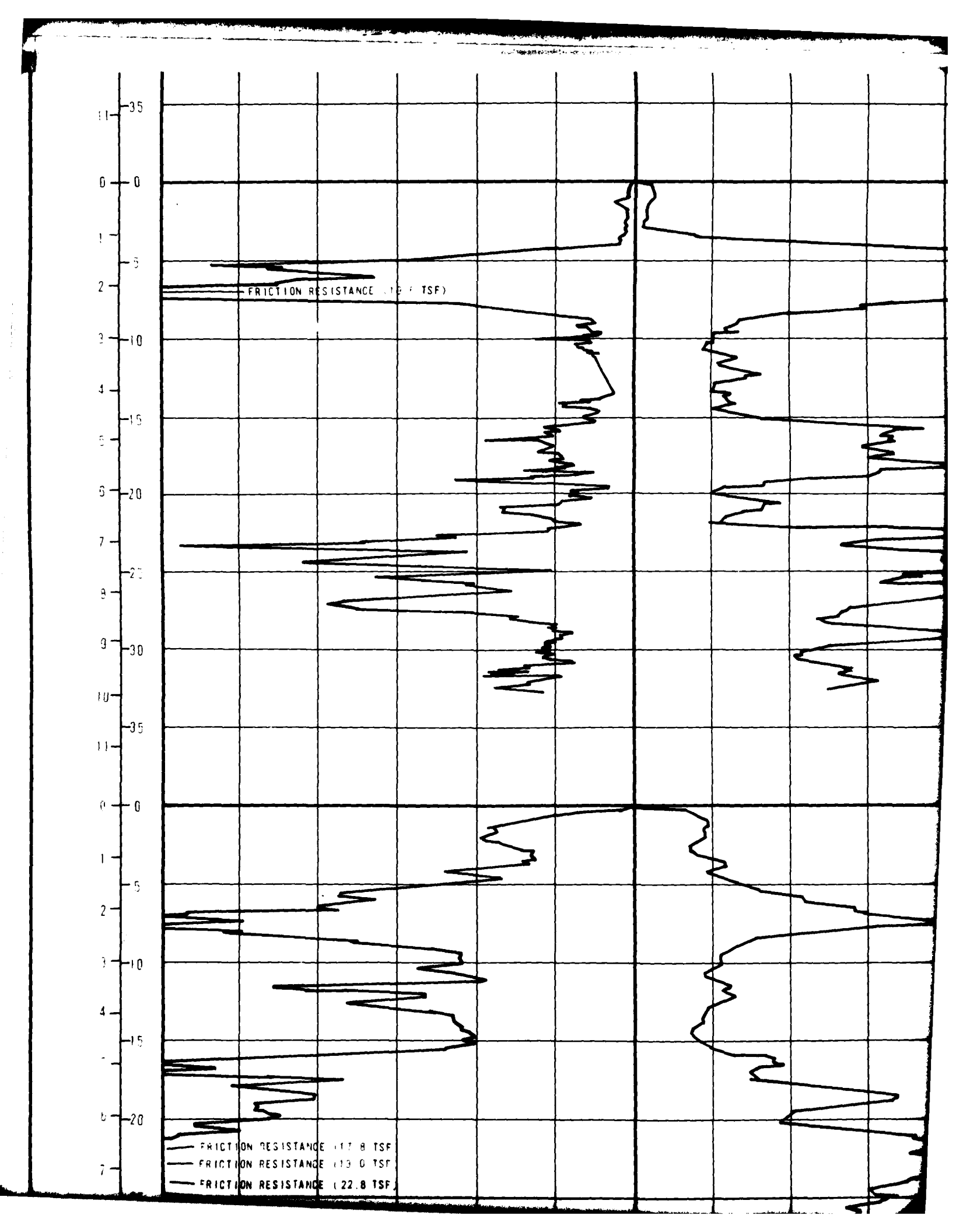

25
0
0
1
5
2
3
10
4
15
5
6
20
7
25
8
9
30
10
35
11
0
0
1
5
2
3
10
4
15
5
6
20
7
25
8

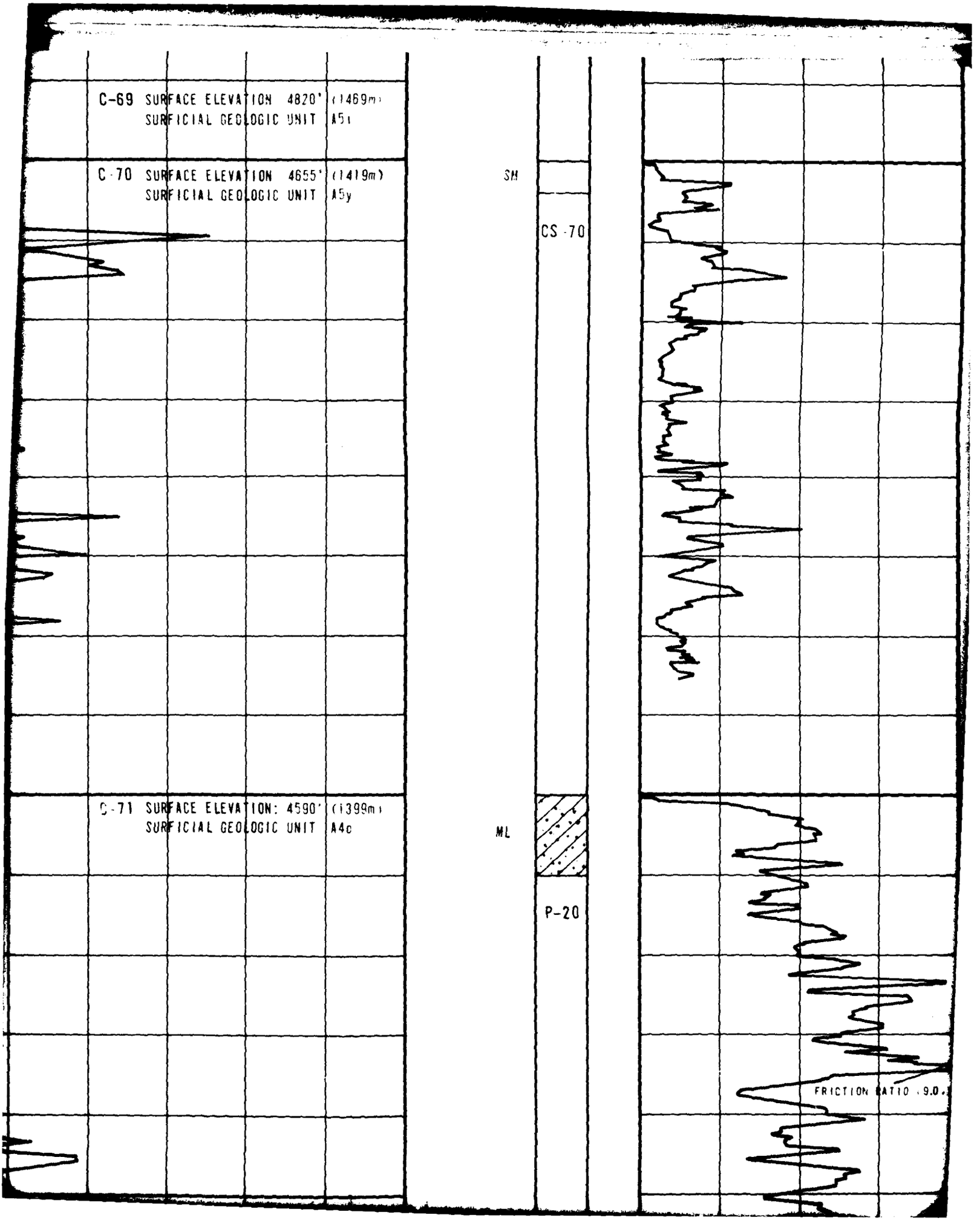

C-68 SURFACE ELEVATION 4720' (1439m)
SURFICIAL GEOLOGIC UNIT A5ı

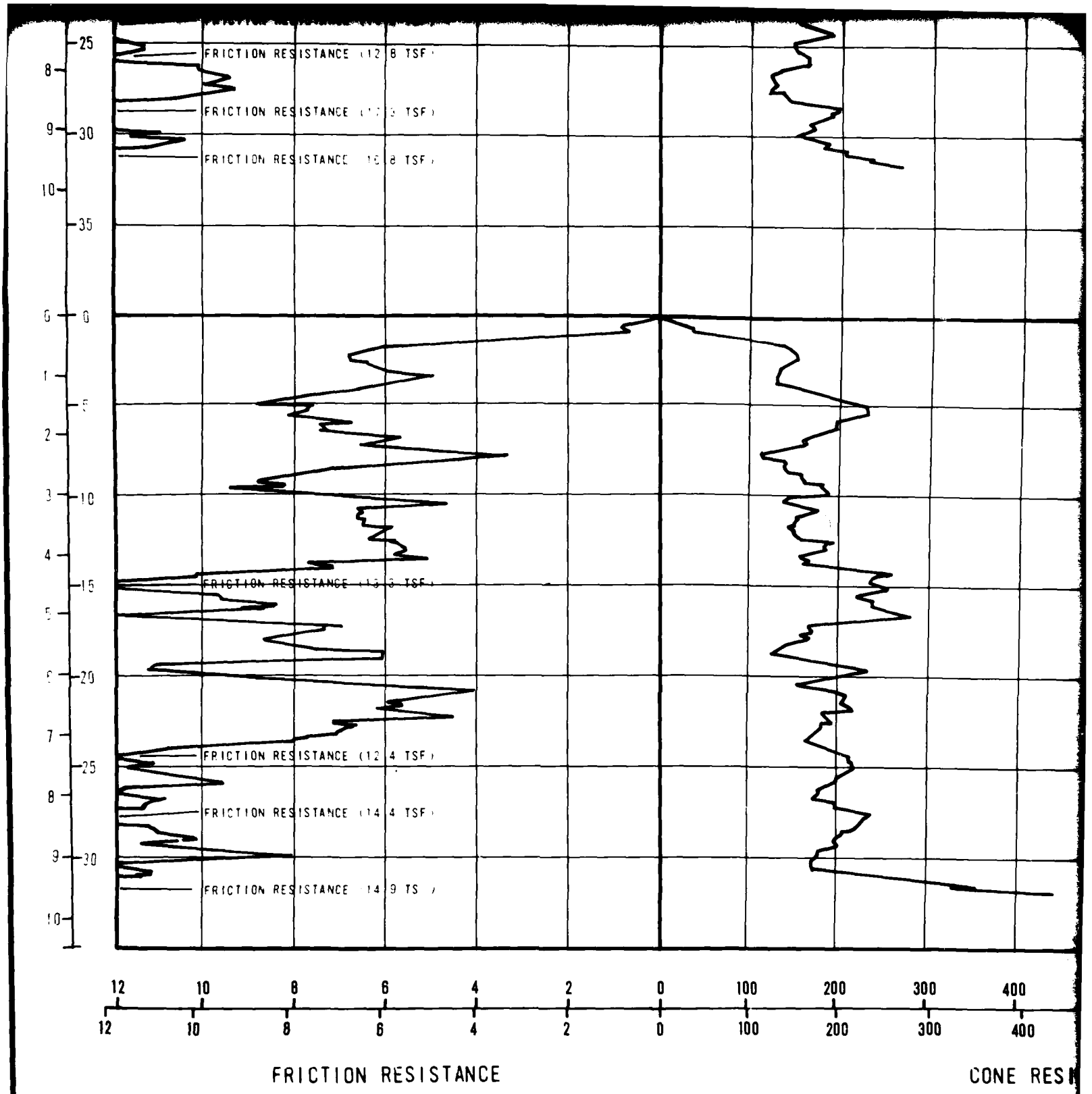

SURFACE ELEVATION 4720' (1439m)
SURFICIAL GEOLOGIC UNIT A5t
SM
T-13
SM
CS-69

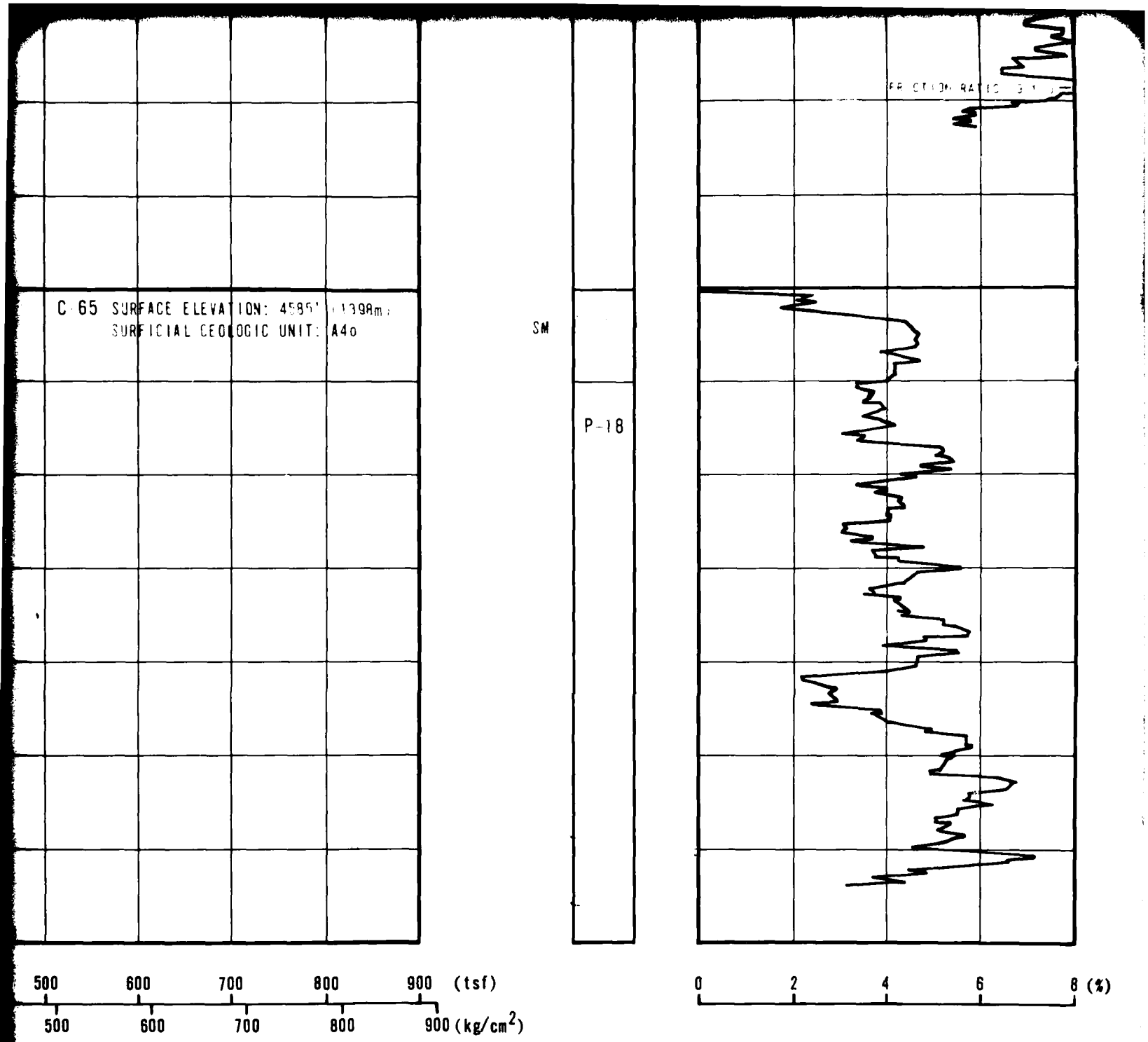

FRICTION RESISTANCE (18.0 TSF)
FRICTION RESISTANCE (13.6 TSF)

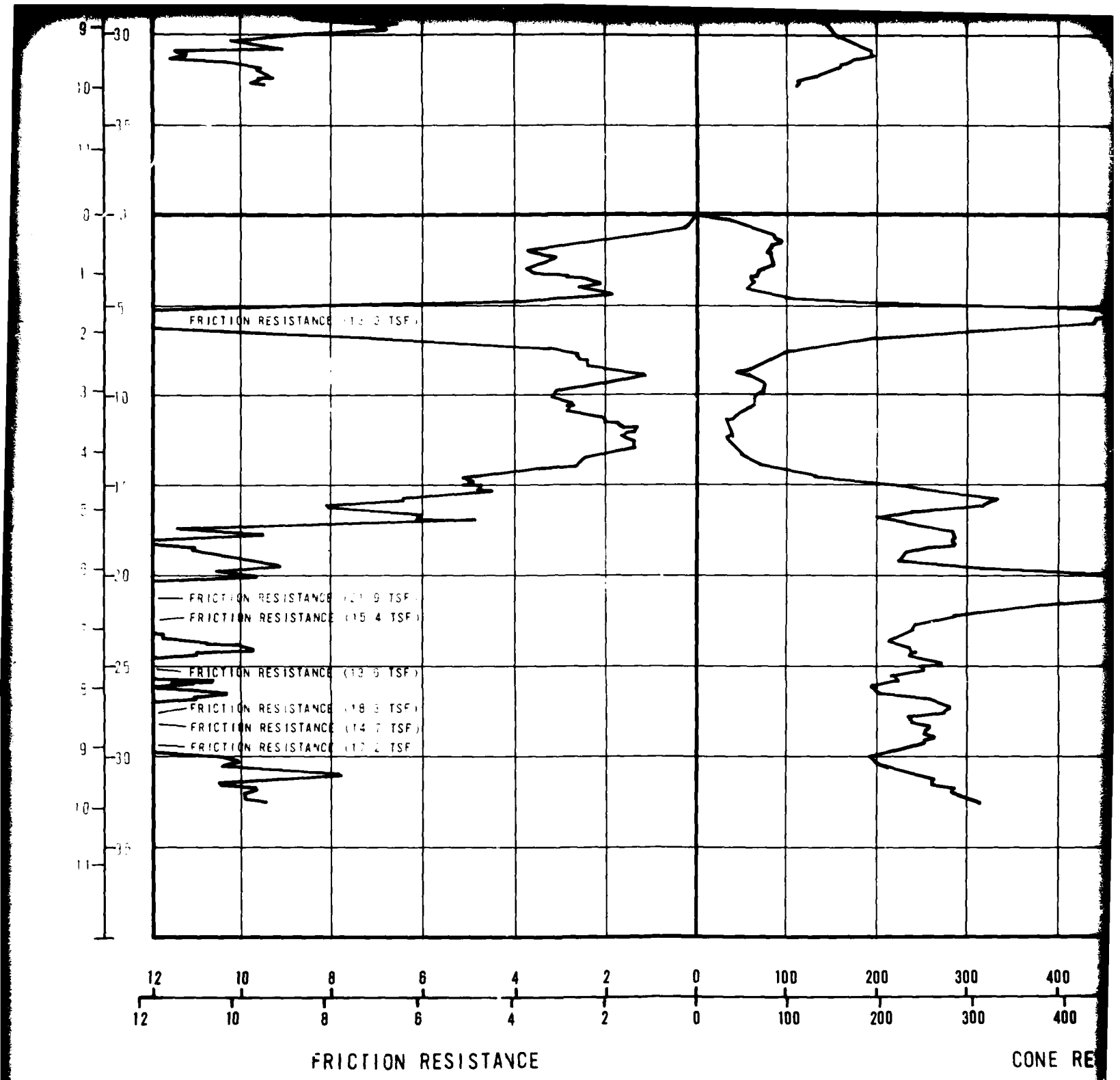

SURFACE ELEVATION 4560' (1396m)
SURFICIAL GEOLOGIC UNIT A4
CH
P-19
SCALE CHANGE SEE BELOW
6
8
10
12
14
SURFACE ELEVATION 4585' (1398m)
SURFICIAL GEOLOGIC UNIT A4o
CL
SP
CS-64

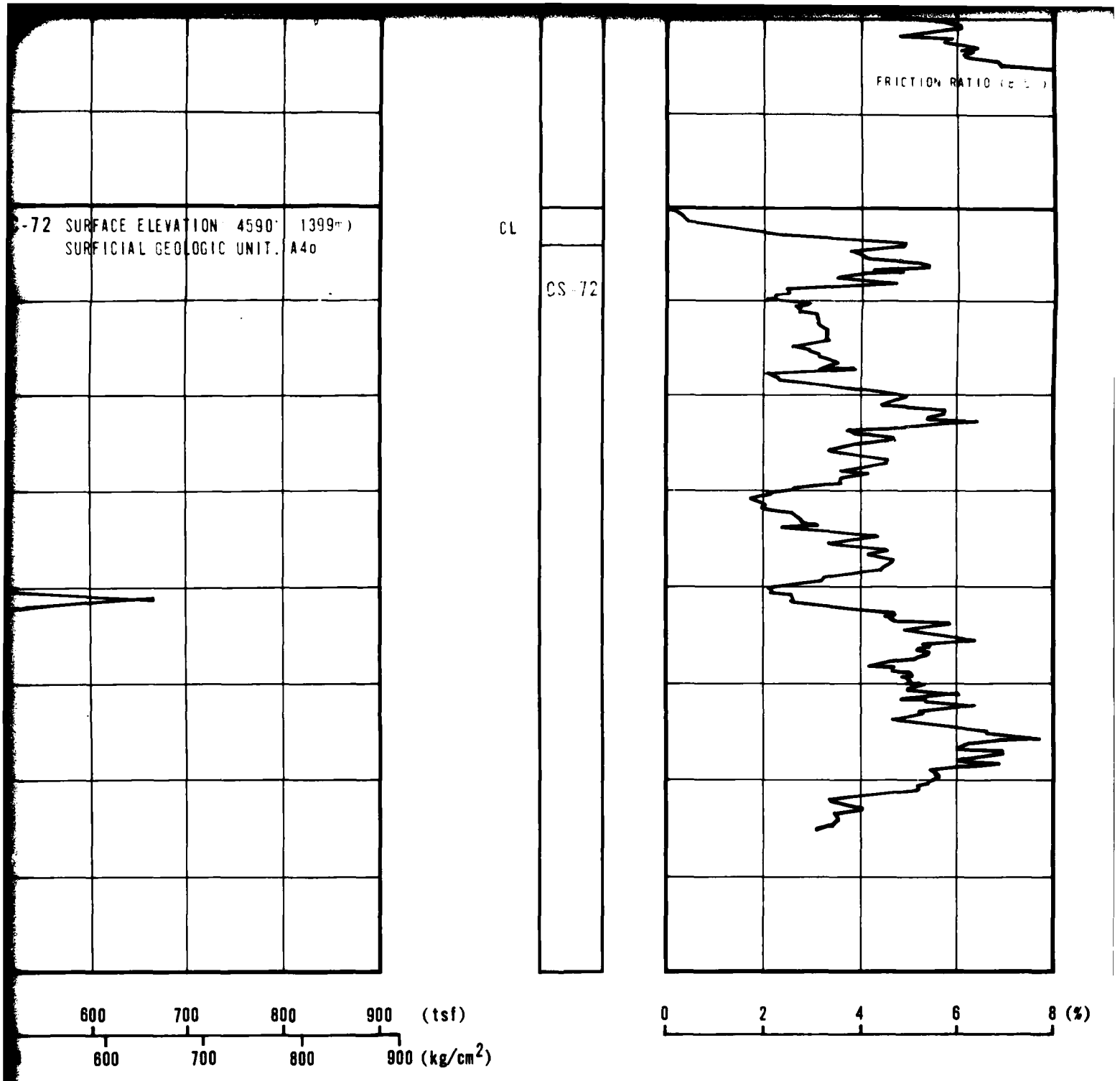

FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE (22.8 TSF)


C-69 SURFACE ELEVATION 4820' (1469m)
SURFICIAL GEOLOGIC UNIT A5i
C-70 SURFACE ELEVATION 4655' (1419m)
SURFICIAL GEOLOGIC UNIT A5y
SM
CS-70
C-71 SURFACE ELEVATION: 4590' (1399m)
SURFICIAL GEOLOGIC UNIT A4c
ML
P-20
FRICTION RATIO - 9.0


FRICTION RESISTANCE (12.8 TSF)
FRICTION RESISTANCE (13.3 TSF)
FRICTION RESISTANCE (13.8 TSF)
FRICTION RESISTANCE (13.3 TSF)
FRICTION RESISTANCE (12.4 TSF)
FRICTION RESISTANCE (14.4 TSF)
FRICTION RESISTANCE (14.9 TSF)
25
30
35
0
5
10
15
20
25
30
12 10 8 6 4 2 0 100 200 300 400
12 10 8 6 4 2 0 100 200 300 400
FRICTION RESISTANCE
CONE RESI


C-65 SURFACE ELEVATION: 4585' (1398m)
SURFICIAL GEOLOGIC UNIT: A4o
SM
P-18
500 600 700 800 900 (tsf)
500 600 700 800 900 (kg/cm²)
0 2 4 6 8 (%)
STANCE
FRICTION RATIO


FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
FRICTION RESISTANCE
12 10 8 6 4 2 0 100 200 300 400
12 10 8 6 4 2 0 100 200 300 400
FRICTION RESISTANCE
CONE RE



CONE PENETROMETER TEST RESULTS
DRY LAKE VALLEY, NEVADA

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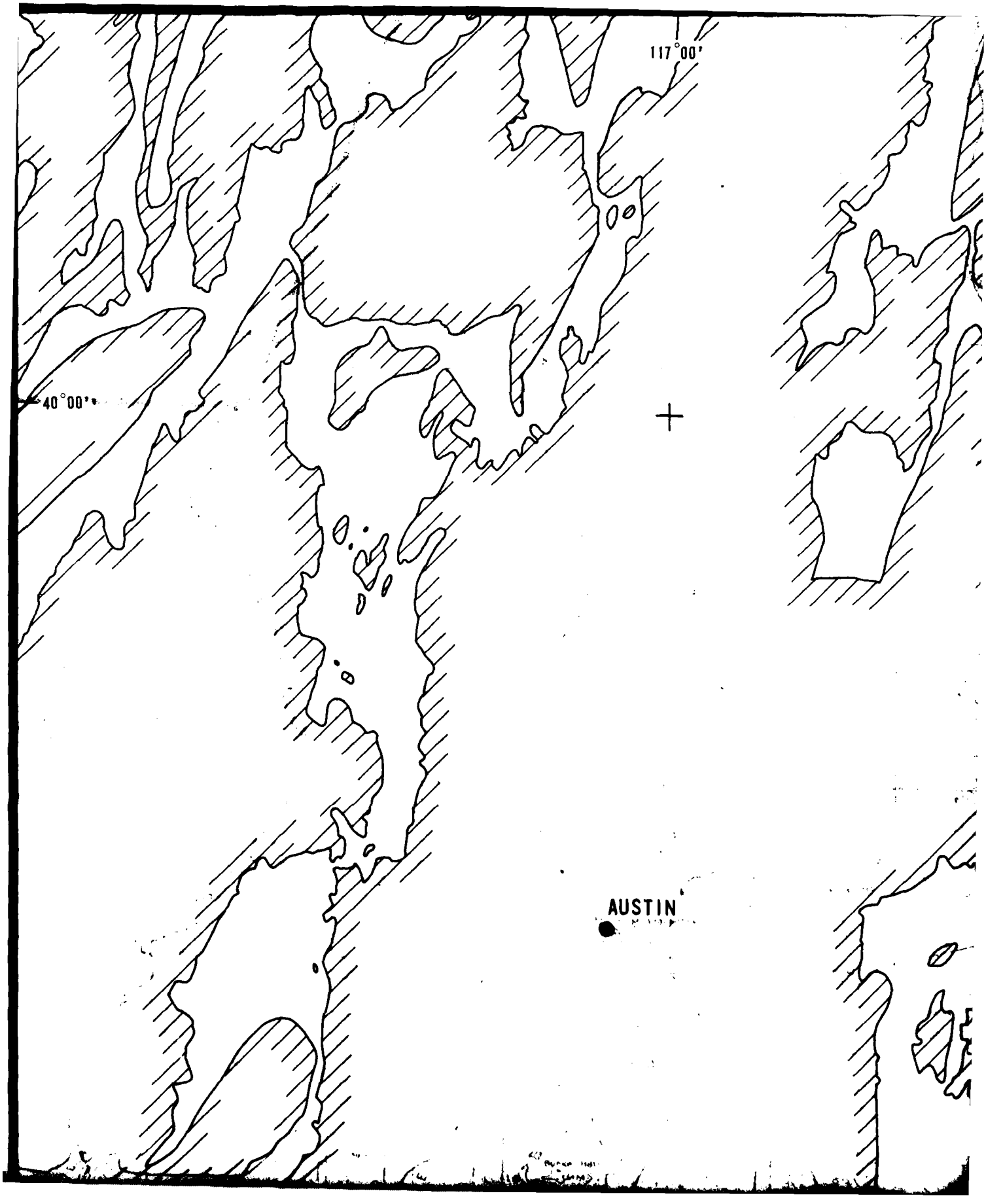
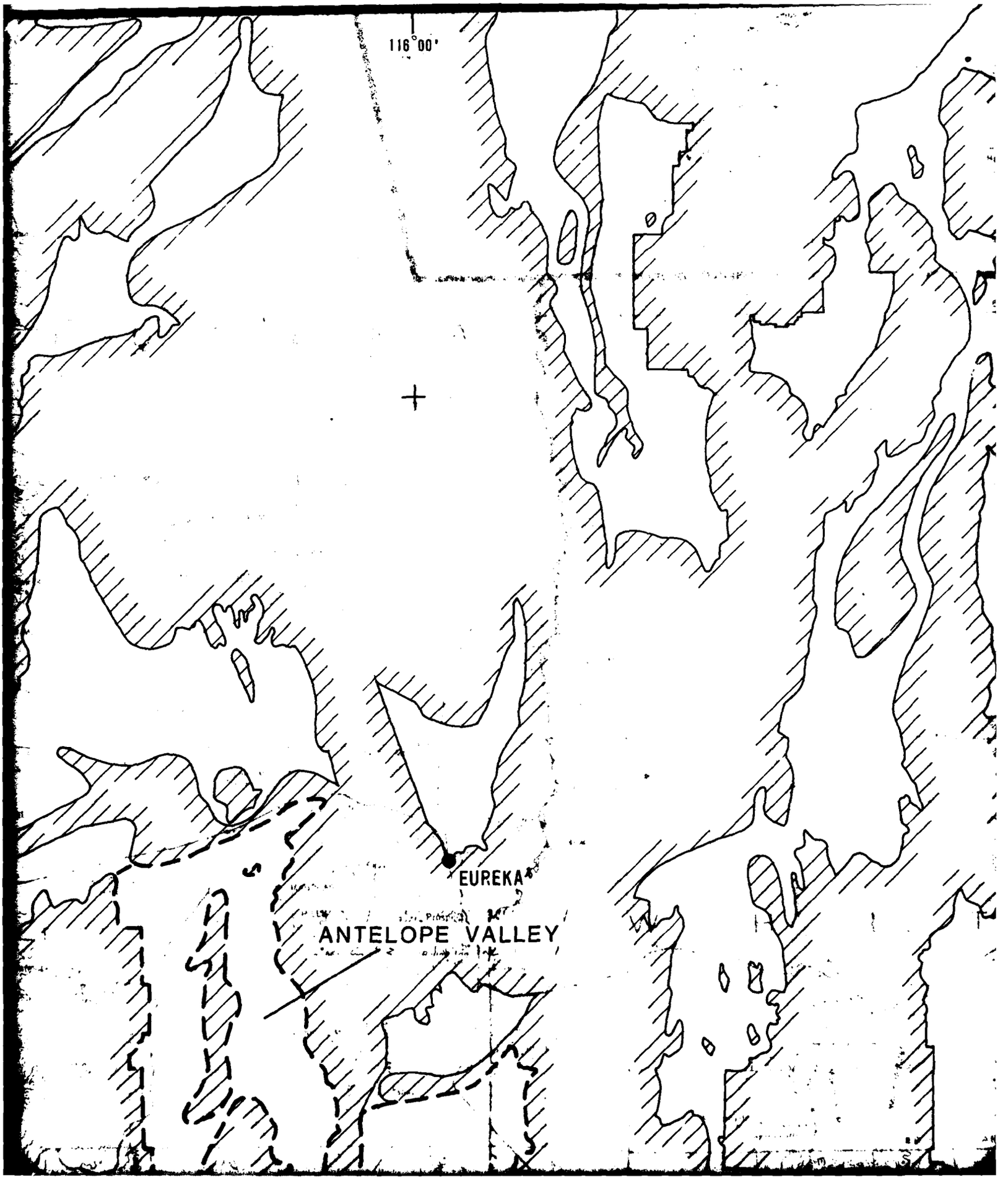
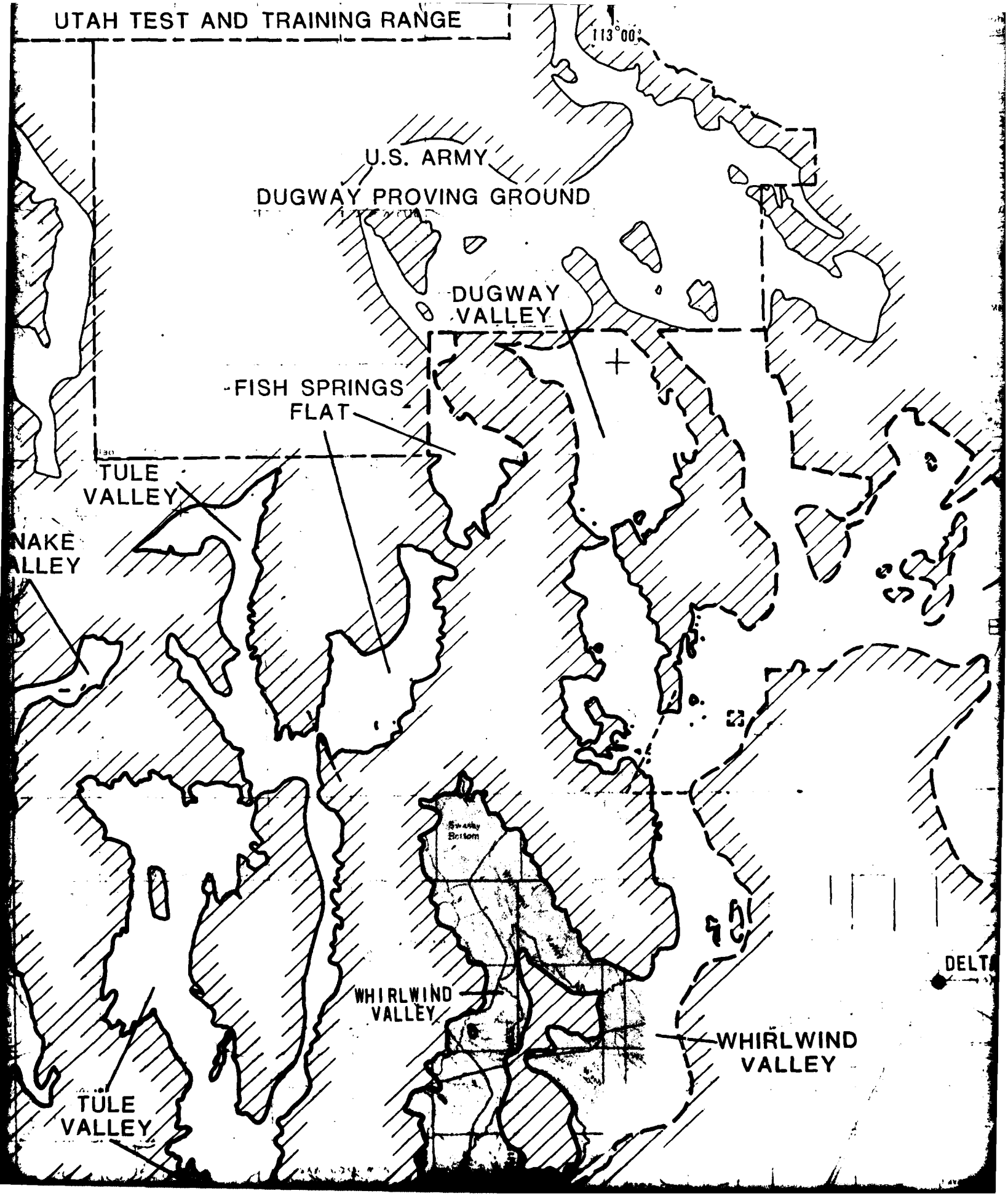
DRAWING
II-8-1
4 of 5

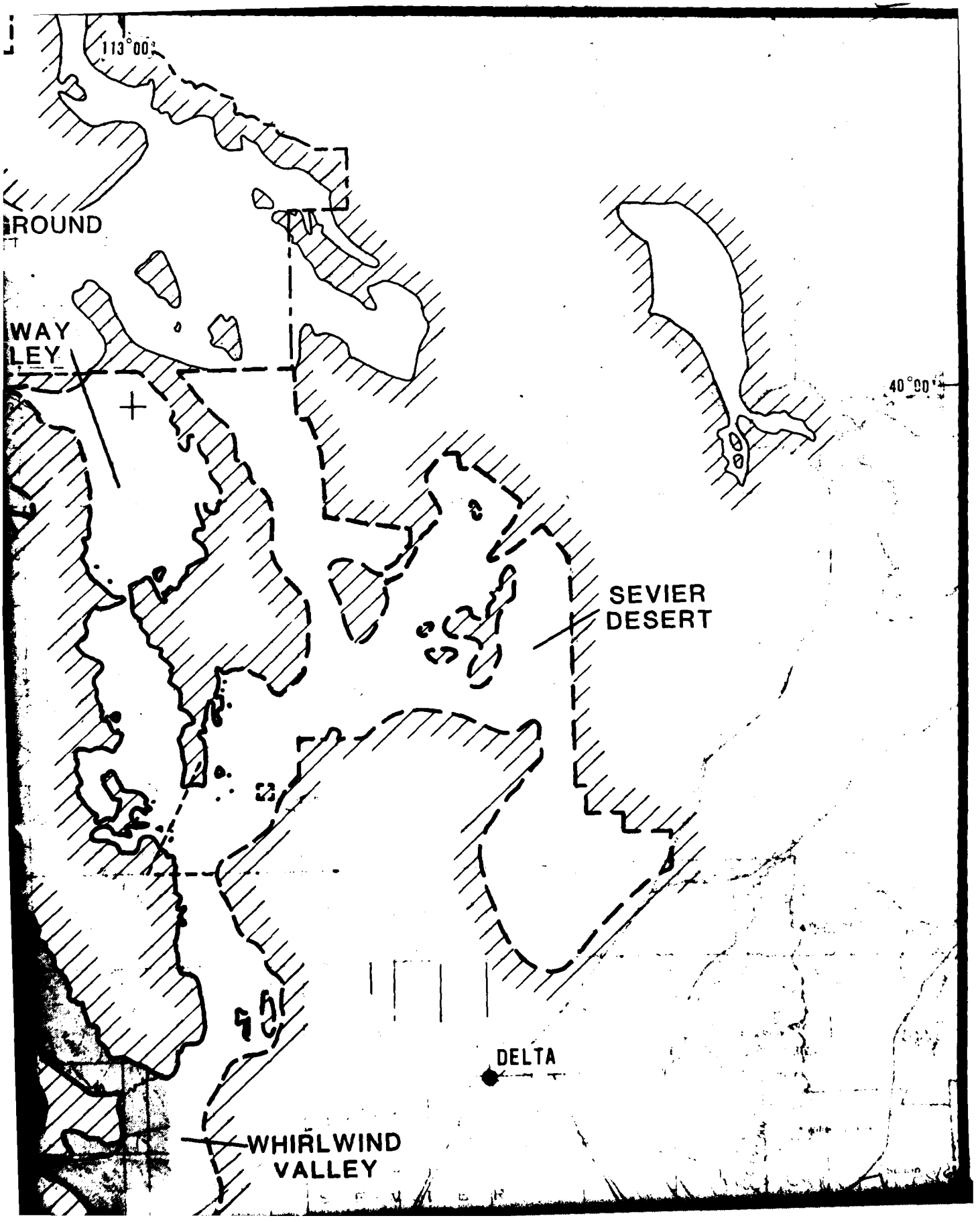
FUGRO NATIONAL, INC.

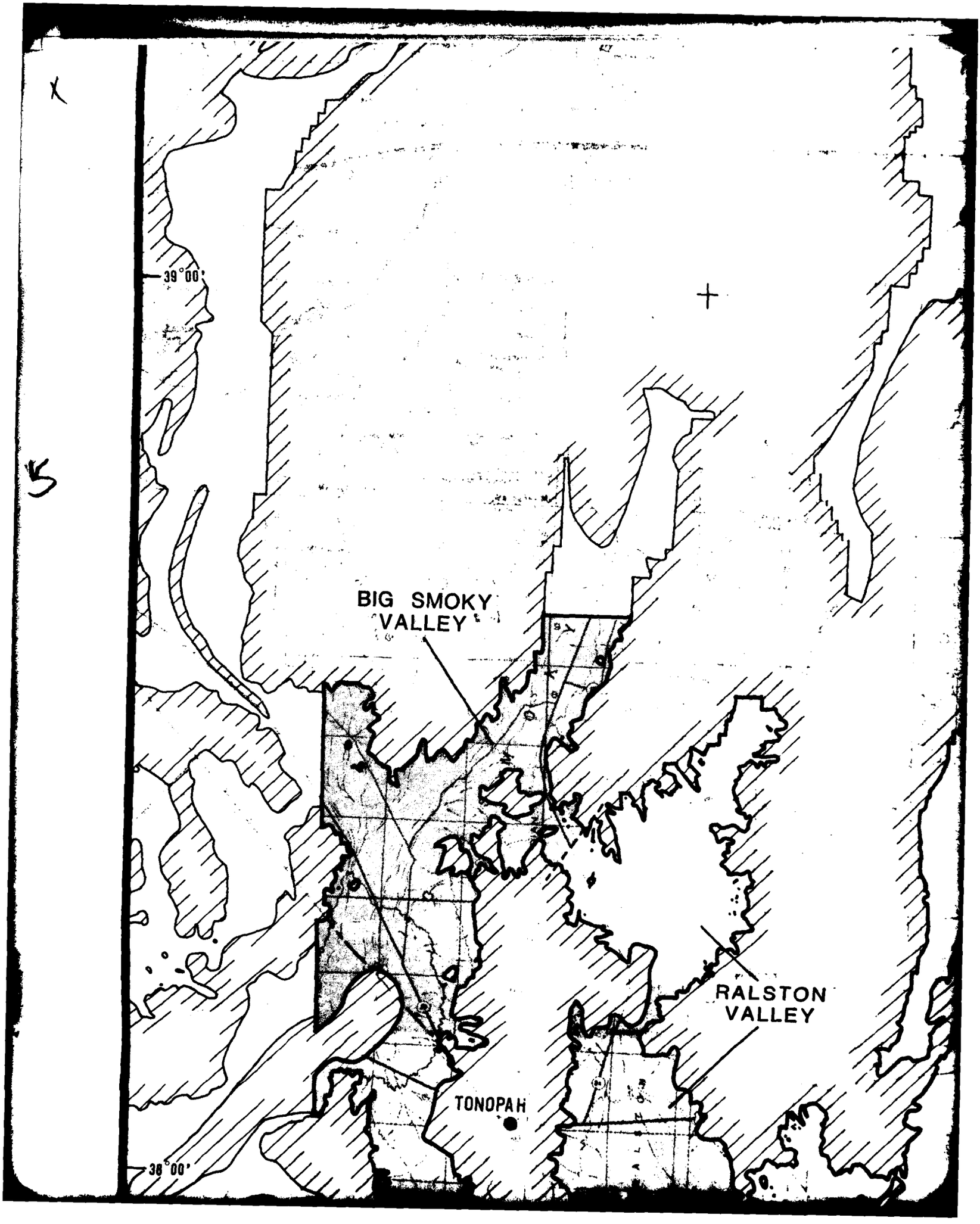

117°00'
40°00'
AUSTIN

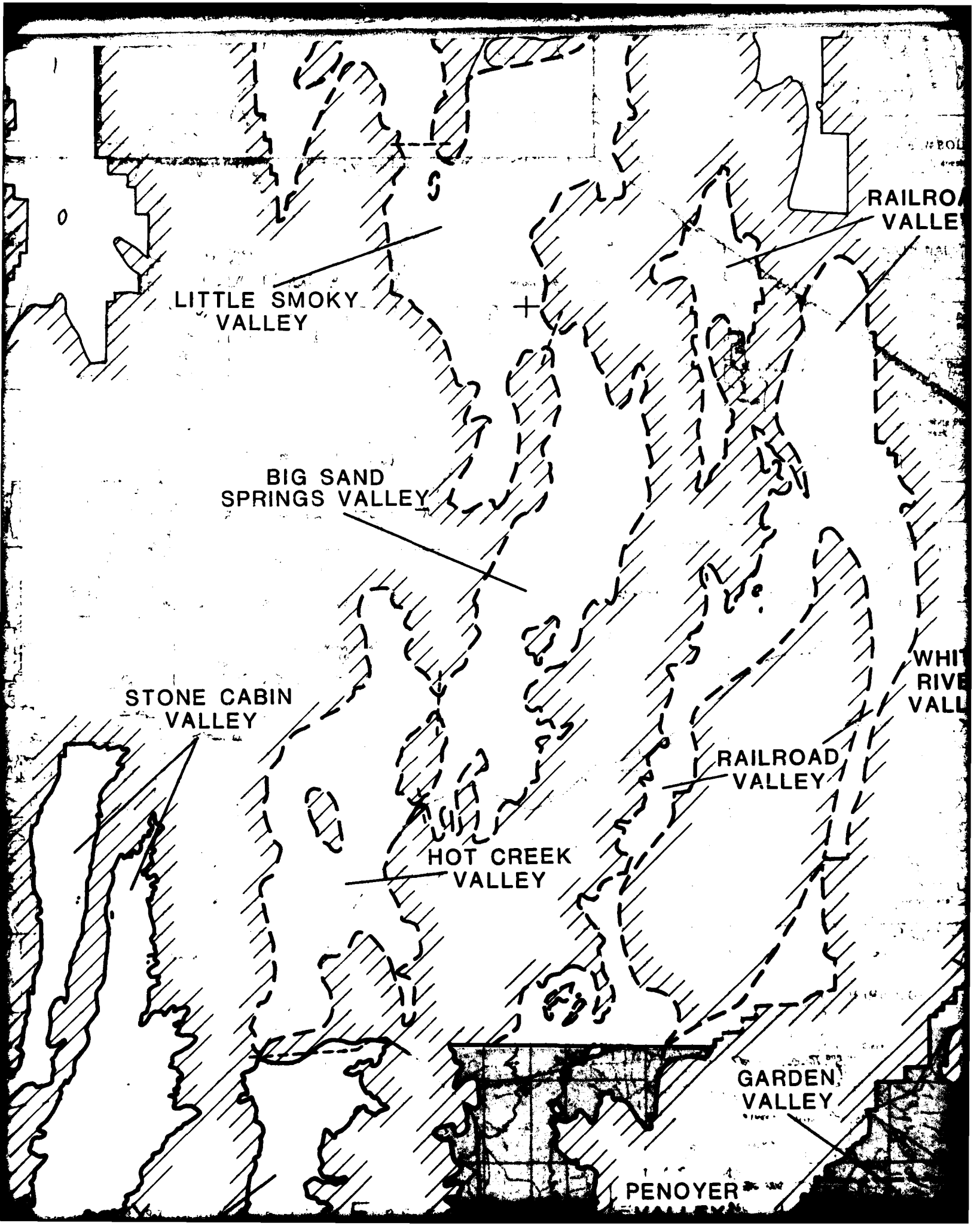

116°00'
EUREKA
ANTELOPE VALLEY

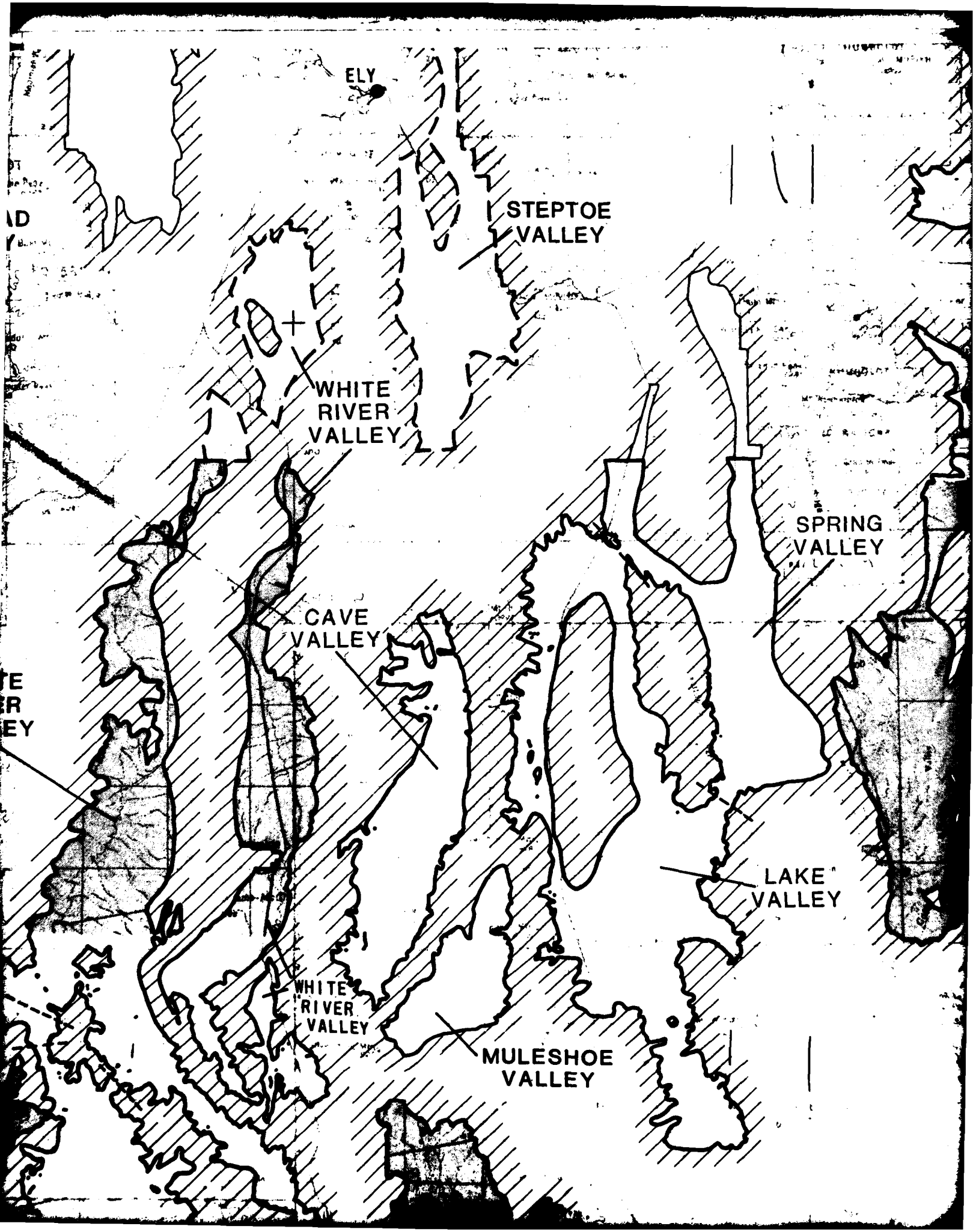

115°00'
114°00'
NEVADA
UTAH
ELY

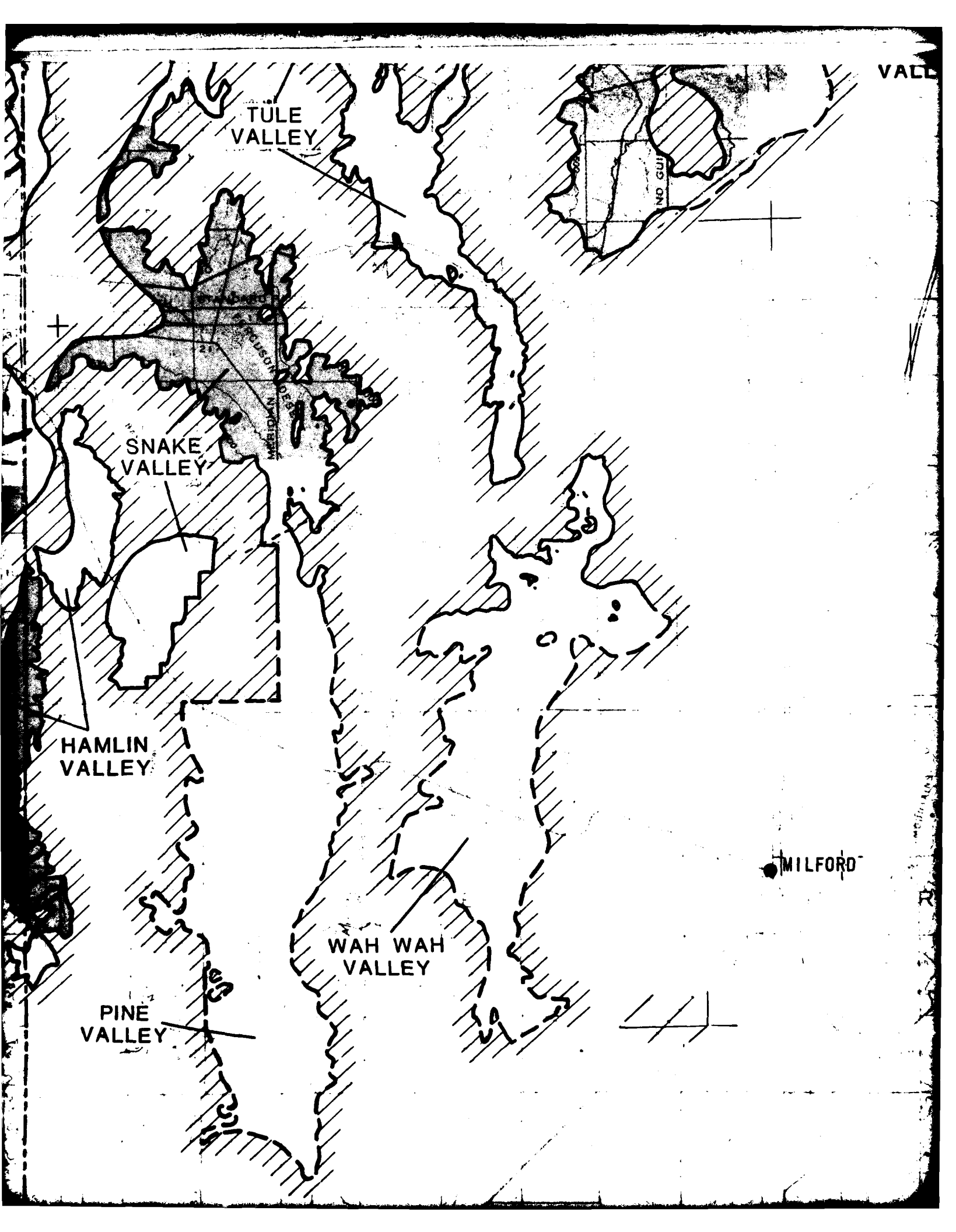

UTAH TEST AND TRAINING RANGE
113°00'
U.S. ARMY
DUGWAY PROVING GROUND
DUGWAY
VALLEY
FISH SPRINGS
FLAT
TULE
VALLEY
NAKE
LLEY
Swanky
Bottom
WHIRLWIND
VALLEY
WHIRLWIND
VALLEY
DELT
TULE
VALLEY

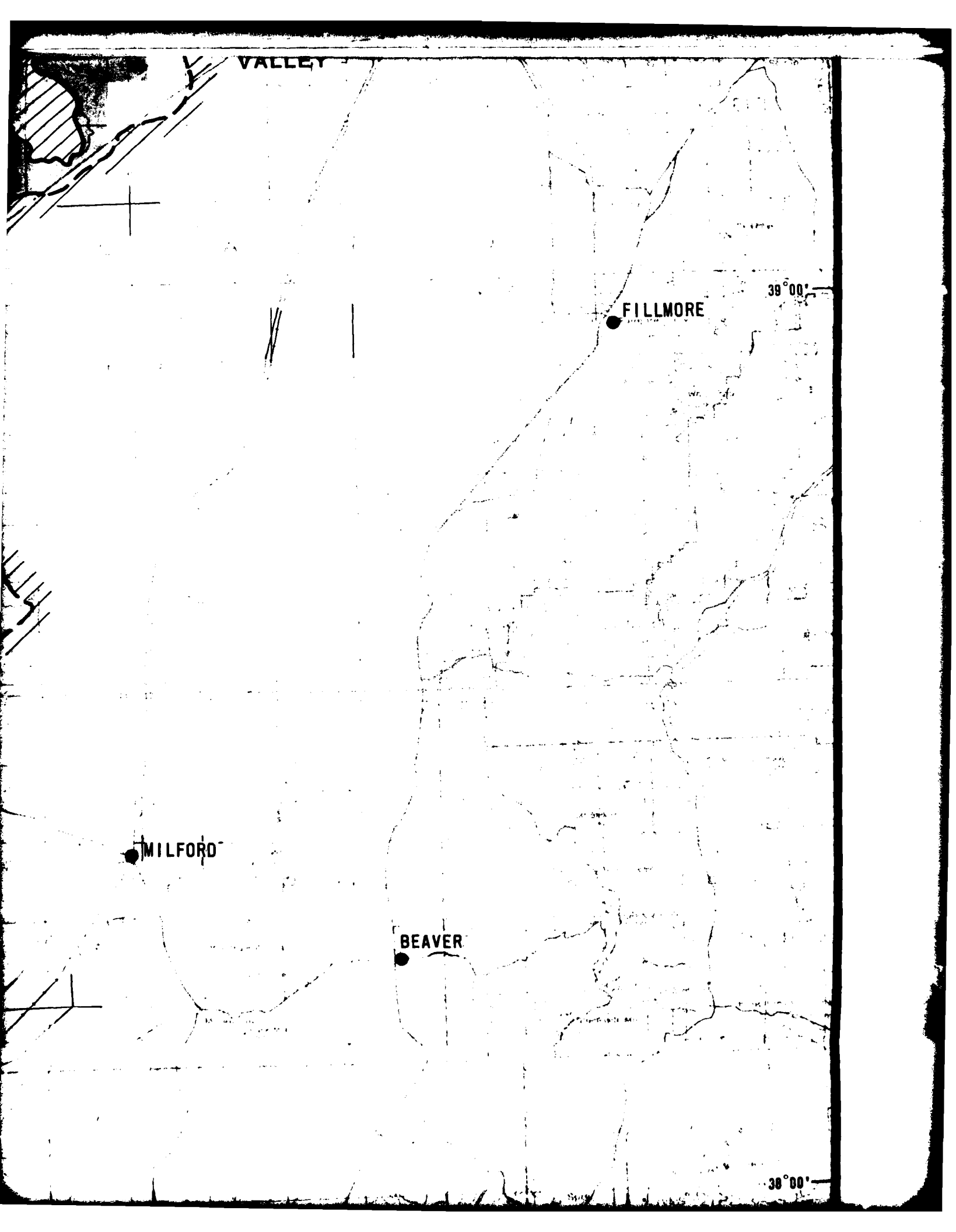

113°00'
ROUND
WAY
LEY
40°00'
SEVIER
DESERT
DELTA
WHIRLWIND
VALLEY

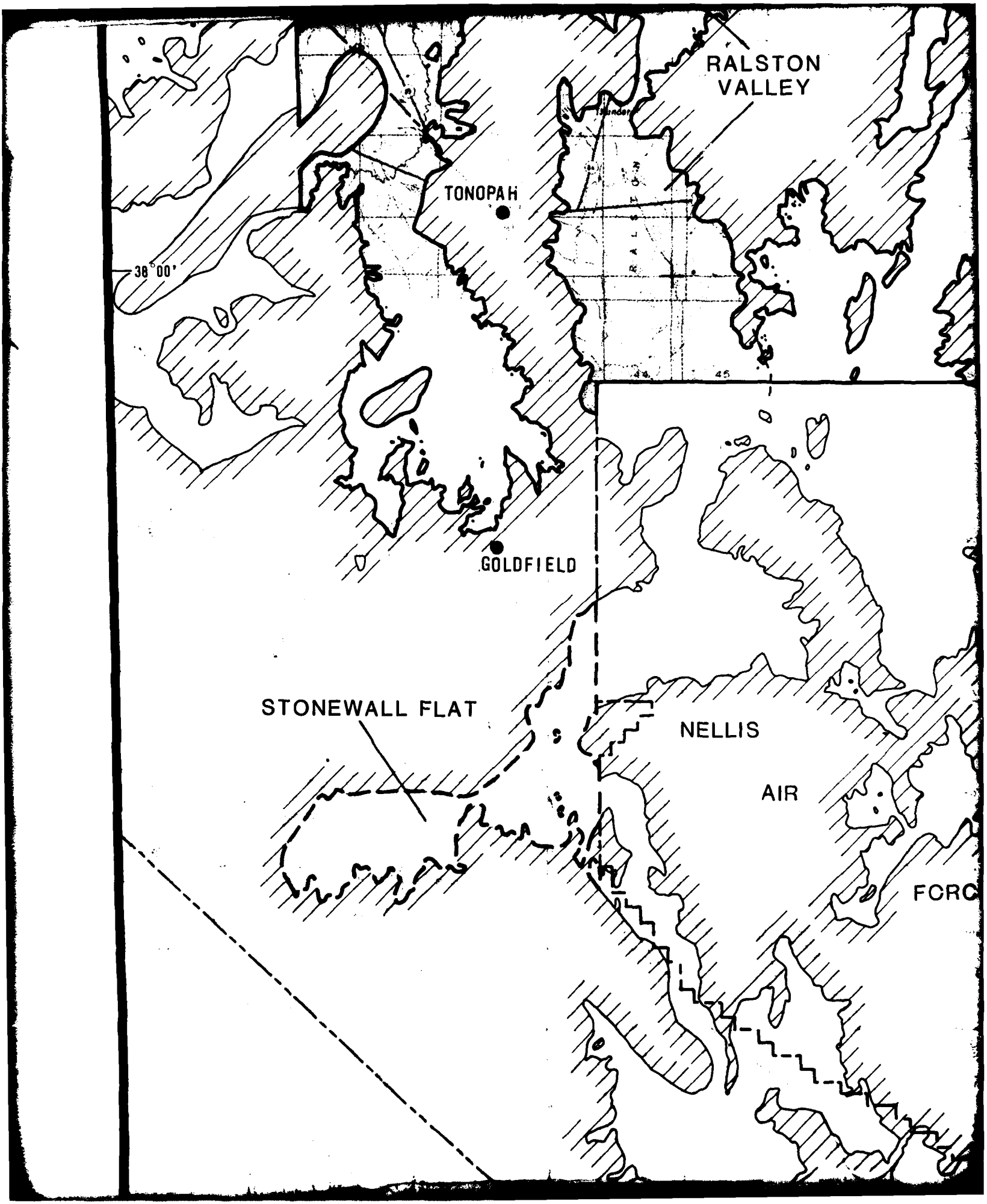

39°00'
BIG SMOKY VALLEY
RALSTON VALLEY
TONOPAH
38°00'

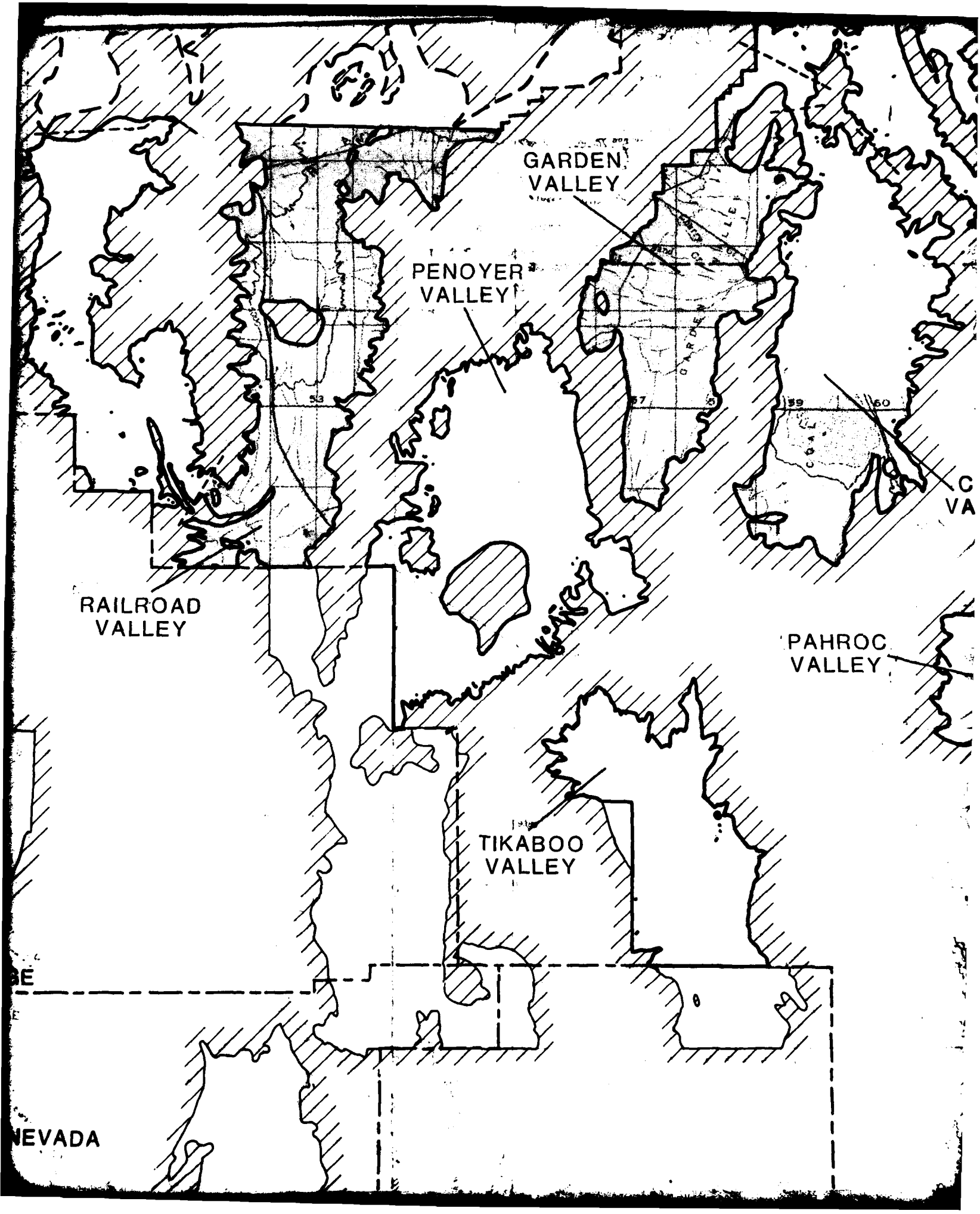

RAILROA
VALLE
LITTLE SMOKY
VALLEY
BIG SAND
SPRINGS VALLEY
WHI
RIVE
VALL
STONE CABIN
VALLEY
RAILROAD
VALLEY
HOT CREEK
VALLEY
GARDEN
VALLEY
PENOYER

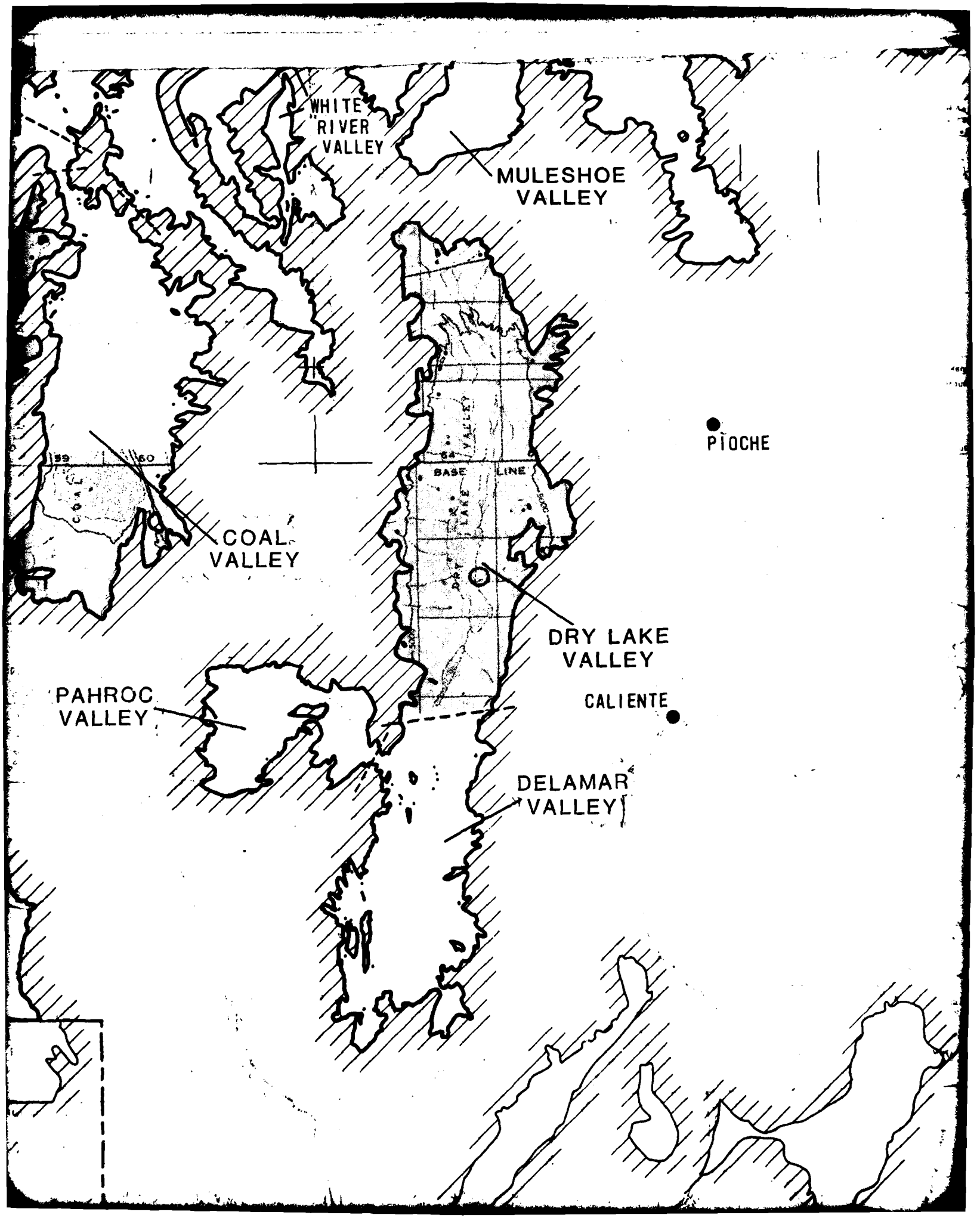

ELY
STEPTOE VALLEY
WHITE RIVER VALLEY
SPRING VALLEY
CAVE VALLEY
LAKE VALLEY
WHITE RIVER VALLEY
MULESHOE VALLEY

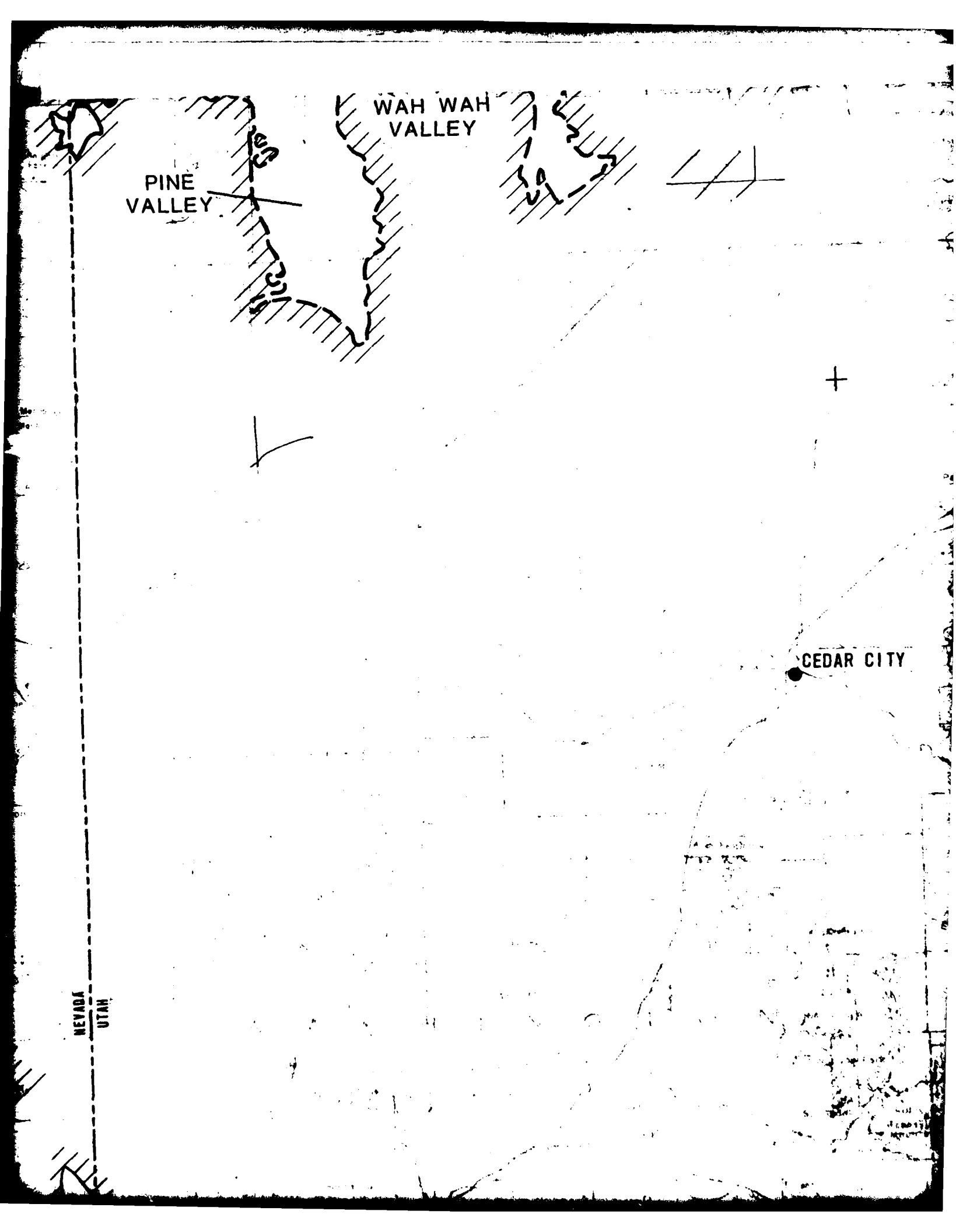

TULE VALLEY
SNAKE VALLEY
HAMLIN VALLEY
WAH WAH VALLEY
PINE VALLEY
MILFORD

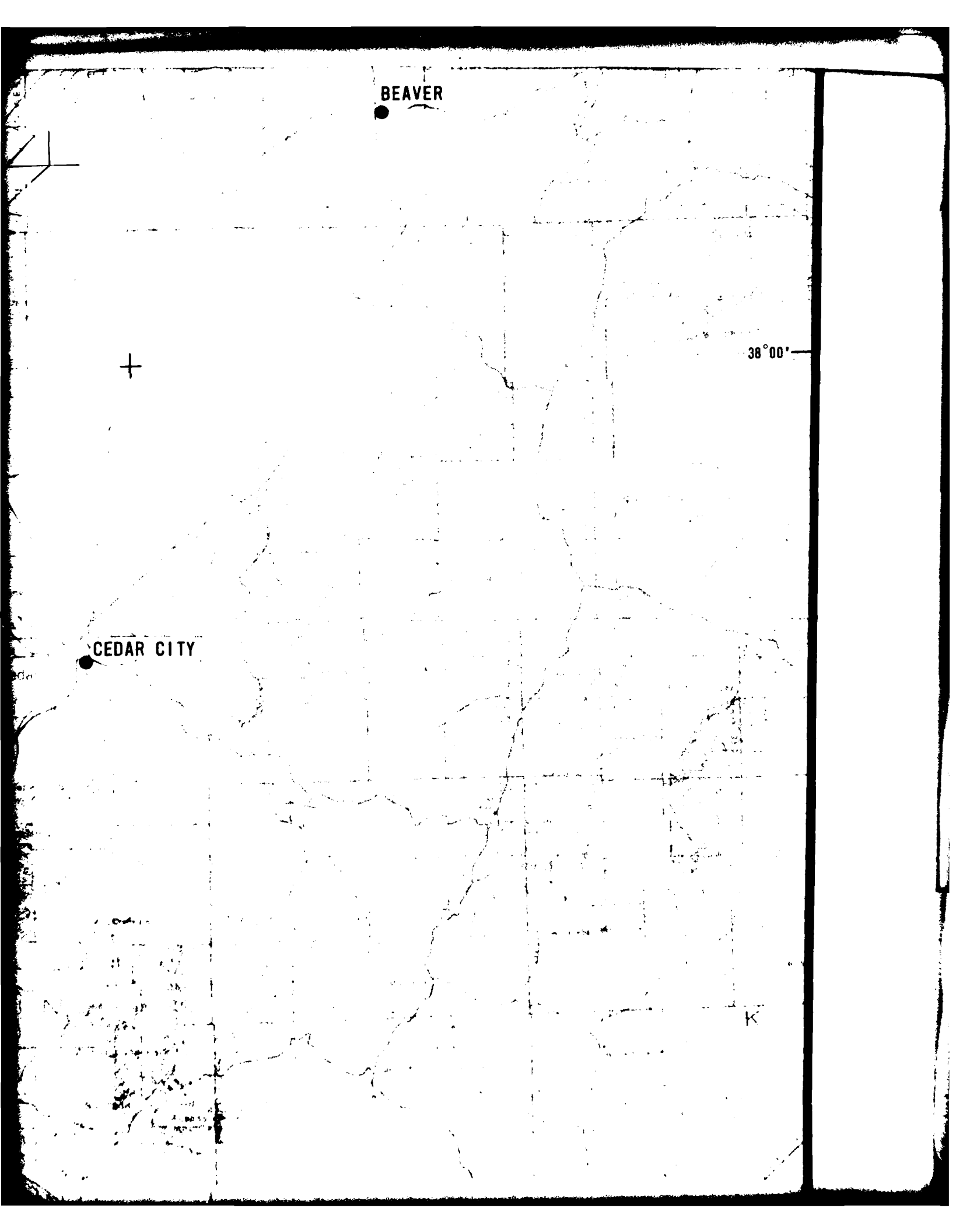

VALLEY
39°00'
FILLMORE
MILFORD
BEAVER
38°00'

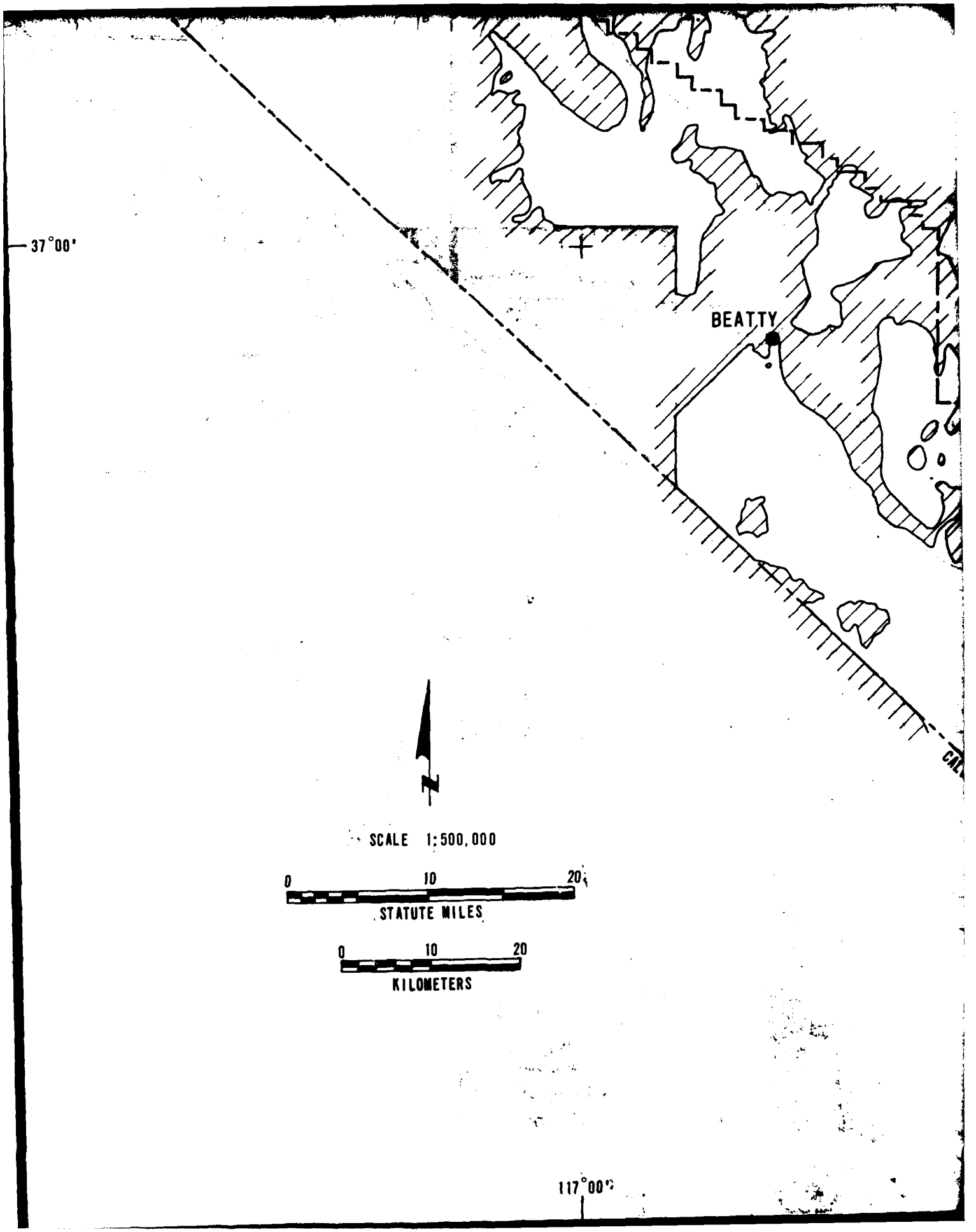

RALSTON
VALLEY
TONOPAH
38°00'
GOLDFIELD
STONEWALL FLAT
NELLIS
AIR
FORC

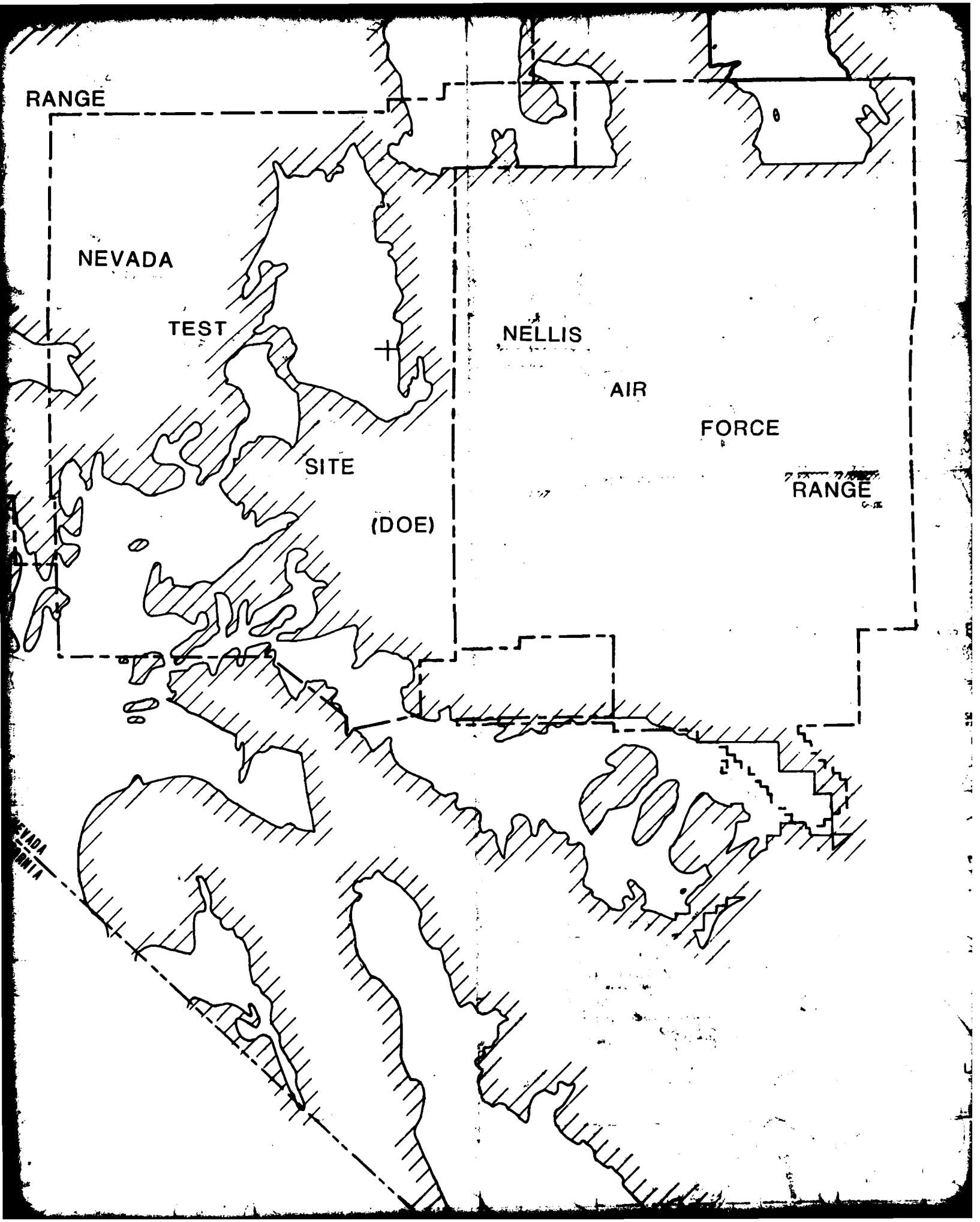

GARDEN VALLEY
PENOYER VALLEY
RAILROAD VALLEY
PAHROC VALLEY
TIKABOO VALLEY
NEVADA

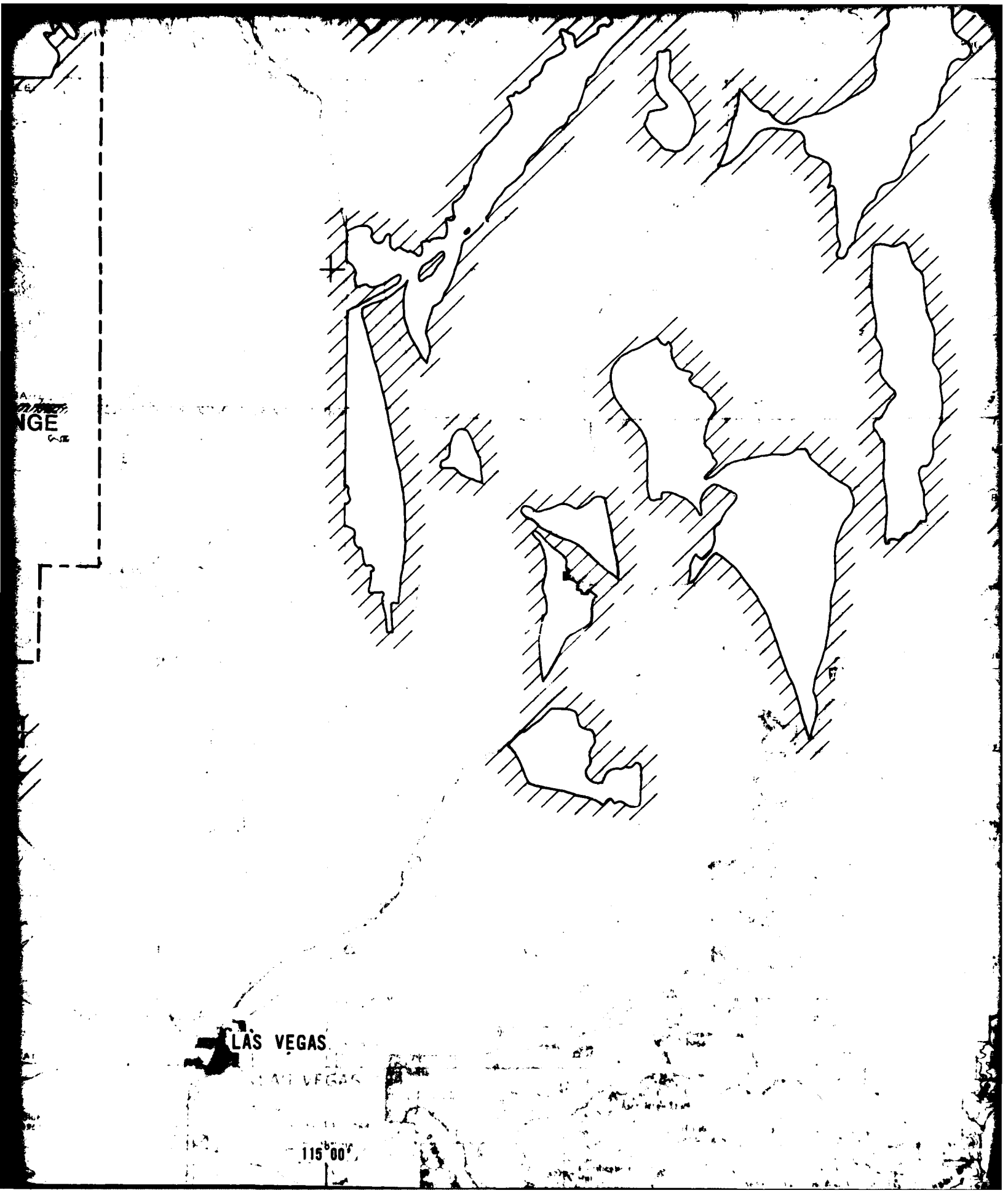

WHITE RIVER VALLEY
MULESHOE VALLEY
PIOCHE
COAL VALLEY
DRY LAKE VALLEY
PAHROC VALLEY
CALIENTE
DELAMAR VALLEY
BASE LINE
LAKE VALLEY

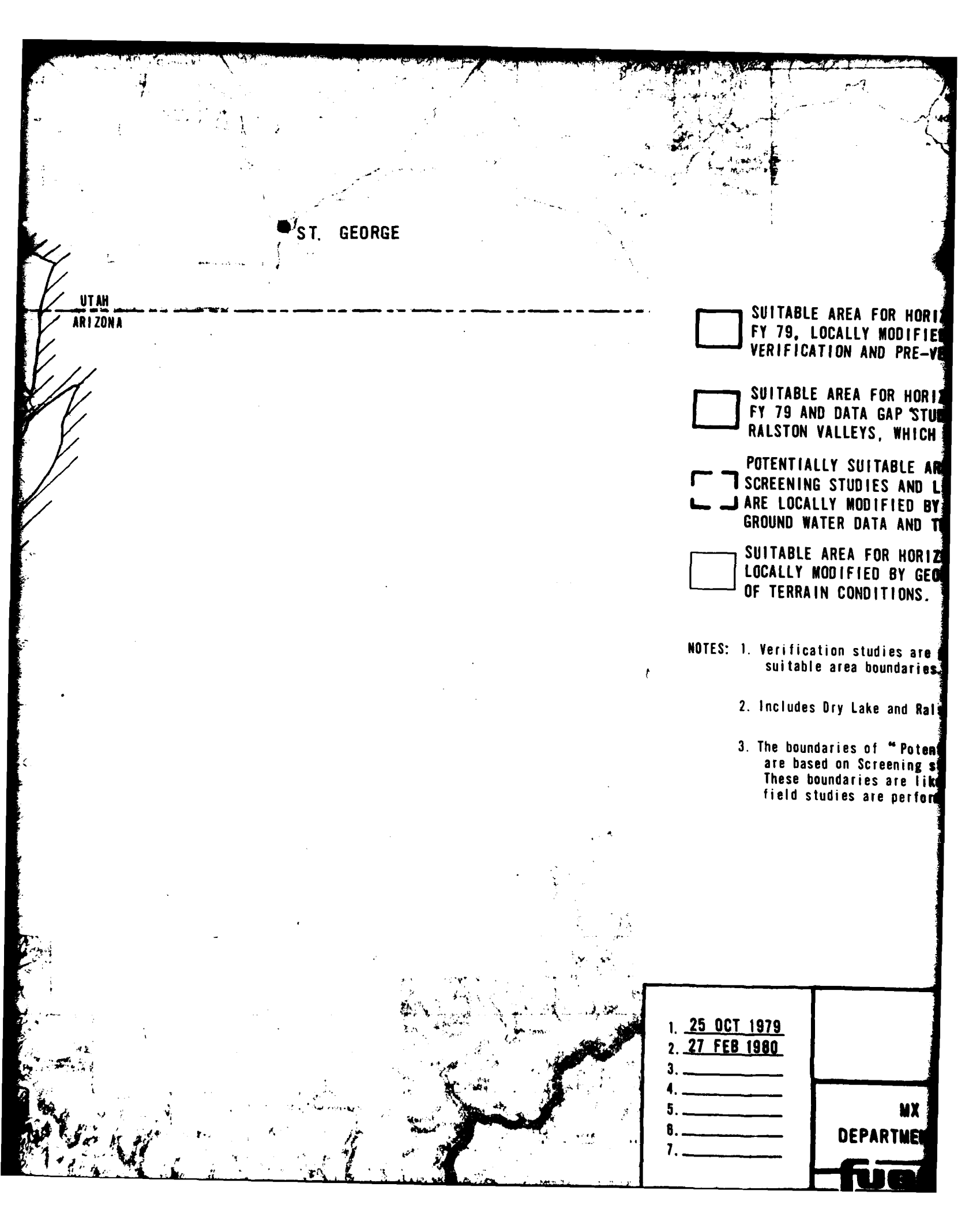

WAH WAH
VALLEY
PINE
VALLEY
CEDAR CITY
NEVADA
UTAH


BEAVER
38°00'
CEDAR CITY


37°00'
BEATTY
N
SCALE 1:500,000
0 10 20
STATUTE MILES
0 10 20
KILOMETERS
117°00'


RANGE
NEVADA
TEST
SITE
(DOE)
NELLIS
AIR
FORCE
RANGE


NGE
LAS VEGAS
115°00'


ST. GEORGE
UTAH
ARIZONA
SUITABLE AREA FOR HORI
FY 79, LOCALLY MODIFIE
VERIFICATION AND PRE-V
SUITABLE AREA FOR HORI
FY 79 AND DATA GAP STU
RALSTON VALLEYS, WHICH
POTENTIALLY SUITABLE AR
SCREENING STUDIES AND L
ARE LOCALLY MODIFIED BY
GROUND WATER DATA AND T
SUITABLE AREA FOR HORIZ
LOCALLY MODIFIED BY GEO
OF TERRAIN CONDITIONS.
NOTES: 1. Verification studies are
suitable area boundaries.
2. Includes Dry Lake and Ral
3. The boundaries of "Poten
are based on Screening s
These boundaries are lik
field studies are perfor
1. 25 OCT 1979
2. 27 FEB 1980
3.
4.
5.
6.
7.
MX
DEPARTME

EXPLANATION

SUITABLE AREA FOR HORIZONTAL SHELTER BASED ON RECONNAISSANCE STUDIES FY 79, LOCALLY MODIFIED BY PRELIMINARY RESULTS OF FY 79 - FY 80 VERIFICATION AND PRE-VERIFICATION STUDIES

SUITABLE AREA FOR HORIZONTAL SHELTER BASED ON VERIFICATION STUDIES FY 79 AND DATA GAP STUDIES FY 79 AND FY 80. INCLUDES DRY LAKE AND RALSTON VALLEYS, WHICH WERE INVESTIGATED INITIALLY IN 1977

POTENTIALLY SUITABLE AREA TO BE INVESTIGATED BASED ON REGIONAL SCREENING STUDIES AND LIMITED GEOLOGIC RECONNAISSANCE. BOUNDARIES ARE LOCALLY MODIFIED BY MORE DETAILED LITERATURE-BASED REVIEW OF GROUND WATER DATA AND TERRAIN CONDITIONS.

SUITABLE AREA FOR HORIZONTAL SHELTER BASED ON SCREENING STUDIES LOCALLY MODIFIED BY GEOLOGIC RECONNAISSANCE AND AIR PHOTO REVIEW OF TERRAIN CONDITIONS.

NOTES: 1. Verification studies are planned for these areas to refine suitable area boundaries.

2. Includes Dry Lake and Ralston Valleys which were investigated in 1977.

3. The boundaries of "Potential Suitable Area To Be Investigated", are based on Screening studies and geologic reconnaissance. These boundaries are likely to change when more thorough field studies are performed.

1. 25 OCT 1979
2. 27 FEB 1980
3. _____
4. _____
5. _____
6. _____
7. _____

GEOTECHNICALLY SUITABLE AREAS NEVADA-UTAH

MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE - BMO

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