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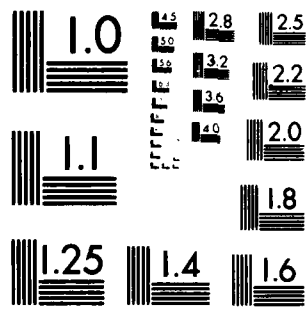
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**MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION**

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**VERIFICATION STUDY
MULESHOE VALLEY, NEVADA
VOLUME II - GEOTECHNICAL DATA**

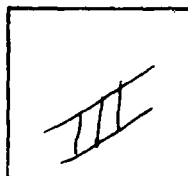
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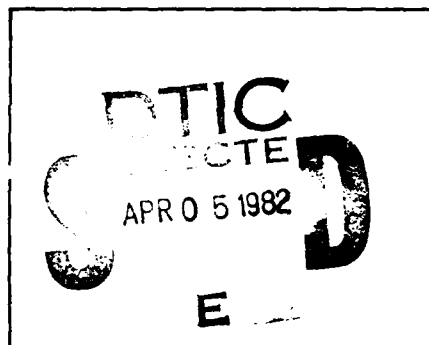
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) this report contains field data & lab test results from the verification investigation of Muleshoe Valley includes basic data on depth to ground water, depth to rock, seismic refraction surveys, electrical resistivity surveys, sieve analysis, and soil profiles.		

(1)

MX SITING INVESTIGATION
GEOTECHNICAL EVALUATION
VERIFICATION STUDY - MULESHOE 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

30 June, 1981

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 004A6. It contains the field data and laboratory test results from the Verification investigation of Muleshoe Valley. A synthesis of these data are available in Volume I (E-TR-27-MS-I).

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

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1.0 ACTIVITY MAP AND GEOGRAPHIC COORDINATES

II-1-1 Activity Location Map, Muleshoe Valley,
Nevada

In Pocket
at end of
Section

1.0 ACTIVITY MAP AND GEOGRAPHIC COORDINATES

Explanation: Locations of all field activities are shown in Drawing II-1-1, Activity Location Map (in pocket). The geodetic and Universal Transverse Mercator (UTM) coordinates of all activities are listed in Table II-1-1.

E-TR-27-MS-II

MULESHOE VALLEY ACTIVITY LOCATIONS

ACT	COORDINATE	UTM	COORDINATE
ID.	LAT.	LONG.	ZONE 12
	DIG MIN	DIG MIN	N (KM) E (KM)

BORING SITES

MS-001	38	22.14	114	44.97	4243.94	696.61
MS-002	38	12.52	114	49.11	4231.01	690.99
MS-003	38	14.75	114	46.74	4235.23	694.06

GPT SITES

MS-001	38	25.46	114	43.40	4255.14	693.71
MS-002	38	25.36	114	44.00	4255.30	697.07
MS-003	38	22.14	114	44.97	4243.94	696.61
MS-004	38	22.17	114	46.21	4243.96	694.30
MS-005	38	22.01	114	43.16	4243.75	690.10
MS-006	38	21.70	114	42.50	4243.37	700.17
MS-007	38	18.30	114	42.55	4241.34	701.40
MS-008	38	18.23	114	40.63	4241.35	693.73
MS-009	38	18.13	114	44.65	4241.53	697.25
MS-010	38	18.03	114	45.66	4241.41	695.79
MS-011	38	13.57	114	51.11	4232.37	637.13
MS-012	38	12.97	114	50.10	4231.31	639.50
MS-013	38	15.09	114	43.50	4235.13	645.03
MS-014	38	14.33	114	44.79	4235.50	697.00
MS-015	38	14.75	114	46.74	4235.23	694.06
MS-016	38	14.60	114	47.43	4234.91	693.11
MS-017	38	17.07	114	46.35	4233.51	694.34
MS-018	38	17.24	114	47.61	4233.73	690.93
MS-019	38	17.29	114	47.21	4240.05	691.79
MS-020	38	14.19	114	43.63	4234.11	691.64
MS-021	38	14.04	114	49.63	4233.30	690.11
MS-022	38	12.52	114	49.11	4231.01	690.99
MS-023	38	12.00	114	43.33	4230.27	690.06
MS-024	38	11.55	114	47.69	4229.27	693.12

GEOLOGIC STATIONS

MS-GS01	38	12.00	114	50.01	4231.37	639.67
MS-GS02	38	11.80	114	43.00	4229.72	692.60
MS-GS03	38	21.69	114	47.30	4243.37	692.50
MS-GS04	38	20.25	114	43.47	4245.43	695.96
MS-GS05	38	22.16	114	45.71	4243.36	693.40
MS-GS06	38	10.69	114	46.72	4223.03	694.55



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GEODETIC AND UTM COORDINATES
OF ACTIVITY LOCATIONS
MULESHOE VALLEY, NEVADA
PAGE 1 OF 4

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TABLE TR-1-1

E-TR-27-MS-II

MULESHOE VALLEY ACTIVITY LOCATIONS

ACT ID.	GEODETTIC COORDS.				UTM COORDS.	
	DEG	MIN	DEG	MIN	(X)(Y)	(X)(Y)
MS-0007	38	14.32	114	48.51	4234.37	691.20
MS-0008	38	15.24	114	49.15	4236.33	690.82
MS-0009	38	17.15	114	49.17	4239.50	690.30
MS-0010	38	17.10	114	48.99	4239.71	690.39
MS-0011	38	16.61	114	44.26	4233.75	697.86
MS-0012	38	13.24	114	44.00	4241.76	691.22
MS-0013	38	21.51	114	40.51	4247.30	691.31
MS-0014	38	21.54	114	44.32	4247.35	690.38
MS-0015	38	24.42	114	43.04	4253.24	690.82
MS-0016	38	26.54	114	42.73	4257.16	690.67
MS-0017	38	26.63	114	44.21	4255.44	697.34
MS-0018	38	26.11	114	43.33	4254.46	690.50
MS-0019	38	22.25	114	44.31	4249.17	690.21
MS-0020	38	20.73	114	43.10	4250.19	690.17
MS-0021	38	19.29	114	41.73	4241.44	711.51
MS-0022	38	22.24	114	47.20	4249.25	693.61
MS-0023	38	20.55	114	47.04	4245.93	690.67
MS-0024	38	21.05	114	46.76	4246.37	694.05
MS-0025	38	21.73	114	48.32	4243.29	700.49
MS-0026	38	20.14	114	42.43	4245.71	700.40
MS-0027	38	19.14	114	44.14	4243.13	697.36
MS-0028	38	20.41	114	44.03	4245.33	699.03
MS-0029	38	20.04	114	45.94	4244.97	695.40
MS-0030	38	10.21	114	47.12	4226.23	691.00
MS-0031	38	11.37	114	43.17	4233.21	692.13
MS-0032	38	11.35	114	47.42	4233.90	691.30
MS-0033	38	11.69	114	47.19	4233.34	700.65
MS-0034	38	13.23	114	44.49	4233.69	697.71
MS-0035	38	14.51	114	44.76	4234.47	697.27
MS-0036	38	15.72	114	42.79	4236.41	700.10
MS-0037	38	15.47	114	42.93	4236.64	690.30
MS-0038	38	13.20	114	52.43	4230.24	690.16
MS-0039	38	9.56	114	52.27	4229.43	696.52
MS-0040	38	11.07	114	50.75	4231.27	698.63
MS-0041	38	11.77	114	51.46	4229.55	697.57
MS-0042	38	13.90	114	52.32	4233.43	695.51
MS-0043	38	19.42	114	47.31	4243.33	693.29
MS-0044	38	20.66	114	45.19	4246.21	696.75
MS-0045	38	17.53	114	46.17	4240.33	695.07
MS-0046	38	16.21	114	44.73	4237.99	697.15
MS-0047	38	17.33	114	44.95	4240.15	696.25
MS-0048	38	12.51	114	43.93	4231.00	691.19



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GEODETTIC AND UTM COORDINATES
OF ACTIVITY LOCATIONS
MULESHOE VALLEY, NEVADA
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TABLE 7-1-1

MULESHOE VALLEY ACTIVITY LOCATIONS

ACT ID.	GEODETIC COORD. LAT. DEC MIN	UTM COORD. LONG. Easting	UTM COORD. NORTH	UTM COORD. Easting

REFRACTION LINES

MS- S01	38	25.46	114	43.42	4255.14	695.71
MS- S02	38	22.14	114	44.97	4243.54	696.61
MS- S03	38	19.30	114	42.63	4241.94	700.13
MS- S04	38	15.09	114	43.52	4235.95	699.05
MS- S05	38	11.55	114	47.69	4219.27	697.12
MS- S06	38	13.57	114	51.24	4232.37	697.35
MS- S07	38	25.12	114	42.12	4254.57	700.60
MS- S08	38	11.71	114	43.00	4213.06	698.66
MS- S09	38	14.35	114	45.52	4218.43	696.12
MS- S10	38	10.56	114	46.37	4227.43	695.09

RESISTIVITY LINES

MS- R01	38	25.46	114	43.42	4255.14	695.71
MS- R03	38	19.30	114	42.63	4241.94	700.13
MS- R04	38	15.09	114	43.52	4235.95	699.05
MS- R05	38	11.55	114	47.69	4219.27	697.12
MS- R06	38	13.57	114	51.24	4232.37	697.35
MS- R07	38	25.12	114	42.12	4254.57	700.60
MS- R08	38	11.71	114	43.00	4213.06	698.66
MS- R09	38	14.35	114	45.52	4218.43	696.12
MS- R10	38	10.56	114	46.37	4227.43	695.09

SURFICIAL SOIL SAMPLES

MS-CS05	38	22.01	114	43.20	4243.75	694.26
MS-CS06	38	13.23	114	43.52	4241.35	694.73
MS-CS10	38	19.03	114	45.66	4241.41	695.79
MS-CS12	38	12.97	114	50.12	4231.34	699.50
MS-CS13	38	15.09	114	43.52	4235.95	699.05
MS-CS18	38	17.24	114	47.61	4239.79	692.98
MS-CS20	38	14.19	114	43.63	4234.11	691.64
MS-CS23	38	12.00	114	43.32	4230.07	692.06

TEST PITS

MS- P01	38	25.56	114	44.00	4255.30	697.37
MS- P02	38	24.99	114	42.33	4254.30	700.32
MS- P03	38	21.73	114	42.50	4245.37	700.25
MS- P04	38	13.15	114	44.55	4241.53	697.25



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GEODETIC AND UTM COORDINATES
OF ACTIVITY LOCATIONS
MULESHOE VALLEY, NEVADA
PAGE 3 OF 4

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TABLE 7-1-1

E-TR-27-MS-II

MULESHOE VALLEY ACTIVITY LOCATIONS

ACT	GEODETIC COORD.				UTM COORD.	
ID.	LAT.		LONG.		EASTING	NORTHING
	DEG	MIN	DEG	MIN	(E(KM))	(N(KM))
YS- P05	38	14.83	114	44.79	4235.33	697.20
YS- P06	38	14.80	114	47.46	4234.91	693.37
YS- P07	38	17.07	114	46.55	4239.31	694.54
YS- P08	38	11.53	114	47.69	4229.27	693.12
YS- P09	38	10.57	114	51.24	4232.37	687.33

TRENCH SITES

YS- T01	38	25.46	114	43.42	4255.14	695.71
YS- T02	38	22.17	114	46.01	4245.95	694.30
YS- T03	38	22.14	114	44.97	4241.94	695.61
YS- T04	38	13.30	114	42.88	4241.94	700.13
YS- T05	38	14.73	114	46.34	4235.23	694.95
YS- T06	38	12.52	114	49.11	4231.01	690.90
YS- T07	38	14.04	114	49.63	4233.30	690.11
YS- T08	38	17.39	114	48.22	4240.05	690.09

WATER WELL SITES

YS- W01	38	13.09	114	46.07	4241.41	695.13
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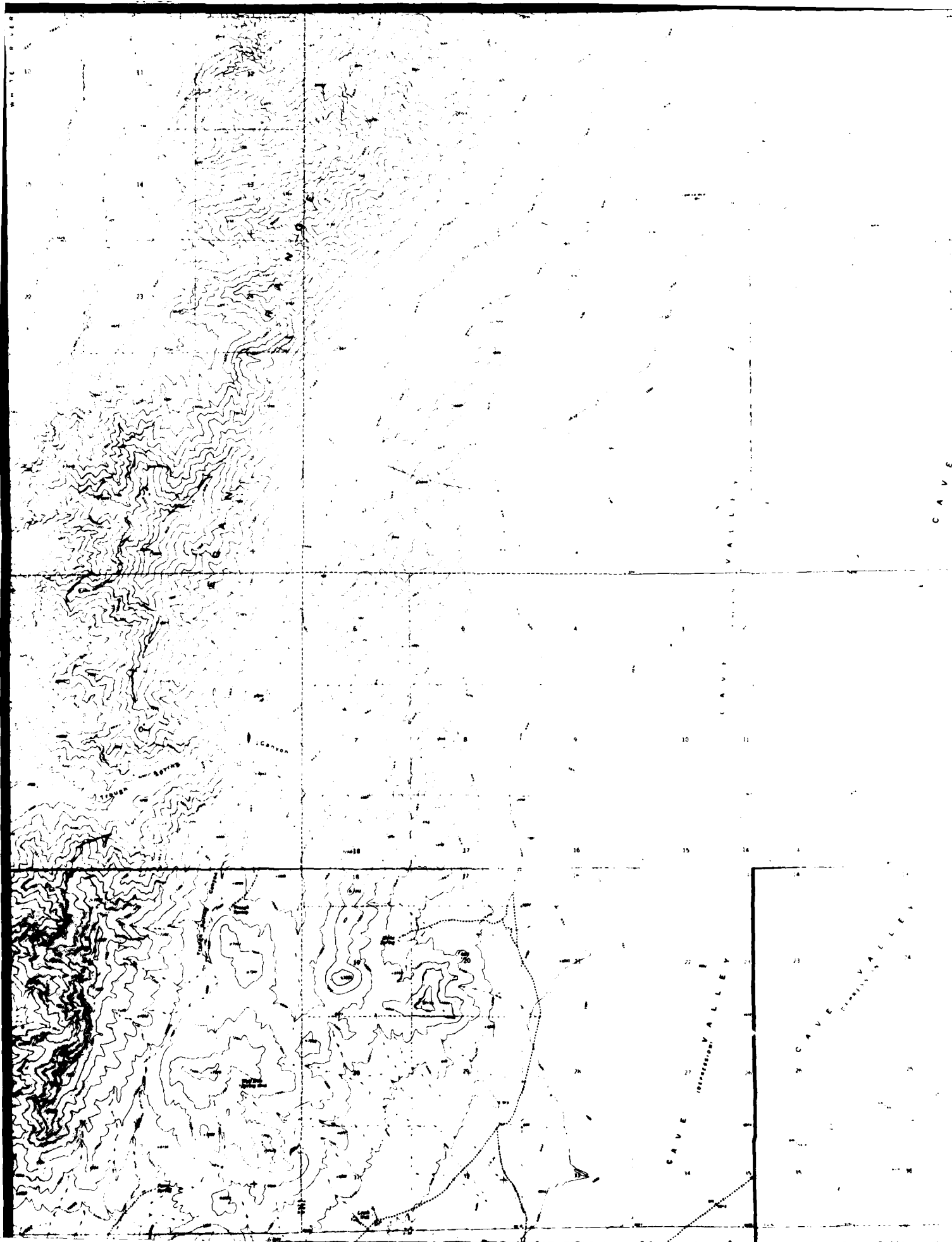


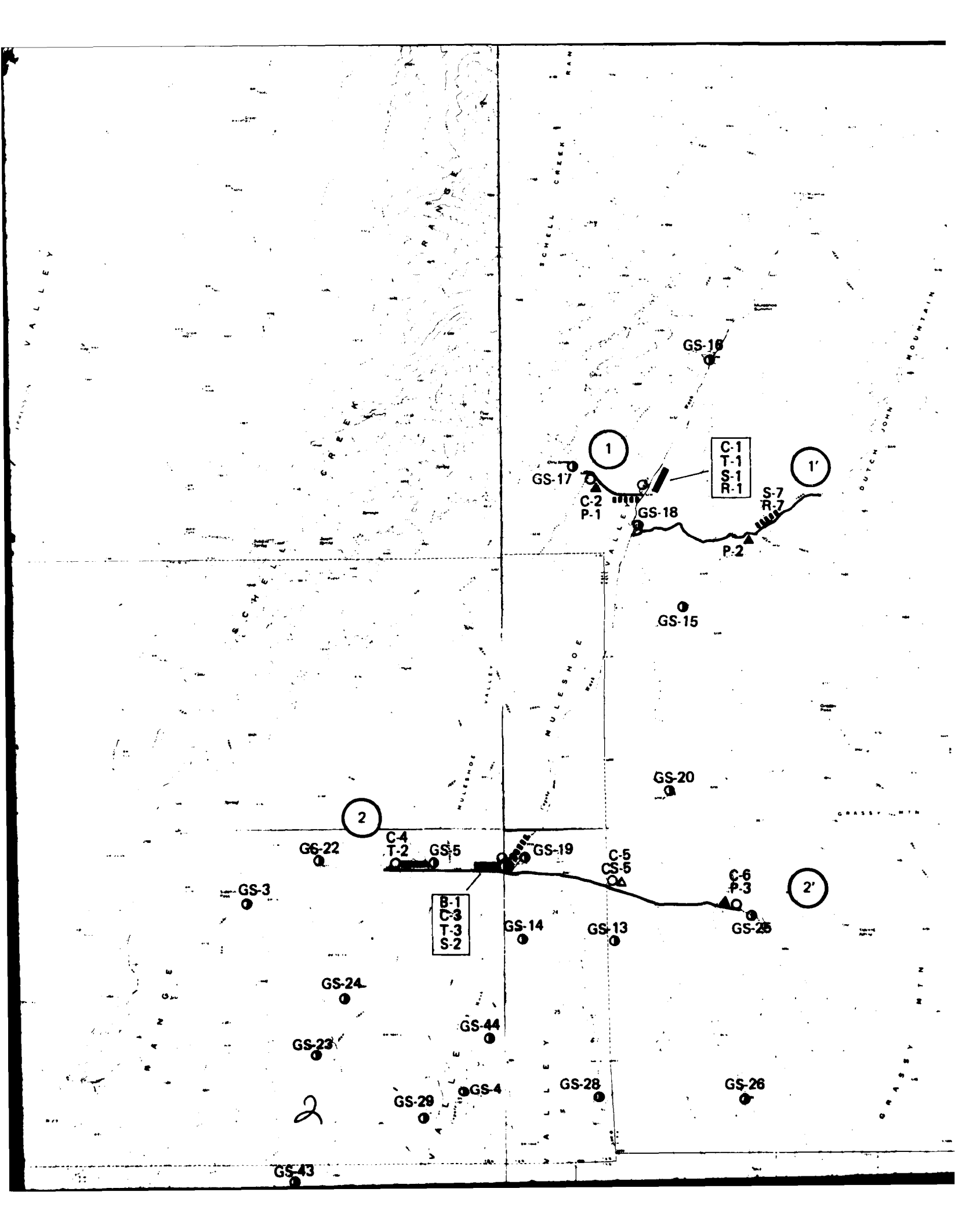
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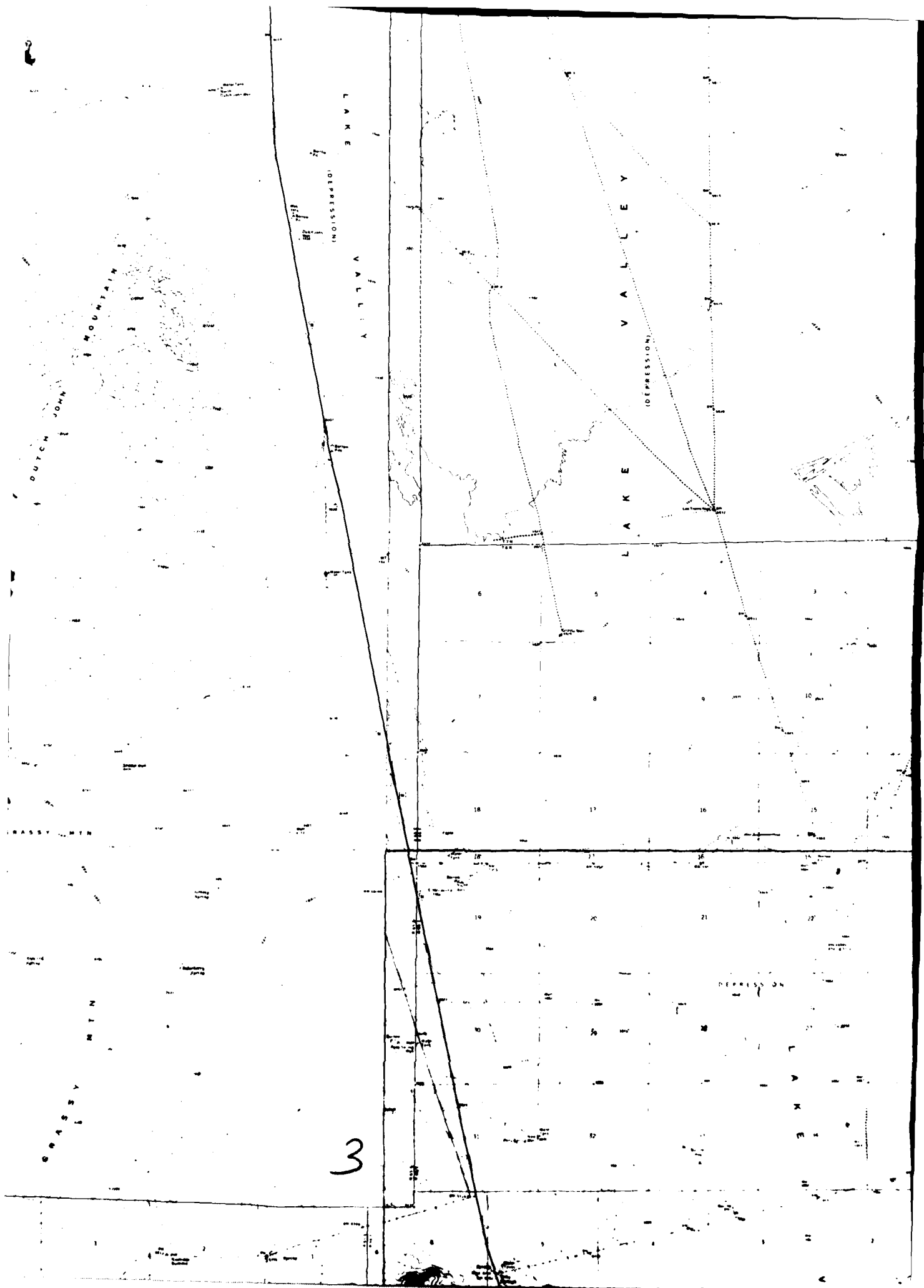
GEODETIC AND UTM COORDINATES
OF ACTIVITY LOCATIONS
MULESHOE VALLEY, NEVADA
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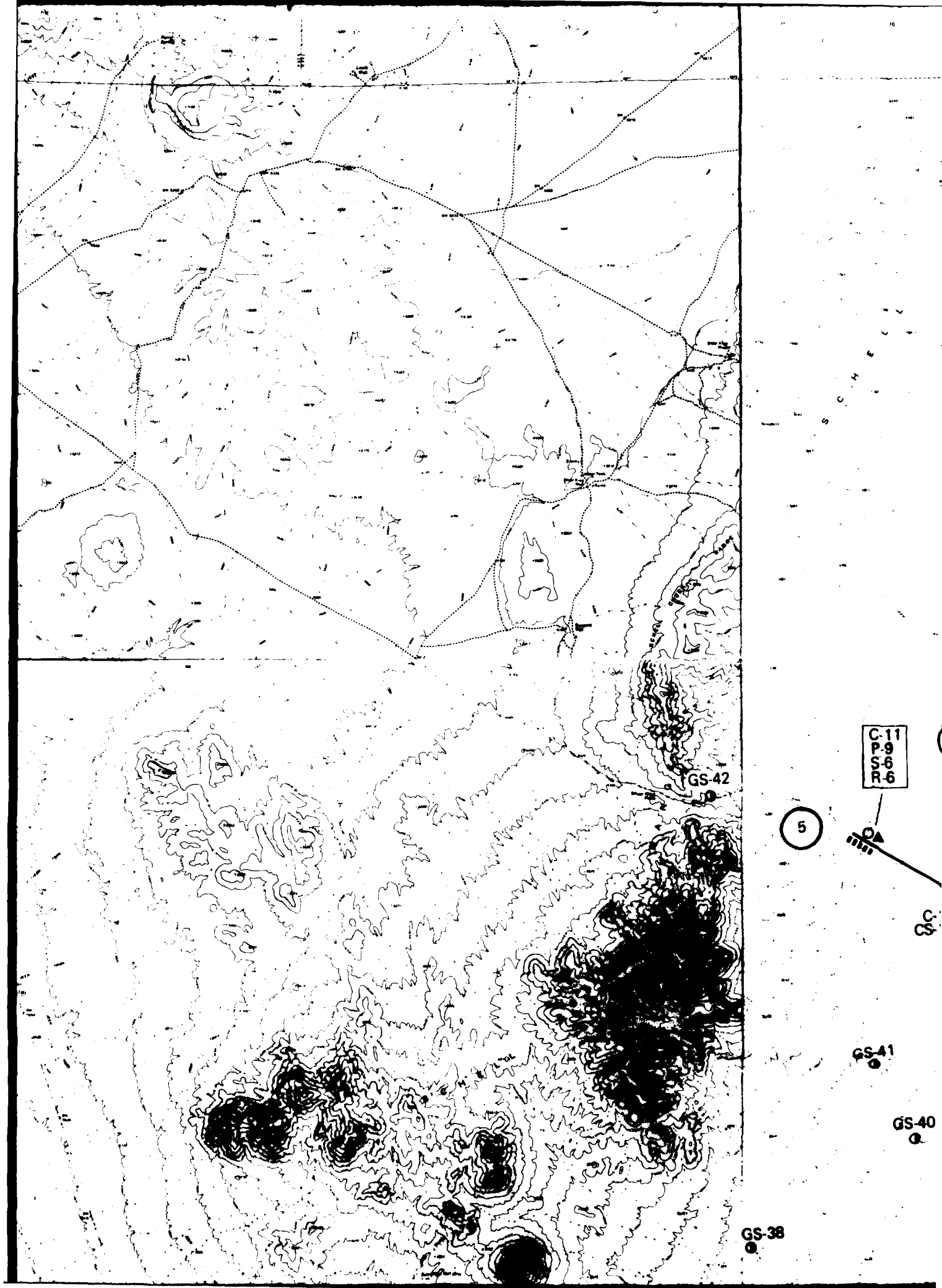
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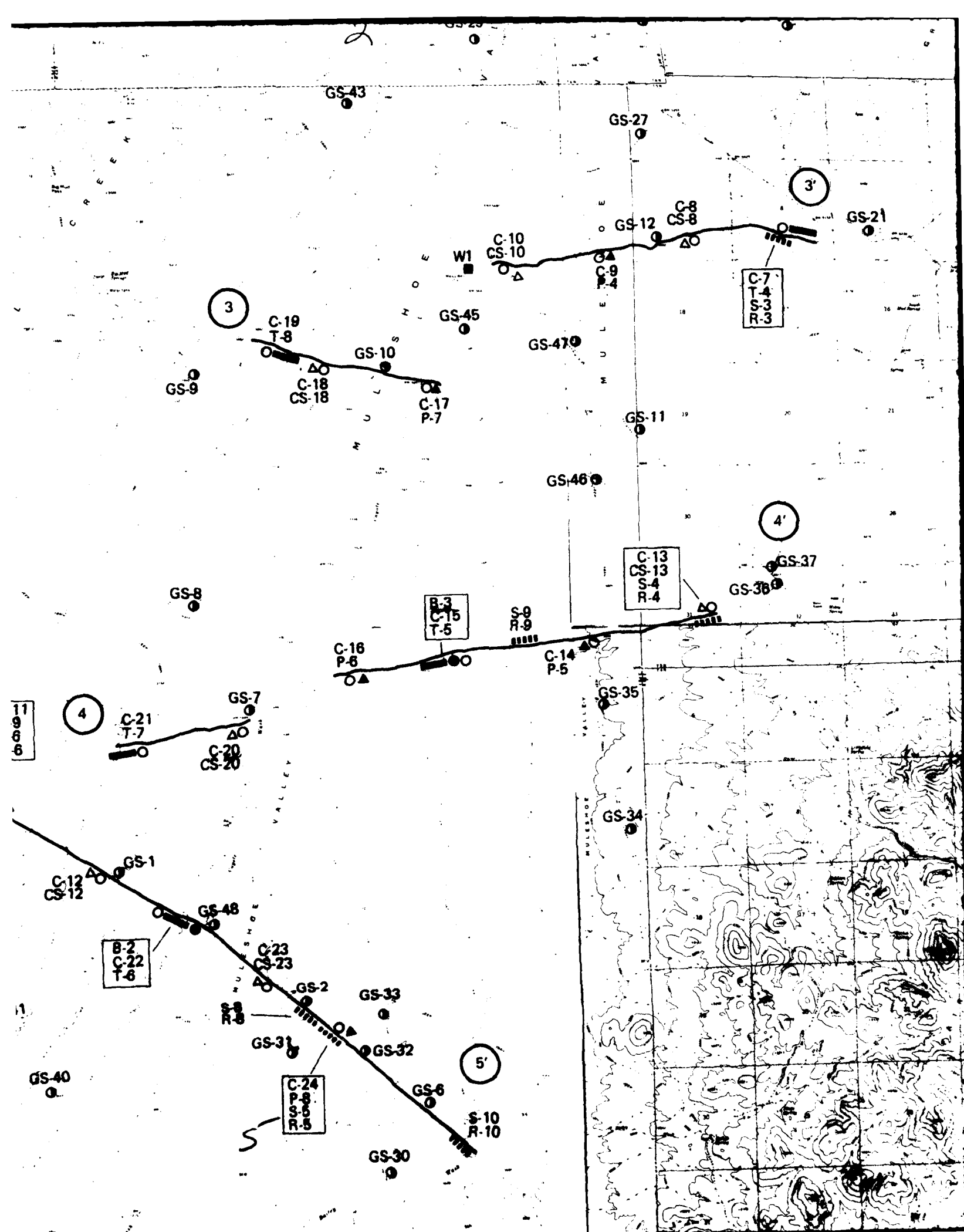
TABLE II-1-1

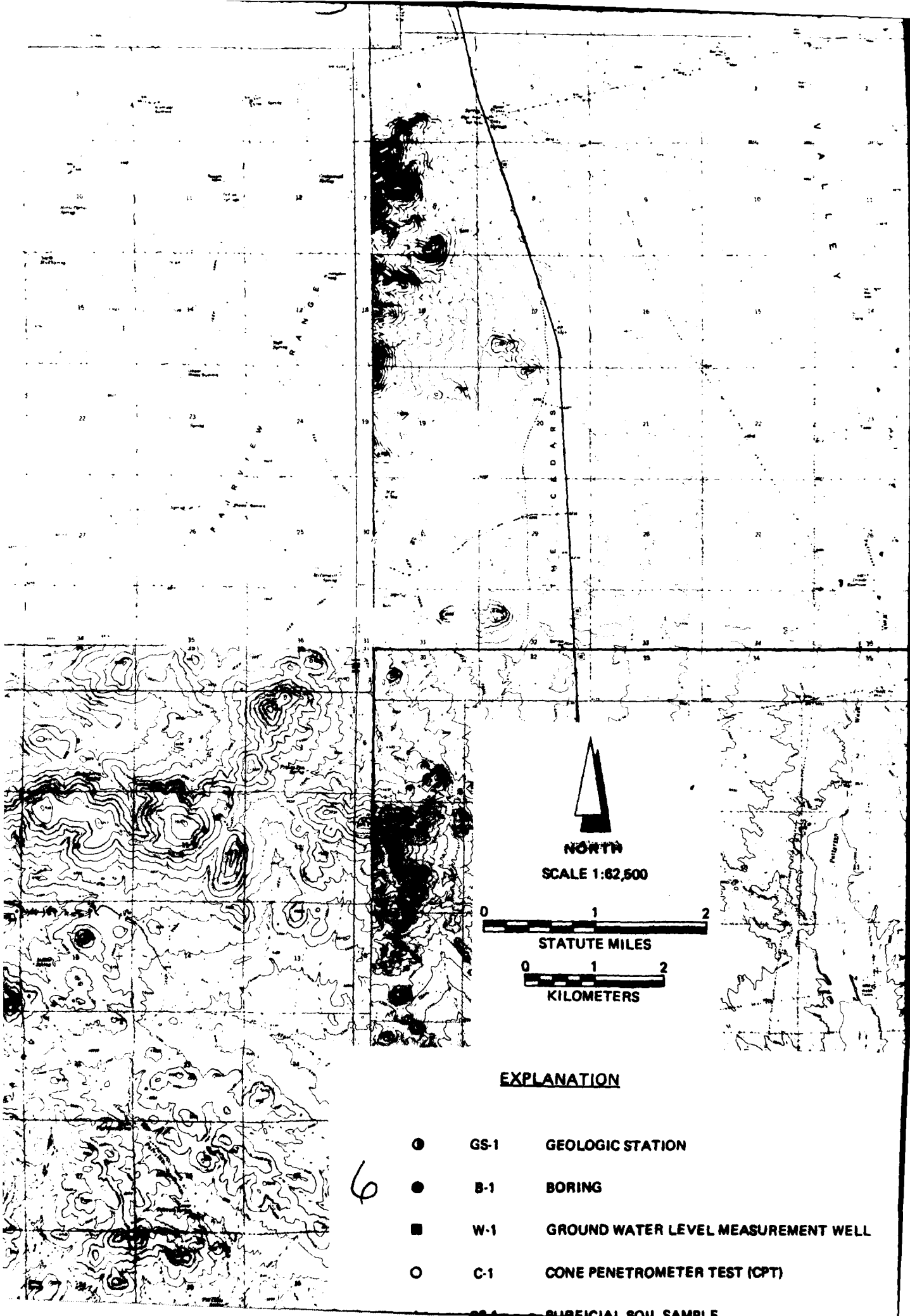


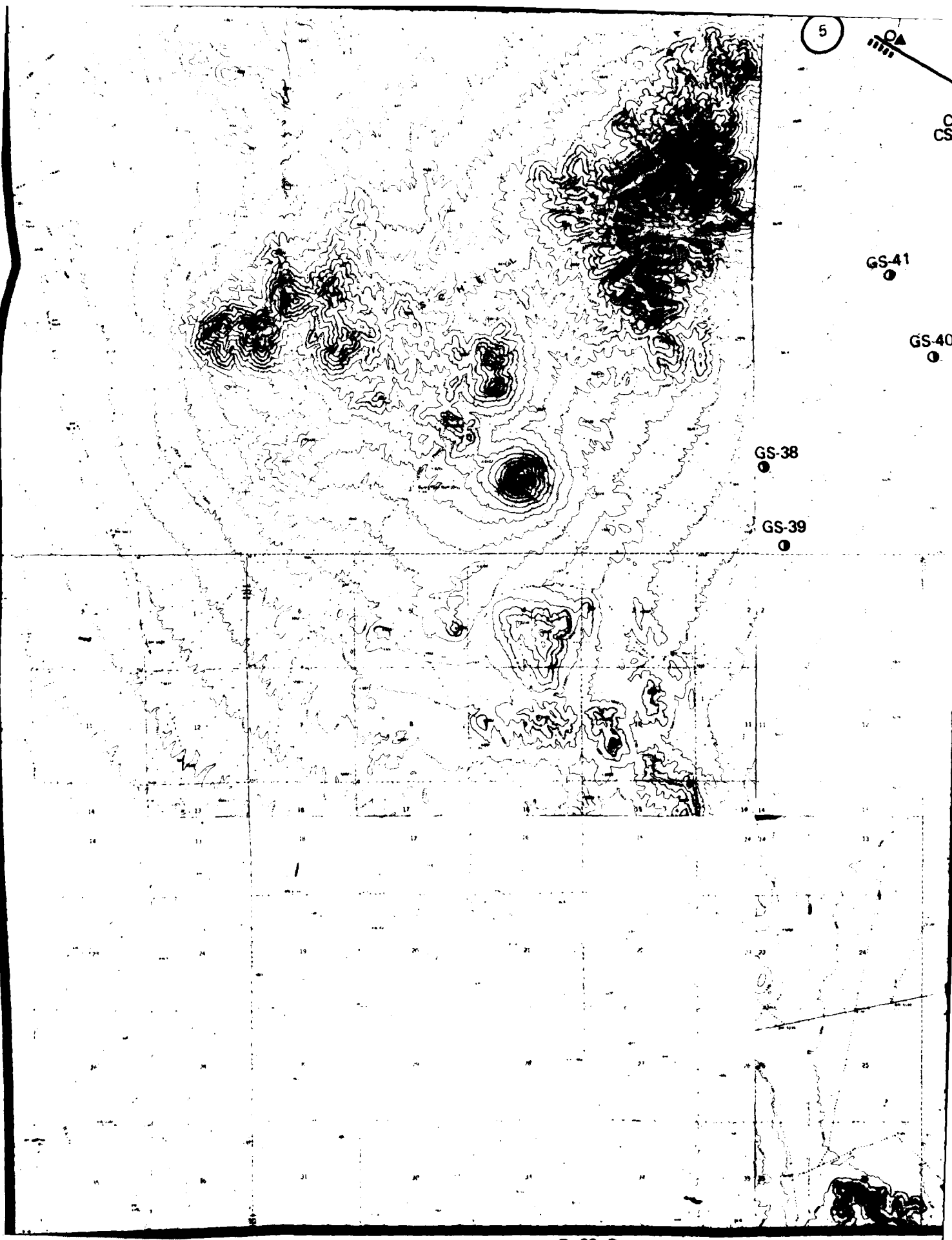


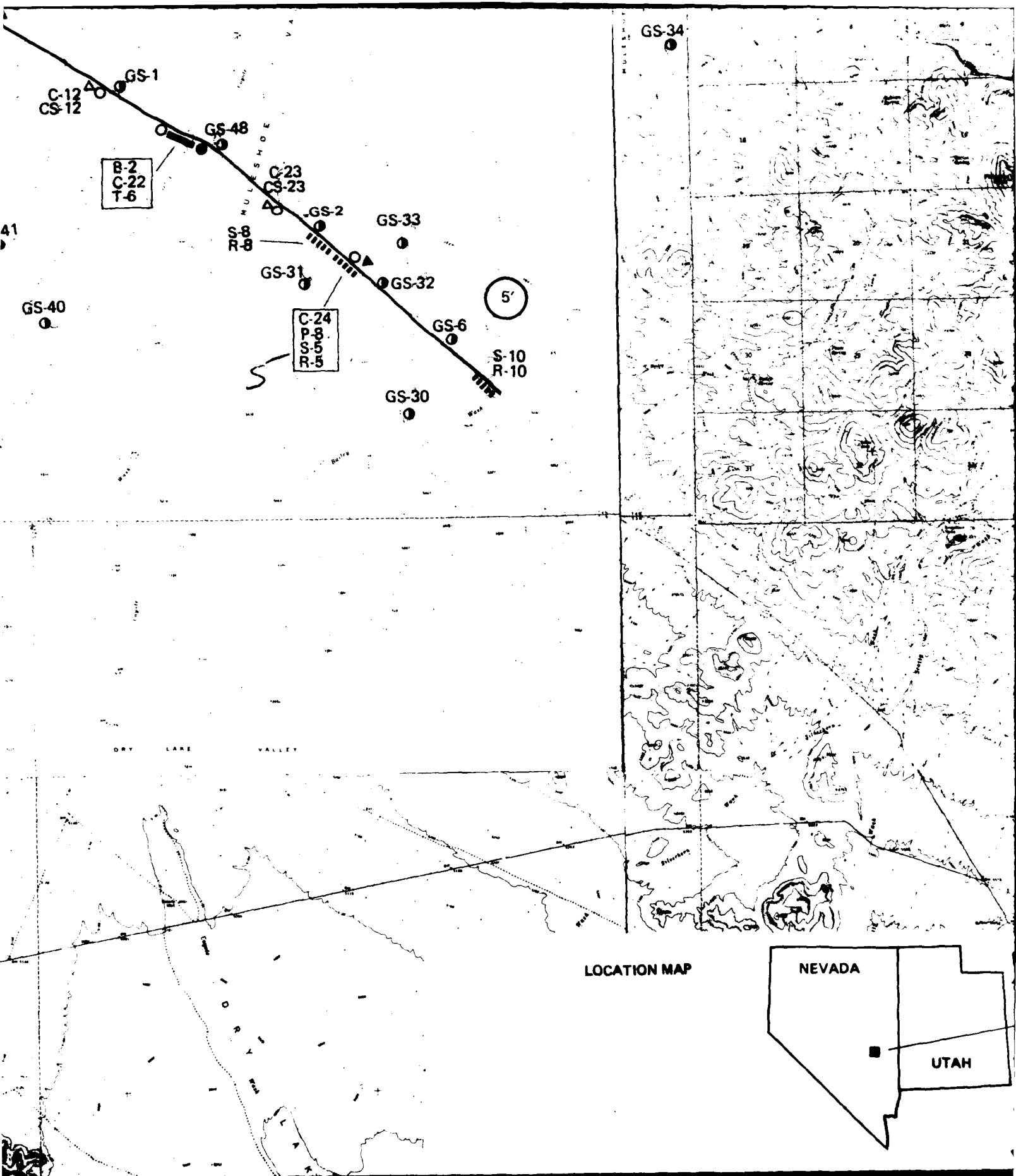


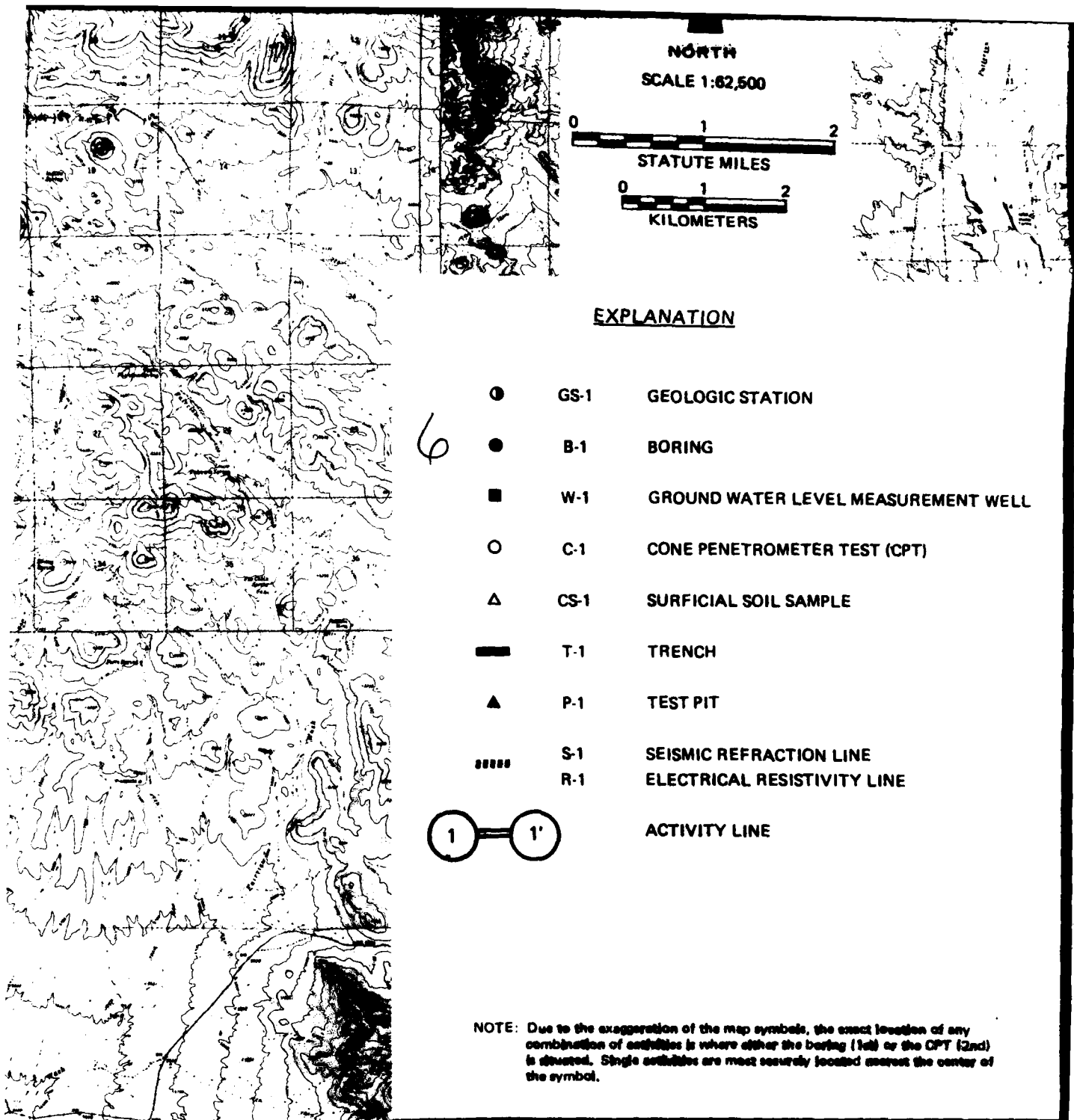












VERIFICATION STUDIES FY 80

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**MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE
BMO/AFRC-MX**

ACTIVITY LOCATION MAP MULESHOE VALLEY, NEVADA

30 JUN 81

DRAWING II-1-1

2.0 GEOLOGIC STATION DATA

Explanation: Geologic stations were established at selected locations throughout the valley at which detailed descriptions of surficial basin-fill deposits or rock were recorded. All data taken on surficial basin-fill units at the geologic stations are listed in Table II-2-1, and an explanation of the column headings in the table is given below. An example of the field data sheet is shown on Figure II-2-1. 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-2-2

Explanation

Station Number	Geologic stations are numbered sequentially. (e.g., NMSG001; N= Nevada-Utah Study Area; MS= Valley abbreviation [Muleshoe]; G= Geology Station).
Geol. Unit	Generalized mapped geomorphic unit (see explanation below). The grain-size designations (s, g, and f) indicate sand, gravel, and fines, respectively.
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. Note: The symbol, Ø (occasional), indicates between one and five percent; zero indicates 0 to one percent.

*	Laboratory analyses of selected soil samples using the Unified Soil Classification System.
USCS	Soil class according to the Unified Soil Classification System.
Munsell Color	Soil color based on standard Munsell Soil Color Charts.
Source Rock Types	Rock types of coarse clasts (gravel) 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 II-2-1. 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) Slightly Moist, 3) Moist, 4) Very Moist, 5) 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) Non-stratified, 2) Stratified, tabular, 3) Stratified, other (lensed, cross bedded, discontinuous beds)
11 (Cementation-Induration)	1) None, 2) Weak, 3) Moderate, 4) Strong
12 (Depth to Cemented Layer)	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) None, 2) Stage I, 3) Stage II, 4) Stage III, 5) Stage IV
Terrain	Terrain information at the data location is broken into the following categories:
Drainage Depth (ft)	Average depth of drainages (in feet)
Drainage Width (ft)	Average width of drainages (in feet)
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 recent stream channel and floodplain deposits.
- A2 Older Fluvial Deposits - Older incised stream channel and floodplain deposits in elevated terraces bordering major recent drainages. Note: Not mapped in Muleshoe Valley.
- A3 Eolian Deposits - Windblown 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, or g) 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 clays and silts (ML, CL, MH, CH)

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

g - gravels (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 composition 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 (pyroclastic) - 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).

E-TR-27-MS-II

SOIL DESCRIPTION														TERRAIN												
STATION NUMBER	GEOLOGIC UNIT	HPS MM	GRAIN SIZE					USCS	MUNSELL COLOR	SOURCE ROCK TYPES	PHYSICAL PROPERTIES										DRAINAGE (FT)		SLOPE WIDTH (%)	SAMPLE		
			W	X	Y	Z	U				6	7	8	9	10	11	12	13	14	15	DEPTH	WIDTH				
MSG0001	ASIS							GM																		0
MSG0002	ASIS																									0
MSG0003	ASIS	23	0	15	15	65	20	SM	10.0YR3/3	S2 I	2	5	2	3	1	1		3	3			5.0	3.0	2		0
MSG0004	A1 F		0	0	0	5	95	ML	10.0YR3/3		2	3	3	8	1	1			1	1		7.0	10.0			0
MSG0005	ASIS	85	0	0	2	93	5	SP-SH	10.0YR3/3	I2 S2	2	3	1	3	1	2	20	3	1	4						0
MSG0006	ASIS	120	0	0	10	75	10	SP-SH	7.5YR4/4	I2	2	3	2	3	1	2	26	3	2	4		7.0	13.0	3		0
MSG0007	A1 S	1	0	0	0	65	35	SH	10.0YR4/4		3	3	2	3	1	1			1	1						0
MSG0008	ASIS	120	0	10	50	35	15	GM-SH		S2 I2	2	3	2	2	1	4	25	2	2	5		7.0	50.0			0
MSG0009	ASIS	90	0	5	10	85	5	SP-SH	7.5YR4/4	S2 I2	2	3	2	3	1	3	58	2	3	4		25.0	3.0	2		0
MSG0010	ASIS	110	0	0	5	75	20	SM	10.0YR4/3	S2	2	3	2	2	1	3	70	2	1	4		8.0	33.0	2		0
MSG0011	ASIS	6	0	0	0	75	25	SC	7.5YR4/6		2	3	3	3	1	1			3	1				2		0
MSG0012	ASIS	200	0	5	20	70	10	SP-SH	10.0YR3/4	I2 S2	2	3	2	3	1	3	41	3	2	4		13.0	70.0	1		0
MSG0013	ASIS	80	0	0	20	60	20	SM-SH	10.0YR4/4	S2 I2	2	5	2	3	1	4	20	2	1	5		10.0	20.0	3		0
MSG0014	ASYS	20	0	0	0	70	30	SH	7.5YR5/4		2	1	2	3	1	1			2	1		1.0	3.0	1		0
MSG0015	ASIS	90	0	0	10	70	20	SP-SH	10.0YR3/3	S2	2	3	2	2	1	2	40	2	2	4		8.0	10.0	5		0
MSG0016	ASIS	110	0	0	40	35	5	SP-SH	10.0YR3/3	S2 I2	2	3	1	2	1	1			2	1		3.0	7.0	4		0
MSG0017	S2																									0
MSG0018	ASIS	85	0	0	5	80	15	SH	10.0YR3/4	S2	2	1	1	2	1	3	20	2	2	4		10.0	70.0	6		0
MSG0019	A1 F		0	0	0	15	85	ML	10.0YR4/3		1	3	7	1	1				1	1		8.0	200.0	0		0
MSG0020	ASIS	25	0	0	5	80	15	SH	10.0YR3/4	S2 S1	2	1	2	2	1	4	35	2	2	5		16.0	200.0	2		0
MSG0021	I2																									0
MSG0022	S2																									0
MSG0023	ASIS	75	0	0	15	70	15	SH	10.0YR3/4	S2 I3 I4 S1	2	1	3	3	1	3	20	2	2	4				1		0
MSG0024	ASIS		0	0	10	80	10	SP-SH	10.0YR3/4	S2 S1	2	1	2	3	1	1			2	2		2.0	3.0	2		0
MSG0025	ASIS	85	0	0	20	35	25	SH	10.0YR3/4	S2 S1 I4	2	1	2	2	1	3	27	2	2	5		20.0	250.0	6		0
MSG0026	ASIS	310	0	5	30	35	15	SH	10.0YR3/4	S2 S1 I4	2	1	3	3	1	1			2	2		7.0	80.0	8		0
MSG0027	ASIS	20	0	0	10	75	15	SH	10.0YR4/4	S1 S2	2	1	2	3	1	4	15	2	2	5				2		0
MSG0028	ASIS		0	0	10	75	15	SH	10.0YR4/4	S2 S1	2	1	2	2	1	4	27	2	2	5						0
MSG0029	ASIS	70	0	0	5	80	15	SH	10.0YR3/4	S2 S1 I2	2	1	2	2	1	3	25	2	2	5		8.0	35.0	0		0
MSG0030	A2 S	25	0	0	5	90	5	SP-SH	5.0YR3/4	I2	2	1	1	4	1	1			2	3				2		0
MSG0031	I3																									0
MSG0032	ASIS	45	0	0	5	70	25	SC	7.5YR4/6	I2	2	3	3	4	1	1			2	3				2		0
MSG0033	ASIS	65	0	0	10	65	25	SH	10.0YR3/4	I2 I3	2	1	1	3	1	3	25	2	2	5				1		0
MSG0034	ASIS	15	0	0	0	95	5	SP-SH	5.0YR3/3		3	1	1	4	3	1			2	1				1		0
MSG0035	ASIS	120	0	5	5	85	10	SP-SH	10.0YR4/4	I2 S2 I3	3	1	2	2	3	4	40	2	2	5				0		0
MSG0036	I2																									0
MSG0037	ASIS	30	0	0	0	95	5	SP-SH	5.0YR3/3		3	1	2	4	1	1			2	2				1		0
MSG0038	ASIS	75	0	0	30	60	10	SP-SH	10.0YR5/4	S2 I3 S1	2	1	2	3	1	3	24	2	1	4		7.0	33.0	6		0
MSG0039	ASIS	100	0	0	10	80	10	SP-SH	10.0YR4/4	S2 S1 I2	3	1	2	3	1	1			2	1		3.0	7.0	4		0
MSG0040	ASIS	140	0	0	35	35	10	GP-GM		S2 S1	2	1	3	3	3	2	32	2	1	4		3.0	20.0	4		0
MSG0041	ASIS	37	0	0	10	75	15	SH	10.0YR4/4	S2 S1	2	1	1	3	1	4	35	2	1	5		2.0	33.0	8		0
MSG0042	S2																									0
MSG0043	ASIS	65	0	0	10	75	15	SH	10.0YR4/4	S2 S1	2	1	2	2	1	4	38	2	1	5		25.0	450.0	6		0
MSG0044	ASIS	35	0	0	0	95	5	SP-SH	10.0YR4/6		3	1	1	4	1	1			2	1				1		0
MSG0045	ASYS	25	0	0	5	90	5	SP-SH	10.0YR4/4	I2 S1	1	1	1	3	1	1			2	1						0
MSG0046	ASIS	45	0	0	0	97	3	SP	10.0YR5/4		3	1	1	2	1	3	40	2	1	4		13.0	380.0	2		0
MSG0047	ASIS	90	0	0	5	92	3	SP	10.0YR4/4	I2 S1 S2	3	1	1	3	1	3	30	2	2	3		3.0	40.0	2		0
MSG0048	A1 S	45	0	0	0	55	45	SH			3	1	2	3	1	1			2	1				1		0

EXPLANATION: PHYSICAL PROPERTIES

6: GRAIN SHAPE	9: CONSISTENCY	12: DEPTH TO CEMENTED LAYER (CM)	15: CALICHE DEVELOPMENT
7: MOISTURE CONTENT	10: STRUCTURE	13: WEATHERING OF CLASTS	NOTE: 0=OCCASIONAL (1-5%)
8: PLASTICITY OF FINES	11: CEMENTATION-INDURATION	14: SOIL PROFILE DEVELOPMENT	NOTE: 8=LAB DATA



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GEOLOGIC STATION DATA
MULESHOE VALLEY, NEVADA

30 JUN 81

TABLE II-2-1

E-TR-27-MS-II

Station No.

CSR/VALLEYVIEW STATION #						
1	2	3	4	5	6	7

 Described Geol. Unit

UNIT 88			
8	9	10	11

Date _____ Complete Geol. Unit _____

Observers _____ Field Photo Nos. _____

Air Photo No. _____ Sample (No=0, Yes=1)

12

SOIL PROPERTIES

1. Grain-Size Distribution: MPS (mm) - grain size of coarsest fraction; boulders and cobbles - percent of total; gravel, sand, and fines - percent less than 3 inches.

MPS								B								C								S								F																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								

2. USCS Symbol

28	29	30	31

3. Descriptive Name (one adjective only) _____

4. Munsell Color (not applicable to gravel)

32	33	34	35	36	37	38

5. Lithology of gravel, cobbles, boulders: give rock type (I1, I2, M, etc.) in order of abundance.

39	40	41	42	43	44	45	46	47	48

6. Grain Shape (coarse grained soil only): 1) Angular, 2) Subangular, 3) Subrounded, 4) Rounded, 5) Well-rounded.

49

7. Moisture Content: 1) Dry, 2) Slightly moist, 3) Moist, 4) Very moist, 5) Wet

50

8. Plasticity of Fines: 1) None, 2) Low, 3) Medium, 4) High

51

9. Consistency:
Coarse-grained: 1) Very Loose, 2) Loose, 3) Medium Dense, 4) Dense, 5) Very Dense
Fine-grained: 6) Soft, 7) Firm, 8) Stiff, 9) Hard

52

10. Structure: 1) Non-stratified (homogeneous), 2) Stratified-tabular, 3) Stratified-other; if 3) describe _____

53

11. Cementation-Induration: 1) None, 2) Weak, 3) Moderate, 4) Strong

54

12. Depth to Cemented Layer (cm)

55	56	57

13. Weathering of boulders, cobbles, and gravel: 1) Fresh, 2) Slight, 3) Moderate, 4) Very

58

14. Degree of Soil Profile Development: 1) None (A-C profile), 2) Poor (incipient E-horizon), 3) Well (prominent R-horizon)
Describe _____

59

15. Degree of Caliche Development: 1) None, 2) Stage I, 3) Stage II, 4) Stage III, 5) Stage IV
Describe _____

60



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FIELD DATA SHEET
PAGE 1 OF 2

30 JUN 81

FIGURE IX-2-1

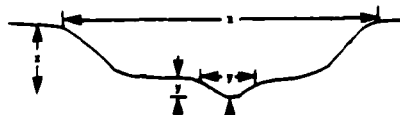
E-TR-27-MS-II

TERRAIN

16. Average Drainage Depth (ft)

17. Average Drainage Width (ft)

18. Slope (percent) - field and/or topo map measurement



1	2	3	4	5	6	7	8	9

1	2	3	4	5	6	7	8	9

1	2	3	4	5	6	7	8	9

FIELD MAP

SURFACE FEATURES

19. Pit Depth (cm) _____

20. Thickness of Vesicular Silt (cm) _____

21. Desert Pavement Development
(None, Poor, Moderate, Well) _____22. Patina Development
(None, Moderate, Well) _____

COMMENTS

ROCK DESCRIPTIONS

23. Rock Type/Formation _____

24. Color, Grain size, Hardness, Texture _____

25. Degree of weathering _____

26. Structure
Bedding Characteristics _____

Bedding Attitude _____

Fracture, Joint _____

27. Secondary Alteration/Mineralization _____



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FIELD DATA SHEET
PAGE 2 OF 2

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FIGURE II-2-1

3.0 GROUND-WATER DATA

Explanation: The only ground-water data available for Muleshoe Valley was a single boring recorded by the State of Nevada Engineer's Office. These data were updated where possible from measurements taken during Ertec EWI's field operations. All data are shown in Table II-3-1. The location of the borehole in which the water-level measurement was attempted is shown in Drawing II-1-1. The well number listed in the left-hand column of Table II-3-1 refers to the well location shown on Drawing II-1-1. The actual well number giving location, according to the Bureau of Land Management Land Survey System, is shown in the second column.

• MOUNT DIABLO BASELINE AND MERIDIAN
• REFERENCES:
1. ERTEC WESTERN MEASUREMENT



4.0 SEISMIC REFRACTION DATA

Explanation: 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 of the geophone array from geophone 1 to geophone 24.

Travel Time Versus Distance Graph (Upper Half of Figure)

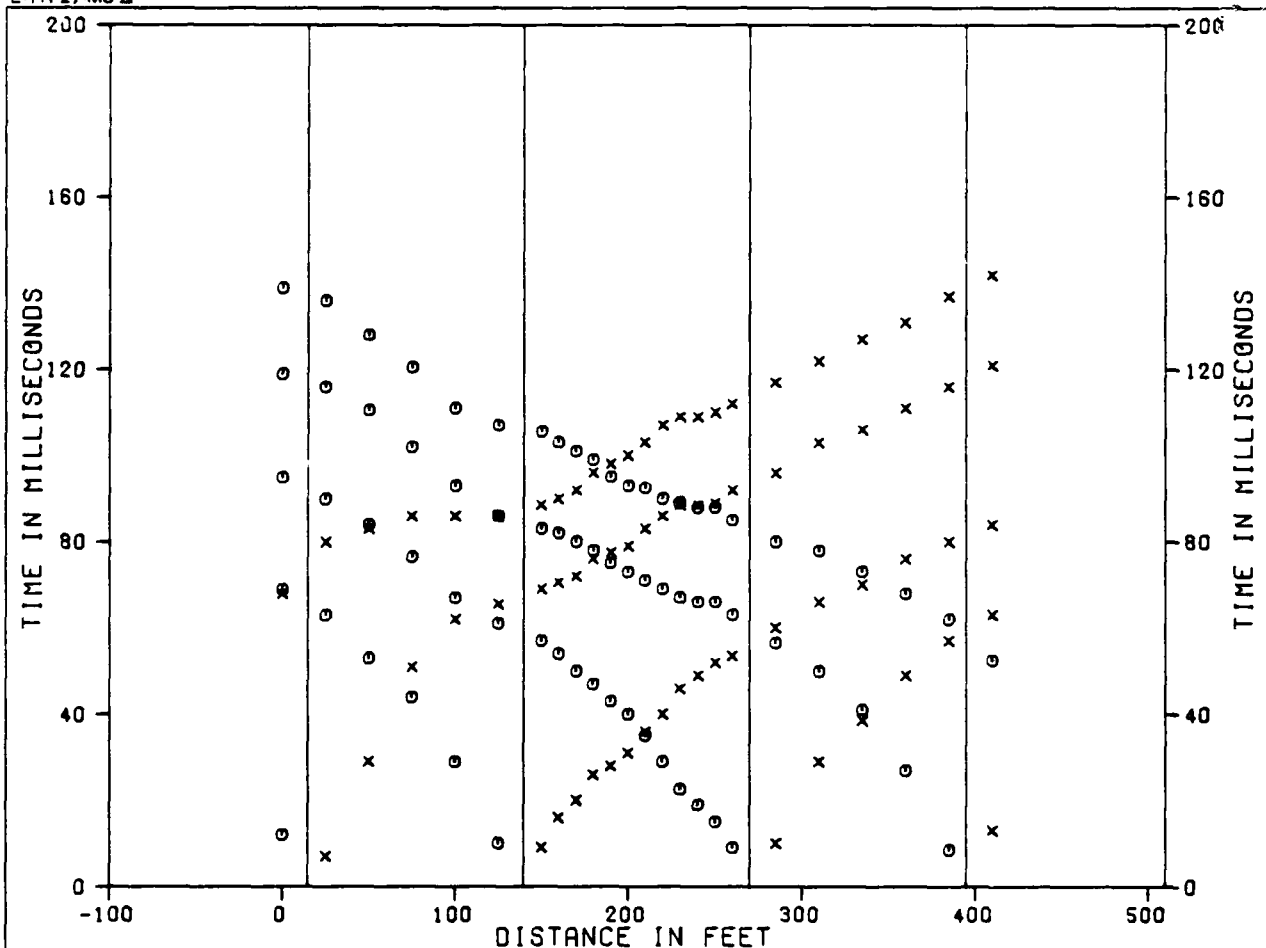
On this graph, the abscissa represents distance; the ordinate, time. The six vertical lines represent the locations of shots (designated as F, G, H, I, J, and K). The symbol "X" denotes travel times at geophones that were located to the right of a shot. The symbol, $\ominus$, denotes travel times that 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

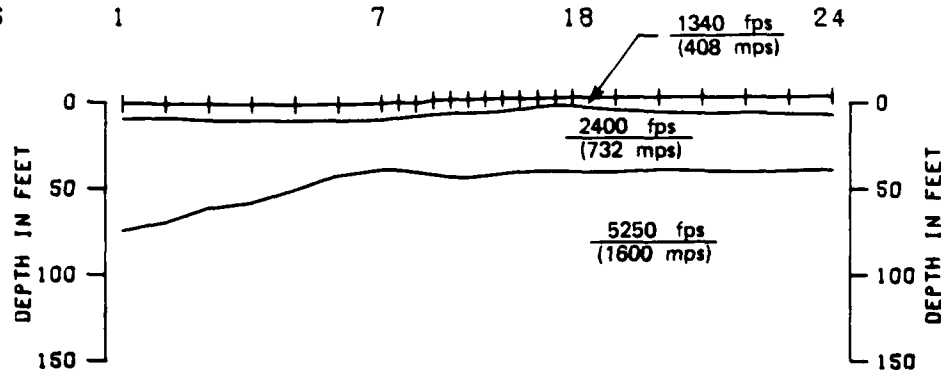
velocities. These boundaries are commonly called "refractors." The velocity interpreted to be representative of each layer is shown.

E-TR-27-MS-II



SHOT F
GEOPHONES

G H I J K
1 7 18 24



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

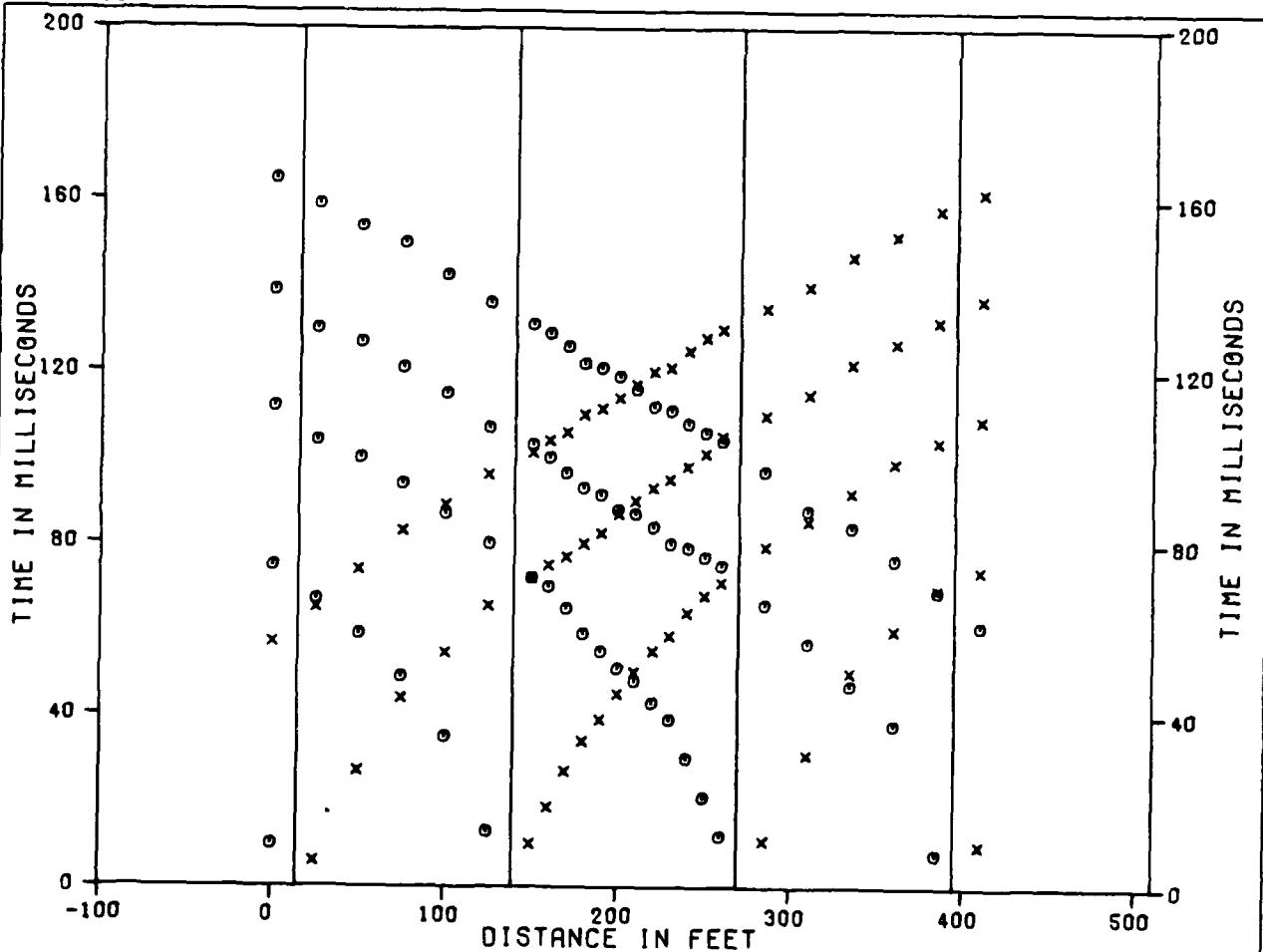
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SEISMIC REFRACTION LINE MSS-1
TIME DISTANCE DATA AND VELOCITY PROFILE
MULESHOE VALLEY, NEVADA

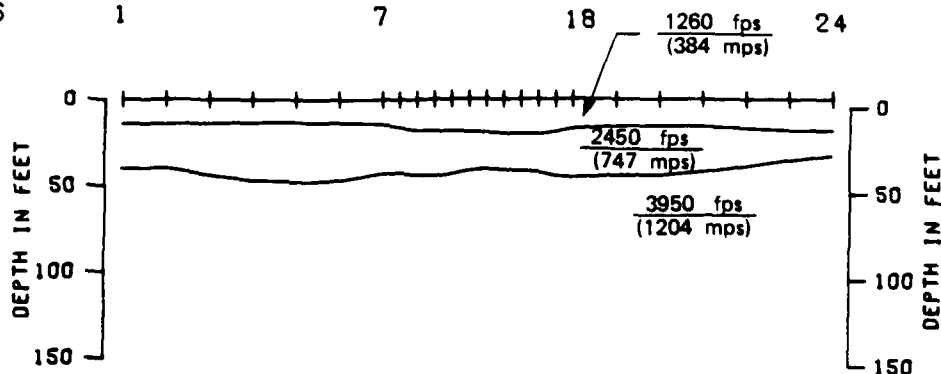
30 JUN 81

FIGURE II-4-1



SHOT F
GEOPHONES

G H I J K
1 7 18 24



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

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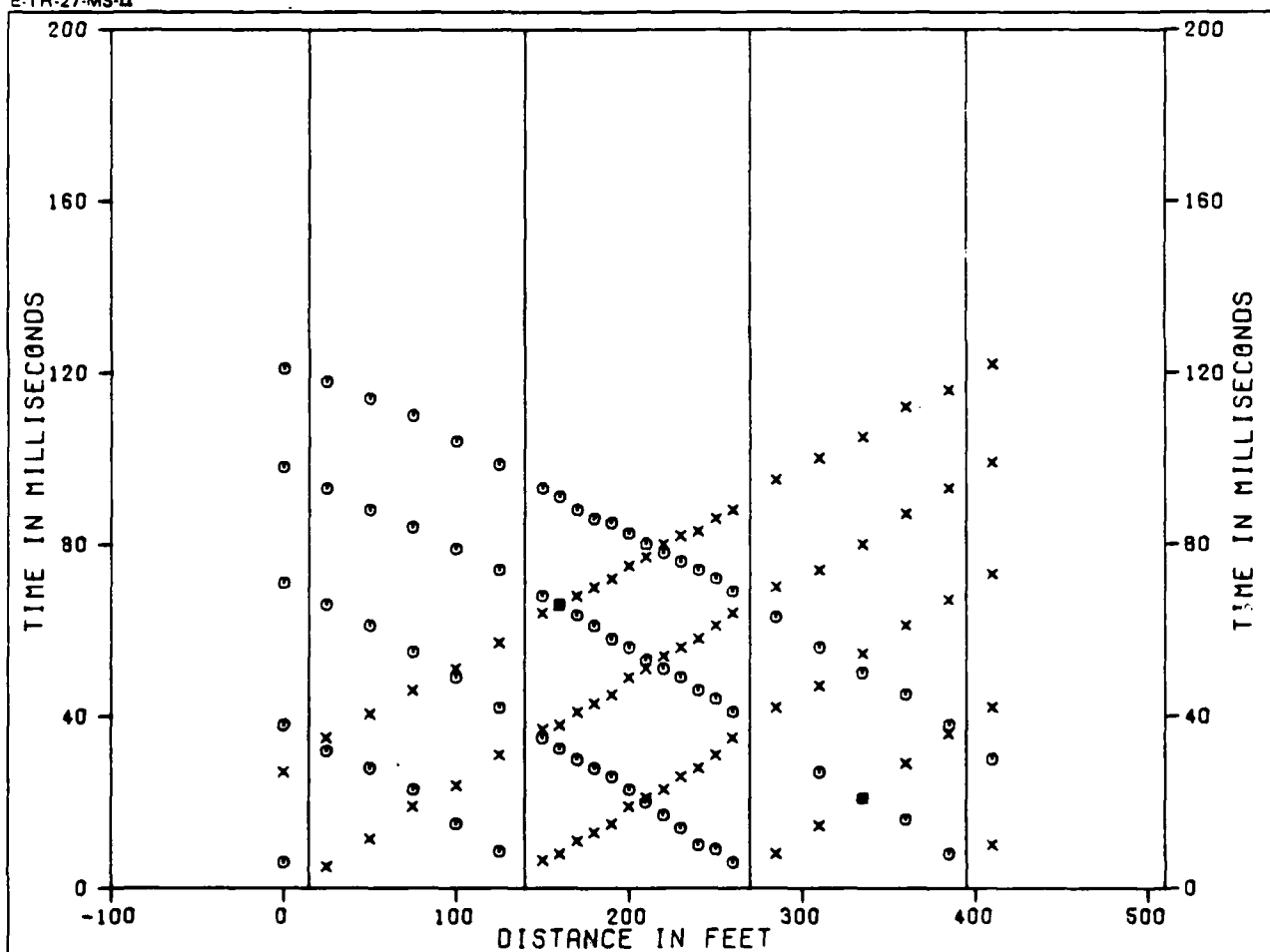
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SEISMIC REFRACTION LINE MS-S-2
TIME DISTANCE DATA AND VELOCITY PROFILE
MULESHOE VALLEY, NEVADA

30 JUN 81

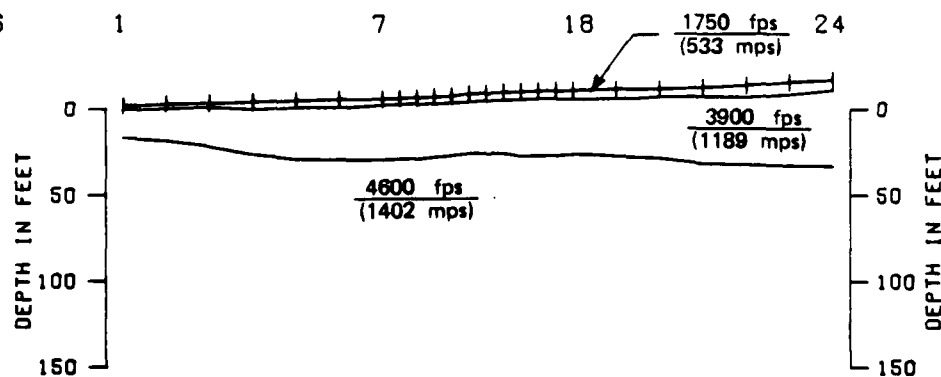
FIGURE II-4-2

E-TR-27-MS-II



SHOT F
GEOPHONES

G H I J K
1 7 18 24



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

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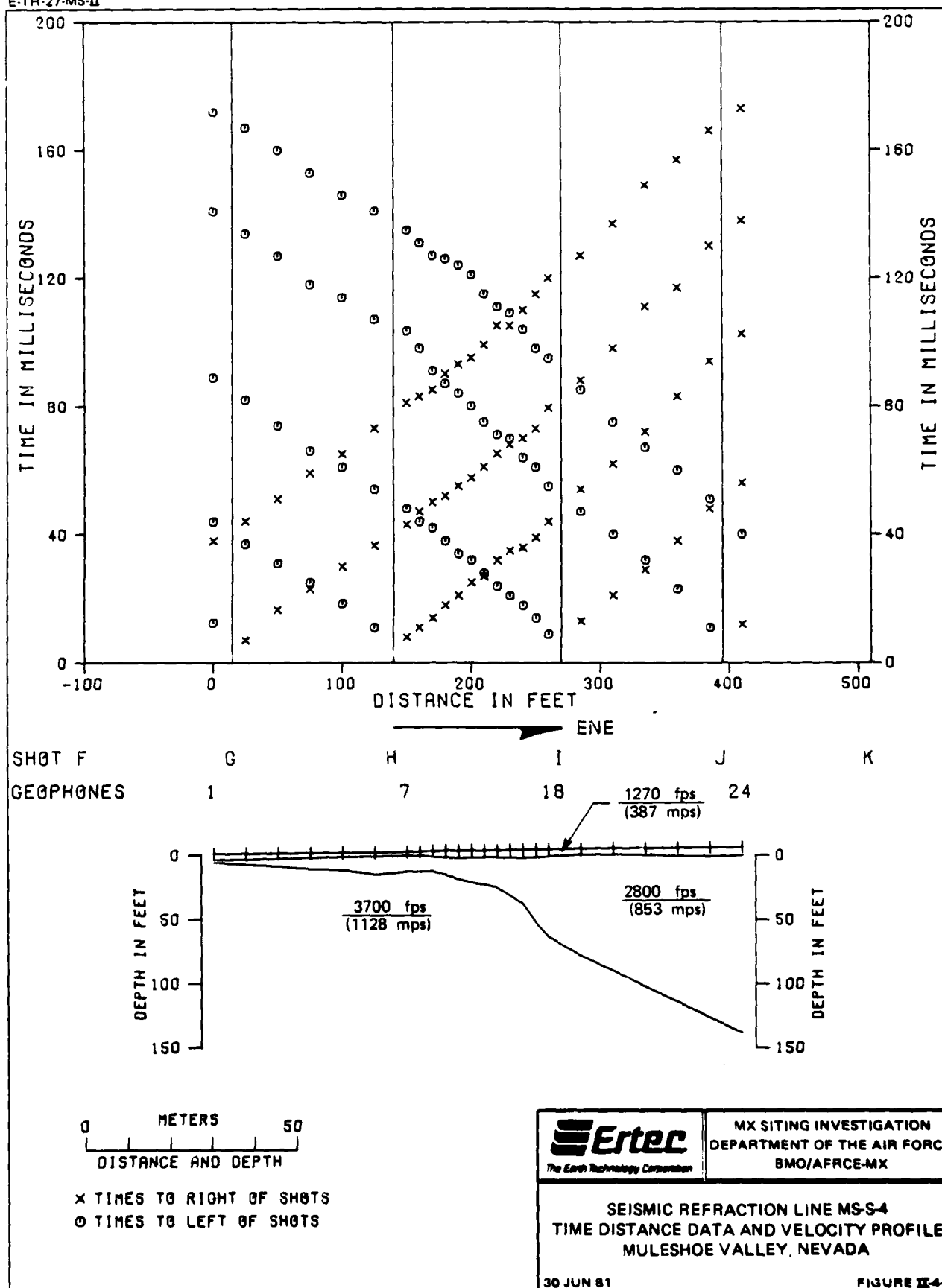
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BMO/AFRC-MX

SEISMIC REFRACTION LINE MS-S-3
TIME DISTANCE DATA AND VELOCITY PROFILE
MULESHOE VALLEY, NEVADA

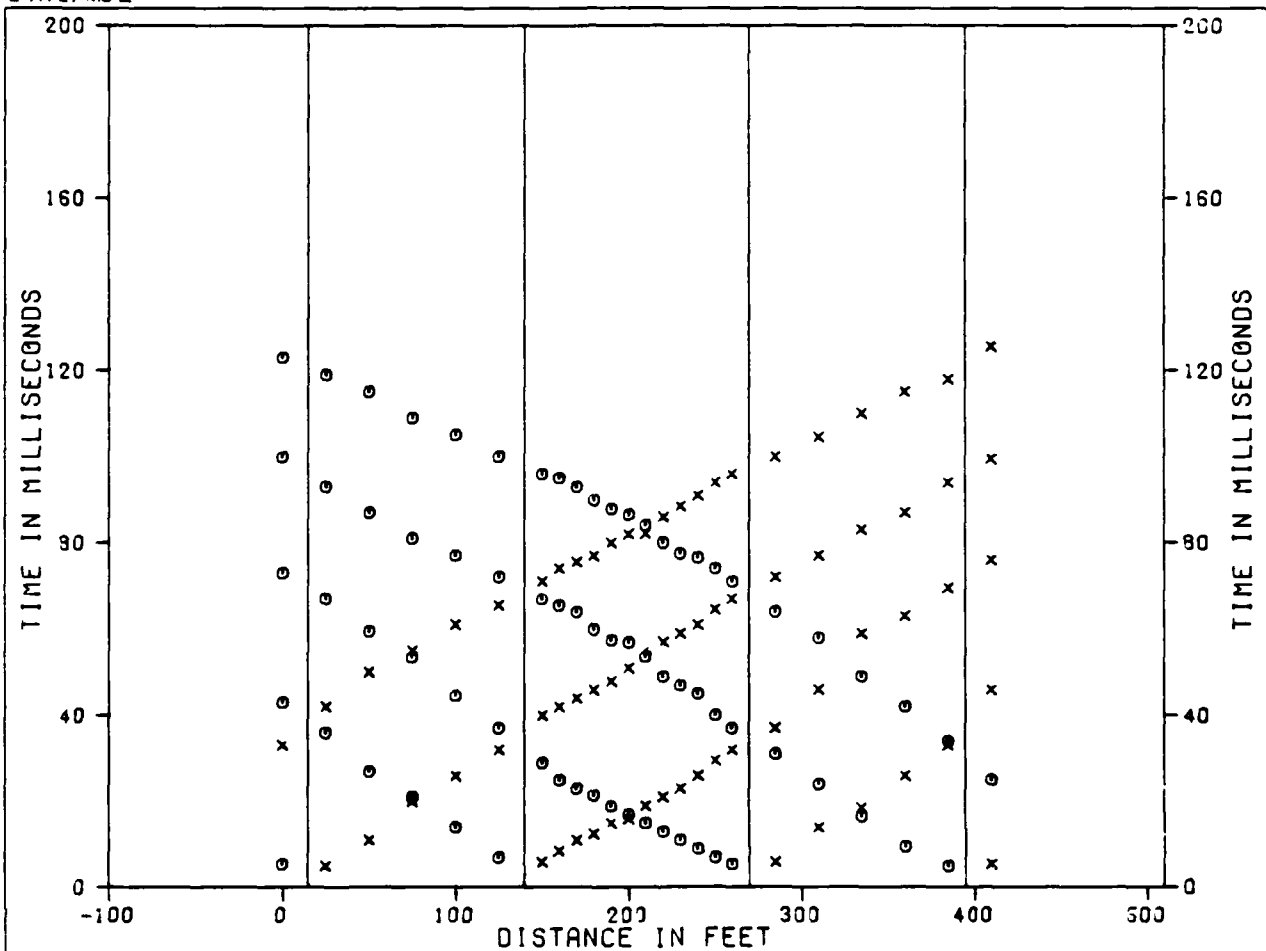
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FIGURE II-4-3

E-TR-27-MS-II

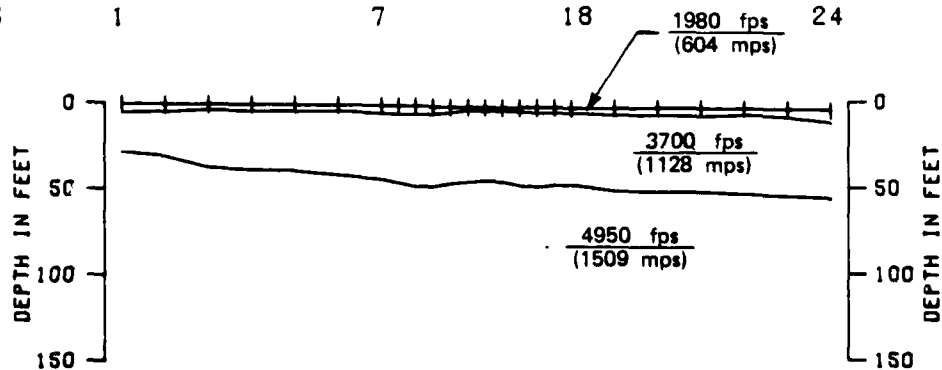


E-TR-27-MS-II



SHOT F
GEOPHONES

G H I J K
1 7 18 24



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

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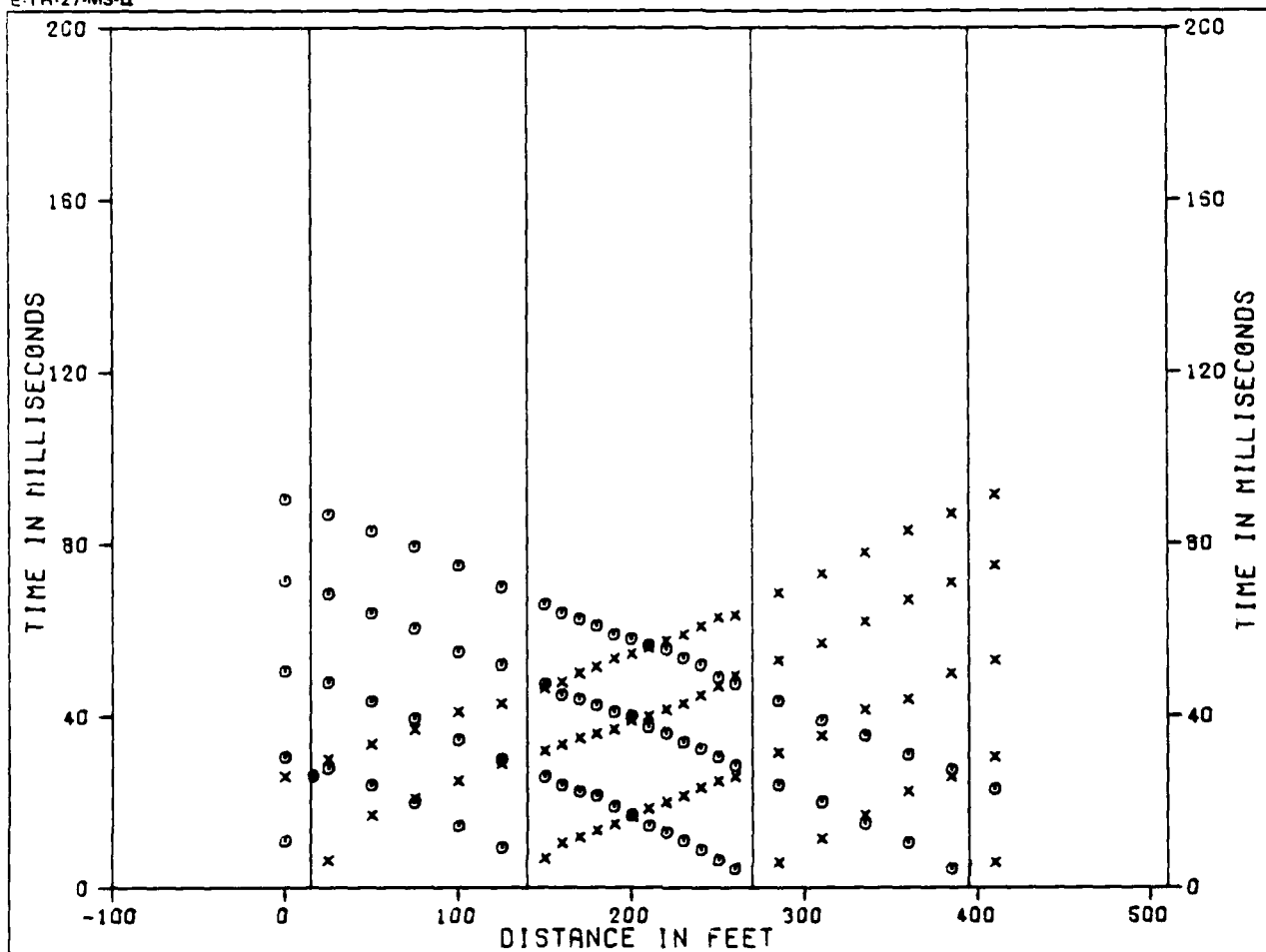
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SEISMIC REFRACTION LINE MS-S-5
TIME DISTANCE DATA AND VELOCITY PROFILE
MULESHOE VALLEY, NEVADA

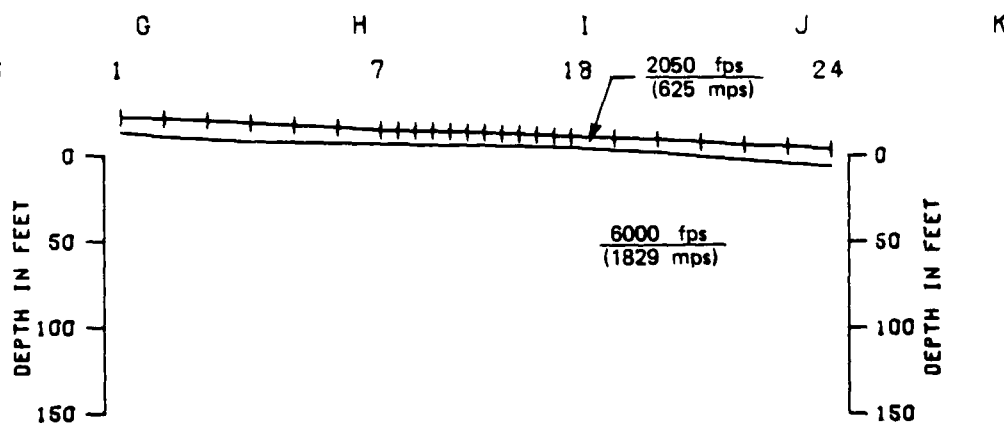
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FIGURE II-4-8

E-TR-27-MS-II



SHOT F
GEOPHONES



0 METERS 50
DISTANCE AND DEPTH

x TIMES TO RIGHT OF SHOTS
o TIMES TO LEFT OF SHOTS

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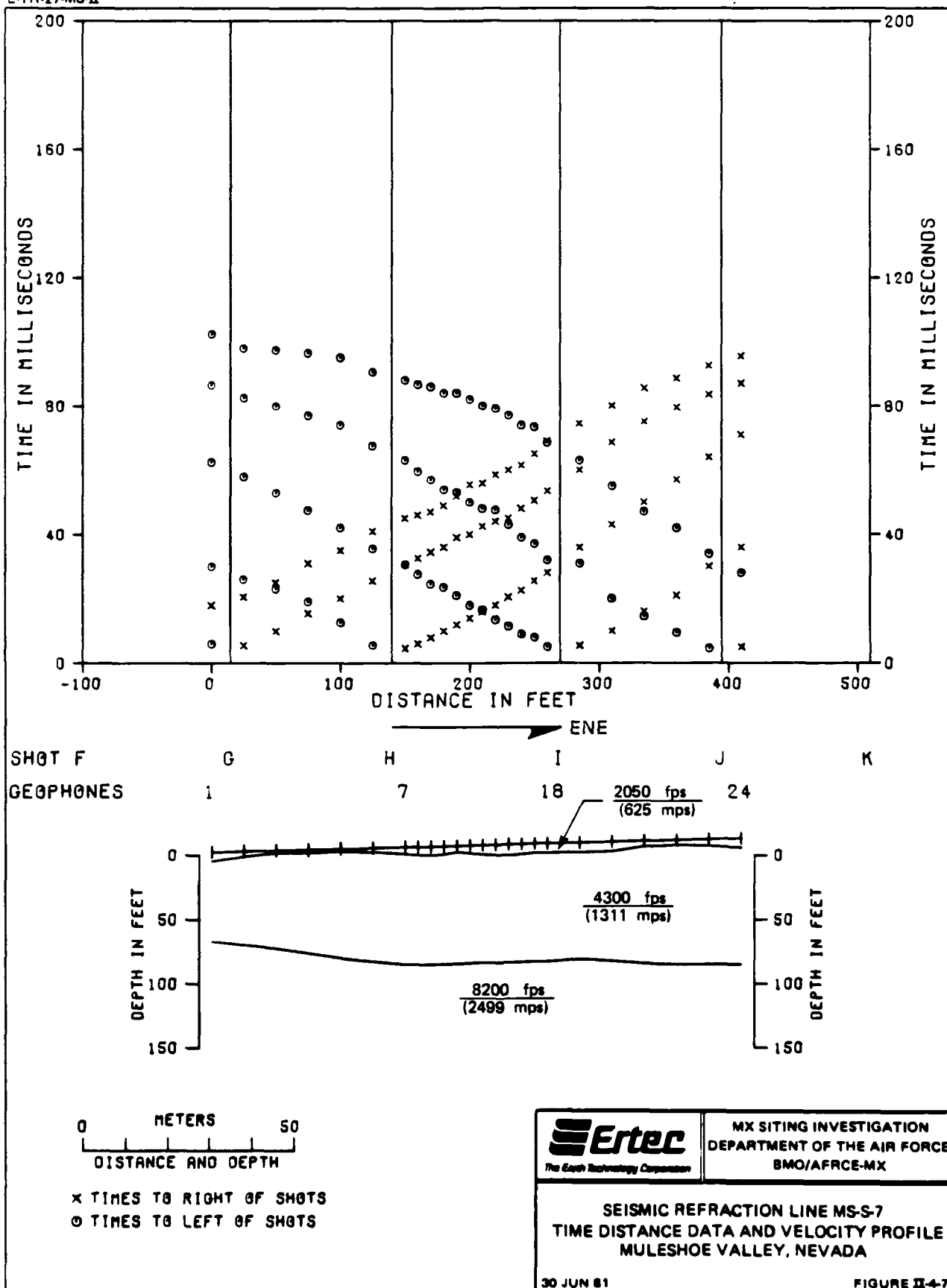
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SEISMIC REFRACTION LINE MSS-6
TIME DISTANCE DATA AND VELOCITY PROFILE
MULESHOE VALLEY, NEVADA

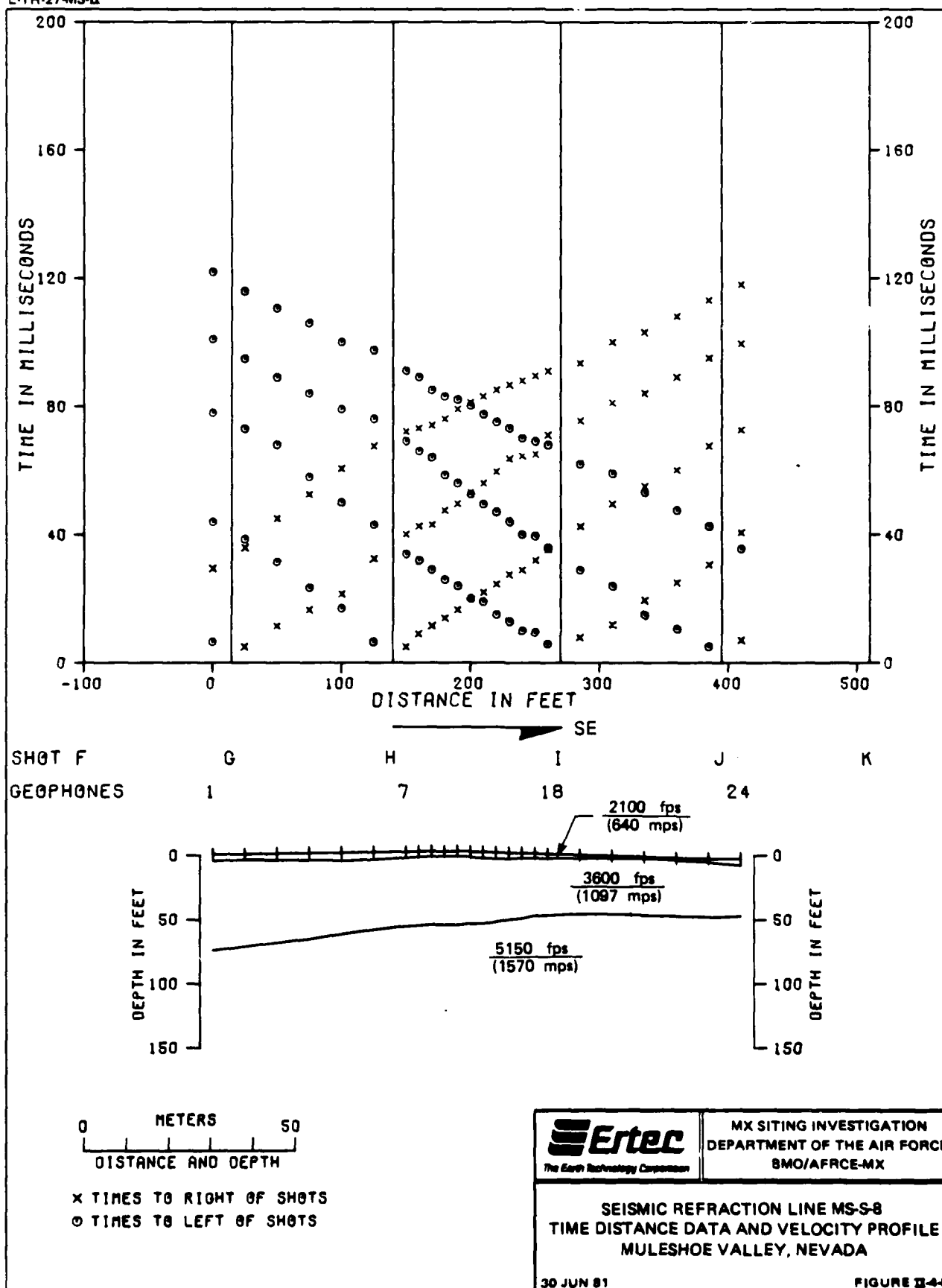
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FIGURE II-4-6

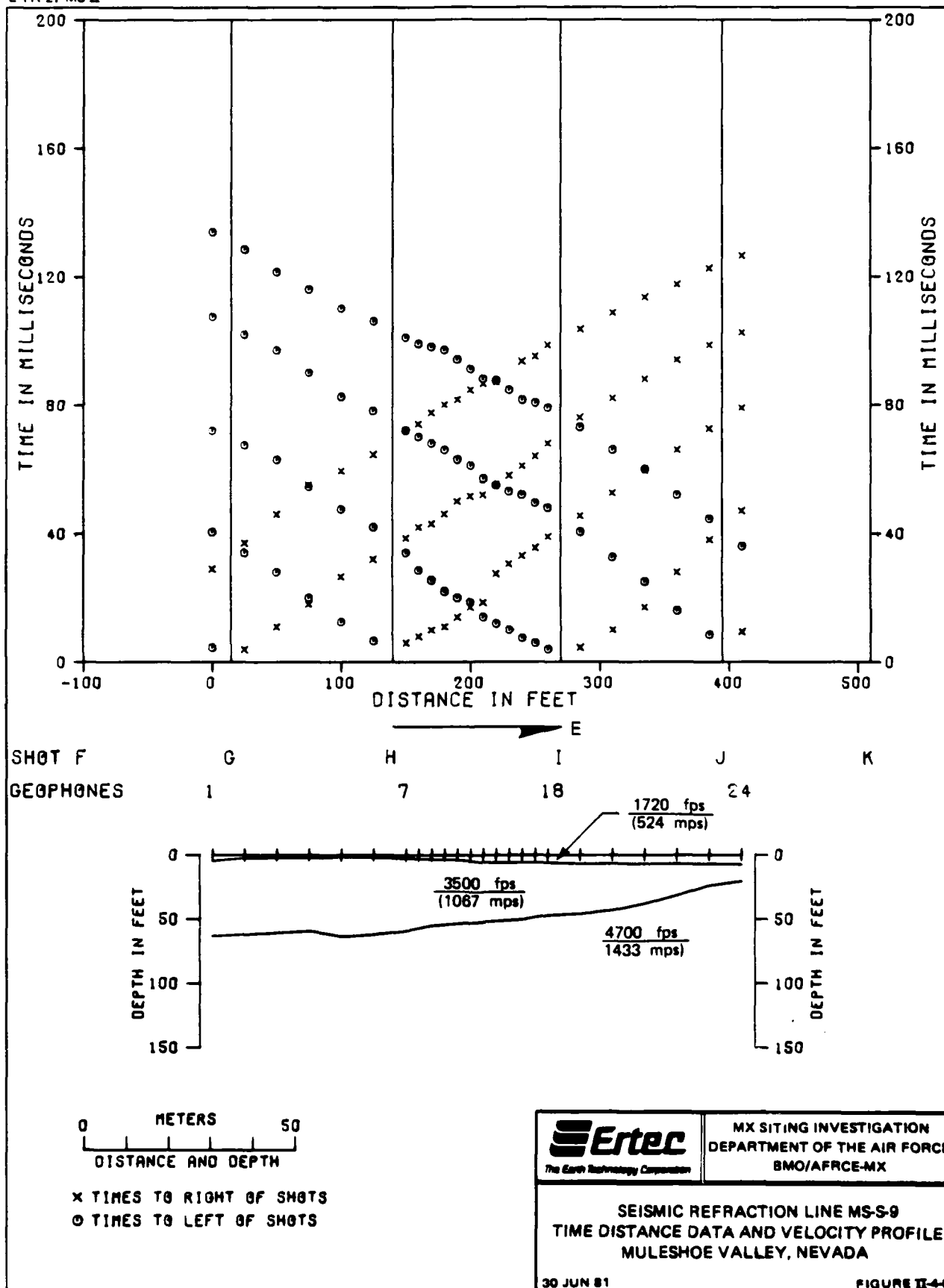
E-TR-27-MS-II



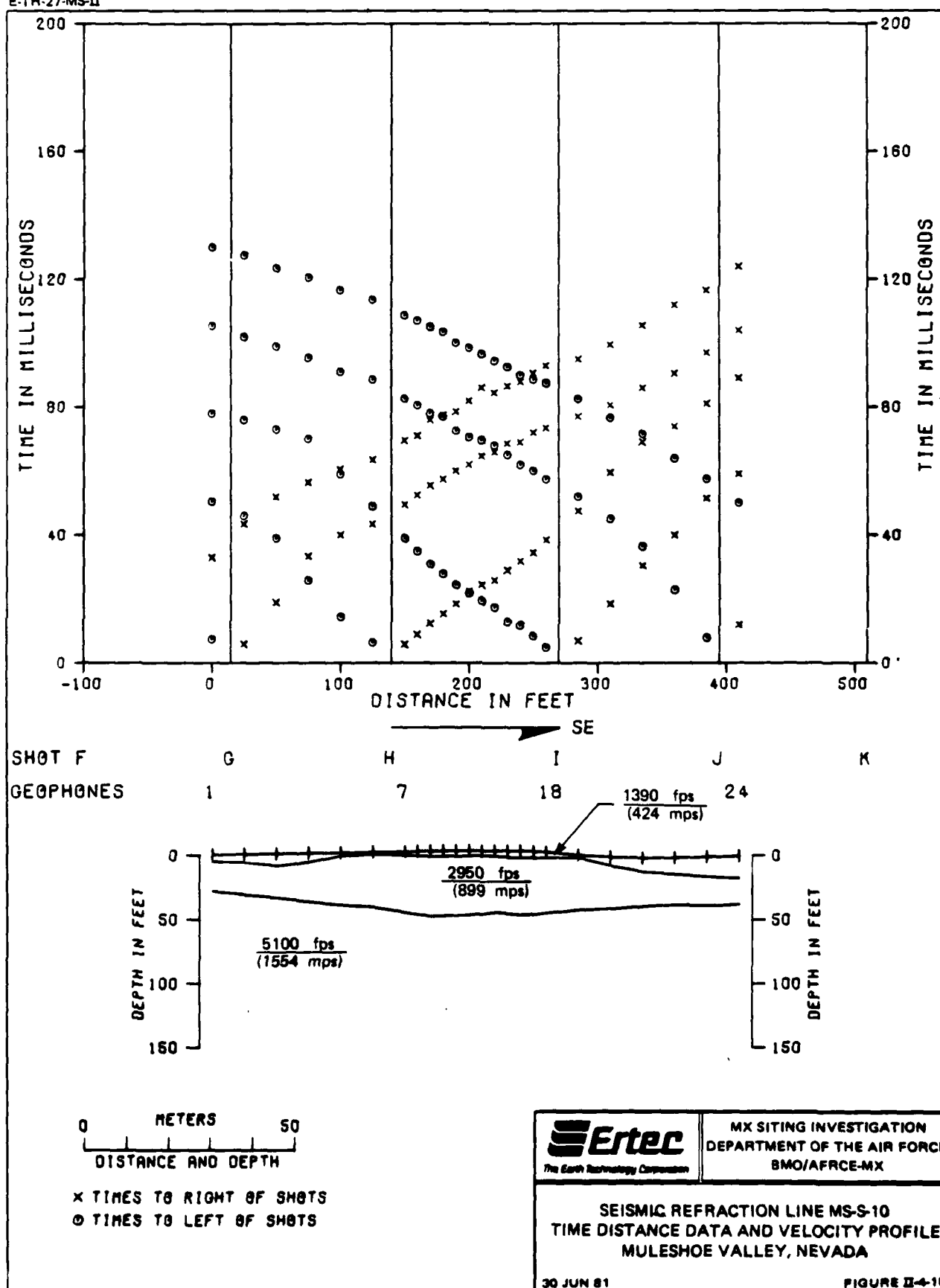
E-TR-27-MS-II



E-TR-27-MS-II



E-TR-27-MS-II



5.0 ELECTRICAL RESISTIVITY DATA

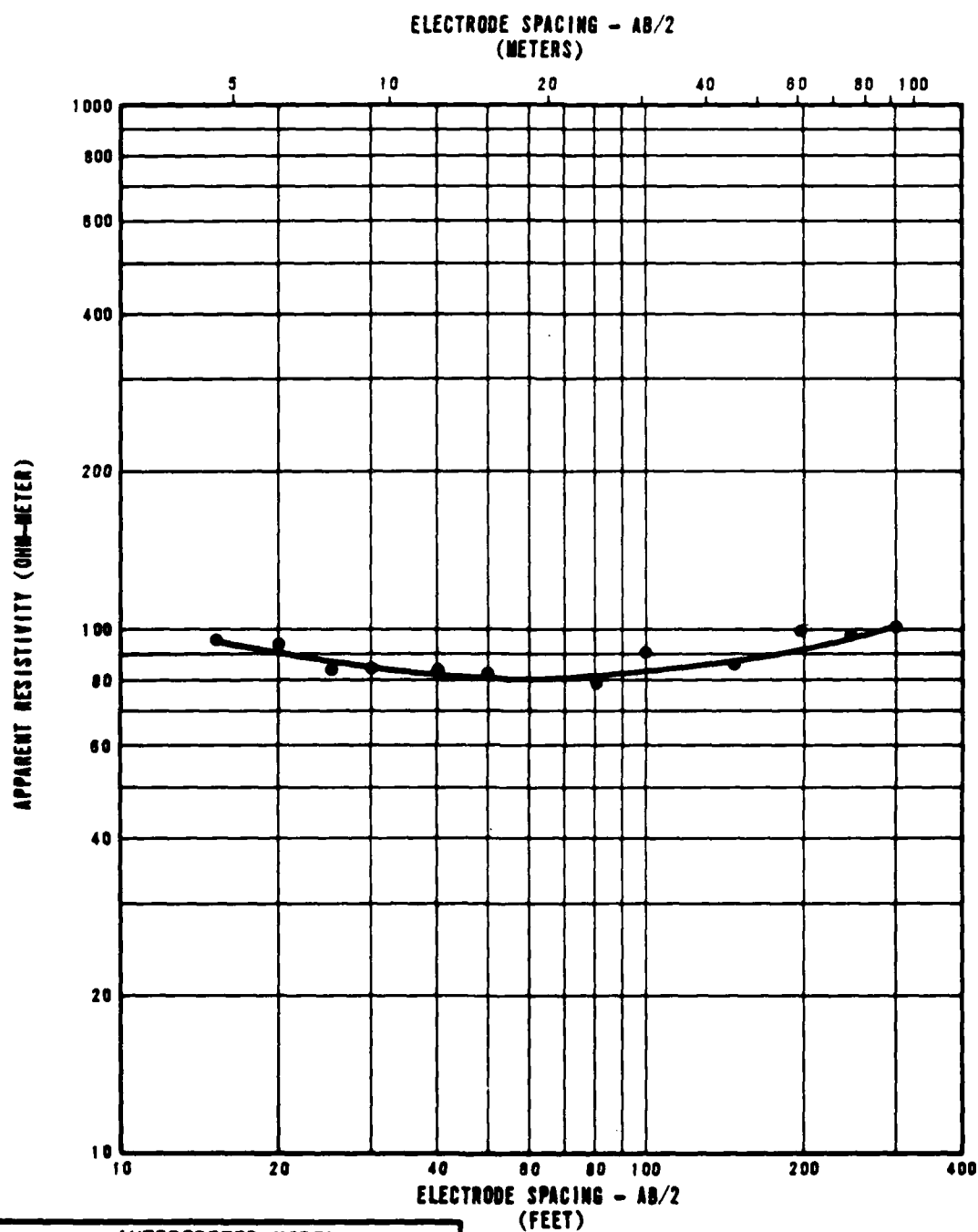
Explanation: Each figure in this section presents the data obtained from a resistivity sounding and a tabulated model of resistivity layers that would produce a curve similar to the observed curve.

The upper portion of the figures is a graph in which measured apparent resistivity values in ohm-meters are plotted versus one-half the distance between the current electrodes.

The interpreted model tabulated at the bottom of the page shows a combination of true resistivity layers and thicknesses obtained by matching theoretical curves to the field curve.

Note: There was no resistivity sounding at location MS-SR-2 because of electrical interference from a grounded fence.

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	100
12	4	75
70	21	110

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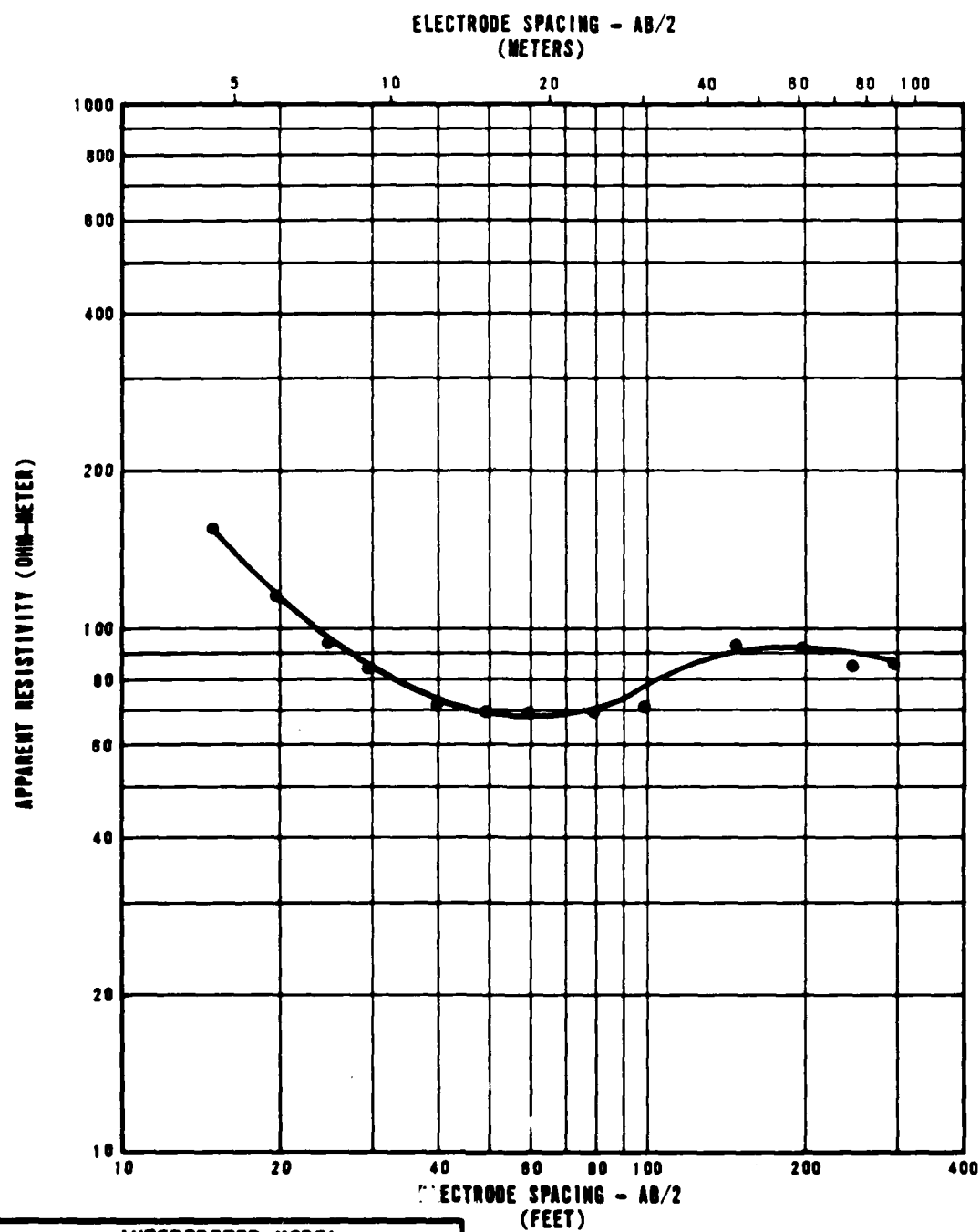
RESISTIVITY SOUNDING MS-R-1
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

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FIGURE 2E-1

000 P-10

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	250
7	2	65
55	17	110
176	54	80

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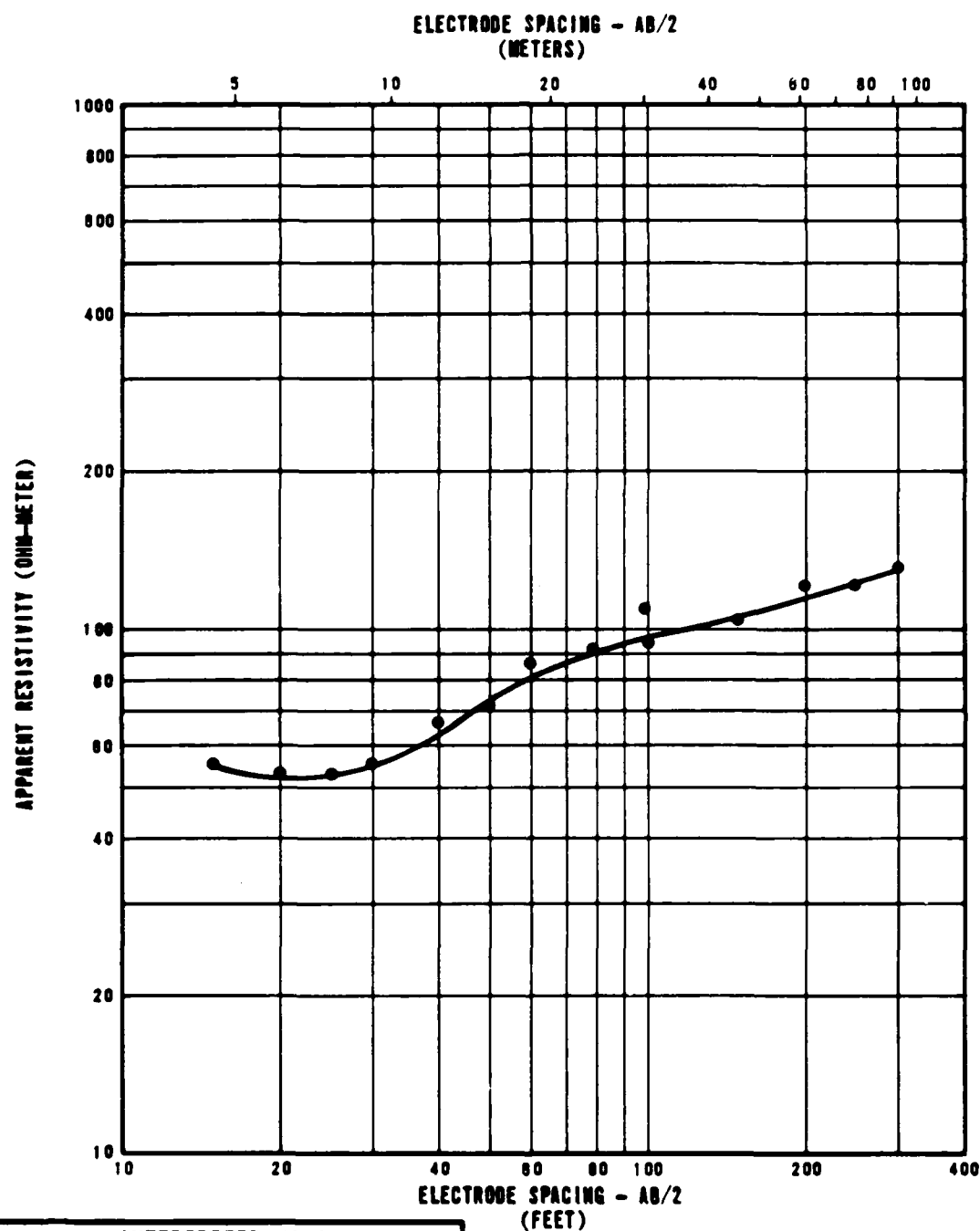
RESISTIVITY SOUNDING MS-R-3
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

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FIGURE 2-5-2

PMP-18

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	50
25	8	280
32	10	110
163	50	250



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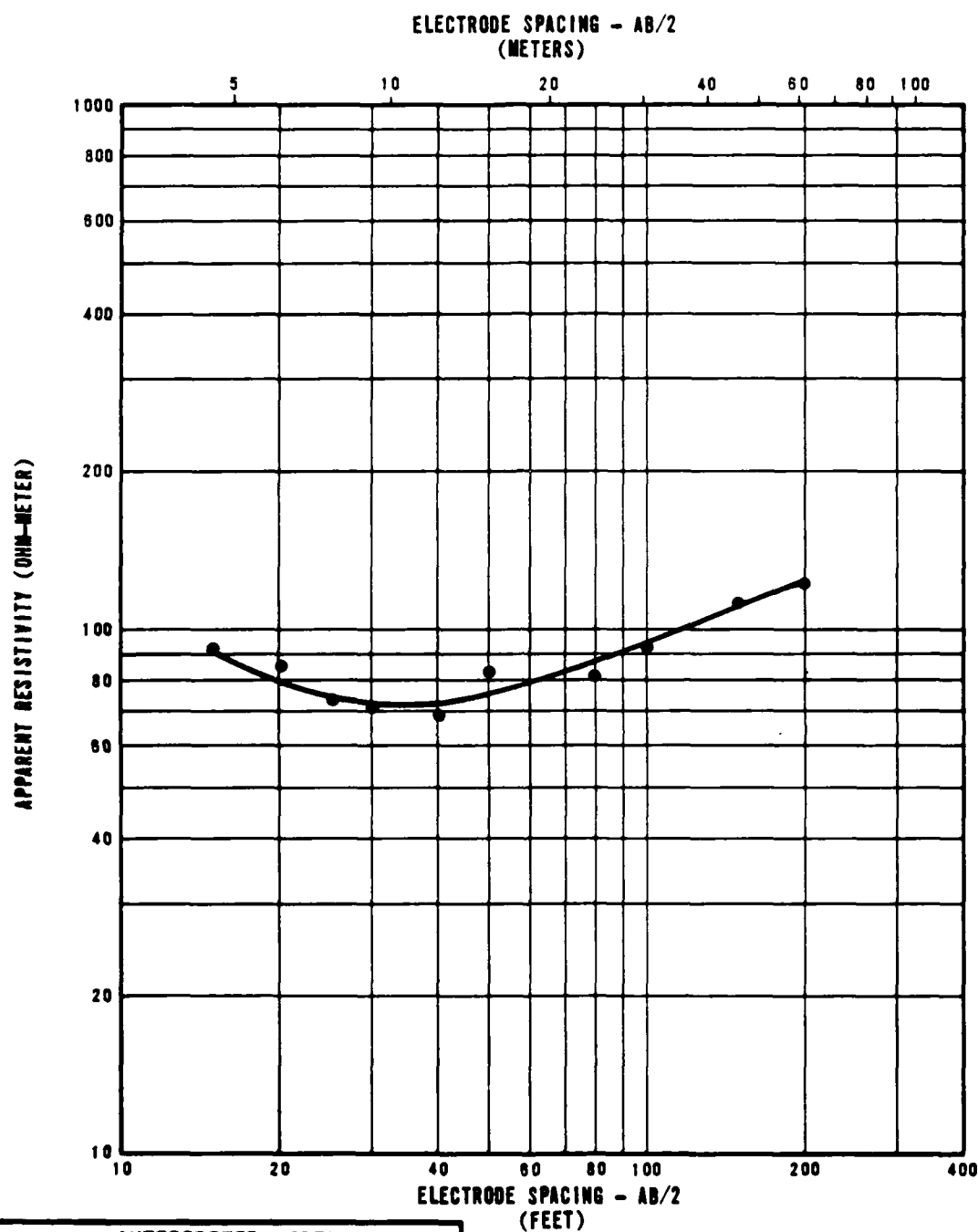
RESISTIVITY SOUNDING MS-R-4
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

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FIGURE II-6-3

USAF-15

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	120
5	2	80
50	15	150

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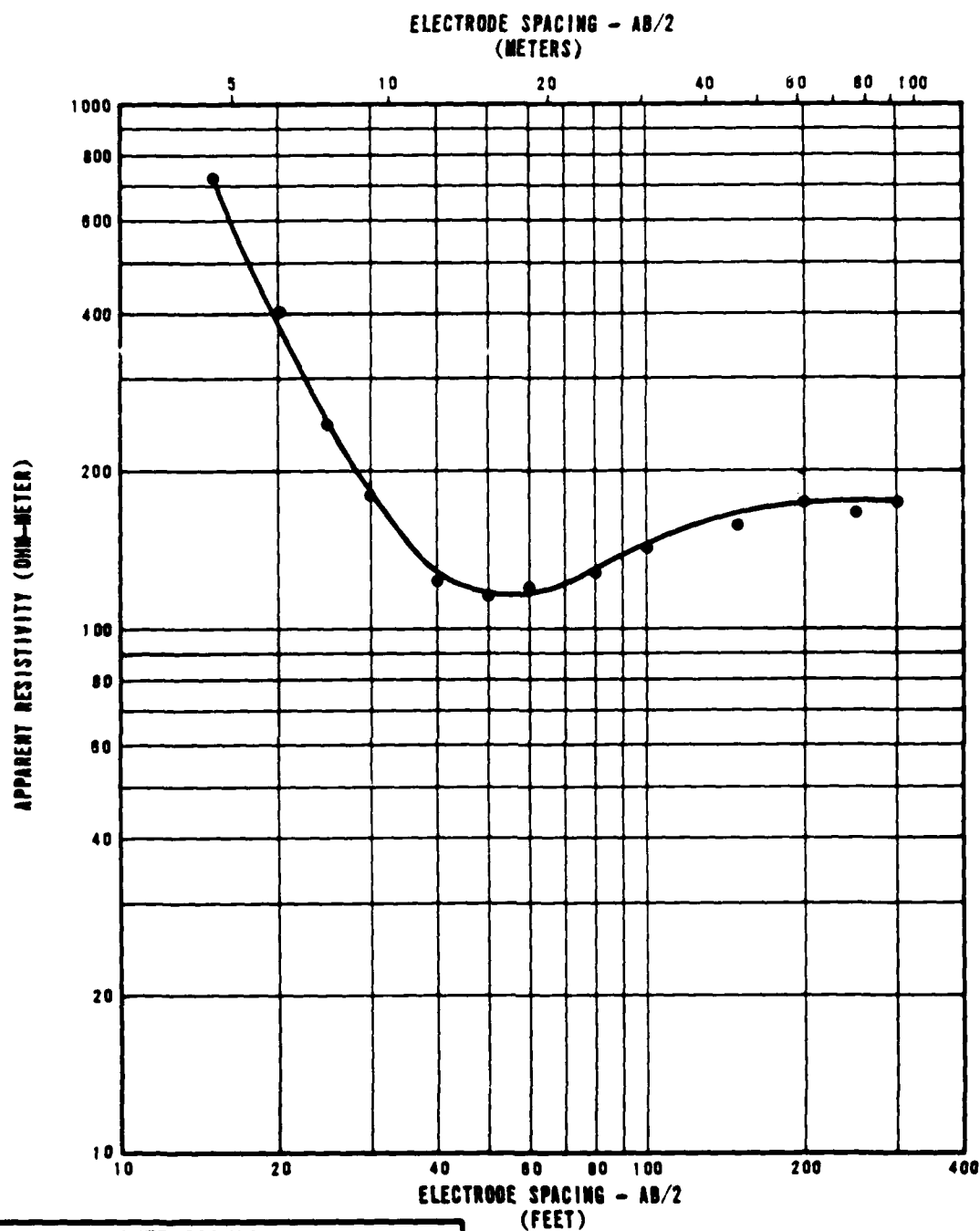
RESISTIVITY SOUNDING MS-R-5
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

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FIGURE 22-6-4

GMR F-18

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	710
10	3	240
14	4	190

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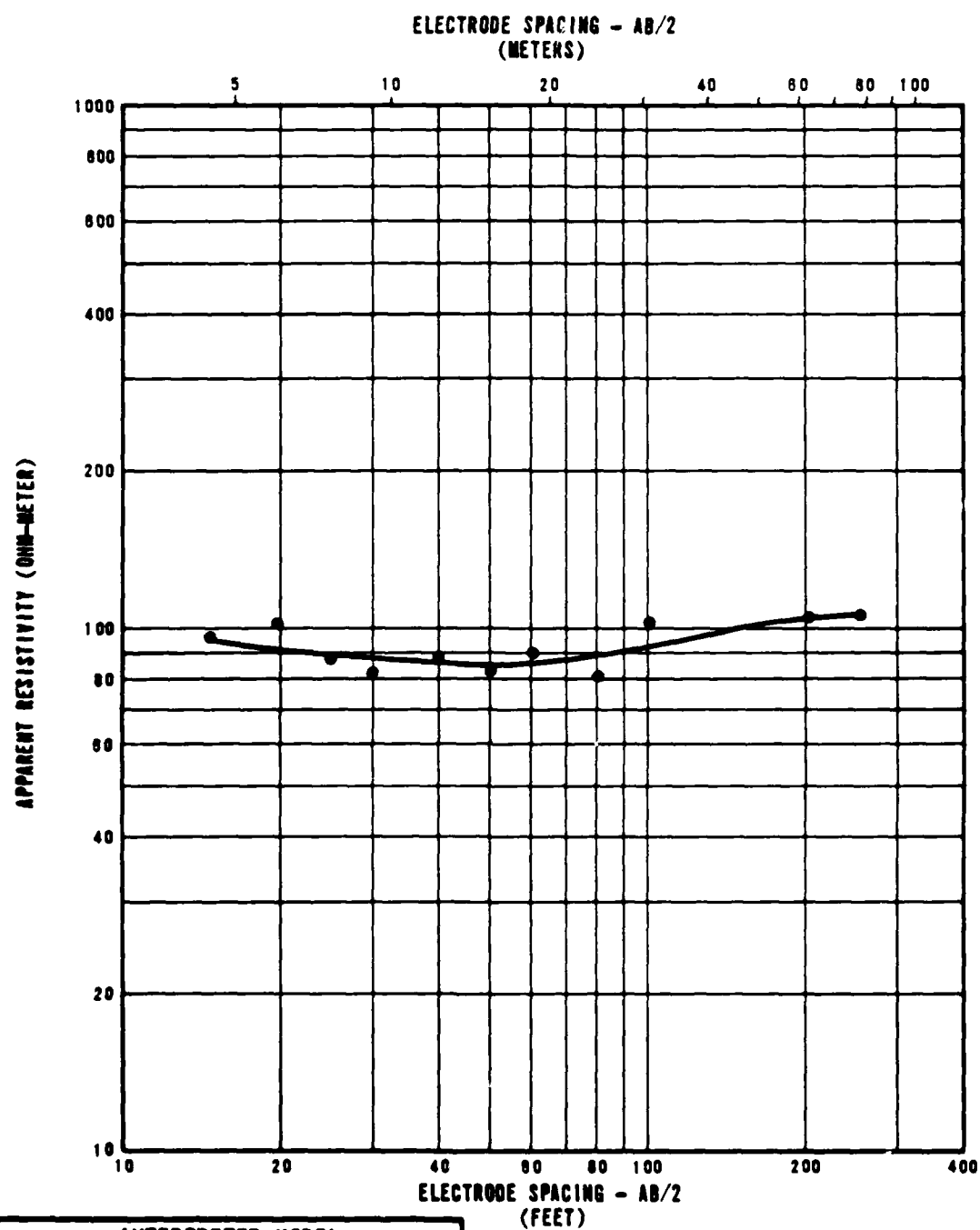
RESISTIVITY SOUNDING MS-R-6
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-6-6

USAF-15

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	95
20	6	75
39	12	90
62	19	130

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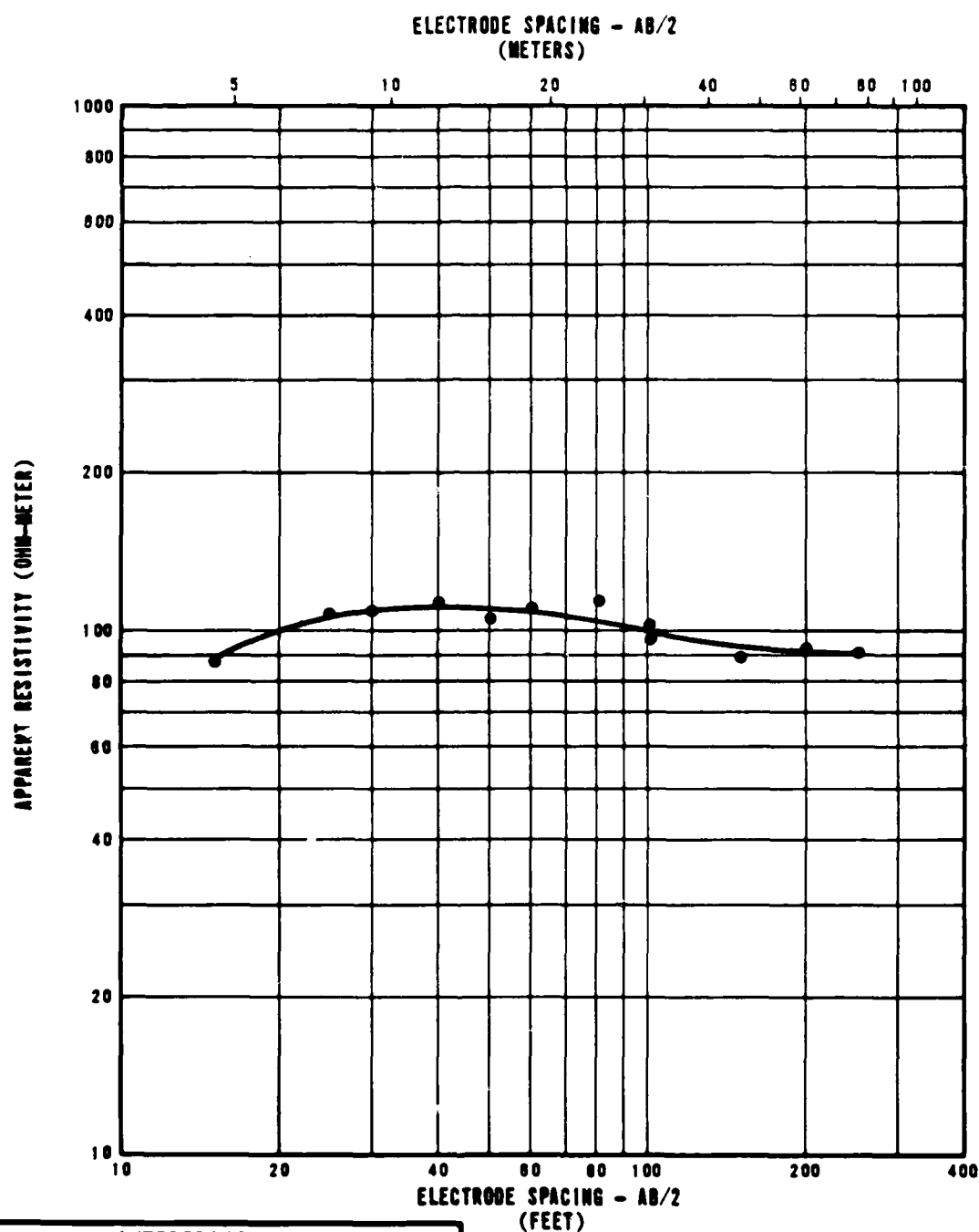
RESISTIVITY SOUNDING MS-R-7
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-5-6

USA F-18

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	85
5	2	130
29	9	80
90	27	110

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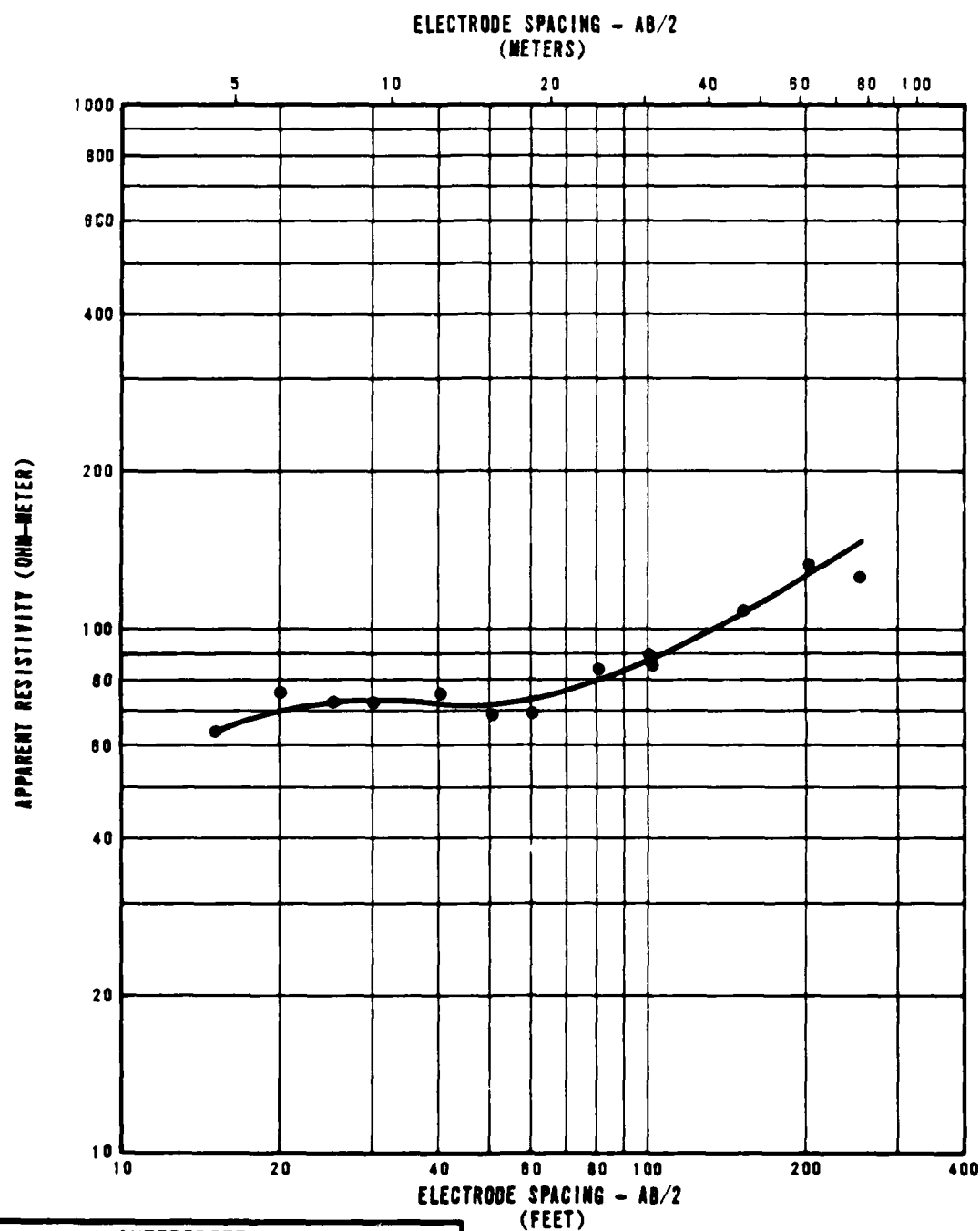
RESISTIVITY SOUNDING MS-R-8
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-6-7

USAF-18

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	50
5	2	80
26	8	55
60	18	250

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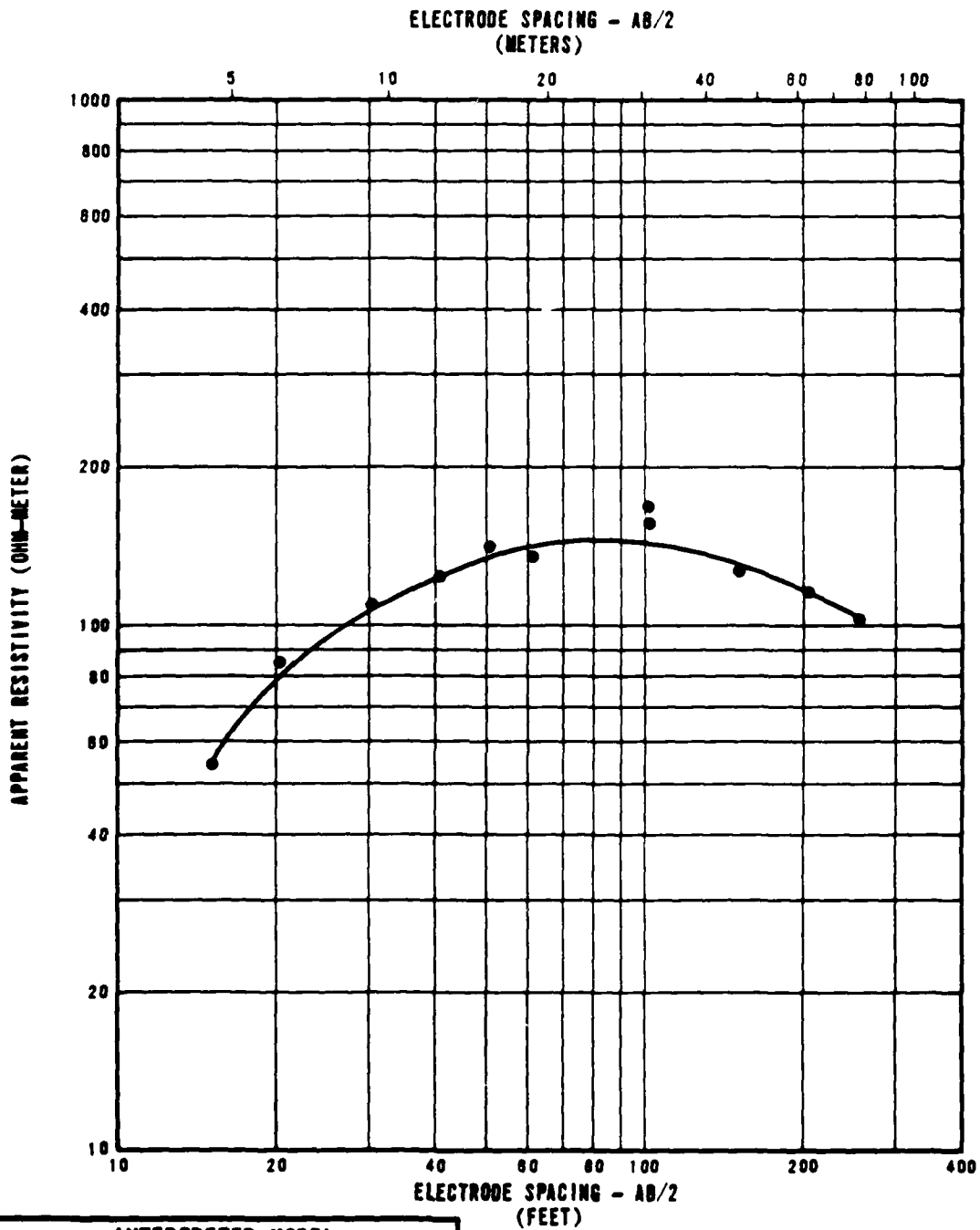
RESISTIVITY SOUNDING MS-R-9
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

20 JUN 81

FIGURE II-5-4

USAF-15

E-TR-27-MS-II



INTERPRETED MODEL		
LAYER DEPTH		RESISTIVITY VALUES
FEET	METERS	OHM-METER
0	0	30
5	2	140
10	3	240
38	12	150
80	24	70



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RESISTIVITY SOUNDING MS-R-10
SOUNDING CURVE AND INTERPRETATION
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-6-6

USA F-10

6.0 BORING LOGS

Explanation: All data from borings, trenches and test pits are presented on standard Ertec Western logs in Sections 6.0 and 7.0. Explanations of the column headings on the logs are as follows:

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

MS-B-1

MS - abbreviation for the valley (e.g., MS Muleshoe)

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 in Volume I (E-TR-27-MS-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 symbols (see Table II-6-1 for complete details).
- 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. A solid line across the column indicates 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 - dry like powder
	Slightly Moist	- much less than optimum moisture
	Moist	- near optimum moisture for soil - provides apparent cohesion
	Very Moist	- much greater than optimum moisture
	Wet	- at or near saturation

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

[illegible]

<u>Consistency</u>	<u>N Value</u> <u>(ASTM D 1586-67)</u>
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:

<u>Consistency</u>	<u>Shear Strength</u>		<u>Field Guide</u>
	<u>(ksf)</u>	<u>(kn/m²)</u>	
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 per 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.

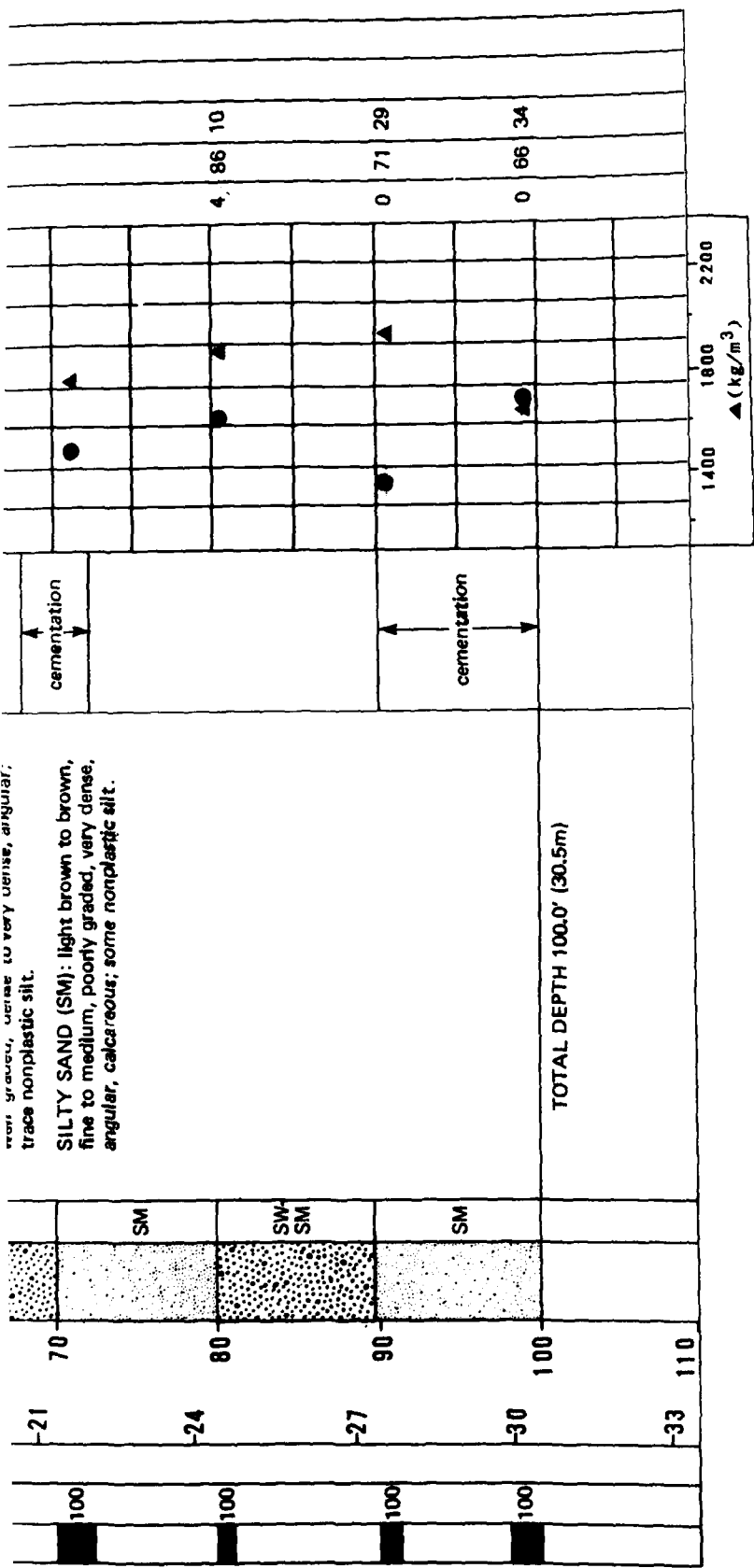
Drilling
Method - signifies the type of drilling procedure used such as rotary wash.

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.



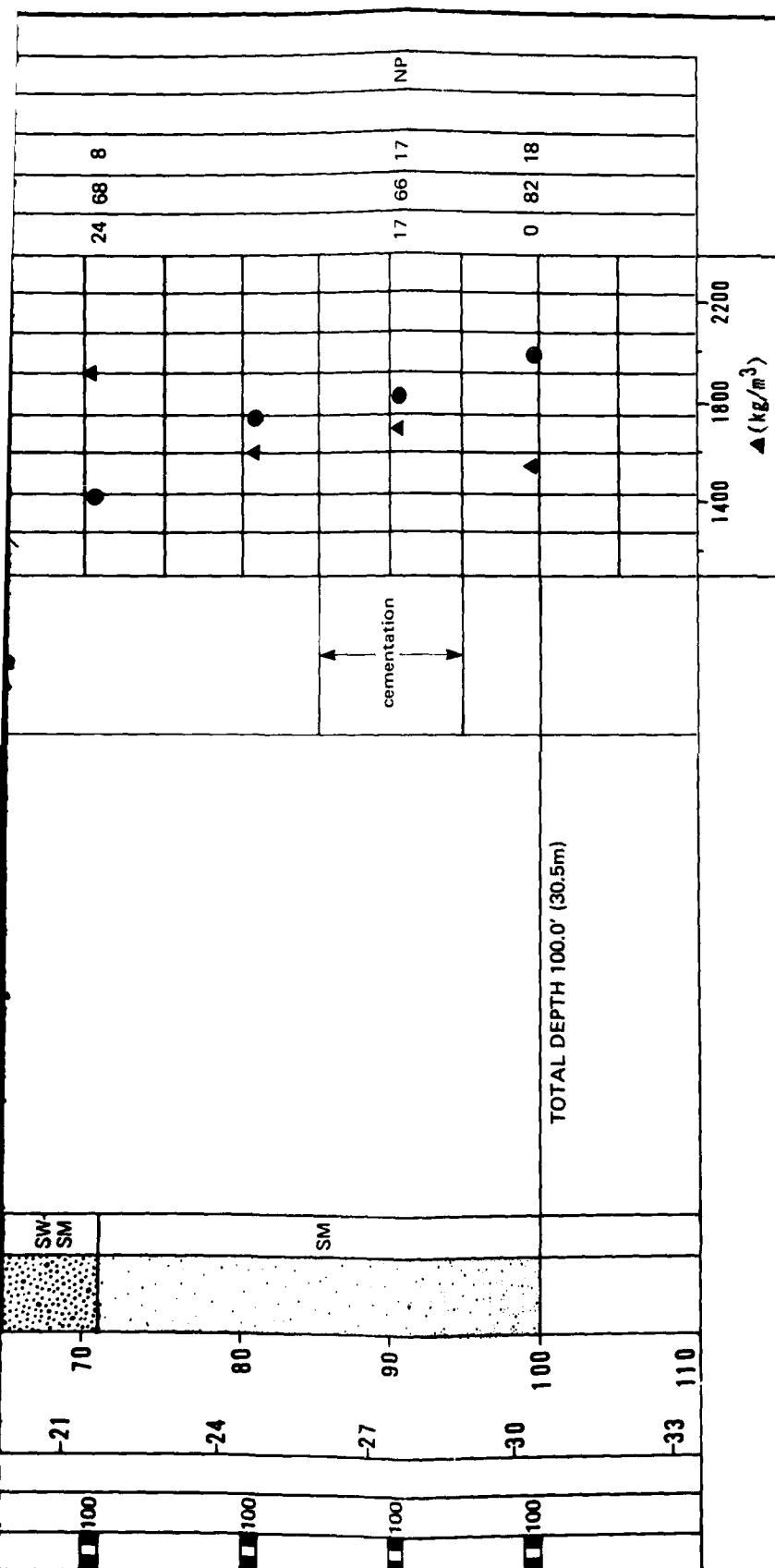
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LOG OF BORING MS-B-1
 MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE 2-1

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲ (pcf)													SIEVE ANALYSIS			
									80	90	100	110	120	130	140	GR	SA	FI	LL	PI					
	100		0	0			Interbedded layers of GRAVEL, SAND and SILT:		●	▲							18	44	38		NP				
	100		3	10		SM	GRAVEL: SANDY GRAVEL (GP-GM, GW-GM); dark brown to dark gray, fine to coarse, poorly to well graded, dense to very dense, angular; some fine to coarse angular to sub-angular sand; trace nonplastic silt.		●	▲											NP				
	100		6	20		SW-SM ML	SAND: GRAVELLY SAND and SAND (SW-SM, SM): brown to black, fine to coarse, well graded, medium dense to very dense, angular to subangular; trace some fine to coarse gravel; trace nonplastic silt.		●	▲							45	49	6		NP				
	100		9	30		GP-GM SM	SILTY SAND (SM): light brown to gray-brown, fine to coarse, poorly graded, loose to very dense, angular to subrounded, calcareous; little to some nonplastic silt; none to little fine to coarse gravel.		●	▲							50	39	11		NP				
	100		12	40		SW GP-GM	SILT: SANDY SILT (ML): brown, stiff, nonplastic, calcareous; some fine to medium subangular sand.		●	▲							10	87	3		NP				
	100		15	50		GW-GM		cobbles	●	▲							67	28	5		NP				
	100		18	60		SM			●	▲							0	79	21		NP				
	100		21	70		SW-SM			●	▲							24	68	8		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 : 5360' (1634m)
 SURFICIAL GEOLOGIC UNIT : A5i
 DATE DRILLED : 17 November 1979
 DRILLING METHOD : Rotary Wash
 HOLE DIAMETER : 4 7/8" (124mm)
 WATER LEVEL : Not Encountered



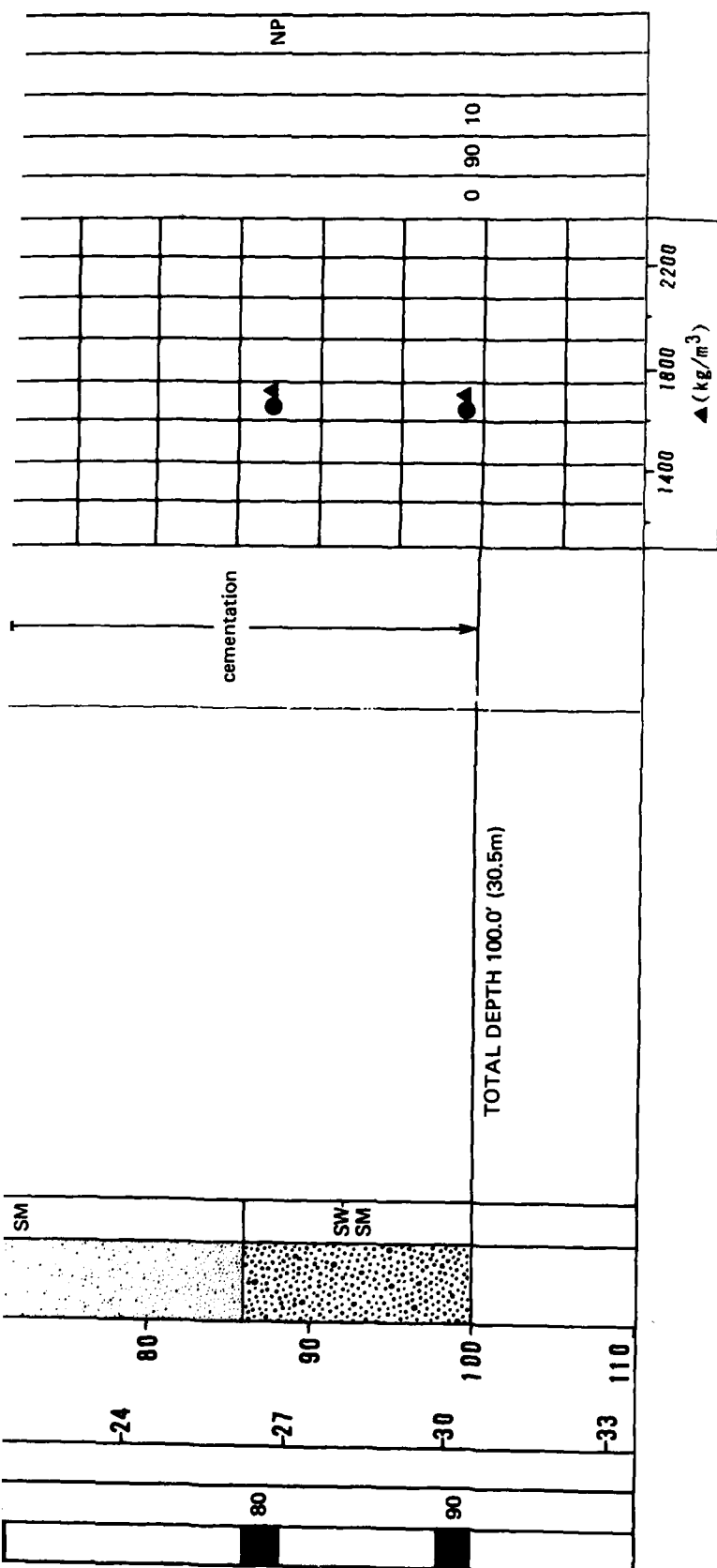
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LOG OF BORING MS-B-2 MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-4-2

SAMPLE TYPE	% RECOVERY	N VALUE	DEPTH METERS	DEPTH FEET	LITHOLOGY	USCS	SOIL DESCRIPTION	REMARKS	▲ (pcf)											SIEVE ANALYSIS			
									80	100	110	120	130	140	GR	SA	FI	LL	PI				
1	100		0	0		SM	Interbedded layers of: GRAVELLY SAND, SAND and SILTY SAND:		●	▲						16	71	13		NP			
2	100					SW	GRAVELLY SAND (SW-SM, SM): light brown to gray - brown, fine to coarse, poorly to well graded, medium dense to very dense, angular to subangular, calcareous; little to some fine angular gravel; trace to little nonplastic silt.		●	▲						4	93	3					
3	100		3	10		SC		↑ cementation ↓	●	▲						11	65	24	31	13			
4	100					SM	SAND (SP-SM, SW-SM, SW): brown to gray-brown, fine to coarse, poorly to well graded, medium dense to very dense, angular to subangular, calcareous; trace nonplastic silt.		●	▲													
5	100		6	20		SP-SM	SILTY SAND (SM): light brown to brown, fine to coarse, poorly graded, dense to very dense, angular to subangular, calcareous; little to some nonplastic silt; none to trace fine gravel; clayey sand (10.0' - 15.0').		●	▲						4	89	7		NP			
6	100								●	▲						6	69	25		NP			
7	100		9	30					●	▲						15	72	13					
8	100		12	40		SM										3	79	18		NP			
9	100		15	50					●	▲						23	65	12					
10	96		18	60		SW-SM			●	▲						0	60	40		NP			
11									●	▲													
12	70		21	70		SM		↑ cobbles ↓	●	▲						0	74	26					



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

: 5700' (1737m)

SURFICIAL GEOLOGIC UNIT : A5i

DATE DRILLED : 18 November 1979

DRILLING METHOD : Rotary Wash

HOLE DIAMETER : 4 7/8" (124mm)

WATER LEVEL : Not Encountered

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LOG OF BORING MS-B-3
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-4-3

7.0 TRENCH AND TEST PIT LOGS

See Section 6.0, "Boring Logs," for explanation.

E-TR-27-MS-II

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0										
	0										
	2						2	26	72	25	4
	1										
	4										
	8		CL-ML	stiff							
	2										
	8										
	3										
	10										
	12		SM	medium dense	SILTY SAND, dark brown, fine to coarse, poorly graded, slightly moist, subangular to subrounded, calcareous; some nonplastic to slightly plastic silt.						
	4										
	14										
					TOTAL DEPTH 14.0' (4.3m)						
	18										
	5										
	18										
	8										
	20										

TRENCH DETAILS

SURFACE ELEVATION : 6230' (1899m)
 DATE EXCAVATED : 20 October 1979
 SURFICIAL GEOLOGIC UNIT : AS1
 TRENCH LENGTH : 18.0' (4.9m)
 TRENCH ORIENTATION : E - W



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LOG OF TRENCH MS-T-1
 MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE 25-1

TRENCH DETAILS



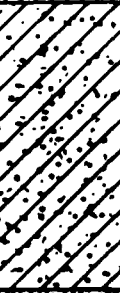
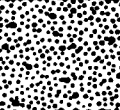
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**LOG OF TRENCH MS-T-2
MULESHOE VALLEY, NEVADA**

30 JUN 81

FIGURE II-7-2

E-TR-27-MS-II

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		CL	stiff	SILTY CLAY, dark brown, slightly moist, slightly plastic, calcareous; trace fine sand.	vertical walls stable	0	6	94	31	11
	2											
	1											
	4											
	6			ML	stiff	SANDY SILT, brown, slightly moist, nonplastic, calcareous; some fine sub-angular to subrounded sand.		0	41	59		NP
	8											
	10											
	12											
	14			SW-SM	medium dense	GRAVELLY SAND, dark brown, fine to coarse, well graded, slightly moist, angular to subangular, calcareous; little fine subangular gravel; trace nonplastic silt.		17	73	10		
	16											
	18											
	20											
						TOTAL DEPTH 14.0' (4.3m)						

TRENCH DETAILS

SURFACE ELEVATION : 5620' (1804m)
 DATE EXCAVATED : 21 October 1979
 SURFICIAL GEOLOGIC UNIT: A1
 TRENCH LENGTH : 16.0' (4.9m)
 TRENCH ORIENTATION : N-S



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LOG OF TRENCH MS-T-3
 MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-7-3

E-TR-27-MS-II

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0										
	2		SM	very dense	GRAVELLY SAND, light brown to white, fine to coarse, poorly graded, dry, angular, calcareous; some fine to coarse gravel; little nonplastic silt; stage III - IV caliche (0.5' - 4.5').	vertical walls stable					
	4										
	6				TOTAL DEPTH 4.5' (1.4m)	cementation at 4.5' exceeded capacity of Case 580C backhoe					
	8										
	10										
	12										
	14										
	16										
	18										
	20										

TRENCH DETAILS

SURFACE ELEVATION : 6100' (1869m)
 DATE EXCAVATED : 30 October 1979
 SURFICIAL GEOLOGIC UNIT : ASo
 TRENCH LENGTH : 8.0' (2.4m)
 TRENCH ORIENTATION : N - S



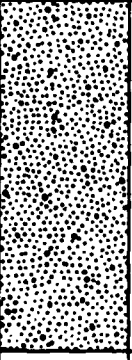
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LOG OF TRENCH MS-T-4
 MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-7-4.

E-TR-27-MS-II

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						BR	SA	FI	LL	PI
	0	0		SW-SM	dense	GRAVELLY SAND, brown, fine to coarse, well graded, slightly moist, angular, calcareous; some fine angular gravel; trace nonplastic silt; occasional cobbles to 6" size; stage II caliche (0.5' - 6.0').	vertical walls stable	33	59	8		
	2											
	4											
	6											
	8											
	10											
	2				very dense	TOTAL DEPTH 6.0' (1.8m)	cementation at 6.0' exceeded capacity of Case 580C backhoe					
	4											
	6											
	8											
	10											
	12											
	14											
	16											
	18											
	20											

TRENCH DETAILS

SURFACE ELEVATION : 5700' (1737m)
 DATE EXCAVATED : 30 October 1979
 SURFICIAL GEOLOGIC UNIT: A61
 TRENCH LENGTH : 8.0' (2.4m)
 TRENCH ORIENTATION : E - W



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LOG OF TRENCH MS-T-5
 MULESHOE VALLEY, NEVADA

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FIGURE II-7-5

E-TR-27-MS-II

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0				Interbedded layers of SILTY SAND and GRAVELLY SAND:						
	2				GRAVELLY SAND (SW-SM): light brown, fine to coarse, well graded, slightly moist, subangular, calcareous; some fine gravel; trace nonplastic silt; stage I caliche.		19	51	30		
	4		SM	medium dense	SILTY SAND (SM): light brown, fine to coarse, poorly graded, slightly moist, subangular, calcareous; some nonplastic silt; little fine gravel; stage I caliche (12.0' - 14.0').						
	8										
	10										
	12		SW-SM	dense			21	72	7		
	14		SM	dense							
	16										
	18										
	20										
					TOTAL DEPTH 14.0' (4.3m)						

TRENCH DETAILS

SURFACE ELEVATION : 5380' (1634m)
 DATE EXCAVATED : 31 October 1979
 SURFICIAL GEOLOGIC UNIT : A51
 TRENCH LENGTH : 16.0' (4.9m)
 TRENCH ORIENTATION : E - W



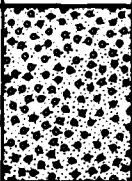
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LOG OF TRENCH MS-T-8
 MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-7-6

E-TR-27-MS-II

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		GM	dense	SANDY GRAVEL, light brown, fine to coarse, poorly graded, slightly moist, angular, calcareous; some fine to coarse sand; little nonplastic silt; stage III caliche (2.0' - 3.0').	vertical wells stable	56	30	14		
	2											
	1					TOTAL DEPTH 3.0' (0.9m)	cementation at 3.0' exceeded capacity of Case 580C backhoe					
	4											
	6											
	2											
	8											
	3	10										
	12											
	4											
	14											
	5	16										
	16											
	6	20										

TRENCH DETAILS

SURFACE ELEVATION : 5630' (1716m)
 DATE EXCAVATED : 30 October 1979
 SURFICIAL GEOLOGIC UNIT : A6f
 TRENCH LENGTH : 7.0' (2.1m)
 TRENCH ORIENTATION : E-W



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LOG OF TRENCH MS-T-7
MULESHOE VALLEY, NEVADA

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FIGURE II-7-7

E-TR-27-MS-II

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0		GC	dense	CLAYEY GRAVEL, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some slightly plastic clay; some fine to coarse sand; stage II caliche (0.5' - 2.0') stage IV caliche at 2.5'.	vertical walls stable	43	28	31	32	11
	2				very dense							
	1					TOTAL DEPTH 2.5' (0.8m)	cementation at 2.5' exceeded capacity of Case 590C backhoe					
	4											
	6											
	8											
	10											
	12											
	14											
	16											
	18											
	20											

TRENCH DETAILS

SURFACE ELEVATION : 5080' (1789m)
 DATE EXCAVATED : 1 November 1979
 SURFICIAL GEOLOGIC UNIT: ASi
 TRENCH LENGTH : 6.0' (1.8m)
 TRENCH ORIENTATION : E-W



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LOG OF TRENCH MS-T-8
MULESHOE VALLEY, NEVADA

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FIGURE II-7-B

E-TR-27-MS-II

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

SURFACE ELEVATION: 6270' (1911m)

SURFICIAL GEOLOGIC UNIT: A54

LOG OF TEST PIT MS-P-1

	0			firm	SANDY SILT, white to dark brown, slightly moist, nonplastic, calcareous; little fine to coarse angular to subangular sand; trace fine gravel; stage II - III caliche (0.5' - 3.0').	vertical walls stable					
	1										
	2										
	3		ML	stiff							
	4				TOTAL DEPTH 3.0' (0.9m)						
	5					consolidation at 3.0' exceeded capacity of Case 580C backhoe					

SURFACE ELEVATION: 6480' (1975m)

SURFICIAL GEOLOGIC UNIT: A51

LOG OF TEST PIT MS-P-2



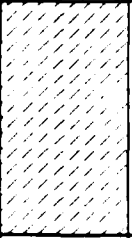
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LOGS OF TEST PITS MS-P-1 AND MS-P-2
MULESHOE VALLEY, NEVADA

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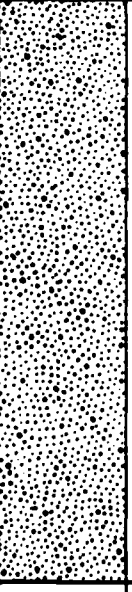
FIGURE II-7-8

E-TR-27-MS-II

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	F1	LL	PI
	0		CL	firm	SILTY CLAY, dark brown to white, dry to slightly moist, slightly plastic, calcareous; trace fine to medium subangular to subrounded sand; occasional boulders to 20" size; stage III - IV caliche (1.0' - 2.0').	vertical walls stable					
	1			hard							
	2					cementation at 2.0' exceeded capacity of Case 580C backhoe					
	3				TOTAL DEPTH 2.0' (0.6m)						
	4										
	5										

SURFACE ELEVATION: 6500' (1981m)
SURFICIAL GEOLOGIC UNIT: A5o

LOG OF TEST PIT MS-P-3

	0		SW-SM	dense	GRAVELLY SAND, brown, fine to coarse, well graded, dry, angular, calcareous; some fine to coarse gravel; trace nonoleastic silt; stage I - II caliche (0.5' - 5.0').	vertical walls stable					
	1						28	67	5		
	2										
	3										
	4										
	5										
					TOTAL DEPTH: 5.0' (1.5m)						

SURFACE ELEVATION: 5820' (1774m)
SURFICIAL GEOLOGIC UNIT: A5o

LOG OF TEST PIT MS-P-4

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LOGS OF TEST PITS MS-P-3 AND MS-P-4
MULESHOE VALLEY, NEVADA

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FIGURE IX-7-10

E-TR-27-MS-II

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0				SAND, white to brown, fine to coarse, poorly graded, slightly moist, angular, calcareous; trace fine to coarse angular to subangular gravel; stage II caliche (0.5' - 5.0').						
	1										
	2										
	3		SP	very dense		vertical walls stable					
	4										
	5										
					TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5800' (1768m)

SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT MSP-5

	0				SILTY SAND, brown to light brown, fine to coarse, poorly graded, slightly moist, angular, calcareous; some nonplastic silt; stage II caliche (2.0' - 4.0').						
	1			dense							
	2		SM			vertical walls stable					
	3			very dense							
	4										
	5										
					TOTAL DEPTH 4.0' (1.2m)	cementation at 4.0' exceeded capacity of Case 580C backhoe					

SURFACE ELEVATION: 5650' (1692m)

SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT MSP-6



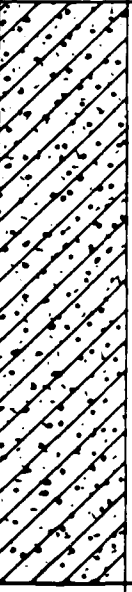
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LOGS OF TEST PITS MSP-5 AND MSP-6
MULESHOE VALLEY, NEVADA

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FIGURE 12-7-11

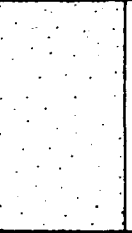
E-TR-27-MS-II

BULK SAMPLE	DEPTH		LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
	METERS	FEET						GR	SA	FI	LL	PI
	0	0				SANDY SILT, brown, slightly moist, nonplastic, calcareous; some fine to medium subangular sand.	vertical walls stable	1	41	58		NP
	1											
	2											
	3											
	4											
	5					TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5600' (1707m)

SURFICIAL GEOLOGIC UNIT: A1

LOG OF TEST PIT MS-P-7

	0	0		SM	medium dense	SILTY SAND, brown, fine to coarse, poorly graded, slightly moist, angular, calcareous; some nonplastic silt; trace fine gravel; occasional cobbles to 8" size; stage III caliche (1.0' - 2.0').	vertical walls stable					
	1											
	2					TOTAL DEPTH 2.0' (0.6m)	cementation at 2.0 exceeded capacity of Case 580C backhoe					
	3											
	4											
	5											

SURFACE ELEVATION: 5470' (1667m)

SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT MS-P-8

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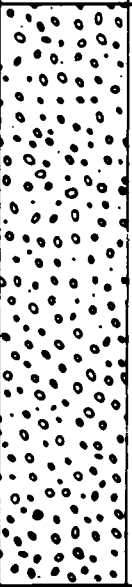
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LOGS OF TEST PIT MS-P-7 AND MS-P-8
MULESHOE VALLEY, NEVADA

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FIGURE II-7-12

E-TR-27-MS-II

BULK SAMPLE	DEPTH METERS FEET	LITHOLOGY	USCS	CONSISTENCY	SOIL DESCRIPTION	REMARKS	SIEVE ANALYSIS				
							GR	SA	FI	LL	PI
	0		GP-GM	medium dense	SANDY GRAVEL, brown, fine to coarse, poorly graded, dry, angular to subangular, calcareous; some fine to coarse sand; trace nonplastic silt; little cobbles to 9" size (3.0' - 5.0').	vertical walls sloughing	60	31	9		
	1										
	2										
	3										
	4										
	5				TOTAL DEPTH 5.0' (1.5m)						

SURFACE ELEVATION: 5800' (1768m)

SURFICIAL GEOLOGIC UNIT: A5i

LOG OF TEST PIT MS-P-9

0	0										
1											
2											
3											
4											
5											

SURFACE ELEVATION:

SURFICIAL GEOLOGIC UNIT:

LOG OF TEST Pit

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LOG OF TEST PIT MS-P-9
MULESHOE VALLEY, NEVADA

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FIGURE II-7-13

E-TR-27-MS-II

ACTIVITY NUMBER	GROUND SURFACE ELEVATION, FEET (METERS)	SURFICIAL GEOLOGIC UNIT	DEPTH, FEET (METERS)	USCS	SOIL DESCRIPTION	SIEVE ANALYSIS				
						GR	SA	FI	LL	PI
MS-CS-5	6080 (1853)	A5i	0.0 - 0.5 (0.0 - 0.2)	GC	CLAYEY GRAVEL, dark brown, fine to coarse, poorly graded, subangular to subrounded, calcareous; some slightly plastic clay; little fine to coarse sand.	46	19	35	33	12
			0.5 - 1.0 (0.2 - 0.3)	GP	SANDY GRAVEL, white, fine to coarse, poorly graded, subangular to subrounded, calcareous; little fine to coarse sand; some cobbles to 10" size; stage IV caliche (0.5' - 1.0').					
MS-CS-8	5960 (1817)	A5o	0.0 - 2.0 (0.0 - 0.6)	SM	GRAVELLY SAND, light brown, fine to coarse, poorly graded, angular, calcareous; some fine to coarse gravel; little nonplastic silt; stage II - III caliche (0.5' - 2.0').					
MS-CS-10	5690 (1734)	A5i	0.0 - 2.0 (0.0 - 0.6)	ML	SILT, brown, slightly plastic, calcareous; trace fine subangular sand.					
MS-CS-12	5510 (1679)	A5i	0.0 - 4.0 (0.0 - 1.2)	GM	SANDY GRAVEL, light brown, fine, poorly graded, subangular, calcareous; some fine to coarse sand; some nonplastic to slightly plastic silt; boulder to 24" size at 2.5'.	38	31	31		
MS-CS-13	6000 (1829)	A5i	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, brown, fine to coarse, poorly graded, angular, calcareous; some nonplastic silt.					
MS-CS-18	5740 (1750)	A5i	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, angular to subangular, calcareous; some nonplastic to slightly plastic silt; occasional cobbles to 7" size.					
MS-CS-20	5450 (1661)	A5y	0.0 - 2.0 (0.0 - 0.6)	ML	SANDY SILT, light brown, nonplastic, calcareous; little fine subangular sand.	0	18	82		NP
MS-CS-23	5400 (1646)	A5i	0.0 - 2.0 (0.0 - 0.6)	SM	SILTY SAND, light brown, fine to coarse, poorly graded, subangular, calcareous; little nonplastic silt.					

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LOGS OF SURFICIAL SOIL SAMPLES
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-8-1

8.0 SURFICIAL SOIL SAMPLE LOGS

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

A. Designations - Surficial samples are identified as follows:

MS-CS-1

MS - abbreviation for the valley (e.g., MS-Muleshoe)

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-6-1 of Section 6.0, "Borings Logs," for details of USCS.

F. Soil Description - Soil is described based on field visual descriptions and/or laboratory test results. See Section 6.0, "Boring Logs," for procedures of soil description.

G. Sieve Analysis, LL and PI - These are from results of laboratory tests. See Section 6.0, "Boring Logs," for explanation.

9.0 LABORATORY TEST RESULTS

Explanation: Laboratory test results are presented in this section. Table II-9-1 contains a summary of laboratory test results. This table shows 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-9-2 through II-9-6 and Figures II-9-1 through II-9-3 present results of triaxial compression, unconfined compression, direct shear, consolidation, 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.

<u>Type of Test</u>	<u>ASTM Designations</u>
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 surface 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-6-1 in Section 6.0, "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_0). 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.				PARTIC SIZE (c)	
				BLDRS.	COBBLES		GRAVEL			SAND				SILT OR CL.		
		FEET	METERS	24"	12"	6"	3"	1½"	3/4"	3/8"	4	10	40	100	200	.005
MS-B-1	P-1	0.8 - 1.6	0.24 - 0.49													
	P-1	1.6 - 2.4	0.49 - 0.73										100	97	93	
	P-2	3.0 - 3.8	0.91 - 1.16									100	97	93	85	
	D-3	6.8 - 7.3	2.07 - 2.23					100	97	91	86	81	70	48	36	
	D-4	10.5 - 11.0	3.20 - 3.35													
	D-5	15.5 - 16.0	4.72 - 4.88							100	99	96	39	16	13	
	P-6	20.0 - 20.9	6.10 - 6.37									100	86	36	22	
	P-7	25.0 - 25.8	7.62 - 7.86													
	P-8	30.5 - 31.0	9.30 - 9.45													
	P-8	31.2 - 31.7	9.51 - 9.66													
	P-8	31.9 - 32.4	9.72 - 9.86						100	99	95	86	68	37	22	
	P-9	40.0 - 40.6	12.19 - 12.37													
	P-10	50.0 - 52.4	15.24 - 15.97								100	98	79	58	51	
	P-11	60.8 - 61.6	18.53 - 18.78								100	88	35	15	11	
	P-12	70.8 - 71.6	21.58 - 21.82													
P-13	80.0 - 80.9	24.38 - 24.66						100	99	96	90	42	15	10		
P-14	90.8 - 91.2	27.68 - 27.80								100	97	65	41	29		
P-15	98.8 - 99.6	30.11 - 30.36								100	97	74	48	34		
MS-B-2	P-1	0.8 - 1.7	0.24 - 0.52					100	93	90	82	75	65	50	38	
	D-3	5.5 - 6.0	1.68 - 1.83													
	D-4	8.5 - 9.0	2.59 - 2.74													
	D-5	11.0 - 11.5	3.35 - 3.51					100	94	75	55	36	13	8	6	
	D-6	15.5 - 16.0	4.72 - 4.88							100	99	97	91	75	58	
	D-6	15.5 - 16.0	4.72 - 4.88													
	D-7	20.5 - 21.0	6.25 - 6.40													
	D-8	25.3 - 25.8	7.71 - 7.86					100	95	73	50	35	23	14	11	
	D-9	31.0 - 31.5	9.45 - 9.60							100	90	61	19	5	3	
	D-10	40.2 - 40.7	12.25 - 12.41				100	75	57	43	3	24	11	6	5	
	D-11	50.2 - 50.7	15.30 - 15.45													
	D-12	60.2 - 60.7	18.35 - 18.50								100	98	62	31	21	
	D-13	70.3 - 70.8	21.43 - 21.58							100	89	76	58	22	12	8
	D-14	80.2 - 80.7	24.44 - 24.60													
	D-15	90.3 - 90.8	27.52 - 27.68						100	96	83	75	49	28	17	
	D-16	99.2 - 99.7	30.24 - 30.39								100	96	72	37	18	
MS-B-3	D-1	1.0 - 1.5	0.30 - 0.46						100	93	84	69	35	18	13	
	D-2	3.5 - 4.0	1.07 - 1.22							100	96	62	16	6	3	
	D-3	6.0 - 6.5	1.83 - 1.98													
	D-4	8.5 - 9.0	2.59 - 2.74													
	D-5	10.5 - 11.0	3.20 - 3.35					100	92	91	89	81	48	29	24	
	D-6	15.3 - 15.8	4.66 - 4.82													
	D-7	21.0 - 21.5	6.40 - 6.55						100	99	96	88	27	9	7	

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

RD SIEVE NO.					PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAxIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION
								DRY UNIT WEIGHT			MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
SILT OR CLAY					LL	PL	PI	(pcf)	(kg/m³)					(pcf)	(kg/m³)								
40	100	200	.005	.001					CL	73.3	1174	10.4	21.9	1.26									
00	97	93			33	18	15		CL	72.6	1163	10.7	22.2	1.28				2.65		*			
97	93	85			31	20	11		CL	75.4	1208	11.4	24.8	1.24									
70	48	36						NP	SM	97.3	1559	7.3	26.9	0.73									
									SM	108.1	1732	7.2	34.7	0.56									
39	16	13						NP	SM	106.9	1712	8.2	37.1	0.61				2.76			*		
86	36	22							SM	88.9	1424	13.6	41.0	0.90									
									SM	109.7	1757	9.9	49.8	0.54									
									SM	103.6	1660	12.4	53.5	0.63						*			
									SM	103.8	1663	10.5	45.5	0.62						*			
68	37	22			22	19	3		SM	106.7	1709	10.0	46.4	0.58						*			
									SM	111.1	1780	9.2	48.2	0.52									
79	58	51						NP	ML	96.7	1549	19.3	70.1	0.74									
35	15	11							SW-SM	111.0	1778	11.7	61.2	0.52									
									SM	111.1	1780	11.8	61.8	0.52									
42	15	10							SW-SM	117.7	1885	15.6	97.9	0.43									
65	41	29							SM	121.1	1940	7.6	52.8	0.39									
74	48	34							SM	103.4	1656	17.8	76.3	0.63									
65	50	38						NP	SM	105.4	1688	3.4	15.4	0.60									
									SM	102.0	1634	5.1	21.0	0.65									
								NP	SM	103.3	1655	5.5	23.3	0.63									
13	8	6						NP	SW-SM	114.5	1834	6.7	38.1	0.47									
91	75	58						NP	ML	96.1	1540	6.8	24.4	0.75									
									ML	91.8	1471	8.8	28.4	0.84									*
									SM	102.3	1639	9.9	41.6	0.65									
23	14	11							GP-GM	115.4	1849	12.4	72.6	0.46									
19	5	3							SW	112.8	1807	8.7	47.5	0.49									
11	6	5							GW-GM	120.1	1924	10.8	72.5	0.40									
									SM	100.1	1603	13.8	54.5	0.68									
62	31	21							SM	101.2	1621	12.0	48.6	0.67									
22	12	8							SW-SM	119.3	1911	9.5	62.6	0.41									
									SM	99.8	1599	19.0	74.5	0.69									
49	28	17						NP	SM	104.9	1680	22.0	97.9	0.61									
72	37	18							SM	96.8	1551	26.9	97.9	0.74									
35	18	13						NP	SM	100.9	1616	9.1	36.6	0.67									
16	6	3							SW	104.5	1674	4.2	18.5	0.61									
									SW	90.7	1453	11.7	36.7	0.86									
									SW	117.8	1887	6.2	39.2	0.43									
48	29	24			31	18	13		SC	104.8	1679	13.6	60.6	0.61									
									SM	115.3	1847	8.3	48.3	0.46									
27	9	7							SP-SM	105.6	1692	7.8	35.5	0.60								*	

	SATURATION (%)	VOID RATIO	COMPACTED		OPTIMUM MOISTURE (%)	SPECIFIC GRAVITY OF SOLIDS	TRIAXIAL (d)	UNCONFINED COMPRESSION	DIRECT SHEAR	CONSOLIDATION	CHEMICAL	CBR
			MAXIMUM DRY DENSITY									
			(pcf)	(kg/m ³)								
	21.9	1.26										
	22.2	1.28				2.65		*				
	24.8	1.24										
	26.9	0.73										
	34.7	0.56										
	37.1	0.61				2.76			*			
	41.0	0.90									*	
	49.8	0.54										
	53.5	0.63					*					
	45.5	0.62					*					
	46.4	0.58					*					
	48.2	0.52										
	70.1	0.74										
	61.2	0.52										
	61.8	0.52										
	97.9	0.43										
	52.8	0.39										
	76.3	0.63										
	15.4	0.60										
	21.0	0.65									*	
	23.3	0.63										
	38.1	0.47										
	24.4	0.75										
	28.4	0.84								*		
	41.6	0.65										
	72.6	0.46										
	47.5	0.49										
	72.5	0.40										
	54.5	0.68										
	48.6	0.67										
	62.6	0.41										
	74.5	0.69										
	97.9	0.61										
	97.9	0.74										
	36.6	0.67										
	18.5	0.61										
	36.7	0.86										
	39.2	0.43										
	60.6	0.61										
	48.3	0.46										
	35.5	0.60							*			



MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE
BMO/AFRC-MX

SUMMARY OF LABORATORY RESULTS
MULESHOE VALLEY, NEVADA
PAGE 1 OF 2

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30 JUN 81

TABLE II-1

ACTIVITY NUMBER	SAMPLE NUMBER (a)	SAMPLE INTERVAL		PERCENT FINER BY WEIGHT													
				STANDARD SIEVE OPENING							U S STANDARD SIEVE NO.						PI SI
				BLDRS.	COBBLES		GRAVEL				SAND				SILT CL.		
		FEET	METERS	24"	12"	6"	3"	1½"	¾"	3/8"	4	10	40	100	200	.075	
MS-B-3	D-8	25.2 - 25.7	7.68 - 7.83						100	97	94	88	64	37	25		
	D-9	30.2 - 30.7	9.20 - 9.36					100	99	93	85	70	36	19	13		
	D-10	40.5 - 41.0	12.34 - 12.50							100	97	89	57	28	18		
	P-11	50.8 - 51.6	15.24 - 15.48						100	91	77	66	38	18	12		
	P-12	60.2 - 60.7	18.35 - 18.50														
	P-12	60.2 - 60.7	18.35 - 18.50														
	P-12	61.0 - 61.5	18.59 - 18.75														
	P-12	61.8 - 62.3	18.84 - 18.99								100	99	88	62	40	1	
	P-13	70.7 - 70.7	21.34 - 21.55								100	94	69	42	26		
	P-14	86.8 - 87.6	26.46 - 26.70														
	P-15	98.8 - 99.8	30.11 - 30.42								100	84	30	14	10		
MS-T-1	B-1	0.5 - 2.0	0.15 - 0.61						100	98	98	96	89	81	72		
MS-T-2	B-1	0.5 - 2.0	0.15 - 0.61								100	95	65	39	31		
	b-2	5.0 - 6.0	1.52 - 1.83							100	99	90	61	40	31		
MS-T-3	B-1	0.5 - 2.0	0.15 - 0.61									100	99	97	94	1	
	b-2	7.0 - 8.0	2.13 - 2.44									100	96	77	59		
	b-3	12.0 - 13.0	3.66 - 3.96						100	91	83	61	24	13	10		
MS-T-5	B-1	0.5 - 2.0	0.15 - 0.61					100	87	77	67	53	23	11	8		
MS-T-6	B-1	0.5 - 2.0	0.15 - 0.61						100	91	81	71	58	40	30		
	b-2	10.0 - 11.0	3.05 - 3.35					100	98	90	79	62	19	9	7		
MS-T-7	B-1	0.5 - 2.0	0.15 - 0.61				100	92	81	62	44	33	23	17	14		
MS-T-8	B-1	0.5 - 2.0	0.15 - 0.61				100	95	73	66	57	49	40	34	31		
MS-P-2	b-1	0.5 - 2.0	0.15 - 0.61														
MS-P-4	b-1	0.5 - 2.0	0.15 - 0.61					100	92	85	72	49	15	6	5		
MS-P-7	b-1	0.5 - 2.0	0.15 - 0.61							100	99	97	85	69	58		
MS-P-9	B-1	0.5 - 2.0	0.15 - 0.61				100	90	68	56	40	28	18	11	9		
MS-CS-5	b-1	0.0 - 0.5	0.00 - 0.30				100	85	67	60	54	49	46	42	35		
MS-CS-12	b-1	0.5 - 2.0	0.15 - 0.61						100	77	62	51	41	35	31		
MS-CS-20	b-1	0.5 - 2.0	0.15 - 0.61									100	99	92	82		

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

STANDARD SIEVE NO.						PARTICLE SIZE (mm)		ATTERBERG LIMITS (b)			USCS (c)	IN-SITU					COMPACTED			SPECIFIC GRAVITY OF SOLIDS	TRIAxIAL (d)	UNCONFINED COMPRESSION	DIRECT	
SAND				SILT OR CLAY		LL	PL	PI	DRY UNIT WEIGHT			MOISTURE CONTENT (%)	SATURATION (%)	VOID RATIO	MAXIMUM DRY DENSITY		OPTIMUM MOISTURE (%)							
0	40	100	200	.005	.001				(pcf)	(kg/m³)					(pcf)	(kg/m³)								
8	64	37	25					NP	SM	111.3	1783	12.8	67.6	0.51										
0	36	19	13						SM	113.8	1823	11.0	61.7	0.48										
9	57	28	18					NP	SM	106.3	1703	11.3	51.9	0.59										
6	38	18	12						SW-SM	108.0	1730	11.9	57.1	0.56										
									SM	91.7	1469	15.3	49.3	0.84										
									SM	92.9	1488	4.2	13.8	0.81										
									SM	88.4	1416	13.5	40.2	0.91										
9	88	62	40	11	6			NP	SM	93.6	1499	13.0	43.8	0.80										
4	69	42	26						SM	111.7	1789	8.4	44.8	0.51										
								NP	SW-SM	106.7	1709	16.2	75.4	0.58										
	30	14	10						SW-SM	105.2	1685	15.6	70.1	0.60										
9	89	81	72				25	21	4	CL-ML						114.0	1828	15.0	2.68					
6	65	39	31				30	16	14	SC														
0	61	40	31						NP	SM														
0	99	97	94	17	7		31	20	11	CL														
0	96	77	59						NP	ML														
1	24	13	10							SW-SM														
3	23	11	8							SW-SM						126.0	2018	9.4						
1	58	40	30							SM														
2	19	9	7							SW-SM														
3	23	17	14							GM						131.5	2106	9.0	2.66					
9	40	34	31				32	21	11	GC						119.0	1906	12.5						
									NP	ML														
9	15	6	5							SW-SM														
7	85	69	58						NP	ML														
3	18	11	9							GP-GM														
9	46	42	35				33	21	12	GC														
	41	35	31							GM														
0	99	92	82						NP	ML														

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SUMMARY OF
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ERTEC WESTERN INC LONG BEACH CA

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MX SITING INVESTIGATION. GEOTECHNICAL EVALUATION. VERIFICATION --ETC(U)

JUN 81

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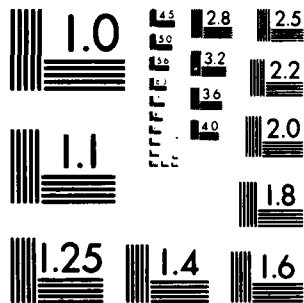
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MICROCOPY RESOLUTION TEST CHART
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**MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE
BMO/AFRCE-MX**

SUMMARY OF LABORATORY RESULTS
MULESHOE VALLEY, NEVADA
PAGE 2 OF 2

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TABLE 20-1

TABLE II-9-2



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The Earth Respiratory Committee

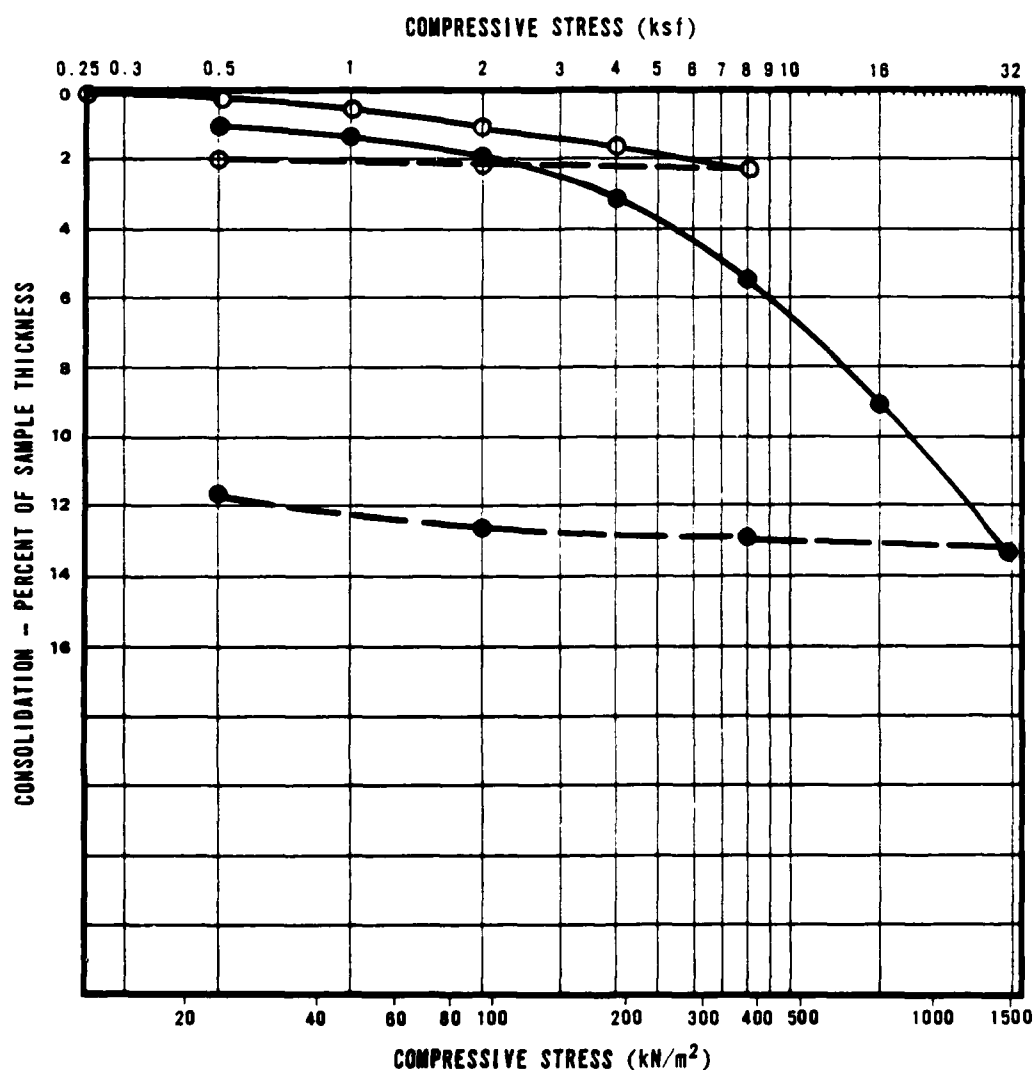
SUMMARY OF UNCONFINED COMPRESSION TEST RESULTS MULESHOE VALLEY, NEVADA

30 JUN 81.

TABLE D-9-3

 Ertec The Earth Technology Corporation	MX SITING INVESTIGATION DEPARTMENT OF THE AIR FORCE 8MO/AFRC-MX
SUMMARY OF DIRECT SHEAR TEST RESULTS MULESHOE VALLEY, NEVADA	

E-TR-27-MS-II



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			
○	MS-B-2	D-8	15.5 - 16.0	4.72 - 4.88	ML	91.8	1471	8.8	0.84	28.4

- AT FIELD MOISTURE
 ● AFTER ADDITION OF WATER
 — COMPRESSION
 - - - REBOUND

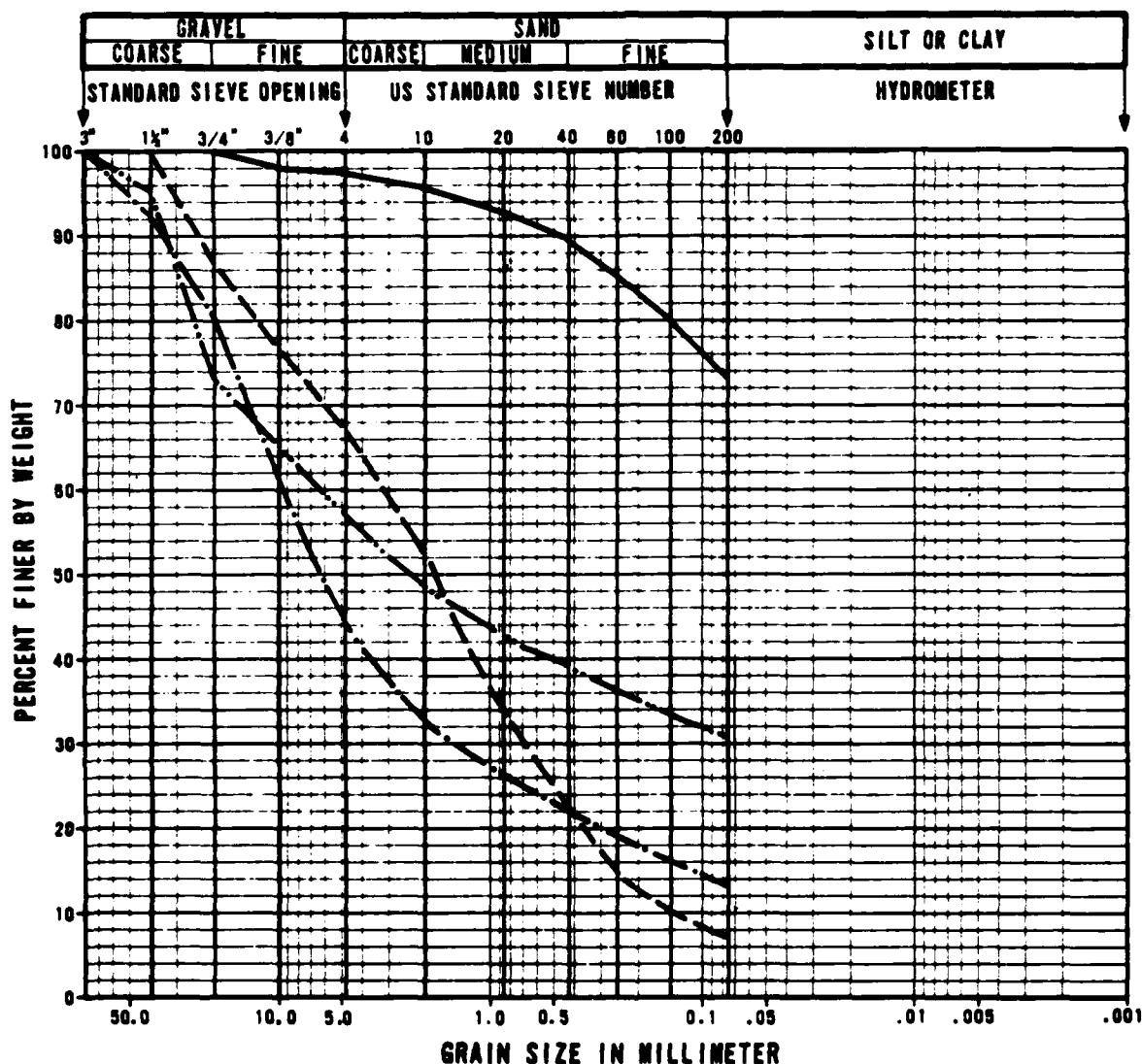
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MX SITING INVESTIGATION
 DEPARTMENT OF THE AIR FORCE
 BMO/AFCE-MX

**CONSOLIDATION TEST RESULTS
 MULESHOE VALLEY, NEVADA**

30 JUN 81

FIGURE II-8-1



SYMBOL	COMPOSITE SAMPLE NUMBER	ACTIVITY NUMBER	SAMPLE INTERVAL		SOIL TYPE
			FEET	METERS	
—	A	MS-T-1	0.5 - 2.0	0.15 - 0.61	CL-ML
- -	B	MS-T-5	0.5 - 2.0	0.15 - 0.61	SW-SM
- · -	C	MS-T-7	0.5 - 2.0	0.15 - 0.61	GM
- · · -	D	MS-T-8	0.5 - 2.0	0.15 - 0.61	GC

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MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE
BMO/AFRC-MX

GRAIN SIZE CURVES, CBR TESTS
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-2

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/m ³		pcf	kg/m ³			
A	CL-ML	72	25	4	2.68	114.0	1826	15.0	110.9	1777	15.1	97.3	21
									106.3	1703	15.1	93.3	7
									98.8	1582	15.2	86.7	4
B	SW-SM	8				126.0	2018	9.4	116.3	1863	9.3	92.3	80
									112.1	1796	9.1	89.0	49
C	GM	14			2.66	131.5	2106	9.0	121.2	1942	9.1	92.2	51
									115.8	1855	8.5	88.1	17
D	GC	31	32	11		119.0	1906	12.5	116.1	1859	14.6	97.5	80
									114.3	1831	13.7	96.0	61
									108.6	1740	12.3	91.3	21

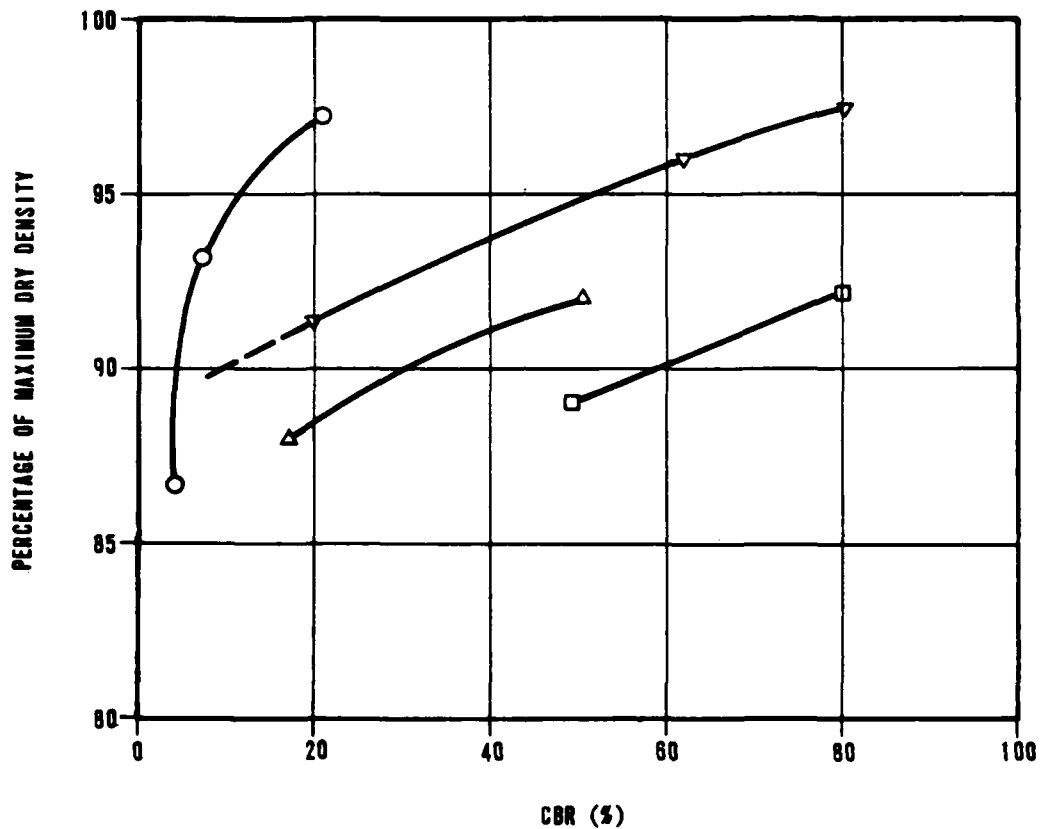


MX SITING INVESTIGATION
DEPARTMENT OF THE AIR FORCE
BMO/AFRC-MX

CALIFORNIA BEARING RATIO
(CBR) TEST RESULTS
MULESHOE VALLEY, NEVADA

30 JUN 81

TABLE II-9-6



SYMBOL	COMPOSITE SAMPLE NUMBER	SOIL TYPE
A	○	CL-ML
B	□	SW-SM
C	△	GM
D	▽	GC

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CALIFORNIA BEARING RATIO
(CBR) CURVES
MULESHOE VALLEY, NEVADA

30 JUN 81

FIGURE II-8-3

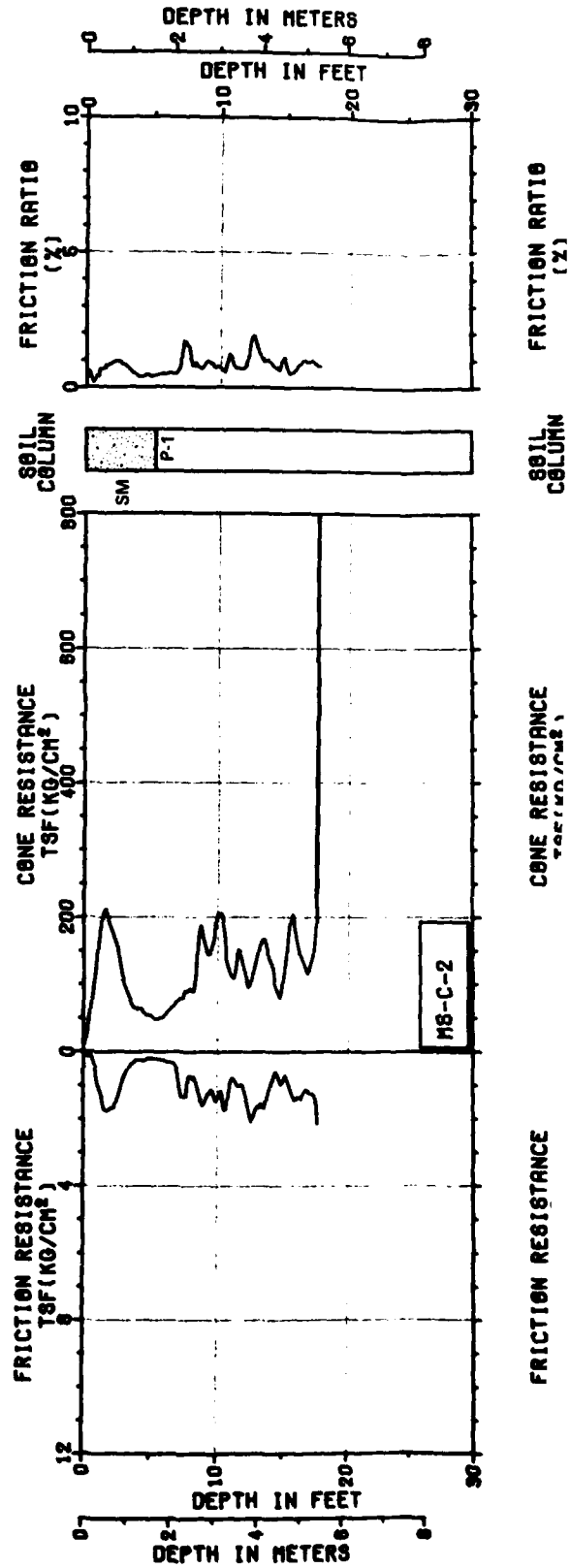
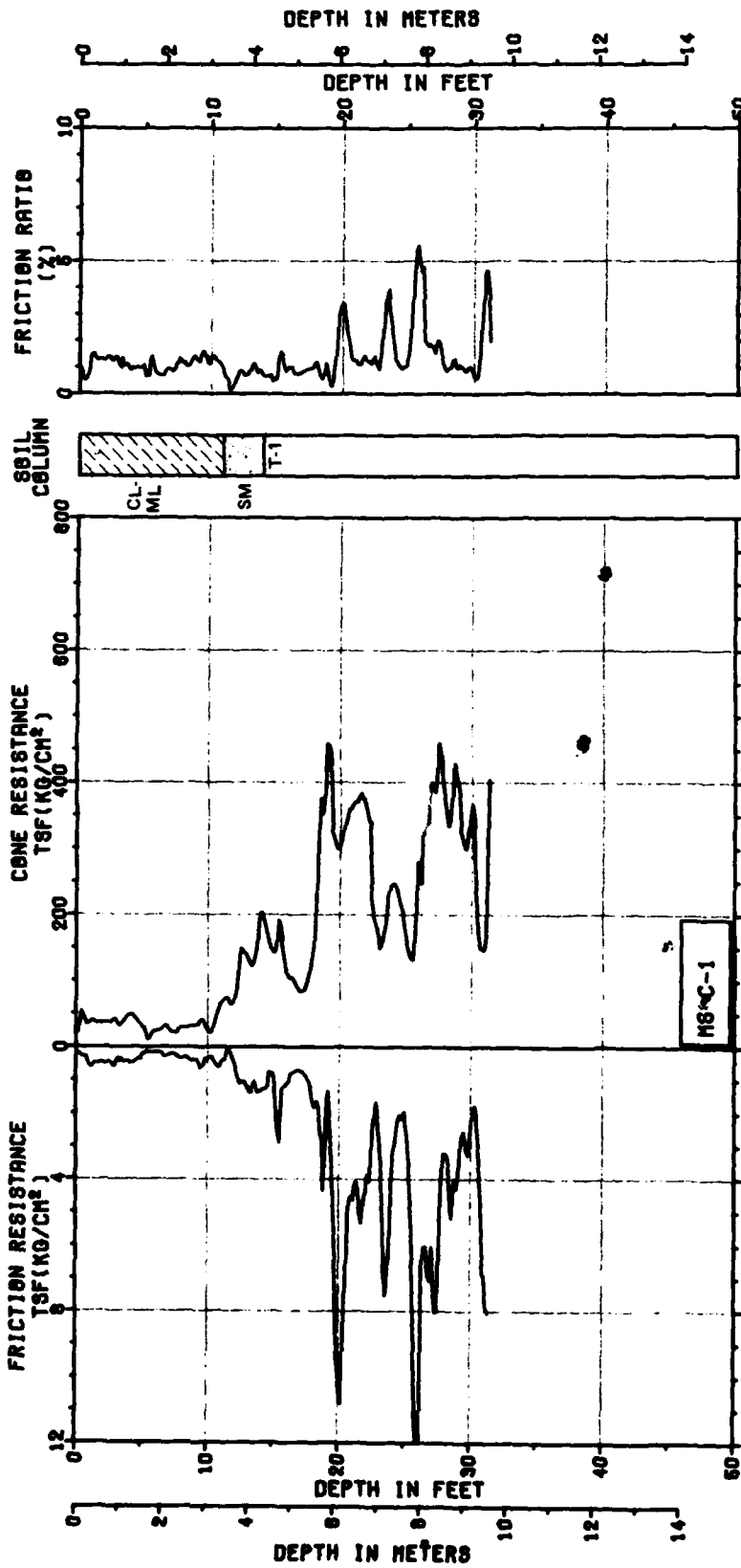
10.0 CONE PENETROMETER TEST RESULTS

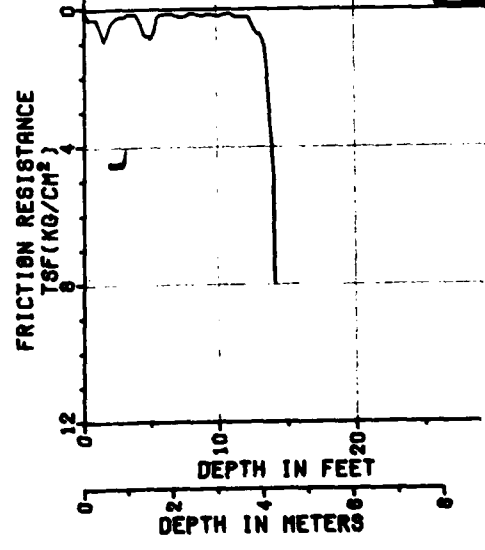
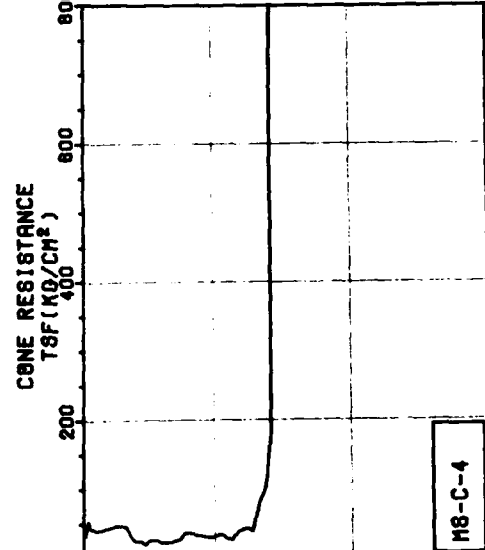
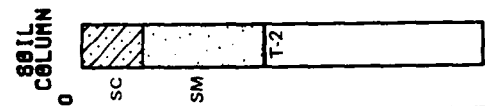
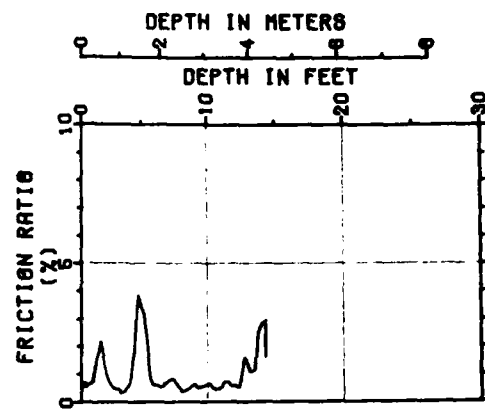
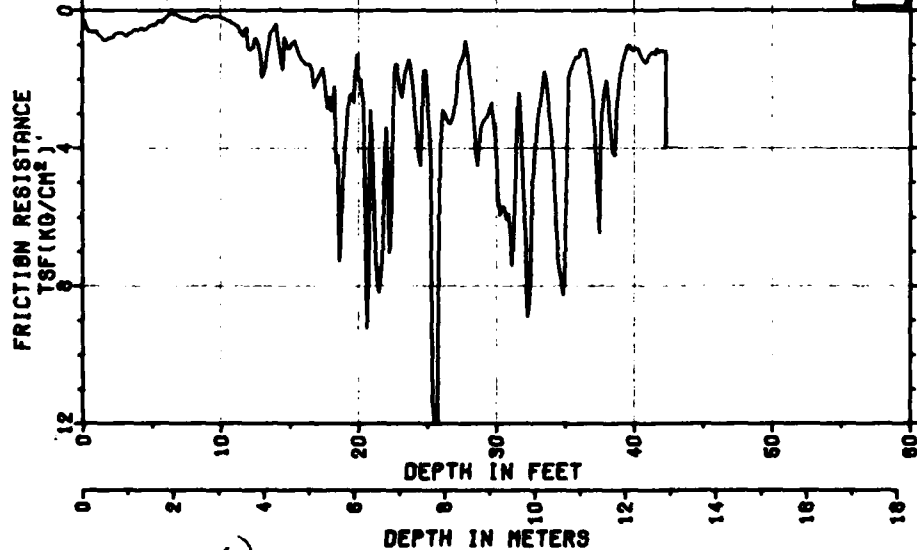
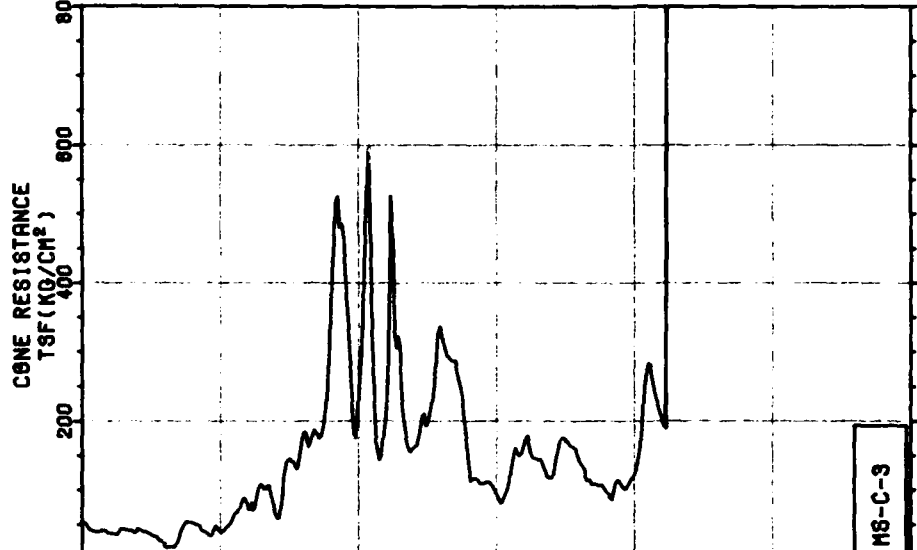
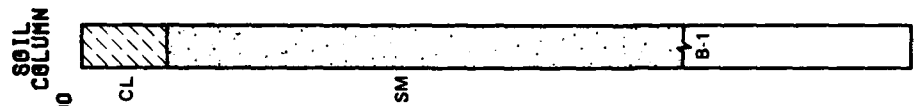
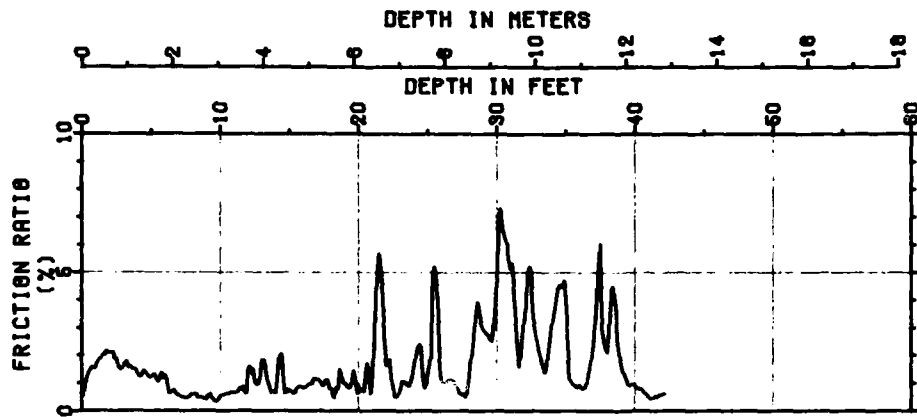
Explanation: The results of all cone penetrometer tests are presented in this section. Explanations of the test results are as follows:

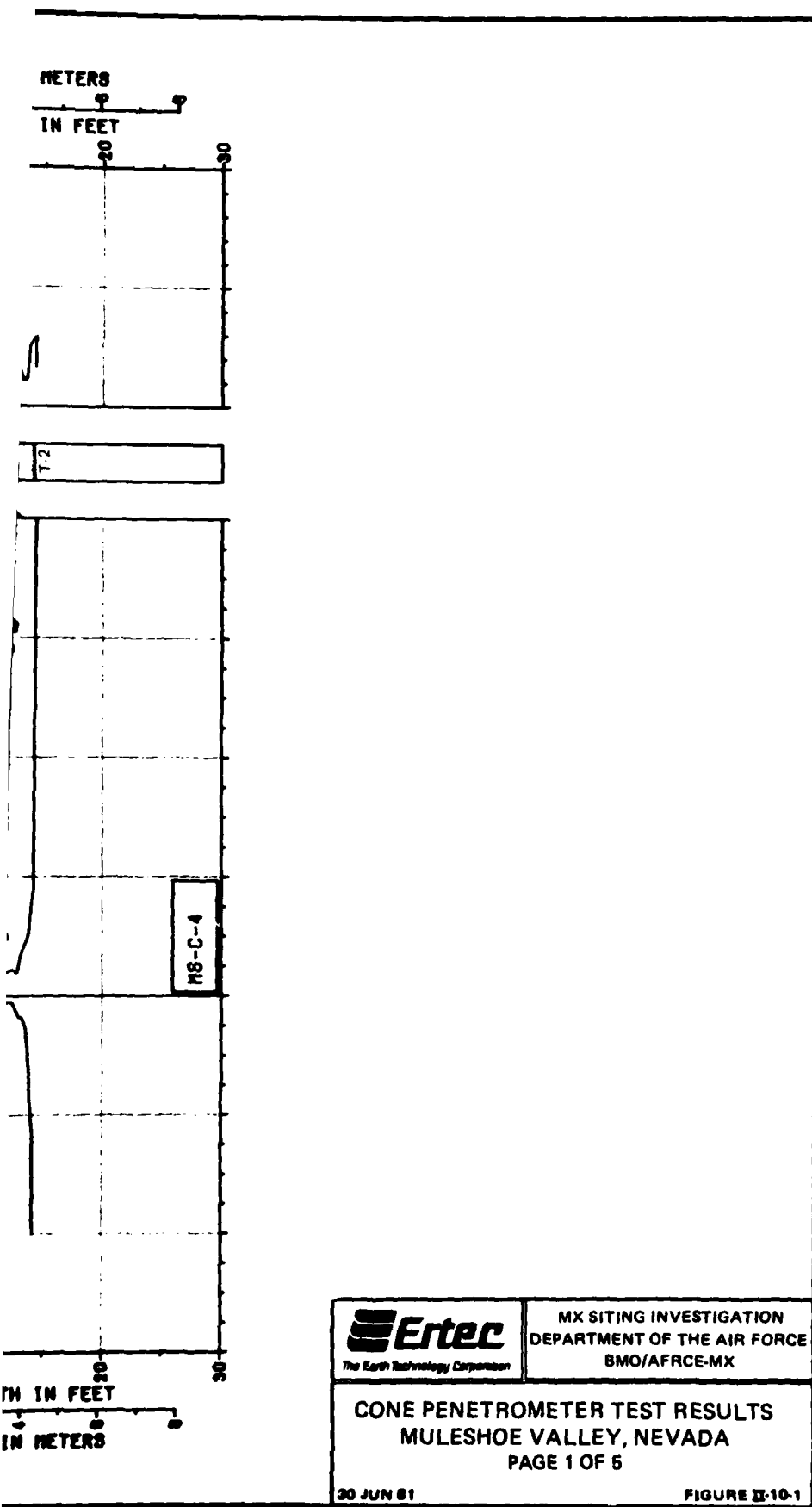
- A. Depth - Corresponds to depth below ground surface.
- B. Friction Resistance - The resistance to penetration developed by the friction sleeve, equal to the vertical force applied to the sleeve divided by its surface area. This resistance is the sum of friction and adhesion.
- C. Cone Resistance - 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.

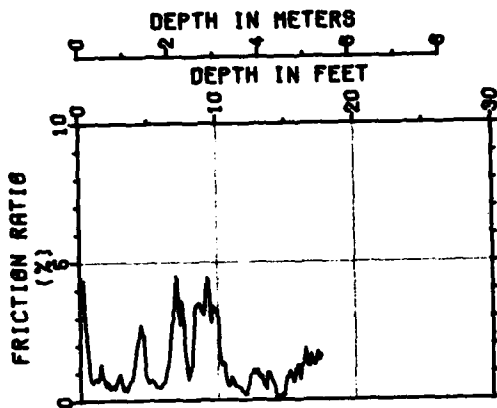
C - abbreviation for the CPT
1 - number of the test

- F. Soil Column - A graphical presentation of the soil type versus depth at each cone penetrometer test location. The Unified Soil Classification Symbol (Table II-6-1) 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.



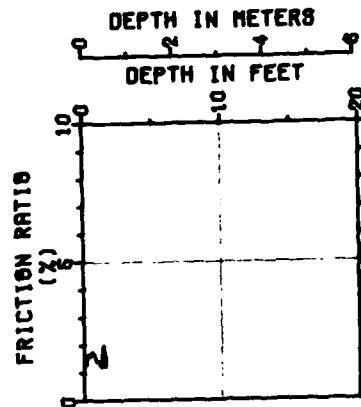
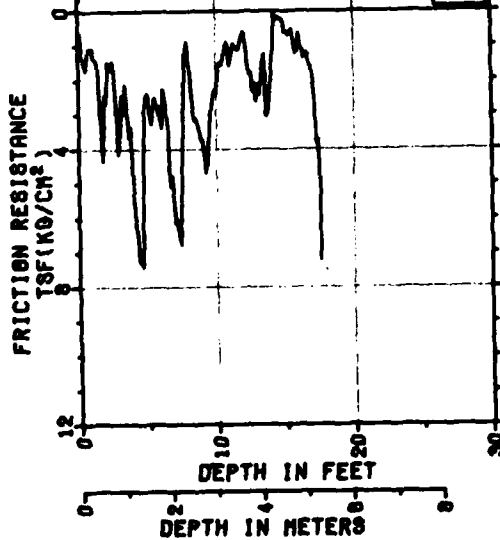
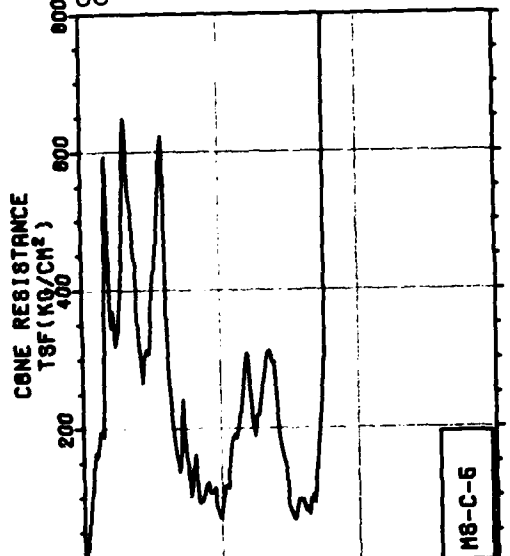






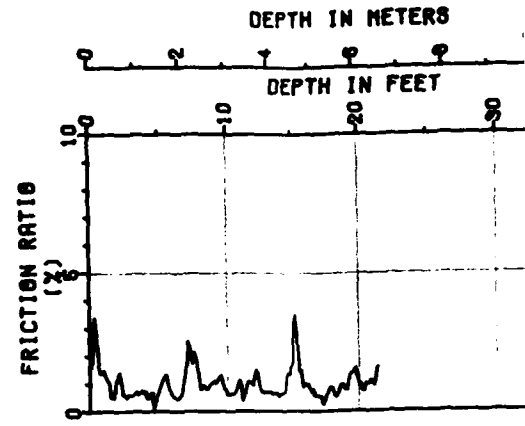
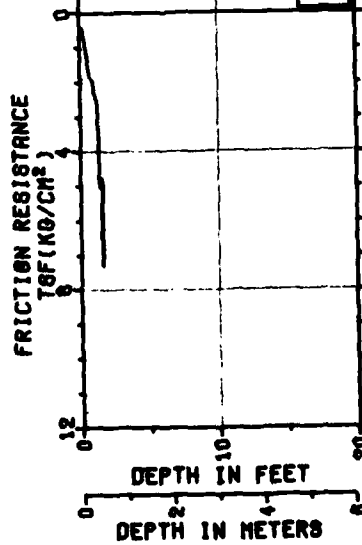
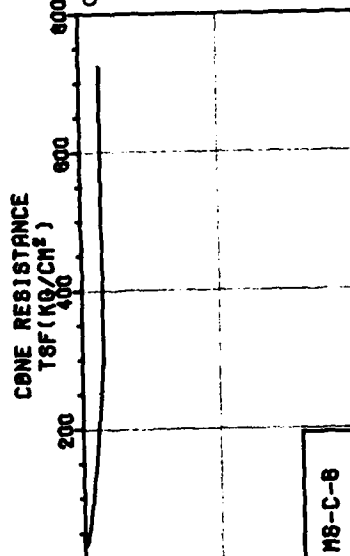
SOIL COLUMN

GC GP



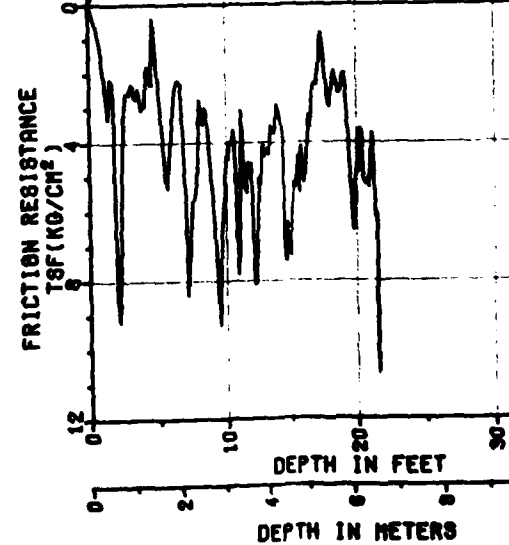
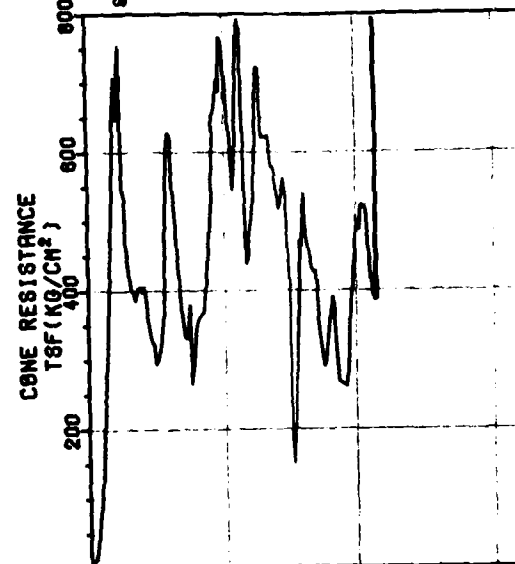
SOIL COLUMN

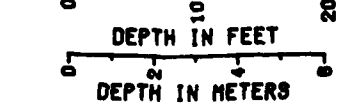
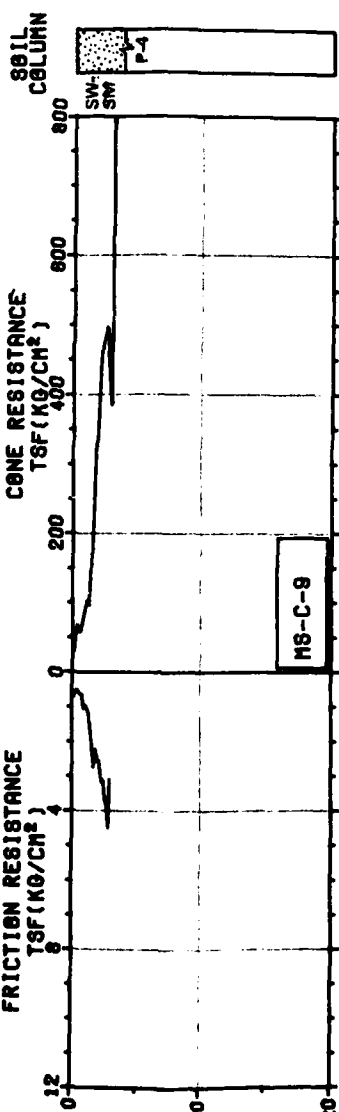
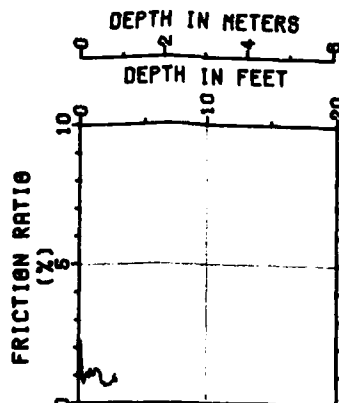
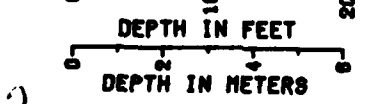
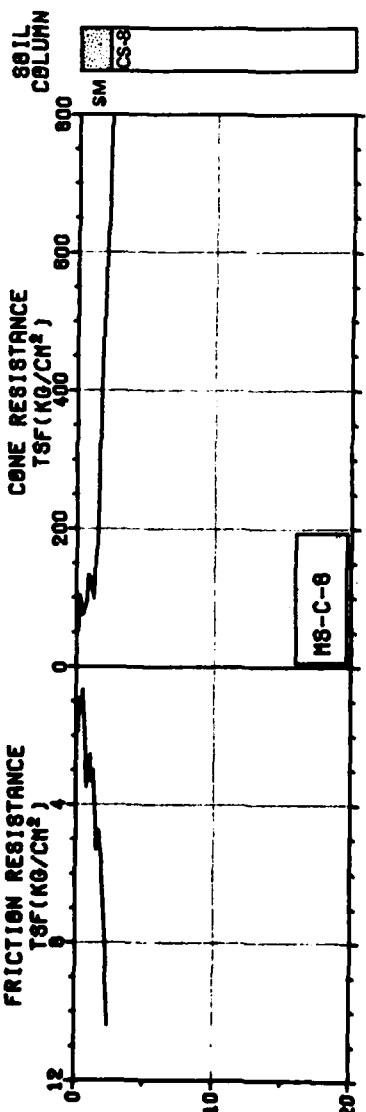
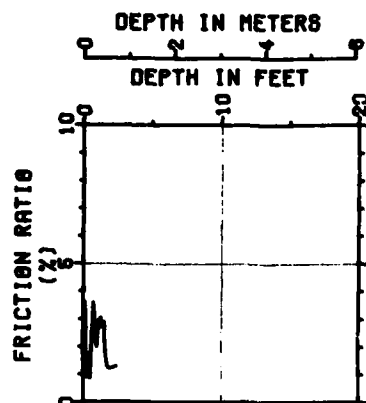
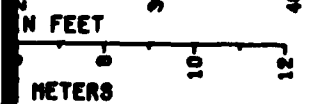
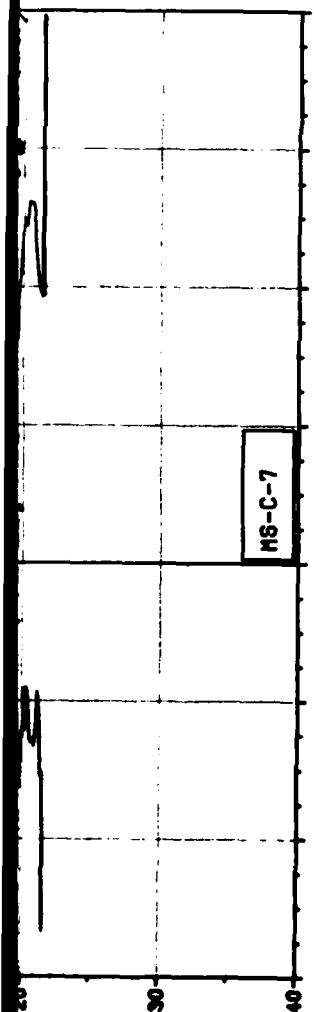
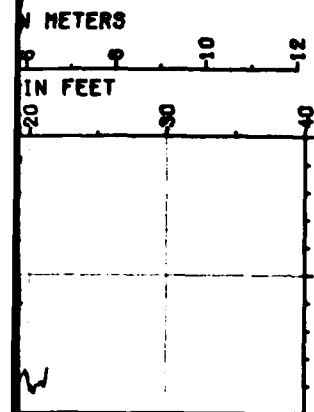
CL F-3

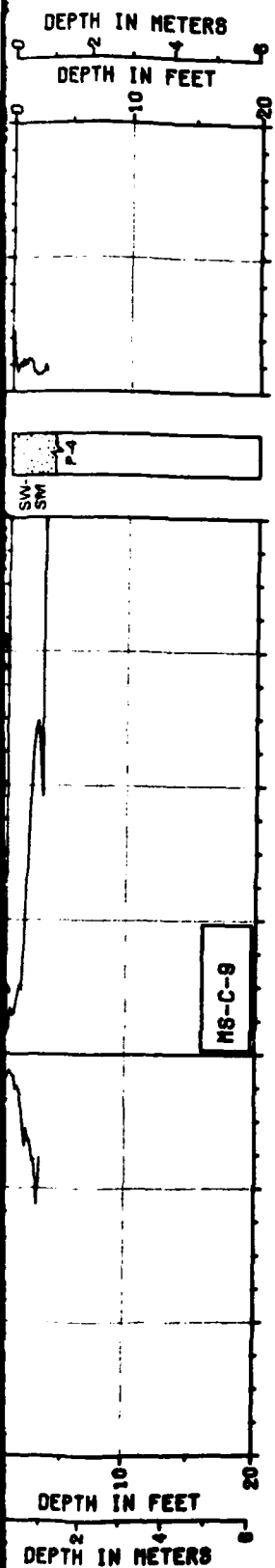


SOIL COLUMN

SM T-4







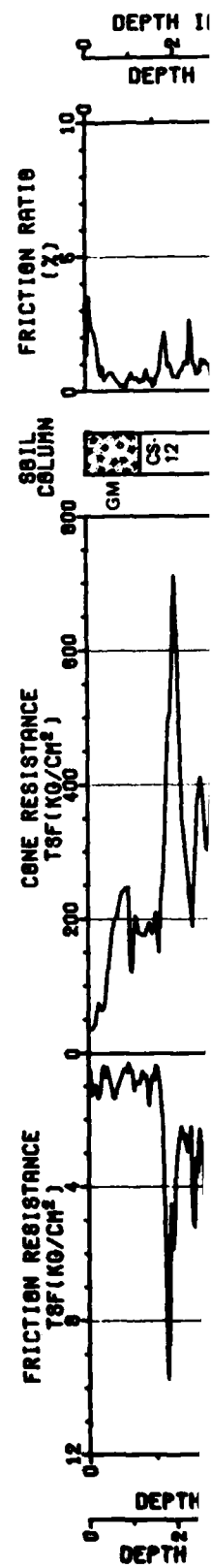
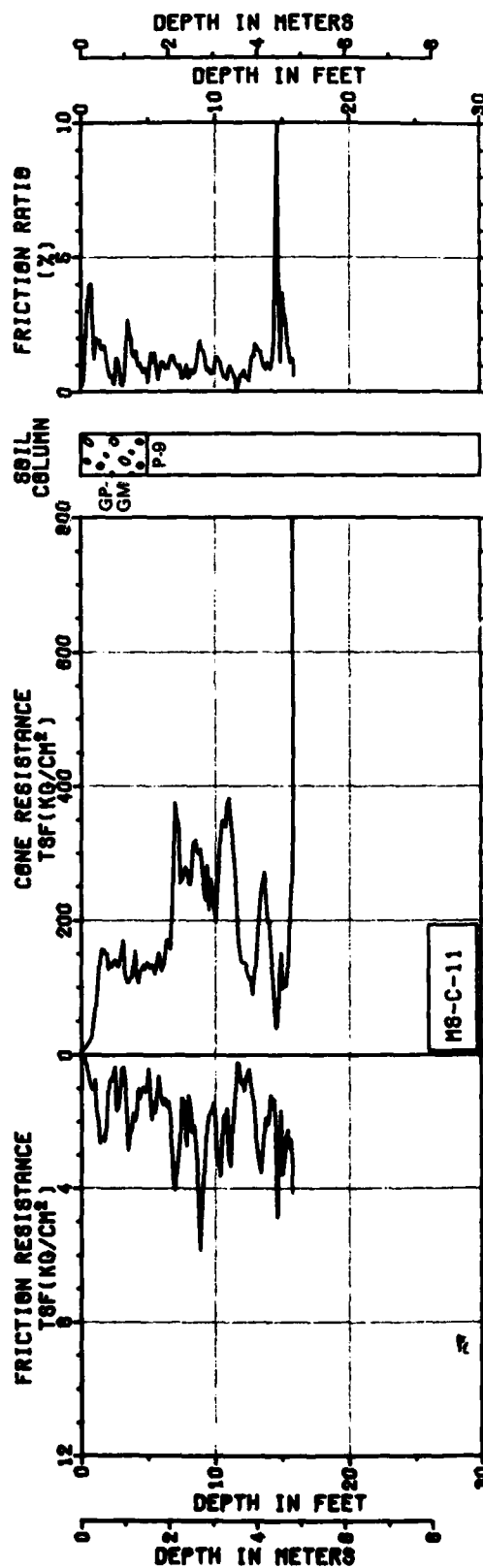
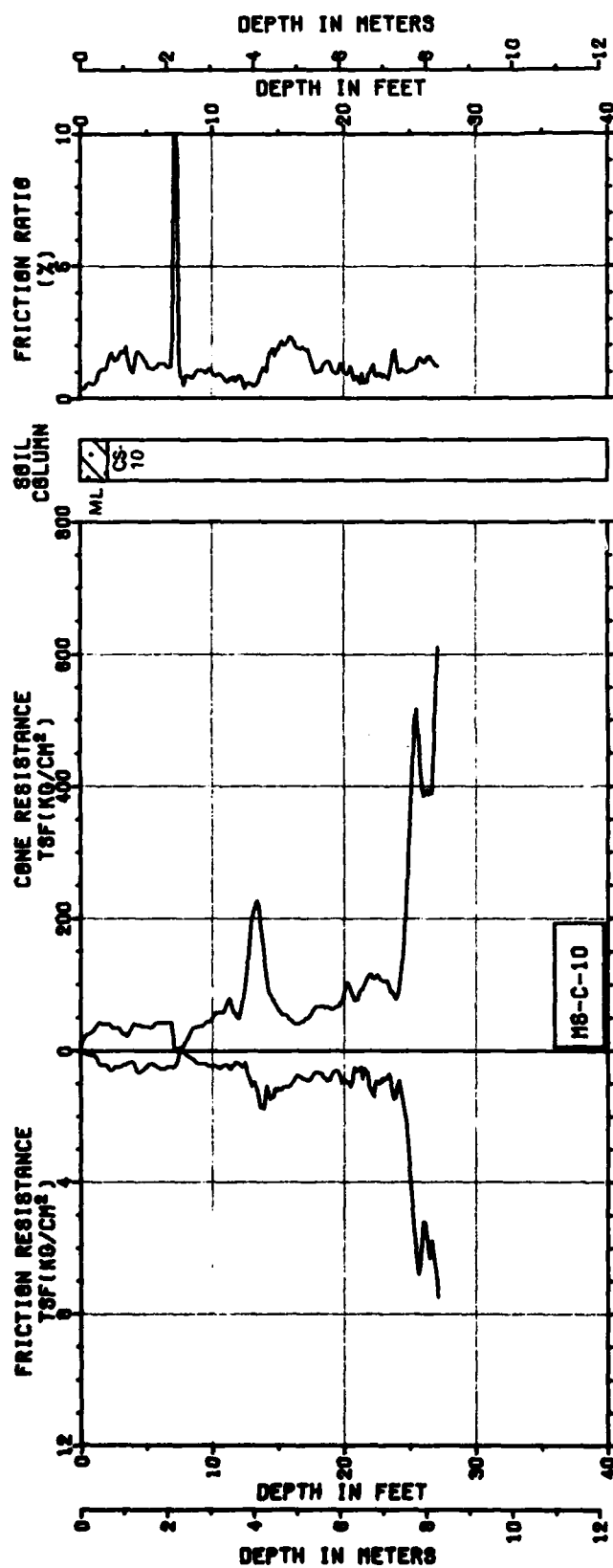
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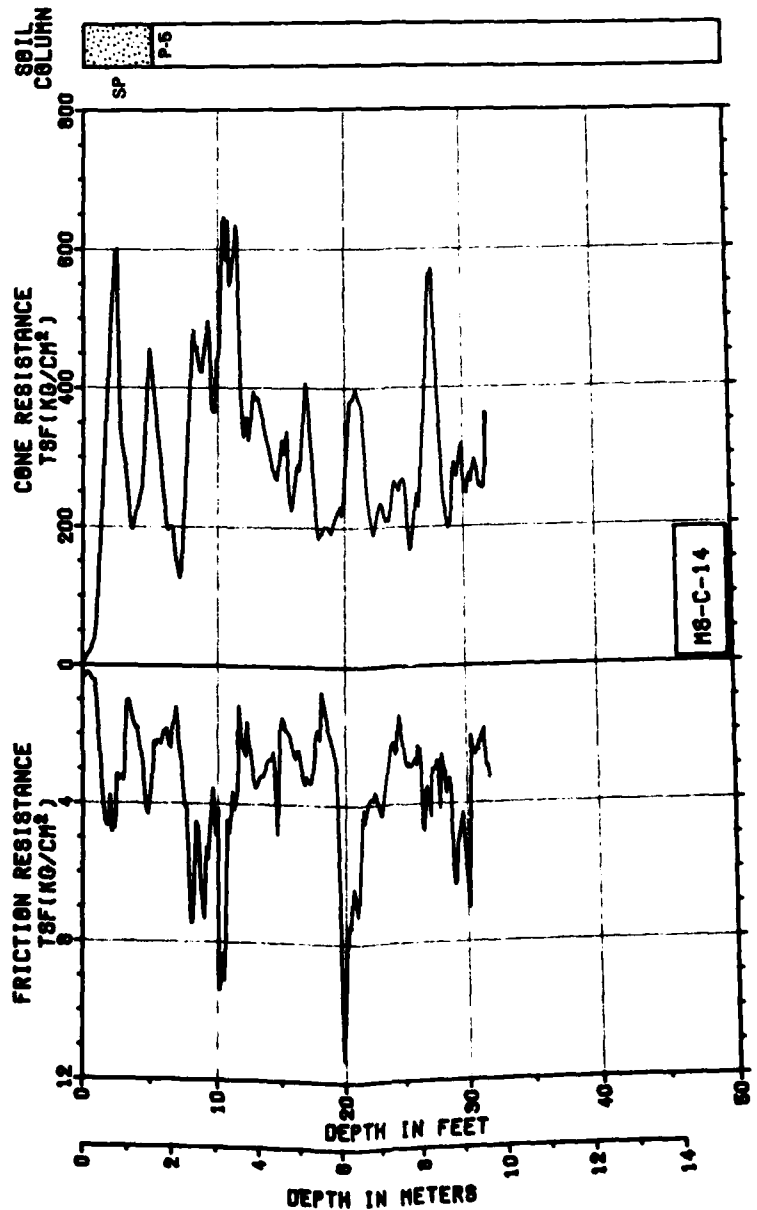
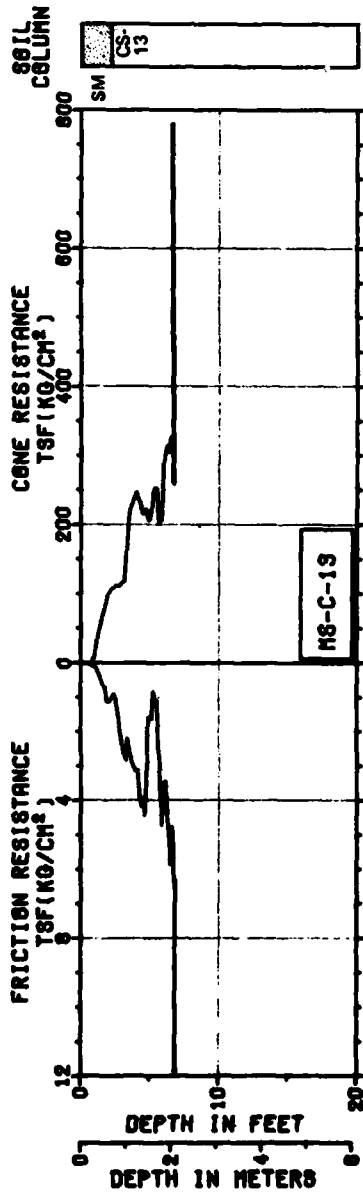
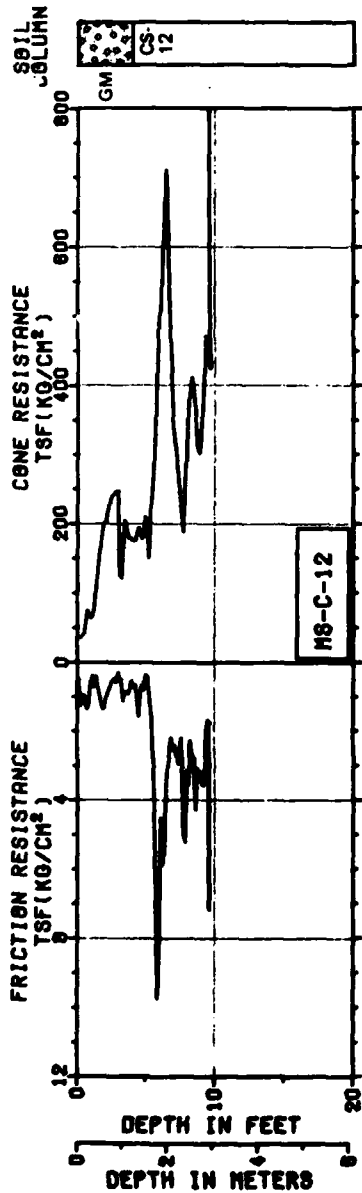
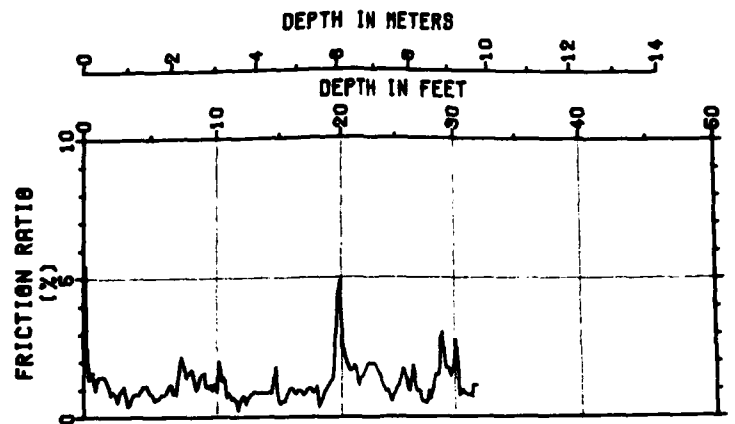
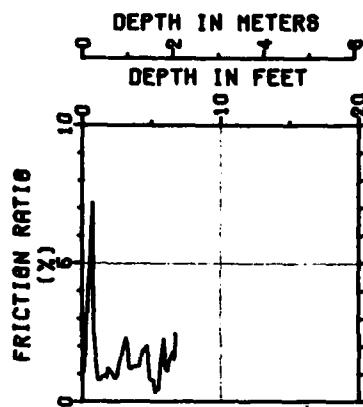
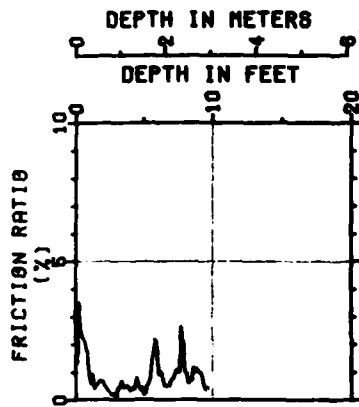
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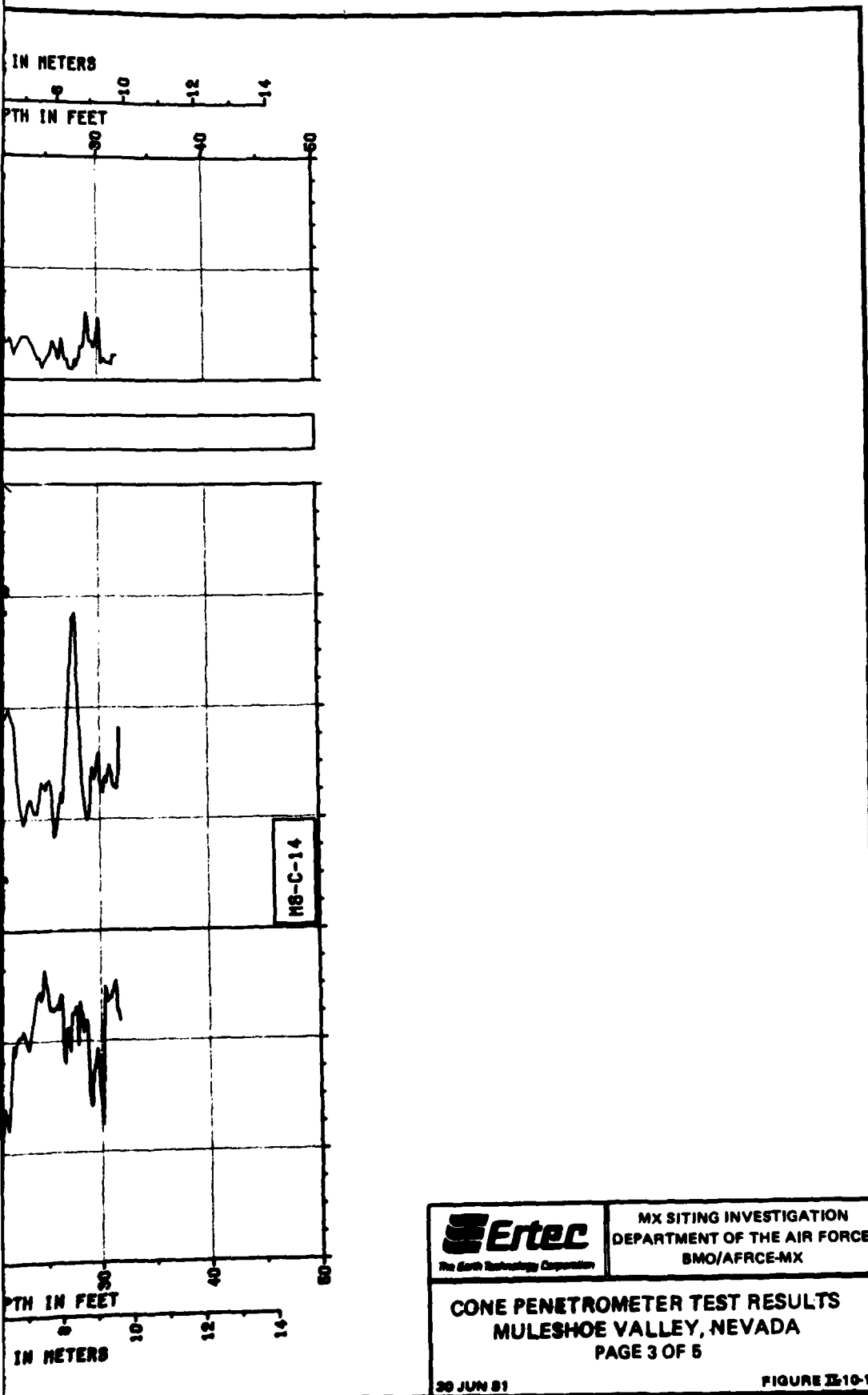
CONE PENETROMETER TEST RESULTS
MULESHOE VALLEY, NEVADA
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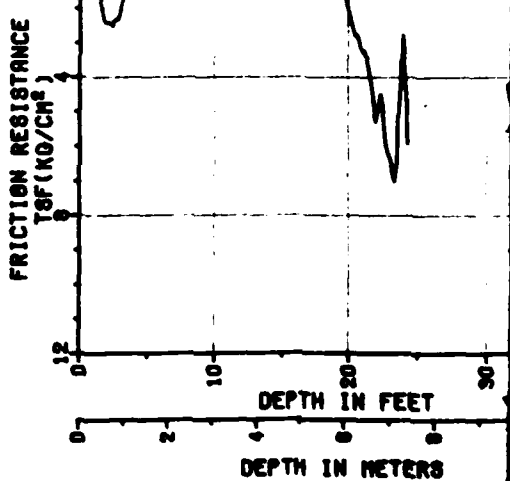
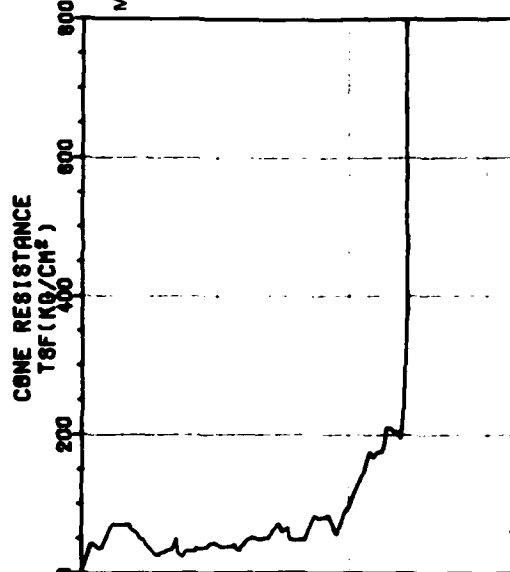
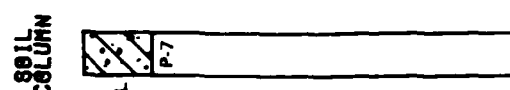
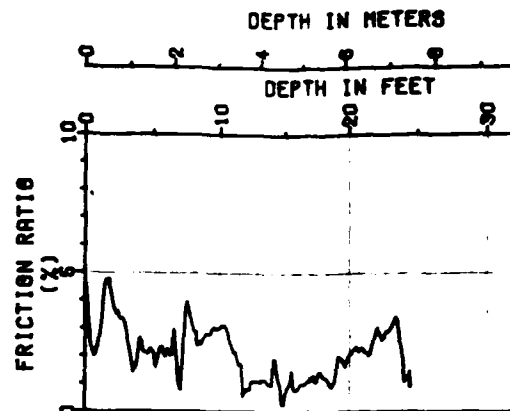
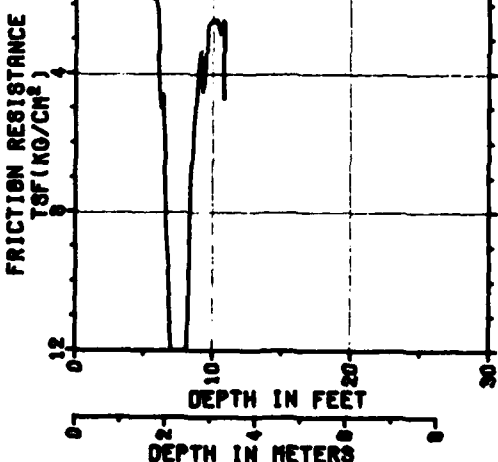
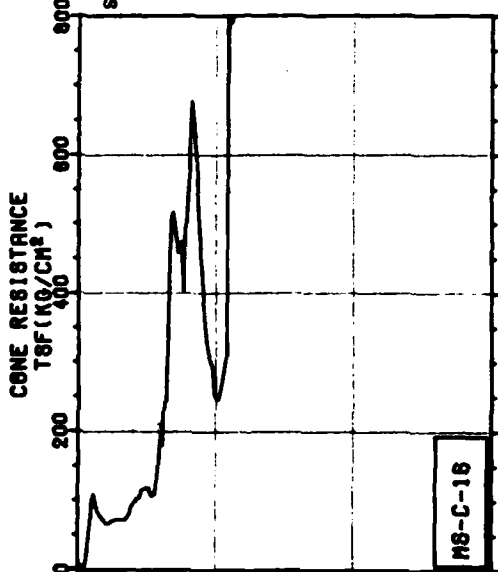
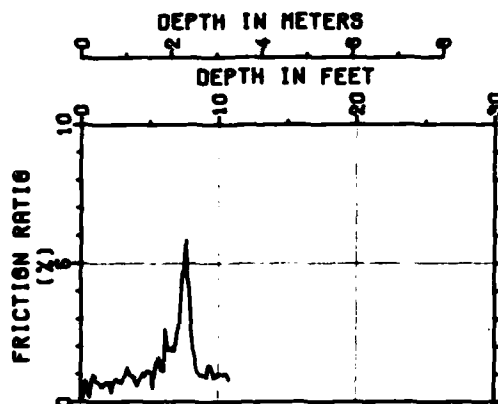
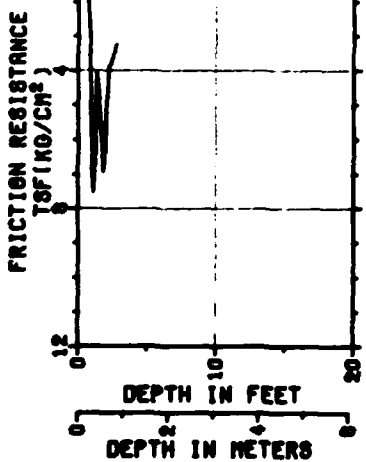
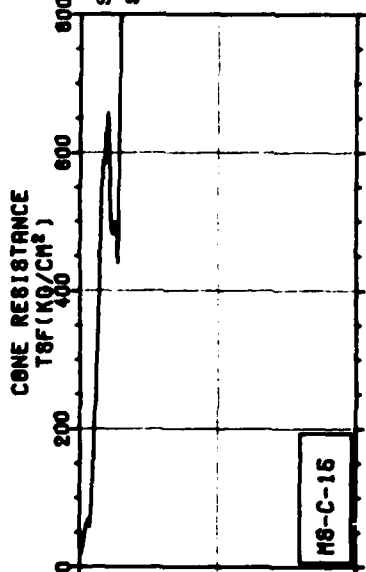
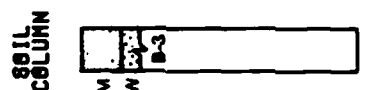
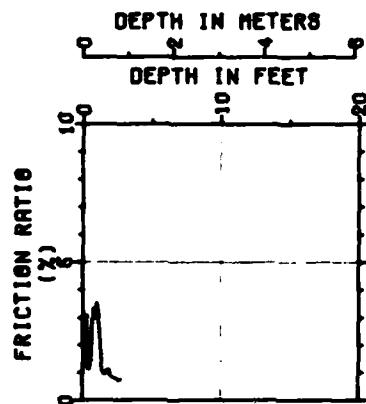
20 JUN 81

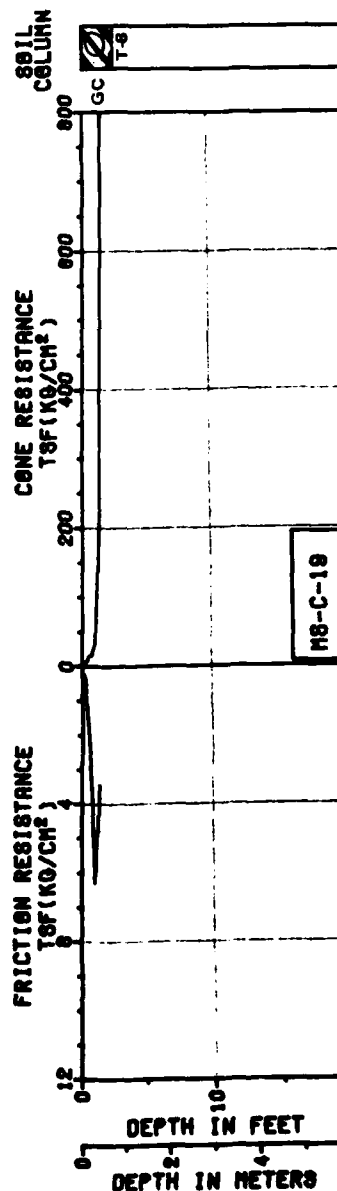
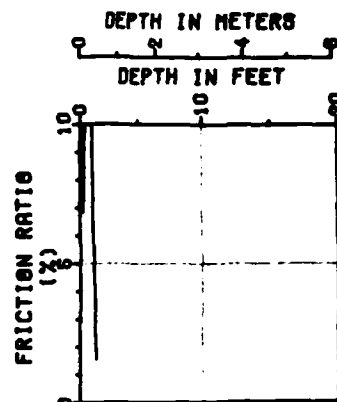
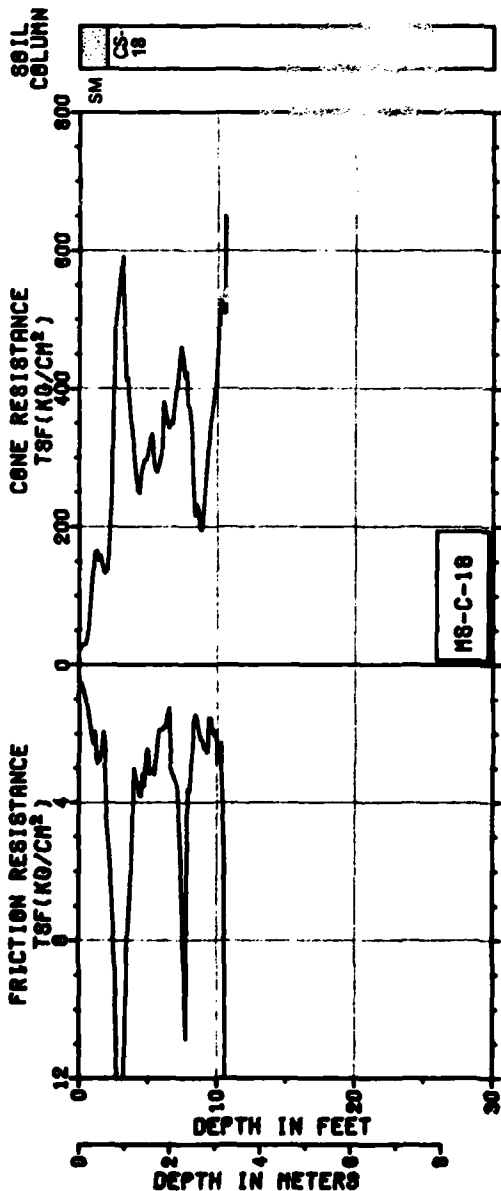
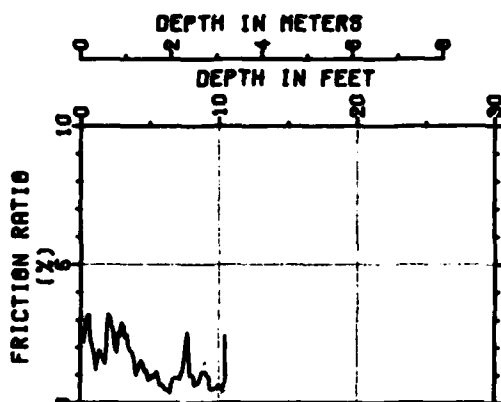
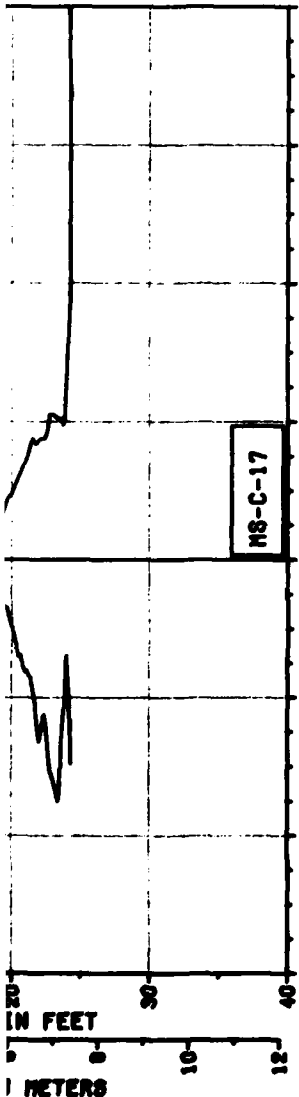
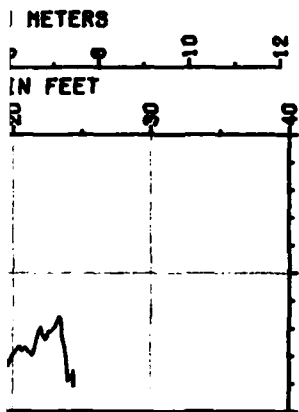
FIGURE II-10-1

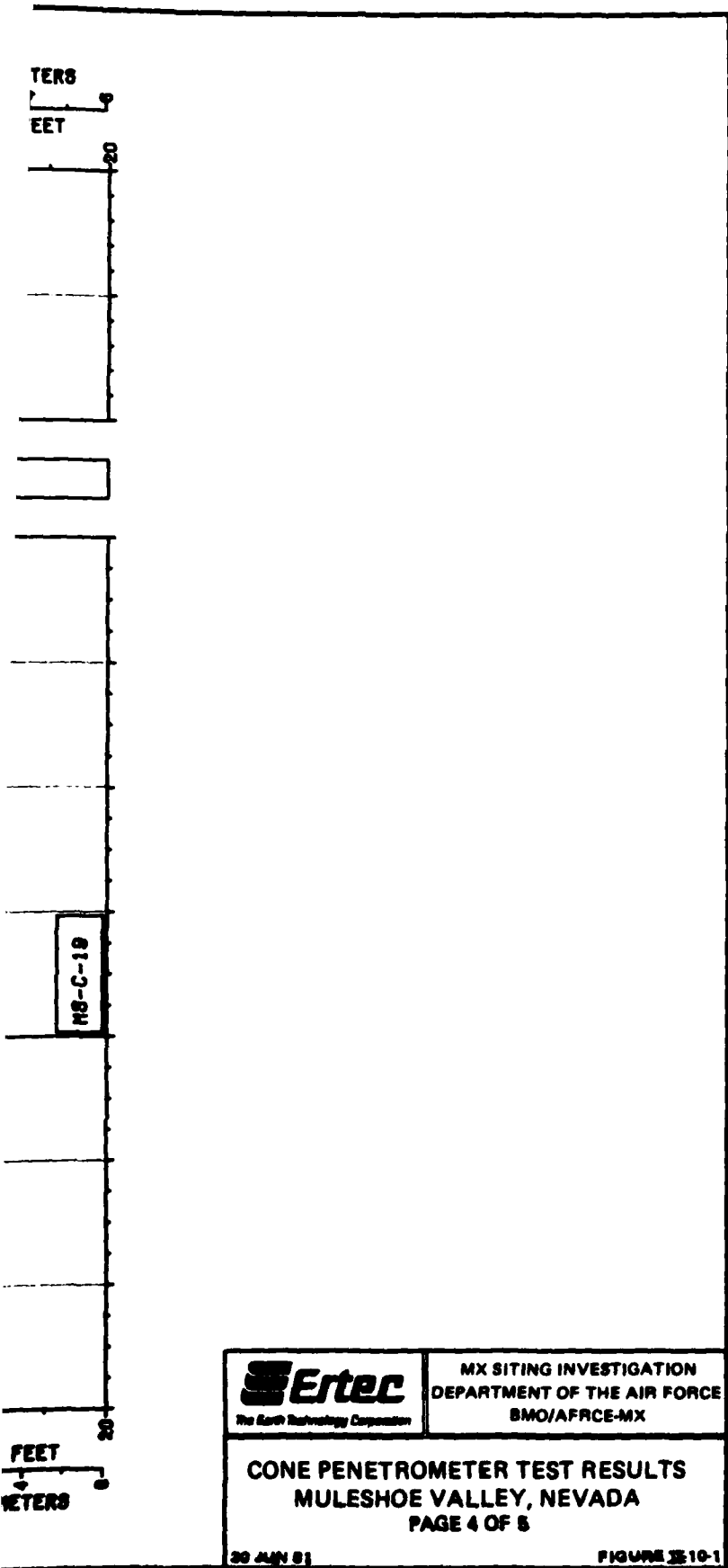


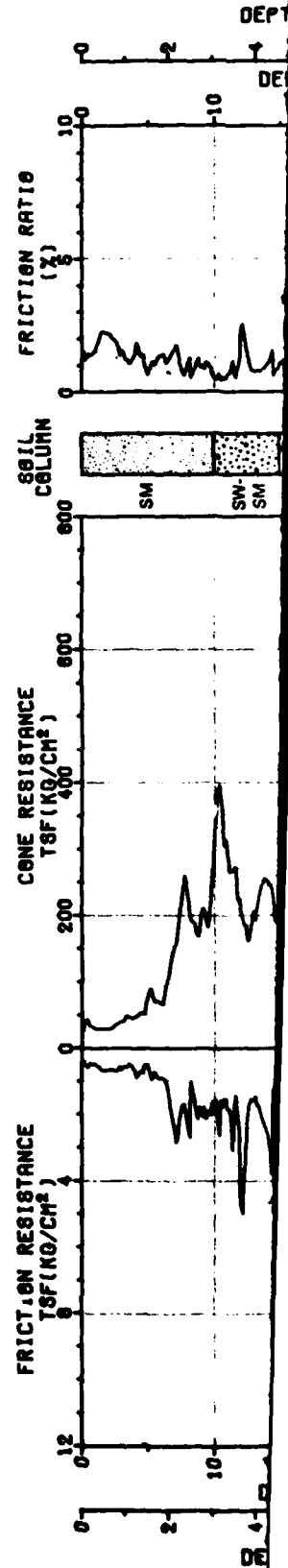
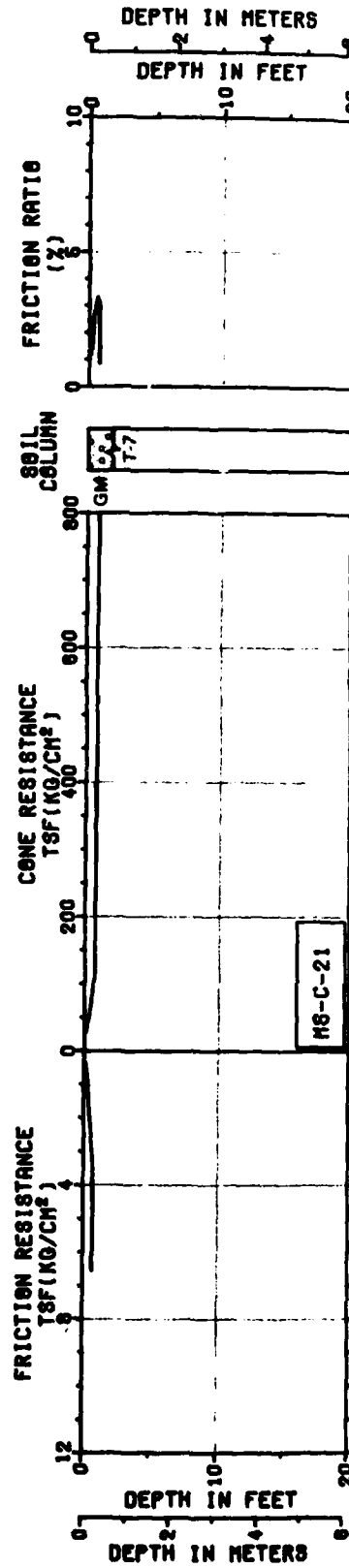
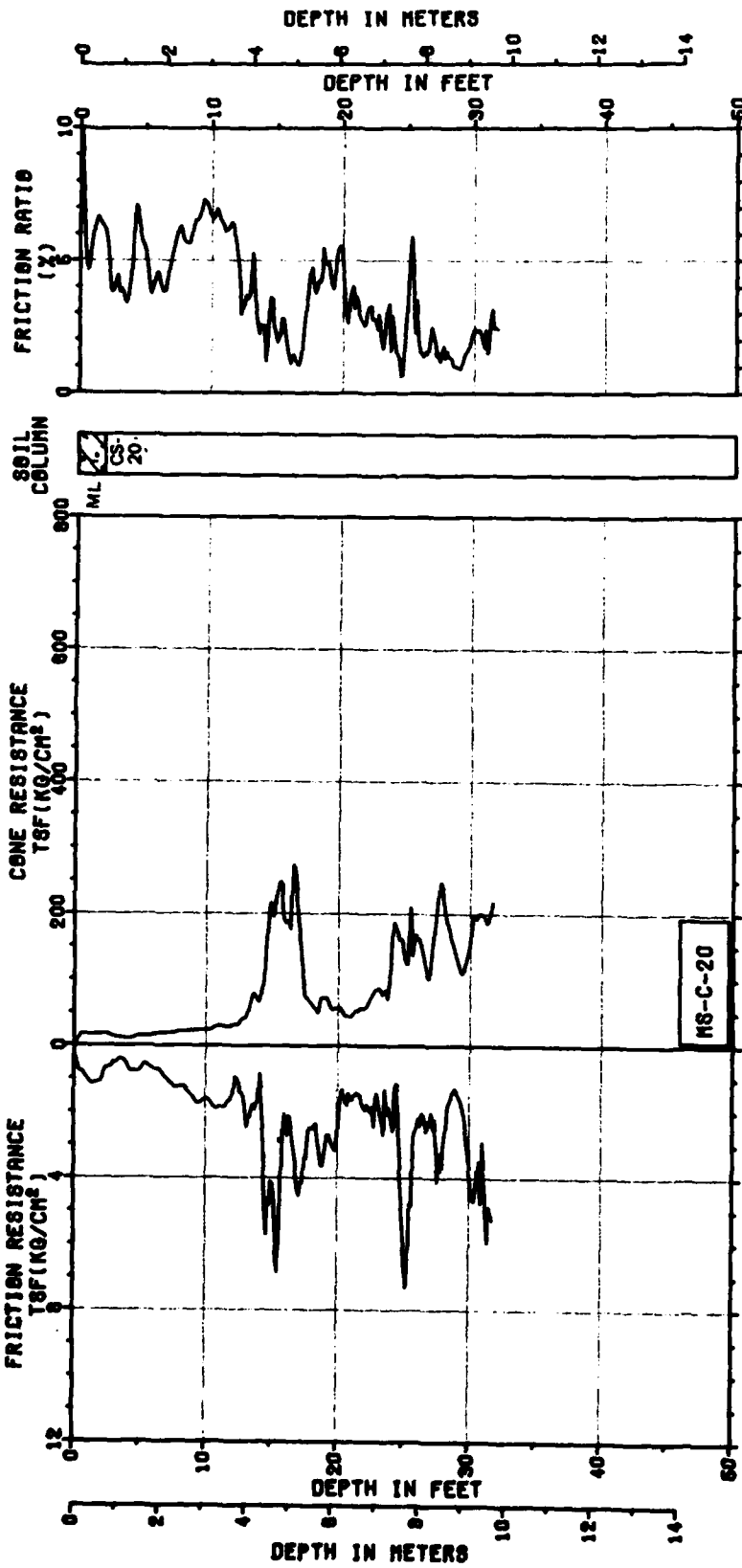


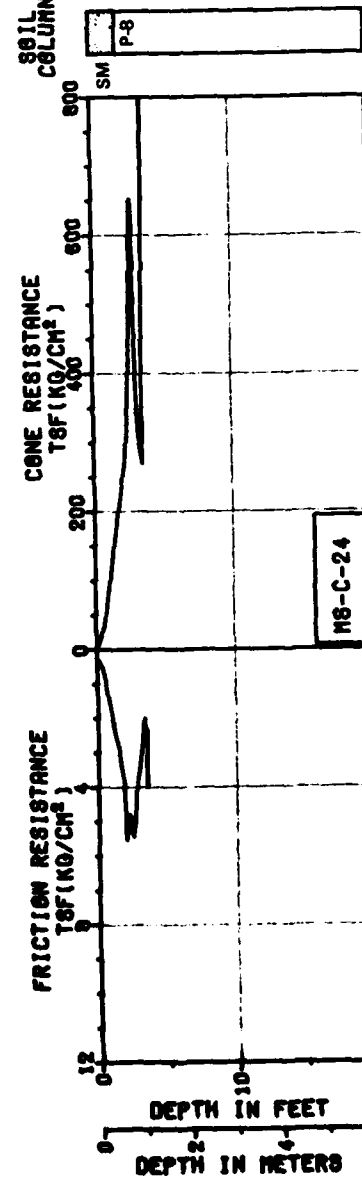
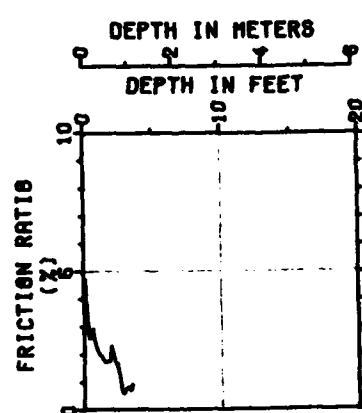
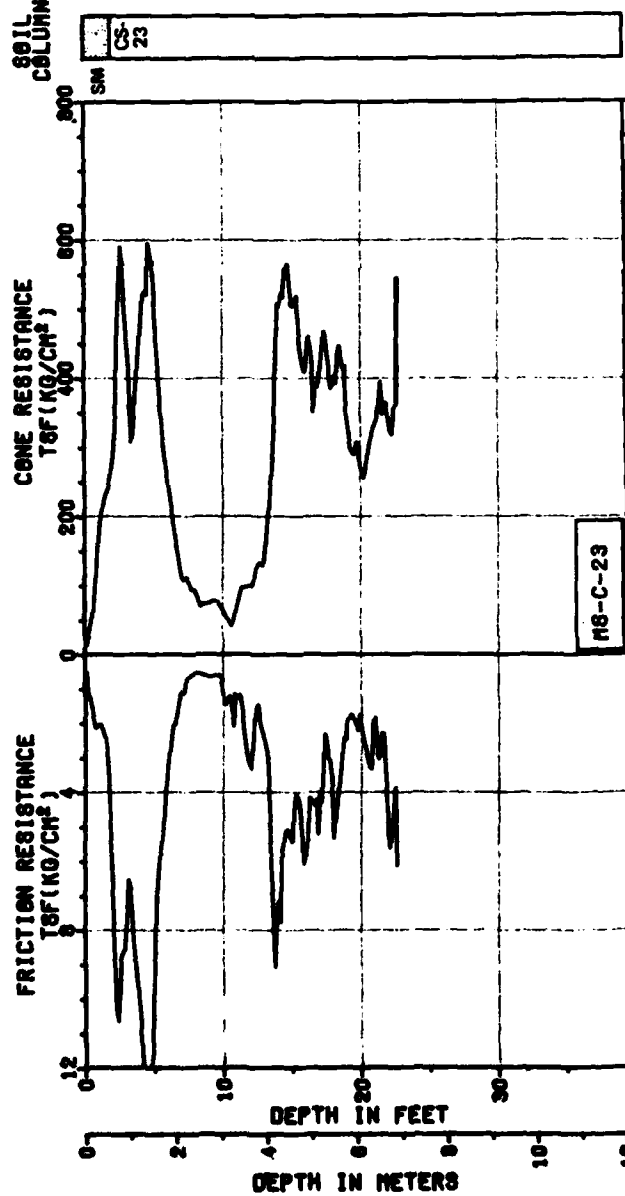
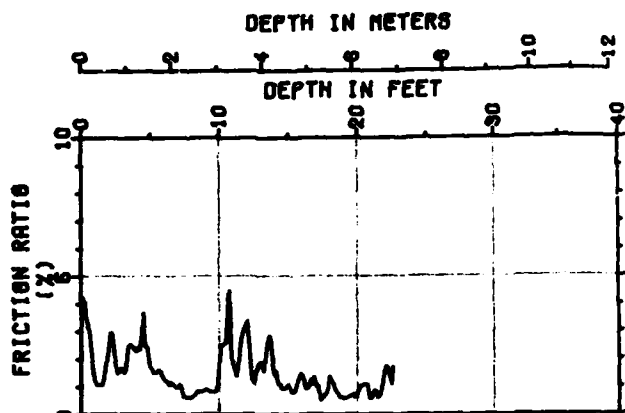
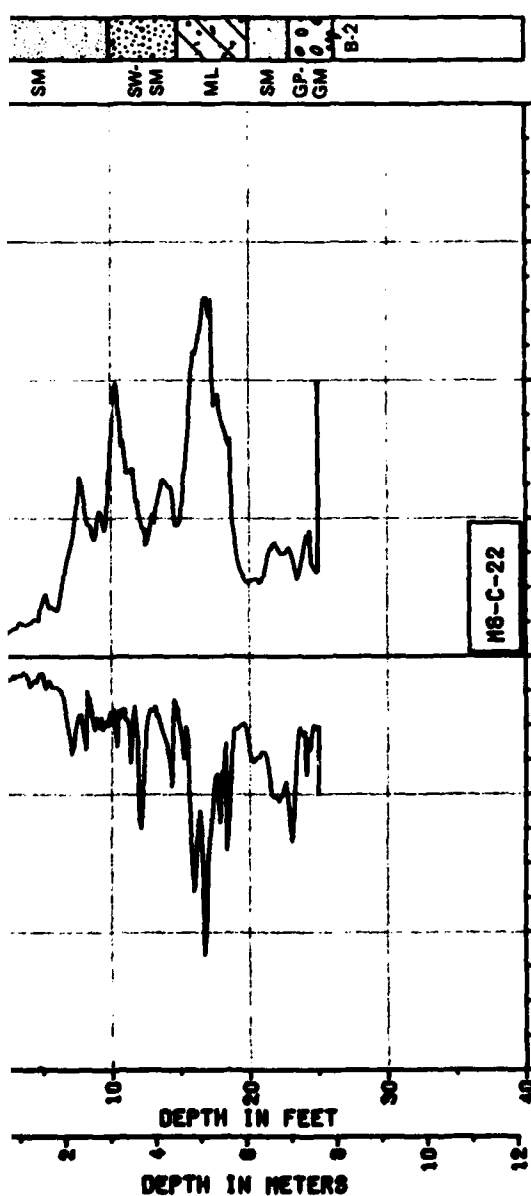
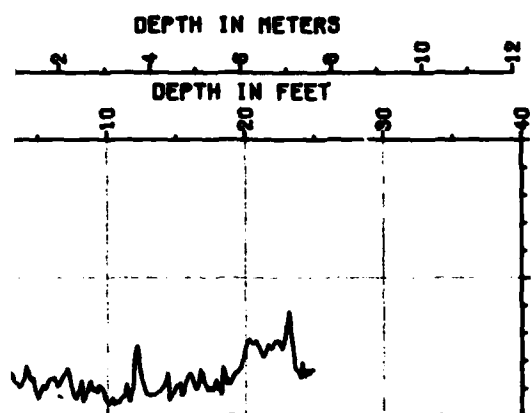


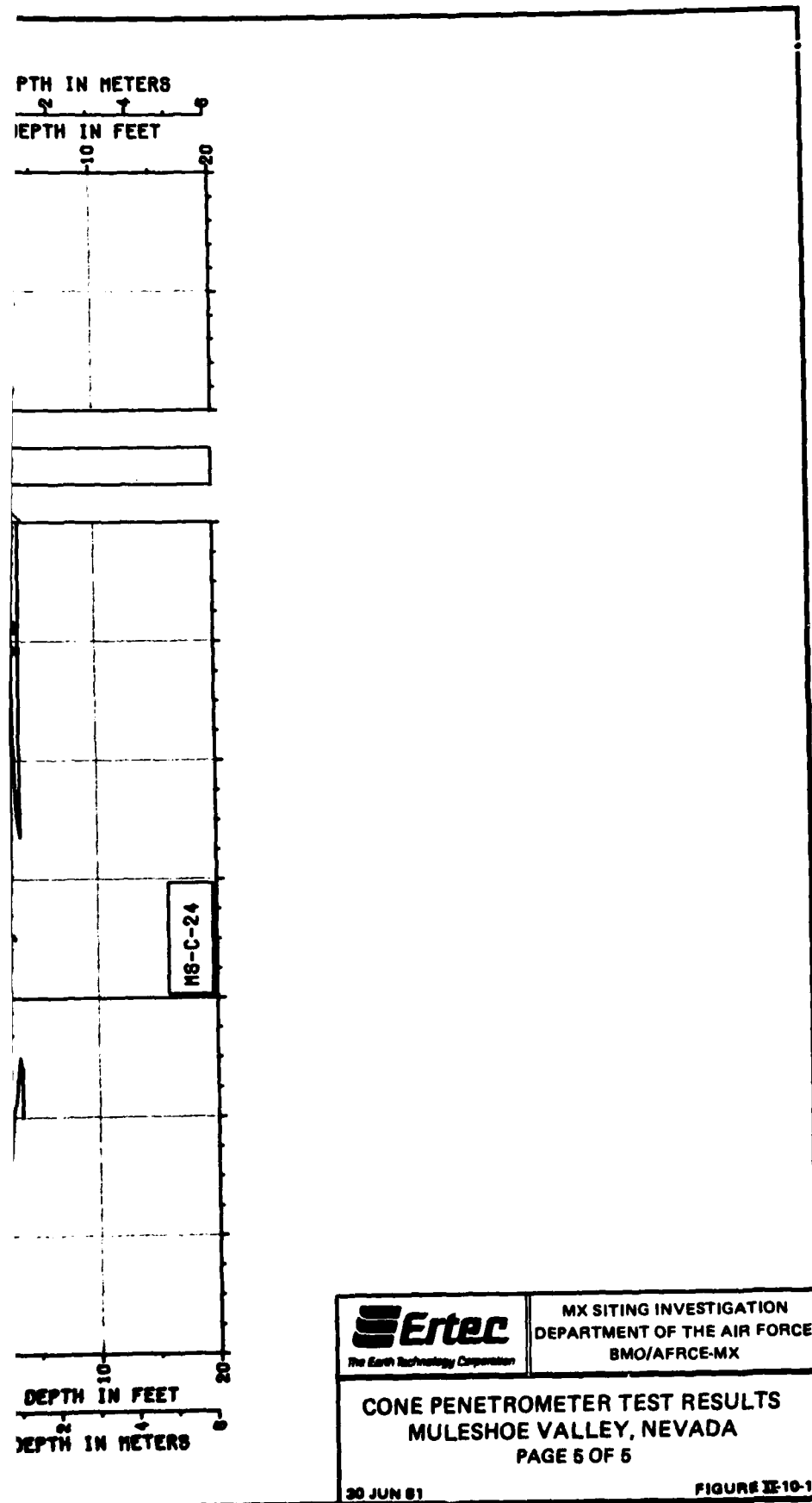












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