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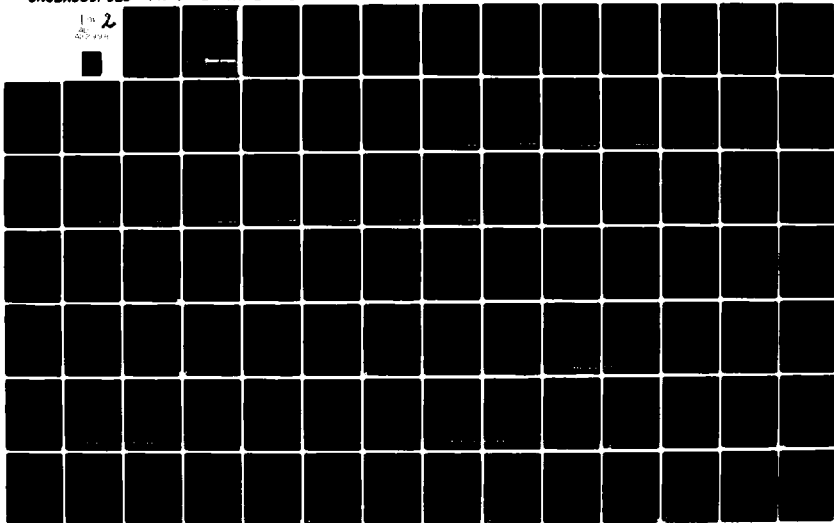
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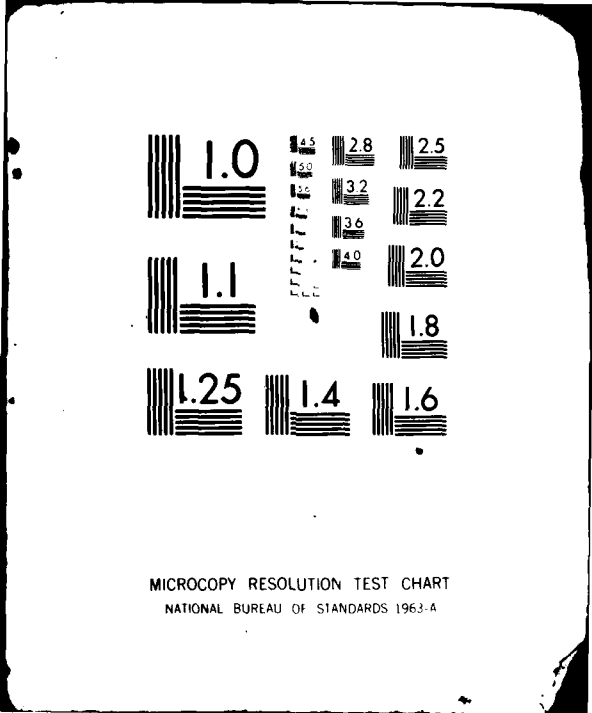
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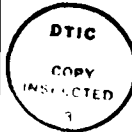
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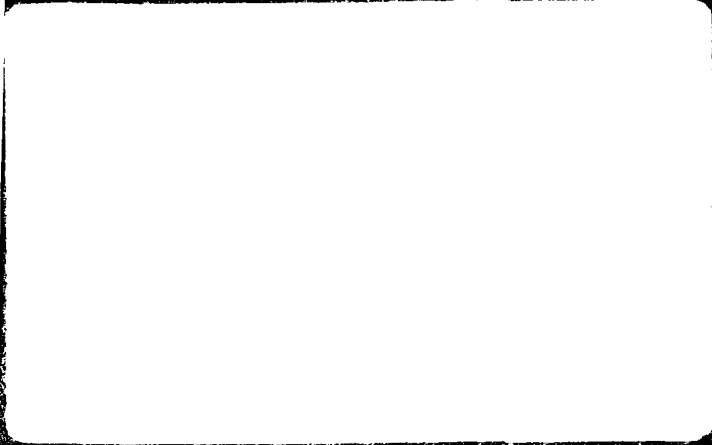
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MX SITING INVESTIGATION  
GEOTECHNICAL EVALUATION

VERIFICATION STUDY - RALSTON VALLEY,  
NEVADA

VOLUME II - GEOTECHNICAL DATA

Prepared for:

U.S. Department of the Air Force  
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Norton Air Force Base, California 92409

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| 20. ABSTRACT (Continue on reverse side if necessary and identify by block number)<br>This report contains the field data & lab test results from the investigation of Ralston Valley, Nevada. It includes...                                |                                      |  |

FOREWORD

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

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

TABLE OF CONTENTS

|   | <u>Page</u> |
|---|-------------|
| FOREWORD  |             |
| 1.0 <u>GEOLOGIC STATION DATA</u> . . . . .          | 1           |
| 2.0 <u>GROUND-WATER DATA</u> . . . . .              | 6           |
| 3.0 <u>SEISMIC REFRACTION DATA</u> . . . . .        | 7           |
| 4.0 <u>BORING LOGS</u> . . . . .                    | 9           |
| 5.0 <u>TRENCH LOGS</u> . . . . .                    | 16          |
| 6.0 <u>LABORATORY TEST RESULTS</u> . . . . .        | 17          |
| 7.0 <u>DOWNHOLE SEISMIC VELOCITY DATA</u> . . . . . | 23          |



FN-TR-27-RV-II

SECTION 1.0  
GEOLOGIC STATION DATA

1.0 EXPLANATIONS OF GEOLOGIC STATION DATA

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

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

Munsell Color      Soil color based on Munsell Soil Color Chart.

Source Rock      Rock types of coarse clasts listed in order of  
Types(s)      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-1-1. Data are coded with each numerical entry referring to a specific soil condition as listed below.

- 6 (Grain Shape) 1) Angular, 2) Subangular, 3) Subrounded,  
4) Rounded, 5) Well rounded
- 7 (Moisture      1) Dry, 2) Moist, 3) Wet  
Content)
- 8 (Plasticity    1) None, 2) Low, 3) Medium, 4) High  
of Fines)
- 9 (Consistency) Coarse grained: 1) Very Loose, 2) Loose,  
3) Medium Dense, 4) Dense, 5) Very Dense,  
  
Fine grained: 1) Soft, 2) Firm, 3) Stiff,  
4) Hard
- 10 (Structure) 1) Stratified Tabular, 2) Stratified Other  
(lensed, cross bedded, discontinuous beds),  
3) Nonstratified
- 11 (Cementation 1) None, 2) Weak, 3) Moderate, 4) Strong  
Induration)
- 12 (Depth to      Depth to layer (in centimeters) exhibiting  
Cemented      cementation induration described in Column 11  
Layers)      (above)
- 13 (Weathering    1) Fresh, 2) Slight, 3) Moderate, 4) Very  
of clasts)
- 14 (Soil          1) None (A-C profile), 2) Poor (incipient  
Profile          B-horizon), 3) Well (prominant B-horizon)  
Development)
- 15 (Caliche      1) Stage I, 2) Stage II, 3) Stage III,  
Development)    4) Stage IV, 5) None

## Drainage

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

GENERALIZED GEOLOGIC UNITSExplanation

## Surficial Basin-fill Units

- A1 Younger Fluvial Deposits - Major modern stream channel and flood-plain deposits.
- A2 Older Fluvial Deposits - Older incised stream channel and flood-plain deposits in elevated terraces bordering major modern drainages.
- A3 Eolian Deposits - Wind-blown deposits of sand occurring as either thin sheets (A3s) or dunes (A3d).
- A4 Playa and Lacustrine Deposits - Deposits occurring in modern, active playas (A4) or in either inactive playas or older lake beds and abandoned shorelines associated with extinct lakes (A4o).
- A5 Alluvial Fan Deposits - Alluvial deposits consisting of debris flow and water-laid alluvium near mountain fronts, grading into predominantly water-laid alluvium deposited in shifting distributary channels near the basin center. Younger (A5y), intermediate (A5i), and older (A5o) alluvial fans are differentiated by surface soil development, terrain conditions, and present depositional/erosional environment.

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

- f - fine-grained (ML, CL, MH, CH)
- s - sands (SP, SW, SM, SC)
- g - gravels (GP, GW, GM, GC)
- c - coarse grained with greater than 30 percent boulders and cobbles (generally GP, GW, GM, GC)

#### ROCK UNITS

- I Igneous (undifferentiated). Rocks formed by solidification of a molten or partially molten mass.
  - I1 Intrusive - Plutonic rocks formed by solidification of molten material beneath the surface (e.g., granite, granodiorite, diorite, gabbro).
  - I2 Extrusive (intermediate and acidic) - Volcanic rocks of intermediate and acidic 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).

| STATION NUMBER | GEOID | MIS | DEPTH | SIZ | USCS | DESCRIPTION | DEPTH (FEET) | #PHYSICAL PROPERTIES |             |    |    |   |   |     |   |   |    |    |    |    |     |     | AVERAGE (MO) | SCOPE (FO) | SCALE (IN) | SAMPLE |
|----------------|-------|-----|-------|-----|------|-------------|--------------|----------------------|-------------|----|----|---|---|-----|---|---|----|----|----|----|-----|-----|--------------|------------|------------|--------|
|                |       |     |       |     |      |             |              | 1                    | 2           | 3  | 4  | 5 | 6 | 7   | 8 | 9 | 10 | 11 | 12 | 13 | 14  | 15  |              |            |            |        |
| NRVG01         | AS1   | 020 |       |     |      | SP          | 12           | 2                    | 1           | 2  | 3  | 3 | 2 | 018 | 2 | 1 | 1  |    |    |    |     |     |              |            |            |        |
| NRVG01H        | AS1   | 260 | 01    | 30  | 15   | 065         | 020          | SP                   | 10,0YR4/2   | 13 |    |   |   |     |   |   |    |    |    |    | 04  | 0   |              |            |            |        |
| NRVG02         | AS1   | 050 |       |     |      | SP          | 12           | 2                    | 1           | 2  | 2  | 2 | 2 | 032 | 2 | 2 | 2  |    |    |    |     |     |              |            |            |        |
| NRVG02B        | AS1   | 180 | 07    | 02  | 05   | 075         | 020          | SP                   | 07,5YR5/6   | 13 |    |   |   |     |   |   |    |    |    |    | 5,5 | 008 | 04           | 0          |            |        |
| NRVG03         | AS1   | 040 |       |     |      | SP          | 12           | 2                    | 1           | 2  | 3  | 3 | 3 | 016 | 2 | 2 | 3  |    |    |    |     |     |              |            |            |        |
| NRVG03H        | AS1   | 120 | 07    | 05  | 03   | 072         | 025          | SP-SF                | 10,0YR4/2   | 13 |    |   |   |     |   |   |    |    |    |    | 1,5 | 008 | 04           | 0          |            |        |
| NRVG04H        | AS1   | 069 | 09    | 01  | 35   | 040         | 025          | SM                   | 07,5YR4.5/4 | 12 | 13 |   |   |     |   |   |    |    |    |    | 1,5 | 004 | 04           | 0          |            |        |
| NRVG05B        | AS1   | 054 | 00    | 00  | 02   | 083         | 015          | SM                   | 10,0YR5/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG06H        | AS1   | 055 | 00    | 00  | 10   | 075         | 015          | SM                   | 10,0YR6/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG07H        | AS1   | 035 | 00    | 00  | 05   | 068         | 017          | SF-SM                | 10,0YR6/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG08         | AS1   | 120 |       |     |      | SP          | 12           | 2                    | 1           | 1  | 1  | 1 | 1 |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG08B        | AS1   | 035 | 00    | 00  | 05   | 075         | 020          | SP                   | 10,0YR5/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG09         | AS1   | 050 |       |     |      | CL-SM       | 12           | 2                    | 1           | 3  | 2  | 3 | 2 | 049 | 2 | 1 | 1  |    |    |    |     |     |              |            |            |        |
| NRVG09H        | AS1   | 013 | 00    | 00  | 05   | 065         | 050          | CL                   | 07,5YR4/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG10H        | AS1   | 000 | 00    | 00  | 00   | 050         | 050          | SC-CL                | 10,0YR5/6   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG11         | AS1   | 060 |       |     |      | SM          | 13           | 2                    | 1           | 2  | 3  | 3 | 3 |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG11B        | AS1   | 016 | 00    | 00  | 01   | 097         | 033          | SP                   | 10,0YR6/3   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG12         | AS1   | 040 |       |     |      | SP          | 12           | 2                    | 2           | 3  | 3  | 3 | 3 | 030 | 2 | 2 | 3  |    |    |    |     |     |              |            |            |        |
| NRVG12A        | AS1   | 020 | 00    | 00  | 30   | 060         | 010          | SF-SM                | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG12H        | AS1   | 030 | 00    | 00  | 01   | 067         | 013          | SP                   | 10,0YR5/6   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG13         | AS1   | 040 | 00    | 00  | 05   | 055         | 040          | SP                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG13H        | AS1   | 012 | 00    | 00  | 01   | 065         | 005          | SF-SM                | 10,0YR4/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG14         | AS1   | 030 | 00    | 00  | 05   | 070         | 025          | SP                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG14H        | AS1   | 030 | 00    | 00  | 01   | 070         | 030          | SC                   | 10,0YR4/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG15         | AS1   | 030 | 00    | 00  | 05   | 070         | 025          | SP                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG15H        | AS1   | 014 | 00    | 00  | 01   | 065         | 013          | SP                   | 10,0YR5/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG16         | AS1   | 030 | 00    | 00  | 12   | 065         | 003          | SA                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG16H        | AS1   | 030 | 00    | 00  | 15   | 065         | 020          | SM                   | 10,0YR4/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG17         | AS1   | 040 | 00    | 00  | 05   | 070         | 025          | SM                   | 12          | 11 | 51 |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG17H        | AS1   | 029 | 00    | 00  | 05   | 080         | 015          | SM                   | 10,0YR5/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG18         | AS1   | 040 | 00    | 00  | 20   | 065         | 015          | SM                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG18H        | AS1   | 020 | 00    | 00  | 07   | 075         | 025          | SM                   | 10,0YR6/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG19         | AS1   | 020 | 00    | 00  | 05   | 090         | 050          | SM                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG19H        | AS1   | 040 | 00    | 00  | 35   | 085         | 020          | SM                   | 10,0YR5/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG20         | AS1   | 001 | 00    | 00  | 02   | 098         | 030          | SM                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG20H        | AS1   | 040 | 00    | 00  | 40   | 065         | 015          | SC                   | 10,0YR5/6   | 12 | 13 |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG21         | AS1   | 040 | 00    | 00  | 30   | 065         | 005          | SF-SM                | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG21H        | AS1   | 050 | 00    | 00  | 20   | 085         | 045          | SC                   | 10,0YR5/6   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG22H        | AS1   | 045 | 00    | 00  | 10   | 075         | 015          | SM                   | 10,0YR5/6   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG23         | AS1   | 040 | 00    | 00  | 30   | 077         | 030          | SM                   | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG23H        | AS1   | 032 | 00    | 00  | 08   | 077         | 015          | SM                   | 10,0YR5/6   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG24H        | AS1   | 130 | 00    | 00  | 15   | 070         | 015          | SM                   | 07,5YR5/6   | 12 | 13 |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG25         | AS1   | 070 |       |     |      | LL          | 12           | 2                    | 1           | 4  | 3  | 2 | 1 |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG25H        | AS1   | 176 | 00    | 00  | 20   | 065         | 015          | SM                   | 07,5YR6/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG26         | AS1   | 020 | 00    | 00  | 20   | 065         | 010          | SM-SM                | 12          |    |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG26H        | AS1   | 070 | 00    | 00  | 05   | 075         | 020          | SM                   | 10,0YR5/4   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG27         | AS1   | 020 |       |     |      | CL          | 12           | 2                    | 1           | 2  | 2  | 2 | 1 |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG27H        | AS1   | 160 | 00    | 00  | 10   | 060         | 050          | SC                   | 07,5YR5/6   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG28H        | AS1   | 130 | 00    | 00  | 20   | 065         | 015          | SM                   | 10,0YR5/6   | 12 | 51 |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG29H        | AS1   | 012 | 00    | 00  | 05   | 063         | 012          | SF-SM                | 10,0YR4/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |
| NRVG42B        | AS1   | 160 | 00    | 00  | 12   | 073         | 015          | SM                   | 10,0YR4/2   | 12 |    |   |   |     |   |   |    |    |    |    |     |     |              |            |            |        |

#PHYSICAL PROPERTIES  
0 = GRAIN SHAPE  
7 = MOISTURE CONTENT  
M = PLASTICITY LIMITS  
4 = CONSISTENCY  
10 = STRUCTURE  
11 = IDENTIFICATION NUMBER  
12 = DEPTH TO FIRST BED  
13 = DEPTH TO LAST BED  
14 = DEPTH TO CENTER OF GRAIN  
15 = GRAIN SIZE (D50)

NOTE: GEOLOGIC STATIONS WHICH WERE USED ONLY FOR SITE SPECIFIC PHOTOGRAPHIC CHECKS AND/OR FOR GEOLOGIC DESCRIPTIONS ARE NOT LISTED.

|  |     |
|--|-----|
| <b>GEOLOGIC STATION DATA</b><br>RALSTON VALLEY, NEVADA |     |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE | DND |
| TABLE<br><b>II-1-1</b>                                 |     |
| <b>FUGRO NATIONAL, INC.</b>                            |     |

FN-TR-27-RV-II

SECTION 2.0  
GROUND-WATER DATA



## 2.0 EXPLANATIONS OF GROUND-WATER DATA

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

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

| WELL NO. | WELL LOCATION NUMBER* | ELEVATION OF GROUND SURFACE - FEET (METERS) ABOVE N.S.L. | DEPTH OF WELL - FEET (METERS) | WATER LEVEL                                |               |  | REFERENCES**/REMARKS |
|----------|-----------------------|--|-------------------------------|--|---------------|--|----------------------|
|          |                       |  |                               | DEPTH BELOW GROUND SURFACE - FEET (METERS) | DATE MEASURED | ELEVATION - FEET (METERS) ABOVE N.S.L. |                      |
| W1       | 4N/44E-08ab-2         | 5740<br>(1750)   | 80<br>(24.4)                  | 9<br>(2.7)                                 | 1962          | 5731<br>(1747)                         | 1,2,3                |
| W2       | 4N/44E-08ba-1         | 5735<br>(1748)   | 83<br>(25.3)                  | 9<br>(2.7)                                 | 1962          | 5726<br>(1745)                         | 1,2,3                |
| W3       | 4N/44E-08cc-1         | 5710<br>(1740)   | 38<br>(11.6)                  | 8<br>(2.4)                                 | 1948          | 5702<br>(1738)                         | 1,2,3                |
| W4       | 4N/44E-18ad-2         | 5685<br>(1733)   | 47<br>(14.3)                  | 11<br>(3.4)                                | 1948          | 5674<br>(1729)                         | 1,2,3                |
| W5       | 4N/44E-19aa-1         | 5655<br>(1724)   | 55<br>(16.8)                  | 8<br>(2.4)                                 | 1948          | 5647<br>(1721)                         | 1,2,3                |
| W6       | 3N/44E-16C-1          | 5487<br>(1672)   | 540<br>(164.6)                | 480<br>(146.3)                             | 1947          | 5007<br>(1526)                         | 1,2,3                |
| W7       | 3N/44E-35d-1          | 5380<br>(1640)   | —<br>(--)                     | 383<br>(116.7)                             | 1960          | 4997<br>(1523)                         | 1,2,3                |
| W8       | 2N/44E-8b             | 5385<br>(1641)   | 264<br>(80.5)                 | >264<br>(>80.5)                            | —             | <5121<br>(<1561)                       | 1,2,3/<br>Dry        |
| W9       | 2N/45E-21c-1          | ≈5250<br>(≈1600)   | 325<br>(99.1)                 | --<br>(--)                                 | —             | —<br>(--)                              | 1,2,3/***            |

\* Mount Diablo Baseline and Meridian

\*\* References

1. Eakin, T. E., 1962
2. United States Geological Survey, 1980
3. Robinson, B. P., and Others, 1967
4. Nevada State Engineers Office, 1974

\*\*\* Depth to Water not reported.

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

|  |                 |
|--|-----------------|
| <b>GROUND-WATER DATA<br/>RALSTON VALLEY, NEVADA</b>          |                 |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO | TABLE<br>II-2-1 |
| <b>FUGRO NATIONAL, INC.</b>                                  |                 |

FN-TR-27-RV-II

SECTION 3.0  
SEISMIC REFRACTION DATA

### 3.0 EXPLANATIONS OF SEISMIC REFRACTION DATA

Note: There is no seismic refraction line designated as RV-S-11. Each figure shows seismic wave travel times plotted versus surface distance between the energy source (shot) and the detector (geophone) for a single seismic line. Distances are measured along the line from geophone number 1 which is designated as zero distance. Distances to the right (on the paper) of geophone 1 are positive. The direction arrow gives the approximate direction along the geophone array from geophone 1 to geophone 24.

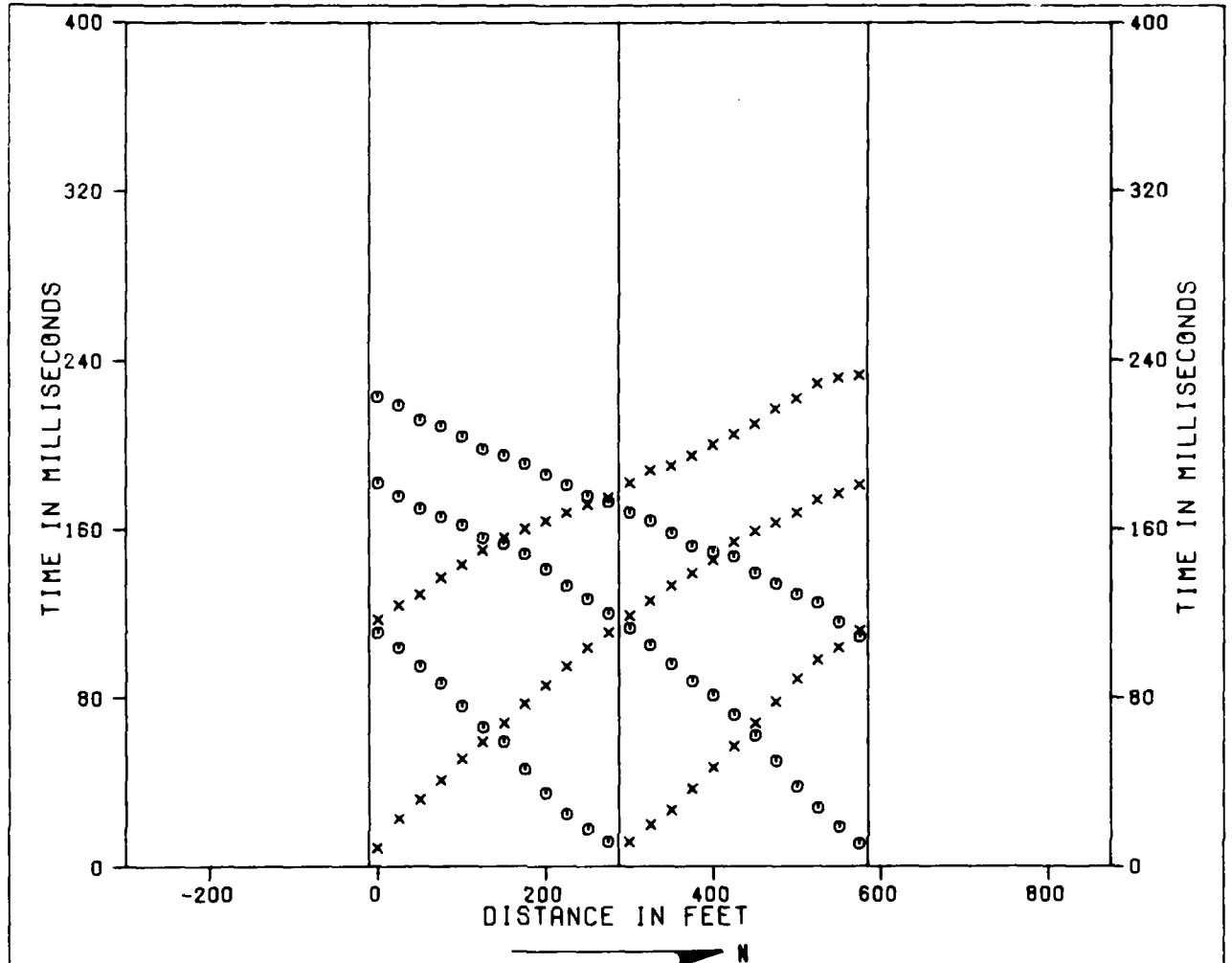
#### Travel Time Versus Distance Graph (Upper Half of Figure)

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

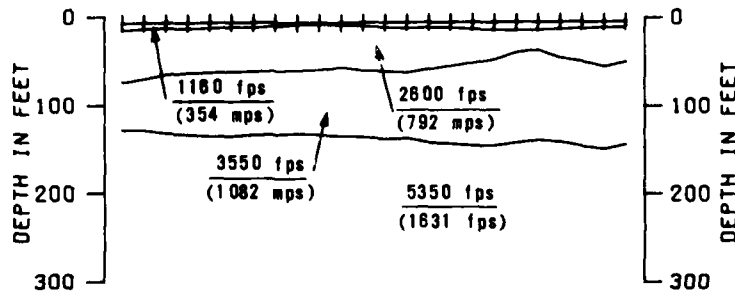
#### Velocity Cross Section (Lower Half of Figure)

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.



|           |   |   |    |    |
|-----------|---|---|----|----|
| SHOT F    | G | H | I  | J  |
| GEOPHONES | 1 | 8 | 16 | 24 |



0 METERS 100  
DISTANCE AND DEPTH

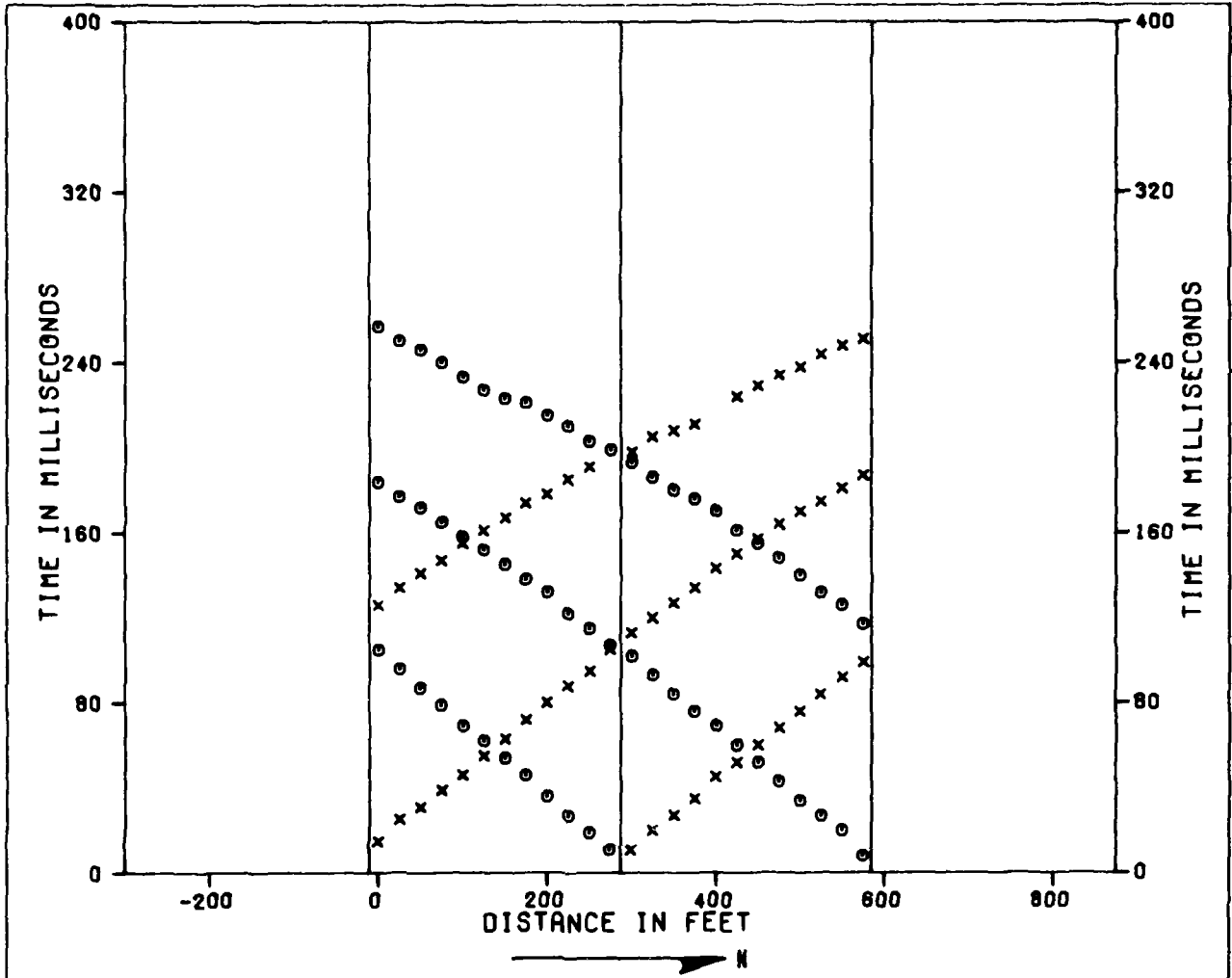
x TIMES TO RIGHT OF SHOTS  
o TIMES TO LEFT OF SHOTS

|  |                         |
|--|-------------------------|
| <b>SEISMIC REFRACTION LINE RV-S-1</b><br><b>TIME-DISTANCE DATA AND VELOCITY PROFILE</b><br><b>RALSTON VALLEY, NEVADA</b> |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO   | FIGURE<br><b>II-3-1</b> |
| <b>FURRO NATIONAL INC.</b>   |                         |



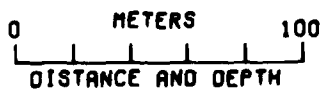
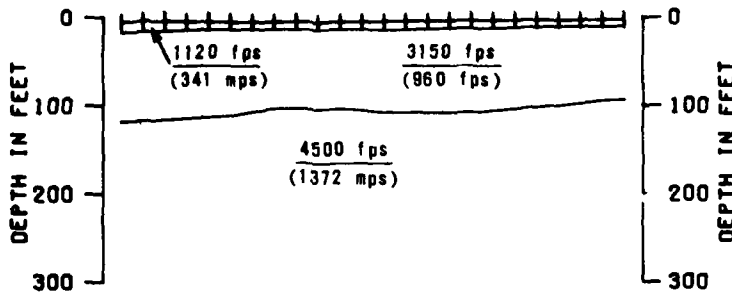






SHOT F  
 GEOPHONES

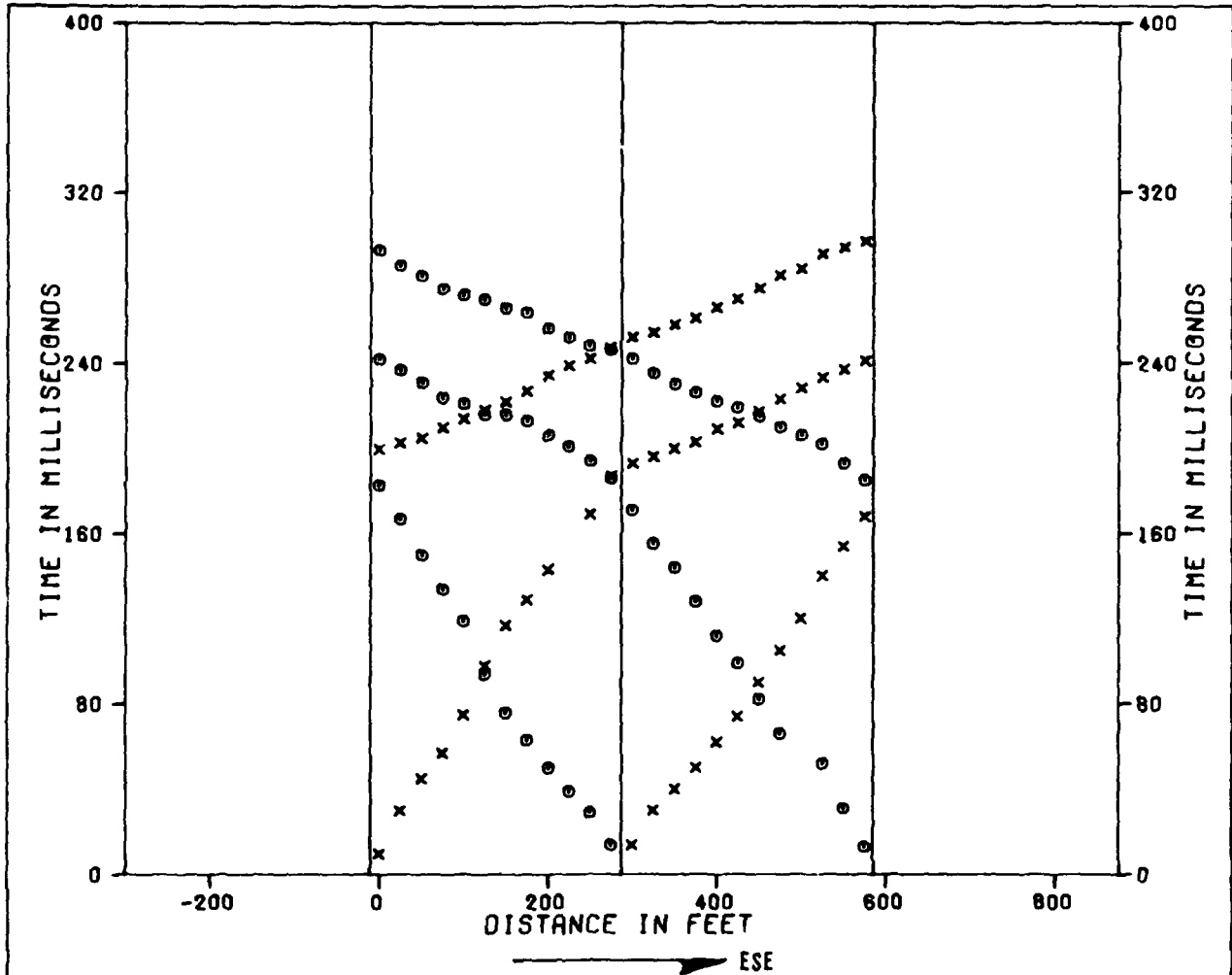
|   |   |    |    |
|---|---|----|----|
| G | H | I  | J  |
| 1 | 8 | 16 | 24 |



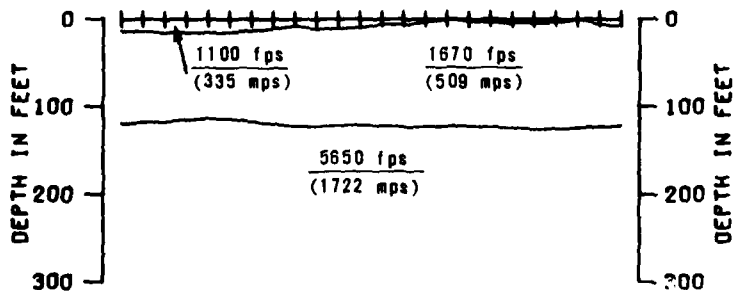
x TIMES TO RIGHT OF SHOTS  
 o TIMES TO LEFT OF SHOTS

|   |                  |
|---|------------------|
| SEISMIC REFRACTION LINE RV-S-4<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |                  |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO  | FIGURE<br>II-3-4 |





|           |   |   |    |    |
|-----------|---|---|----|----|
| SHOT F    | G | H | I  | J  |
| GEOPHONES | 1 | 8 | 16 | 24 |



0 METERS 100  
DISTANCE AND DEPTH

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

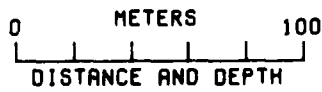
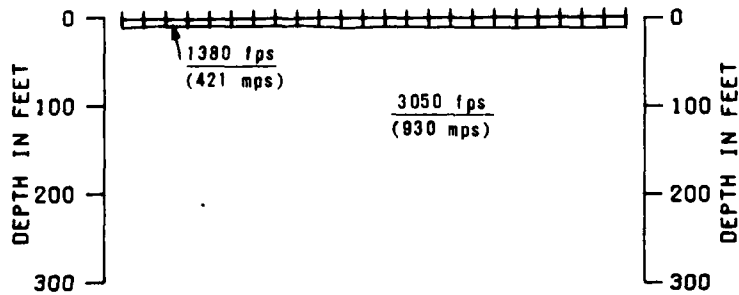
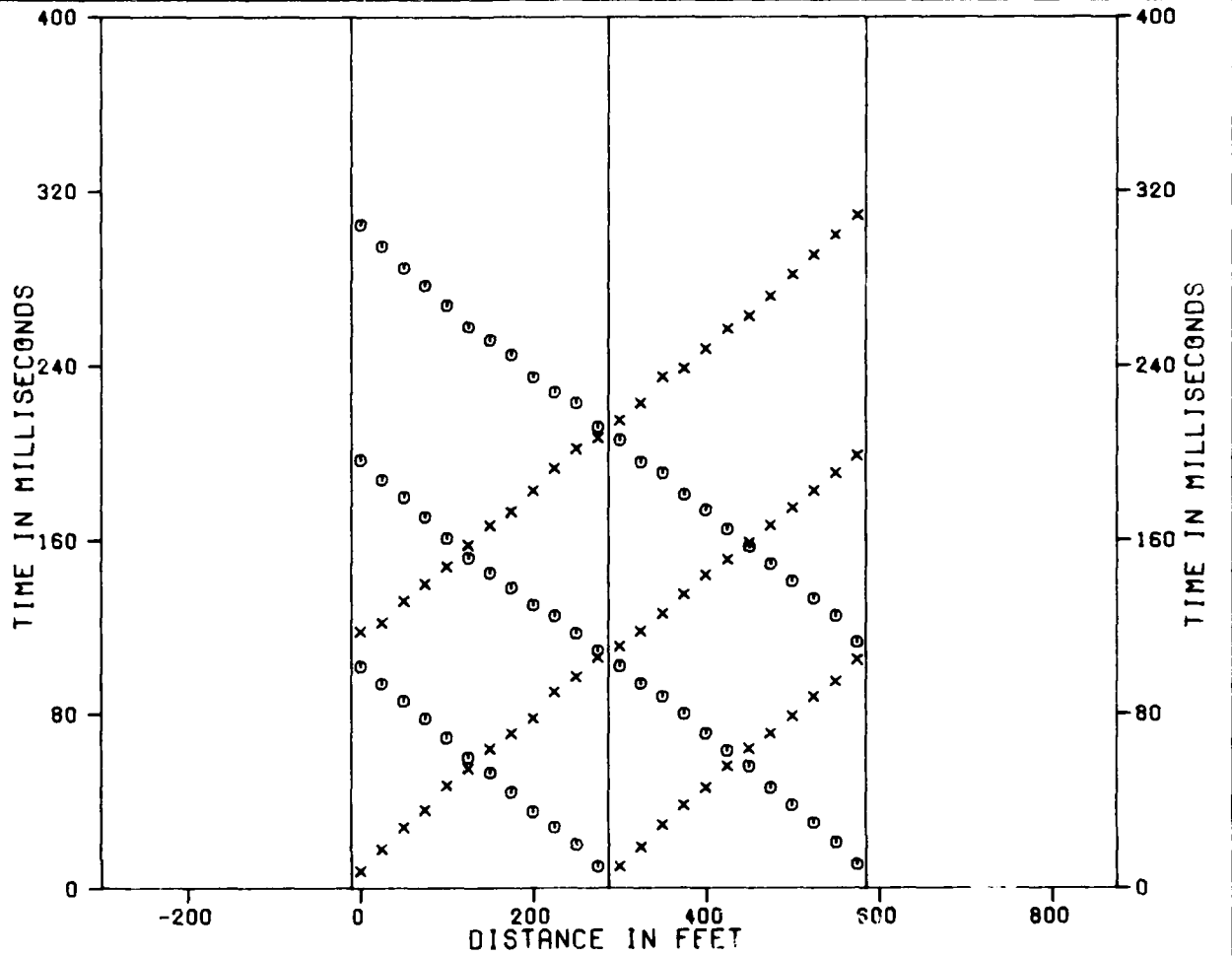
SEISMIC REFRACTION LINE RV-S-6  
TIME-DISTANCE DATA AND VELOCITY PROFILE  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
II-3-6

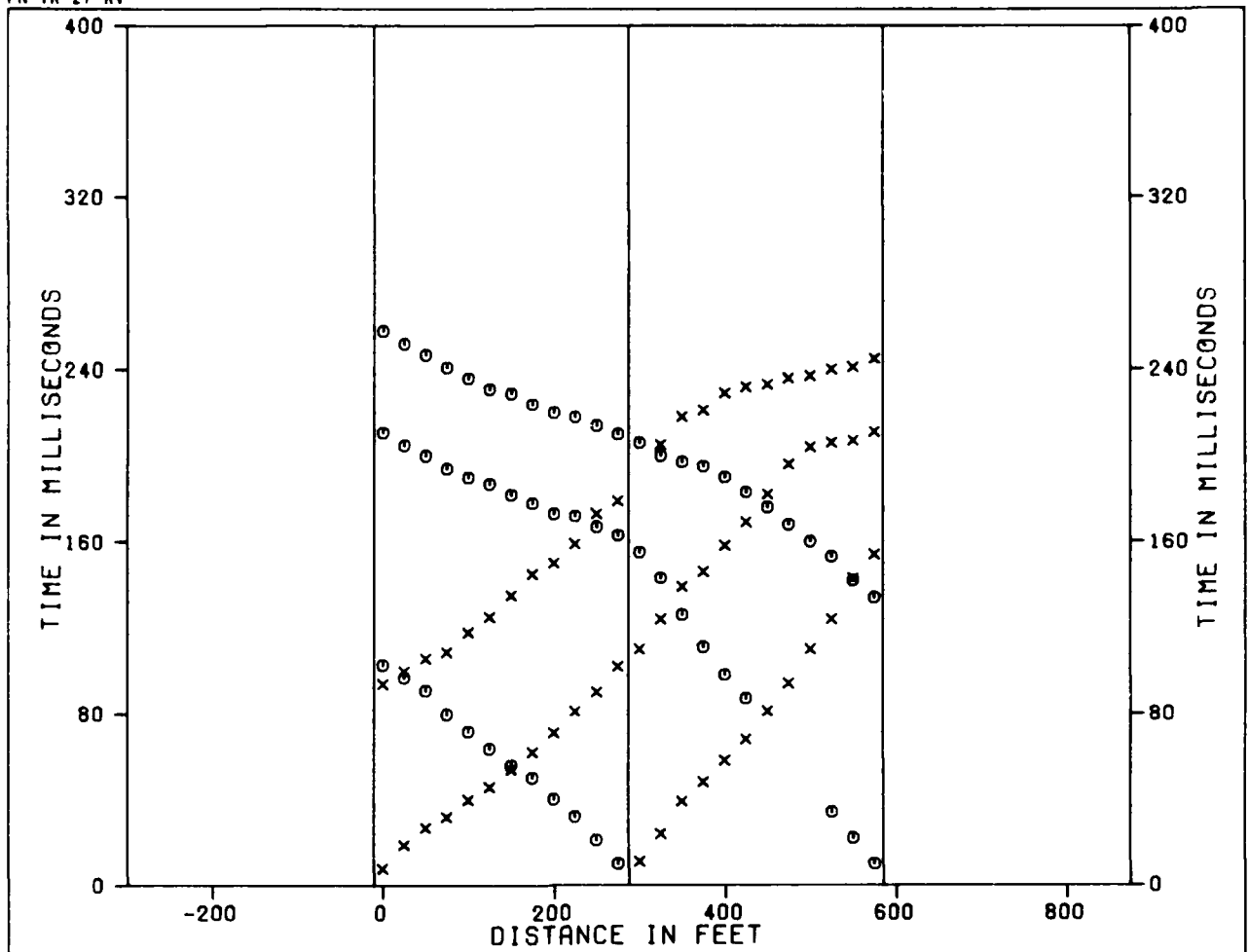
**TECHNICAL NATIONAL INC.**





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

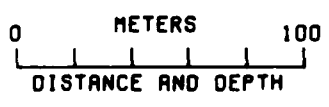
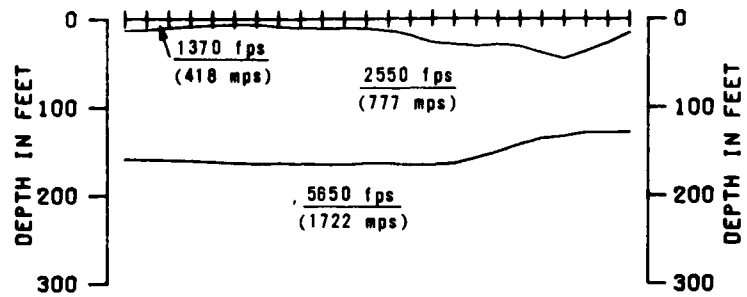
|   |                  |
|---|------------------|
| SEISMIC REFRACTION LINE RV-S-8<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |                  |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO  | FIGURE<br>II-3-8 |
| <b>FLUORO NATIONAL INC.</b>   |                  |



SHOT F  
GEOPHONES

|  |   |   |    |    |
|--|---|---|----|----|
|  | G | H | I  | J  |
|  | 1 | 8 | 16 | 24 |

→ ESE



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

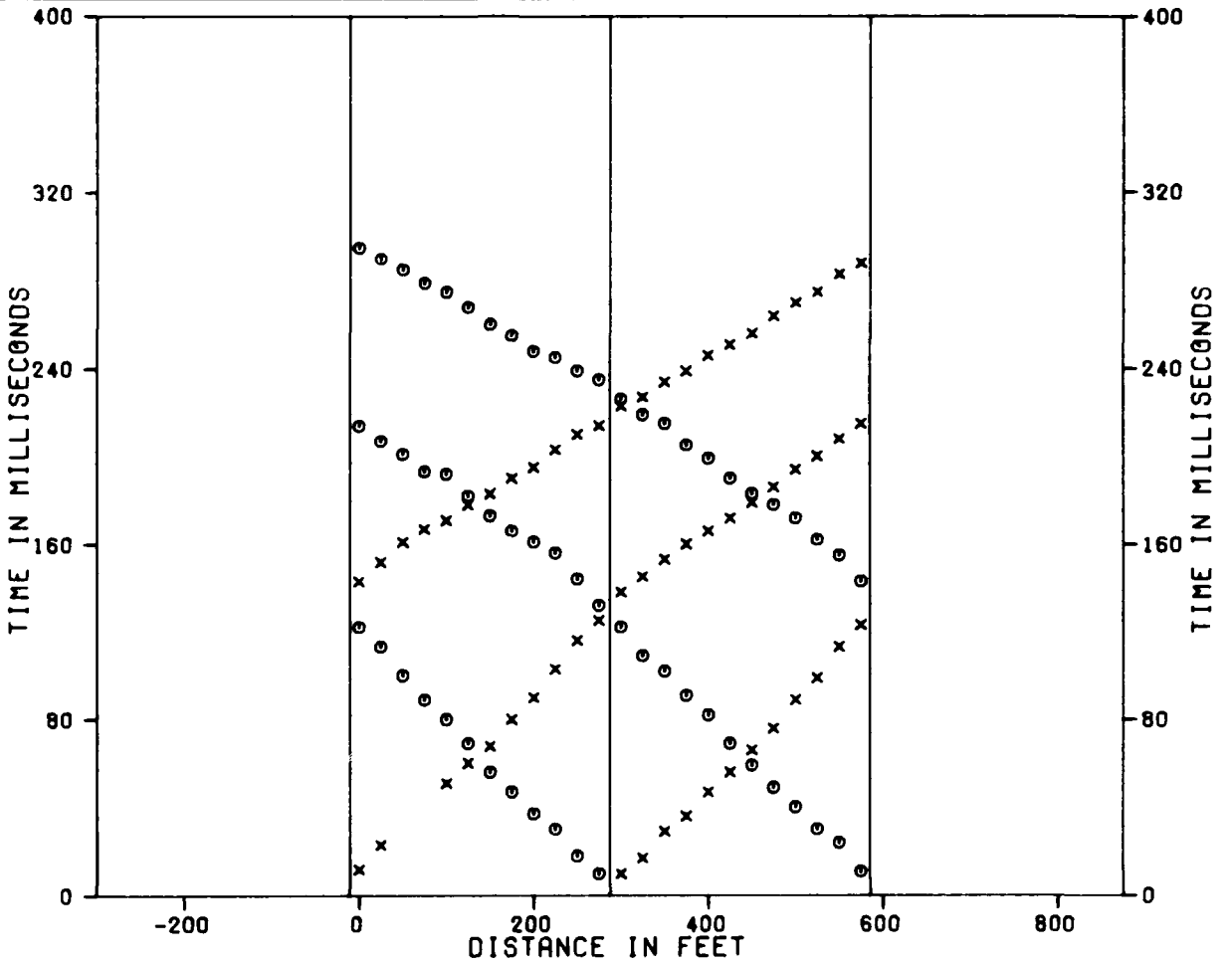
|   |                  |
|---|------------------|
| SEISMIC REFRACTION LINE RV-S-9<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |                  |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO  | FIGURE<br>II-3-9 |

**JURRO NATIONAL INC.**

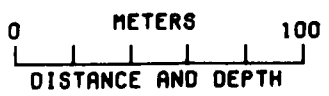
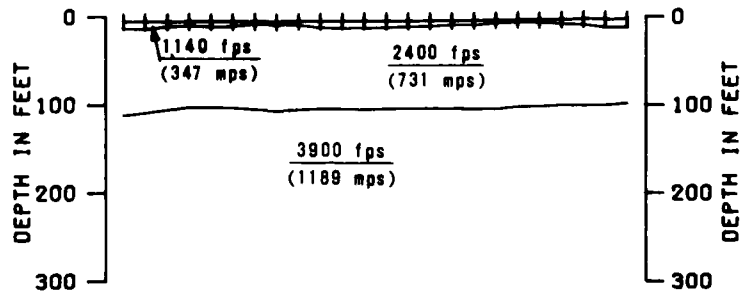








SHOT F                                    G                                    H                                    I                                    J  
 GEOPHONES                                1                                    8                                    16                                  24



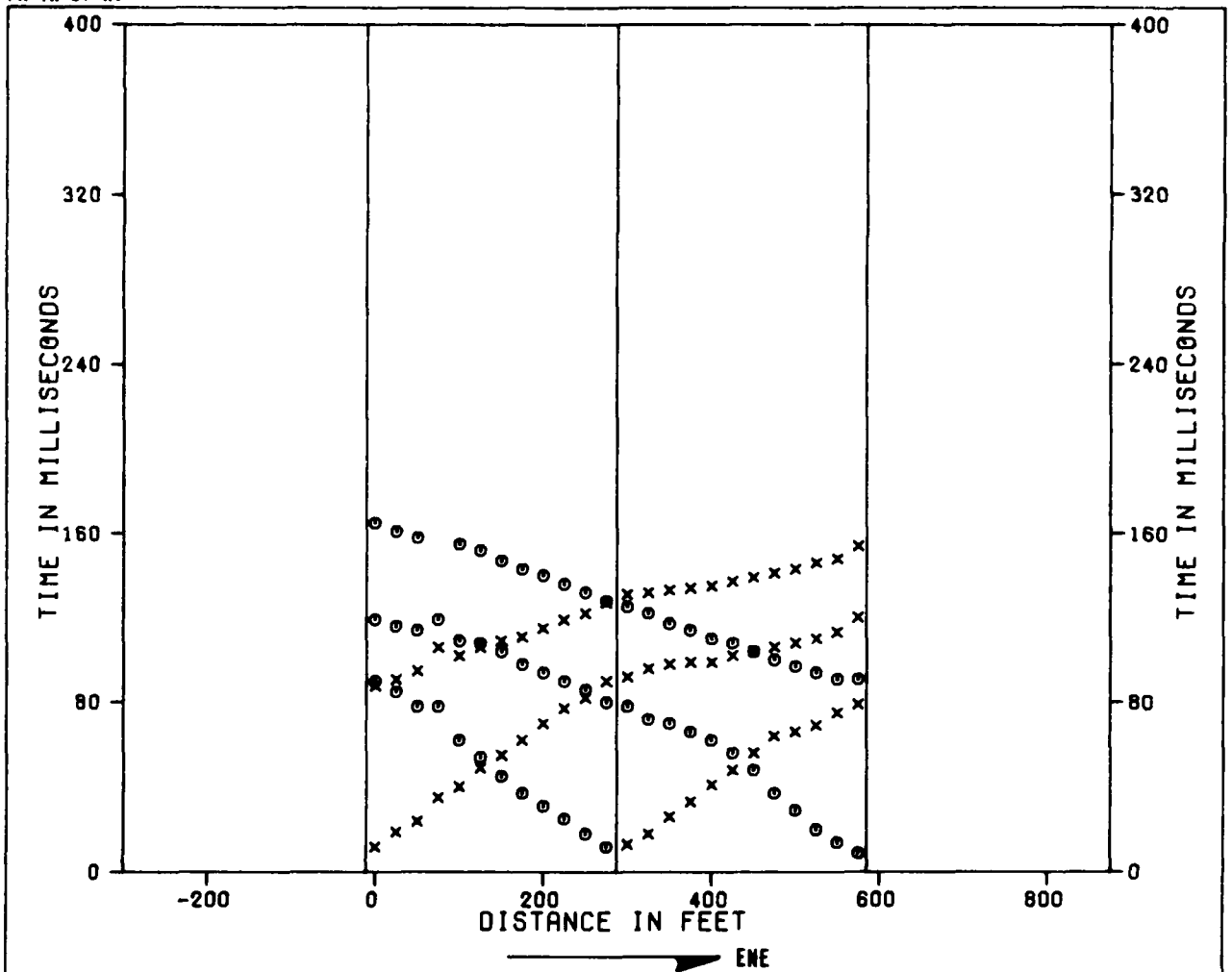
x TIMES TO RIGHT OF SHOTS  
 o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE RV-S-13  
 TIME-DISTANCE DATA AND VELOCITY PROFILE  
 RALSTON VALLEY, NEVADA

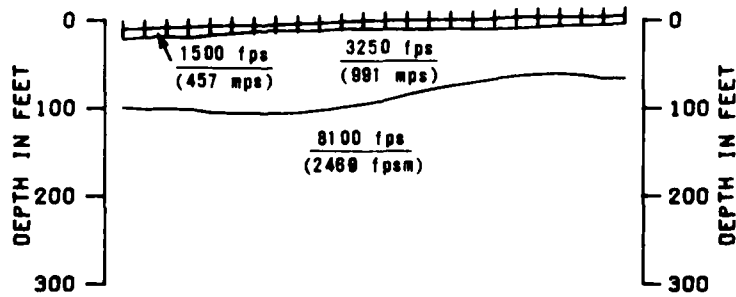
MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
 II-3-12

**USARO NATIONAL LABS.**



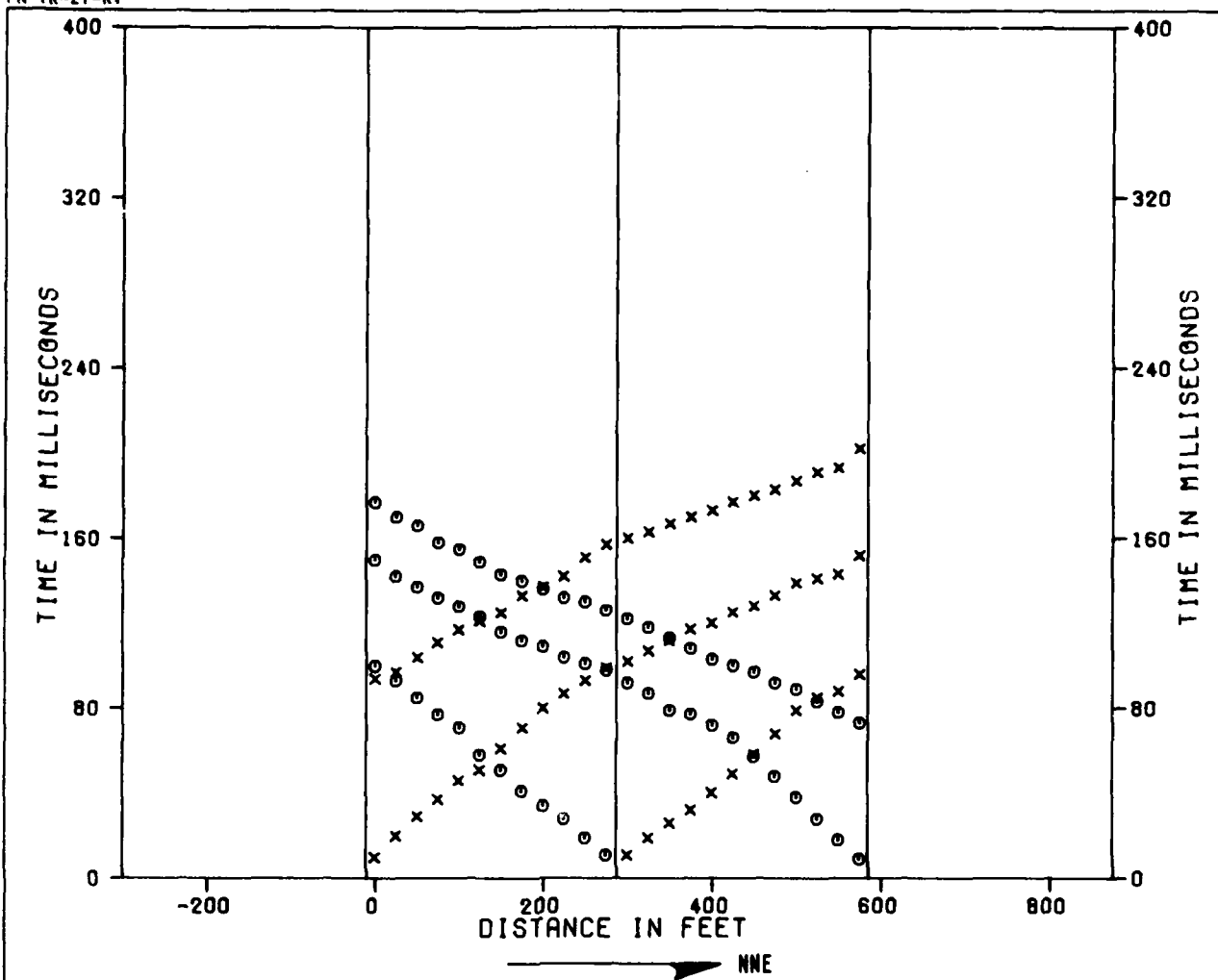
|           |   |   |    |    |
|-----------|---|---|----|----|
| SHOT F    | G | H | I  | J  |
| GEOPHONES | 1 | 8 | 16 | 24 |



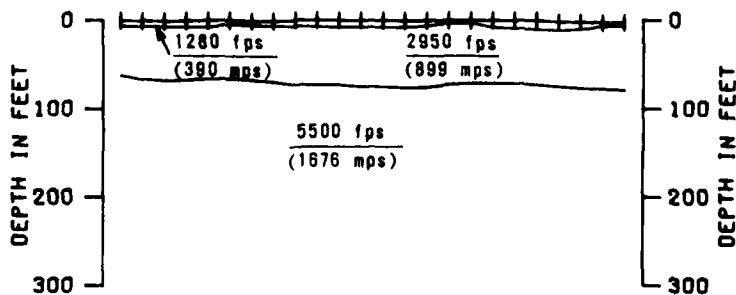
0 METERS 100  
DISTANCE AND DEPTH

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

|  |                          |
|--|--------------------------|
| SEISMIC REFRACTION LINE RV-S-14<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |                          |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE   | FIGURE<br><b>II-3-13</b> |
| <b>VERD NATIONAL INC.</b>  |                          |



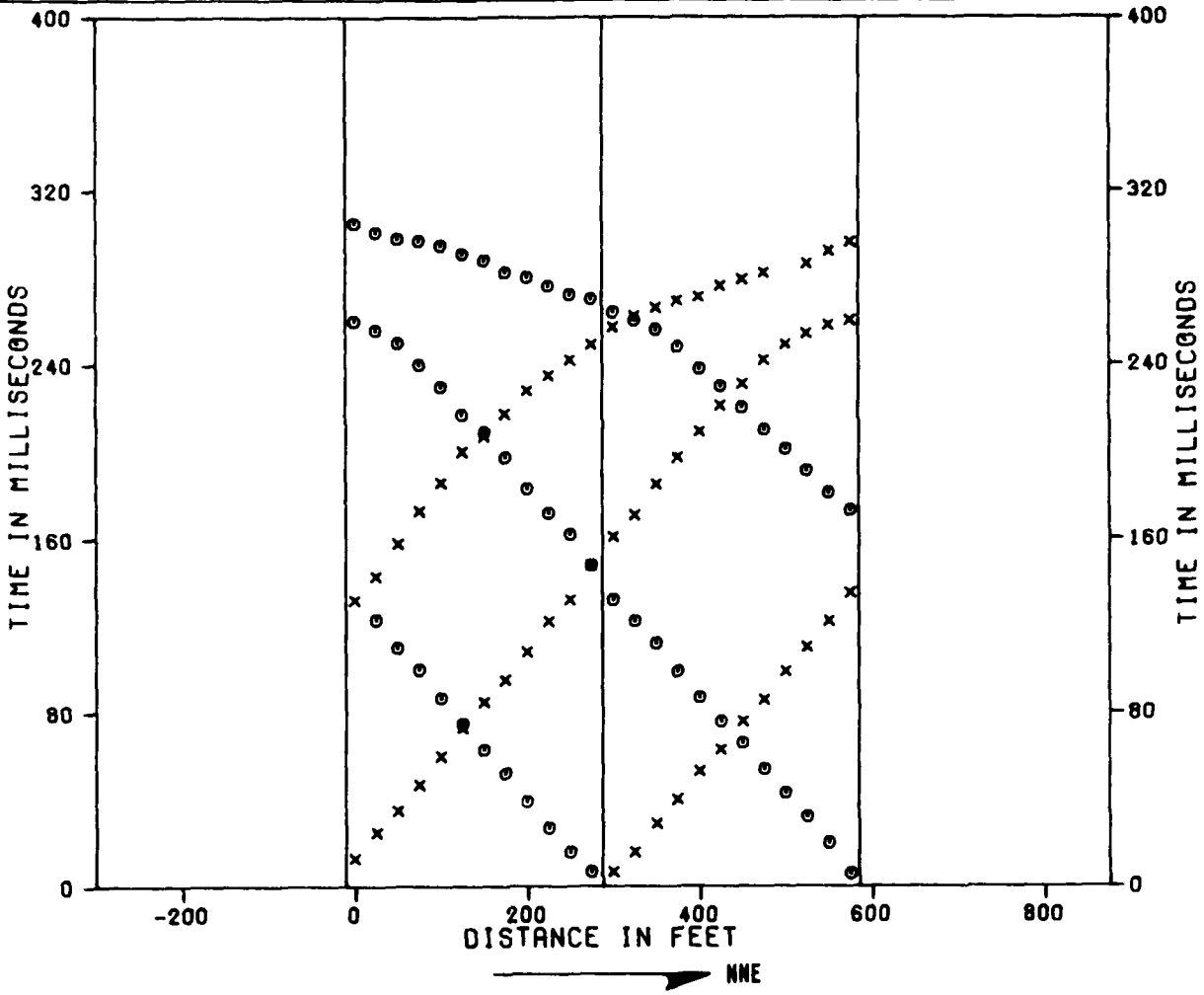
SHOT F                      G                      H                      I                      J  
 GEOPHONES                1                      8                      16                      24



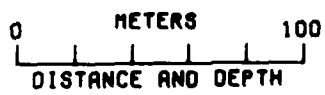
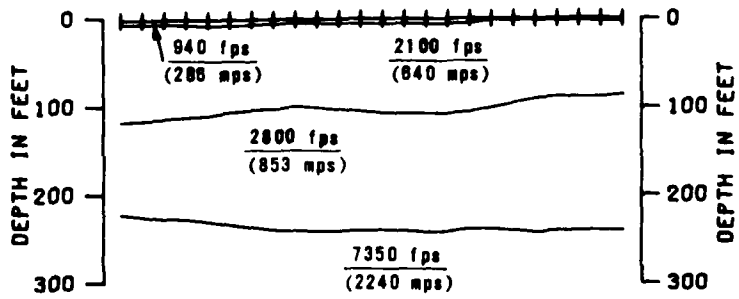
0                      METERS                      100  
 DISTANCE AND DEPTH

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

|  |                          |
|--|--------------------------|
| SEISMIC REFRACTION LINE RV-S-15<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |                          |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - 000   | FIGURE<br><b>II-3-14</b> |
| <b>JUGRO NATIONAL, INC.</b>  |                          |



|           |   |   |    |    |
|-----------|---|---|----|----|
| SHOT F    | G | H | I  | J  |
| GEOPHONES | 1 | 8 | 16 | 24 |



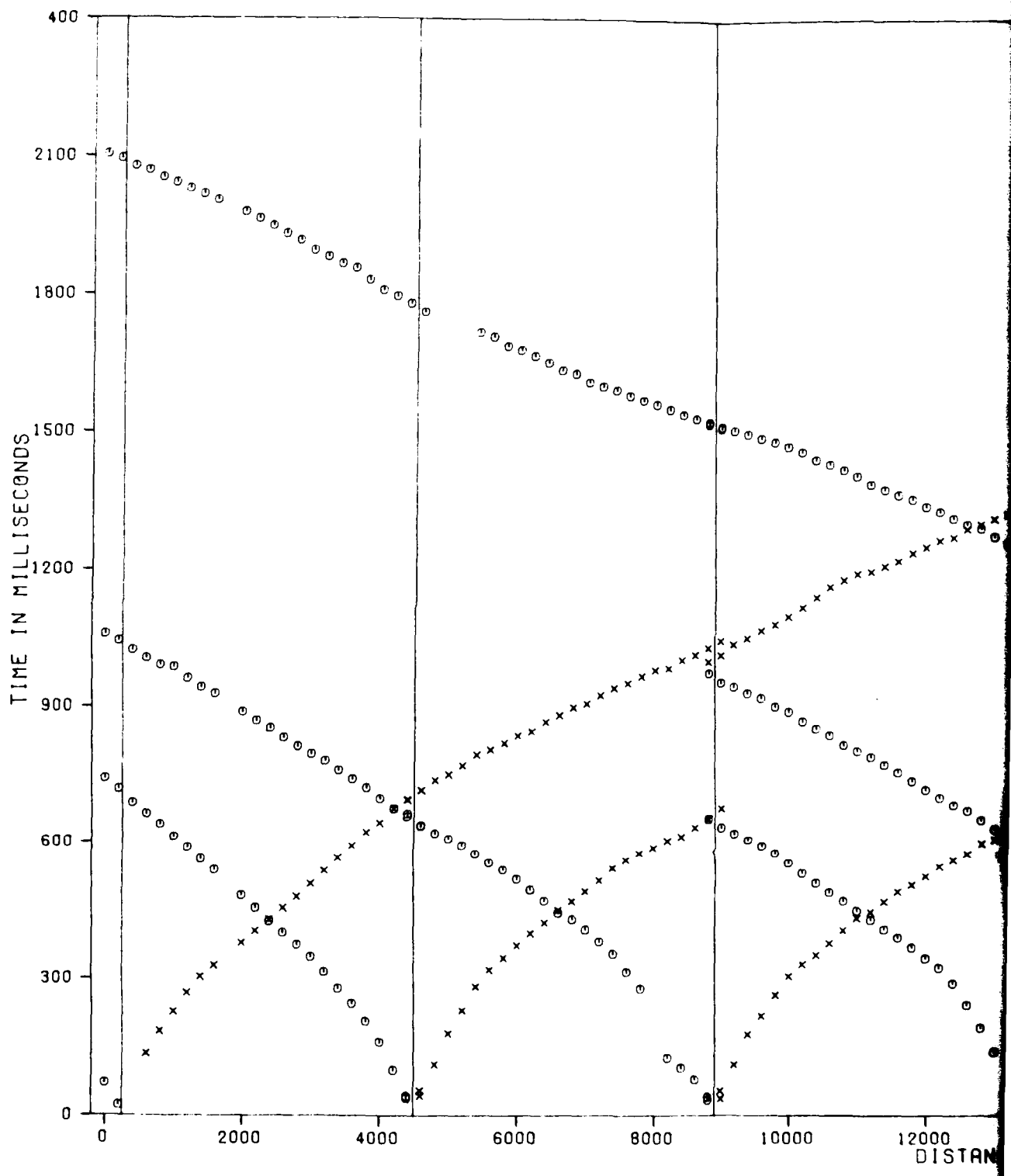
x TIMES TO RIGHT OF SHOTS  
o TIMES TO LEFT OF SHOTS

SEISMIC REFRACTION LINE RV-S-16  
TIME-DISTANCE DATA AND VELOCITY PROFILE  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - MO

FIGURE  
II-3-15

**FLUOR NATIONAL INC.**



SHOT F

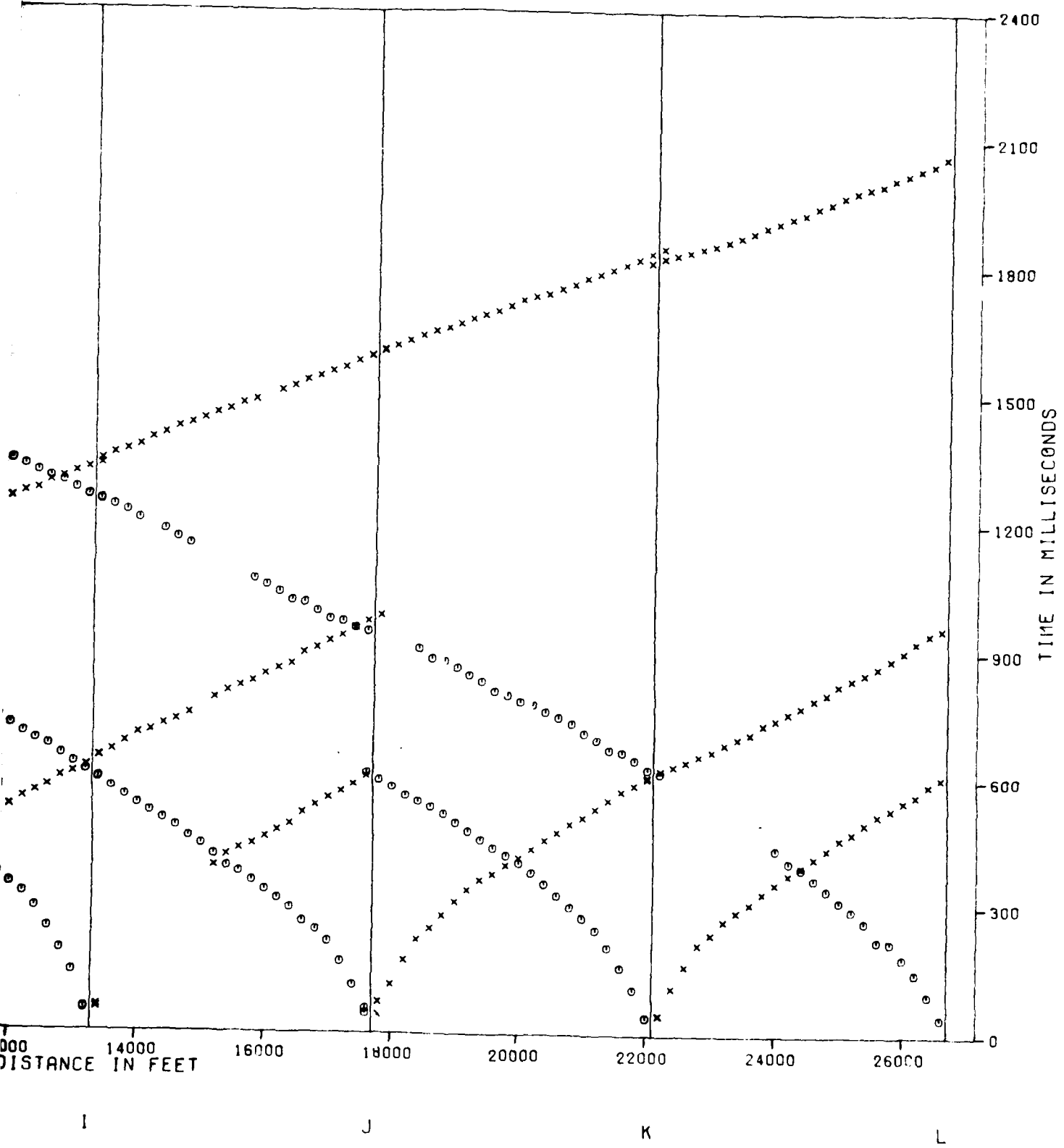
G

H

DISTANCE

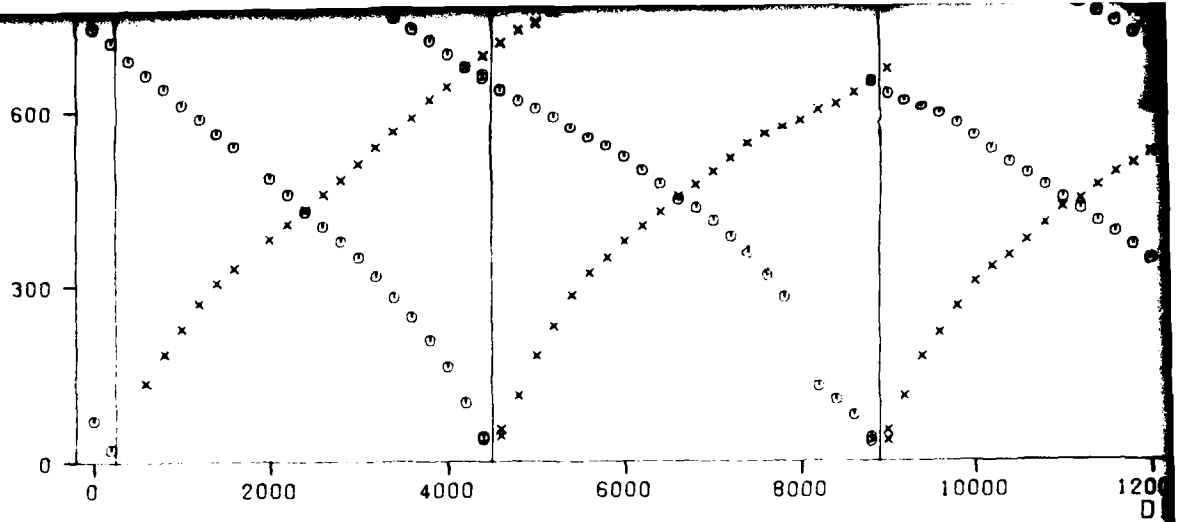
1

2



N

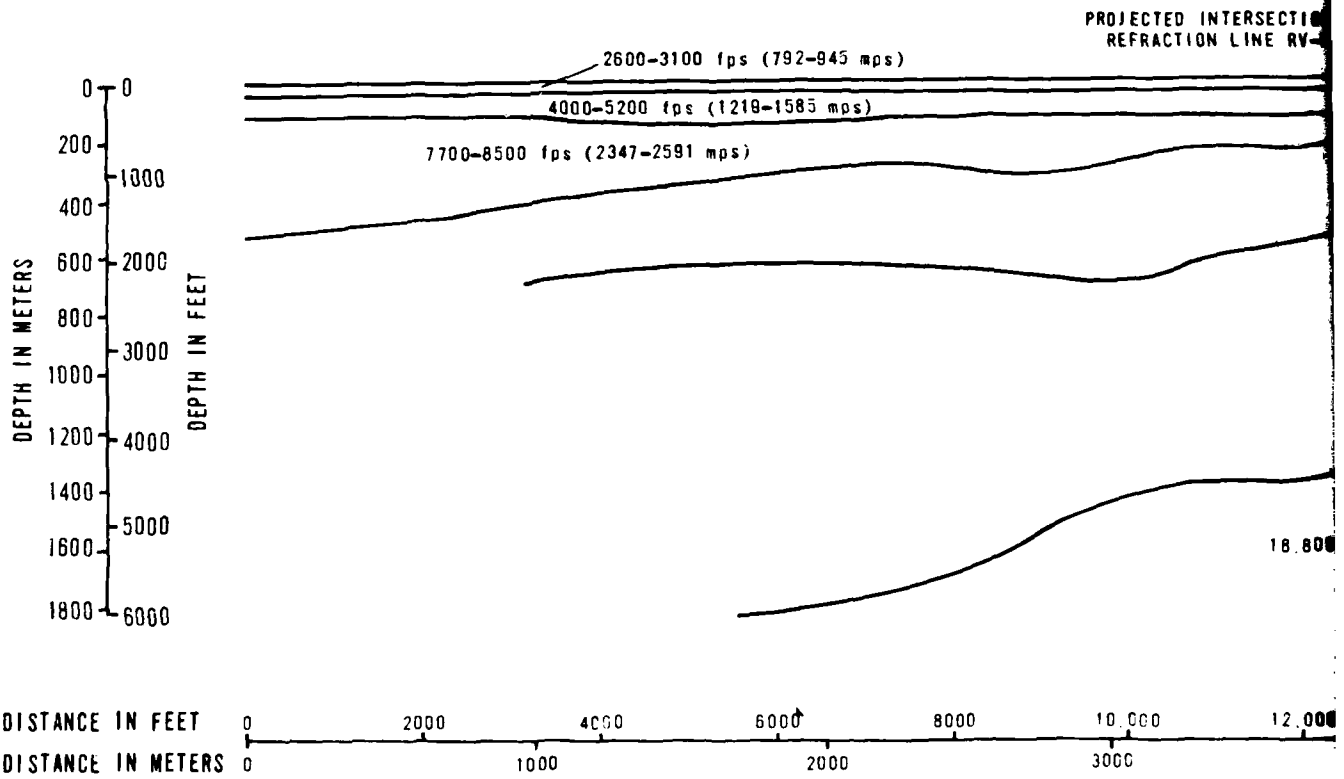
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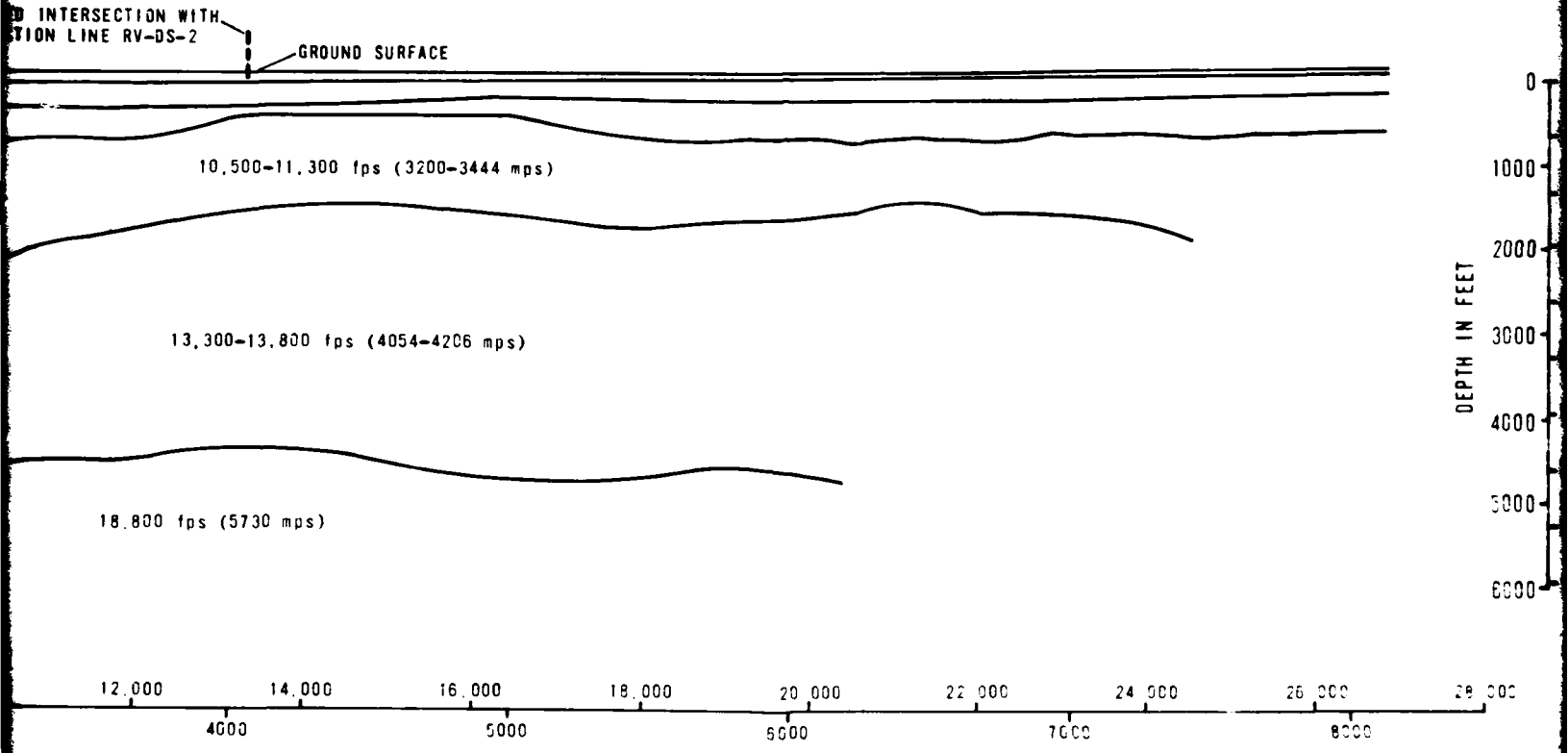
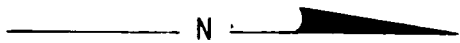
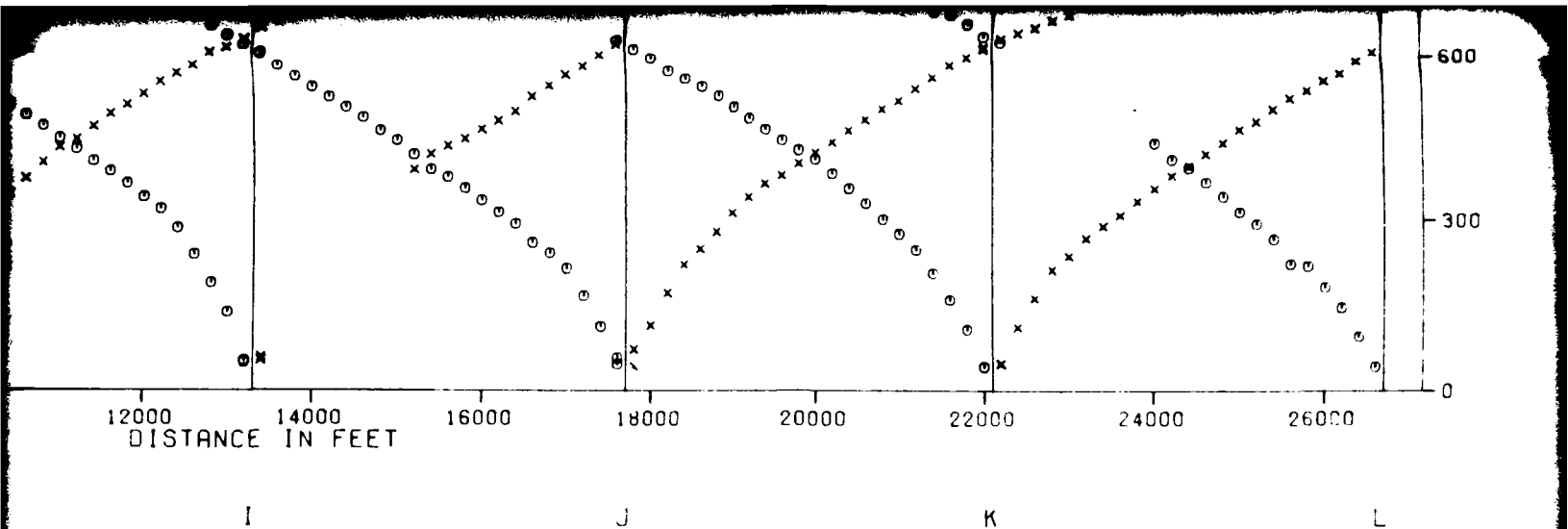


SHOT F

G

H





**EXPLANATION**

- TIMES TO LEFT OF SHOTS
- × TIMES TO RIGHT OF SHOTS

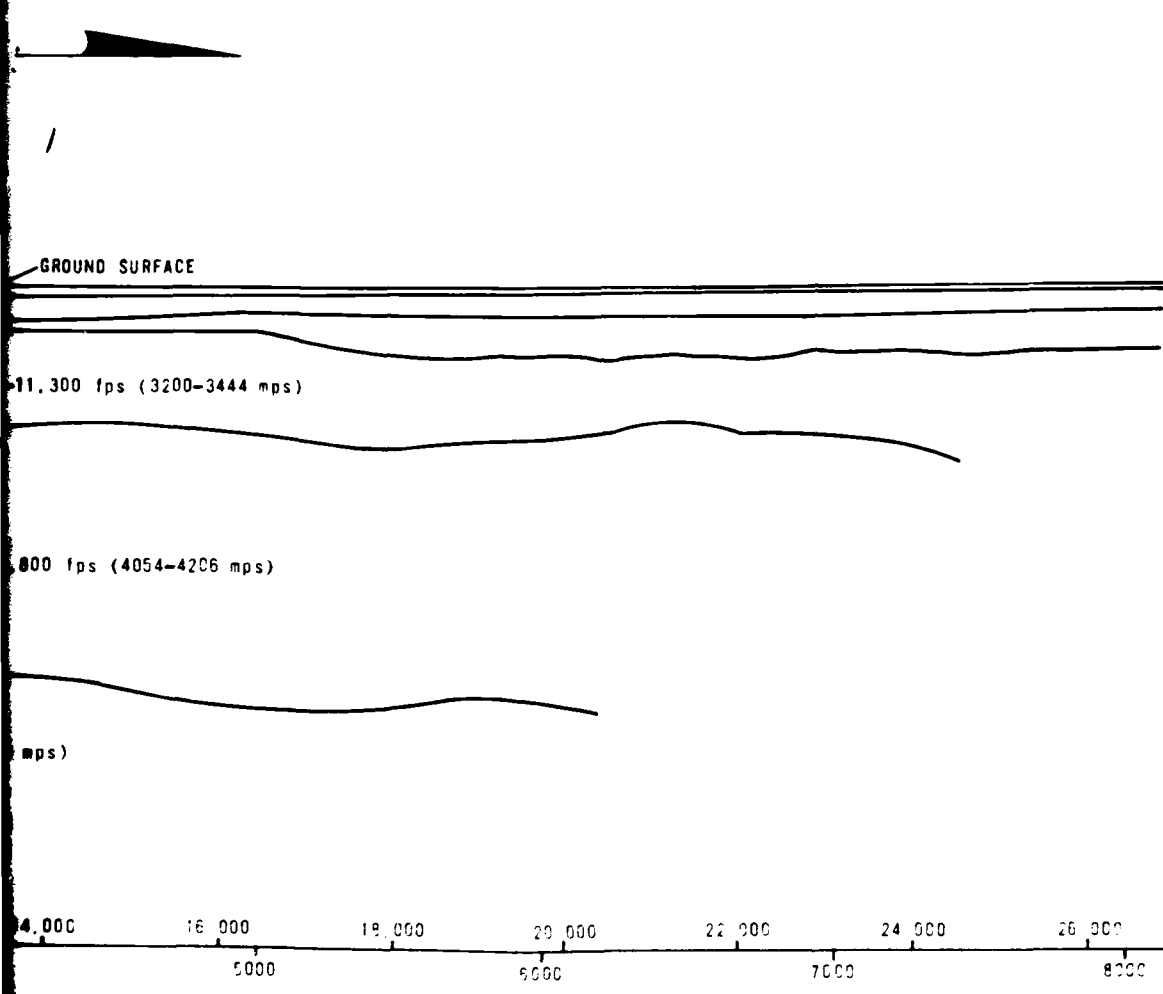
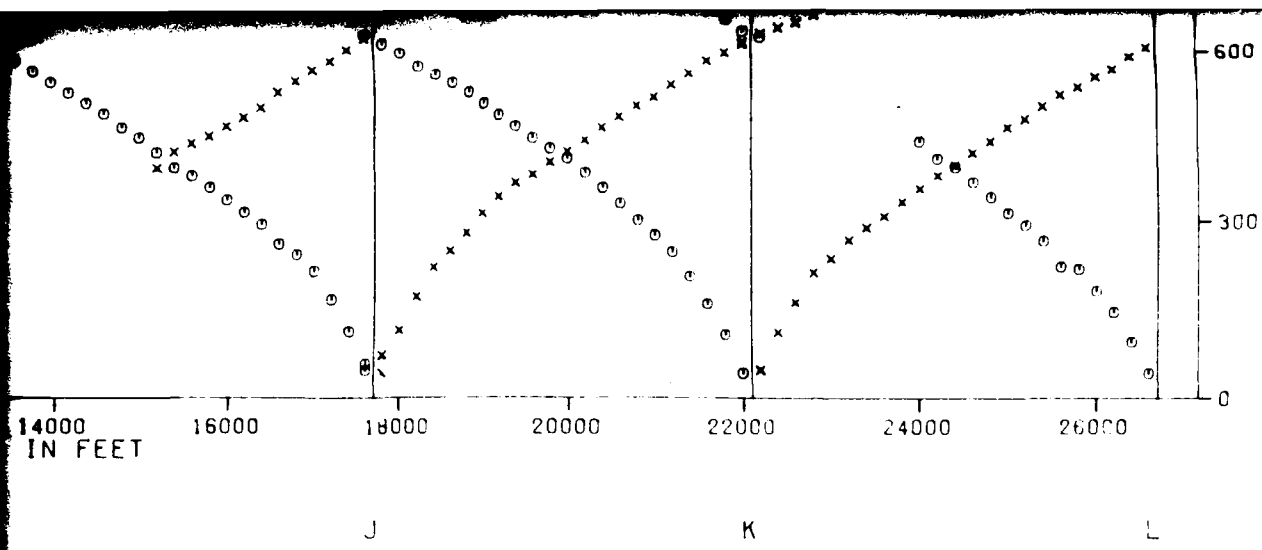
SEISMIC REFRACTION LINE  
TIME-DISTANCE DATA AND VELOCITIES  
RALSTON VALLEY, NEVADA

WELL SITE INVESTIGATION  
DEPARTMENT OF THE AIR FORCE

**FUGRO NATION**

1 4





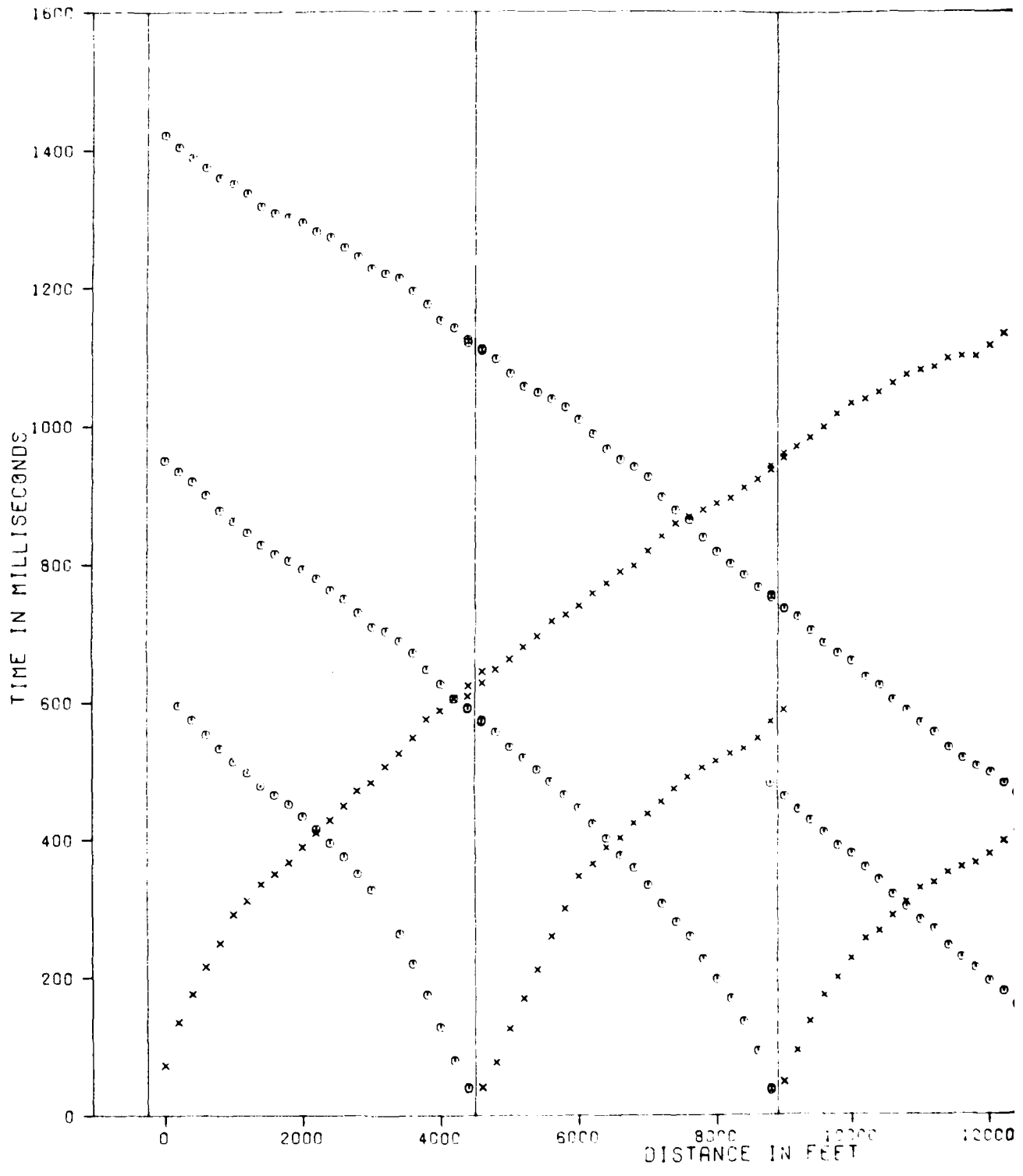
**EXPLANATION**  
 ○ LEFT OF SHOTS  
 ● RIGHT OF SHOTS

|  |     |
|--|-----|
| SEISMIC REFRACTION LINE RV-DS-1<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |     |
| GEOTECHNICAL INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE  | BNC |
| FIGURE<br>□-3-16   |     |

**FUGRO NATIONAL, INC.**

4

5



SHOT

F

G

H

DISTANCE IN FEET

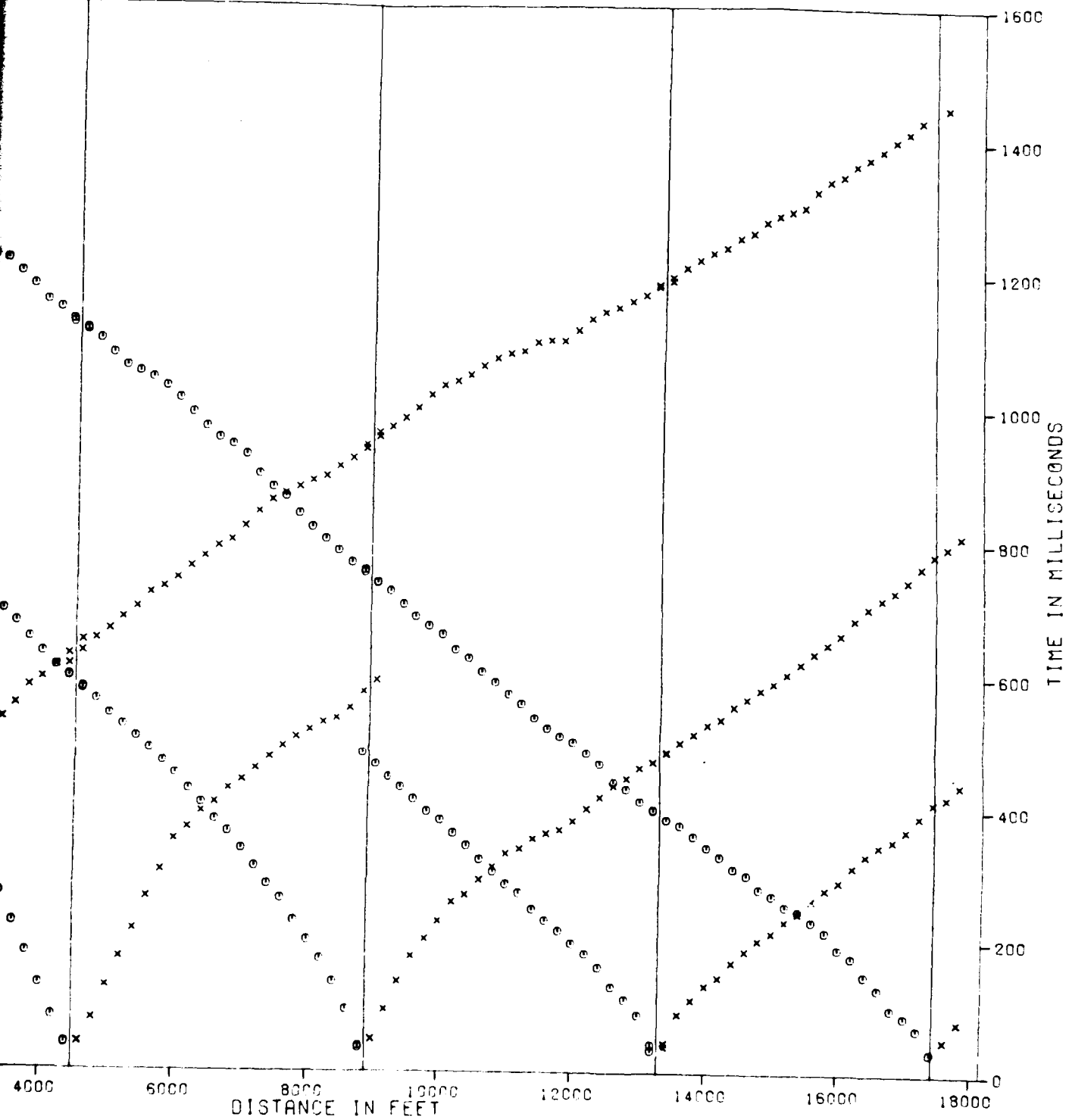
ENE



1

1

2



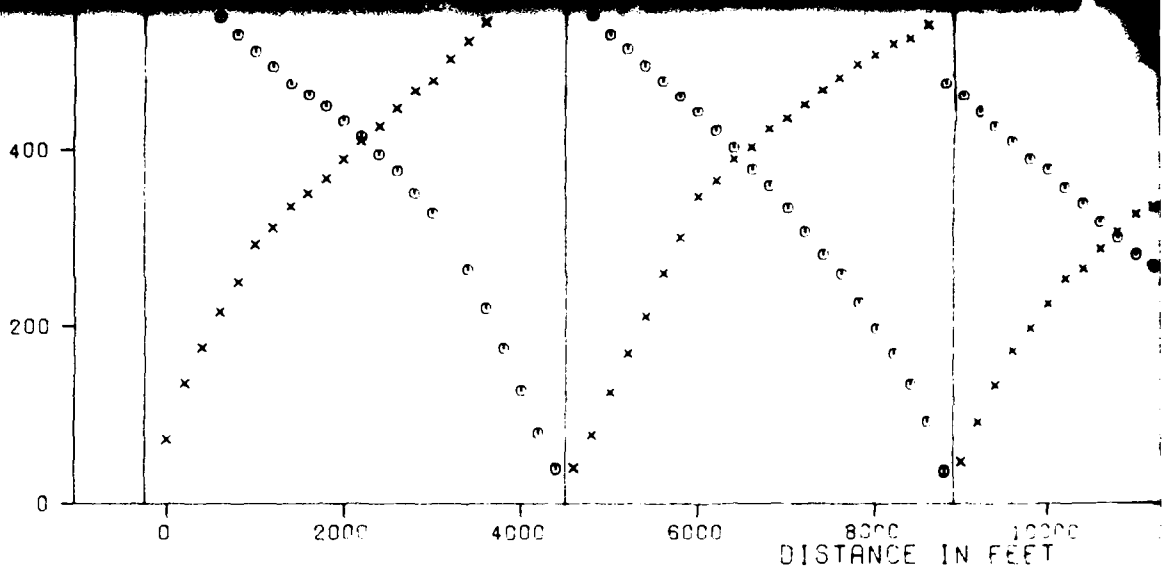
G

H

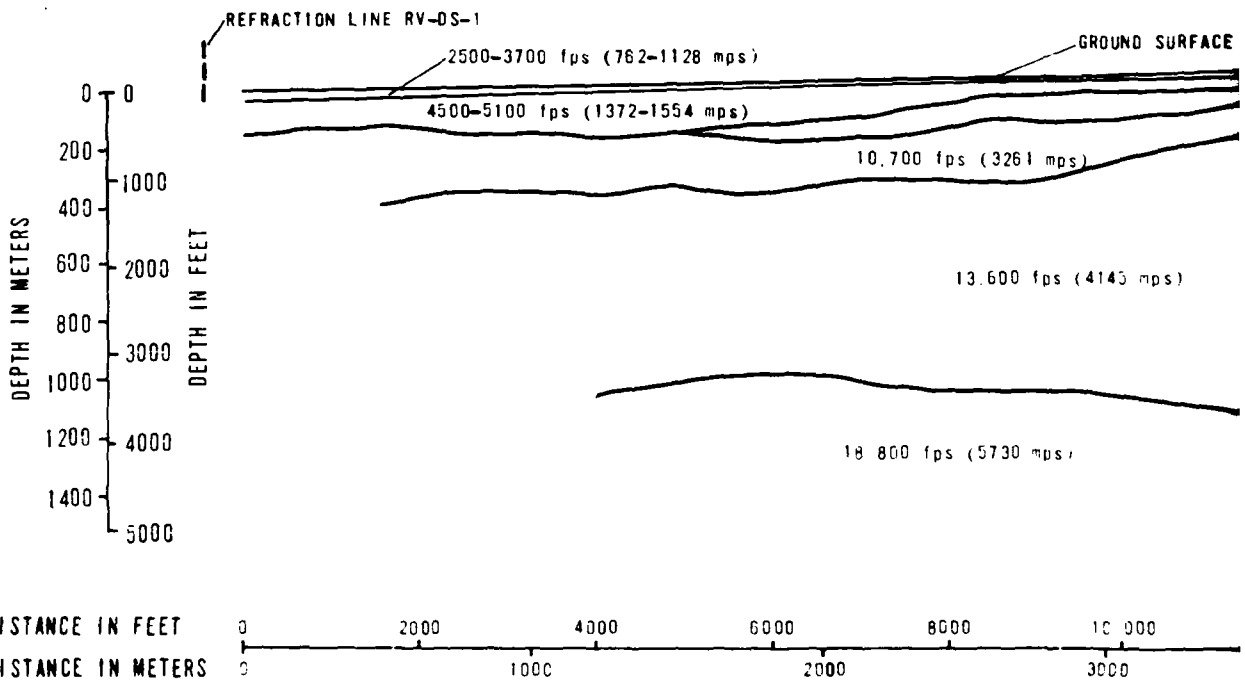
I

J

ENE 

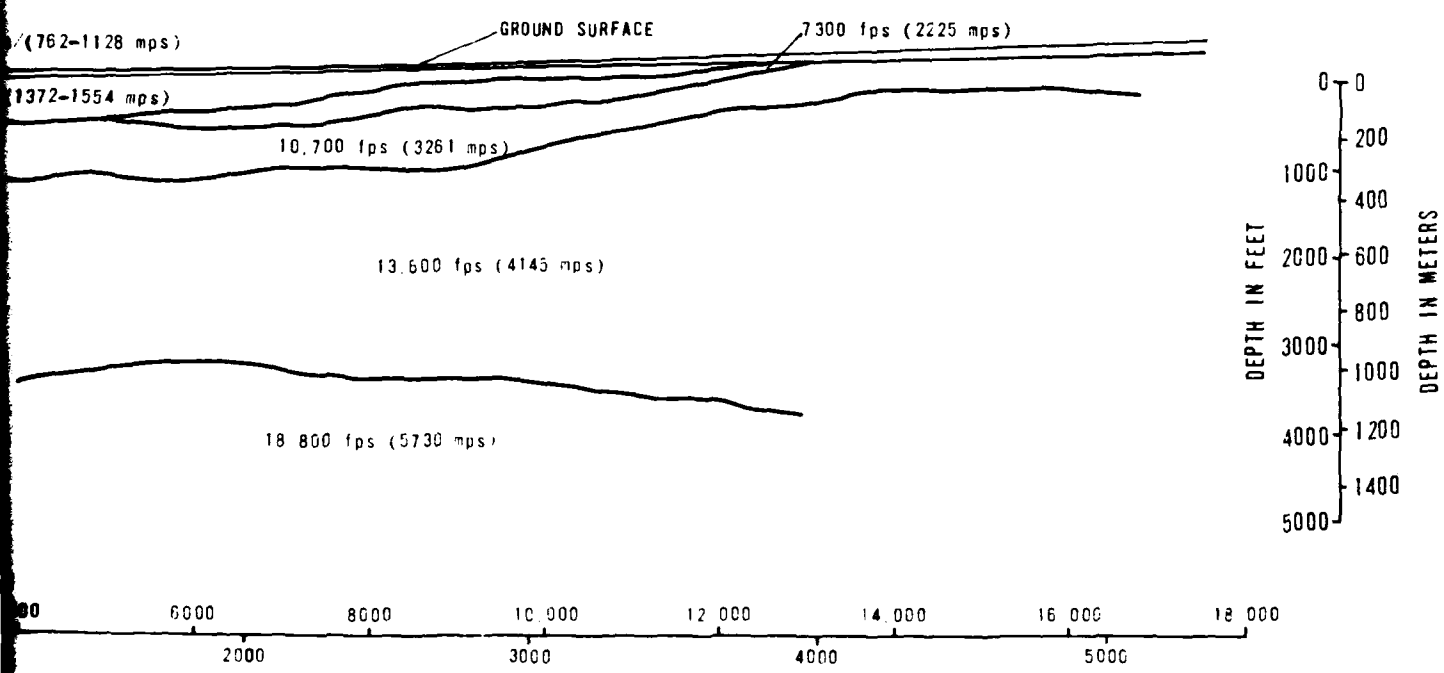
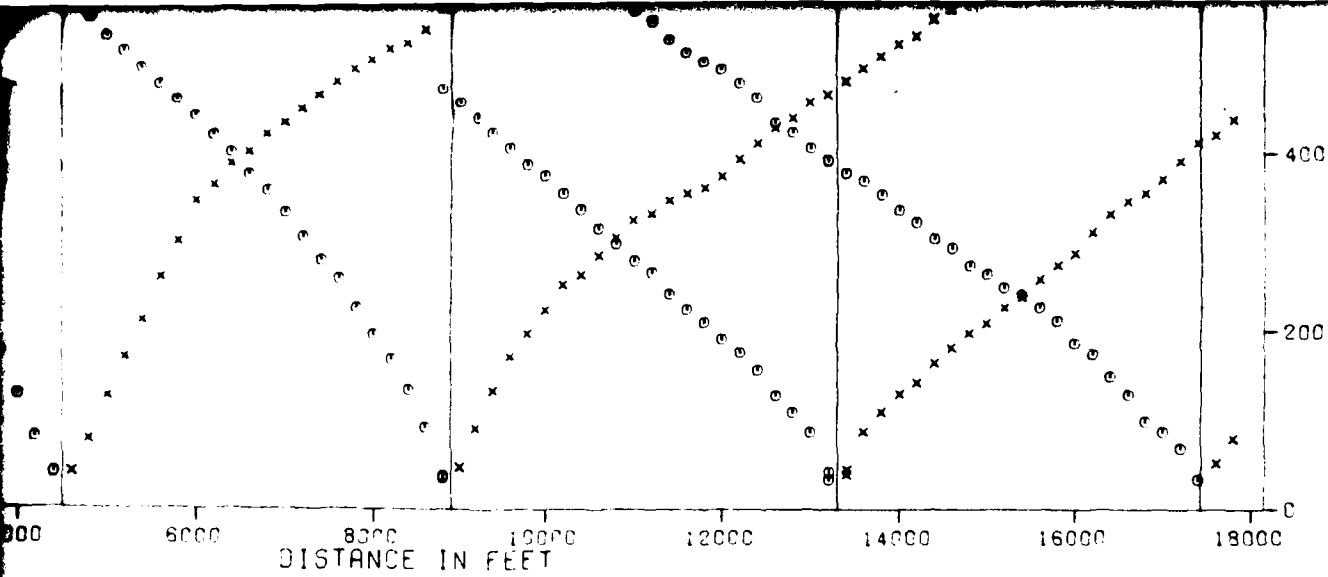


SHOT F G H



**EXPLANATION**

- TIMES TO LEFT OF SHOTS
- × TIMES TO RIGHT OF SHOTS



**EXPLANATION**

- TIMES TO LEFT OF SHOTS
- × TIMES TO RIGHT OF SHOTS

|  |                          |
|--|--------------------------|
| SEISMIC REFRACTION LINE RV-DS-2<br>TIME-DISTANCE DATA AND VELOCITY PROFILE<br>RALSTON VALLEY, NEVADA |                          |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - BMD   | FIGURE<br><b>II-3-17</b> |
| <b>FUGRO NATIONAL, INC.</b>  |                          |

3

4

FN-TR-27-RV-II

SECTION 4.0

BORING LOGS

#### 4.0 EXPLANATIONS OF BORING AND TRENCH LOGS

Note: The boring scheduled for the location numbered RV-B-11 was not drilled.

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

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

RV-B-1

RV - abbreviation for the site (e.g., RV-Ralston Valley)

B - abbreviation for activity (e.g., B-boring, T-trench)

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. Horizontal lines, to scale, indicate the depth where sampling was attempted.

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

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

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

- F. Lithology - Graphic representation of the soil and rock types.
- G. USCS - Unified Soil Classification System (see Table II-4-1 for complete details) symbols.
- H. Soil Description - Except in cases where samples were classified based on laboratory test data, the descriptions are based on visual classification. The procedures outlined in ASTM D 2487-69, Classification of Soils for Engineering Purposes, and D 2488-69, Description of Soils (Visual-Manual Procedure) were followed. Solid lines across the column indicate known change in strata at the depth shown.

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

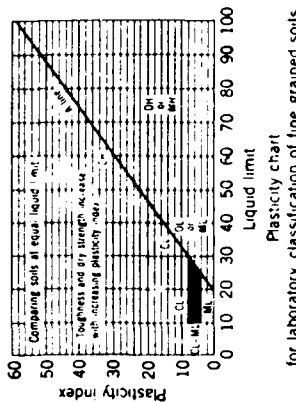
Gradation : A coarse-grained soil is well graded if it has a wide range in grain size and substantial amounts of most intermediate particle sizes.

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

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



| Field Identification Procedures<br>(Excluding particles larger than 3 in. and bearing fractions on estimated weights) | Group Symbols | Typical Names  | Information Required for Describing Soils   | Laboratory Classification Criteria  |
|---|---------------|--|---|---|
| Coarse-grained soils<br>More than half of material is larger than No. 200 sieve size                                  |               |  |   |   |
| Gravels<br>More than half of coarse fraction is larger than No. 4 sieve size  | GW            | Well graded, gravelly sands, little or no fines  | Give typical name, indicate approximate percentages of sand and gravel, maximum size, angularity, surface condition, and soil texture. Local or geologic name and other pertinent descriptive information, and symbols in parentheses.            | $C_u = \frac{D_{60}}{D_{10}}$ Greater than 4<br>$C_c = \frac{D_{30}^2}{D_{10} \times D_{60}}$ Between 1 and 3 |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | GP            | Poorly graded sands, gravelly sands, little or no fines  | For undisturbed soils add information on stratification, degree of compaction, cementation, and moisture conditions and drainage characteristics.   | Not meeting all gradation requirements for GW   |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | GM            | Silty sands, poorly graded sand-clay mixtures  | Example:<br>Silty sand, angular, about 20% hard gravel, gravel particles 1-in maximum size, rounded coarse to fine, about 15% non-plastic, well compacted, moist in place, alluvial sand, (SM)  | Above A-line with P between 4 and 7 are border-line cases requiring use of dual symbols                       |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | GC            | Clayey sands, poorly graded sand-clay mixtures   |   | Above A-line with P greater than 7 are border-line cases requiring use of dual symbols                        |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | SW            | Well graded sands, gravelly sands, little or no fines  |   | $C_u = \frac{D_{60}}{D_{10}}$ Greater than 6<br>$C_c = \frac{D_{30}^2}{D_{10} \times D_{60}}$ Between 1 and 3 |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | SP            | Poorly graded sands, gravelly sands, little or no fines  |   | Not meeting all gradation requirements for SW   |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | SM            | Silty sands, poorly graded sand-clay mixtures  |   | Above A-line with P between 4 and 7 are border-line cases requiring use of dual symbols                       |
| Sands<br>More than half of coarse fraction is smaller than No. 4 sieve size   | SC            | Clayey sands, poorly graded sand-clay mixtures   |   | Above A-line with P greater than 7 are border-line cases requiring use of dual symbols                        |
| Identification Procedures on Fraction Smaller than No. 40 Sieve Size  |               |  |   |   |
| Dry Strength (crushing character-strength)  |               |  |   |   |
| Dilatancy (reaction to shaking)   |               |  |   |   |
| Toughness (consistency near plastic limit)  |               |  |   |   |
| None to slight  | ML            | Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with high plasticity | Give typical name, indicate degree and character of plasticity, amount, and maximum size of coarse grains; colour in wet condition, odour if any, local or geologic name, and other pertinent descriptive information, and symbol in parentheses. | Below A-line with P between 4 and 7 are border-line cases requiring use of dual symbols                       |
| Medium to high  | CL            | Inorganic clays of low to medium plasticity, gravelly silty clays, silty clays, lean clays       | For undisturbed soils add information on structure, stratification, consistency in undisturbed state, moisture content, and drainage characteristics.   | Above A-line with P greater than 7 are border-line cases requiring use of dual symbols                        |
| Slight to medium  | OL            | Organic silts and organic silty clays of low plasticity  | Example:<br>Clayey silt, brown, slightly plastic, small percentage of root holes, firm and dry in place, loess, (ML)  |   |
| Slight to medium  | MH            | Inorganic silts, micaceous silty soils, elastic silts  |   |   |
| High to very high   | CH            | Inorganic clays of high plasticity, fat clays  |   |   |
| Medium to high  | OH            | Organic clays of medium to high plasticity   |   |   |
| Readily identified by colour, odour, spongy feel and frequently by fibrous texture                                    | PI            | Peat and other highly organic soils  |   |   |



Use grain size curve in identifying the fractions as given under field identification.

Dependent on percentage of fines (fraction smaller than No. 200 sieve size); well graded soils are classified as follows:

More than 5% fines (fraction smaller than No. 200 sieve size):

- 5% to 12% fines:  $C_u = \frac{D_{60}}{D_{10}}$  Greater than 6
- 12% to 50% fines:  $C_c = \frac{D_{30}^2}{D_{10} \times D_{60}}$  Between 1 and 3

Not meeting all gradation requirements for SW

Above A-line with P between 4 and 7 are border-line cases requiring use of dual symbols

Above A-line with P greater than 7 are border-line cases requiring use of dual symbols

for laboratory classification of fine grained soils

Toughness (Consistency near plastic limit)

After removing particles larger than the No. 40 sieve size, a specimen of soil about one-half inch cube in size is moulded to the consistency of putty. If too dry, water must be added and if sticky, the specimen should be spread in a thin layer and rolled out by the use of some moisture. The thread is then rolled out by the use of the palm of the hand on a surface or between the palms into a thread about one-eighth inch in diameter. The thread is then folded and re-rolled repeatedly. During this manipulation the moisture content is gradually reduced and the specimen stiffens. Finally loses its plasticity, and crumbles when the thread crumbles. The process should be lumped together and a slight kneading action continued until the lump crumbles.

The tougher the thread near the plastic limit and the stiffer the lump when it finally crumbles, the more potent is the colloidal clay fraction in the soil. Weakness of the thread at the plastic limit and quick loss of plasticity on drying are characteristic of soils containing high percentages of clay of low plasticity or materials such as kaolin-type clays and organic clays which occur below the A-line.

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

Field Identification Procedure for Fine Grained Soils or Fractions

For example GW-CC, well graded gravel-sand mixture with clay binder.

These procedures are to be performed on the minus No. 40 sieve size particles, approximately 1/4 in. For field classification purposes, screening is not intended, simply remove by hand the coarse particles that interfere with the test.

Dilatancy (Reaction to shaking)

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

Place the pat in the open palm of one hand and shake horizontally, striking the pat with the fingers of the other hand. The pat should be observed for changes in the appearance of water on the surface of the pat which changes to a lively consistency and becomes glossy. When the sample is squeezed between the fingers, the water and gloss disappear from the surface, the pat stiffens and finally it cracks or crumbles. The rapidity of appearance of water during the shaking of the pat in a soil during very fine clean sands give the quickest and most distinct reaction whereas a plastic clay has no reaction. Inorganic silt, such as a typical rock flour, show a moderately quick reaction.

**UNIFIED SOIL CLASSIFICATION SYSTEM**

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - SAMSOC

TABLE  
**II-4-1**

**TUBRO NATIONAL, INC.**

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

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

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

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.

CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

| SAMPLE TYPE | % RECOVERY | N VALUE | DEPTH  |      | LITHOLOGY | USCS  | SOIL DESCRIPTION   | REMARKS   | ▲(pcf) / ●(%) |    |     |     |     |     |     |    |    |    | SIEVE ANALYSIS |    |    |    |    |    |
|-------------|------------|---------|--------|------|-----------|-------|--|-----------|---------------|----|-----|-----|-----|-----|-----|----|----|----|----------------|----|----|----|----|----|
|             |            |         | METERS | FEET |           |       |  |           | 80            | 90 | 100 | 110 | 120 | 130 | 140 | GR | SA | FI | LL             | PI |    |    |    |    |
|             | 100        |         | 0      | 0    |           | SM    | SILTY SAND, gray brown, fine to coarse, poorly graded, dense to very dense, subangular to sub-rounded, calcareous; some non-plastic silt; little fine gravel.  |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 19             | 45 | 36 |    |    |    |
|             | 53         | 43      |        |      |           | SP-SM |  |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 0              | 55 | 45 |    |    | NP |
|             | 100        |         | 6      | 20   |           | GP-GM | Interbedded layers of GRAVELLY SAND and SANDY GRAVEL:  | ▲         | ●             | ●  | ▲   |     |     |     |     |    |    |    | 42             | 49 | 9  |    |    |    |
|             | 100        |         |        |      |           | SC    |  |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 49             | 42 | 9  |    |    |    |
|             | 100        |         |        |      |           | GW-G  | GRAVELLY SAND, (SP-SM SC, SW-SM), gray brown fine to coarse, poorly to well graded, very dense, sub-angular to subrounded calcareous; some fine to coarse gravel; trace to little slightly plastic clay and silt.                                    |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 43             | 44 | 13 | 36 | 17 |    |
|             | 100        |         | 12     | 40   |           | SC    |  | 6" cobble | ●             | ●  | ▲   |     |     |     |     |    |    |    | 48             | 42 | 10 | 32 | 11 |    |
|             | 100        |         |        |      |           | SC    |  |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 40             | 44 | 16 | 32 | 13 |    |
|             | 100        |         | 18     | 60   |           | SW-SM | SANDY GRAVEL, (CP-GM, GW-GC), gray brown fine to coarse, poorly to well graded, very dense, subangular to subrounded calcareous, some fine to coarse sand, trace to little slightly plastic clay and silt.   |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 28             | 56 | 16 |    |    |    |
|             | 100        |         | 24     | 80   |           | SW-SM |  |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 26             | 65 | 3  |    |    |    |
|             | 100        |         |        |      |           |       | SILTY SAND and GRAVELLY SAND   |           | ●             | ●  | ▲   |     |     |     |     |    |    |    |                |    |    |    |    |    |
|             | 100        |         | 30     | 100  |           |       | gray brown to brown fine to coarse, poorly graded, very dense, sub-angular to subrounded, calcareous; little to some nonplastic to slightly plastic silt; trace to some fine subangular to sub-rounded gravel; layer of sandy gravel (200 0"-205 0") |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 18             | 67 | 15 |    |    |    |
|             | 100        |         | 36     | 120  |           |       |  |           | ●             | ●  | ▲   |     |     |     |     |    |    |    | 15             | 54 | 21 |    |    |    |

little to some nonplastic to slightly plastic silt; trace to some fine subangular to sub-rounded gravel; layer of sandy gravel (200 0'-205 0')

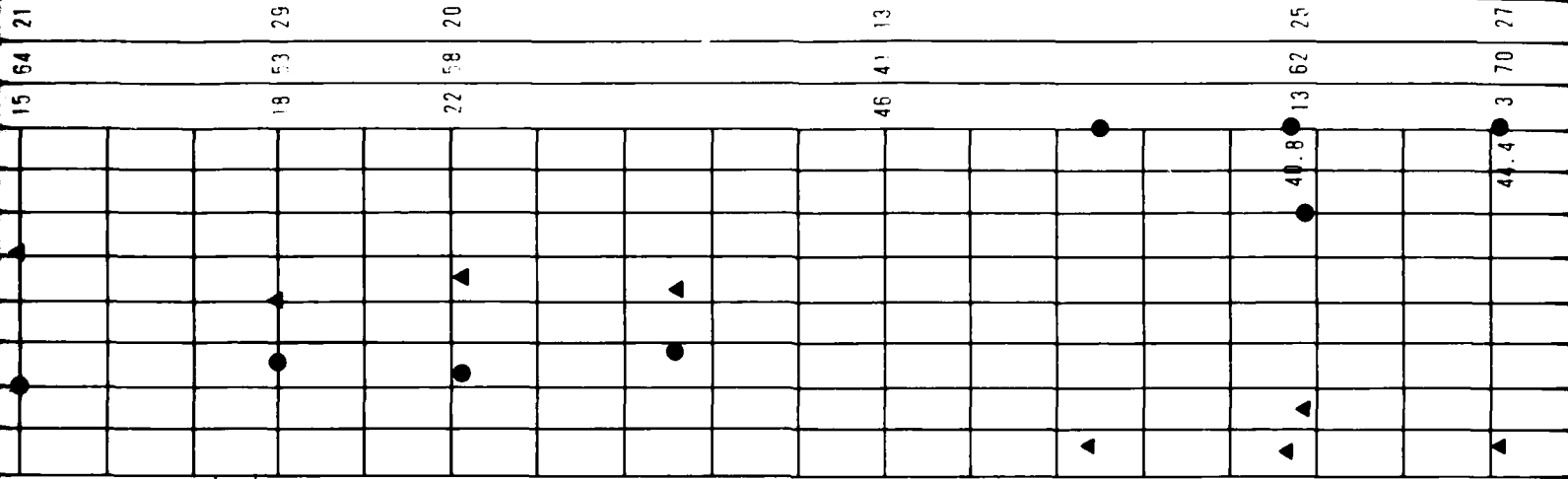
24" boulder

DRILL CHATTER

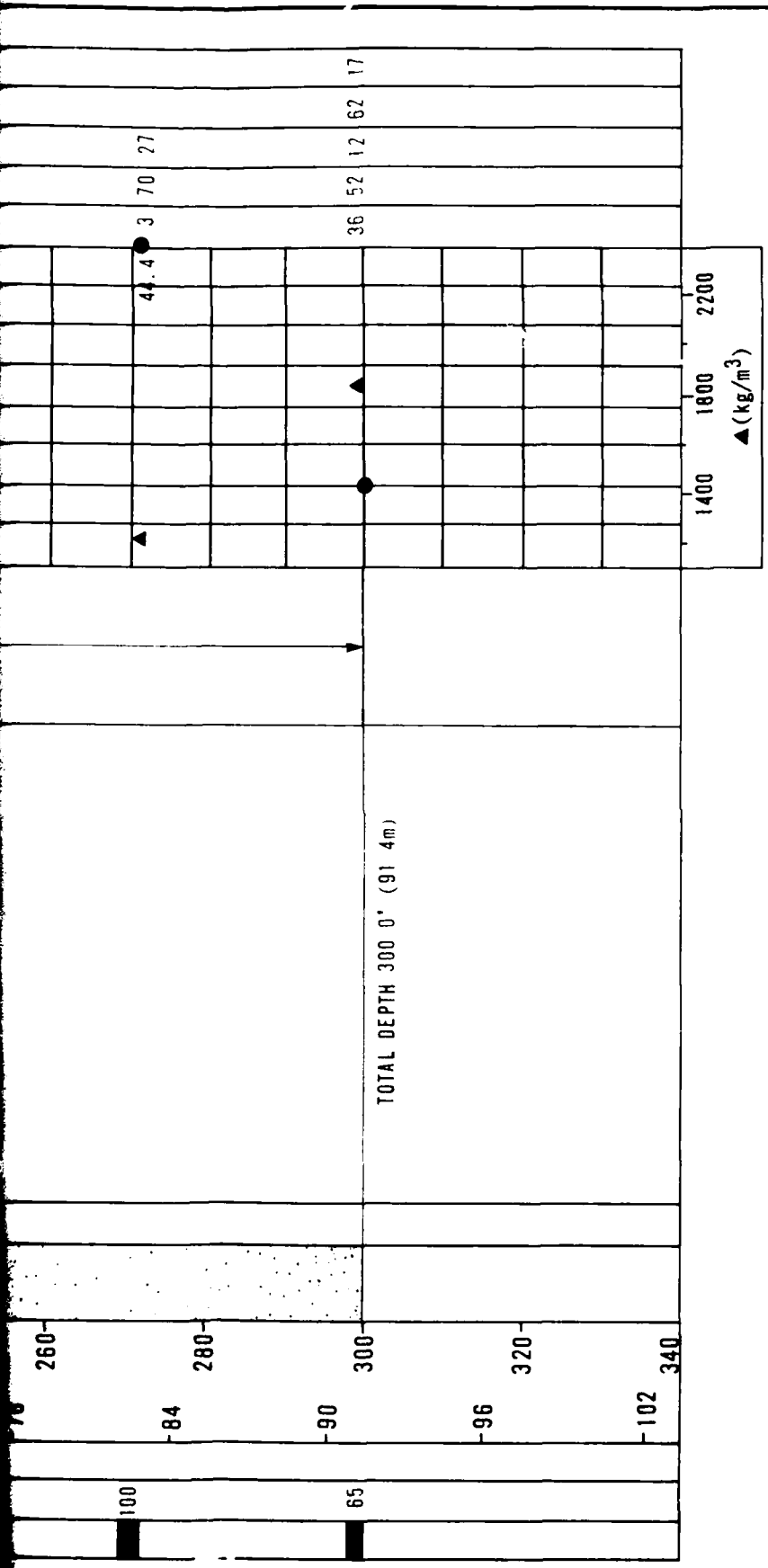
SM

GM

SM



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 : 5610' (1710m)
- SURFICIAL GEOLOGIC UNIT : A5y
- DATE DRILLED : 6-8 August 1977
- DRILLING METHOD : Rotary Wash
- HOLE DIAMETER : 4 7/8" (124mm)
- WATER LEVEL : 221' (67.4m)

LOG OF BORING RV-B-1  
RALSTON VALLEY, NEVADA

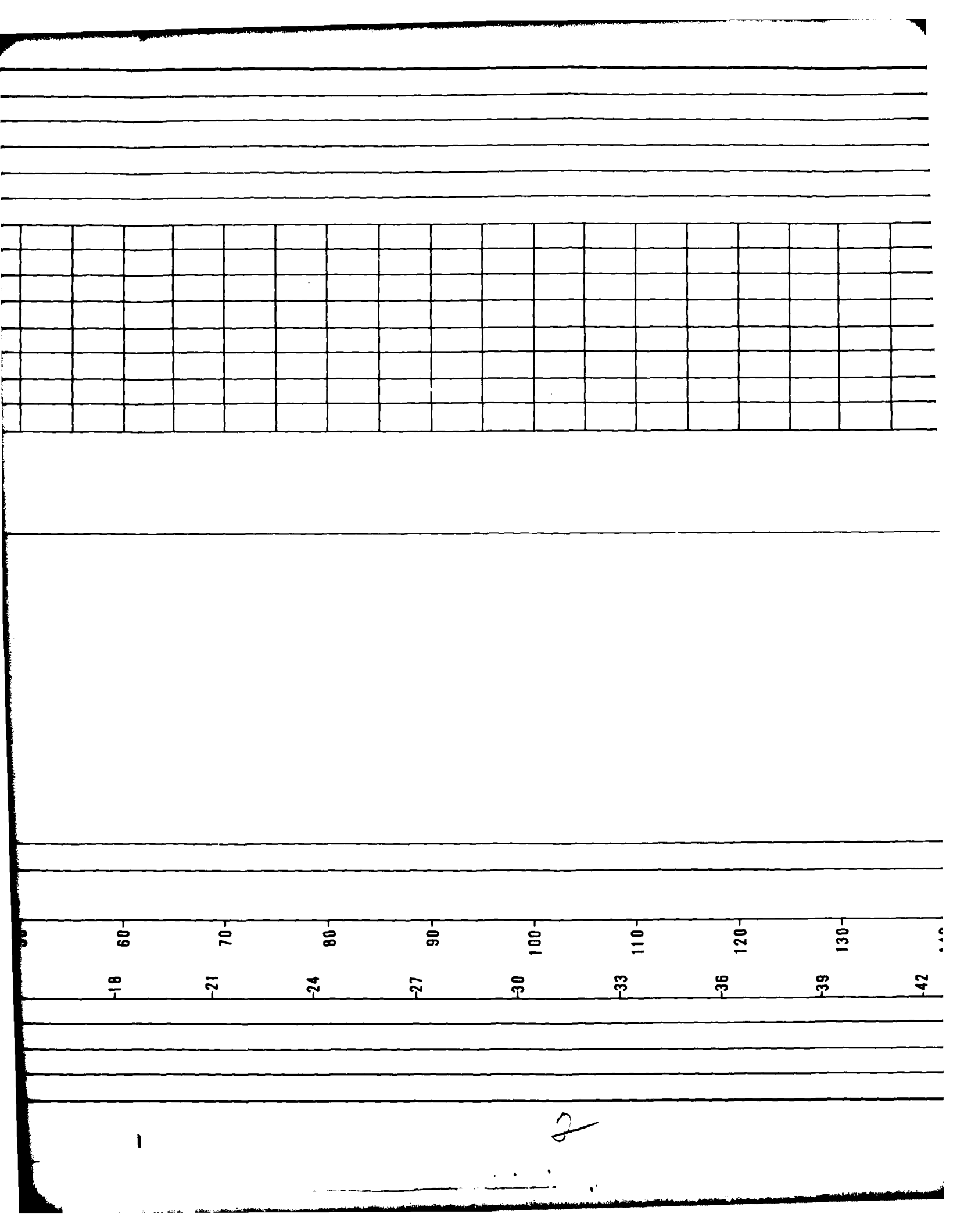
|  |                  |
|--|------------------|
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE BMD | FIGURE<br>II-4-1 |
|--|------------------|

**FUGRO NATIONAL, INC.**



CH BY

| DEPTH  |      | USCS                     | SOIL DESCRIPTION  | REMARKS | ▲(pcf) |    |     |     |     |     | SIEVE ANALYSIS |    |    |    |    |    |  |
|--------|------|--------------------------|---|---------|--------|----|-----|-----|-----|-----|----------------|----|----|----|----|----|--|
| METERS | FEET |                          |   |         | 80     | 90 | 100 | 110 | 120 | 130 | 140            | GR | SA | FI | LL | PI |  |
| 0      | 0    | SM                       | SILTY SAND, brown, fine to coarse. poorly graded, dense; some silt; some gravel   |         |        |    |     |     |     |     |                |    |    |    |    |    |  |
| 3      | 10   | SW-SM                    | GRAVELLY SAND, brown, fine to coarse. well graded, very dense, angular; little to some fine to coarse gravel; trace silt. |         |        |    |     |     |     |     | 16             | 79 | 5  |    |    |    |  |
| 6      | 20   | SM                       | SILTY SAND, brown, fine to coarse. poorly graded, very dense; little silt; little fine gravel                             |         |        |    |     |     |     |     | 24             | 70 | 6  |    |    |    |  |
| 9      | 30   | SM                       |   |         |        |    |     |     |     |     | 10             | 74 | 16 |    |    |    |  |
| 12     | 40   |                          |   |         |        |    |     |     |     |     |                |    |    |    |    |    |  |
| 15     | 50   |                          |   |         |        |    |     |     |     |     |                |    |    |    |    |    |  |
| 18     | 60   |                          |   |         |        |    |     |     |     |     |                |    |    |    |    |    |  |
|        |      | TOTAL DEPTH 27.5' (8.4m) |   |         |        |    |     |     |     |     |                |    |    |    |    |    |  |



-18

-21

-24

-27

-30

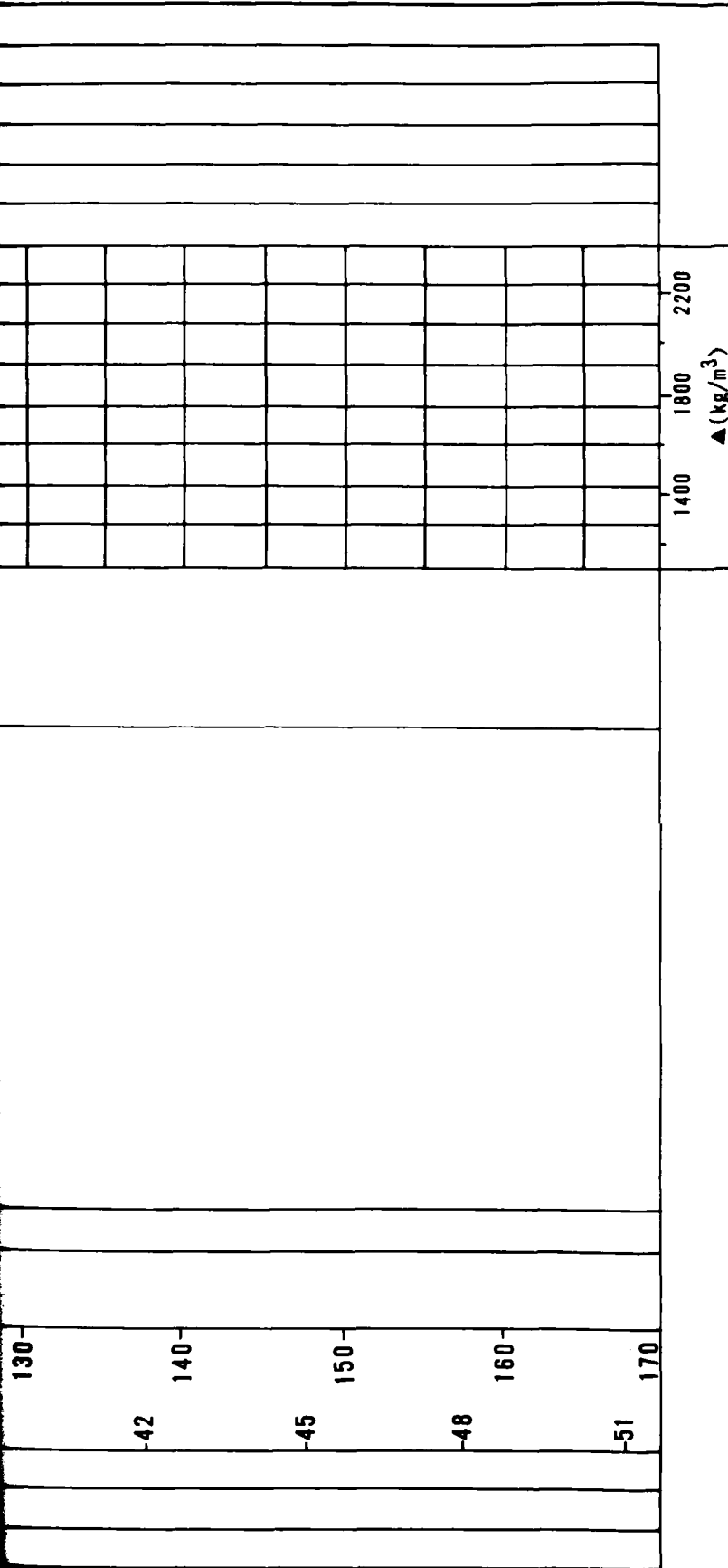
-33

-36

-39

-42

?



**EXPLANATION**

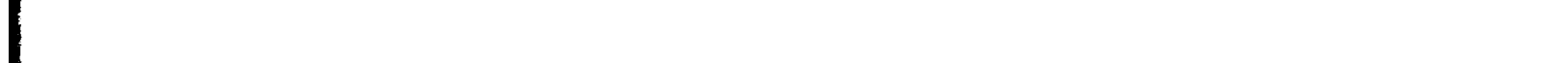
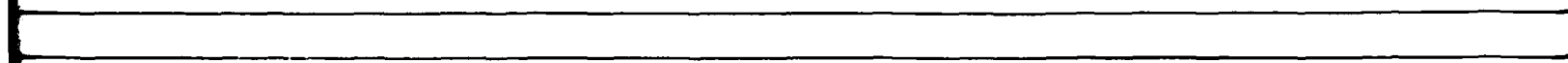
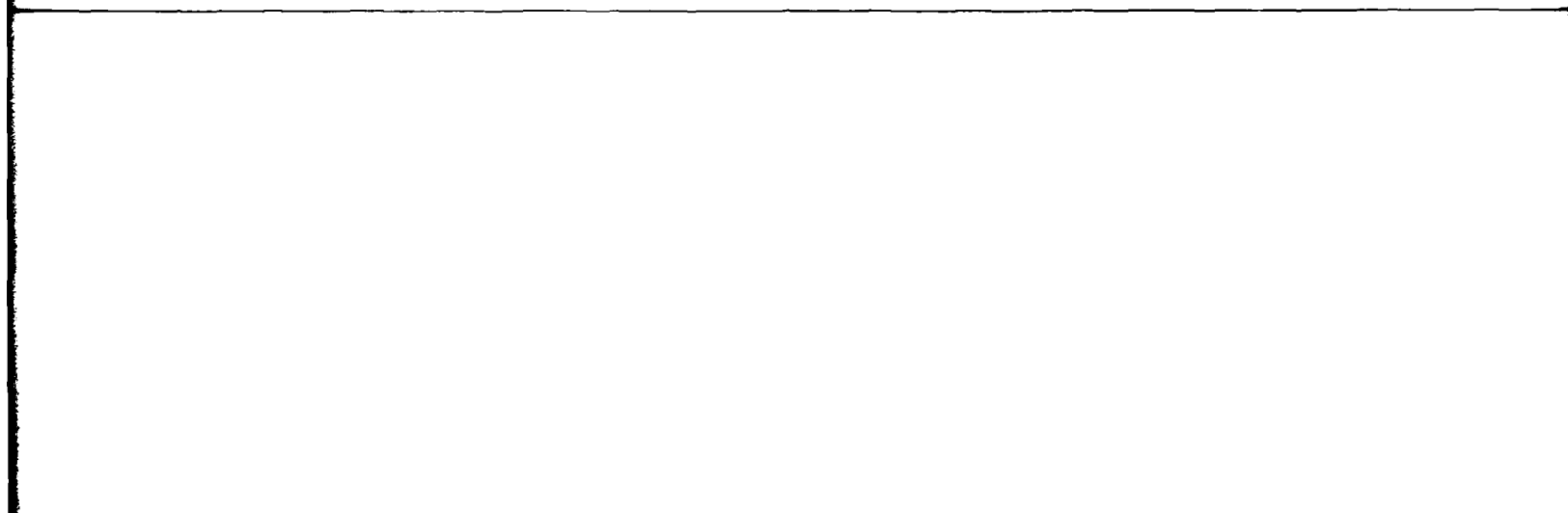
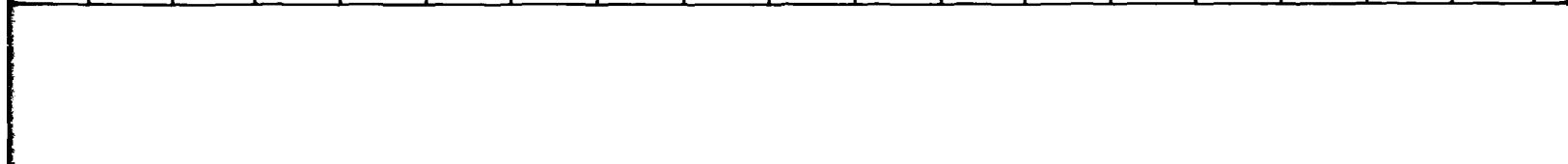
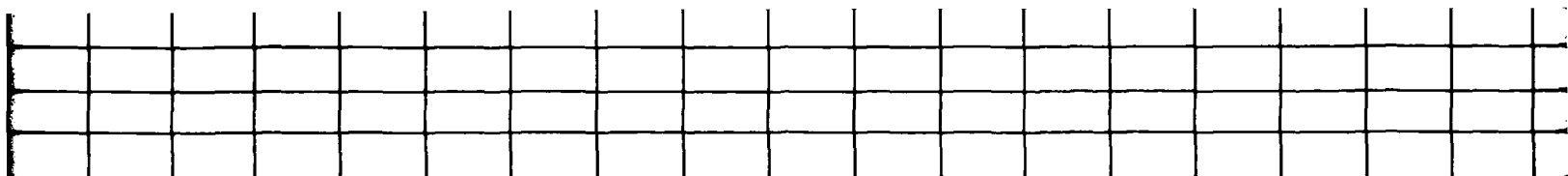
- FUGRO DRIVE SAMPLE
- BULK SAMPLE
- PITCHER TUBE SAMPLE
- STANDARD PENETRATION TEST SAMPLE
- ▨ CORE SAMPLE
- N - STANDARD PENETRATION RESISTANCE
- ▲ - DRY UNIT WEIGHT (ASTM: D-2937-71)
- - MOISTURE CONTENT (ASTM: D-2216-71)
- NR - NO RECOVERY

**BORING DETAILS**

- ELEVATION : 5760' (1756m)
- SURFICIAL GEOLOGIC UNIT : A5i
- DATE DRILLED : 3 August 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

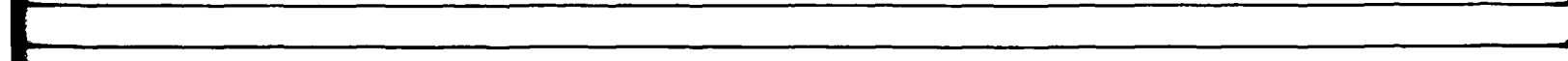
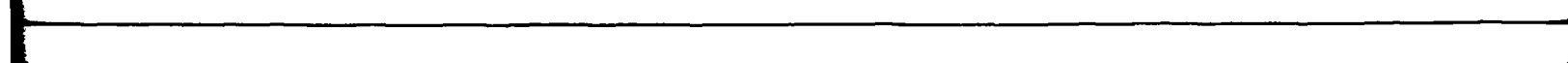
|  |                         |
|--|-------------------------|
| <b>LOG OF BORING RV-B-2<br/>RALSTON VALLEY, NEVADA</b>       |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - BMO | FIGURE<br><b>II-4-2</b> |
| <b>FUGRO NATIONAL, INC.</b>                                  |                         |





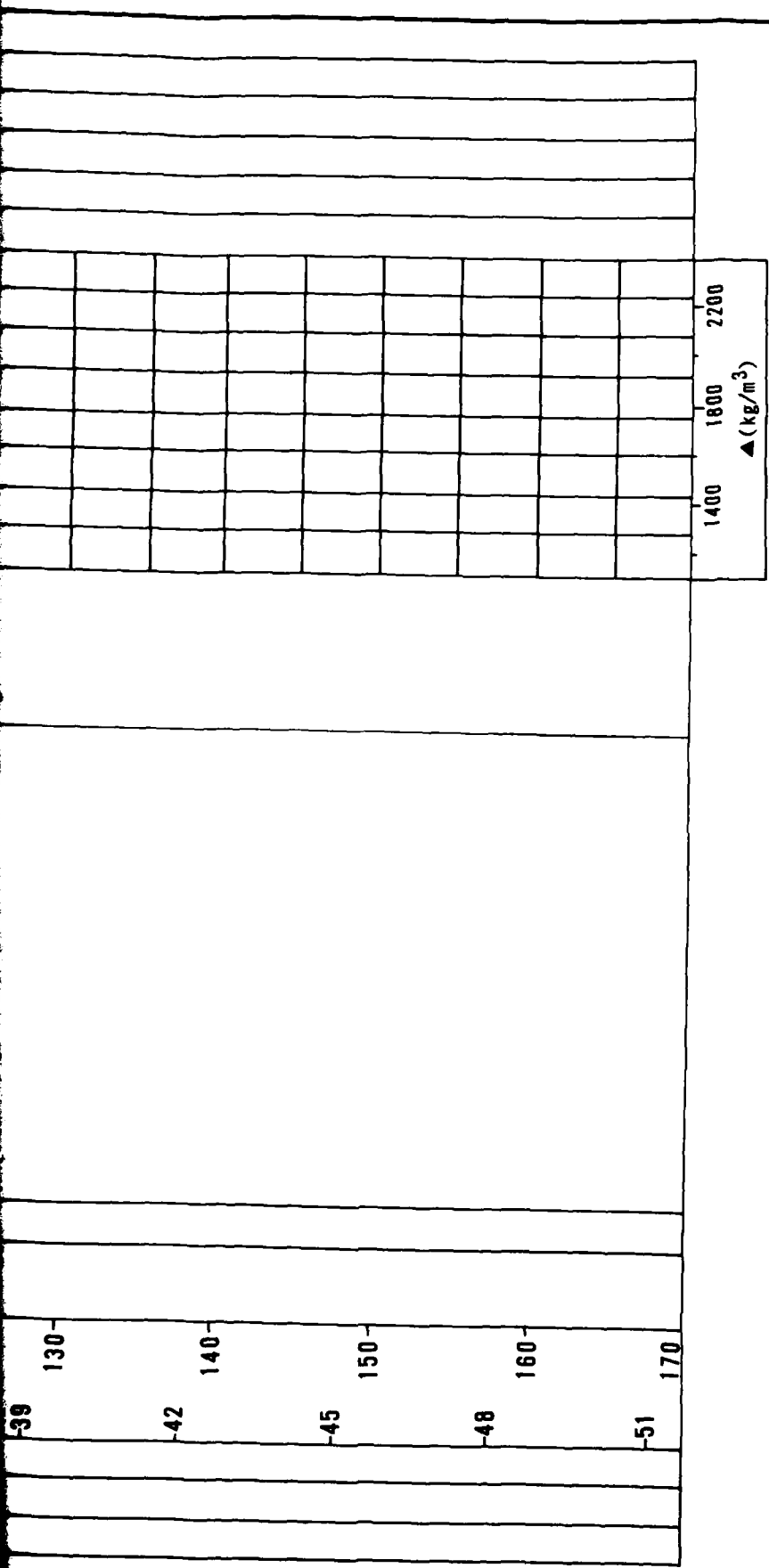
60 70 80 90 100 110 120 130 140

-18 -21 -24 -27 -30 -33 -36 -39 -42



-

*J*



**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 : 5535' (1687m)
- SURFICIAL GEOLOGIC UNIT : A5y
- DATE DRILLED : 7 August 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

LOG OF BORING RV-B-3  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMD

FIGURE  
**II-4-3**

**FUGRO NATIONAL, INC.**

3

| DEPTH  |      | N VALUE | % RECOVERY | SAMPLE TYPE | USCS | LITHOLOGY                   | SOIL DESCRIPTION   | REMARKS                        | ▲(pcf) ANALYSIS |    |     |     |     |     |     |    |    |    | SIEVE ANALYSIS |    |    |    |   |  |  |  |  |
|--------|------|---------|------------|-------------|------|-----------------------------|--|--------------------------------|-----------------|----|-----|-----|-----|-----|-----|----|----|----|----------------|----|----|----|---|--|--|--|--|
| METERS | FEET |         |            |             |      |                             |  |                                | 80              | 90 | 100 | 110 | 120 | 130 | 140 | GR | SA | FI | LL             | PI |    |    |   |  |  |  |  |
| 0      | 0    |         |            |             | GM   | [Diagonal hatching pattern] | SILTY GRAVEL, brown, fine to coarse, poorly graded, dense, some gravel; trace sand.  |                                |                 |    |     |     |     |     |     |    |    |    |                |    | 83 | 16 | 1 |  |  |  |  |
| 3      | 10   |         |            |             | GP   | [Dotted pattern]            | SANDY GRAVEL, light brown, fine to coarse, poorly to well graded, loose to very dense, subangular to subrounded; little to some fine to coarse sand. |                                |                 |    |     |     |     |     |     |    |    |    |                |    |    |    |   |  |  |  |  |
| 6      | 20   |         |            |             |      | [Mixed hatching pattern]    |  |                                |                 |    |     |     |     |     |     |    |    |    |                |    |    |    |   |  |  |  |  |
| 9      | 30   |         |            |             |      | [Mixed hatching pattern]    |  |                                |                 |    |     |     |     |     |     |    |    |    |                |    |    |    |   |  |  |  |  |
| 12     | 40   |         |            |             |      | [Mixed hatching pattern]    |  |                                |                 |    |     |     |     |     |     |    |    |    |                |    |    |    |   |  |  |  |  |
| 15     | 50   |         |            |             | GM   | [Mixed hatching pattern]    |  |                                |                 |    |     |     |     |     |     |    |    |    |                |    |    |    |   |  |  |  |  |
| 18     | 60   |         |            |             |      | [Mixed hatching pattern]    |  | began rotary drilling at 60.0' |                 |    |     |     |     |     |     |    |    |    |                |    |    |    |   |  |  |  |  |

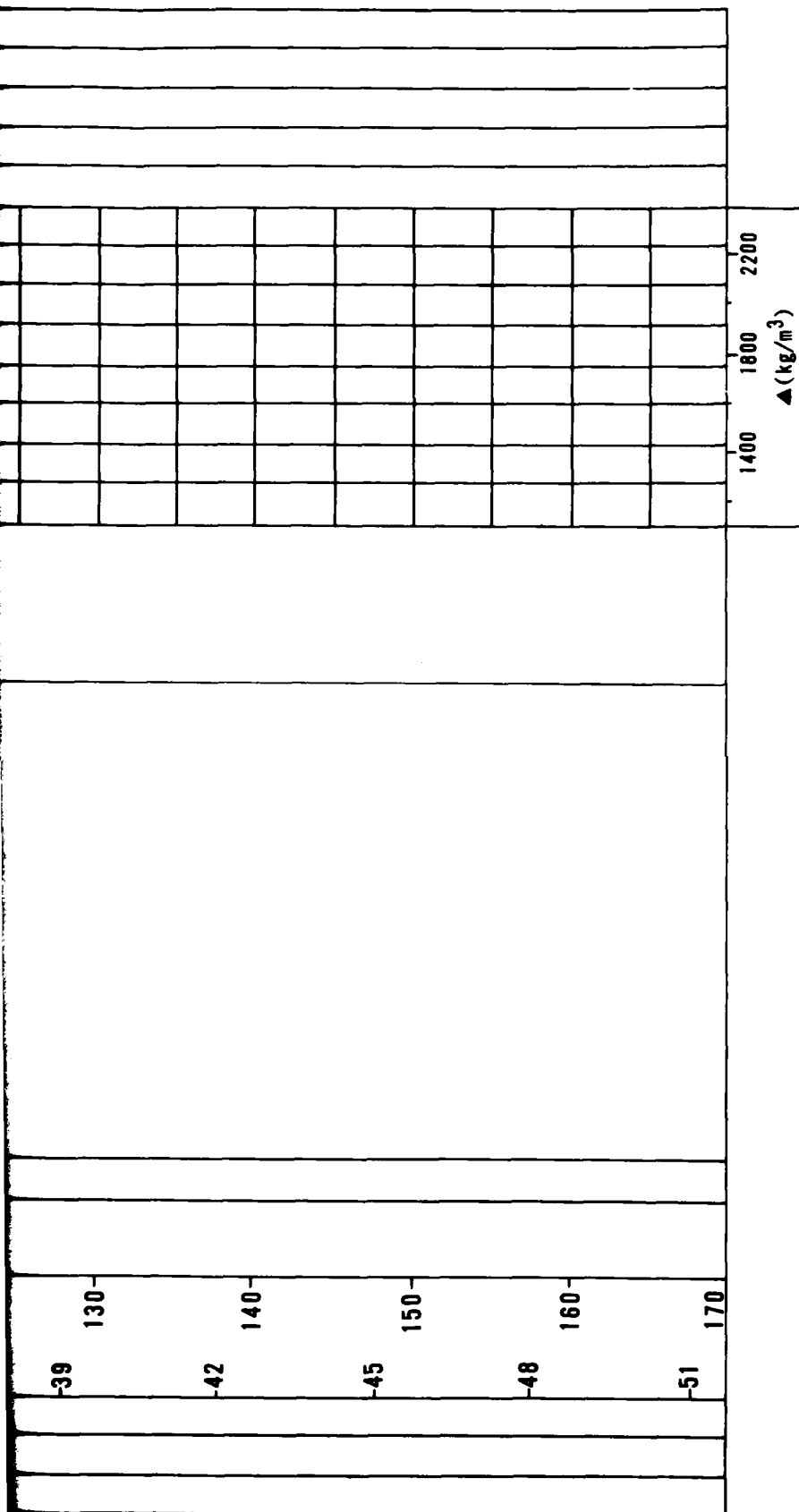
74 22 4

began  
rotary  
drilling  
at  
60 0'

TOTAL DEPTH 87.0' (26.5m)

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





**EXPLANATION**

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

**BORING DETAILS**

- ELEVATION : 5480 (1670m)
- SURFICIAL GEOLOGIC UNIT : A5y
- DATE DRILLED : 23-24 July 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

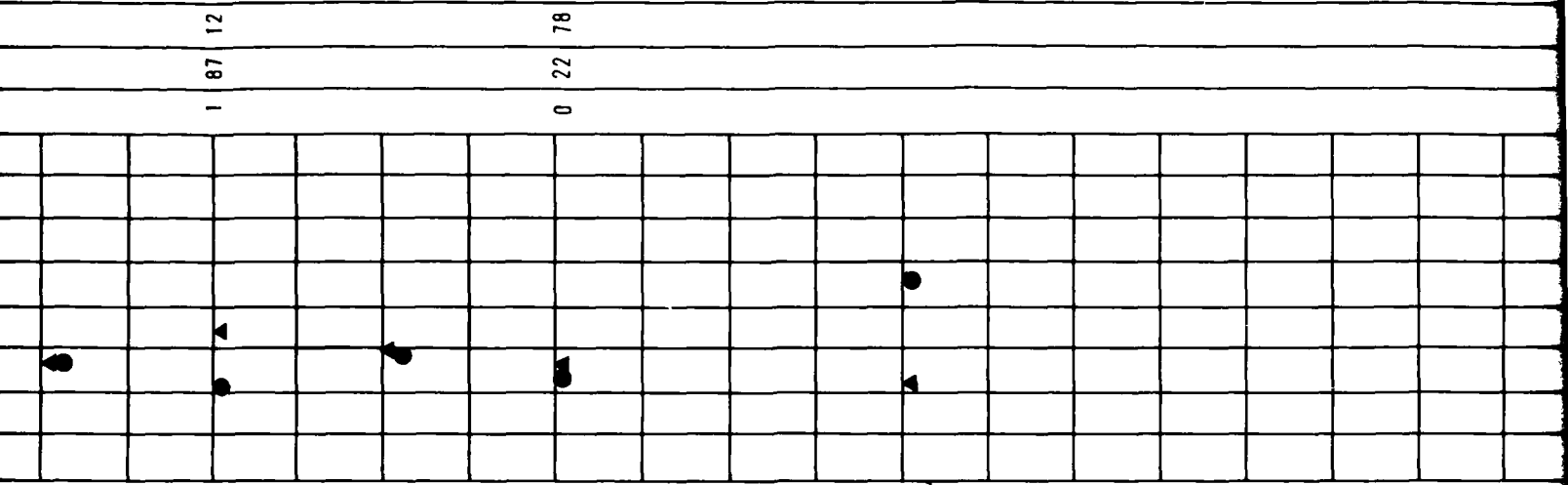
LOG OF BORING RV-8-4  
 RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - BMD

FIGURE  
 II-4-4

**FUGRO NATIONAL, INC.**





SAND, brown, fine to medium, poorly graded, dense to very dense, angular to subrounded; trace nonplastic silt

SP-  
SM

SANDY SILT, brown, hard, non-plastic; some fine sand.

ML

SILTY SAND, brown fine to coarse, poorly graded, dense; trace gravel.

SM

TOTAL DEPTH 101.3' (30.9m)

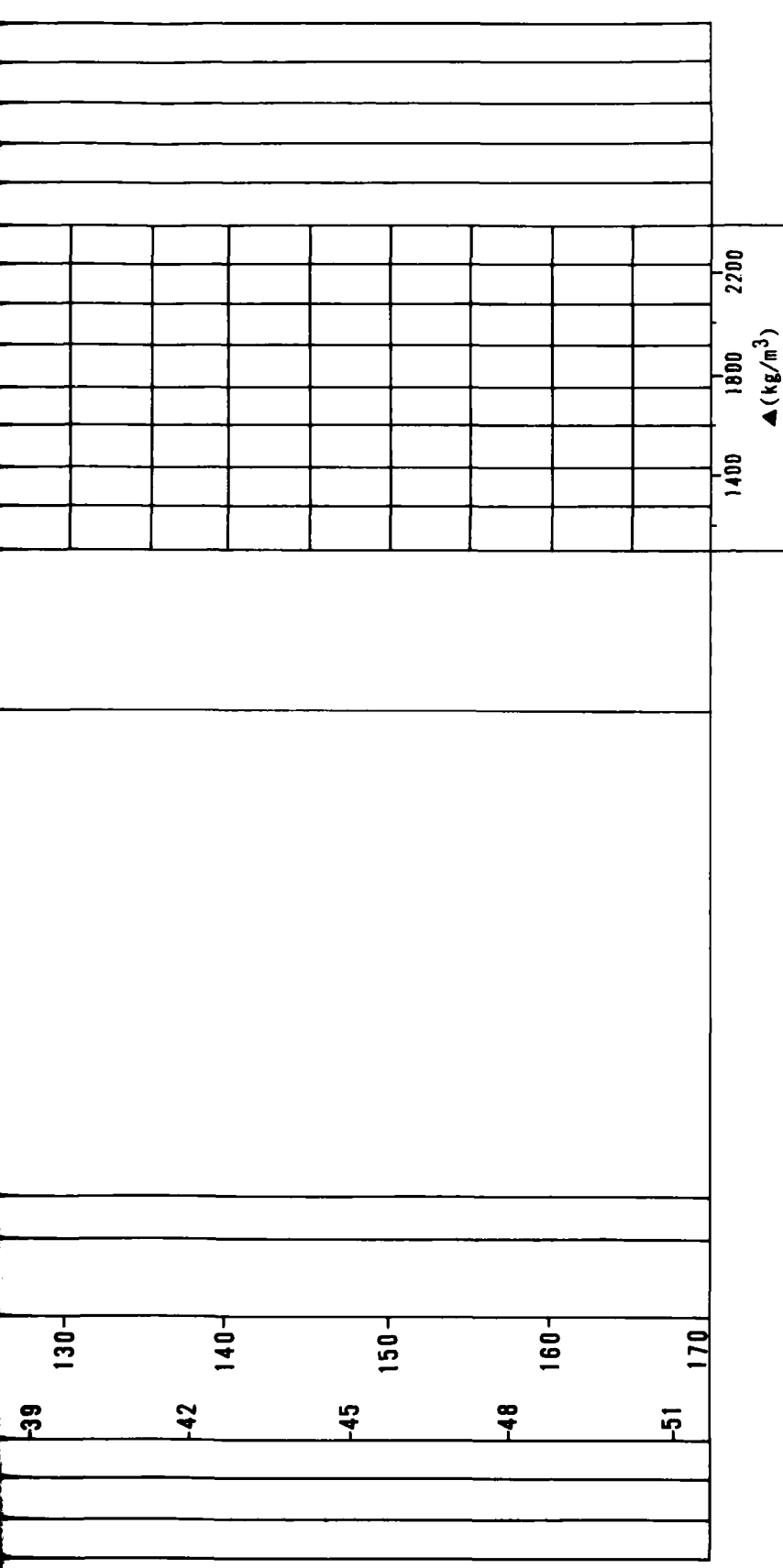
50  
60  
70  
80  
90  
100  
110  
120  
130

15 18 21 24 27 30 33 36 39 42

80 85 93 90 87

2

7



**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

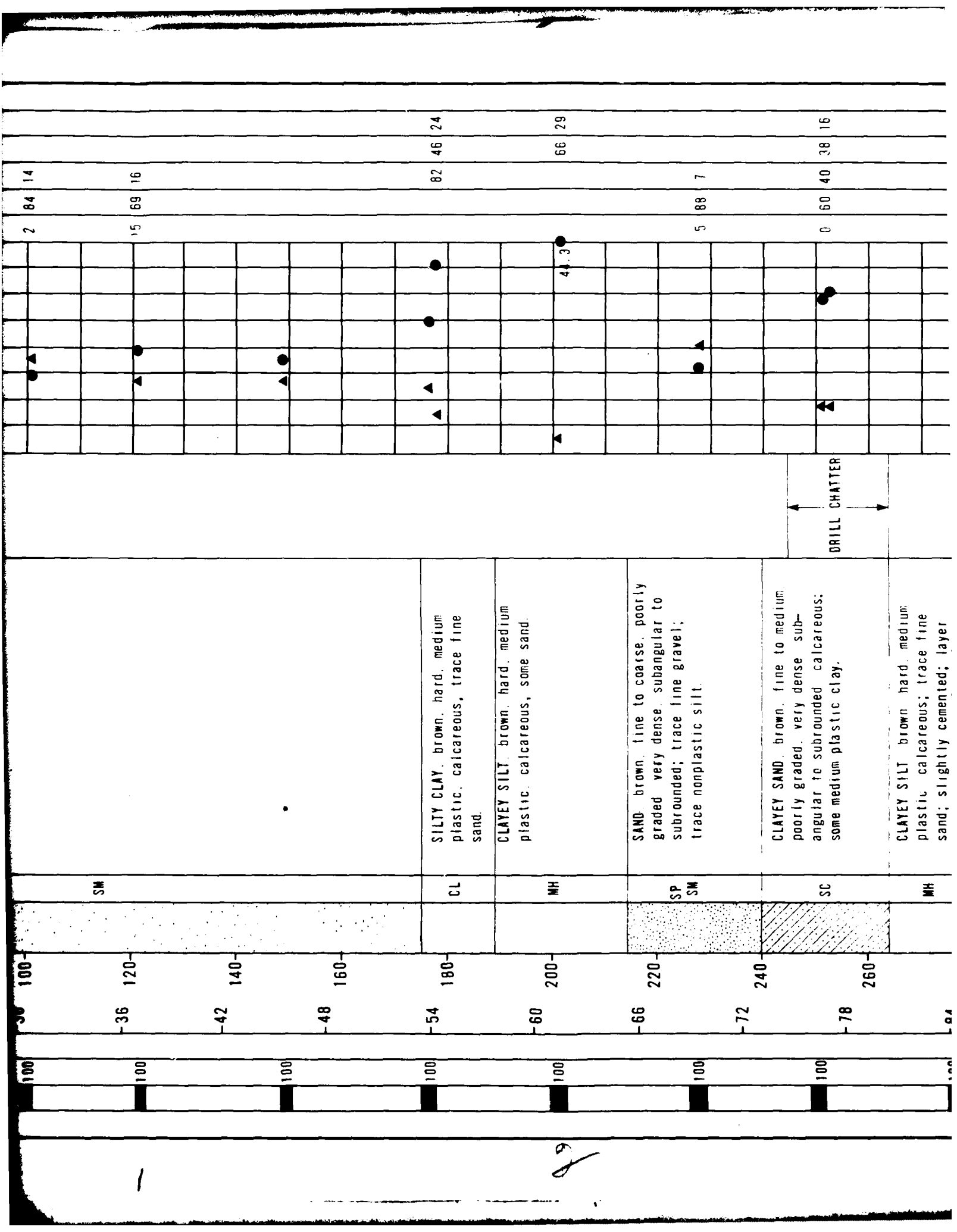
**BORING DETAILS**

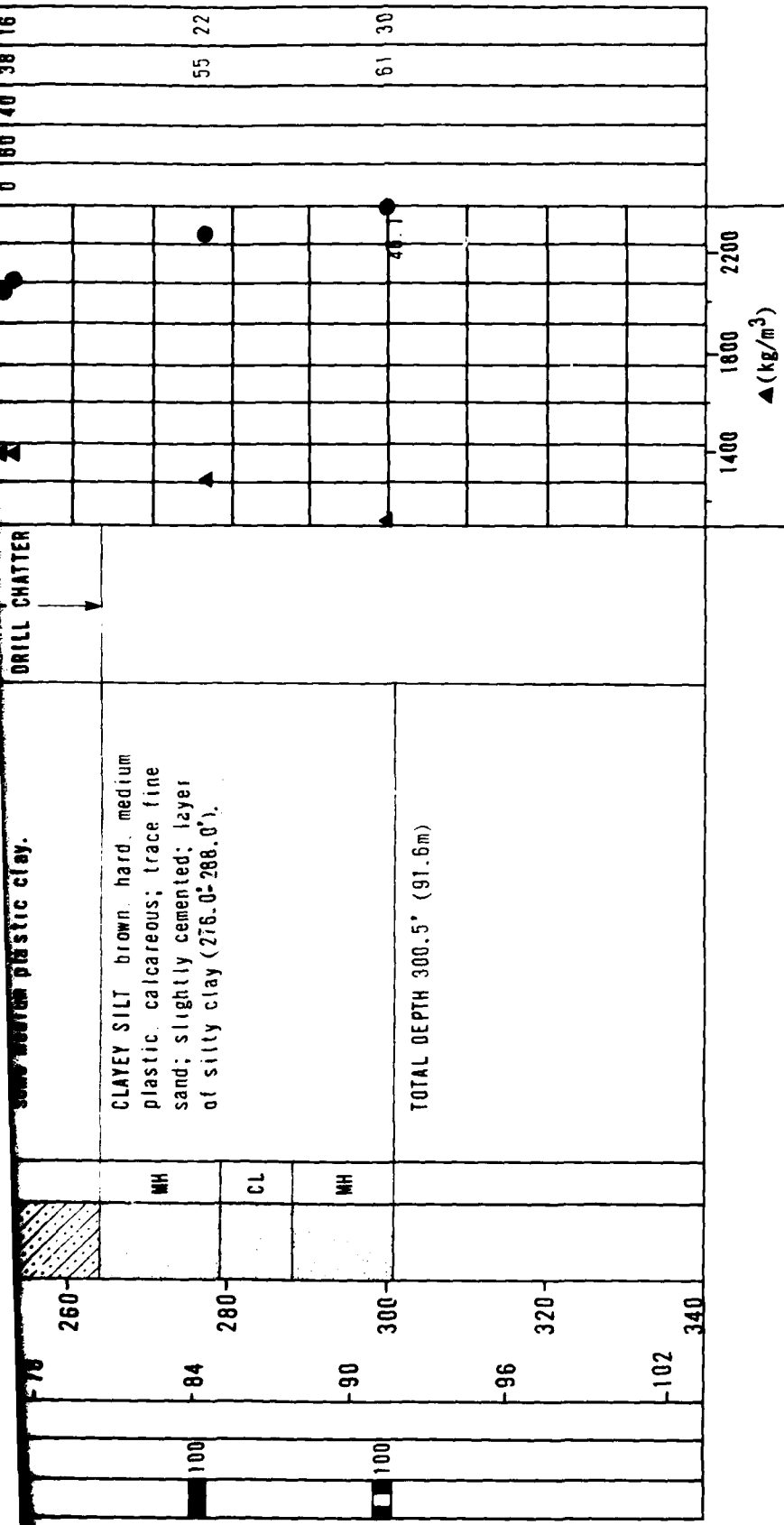
ELEVATION : 5220' (1591m)  
 SURFICIAL GEOLOGIC UNIT : A5y A4  
 DATE DRILLED : 15 August 1977  
 DRILLING METHOD : Rotary Wash  
 HOLE DIAMETER : 4 7/8" (124mm)  
 WATER LEVEL : Not Encountered

|  |                  |
|--|------------------|
| LOG OF BORING RV-B-5<br>RALSTON VALLEY, NEVADA             |                  |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE BMO | FIGURE<br>II-4-5 |
| <b>FUGRO NATIONAL, INC.</b>                                |                  |

CH. BY APPROVED BY

| 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 |
| 100         | 100        | 0       | 0            | 0          | ML        | ML   | SILTY SAND, light gray, fine to medium, poorly graded, dense to very dense, angular to subangular calcareous; little to some nonplastic silt, trace to little fine gravel layers of sandy silt (0.0'-2.0') and layers of gravelly sand (60.0'-62.0'); layer of gravelly sand (19.0'-22.0'). |         | 0      | 37 | 63  | NP  |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 0            | 0          | SM        | SM   |   |         |        | 0  | 63  | 37  |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 6            | 20         | SP        | SP   |   |         | 0      | 70 | 30  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 12           | 40         | SM        | SM   |   |         | 18     | 78 | 4   | 36  | 11  |     |                |    |    |    |    |
| 100         | 100        | 0       | 18           | 60         | ML        | ML   |   |         | 2      | 60 | 38  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 24           | 80         | ML        | ML   |   |         | 0      | 82 | 18  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 30           | 100        | SM        | SM   |   |         | 0      | 52 | 48  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 30           | 100        | SM        | SM   |   |         | 0      | 44 | 56  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 30           | 100        | SM        | SM   |   |         | 1      | 56 | 43  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 30           | 100        | SM        | SM   |   |         | 2      | 85 | 13  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 30           | 100        | SM        | SM   |   |         | 0      | 57 | 43  |     |     |     |                |    |    |    |    |
| 100         | 100        | 0       | 30           | 100        | SM        | SM   |   |         | 2      | 84 | 14  |     |     |     |                |    |    |    |    |





**EXPLANATION**

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

**BORING DETAILS**

- ELEVATION : 5180' (1579m)
- SURFICIAL GEOLOGIC UNIT : A4
- DATE DRILLED : 19-20 August 1979
- DRILLING METHOD : Rotary Wash
- HOLE DIAMETER : 4 7/8" (124mm)
- WATER LEVEL : Not Encountered

**LOG OF BORING RV-B-6  
RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE  
**II-4-6**

**FUGRO NATIONAL, INC.**

CHG BY AP 0 BY

| SAMPLE TYPE | % RECOVERY | N VALUE | METERS | FEET | LITHOLOGY | USCS  | SOIL DESCRIPTION   | REMARKS               | ▲ (pcf) |    |     |     | ● (%) |     |     |   | SIEVE ANALYSIS |    |    |    |    |    |    |    |    |    |    |
|-------------|------------|---------|--------|------|-----------|-------|--|-----------------------|---------|----|-----|-----|-------|-----|-----|---|----------------|----|----|----|----|----|----|----|----|----|----|
|             |            |         |        |      |           |       |  |                       | 80      | 90 | 100 | 110 | 120   | 130 | 140 | 5 | 10             | 15 | 20 | 25 | 30 | 35 | GR | SA | FI | LL | PI |
|             | 100        |         | 0      | 0    | SW-SM     | SW-SM | SAND, light gray, fine to coarse, well graded, dense, subangular to subrounded, calcareous; trace silt.  | ROTARY AIR            |         |    |     |     |       |     |     |   |                | 4  | 86 | 10 |    |    |    |    |    |    |    |
|             | 100        | 75      | 3      | 10   |           | SM    | Interbedded layers of SILTY SAND and SANDY SILT;   | CHANGE TO ROTARY WASH |         |    |     |     |       |     |     |   | 11             | 66 | 23 |    |    |    |    |    |    |    |    |
|             | 100        |         | 6      | 20   | ML        | ML    | SILTY SAND, light gray, fine to coarse, poorly graded, dense, subangular to subrounded, calcareous; some nonplastic silt; trace fine subangular to subrounded gravel.        |                       |         |    |     |     |       |     |     |   |                |    |    |    |    |    |    | 04 | 27 | 5  |    |
|             | 100        |         | 9      | 30   |           | SM    | SANDY SILT, light gray, hard, nonplastic to slightly plastic, calcareous; some fine to medium sand   |                       |         |    |     |     |       |     |     |   | 3              | 72 | 25 |    |    |    |    |    |    | NP |    |
|             | 100        |         | 12     | 40   |           | ML    | GRAVELLY SAND, light gray, fine to coarse, poorly graded, very dense, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded gravel; trace silt. |                       |         |    |     |     |       |     |     |   | 0              | 48 | 52 |    |    |    |    |    |    | NP |    |
|             | 87         |         | 15     | 50   |           | SP-SM |  |                       |         |    |     |     |       |     |     |   |                |    |    |    |    |    |    |    |    |    |    |
|             | 100        |         | 18     | 60   |           |       |  |                       |         |    |     |     |       |     |     |   |                |    |    |    |    |    |    |    |    |    |    |



100

100

100

64

106

-18

-21

-24

-27

-30

-33

-36

-39

-42

60

70

80

90

100

110

120

130

140

ML

SP

CL

SANDY SILT. light gray, brown.  
hard nonplastic, calcareous;  
some fine to medium sand.

GRAVELLY SAND. light gray brown  
fine to coarse, poorly graded,  
very dense, subangular to sub-  
rounded; little fine subangular  
to subrounded gravel.

SANDY CLAY. light gray brown, hard,  
slightly plastic, calcareous;  
little fine to medium sand.

TOTAL DEPTH 100 2' (30 5m)

0 50 50

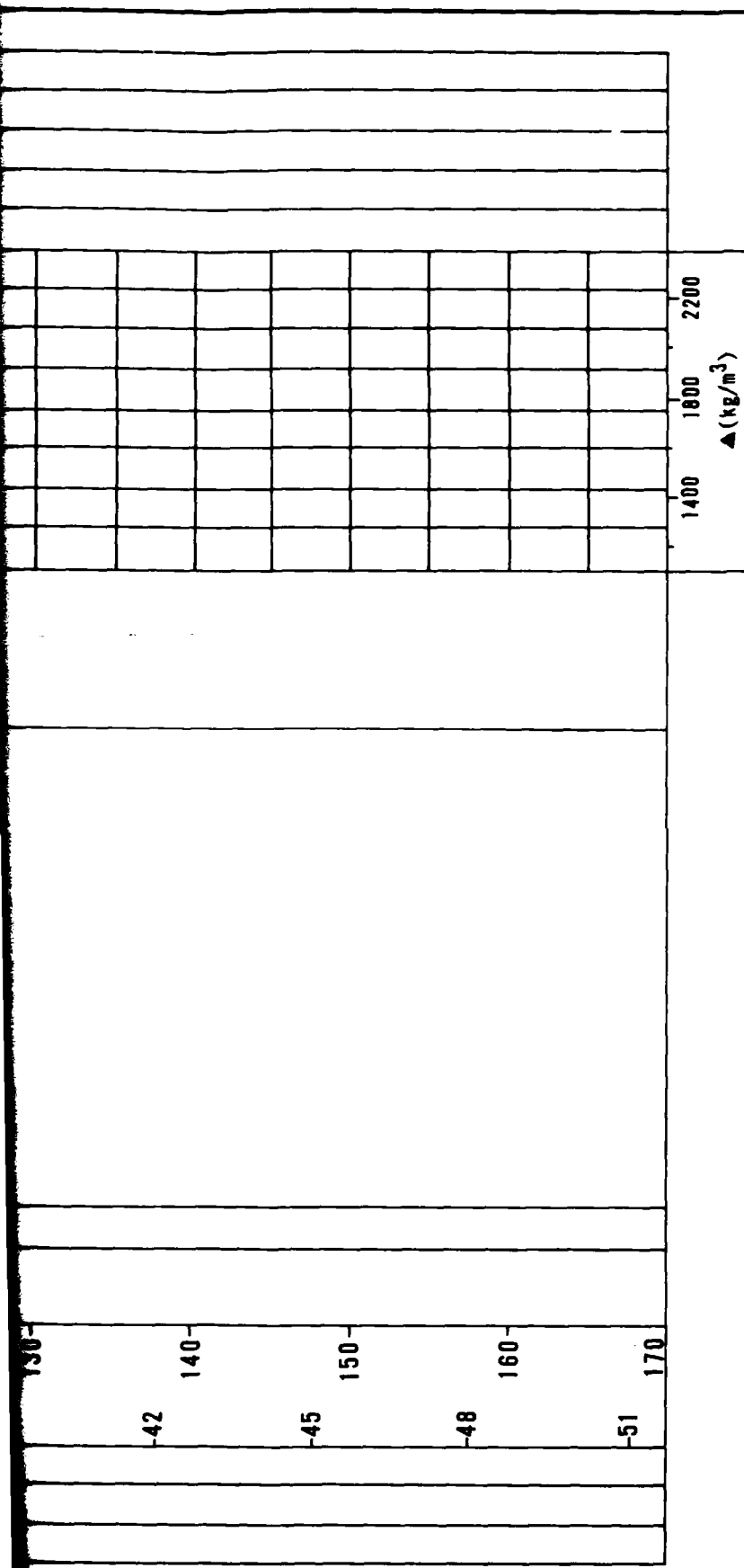
17 80 3

0 14 86

NP

NP

2



**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 : 5240' (1597m)
- SURFICIAL GEOLOGIC UNIT : A5y A4
- DATE DRILLED : 17-18 August 1977
- DRILLING METHOD : Rotary Air Wash
- HOLE DIAMETER : 4 7/8" (124mm)
- WATER LEVEL : Not Encountered

|  |                         |
|--|-------------------------|
| LOG OF BORING RV-B-7<br>RALSTON VALLEY, NEVADA               |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - BMO | FIGURE<br><b>II-4-7</b> |
| <b>FUGRO NATIONAL, INC.</b>                                  |                         |

CHECKED BY APPROVED BY

| 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          |           | SP<br>SM | GRAVELLY SAND, light gray brown, fine to coarse, poorly to well graded very dense, subangular to subrounded, calcareous; some fine to coarse subrounded to subangular gravel; trace silt; little slightly plastic clay; layer of clayey sand (20.0'-24.0'). | gravel to 2"  | ●      |    |     |     |     |     |     |    |    |    | 33             | 59 | 8  |    |    |
|             | 100        |         | 6            | 20         |           | SW<br>SM |   |               | ●      | ▲  |     |     |     |     |     |    |    |    | 31             | 57 | 12 |    |    |
|             | 100        |         | 12           | 40         |           | SC       |   |               | ●      | ▲  |     |     |     |     |     |    |    |    | 11             | 71 | 18 |    |    |
|             | 100        |         | 18           | 60         |           | GW<br>GM | SANDY GRAVEL light gray brown, fine to coarse well graded, very dense, subangular to subrounded; some fine to coarse sand; trace silt.  |               | ●      | ▲  |     |     |     |     |     |    |    |    | 23             | 62 | 15 | 35 | 20 |
|             | 100        |         | 24           | 80         |           | SW<br>SM | GRAVELLY SAND light gray brown, fine to coarse well graded very dense, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded gravel; trace nonplastic silt.  | drill chatter | ●      | ▲  |     |     |     |     |     |    |    |    | 47             | 46 | 7  |    |    |
|             | 100        |         | 30           | 100        |           |          |   |               | ●      | ▲  |     |     |     |     |     |    |    |    | 37             | 54 | 9  |    |    |
|             | 100        |         | 36           | 120        |           | SM       | SILTY SAND, light gray brown, fine to medium, poorly graded, very dense, subangular to sub-rounded, calcareous; little silt.  |               | ●      | ▲  |     |     |     |     |     |    |    |    | 1              | 79 | 20 |    |    |

SILTY SAND, light gray brown, fine to medium, poorly graded, very dense, subangular to subrounded, calcareous; little silt

SM

1 79 20

SANDY SILT, light gray brown, hard, slightly plastic, calcareous; some fine to medium sand.

ML

0 45 55 26 4

GRAVELLY SAND, light gray brown, fine to medium, poorly graded, very dense, subangular to subrounded; some fine subangular to subrounded gravel.

SP

●

SANDY SILT, light gray brown, hard, slightly plastic; some fine sand.

ML

0 37 63

SILTY SAND, light gray brown, fine to medium, poorly graded, very dense, subangular to subrounded; some nonplastic silt.

SM

1 77 22

3 52 45

NP

36 120

100

42 140

100

48 160

54 180

100

60 200

100

66 220

100

72 240

78 260

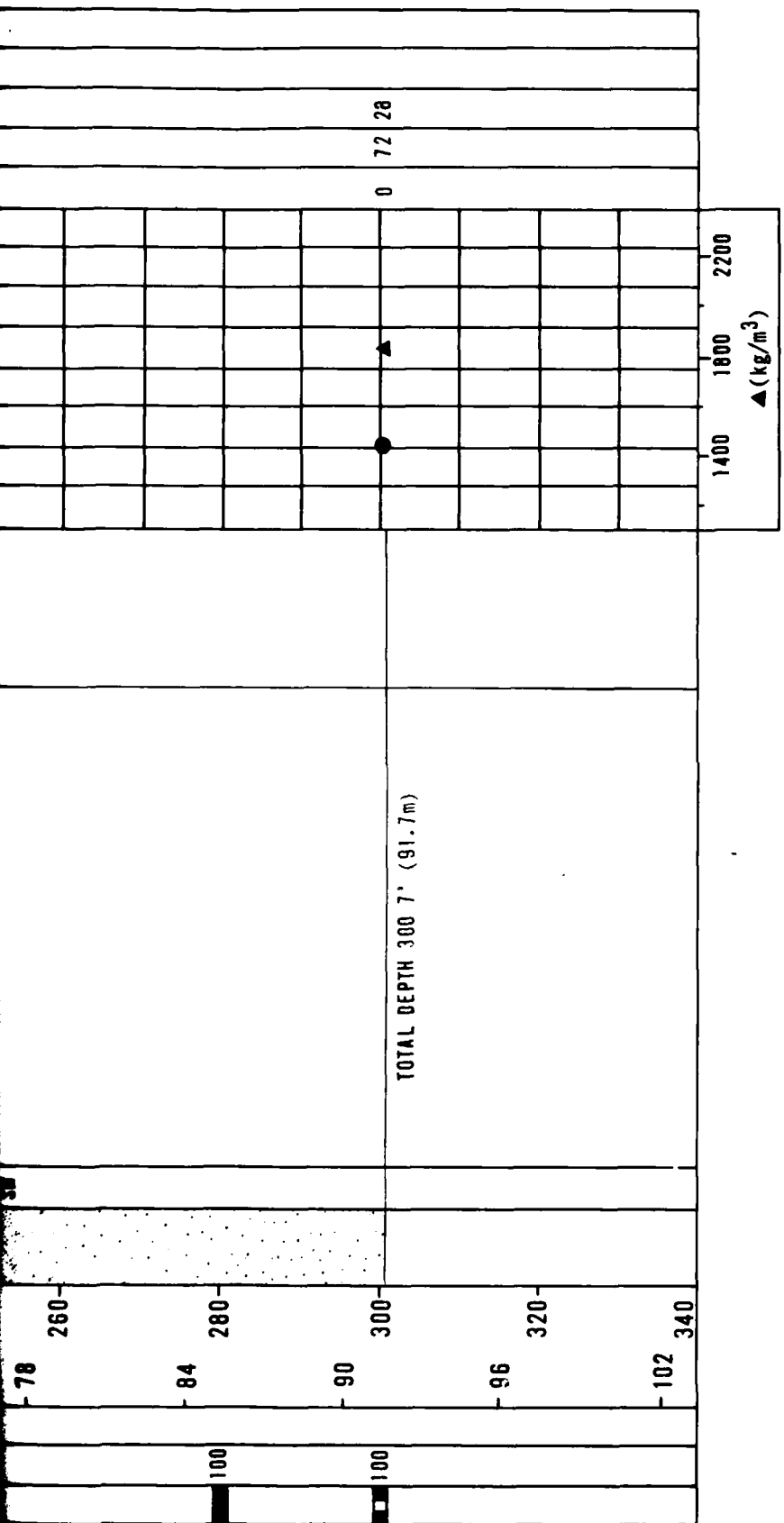
100

84 280

100

Handwritten mark resembling a stylized '2' or 'S'

Handwritten mark resembling a stylized '3'



**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 : 5335' (1626m)
- SURFICIAL GEOLOGIC UNIT : A5y
- DATE DRILLED : 15-16 August 1977
- DRILLING METHOD : Rotary Wash
- HOLE DIAMETER : 4 7/8" (124mm)
- WATER LEVEL : Not Encountered

|  |                         |
|--|-------------------------|
| <b>LOG OF BORING RV-8-8</b><br><b>RALSTON VALLEY, NEVADA</b> |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - BMO | FIGURE<br><b>II-4-8</b> |
| <b>FUGRO NATIONAL, INC.</b>                                  |                         |

CHECKED BY \_\_\_\_\_ APPR'D BY \_\_\_\_\_

| SAMPLE TYPE | % RECOVERY | N VALUE | DEPTH METERS | DEPTH FEET | LITHOLOGY | USCS  | SOIL DESCRIPTION   | REMARKS | ▲(pcf)<br>● (%) |    |    |    |    |    |    |     | SIEVE ANALYSIS |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|-------------|------------|---------|--------------|------------|-----------|-------|--|---------|-----------------|----|----|----|----|----|----|-----|----------------|-----|-----|-----|----|----|----|----|----|--|--|--|--|--|--|
|             |            |         |              |            |           |       |  |         | 5               | 10 | 15 | 20 | 25 | 30 | 35 | 140 | 130            | 120 | 110 | 100 | GR | SA | FI | LL | PI |  |  |  |  |  |  |
|             | 67         | 31      | 0            | 0          |           | SM    | SILTY SAND, brown, fine to coarse, poorly graded, dense to very dense, subangular, calcareous; some silt; little fine subangular gravel. |         |                 |    |    |    |    |    |    |     |                |     |     |     |    | 15 | 62 | 23 |    |  |  |  |  |  |  |
|             | 40         | 100     | 3            | 10         |           |       |  |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 63         |         |              |            |           | SP-SC | SAND, light brown to brown, fine to coarse, poorly graded, very dense; trace slightly plastic clay.                                      |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 67         | 100     | 6            | 20         |           | CL    | SANDY CLAY, brown, hard, slightly plastic, little fine sand.   |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 43         | 100     |              |            |           |       | SAND brown fine to coarse poorly graded dense subangular; trace silt; trace fine gravel.   |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 90         |         | 9            | 30         |           | SP-SM |  |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 100        | 100     | 12           | 40         |           |       |  |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 75         |         | 15           | 50         |           | CL    | SANDY CLAY brown stiff slightly plastic, some fine to coarse sand.   |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |
|             | 38         | 100     | 18           | 60         |           |       | GRAVELLY SAND brown fine to coarse, poorly graded dense to very dense, subangular.   |         |                 |    |    |    |    |    |    |     |                |     |     |     |    |    |    |    |    |  |  |  |  |  |  |

1 46 53

15 79 6

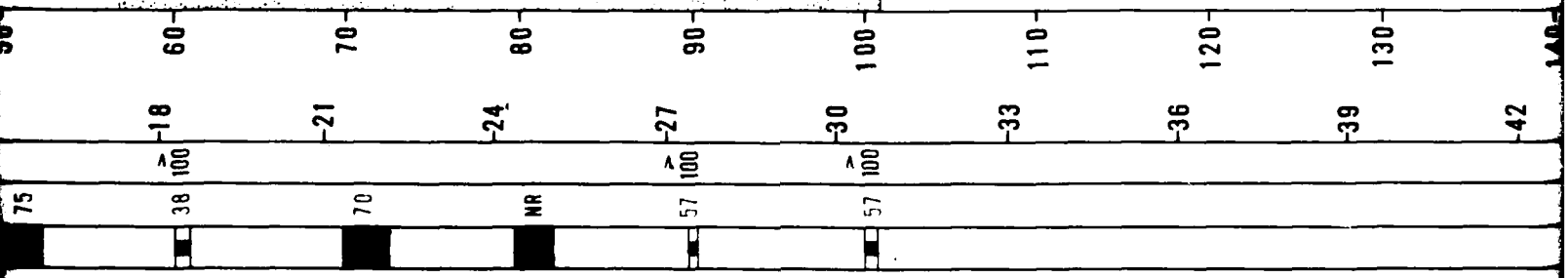
25 69 6

GRAVELLY SAND brown fine to coarse poorly graded dense to very dense angular to sub-angular; little fine subrounded gravel; trace silt.

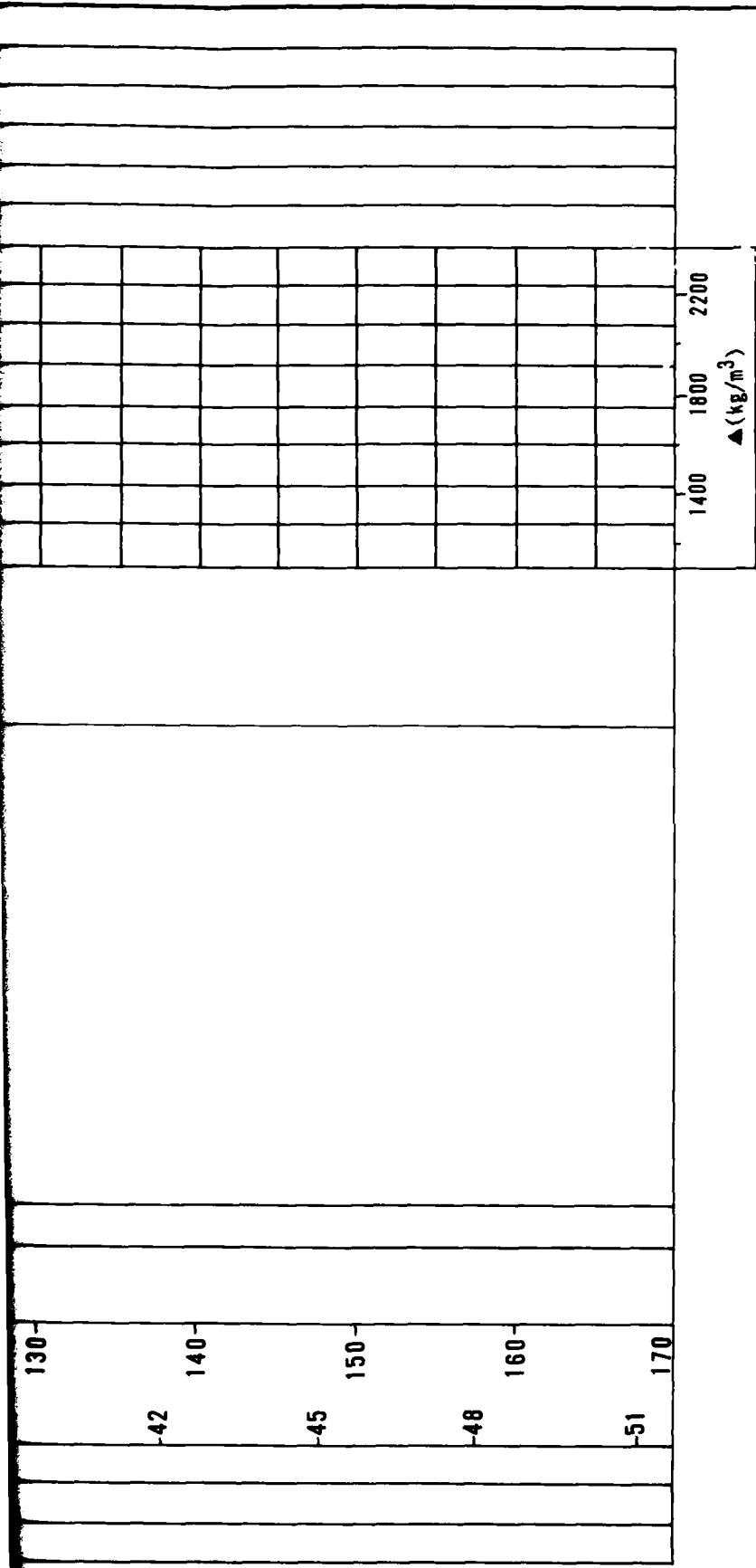
TOTAL DEPTH 100 7' (30 7m)

CL

SP-SM



29



**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 : 5285' (1611m)  
 SURFICIAL GEOLOGIC UNIT : A5y A4  
 DATE DRILLED : 16 August 1977  
 DRILLING METHOD : Rotary Wash  
 HOLE DIAMETER : 4 7/8" (124mm)  
 WATER LEVEL : Not Encountered

LOG OF BORING RV-8-9  
 RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - BMD

FIGURE  
 II-4-9

**FUGRO NATIONAL, INC.**



CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

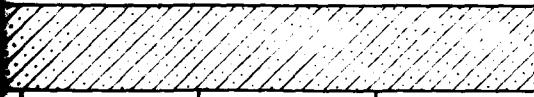
| SAMPLE TYPE | % RECOVERY | N VALUE | DEPTH  |      | LITHOLOGY | USCS | SOIL DESCRIPTION  | REMARKS | ▲(pcf) |    | ●(%) |     | SIEVE ANALYSIS |     |     |    |    |    |    |
|-------------|------------|---------|--------|------|-----------|------|---|---------|--------|----|------|-----|----------------|-----|-----|----|----|----|----|
|             |            |         | METERS | FEET |           |      |   |         | 80     | 90 | 100  | 110 | 120            | 130 | 140 | GR | SA | FI | LL |
|             |            |         | 0      | 0    |           |      |   |         |        |    |      |     |                |     |     |    |    |    |    |
|             |            |         | 3      | 10   |           |      | GRAVELLY SAND, brown, fine to coarse, poorly graded, medium dense to dense subangular, calcareous; little fine sub-angular gravel; trace nonplastic silt. |         |        |    |      |     |                |     |     |    |    |    |    |
|             |            |         | 6      | 20   |           | SM   |   |         |        |    |      |     |                |     |     |    |    |    |    |
|             |            |         | 9      | 30   |           |      |   |         |        |    |      |     |                |     |     |    |    |    |    |
|             |            |         | 12     | 40   |           |      |   |         |        |    |      |     |                |     |     |    |    |    |    |
|             |            |         | 15     | 50   |           |      | CLAYEY SAND brown, fine to coarse poorly graded very dense, sub-rounded calcareous; some slightly plastic clay; trace fine gravel.                        |         |        |    |      |     |                |     |     |    |    |    |    |
|             | 47         | 100     |        |      |           |      |   |         |        |    |      |     |                |     |     |    |    |    |    |

cobble

19 59 12

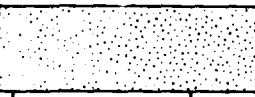
rounded, calcareous; some slightly plastic clay; trace fine gravel.

SC



GRAVELLY SAND, gray fine to coarse, poorly graded, very dense, angular, calcareous; some fine to coarse angular gravel; little nonplastic silt.

SP SM

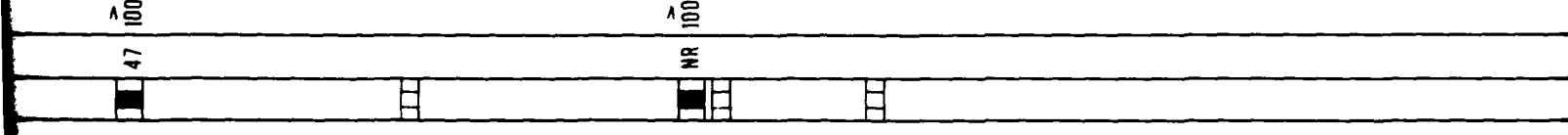
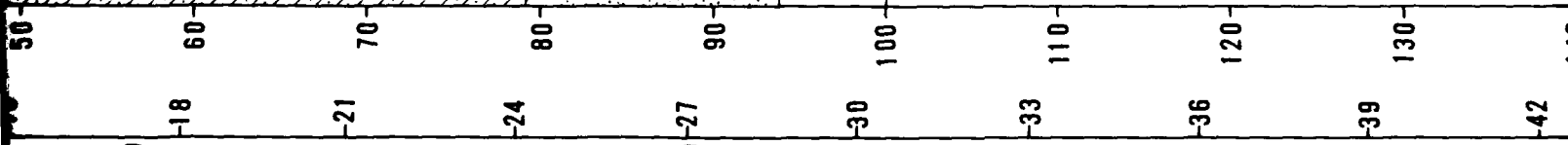


SILTY SAND, light brown, fine to coarse, poorly graded, very dense, angular, calcareous; trace fine gravel; little silt.

SM



TOTAL DEPTH 100 0' (30.5m)



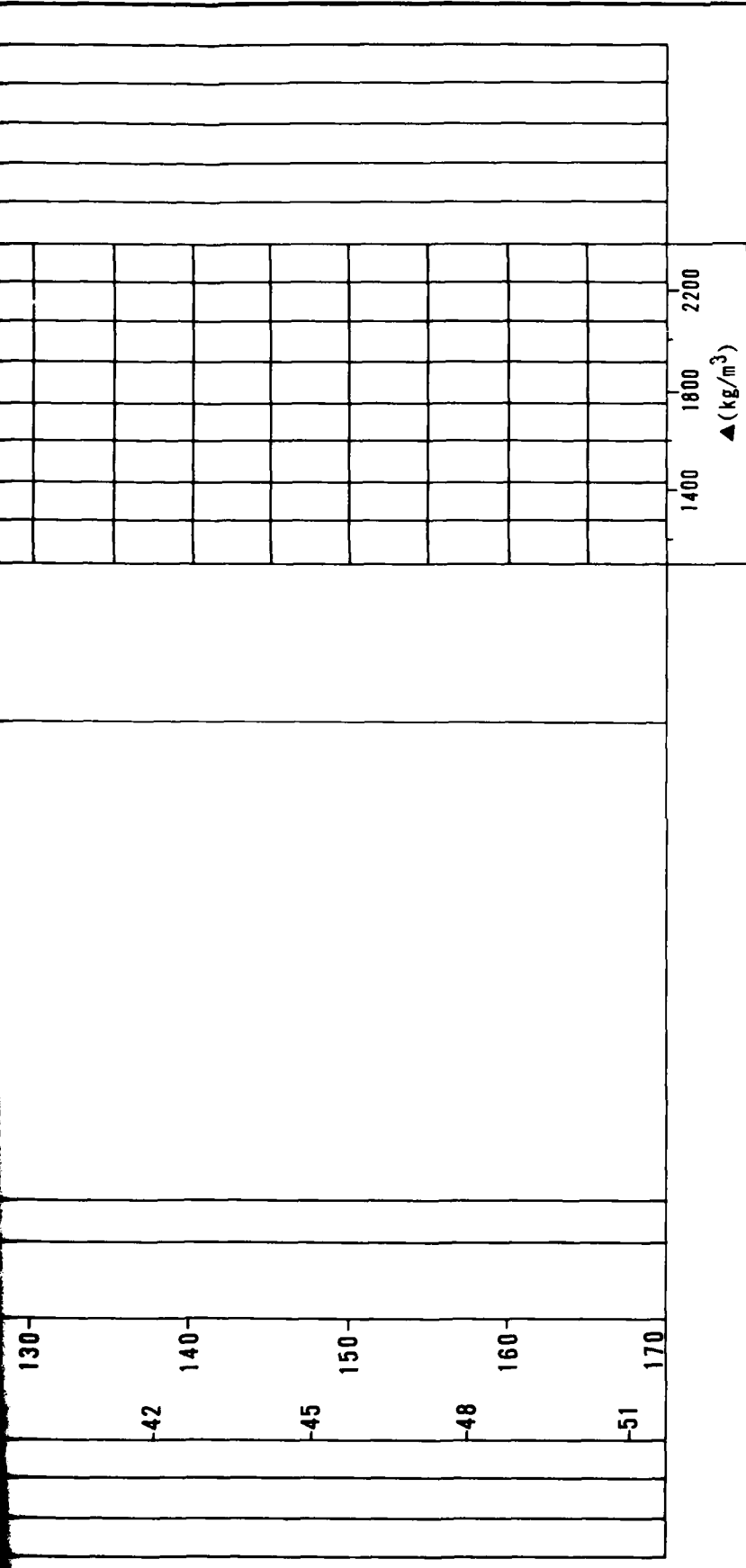
cobbles



30 64 6

11 72 17

Handwritten signature or mark.



**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 : 5560' (1695m)
- SURFICIAL GEOLOGIC UNIT : A5y
- DATE DRILLED : 3-6 August 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

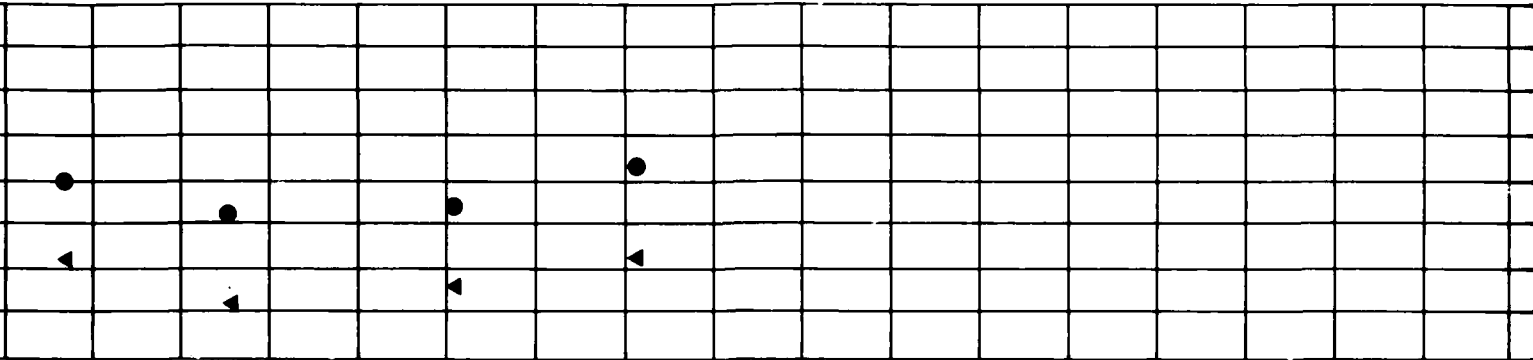
|  |                   |
|--|-------------------|
| LOG OF BORING RV-B-10<br>RALSTON VALLEY, NEVADA            |                   |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE BMO | FIGURE<br>II-4-10 |

**FUGRO NATIONAL, INC.**

CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

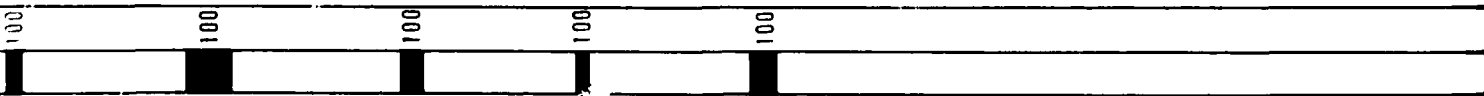
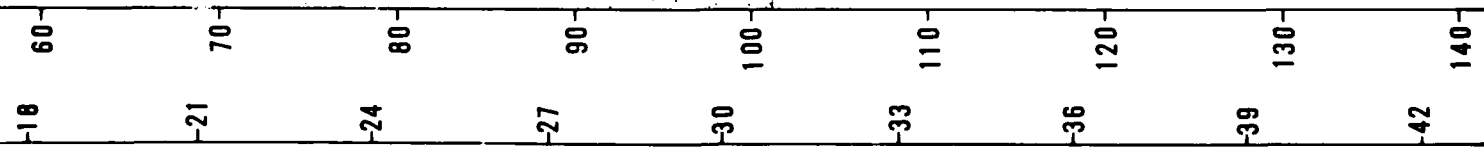
| SAMPLE TYPE | % RECOVERY | N VALUE | DEPTH<br>METERS<br>FEET | LITHOLOGY | USCS     | SOIL DESCRIPTION  | REMARKS  | ▲(pcf)<br>●(%) |    |     |     |     |     |     | SIEVE ANALYSIS |    |    |    |    |  |  |  |  |  |
|-------------|------------|---------|-------------------------|-----------|----------|---|--|----------------|----|-----|-----|-----|-----|-----|----------------|----|----|----|----|--|--|--|--|--|
|             |            |         |                         |           |          |   |  | 80             | 90 | 100 | 110 | 120 | 130 | 140 | GR             | SA | FI | LL | PI |  |  |  |  |  |
|             |            |         | 0                       |           |          | GRAVELLY SAND, light brown gray, fine to coarse, poorly to well graded, loose to very dense, sub-angular to subrounded, calcareous; some fine to coarse subangular gravel; trace to some silt, layer of sandy gravel (9 0-13.0'). | boulders to 24" size<br>boulder 6" size<br>drill chatter |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           | SM       |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         | 3                       | CP<br>GM  |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           | SW<br>SM | SILTY SAND, brown gray, fine to coarse poorly graded, very dense, calcareous; little to some silt, trace fine gravel; occasional cemented layers throughout   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         | 6                       |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         | 9                       |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         | 12                      |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         | 15                      |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |
|             | 100        |         |                         |           |          |   |  |                |    |     |     |     |     |     |                |    |    |    |    |  |  |  |  |  |

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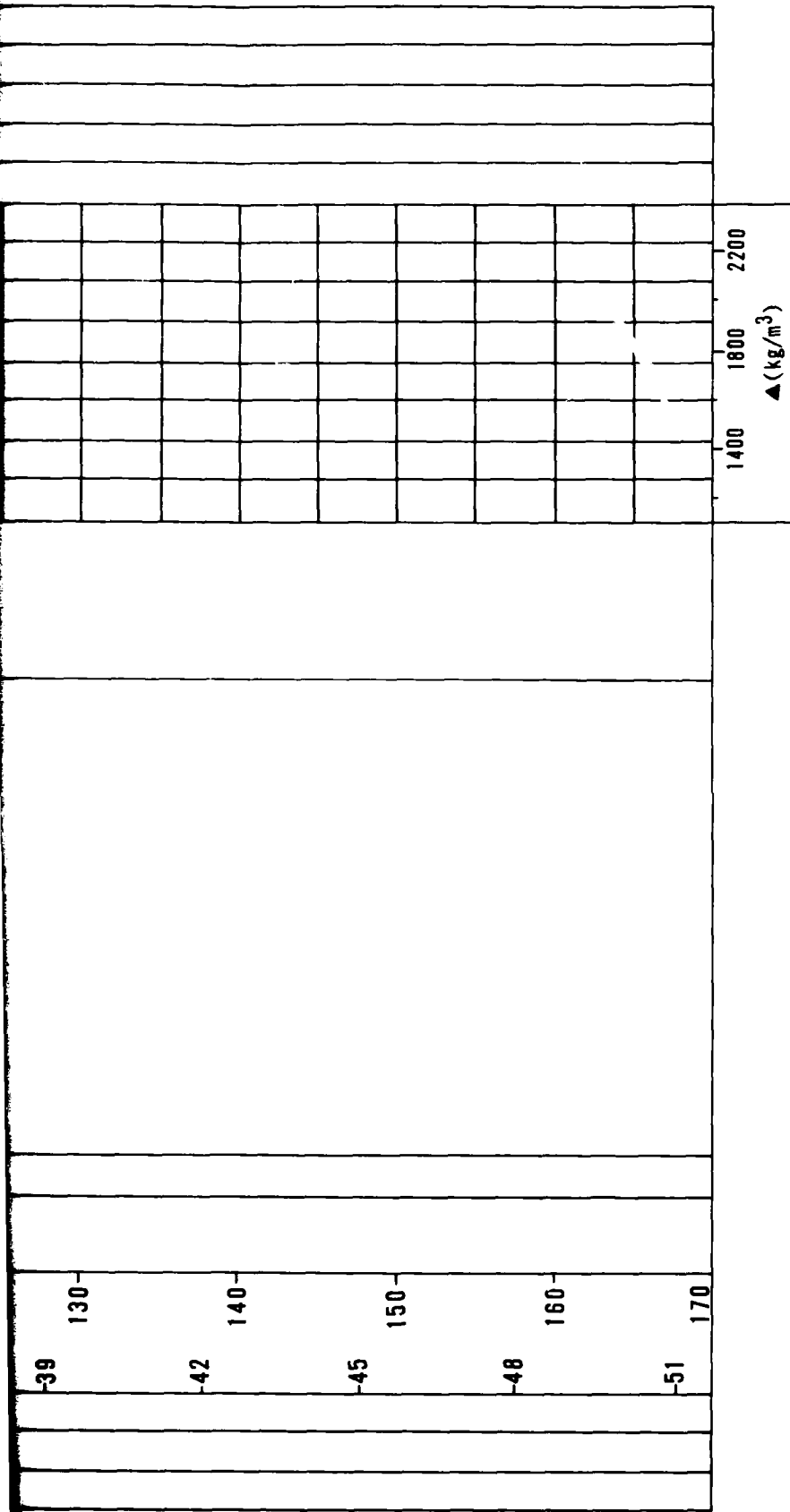


TOTAL DEPTH 101.3' (30.9m)

SM



12



**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**

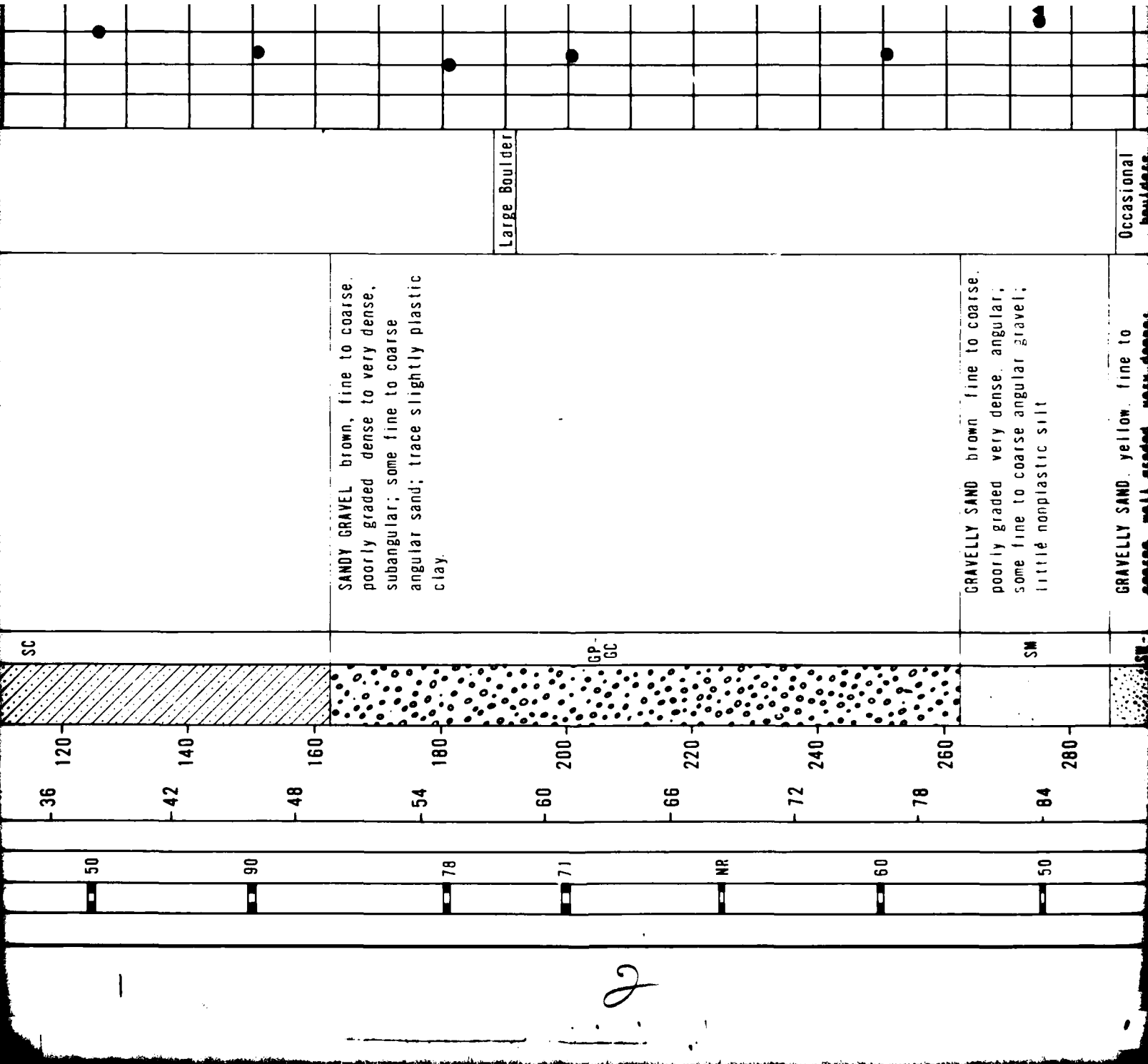
- ELEVATION : 5770' (1759m)
- SURFICIAL GEOLOGIC UNIT : A5i
- DATE DRILLED : 9 August 1977
- DRILLING METHOD : Rotary Wash
- HOLE DIAMETER : 4 7/8" (124mm)
- WATER LEVEL : Not Encountered

|  |                   |
|--|-------------------|
| LOG OF BORING RV-B-12<br>RALSTON VALLEY, NEVADA              |                   |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - BMO | FIGURE<br>II-4-11 |
| <b>FUGRO NATIONAL, INC.</b>                                  |                   |

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15 JUN 80

| SAMPLE TYPE | % RECOVERY | N VALUE | METERS | FEET | LITHOLOGY | USCS  | SOIL DESCRIPTION   | REMARKS | ▲(pcf) |    |     |     |     |     | SIEVE ANALYSIS |    |    |    |    |    |  |
|-------------|------------|---------|--------|------|-----------|-------|--|---------|--------|----|-----|-----|-----|-----|----------------|----|----|----|----|----|--|
|             |            |         |        |      |           |       |  |         | 80     | 90 | 100 | 110 | 120 | 130 | 140            | GR | SA | FI | LL | PI |  |
|             | 50         | 59      | 0      | 0    | SW-SC     | SW-SC | GRAVELLY SAND, brown, fine to coarse, well graded, medium dense to very dense, subrounded to subangular, some fine subrounded gravel; trace nonplastic silt.                   |         |        |    |     |     |     |     |                |    | 45 | 48 | 7  |    |  |
|             | 13         | >100    | 6      | 20   |           | ML    | SANDY GRAVEL, brown, fine to coarse, poorly graded, dense, subrounded; some fine to coarse subrounded sand; trace silt; layers of sandy silt. (24.0'-29.0') and (46.0'-56.0'). |         |        |    |     |     |     |     |                |    | 4  | 30 | 66 |    |  |
|             | 57         | >100    |        |      |           | GP-GM |  |         |        |    |     |     |     |     |                |    | 47 | 44 | 9  |    |  |
|             | 50         |         | -12    | 40   |           | ML    |  |         |        |    |     |     |     |     |                |    | 46 | 43 | 11 |    |  |
|             | 90         |         |        |      |           |       |  |         |        |    |     |     |     |     |                |    | 0  | 30 | 70 |    |  |
|             | 93         |         |        |      |           |       |  |         |        |    |     |     |     |     |                |    |    |    |    |    |  |
|             | 70         |         | -18    | 60   |           | SC    | CLAYEY SAND, brown, medium to coarse, poorly graded, dense, angular; little slightly plastic clay; layer of fine to coarse sandy gravel (65.0'-75.0')                          |         |        |    |     |     |     |     |                |    | 4  | 82 | 14 |    |  |
|             | 90         |         |        |      |           | SC    |  |         |        |    |     |     |     |     |                |    | 60 | 31 | 9  |    |  |
|             | 70         |         | -24    | 80   |           |       | GRAVELLY SAND, brown, fine to coarse, poorly graded, dense angular to subangular; some fine to coarse gravel, little slightly plastic clay.                                    |         |        |    |     |     |     |     |                |    | 35 | 52 | 13 |    |  |
|             | 80         |         |        |      |           |       |  |         |        |    |     |     |     |     |                |    |    |    |    |    |  |
|             | 70         |         | -30    | 100  |           |       |  |         |        |    |     |     |     |     |                |    | 31 | 56 | 13 |    |  |
|             | 50         |         | -36    | 120  |           |       |  |         |        |    |     |     |     |     |                |    | 36 | 47 | 17 |    |  |

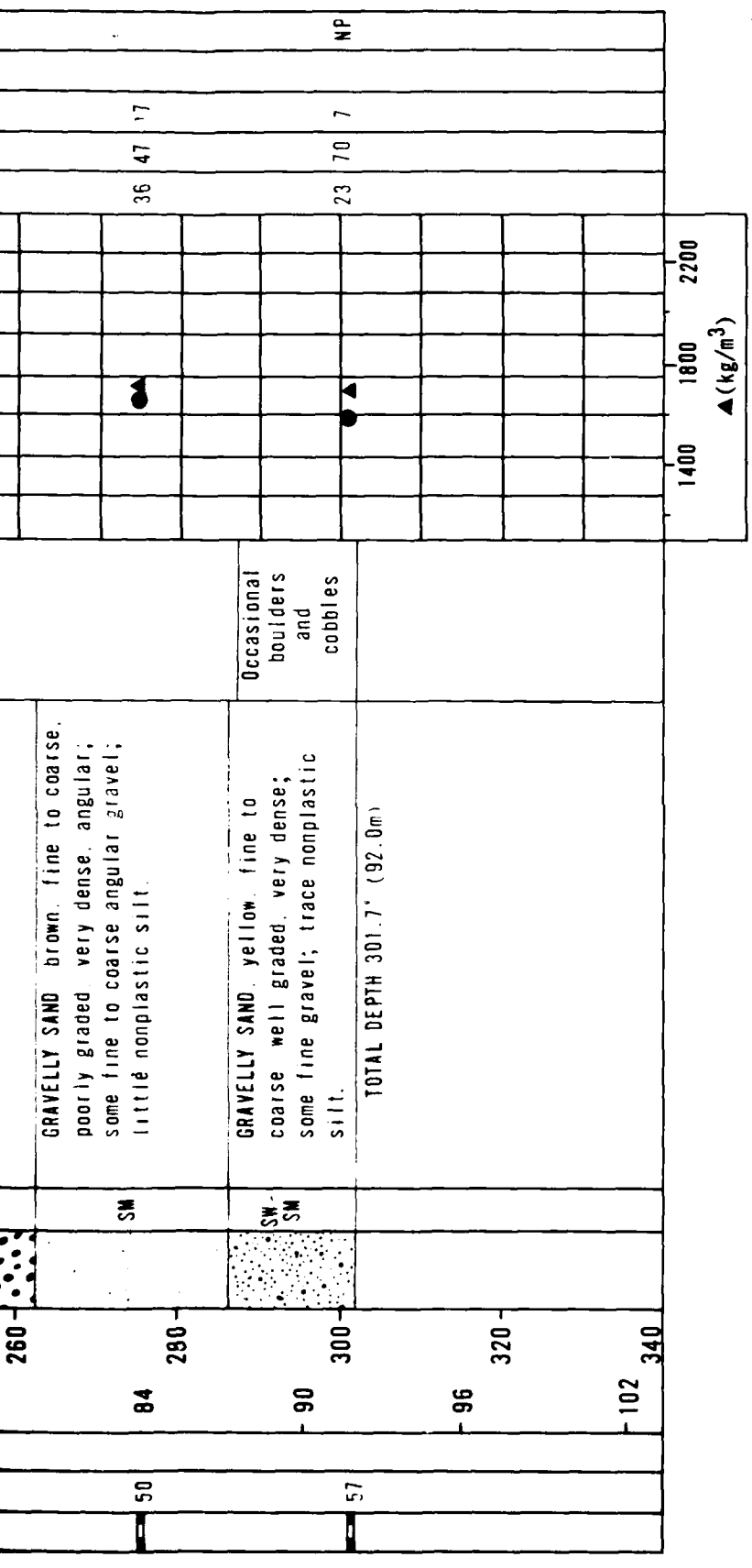


Large Boulder

Occasional boulders.

2





**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 : 5545' (1690m)  
 SURFICIAL GEOLOGIC UNIT : A5y  
 DATE DRILLED : 18-22 August 1977  
 DRILLING METHOD : Rotary Wash  
 HOLE DIAMETER : 4 7/8" (124mm)  
 WATER LEVEL : Not Encountered

LOG OF BORING RV-B-13  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE DMO

FIGURE  
**II-4-12**

**FUGRO NATIONAL, INC.**

CH 07

| 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             |  |  |  |    |    |   |  |
|             |            |         |              |            |           |          |  |                     | 5      | 10 | 15  | 20  | 25  | 30  | 35  | 5  | 10 | 20 | 30 | 40 | 60 |    |                |  |  |  |    |    |   |  |
|             |            |         | 0            | 0          |           | SW<br>SM | GRAVELLY SAND, light brown fine to coarse poorly graded loose sub-angular calcareous some fine to coarse subangular gravel; trace silt.                    |                     |        |    |     |     |     |     |     |    |    |    |    |    |    |    |                |  |  |  | 38 | 53 | 9 |  |
|             |            |         | 3            | 10         |           | GP<br>GM | SANDY GRAVEL brown fine, poorly graded loose to medium dense sub-angular calcareous; some fine to coarse subrounded sand; trace non-plastic silt.          |                     |        |    |     |     |     |     |     |    |    |    |    |    |    |    |                |  |  |  | 65 | 30 | 5 |  |
|             |            |         | 9            | 30         |           | GC       | SANDY GRAVEL brown fine to coarse, poorly graded, medium dense to very dense, subrounded, calcareous, some fine to coarse sand; little medium plastic clay | OCCASIONAL BOULDERS |        |    |     |     |     |     |     |    |    |    |    |    |    |    |                |  |  |  |    |    |   |  |
|             |            |         | 12           | 40         |           | GC       |  |                     |        |    |     |     |     |     |     |    |    |    |    |    |    |    |                |  |  |  |    |    |   |  |
|             |            |         | 15           | 50         |           | GC       |  |                     |        |    |     |     |     |     |     |    |    |    |    |    |    |    |                |  |  |  |    |    |   |  |
|             |            |         | 18           | 60         |           | GC       |  |                     |        |    |     |     |     |     |     |    |    |    |    |    |    |    |                |  |  |  |    |    |   |  |

61 24 15

15 31 54

SANDY CLAY brown, soft, highly plastic, calcareous; some fine to coarse sand; little fine rounded gravel.

CL

TOTAL DEPTH 75 0' (22.9m)

-18 60

-21 70

-24 80

-27 90

-30 100

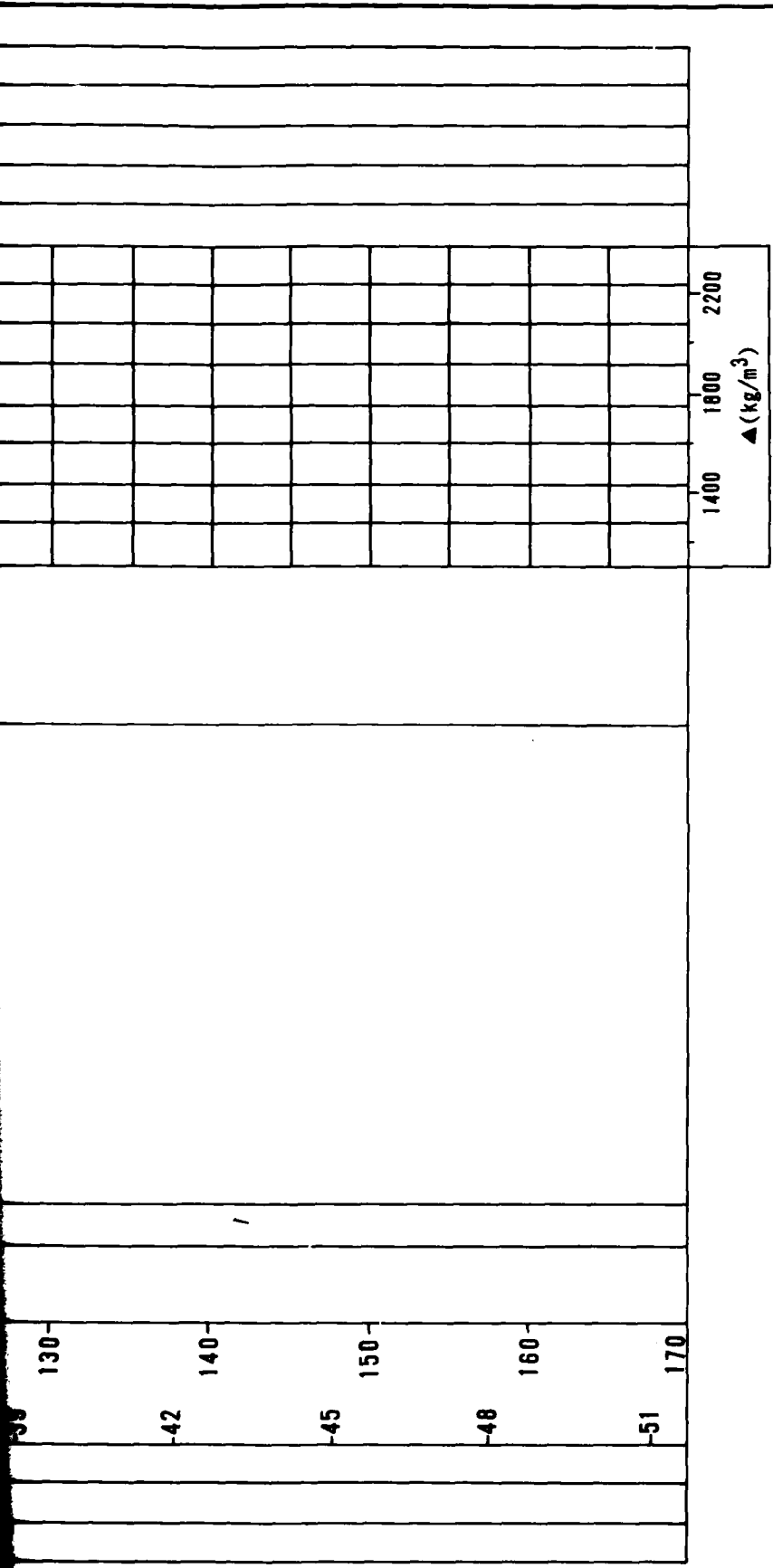
-33 110

-36 120

-39 130

-42 140

*J*



1400 1800 2200  
▲ (kg/m<sup>3</sup>)

**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 : 5940' (1811m)
- SURFICIAL GEOLOGIC UNIT : A5i
- DATE DRILLED : 23 July 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

LOG OF BORING RV-B-14  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMO

FIGURE  
II-4-13

**FUGRO NATIONAL, INC.**

CH BY AP 0 81

| SAMPLE TYPE | % RECOVERY | N VALUE | DEPTH<br>METERS | DEPTH<br>FEET | LITHOLOGY | USCS     | SOIL DESCRIPTION  | REMARKS | ▲ (pcf) |    |     |     |     | ● (%) |     |    |    |    | SIEVE ANALYSIS |    |  |    |    |    |  |  |  |  |
|-------------|------------|---------|-----------------|---------------|-----------|----------|---|---------|---------|----|-----|-----|-----|-------|-----|----|----|----|----------------|----|--|----|----|----|--|--|--|--|
|             |            |         |                 |               |           |          |   |         | 80      | 90 | 100 | 110 | 120 | 130   | 140 | GR | SA | FI | LL             | PI |  |    |    |    |  |  |  |  |
| □           | 27         | 27      | 0               | 0             |           | SM       | GRAVELLY SAND brown, fine to coarse poorly to well graded, medium dense to very dense subrounded to sub-angular calcareous, some fine to coarse angular gravel, trace to some nonplastic silt |         |         |    |     |     |     |       |     |    |    |    |                |    |  |    |    |    |  |  |  |  |
| ■           | 67         | 68      | 3               | 10            |           | SM       |   |         | ●       |    |     |     |     |       |     |    |    |    |                |    |  | 30 | 48 | 22 |  |  |  |  |
| ■           | 67         | 68      | 6               | 20            |           | SW<br>SM |   |         | ●       |    |     |     |     |       |     |    |    |    |                |    |  | 44 | 45 | 11 |  |  |  |  |
| □           | 50         | > 100   | 9               | 30            |           |          |   |         |         |    |     |     |     |       |     |    |    |    |                |    |  |    |    |    |  |  |  |  |
| ■           | 47         | > 100   | 12              | 40            |           |          |   |         |         |    |     |     |     |       |     |    |    |    |                |    |  |    |    |    |  |  |  |  |
| ■           | 67         | > 100   | 15              | 50            |           | SM       |   |         |         |    |     |     |     |       |     |    |    |    |                |    |  |    |    |    |  |  |  |  |
| ■           | 67         | > 100   | 18              | 60            |           |          |   |         |         |    |     |     |     |       |     |    |    |    |                |    |  |    |    |    |  |  |  |  |

57 100

-18

-21

-24

-27

-30

-33

-36

-39

-42

60

70

80

90

100

110

120

130

140

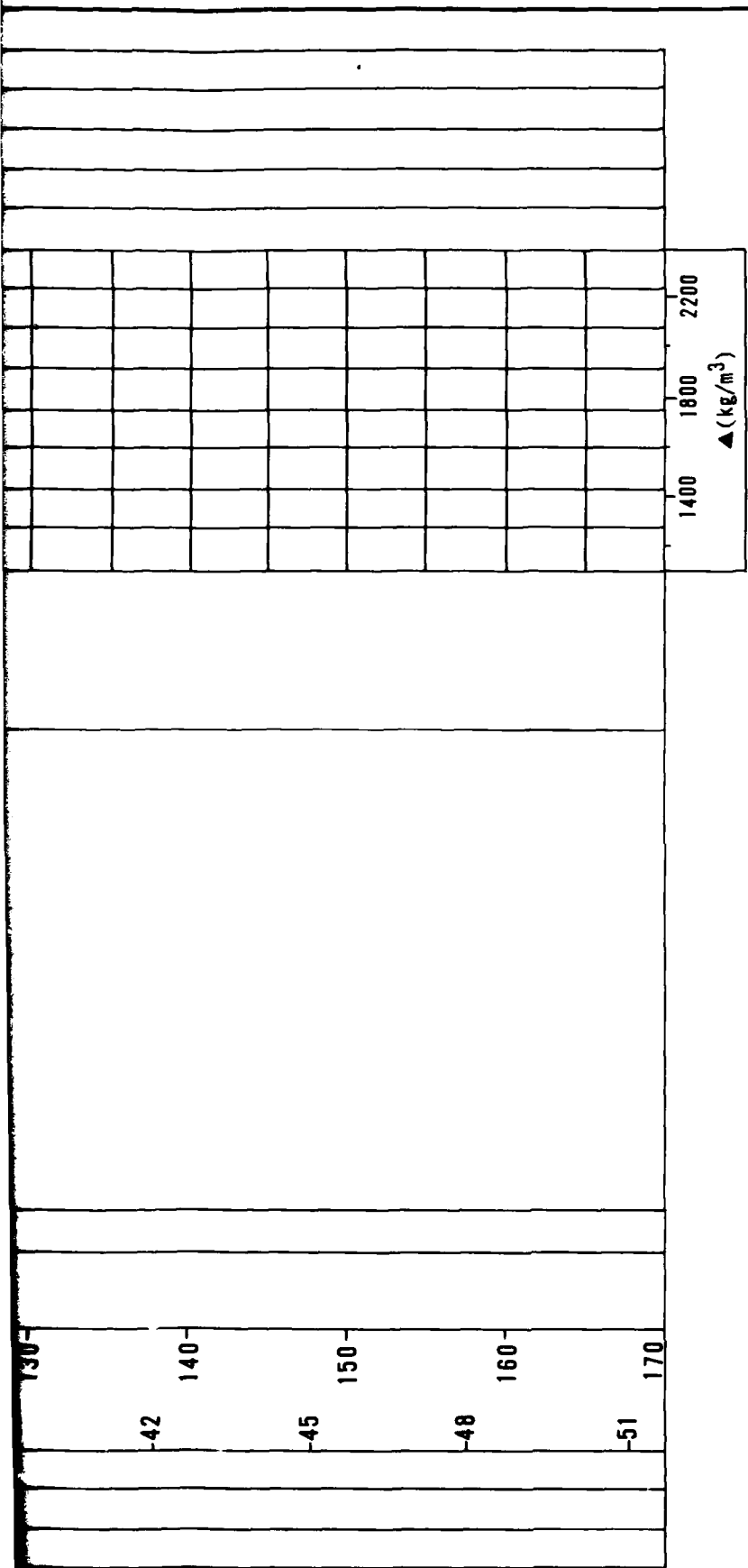


LATITE, medium-dark-gray to light-brownish-gray, very dense, porphyritic.

Rock

TOTAL DEPTH 82 0' (25 0m)

19



**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 : 5555' (1693m)
- SURFICIAL GEOLOGIC UNIT : ASy
- DATE DRILLED : 6-7 August 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

|  |                   |
|--|-------------------|
| LOG OF BORING RV-B-15<br>RALSTON VALLEY, NEVADA            |                   |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE BMD | FIGURE<br>II-4-14 |
| <b>FUGRO NATIONAL, INC.</b>                                |                   |

3

CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

| SAMPLE TYPE | % RECOVERY | N VALUE | DEPTH<br>METERS | DEPTH<br>FEET | LITHOLOGY | USCS | SOIL DESCRIPTION   | REMARKS | ▲(pcf) |    |     |     |     |     |     |    |    |    |    | SIEVE ANALYSIS |    |    |   |  |  |  |
|-------------|------------|---------|-----------------|---------------|-----------|------|--|---------|--------|----|-----|-----|-----|-----|-----|----|----|----|----|----------------|----|----|---|--|--|--|
|             |            |         |                 |               |           |      |  |         | 80     | 90 | 100 | 110 | 120 | 130 | 140 | GR | SA | FI | LL | PI             |    |    |   |  |  |  |
|             |            |         | 0               | 0             |           |      | SANDY GRAVEL, brown, fine to coarse well graded, loose to medium dense subrounded, some fine to coarse subangular to subrounded sand |         | ●      |    |     |     |     |     |     |    |    |    |    |                | 71 | 27 | 2 |  |  |  |
|             |            |         | 3               | 10            |           |      |  |         | ●      |    |     |     |     |     |     |    |    |    |    |                |    |    |   |  |  |  |
|             |            |         | 6               | 20            |           | GW   |  |         |        |    |     |     |     |     |     |    |    |    |    |                |    |    |   |  |  |  |
|             |            |         | 9               | 30            |           |      |  |         |        |    |     |     |     |     |     |    |    |    |    |                |    |    |   |  |  |  |
|             |            |         | 12              | 40            |           |      |  |         |        |    |     |     |     |     |     |    |    |    |    |                |    |    |   |  |  |  |
|             | 60         | 100     | 15              | 50            |           |      | SILTY SAND brown, fine to coarse poorly graded, dense to very dense little to some silt; trace to little fine gravel.                |         | ●      |    |     |     |     |     |     |    |    |    |    |                |    |    |   |  |  |  |
|             |            |         | 18              | 60            |           |      |  |         |        |    |     |     |     |     |     |    |    |    |    |                |    |    |   |  |  |  |



fine gravel.

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

73 92



SM

cobbles  
boulders

TOTAL DEPTH 100 0' (30.5m)

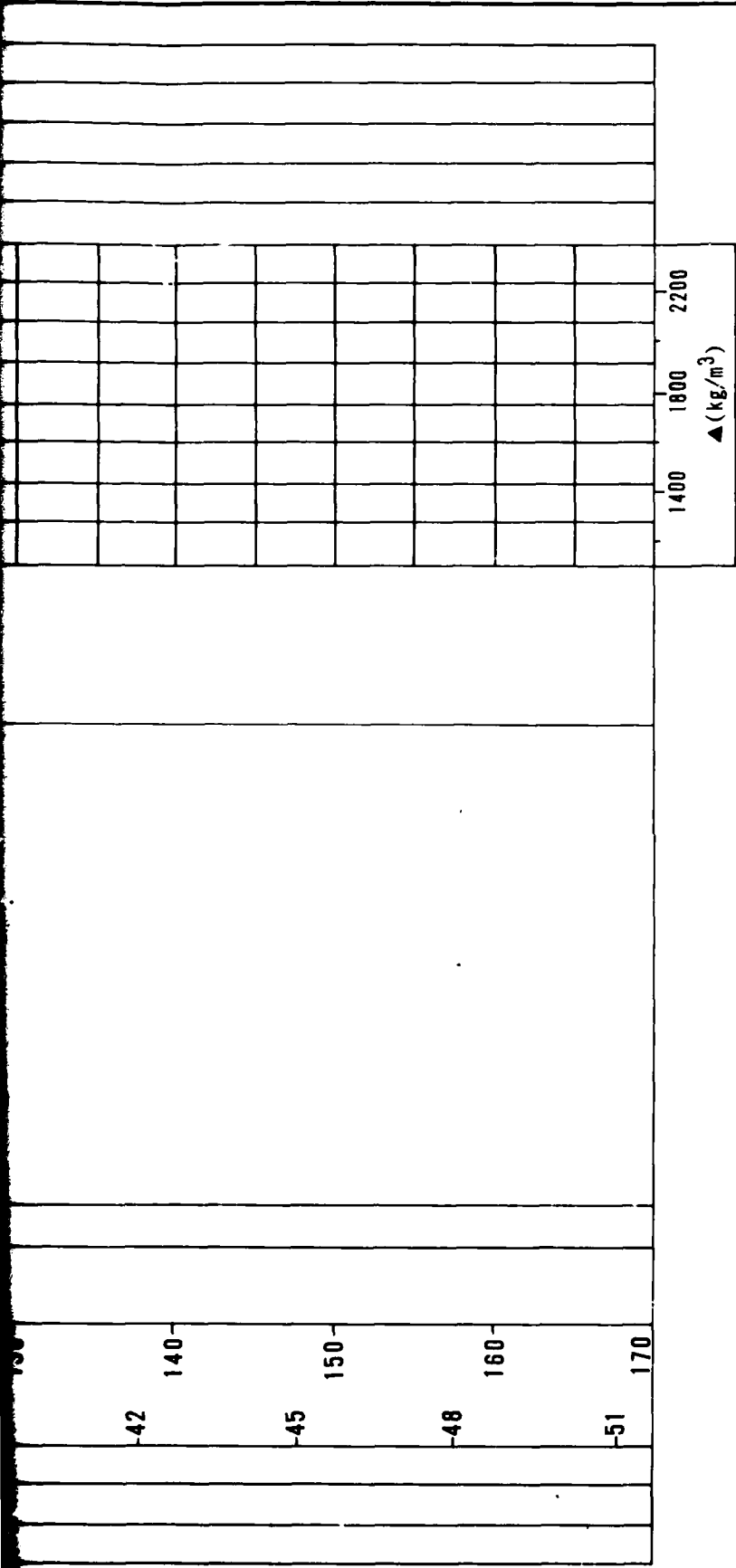
7 73 20



1 72 27



29



**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 : 5380' (1640m)
- SURFICIAL GEOLOGIC UNIT : A5y
- DATE DRILLED : 8-9 August 1977
- DRILLING METHOD : Becker Percussion
- HOLE DIAMETER : 5 1/2" (140mm)
- WATER LEVEL : Not Encountered

|  |                   |
|--|-------------------|
| LOG OF BORING RV-8-16<br>RALSTON VALLEY, NEVADA            |                   |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE BMO | FIGURE<br>II-4-15 |
| <b>FUGRO NATIONAL, INC.</b>                                |                   |

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FUGRO NATIONAL INC LONG BEACH CA  
MX SITING INVESTIGATION. GEOTECHNICAL EVALUATION. VERIFICATION --ETC(U)  
JUN 80

F/G 8/13

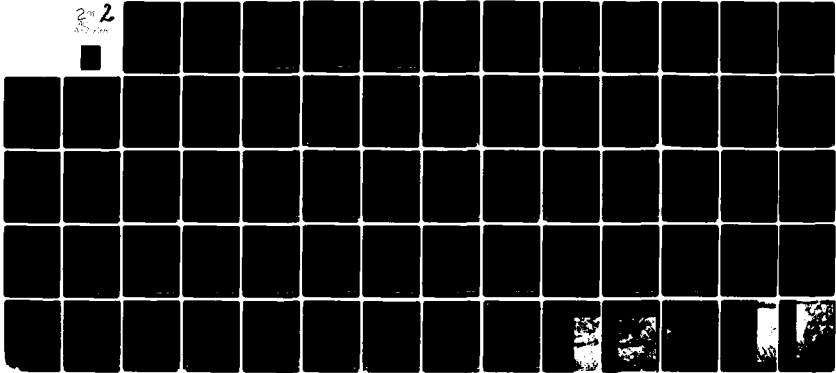
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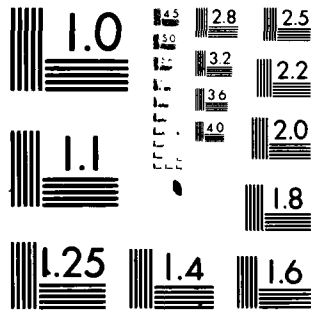
FN-TR-27-RV-2-VOL-2

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BY  
BTIC



MICROCOPY RESOLUTION TEST CHART  
NATIONAL BUREAU OF STANDARDS 1963-A

**FN-TR-27-RV-II**

**SECTION 5.0**

**TRENCH LOGS**

5.0 EXPLANATIONS OF TRENCH LOGS

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

| BULK SAMPLE | DEPTH  |      | LITHOLOGY                   | USCS | CONSISTENCY | SOIL DESCRIPTION   | REMARKS               | SIEVE ANALYSIS |    |    |    |    |    |    |  |
|-------------|--------|------|-----------------------------|------|-------------|--|-----------------------|----------------|----|----|----|----|----|----|--|
|             | METERS | FEET |                             |      |             |  |                       | BR             | SA | FI | LL | PI |    |    |  |
|             | 0      | 0    | [Diagonal hatching pattern] | ML   | hard        | SANDY SILT, gray, dry to slightly moist, nonplastic, calcareous; some fine sand.   | ↑                     | 0              | 41 | 58 |    |    |    |    |  |
|             | 2      |      |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 4      |      |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 6      |      |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 2      | 8    | [Dotted pattern]            | SM   | dense       | SILTY SAND, gray, fine to coarse, poorly graded, slightly moist, subangular to subrounded; calcareous; some nonplastic silt. | vertical walls stable |                |    |    |    |    |    |    |  |
|             | 10     |      |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 12     |      |                             |      |             |  |                       | medium dense   |    |    |    | 1  | 61 | 38 |  |
|             | 14     |      |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 18     |      |                             |      | dense       |  |                       |                |    |    | 2  | 70 | 28 |    |  |
|             | 5      | 18   |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 18     |      |                             |      |             |  |                       |                |    |    |    |    |    |    |  |
|             | 6      | 20   | TOTAL DEPTH 18.0' (5.5m)    |      |             |  |                       |                |    |    |    |    |    |    |  |
|             |        |      |                             |      |             |  |                       | 0              | 75 | 25 |    |    |    |    |  |

**TRENCH DETAILS**

SURFACE ELEVATION : 5180' (1579m)  
 DATE EXCAVATED : 18 August 1977  
 SURFICIAL GEOLOGIC UNIT: A4  
 TRENCH LENGTH : 80.0' (24.4m)  
 TRENCH ORIENTATION : NE-SW

|  |                         |
|--|-------------------------|
| <b>LOG OF TRENCH RV-T-1</b><br><b>RALSTON VALLEY, NEVADA</b> |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - WFO | FIGURE<br><b>II-5-1</b> |

**MOORE NATIONAL INC.**

| BULK SAMPLE | DEPTH  |      | LITHOLOGY | USCS | CONSISTENCY  | SOIL DESCRIPTION  | REMARKS                 | SIEVE ANALYSIS |    |    |    |    |
|-------------|--------|------|-----------|------|--------------|---|-------------------------|----------------|----|----|----|----|
|             | METERS | FEET |           |      |              |   |                         | GR             | SA | FI | LL | PI |
|             | 0      | 0    |           | ML   | soft         | SANDY SILT, light brown, nonplastic, calcareous; some fine to coarse sand.  |                         | 1              | 38 | 80 | 21 | 3  |
|             | 2      |      |           |      |              | SILTY SAND, gray to brown, fine to coarse, poorly graded, dry, sub-rounded, calcareous; little to some nonplastic silt. |                         | 1              | 73 | 26 |    | NP |
|             | 1      | 4    |           |      |              |   |                         |                |    |    |    |    |
|             | 2      | 6    |           |      | dense        |   |                         |                |    |    |    |    |
|             | 3      | 8    |           | SM   |              |   | vertical walls unstable |                |    |    |    |    |
|             | 4      | 10   |           |      |              |   |                         |                |    |    |    |    |
|             | 5      | 12   |           |      |              |   |                         |                |    |    |    |    |
|             | 6      | 14   |           |      |              |   |                         | 0              | 84 | 18 |    |    |
|             | 7      | 16   |           |      | medium dense |   |                         |                |    |    |    |    |
|             | 8      | 18   |           |      |              |   |                         | 2              | 76 | 22 |    |    |
|             |        | 20   |           |      |              | TOTAL DEPTH 18.0' (5.5m)  |                         |                |    |    |    |    |

**TRENCH DETAILS**

SURFACE ELEVATION : 5240' (1587m)  
 DATE EXCAVATED : 18 August 1977  
 SURFICIAL GEOLOGIC UNIT: A5y/A4  
 TRENCH LENGTH : 54.0' (16.5m)  
 TRENCH ORIENTATION : NE-SW

|  |                  |
|--|------------------|
| LOG OF TRENCH RV-T-2<br>RALSTON VALLEY, NEVADA               |                  |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO | FIGURE<br>II-5-2 |

**INSTRON NATIONAL, INC.**



| BULK SAMPLE              | DEPTH  |      | LITHOLOGY        | USCS         | CONSISTENCY | SOIL DESCRIPTION   | REMARKS                           | SIEVE ANALYSIS                  |    |    |    |    |  |  |
|--------------------------|--------|------|------------------|--------------|-------------|--|-----------------------------------|---------------------------------|----|----|----|----|--|--|
|                          | METERS | FEET |                  |              |             |  |                                   | GR                              | SA | FI | LL | PI |  |  |
|                          | 0      | 0    | [Dotted pattern] | SP           | loose       | GRAVELLY SAND, brown, fine to coarse, poorly graded, slightly moist to very moist, subangular to subrounded, calcareous; some fine gravel.       | ↑<br>vertical walls unstable<br>↓ |                                 |    |    |    |    |  |  |
|                          | 2      |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 4      |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 6      |      |                  | medium dense |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 8      |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 10     |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 12     |      |                  | SW-SH        | dense       | GRAVELLY SAND, brown, fine to coarse, well graded, slightly moist, subangular to subrounded, calcareous; some fine to coarse gravel; trace silt. |                                   | ↓<br>vertical walls stable<br>↑ |    |    |    |    |  |  |
|                          | 14     |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 16     |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 18     |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 18     |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
|                          | 20     |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |
| TOTAL DEPTH 18.0' (5.5m) |        |      |                  |              |             |  |                                   |                                 |    |    |    |    |  |  |

**TRENCH DETAILS**

SURFACE ELEVATION : 5335' (1626m)  
 DATE EXCAVATED : 20 August 1977  
 SURFICIAL GEOLOGIC UNIT: A5y  
 TRENCH LENGTH : 58.0' (17.1m)  
 TRENCH ORIENTATION : E-W

|  |                         |
|--|-------------------------|
| <b>LOG OF TRENCH RV-T-3</b><br><b>RALSTON VALLEY, NEVADA</b> |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - ONO | FIGURE<br><b>II-5-3</b> |
| <b>FLUORO NATIONAL INC.</b>                                  |                         |

| BULK SAMPLE | DEPTH  |      | LITHOLOGY | USCS  | CONSISTENCY  | SOIL DESCRIPTION  | REMARKS                  | SIEVE ANALYSIS |    |    |    |    |
|-------------|--------|------|-----------|-------|--------------|---|--------------------------|----------------|----|----|----|----|
|             | METERS | FEET |           |       |              |   |                          | GR             | SA | FI | LL | PI |
|             | 0      | 0    |           | ML    | firm         | SANDY SILT, brown, moist, non-plastic, calcareous.  |                          |                |    |    | 19 | 3  |
|             |        | 2    |           |       |              | GRAVELLY SAND, brown, fine to coarse, poorly graded, slightly moist, sub-angular to subrounded, calcareous; little to some fine gravel; trace silt. | vertical walls sloughing | 38             | 60 | 4  |    |    |
|             | 1      | 4    |           | SP    | medium dense |   |                          |                |    |    |    |    |
|             | 2      | 8    |           |       |              |   |                          |                |    |    |    |    |
|             | 3      | 12   |           | SP-SW |              |   |                          |                |    |    |    |    |
|             | 4      | 14   |           |       |              |   | vertical walls stable    | 13             | 80 | 7  |    |    |
|             | 5      | 18   |           |       | dense        |   |                          |                |    |    |    |    |
|             | 6      | 20   |           |       |              | TOTAL DEPTH 18.0' (5.5m)  |                          |                |    |    |    |    |

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**TRENCH DETAILS**

SURFACE ELEVATION : 5285' (1611m)  
 DATE EXCAVATED : 19 August 1977  
 SURFICIAL GEOLOGIC UNIT : A5y/A4  
 TRENCH LENGTH : 89.0' (21.0m)  
 TRENCH ORIENTATION : NW-SE

|  |                         |
|--|-------------------------|
| <b>LOG OF TRENCH RV-T-4</b><br><b>RALSTON VALLEY, NEVADA</b> |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO | FIGURE<br><b>II-5-4</b> |
| <b>FURRO NATIONAL INC.</b>                                   |                         |

| BULK SAMPLE | DEPTH                    |      | LITHOLOGY                                   | USCS  | CONSISTENCY | SOIL DESCRIPTION  | REMARKS               | SIEVE ANALYSIS        |    |    |    |    |  |
|-------------|--------------------------|------|---|-------|-------------|---|-----------------------|-----------------------|----|----|----|----|--|
|             | METERS                   | FEET |   |       |             |   |                       | GR                    | SA | FI | LL | PI |  |
|             | 0                        | 0    | [Dotted pattern representing gravelly sand] | SP-SM | loose       | GRAVELLY SAND, brown, fine to coarse, poorly graded, dry, subangular, calcareous; some fine to coarse gravel; trace silt; caliche lenses. | vertical walls stable | 38                    | 55 | 7  |    |    |  |
|             | 2                        |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 4                        |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 6                        |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 8                        |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 10                       |      |   |       | dense       |   | cobble to 8" size     | vertical walls stable | 30 | 61 | 9  |    |  |
|             | 12                       |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 14                       |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 16                       |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 18                       |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | TOTAL DEPTH 18.0' (5.5m) |      |   |       |             |   |                       |                       |    |    |    |    |  |
|             | 20                       |      |   |       |             |   |                       |                       |    |    |    |    |  |

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**TRENCH DETAILS**

SURFACE ELEVATION : 5590' (1704m)  
 DATE EXCAVATED : 18 August 1977  
 SURFICIAL GEOLOGIC UNIT: A5y  
 TRENCH LENGTH : 65.0' (19.8m)  
 TRENCH ORIENTATION : NW-SE

|  |                         |
|--|-------------------------|
| <b>LOG OF TRENCH RV-7-5</b><br><b>RALSTON VALLEY, NEVADA</b> |                         |
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - DMO | FIGURE<br><b>II-5-5</b> |
| <b>TURO NATIONAL INC.</b>                                    |                         |

| BULK SAMPLE | DEPTH  |      | LITHOLOGY  | USCS | CONSISTENCY | SOIL DESCRIPTION   | REMARKS               | SIEVE ANALYSIS |    |    |    |    |  |  |  |  |
|-------------|--------|------|--|------|-------------|--|-----------------------|----------------|----|----|----|----|--|--|--|--|
|             | METERS | FEET |  |      |             |  |                       | GR             | SA | FI | LL | PI |  |  |  |  |
|             | 0      | 0    | GRAVELLY SAND, light brown to brown, fine to coarse, poorly graded, slightly moist to moist, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded sand; trace silt; occasional cobbles to 6" size. | SP   | loose       | GRAVELLY SAND, light brown to brown, fine to coarse, poorly graded, slightly moist to moist, subangular to subrounded, calcareous; some fine to coarse subangular to subrounded sand; trace silt; occasional cobbles to 6" size. | vertical walls stable |                |    |    |    |    |  |  |  |  |
|             | 2      |      |  |      |             |  |                       | 48             | 49 | 3  |    |    |  |  |  |  |
|             | 4      |      |  |      |             |  |                       |                |    |    |    |    |  |  |  |  |
|             | 6      |      |  |      |             |  |                       |                |    |    |    |    |  |  |  |  |
|             | 8      |      |  |      | dense       |  |                       |                |    |    |    |    |  |  |  |  |
|             | 10     |      |  |      |             |  |                       |                |    |    |    |    |  |  |  |  |
|             | 12     |      |  |      | SP-SM       |  |                       |                |    |    |    |    |  |  |  |  |
|             | 14     |      |  |      |             |  |                       |                |    |    |    |    |  |  |  |  |
|             | 16     |      |  |      | very dense  |  |                       |                |    |    |    |    |  |  |  |  |
|             | 18     |      |  |      |             |  |                       |                |    |    |    |    |  |  |  |  |
|             | 18     |      | TOTAL DEPTH 18.0' (5.5m)   |      |             |  |                       |                |    |    |    |    |  |  |  |  |
|             | 20     |      |  |      |             |  |                       |                |    |    |    |    |  |  |  |  |

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**TRENCH DETAILS**

SURFACE ELEVATION : 5545' (1690m)  
 DATE EXCAVATED : 18 August 1977  
 SURFICIAL GEOLOGIC UNIT : A5y  
 TRENCH LENGTH : 85.0' (19.8m)  
 TRENCH ORIENTATION : E-W

**LOG OF TRENCH RV-T-6  
 RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
**II-5-6**

**FURRO NATIONAL, INC.**

| BULK SAMPLE | DEPTH  |      | LITHOLOGY                   | USCS  | CONSISTENCY  | SOIL DESCRIPTION  | REMARKS                      | SIEVE ANALYSIS |    |    |    |    |    |
|-------------|--------|------|-----------------------------|-------|--------------|---|------------------------------|----------------|----|----|----|----|----|
|             | METERS | FEET |                             |       |              |   |                              | GR             | SA | FI | LL | PI |    |
|             | 0      | 0    | [Diagonal hatching pattern] | ML    | soft         | SANDY SILT, brown, moist, nonplastic, calcareous; some fine to coarse sand; caliche lenses.   | ↑<br>vertical walls unstable |                |    |    | 19 | 1  |    |
|             | 2      |      |                             |       |              |   |                              |                |    |    |    |    |    |
|             | 4      |      |                             |       |              |   |                              |                |    |    |    |    |    |
|             | 6      |      |                             |       |              |   |                              |                |    |    |    |    |    |
|             | 2      | 6    | [Dotted pattern]            | SW-SM | medium dense | GRAVELLY SAND, light brown, fine to coarse, well to poorly graded, slightly moist, subangular to sub-rounded, calcareous; some fine to coarse gravel; trace to little silt. | ↑<br>vertical walls stable   |                |    |    |    |    |    |
|             | 8      |      |                             |       |              |   |                              |                |    |    |    |    |    |
|             | 3      | 10   |                             |       |              |   |                              |                |    |    |    |    |    |
|             | 4      | 12   |                             |       | dense        |   |                              |                |    | 29 | 63 | 8  |    |
|             | 5      | 14   | [Dotted pattern]            | SM    | medium dense |   | ↓                            |                |    |    |    |    |    |
|             | 18     |      |                             |       |              |   |                              |                |    |    |    | 28 | 59 |
|             | 6      | 20   |                             |       |              | TOTAL DEPTH 16.0' (5.5m)  |                              |                |    |    |    |    |    |

**TRENCH DETAILS**

SURFACE ELEVATION : 5940' (1811m)  
 DATE EXCAVATED : 19 August 1977  
 SURFICIAL GEOLOGIC UNIT: A51  
 TRENCH LENGTH : 88.0' (27.0m)  
 TRENCH ORIENTATION : NE-SW

**LOG OF TRENCH RV-T-7  
 RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
**II-5-7**

**FUGRO NATIONAL, INC.**

| BULK SAMPLE | DEPTH<br>METERS<br>FEET | LITHOLOGY                | USCS | CONSISTENCY  | SOIL DESCRIPTION  | REMARKS                           | SIEVE ANALYSIS |    |    |    |    |
|-------------|-------------------------|--------------------------|------|--------------|---|-----------------------------------|----------------|----|----|----|----|
|             |                         |                          |      |              |   |                                   | GR             | SA | FI | LL | PI |
|             | 0                       | [Dotted pattern]         | SP   | loose        | GRAVELLY SAND, light brown to dark brown, fine to coarse, poorly graded, dry to moist, subangular to subrounded, calcareous; some fine to coarse gravel; caliche (1.0'-1.2'). | ↑<br><br>vertical walls sloughing | 37             | 81 | 2  |    |    |
|             | 2                       |                          |      | medium dense |   |                                   |                |    |    |    |    |
|             | 4                       |                          |      |              |   |                                   |                |    |    |    |    |
|             | 6                       |                          |      |              |   |                                   |                |    |    |    |    |
|             | 8                       | [Dotted pattern]         | SM   | dense        | SILTY SAND, light brown, fine to coarse, poorly graded, slightly moist, subangular to subrounded, calcareous; some nonplastic silt; trace fine gravel.                        | ↓<br><br>vertical walls stable    | 11             | 59 | 30 |    |    |
|             | 10                      |                          |      |              |   |                                   |                |    |    |    |    |
|             | 12                      |                          |      |              |   |                                   |                |    |    |    |    |
|             | 14                      |                          |      |              |   |                                   |                |    |    |    |    |
|             | 16                      | [Dotted pattern]         | SP   | medium dense | GRAVELLY SAND, light brown, fine to coarse, poorly graded, slightly moist, subangular to subrounded, calcareous; some fine to coarse gravel.                                  | ↓                                 | 47             | 51 | 2  |    |    |
|             | 18                      |                          |      |              |   |                                   |                |    |    |    |    |
|             | 20                      | TOTAL DEPTH 18.0' (5.5m) |      |              |   |                                   |                |    |    |    |    |

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**TRENCH DETAILS**

SURFACE ELEVATION : 5380' (1640m)  
 DATE EXCAVATED : 20 August 1977  
 SURFICIAL GEOLOGIC UNIT : A5y  
 TRENCH LENGTH : 74.0' (23.0m)  
 TRENCH ORIENTATION : N-S

**LOG OF TRENCH RV-T-8  
 RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
**II-5-8**

**FLUORO NATIONAL, INC.**

FN-TR-27-RV-II

SECTION 6.0  
LABORATORY TEST RESULTS

## 6.0 EXPLANATIONS OF LABORATORY TEST RESULTS

Laboratory test results are presented in this section. Table II-6-1 contains a summary of laboratory test results. This table contains results of sieve analysis; plasticity data; in-situ dry unit weight, moisture content, degree of saturation, and void ratio for drive and Pitcher samples; results of compaction tests; and specific gravity of solids. Other tests such as triaxial compression, unconfined compression, direct shear, consolidation, chemical, and California Bearing Ratio (CBR) are indicated on the table. Tables II-6-2 through II-6-4 and Figures II-6-1 through II-6-14 present results of triaxial compression, unconfined compression, direct shear, chemical, and CBR tests.

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

| <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 or trench sample designation.
- B. Sample Number - Prefix indicates the type of sample; explanation is at the bottom of the table.
- C. Sample Interval - This is the depth range measured from ground surface over which the sample was obtained.
- D. Percent Finer by Weight - Presents the results of laboratory particle size analysis (ASTM D 422-63) performed on representative soil samples at the depth indicated. The numbers represent the percent (by dry weight) of the total sample weight passing through each sieve size indicated.
- E. Atterberg Limits (ASTM D 423-66 and D 424-59)
  - LL - Liquid Limit, the water content (as percent of soil dry weight) corresponding to the arbitrary limit between the liquid and plastic states of consistency of a soil (ASTM D 423-66).
  - PL - Plastic Limit, the water content corresponding to an arbitrary limit between the plastic and the semisolid state of consistency of a soil (ASTM D 424-59).
  - PI - Plasticity Index, numerical difference between the liquid limit (LL) and the plastic limit (PL) indicating the range of moisture content within which a soil-water mixture is plastic.
  - NP - Nonplastic.
- F. USCS - Unified Soil Classification Symbols are given here; see Table II-4-1 in Section 4.0, "Boring Logs", for complete details of USCS system.

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

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

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

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

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

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

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

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

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

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

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

Confining Pressure ( $\sigma_3$ ) - 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,  $\epsilon$ , at a given stress level is defined as the ratio of the change in length (L) 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."



| FINER BY WEIGHT       |    |     |              |     |                    |       |                      | ATTERBERG LIMITS (b) |    |    | USCS (c) | IN-SITU         |                      |                      |                | COMPACTED  |                     |  | SPECIFIC GRAVITY |                      |
|-----------------------|----|-----|--------------|-----|--------------------|-------|----------------------|----------------------|----|----|----------|-----------------|----------------------|----------------------|----------------|------------|---------------------|--|------------------|----------------------|
| U S STANDARD SIEVE NO |    |     |              |     | PARTICLE SIZE (mm) |       |                      | LL                   | PL | PI |          | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |  |                  | OPTIMUM MOISTURE (%) |
| SAND                  |    |     | SILT OR CLAY |     |                    | (pcf) | (kg/m <sup>3</sup> ) |                      |    |    |          | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            |                     |  |                  |                      |
| 3/8"                  | 4  | 10  | 40           | 100 | 200                | .005  | .001                 |                      |    |    |          |                 |                      |                      |                |            |                     |  |                  |                      |
| 89                    | 81 | 76  | 64           | 42  | 36                 |       |                      |                      |    |    | SM       | 102.4           | 1640                 | 8.2                  | 34.2           | 0.65       |                     |  |                  |                      |
|                       |    | 100 | 97           | 68  | 45                 | 8     | 4                    |                      |    |    | NP       |                 |                      | 12.6                 |                |            |                     |  |                  |                      |
| 87                    | 58 | 36  | 17           | 11  | 9                  |       |                      |                      |    |    | SP-SM    | 107.7           | 1725                 | 8.2                  | 45.7           | 0.45       |                     |  |                  |                      |
| 57                    | 51 | 38  | 20           | 12  | 9                  |       |                      |                      |    |    | GP-GM    | 118.7           | 1901                 | 5.4                  | 34.8           | 0.42       |                     |  |                  |                      |
| 78                    | 57 | 36  |              | 15  | 13                 | 9     | 7                    | 36                   | 19 | 17 | SC       | 109.4           | 1752                 | 8.8                  | 44.0           | 0.54       |                     |  |                  |                      |
| 69                    | 52 | 38  | 25           | 14  | 10                 | 4     | 1                    | 32                   | 21 | 11 | GW-GC    | 118.9           | 1905                 | 10.7                 | 69.3           | 0.42       |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SC       | 119.7           | 1917                 | 8.5                  | 56.3           | 0.41       |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SC       | 120.5           | 1930                 | 7.8                  | 52.9           | 0.40       |                     |  |                  |                      |
| 74                    | 60 | 47  | 27           | 19  | 16                 | 10    | 8                    | 32                   | 19 | 13 | SC       | 118.1           | 1892                 | 8.5                  | 53.8           | 0.43       |                     |  |                  |                      |
| 92                    | 72 | 54  | 35           | 25  | 16                 |       |                      |                      |    |    | SC       | 117.6           | 1884                 | 8.8                  | 54.9           | 0.43       |                     |  |                  |                      |
| 88                    | 74 | 59  | 29           | 13  | 9                  | 9     | 4                    |                      |    |    | SW-SM    | 102.6           | 1643                 | 14.6                 | 61.4           | 0.64       |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SW-SM    | 98.3            | 1575                 | 6.5                  | 24.6           | 0.72       |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SM       |                 |                      | 22.6                 |                |            |                     |  |                  |                      |
| 94                    | 82 | 68  | 42           | 26  | 15                 | 3     | 1                    |                      |    |    | SM       | 108.9           | 1744                 | 13.3                 | 65.6           | 0.55       |                     |  |                  |                      |
| 97                    | 85 | 65  | 35           | 27  | 21                 |       |                      |                      |    |    | SM       | 121.4           | 1945                 | 10.3                 | 71.7           | 0.39       |                     |  |                  |                      |
| 91                    | 82 | 70  | 49           | 37  | 29                 |       |                      |                      |    |    | SM       | 110.3           | 1767                 | 12.7                 | 65.0           | 0.53       |                     |  |                  |                      |
| 92                    | 78 | 64  | 44           | 28  | 20                 | 4     | 3                    |                      |    |    | SM       | 114.5           | 1834                 | 11.9                 | 68.4           | 0.47       |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SM       | 112.2           | 1797                 | 14.4                 | 77.5           | 0.50       |                     |  |                  |                      |
| 69                    | 54 | 41  | 24           | 16  | 13                 |       |                      |                      |    |    | GM       |                 |                      |                      |                |            |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SM       | 76.5            | 1225                 | 42.2                 | 94.7           | 1.20       |                     |  |                  |                      |
| 98                    | 87 | 74  | 46           | 33  | 25                 | 2     | 0                    |                      |    |    | NP       | 77.0            | 1233                 | 40.8                 | 96.5           | 1.09       |                     |  |                  |                      |
| 81                    | 71 | 62  | 47           | 34  | 27                 | 3     | 1                    |                      |    |    | SM       | 85.6            | 1371                 | 28.9                 | 80.6           | 0.97       |                     |  |                  |                      |
| 100                   | 97 | 92  | 65           | 40  | 27                 |       |                      |                      |    |    | SM       | 76.2            | 1221                 | 44.4                 | 99.0           | 1.21       |                     |  |                  |                      |
| 75                    | 64 | 48  | 24           | 15  | 12                 | 5     | 2                    | 62                   | 46 | 17 | SM       | 116.6           | 1868                 | 10.6                 | 64.6           | 0.44       |                     |  |                  |                      |
| 88                    | 84 | 71  | 23           | 8   | 5                  |       |                      |                      |    |    | SW-SM    |                 |                      |                      |                |            |                     |  |                  |                      |
| 86                    | 76 | 58  | 25           | 11  | 6                  |       |                      |                      |    |    | SW-SM    |                 |                      |                      |                |            |                     |  |                  |                      |
| 99                    | 90 | 73  | 42           | 25  | 16                 |       |                      |                      |    |    | SM       |                 |                      | 1.5                  |                |            |                     |  |                  |                      |
| 100                   | 96 | 92  | 82           | 38  | 13                 | 2     | 1                    |                      |    |    | SM       |                 |                      | 2.9                  |                |            |                     |  |                  |                      |
|                       |    |     |              |     |                    |       |                      |                      |    |    | SM       |                 |                      | 3.4                  |                |            |                     |  |                  |                      |

2

| ORG<br>(b) | USCS<br>(c) | IN-SITU            |                      |                            |                   |               | COMPACTED              |                       |                            | SPECIFIC<br>GRAVITY<br>OF SOLIDS | TRIAxIAL (d) | UNCONFINED<br>COMPRESSION | DIRECT<br>SHEAR | CONSOLIDATION | CHEMICAL | CBR |
|------------|-------------|--------------------|----------------------|----------------------------|-------------------|---------------|------------------------|-----------------------|----------------------------|----------------------------------|--------------|---------------------------|-----------------|---------------|----------|-----|
|            |             | DRY UNIT<br>WEIGHT |                      | MOISTURE<br>CONTENT<br>(%) | SATURATION<br>(%) | VOID<br>RATIO | MAXIMUM<br>DRY DENSITY |                       | OPTIMUM<br>MOISTURE<br>(%) |                                  |              |                           |                 |               |          |     |
|            |             | (pcf)              | (kg/m <sup>3</sup> ) |                            |                   |               | (pcf)                  | (kg. m <sup>3</sup> ) |                            |                                  |              |                           |                 |               |          |     |
|            | SM          | 102.4              | 1640                 | 8.2                        | 34.2              | 0.65          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
| NP         | SM          |                    |                      | 12.6                       |                   |               |                        |                       | 2.59                       |                                  |              |                           |                 |               |          |     |
|            | SP-SM       | 107.7              | 1725                 | 8.2                        | 45.7              | 0.45          |                        |                       | 2.50                       | *                                |              |                           |                 |               |          |     |
|            | GP-GM       | 118.7              | 1901                 | 5.4                        | 34.8              | 0.42          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
| 17         | SC          | 109.4              | 1752                 | 8.8                        | 44.0              | 0.54          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
| 11         | GW-GC       | 118.9              | 1905                 | 10.7                       | 69.3              | 0.42          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SC          | 119.7              | 1917                 | 8.5                        | 56.3              | 0.41          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SC          | 120.5              | 1930                 | 7.8                        | 52.9              | 0.40          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
| 13         | SC          | 118.1              | 1892                 | 8.5                        | 53.8              | 0.43          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
|            | SC          | 117.6              | 1884                 | 8.8                        | 54.9              | 0.43          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
|            | SW-SM       | 102.6              | 1643                 | 14.6                       | 61.4              | 0.64          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
|            | SW-SM       | 98.3               | 1575                 | 6.5                        | 24.6              | 0.72          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          |                    |                      | 22.6                       |                   |               |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          | 108.9              | 1744                 | 13.3                       | 65.6              | 0.55          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
|            | SM          | 121.4              | 1945                 | 10.3                       | 71.7              | 0.39          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
|            | SM          | 110.3              | 1767                 | 12.7                       | 65.0              | 0.53          |                        |                       |                            | *                                |              |                           |                 |               |          |     |
|            | SM          | 114.5              | 1834                 | 11.9                       | 68.4              | 0.47          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          | 112.2              | 1797                 | 14.4                       | 77.5              | 0.50          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | GM          |                    |                      |                            |                   |               |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          | 76.5               | 1225                 | 42.2                       | 94.7              | 1.20          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
| NP         | SM          | 77.0               | 1233                 | 40.8                       | 96.5              | 1.09          |                        |                       | 2.58                       | *                                |              |                           |                 |               |          |     |
|            | SM          | 85.6               | 1371                 | 28.9                       | 80.6              | 0.97          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          | 76.2               | 1221                 | 44.4                       | 99.0              | 1.21          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
| 17         | SM          | 116.6              | 1868                 | 10.6                       | 64.6              | 0.44          |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SW-SM       |                    |                      |                            |                   |               |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SW-SM       |                    |                      |                            |                   |               |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          |                    |                      | 1.5                        |                   |               |                        |                       |                            |                                  |              |                           |                 |               |          |     |
|            | SM          |                    |                      | 2.9                        |                   |               |                        |                       | 2.54                       |                                  |              |                           |                 |               |          |     |
|            | SM          |                    |                      | 3.4                        |                   |               |                        |                       |                            |                                  |              |                           |                 |               |          |     |

**SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMO

TABLE  
**II-6-1**  
1 OF 7

**FUGRO NATIONAL, INC.**

2

3



| ACTIVITY NUMBER | SAMPLE NUMBER (a) | SAMPLE INTERVAL |             | PERCENT FINER BY WEIGHT |     |         |    |        |    |          |     |     |
|-----------------|-------------------|-----------------|-------------|-------------------------|-----|---------|----|--------|----|----------|-----|-----|
|                 |                   |                 |             | STANDARD SIEVE OPENING  |     |         |    |        |    | U S STAM |     |     |
|                 |                   |                 |             | BLDRS.                  |     | COBBLES |    | GRAVEL |    | SAND     |     |     |
|                 |                   |                 |             | 24"                     | 12" | 6"      | 3" | 1½"    | ¾" | 3/8"     | 4   | 10  |
|                 |                   | FEET            | METERS      |                         |     |         |    |        |    |          |     |     |
| RV-B-4          | b-1               | 5.0-6.0         | 1.52-1.83   |                         |     |         |    | 100    | 54 | 28       | 17  | 12  |
|                 | b-2               | 13.0-14.0       | 3.96-4.27   |                         |     |         |    |        |    |          |     |     |
|                 | b-3               | 21.0-22.0       | 6.40-6.71   |                         |     |         |    | 100    | 67 | 45       | 31  | 20  |
|                 | b-4               | 29.0-30.0       | 8.84-9.14   |                         |     |         |    |        |    |          |     |     |
|                 | b-6               | 55.0-56.0       | 16.76-17.07 |                         |     |         |    | 100    | 72 | 39       | 26  | 15  |
| RV-B-5          | b-1               | 0.0-3.0         | 0.00-0.91   |                         |     |         |    | 100    | 96 | 85       | 73  | 62  |
|                 | SS-2              | 5.5-6.5         | 1.68-1.98   |                         |     |         |    |        |    | 100      | 92  | 82  |
|                 | SS-4              | 10.5-11.5       | 3.20-3.51   |                         |     |         |    |        |    |          |     | 100 |
|                 | P-3               | 15.0-15.8       | 4.57-4.82   |                         |     |         |    |        |    | 100      | 98  | 89  |
|                 | P-3               | 15.8-16.1       | 4.82-4.91   |                         |     |         |    |        |    |          |     |     |
|                 | P-4               | 20.0-20.8       | 6.10-6.34   |                         |     |         |    | 100    | 96 | 87       | 71  |     |
|                 | P-4               | 20.8-21.1       | 6.34-6.43   |                         |     |         |    |        |    |          |     |     |
|                 | P-5               | 25.0-25.8       | 7.62-7.86   |                         |     |         |    |        |    | 100      | 95  | 90  |
|                 | P-5               | 25.8-26.1       | 7.86-7.96   |                         |     |         |    |        |    |          |     |     |
|                 | P-6               | 30.0-31.4       | 9.14-9.57   |                         |     |         |    |        |    |          |     |     |
|                 | P-7               | 40.0-40.8       | 12.19-12.44 |                         |     |         |    | 100    | 95 | 82       | 71  |     |
|                 | P-8               | 50.0-50.8       | 15.24-15.48 |                         |     |         |    |        |    |          | 100 | 99  |
| P-9             | 60.0-60.8         | 18.29-18.53     |             |                         |     |         |    |        |    |          |     |     |
| P-10            | 70.0-71.4         | 21.34-21.76     |             |                         |     |         |    |        |    |          |     |     |
| P-11            | 80.0-80.7         | 24.38-24.60     |             |                         |     |         |    |        |    |          | 100 |     |
| P-12            | 100.0-100.7       | 30.48-30.69     |             |                         |     |         |    |        |    |          |     |     |
| RV-B-6          | b-1               | 0.5-1.0         | 0.15-0.30   |                         |     |         |    |        |    |          |     | 100 |
|                 | P-1               | 5.0-5.7         | 1.52-1.74   |                         |     |         |    |        |    |          |     | 100 |
|                 | P-2               | 10.0-10.7       | 3.05-3.26   |                         |     |         |    |        |    |          |     |     |
|                 | P-3               | 15.7-16.3       | 4.79-4.97   |                         |     |         |    |        |    |          |     | 100 |
|                 | P-4               | 20.0-20.7       | 6.10-6.31   |                         |     |         |    | 100    | 91 | 82       | 69  |     |
|                 | P-4               | 20.7-22.0       | 6.31-6.71   |                         |     |         |    |        |    |          |     |     |
|                 | P-5               | 25.0-25.7       | 7.62-7.83   |                         |     |         |    |        |    | 100      | 98  | 94  |
|                 | P-6               | 30.0-30.8       | 9.14-9.39   |                         |     |         |    |        |    |          | 100 | 99  |
|                 | P-7               | 40.0-40.8       | 12.19-12.44 |                         |     |         |    |        |    |          |     |     |
|                 | P-8               | 50.1-50.9       | 15.27-15.51 |                         |     |         |    |        |    |          |     | 100 |
|                 | P-9               | 60.1-60.9       | 18.32-18.56 |                         |     |         |    |        |    |          |     | 100 |
|                 | P-10              | 70.1-70.8       | 21.37-21.58 |                         |     |         |    |        |    | 100      | 99  | 98  |
|                 | P-12              | 80.1-80.8       | 24.41-24.63 |                         |     |         |    |        |    | 100      | 98  | 94  |
|                 | P-13              | 90.1-90.8       | 27.46-27.68 |                         |     |         |    |        |    |          | 100 | 97  |
|                 | P-14              | 100.1-100.8     | 30.51-30.72 |                         |     |         |    |        |    |          | 100 | 98  |
|                 | P-15              | 121.0-121.7     | 36.88-37.09 |                         |     |         |    | 100    | 97 | 85       | 72  |     |
|                 | P-16              | 149.1-149.8     | 45.45-45.66 |                         |     |         |    |        |    |          |     |     |
| P-17            | 176.1-176.9       | 53.68-53.92     |             |                         |     |         |    |        |    |          |     |     |
| P-17            | 176.1-176.9       | 53.68-53.92     |             |                         |     |         |    |        |    |          |     |     |
| P-17            | 178.0-178.6       | 54.25-54.44     |             |                         |     |         |    |        |    |          |     |     |

NOTES:

- (a) Sample types
  - SS - Standard split spoon
  - P - Pitcher
  - D - Fugro Drive
  - B, b - Bulk
- (b) NP - Not Plastic
- (c) USCS - Unified Soil Classification System
- (d) \* Indicates that test has been performed and results are included in this report

PERCENT FINER BY WEIGHT

| U S STANDARD SIEVE NO |      |     |     |    |     |              |      |      | PARTICLE SIZE (mm) |    |    | ATTERBERG LIMITS (b) |                      |                      | USCS (c) | IN-SITU        |            |                     |                      | COMPACTED            |       |                      |
|-----------------------|------|-----|-----|----|-----|--------------|------|------|--------------------|----|----|----------------------|----------------------|----------------------|----------|----------------|------------|---------------------|----------------------|----------------------|-------|----------------------|
| SAND                  |      |     |     |    |     | SILT OR CLAY |      |      | LL                 | PL | PI | DRY UNIT WEIGHT      |                      | MOISTURE CONTENT (%) |          | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |                      | OPTIMUM MOISTURE (%) |       |                      |
| 4"                    | 3.8" | 4   | 10  | 40 | 100 | 200          | .005 | .001 |                    |    |    | (pcf)                | (kg/m <sup>3</sup> ) |                      |          |                |            | (pcf)               | (kg/m <sup>3</sup> ) |                      | (pcf) | (kg/m <sup>3</sup> ) |
| 4                     | 28   | 17  | 12  | 6  | 2   | 1            |      |      |                    |    |    |                      | GP                   |                      |          | 0.5            |            |                     |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | GP                   |                      |          | 1.0            |            |                     |                      |                      |       |                      |
| 7                     | 45   | 31  | 20  | 8  | 5   | 4            |      |      |                    |    |    |                      | GW                   |                      |          | 1.1            |            |                     |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | GW                   |                      |          | 3.0            |            |                     |                      |                      |       |                      |
| 2                     | 39   | 26  | 15  | 7  | 5   | 4            |      |      |                    |    |    |                      | GW                   |                      |          | 1.4            |            |                     |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      |                      |                      |          |                |            |                     |                      |                      |       |                      |
| 6                     | 85   | 73  | 62  | 49 | 29  | 18           | 8    | 2    |                    |    |    |                      | SM                   |                      |          | 3.2            |            |                     |                      |                      |       |                      |
|                       | 100  | 92  | 82  | 67 | 48  | 28           | 7    | 4    |                    |    |    |                      | NP                   | SM                   |          |                |            |                     |                      |                      |       |                      |
|                       |      |     | 100 | 94 | 31  | 25           |      |      |                    |    |    |                      | SM                   |                      |          | 2.2            |            |                     |                      |                      |       |                      |
|                       | 100  | 98  | 89  | 67 | 41  | 22           | 8    | 4    |                    |    |    |                      | SM                   | 110.6                | 1772     | 13.1           | 67.6       | 0.52                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   |                      |          |                |            |                     |                      |                      |       |                      |
| 10                    | 96   | 87  | 71  | 34 | 11  | 6            |      |      |                    |    |    |                      | SP-SM                | 100.8                | 1615     | 9.1            | 36.6       | 0.67                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SP-SM                |                      |          |                |            |                     |                      |                      |       |                      |
|                       | 100  | 95  | 90  | 72 | 38  | 20           |      |      |                    |    |    |                      | SM                   | 101.1                | 1619     | 7.7            | 31.2       | 0.67                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   |                      |          |                |            |                     |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   | 105.1                | 1684     | 17.8           | 79.7       | 0.60                |                      |                      |       |                      |
| 10                    | 95   | 82  | 71  | 41 | 13  | 10           |      |      |                    |    |    |                      | SW-SM                | 108.7                | 1741     | 12.4           | 60.9       | 0.55                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SP-SM                | 96.0                 | 1538     | 13.5           | 48.3       | 0.76                |                      |                      |       |                      |
|                       | 100  | 99  | 96  | 80 | 30  | 12           |      |      |                    |    |    |                      | SP-SM                | 104.1                | 1668     | 10.2           | 44.5       | 0.62                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SP-SM                | 99.4                 | 1592     | 14.6           | 56.7       | 0.69                |                      |                      |       |                      |
|                       |      |     | 100 | 99 | 88  | 78           | 10   | 2    |                    |    |    |                      | ML                   | 96.3                 | 1543     | 12.1           | 43.6       | 0.75                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   | 91.6                 | 1467     | 22.6           | 73.5       | 0.84                |                      |                      |       |                      |
|                       |      |     | 100 | 97 | 84  | 61           | 15   | 10   |                    |    |    |                      | NP                   | ML                   |          |                |            |                     |                      |                      |       |                      |
|                       |      |     | 100 | 91 | 61  | 37           | 9    | 4    |                    |    |    |                      | SM                   | 87.0                 | 1394     | 8.4            | 24.2       | 0.93                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   | 103.0                | 1650     | 6.5            | 27.6       | 0.64                |                      |                      |       |                      |
|                       |      |     | 100 | 97 | 68  | 30           |      |      |                    |    |    |                      | SM                   | 97.4                 | 1560     | 5.7            | 21.0       | 0.73                |                      |                      |       |                      |
| 10                    | 91   | 82  | 69  | 29 | 7   | 4            | 2    | 1    |                    |    |    |                      | SP                   | 81.2                 | 1301     | 23.3           | 58.5       | 1.07                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    | 36 | 25 | 11                   | SP                   | 80.9                 | 1296     | 27.9           | 69.5       | 1.08                |                      |                      |       |                      |
|                       | 100  | 98  | 94  | 76 | 54  | 38           |      |      |                    |    |    |                      | SM                   | 90.5                 | 1450     | 20.9           | 65.4       | 0.86                |                      |                      |       |                      |
|                       |      | 100 | 99  | 89 | 47  | 18           |      |      |                    |    |    |                      | SM                   | 93.5                 | 1498     | 11.5           | 41.1       | 0.72                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   | 110.1                | 1764     | 13.8           | 70.3       | 0.53                |                      |                      |       |                      |
|                       |      |     | 100 | 97 | 85  | 48           | 4    | 1    |                    |    |    |                      | SM                   | 93.3                 | 1495     | 12.1           | 40.5       | 0.81                |                      |                      |       |                      |
|                       |      |     | 100 | 99 | 89  | 56           | 11   | 7    |                    |    |    |                      | ML                   | 89.2                 | 1429     | 15.4           | 49.1       | 0.81                |                      |                      |       |                      |
|                       | 100  | 99  | 98  | 90 | 75  | 43           |      |      |                    |    |    |                      | SM                   | 95.2                 | 1525     | 8.3            | 29.1       | 0.77                |                      |                      |       |                      |
|                       | 100  | 98  | 94  | 66 | 30  | 13           |      |      |                    |    |    |                      | SM                   | 102.7                | 1645     | 16.7           | 70.0       | 0.64                |                      |                      |       |                      |
|                       |      | 100 | 97  | 82 | 70  | 43           |      |      |                    |    |    |                      | SM                   | 106.2                | 1701     | 15.8           | 72.7       | 0.57                |                      |                      |       |                      |
|                       | 100  | 98  | 91  | 67 | 33  | 14           |      |      |                    |    |    |                      | SM                   | 105.5                | 1690     | 14.4           | 65.0       | 0.59                |                      |                      |       |                      |
| 10                    | 97   | 85  | 72  | 56 | 41  | 16           | 5    | 1    |                    |    |    |                      | SM                   | 97.6                 | 1563     | 18.8           | 70.1       | 0.73                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | SM                   | 96.6                 | 1547     | 17.1           | 62.1       | 0.74                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    | 46 | 23 | 24                   | CL                   | 94.4                 | 1512     | 24.9           | 85.6       | 0.78                |                      |                      |       |                      |
|                       |      |     |     |    |     |              |      |      |                    |    |    |                      | CL                   | 89.3                 | 1430     | 30.6           | 93.0       | 0.89                |                      |                      |       |                      |
|                       |      |     |     |    |     | 82           |      |      |                    |    |    |                      | CL                   | 82.5                 | 1322     | 37.3           | 96.7       | 1.04                |                      |                      |       |                      |

2

| S (b) | USCS (c) | IN-SITU         |                      |                      |                |            | COMPACTED           |                      |                      | SPECIFIC GRAVITY OF SOLIDS | TRIAxIAL (d) | UNCONFINED COMPRESSION | DIRECT SHEAR | CONSOLIDATION | CHEMICAL | COR |
|-------|----------|-----------------|----------------------|----------------------|----------------|------------|---------------------|----------------------|----------------------|----------------------------|--------------|------------------------|--------------|---------------|----------|-----|
|       |          | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |                      | OPTIMUM MOISTURE (%) |                            |              |                        |              |               |          |     |
|       |          | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            | (pcf)               | (kg/m <sup>3</sup> ) |                      |                            |              |                        |              |               |          |     |
|       | GP       |                 |                      | 0.5                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | GP       |                 |                      | 1.0                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | GW       |                 |                      | 1.1                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | GW       |                 |                      | 3.0                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | GW       |                 |                      | 1.4                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       |                 |                      | 3.2                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
| NP    | SM       |                 |                      |                      |                |            |                     |                      | 2.59                 |                            |              |                        |              |               |          |     |
|       | SM       |                 |                      | 2.2                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 110.6           | 1772                 | 13.1                 | 67.6           | 0.52       |                     |                      |                      | *                          |              |                        |              | *             |          |     |
|       | SM       |                 |                      |                      |                |            |                     |                      |                      |                            | *            |                        |              |               |          |     |
|       | SP-SM    | 100.8           | 1615                 | 9.1                  | 36.6           | 0.67       |                     |                      |                      | *                          |              | *                      |              |               |          |     |
|       | SP-SM    |                 |                      |                      |                |            |                     |                      |                      |                            |              | *                      |              |               |          |     |
|       | SM       | 101.1           | 1619                 | 7.7                  | 31.2           | 0.67       |                     |                      |                      | *                          |              | *                      |              |               |          |     |
|       | SM       |                 |                      |                      |                |            |                     |                      |                      |                            |              | *                      |              |               |          |     |
|       | SM       | 105.1           | 1684                 | 17.8                 | 79.7           | 0.60       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SW-SM    | 108.7           | 1741                 | 12.4                 | 60.9           | 0.55       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SP-SM    | 96.0            | 1538                 | 13.5                 | 48.3           | 0.76       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SP-SM    | 104.1           | 1668                 | 10.2                 | 44.5           | 0.62       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SP-SM    | 99.4            | 1592                 | 14.6                 | 56.7           | 0.69       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | ML       | 96.3            | 1543                 | 12.1                 | 43.6           | 0.75       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 91.6            | 1467                 | 22.6                 | 73.5           | 0.84       |                     |                      |                      |                            |              |                        |              |               |          |     |
| NP    | ML       |                 |                      |                      |                |            |                     |                      | 2.58                 |                            |              |                        |              |               |          |     |
|       | SM       | 87.0            | 1394                 | 8.4                  | 24.2           | 0.93       |                     |                      |                      |                            |              | *                      |              |               |          |     |
|       | SM       | 103.0           | 1650                 | 6.5                  | 27.6           | 0.64       |                     |                      |                      |                            |              | *                      |              |               |          |     |
|       | SM       | 97.4            | 1560                 | 5.7                  | 21.0           | 0.73       |                     |                      |                      |                            |              | *                      |              |               |          |     |
|       | SP       | 81.2            | 1301                 | 23.3                 | 58.5           | 1.07       |                     |                      |                      |                            | *            |                        |              | *             |          |     |
| 11    | SP       | 80.9            | 1296                 | 27.9                 | 69.5           | 1.08       |                     |                      |                      |                            |              |                        | *            |               |          |     |
|       | SM       | 90.5            | 1450                 | 20.9                 | 65.4           | 0.86       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 93.5            | 1498                 | 11.5                 | 41.1           | 0.72       |                     |                      | 2.58                 |                            |              |                        |              |               |          |     |
|       | SM       | 110.1           | 1764                 | 13.8                 | 70.3           | 0.53       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 93.3            | 1495                 | 12.1                 | 40.5           | 0.81       |                     |                      |                      | *                          |              |                        |              |               |          |     |
|       | ML       | 89.2            | 1429                 | 15.4                 | 49.1           | 0.81       |                     |                      | 2.59                 |                            |              |                        |              |               |          |     |
|       | SM       | 95.2            | 1525                 | 8.3                  | 29.1           | 0.77       |                     |                      |                      | *                          |              |                        |              |               |          |     |
|       | SM       | 102.7           | 1645                 | 16.7                 | 70.0           | 0.64       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 106.2           | 1701                 | 15.8                 | 72.7           | 0.57       |                     |                      |                      | *                          |              |                        |              |               |          |     |
|       | SM       | 105.5           | 1690                 | 14.4                 | 65.0           | 0.59       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 97.6            | 1563                 | 18.8                 | 70.1           | 0.73       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | SM       | 96.6            | 1547                 | 17.1                 | 62.1           | 0.74       |                     |                      |                      |                            |              |                        |              |               |          |     |
| 24    | CL       | 94.4            | 1512                 | 24.9                 | 85.6           | 0.78       |                     |                      |                      |                            |              |                        |              |               |          |     |
|       | CL       | 89.3            | 1430                 | 30.6                 | 93.0           | 0.89       |                     |                      |                      |                            | *            |                        |              |               |          |     |
|       | CL       | 82.5            | 1322                 | 37.3                 | 96.7           | 1.04       |                     |                      |                      |                            | *            |                        |              |               |          |     |

SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMO

TABLE  
II-6-1  
2 OF 7

**FUGRO NATIONAL INC.**

2

3

| ACTIVITY NUMBER | SAMPLE NUMBER (a) | SAMPLE INTERVAL |             | PERCENT FINER BY WEIGHT |         |    |        |     |     |                   |     |     |    |
|-----------------|-------------------|-----------------|-------------|-------------------------|---------|----|--------|-----|-----|-------------------|-----|-----|----|
|                 |                   |                 |             | STANDARD SIEVE OPENING  |         |    |        |     |     | U S STANDARD SAND |     |     |    |
|                 |                   |                 |             | BLDRS                   | COBBLES |    | GRAVEL |     |     | SAND              |     |     |    |
|                 | 24"               | 12"             | 6"          | 3"                      | 1½"     | ¾" | 3/8"   | 4   | 10  | 40                | 60  |     |    |
|                 |                   | FEET            | METERS      |                         |         |    |        |     |     |                   |     |     |    |
| RV-B-6          | P-18              | 200.2-201.0     | 61.02-61.26 |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-18              | 200.2-201.0     | 61.02-61.26 |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-19              | 227.5-228.2     | 69.34-69.56 |                         |         |    |        |     |     | 100               | 95  | 81  | 40 |
|                 | P-20              | 250.1-250.9     | 76.23-76.47 |                         |         |    |        |     |     |                   |     | 100 | 92 |
|                 | P-20              | 251.9-252.6     | 76.78-76.99 |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-21              | 276.1-276.8     | 84.16-84.37 |                         |         |    |        |     |     |                   |     |     |    |
|                 | D-22              | 299.4-299.9     | 91.26-91.41 |                         |         |    |        |     |     |                   |     |     |    |
| RV-B-7          | P-1               | 5.0-5.7         | 1.52-1.74   |                         |         |    |        |     |     | 100               | 96  | 90  | 49 |
|                 | B-2               | 10.5-11.5       | 3.20-3.51   |                         |         |    |        |     |     |                   |     |     |    |
|                 | SS-3              | 15.0-16.5       | 4.57-5.03   |                         |         |    |        |     | 100 | 96                | 89  | 77  | 57 |
|                 | P-4               | 20.0-20.8       | 6.10-6.34   |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-4               | 20.0-20.8       | 6.10-6.34   |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-5               | 25.0-25.7       | 7.62-7.83   |                         |         |    |        |     | 100 | 99                | 97  | 89  | 57 |
|                 | P-6               | 30.0-30.8       | 9.14-9.39   |                         |         |    |        |     |     |                   |     | 100 | 93 |
|                 | P-6               | 30.0-30.8       | 9.14-9.39   |                         |         |    |        |     |     |                   |     |     |    |
|                 | D-7               | 40.0-41.2       | 12.19-12.56 |                         |         |    |        |     |     |                   |     |     |    |
|                 | D-8               | 50.0-50.7       | 15.24-15.45 |                         |         |    |        | 100 | 95  | 77                | 59  | 43  | 27 |
|                 | P-9               | 58.6-59.6       | 17.86-18.17 |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-10              | 69.0-69.7       | 21.03-21.24 |                         |         |    |        |     |     |                   | 100 | 98  | 87 |
|                 | P-11              | 81.0-81.7       | 24.69-24.90 |                         |         |    |        |     |     |                   |     |     |    |
|                 | P-12              | 91.8-93.0       | 27.98-28.35 |                         |         |    |        |     | 100 | 92                | 83  | 67  | 22 |
|                 | P-13              | 98.0-98.7       | 29.87-30.08 |                         |         |    |        |     |     |                   |     | 100 | 98 |

NOTES:

- (a) Sample types
  - SS - Standard split spoon
  - P - Pitcher
  - D - Fugro Drive
  - B, b - Bulk
- (b) NP - Not Plastic
- (c) USCS - Unified Soil Classification System
- (d) \* Indicates that test has been performed and results are included in this report

1

CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

| FINER BY WEIGHT       |      |     |    |                    |     |      |      | ATTERBERG LIMITS (b) |    |    | USCS (c) | IN-SITU              |      |                      |                | COMPACTED  |                     | SPECIFIC |                      |
|-----------------------|------|-----|----|--------------------|-----|------|------|----------------------|----|----|----------|----------------------|------|----------------------|----------------|------------|---------------------|----------|----------------------|
| U S STANDARD SIEVE NO |      |     |    | PARTICLE SIZE (mm) |     |      |      |                      |    |    |          | DRY UNIT WEIGHT      |      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |          | OPTIMUM MOISTURE (%) |
| 3/8"                  | SAND |     |    | SILT OR CLAY       |     |      |      | LL                   | PL | PI | (pcf)    | (kg/m <sup>3</sup> ) |      |                      |                |            |                     |          |                      |
|                       | 4    | 10  | 40 | 100                | 200 | .005 | .001 | 66                   | 37 | 29 | MH       | 74.4                 | 1192 | 44.3                 | 98.8           | 1.15       |                     |          | 2.                   |
|                       |      |     |    |                    |     |      |      |                      |    |    | MH       | 75.7                 | 1213 | 41.5                 | 91.4           | 1.23       |                     |          |                      |
| 100                   | 95   | 81  | 40 | 15                 | 7   |      |      |                      |    |    | SP-SM    | 110.2                | 1765 | 16.3                 | 83.8           | 0.53       |                     |          |                      |
|                       |      | 100 | 92 | 70                 | 40  | 13   | 7    | 38                   | 22 | 16 | SC       | 88.8                 | 1422 | 28.8                 | 86.8           | 0.90       |                     |          |                      |
|                       |      |     |    |                    |     |      |      |                      |    |    | SC       | 87.6                 | 1403 | 32.3                 | 94.5           | 0.92       |                     |          |                      |
|                       |      |     |    |                    |     |      |      | 55                   | 34 | 22 | MH       | 80.4                 | 1288 | 36.9                 | 91.0           | 1.10       |                     |          |                      |
|                       |      |     |    |                    |     |      |      | 61                   | 31 | 30 | MH       | 71.7                 | 1149 | 46.1                 | 92.3           | 1.35       |                     |          |                      |
| 100                   | 96   | 90  | 49 | 15                 | 10  |      |      |                      |    |    | SW-SM    | 102.1                | 1635 | 6.2                  | 25.7           | 0.65       |                     |          |                      |
|                       |      |     |    |                    |     |      |      |                      |    |    | SM       |                      |      | 2.2                  |                |            |                     |          |                      |
| 96                    | 89   | 77  | 57 | 36                 | 23  |      |      |                      |    |    | SM       |                      |      | 19.9                 |                |            |                     |          |                      |
|                       |      |     |    |                    | 64  |      |      | 27                   | 23 | 5  | ML       | 96.8                 | 1551 | 20.1                 | 73.3           | 0.74       |                     |          |                      |
|                       |      |     |    |                    |     |      |      |                      |    |    | ML       | 96.4                 | 1544 | 20.7                 | 74.7           | 0.75       |                     |          |                      |
| 99                    | 97   | 89  | 57 | 33                 | 25  |      |      |                      |    |    | NP SM    | 102.8                | 1647 | 16.6                 | 70.2           | 0.64       |                     |          |                      |
|                       |      | 100 | 93 | 75                 | 52  | 21   | 11   |                      |    |    | NP ML    | 110.0                | 1762 | 13.8                 | 82.5           | 0.42       |                     |          | 2.                   |
|                       |      |     |    |                    |     |      |      |                      |    |    | ML       | 107.4                | 1721 | 15.5                 | 85.5           | 0.45       |                     |          |                      |
|                       |      |     |    |                    |     |      |      |                      |    |    | SP-SM    | 103.0                | 1650 | 18.8                 | 79.8           | 0.64       |                     |          |                      |
| 77                    | 59   | 43  | 27 | 11                 | 9   |      |      |                      |    |    | SP-SM    | 115.4                | 1849 | 7.0                  | 41.1           | 0.46       |                     |          |                      |
|                       |      |     |    |                    |     |      |      |                      |    |    | SP-SM    | 112.7                | 1805 | 16.0                 | 87.3           | 0.49       |                     |          |                      |
|                       | 100  | 98  | 87 | 69                 | 50  |      |      |                      |    |    | NP ML    | 98.3                 | 1575 | 19.8                 | 74.9           | 0.71       |                     |          |                      |
|                       |      |     |    |                    |     |      |      |                      |    |    | NP ML    | 83.6                 | 1334 | 24.2                 | 64.5           | 1.01       |                     |          |                      |
| 92                    | 83   | 67  | 22 | 5                  | 3   |      |      |                      |    |    | SP       | 110.7                | 1773 | 14.8                 | 76.6           | 0.52       |                     |          |                      |
|                       |      | 100 | 98 | 92                 | 86  | 37   | 15   |                      |    |    | CL       | 92.6                 | 1483 | 20.0                 | 65.9           | 0.82       |                     |          |                      |

| NO. (b) | PI | USCS (c) | IN-SITU         |                      |                      |                |            | COMPACTED           |                      |                      | SPECIFIC GRAVITY OF SOLIDS | TRIAxIAL (d) | UNCONFINED COMPRESSION | DIRECT SHEAR | CONSOLIDATION | CHEMICAL | CBR |
|---------|----|----------|-----------------|----------------------|----------------------|----------------|------------|---------------------|----------------------|----------------------|----------------------------|--------------|------------------------|--------------|---------------|----------|-----|
|         |    |          | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |                      | OPTIMUM MOISTURE (%) |                            |              |                        |              |               |          |     |
|         |    |          | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            | (pcf)               | (kg/m <sup>3</sup> ) |                      |                            |              |                        |              |               |          |     |
| 7       | 29 | MH       | 74.4            | 1192                 | 44.3                 | 98.8           | 1.15       |                     |                      |                      | 2.56                       |              | *                      |              |               |          |     |
|         |    | MH       | 75.7            | 1213                 | 41.5                 | 91.4           | 1.23       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | SP-SM    | 110.2           | 1765                 | 16.3                 | 83.8           | 0.53       |                     |                      |                      |                            |              |                        |              |               |          |     |
| 2       | 16 | SC       | 88.8            | 1422                 | 28.8                 | 86.8           | 0.90       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | SC       | 87.6            | 1403                 | 32.3                 | 94.5           | 0.92       |                     |                      |                      |                            |              | *                      |              |               |          |     |
| 4       | 22 | MH       | 80.4            | 1288                 | 36.9                 | 91.0           | 1.10       |                     |                      |                      |                            |              | *                      |              |               |          |     |
| 1       | 30 | MH       | 71.7            | 1149                 | 46.1                 | 92.3           | 1.35       |                     |                      |                      |                            |              | *                      |              |               |          |     |
|         |    | SW-SM    | 102.1           | 1635                 | 6.2                  | 25.7           | 0.65       |                     |                      |                      |                            |              |                        | *            |               |          |     |
|         |    | SM       |                 |                      | 2.2                  |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | SM       |                 |                      | 19.9                 |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
| 3       | 5  | ML       | 96.8            | 1551                 | 20.1                 | 73.3           | 0.74       |                     |                      |                      |                            |              | *                      |              |               |          |     |
|         |    | ML       | 96.4            | 1544                 | 20.7                 | 74.7           | 0.75       |                     |                      |                      |                            |              |                        |              | *             |          |     |
|         |    | NP SM    | 102.8           | 1647                 | 16.6                 | 70.2           | 0.64       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | NP ML    | 110.0           | 1762                 | 13.8                 | 82.5           | 0.42       |                     |                      |                      | 2.50                       |              | *                      |              |               |          |     |
|         |    | ML       | 107.4           | 1721                 | 15.5                 | 85.5           | 0.45       |                     |                      |                      |                            |              |                        |              | *             |          |     |
|         |    | SP-SM    | 103.0           | 1650                 | 18.8                 | 79.8           | 0.64       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | SP-SM    | 115.4           | 1849                 | 7.0                  | 41.1           | 0.46       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | SP-SM    | 112.7           | 1805                 | 16.0                 | 87.3           | 0.49       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | NP ML    | 98.3            | 1575                 | 19.8                 | 74.9           | 0.71       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | NP ML    | 83.6            | 1339                 | 24.2                 | 64.5           | 1.01       |                     |                      |                      |                            |              | *                      |              |               |          |     |
|         |    | SP       | 110.7           | 1773                 | 14.8                 | 76.6           | 0.52       |                     |                      |                      |                            |              |                        |              |               |          |     |
|         |    | CL       | 92.6            | 1483                 | 20.0                 | 65.9           | 0.82       |                     |                      |                      |                            |              |                        |              |               |          |     |

SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE BMO

TABLE  
II-6-1  
3 OF 7

**TUBRO NATIONAL, INC.**

2

3

| ACTIVITY NUMBER | SAMPLE NUMBER (a) | SAMPLE INTERVAL |             | PERCENT FINER BY WEIGHT |    |         |      |        |     |       |    |     |
|-----------------|-------------------|-----------------|-------------|-------------------------|----|---------|------|--------|-----|-------|----|-----|
|                 |                   |                 |             | STANDARD SIEVE OPENING  |    |         |      |        |     | U S S |    |     |
|                 |                   |                 |             | BLDRS.                  |    | COBBLES |      | GRAVEL |     | 4     | 10 |     |
| FEET            | METERS            | 24"             | 12"         | 6"                      | 3" | 1 1/2"  | 3/4" | 3/8"   | 4   | 10    |    |     |
| RV-B-8          | D-1               | 5.7-6.2         | 1.74-1.89   |                         |    |         |      | 100    | 91  | 80    | 67 | 51  |
|                 | D-2               | 10.7-11.2       | 3.26-3.41   |                         |    |         |      |        |     |       |    |     |
|                 | D-3               | 15.3-15.8       | 4.66-4.82   |                         |    |         |      | 100    | 82  | 69    | 69 | 55  |
|                 | D-4               | 20.4-20.9       | 6.22-6.37   |                         |    |         |      | 100    | 99  | 89    | 89 | 76  |
|                 | D-5               | 25.4-25.9       | 7.74-7.89   |                         |    |         |      | 100    | 96  | 89    | 89 | 72  |
|                 | D-6               | 30.4-30.9       | 9.27-9.42   |                         |    |         |      | 100    | 87  | 77    | 77 | 66  |
|                 | D-7               | 40.0-40.9       | 12.19-12.47 |                         |    |         |      | 100    | 96  | 85    | 77 | 68  |
|                 | D-8               | 50.0-50.9       | 15.24-15.51 |                         |    |         |      | 100    | 88  | 68    | 53 | 41  |
|                 | D-9               | 60.0-60.9       | 18.29-18.56 |                         |    |         |      |        |     |       |    |     |
|                 | D-10              | 70.0-70.9       | 21.34-21.61 |                         |    |         |      | 100    | 86  | 69    | 54 | 42  |
|                 | D-11              | 80.0-80.9       | 24.38-24.66 |                         |    |         |      |        |     |       |    |     |
|                 | D-12              | 90.0-90.9       | 27.43-27.71 |                         |    |         |      |        |     |       |    |     |
|                 | D-13              | 100.0-101.0     | 30.48-30.78 |                         |    |         |      | 100    | 84  | 63    | 63 | 44  |
|                 | D-14              | 125.0-125.9     | 38.10-38.37 |                         |    |         |      |        | 100 | 99    | 99 | 96  |
|                 | D-15              | 150.0-150.9     | 45.72-45.99 |                         |    |         |      |        |     |       |    | 100 |
|                 | D-16              | 177.0-178.0     | 53.95-54.25 |                         |    |         |      |        |     |       |    |     |
|                 | D-17              | 200.5-201.2     | 61.11-61.33 |                         |    |         |      |        |     |       |    | 100 |
|                 | D-18              | 225.2-225.9     | 68.64-68.85 |                         |    |         |      |        | 100 | 99    | 99 | 95  |
|                 | D-19              | 250.2-250.9     | 76.20-76.47 |                         |    |         |      | 100    | 98  | 97    | 97 | 93  |
|                 | D-21              | 300.2-300.7     | 91.50-91.65 |                         |    |         |      |        |     |       |    | 100 |
| RV-B-9          | SS-1              | 5.0-6.0         | 1.52-1.83   |                         |    |         |      | 100    | 94  | 85    | 85 | 74  |
|                 | SS-2              | 10.0-10.2       | 3.05-3.11   |                         |    |         |      |        |     |       |    |     |
|                 | P-3               | 15.7-16.5       | 4.79-5.03   |                         |    |         |      |        |     |       |    |     |
|                 | SS-4              | 20.0-20.6       | 6.10-6.28   |                         |    |         |      |        |     |       |    | 100 |
|                 | P-6               | 30.0-30.5       | 9.14-9.30   |                         |    |         |      | 100    | 99  | 91    | 91 | 74  |
|                 | P-8               | 50.7-51.8       | 15.45-15.79 |                         |    |         |      |        | 100 | 99    | 99 | 97  |
|                 | P-10              | 70.0-70.7       | 21.34-21.55 |                         |    |         |      | 100    | 95  | 85    | 85 | 73  |
|                 | SS-12             | 100.0-100.7     | 30.48-30.69 |                         |    |         |      | 100    | 91  | 75    | 75 | 63  |
| RV-B-10         | b-3               | 21.0-22.0       | 6.40-6.71   |                         |    |         |      | 100    | 93  | 81    | 81 | 59  |
|                 | b-7               | 72.0-73.0       | 21.95-22.25 |                         |    |         |      |        |     |       |    |     |
|                 | b-8               | 90.0-91.0       | 27.43-27.74 |                         |    |         |      | 100    | 95  | 88    | 70 | 49  |
|                 | b-9               | 99.0-100.0      | 30.18-30.48 |                         |    |         |      | 100    | 97  | 82    | 82 | 81  |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |
|                 |                   |                 |             |                         |    |         |      |        |     |       |    |     |

CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

**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

| BY WEIGHT             |     |    |              |                    |      |      | ATTERBERG LIMITS (b) |    |    | USCS (c) | IN-SITU         |                      |                      |                | COMPACTED  |                     | SPECIFIC GRAVITY OF SOLIDS |                      |                      |
|-----------------------|-----|----|--------------|--------------------|------|------|----------------------|----|----|----------|-----------------|----------------------|----------------------|----------------|------------|---------------------|----------------------------|----------------------|----------------------|
| U S STANDARD SIEVE NO |     |    |              | PARTICLE SIZE (mm) |      |      |                      |    |    |          | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |                            | OPTIMUM MOISTURE (%) |                      |
| SAND                  |     |    | SILT OR CLAY |                    |      |      |                      |    |    |          | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            | (pcf)               |                            |                      | (kg/m <sup>3</sup> ) |
| 4                     | 10  | 40 | 100          | 200                | .005 | .001 | LL                   | PL | PI |          |                 |                      |                      |                |            |                     |                            |                      |                      |
| 67                    | 51  | 22 | 9            | 8                  |      |      |                      |    |    | SP-SM    | 107.5           | 1722                 | 3.8                  | 18.1           | 0.57       |                     |                            |                      |                      |
|                       |     |    |              |                    |      |      |                      |    |    | SP-SM    | 100.4           | 1608                 | 12.6                 | 50.2           | 0.68       |                     |                            |                      |                      |
| 69                    | 55  | 30 | 15           | 12                 |      |      |                      |    |    | SW-SM    | 115.8           | 1855                 | 7.8                  | 46.3           | 0.45       |                     |                            |                      |                      |
| 89                    | 76  | 43 | 22           | 18                 |      |      |                      |    |    | SC       | 116.9           | 1873                 | 7.4                  | 53.4           | 0.35       |                     | 2.53                       |                      |                      |
| 89                    | 72  | 30 | 17           | 15                 | 8    | 6    | 35                   | 15 | 20 | SC       | 114.6           | 1837                 | 8.9                  | 59.6           | 0.38       |                     |                            |                      |                      |
| 77                    | 66  | 41 | 20           | 15                 | 5    | 2    | 34                   | 21 | 13 | SC       | 114.7           | 1837                 | 8.9                  | 59.7           | 0.38       |                     |                            |                      |                      |
| 77                    | 68  | 52 | 24           | 18                 |      |      |                      |    |    | SC       | 113.6           | 1820                 | 10.2                 | 57.0           | 0.48       |                     |                            |                      |                      |
| 53                    | 41  | 20 | 9            | 7                  | 2    | 1    |                      |    |    | GW-GM    | 121.4           | 1945                 | 9.4                  | 65.4           | 0.39       |                     |                            |                      |                      |
|                       |     |    |              |                    |      |      |                      |    |    | SW-SM    | 113.0           | 1810                 | 13.3                 | 73.1           | 0.49       |                     |                            |                      |                      |
| 54                    | 42  | 19 | 9            | 7                  | 2    | 1    |                      |    |    | SW-SM    | 114.5           | 1834                 | 8.2                  | 47.0           | 0.47       |                     |                            |                      |                      |
|                       |     |    |              |                    |      |      |                      |    |    | SW-SM    | 116.3           | 1863                 | 8.3                  | 49.9           | 0.45       |                     |                            |                      |                      |
|                       |     |    |              |                    |      |      |                      |    |    | SW-SM    | 113.9           | 1825                 | 9.6                  | 54.1           | 0.48       |                     |                            |                      |                      |
| 63                    | 44  | 22 | 12           | 9                  |      |      |                      |    |    | SW-SM    | 115.5           | 1850                 | 9.5                  | 55.9           | 0.46       |                     |                            |                      |                      |
| 99                    | 96  | 85 | 40           | 20                 |      |      |                      |    |    | SM       | 107.0           | 1714                 | 8.4                  | 39.5           | 0.57       |                     |                            |                      |                      |
|                       | 100 | 93 | 76           | 55                 | 12   | 4    | 26                   | 22 | 4  | ML       | 107.2           | 1717                 | 9.6                  | 45.3           | 0.57       |                     |                            |                      |                      |
|                       |     |    |              |                    |      |      |                      |    |    | SP       | 117.8           | 1887                 | 7.6                  | 47.7           | 0.43       |                     |                            |                      |                      |
|                       | 100 | 97 | 79           | 63                 |      |      |                      |    |    | ML       |                 |                      |                      |                |            |                     |                            |                      |                      |
| 99                    | 95  | 75 | 46           | 22                 | 8    | 3    |                      |    |    | SM       | 114.6           | 1836                 | 10.6                 | 60.9           | 0.47       |                     |                            |                      |                      |
| 97                    | 93  | 82 | 66           | 45                 | 10   | 4    |                      |    | NP | SM       | 114.2           | 1829                 | 12.0                 | 68.2           | 0.48       |                     |                            |                      |                      |
|                       | 100 | 65 | 35           | 28                 | 8    | 3    |                      |    |    | SM       | 115.1           | 1844                 | 10.0                 | 58.2           | 0.46       |                     |                            |                      |                      |
| 85                    | 74  | 55 | 35           | 23                 | 4    | 0    |                      |    |    | SM       |                 |                      |                      |                |            |                     |                            |                      |                      |
|                       |     |    |              | 7                  |      |      | 25                   | 16 | 9  | SP-SC    | 101.0           | 1618                 | 17.8                 | 71.9           | 0.67       |                     |                            |                      |                      |
|                       | 100 | 99 | 94           | 87                 |      |      |                      |    |    | CL       |                 |                      |                      |                |            |                     |                            |                      |                      |
| 91                    | 74  | 40 | 16           | 8                  | 3    | 1    |                      |    |    | SP-SM    | 103.6           | 1660                 | 11.5                 | 49.5           | 0.63       |                     |                            |                      |                      |
| 99                    | 97  | 88 | 64           | 53                 | 17   | 9    |                      |    |    | CL       | 92.3            | 1479                 | 22.3                 | 73.0           | 0.83       |                     |                            |                      |                      |
| 85                    | 73  | 47 | 11           | 6                  | 1    | 0    |                      |    |    | SP-SM    | 106.5           | 1706                 | 20.6                 | 95.6           | 0.58       |                     |                            |                      |                      |
| 75                    | 63  | 25 | 9            | 6                  |      |      |                      |    |    | SP-SM    |                 |                      |                      |                |            |                     |                            |                      |                      |
| 81                    | 59  | 35 | 21           | 12                 | 3    | 2    |                      |    |    | SM       |                 |                      | 1.7                  |                |            |                     |                            |                      |                      |
|                       |     |    |              |                    |      |      |                      |    |    | SC       |                 |                      | 8.0                  |                |            |                     |                            |                      |                      |
| 70                    | 49  | 21 | 10           | 6                  |      |      |                      |    |    | SP-SM    |                 |                      | 1.3                  |                |            |                     |                            |                      |                      |
| 89                    | 81  | 55 | 29           | 17                 | 2    | 1    |                      |    |    | SM       |                 |                      | 1.6                  |                |            |                     |                            |                      |                      |

2



| TERBERG<br>BITS (b) |    | USCS<br>(c) | IN-SITU            |                      |                            |                   |               | COMPACTED              |                       | SPECIFIC<br>GRAVITY<br>OF SOLIDS | TRIAxIAL (d) | UNCONFINED<br>COMPRESSION | DIRECT<br>SHEAR | CONSOLIDATION | CHEMICAL | CBR |                            |
|---------------------|----|-------------|--------------------|----------------------|----------------------------|-------------------|---------------|------------------------|-----------------------|----------------------------------|--------------|---------------------------|-----------------|---------------|----------|-----|----------------------------|
|                     |    |             | DRY UNIT<br>WEIGHT |                      | MOISTURE<br>CONTENT<br>(%) | SATURATION<br>(%) | VOID<br>RATIO | MAXIMUM<br>DRY DENSITY |                       |                                  |              |                           |                 |               |          |     | OPTIMUM<br>MOISTURE<br>(%) |
|                     |    |             | (pcf)              | (kg/m <sup>3</sup> ) |                            |                   |               | (pcf)                  | (kg. m <sup>3</sup> ) |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP-SM       | 107.5              | 1722                 | 3.8                        | 18.1              | 0.57          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP-SM       | 100.4              | 1608                 | 12.6                       | 50.2              | 0.68          |                        |                       |                                  | *            |                           |                 |               |          |     |                            |
|                     |    | SW-SM       | 115.8              | 1855                 | 7.8                        | 46.3              | 0.45          |                        |                       |                                  | *            |                           |                 |               |          |     |                            |
|                     |    | SC          | 116.9              | 1873                 | 7.4                        | 53.4              | 0.35          |                        |                       | 2.53                             | *            |                           |                 |               |          |     |                            |
| 15                  | 20 | SC          | 114.6              | 1837                 | 8.9                        | 59.6              | 0.38          |                        |                       |                                  |              |                           | *               |               |          |     |                            |
| 21                  | 13 | SC          | 114.7              | 1837                 | 8.9                        | 59.7              | 0.38          |                        |                       |                                  |              |                           | *               |               |          |     |                            |
|                     |    | SC          | 113.6              | 1820                 | 10.2                       | 57.0              | 0.48          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | GW-GM       | 121.4              | 1945                 | 9.4                        | 65.4              | 0.39          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SW-SM       | 113.0              | 1810                 | 13.3                       | 73.1              | 0.49          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SW-SM       | 114.5              | 1834                 | 8.2                        | 47.0              | 0.47          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SW-SM       | 116.3              | 1863                 | 8.3                        | 49.9              | 0.45          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SW-SM       | 113.9              | 1825                 | 9.6                        | 54.1              | 0.48          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SW-SM       | 115.5              | 1850                 | 9.5                        | 55.9              | 0.46          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SM          | 107.0              | 1714                 | 8.4                        | 39.5              | 0.57          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
| 22                  | 4  | ML          | 107.2              | 1717                 | 9.6                        | 45.3              | 0.57          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP          | 117.8              | 1887                 | 7.6                        | 47.7              | 0.43          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | ML          |                    |                      |                            |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SM          | 114.6              | 1836                 | 10.6                       | 60.9              | 0.47          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     | NP | SM          | 114.2              | 1829                 | 12.0                       | 68.2              | 0.48          |                        |                       |                                  | *            |                           |                 |               |          |     |                            |
|                     |    | SM          | 115.1              | 1844                 | 10.0                       | 58.2              | 0.46          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SM          |                    |                      |                            |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SM          |                    |                      |                            |                   |               |                        |                       |                                  |              |                           |                 | *             |          |     |                            |
| 16                  | 9  | SP-SC       | 101.0              | 1618                 | 17.8                       | 71.9              | 0.67          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | CL          |                    |                      |                            |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP-SM       | 103.6              | 1660                 | 11.5                       | 49.5              | 0.63          |                        |                       |                                  |              |                           | *               |               |          |     |                            |
|                     |    | CL          | 92.3               | 1479                 | 22.3                       | 73.0              | 0.83          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP-SM       | 106.5              | 1706                 | 20.6                       | 95.6              | 0.58          |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP-SM       |                    |                      |                            |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SM          |                    |                      | 1.7                        |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SC          |                    |                      | 8.0                        |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SP-SM       |                    |                      | 1.3                        |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |
|                     |    | SM          |                    |                      | 1.6                        |                   |               |                        |                       |                                  |              |                           |                 |               |          |     |                            |

SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE BMO

TABLE  
II-6-1  
4 OF 7

**TUGRO NATIONAL, INC.**

| ACTIVITY NUMBER | SAMPLE NUMBER (a) | SAMPLE INTERVAL |             | PERCENT FINER BY WEIGHT |         |     |        |     |        |      |           |     |    |
|-----------------|-------------------|-----------------|-------------|-------------------------|---------|-----|--------|-----|--------|------|-----------|-----|----|
|                 |                   |                 |             | STANDARD SIEVE OPENING  |         |     |        |     |        |      | U S STAND |     |    |
|                 |                   |                 |             | BLDRS                   | COBBLES |     | GRAVEL |     |        |      | SAND      |     |    |
|                 |                   |                 |             |                         | 24"     | 12" | 6"     | 3"  | 1 1/2" | 3/4" | 3/8"      | 4   | 10 |
| FEET            | METERS            |                 |             |                         |         |     |        |     |        |      |           |     |    |
| RV-B-12         | B-1               | 0.0-2.2         | 0.00-0.67   |                         |         |     |        | 100 | 91     | 78   | 65        | 55  |    |
|                 | D-1               | 5.0-6.4         | 1.52-1.95   |                         |         |     |        |     | 100    | 94   | 79        | 62  |    |
|                 | D-2               | 10.2-10.9       | 3.11-3.32   |                         |         |     |        | 100 | 67     | 52   | 39        | 28  |    |
|                 | D-3               | 15.4-15.9       | 4.64-4.85   |                         |         |     |        |     | 100    | 90   | 78        | 60  |    |
|                 | D-4               | 20.3-20.8       | 6.19-6.34   |                         |         |     |        |     | 100    | 91   | 79        | 63  |    |
|                 | P-6               | 30.0-30.7       | 9.14-9.36   |                         |         |     |        |     |        | 100  | 99        | 98  |    |
|                 | P-7               | 38.0-38.7       | 11.58-11.80 |                         |         |     |        |     |        |      |           |     |    |
|                 | P-8               | 48.0-48.7       | 14.63-14.84 |                         |         |     |        |     |        | 100  | 95        | 90  |    |
|                 | P-9               | 58.0-58.8       | 17.68-17.92 |                         |         |     |        |     |        |      |           |     |    |
|                 | P-10              | 68.0-68.7       | 20.73-20.94 |                         |         |     |        |     |        |      | 100       | 99  |    |
|                 | P-11              | 80.0-80.7       | 24.38-24.60 |                         |         |     |        |     |        |      |           |     |    |
|                 | P-12              | 90.0-90.9       | 27.43-27.71 |                         |         |     |        |     |        | 100  | 99        | 95  |    |
| RV-B-13         | SS-1              | 5.0-6.4         | 1.52-1.95   |                         |         |     |        |     | 100    | 73   | 55        | 37  |    |
|                 | SS-5              | 25.0-25.7       | 7.62-7.83   |                         |         |     |        |     | 100    | 99   | 96        | 91  |    |
|                 | D-6               | 30.0-30.5       | 9.14-9.30   |                         |         |     |        | 100 | 90     | 68   | 53        | 37  |    |
|                 | B-7               | 40.0-41.9       | 12.19-12.77 |                         |         |     |        | 100 | 86     | 70   | 54        | 41  |    |
|                 | P-8               | 50.0-50.8       | 15.24-15.48 |                         |         |     |        |     |        |      |           | 100 |    |
|                 | D-9               | 60.0-60.7       | 18.29-18.50 |                         |         |     |        |     |        | 100  | 96        | 65  |    |
|                 | D-10              | 70.0-70.9       | 21.34-21.61 |                         |         |     | 100    | 72  | 61     | 50   | 40        | 28  |    |
|                 | D-11              | 80.0-81.0       | 24.38-24.69 |                         |         |     |        | 100 | 93     | 83   | 65        | 46  |    |
|                 | D-12              | 90.0-91.0       | 27.43-27.74 |                         |         |     |        |     |        |      |           |     |    |
|                 | D-13              | 100.0-100.7     | 30.48-30.69 |                         |         |     |        | 100 | 89     | 82   | 69        | 53  |    |
|                 | D-14              | 125.0-125.8     | 38.10-38.34 |                         |         |     |        |     | 100    | 80   | 64        | 46  |    |
|                 | D-15              | 150.0-150.5     | 45.72-45.87 |                         |         |     |        |     | 100    | 79   | 67        | 49  |    |
|                 | D-16              | 181.0-181.9     | 55.17-55.44 |                         |         |     |        | 100 | 91     | 72   | 54        | 38  |    |
|                 | D-17              | 200.0-200.7     | 60.96-61.17 |                         |         |     |        | 100 | 91     | 71   | 53        | 42  |    |
|                 | D-18              | 250.0-251.0     | 76.20-76.50 |                         |         |     |        |     |        |      |           |     |    |
|                 | D-19              | 275.0-276.0     | 83.82-84.12 |                         |         |     |        | 100 | 88     | 85   | 64        | 53  |    |
|                 | D-20              | 301.0-301.7     | 91.74-91.96 |                         |         |     |        |     | 100    | 96   | 77        | 50  |    |

CHECKED BY \_\_\_\_\_ APPROVED BY \_\_\_\_\_

**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



| S | L | PI | USCS (c) | IN-SITU         |                      |                      |                |            | COMPACTED           |                      |                      | SPECIFIC GRAVITY OF SOLIDS | TRIAxIAL (d) | UNCONFINED COMPRESSION | DIRECT SHEAR | CONSOLIDATION | CHEMICAL | CBR |
|---|---|----|----------|-----------------|----------------------|----------------------|----------------|------------|---------------------|----------------------|----------------------|----------------------------|--------------|------------------------|--------------|---------------|----------|-----|
|   |   |    |          | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |                      | OPTIMUM MOISTURE (%) |                            |              |                        |              |               |          |     |
|   |   |    |          | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            | (pcf)               | (kg/m <sup>3</sup> ) |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       |                 |                      |                      |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       | 106.2           | 1701                 | 10.0                 | 46.0           | 0.59       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GP-GM    | 112.1           | 1796                 | 11.6                 | 62.3           | 0.50       |                     |                      |                      |                            | *            |                        |              |               |          |     |
|   |   |    | SW-SM    | 116.4           | 1865                 | 5.4                  | 32.6           | 0.45       |                     |                      |                      |                            | *            |                        |              |               |          |     |
|   |   |    | SM       | 111.5           | 1786                 | 9.7                  | 51.2           | 0.51       |                     |                      |                      |                            | *            |                        |              |               |          |     |
|   |   |    | SM       | 84.3            | 1350                 | 21.3                 | 57.6           | 1.00       |                     |                      |                      |                            |              | *                      | *            |               |          |     |
|   |   |    | SM       | 88.1            | 1411                 | 14.6                 | 43.2           | 0.91       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       | 90.1            | 1443                 | 15.1                 | 49.0           | 0.80       |                     |                      |                      | 2.60                       |              | *                      |              |               |          |     |
|   |   |    | SM       | 91.1            | 1459                 | 19.7                 | 62.5           | 0.85       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       | 81.5            | 1306                 | 16.7                 | 42.2           | 1.07       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       | 86.3            | 1382                 | 16.8                 | 47.6           | 0.95       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       | 92.4            | 1480                 | 22.4                 | 73.5           | 0.82       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SW-SM    |                 |                      |                      |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | ML       |                 |                      | 15.2                 |                |            |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GP-GM    | 108.3           | 1735                 | 15.7                 | 76.3           | 0.56       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GP-GM    | 119.1           | 1908                 | 9.2                  | 59.9           | 0.41       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   | NP | ML       | 85.2            | 1365                 | 19.6                 | 56.8           | 0.89       |                     |                      |                      | 2.58                       |              | *                      |              |               |          |     |
|   |   |    | SC       | 115.4           | 1849                 | 11.7                 | 68.7           | 0.46       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GW-GC    | 122.1           | 1956                 | 9.0                  | 64.0           | 0.38       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SC       | 115.5           | 1850                 | 11.7                 | 68.9           | 0.46       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SC       | 118.2           | 1893                 | 9.6                  | 60.9           | 0.43       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SC       | 122.5           | 1962                 | 9.3                  | 66.9           | 0.38       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SC       | 114.8           | 1839                 | 14.9                 | 86.0           | 0.47       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SC       | 117.3           | 1879                 | 12.3                 | 76.1           | 0.44       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GP-GC    | 122.9           | 1969                 | 10.3                 | 75.0           | 0.37       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GP-GC    | 120.9           | 1937                 | 11.2                 | 76.8           | 0.39       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | GP-GC    | 116.6           | 1868                 | 11.8                 | 71.6           | 0.44       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   |    | SM       | 109.6           | 1756                 | 17.1                 | 85.9           | 0.54       |                     |                      |                      |                            |              |                        |              |               |          |     |
|   |   | NP | SW-SM    | 107.8           | 1727                 | 14.5                 | 69.6           | 0.56       |                     |                      |                      |                            |              |                        |              |               |          |     |

SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - 8MO

TABLE  
II-6-1  
5 OF 7

**FUGRO NATIONAL, INC.**

2

AFV-01  
3

| ACTIVITY NUMBER | SAMPLE NUMBER (a) | SAMPLE INTERVAL |             | PERCENT FINER BY WEIGHT |         |      |        |     |     |              |    |    |    |
|-----------------|-------------------|-----------------|-------------|-------------------------|---------|------|--------|-----|-----|--------------|----|----|----|
|                 |                   |                 |             | STANDARD SIEVE OPENING  |         |      |        |     |     | U S STANDARD |    |    |    |
|                 |                   |                 |             | BLDRS.                  | COBBLES |      | GRAVEL |     |     | SAND         |    |    |    |
|                 | 24"               | 12"             | 6"          | 3"                      | 1 1/2"  | 3/4" | 3/8"   | 4   | 10  | 40           |    |    |    |
|                 |                   | FEET            | METERS      |                         |         |      |        |     |     |              |    |    |    |
| RV-B-14         | b-1               | 5.0-6.0         | 1.52-1.83   |                         |         |      |        | 100 | 97  | 81           | 62 | 43 | 20 |
|                 | b-2               | 13.0-14.0       | 3.96-4.27   |                         |         |      |        |     | 100 | 68           | 35 | 20 | 10 |
|                 | b-3               | 21.0-22.0       | 6.40-6.71   |                         |         |      |        |     |     |              |    |    |    |
|                 | b-4               | 29.0-30.0       | 8.84-9.14   |                         |         |      |        |     |     |              |    |    |    |
|                 | b-6               | 53.0-54.0       | 16.15-16.46 |                         |         |      |        | 100 | 76  | 49           | 39 | 32 | 23 |
|                 | b-7               | 69.0-70.0       | 21.03-21.34 |                         |         |      |        |     | 100 | 95           | 85 | 77 | 67 |
| RV-B-15         | SS-1              | 6.0-7.5         | 1.83-2.29   |                         |         |      |        | 100 | 84  | 78           | 70 | 58 | 40 |
|                 | SS-2              | 14.0-15.0       | 4.27-4.57   |                         |         |      |        | 100 | 86  | 73           | 56 | 41 | 24 |
|                 | b-3               | 22.0-23.0       | 6.71-7.01   |                         |         |      |        | 100 | 86  | 76           | 65 | 52 | 32 |
|                 | SS-4              | 31.0-32.0       | 9.45-9.75   |                         |         |      |        |     |     |              |    |    |    |
|                 | SS-5              | 40.0-41.5       | 12.19-12.65 |                         |         |      |        |     | 100 | 84           | 68 | 51 | 32 |
|                 | SS-6              | 56.0-57.5       | 17.07-17.53 |                         |         |      |        |     |     |              |    |    |    |
| RV-B-16         | b-1               | 5.0-6.0         | 1.52-1.83   |                         |         |      |        | 100 | 69  | 43           | 29 | 19 | 6  |
|                 | b-2               | 14.0-15.0       | 4.27-4.57   |                         |         |      |        |     |     |              |    |    |    |
|                 | b-3               | 22.0-23.0       | 6.71-7.01   |                         |         |      |        |     |     |              |    |    |    |
|                 | b-4               | 30.0-31.0       | 9.14-9.45   |                         |         |      |        | 100 | 81  | 55           | 38 | 25 | 11 |
|                 | b-5               | 38.0-39.0       | 11.58-11.89 |                         |         |      |        |     |     |              |    |    |    |
|                 | SS-6              | 47.0-47.5       | 14.33-14.48 |                         |         |      |        |     | 100 | 96           | 83 | 68 | 44 |
|                 | SS-7              | 64.0-65.5       | 19.51-19.96 |                         |         |      |        |     | 100 | 96           | 93 | 89 | 74 |
|                 | b-8               | 89.0-90.0       | 27.13-27.43 |                         |         |      |        |     |     | 100          | 99 | 99 | 88 |
|                 | b-9               | 99.0-100.0      | 30.18-30.48 |                         |         |      |        |     |     |              |    |    |    |

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

CHECK BY APPROVED BY

| BY WEIGHT              |    |    |     |                    |      |      | ATTERBERG LIMITS (b) |                      |       | USCS (c)             | IN-SITU         |                      |                      |                | COMPACTED  |                     |  | SPECIFIC GRAVITY OF SOLIDS |
|------------------------|----|----|-----|--------------------|------|------|----------------------|----------------------|-------|----------------------|-----------------|----------------------|----------------------|----------------|------------|---------------------|--|----------------------------|
| U S STANDARD SIEVE NO. |    |    |     | PARTICLE SIZE (mm) |      |      |                      |                      |       |                      | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |  |                            |
| SAND                   |    |    |     | SILT OR CLAY       |      |      | (pcf)                | (kg/m <sup>3</sup> ) | (pcf) | (kg/m <sup>3</sup> ) | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            |                     |  |                            |
| 4                      | 10 | 40 | 100 | 200                | .005 | .001 | LL                   | PL                   | PI    |                      |                 |                      |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       |                      |                 |                      |                      |                |            |                     |  |                            |
| 62                     | 43 | 20 | 13  | 9                  | 2    | 1    |                      |                      |       | SW-SM                |                 | 3.6                  |                      |                |            |                     |  |                            |
| 35                     | 20 | 10 | 7   | 5                  | 2    | 1    |                      |                      |       | GP-GM                |                 | 1.6                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | GP-GM                |                 | 1.7                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | GP-GM                |                 | 1.7                  |                      |                |            |                     |  |                            |
| 39                     | 32 | 23 | 18  | 15                 | 4    | 3    |                      |                      |       | GC                   |                 | 3.0                  |                      |                |            |                     |  |                            |
| 85                     | 77 | 67 | 59  | 54                 | 28   | 0    |                      |                      |       | CL                   |                 | 9.2                  |                      |                |            | 2.53                |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       |                      |                 |                      |                      |                |            |                     |  |                            |
| 70                     | 58 | 40 | 30  | 22                 |      |      |                      |                      |       | SM                   |                 | 6.5                  |                      |                |            |                     |  |                            |
| 56                     | 41 | 24 | 15  | 11                 | 3    | 1    |                      |                      |       | SW-SM                |                 | 1.3                  |                      |                |            |                     |  |                            |
| 65                     | 52 | 32 | 22  | 18                 |      |      |                      |                      |       | SM                   |                 | 1.5                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | SM                   |                 | 1.8                  |                      |                |            |                     |  |                            |
| 68                     | 51 | 32 | 21  | 13                 | 4    | 2    |                      |                      |       | SM                   |                 | 1.4                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | SM                   |                 | 2.5                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       |                      |                 |                      |                      |                |            |                     |  |                            |
| 29                     | 19 | 6  | 3   | 2                  |      |      |                      |                      |       | GW                   |                 | 0.5                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | GW                   |                 | 0.9                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | GW                   |                 | 1.3                  |                      |                |            |                     |  |                            |
| 38                     | 25 | 11 | 5   | 3                  |      |      |                      |                      |       | GW                   |                 | 0.9                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       | GW                   |                 | 1.0                  |                      |                |            |                     |  |                            |
| 83                     | 68 | 44 | 27  | 21                 | 10   | 5    |                      |                      |       | SM                   |                 | 2.8                  |                      |                |            |                     |  |                            |
| 93                     | 89 | 74 | 41  | 20                 | 5    | 2    |                      |                      |       | SM                   |                 | 8.8                  |                      |                |            |                     |  |                            |
| 99                     | 99 | 88 | 49  | 27                 |      |      |                      |                      |       | SM                   |                 | 4.6                  |                      |                |            |                     |  |                            |
|                        |    |    |     |                    |      |      |                      |                      |       |                      |                 | 9.2                  |                      |                |            |                     |  |                            |

DEPA

8

| ATTERBERG LIMITS (b) |    |    | USCS (c) | IN-SITU              |  |                      |                | COMPACTED  |                     |  | SPECIFIC GRAVITY OF SOLIDS | TRIAxIAL (d)         | UNCONFINED COMPRESSION | DIRECT SHEAR | CONSOLIDATION | CHEMICAL | CBR |
|----------------------|----|----|----------|----------------------|--|----------------------|----------------|------------|---------------------|--|----------------------------|----------------------|------------------------|--------------|---------------|----------|-----|
|                      |    |    |          | DRY UNIT WEIGHT      |  | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |  |                            |                      |                        |              |               |          |     |
| L                    | PL | PI | (pcf)    | (kg/m <sup>3</sup> ) |  |                      |                |            |                     |  | (pcf)                      | (kg/m <sup>3</sup> ) |                        |              |               |          |     |
|                      |    |    |          |                      |  |                      |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SW-SM    |                      |  | 3.6                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GP-GM    |                      |  | 1.6                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GP-GM    |                      |  | 1.7                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GP-GM    |                      |  | 1.7                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GC       |                      |  | 3.0                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | CL       |                      |  | 9.2                  |                |            |                     |  | 2.53                       |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 6.5                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SW-SM    |                      |  | 1.3                  |                |            |                     |  |                            |                      |                        |              |               |          | *   |
|                      |    |    | SM       |                      |  | 1.5                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 1.8                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 1.4                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 2.5                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GW       |                      |  | 0.5                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GW       |                      |  | 0.9                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GW       |                      |  | 1.3                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GW       |                      |  | 0.9                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | GW       |                      |  | 1.0                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 2.8                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 8.8                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    | SM       |                      |  | 4.6                  |                |            |                     |  |                            |                      |                        |              |               |          |     |
|                      |    |    |          |                      |  | 9.2                  |                |            |                     |  |                            |                      |                        |              |               |          |     |

SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMO

TABLE  
II-6-1  
8 OF 7

**FUGRO NATIONAL, INC.**

2

3

| ACTIVITY NUMBER | SAMPLE NUMBER (a) | SAMPLE INTERVAL |           | PERCENT FINER BY WEIGHT |     |         |    |        |      |              |     |     |    |
|-----------------|-------------------|-----------------|-----------|-------------------------|-----|---------|----|--------|------|--------------|-----|-----|----|
|                 |                   |                 |           | STANDARD SIEVE OPENING  |     |         |    |        |      | U S STANDARD |     |     |    |
|                 |                   |                 |           | BLORS.                  |     | COBBLES |    | GRAVEL |      | SAND         |     |     |    |
|                 |                   |                 |           | 24"                     | 12" | 6"      | 3" | 1 1/2" | 3/4" | 3/8"         | 4   | 10  | 20 |
|                 |                   |                 |           |                         |     |         |    |        |      |              |     |     |    |
|                 |                   | FEET            | METERS    |                         |     |         |    |        |      |              |     |     |    |
| RV-T-1          | B-1               | 0.0-1.5         | 0.00-0.46 |                         |     |         |    |        |      |              |     | 100 |    |
|                 | B-2               | 5.0-6.5         | 1.52-1.98 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-3               | 11.5-13.0       | 3.51-3.96 |                         |     |         |    |        |      |              | 100 | 99  | 95 |
|                 | B-4               | 14.5-16.0       | 4.42-4.88 |                         |     |         |    |        |      |              | 100 | 98  | 92 |
|                 | B-5               | 17.0-18.0       | 5.18-5.49 |                         |     |         |    |        |      |              |     | 100 | 98 |
| RV-T-2          | B-1               | 0.0-0.5         | 0.00-0.46 |                         |     |         |    |        |      |              | 100 | 99  | 97 |
|                 | B-2               | 2.0-3.0         | 0.61-0.91 |                         |     |         |    |        |      |              | 100 | 99  | 91 |
|                 | B-3               | 4.5-5.5         | 1.37-1.68 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-4               | 7.0-8.0         | 2.13-2.44 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-5               | 10.5-11.5       | 3.20-3.51 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-6               | 13.5-14.5       | 4.11-4.42 |                         |     |         |    |        |      |              |     | 100 | 99 |
|                 | B-7               | 16.5-18.0       | 5.03-5.49 |                         |     |         |    |        |      |              | 100 | 98  | 92 |
| RV-T-3          | B-2               | 2.5-4.5         | 0.76-1.37 |                         |     |         |    | 100    | 98   | 82           | 66  | 50  |    |
|                 | B-4               | 13.5-15.0       | 4.11-4.57 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-5               | 17.0-18.0       | 5.18-5.49 |                         |     |         |    | 100    | 91   | 97           | 59  | 41  |    |
| RV-T-4          | B-1               | 0.0-1.0         | 0.00-0.30 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-2               | 2.5-5.0         | 0.76-1.52 |                         |     |         |    | 100    | 98   | 80           | 64  | 47  |    |
|                 | B-4               | 11.5-13.0       | 3.51-3.96 |                         |     |         |    |        | 100  | 95           | 87  | 73  |    |
| RV-T-5          | B-1               | 0.0-1.0         | 0.00-0.30 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-2               | 5.0-6.0         | 1.52-1.83 |                         |     |         |    | 100    | 94   | 79           | 62  | 46  |    |
|                 | B-3               | 11.0-12.5       | 3.35-3.81 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-4               | 14.5-15.5       | 4.42-4.72 |                         |     |         |    | 100    | 95   | 87           | 70  | 50  |    |
| RV-T-6          | B-2               | 1.5-3.5         | 0.46-1.07 |                         |     |         |    | 100    | 77   | 64           | 52  | 37  |    |
|                 | B-3               | 10.0-13.5       | 3.05-4.11 |                         |     |         |    | 100    | 91   | 70           | 55  | 40  |    |
|                 | B-4               | 17.0-18.0       | 5.18-5.49 |                         |     |         |    |        |      |              |     |     |    |
| RV-T-7          | B-1               | 0.0-0.5         | 0.00-0.15 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-2               | 4.5-6.0         | 1.37-1.83 |                         |     |         |    |        |      |              |     |     |    |
|                 | B-3               | 10.0-11.5       | 3.05-3.51 |                         |     |         |    | 100    | 98   | 88           | 71  | 49  |    |
|                 | B-5               | 17.0-18.0       | 5.18-5.49 |                         |     |         |    | 100    | 98   | 87           | 72  | 53  |    |
| RV-T-8          | B-3               | 2.5-5.0         | 0.76-1.52 |                         |     |         |    | 100    | 93   | 77           | 63  | 49  |    |
|                 | B-4               | 9.0-10.5        | 2.74-3.20 |                         |     |         |    | 100    | 97   | 93           | 89  | 84  |    |
|                 | B-6               | 17.0-18.0       | 5.18-5.49 |                         |     |         |    | 100    | 76   | 63           | 53  | 41  |    |

NOTES:

(a) Sample types

SS - Standard split spoon

P - Pitcher

D - Fugro Drive

B, b - Bulk

(b) NP - Not Plastic

(c) USCS - Unified Soil Classification System

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

CHECKED BY APPROVED BY



| GRAIN SIZE DISTRIBUTION BY WEIGHT |     |    |     |                    |      |      |    | ATTERBERG LIMITS (b) |    |       | USCS (c) | IN-SITU         |                      |                      |                | COMPACTED  |                     |                      | SPECIFIC GRAVITY OF SOLIDS |                      |
|-----------------------------------|-----|----|-----|--------------------|------|------|----|----------------------|----|-------|----------|-----------------|----------------------|----------------------|----------------|------------|---------------------|----------------------|----------------------------|----------------------|
| U S STANDARD SIEVE NO.            |     |    |     | PARTICLE SIZE (mm) |      |      |    | LL                   | PL | PI    |          | DRY UNIT WEIGHT |                      | MOISTURE CONTENT (%) | SATURATION (%) | VOID RATIO | MAXIMUM DRY DENSITY |                      |                            | OPTIMUM MOISTURE (%) |
| SAND                              |     |    |     | SILT OR CLAY       |      |      |    |                      |    |       |          | (pcf)           | (kg/m <sup>3</sup> ) |                      |                |            | (pcf)               | (kg/m <sup>3</sup> ) |                            |                      |
| 4                                 | 10  | 40 | 100 | 200                | .005 | .001 |    |                      |    |       |          |                 |                      |                      |                |            |                     |                      |                            |                      |
|                                   | 100 | 96 | 83  | 59                 | 12   | 8    |    |                      |    | ML    |          |                 | 8.3                  |                      |                |            |                     |                      |                            |                      |
| 99                                | 95  | 79 | 58  | 38                 | 11   | 8    |    |                      | NP | SM    |          |                 | 5.0                  |                      |                |            |                     | 2.53                 |                            |                      |
| 98                                | 92  | 71 | 37  | 28                 | 16   | 10   |    |                      |    | SM    |          |                 | 7.6                  |                      |                |            |                     |                      |                            |                      |
| 100                               | 98  | 91 | 45  | 25                 | 9    | 7    |    |                      |    | SM    |          |                 | 5.3                  |                      |                |            |                     |                      |                            |                      |
| 99                                | 97  | 84 | 67  | 60                 | 29   | 8    | 21 | 18                   | 3  | ML    |          |                 | 8.9                  |                      |                | 112.0      | 1794                | 15.0                 |                            |                      |
| 99                                | 91  | 61 | 39  | 26                 | 16   | 8    |    |                      | NP | SM    |          |                 | 5.1                  |                      |                |            |                     | 2.58                 |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SM    |          |                 | 5.7                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SM    |          |                 | 6.2                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SM    |          |                 | 2.3                  |                      |                |            |                     |                      |                            |                      |
| 100                               | 99  | 97 | 55  | 16                 |      |      |    |                      |    | SM    |          |                 | 3.1                  |                      |                | 95.3       | 1527                | 10.3                 |                            |                      |
| 98                                | 92  | 72 | 41  | 22                 |      |      |    |                      |    | SM    |          |                 | 7.9                  |                      |                |            |                     |                      |                            |                      |
| 66                                | 50  | 19 | 5   | 3                  |      |      |    |                      |    | SP    |          |                 | 2.1                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SW-SM |          |                 | 1.9                  |                      |                |            |                     |                      |                            |                      |
| 59                                | 41  | 16 | 8   | 6                  |      |      |    |                      |    | SW-SM |          |                 |                      |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      | 19 | 16                   | 3  | ML    |          |                 | 9.8                  |                      |                |            |                     |                      |                            |                      |
| 64                                | 47  | 18 | 5   | 4                  |      |      |    |                      |    | SP    |          |                 | 4.2                  |                      |                |            |                     |                      |                            |                      |
| 87                                | 73  | 36 | 10  | 7                  |      |      |    |                      |    | SP-SM |          |                 | 3.0                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SP-SM |          |                 | 6.6                  |                      |                |            |                     |                      |                            |                      |
| 62                                | 46  | 25 | 13  | 7                  | 3    | 2    |    |                      |    | SP-SM |          |                 | 4.2                  |                      |                | 118.0      | 1890                | 11.5                 |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SW-SM |          |                 |                      |                      |                |            |                     |                      |                            |                      |
| 70                                | 50  | 23 | 13  | 9                  | 4    | 2    |    |                      |    | SW-SM |          |                 | 5.0                  |                      |                |            |                     |                      |                            |                      |
| 52                                | 37  | 12 | 4   | 3                  |      |      |    |                      |    | SP    |          |                 | 1.1                  |                      |                | 124.5      | 1994                | 7.0                  |                            |                      |
| 55                                | 40  | 18 | 8   | 6                  |      |      |    |                      |    | SP-SM |          |                 | 3.0                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | SP-SM |          |                 | 5.2                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      | 19 | 18                   | 1  | ML    |          |                 | 10.9                 |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    | ML    |          |                 | 4.9                  |                      |                |            |                     |                      |                            |                      |
| 71                                | 49  | 23 | 13  | 8                  |      |      |    |                      |    | SW-SM |          |                 | 4.2                  |                      |                |            |                     |                      |                            |                      |
| 72                                | 53  | 30 | 19  | 13                 |      |      |    |                      |    | SM    |          |                 | 3.6                  |                      |                |            |                     |                      |                            |                      |
|                                   |     |    |     |                    |      |      |    |                      |    |       |          |                 |                      |                      |                |            |                     |                      |                            |                      |
| 63                                | 49  | 17 | 3   | 2                  |      |      |    |                      |    | SP    |          |                 | 1.5                  |                      |                |            |                     |                      |                            |                      |
| 89                                | 84  | 74 | 52  | 30                 | 8    | 3    |    |                      |    | SM    |          |                 | 5.5                  |                      |                |            |                     |                      |                            |                      |
| 53                                | 41  | 15 | 4   | 2                  |      |      |    |                      |    | SP    |          |                 | 1.0                  |                      |                |            |                     |                      |                            |                      |

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DEF

| TERBERG<br>LIMITS (b) |    | USCS<br>(c) | IN-SITU            |                      |                            |                   |               | COMPACTED              |                      |                            | SPECIFIC<br>GRAVITY<br>OF SOLIDS | TRIAxIAL (d) | UNCONFINED<br>COMPRESSION | DIRECT<br>SHEAR | CONSOLIDATION | CHEMICAL | CBR |
|-----------------------|----|-------------|--------------------|----------------------|----------------------------|-------------------|---------------|------------------------|----------------------|----------------------------|----------------------------------|--------------|---------------------------|-----------------|---------------|----------|-----|
|                       |    |             | DRY UNIT<br>WEIGHT |                      | MOISTURE<br>CONTENT<br>(%) | SATURATION<br>(%) | VOID<br>RATIO | MAXIMUM<br>DRY DENSITY |                      | OPTIMUM<br>MOISTURE<br>(%) |                                  |              |                           |                 |               |          |     |
|                       |    |             | (pcf)              | (kg/m <sup>3</sup> ) |                            |                   |               | (pcf)                  | (kg/m <sup>3</sup> ) |                            |                                  |              |                           |                 |               |          |     |
|                       |    | ML          |                    |                      | 8.3                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | ML          |                    |                      |                            |                   |               |                        |                      |                            |                                  |              |                           |                 |               | *        |     |
|                       | NP | SM          |                    |                      | 5.0                        |                   |               |                        |                      | 2.53                       |                                  |              |                           |                 |               |          |     |
|                       |    | SM          |                    |                      | 7.6                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SM          |                    |                      | 5.3                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
| 18                    | 3  | ML          |                    |                      | 8.9                        |                   |               | 112.0                  | 1794                 | 15.0                       |                                  |              |                           |                 |               | *        |     |
|                       | NP | SM          |                    |                      | 5.1                        |                   |               |                        |                      |                            | 2.58                             |              |                           |                 |               |          | *   |
|                       |    | SM          |                    |                      | 5.7                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SM          |                    |                      | 6.2                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SM          |                    |                      | 2.3                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SM          |                    |                      | 3.1                        |                   |               | 95.3                   | 1527                 | 10.3                       |                                  |              |                           |                 |               |          | *   |
|                       |    | SM          |                    |                      | 7.9                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP          |                    |                      | 2.1                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               | *        | *   |
|                       |    | SW-SM       |                    |                      | 1.9                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SW-SM       |                    |                      |                            |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
| 16                    | 3  | ML          |                    |                      | 9.8                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          | *   |
|                       |    | SP          |                    |                      | 4.2                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP-SM       |                    |                      | 3.0                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP-SM       |                    |                      | 6.6                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP-SM       |                    |                      | 4.2                        |                   |               | 118.0                  | 1890                 | 11.5                       |                                  |              |                           |                 |               | *        |     |
|                       |    | SW-SM       |                    |                      |                            |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SW-SM       |                    |                      | 5.0                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          | *   |
|                       |    | SP          |                    |                      | 1.1                        |                   |               | 124.5                  | 1994                 | 7.0                        |                                  |              |                           |                 |               |          |     |
|                       |    | SP-SM       |                    |                      | 3.0                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP-SM       |                    |                      | 5.2                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
| 18                    | 1  | ML          |                    |                      | 10.9                       |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | ML          |                    |                      | 4.9                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SW-SM       |                    |                      | 4.2                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          | *   |
|                       |    | SM          |                    |                      | 3.6                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP          |                    |                      | 1.5                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SM          |                    |                      | 5.5                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |
|                       |    | SP          |                    |                      | 1.0                        |                   |               |                        |                      |                            |                                  |              |                           |                 |               |          |     |

SUMMARY OF LABORATORY TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - BMD

TABLE  
II-6-1  
7 OF 7

**TUGRO NATIONAL, INC.**

2

3

| BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |             | SOIL TYPE | TYPE OF TEST | DRY DENSITY |                   | MOISTURE CONTENT (%) | CONFINING PRESSURE (σ <sub>3</sub> ) |                   | MAXIMUM DEVIATOR STRESS (σ <sub>1</sub> -σ <sub>3</sub> ) |                   | STRAIN RATE (% min) | BACK PRESSURE |                   |
|------------|------------|-----------------|-------------|-----------|--------------|-------------|-------------------|----------------------|--------------------------------------|-------------------|---|-------------------|---------------------|---------------|-------------------|
|            |            | FEET            | METERS      |           |              | pcf         | kg/m <sup>3</sup> |                      | ksf                                  | kN/m <sup>2</sup> | ksf   | kN/m <sup>2</sup> |                     | ksf           | kN/m <sup>2</sup> |
| RV-B-1     | D-3        | 15.5-16.0       | 4.72-4.88   | SP-SM     | CD           | 107.7       | 1725              | 8.2                  | 1.7                                  | 81                | 14.5  | 694               | .07                 | 0             | 0                 |
|            | D-4        | 20.5-21.0       | 6.25-6.40   | GP-SM     | CD           | 118.7       | 1901              | 5.4                  | 4.0                                  | 192               | 25.7  | 1230              | .07                 | 0             | 0                 |
|            | D-5        | 25.0-26.0       | 7.62-7.92   | SC        | CD           | 109.4       | 1752              | 8.8                  | 8.9                                  | 426               | 36.5  | 1747              | .07                 | 0             | 0                 |
|            | D-8        | 50.5-51.0       | 15.39-15.54 | SC        | CD           | 118.1       | 1892              | 8.5                  | 5.5                                  | 263               | 27.1  | 1297              | .08                 | 0             | 0                 |
|            | D-9        | 61.2-61.7       | 18.65-18.81 | SC        | CD           | 117.6       | 1884              | 8.8                  | 12.4                                 | 594               | 64.4  | 3083              | .09                 | 0             | 0                 |
|            | D-10       | 70.3-70.8       | 21.43-21.58 | SW-SM     | CD           | 102.6       | 1643              | 14.6                 | 26.9                                 | 1288              | 110.6   | 5295              | .07                 | 0             | 0                 |
|            | D-13       | 90.2-91.9       | 27.49-28.01 | SM        | CD           | 108.9       | 1744              | 13.3                 | 9.9                                  | 474               | 45.1  | 2159              | .07                 | 0             | 0                 |
|            | D-14       | 100.2-100.7     | 30.54-30.69 | SM        | CD           | 121.4       | 1945              | 10.3                 | 20.2                                 | 967               | 23.5  | 1125              | .07                 | 0             | 0                 |
|            | D-15       | 128.2-128.7     | 39.08-39.23 | SM        | CD           | 110.3       | 1767              | 12.7                 | 44.6                                 | 2135              | 161.2   | 7717              | .07                 | 0             | 0                 |
| RV-B-5     | P-3        | 15.0-15.8       | 4.57-4.82   | SM        | CD           | 110.6       | 1772              | 13.1                 | 1.7                                  | 81                | 13.1  | 627               | .07                 | 0             | 0                 |
|            | P-4        | 20.0-20.8       | 6.10-6.34   | SP-SM     | CD           | 100.8       | 1615              | 9.1                  | 3.9                                  | 182               | 14.5  | 694               | .07                 | 0             | 0                 |
|            | P-5        | 25.0-25.8       | 7.62-7.86   | SM        | CD           | 101.1       | 1619              | 7.7                  | 8.6                                  | 412               | 30.0  | 1436              | .07                 | 0             | 0                 |
| RV-B-6     | P-6        | 50.1-50.9       | 15.27-15.51 | SM        | CD           | 93.3        | 1495              | 12.1                 | 5.5                                  | 263               | 32.0  | 1532              | .07                 | 0             | 0                 |
|            | P-10       | 70.1-70.8       | 21.37-21.58 | SM        | CD           | 95.2        | 1525              | 8.3                  | 12.7                                 | 608               | 54.9  | 2628              | .07                 | 0             | 0                 |
|            | P-13       | 80.1-80.8       | 27.46-27.68 | SM        | CD           | 106.2       | 1701              | 15.8                 | 31.0                                 | 1484              | 121.2   | 5803              | .07                 | 0             | 0                 |
| RV-B-8     | D-2        | 10.7-11.2       | 3.26-3.41   | SP-SM     | CD           | 100.4       | 1608              | 12.6                 | 1.2                                  | 57                | 7.7   | 369               | .08                 | 0             | 0                 |
|            | D-3        | 15.3-15.8       | 4.66-4.82   | SW-SM     | CD           | 115.8       | 1855              | 7.8                  | 3.3                                  | 158               | 18.1  | 867               | .07                 | 0             | 0                 |
|            | D-4        | 20.4-20.9       | 6.22-6.37   | SC        | CD           | 118.9       | 1873              | 7.4                  | 8.8                                  | 421               | 45.5  | 2178              | .07                 | 0             | 0                 |
| RV-B-12    | D-2        | 10.2-10.9       | 3.11-3.32   | GP-SM     | CD           | 112.1       | 1796              | 11.6                 | 1.2                                  | 57                | 8.7   | 417               | .07                 | 0             | 0                 |
|            | D-3        | 15.4-15.9       | 4.69-4.85   | SW-SM     | CD           | 118.4       | 1865              | 5.4                  | 2.8                                  | 139               | 21.5  | 1029              | .07                 | 0             | 0                 |
|            | D-4        | 20.3-20.8       | 6.19-6.34   | SM        | CD           | 111.5       | 1786              | 9.7                  | 5.8                                  | 278               | 26.9  | 1288              | .07                 | 0             | 0                 |

SUMMARY OF TRIAXIAL COMPRESSION TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - DMO

TABLE  
II-6-2

**TUBRO NATIONAL, INC.**

| BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |             | SOIL TYPE | UNCONFINED COMP. STRENGTH |                   | DRY DENSITY |                   | MOISTURE CONTENT (%) | DEGREE OF SATURATION (%) | HEIGHT DIAMETER |
|------------|------------|-----------------|-------------|-----------|---------------------------|-------------------|-------------|-------------------|----------------------|--------------------------|-----------------|
|            |            | FEET            | METERS      |           | ksf                       | kn/m <sup>2</sup> | pcf         | kg/m <sup>3</sup> |                      |                          |                 |
| RV-B-1     | P-20       | 247.0-247.8     | 75.29-75.53 | SM        | 2.8                       | 134               | 77.0        | 1234              | 40.8                 | 96.5                     | 2.0             |
| RV-B-6     | P-4        | 20.0-20.7       | 6.10-6.31   | SP        | 2.1                       | 101               | 81.2        | 1301              | 23.3                 | 58.5                     | 2.4             |
|            | P-17       | 178.1-178.8     | 53.68-53.92 | CL        | 5.4                       | 258               | 89.3        | 1430              | 30.6                 | 93.0                     | 2.4             |
|            | P-17       | 178.0-178.6     | 54.25-54.44 | CL        | 6.5                       | 311               | 82.5        | 1322              | 37.3                 | 96.7                     | 2.4             |
|            | P-18       | 200.2-201.0     | 61.02-61.26 | MH        | 5.5                       | 263               | 74.4        | 1192              | 44.3                 | 98.8                     | 2.4             |
|            | P-20       | 251.9-252.6     | 76.78-76.99 | SC        | 7.9                       | 378               | 87.6        | 1403              | 32.3                 | 94.5                     | 2.4             |
|            | P-21       | 278.1-278.8     | 84.16-84.37 | MH        | 8.5                       | 407               | 80.4        | 1288              | 36.9                 | 91.0                     | 2.4             |
|            | D-22       | 288.4-299.9     | 91.26-91.41 | MH        | 4.8                       | 230               | 71.7        | 1149              | 46.1                 | 92.3                     | 2.4             |
| RV-B-7     | P-4        | 20.0-20.8       | 6.10-6.34   | ML        | 7.0                       | 335               | 96.8        | 1551              | 20.1                 | 73.3                     | 2.4             |
|            | P-6        | 30.0-30.8       | 9.14-9.39   | ML        | 14.4                      | 689               | 110.0       | 1762              | 13.8                 | 82.5                     | 2.4             |
|            | P-11       | 81.0-81.7       | 24.69-24.90 | ML        | 2.8                       | 134               | 83.6        | 1339              | 24.2                 | 64.5                     | 2.4             |
| RV-B-8     | D-19       | 250.2-250.9     | 76.26-76.47 | SM        | 6.1                       | 292               | 114.2       | 1829              | 12.0                 | 68.2                     | 2.4             |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |
|            |            |                 |             |           |                           |                   |             |                   |                      |                          |                 |

**SUMMARY OF UNCONFINED COMPRESSION  
TEST RESULTS  
RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE · BMD

TABLE  
II-6-3

**FUGRO NATIONAL INC.**

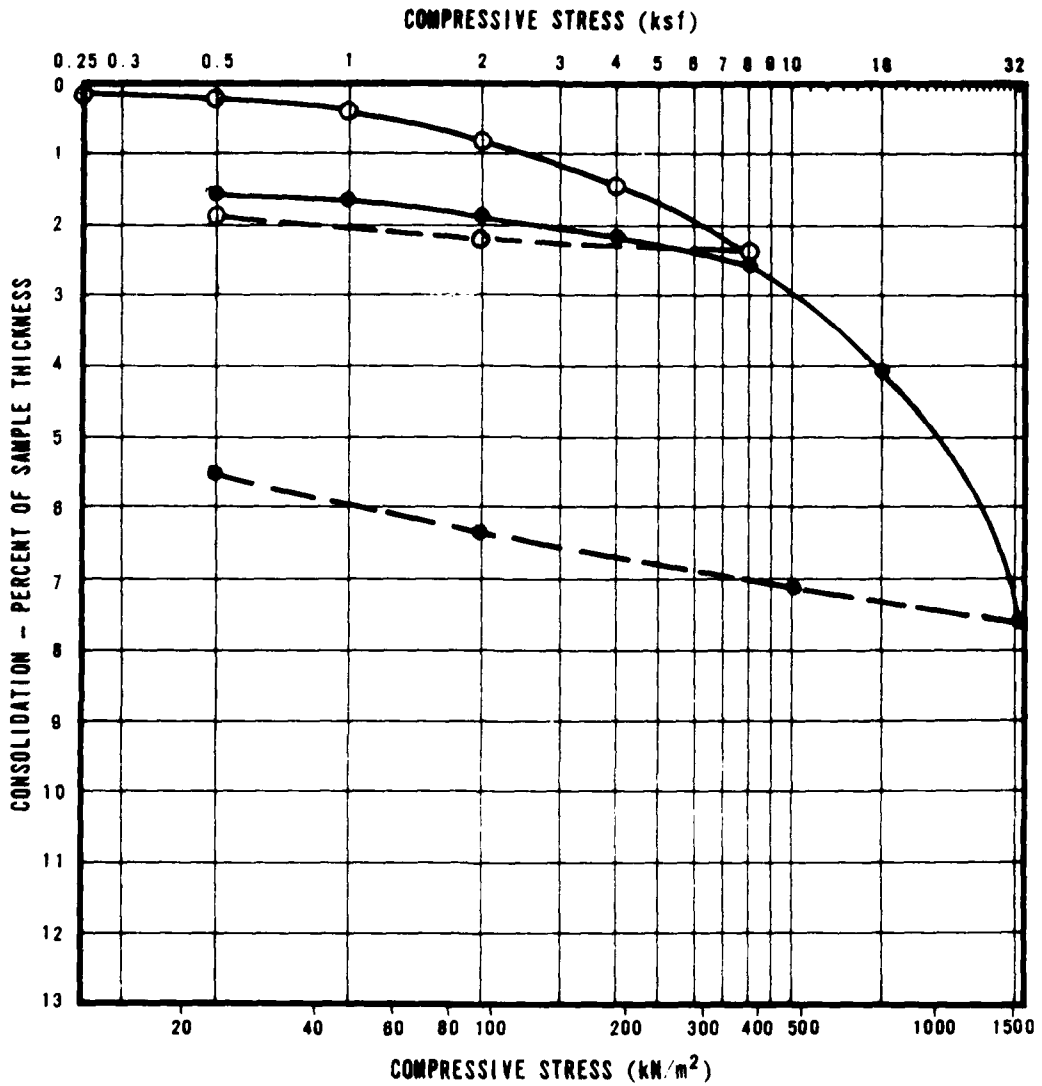
| BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |             | SOIL TYPE | NORMAL STRESS |                   | MAXIMUM SHEAR STRENGTH |                   |
|------------|------------|-----------------|-------------|-----------|---------------|-------------------|------------------------|-------------------|
|            |            | FEET            | METERS      |           | ksf           | kN/m <sup>2</sup> | ksf                    | kN/m <sup>2</sup> |
| RV-B-5     | P-3        | 15.8-16.1       | 4.82-4.91   | SM        | 2.0           | 96                | 3.1                    | 149               |
|            | P-4        | 20.8-21.1       | 6.34-6.43   | SP-SM     | 4.0           | 182               | 3.2                    | 153               |
|            | P-5        | 25.8-26.1       | 7.86-7.96   | SM        | 8.0           | 383               | 6.8                    | 326               |
| RV-B-6     | P-1        | 5.0-5.7         | 1.52-1.74   | SM        | 1.0           | 48                | 1.2                    | 57                |
|            | P-1        | 5.0-5.7         | 1.52-1.74   | SM        | 2.0           | 96                | 1.9                    | 91                |
|            | P-1        | 5.0-5.7         | 1.52-1.74   | SM        | 0.5           | 24                | 0.7                    | 34                |
|            | P-2        | 10.0-10.7       | 3.05-3.26   | SM        | 1.0           | 48                | 1.1                    | 53                |
|            | P-2        | 10.0-10.7       | 3.05-3.26   | SM        | 2.0           | 96                | 1.9                    | 91                |
|            | P-2        | 10.0-10.7       | 3.05-3.26   | SM        | 4.0           | 192               | 5.1                    | 244               |
|            | P-3        | 15.7-16.3       | 4.79-4.97   | SM        | 1.5           | 72                | 1.6                    | 77                |
|            | P-3        | 15.7-16.3       | 4.79-4.97   | SM        | 3.0           | 144               | 3.0                    | 144               |
|            | P-3        | 15.7-16.3       | 4.79-4.97   | SM        | 6.0           | 287               | 5.2                    | 249               |
| RV-B-7     | P-1        | 5.0-5.7         | 1.52-1.74   | SW-SM     | 0.5           | 24                | 0.7                    | 34                |
|            | P-1        | 5.0-5.7         | 1.52-1.74   | SW-SM     | 1.0           | 48                | 1.3                    | 62                |
|            | P-1        | 5.0-5.7         | 1.52-1.74   | SW-SM     | 2.0           | 96                | 2.0                    | 96                |
| RV-B-12    | P-6        | 30.0-30.7       | 9.14-9.36   | SM        | 3.0           | 144               | 2.7                    | 129               |
|            | P-8        | 48.0-48.7       | 14.63-14.84 | SM        | 10.0          | 479               | 10.8                   | 517               |
| RV-B-13    | P-8        | 50.0-50.8       | 15.24-15.48 | ML        | 6.0           | 287               | 4.2                    | 201               |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |
|            |            |                 |             |           |               |                   |                        |                   |

**SUMMARY OF DIRECT SHEAR TEST RESULTS  
RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - DMO

TABLE  
**II-6-4**

**FUGRO NATIONAL, INC.**



| SYMBOL | BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | INITIAL DRY DENSITY |       | INITIAL MOISTURE CONTENT (%) | INITIAL VOID RATIO | INITIAL DEGREE OF SATURATION (%) |
|--------|------------|------------|-----------------|-----------|-----------|---------------------|-------|------------------------------|--------------------|----------------------------------|
|        |            |            | FEET            | METERS    |           | pcf                 | kg/m³ |                              |                    |                                  |
| ○      | RV-B-6     | P-4        | 20.7-22.0       | 6.31-6.71 | SP        | 80.9                | 1286  | 27.9                         | 1.08               | 88.5                             |
|        |            |            |                 |           |           |                     |       |                              |                    |                                  |
|        |            |            |                 |           |           |                     |       |                              |                    |                                  |

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

**CONSOLIDATION TEST RESULTS  
RALSTON VALLEY, NEVADA**

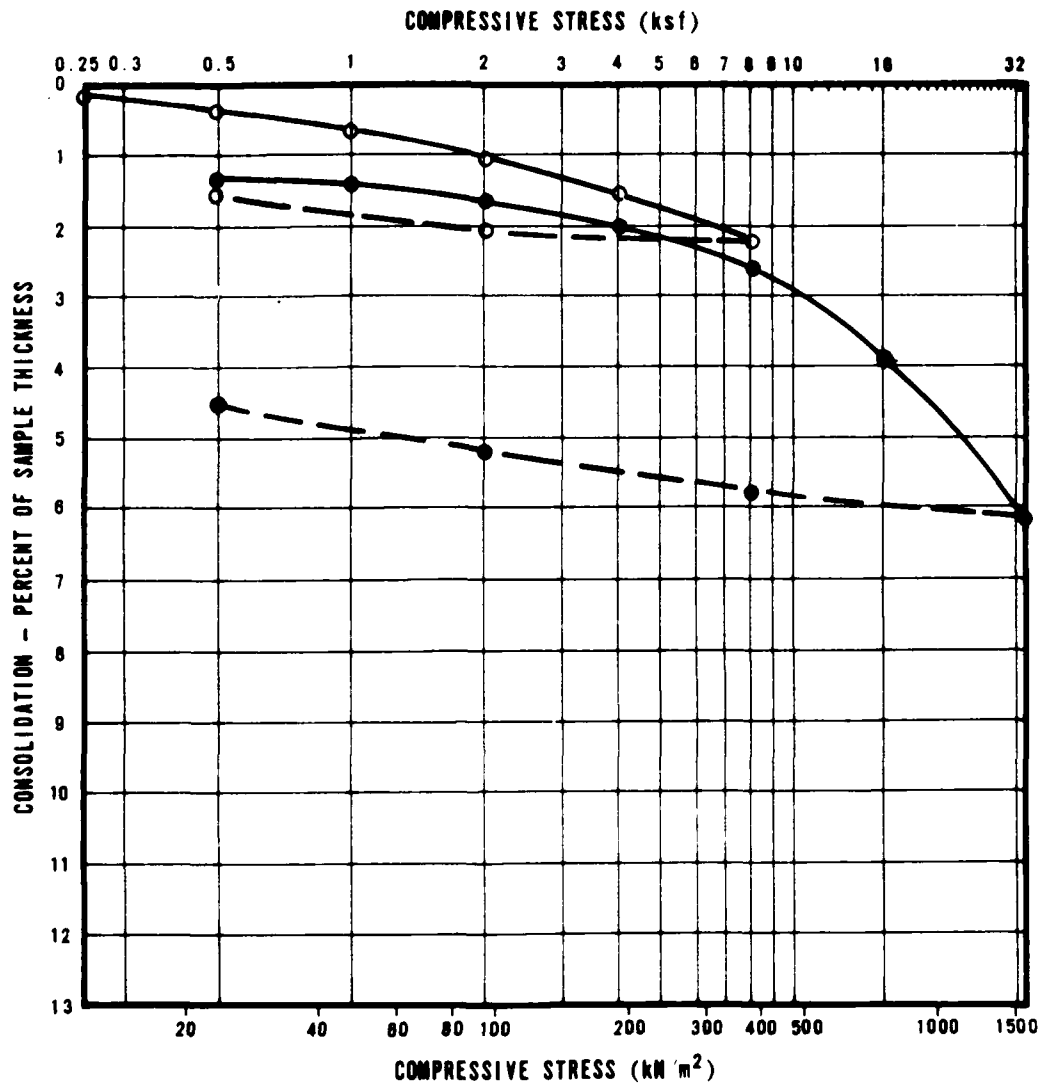
MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
**II-6-1**

**URS NATIONAL, INC.**

APPROVED BY

CHECKED BY



| 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/m <sup>3</sup> |                              |                    |                                  |
| ○      | RV-B-7     | P-4        | 20.0-20.8       | 6.10-6.34 | ML        | 98.8                | 1551              | 20.1                         | 0.75               | 74.7                             |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |

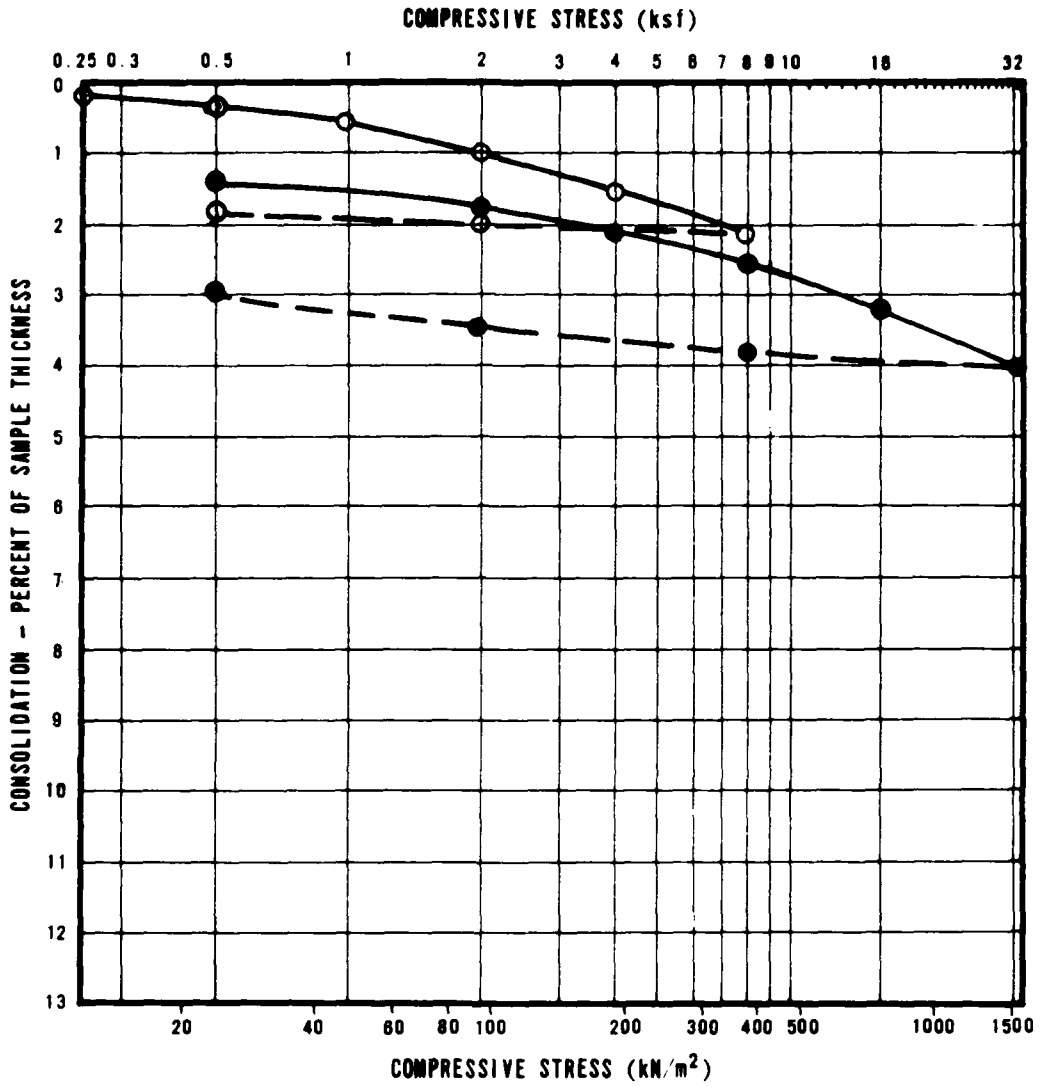
- AT FIELD MOISTURE
- AFTER ADDITION OF WATER
- COMPRESSION
- - - REBOUND

**CONSOLIDATION TEST RESULTS**  
**RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE 000

FIGURE  
**II-6-2**

**FLUORO NATIONAL INC.**



| SYMBOL | BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | INITIAL DRY DENSITY |                   | INITIAL MOISTURE CONTENT (%) | INITIAL VOID RATIO | INITIAL DEGREE OF SATURATION (%) |
|--------|------------|------------|-----------------|-----------|-----------|---------------------|-------------------|------------------------------|--------------------|----------------------------------|
|        |            |            | FEET            | METERS    |           | pcf                 | kg/m <sup>3</sup> |                              |                    |                                  |
| ○      | RV-B-7     | P-8        | 30.0-30.8       | 9.14-9.39 | ML        | 107.4               | 1721              | 15.5                         | 0.45               | 85.5                             |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |

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

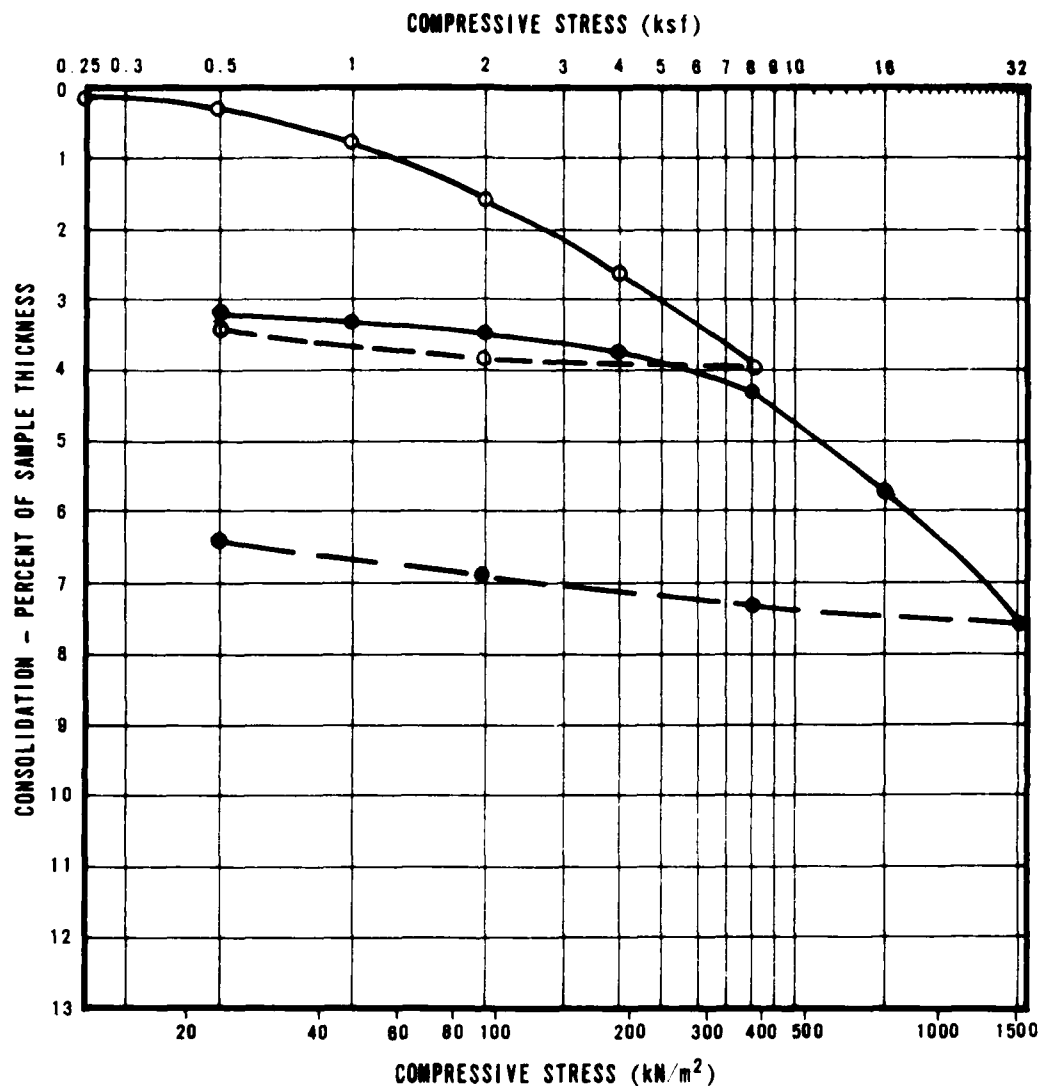
**CONSOLIDATION TEST RESULTS**  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - DND

FIGURE  
**II-6-3**

**URS NATIONAL, INC.**





| SYMBOL | BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | INITIAL DRY DENSITY |                   | INITIAL MOISTURE CONTENT (%) | INITIAL VOID RATIO | INITIAL DEGREE OF SATURATION (%) |
|--------|------------|------------|-----------------|-----------|-----------|---------------------|-------------------|------------------------------|--------------------|----------------------------------|
|        |            |            | FEET            | METERS    |           | pcf                 | kg/m <sup>3</sup> |                              |                    |                                  |
| ○      | RV-B-8     | D-5        | 25.4-25.9       | 7.74-7.89 | SC        | 114.6               | 1837              | 8.9                          | 0.38               | 59.6                             |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |

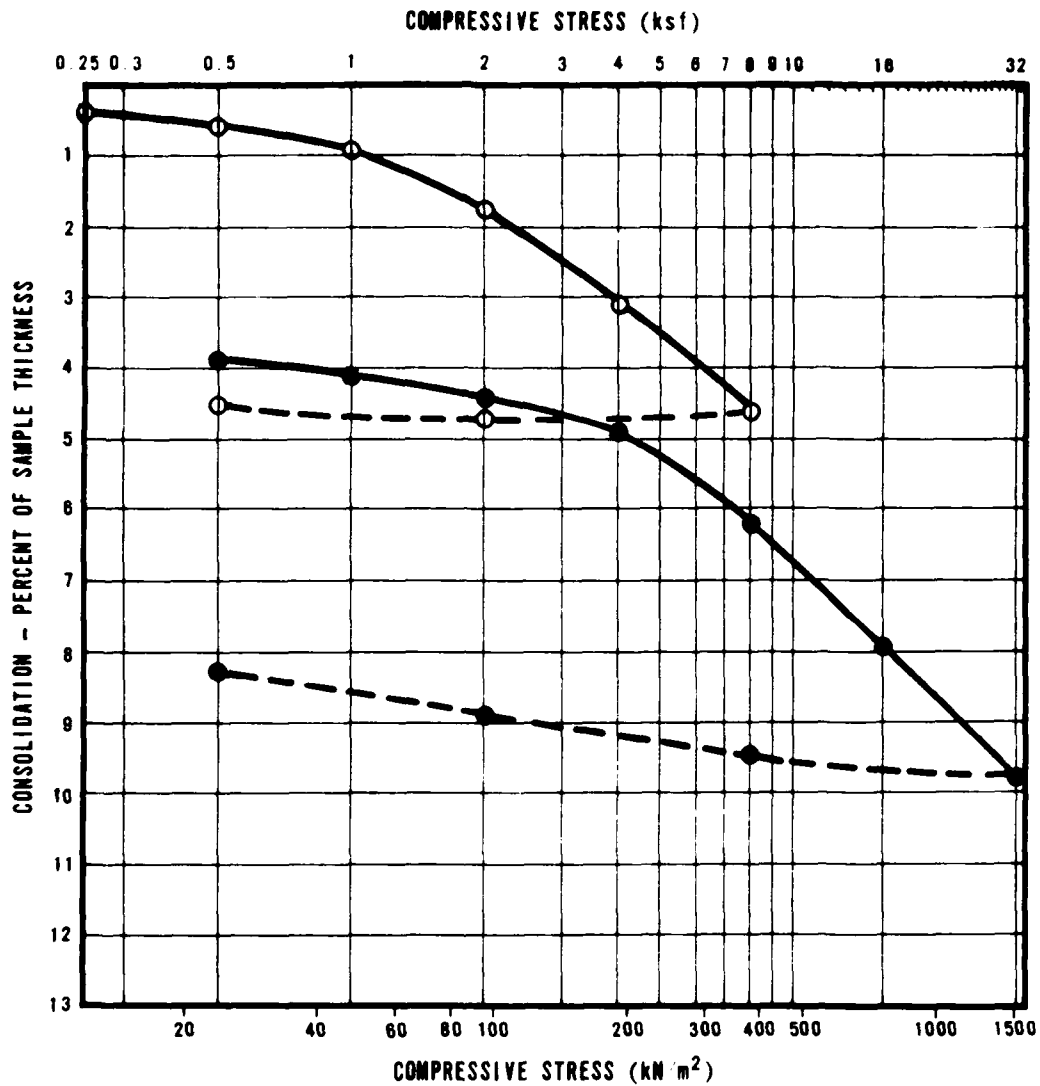
- AT FIELD MOISTURE
- AFTER ADDITION OF WATER
- COMPRESSION
- - - REBOUND

**CONSOLIDATION TEST RESULTS**  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - DWO

FIGURE  
**II-6-4**

**URS NATIONAL, INC.**



| SYMBOL | BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | INITIAL DRY DENSITY |       | INITIAL MOISTURE CONTENT (%) | INITIAL VOID RATIO | INITIAL DEGREE OF SATURATION (%) |
|--------|------------|------------|-----------------|-----------|-----------|---------------------|-------|------------------------------|--------------------|----------------------------------|
|        |            |            | FEET            | METERS    |           | pcf                 | kg/m³ |                              |                    |                                  |
| ○      | RV-8-8     | D-6        | 30.4-30.9       | 9.27-9.42 | SC        | 114.7               | 1837  | 8.9                          | 0.38               | 59.7                             |
|        |            |            |                 |           |           |                     |       |                              |                    |                                  |
|        |            |            |                 |           |           |                     |       |                              |                    |                                  |

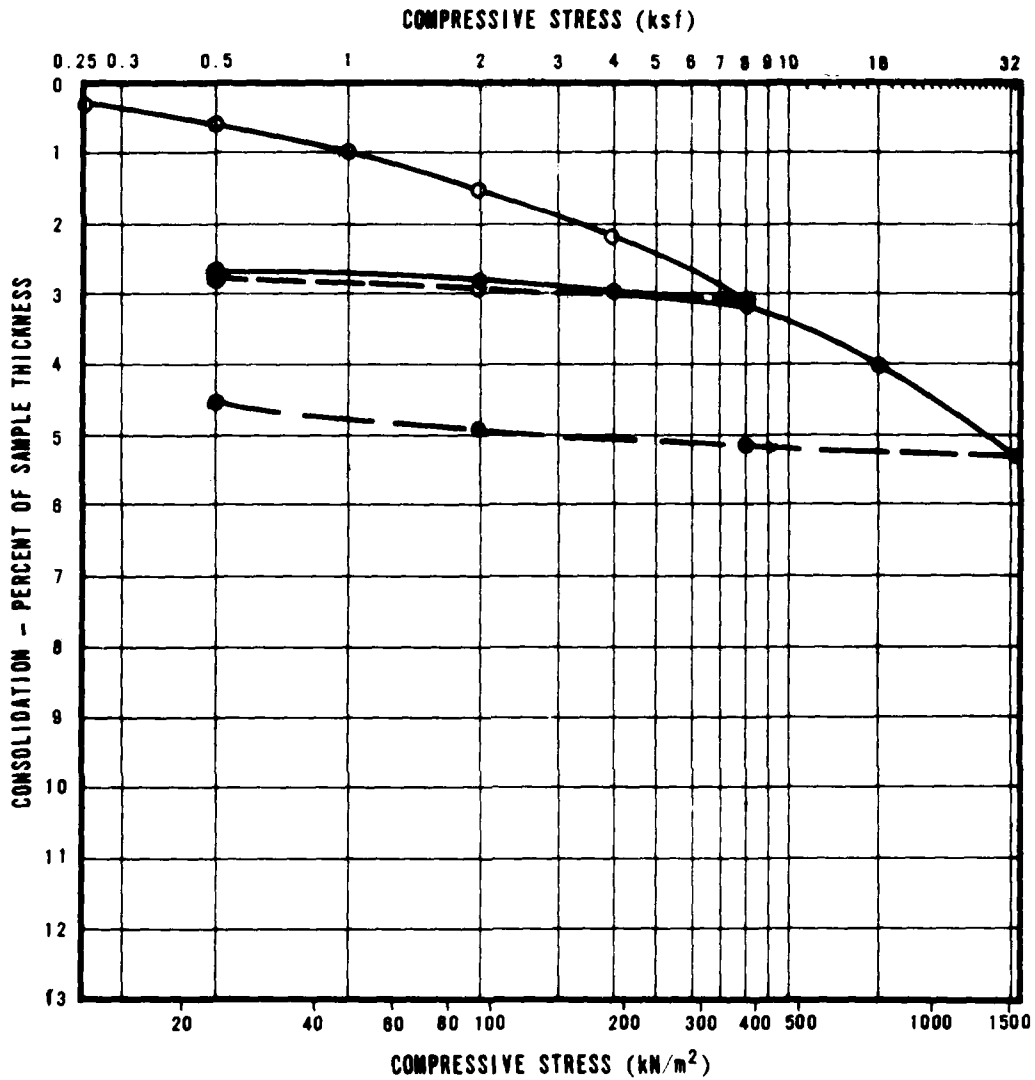
- AT FIELD MOISTURE
- AFTER ADDITION OF WATER
- COMPRESSION
- - - REBOUND

**CONSOLIDATION TEST RESULTS**  
**RALSTON VALLEY, NEVADA**

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - DMO

FIGURE  
**II-6-5**

**URS NATIONAL, INC.**



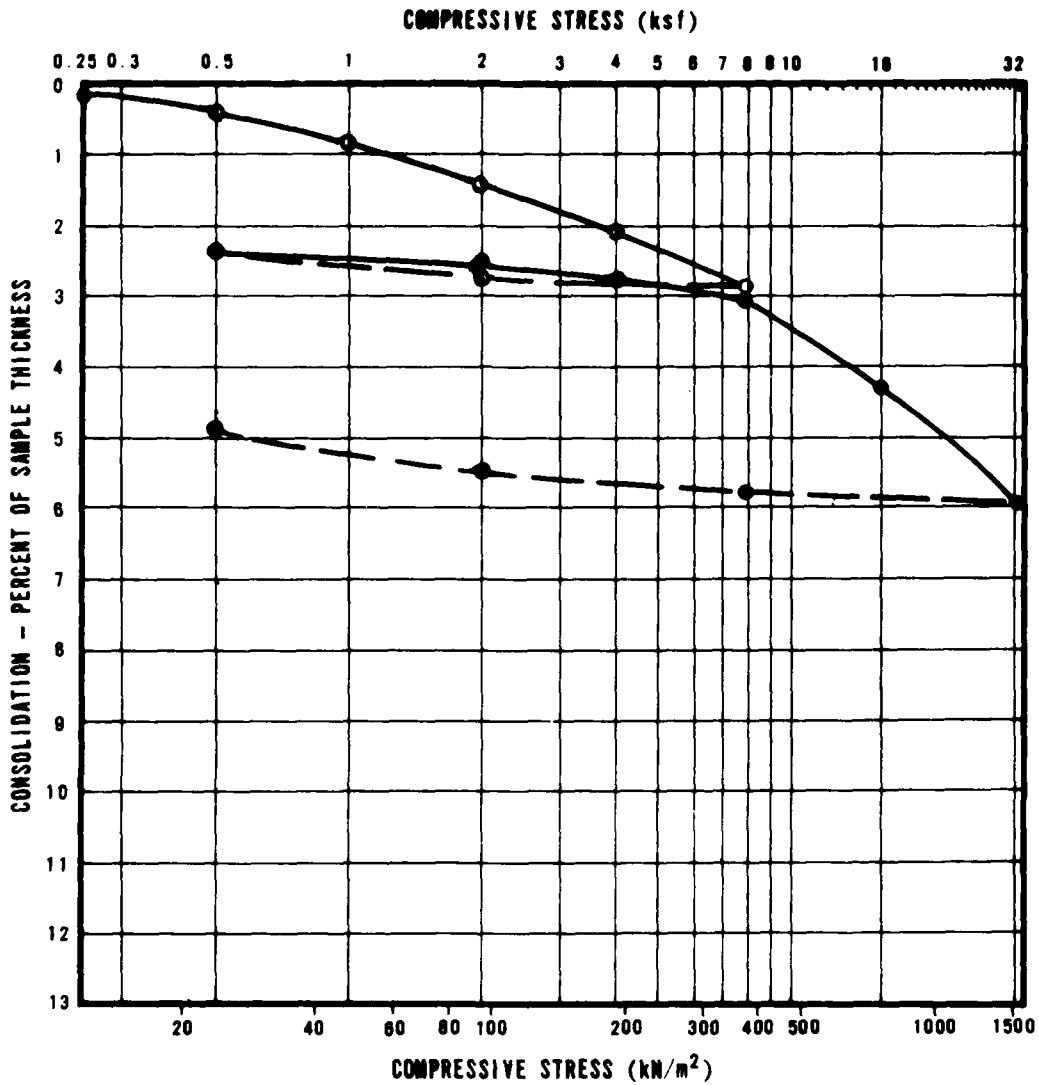
| SYMBOL | BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | INITIAL DRY DENSITY |                   | INITIAL MOISTURE CONTENT (%) | INITIAL VOID RATIO | INITIAL DEGREE OF SATURATION (%) |
|--------|------------|------------|-----------------|-----------|-----------|---------------------|-------------------|------------------------------|--------------------|----------------------------------|
|        |            |            | FEET            | METERS    |           | pcf                 | kg/m <sup>3</sup> |                              |                    |                                  |
| ○      | RV-B-9     | P-6        | 30.0-30.5       | 9.14-9.30 | SP-SM     | 103.6               | 1660              | 11.5                         | 0.83               | 49.5                             |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |

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

**CONSOLIDATION TEST RESULTS**  
**RALSTON VALLEY, NEVADA**

|  |                         |
|--|-------------------------|
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE DND | FIGURE<br><b>II-6-6</b> |
|--|-------------------------|

**URS NATIONAL INC.**



| SYMBOL | BORING NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | INITIAL DRY DENSITY |                   | INITIAL MOISTURE CONTENT (%) | INITIAL VOID RATIO | INITIAL DEGREE OF SATURATION (%) |
|--------|------------|------------|-----------------|-----------|-----------|---------------------|-------------------|------------------------------|--------------------|----------------------------------|
|        |            |            | FEET            | METERS    |           | pcf                 | kg/m <sup>3</sup> |                              |                    |                                  |
| ○      | RV-8-12    | P-6        | 30.0-30.7       | 9.14-9.36 | SM        | 84.3                | 1350              | 21.3                         | 1.00               | 57.6                             |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |
|        |            |            |                 |           |           |                     |                   |                              |                    |                                  |

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

**CONSOLIDATION TEST RESULTS**  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE **AND**

FIGURE  
**II-6-7**

**WARD NATIONAL, INC.**

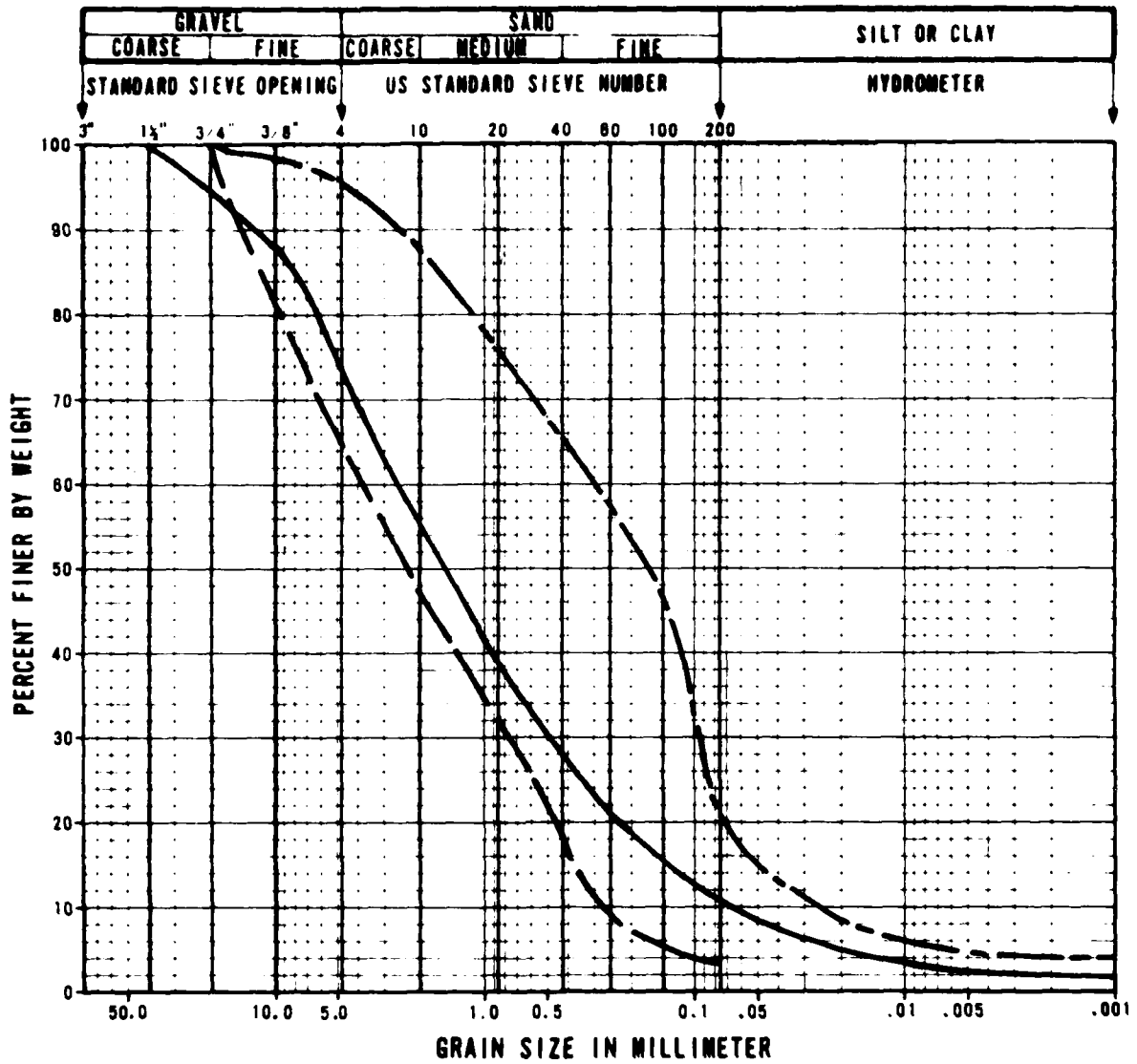
| BORING / TRENCH NO. | SAMPLE NO. | SAMPLE INTERVAL |           | SOIL TYPE | PH  | WATER SOLUBLE |                |                |               | CALCIUM CARBONATE mg/kg |
|---------------------|------------|-----------------|-----------|-----------|-----|---------------|----------------|----------------|---------------|-------------------------|
|                     |            | FEET            | METERS    |           |     | SODIUM mg/kg  | CHLORIDE mg/kg | SULPHATE mg/kg | CALCIUM mg/kg |                         |
| RV-B-5              | P-3        | 15.0-15.8       | 4.57-4.82 | SM        | 8.1 | 110           | 62             | 276            | 10            | 25                      |
| RV-B-6              | P-4        | 20.0-20.7       | 6.10-6.31 | SP        | 7.7 | 105           | 19             | 84             | 10            | 25                      |
| RV-B-9              | SS-2       | 10.0-10.2       | 3.05-3.20 | SM        | 7.6 | 125           | 110            | 166            | 51            | 128                     |
| RV-B-15             | SS-2       | 14.0-15.0       | 4.27-4.57 | SW-SM     | 7.7 | 183           | 133            | 41             | 5             | 12                      |
| RV-T-1              | B-2        | 5.0-6.5         | 1.52-1.98 | ML        | 7.4 | 1100          | 741            | 1480           | 88            | 220                     |
| RV-T-2              | B-1        | 0.0-0.5         | 0.00-0.15 | ML        | 7.0 | 650           | 727            | 88             | 144           | 360                     |
| RV-T-3              | B-2        | 2.5-4.5         | 0.76-1.37 | SP        | 7.6 | 125           | 238            | 825            | 72            | 180                     |
| RV-T-5              | B-2        | 5.0-6.0         | 1.52-1.83 | SP-SM     | 7.8 | 840           | 437            | 1360           | 52            | 130                     |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |
|                     |            |                 |           |           |     |               |                |                |               |                         |

SUMMARY OF CHEMICAL TEST RESULTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE DMO

TABLE  
II-6-5

**FUGRO NATIONAL INC.**



| SYMBOL | COMPOSITE SAMPLE NUMBER | TRENCH NUMBER | SAMPLE INTERVAL |           | SOIL TYPE |
|--------|-------------------------|---------------|-----------------|-----------|-----------|
|        |                         |               | FEET            | METERS    |           |
| —      | A                       | RV-T-5        | 14.5-15.5       | 4.42-4.72 | SW-SM     |
|        |                         | RV-T-7        | 10.0-11.5       | 3.05-3.51 |           |
| - - -  | B                       | RV-T-3        | 2.5-4.5         | 0.78-1.37 | SP        |
|        |                         | RV-T-4        | 2.5-5.0         | 0.78-1.52 |           |
| - - -  | C                       | RV-T-2        | 2.0-3.0         | 0.61-0.91 | SM        |
|        |                         | RV-T-2        | 18.5-18.0       | 5.03-5.49 |           |

GRAIN SIZE CURVES, CBR TESTS  
RALSTON VALLEY, NEVADA

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE DMO

FIGURE  
II-6-8

**TRURO NATIONAL, INC.**

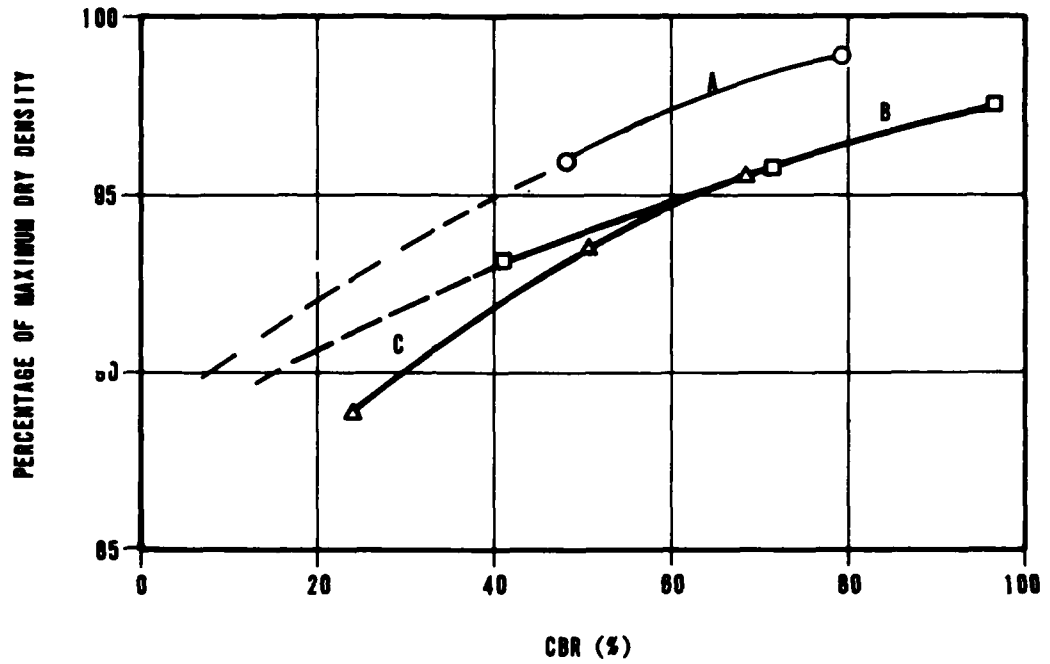
| COMPOSITE SAMPLE NUMBER | SOIL TYPE | PERCENT PASSING #200 | ATTERBERG LIMITS |    | SPECIFIC GRAVITY | MAXIMUM DRY DENSITY |                   | OPTIMUM MOISTURE (%) | COMPACTED DRY DENSITY |                   | COMPACTED MOISTURE (%) | PERCENT OF MAXIMUM DRY DENSITY | CBR (%) |
|-------------------------|-----------|----------------------|------------------|----|------------------|---------------------|-------------------|----------------------|-----------------------|-------------------|------------------------|--------------------------------|---------|
|                         |           |                      | LL               | PI |                  | pcf                 | kg/m <sup>3</sup> |                      | pcf                   | kg/m <sup>3</sup> |                        |                                |         |
| A                       | SP-SM     | 11                   |                  |    |                  | 122.1               | 1956              | 9.8                  | 120.6                 | 1932              | 9.4                    | 96.8                           | 79      |
|                         |           |                      |                  |    |                  |                     |                   |                      | 117.0                 | 1874              | 9.7                    | 95.8                           | 48      |
|                         |           |                      |                  |    |                  |                     |                   |                      | 113.2                 | 1813              | 9.5                    | 92.7                           | 18      |
| B                       | SP        | 3                    |                  |    | 2.60             | 121.0               | 1938              | 10.0                 | 118.1                 | 1892              | 9.7                    | 97.6                           | 97      |
|                         |           |                      |                  |    |                  |                     |                   |                      | 115.9                 | 1857              | 9.7                    | 95.8                           | 72      |
|                         |           |                      |                  |    |                  |                     |                   |                      | 112.8                 | 1807              | 9.7                    | 93.2                           | 41      |
| C                       | SM        | 21                   |                  |    |                  | 118.0               | 1890              | 11.5                 | 112.7                 | 1805              | 11.9                   | 95.5                           | 68      |
|                         |           |                      |                  |    |                  |                     |                   |                      | 110.4                 | 1768              | 11.6                   | 93.6                           | 51      |
|                         |           |                      |                  |    |                  |                     |                   |                      | 105.0                 | 1662              | 12.1                   | 89.0                           | 24      |

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

MX SITING INVESTIGATION  
DEPARTMENT OF THE AIR FORCE - WMO

TABLE  
II-6-6

**WORO NATIONAL, INC.**



| SYMBOL | COMPOSITE SAMPLE NUMBER | SOIL TYPE |
|--------|-------------------------|-----------|
| ○      | A                       | SW-SM     |
| □      | B                       | SP        |
| △      | C                       | SN        |

**CALIFORNIA BEARING RATIO (CBR) CURVES  
RALSTON VALLEY, NEVADA**

|  |                  |
|--|------------------|
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE - ONO | FIGURE<br>II-6-9 |
|--|------------------|

**FURRO NATIONAL, INC.**



FN-TR-27-RV-II

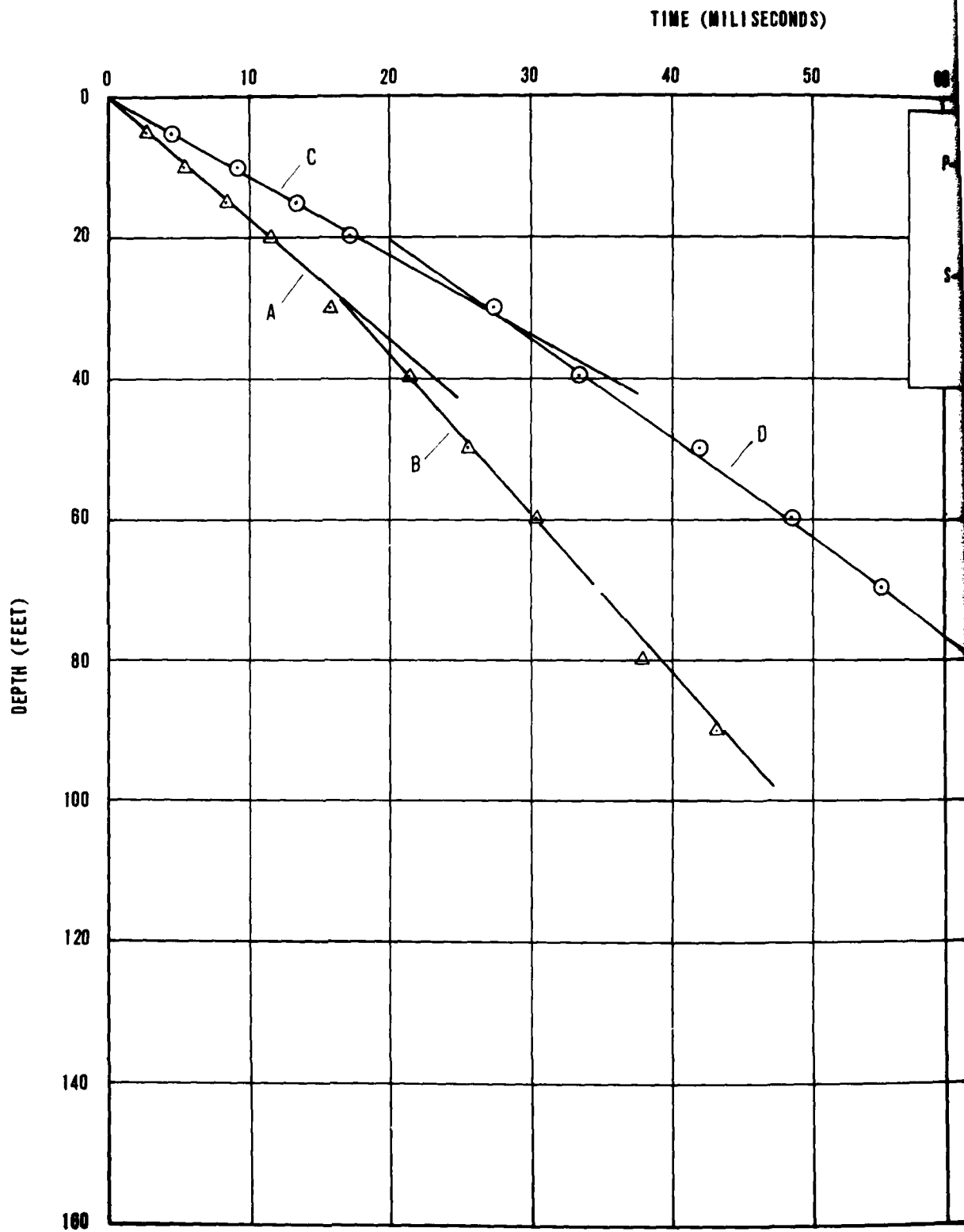
SECTION 7.0  
DOWNHOLE SEISMIC VELOCITY DATA

### 7.0 DOWNHOLE SEISMIC VELOCITY DATA

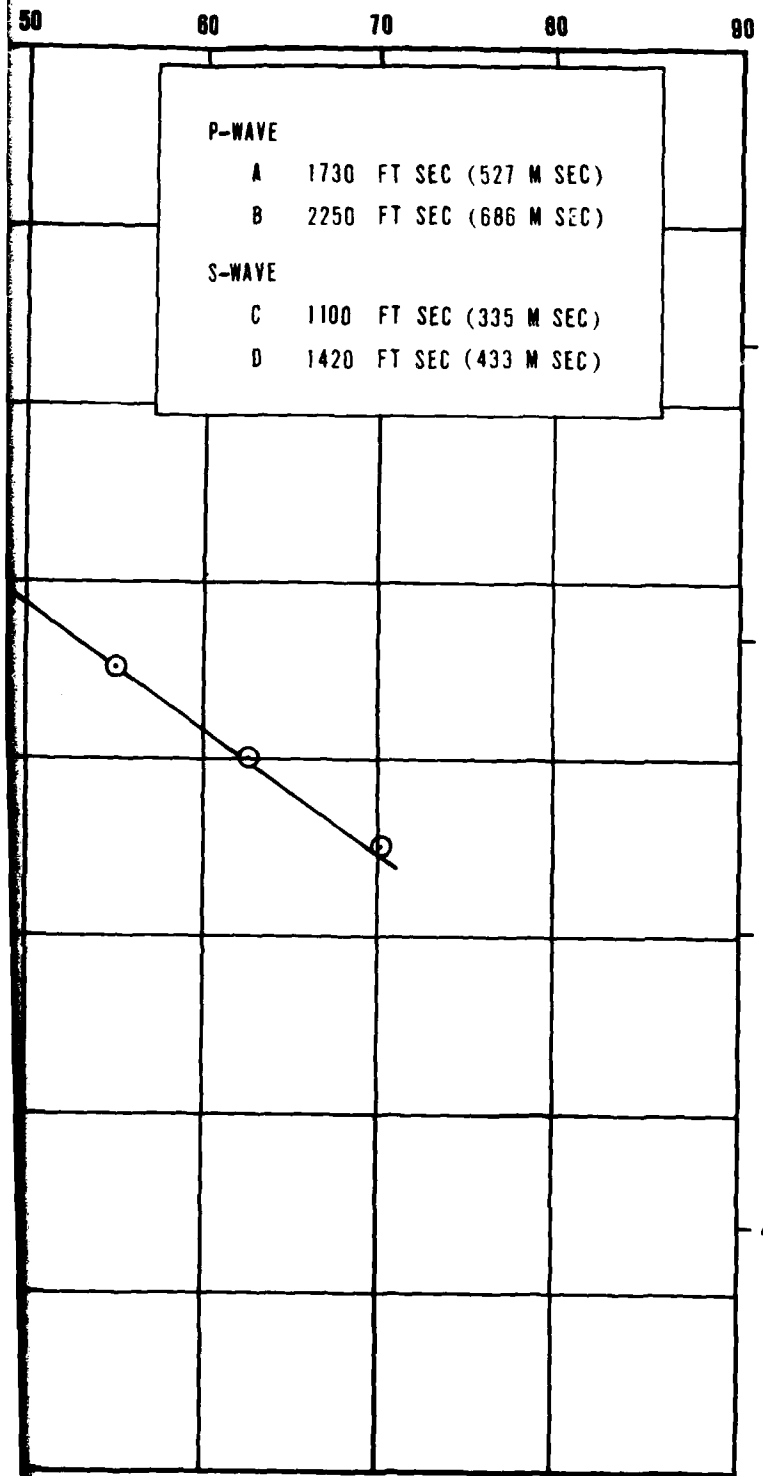
The corrected (see Appendix A4.2.0 in Volume I) travel times for the compressional and shear waves are plotted on the same coordinate system. The X-axis represents travel time in milliseconds and the y-axis represents depth. Compressional wave travel times are plotted as triangles and shear wave travel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

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

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



PS)



| LITHOLOGY        | USCS SYMBOL |
|------------------|-------------|
| [Blank]          | SM          |
| [Stippled]       | SP-SM       |
| [Blank]          | SM          |
| [Stippled]       | SW-SM       |
| [Blank]          | SP-SM       |
| [Diagonal lines] | ML          |
| [Blank]          | SM          |

**EXPLANATION**  
 ▲ COMPRESSIONAL WAVE  
 ○ SHEAR WAVE DATA

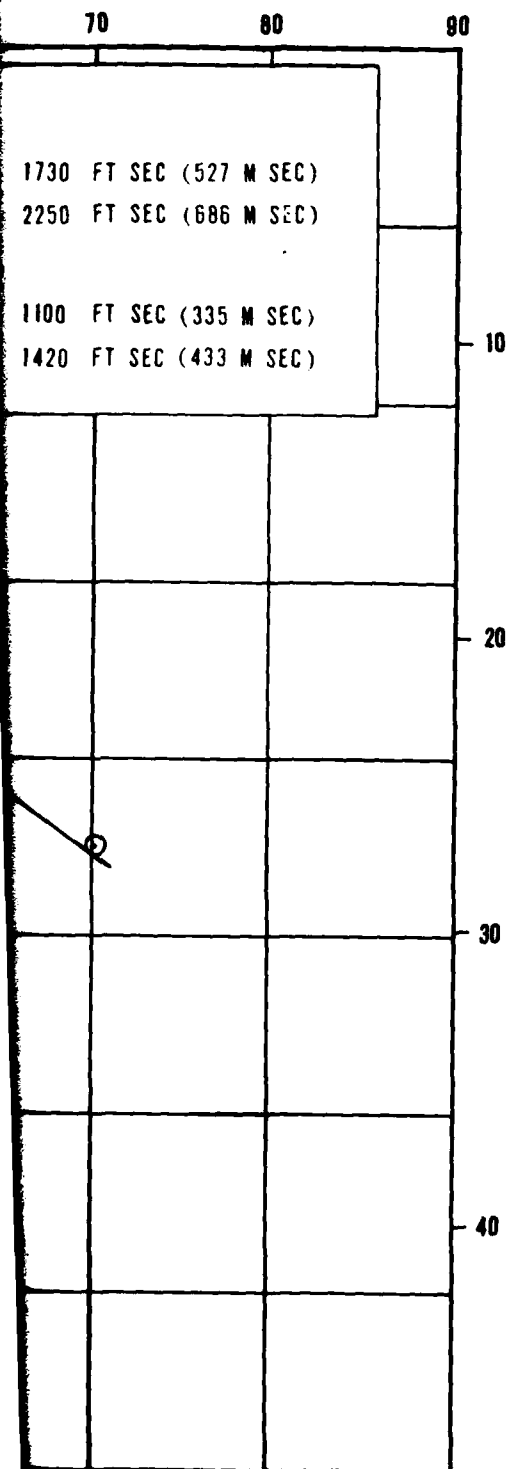
**TIME VERSUS DEPTH  
 DOWNHOLE SEISMIC VELOCITY  
 BORING RV-B-5**

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE

**FUGRO NATION**

1

2



| LITHOLOGY        | USCS SYMBOL |
|------------------|-------------|
| [Blank]          | SM          |
| [Stippled]       | SP-SM       |
| [Blank]          | SM          |
| [Stippled]       | SW-SM       |
| [Blank]          | SP-SM       |
| [Diagonal lines] | ML          |
| [Blank]          | SM          |

EXPLANATION

- △ COMPRESSIONAL WAVE DATA
- ⊗ SHEAR WAVE DATA

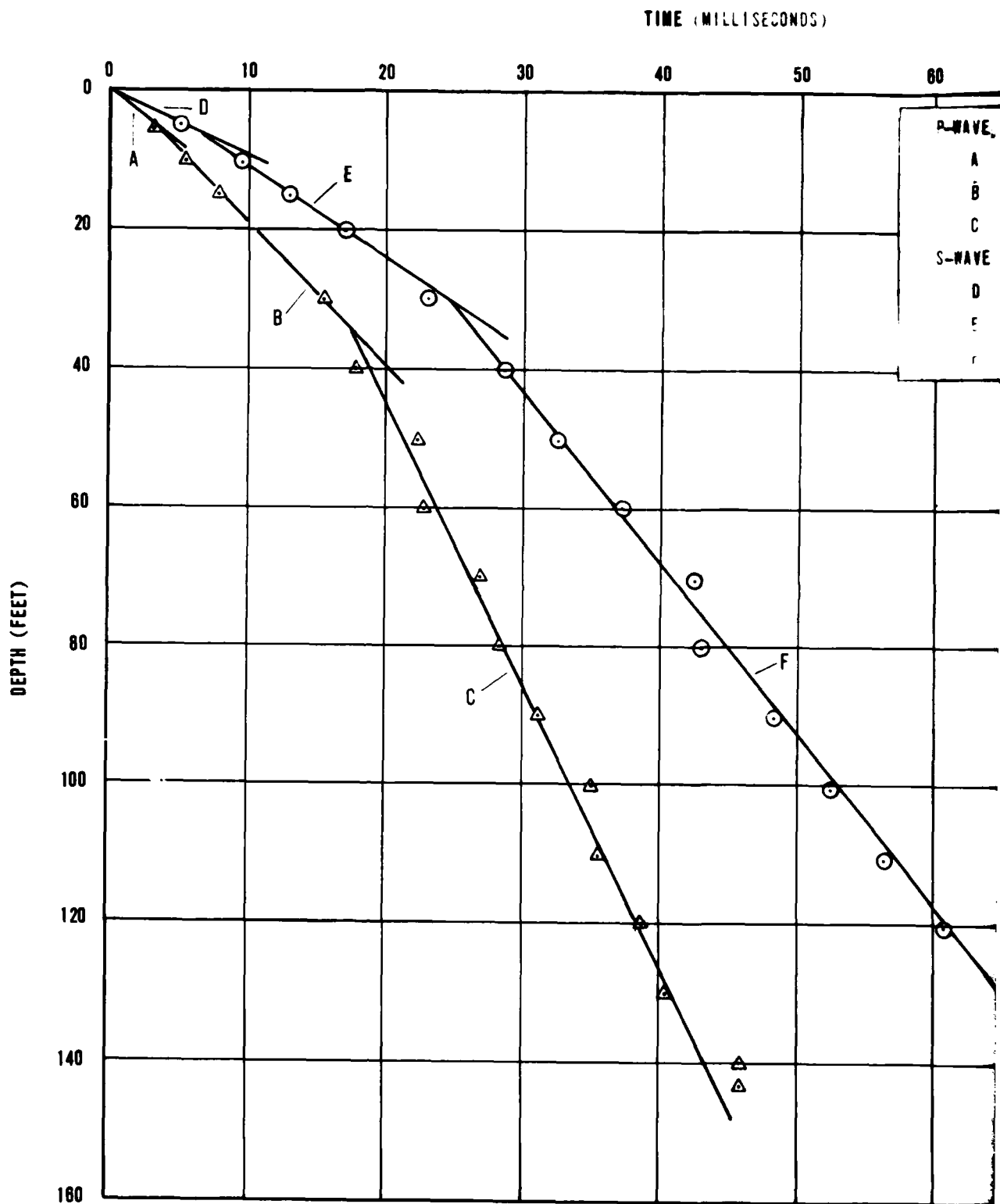
**TIME VERSUS DEPTH GRAPH  
DOWNHOLE SEISMIC VELOCITY SURVEY  
BORING RV-B-5**

|  |                         |
|--|-------------------------|
| MX SITING INVESTIGATION<br>DEPARTMENT OF THE AIR FORCE BMO | FIGURE<br><b>II-7-1</b> |
|--|-------------------------|

**FUGRO NATIONAL, INC.**

2

1 3

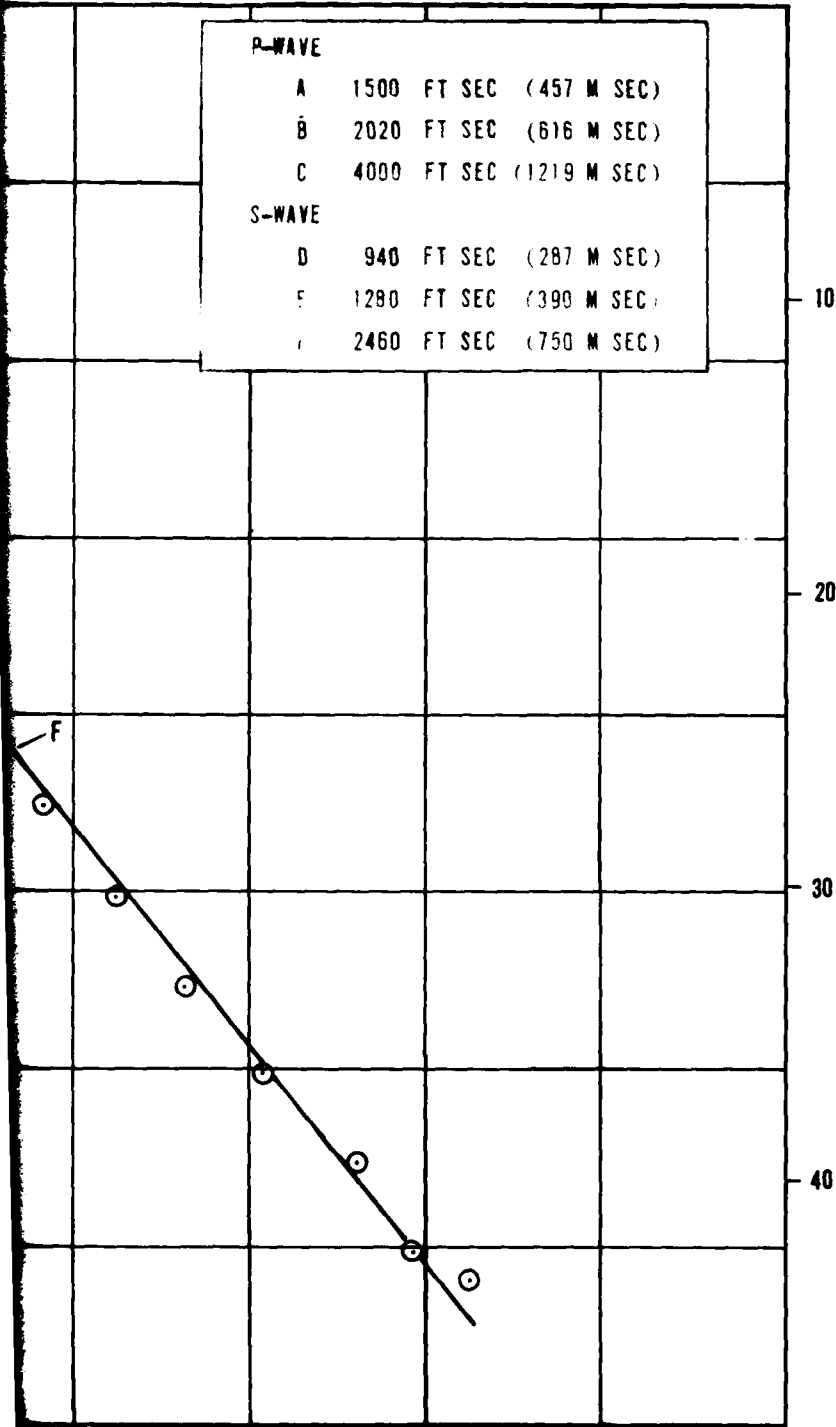


SECONDS)

50 60 70 80 90

**P-WAVE**  
 A 1500 FT SEC (457 M SEC)  
 B 2020 FT SEC (616 M SEC)  
 C 4000 FT SEC (1219 M SEC)

**S-WAVE**  
 D 940 FT SEC (287 M SEC)  
 E 1280 FT SEC (390 M SEC)  
 F 2460 FT SEC (750 M SEC)



| LITHOLOGY | USCS SYMBOL |
|-----------|-------------|
|           | SP-SM       |
|           | SW-SM       |
|           | SC          |
|           | GW-GM       |
|           | SW-SM       |
|           | SM          |
|           | ML          |
|           | SP          |
|           | ML          |
|           | SM          |

**EXPLANATION**

- △ COMPRESSIONAL WAVE
- SHEAR WAVE DATA

TIME VERSUS DEPTH  
 DOWNHOLE SEISMIC VELOCITY  
 BORING NO. 1

MR. SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE

**FUGRO NATIONAL**

1 2

70                      80                      90

1500 FT SEC (457 M SEC)  
 2020 FT SEC (616 M SEC)  
 4000 FT SEC (1219 M SEC)

940 FT SEC (287 M SEC)  
 1280 FT SEC (390 M SEC)  
 2460 FT SEC (750 M SEC)

10

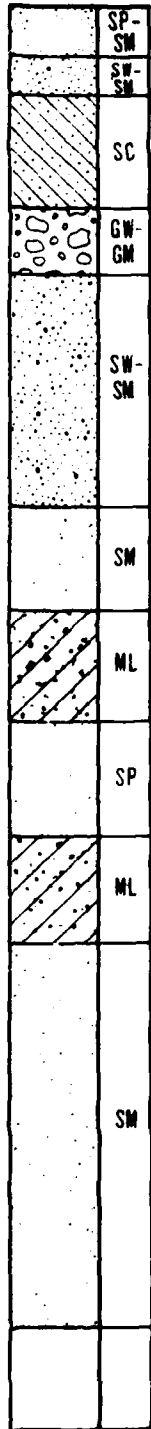
20

30

40

DEPTH (METERS)

LITHOLOGY  
 USCS SYMBOL



**EXPLANATION**

- △ COMPRESSIONAL WAVE DATA
- SHEAR WAVE DATA

TIME VERSUS DEPTH GRAPH  
 DOWNHOLE SEISMIC VELOCITY SURVEY  
 BORING RV-8-3

MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE DND

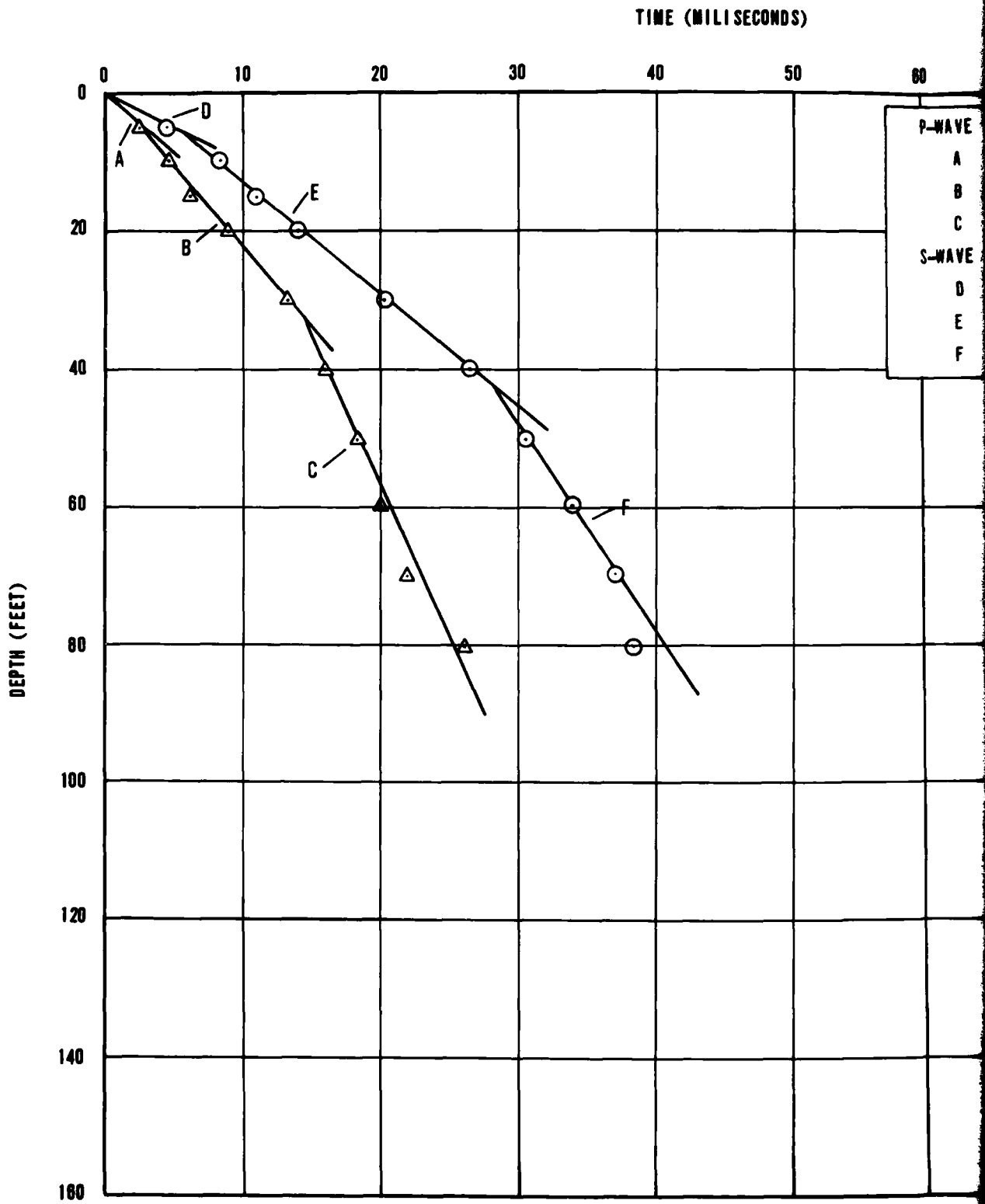
FIGURE  
 II-7-2

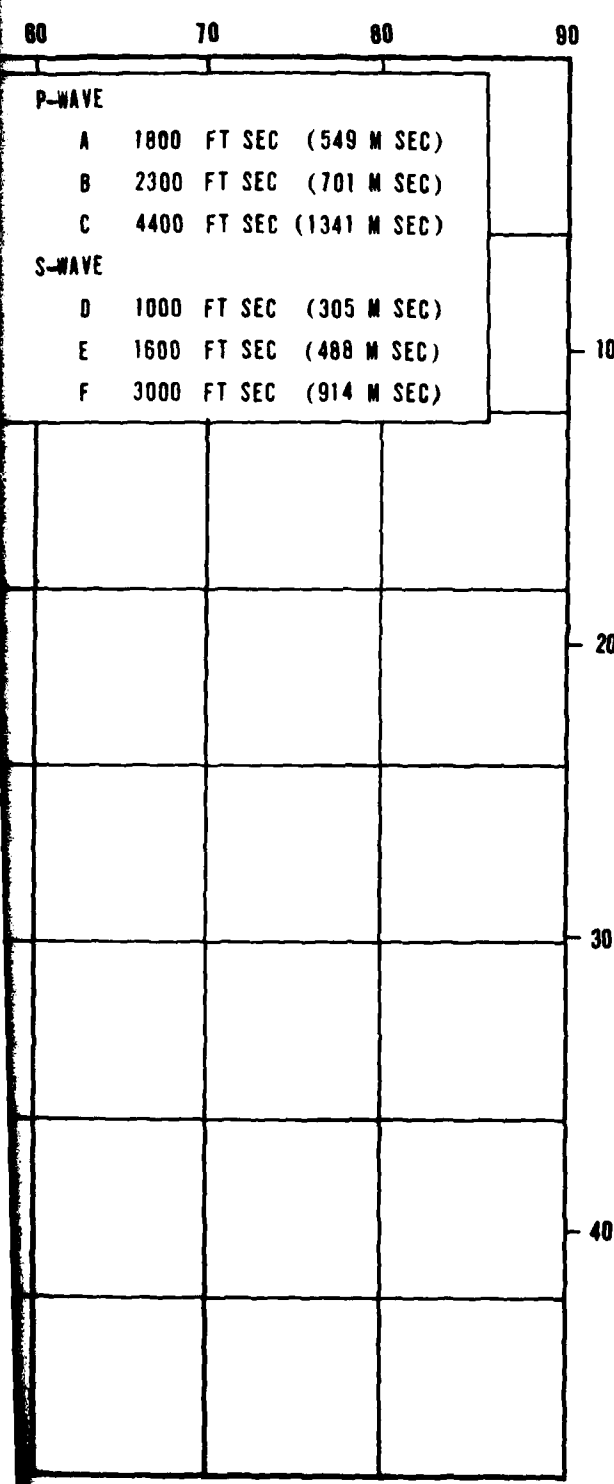
**JUGRO NATIONAL, INC.**

2

3

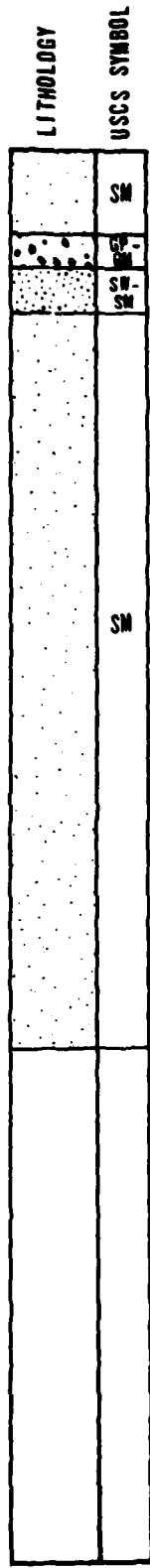






**P-WAVE**  
 A 1800 FT SEC (549 M SEC)  
 B 2300 FT SEC (701 M SEC)  
 C 4400 FT SEC (1341 M SEC)

**S-WAVE**  
 D 1000 FT SEC (305 M SEC)  
 E 1600 FT SEC (488 M SEC)  
 F 3000 FT SEC (914 M SEC)



**EXPLANATION**  
 Δ COMPRESSIONAL WAVE DATA  
 ⊙ SHEAR WAVE DATA

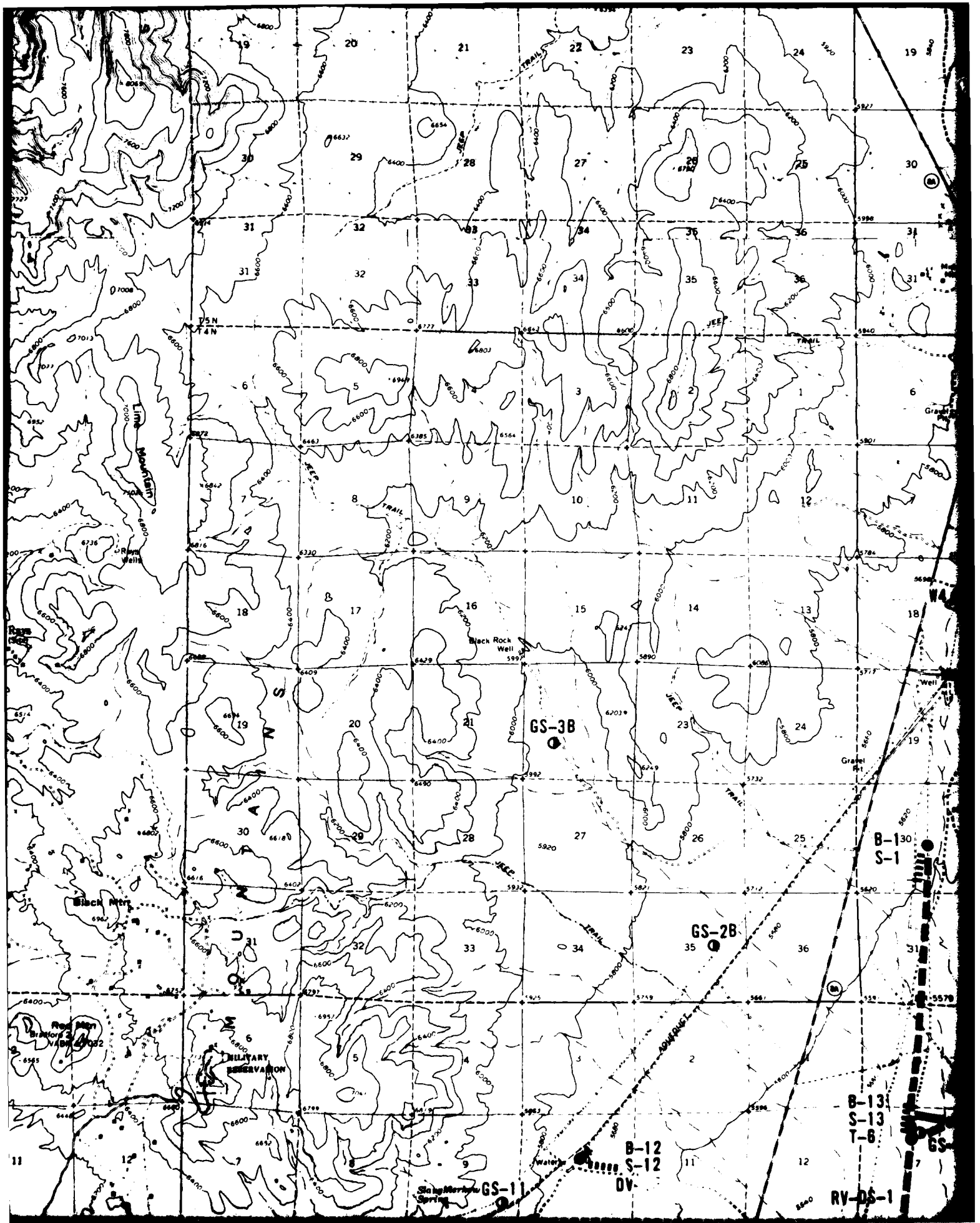
**TIME VERSUS DEPTH GRAPH  
 DOWNHOLE SEISMIC VELOCITY SURVEY  
 BORING RV-6-12**

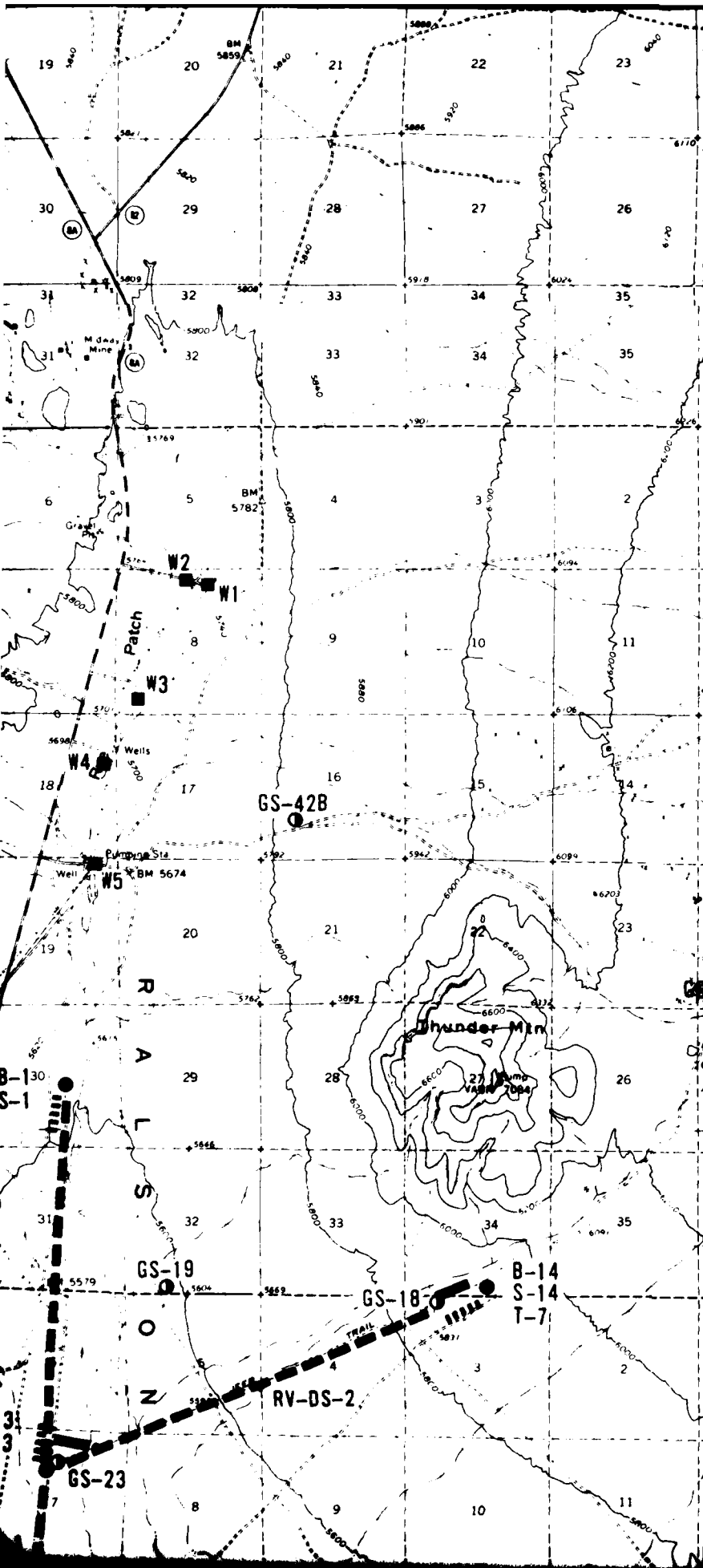
MX SITING INVESTIGATION  
 DEPARTMENT OF THE AIR FORCE - BMD

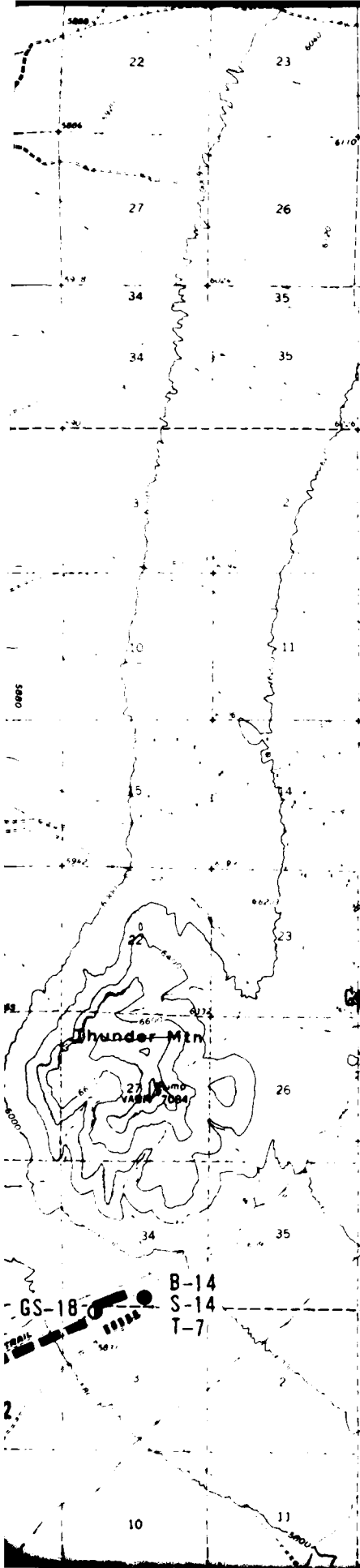
FIGURE  
**II-7**

**PERRO NATIONAL INC**

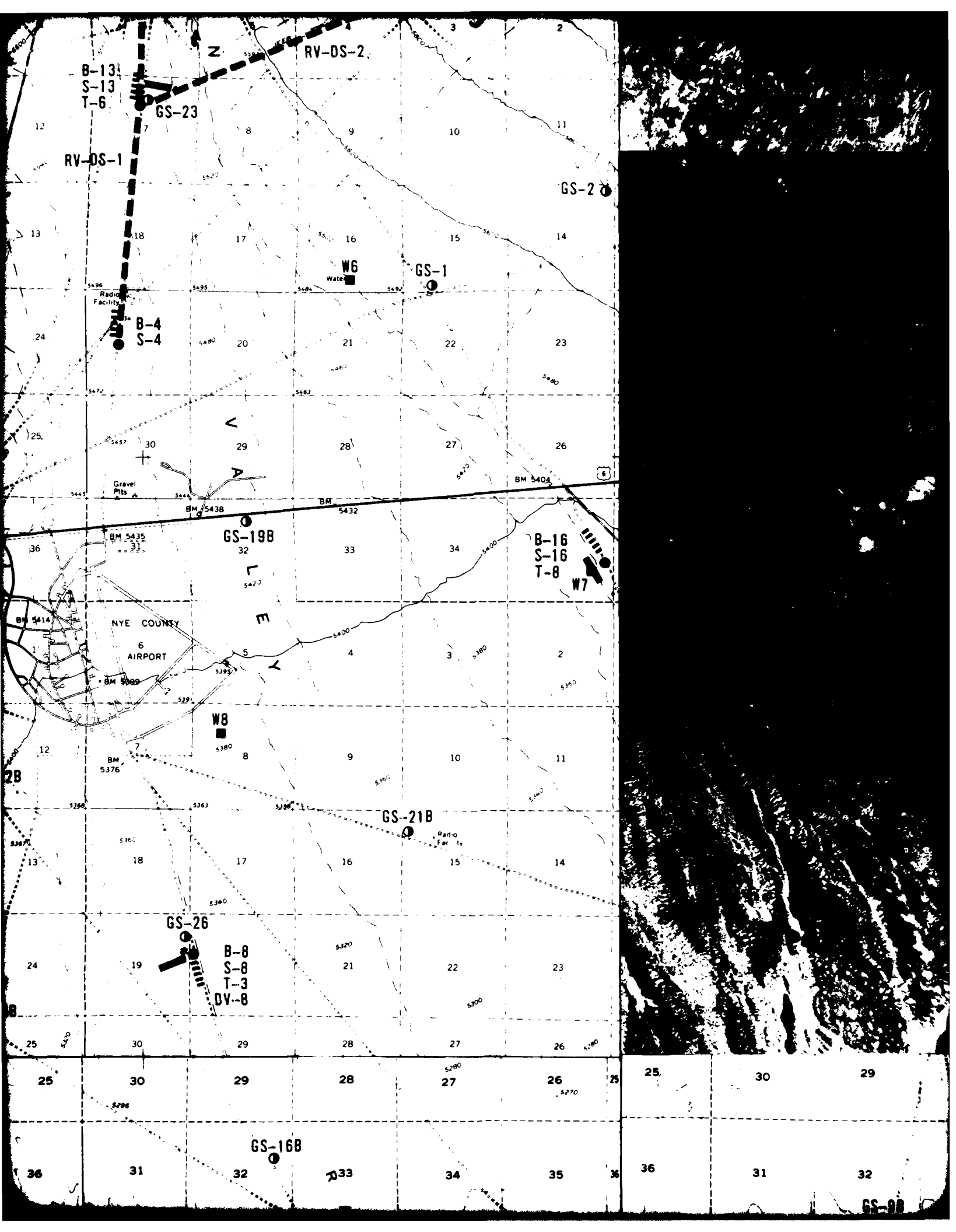
1 2

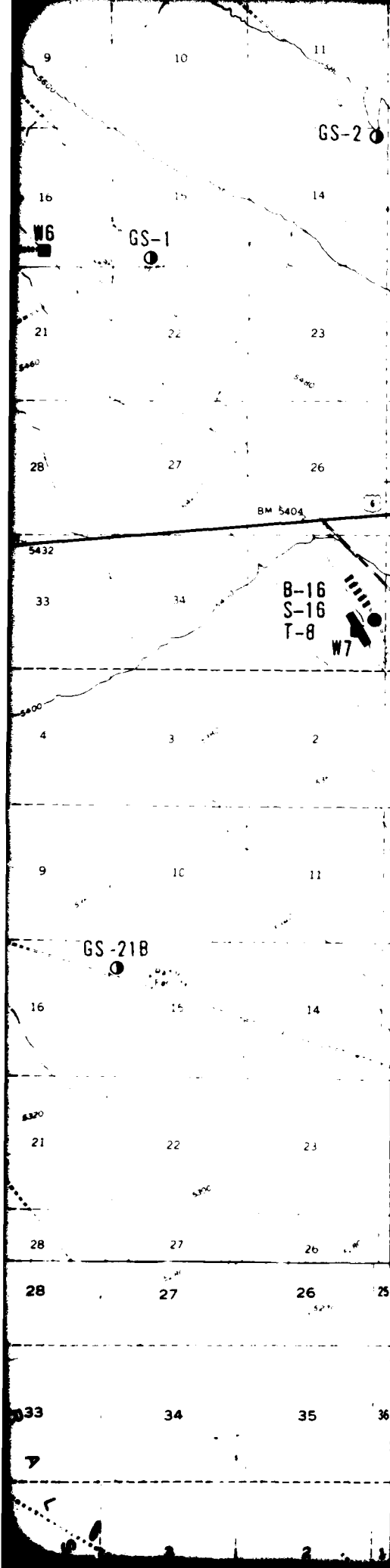




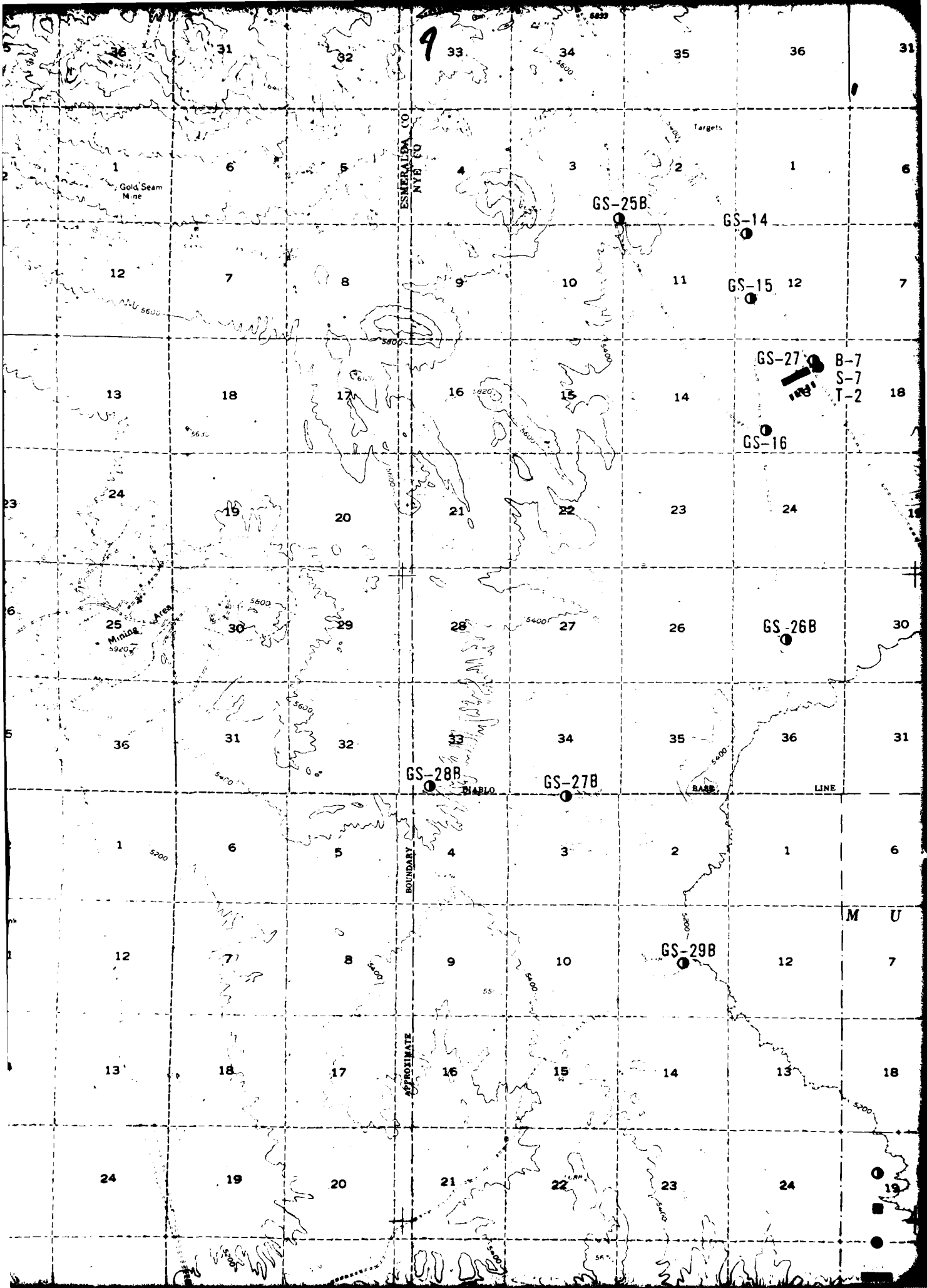


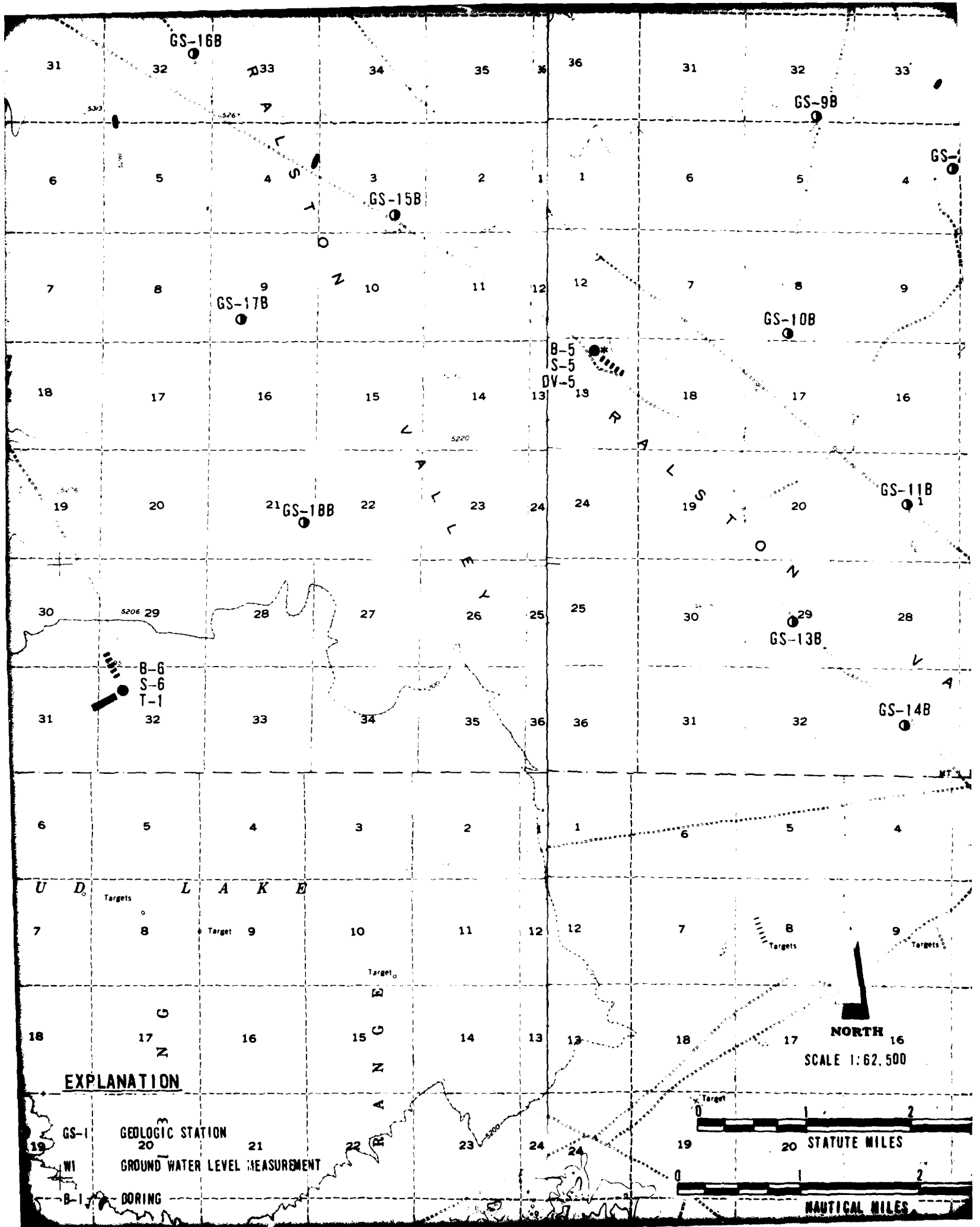












GS-16B

GS-9B

GS-15B

GS-17B

GS-10B

GS-18B

GS-11B

GS-13B

GS-14B

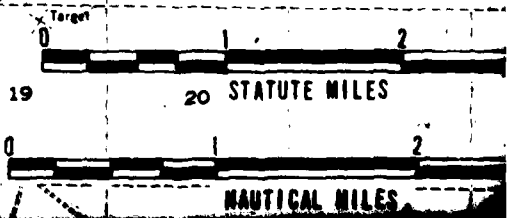
B-6  
S-6  
T-1

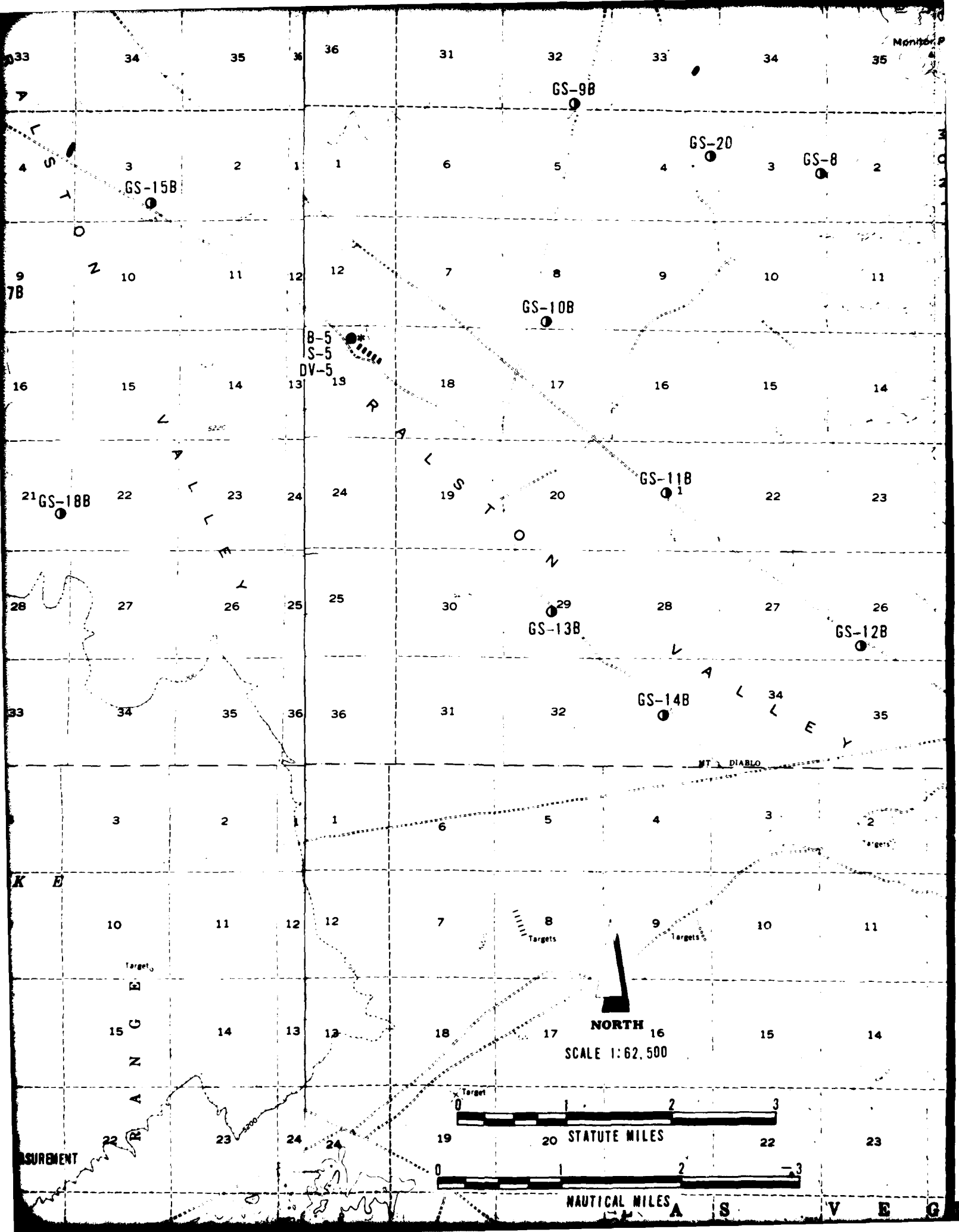
B-5  
S-5  
DV-5

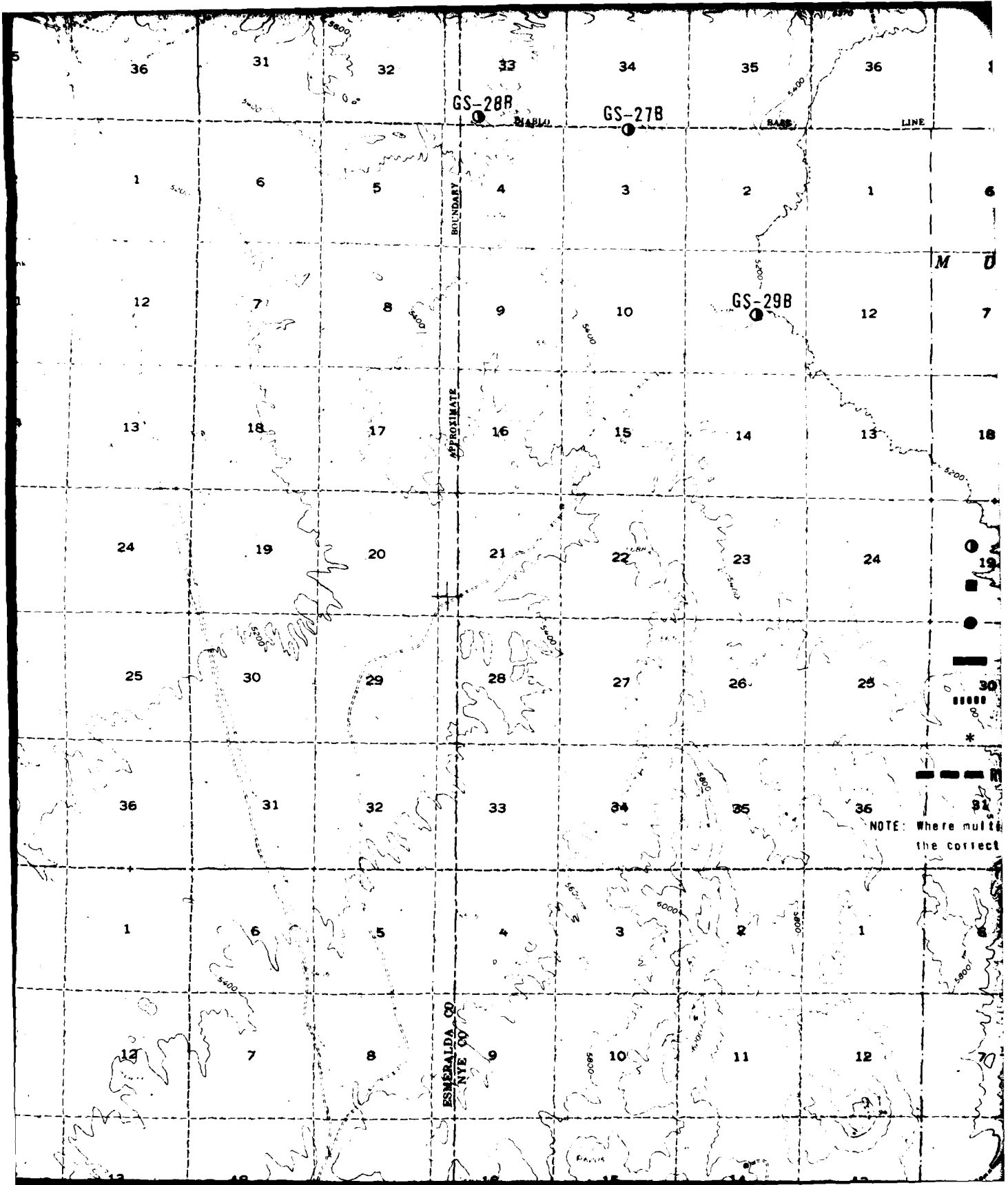
**EXPLANATION**

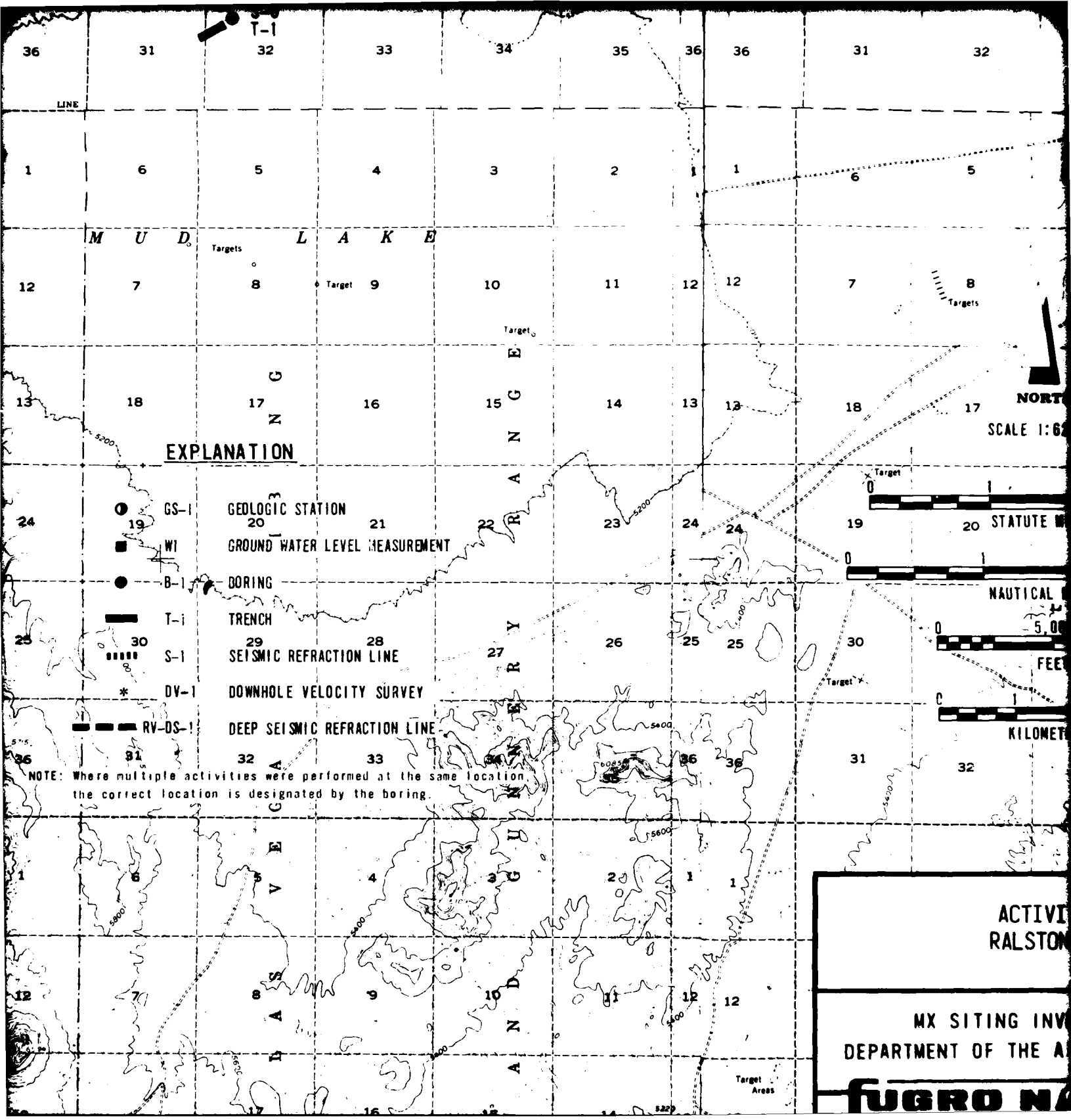
- GS-1 GEOLOGIC STATION
- WI GROUND WATER LEVEL MEASUREMENT
- B-1 BORING

**NORTH**  
SCALE 1:62,500









**EXPLANATION**

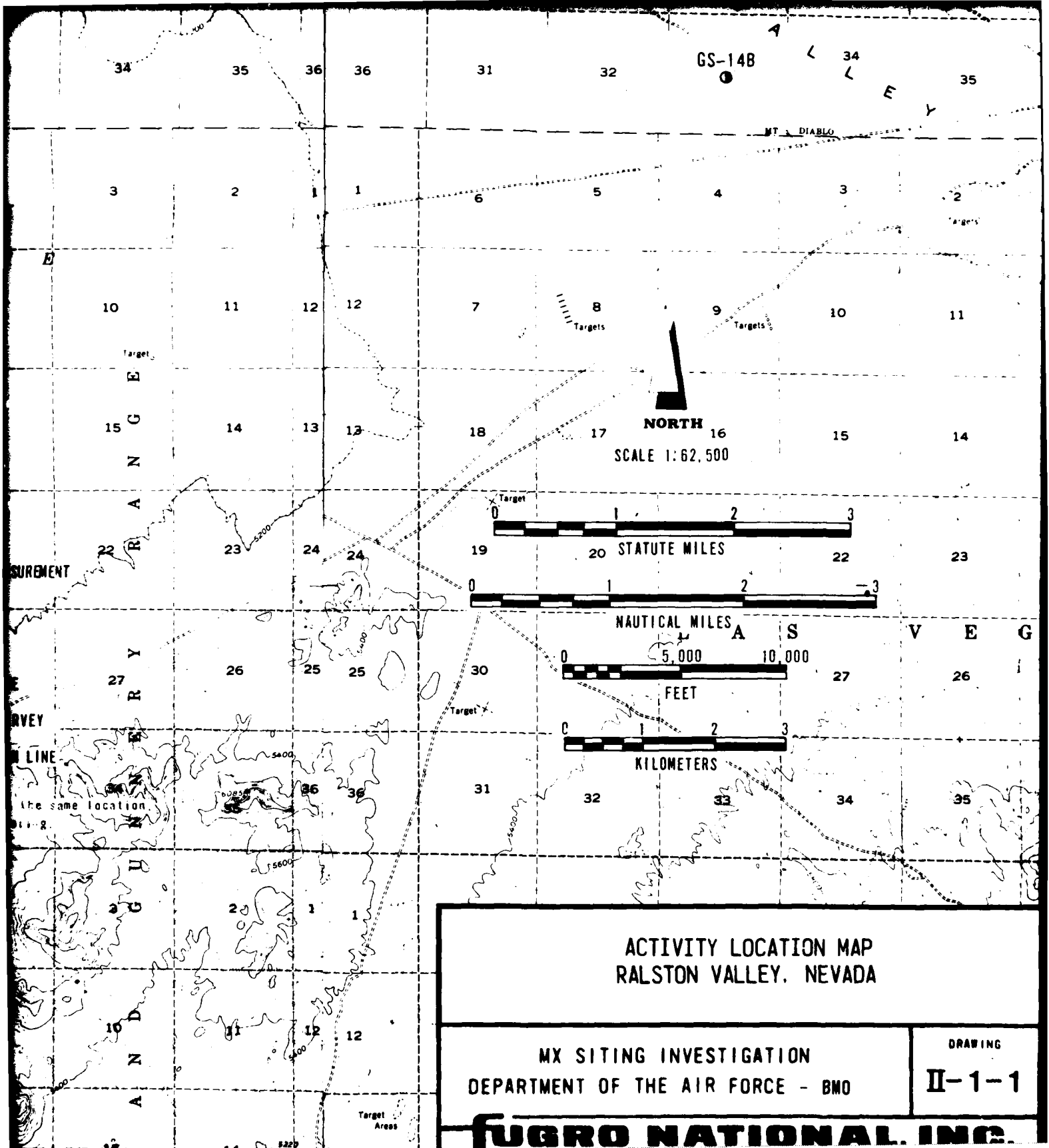
- GS-1 GEDLOGIC STATION
- WI GROUND WATER LEVEL MEASUREMENT
- B-1 BORING
- T-1 TRENCH
- ▬ S-1 SEISMIC REFRACTION LINE
- \* DV-1 DOWNHOLE VELOCITY SURVEY
- ▬▬▬ RV-DS-1 DEEP SEISMIC REFRACTION LINE

NOTE: Where multiple activities were performed at the same location the correct location is designated by the boring.

**ACTIVE RALSTON**

MX SITING INV  
DEPARTMENT OF THE A

**FUGRO NA**



**ACTIVITY LOCATION MAP  
RALSTON VALLEY, NEVADA**

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

**DRAWING  
II-1-1**

**FUGRO NATIONAL, INC.**

FILMED  
5-8

