REPORT ON
EXPLORATION/GROUTING PROGRAM
DEWATERING WELL NO. 6

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 & 3

BECHTEL JOB 10079-003

FEBRUARY 1979

Docket #50-361
Control #7902220130
Date 2/16/79 of Document:
REGULATORY DOCKET FILE

790222 0134

TABLE OF CONTENTS

SECTION	TITLE	PAGE
1.0	INTRODUCTION	1
2.0	BACKGROUND	1
3.0	SUMMARY	2
4.0	CONCLUSIONS	2
5.0	DRILLING AND GROUTING	3
5.1	Drilling Methods and Materials	4
5.1.1	Stage 1 Vertical Holes	4
5.1.2	Stage 2 Holes Along Axis of Defined Cavity	4
5.1.3	Stage 3 Vertical Holes	4
5.1.4	Angle Holes Adjacent to and Under Auxiliary Building	5
5.2	Sampling	5
5.3	Grouting Methods and Materials	5
6.0	RESULTS OF THE EXPLORATION/GROUTING PROGRAM	7
6.1	Cavity Definition	7
6.2	Materials in the Cavity	8
6.3	Grouting	8
7.0	SUMMARY OF FOUNDATION CONDITIONS	9

LIST OF FIGURES

FIGURE 1	Location Map
FIGURE 2	Preliminary Plan of Drill Holes
FIGURE 3	Location of Grout Holes
FIGURE 4	Distribution of SPT Results
FIGURE 5	Typical Exploration/Grout Hole
FIGURE 6	Contours of Top of San Mateo Formation
FIGURE 7	Isometric Drawing of Cavity
FIGURE 8	Location of Cross Sections
FIGURE 9	Cross Sections
FIGURE 10	Isopach of Grout Thickness
FIGURE 11	Isopach of Disturbed Sand

APPENDICES

APPENDIX A	Gyroscopic Survey Results of Exploration/Grouting Drill Holes
APPENDIX B	Graphic Logs of the Exploration/Grouting Drill Holes
APPENDIX C	Grouting Results of the Exploration/Grouting Program
APPENDIX D	Photographs of Three-Dimensional Stick-Model - Well No. 6

REPORT ON
EXPLORATION/GROUTING PROGRAM
DEWATERING WELL NO. 6

SAN ONOFRE NUCLEAR GENERATING STATION UNITS 2 & 3
BECHTEL JOB 10079-003

1.0 INTRODUCTION

During the initial demobilization of Dewatering Well No. 6, subsidence of the gravel pack around the well occurred. This prompted exploration which led to the discovery of a cavity at this well.

This report presents details of the Exploration/Grouting Program completed at Dewatering Well No. 6 located at the San Onofre Nuclear Generating Station (SONGS) plant site. It describes the procedures of the program and the subsurface conditions at Well No. 6 after the program was completed.

Geotechnical personnel carried out the technical tasks in two steps. Step 1 consisted of drilling 74 Stage 1, 2 and 3 holes to determine the extent of the cavity and to determine the characteristics of the cavity fill. Step 2 consisted of pressure grouting the holes in Step 1 to fill all possible areas of open cavity.

2.0 BACKGROUND

Dewatering Well No. 6 is located adjacent to the Unit 2 Auxiliary Building as shown in Figure 1. During demobilization of the well by backfilling with sand in May 1977, subsidence of the gravel pack around the well bore occurred. Subsequent investigation revealed the existence of a subsurface cavity.

The well casing and annulus were partially cleaned of loose sand and gravel by air lifting. The cavity was measured by mechanical caliper and sonar. A video scan of the 14-inch casing was also made. A total of 34 auger holes were drilled for purposes of exploration and backfill of the cavity with tremie grout. The results of these initial investigations have been described in presentations to the NRC, in reports documenting those presentations and in monthly status reports.

In April 1978, a total of 112 cubic yards of grout (site batch plant mix G-3) was placed by tremie method in nine auger holes to fill the open portion at the top of the cavity created by air lifting and to stabilize the cavity area for further investigative work.

A deep boring investigation similar to that done at Well No. 8 followed this initial grouting program. A total of 17 holes were drilled to the design depth of 200 feet and one hole was drilled to 154-foot depth. Data from these holes established the maximum drilling depths of the initial exploration/grout holes. During the Exploration/Grouting Program an additional four deep borings were drilled, two of which were abandoned prior to reaching design depth due to drilling difficulties. Details of the program are contained in a separate report entitled Deep Exploration Drilling Program - Dewatering Well No. 6. The Exploration/Grouting Program followed the deep hole drilling.

3.0 SUMMARY

The objectives of the Exploration/Grouting Program were to define the limits of the cavity around the well and to fill any existing areas of open cavity with grout. A total of 74 holes were drilled and 500 bags of cement placed during the program. The results of the drilling and sampling indicated that the cavity is a narrow, northwest trending linear feature deepening toward the well bore. It is filled with loose-to-dense sand. No open cavity was encountered. A series of angle holes drilled under the Auxiliary Building demonstrates that the cavity does not extend under the structure.

4.0 CONCLUSIONS

The following conclusions can be drawn from results of the Exploration/Grouting Program:

A. The extent of the sand filled cavity is limited to a narrow zone. The cavity is less than 1-foot wide at its maximum depth of 140 feet from plant grade.

B. Data obtained from angle holes extending beneath the Auxiliary Building demonstrate that the cavity does not extend under the building.

C. The cavity is filled with loose-to-dense sand and grout and contains no voids.

D. The pressure grouting injected lenses and dikes of grout into the sand resulting in a slight densification of the loose sand.

5.0 DRILLING AND GROUTING

The Exploration/Grouting Program consisted of three drilling and grouting stages. Stage 1 holes were drilled in and around the existing cavity to determine its depth and lateral extent. Stage 2 holes were drilled after most Stage 1 holes were completed. These were drilled at various angles across the long axis of the cavity as defined by the Stage 1 holes. The purpose of the Stage 2 holes was to pressure grout any voids not detected and filled by the previous grouting. Stage 3 holes were drilled subsequent to completion of all adjacent Stage 1 and 2 holes to close out the grouting pattern and to check completeness of the program. A series of angle holes were drilled under the Auxiliary Building in each of the three stages to determine that no disturbed sand exists under the structure.

All holes were pressure grouted with a cement-grout mixture to fill any cavities present.

Holes were drilled on a grid system set up parallel to the plant grid system. The original Stage 1 hole locations, shown on Figure 2, were based on the cavity as defined by prior exploration. Modification of the Stage 1 pattern was made as more information was obtained during the Exploration/Grouting Program. Locations of Stage 2 holes were based on the configuration of the cavity interpreted from the Stage 1 borings. Stage 3 hole locations were determined from the information obtained from the Stage 1 and 2 holes. The final boring location plan is shown on Figure 3.

5.1 Drilling Methods and Materials

A Simco 400 hydraulic rotary track-mounted rig was used to drill both vertical and angle holes. A CME 750 modified hydraulic rotary drill was used to drill vertical and several steeply inclined angle holes.

Holes were drilled using rotary drilling techniques with Revert mud as a drilling fluid. Holes were advanced either by tri-cone bit, drag bit, or by carbide bit attached to BX or NX casing. Where sampling of grout was required, a diamond core barrel was sometimes used. Hole size varied from BX to approximately 4-1/4-inch diameter. Several holes were stopped prematurely due to drilling difficulties. These holes were pressure grouted or tremie grouted and replaced by drilling an additional hole adjacent to the original hole.

5.1.1 Stage 1 Vertical Holes

A total of 45 vertical Stage 1 holes were drilled in the cavity region and adjacent to the Auxiliary Building to determine the lateral and vertical extent of the disturbed sand surrounding Dewatering Well No. 6 and to grout any areas of open cavity or loose sands encountered.

5.1.2 Stage 2 Holes Along Axis of Defined Cavity

A total of 13 Stage 2 holes were drilled at angles varying from 70 degrees to 85 degrees from horizontal across the major axis of the cavity defined by Stage 1 borings. The purpose of these holes was to supplement Stage 1 grouting of the cavity fill materials. Gyroscopic surveys to determine hole drift were conducted in many of these holes (refer to Appendix A).

5.1.3 Stage 3 Vertical Holes

A total of seven vertical Stage 3 holes were drilled and grouted following completion of Stage 1 and 2 holes. These were done to complete closure of the grouting program and to check the completeness of the program. Locations and depths were determined from the previously drilled grout holes.

5.1.4 Angle Holes Adjacent to and Under Auxiliary Building

A total of nine Stage 1, 2 and 3 holes were drilled and grouted adjacent to and beneath the structure. Angles ranged from 75 degrees to 85 degrees from horizontal. Gyroscopic surveys were performed on seven of these holes to check hole drift (refer to Appendix A). These angle holes established that no cavity exists under the Auxiliary Building.

5.2 Sampling

Sampling was done to differentiate disturbed sand from native San Mateo Formation. Standard Penetration Tests (SPT) using a 2-inch O.D. split-spoon drive sampler were performed according to ASTM D 1586 (74) at 5-foot intervals in all Stage 1 holes. In Stage 3 holes, sampling was done at 5-foot intervals in native San Mateo and at 2.5-foot intervals where disturbed sand was encountered. In some Stage 2 holes only a visual inspection of drill cuttings was made. Other Stage 2 holes were sampled at 5- and 10-foot intervals. The drive hammer was set on a steel sled attached to the drill boom when performing SPT's on angle holes less than 85 degrees from horizontal. A log of each hole was made by the geologist supervising the drilling. Data recorded included: depths and blow counts of SPT's; descriptions of subsurface materials; drilling characteristics; rate of penetration; circulation loss; and any unusual difficulties encountered during the drilling. Samples were examined as soon as they were recovered from the sampler. After inspection they were placed in plastic bags for storage. Graphic logs of all holes are shown in Appendix B. SPT results (Figure 4) for all samples in disturbed sand in the cavity area illustrate that the materials encountered varied from loose-to-dense sand. The histograms show an increase in mean SPT results for Stage 3 holes as compared to Stage 1 and 2 holes.

5.3 Grouting Methods and Materials

After each hole was drilled, it was pressure grouted. An example of a typical exploration/grout hole is shown on Figure 5.

Equipment used in the grouting program consisted of a Moyno 3-L-10 pump, a horizontal paddle-type mixer, and an 11 cubic foot capacity hold-over tank with vertical center shaft paddle. The grouting system provided continuous circulation of grout from the mixer tanks to the hole. A pressure gauge was located at the top of the hole to monitor grout pressure at the hole. The gauge was checked for accuracy by Bechtel Quality Control.

The grout mixes varied from 5:1 to 3/4:1 water-cement ratio by volume. Intraplast-N was used as an additive at a quantity of one percent by weight of cement to increase flowability and decrease shrinkage of the grout. Sand was not used in the grout program.

Grouting pressures measured at the top of the hole ranged from 10 to 60 psi. Most holes were grouted at 45 to 50 psi maximum pressure. Pressures were kept in this range to prevent damage to adjacent structures and also to help minimize surface leakage.

The grouting procedure involved several steps. After completion of the drilling of each hole, 1-1/2-inch diameter PVC was installed to the bottom of the hole. Slotted PVC was used to within 10 to 20 feet of the top of each hole and solid PVC used to the top of the hole. A 3-inch diameter nipple was then placed in the top of the hole and sealed at the surface with grout. Originally 5-foot lengths of NX casing were used but shortly into the program 10-foot lengths of 3-inch PVC were utilized. The grout connection was made directly to a threaded coupling glued to the PVC (see Figure 6).

Immediately prior to grouting, the hole was washed of Revert mud by placing a hose to the bottom and flushing with water and Fast-Break, an additive used to break down the Revert drilling fluid. The hole was then pressure grouted to refusal from the top in one stage. Refusal was determined to be when the hole accepted one-half cubic foot of grout or less in five minutes with a steady pressure maintained on the gauge. In some holes where surface leakage occurred, the grouting was stopped prior to reaching refusal and the hole backfilled with 1:1 grout. A replacement hole was added where this occurred.

6.0 RESULTS OF THE EXPLORATION/GROUTING PROGRAM

The configuration of the cavity was determined from the 74 borings completed at Well No. 6.

6.1 Cavity Definition

The cavity is a narrow, steep-sided linear feature extending approximately 22 feet northwest and 12 feet southeast of the well bore. West of the well, it varies from 8-1/2 feet wide at plant grade (Elevation 0) to less than one-half foot wide at its deepest point, Elevation -110 feet. East of the well the cavity varies from 8 feet wide at plant grade to less than one foot wide at Elevation -90 feet. The deepest and widest portion of the cavity is confined to within a radius of 7 feet from the well bore. The average depth of disturbed sand in the remaining portion of the cavity is 70 feet.

The upper region of the cavity between the well bore and Auxiliary Building resulted from erosion caused by rainfall and surface drainage traveling through existing borings into a portion of the cavity which was opened by airlift operations. Localized collapse of the roof during exploratory operations prior to the tremie backfilling with grout also contributed to upward migration of the cavity.

A contour map of the top of native San Mateo Formation (Figure 6) has been constructed from the deep boring and exploration/grout hole drilling data. The contours were constructed in a conservative manner. They reflect the deepest extent of disturbed sand found in the borings. In several holes undisturbed San Mateo Formation was encountered between zones of disturbed sand; however, the contours show the total zone as disturbed. An estimate of this conservatism can be demonstrated on the geologic sections (Figure 9) in which the cavity definition can be seen more clearly.

A stick model of the Deep Exploration Drilling Program and the Exploration/Grouting Program was constructed to illustrate the cavity in a three-dimensional view. Photographs of this model are included in Appendix D.

6.2 Materials in the Cavity

The cavity around Well No. 6 is filled with disturbed sand, sanded grout placed by tremie method (G-3) and Portland cement grout placed during the Exploration/Grouting Program. Thicknesses of grout varies from several inches to over 40 feet (refer to Figure 10).

No voids were encountered during the Exploration/Grouting Program. This was determined by observation of drill rates, drilling fluid circulation, and by the results of Standard Penetration Tests. Only grout and disturbed sand was encountered in the cavity. The sand fill in the cavity varies in density from loose-to-dense.

In many of the holes disturbed sand was found to overlie native San Mateo sand which was subsequently underlain by more disturbed sand at depth. This is displayed on isometric drawings and cross sections (refer to Figures 7 and 9).

6.3 Grouting

During the Exploration/Grouting Program, a total of 500 bags of cement were placed. Data relating to the Exploration/Grouting Program and grout logs are shown in Appendix C. During the early grouting, communication commonly occurred between drill holes. Grout travel between holes ranged from several feet to over 15 linear feet. The extensive grout travel indicates significant penetration within the cavity region. Communication and grout take decreased appreciably after the initial two weeks of grouting.

No voids were encountered in any of the exploration/grout holes. Some lenses of Portland cement grout were found in several of the later grout holes.

An isopach map (Figure 10) defining the thickness of G-3 and Portland cement grout placed in the cavity and an isopach map (Figure 11) defining the thickness of disturbed sand below plant grade was constructed. A planimeter measurement was made of these maps and also of the contour map of the top of the San Mateo Formation. A total of 120 cubic yards of grout

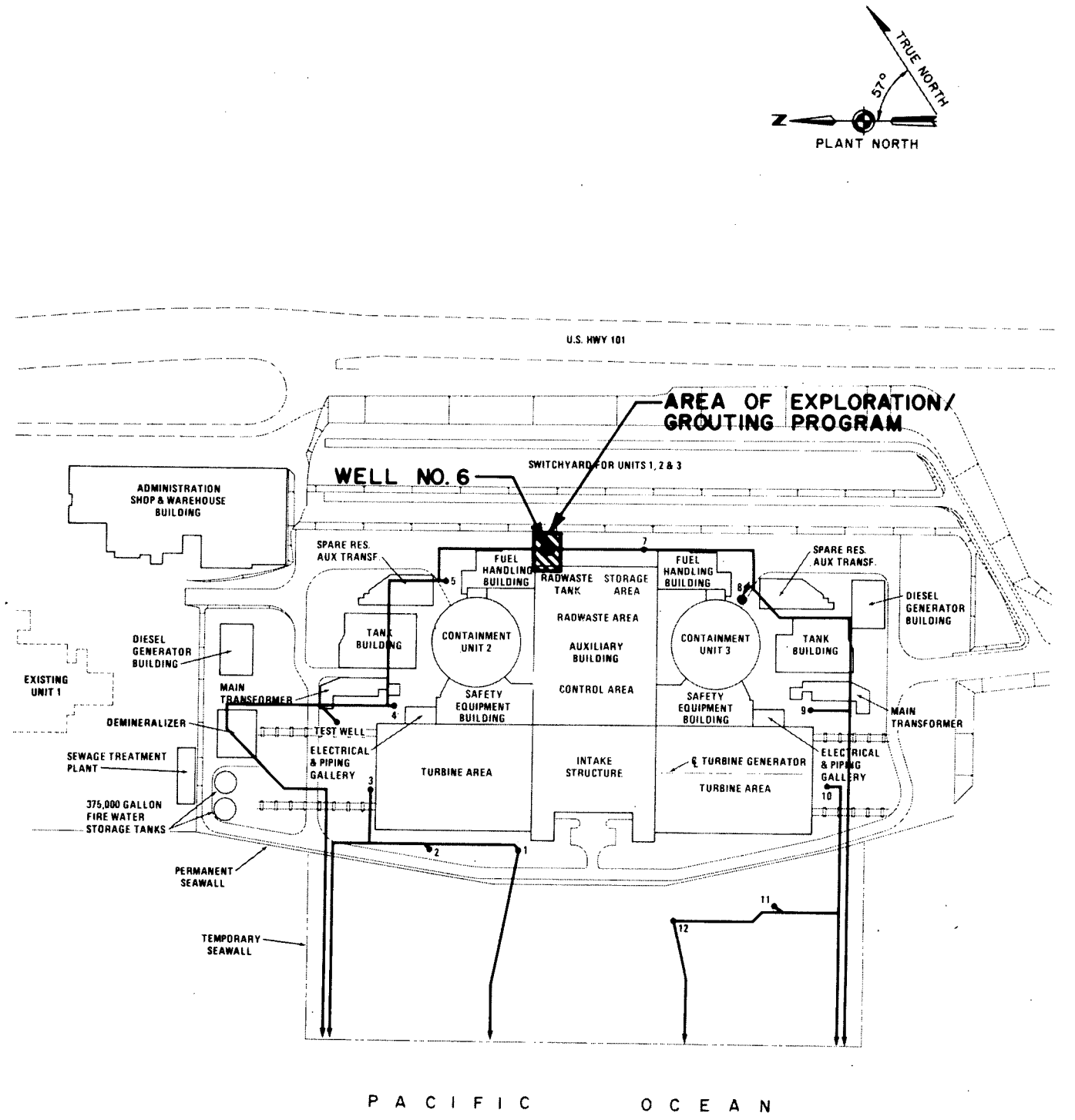
(G-3 and Portland cement grout) was calculated from the grout isopach map. The total amount of disturbed sand calculated from the disturbed sand isopach map was only 94 cubic yards.

7.0 SUMMARY OF FOUNDATION CONDITIONS

Results of the Exploration/Grouting Program show that the total amount of disturbed sand remaining below ground surface (Elevation +30 feet) at the conclusion of the program is less than 100 cubic yards.

The cavity is confined to a narrow linear zone trending northwest-southeast from the well. No disturbed sand extends under the Auxiliary Building.

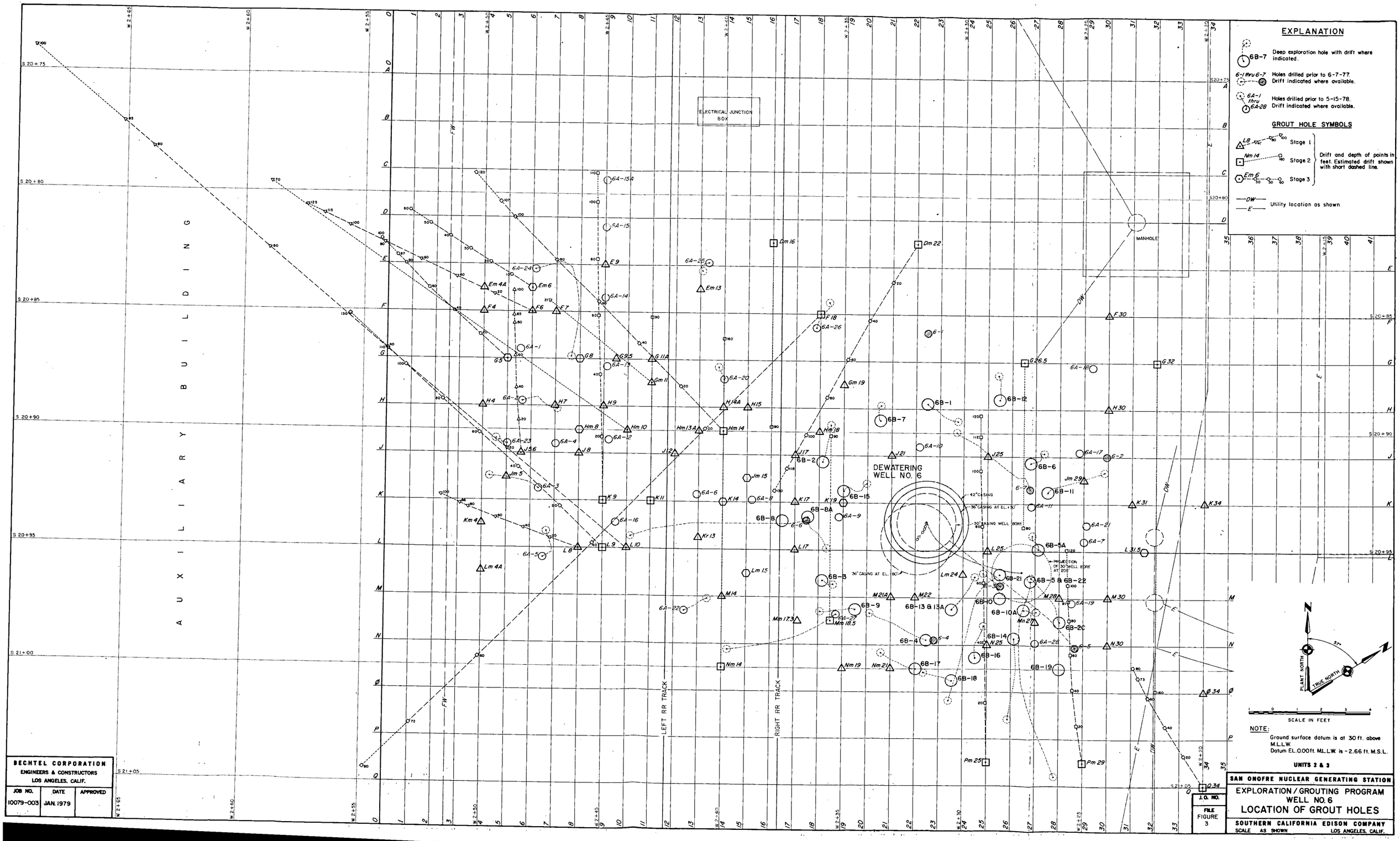
The drilling encountered no areas of open cavity. The cavity-fill materials consist of loose-to-dense sand, G-3 grout, or Portland cement grout.

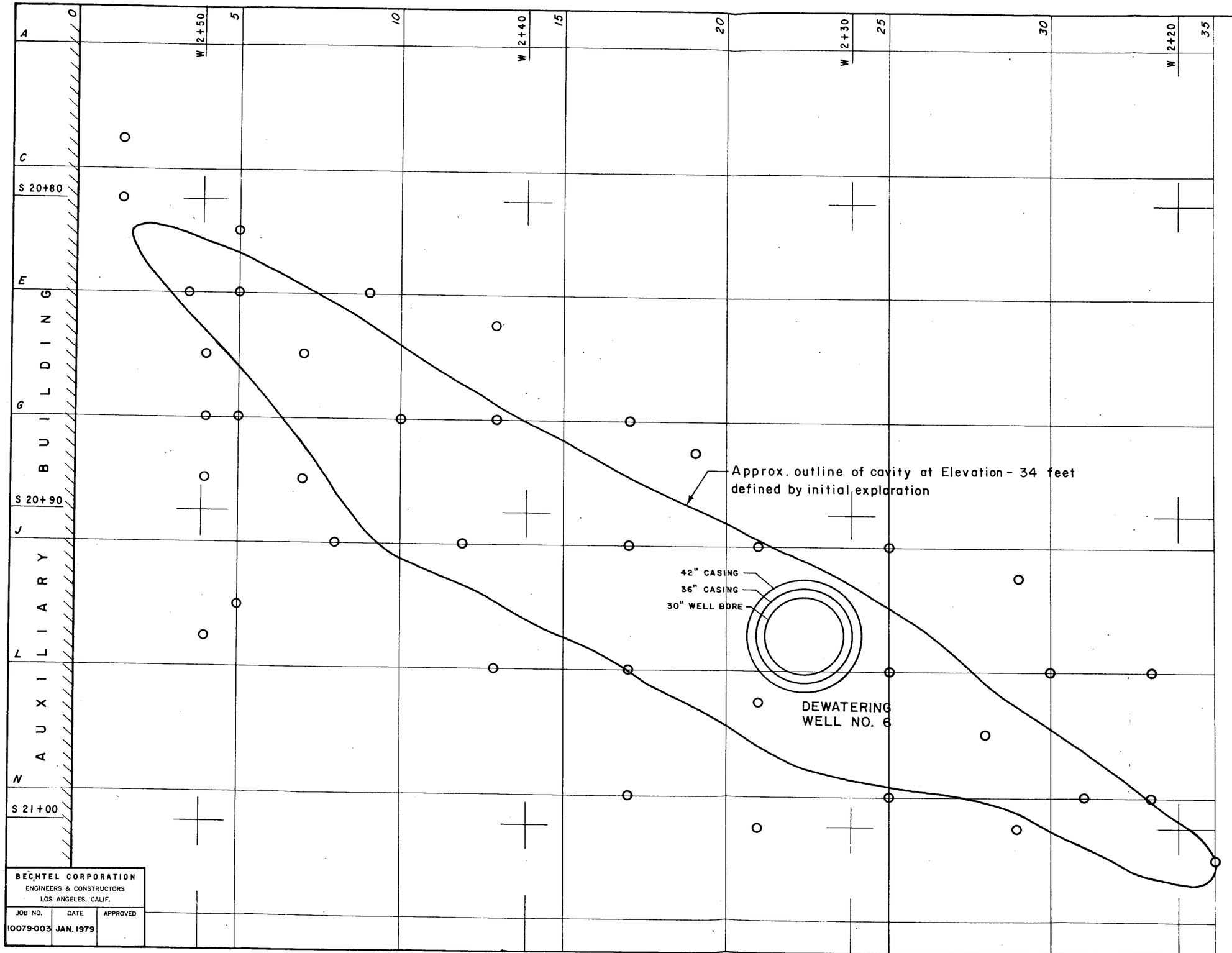


UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

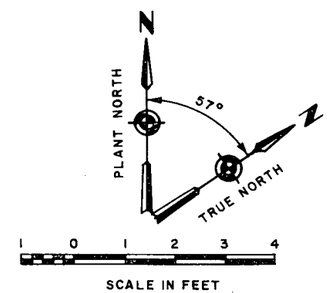
J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE FIGURE 1	EXPLORATION/GROUTING PROGRAM WELL NO.6 LOCATION MAP
SCALE N.T.S.	SOUTHERN CALIFORNIA EDISON COMPANY LOS ANGELES, CALIF.


EXPLANATION
6B-7 Deep exploration hole with drift where indicated.
6-1 thru 6-7 Holes drilled prior to 6-7-77. Drift indicated where available.
6A-1 thru 6A-28 Holes drilled prior to 5-15-78. Drift indicated where available.
GROUT HOLE SYMBOLS
Stage 1
Stage 2
Stage 3
Drift and depth of points in feet. Estimated drift shown with short dashed line.
DW
E
Utility location as shown
BUILDING
AUXILIARY
ELECTRICAL JUNCTION BOX
MANHOLE
DEWATERING WELL NO. 6
42" CASING
36" CASING AT EL. +30
30" CASING WELL BORE
36" CASING AT EL. 60'
PROJECTION OF 30" WELL BORE AT 200
LEFT RR TRACK
RIGHT RR TRACK
FW
DW
E
S 20+75
S 20+80
S 20+85
S 20+90
S 20+95
S 21+00
S 21+05
W 2+65
W 2+60
W 2+55
W 2+50
W 2+45
W 2+40
W 2+35
W 2+30
W 2+25
W 2+20
W 2+15
PLANT NORTH
TRUE NORTH
57°
SCALE IN FEET
0 1 2 3 5
NOTE:
Ground surface datum is at 30 ft. above M.L.L.W.
Datum EL. 0.00 ft. M.L.L.W. is - 2.66 ft. M.S.L.
UNITS 2 & 3
SAN ONOFRE NUCLEAR GENERATING STATION
EXPLORATION / GROUTING PROGRAM
WELL NO. 6
LOCATION OF GROUT HOLES
SOUTHERN CALIFORNIA EDISON COMPANY
SCALE AS SHOWN
LOS ANGELES, CALIF.
J.O. NO.
FILE
FIGURE 3
BECHTEL CORPORATION
ENGINEERS & CONSTRUCTORS
LOS ANGELES, CALIF.
JOB NO. 10079-003
DATE JAN. 1979
APPROVED



EXPLANATION

O Stage I drill hole



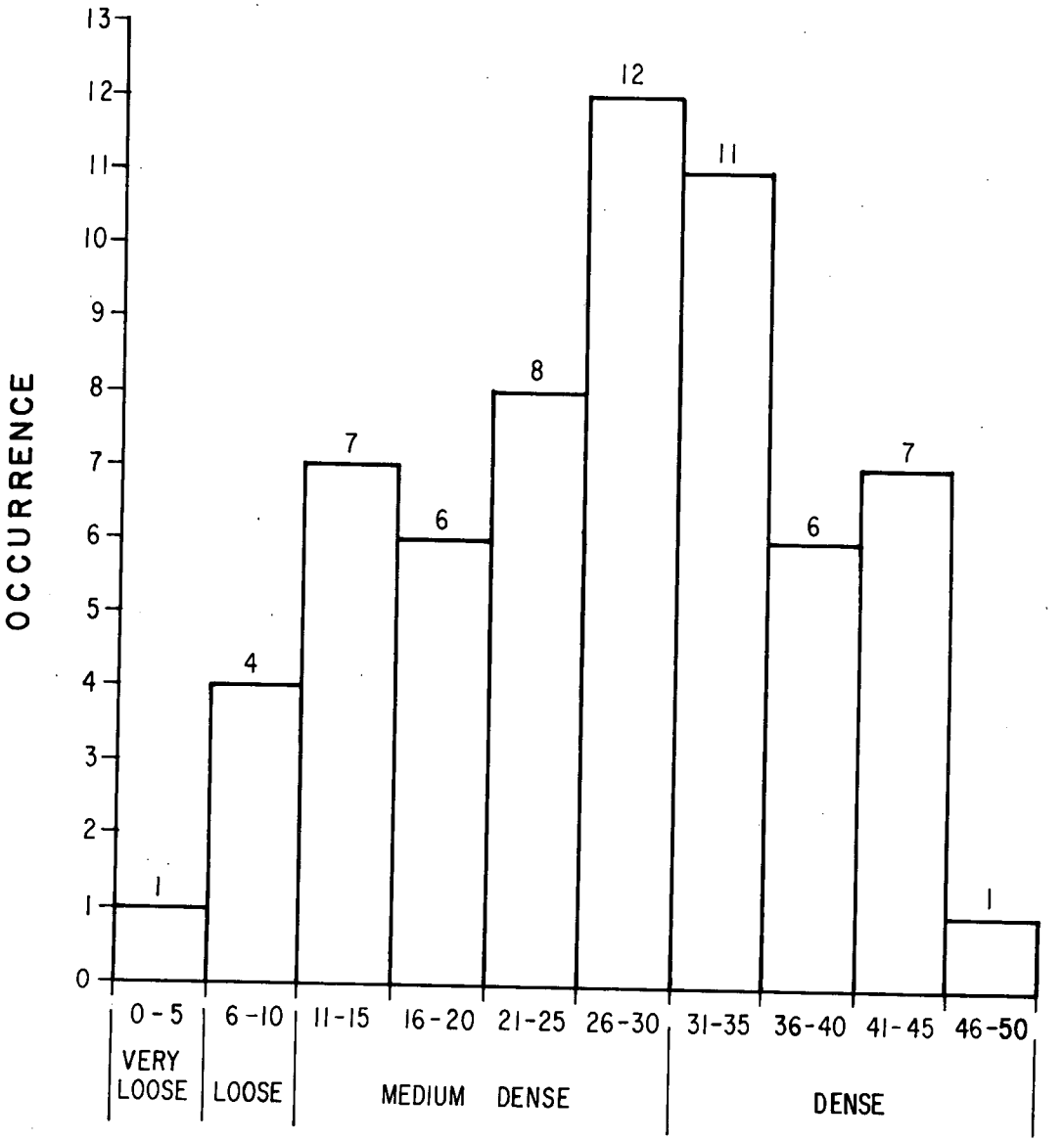
UNITS 2 & 3

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION/GROUTING PROGRAM WELL NO.6
FIGURE 2	PRELIMINARY PLAN OF DRILL HOLES
	SOUTHERN CALIFORNIA EDISON COMPANY LOS ANGELES, CALIF.
	SCALE 1" = 3'

BECHTEL CORPORATION
ENGINEERS & CONSTRUCTORS
LOS ANGELES, CALIF.

JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

NOTE: Data taken from original drill logs.
Excludes top 10 feet of each hole.



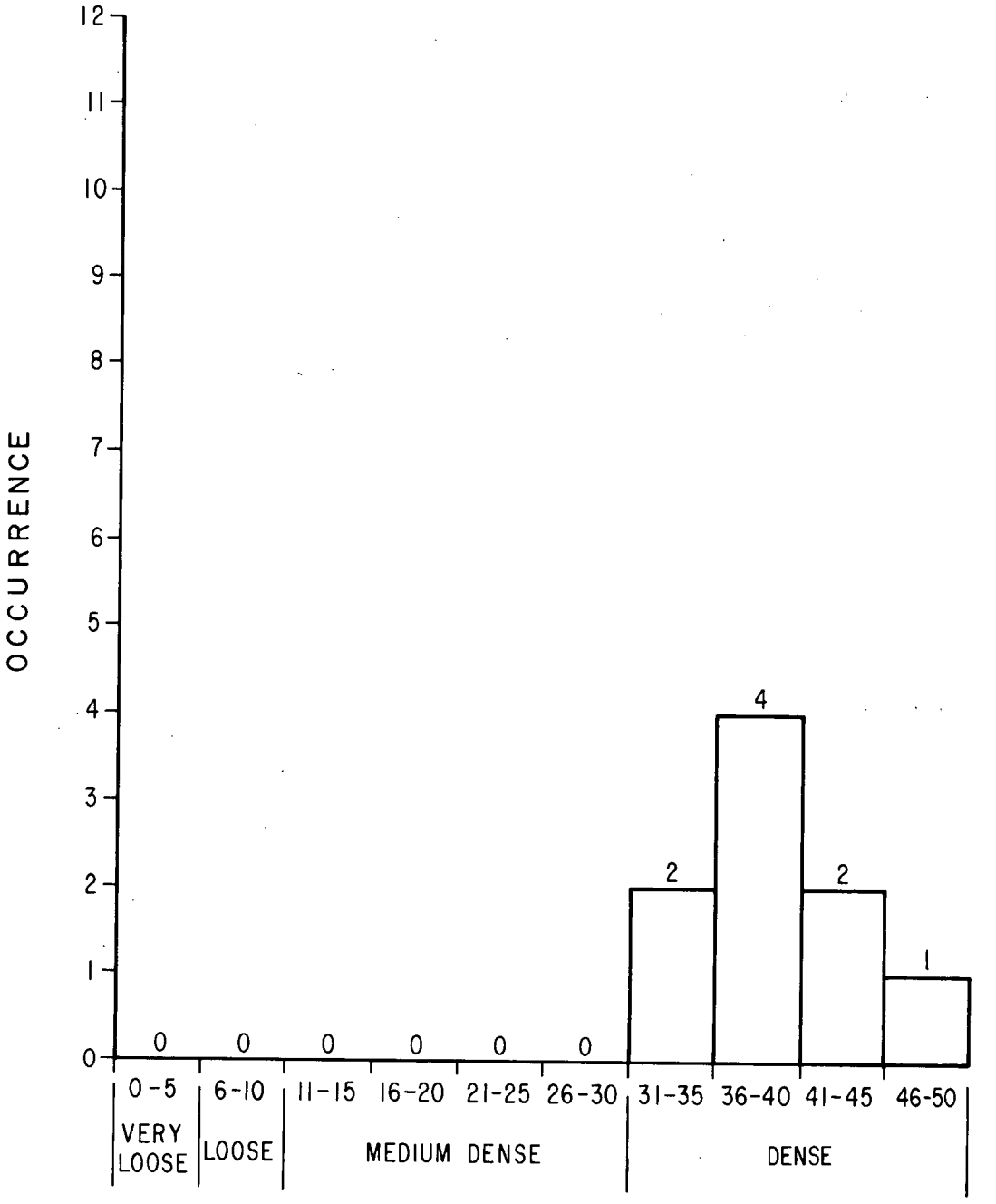
STANDARD PENETRATION TEST RESULTS IN DISTURBED SAND
FOR STAGE I, STAGE II

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

UNITS 2 & 3

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE FIGURE 4 SHEET 1 OF 2	EXPLORATION/GROUTING PROGRAM WELL NO. 6 DISTRIBUTION OF S.P.T. RESULTS
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

NOTE: Data taken from original drill logs.
Excludes top 10 feet of each hole.

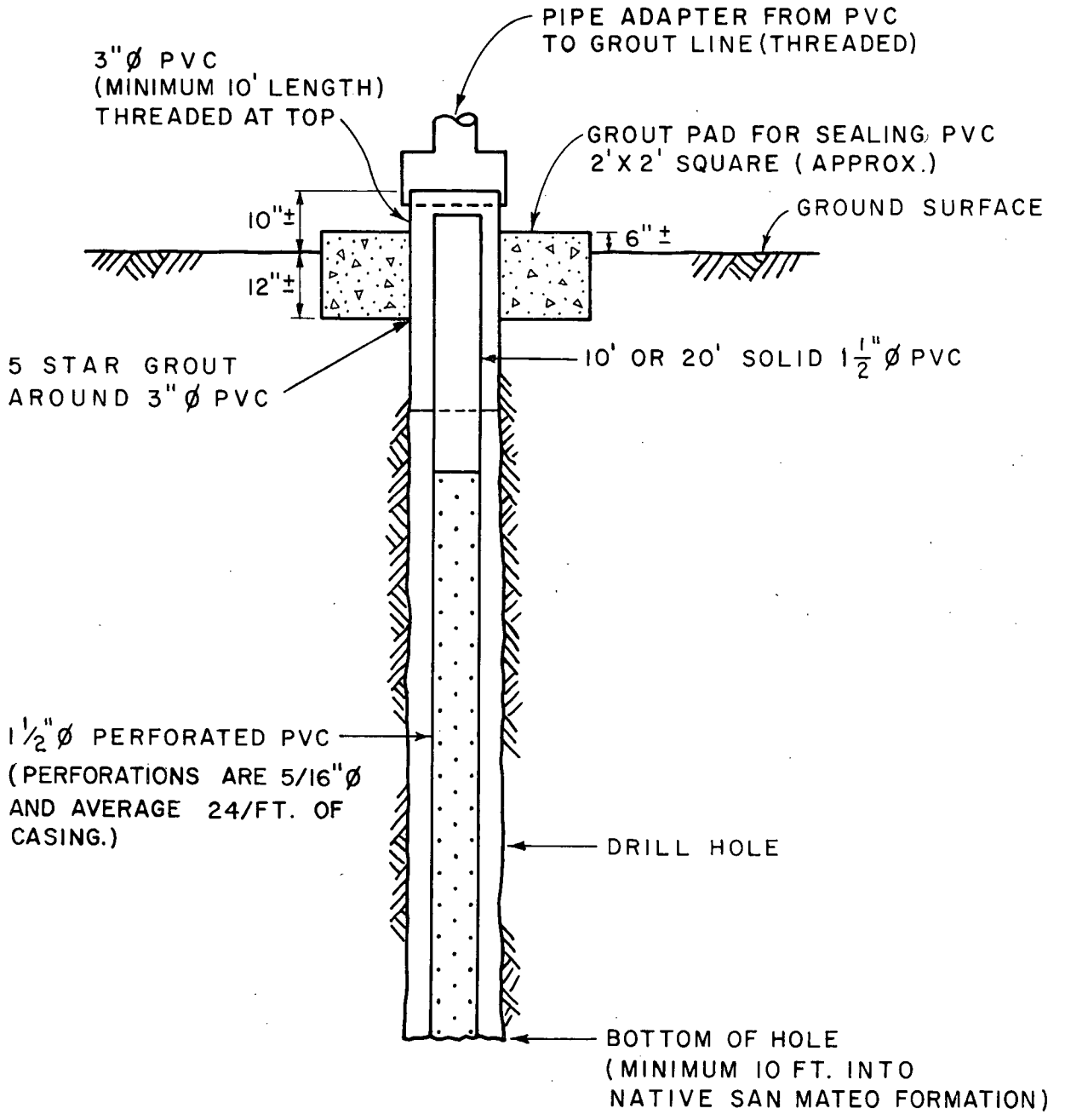


STANDARD PENETRATION TEST RESULTS IN DISTURBED SAND
FOR STAGE III HOLES

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

UNITS 2 & 3

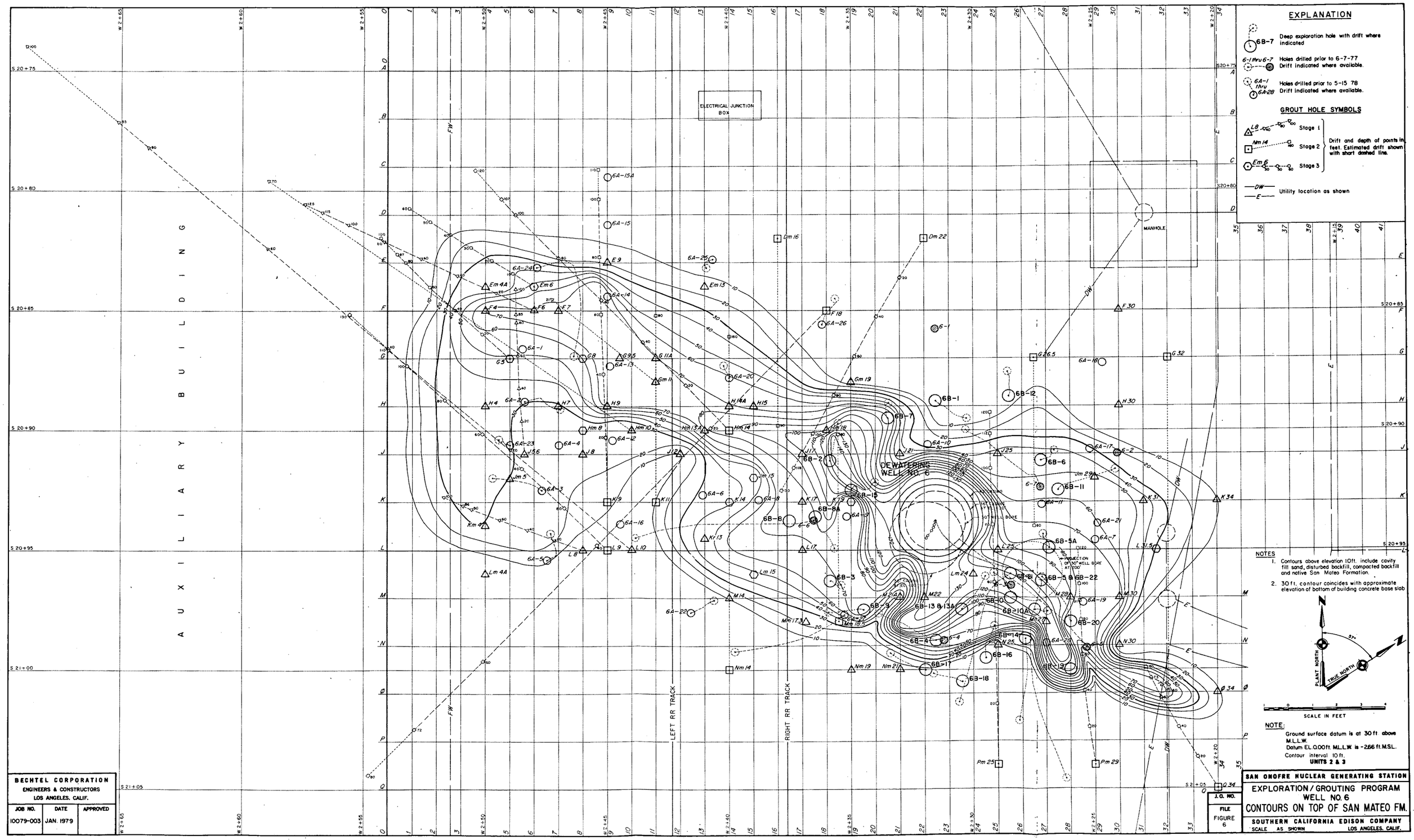
J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE FIGURE 4 SHEET 2 OF 2	EXPLORATION/GROUTING PROGRAM WELL NO. 6 DISTRIBUTION OF S.P.T. RESULTS
SCALE N.T.S.	SOUTHERN CALIFORNIA EDISON COMPANY LOS ANGELES, CALIF.



UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION/GROUTING PROGRAM WELL NO.6
FIGURE 5	TYPICAL EXPLORATION GROUT HOLE
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

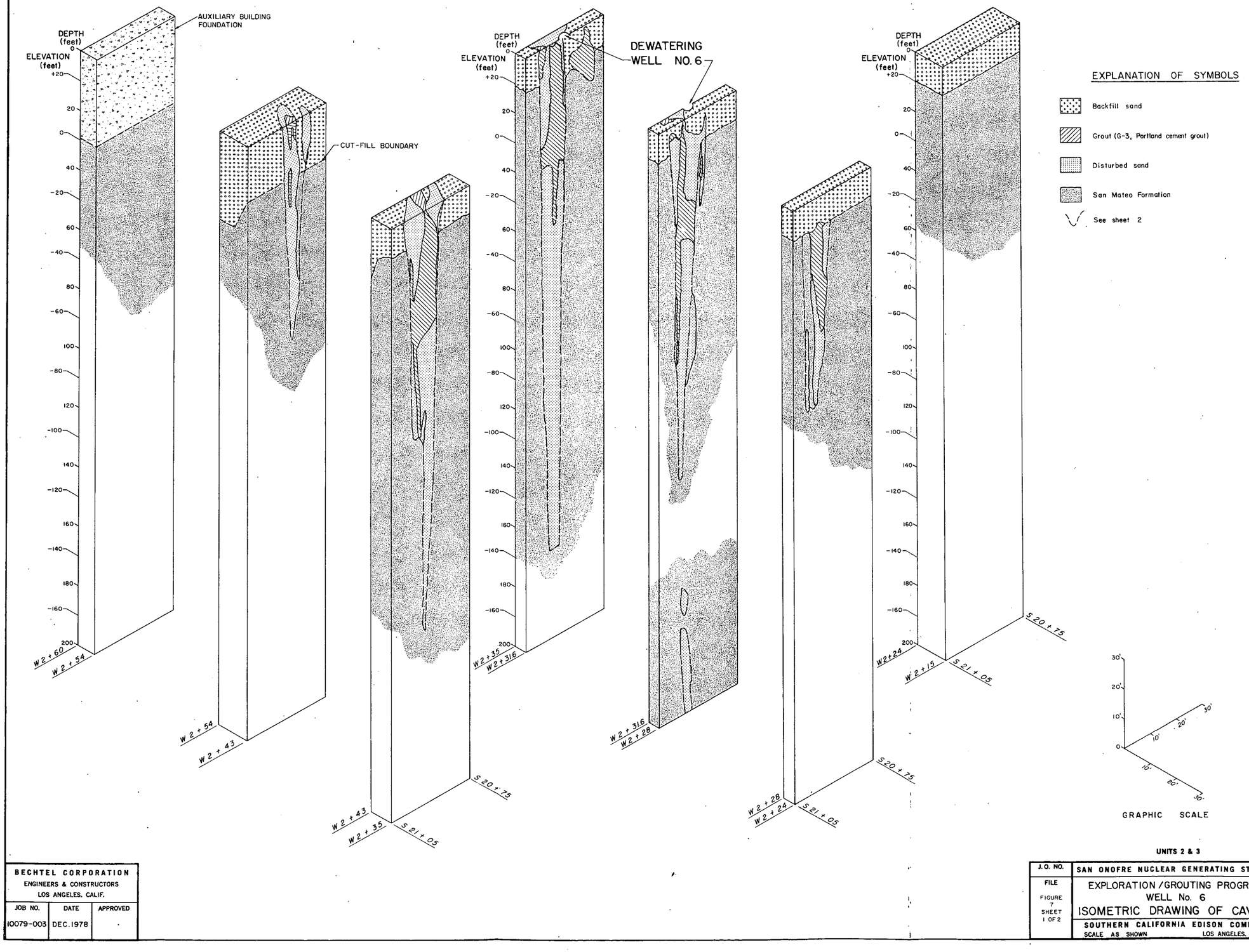
SAN ONOFRE NUCLEAR GENERATING STATION

EXPLORATION / GROUTING PROGRAM
WELL NO. 6
CONTOURS ON TOP OF SAN MATEO FM.

SOUTHERN CALIFORNIA EDISON COMPANY
SCALE AS SHOWN LOS ANGELES, CALIF.

J.O. NO.

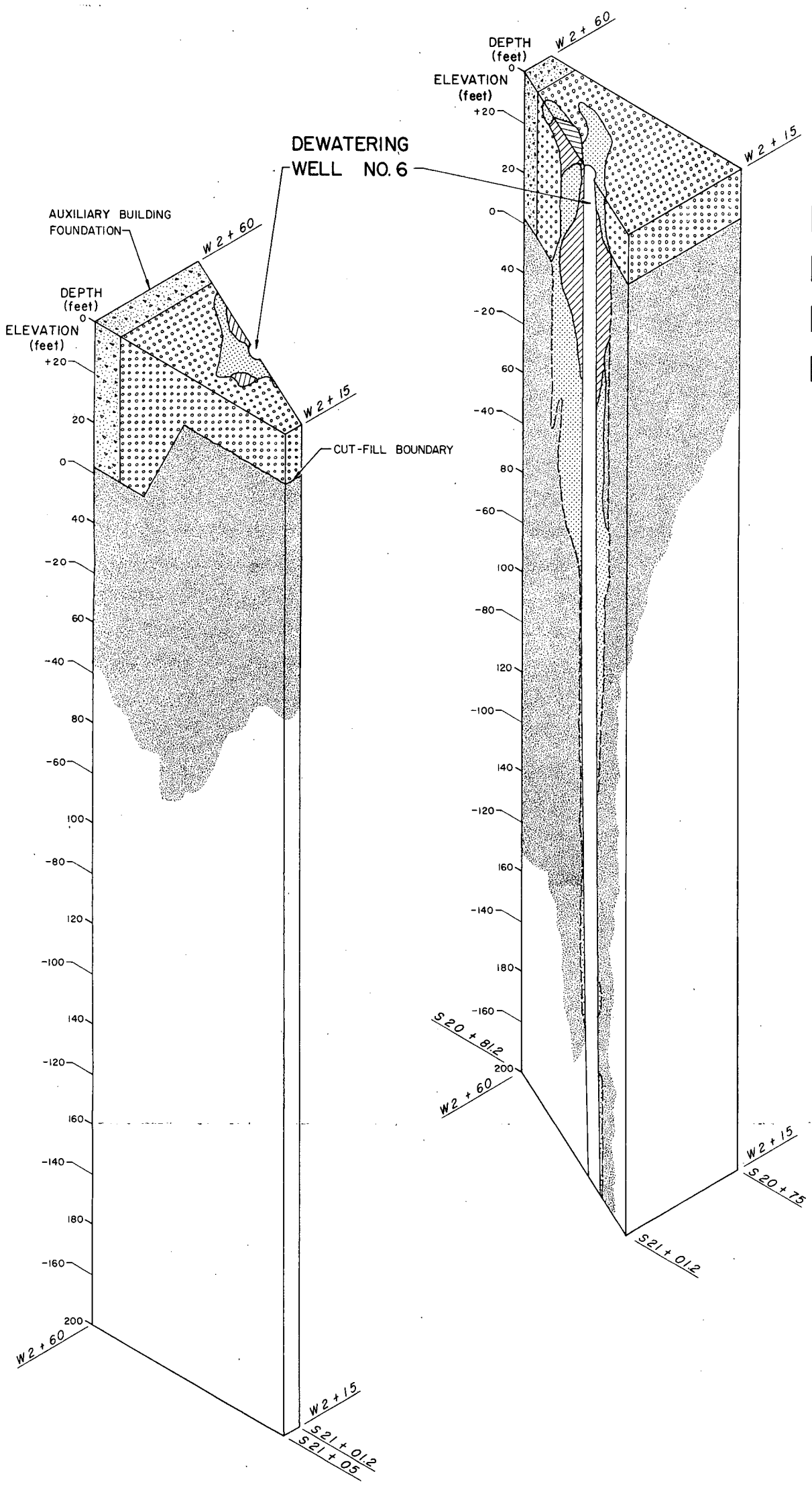
FILE
FIGURE 6



UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

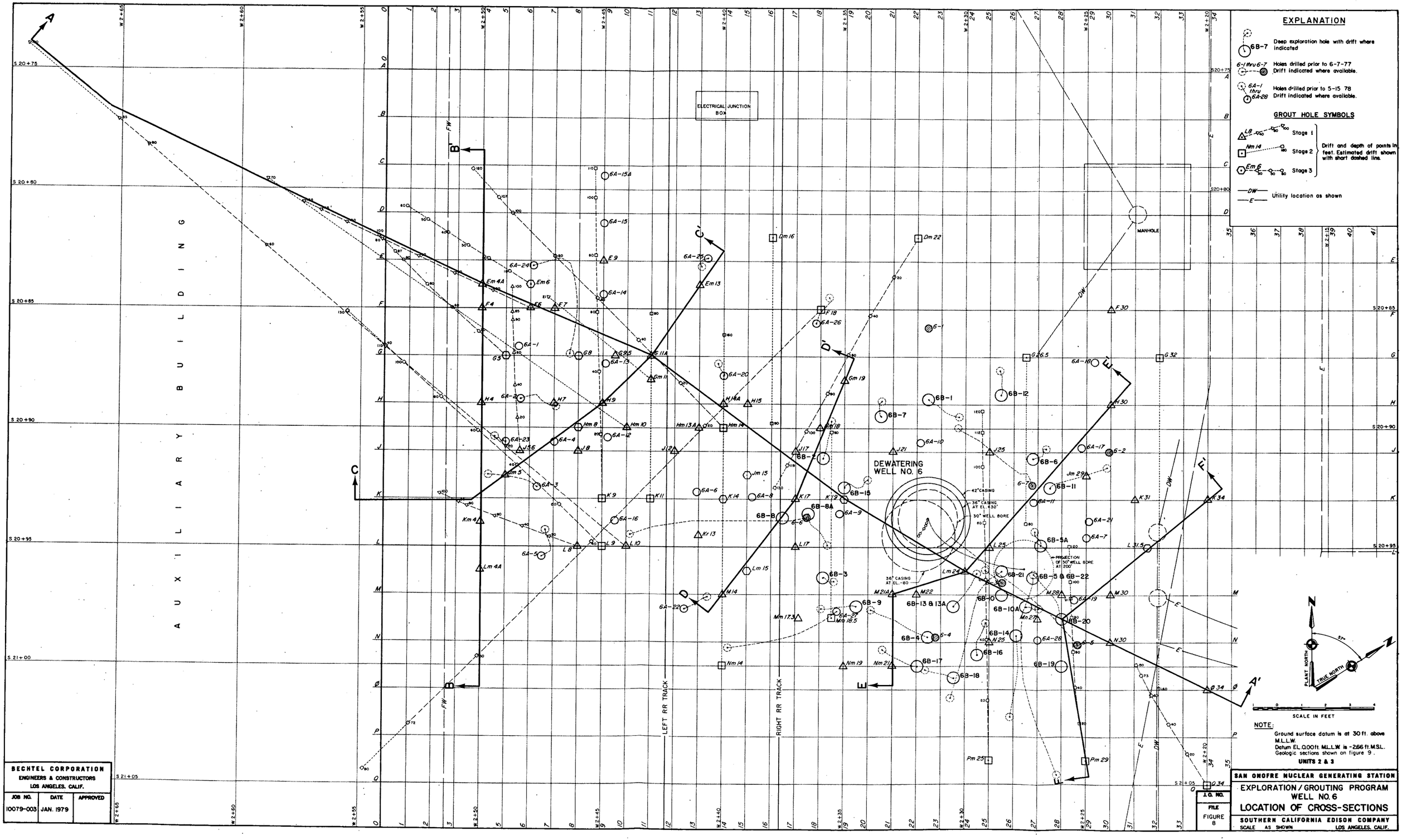
J. O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6
FIGURE 7 SHEET 1 OF 2	ISOMETRIC DRAWING OF CAVITY
	SOUTHERN CALIFORNIA EDISON COMPANY
	SCALE AS SHOWN LOS ANGELES, CALIF.

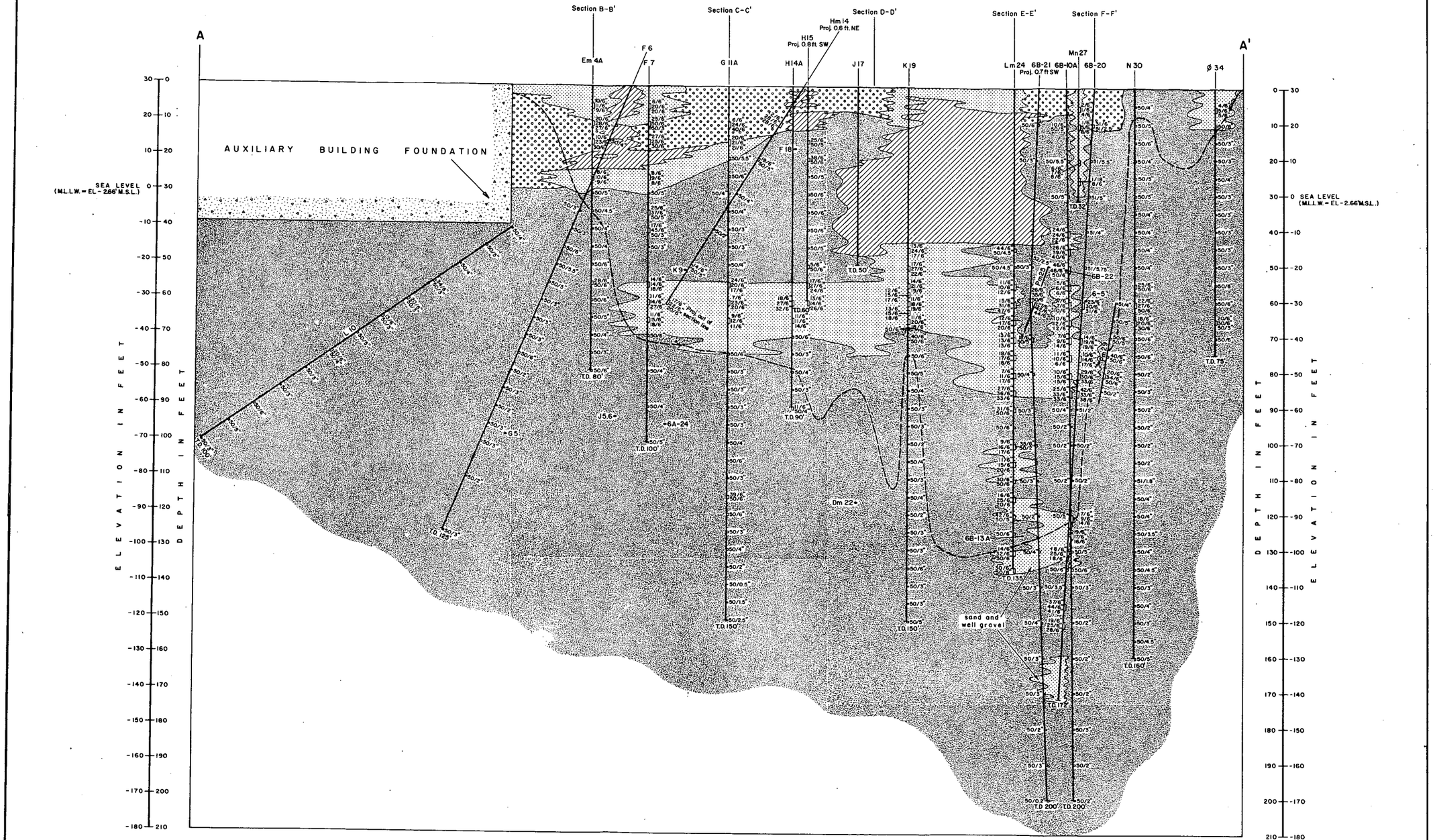


UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES. CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE FIGURE 7 SHEET 2 OF 2	EXPLORATION / GROUTING PROGRAM WELL No. 6 ISOMETRIC DRAWING OF CAVITY
	SOUTHERN CALIFORNIA EDISON COMPANY
	SCALE AS SHOWN — LOS ANGELES, CALIF.


EXPLANATION
6B-7 Deep exploration hole with drift where indicated
6-1 thru 6-7 Holes drilled prior to 6-7-77 Drift indicated where available.
6A-1 thru 6A-28 Holes drilled prior to 5-15 78 Drift indicated where available.
GROUT HOLE SYMBOLS
Stage 1
Stage 2
Stage 3
Drift and depth of points in feet. Estimated drift shown with short dashed line.
DW Utility location as shown
E
ELECTRICAL JUNCTION BOX
MANHOLE
DEWATERING WELL NO. 6
42" CASING
36" CASING AT EL. 430'
30" WELL BORE
36" CASING AT EL. -80
PROJECTION OF 30" WELL BORE AT 200'
LEFT RR TRACK
RIGHT RR TRACK
AUXILIARY BUILDING
PLANT NORTH
TRUE NORTH
57°
SCALE IN FEET
NOTE:
Ground surface datum is at 30 ft. above M.L.L.W.
Datum EL. 0.00 ft. M.L.L.W. is -2.66 ft. M.S.L.
Geologic sections shown on figure 9.
UNITS 2 & 3
BECHTEL CORPORATION
ENGINEERS & CONSTRUCTORS
LOS ANGELES, CALIF.
JOB NO. 10079-003
DATE JAN. 1979
APPROVED
SAN ONOFRE NUCLEAR GENERATING STATION
EXPLORATION / GROUTING PROGRAM
WELL NO. 6
LOCATION OF CROSS-SECTIONS
SOUTHERN CALIFORNIA EDISON COMPANY
SCALE AS SHOWN
LOS ANGELES, CALIF.
J.O. NO.
FILE
FIGURE 8



SECTION A-A'

EXPLANATION OF SYMBOLS

- Backfill sand
- Grout (undiff.)
- Disturbed sand
- San Mateo Fm.
- 31/6" 50/6" — Blow counts and interval with split spoon sampler
- Dm 22 ● — Intersection of angle hole with plane of section. Portion of hole shown is a maximum of 1 foot projection off plane of section
- Dm 22 ● — Intersection of angle hole into plane of section
- Top of San Mateo Formation according to contour map (Figure 6)

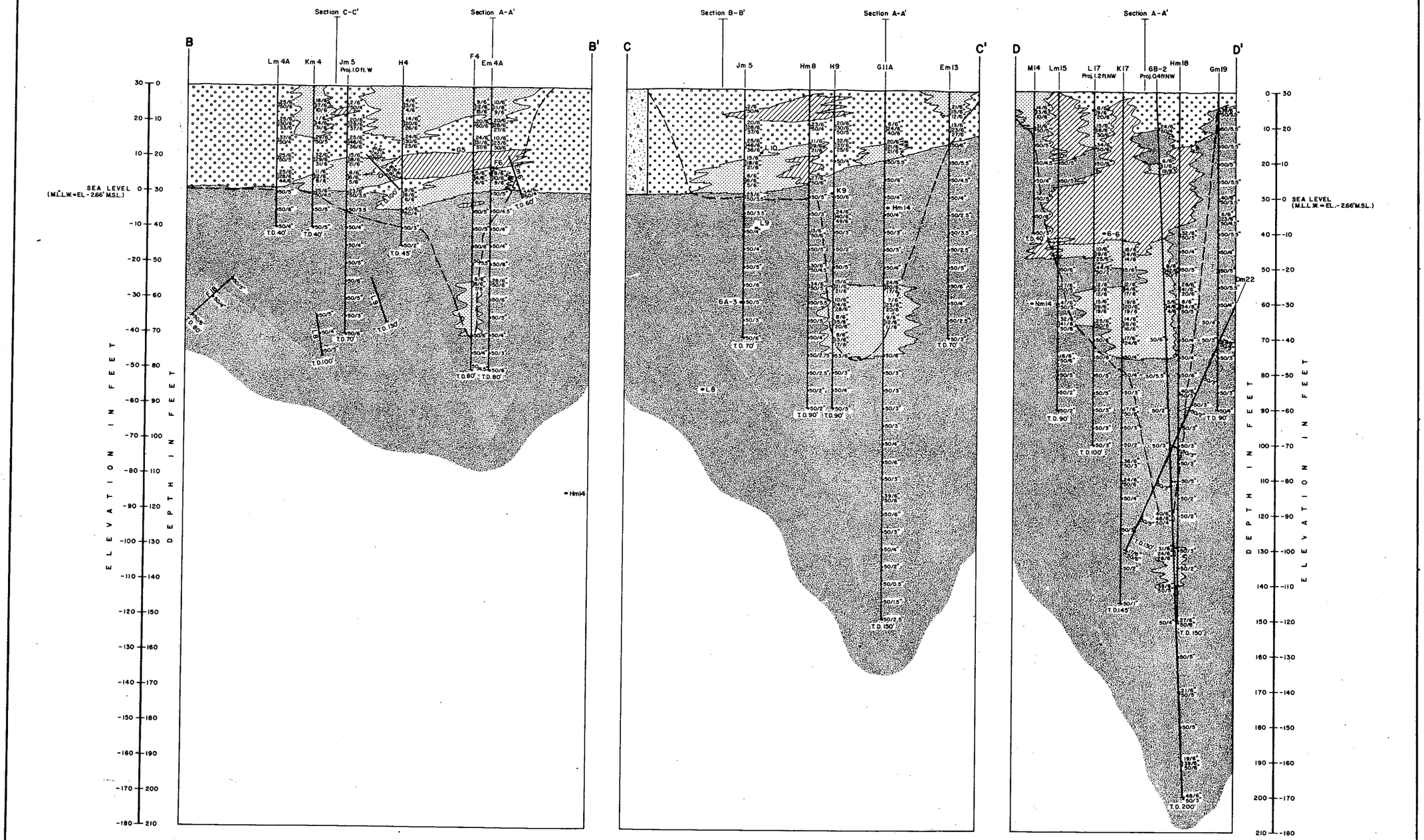
SCALE IN FEET: 10 0 10 20 30 VERTICAL; 2 0 2 4 6 HORIZONTAL

Note: For location of sections see figure 8

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 CROSS-SECTIONS
FIGURE 9 SHEET 1 OF 3	SOUTHERN CALIFORNIA EDISON COMPANY SCALE AS SHOWN LOS ANGELES, CALIF.



SECTION B-B'

SECTION C-C'

SECTION D-D'

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

SCALE IN FEET

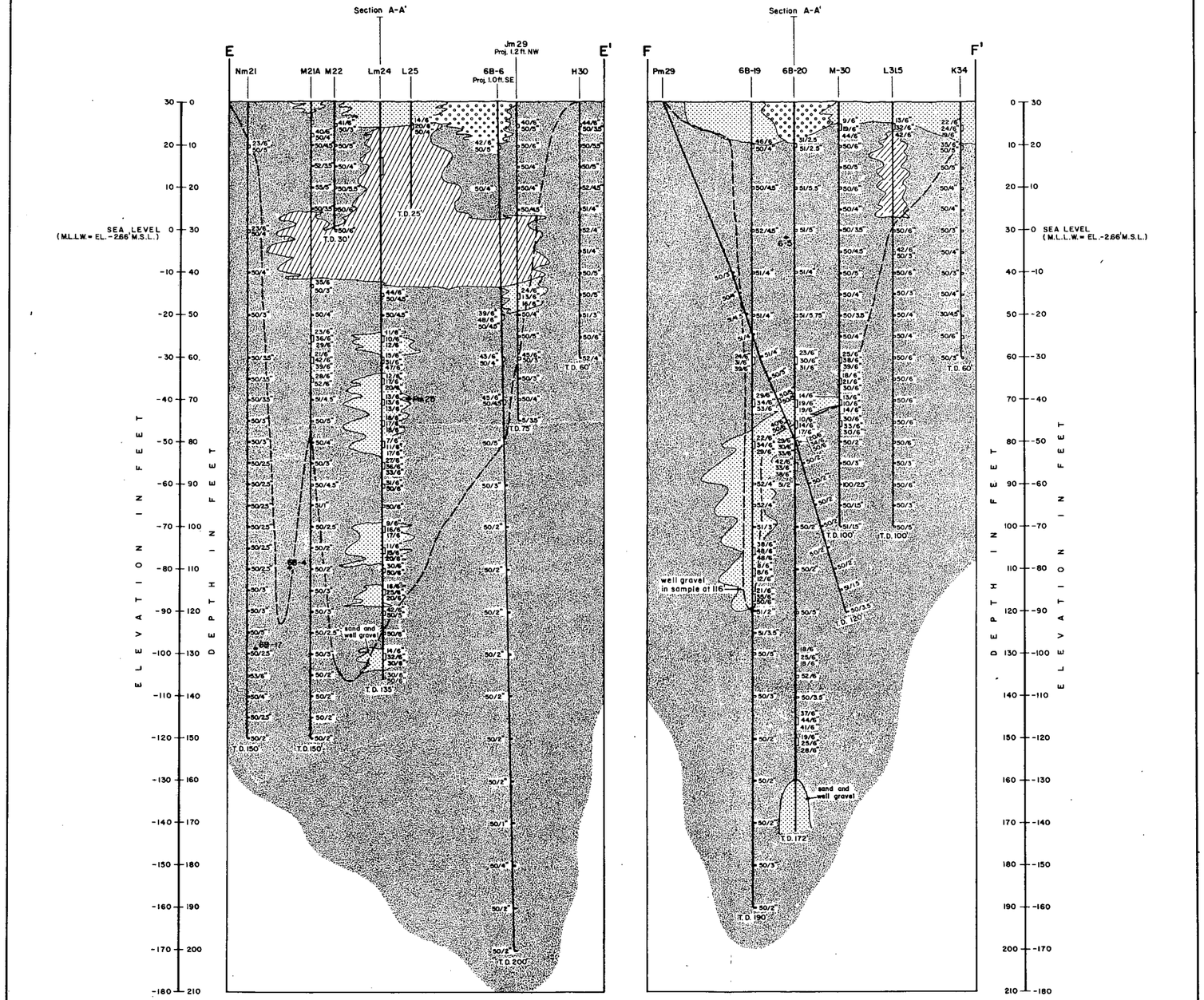
VERTICAL: 10 0 10 20 30

HORIZONTAL: 2 0 2 4 6

Notes:
1. For location of sections see figure 8
2. For explanation of symbols see figure 9 sheet 1

UNITS 2 & 3

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 CROSS-SECTIONS
FIGURE 9 SHEET 2 OF 3	SOUTHERN CALIFORNIA EDISON COMPANY
	SCALE AS SHOWN — LOS ANGELES, CALIF.



SECTION E-E'

SECTION F-F'

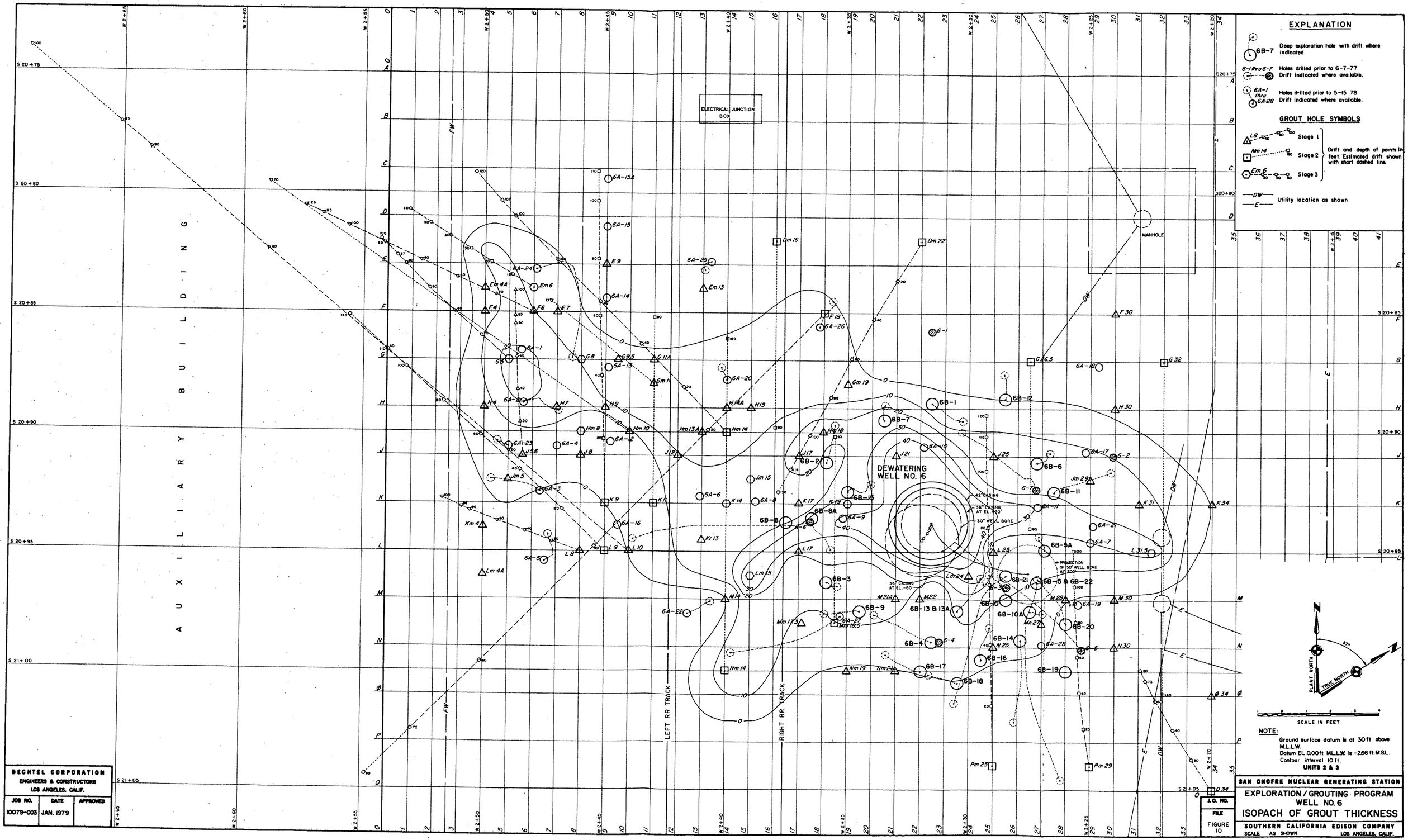
BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

SCALE IN FEET: VERTICAL 10 0 10 20 30; HORIZONTAL 2 0 2 4 6

Notes:
1. For location of sections see figure 8
2. For explanation of symbols see figure 9 sheet 1

UNITS 2 & 3

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 CROSS-SECTIONS
FIGURE 9 SHEET 3 OF 3	SOUTHERN CALIFORNIA EDISON COMPANY SCALE AS SHOWN LOS ANGELES, CALIF.


EXPLANATION
6B-7 Deep exploration hole with drift where indicated
6-1 thru 6-7 Holes drilled prior to 6-7-77 Drift indicated where available.
6A-1 thru 6A-28 Holes drilled prior to 5-15 78 Drift indicated where available.
GROUT HOLE SYMBOLS
Stage 1
Stage 2
Stage 3
Drift and depth of points in feet. Estimated drift shown with short dashed line.
DW Utility location as shown
E
ELECTRICAL JUNCTION BOX
MANHOLE
DEWATERING WELL NO. 6
42" CASING
36" CASING AT EL. 200'
30" WELL BORE
36" CASING AT EL. -80
PROJECTION OF 30" WELL BORE AT 200
BUILDING
AUXILIARY
FW
LEFT RR TRACK
RIGHT RR TRACK
PLANT NORTH
TRUE NORTH
SCALE IN FEET
NOTE:
Ground surface datum is at 30 ft. above M.L.L.W.
Datum EL. 0.00 ft. M.L.L.W. is -2.66 ft. M.S.L.
Contour interval 10 ft.
UNITS 2 & 3
BECHTEL CORPORATION
ENGINEERS & CONSTRUCTORS
LOS ANGELES, CALIF.
JOB NO. 10079-003
DATE JAN. 1979
APPROVED
SAN ONOFRE NUCLEAR GENERATING STATION
EXPLORATION / GROUTING PROGRAM
WELL NO. 6
ISOPACH OF GROUT THICKNESS
SOUTHERN CALIFORNIA EDISON COMPANY
SCALE AS SHOWN
LOS ANGELES, CALIF.
J.O. NO.
FILE
FIGURE 10

EXPLANATION

- 6B-7 — Deep exploration hole with drift where indicated
- 6-1 thru 6-7 — Holes drilled prior to 6-7-77 Drift indicated where available.
- 6A-1 thru 6A-28 — Holes drilled prior to 5-15 78 Drift indicated where available.

GROUT HOLE SYMBOLS

- Stage 1
- Stage 2
- Stage 3

Drift and depth of points in feet. Estimated drift shown with short dashed line.

- DW — Utility location as shown
- E

BUILDING

AUXILIARY BUILDING

ELECTRICAL JUNCTION BOX

MANHOLE

DEWATERING WELL NO. 6

42" CASING

36" CASING AT EL. 430'

30" WELL BORE

36" CASING AT EL. -80

PROJECTION OF 30" WELL BORE AT 200

LEFT RR TRACK

RIGHT RR TRACK

FW

DW

E

PLANT NORTH

TRUE NORTH

SCALE IN FEET

NOTE:

Ground surface datum is at 30 ft. above M.L.L.W.
Datum EL. 0.00 ft. M.L.L.W. is -2.66 ft. M.S.L.
Contour interval 10 ft.
UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	JAN. 1979	

SAN ONOFRE NUCLEAR GENERATING STATION

EXPLORATION / GROUTING PROGRAM WELL NO. 6

ISOPACH OF DISTURBED SAND

SOUTHERN CALIFORNIA EDISON COMPANY

SCALE AS SHOWN — LOS ANGELES, CALIF.

I.D. NO.

FILE

FIGURE 11

APPENDIX A

Appendix A includes results of the gyroscopic multi-shot surveys performed by Eastman Whipstock during the exploration/grouting program. The computer printouts of the surveys and directional plots are included for the following holes:

Dm 22
Em 6
F 6
F 18
G 5
Hm 14
J 5.6
K 9
L 8
L 9
L 10
Pm 25
Pm 29
Q 34

The above holes were surveyed to establish direction and inclination.

BECHTEL POWER CORP.-- WELL 6 #D_m -22 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 28 SEPTEMBER 1978
JOB NO: P-0978-G0067
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-6
PITT

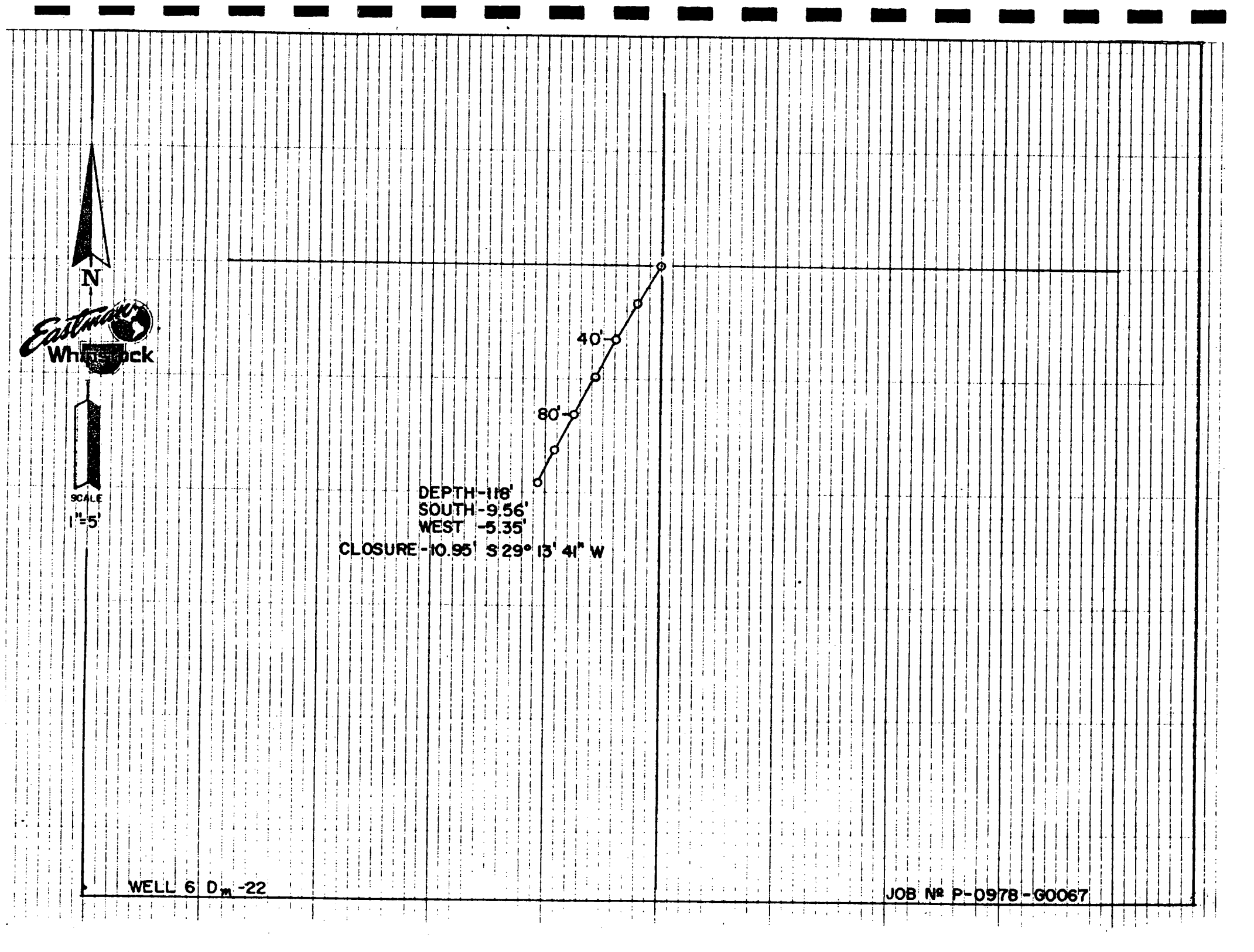
VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

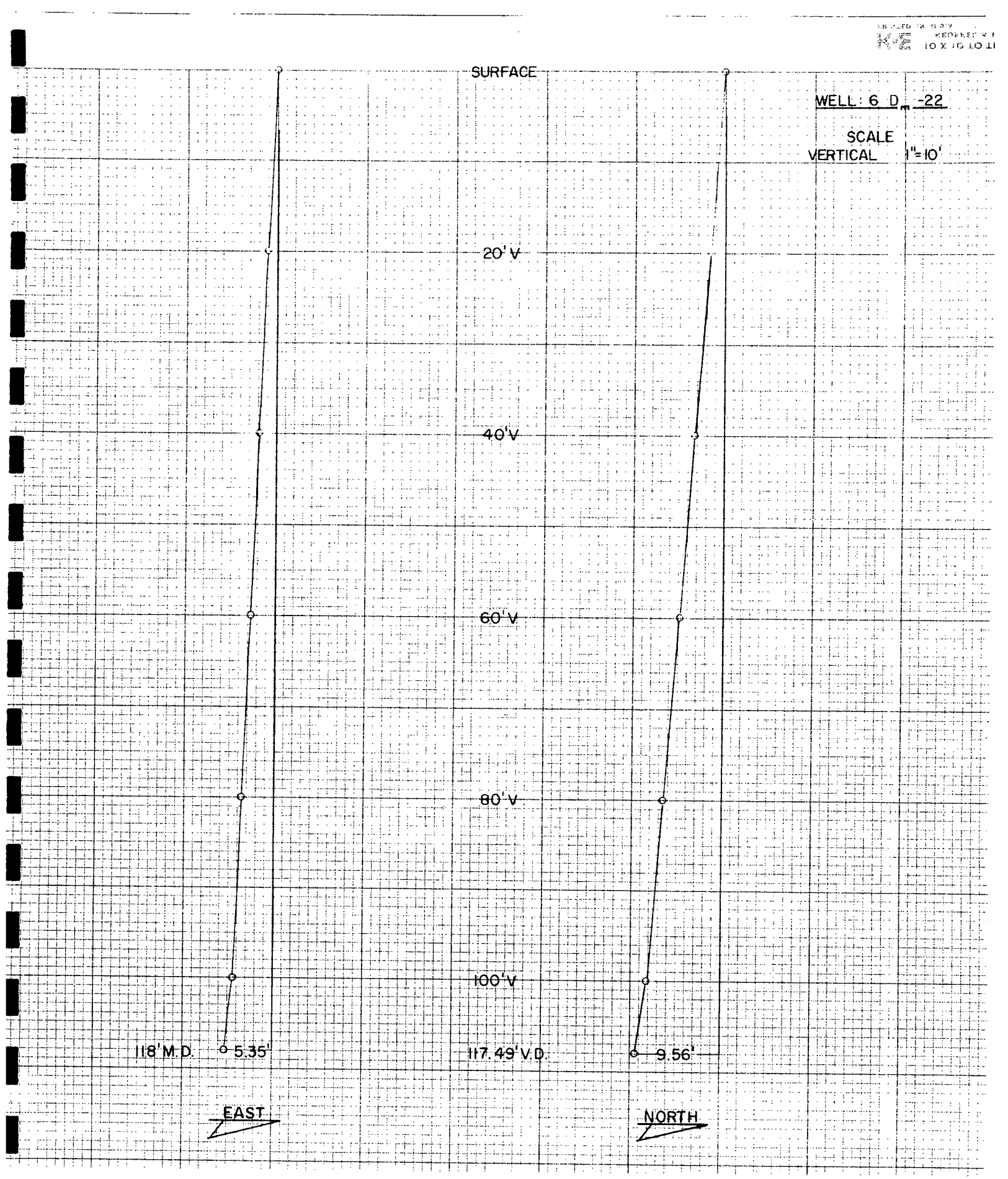
RECORD OF SURVEY

ANGLE AVERAGING METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET		DOG LEG SEVERITY DEG/100FT
0.	5 30	S 31 30 W	0.00	0.00	0.00	0.00	0.0
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W							
20.	5 30	S 31 30 W	19.91	1.92	1.63 S	1.00 W	0.0
40.	5 20	S 29 0 W	39.82	3.80	3.27 S	1.95 W	1.4
60.	5 25	S 27 30 W	59.73	5.68	4.92 S	2.84 W	0.8
80.	5 10	S 28 0 W	79.65	7.52	6.55 S	3.70 W	1.3
100.	5 10	S 28 30 W	99.56	9.32	8.13 S	4.55 W	0.2
118.	5 15	S 30 0 W	117.49	10.95	9.56 S	5.35 W	0.9

FINAL CLOSURE - DIRECTION: S 29 DEGS 13 MINS 41 SECS W
DISTANCE: 10.95 FEET


N
Eastman Whipstock
SCALE
1"=5'
40'
80'
DEPTH-118'
SOUTH-9.56'
WEST -5.35'
CLOSURE-10.95' S 29° 13' 41" W
WELL 6 Dm -22
JOB Nº P-0978-G0067


SURFACE
WELL: 6 D -22
SCALE
VERTICAL 1"=10'
20' V
40' V
60' V
80' V
100' V
118' M.D.
5.35'
117.49' V.D.
9.56'
EAST
NORTH

BECHTEL POWER CORP.--- WELL 3 $4E_m$-3 ---EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 11 OCTOBER 1978
JOB NO: P-1078-G0102
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-16
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

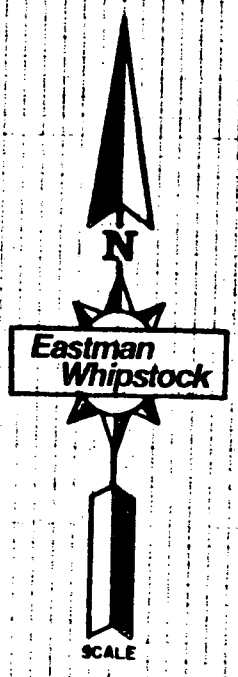
RECORD OF SURVEY

ANGLE AVERAGING METHOD

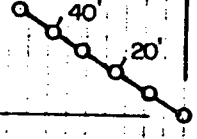
BECHTEL POWER CORP.--- WELL 6 #E_m-6 ---EASTMAN GYRO MULTI-SHOT SURVEY 16:30:29 10-OCT-78 PAGE NO.

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	5 55	N 58 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS 'PLANT NORTH', N 57 00 W						
10.	5 55	N 58 W	9.95	1.03	0.55 N	0.87 W
20.	5 50	N 58 W	19.89	2.05	1.09 N	1.74 W
30.	5 45	N 57 W	29.84	3.06	1.63 N	2.59 W
40.	5 45	N 57 W	39.79	4.07	2.18 N	3.43 W
50.	5 40	N 57 W	49.74	5.06	2.72 N	4.27 W

FINAL CLOSURE - DIRECTION: N 57 DEGS 30 MINS 21 SECS W
DISTANCE: 5.06 FEET

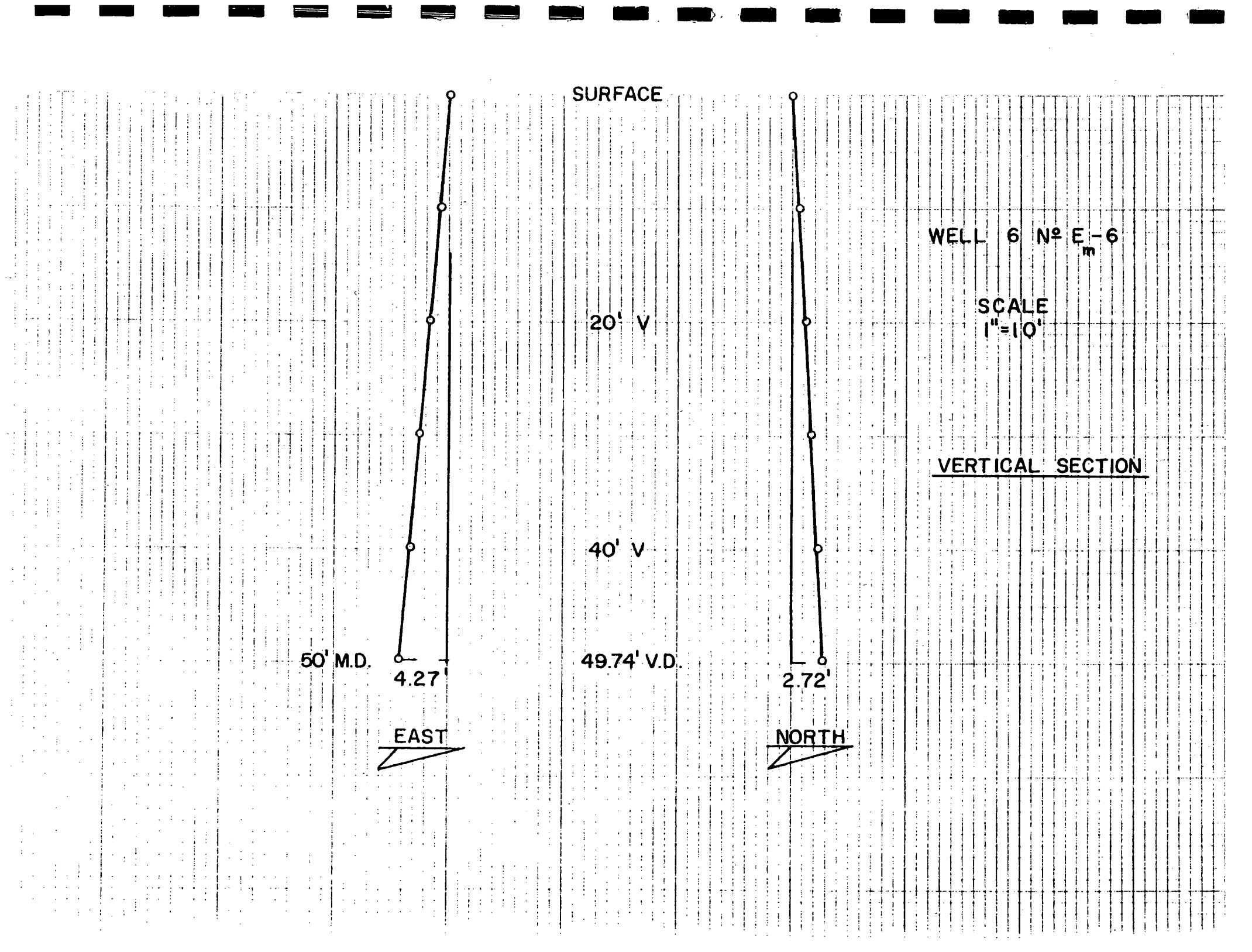


DEPTH-50'
NORTH-2.72'
WEST -4.27'
CLOSURE-5.06' N 57° 30' 21" W



WELL Nº: 6 Nº E_m-6

JOB Nº P-1078-G0102


SURFACE
20' V
40' V
50' M.D.
49.74' V.D.
4.27'
2.72'
EAST
NORTH
WELL 6 Nº E_m-6
SCALE
1"=10'
VERTICAL SECTION

BECHTEL POWER CORP.-- WELL 6 #F-6 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 29 SEPTEMBER 1978
JOB NO: F-0978-G0069
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-7
PITT

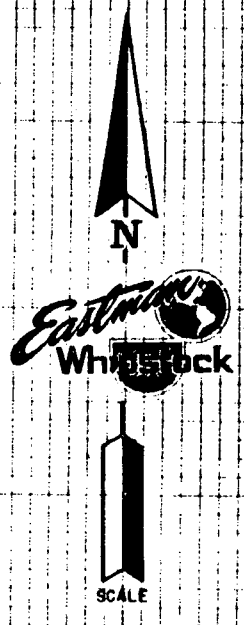
VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

RECORD OF SURVEY

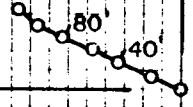
ANGLE AVERAGING METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	5 0	N 65 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	5 0	N 65 W	19.92	1.74	0.74 N	1.58 W
40.	4 50	N 65 W	39.85	3.46	1.46 N	3.13 W
60.	4 50	N 65 W	59.78	5.14	2.17 N	4.66 W
80.	4 40	N 65 W	79.71	6.80	2.87 N	6.16 W
100.	4 35	N 64 W	99.65	8.41	3.57 N	7.62 W
115.	4 30	N 65 W	114.60	9.60	4.08 N	8.69 W

FINAL CLOSURE - DIRECTION: N 64 DEGS 51 MINS 15 SECS W
DISTANCE: 9.60 FEET

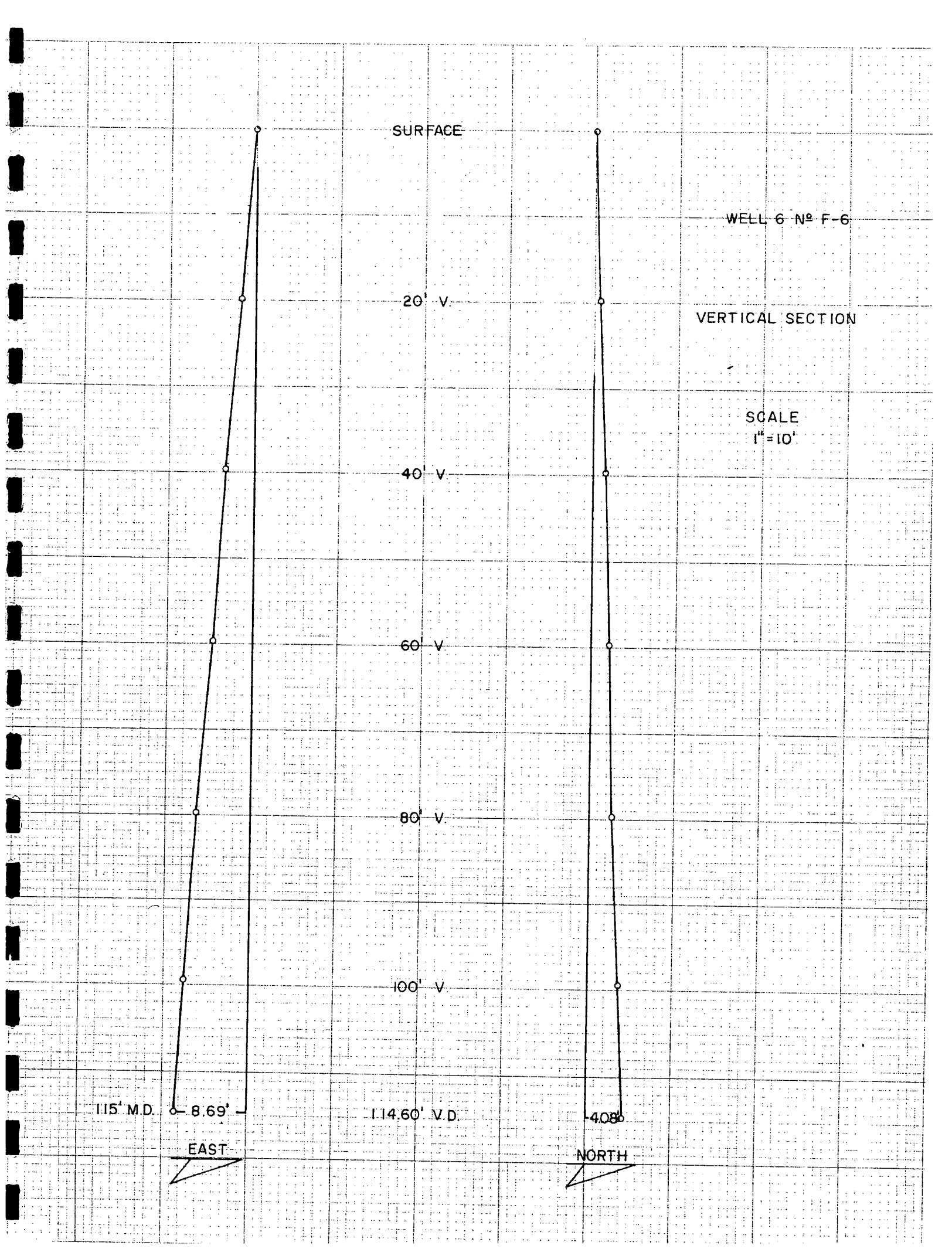


DEPTH - 115'
NORTH - 4.08'
WEST - 8.69'
CLOSURE - 9.60' N 64° 51' 15" W



WELL 6 Nº F-6

JOB Nº P-0978-G0069


SURFACE
20' V
40' V
60' V
80' V
100' V
WELL 6 Nº F-6
VERTICAL SECTION
SCALE
1" = 10'
115' M.D.
8.69'
EAST
114.60' V.D.
-40.8'
NORTH

BECHTEL POWER CORP.-- HOLE 6 #F-18 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 6 SEPTEMBER 1978
JOB NO: F-0978-G0016
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F134-9
PITT

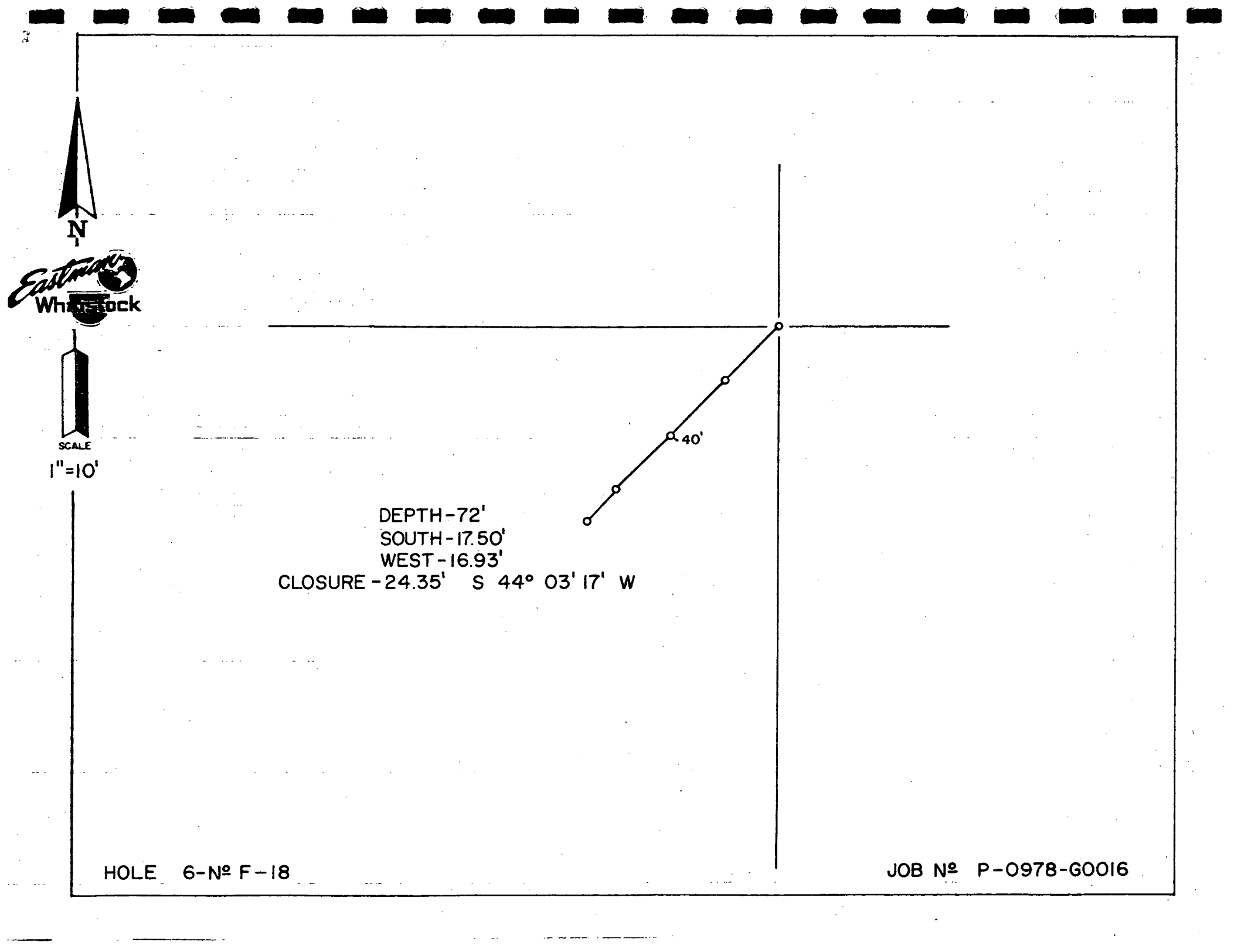
VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

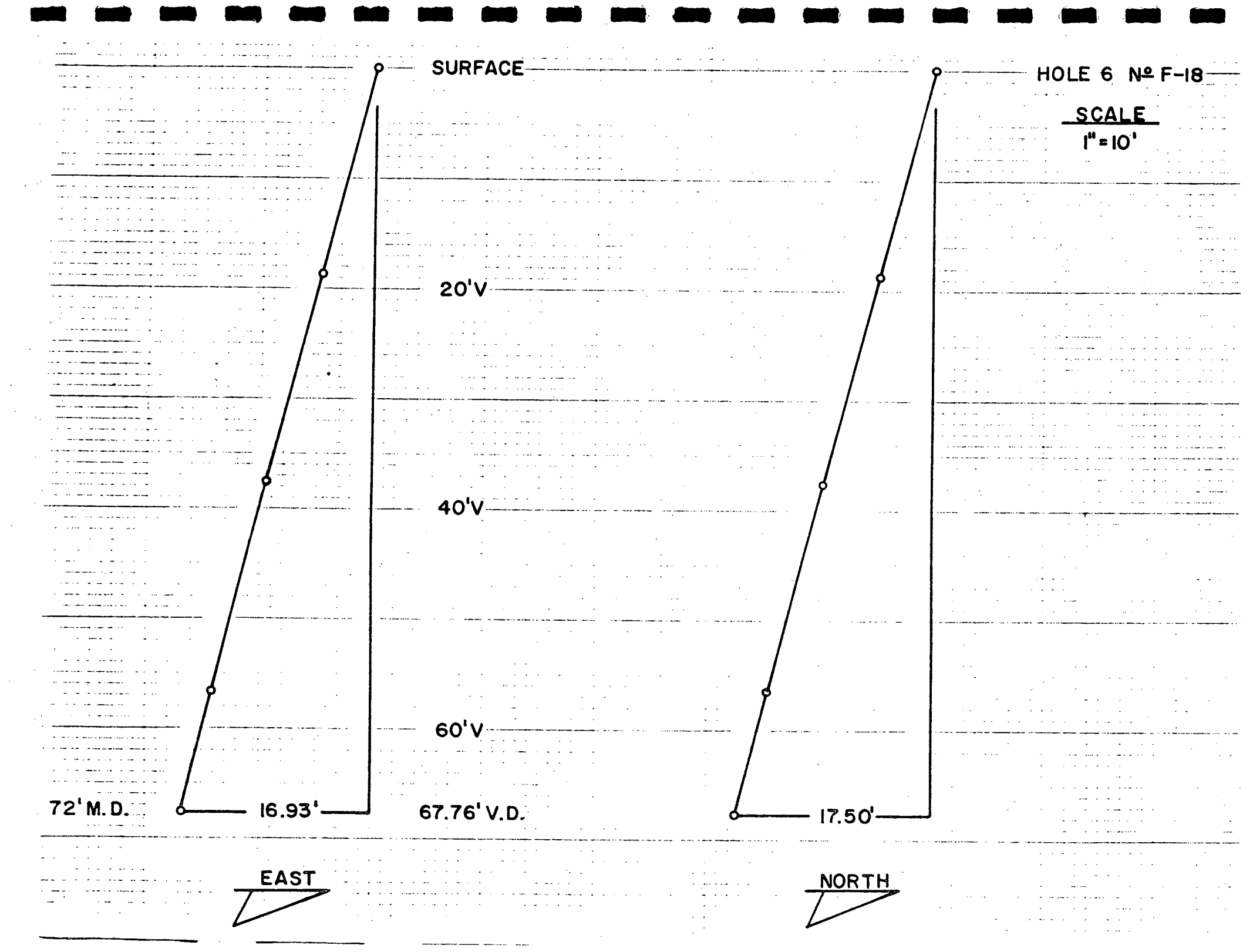
RECORD OF SURVEY

ANGLE AVERAGING METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	20 0	S 44 0 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVVEY IS "PLANT NORTH", N 57 00 W						
20.	20 0	S 44 0 W	18.79	6.84	4.92 S	4.75 W
40.	19 30	S 43 30 W	37.62	13.60	9.80 S	9.43 W
60.	19 45	S 44 30 W	56.46	20.32	14.63 S	14.09 W
72.	19 30	S 45 0 W	67.76	24.35	17.50 S	16.93 W

FINAL CLOSURE - DIRECTION: S 44 DEGS 3 MINS 17 SECS W
DISTANCE: 24.35 FEET


N
Eastman
Whipstock
SCALE
1"=10'
40'
DEPTH-72'
SOUTH-17.50'
WEST-16.93'
CLOSURE-24.35' S 44° 03' 17' W
HOLE 6-Nº F-18
JOB Nº P-0978-G0016


SURFACE
HOLE 6 Nº F-18
SCALE
1" = 10'
20'V
40'V
60'V
72' M.D.
16.93'
67.76' V.D.
17.50'
EAST
NORTH

BECHTEL POWER CORP.--- WELL 6 #G-5 ---EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 3 OCTOBER 1978
JOB NO: P-1078-G0077
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-10
PITT

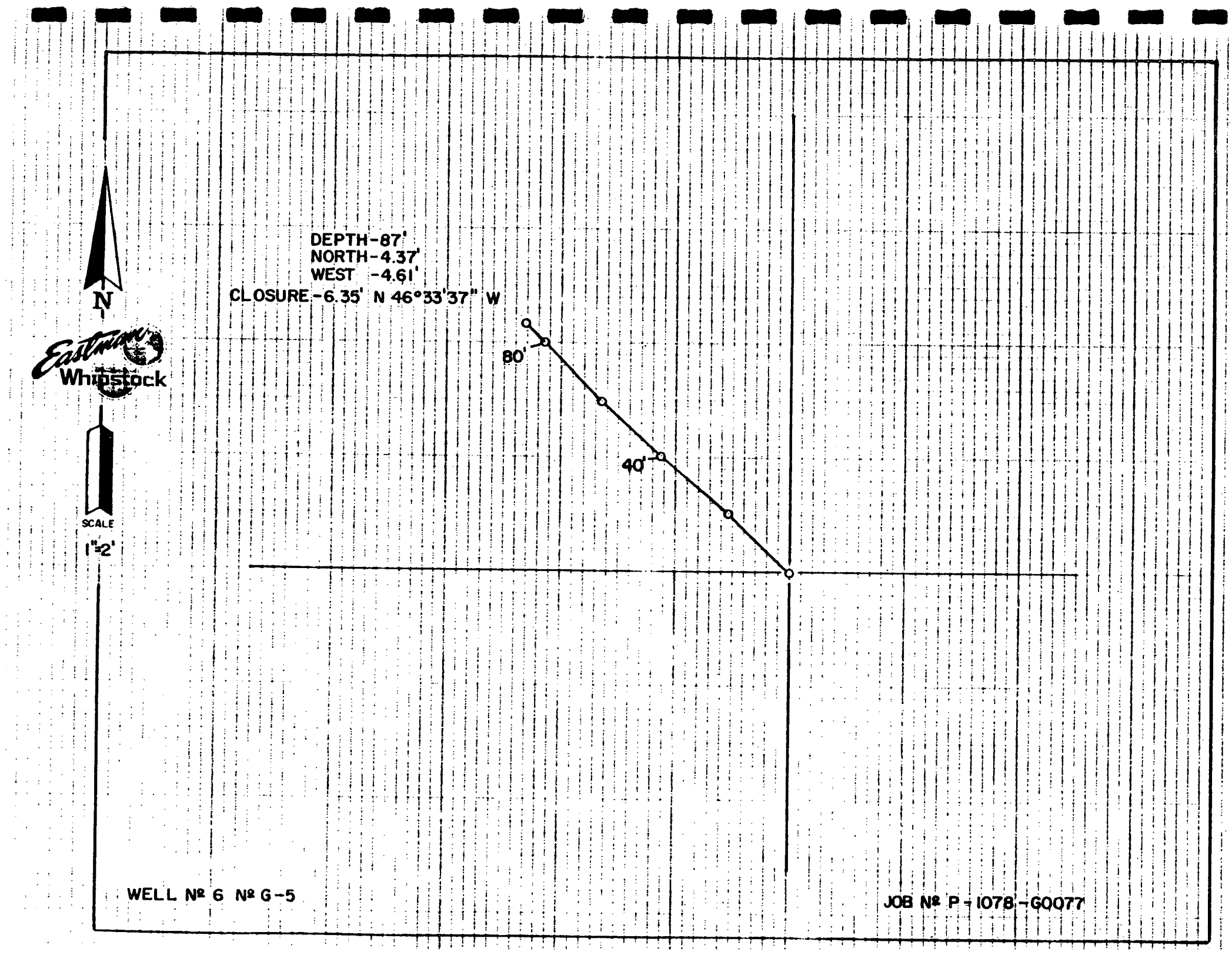
VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

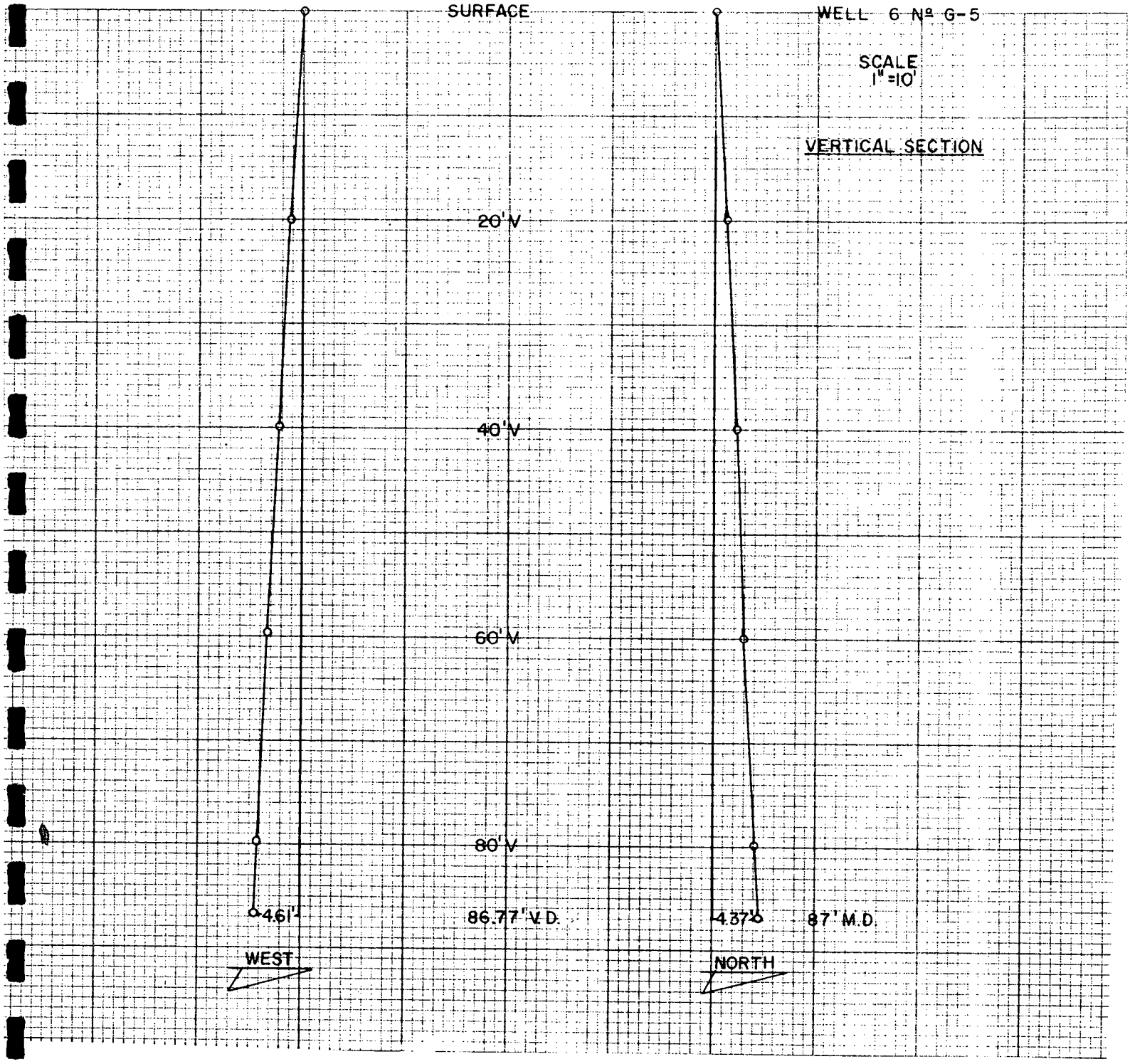
RECORD OF SURVEY

ANGLE AVERAGING METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	4 20	N 48 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	4 25	N 48 W	19.94	1.53	1.02 N	1.13 W
40.	4 5	N 48 W	39.89	3.01	2.01 N	2.24 W
60.	4 5	N 46 W	59.84	4.43	2.98 N	3.28 W
80.	4 5	N 43 W	79.79	5.85	4.00 N	4.28 W
87.	4 5	N 42 W	86.77	6.35	4.37 N	4.61 W

FINAL CLOSURE - DIRECTION: N 46 DEGS 33 MINS 37 SECS W
DISTANCE: 6.35 FEET


DEPTH-87'
NORTH-4.37'
WEST -4.61'
CLOSURE-6.35' N 46°33'37" W
80'
40'
N
Eastman Whipstock
SCALE
1"=2'
WELL Nº 6 Nº G-5
JOB Nº P-1078-G0077


SURFACE
WELL 6 Nº G-5
SCALE
1" = 10'
VERTICAL SECTION
20' V
40' V
60' V
80' V
4.61'
86.77' V.D.
4.37'
87' M.D.
WEST
NORTH

BECHTEL POWER CORP.-- WELL 6 #H_m -14 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 27 SEPTEMBER 1978
JOB NO: P-0978-G0064
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-5
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

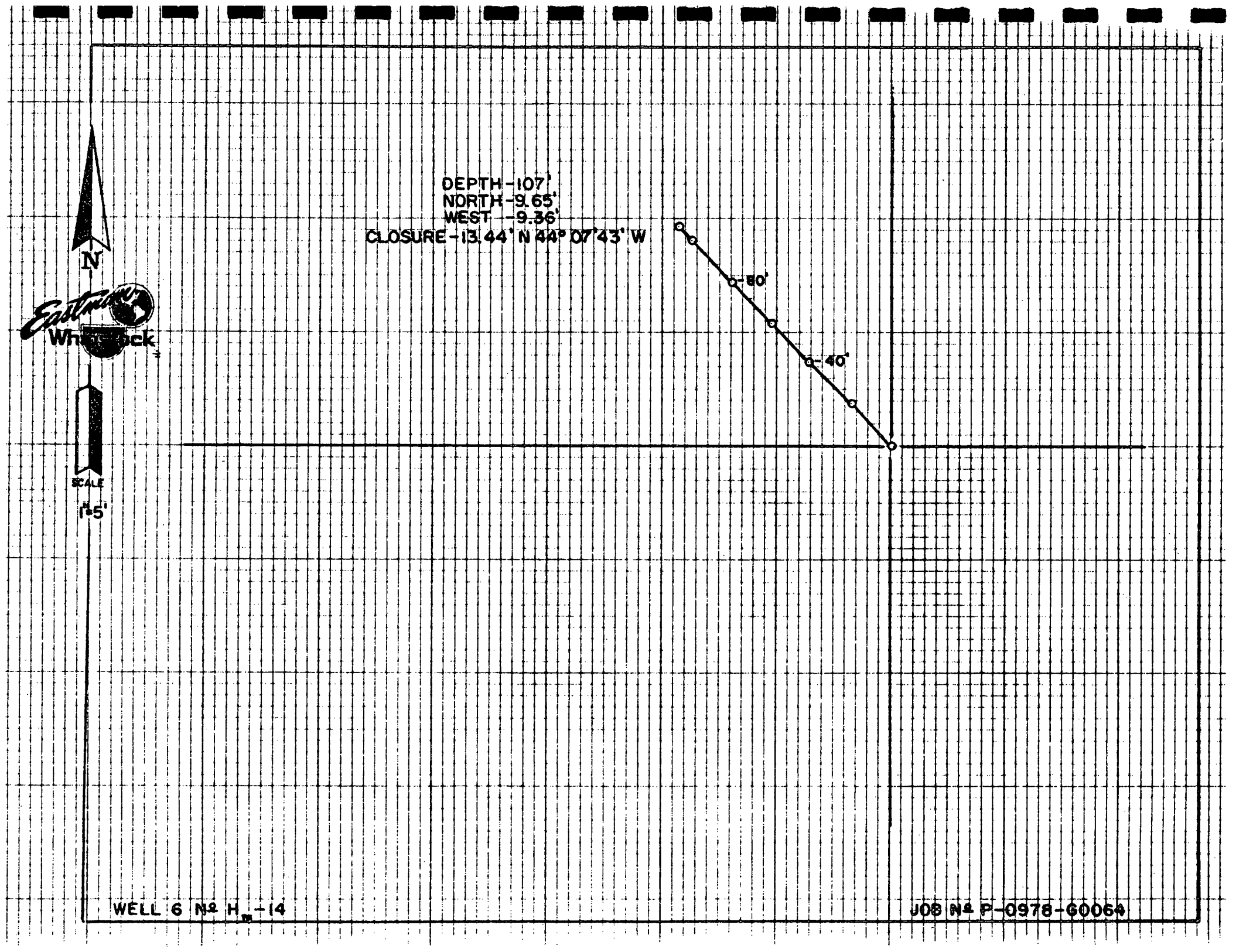
RECORD OF SURVEY

ANGLE AVERAGING METHOD

BECHTEL POWER CORP.-- WELL 6 #H_m-14 --EASTMAN GYRO MULTI-SHOT SURVEY 06:55:52 00--72 PAGE NO. 1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	7 25	N 43 30 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	7 25	N 43 30 W	19.83	2.58	1.87 N	1.78 W
40.	7 5	N 44 30 W	39.67	5.11	3.69 N	3.53 W
60.	7 0	N 44 30 W	59.52	7.56	5.44 N	5.25 W
80.	7 15	N 45 30 W	79.37	10.04	7.19 N	7.00 W
100.	7 15	N 43 0 W	99.21	12.56	9.00 N	8.76 W
107.	7 10	N 42 0 W	106.15	13.44	9.65 N	9.36 W

FINAL CLOSURE - DIRECTION: N 44 DEGS 7 MINS 43 SECS W
DISTANCE: 13.44 FEET


DEPTH - 107'
NORTH - 9.65'
WEST - 9.36'
CLOSURE - 13.44' N 44° 07' 43" W
-80'
-40'
N
SCALE
1"=5'
WELL 6 Nº H - 14
JOB Nº P-0978-60064

SURFACE
HOLE 6 Nº Hm -14
SCALE
1"=10'
VERTICAL SECTION
20' V
40' V
60' V
80' V
100' V
9.36'
106.15' V.D.
9.65'
107' M.D.
EAST
NORTH

BECHTEL POWER CORP.--- HOLE: 6 #J5.6 ---EASTMAN GYRO MULTI-SHOT
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 15 SEPTEMBER 1978
JOB NO: P-0978-G0037
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F134-18
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

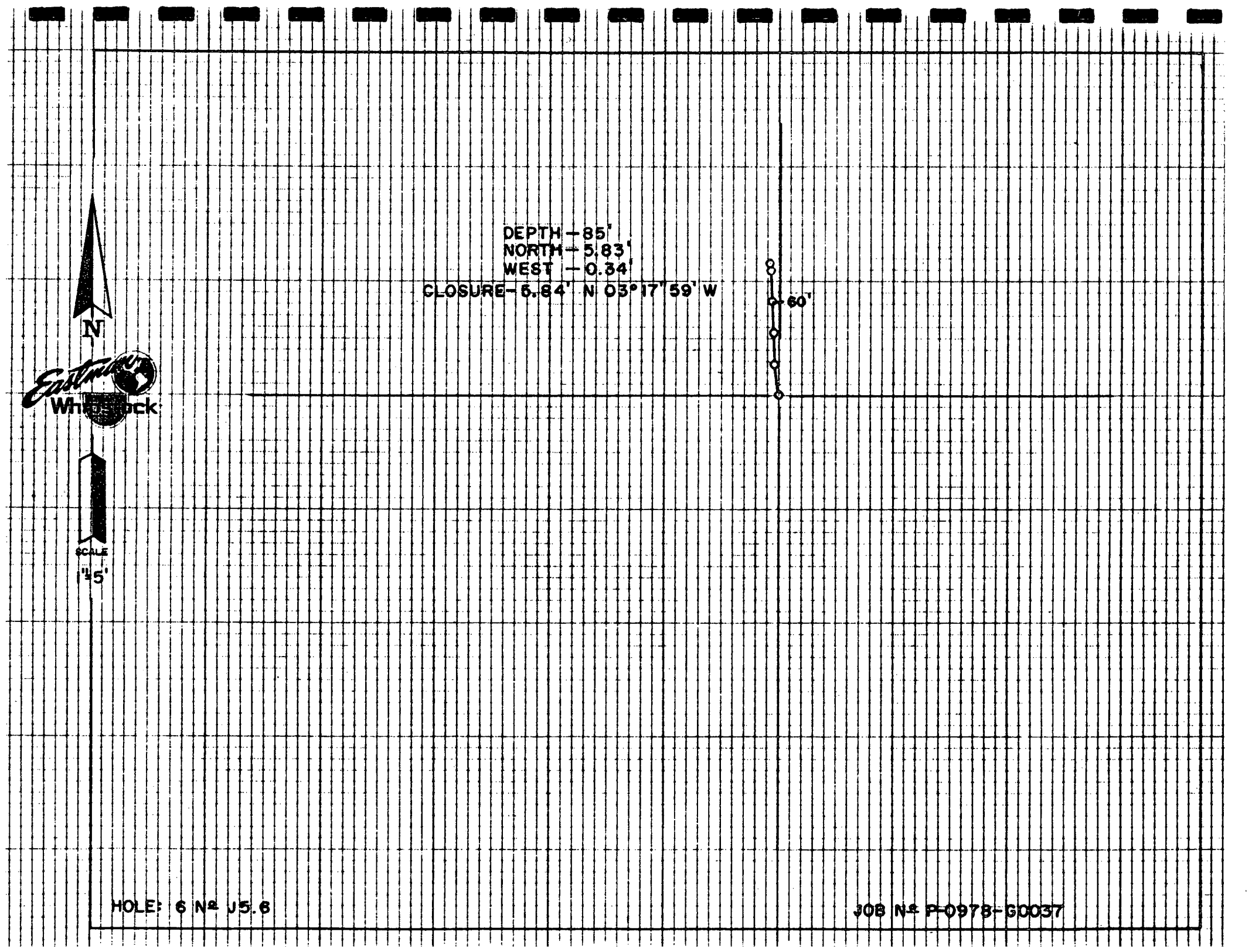
RECORD OF SURVEY

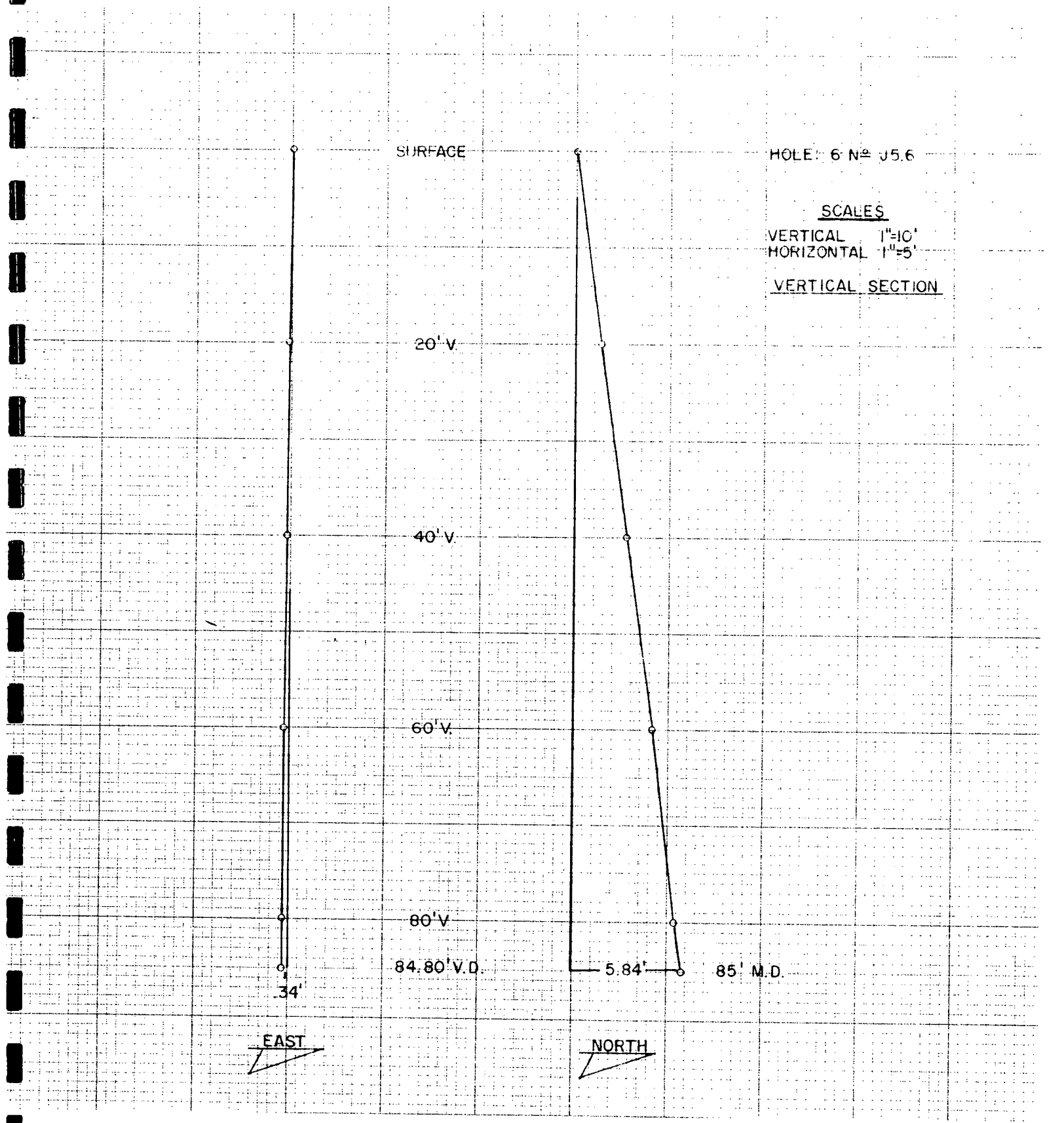
ANGLE AVERAGING METHOD

BECHTEL POWER CORP.--- HOLE: 6 #J5.6 ---EASTMAN GYRO MULTI-SHOT 00:51:14 00--72 PAGE NO. 1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	4 0	N 5 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	4 0	N 5 W	19.95	1.39	1.39 N	0.12 W
40.	3 50	N 3 W	39.90	2.76	2.75 N	0.22 W
60.	3 55	N 2 W	59.86	4.11	4.10 N	0.28 W
80.	4 0	N 2 W	79.81	5.49	5.48 N	0.32 W
85.	4 0	N 2 W	84.80	5.84	5.83 N	0.34 W

FINAL CLOSURE - DIRECTION: N 3 DEGS 17 MINS 59 SECS W
DISTANCE: 5.84 FEET


DEPTH – 85'
NORTH – 5.83'
WEST – 0.34'
CLOSURE – 5.84' N 03° 17' 59" W
60'
N
Eastman
Whipstock
SCALE
1" = 5'
HOLE: 6 Nº J5.6
JOB Nº P-0978-G0037


SURFACE
20' V
40' V
60' V.
80' V
84.80' V.D.
.34'
EAST
5.84'
85' M.D.
NORTH
HOLE: 6 Nº 05.6
SCALES
VERTICAL 1"=10'
HORIZONTAL 1"=5'
VERTICAL SECTION

BECHTEL POWER CORP.-- WELL 6 #K-9 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 5 OCTOBER 1978
JOB NO: P-1078-G0085
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-12
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

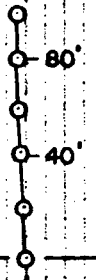
RECORD OF SURVEY

ANGLE AVERAGING METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	7 45	N 1 30 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	7 45	N 1 30 W	19.82	2.70	2.70 N	0.07 W
40.	7 30	N 2 30 W	39.64	5.35	5.35 N	0.16 W
60.	6 50	N 2 0 W	59.48	7.85	7.84 N	0.26 W
80.	7 0	N 1 0 W	79.34	10.25	10.25 N	0.32 W
100.	6 55	N 0 0 W	99.19	12.68	12.67 N	0.35 W

FINAL CLOSURE - DIRECTION: N 1 DEGS 33 MINS 40 SECS W
DISTANCE: 12.68 FEET

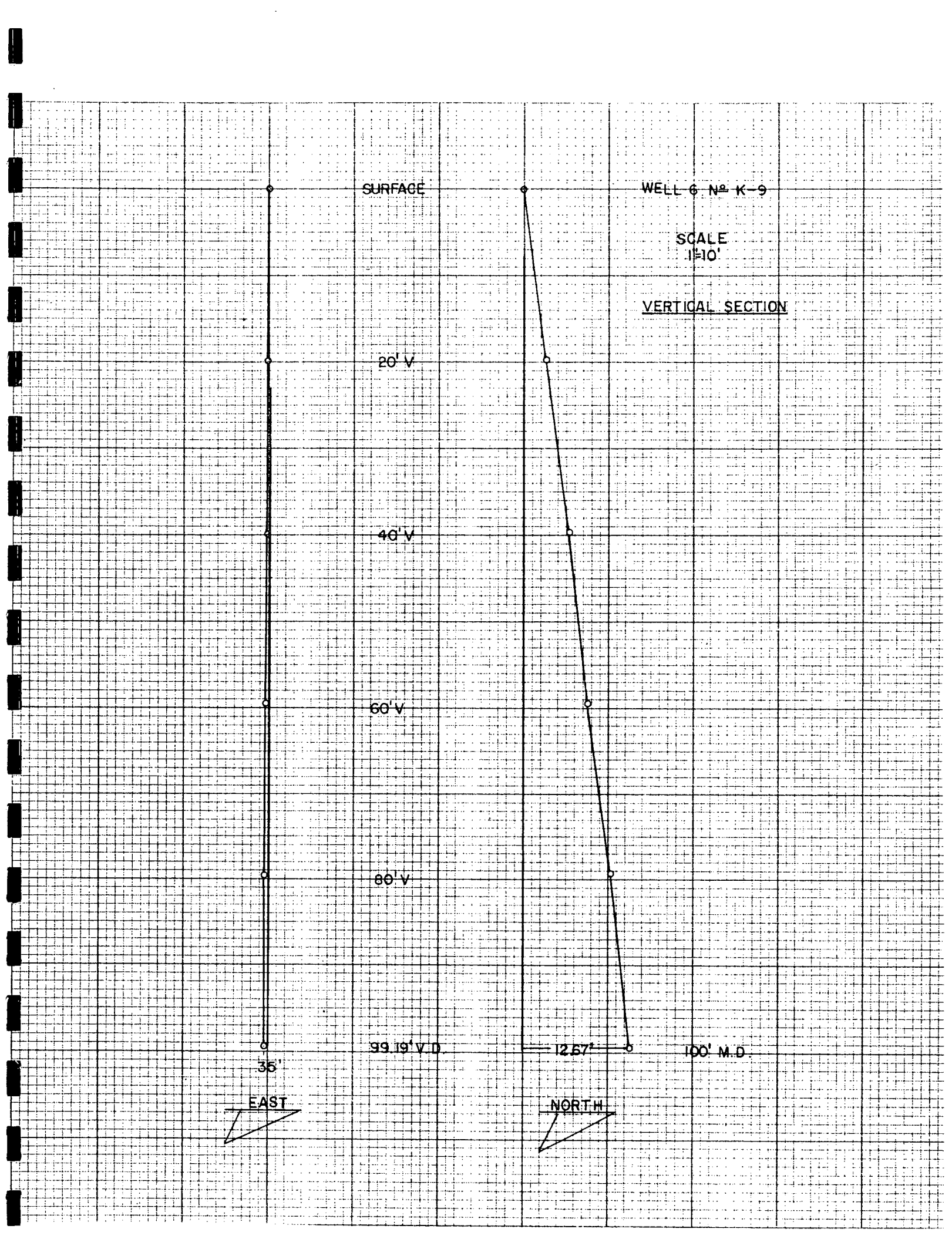
DEPTH-100'
NORTH-12.67'
WEST -0.35'
CLOSURE-12.68' N 01° 33' 40" W



SCALE
1"=10

WELL 6 Nº K-9

JOB Nº P-1078-G0085


SURFACE
WELL 6 Nº K-9
SCALE
1"=10'
VERTICAL SECTION
20' V
40' V
60' V
80' V
99.19' V D
12.57'
100' M.D.
35'
EAST
NORTH

BECHTEL POWER CORP.--- HOLE 6 #L-8 ---EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS 'PLANT NORTH', N 57 00 W

DATE: 11 SEPTEMBER 1978
JOB NO: P-0978-G0023
SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F134-13
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

RECORD OF SURVEY

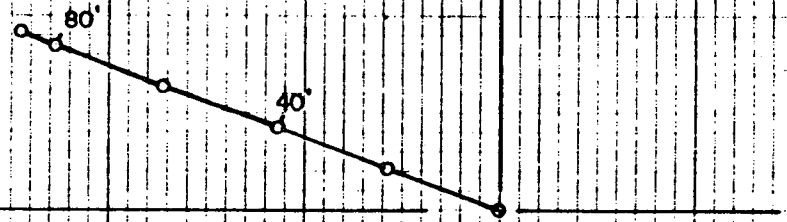
ANGLE AVERAGING METHOD

BECHTEL POWER CORP.--- HOLE 6 #L-8 ---EASTMAN GYRO MULTI-SHOT SURVEY 00:02:28 00--72 PAGE NO. 1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	3 30	N 70 0 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	3 30	N 70 0 W	19.96	1.22	0.42 N	1.15 W
40.	3 30	N 69 0 W	39.93	2.44	0.85 N	2.29 W
60.	3 30	N 69 30 W	59.89	3.66	1.28 N	3.43 W
80.	3 30	N 69 0 W	79.85	4.88	1.71 N	4.57 W
86.	3 30	N 68 0 W	85.84	5.25	1.84 N	4.92 W

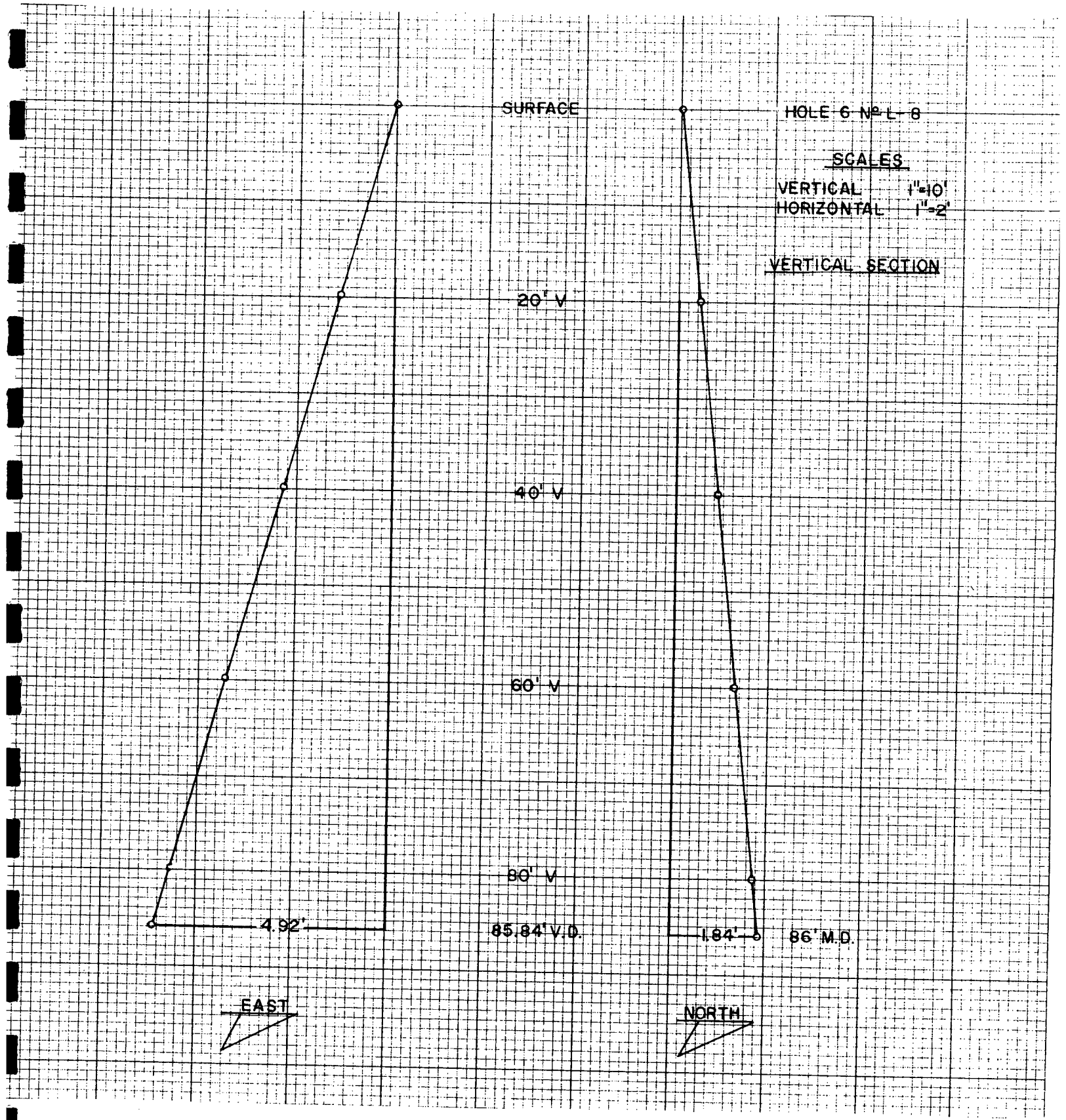
FINAL CLOSURE - DIRECTION: N 69 DEGS 25 MINS 49 SECS W
DISTANCE: 5.25 FEET

DEPTH - 86'
NORTH - 1.84'
WEST - 4.92'
CLOSURE - 5.25' N 69° 25' 49" W



HOLE: 6-L-8

JOB Nº P-0978-G0023


SURFACE
HOLE 6 Nº L-8
SCALES
VERTICAL 1"=10'
HORIZONTAL 1"=2'
VERTICAL SECTION
20' V
40' V
60' V
80' V
85.84' V.D.
4.92'
1.84'
86' M.D.
EAST
NORTH

BECHTEL POWER CORP.--- WELL 6 #L-9 ---EASTMAN GYRO MULTI-SHOT
SAN ONFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 25 SEPTEMBER 1978
JOB NO: P-0978-G0061
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F135-3
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

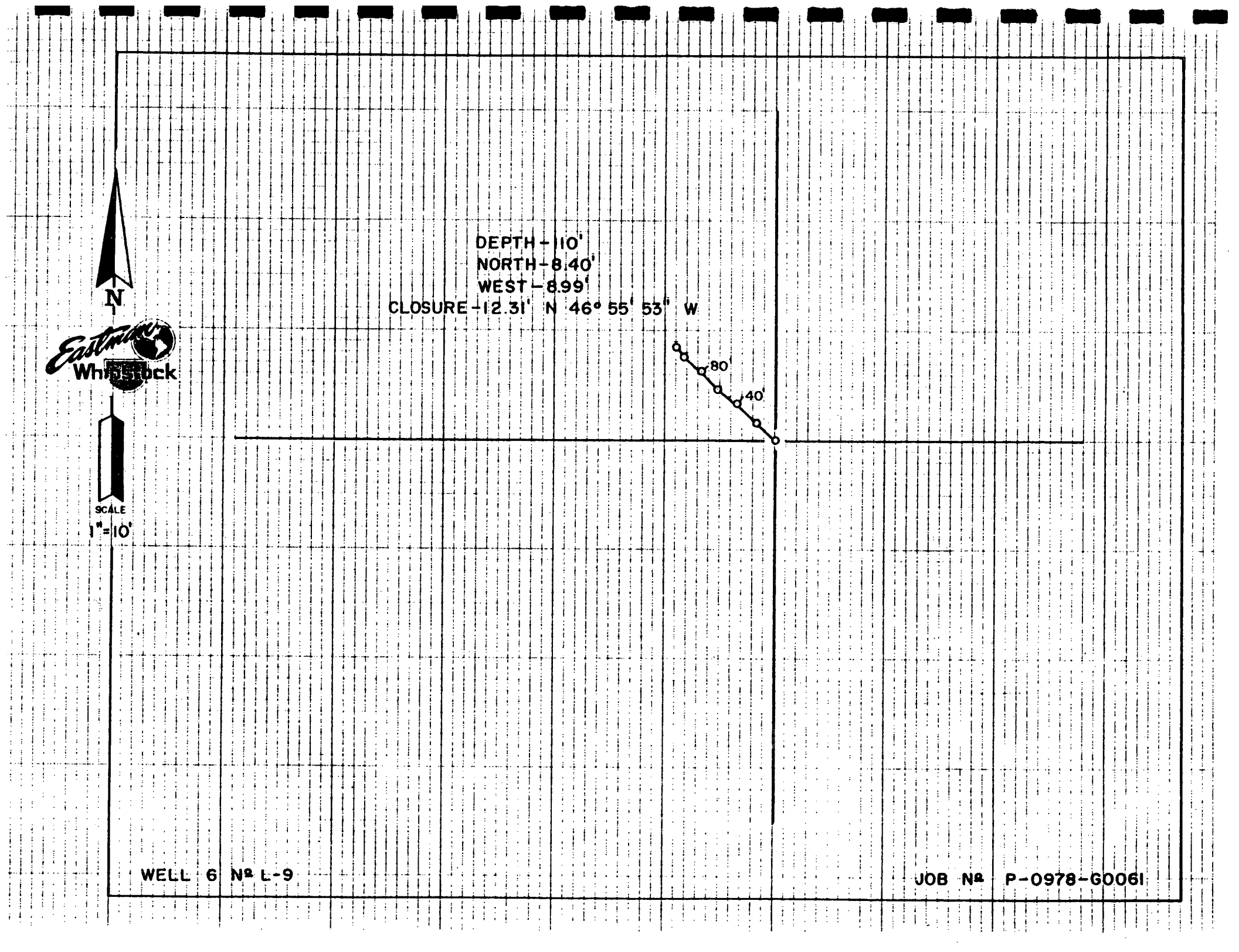
RECORD OF SURVEY

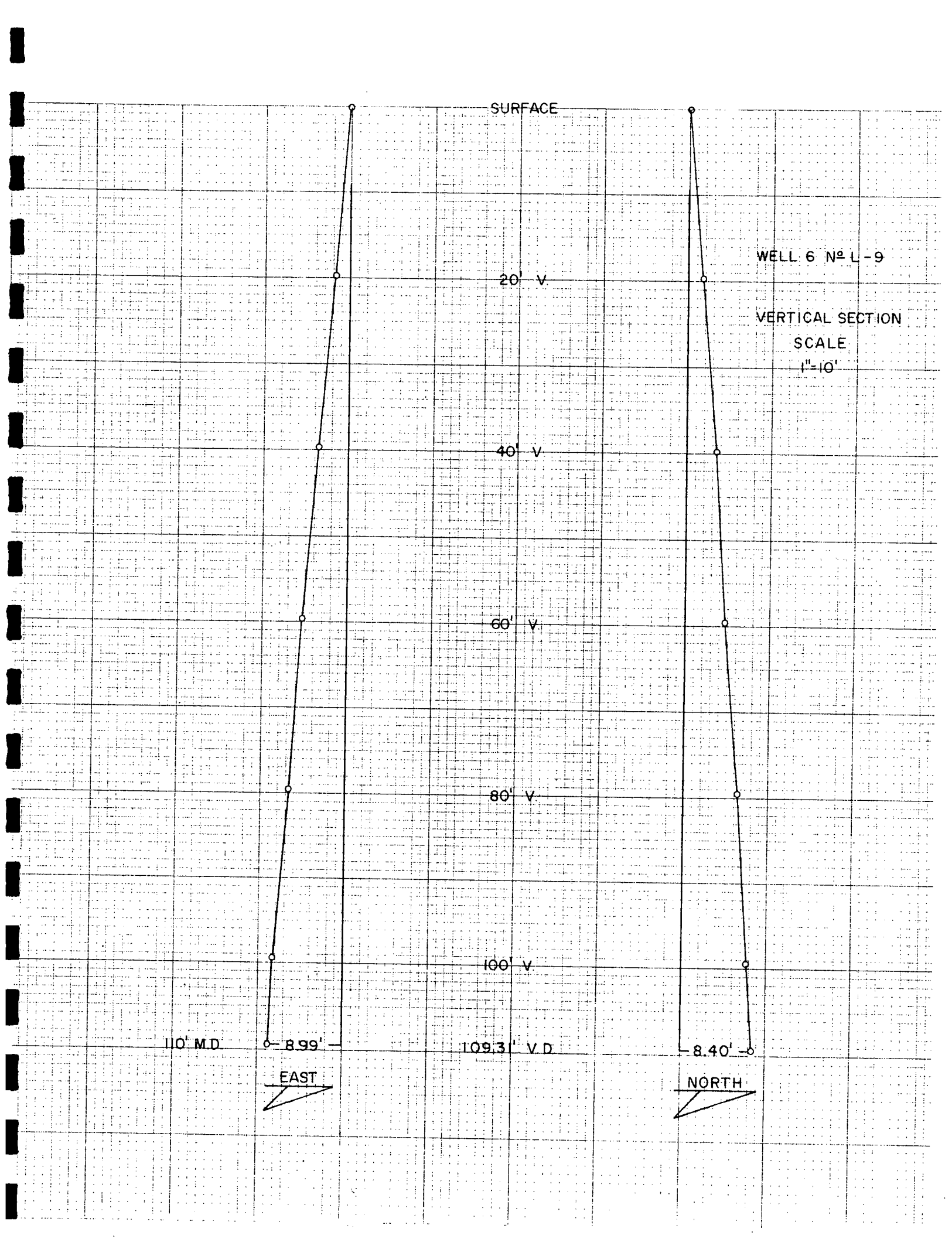
ANGLE AVERAGING METHOD

BECHTEL POWER CORP.--- WELL 6 #L-9 ---EASTMAN GYRO MULTI-SHOT 00:02:08 00--72 PAGE NO. 1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	7 10	N 45 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	7 10	N 45 W	19.84	2.49	1.76 N	1.76 W
40.	6 30	N 48 W	39.70	4.87	3.40 N	3.49 W
60.	6 0	N 48 W	59.58	7.05	4.86 N	5.11 W
80.	6 5	N 48 W	79.47	9.15	6.27 N	6.67 W
100.	6 0	N 47 W	99.36	11.26	7.69 N	8.22 W
110.	6 0	N 47 W	109.31	12.31	8.40 N	8.99 W

FINAL CLOSURE - DIRECTION: N 46 DEGS 55 MINS 53 SECS W
DISTANCE: 12.31 FEET


DEPTH - 110'
NORTH - 8.40'
WEST - 8.99'
CLOSURE - 12.31' N 46° 55' 53" W
80'
40'
N
Eastman Whipstock
SCALE
1" = 10'
WELL 6 Nº L-9
JOB Nº P-0978-G0061


SURFACE
20' V
40' V
60' V
80' V
100' V
WELL 6 Nº L-9
VERTICAL SECTION
SCALE
1"=10'
110' M.D
8.99'
EAST
109.3' V.D
8.40'
NORTH

BECHTEL POWER CORP.-- HOLE 6 # L-10 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH:, N 57 00 W

DATE: 30 AUGUST 1978
JOB NO: P-0878-G1060
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F 134-5
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

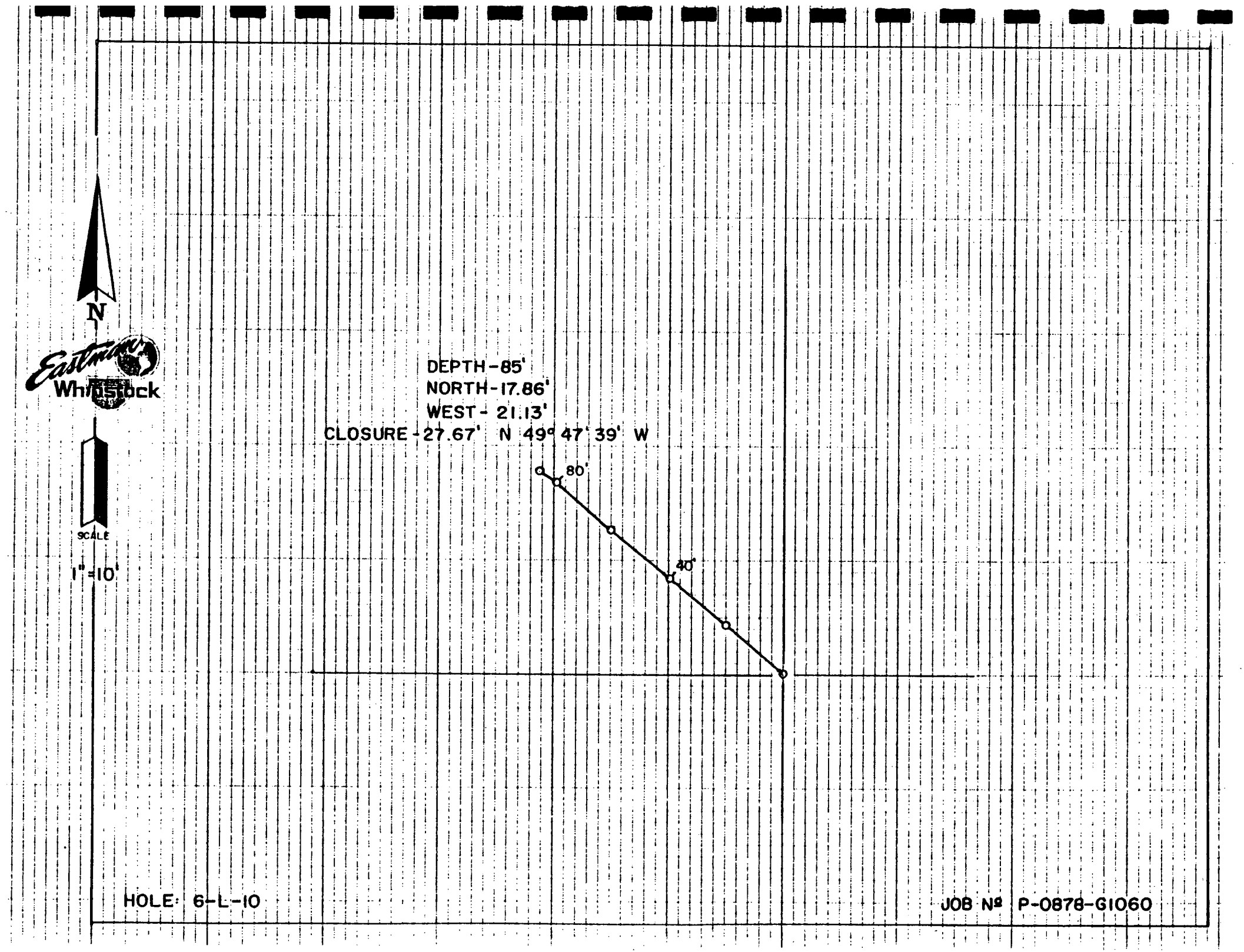
RECORD OF SURVEY

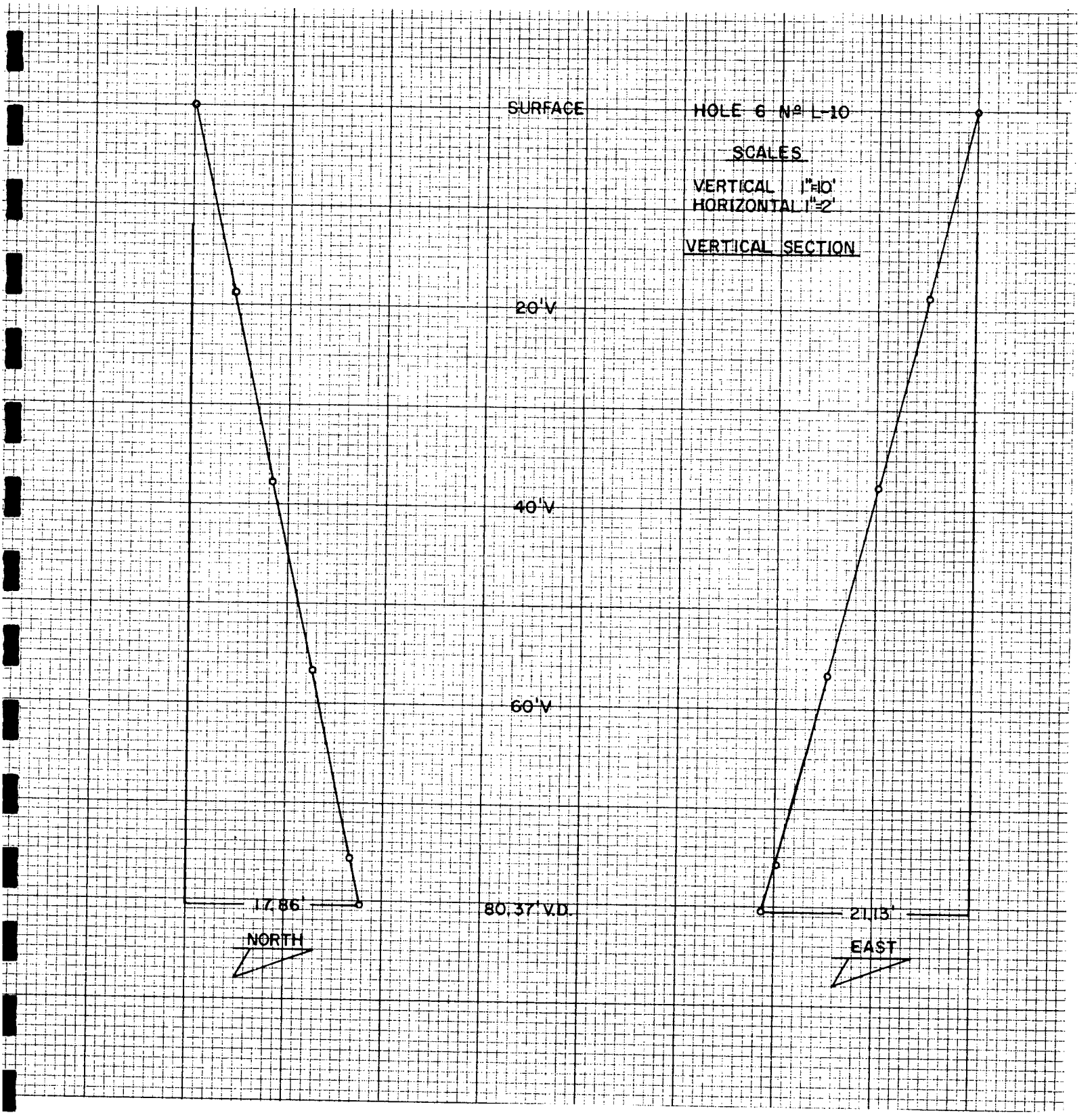
ANGLE AVERAGING METHOD

BECHTEL POWER CORP.-- HOLE 6 # L-10 --EASTMAN GYRO MULTI-SHOT SURVEY 00:39:13 00--72 PAGE NO. 1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	19 0	N 50 0 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS 'PLANT NORTH', N 57 00 W						
20.	19 0	N 50 0 W	18.91	6.51	4.19 N	4.99 W
40.	19 0	N 50 0 W	37.82	13.02	8.37 N	9.98 W
60.	19 0	N 49 30 W	56.73	19.53	12.58 N	14.95 W
80.	19 0	N 49 30 W	75.64	26.05	16.81 N	19.90 W
85.	19 0	N 49 30 W	80.37	27.67	17.86 N	21.13 W

FINAL CLOSURE - DIRECTION: N 49 DEGS 47 MINS 39 SECS W
DISTANCE: 27.67 FEET


N
Eastman Whipstock
SCALE
1"=10'
DEPTH-85'
NORTH-17.86'
WEST- 21.13'
CLOSURE-27.67' N 49° 47' 39" W
80'
40'
HOLE: 6-L-10
JOB Nº P-0878-G1060


SURFACE
HOLE 6 Nº L-10
SCALES
VERTICAL 1"=10'
HORIZONTAL 1"=2'
VERTICAL SECTION
20'V
40'V
60'V
17.86'
NORTH
80.37' V.D.
21.13'
EAST

BECHTEL POWER CORP.-- WELL 6 #P_m -25 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 25 SEPTEMBER 1978
JOB NO: P-0978-G0060
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC
FILE: F135-4
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

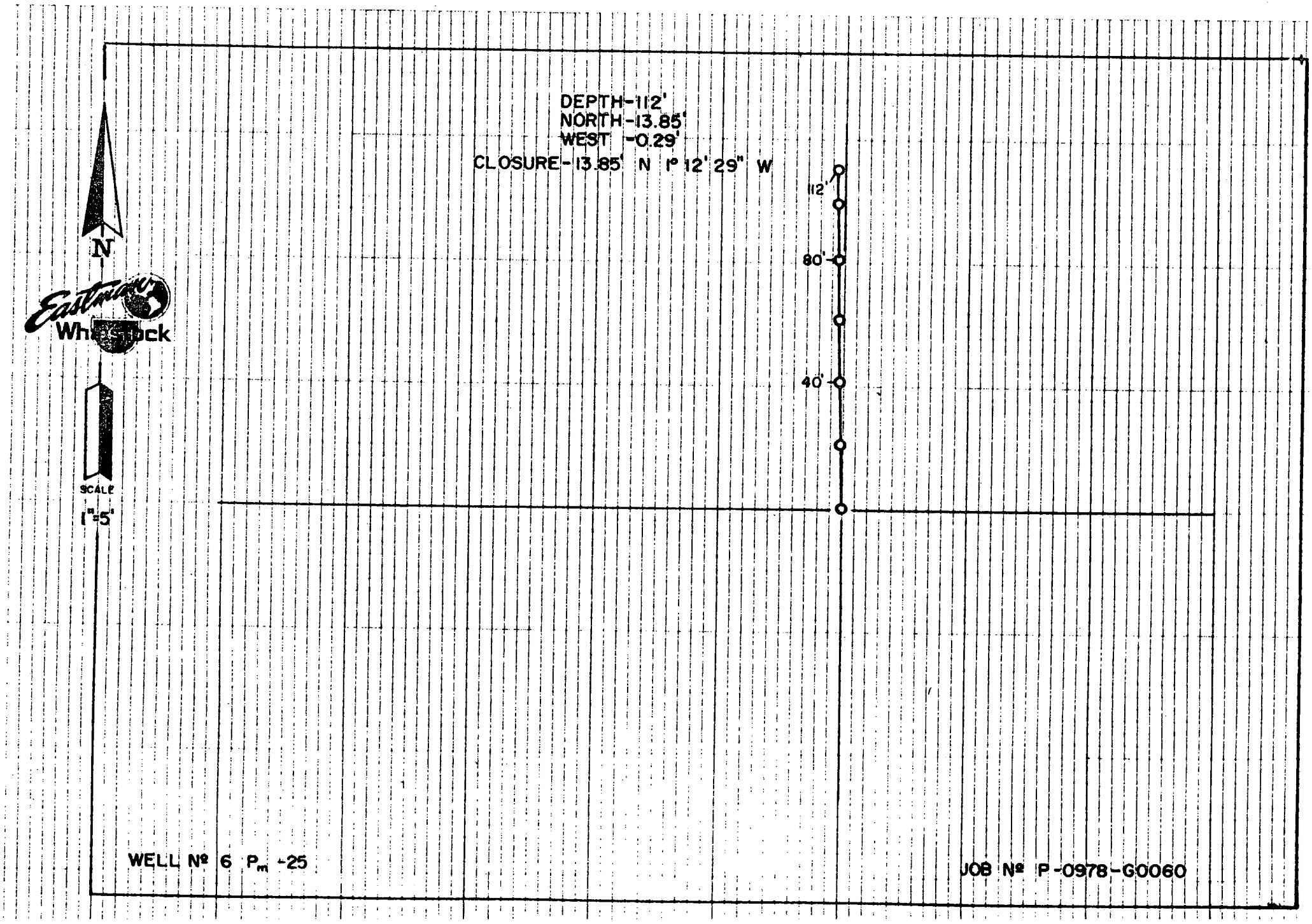
RECORD OF SURVEY

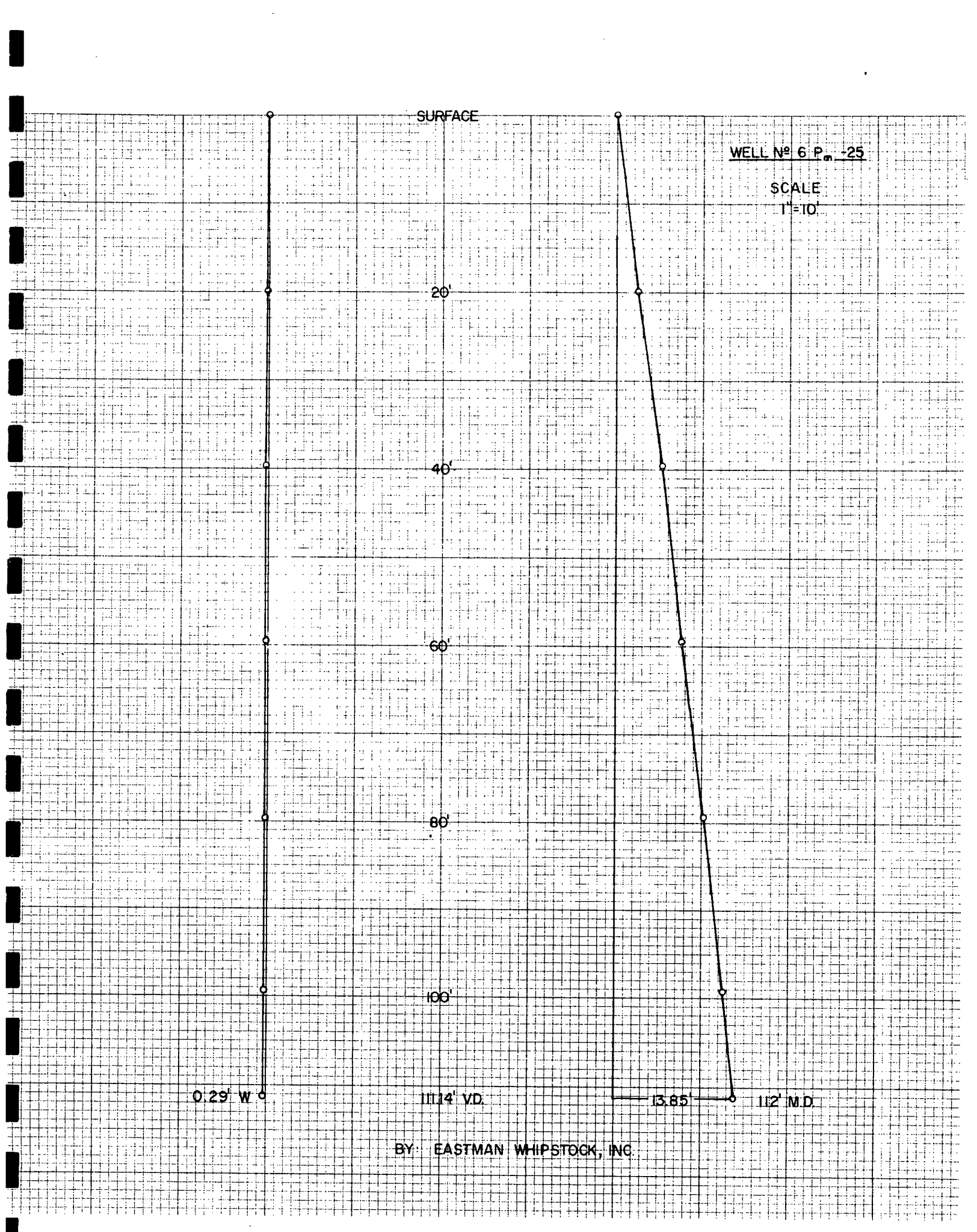
ANGLE AVERAGING METHOD

BECHTEL POWER CORP.-- WELL 6 #P_m -25 --EASTMAN GYRO MULTI-SHOT SURVEY 00:26:29 00--72

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET
0.	7 20	N 1 0 W	0.00	0.00	0.00 0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W					
20.	7 20	N 1 0 W	19.84	2.55	2.55 N 0.04 W
40.	7 30	N 1 30 W	39.67	5.13	5.13 N 0.10 W
60.	7 0	N 0 30 W	59.51	7.66	7.66 N 0.14 W
80.	6 45	N 2 30 W	79.37	10.05	10.05 N 0.21 W
100.	6 45	N 1 0 W	99.23	12.40	12.40 N 0.28 W
112.	7 5	N 0 0 W	111.14	13.85	13.85 N 0.29 W

FINAL CLOSURE - DIRECTION: N 1 DEGS 12 MINS 29 SECS W
DISTANCE: 13.85 FEET


DEPTH-112'
NORTH-13.85'
WEST -0.29'
CLOSURE-13.85' N 1° 12' 29" W
112'
80'
40'
N
Eastman Whipstock
SCALE
1"=5'
WELL Nº 6 Pm -25
JOB Nº P-0978-G0060


SURFACE
WELL Nº 6 P.m. -25
SCALE
1"=10'
20'
40'
60'
80'
100'
0.29' W
1111.4' V.D.
13.85'
112' M.D.
BY EASTMAN WHIPSTOCK, INC.

BECHTEL POWER CORP.-- WELL 6 #P_m 29 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 8 SEPTEMBER 1978
JOB NO: P-0978-G0020
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F134-11
PITT

VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

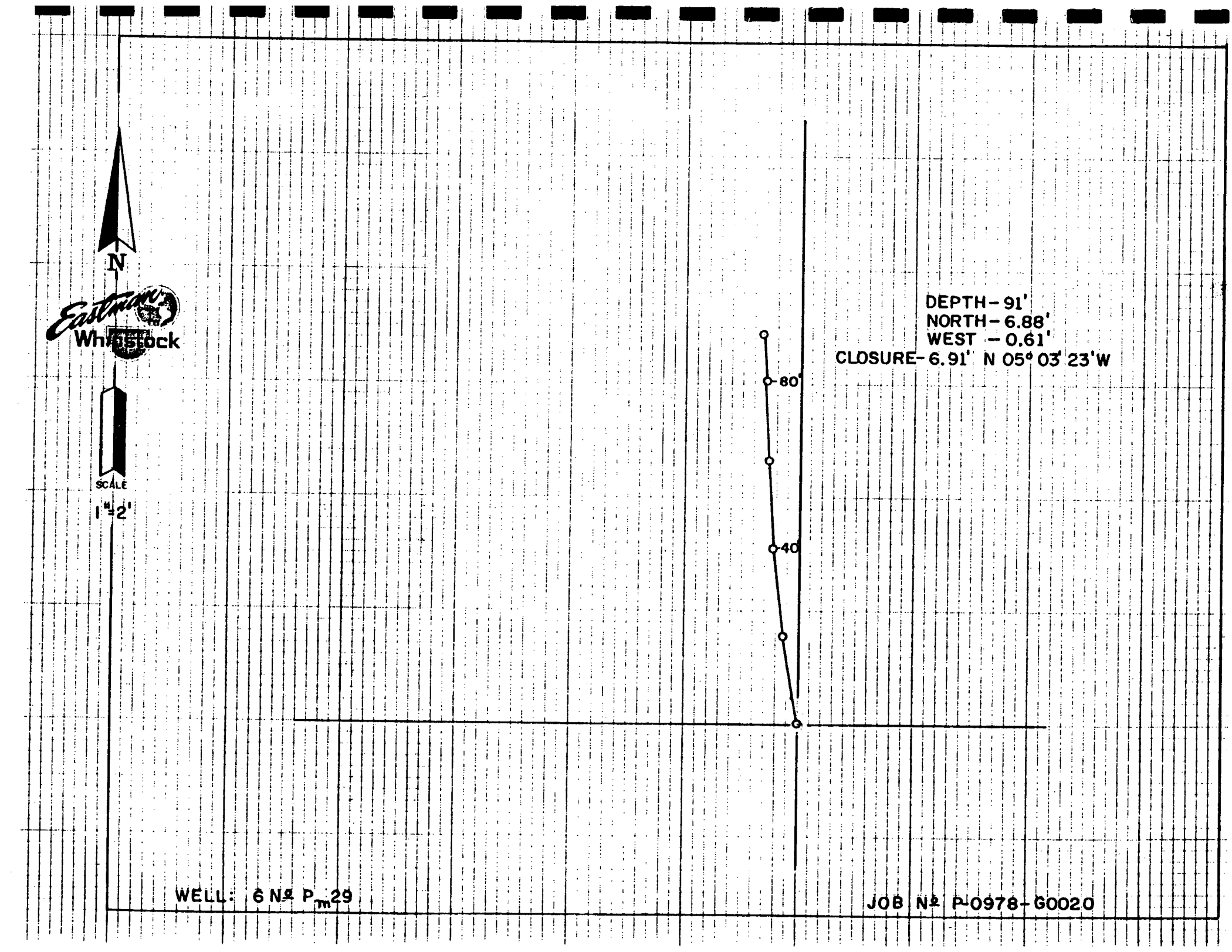
RECORD OF SURVEY

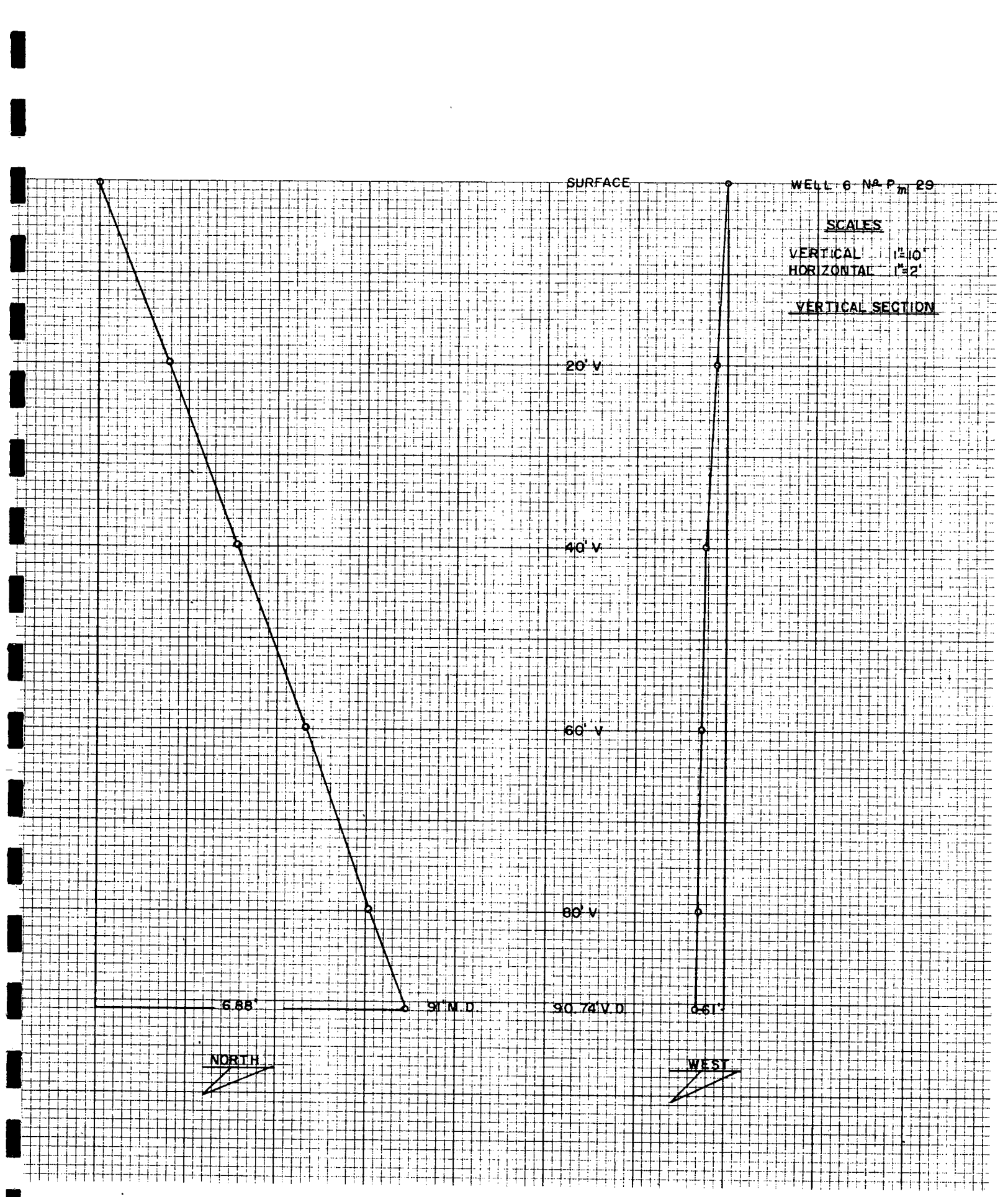
ANGLE AVERAGING METHOD

BECHTEL POWER CORP.-- WELL 6 #P_m 29 --EASTMAN GYRO MULTI-SHOT SURVEY 00:19:19 00--72 PAGE NO. 1

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D M	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	4 35	N 8 30 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	4 35	N 8 30 W	19.94	1.60	1.58 N	0.24 W
40.	4 20	N 5 30 W	39.88	3.15	3.12 N	0.43 W
60.	4 15	N 1 30 W	59.82	4.65	4.62 N	0.52 W
80.	4 10	N 3 30 W	79.77	6.11	6.08 N	0.58 W
91.	4 10	N 0 30 W	90.74	6.91	6.88 N	0.61 W

FINAL CLOSURE - DIRECTION: N 5 DEGS 3 MINS 23 SECS W
DISTANCE: 6.91 FEET


N
Eastman
Whipstock
SCALE
1"=2'
DEPTH - 91'
NORTH - 6.88'
WEST - 0.61'
CLOSURE - 6.91' N 05° 03' 23" W
80'
40'
WELL: 6 Nº P_m29
JOB Nº P-0978-G0020


SURFACE
WELL 6 Nº Pm 29
SCALES
VERTICAL 1"=10'
HORIZONTAL 1"=2'
VERTICAL SECTION
20' V
40' V
60' V
80' V
6.88'
91' N.D.
90.74' V.D.
0.61'
NORTH
WEST

BECHTEL POWER CORP.--- HOLE: 6 #Q-34 --EASTMAN GYRO MULTI-SHOT SURVEY
SAN ONOFRE POWER PLANT

NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W

DATE: 12 SEPTEMBER 1978
JOB NO: P-0978-G0026
GYRO SURVEY BY: EASTMAN WHIPSTOCK, INC.
FILE: F134-15
PITT

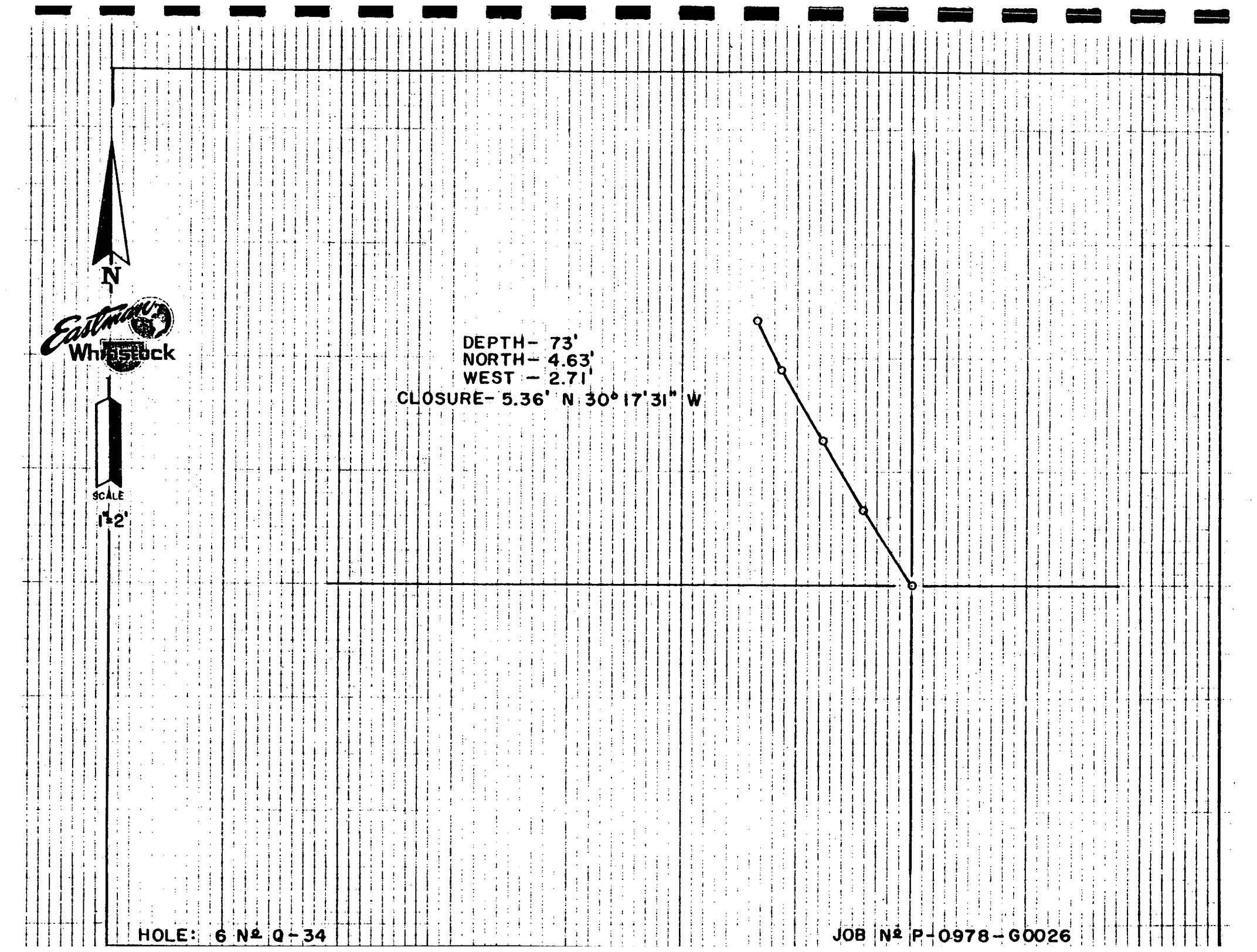
VERTICAL SECTION IS IN
PLANE OF BOTTOM HOLE CLOSURE.

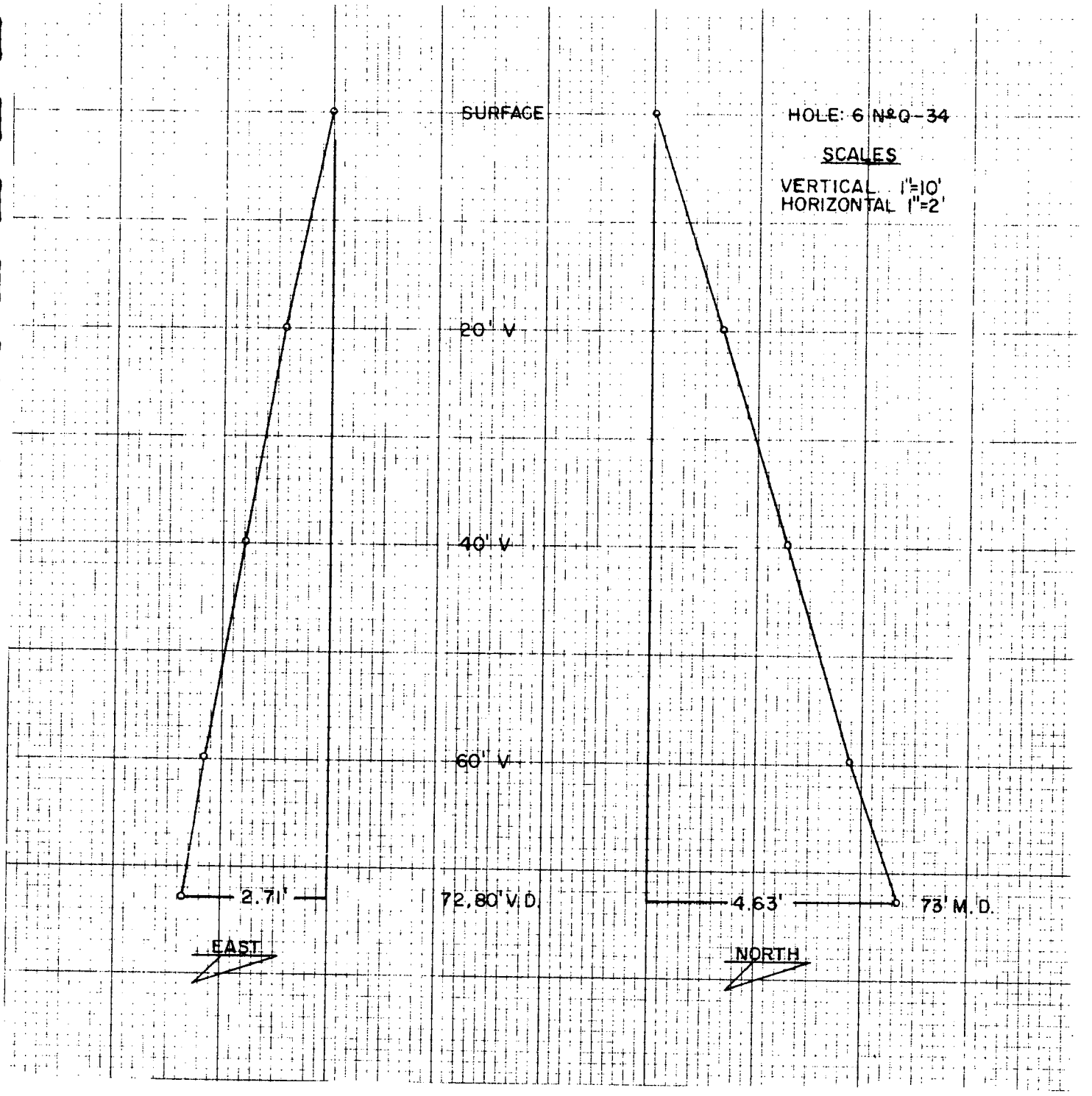
RECORD OF SURVEY

ANGLE AVERAGING METHOD

MEASURED DEPTH FEET	DRIFT ANGLE D M	DRIFT DIRECTION D	TRUE VERTICAL DEPTH FEET	VERTICAL SECTION FEET	RECTANGULAR COORDINATES FEET	
0.	4 25	N 32 W	0.00	0.00	0.00	0.00
NORTH FOR THIS SURVEY IS "PLANT NORTH", N 57 00 W						
20.	4 25	N 32 W	19.94	1.54	1.31 N	0.82 W
40.	4 5	N 31 W	39.89	3.02	2.57 N	1.59 W
60.	4 0	N 29 W	59.84	4.43	3.79 N	2.30 W
73.	4 15	N 23 W	72.80	5.36	4.63 N	2.71 W

FINAL CLOSURE - DIRECTION: N 30 DEGS 17 MINS 31 SECS W
DISTANCE: 5.36 FEET


N
Eastman Whipstock
SCALE
1"=2'
DEPTH- 73'
NORTH- 4.63'
WEST - 2.71'
CLOSURE- 5.36' N 30° 17' 31" W
HOLE: 6 Nº Q-34
JOB Nº P-0978-G0026


SURFACE
HOLE: 6 N&Q-34
SCALES
VERTICAL 1"=10'
HORIZONTAL 1"=2'
20' V
40' V
60' V
2.71'
72.80' V.D.
4.63'
73' M.D.
EAST
NORTH

APPENDIX B

This appendix presents graphic logs of the 74 exploration/grouting holes drilled from July 25 through October 13, 1978.

Logging of the holes was performed by qualified Bechtel geotechnical personnel. Original logs of the holes were completed and checked in the field and will be retained in the Hydro and Community Facilities Division, Geotechnical Services files.

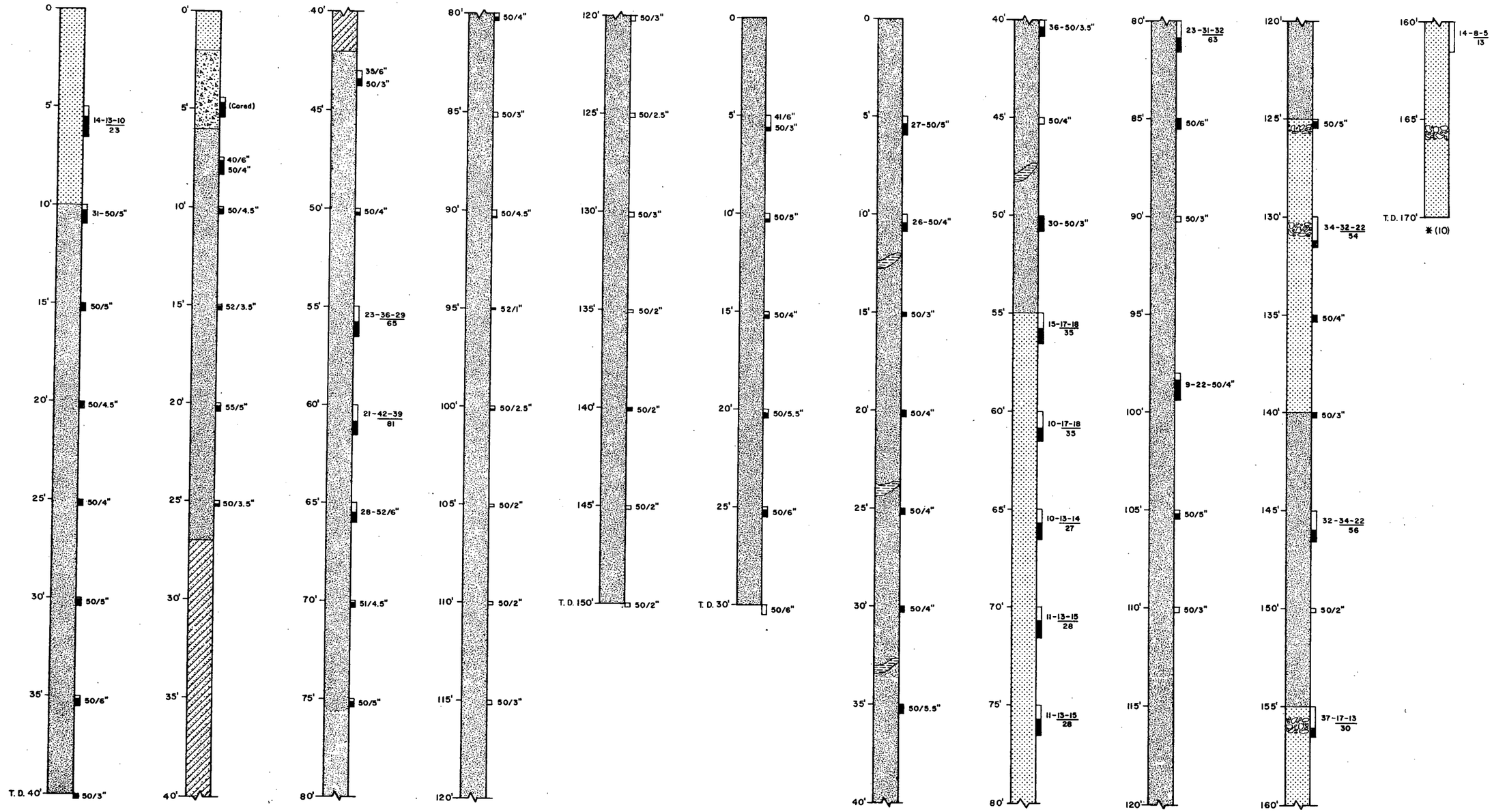
APPENDIX B

EXPLORATION/GROUT HOLES - WELL NO. 6

Hole #	Total Depth (Ft.)	Stage	Coordinates	
			S	W
E 9	17	1	20 + 83	2 + 45
Em 4A	80	1	20 + 84	2 + 50
Em 13	70	1	20 + 84	2 + 41
F 4	80	1	20 + 85	2 + 50
F 6	125	1	20 + 85	2 + 48
F 7	100	1	20 + 85	2 + 47
F 30	80	1	20 + 85	2 + 24
G 9.5	40	1	20 + 87	2 + 44.5
G 11A	150	1	20 + 87	2 + 43
Gm 11	21	1	20 + 88	2 + 43
Gm 19	90	1	20 + 88	2 + 35
H 4	45	1	20 + 89	2 + 50
H 7	75	1	20 + 89	2 + 47
H 9	90	1	20 + 89	2 + 45
H 14A	90	1	20 + 89	2 + 40
H 15	60	1	20 + 89	2 + 39
H 30	60	1	20 + 89	2 + 24
Hm 10	70	1	20 + 90	2 + 44
Hm 13A	85	1	20 + 90	2 + 41
Hm 18	150	1	20 + 90	2 + 36
J 5.6	100	1	20 + 91	2 + 48.4
J 8	55	1	20 + 91	2 + 46
J 12	31.5	1	20 + 91	2 + 42
J 17	50	1	20 + 91	2 + 37
J 21	150	1	20 + 91	2 + 33
J 25	70	1	20 + 91	2 + 29
Jm 5	70	1	20 + 92	2 + 49
Jm 29	75	1	20 + 92	2 + 25
K 17	145	1	20 + 93	2 + 37
K 31	60	1	20 + 93	2 + 23
K 34	60	1	20 + 93	2 + 20
Km 4	40	1	20 + 94	2 + 50
Kr 13	70	1	20 + 94.5	2 + 41

Hole #	Total Depth (Ft.)	Stage	Coordinates S	Coordinates W
L 8	100	1	20 + 95	2 + 46
L 10	100	1	20 + 95	2 + 44
L 17	100	1	20 + 95	2 + 37
L 25	25	1	20 + 95	2 + 29
Lm 4A	40	1	20 + 96	2 + 50
Lm 24	135	1	20 + 96	2 + 30
M 14	40	1	20 + 97	2 + 40
M 21A	150	1	20 + 97	2 + 33
M 22	30	1	20 + 97	2 + 32
M 28	170	1	20 + 97	2 + 26
M 30	100	1	20 + 97	2 + 24
Mm 17.3	80	1	20 + 98	2 + 36.9
Mn 27	32	1	20 + 98	2 + 27
N 25	120	1	20 + 99	2 + 29
N 30	160	1	20 + 99	2 + 24
Nm 19	40	1	21 + 00	2 + 35
Nm 21	150	1	21 + 00	2 + 33
O 34	75		21 + 01	2 + 20
Dm 16	90	2	20 + 82	2 + 38
Dm 22	130	2	20 + 82	2 + 32
F 18	80	2	20 + 85	2 + 36
G 26.5	80	2	20 + 87	2 + 27.5
G 32	160	2	20 + 87	2 + 22
Hm 14	120	2	20 + 90	2 + 40
K 9	110	2	20 + 93	2 + 45
K 11	90	2	20 + 93	2 + 43
L 9	130	2	20 + 95	2 + 45
Mm 18.5	90	2	20 + 98	2 + 35.5
Nm 14	160	2	21 + 00	2 + 40
Pm 25	120	2	21 + 04	2 + 29
Pm 29	120	2	21 + 04	2 + 25
Q 34	80	2	21 + 05	2 + 20

Hole #	Total Depth (Ft.)	Stage	Coordinates S	Coordinates W
Em 6	60	3	20 + 84	2 + 48
G 5	100	3	20 + 87	2 + 49
G 8	80	3	20 + 87	2 + 46
Hm 8	90	3	20 + 90	2 + 46
Jm 15	75	3	20 + 92	2 + 39
K 14	69	3	20 + 93	2 + 40
K 19	150	3	20 + 93	2 + 35
L 31.5	100	3	20 + 95	2 + 22.5
Lm 15	90	3	20 + 96	2 + 39

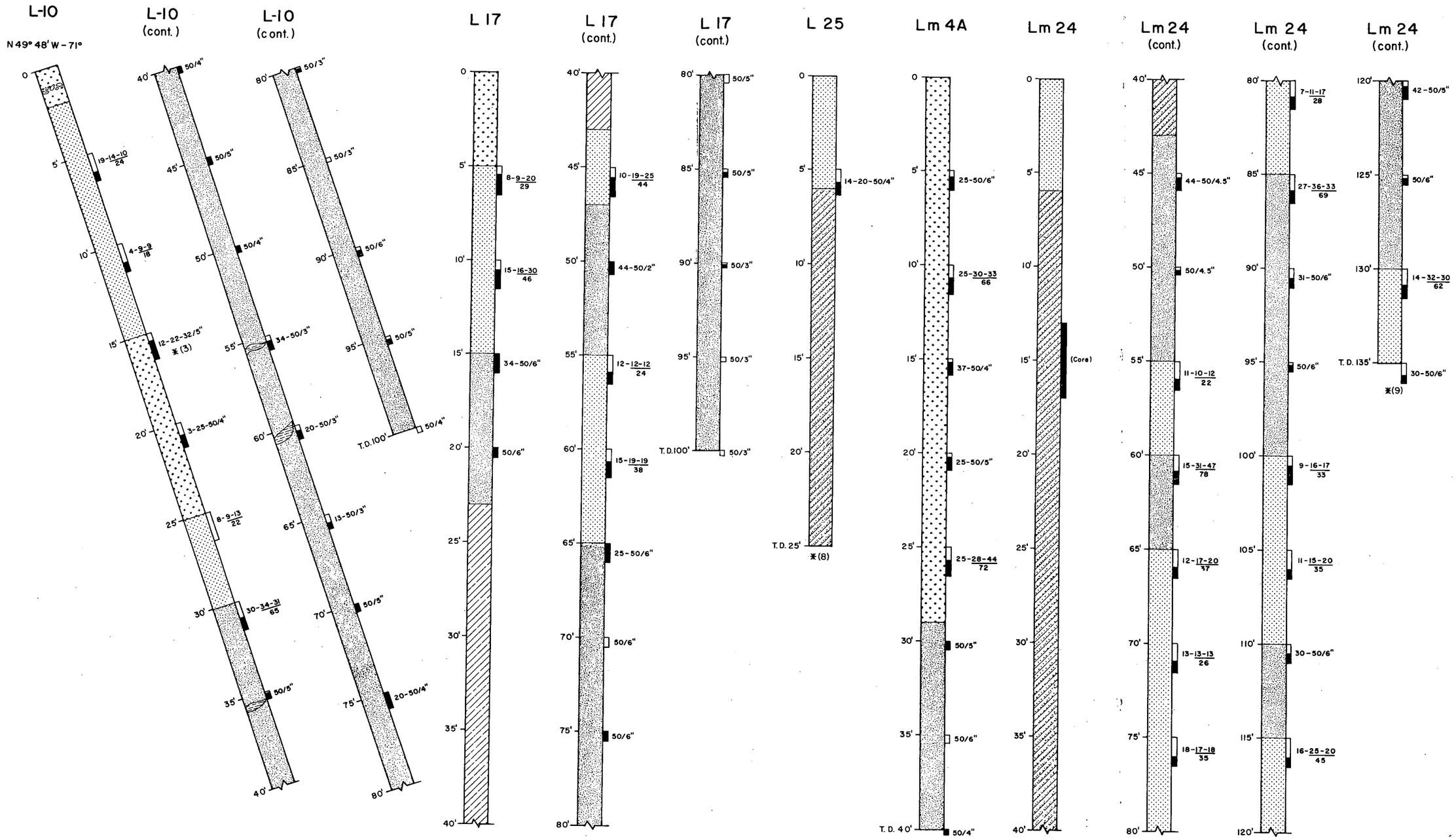


For explanation of symbols, footnotes (*) and notes see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B
SHEET No. 9 OF 11	GRAPHIC LOGS - STAGE I
SCALE N.T.S.	SOUTHERN CALIFORNIA EDISON COMPANY LOS ANGELES, CALIF.

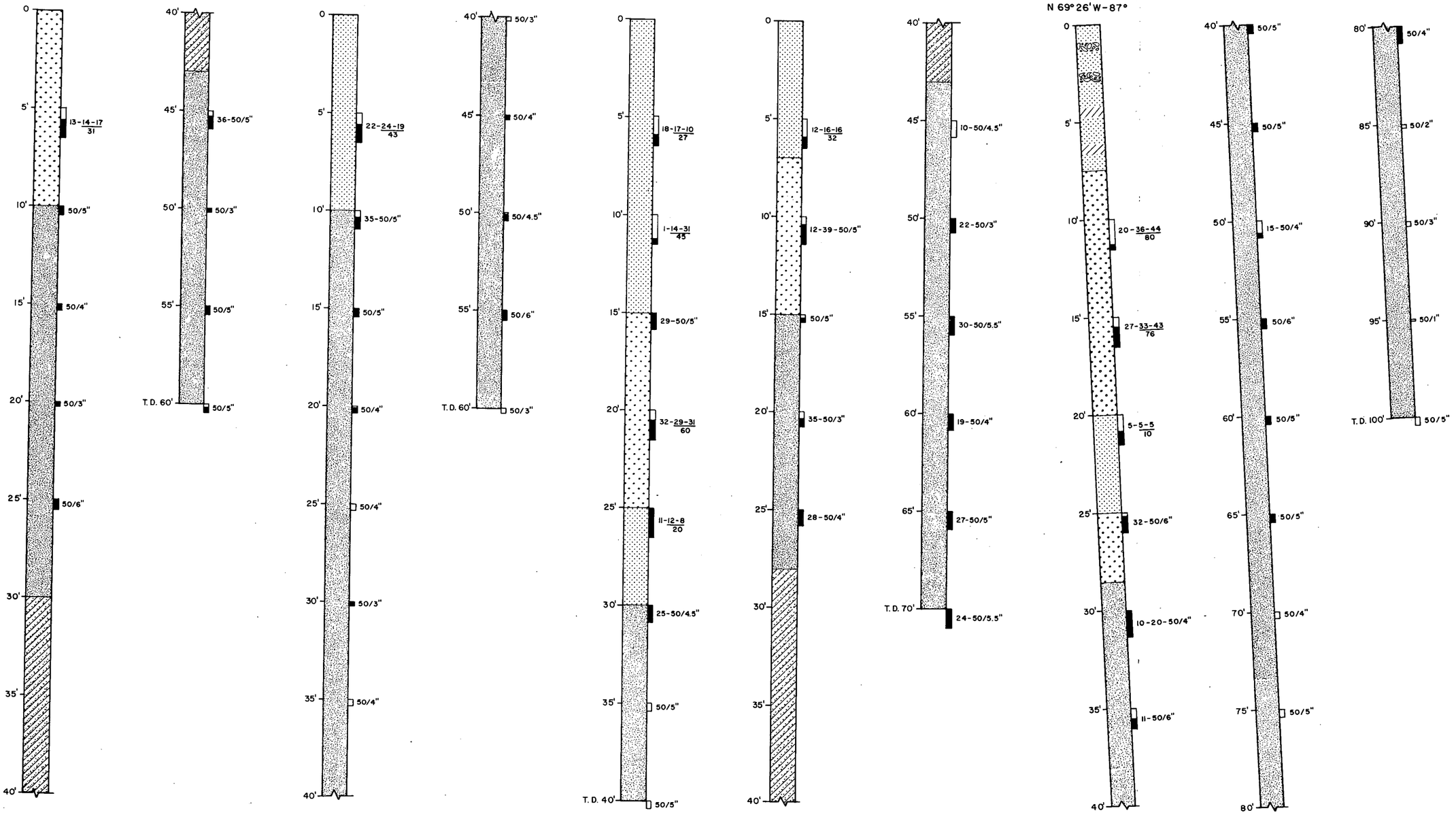


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J. O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B
SHEET No. 8 OF 11	GRAPHIC LOGS - STAGE I
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

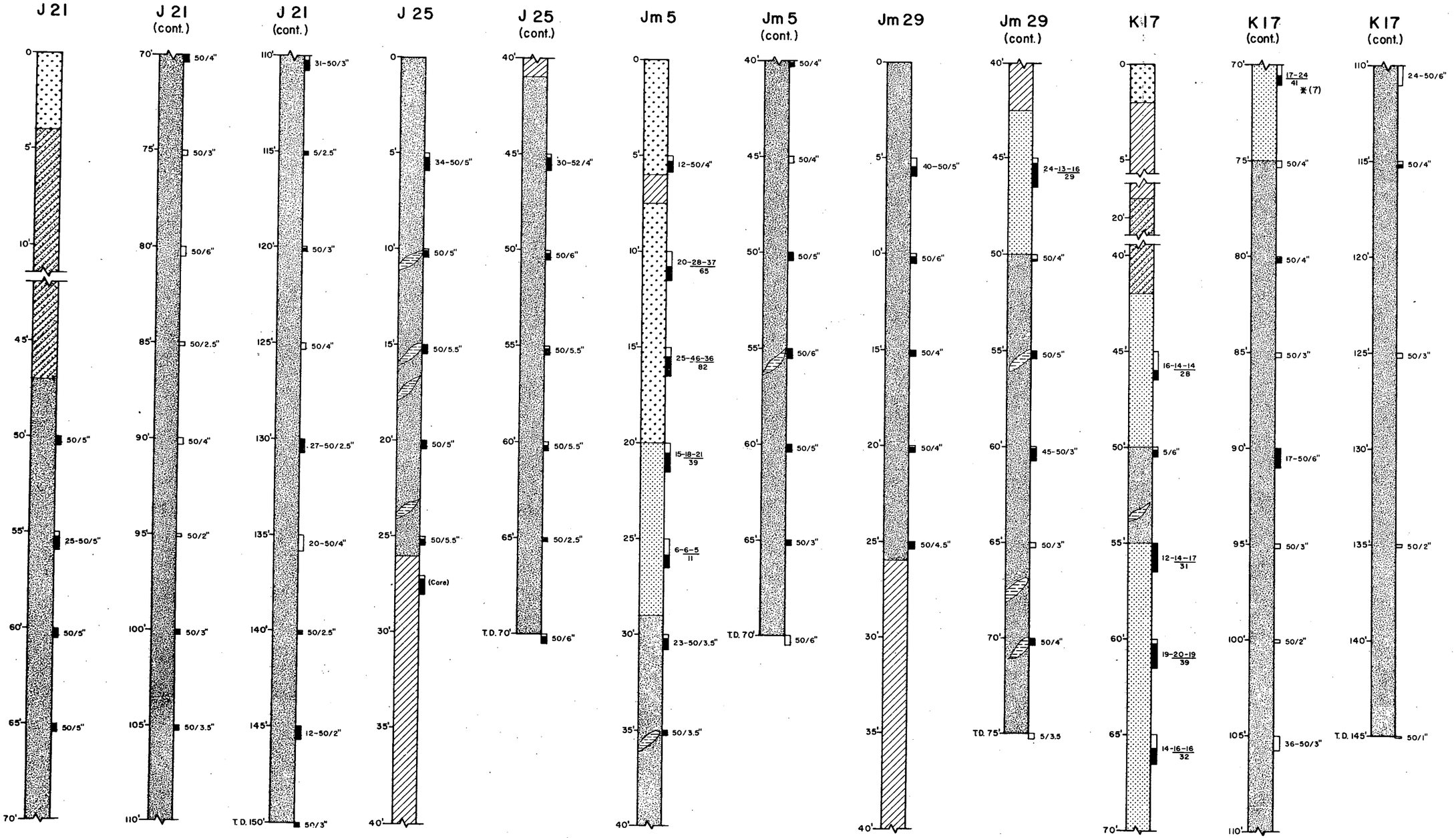


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO. 10079-003	DATE DEC. 1978	APPROVED

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No. 7 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

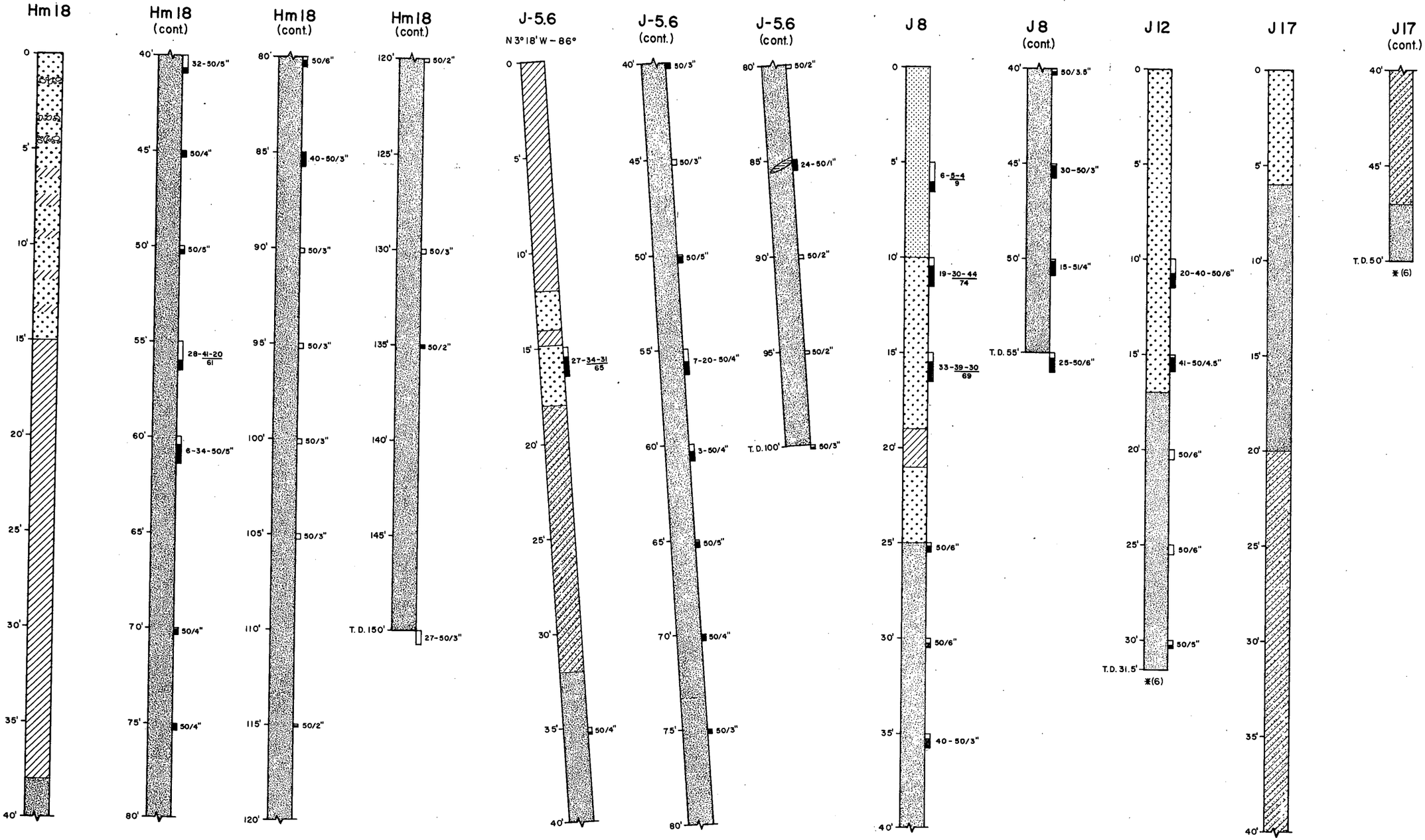


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS – STAGE I
SHEET No. 6 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



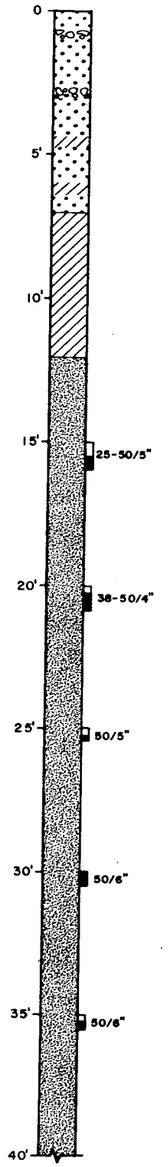
For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

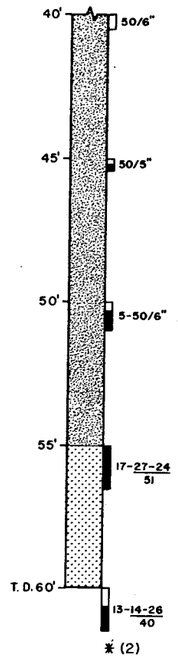
BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO. 0079-003	DATE DEC. 1978	APPROVED

J. O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No. 5 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

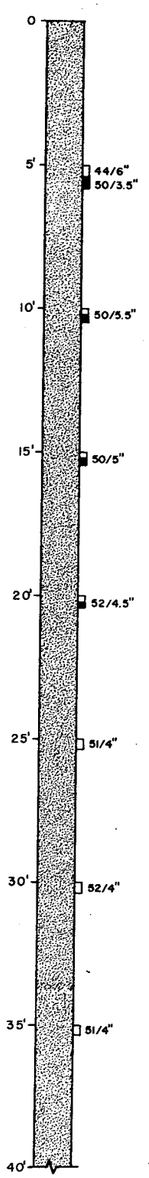
H 15



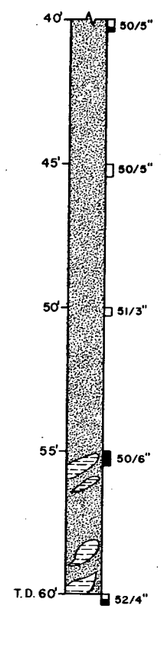
H15 (cont.)



H 30

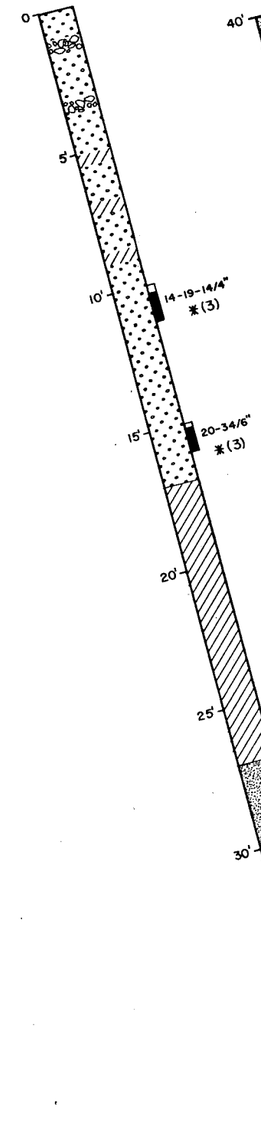


H 30 (cont.)

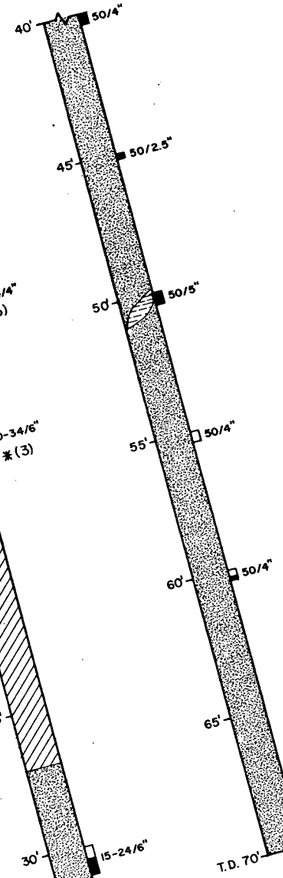


Hm 10

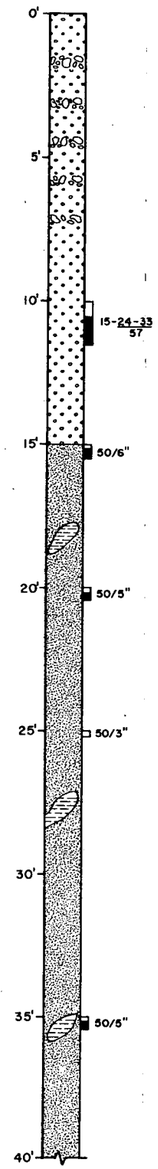
N 45° 30' W - 75°



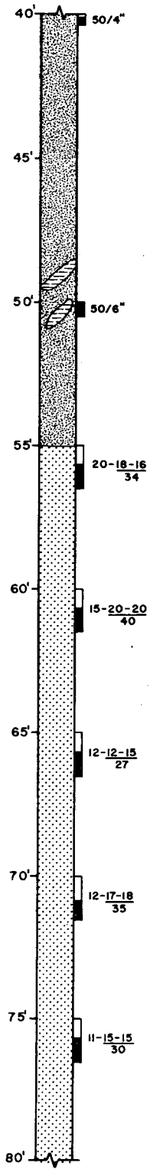
Hm 10 (cont.)



Hm 13A



Hm 13A (cont.)



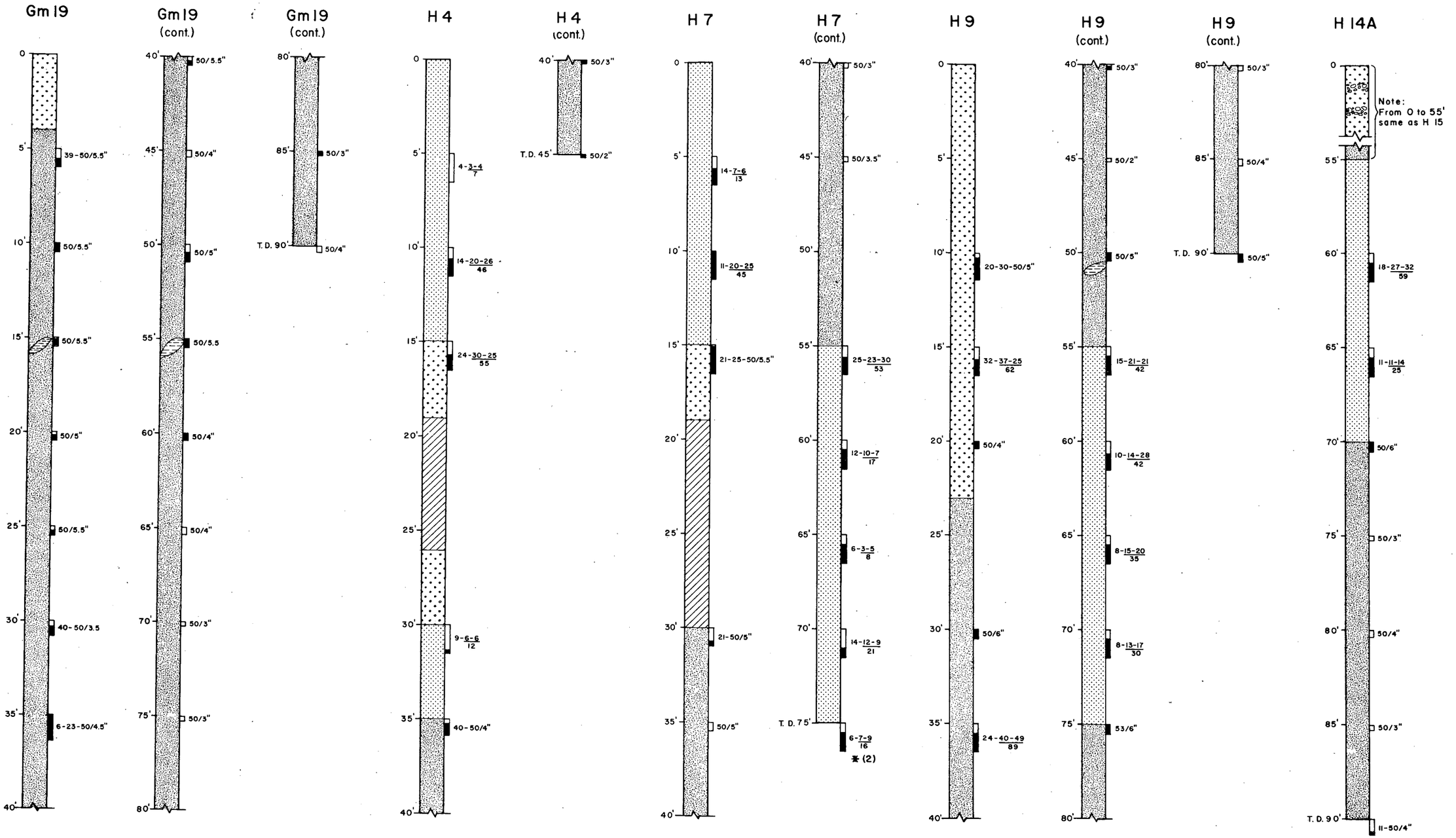
Hm 13A (cont.)

For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No. 4 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

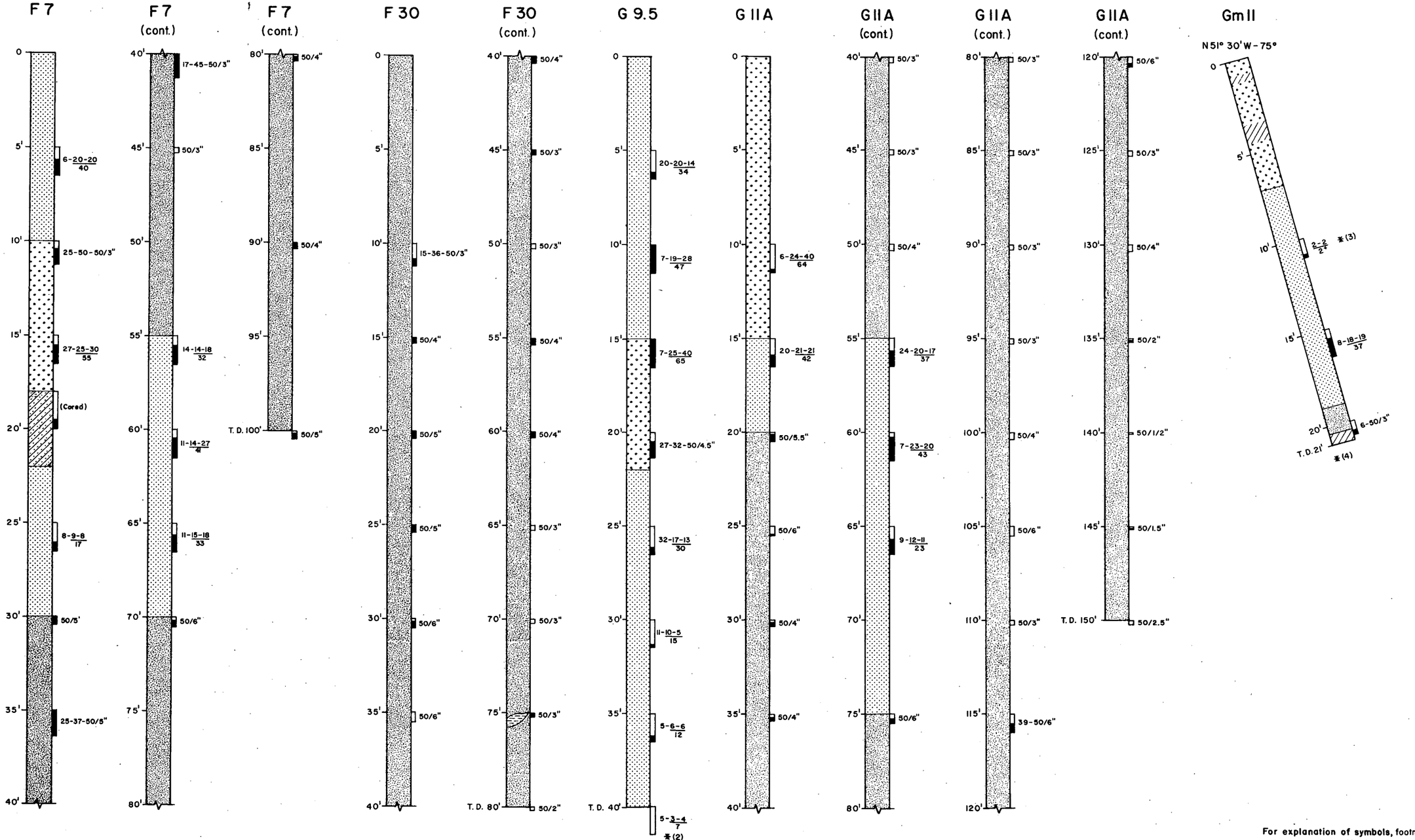


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No. 3 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

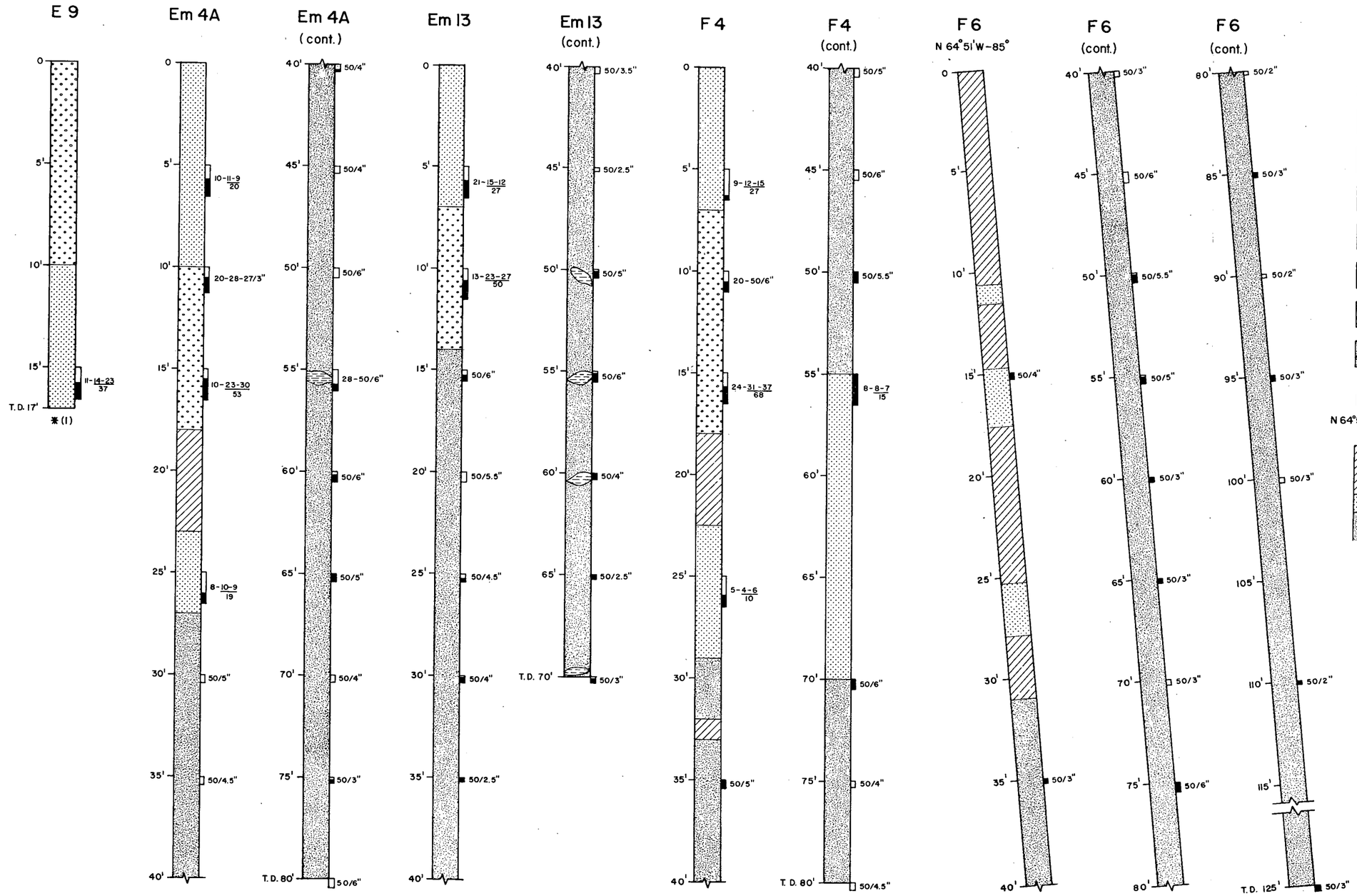


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J. O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No. 2 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



EXPLANATION OF SYMBOLS

- Backfill sand
- Backfill concrete
- Gravel
- Grout (G-3)
- Grout (undiff.)
- Disturbed sand
- San Mateo Formation
- Siltstone (Fragments and lenses within San Mateo Formation)

NOTE:

F 6 — Drill hole number

N 64°51' W-85° — Bearing of angle hole - reference to plant north with dip angle from horizontal

CORED INTERVAL — darkened interval indicates core recovery

BLOW COUNTS WITH SPLIT SPOON SAMPLER

- $8\text{-}\frac{12\text{-}14}{26}$ — blows/6" — $\frac{\text{blows/6"} - \text{blows/6"}}{\text{total blows for last 12"}}$
- 40-50/5" — blows/6" — blows/interval noted
- 50/4" — blows/interval noted

darkened interval indicates sample recovery

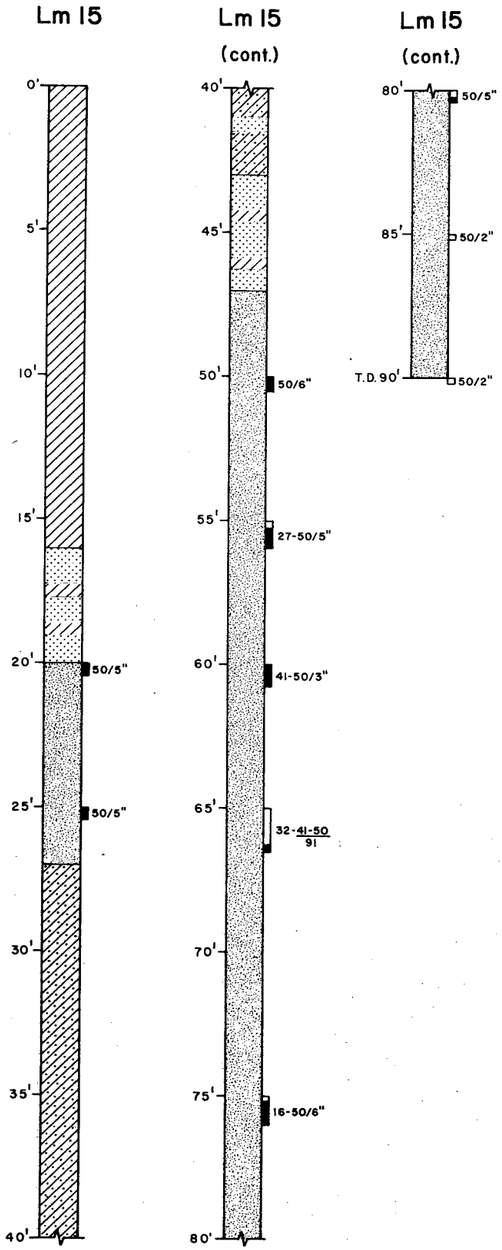
STAGE I — FOOTNOTES (*)

1. Hole terminated due to Revert drilling fluid running into Fuel Handling Building.
2. Hole terminated due to communication with another hole.
3. Unable to drive sampler full 18" because of interference with hammer.
4. Unable to advance hole through grout and metal.
5. Hole terminated at design depth.
6. Lost casing in hole; couldn't advance
7. Driller error in advancement of sampler.
8. Pipe wrench fell in hole; couldn't advance.
9. Lost circulation in well gravels; terminated hole.
10. Due to excessive water loss and caving, hole was terminated to avoid losing casing.
11. Blow counts inaccurate; taken in at least 12" of cuttings.
12. Hole sanded in; could not take accurate blow counts

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

UNITS 2&3

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No. 1 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S LOS ANGELES, CALIF.

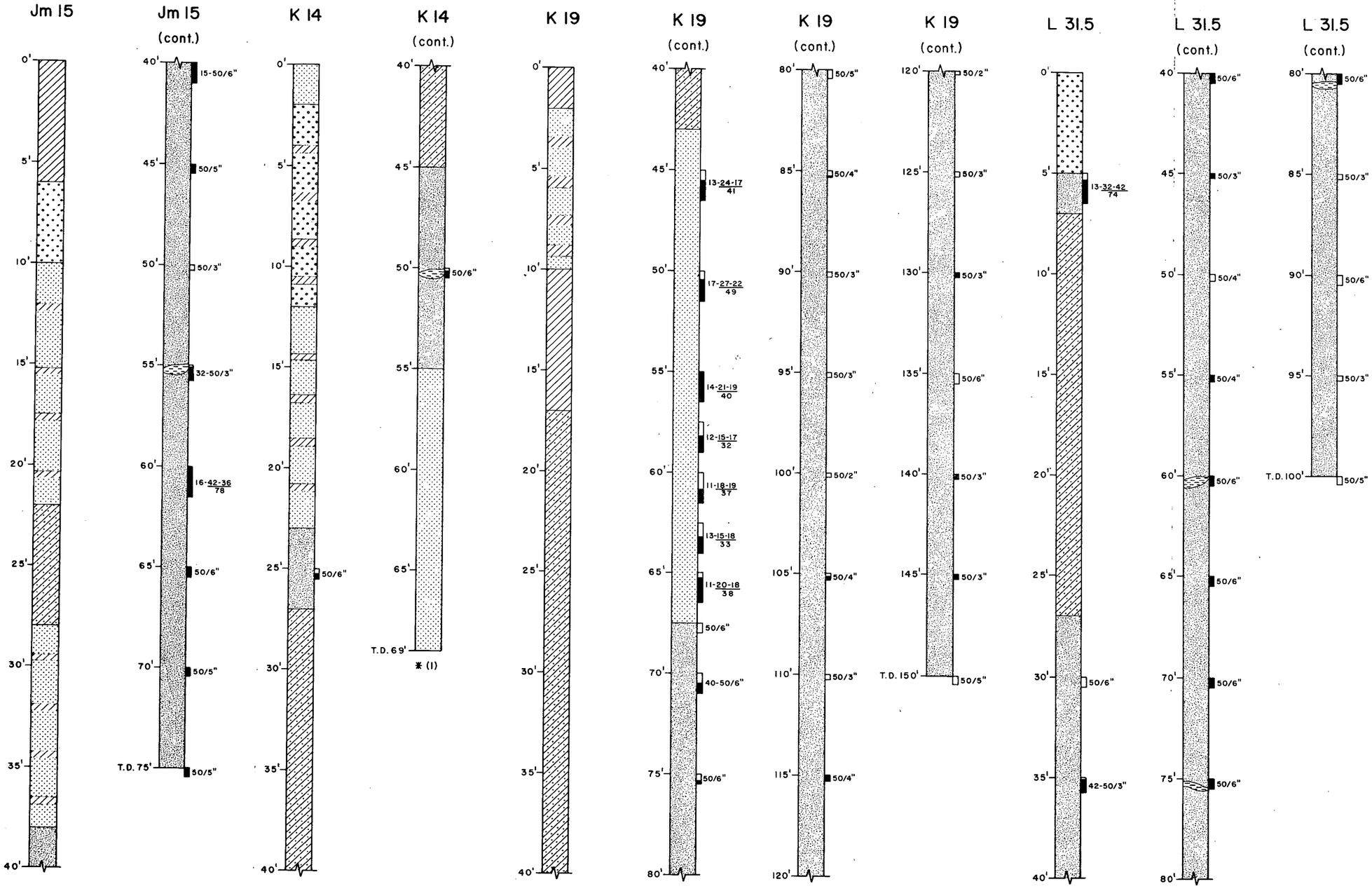


For explanation of symbols, footnote (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B
SHEET No. 3 OF 3	GRAPHIC LOGS - STAGE III
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

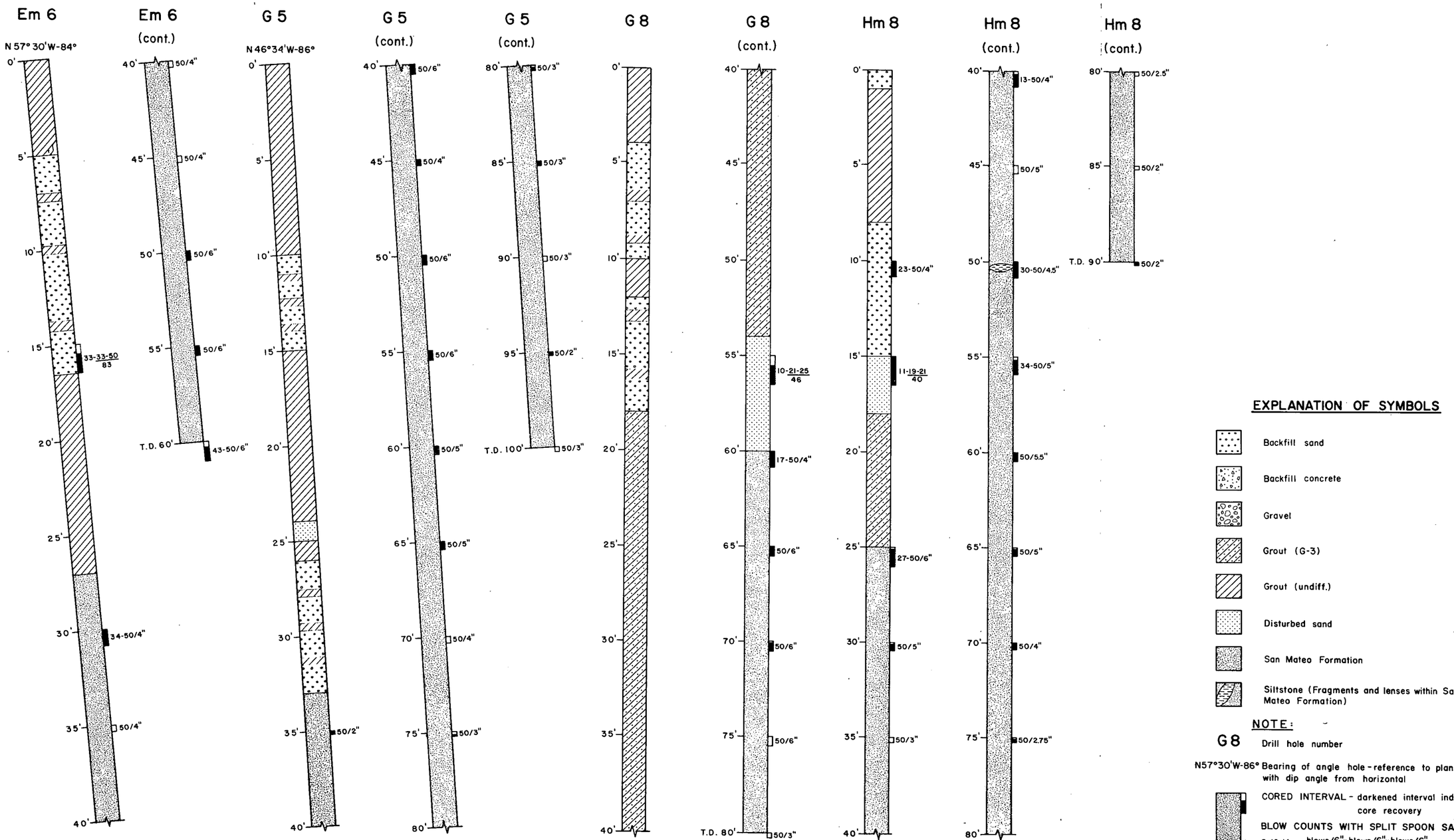


For explanation of symbols, footnote. (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B
SHEET No. 2 OF 3	GRAPHIC LOGS - STAGE III
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



STAGE III – FOOTNOTE (*)

1. Hole terminated due to communication with another hole.

EXPLANATION OF SYMBOLS

- Backfill sand
- Backfill concrete
- Gravel
- Grout (G-3)
- Grout (undiff.)
- Disturbed sand
- San Mateo Formation
- Siltstone (Fragments and lenses within San Mateo Formation)

NOTE:

G8 — Drill hole number

N57°30'W-86° — Bearing of angle hole - reference to plant north with dip angle from horizontal

CORED INTERVAL - darkened interval indicates core recovery

BLOW COUNTS WITH SPLIT SPOON SAMPLER

8-12-14 / 26 — blows/6"-blows/6"-blows/6" total blows for last 12"

40-50/5" — blows/6"-blows/interval noted

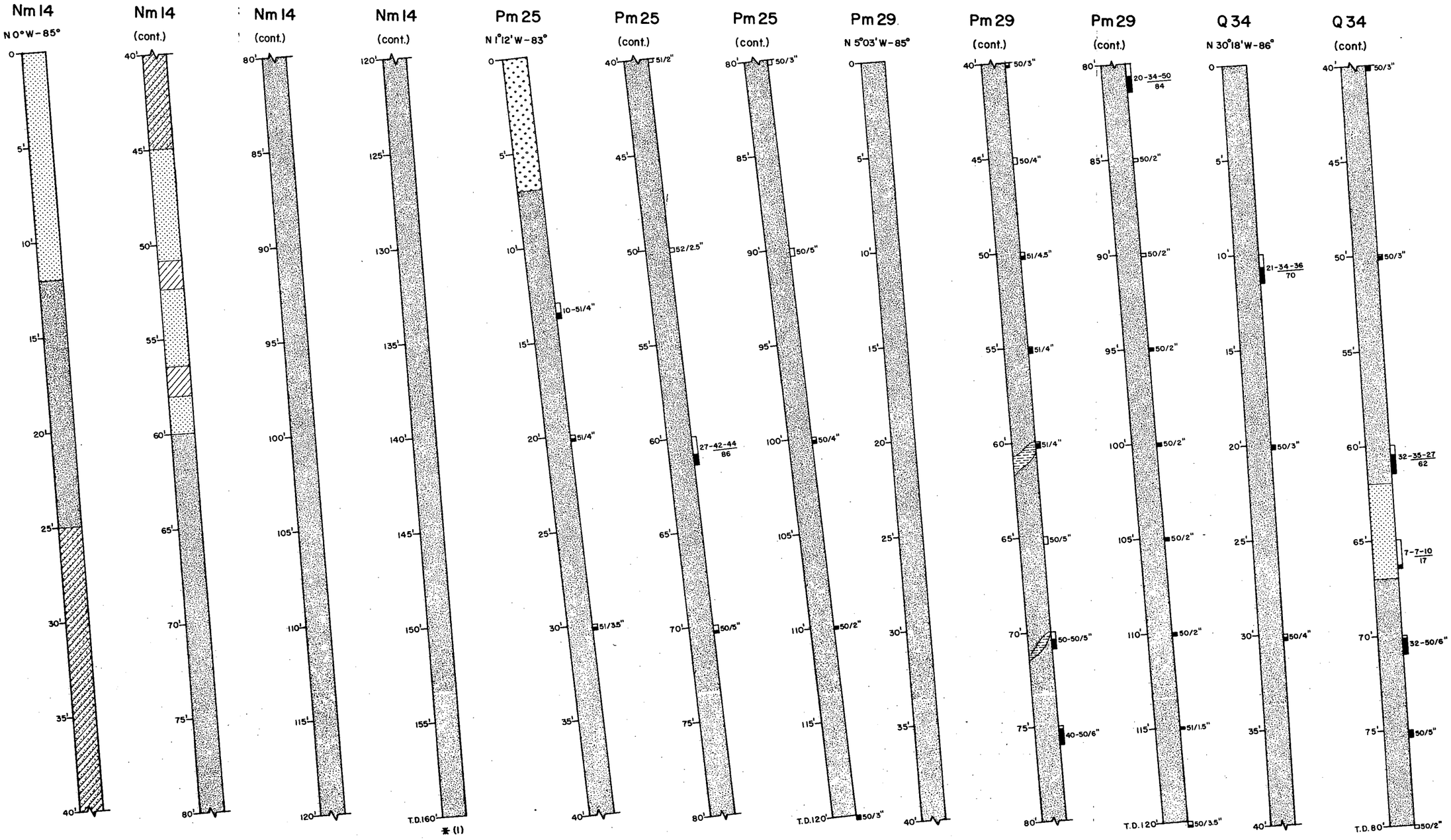
50/4" — blows/interval noted

darkened interval indicates sample recovery

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B
SHEET No. 1 OF 3	GRAPHIC LOGS - STAGE III
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



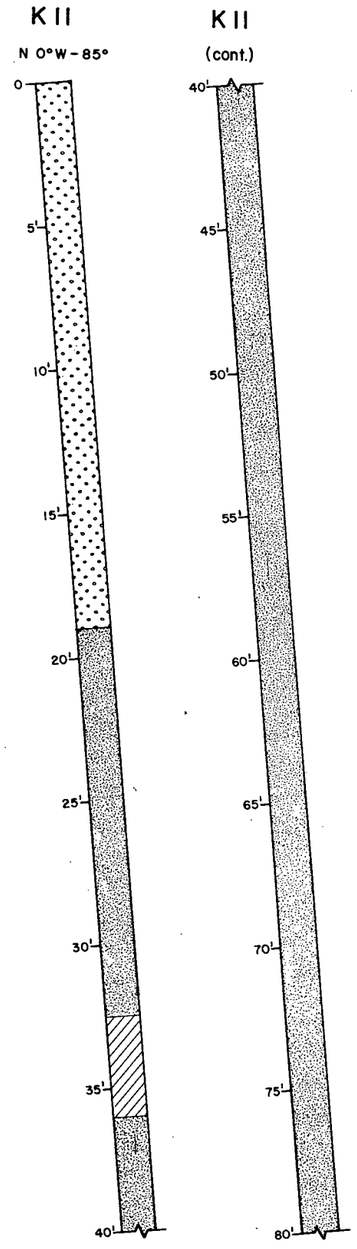
(1)

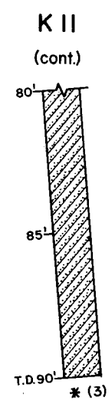
For explanation of symbols, footnotes (*) and notes, see sheet No. 1

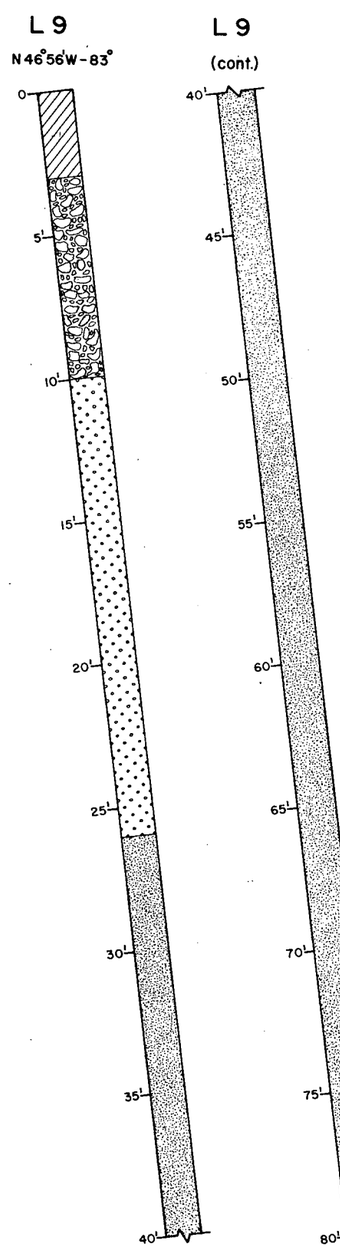
UNITS 2 & 3

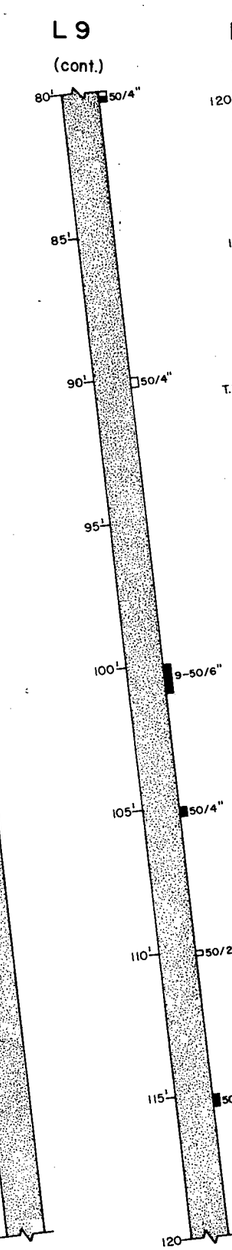
BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

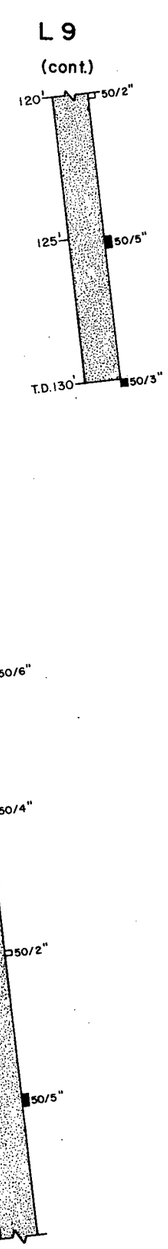
J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE II
SHEET No. 4 OF 4	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

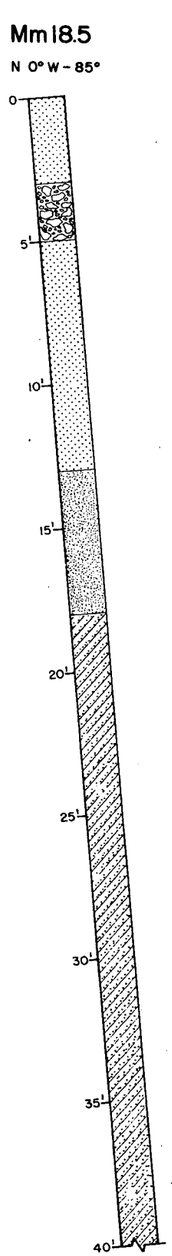


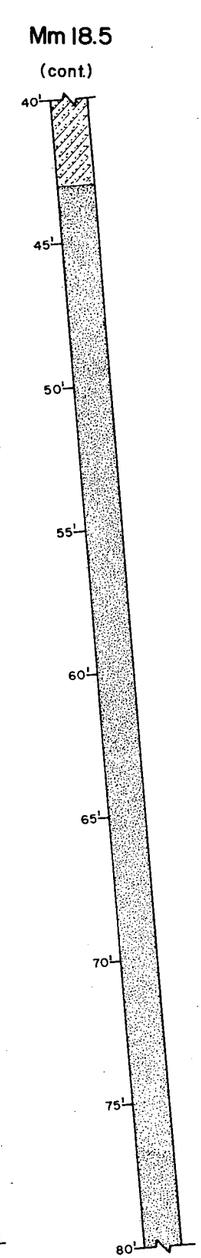


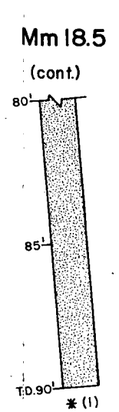










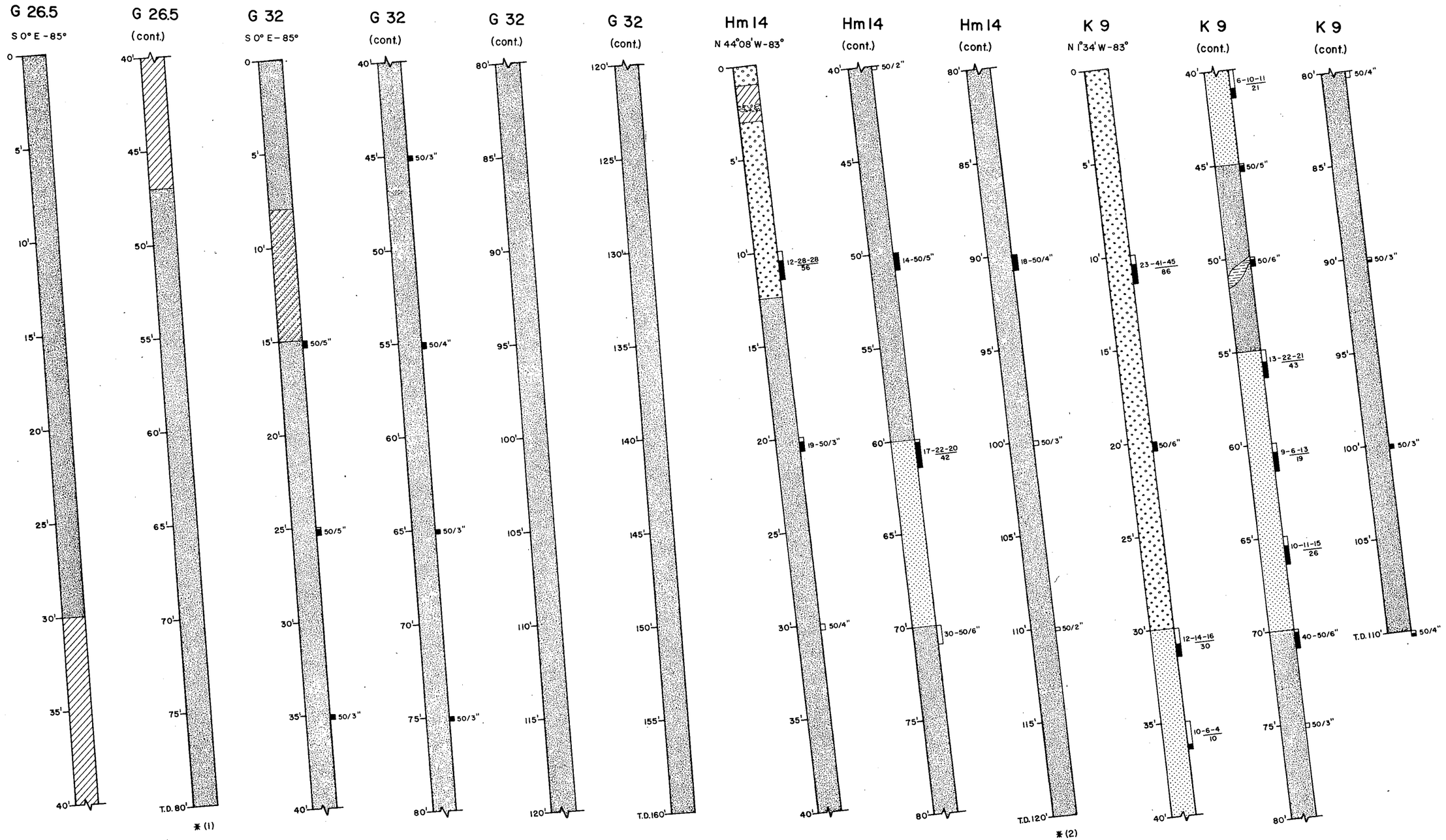


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE II
SHEET No. 3 OF 4	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

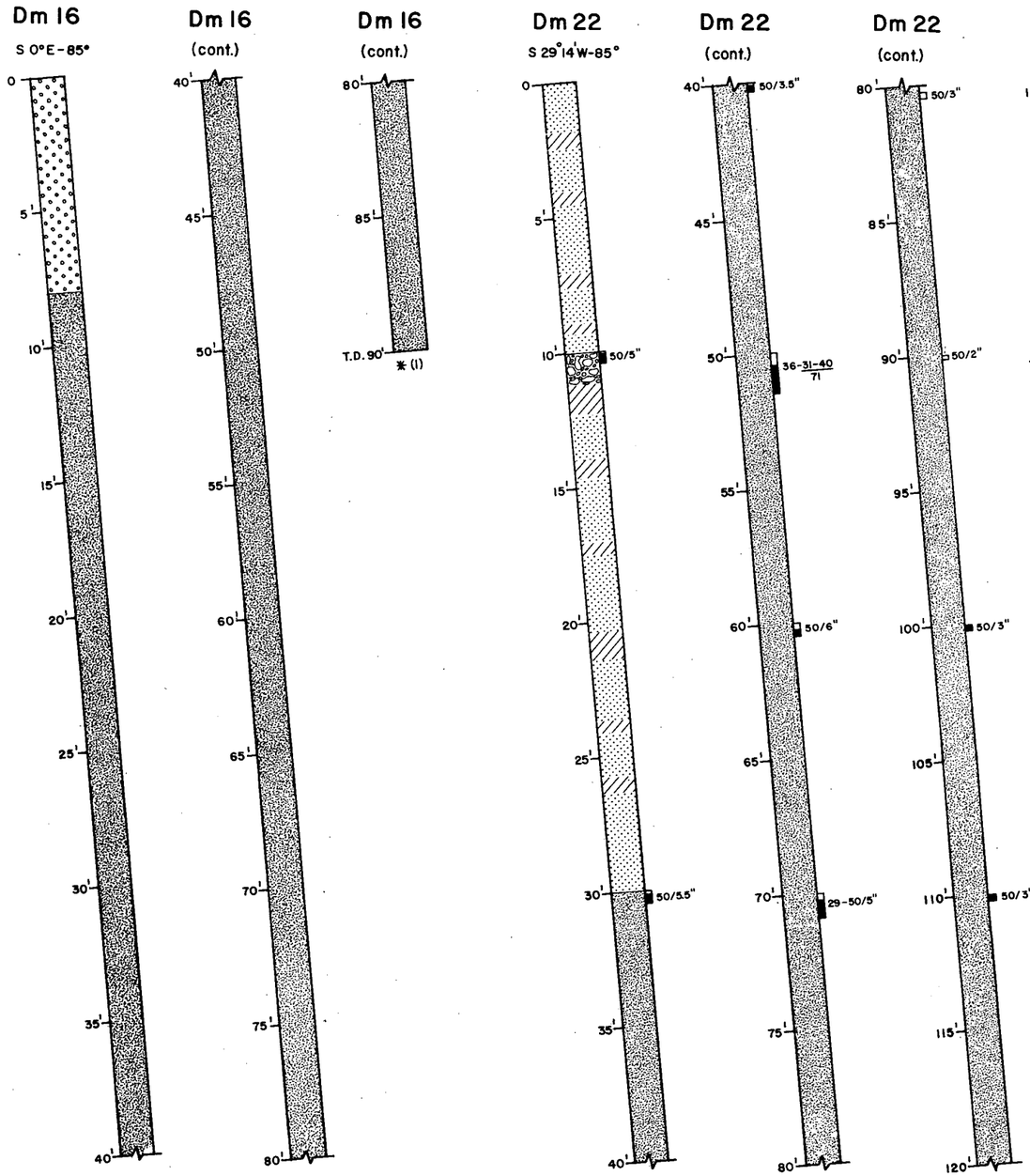


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS-STAGE II
SHEET No. 2 OF 4	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



EXPLANATION OF SYMBOLS

- Backfill sand
- Backfill concrete
- Gravel
- Grout (G-3)
- Grout (undiff.)
- Disturbed sand
- San Mateo Formation
- Siltstone (Fragments and lenses within San Mateo Formation)

NOTE:

F 18 — Drill hole number

S44°03'W-70° — Bearing of angle hole reference to plant north with dip angle from horizontal

CORED INTERVAL darkened interval indicates core recovery

BLOW COUNTS WITH SPLIT SPOON SAMPLER

8-12-14/26 — blows/6"- blows/6"- blows/6" total blows for last 12"

40-50/5" — blows/6"- blows/interval noted

50/4" — blows/interval noted

darkened interval indicates sample recovery

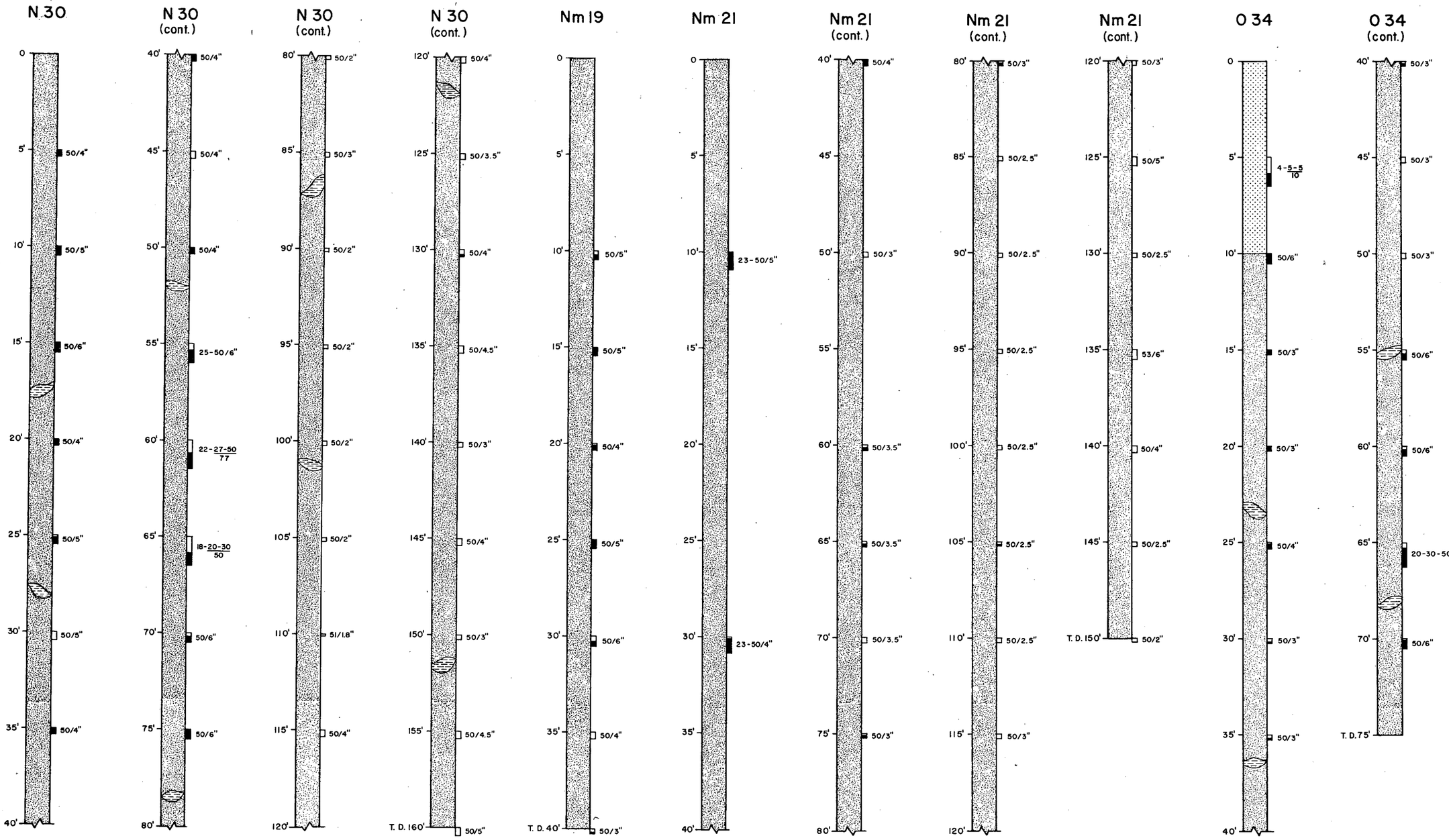
STAGE II – FOOTNOTES (*)

1. Hole drilled for grouting only; no samples taken.
2. No sample taken at bottom of hole; communication breakdown at shift change.
3. Hole drilled for grouting only; no samples taken. Hole terminated at design depth.

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B: GRAPHIC LOGS – STAGE II
SHEET No. 1 OF 4	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

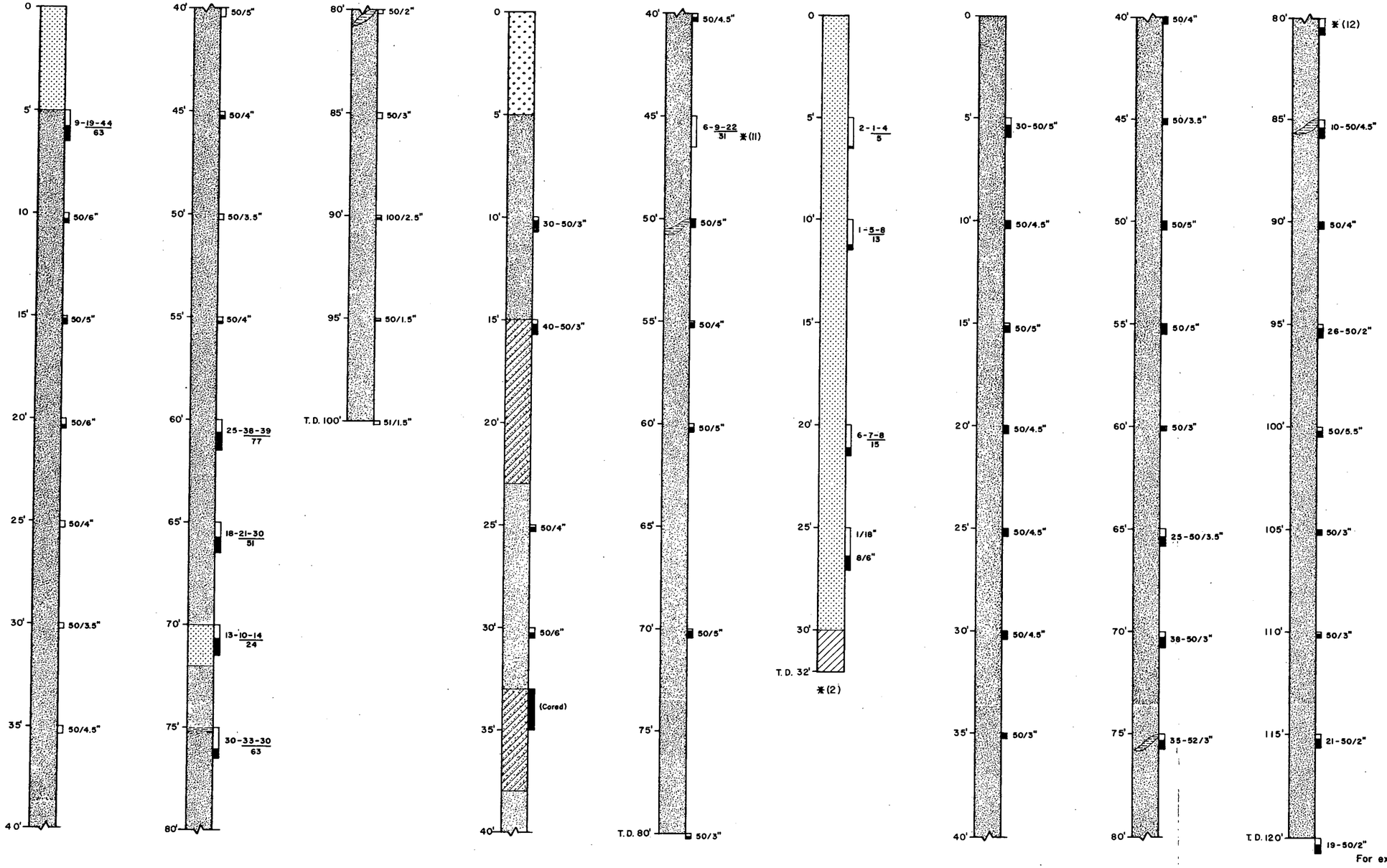


For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B
SHEET No. 11 OF 11	GRAPHIC LOGS - STAGE I
	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.



For explanation of symbols, footnotes (*) and notes, see sheet No. 1

UNITS 2 & 3

BECHTEL CORPORATION ENGINEERS & CONSTRUCTORS LOS ANGELES, CALIF.		
JOB NO.	DATE	APPROVED
10079-003	DEC. 1978	

J.O. NO.	SAN ONOFRE NUCLEAR GENERATING STATION
FILE	EXPLORATION / GROUTING PROGRAM WELL No. 6 APPENDIX B GRAPHIC LOGS - STAGE I
SHEET No.10 OF 11	SOUTHERN CALIFORNIA EDISON COMPANY SCALE N.T.S. LOS ANGELES, CALIF.

APPENDIX C

Appendix C consists of the following:

1. Table of Results of Exploration/Grouting Program at Dewatering Well No. 6.

2. Copies of original field grout logs.

   Net grout take is the total bags of cement placed in the hole, excluding waste. Waste includes surface leakage and unused grout.

   The pressures recorded are gauge pressures measured at the top of the hole.

   Grout mixes varied from 5:1 to 3/4:1. Early in the program most holes were started with 5:1 grout mix (water:cement by volume). Surface leakage commonly occurred with the 5:1 mix so the starting mix was changed to a 3:1 or 2:1 mix. If a hole took this mix readily or the desired pressure could not be reached, the mix was thickened. The thickest mix which could be pumped effectively through the perforated PVC pipe was 3/4:1 mix.

APPENDIX C

RESULTS OF EXPLORATION/GROUTING PROGRAM
DEWATERING WELL NO. 6

Hole #	Stage	Injected Take (Bags)*
E 9	1	2.0
Em 4A	1	1.3
Em 13	1	7.5
F 4	1	6.0
F 6	1	1.2
F 7	1	8.2
F 30	1	2.6
G 9.5	1	5.0
G 11A	1	28.5
Gm 11	1	4.0
Gm 19	1	3.5
H 4	1	9.0
H 7	1	-
H 9	1	6.0
H 14A	1	6.6
H 15	1	0.9
H 30	1	1.1
Hm 10	1	5.0
Hm 13A	1	1.5
Hm 18	1	7.7
J 5.6	1	3.6
J 8	1	2.5
J 12	1	1.0
J 17	1	3.7
J 21	1	0.2
J 25	1	0.5
Jm 5	1	0
Jm 29	1	19.8
K 17	1	7.8
K 31	1	1.6
K 34	1	1.2
Km 4	1	2.5
Kr 13	1	62.0

Hole #	Stage	Injected Take (Bags)*
L 8	1	6.3
L 10	1	3.3
L 17	1	9.2
L 25	1	2.0
Lm 4A	1	2.5
Lm 24	1	0
M 14	1	1.1
M 21A	1	6.6
M 22	1	3.0
M 28	1	89.5
M 30	1	6.8
Mm 17.3	1	43.7
Mn 27	1	3.0
N 25	1	0.3
Nm 19	1	0.5
Nm 21	1	1.1
N 30	1	7.9
O 34	1	4.6
Dm 16	2	7.4
Dm 22	2	5.4
F 18	2	1.4
G 26.5	2	0.2
G 32	2	5.7
Hm 14	2	4.7
K 9	2	4.2
K 11	2	4.6
L 9	2	6.0
Mm 18.5	2	1.9
Nm 14	2	3.5
Pm 25	2	1.6
Pm 29	2	6.3
Q 34	2	2.3

Hole #	Stage	Injected Take (Bags)*
Em 6	3	1.2
G 5	3	4.1
G 8	3	6.0
Hm 8	3	3.9
Jm 15	3	3.3
K 14	3	0.1
K 19	3	14.4
L 31.5	3	6.5
Lm 15	3	0.2
	TOTAL	500.3 bags

*One bag is 94 pounds dry weight of cement.

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: E-9

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-22-78	0-17			1:1						Backfilled 1:1 mix
								2		Carryover 9 bags from JM-5.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 49 bags
WASTE: 7 bags
NET TAKE IN HOLE: 2 bags

INSPECTOR J. Wallerson
REVIEWED BY Robert G. Blackburn

Casing in Hole 80' Ft. 70' perforated 10' solid
Type Casing 1½" PVC
Rep/Contractor Bentley

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: Em-4A

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-1-78	0-80			Fastbreak			—	—		Washed hole - tremie method.
			15	3:1	9:35	10.5	—	—		Carryover 6.4 bags.
				3:1	9:40	8.4		0.7		
			25	3:1	9:47	10.0				
			30	3:1	9:50	8.5				
		30	30	3:1	10:00	8.0		0.6		
										Backfilled with 1:1 mix
										tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.3 bags
WASTE: — bags
NET TAKE IN HOLE: 1.3 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Depth 70' E.

Type Casing 1½" PVC

Rep/Contractor BPC

GROUTING LOG

SONIC UNITS 2 & 3

Location: WELL 6

Hole No: EM-13

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS** MIXED	REMARKS
8-25-78	0-70			H_2O	1005					Washed hole with 3/4" pipe
				Fast break	1040					Added fast break to wash water
		10	10	5:1	1350			2	2	Grouted hole from surface to 70'
		10	30	5:1	1405			2	2	
		20	30	3:1	1413			2	2	
		20	20	3:1	1415			1	2	Leakage from surface at const.
		0	0	1:1						joint between unit 2 & E H. Bldg
										Stopped grouting.
		—	—	1:1	1650			½		Backfilled with 1:1 mix from surface
				1:1	1710			0	3+(3)	Mix 3 sacks backfill

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 7½ bags

WASTE: 6 bags

NET TAKE IN HOLE: 7½ bags

INSPECTOR P. Yon (EPC)

REVIEWED BY Robert G. Bloodworth

**( ) carry over from previous hole

Casing in Hole 40' Ft.
Type Casing 1½" PVC
Rep/Contractor BECHTEL POWER CORP.

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: WELL 6
Hole No: F-4

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-16-78	0-20			FAST BREAK	1000					Washed hole
"	0-20	10	10	5:1	1038	9.0 ft³			2	
"	0-20	10	20	5:1	1055	8.5		1	—	Moved to grout H-4 because F-4 had no take.
"	0-20	0	5	1:1	1230	—		3½	CARRYOVER	GROUTED HOLE WITH 1:1 MIX
"	"	10	20	1:1	1325			1	4	REFUSED MOVE TO H-4
"	0	0	0	1:1	1625	—		½		BACKFILL FROM SURFACE

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6 bags
WASTE: — bags
NET TAKE IN HOLE: 6 bags

INSPECTOR [illegible] 8/16/78
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Job No. [redacted]
Location: Well 6
Hole No: F-6
Stage 1

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-2-78	0-125			Fast break						Washed hole - tremie method
	0-125	10		3:1	11:29	9.0	—	—	—	Carryover 6.6 bags from Dm-22.
			10	3:1	11:35	7.0				
		20	20	3:1	11:38	5.6				
			20	3:1	11:41	5.0		1.1		
			20	3:1	11:42	8.0				
		30	35	3:1	11:46	7.7		0.1		
		40	50	3:1	11:50	7.0		(0.2) waste		Surface leakage @ 40 psi. Unable to grout further.
										Carryover 5.2 bags to backfill.
										Backfilled 1:1 mix using tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.4 bags
WASTE: 0.2 bags
NET TAKE IN HOLE: 1.2 bags

INSPECTOR John E. Wallerone
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [redacted]
Location: Well 6
Hole No: F-7

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
4-7-78	0-100			Fast break						Washed hole - tremie method
	0-100		0	3:1	9:55	8.9	—	—	6	
						[redacted]		6.0		Had to repair leak in line
		0	10	3:1	10:15	8.8	—	—	6	
			20	3:1	10:18	5.0		- 1.1		
		25	30	3:1	10:20	8.5				
		30	35	3:1	10:24	8.0				
		35	40	3:1	10:26	6.5				
			40	3:1	10:30	5.3		0.9		
		40	40	3:1	10:31	8.2				
			40	3:1	10:36	7.9				
		40	40	3:1	10.41	7.5		0.2		
										3.8 Carryover [redacted] bags to F-18.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 8.2 bags
WASTE: — bags
NET TAKE IN HOLE: 8.2 bags

INSPECTOR J. Gallegos
REVIEWED BY Robert H. Blackmon

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: F-30

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-19-78	0-80			Fastbreak						Washed hole - tremie method
		10	10	3:1	11:36	6.0				Carryover 5.7 bags from L-17.
				3:1	11:38	2.0		1.2		
			10	3:1	11:40	8.0				
				3:1	11:43	6.0		0.6		
					11:44	8.5				
			20	3:1	11:50	6.0				
			20	3:1	11:54	4.5				
		20	20	3:1	11:57	8.5	—	—	6	
			25	3:1	12:02	6.5				
			30	3:1	12:09	6.0				
			40	3:1	12:16	6.0				
			45	3:1	12:21	5.8		0.8		

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 2.6 bags
WASTE: - bags
NET TAKE IN HOLE: 2.6 bags

INSPECTOR J. Gallerani
REVIEWED BY Robert E. Rodenbaugh

Casing in Hole 45 Ft.
Type Casing 1½" PVC
Rep/Contractor BECHTEL POWER CORP.

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: WELL 6
Hole No: G-9.5

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-16-78	0-40			WATER	1300					Washed hole to 40'
"	"			FAST BREAK	1350					" "
"	"	0	25	3:1	1500			3	CARRY OVER	GROUTED HOLE
"	"	10	30	1:1	1600-1620			2	5	REFUSED
										MOVED TO BACKFILL ALL
										COMPLETED HOLES WITH 1:1 MIX

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5 bags
WASTE: — bags
NET TAKE IN HOLE: 5 bags

INSPECTOR P. Yen
REVIEWED BY Robert Schwerdtfeger

Type Casing 1½" PVC 10', 3" CASING @ TOP
Rep/Contractor BPC

GROUTING LOG

SONGS UNITS 2 & 3

Job No. 10029
Location: WELL 6
Hole No: G11-A

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED**	REMARKS
8-25-78	0-150'	—	—	H_2O	0930					Washed hole with ¾" pipe
		—	—	Fast Break	1040					Injected Fast Break
		10	20	5:1	1430			3	2(+1)	Grouted hole 0-150'
		20	30	3:1	1450			2	2	
		30	40	3:1	1510			4	4	
		40	50	3:1	1520			4	4	Communication from HM-13 @1520
		50	50	3:1	1540			2	2	Capped communication & cont. to grout
		50	50	1:1	1547			5	5	
		50	50	1:1	1552			5	5	
		50	50	1:1	1605			3	5	Refused
		—	—	1:1	1635			½	—	Backfill from 1:1 in tub.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 28½ bags
WASTE: 0 bags
NET TAKE IN HOLE: 28½ bags

INSPECTOR [signature]
REVIEWED BY [signature]

** ( ) bags carried over from previous hole

Casing in Hole 0 Ft.
Type Casing
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 1001.1
Location: Well 6
Hole No: 6m-11
75° Angle

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-14-78	0-20	Gravity		1:1				4		Backfilled with 1:1 mix tremie method. Hole had been abandoned after drilling building @ 20' depth.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5 bags
WASTE: 1 bags
NET TAKE IN HOLE: 4 bags

INSPECTOR J. Gallegos
REVIEWED BY Robert Blackmon

Hole 80' Ft.
Type Casing 1½" PVC & 10' of 3" PVC collar
Rep/Contractor BPC

BECHTEL CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Job:
Location: WELL 6
Hole No: GM-19

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-25-78	0-80	—	—	H_2O	1330					Washed hole with 3/4" pipe.
		—	—	Fast Break	1400					Injected Fast Break additive
		10	50	5:1	1715			2	2	Grouted hole from surface to 80'
		50	50	5:1	1740			1	2	Refused.
		—	—	1:1	1800			½	3	Backfill with 1:1

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 3½ bags
WASTE: 3½ bags
NET TAKE IN HOLE: 3½ bags

INSPECTOR
REVIEWED BY

Casing in Hole 40 Ft.
Type Casing 1½" PVC
Rep/Contractor BECHTEL

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10077
Location: WELL 6
Hole No: H-4

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-16-78				FAST BREAK	1080					
"	0-40	10	10	5:1	1055	8.5			2	(2 bags left from F-4 ~~in hole~~)
"	"	10	10	5:1	1105	?		3		
"	"	10	10	5:1					2	Communication with J-8 @ 1105
"	"	10	10	5:1	1110					Capped J-8
"	"	10	10	5:1	1111					Developed surface leakage 2' N of J-8
										Moved to grout J-8
"	"	0	10	1:1	1325			5	CARRY OVER	GROUTED HOLE MOVED TO J-8
"	"	0	10	1:1	1345			1	8	(SURFACE LEAKAGE HALFWAY BETWEEN J-8 & H-4 MOVE TO J-8).
										COMMUNICATION WITH J-8

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 10 bags
WASTE: 1 bags
NET TAKE IN HOLE: 9 bags

INSPECTOR P. Yun
REVIEWED BY Robert L. Blanchard

Casing in Hole 90' Ft. 80' perforated
Type Casing 1½"ϕ pvc 10' solid
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10074
Location: well 6
Hole No: H-9

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-31-78	0-90			Fast break						Washed hole - tremie method
9-1-78	0-90				[illegible]	[illegible]	-	-	0	
			20	3:1	9:12	8.0	-	-		Carryover 2.4 bags from L-10.
				3:1	9:21	4.0		1.1		
			20	3:1	9:25	6.5	-	-	6	water comm. to H-15 noted @ 9:18 Grout @ 9:25
			20	3:1	9:30	3.5		0.9		Capped hole off
										Surface leakage developed near H-15. Had to stop temporarily.
		20	30	1:1	11:17	8.3	-	-		Carryover 9.7 bags from H-15
		30	30	1:1	11:21	5.0				
			35	1:1	11:26	4.4				
		35	50	1:1	11:31	3.2	-	3.5		
			50	1:1	11:34	7.7	-	-		
			50	1:1	11:40	7.4				
			50	1:1	11:45	7.0		0.5		
										Carryover 5.7 bags to L-10
										Backfilled hole 1:1 mix

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.0 bags
WASTE: — bags
NET TAKE IN HOLE: 6.0 bags

INSPECTOR J. Wallerius
REVIEWED BY Robert Chodowski

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 1[illegible]
Location: Well 6
Hole No: H-14A

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-12-78	0-90'			Fastbreak						Washed hole - tremie method
9-12-78	0-90		10	3:1	10:28	9.0	—	—		Carryover 5.7 bags from
				3:1	10:31	9.0	—	—		1-8.
		10	10	3:1	10:36	8.2				C Immediate grout comm.
			20	3:1	10:42	6.5				to F-18. Topped off
			20	3:1	10:43	8.5				
			20	3:1	10:48	7.2				
			20	3:1	10:55	6.0				
		30	30	3:1	11:00	4.6				
			30	3:1	11:03	4.0				
			30	3:1	11:07	2.8		4.8		
			30	3:1	11:11	8.0	—	—	6	
		40	40	3:1	11:14	7.5				
			45	3:1	11:18	7.5				
		50	50	3:1	11:23	5.8				
			50	3:1	11:29	3.8		1.2		
			50	3:1	11:31	8.5				
			50	3:1	11:37	7.0				
			50	3:1	11:42	6.7				
		50	50	3:1	11:51	6.5		0.6		
										Carryover 5.1 bags to
										backfill. Mixed 3 more
										bags cement.
										Tremie backfilled with
										1:1 mix. Pipe to 80'

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.6 bags
WASTE: — bags
NET TAKE IN HOLE: 6.6 bags

INSPECTOR [signature]
REVIEWED BY [signature]

Casing in Hole 60' ft. 10' sand
Type Casing 5" 1 1/2" PVC perforated
Rep/Contractor Bechtel

BECHTEL [illegible] CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: well 6
Hole No: H-15

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-1-78	0-60									Washed hole - tremie method
	0-60		10	3:1	10:40	0.2	—	—		Carryover 4.6 bags
								0		Surface leakage immediately.
		5	10	1:1	10:53	9.6	—	—	6	leaking through railroad
			20	1:1	11:02	8.7				ballast. No way to
			20	1:1	11:07	8.5				prevent the leakage. Thickened
		30	30	1:1	11:12	8.3		0.9		mix to 1:1. Pumped
			30							in hole.
										No further leakage using
										1:1 mix.
										Carryover 9.7 bags to
										H-9.
										Backfilled hole 1:1 mix
										Tremie

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0.9 bags
WASTE: — bags
NET TAKE IN HOLE: 0.9 bags

INSPECTOR J. Gallerani
REVIEWED BY Robert E. Blackwelder

Casing in Hole 60' Ft. 60' perforated
Type Casing 1½" PVC 10' solid
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10077
Location: Well 6
Hole No: H-30

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-30-78	0-60			Fast break						washed hole - tremie method.
		20		3:1	11:30	8.5			6	
						7.7				
		0	0	3:1	1:01			—	—	Built grout pad around hole.
										started grouting again @ 1 PM.
										Used low pressure initially.
										surface leakage again. Had
										to stop again and build
										new grout pad.
										Moved to O-34
	0-60		10	1½:1	3:03	9.5	—	—	—	Carryover 7.8 bags from
		0	0	1½:1	3:07	8.5		0.3		N-30.
								0.2 ← WASTE on surface		surface leakage reoccurring
										even at low pump speed.
										stopped grouting.
										Backfilled 1:1 mix
										Mixed 2 more bags

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.3 bags
WASTE: 0.2 bags
NET TAKE IN HOLE: 1.1 bags

INSPECTOR J. Gallegos
REVIEWED BY Robert Blackburn

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: Well 6
Hole No: Hm-10
Angle

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
	0-70'			Fastbreak						Washed hole - tremie method
9-12-78	0-70			3:1	10:01	8.0	-	-		Carryover 5.7 bags from Pm-29.
			0	3:1	10:07	3.5		4.7		Surface leakage noted @ 10:06 3' from hole.
										Unable to step. Stopped grouting. Will return later with 1:1 mix.
										Carryover 1.0 bags to L-8.
	0-70	0	10	2:1	2:54	8.5	—	—	-	Carryover 7 bags from L-8.
		5	10	2:1	2:58	8.0				
			20	2:1	3:03	7.8				
		30	40	2:1	3:11	7.8		0.3		No leakage
										Backfilled 1:1 mix tremie method
										Mixed 2 more bags
										WASTE 4 bags

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 9.0 bags
WASTE: 4.0 bags
NET TAKE IN HOLE: 5.0 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Hole 85'
Type Casing 1½" PVC & 10', 3" PVC collar
Grp/Contractor BPC

BECHTEL POWER CORPORATION
GROUTING LOG
LONGS UNITS 2 & 3

Job No: 10011
Location: WELL 6
Hole No: HM-13A

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-25-78	0-85'									Washed hole
↓	↓									Added Fast Break
		10	50	1:1	1605			-	5	Grouted hole due to communication
		50	50	1:1	1625			1	-	from G11A - Refused
↓	↓	-	-	1:1	1630			½	-	Backfill from 1:1 in tub.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1½ bags
WASTE: 0 bags
NET TAKE IN HOLE: 1½ bags

INSPECTOR P. Yan
REVIEWED BY Robert B. Stockwell

Casing in Hole 147.5' t. 7.5' Solid
Type Casing 140' perforated
Rep/Contractor Bechtel

BECHTEL CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Job No:
Location: Well 2
Hole No: H-18

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
			20		11:42	4.3	—			Carryover 5.2 bags from H-30
				3:1	11:50	-		5.2		
				3:1	11:50	7.0	-	—	6	
			10	3:1	11:54	5.5				
			10	3:1	11:58	4.0		0.8		
			25		12:04	9.0				
			30	3:1	12:10	8.4				
		30	30	3:1	12:16	7.5				
			40	3:1	12:22	6.0				
			40	3:1	12:28	4.0		1.4		
			40	3:1	12:33	6.9				
			50	3:1	12:38	6.9				
			50	3:1	12:46	6.1				
			50	3:1	12:52	5.9		0.3		
										Carryover ~~[illegible] bags~~ to H-30
										Waste: 1.7 bags due to foam.
										Backfilled with 1:1 mix

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 9.4 bags
WASTE: 1.7 bags
NET TAKE IN HOLE: 7.7 bags

INSPECTOR J. Galloway
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPO[illegible]TION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: well 6
Hole No: J-5.6
85° angle

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-19-78	0-100			Fastbreak						Washed hole - tremie method
	0-100	0	10	3:1	10:45	7.6	-	-	6	
						-				
		10	10	3:1	10:48	7.2		(4.0)	← washed out	Surface leakage, massive 4' from hole. Grouting stopped when first noted.
										Carryover 2 bags to
										Exposed 3" pvc and found it improperly sealed. Had to
										wash out hole and reseal
										with 5 star grout.
9-20-78	0-100	10		3:1	1:15	10.0	-	-	6	
			10	3:1	1:17	3.0		2.8		
			10	3:1	1:19	8.7				
		15	15	3:1	1:22	8.2				
		30	30	3:1	1:29	6.5				
		40	40	3:1	1:36	6.0				
			45	3:1	1:41	6.0		0.8		
					1:42	8.5				Carryover 2.4 bags to
										L m-11.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 7.6 bags
WASTE: 4.0 bags
NET TAKE IN HOLE: 3.6 bags

INSPECTOR J. Galleroni
REVIEWED BY [signature]

Casing in Hole 40 Ft.
Type Casing 1½" PVC
Rep/Contractor BECHTEL

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10071
Location: Well 6
Hole No: J-8

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-16-78	0-40			FAST BREAK	1000					
"	0-40	10	10	5:1	1114				2	
"	0-40	10	10	5:1	1115			1	—	Communication with H-4 moved to grout Km-4
										Note H-4 capped while grouting was continued on J-8
"	"			1:1	1345				CARRY OVER	GROUTED HOLE
										COMMUNICATION WITH H-4
										AND SURFACE LEAKAGE.
"	"	10	10	1:1	1450-1500			1	"	REFUSED
										MOVED TO Km 4
"	"	0	0	1:1	1620			½		BACKFILL

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 2½ bags
WASTE: — bags
NET TAKE IN HOLE: 2½ bags

INSPECTOR L. Yu
REVIEWED BY Robert Blackwelder

Casing In Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: J-12

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CEM	BAGS TAKE	BAGS MIXED	REMARKS
8 10 79	0-31.5	Tremie		1 1						Backfilled 1:1 mix

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1 bags
WASTE: - bags
NET TAKE
IN HOLE: 1 bags

INSPECTOR J. Gallerani
REVIEWED BY Robert E. Blackburn

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: J-17

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-15-78	0-50			Fort Bend Water						Unable to jet wash pipe past 15'. Stuck on PVC. PVC possibly bent.
	0-50		15	1:1	11:41	5.5			3	
			15		11:56	4.7				
			20	1:1	12:00	4.5				
		10	25	1:1	12:03	4.5				Pressure dropped to 10 psi
					12:04	1.5		2.7		Surface leakage 5' west of hole coming up through railroad ballast
										Used 1.3 bags to backfill around J-25
8-16-78	0-50	10	10	1:1	1130			1/2	CARRY OVER	GROUTED HOLE
					1135					SURFACE LEAKAGE 1' S. OF HOLE
										AT EDGE OF GROUT CAP
		0	10	1:1	1140-1200			1/2	4	COMPLETED GROUTING
										MOVE TO F-4

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 3.7 bags
WASTE: _____ bags
NET TAKE IN HOLE: 3.7 bags

INSPECTOR BPC 5i JOE 8-15-78 J.G. / P.Y.
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: _____
Location: well 6
Hole No: V-21

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-22-78	0-150'			Fastbreak						washed hole to 150'.
		30		1:1	5:10	8.4	—	—		Conveyor 9.7 bags.
			50	1:1	5:17	8.2		0.2		Grouted when grouting M-28.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0.2 bags
WASTE: — bags
NET TAKE IN HOLE: 0.2 bags

INSPECTOR J Williams
REVIEWED BY Robert [illegible]

Casing in Hole 2" Perforated Ft.
Type Casing 1½" PVC
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 100 11
Location: Well 6
Hole No: J-25

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-15-78	0-70			Fast break & water	10:5					washed hole open to 70'. Return around PVC
	0-70			5:1	10:55	7.5	—	—	2	
								½ ← to ground		Grout leakage at surface near nipple. Dug 2' deep hole to investigate leakage. Coming from vertical fracture which runs NICE E and intersects old drill hole. Backfilled area around leakage with Five Star. Washed hole out. Will let grout set. Then dig out hole.
										Waste 0.5 bag

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: _____ bags
WASTE: 0.5 bags
NET TAKE IN HOLE: 0.5 bags

INSPECTOR 8/15/78 J. G.
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: Well 6
Hole No: Jm-5

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-22-78	0-70									Hole not washed. Drilled today.
			25	1:1	5·25	8.2				Grouted when grouting M-28
						▶	—	—		Carryover 9.5 bags
			20							
										Leakage out around 3" pvc Hub to stop. Hole was already FULL OF 1:1 prior to pumping.
										Carry over 9 bags to Back Fill E-9.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0 bags
WASTE: 0.5 bags
NET TAKE IN HOLE: 0 bags

INSPECTOR J. Dalleran
REVIEWED BY Robert E. Blackburn

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: Well 6
Hole No: J-29
M

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-22-78	0-75			Fast break						washed hole to 75'.
		35	[illegible]	1:1	4:00	9.5	—	—	—	Carryover 9.5 bags from N-25. Had been grouted when grouting M-28
			35	1:1	4:15					
				1:1	4:17			9.5	[illegible]	
			40	1:1	4:17				[illegible]	Comm. back to N-25 and J.M-5
			30	1:1	4:26	8.2	—	—	10	Cap blew off J.M-5. Had to replace. Reduced pressure
			30	1:1	4:31	—		10		to 30 psi
			30	1:1	4:37	9.1			10	
		30	30	1:1	4:47	8.6	.5	0.3		
										Carryover 9.7 bags to L.M-24.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 19.8 bags
WASTE: — bags
NET TAKE IN HOLE: 19.8 bags

INSPECTOR J. Gallerani

REVIEWED BY [BPC 4 QCE] Robert B. Blackmon

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10077
Location: well 6
Hole No: K-17

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-13-78	0-145			Fastbreak						washed hole - tremie method
9-14-78	0-145	0		2:1	10:53	7.3	-	-	-	Conveyer 10.2 bags from M-21A
			20	2:1	10:54	3.5				
		20	20	2:1	10:59	10.5				20 gal @ 10:58
			30	2:1	11:02	9.5				
			30	2:1	11:08	8.0				
			30	2:1	11:14	8.6				Checked lines. OK.
		40	40	2:1	11:16	7.4				
		50	50	2:1	11:22	6.3				
			50	2:1	11:27	6.0		7.8		
										Conveyer 2.4 bags to M-21A.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 7.8 bags
WASTE: - bags
NET TAKE IN HOLE: 7.8 bags

INSPECTOR J Gallegos
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Location: Well 6
Hole No: K-31

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-19-78	0-60			Fastbreak	1°					Washed hole - tremie method
	0-60	10	10	3:1	12:27	5.8	—	—	~	Carryover 9.1 bags from F-30
			10			3.0		0.8		
				3:1	12:37	8.0				Waste: 0.9 bags - Foaming
		20	20	3:1	12:41	7.5				
			40	3:1	12:44	6.8				
		40	40	3:1	12:47	6.0				
			50	3:1	12:53	5.5				
			50	3:1	12:57	5.0		0.8		
		50	50	3:1	12:57	8.0				
			50	3:1	1:02	8.0				

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 9.1 bags
WASTE: 7.5 bags
NET TAKE IN HOLE: 1.6 bags

INSPECTOR J. Galleani
REVIEWED BY Robert Glendenning

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: K-34

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
4-22-78	0-60			Fastbreak						Washed hole - tremie method
					2:43					
	0-60	10		3:1	2:40	8.0	—	—	—	Carryover 3.1 bags from G-32.
			20	3:1	2:46	7.0				
		20	30	3:1	2:52	7.0				
		40	45	3:1	3:00	6.7		1.2		
										Carryover 1.9 bags to Dm-16
										Backfilled with 1:1 mix tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.2 bags
WASTE: — bags
NET TAKE

INSPECTOR J. Mallerau
REVIEWED BY Robert E. Hochuli

Casing in Hole 40 Ft.
Type Casing 1½" PVC
Rep/Contractor BECHTEL

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10017
Location: Well 6
Hole No: KM-4

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-16-78	0-40	—	—	FAST BREAK	1000					Washed hole
8-16-78	"	10	10	5:1	11:20				Carry over	Grouted hole
"	"	10	10	5:1	11:25			1		Communication with J-8, H-4 & surface leakage near J-8.
"	"	10	10	5:1	1130			—		Capped J-8 & H-4
										Moved to grout J-25
"	"	10	20	1:1	1500-1600			1		REFUSED
"	"	0	0	1:1	1625			½		BACKFILL

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 2½ bags
WASTE: — bags
NET TAKE IN HOLE: 2½ bags

INSPECTOR P. Yee
REVIEWED BY Robert Goldsmith

Casing in Hole 60' 1½" PVC (perf) 10' 1½" PVC Ft. solid
Type Casing
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: Kp-13

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-10-78	0-70			Kast Break Water						Washed hole with ¾" pipe.
										Return around 1½" PVC.
	0-70	5	10	3:1	12:54	8.0	—	—	3	
		10	10	3:1	1:03	2.5				only 10 on gage. By pass closed changed Values. No difference
			5	3:1	1:15	8.1			3	
			5	3:1	1:21	—		6		
			0	3:1	1:26	9.5		—	6	Unable to get pressure
			0	3:1	1:33	—	—	6		
				2:1	1:39	7.5	—	—	10	
			0	2:1	1:40	1.0		10		
			0	2:1	1:48	10.0			10	
				2:1	1:53	—		10	—	Checked gauge Ok
			0	1:1	1:59	7.5		—	10	
				1:1	2:15			5		
				1:1	2:30			5	—	Comm. to Nm-21 noted
			5	1:1	2:35		—	—	15	@ 2:15. Stopped grouting
				1:1	2:47			15		Had to move drill. Cap hole.
				1:1	2:50				10	Thick grout coming out @ 2:37.
					3:00			4		Capped hole.
			5	1:1	3:01					
										Comm. to 6A-18! @ 2:45
										1:1 Grout coming out @ 3:00
										Had to stop grouting hole!
										Broke pressure on hole after
										Stopping. Let set. For 10 min.
										Valve Closed.
										Carryover 5 bags to Nm-17.3
					4:45			1		Used 1 more bag to top off Hole Full.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 62 bags
WASTE: 0 bags
NET TAKE IN HOLE: 62 bags

INSPECTOR John Gallegos
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10077
Location: Well 6
Hole No: [redacted]
L-8 85° angle

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-12-78	0-100'			Fast break			-	-		washed hole - tremie method
9-12-78	0-100			3:1	10:16	8.5	-	-	6	Carryover 1 bag from Hon-10
			0	3:1	10:22	4.0		1.3		
										Surface leakage around
	0-100	0	10	2:1	2:08	7.5	-	-	6	PVC. Have to dig out
		10	10	2:1	2:11	5.5				PVC & seal and repair.
		10	25	2:1	2:15	3.7	-	1.6		Moved to H-14A.
			25	2:1	2:16	7.5	-			
		30	30	2:1	2:21	6.5	-			
			30	2:1	2:26	5.5				
		50	50	2:1	2:31	4.5				No leakage.
			50	2:1	2:36	4.0				
			50	2:1	2:41	3.0		3.2		
		50	50	2:1	2:45	8.8	-	-	6	1.2
		50	50	2:1	2:50	8.5		0.2		
										Carryover 7 bags to Hon-10
										Backfilled with 1:1 mix tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.3 bags
WASTE: - bags
NET TAKE IN HOLE: 6.3 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Casing in Hole 100' Ft. 10' sand PVC
Type Casing 90' 1½" PVC perforated
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: 2-10
70° angle

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-1-78	0-102			Fast to soak						Washed hole - tremie method 40'
			20	3:1	9:01	9.0	-	-	6	Pipe stuck in hole.
					9:03	3.0				
					9:05	1.0				
		20	20	3:1	9:10	0.6		2.3		
			30	3:1	9:10					
					9:10	11.0		1.3		Large surface leakage at edge of Aux. building @ 35 psi had to stop grouting
					9:11	8.0				
		20	20	1:1	11:51	7.0	-	-		Carryover 5.7 bags from H-9.
								2.5		Surface leakage at edge of Aux. buildings. Became very large. Unable to seal off.
							approx. 1 bag in hole = 1.5 bags on surface as waste			
										Backfilled with 1:1 mix tremie
										Used remaining 1:1 mix for backfill. plus 7 bags more mixed

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.1 bags
WASTE: 2.8 bags
NET TAKE IN HOLE: 3.3 bags

INSPECTOR J. Alvarez
REVIEWED BY Robert Blackburn

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Location: Well 6
Hole No: 2-17

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-19-78	0-100			Fast break						Washed hole - Tremie method
	0-100	10	10	3:1	11:15	6.5	—	—		Carryover 6.7 bags from ~~Nm-11~~ K-11 RB
			10	3:1	11:19	4.0				
			10	3:1	11:20	7.0				
		15	15			6.0		1.0	washed out	Surface leakage along R.R. track, north of hole about 5'. Stopped grouting
										Carryover 5.7 bags to F-30
										Exposed 3" PVC nipple. Not properly sealed. Had to wash out hole and reseal with 5 Star grout.
										K-11 RB
9-20-78	0-100		10	3:1	2:17	~~x~~.6	—	—	—	Carryover 5.2 bags from ~~Nm-11~~
			10	3:1	2:19	3.0				
				3:1	2:23	5.5				Communication to Nm-14
				3:1	2:28	1.0		4.9		@ 2:19. Revert coming out
				3:1	2:30		—	—	6	hole. Grout @ 2:37.
				3:1	2:37	7.0				Capped hole off
		15	20	3:1	2:39	9.5				
			20	3:1	2:45	7.8				
			25	3:1	2:49	7.0		4.3		Surface leakage noted at approx. @-20. Unable to stop. Pumped 1:1 mix. after grouting Nm-14.
										Carryover 2 bags to Nm-14.
	0-100	10	25	1:1	4:31	7.0				
				1:1	4:32	6.5		0.4	on surface waste	Carryover 8.1 bags from Nm-14
										large surface leakage.
										Comm. to Nm-14. Stopped
										grouting. Waste: 7.7 bags

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 18.3 bags
WASTE: 9.1 bags
NET TAKE IN HOLE: 9.2 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Casing in Hole — ft.
Type Casing NONE
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: L-25

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-10-78	0-25			1:1				2 ±		Backfilled hole - tremie
										method with 1:1 mix

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: ________ bags
WASTE: ________ bags
NET TAKE IN HOLE: ________ bags

INSPECTOR [signature]
REVIEWED BY [signature]

In[illegible]e 40'
Type Casing PVC 1½" 0-40'
Rep/Contractor BECHTEL POWER CORP.

GROUTING LOG

SONICS UNITS 2 & 3

J[illegible]N 10071
Location: WELL 6
Hole No: LM-4A

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-25-78	0-40'			H_2O	0845					Washed hole to 40'
"	"			Fastbreak	0900					Injected Fast Break additive
8-25-78	"	10	10	5:1	1315	8.0		½	2	Grouted hole from surface to 40'
	"	20	20		1320	7.0		—		
	"	30	30		1325	7.0		—		
	"	40	40		1330	7.0		—		
	"	50	50	↓	1345	6.0		1½		
↓	"	—	—	1:1	1640			½		Backfill from 1:1 in tub

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 2½ bags
WASTE: 0 bags
NET TAKE IN HOLE: 2½ bags

INSPECTOR [signature]
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: Lm-24

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-22-78	0-135			Fast break						Washed hole to 80'. Unable to get Further
	0-80	30		1:1	4:51	8.4	—	—		Carryover 9.7 bags
			40	1:1	4:58	8.4		0		Grouted when grouting
			45							Lm-28.
										No take.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0 bags
WASTE: — bags
NET TAKE IN HOLE: 0 bags

INSPECTOR J. Gallegos

REVIEWED BY Robert E. Blackburn

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: Well 6
Hole No: M-14

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-14-78	0-40			Fast break						washed hole - tremie method
9-14-78	0-40	10	20	3:1	12:06	9.0		—	-	Carryover 6.1 bags from Q-34.
		20	20	3:1	12:12	8.5		—		
		30	30	3:1	12:18	7.6				
			30	3:1	12:21	6.3				
		30	35	3:1	12:27	5.5				
		35	35	3:1	12:33	5.2				
		40	40	3:1	12:38	5.0		1.1		
										Carryover 5 bags to Q-34.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.1 bags
WASTE: — bags
NET TAKE IN HOLE: 1.1 bags

INSPECTOR J. Galleani
REVIEWED BY Robert Blaschke

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10071
Location: Well 6
Hole No: M-21A

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-13-78	0-150'			Fastbreak						Washed hole - tremie method
9-14-78	0-150'	10	10	3:1	10:00	8.0	—	—	6	
			20	3:1	10:10	5.5				
			20	3:1	10:11	9.0				
		30	30	3:1	10:14	7.0				
			30	3:1	10:18	10.0				
		40	40							
			45	3:1		3.5		5.0		Some surface leakage at 45psi
			20	3:1					9	Reduced to 20 psi. Still
		15	20	2:1	10:37	9.6	—	—	10	Small leakage. Thickened
			20	2:1	10:42	7.7				mix to 2:1. No more
		15	20	2:1	10:47	7.3		0.8		leakage. Slight bubbling
										at surface noted @ 10:55
										Sealed with sand
										Surface leakage developed
										after increasing pressure
										slightly.
		20	20	2:1	11:31	6.0	—	—		Carryover 2.4 bags from K-17
			30	2:1	11:34	4.0		0.8		Surface leakage @ 30 psi.
										Stopped grouting.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.6 bags
WASTE: — bags
NET TAKE IN HOLE: 6.6 bags

INSPECTOR J. Valleau
REVIEWED BY Robert W. Goldsmith

Casing in Hole 0 ft.
Type Casing 0
Rep/Contractor Bechtel

BECHTEL POWER CORP ON
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 16011
Location: well 6
Hole No: M-22

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-1-78	0-30			1:1				3		Backfilled hole - tremie method only.
										Hole abandoned @ 30' Bit fell off in hole.
										Hole drilled completely in native soil.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: _____ bags
WASTE: _____ bags
NET TAKE
IN HOLE: _____ bags

INSPECTOR J. Gallerani
REVIEWED BY Robert E. Glerhusen

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: M-28

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-22-78	0-100			Fast break						Had to wash from 50'-100'
			0	3:1	12:54	10.0	-	—	6	Unable to get past 100'
					12:57	8.5		4.9		Conveyance 1.3 bags from M-17-3
										Comm. to Lm-24 @ 12:56.
			30	3:1	12:58	8.5		—		Grout @ 12:56. Capped hole off
					1:00					
			35		1:05			2.4		Able to get 30 psi max
			35	3:1	1:08				6	@ 1:00
										Comm. to Jm-29 @ 1:12
			40	3:1	1:13	8.0				Capped hole @ 1:13
				3:1	1:18	—		6	6	
		40	48	3:1	1:23				6	
					1:28			6		
				3:1	1:35		-	—	10	Bypass closed. Pump at Full capacity
		20	40	2:1	1:42			10		
		30		2:1	1:52			—	10	
			30	2:1	1:59			10		Took caps off communicating holes. Bled water off.
		20	35	1½:1	2:13				10	
			35	1½:1	2:20			10		Comm. to J-21 @ 1:58
			30	1½:1	2:25				10	Grout @ 1:58
			35	1½:1	2:30			10		
				1½:1	2:35				10	1½:1 Comm. to N-25 @ 2:37. Grout
			30	1½:1	2:39			10		out @ 2:39. Capped all holes.
			30	1½:1	2:45			10	10	
			30	1:1	2:50				10	Grout coming out of Jm-5
			25	1:1	3:00			10		@ 2:55! Had to put in 3" PVC nipple @ Jm-5!

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: _____ bags
WASTE: _____ bags
NET TAKE IN HOLE: _____ bags

INSPECTOR J. Galloway
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: well 6
Hole No: M-28

Page 2 of 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
										Put 15' 3" Sch 80 PVC in
				1:1						Jm-5. Grout (1:1) coming
										out this 1" Dry packed
										around PVC. Then put
										cap on PVC. 10 psi backpressure
										on gage with valve off.
				1:1	3:24	10.0	—	—	10	Capped Jm-5 off with duct tape
		40	40							
			50		3:34	9.8		0.2	—	Checked gauge & lines.
										Everything OK. Hole Full.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: _____ bags
WASTE: _____ bags
NET TAKE IN HOLE: 90.8 bags

INSPECTOR J. Gallegos
REVIEWED BY Robert F. Bladukas

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: _____
Location: Well 6
Hole No: M-30

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-7-78	0-100			Fastbreak						Washed hole - tremie method
	0-100	10		3:1	11:01	6.0	—	—	6	Conveyor. 2.4 bags from F-18.
						1.0	—	2.4	—	
				3:1	11:03	9.0	—	—	—	
			20	3:1	11:06	5.0				
		20	20	3:1	11:07	7.0				
			25	3:1	11:11	4.0				
		35	35	3:1	11:14	5.5		3.6		
			40	3:1	11:19	8.5	—	—		
		40	40	3:1	11:24	6.5				
			40	3:1	11:29	6.0				
		40	40	3:1	11:34	5.7		0.8		
										Conveyor 1.6 bags to F-18.
										Had to leave several sections of 3/4" pipe in hole. Stuck when washing hole.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.8 bags
WASTE: — bags
NET TAKE IN HOLE: 6.8 bags

INSPECTOR J. Tallerini
REVIEWED BY Robert A. Glodowski

Casing in Hole 80' 1½" PVC Ft.
Type Casing PVC
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location:
Hole No: Mm-17.3

original hole depth = 80'

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
5-22-78	0-40			Water						
	0-40	0	18	5:1	11:38	7.8			2	Could only wash to 40'. Hit very hard material. Probably grout from K-13.
			18	5:1	11:40	—		2		
	unable to get more flow		18	5:1	11:44	8.5			2	Unable to get more than 18 psi with bypass closed.
			16	5:1	11:46	[illegible]	—	2		
			15	2:1	11:50		—	—	6	
				2:1	11:53			6		
			10	2:1	11:57				6	Bypass closed. pump full capacity.
			10	2:1	12:03			6		
			12	2:1	12:07			—	10	
				2:1	12:14			10		
			10	2:1	12:18				@6	Grout leakage @ P-12 noted @ 12:20. Appears to be coming from Railroad ballast. More grout being pumped into hole than leaking out surface.
					12:20			6		
			10	1:1	12:28				@8	
			10	1:1	12:33			8		
									8	
					12:35				5	Leakage in numerous areas along R.R. @ 12:36. 1:1 mix coming out. Stopped pumping.
		10	12	1:1	13:37	2.0		3.7		
										Carryover 1.3 bags to M-28

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 43.7 bags
WASTE: — bags
NET TAKE IN HOLE: 43.7 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Casing in Hole 0 ft.
Type Casing 0
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: MW27

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-1-78	0-32	Gravity		1:1				3 ±		Hole backfilled with 1:1 mix. - tremie method only. Hole had intersected previously drilled hole and was abandoned.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: _____ bags
WASTE: _____ bags
NET TAKE IN HOLE: _____ bags

INSPECTOR J. Gilleran
REVIEWED BY Robert Blackburn

Casing in Hole ________ Ft.
Type Casing ________
Rep/Contractor ________

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: N-25

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-22-78	0-120			Fastbreak						Washed hole to 120'. No water return.
		40		1:1	3:38	9.8	—	—		Carryover 9.8 bags from M-28
			50	1:1	3:48	9.5		0.3		1:1 grout coming out when grouting M-28.
										Hole Full Grouted when grouting on M-28.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: ________ bags
WASTE: ________ bags
NET TAKE IN HOLE: 0.3 bags

INSPECTOR J. Galleson
REVIEWED BY Robert G. Blodunlus

Casing in Hole _____ t.
Type Casing _____
Rep/Contractor _____

BECHTEL POWER CO[illegible] ION
GROUTING LO[illegible]

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: Nm-19

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
	0-40									Washed hole - tremie method
9-1-78	0-40		20	3:1	10:07	8.0	-	-		Conveyer 5.1 bags
		20	20	3:1	10:11	6.5				
		30	35	3:1	10:20	6.2		0.5		
										Backfilled hole 1:1 mix tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0.5 bags
WASTE: - bags
NET TAKE IN HOLE: 0.5 bags

INSPECTOR J. Williams
REVIEWED BY [signature]

Casing in Hole 120 Perforated 10' Solid Ft.
Type Casing 1½" PVC
Rep/Contractor

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: Am-~~B~~ 21

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-10-78	0-150			1:1						Comm. when grouting Kp-13 1:1 out of hole.
			70							
					3:26	7.0				
		70	70		3:29	7.0		0,7		Took up off Kp-13. No grout coming out. Check hole Am-21 to be sure it wasn't plugged. Plugged. Unable to wash below 40'. Regrouted
			60	1:1	4:07	7.0				
			60	1:1	4:08	6.5				
		60	60	1:1	4:15	6.7		0.4		
										Conveyer 4.7 bags to back fill

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.1 bags
WASTE: _____ bags
NET TAKE
IN HOLE: 1.1 bags

INSPECTOR John E. Gallegos
REVIEWED BY

Casing in Hole 160' Ft. 10' Solid
Type Casing 1½" PVC - 150' perforated
Rep/Contractor Beelitel

BECH OWER CORPORATIC
UTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: Well 6
Hole No: N-30

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-30-78	0-140			Fast break						Unable to wash past 110'.
	0-110	0		3:1	11:21	8.7	-	-	6	Able to get only 10 psi on gage.
			10	3:1	11:24	1.0		5.7		@ 11:23. By pass closed
										Surface leakage 2' west of hole @ 11:24 Make grout pass and let set up til 2 pm. waste 0.3 on surface.
	0-110		0	3:1	2:00	9.0	-	-	6	Carryover 1.4 bags from 0-34.
			5	3:1	2:04	7.0		0.5		Sm. leakage at surface. Thickened mix.
	0-110			1½:1	2.18	6.2	-	-	4	
				1½:1	2:22	5.4				Still surface leakage. Pumped at slower speed. No leakage noted.
		0		1½:1	2:32	4.0		1.2		
		0	2	1½:1	2:33	8.3		*		
				1½:1	2:45	7.3		0.5		
				1½:1	2:55	7.2		-		Surface leakage in numerous areas around hole. Slowed pump.
										Tried to raise pressure. Recurrent surface leakage. Abandoned hole.
										Carryover 7.8 bags to H-30.
										Backfilled 1:1 mix.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 7.9 bags
WASTE: - bags
NET TAKE IN HOLE: 7.9 bags

INSPECTOR J Wallerau
REVIEWED BY [signature]

Casing in Hole 75 ft. 1½"ϕ
Type Casing 65' 1½" perf PVC 10' solid PVC
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: Well 6
Hole No: O-34

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
8-30-78	0-75			Fast-break						Washed hole - tremie method.
	0-75	10	10	3:1	1:16	7.6	—	—	6	
					1:19	9.1				
			10	3:1	1:19	9.1				
			14	3:1	1:28	7.3				
			25	3:1	1:37	5.2				
		35	35	3:1	1:43	5.1				
		50	50	3:1	1:50	4.7		4.6		
			50							
										Carryover 1.4 bags to N-30
										Backfilled with 1:1 mix

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 4.6 bags
WASTE: — bags
NET TAKE IN HOLE: 4.6 bags

INSPECTOR D. J. Allerow
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: Well 6
Hole No: Dm-16
Stage 2
85"

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-20-78	0-90'			Fast break						Washed hole - tremie method
9-22-78	0-90'	10		3:1	3:07	6.7	—	—	3	
			10	3:1	3:11	7.5		[redacted]	2	Carryover 1.9 bags from [redacted] 15-34.
		20	20	3:1	3:18	5.5				
			20	3:1	3:22	2.5		4.2		
			20	3:1	3:25	6.5	—	—	3	
					3:30	4.5				
			20	3:1	3:31	8.7	—			
		35	35	3:1	3:36	7.5				
		40	45	3:1	3:40	5.3				
			45	3:1	3:47	2.5		3.0		
		40	45	3:1	3:52	7.3			6	
			45	3:1	3:56	6.8				
		40	40	3:1	4:01	6.5		0.2		
										Carryover 6.5 bags to backfill. Mixed 6 more bags cement. Waste: 1.7 bags
										Backfilled with 1:1 mix tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 9.1 bags
WASTE: 1.7 bags
NET TAKE IN HOLE: 7.4 bags

INSPECTOR J. Dalleani
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 1[illegible]
Location: well 6
Hole No: D-22
Stage 2 85°

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-2-78	0-110			Fast break						Washed hole - tremie method
	0-110	10		2:1	10:39	7.5	—	—	6	Unable to wash past 110'. Grout in washings.
			20	2:1	10:43	5.0				
		20	20	2:1	10:44	8.8				
			20	2:1	10:48	6.5				
			25	2:1	10:49	8.5				
		25	30	2:1	10:52	8.0				
		30	30	2:1	10:56	6.3				
		40	40	2:1	11:00	5.[illegible]		4.0		
			40	2:1	11:00	8.5	—	—	6	2
			40	2:1	11:04	7.8	—	—		
			40	2:1	11:09	6.3				
		40	40	2:1	11:12	8.9				
			50	2:1	11:15	5.5		1.2		
		50	50	2:1	11:16	9.0				
			50	2:1	11:21	8.6		0.2		
										Carryover 6.6 bags to F-6.
										Backfilled with 1:1 mix using tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5.4 bags
WASTE: — bags
NET TAKE IN HOLE: 5.4 bags

INSPECTOR J. Gallerani
REVIEWED BY Robert E. Blackburn

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: F-18
Angle hole
Stage 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-7-78	0-80			Fast breakin			—			washed hole - tremie method
	0-80	10	10	3:1	10:47	7.0	—	—		
			20	3:1	10:53	5.0		1.4		Carryover 3.8 bags from F-7. Surface leakage 3' from hole in sand. Decided to go to another hole and come back at later with 1:1 mix.
	0-80	0		1:1	11:41	6.0	—	—	2	Carryover 1.6 bags from M-3C.
			0	1:1	11:45	2.0		2.6		Surface leakage in railroad ballast.
								4		
								on surface waste.		

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5.0 bags
WASTE: 3.6 bags
NET TAKE IN HOLE: 1.4 bags

INSPECTOR J. Wallerson
REVIEWED BY Robert W. Blocksom

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: _____
Location: Well 6
Hole No: G-26.5
Stage 2
83°

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-22-78	0-80			Fastbreak			—	—		Washed hole - tremie method
	0-80	10		3:1	1:55	6.8	—	—	6	
			20	3:1	2:02	6.5		0.2		Surface leakage noted after raising pressure to 25psi stopped grouting. No significant take in hole.
			25	3:1						
										Carryover 5.8 bags to G-32.
										Back Filled with 1:1 mix tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0.2 bags
WASTE: — bags
NET TAKE IN HOLE: 0.2 bags

INSPECTOR J. Talleron
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Location: Well 6
Hole No: G-32
Stage 2 85'

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-22-78	0-160			Fast break						Washed hole - tremie method
	0-160	10		3:1	2:07	9.0	—	—	—	Carryover 5.8 bags from G-26.5
					2:09	5.0				
			10	3:1	2:10	6.5				
			10	3:1	2:16	3.0		5.0		
		20	20	3:1	2:18	8.5	—	—	3	0.8
			20		2:23	7.0				
		30	30	3:1	2:28	6.5				
			30	3:1	2:33	6.3		0.7		
			40	3:1	2:34	6.3				Tried 40 psi. Large surface leakage 2' from nipple. Had to stop grouting
										Carryover 3.1 bags to G-37
										Bore Filled with 1:1 mix tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5.7 bags
WASTE: — bags
NET TAKE IN HOLE: 5.7 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: well 6
Hole No: [redacted] Hm-14
Stage 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-28-78	0-120			Fast break						Washed hole - tremie method
		10		3:1	2:41	6.5	-	-	-	Carryover 5.7 bags
					2:44	1.0		1.5		from L-9.
			10	3:1	2:46	8.5				
			10	3:1	2:50	8.2				
		25	30	3:1	2:55	5.5				
		30	30	3:1	3:01	5.0		1.0		
		40	40	3:1	3:04	9.2				
			50	3:1	3:09	8.0				
			50	3:1	3:14	6.5				
			50	3:1	3:22	3.0				
			50	3:1	3:23	6.0				
			50	3:1	3:28	5.2				
			50	3:1	3:38	4.0				
			50	3:1	3:43	3.6				
		50	50	3:1	3:48	3.4		2.2		
										L-10
										Carryover 1 bag to L-9.
										Backfilled with 1:1 mix tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 4.7 bags
WASTE: - bags
NET TAKE IN HOLE: 4.7 bags

INSPECTOR [signature]
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 1001
Location: Well 6
Hole No: K-9
Stage 2 810

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-6-78	0-110			Fast break				—	—	Washed hole - tremie method
	0-110	10		3:1	1:56	7.2				Carryover 4.9 bags from K-19.
			20	3:1	1:58	2.0		1.4 WASTE		Surface leakage @ 1:58 around PVC nipple. Had to stop grouting & repair seal
										Carryover 3.5 bags to Lm-15
										Washed hole ext. will
10-9-78	0-110'	10		2:1	1:56	8.3	—	—	5	regrout 10-9-78.
			10	2:1	1:59	4.0				
			10	2:1	2:00	8.0				
			10	2:1	2:04	6.5				
		10	10	2:1	2:10	5.8				
		10	15	2:1	2:14	4.5		3.2		
		15	20	2:1	2:15	8.5	—	—	5	1.8
		20	20	2:1	2:20	8.0				
		30	30	2:1	2:25	8.0				Checked lines OK. Not plugged
			30	2:1	2:30	7.4				
			30	2:1	2:34	6.4				
			30	2:1	2:38	6.2				
		40	40	2:1	2:39	6.2				
			40	2:1	2:44	6.1				
			45	2:1	2:53	6.0		1.0		
										Carryover 5.8 bags to backfill
									2	Backfilled using 1:1 mix tremie method mixed 2 bags cement additional

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5.6 bags
WASTE: 1.4 bags
NET TAKE IN HOLE: 4.2 bags

INSPECTOR J. Albrecht
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: _____
Location: Well 6
Hole No: ~~Unit~~ K-11
Stage 2
85°

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-19-78	0-90			Fast break						Washed hole tremie method
		10		3:1	11:02	7.2	—	—		Carryover 2 bags from
					11:07	4.0		1.0		V-5.6.
			10	3:1	11:08	7.3	—	—	6	
			20	3:1	11:10	6.5		0.3		Surface leakage around surface
								washed out.		grout seal. Stopped grouting
										immediately!
										Carryover 6.7 bags to 4-17
										Exposed 3" PVC and found
										it not properly sealed.
										Had to wash out hole and
										re-seal PVC with 5 sks.
9-20-78	0-90			3:1	1:49	8.5	—	—	—	Carryover 2.4 bags from
		10	20	3:1	1:51	2.5		1.7		V-5.6.
			20	3:1	1:53	7.0	—	—	6	
					1:56	5.0				
			20	3:1	1:59	8.5				
			30	3:1	2:05	5.2		1.5		PVC nipple cracked 1' below
										surface. Had to replace Made
										new seal.
										Carryover 5.2 bags to 4-17
	0-90		10	3:1	3:19	9.0	—	—	6	Carryover 1 bag from Nm-14
			10	3:1	3:23	7.5				Slight leakage around PVC.
			20	3:1	3:28	7.5				
			20	3:1	3:32	7.0				
		20	25	3:1	3:37	6.6				Large leakage past 30 sk mix
			25	3:1	3:41	5.5				thicken mix 1:1.
		20	25	3:1	3:45	4.6		1.2		
			25	3:1	3:46	8.5				
			25	3:1	3:51	8.9				

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: _____ bags
WASTE: _____ bags
NET TAKE IN HOLE: _____ bags

INSPECTOR J. Valleau
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Location: Well 6
Hole No: ~~Unit~~ K-11 RLB
Page 2 of 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-20-78	0-90	30	30	3:1	3:51	8.4	—	—		
			35	3:1	3:56	8.0		0.2		Surface leakage above 35 psi.
										Carryover 5.6 bags to Nm-14.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 5.9 bags
WASTE: 1.3 bags
NET TAKE IN HOLE: 4.6 bags

INSPECTOR J. Gallegos
REVIEWED BY Robert Klodzinski

Casing in Hole ________ Ft.
Type Casing
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: Well 6
Hole No: 6-9
Stage 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-27-78	0-130'			Fastbreak						Washed hole - tremie method
	0-130'	10	10	3:1	2:10	10.0	—	—	6	
				3:1	2:19	2.5		5.3		
			10	3:1	2:20	8.3	—	—	6	
			10	3:1	2:26	7.0	—	—		
		10	15	3:1	2:31	6.8		0.4		
										Surface leakage around nipple when pressure raised to 20 psi.
										Moved to Hm-8.
										Carryover 6.3 bags to Hm-8
	0-130'	80	40	3:1	3:04	8.5				No leakage for 1 minute then more leakage Carryover
			0	3:1	3:05	8.0		(0.2) waste		2.4 bags from Hm-8.
										Built new surface seal with 5 star grout.
9-28-78	0-130	10		3:1	2:33	7.8	—	—	6	
			20	3:1	2:40	6.5		0.3		Surface leakage again on edge of surface grout seal. Unable to stop. 20 psi.
										Carryover 5.7 bags to Hm-14.
			20	1:1	3:56	9.5	—	—	10	Carryover 1 bag from Hm-14 immediate surface leakage
										Backfilled with 1:1 mix tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.2 bags
WASTE: 0.2 bags
NET TAKE IN HOLE: 6.0 bags

INSPECTOR [signature]
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10071
Location: Well 6
Hole No: Mm-18.5
Stage 2 85°

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-27-78	0-90'			Fast-break						Washed hole - tremie method
	0-90			2:1	3:18	8.5	-	-	- 1	Carryover 2.2 bags from Mm-9.
		10	10	2:1	3:25	8.0	-			
			10	2:1	3:32	7.0				
		20	20	2:1	3:40	6.5				
			30	2:1	3:42	6.0				
			30	2:1	3:48	5.5				
		35	40	2:1	3:53	4.5				
			40	2:1	3:57	4.0				
			40	2:1	4:02	3.8		1.9		
										Carryover 1.3 bags to Mm-8.
										Backfilled with 1:1 mix tremie method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.9 bags
WASTE: - bags
NET TAKE IN HOLE: 1.9 bags

INSPECTOR J. Galleani
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: well 6
Hole No: Nm-14
Stage 2
85°

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-20-78	0-160	15		3:1	2:54	7.0	—	—	—	Unable to Had comm. when grouting L-17. Unable to wash.
			20		2:57	6.2				Carryover 2 bags from L-17.
			25	3:1	3:01	5.5				
			35	3:1	3:05	4.5				Comm to L-17 @ 3:05
		30	30	3:1	3:08	4.5	—	-		Capped hole.
						3.5		1.0		Surface leakage at approx Q-20. F
										Returned to hole Lm-11.
										Carryover 1 bag to Lm-11
	0-160			1:1	4:22	8.5	—	—	5	Carryover 5.6 bags from Lm-11.
		20	30	1:1	4:24	8.0				Comm to L-17. 1:1 mix
				1:1	4:25	8.5				coming out @ 4:24
			30	1:1	4:30	7.0		2.5		Capped hole.
										Massive surface leakage at Q-20 and near L-17. Stopped grouting when 1:1 mix started coming out surface.
										Carryover 8.1 bags to L-17.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 3.5 bags
WASTE: — bags
NET TAKE IN HOLE: 3.5 bags

INSPECTOR J. Hellyers
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG
SONGS UNITS 2 & 3

Job No: 1001
Location: Well 6
Hole No: Pm-25
Stage 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-10-78	0-120			Fast break						Washed hole - tremie method
	0-120			~~Start~~	~~Start~~	~~Start~~	—	—	0	No return at surface.
										80' I wash hose removed stuck in hole
	0-120	40	40	1:1	4:57	8.3	—	—	—	Carryover 7.7 bags from
		40	60	1:1	5:01	6.5				6B-20. Communication
		60	60	1:1	5:05	6.0				when grouting 6B-20.
					5:10	6.0		1.6		with 1:1 mix.
										Hole full of grout
										Carryover 6.1 bags
										to 6B-19.
										Topped hole off from
										top with 1:1 mix.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.6 bags
WASTE: — bags
NET TAKE
IN HOLE: 1.6 bags

INSPECTOR J. Ballegui
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: Well 6
Hole No: Pm-29
Stage 2

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
	[illegible]									
9-11-78	0 - 120			Fast break		[illegible]				Washed hole - tremie method
9-12-78	0-120			3:1	9:08	9.0	-	-	6	
			0		9:09	4.0				
			15	3:1	9:12	5.8				
		10	20	3:1	9:15	3.6				
		20	20	3:1	9:17	2.8		5.2		
			30	3:1	9:19	7.6	-	-	6	
			30	3:1	9:30	6.5				
		50	50	3:1	9:38	5.6				
			50	3:1	9:43	4.9				
		50	50	3:1	9:48	4.4				
			50	3:1	9:53	4.0		1.1		
										Carryover 5.7 bags to
										Backfilled with 1:1 mix. ited to from top of hole because 3/4" wash pipe Stuck in hole. Unable to tremie backfill.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.3 bags
WASTE: — bags
NET TAKE IN HOLE: 6.3 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: _____
Location: Well 6
Hole No: Q-34

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-13-78	0-80			Fast break						Washed hole - tremie method
9-14-78	0-80	20		3:1	11:45	8.0	—	—	6	Carryover 1.6 bags from M-21A.
			40	3:1	11:50	2.8		1.5		Surface leakage around grout seal noted @ 11:50. No take @ 20 psi. Had increased to 40 psi prior to leakage. 9/8 grout in hole. Moved off hole after spotting leakage. Repaired seal with 5 sks grout.
	0-80	15		2:1	1:03	5.3	—	—	1	Carryover 5 bags from M-14.
			15	2:1	1:09	4.5				
			15	2:1	1:13	4.5				
		30	30	2:1	1:18	4.2				
		40	40	2:1						
		50	50	2:1	1:23	3.8				
			50	2:1	1:28	3.6		0.8		
										Carryover 5.2 bags to backfill Mixed 5 additional bags

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 2.3 bags
WASTE: — bags
NET TAKE IN HOLE: 2.3 bags

INSPECTOR J. Villarreal
REVIEWED BY Robert E. Blackwelder

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: Em-6
Stage 3 83° angle

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-12-78	0-60			Fast-bread						Washed hole - tremie method
		10		3:1	10:16	9.6	—	—	6	
			20	3:1	10:20	8.5				
		20	20	3:1	10:25	7.5				
		30		3:1	10:30	6.5				
			30	3:1	10:35	5.6				
		30	40	3:1	10:40	5.4				
		40	40	3:1	10:45	5.4		1.2		Carryover 4.8 bags to G-8
										Backfilled hole with 1:1 mix - tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 1.2 bags
WASTE: — bags
NET TAKE IN HOLE: 1.2 bags

INSPECTOR J. Gallegos
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: [illegible]
Location: Well 6
Hole No: G-5
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-5-78	0-100			Fast break						washed hole - tremie method
	0-100			3:1	1:54	8.0	—	—	6	
		10	10	3:1	1:57	6.5				
			20	3:1	2:01	4.0	+	1.0		
			20	3:1	2:02	4.0				
		20	20	3:1	2:11	8.0				
		30	30	3:1	2:15	7.0				
			35	3:1	2:21	6.0				
		40	40	3:1	2:27	5.5				
		50	55	3:1	2:37	2.0		3.0		
			50	3:1	2:38	8.0				
			50	3:1	2:44	7.5				
			50	3:1	2:50	7.0				
			50	3:1	2:58	6.8		1.0		
										Carryover 1.9 bags to backfill mixed 3 additional bags cement for 1:1 mix.
										Backfilled with 1:1 mix - tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 4.1 bags
WASTE: — bags
NET TAKE IN HOLE: 4.1 bags

BPC 26 OCT

INSPECTOR J. Williams

REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: G-8
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-12-78	e-80'			Fast break						Washed hole-Tremie method
		10		3:1	10:50	9.5	—	—	—	Carryover 4.8 bags from Em-6.
			10	3:1	10:54	7.0				
		20	20	3:1	10:59	6.0				
		25	30	3:1	11:03	5.5				
		40	40	3:1	11:07	1.0		4.5		Started taking grout at
		20	40	3:1	11:15	7.5	—	—	6	3 increase pace @ 11:06
		40	40	3:1	11:18	5.5				
			40	3:1	11:25	4.5				
		50	50	3:1	11:33	3.5		1.1		
			50	3:1	11:34	9.0				
			50	3:1	11:40	8.0				
				3:1	11:45	7.8				
			50	3:1	11:50	7.7		0.4		
										Carryover 4.8 bags to K-14
										Backfilled hole with 1:1 mix tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.0 bags
WASTE: — bags
NET TAKE IN HOLE: 6.0 bags

INSPECTOR J. Wallerius
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: Well 6
Hole No: Hm-8
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
9-27-78	0-90			Fast break					-	Washed hole - tremie method
	0-90	10		3:1	2:33	6.8	-	-	-	Carryover 6.3 bags from L-9.
			10	3:1	2:40	4.0				
			20	3:1	2:41	8.5				
			20	3:1	2:48	8.0				
		30	30	3:1	2:51	5.0				Pressure dropped to 20 then
			30	3:1	2:53	8.5				Came back up. Increase
			30	3:1	2:57	7.5				in grout take.
					2:59	8.0		3.6		
					3:00	6.0		(0.3) waste		Surface leakage developed
					3:03	8.5				2'-4' east of hole. Crack
										developed in sand. 30 psi
										@ 2:59. Stopped
										grouting. Will return
										with thicker mix
										Carryover 3.9 bags to L-9.
		20	25	2:1	4:06	3.8	-	-	-	
				2:1	4:07	3.0		(0.3) waste		Carryover 1.3 bags from
										Hm-8.
										Leakage at 25 psi.
		20	20	1:1	4:10	9.5	-	-	11	Thickened mix to 1:1
				1:1	4:15	9.2				pumped in hole.
		35	35	1:1	4:20	9.0				No leakage @ 20psi with 1:1 mix
			40	1:1	4:21	9.0	-	0.3		or 35 psi
										Leakage at 40 psi
										Stopped grouting.
										Carryover 12 bags to backfill.
										Backfilled 1:1 mix - tremie
										method

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 4.5 bags
WASTE: 0.6 bags
NET TAKE IN HOLE: 3.9 bags

INSPECTOR J. Williams
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10879
Location: Well 6
Hole No: JM-15
stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-17-78	8-75			Fast-break						Washed hole - tremie method
		10	10	3:1	11:01	8.4	—	—	6	
		10		3:1	11:05	6.5				
			20	3:1	11:08	5.8				
		20	20	3:1	11:11	5.5				
			30	3:1	11:12	9.1				
		30	30	3:1	11:16	8.6				
		40	50	3:1	11:20	6.5				
		50	50	3:1	11:25	5.0				
			50	3:1	11:28	4.5				
				3:1	11:29	10.0				
		50	50	3:1	11:33	9.6				
		50	50	3:1	11:38	9.4		3.3		
										Carryover 2.7 bags to L-31.5
										Backfilled hole 1:1 mix - tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 3.3 bags
WASTE: — bags
NET TAKE IN HOLE: 3.3 bags

INSPECTOR J. Gallegos
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10011
Location: Well 6
Hole No: K-14
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-12-78	0-69			Fast break						Washed hole - tremie method
		10		3:1	11:55	7.7				Carryover 4.8 bags from G-8.
		30	40	3:1	12:00	7.4		0.1		
										Surface leakage developed 3' east of hole.
	0-69	10		1:1	12:58	4.5	-	-	8	
						8.5		(0.7) waste on surface		This hole will be replaced by another. Stopped grouting with 3:1 mix.
										Mixed 1:1 grout.
										Pumped til 1:1 coming out on surface.
										Backfilled hole with 1:1 mix - tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 0.8 bags
WASTE: 0.7 bags
NET TAKE IN HOLE: 0.1 bags

INSPECTOR J Dalleras
REVIEWED BY [signature]

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPO[illegible]TION
GROUTING LOG

SONGS UNITS 2 & 3

JOB NO. _____
Location: well 6
Hole No: K-19
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-5-78	0-150			Fast break						Washed hole - tremie method
10-6-78	0-150			3:1	1:08	8.5	—	—	6	
		10		3:1	1:10	3.0				
				3:1	1:11	5.0				Comm. to Mm-18.5. water
			10	3:1	1:12	1.0		5.7		Comm. to Lm-15. @ 1:12.
				3:1	1:21	4.0		—	6	3 Capped Mm-18.5 @ 1:24
					1:25	4.0				Grout out of Lm-15 @ 1:25
			10	3:1	1:27	8.0				Capped hole @ 1:26
		20	20	3:1	1:31	2.0				Pressure dies rapidly after capping other holes.
		30	30	3:1	1:32	6.4				
			40	3:1	1:34	1.0		6.0		
		40	40	3:1	1:38	18.0	—	—	6	
			40	3:1	1:42	7.8				
		40	40	3:1	1:48	7.0		1.1		
			50	3:1	1:49	8.7				
			50	3:1	1:52	7.5		0.3		Surface leak near collar of hole. @ 50 psi. Had to repair seal with quick set grout. Moved to K-9.
										Carryover 4.9 bags to K-9.
	0-150	10		1:1	3:10	7.8	—	—	3	Carryover 3.3 bags from Lm-15.
			10	1:1	3:11	6.5		0.8		Comm. to Mm-18.5. Capped hole when 1:1 grout coming out.
		10	20	1:1	3:13	8.7				No comm. to Lm-15
			20	1:1	3:18	8.3				
		30	30	1:1	3:24	8.0				
		40	40	1:1	3:31	7.4		0.5		
										Carryover 5 bags to backfill.
										Backfilled hole with 1:1 mix - tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 14.4 bags
WASTE: — bags
NET TAKE IN HOLE: 14.4 bags

INSPECTOR J. Sollerson
REVIEWED BY Robert L. Stockelman

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 10079
Location: Well 6
Hole No: L-31.5
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-17-78	0-100			Fast break						Washed hole - tremie method
		10	10	3:1	11:46	9.4	-	—	-	
			10	3:1	11:48	5.0		1.8	-	Carryover 2.7 bags
				3:1	11:49	6.0	-	—	6	from Jm-15.
			10	3:1	11:52	4.0				
		20	20	3:1	11:53	8.6				
			20	3:1	11:58	7.0				
		20	20	3:1	12:03	5.5				
				3:1	12:04	8.0				
		20	20	3:1	12:06	7.8				
		30	40	3:1	12:14	6.0				
		40	40	3:1	12:19	5.4				
			40	3:1	12:26	4.0				
			40	3:1	12:27	9.5				
		40	40	3:1	12:32	8.5				
			40	3:1	12:36	8.0				
		50	50	3:1	12:44	7.8		4.7		
										Carryover 2.2 bags to 6B-22
										Topped Filled hole 1:1 mix tremie method.

*NOTE: All mix contains 1% interplast per weight of cement

TOTAL USED: 6.5 bags
WASTE: — bags
NET TAKE IN HOLE: 6.5 bags

INSPECTOR J. Wallgren
REVIEWED BY

Casing in Hole _____ Ft.
Type Casing _____
Rep/Contractor Bechtel

BECHTEL POWER CORPORATION
GROUTING LOG

SONGS UNITS 2 & 3

Job No: 1001
Location: Well 6
Hole No: Lm-15
Stage 3

DATE	INTERVAL	PRESSURE MIN	PRESSURE MAX	MIX*	TIME	TANK LEVEL	TAKE CFM	BAGS TAKE	BAGS MIXED	REMARKS
10-5-78	0-90'			Fastbreak						Washed hole - tremie method
		10	20	3:1	2:01	8.5	-	—	-	Carryover 3.5 bags from K-9. Had comm. when grouting K-19.
			20	3:1	2:05	8.2				
		30	30	3:1	2:11	8.2				
		35	40	3:1	2:17	8.0		0.2		
			45	3:1	2:23	8.0	-	-		Carryover 3.3 bags to K-19
										No communication back to K-19.
										Backfilled hole with 1:1 mix - tremie method

*NOTE: All mix contains 1% interplast per weight of cement

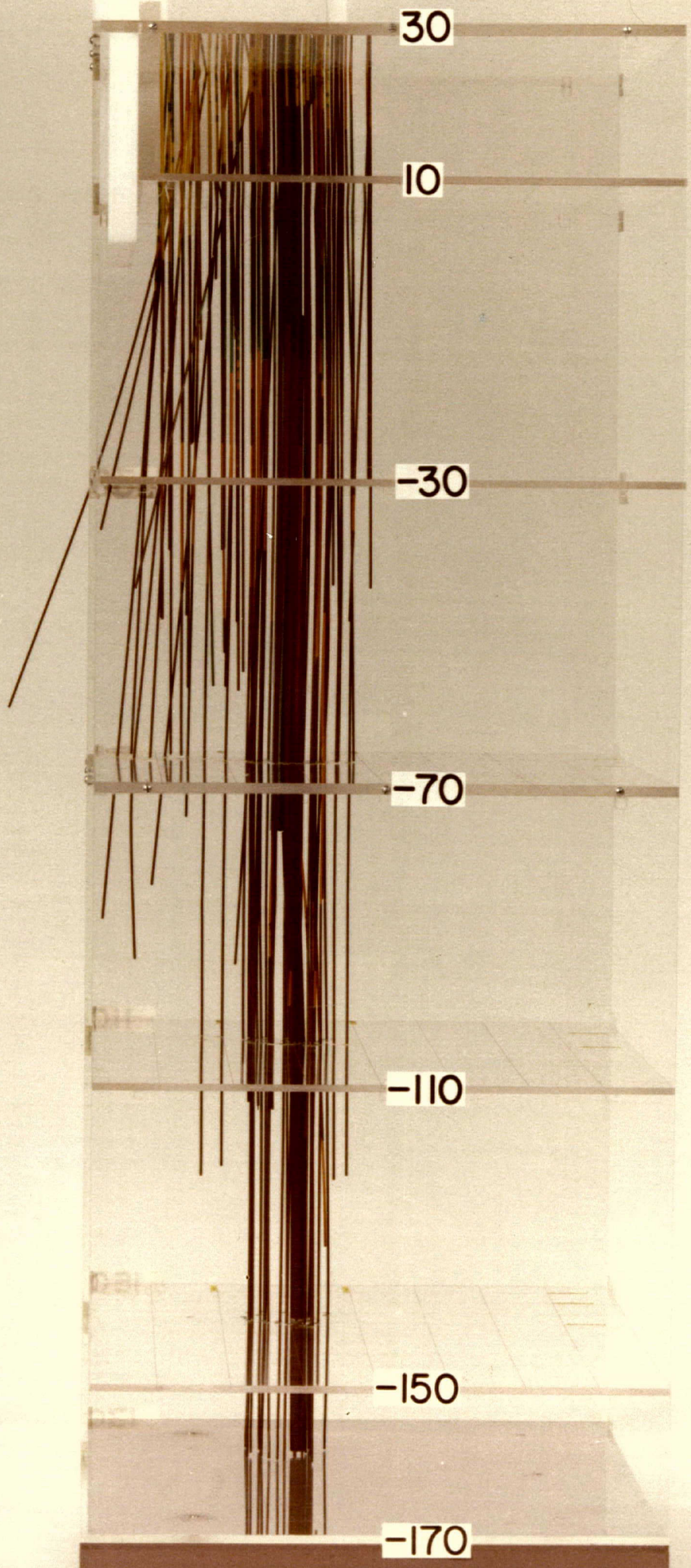
TOTAL USED: 0.2 bags
WASTE: — bags
NET TAKE IN HOLE: 0.2 bags

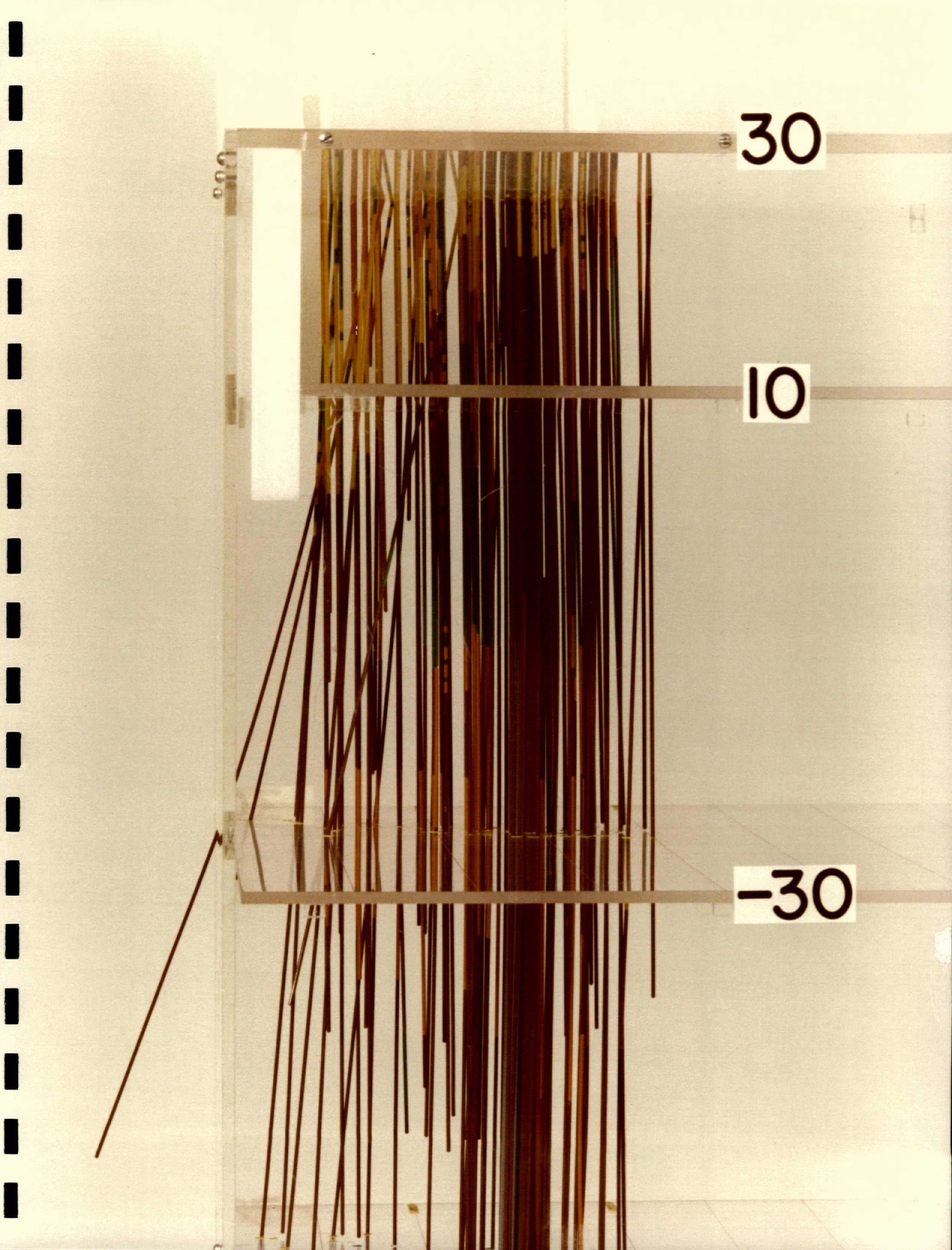
INSPECTOR J. Gallegos
REVIEWED BY [signature]

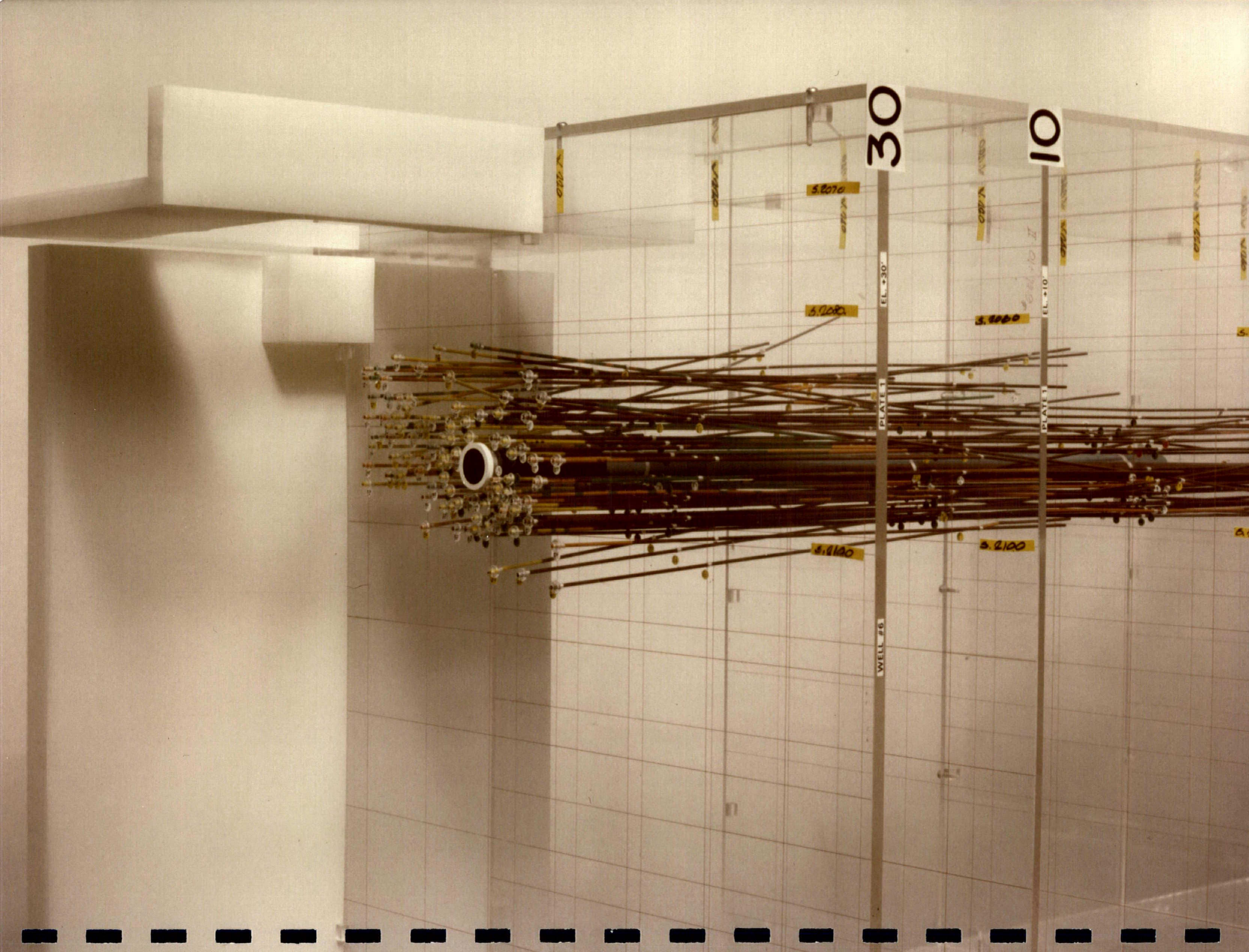
APPENDIX D

The three-dimensional stick model for Well No. 6 is a scale model illustrating the exploration work performed for the Deep Exploration Drilling Program and Exploration/Grouting Program. Scale of the model is 1/4-inch represents 1 foot. The drill holes are depicted by rods placed to the depth of the hole. Different colors represent materials encountered. Brown represents San Mateo Formation, orange represents disturbed sand, green represents either backfill grout (G-3) or grout placed in the Exploration/Grouting Program and yellow represents backfill sand.

The first picture is an overall view looking north at Well No. 6 showing the drill holes in profile from ground surface Elevation +30, to the bottom of the well at Elevation -170. The Unit 2 Fuel Handling Building is in the background and the Unit 2 Radwaste Storage Area is on the left. The second picture is a close-up of the previous view showing the area from Elevation +30 to approximately Elevation -40. The third view is an overhead view looking from about a 45 degree angle. The Unit 2 Radwaste area is in the background and the Fuel Handling Building is on the right. The fourth view is also an overhead view looking in a northwesterly direction along the axis of the cavity at an angle of about 45 degrees. The Radwaste Storage Area for Unit 2 is in the background.


30
10
-30
-70
-110
-150
-170


30
10
-30


30
10
EL. +30'
EL. +10'
PLATE 1
PLATE 1
WELL #6