ENVIRONMENTAL HEALTH RECEIVED

GEOCONSULTANTS, INC.

Consultants in Geology, Hydrology, Engineering

EVALUATION OF TEST WELL "WARHEIT" NO. 1, PESCADERO SAN MATEO COUNTY, CALIFORNIA (AGREEMENT # 6700-83-1247)

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Telephone: (408) 286-4251

Project No. G432-02
May 3, 1983

Mr. Edward H. Barnes
Senior Civil Engineer
Department of Public Works
County of San Mateo
590 Hamilton Street
Redwood City, CA 94063

RE: EVALUATION OF TEST WELL
"WARHEIT" NO. 1, PESCADERO
SAN MATEO COUNTY, CALIFORNIA
(AGREEMENT # 6700-83-1247)

Dear Mr. Barnes:

In accordance with the above Agreement with the County of San Mateo dated January 19, 1983, we have completed an evaluation of the subject test well. This report contains the results of our evaluation which included electrical logging, observation of drilling, sieve analyses of formation samples, and the observation and analysis of a 24-hour pumping test.

If you have any questions concerning the data, conclusions, or recommendations presented, please do not hesitate to call.

Very truly yours,

GEOCONSULTANTS, INC.

Jeremy C. Wire
Engineering Geologist - EG-71

JCW:sen

cc: Mr. John J. Lingemann
Earthflow Drilling Company

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EVALUATION OF TEST WELL
"WARHEIT" NO. 1, PESCADERO
SAN MATEO COUNTY, CALIFORNIA
(AGREEMENT #6700-83-1247)

for:

Mr. Edward H. Barnes

May 3, 1983

EVALUATION OF TEST WELL

"WARHEIT" NO. 1

PESCADERO

SAN MATEO COUNTY, CALIFORNIA

INTRODUCTION

This report presents the results of a test well drilling program to develop a potable water supply for use by a small low-income community housing development. The test well is located near the top of a ridge, a short distance southwest of the intersection of Pescadero and Bean Hollow Roads. Our evaluation of the test drilling was performed in accordance with Agreement #6700-83-1247, County of San Mateo, as authorized on January 19, 1983.

The test drilling program followed recommendations made by Perry R. Wood, Engineering Geologist, in his report to the County, dated September 13, 1982.* The immediate objective was to case, complete, develop, and test pump a 6-inch diameter well to prove the occurrence, quality and quantity of ground water previously discovered by drilling a test hole in the area.

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* Refer to Selected References

SCOPE

The scope of work of this evaluation included the completion of an electrical log, observation of drilling at critical times, and sieve analyses of formation samples in order to select the correct gravel pack and screen slot size for the test well. In addition, we observed drawdown and recovery of the well during a 24-hour pumping test, and analyzed the resulting data. Laboratory analysis of water quality was outside the scope of our work.

TEST WELL DRILLING AND COMPLETION

Drilling

The test well was drilled to a depth of 280 feet at the location shown on the Site Plan, Figure 1. Drilling of the 12-inch diameter hole was done by Earthflow Drilling Company with a rotary-wash rig during the period of April 4 through 7, 1983, and was cased and developed by April 12, 1983.

In general, the well penetrated a sequence of locally clayey, tan to yellow-brown fine to medium-grained sand to total depth. Locally, some intervals were slightly cemented. Details of the lithology of materials penetrated in the hole are contained in the sample log of Appendix A.

An electrical log was made in the test well immediately following the drilling, and generally confirms the nature of the formations penetrated. However, interpretation of the log indicated that the water quality below a depth of 260 feet was poor, and that the total dissolved solids content

(TDS) might exceed acceptable limits for domestic supply. A copy of the log is included in the pocket of this report, and an explanation of the parameters measured by the log is contained in the Appendix.

Completion

Because of the possibility of poor quality water at depth, the test well was cased to a depth of only 247 feet; bentonite was placed in the hole from 250 to 280 feet to serve as a seal against intrusion of poor quality water. PVC casing was used, with 40 feet of .040 slot screen being placed on bottom. No. 8 Monterey Sand (as indicated by sieve analyses, Figure A-1) was used to fill the annulus of the hole and serve as a gravel envelope. A 50-foot concrete collar was placed at the top of the well to serve as a sanitary seal. Following completion, the well was developed by air-lift. Details of the well construction are shown on Figure 2.

Pumping Test

A 24-hour pumping test was run on April 18 and 19, 1983, using a 3 horsepower pump set at a depth of 237 feet in the well. Static water level was 169.5feet. Within one-half hour following the start of the test, the pumping level dropped to 176 feet where it remained until the end of the test. Yield during the test was a constant 22 gallons per minute.

At 24 hours, the well was shut off and the recovery was measured for 110 minutes, by which time the original static

level was reached. Plots of drawdown and recovery ("residual drawdown") observed in the test well are shown on Figures 3 and 4.

WELL CAPACITY

Results of the drawdown and recovery data at the end of the 24-hour test period indicate that the specific capacity is about 3.4 gallons per minute per foot of drawdown. Analysis of the drawdown and recovery data (Figures 3 and 4) using a modification of the Theis non-equilibrium equation indicates that the average transmissivity (T) or capacity of the aquifer to transmit water into the well, is about 23,230 gallons per day per foot of saturated formation penetrated by the well (Figures 3 and 4).

Thus, with 40 feet of net aquifer section open to production, the well is theoretically capable of producing about 650 gallons per minute. However, from a practical standpoint, the indicated specific capacity of 3.4 gallons per minute will limit the maximum drawdown that can be obtained to the top of the screen at 210 feet. From a static water level of 169.5 feet, the maximum drawdown is about 40 feet. The maximum yield that could be obtained from the well is thus about 135 gallons per minute (40 feet x 3.4 gallons per minute per foot), which is slightly more than the capacity of the 6-inch diameter casing, in any event.

Water Quality

Field conductivity measurements suggest that the EC is

500 micromhos at a temperature of 16°C. Thus, the total dissolved solids (TDS) at field temperature is indicated to be about 350 milligrams per liter. We understand that a complete mineral analysis will be made by the County.

CONCLUSIONS AND RECOMMENDATIONS

From the results of this evaluation, we conclude that the test well indicates a satisfactory yield and water quality of ground water can be developed at the site. It appears that the water-bearing strata penetrated by the test well are of sufficient thickness and probable areal extent to supply additional wells in the area, if land for sites is available, and a regional "water balance" of the aquifer system demonstrates that additional yield can be secured in the vicinity without "mining" the ground water.

LIMITATIONS

Environmental changes, either naturally-occurring or artificially-induced, may cause the quality and/or quantity of water produced to change with time. Therefore, we do not guarantee continued production or consistent mineral quality of ground water from any well in the future.

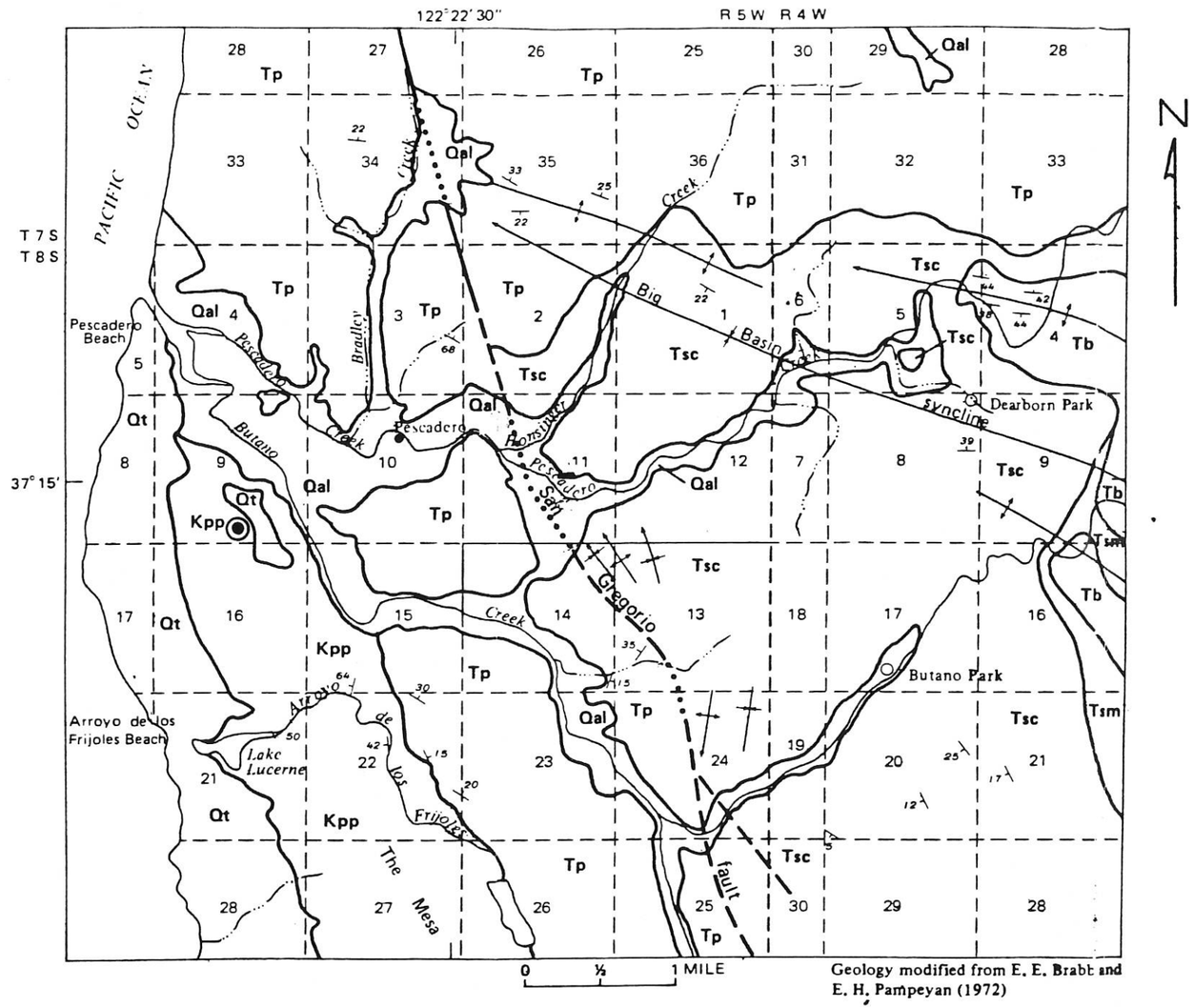
This report, consisting of professional opinions and recommendations, has been made in accordance with generally accepted principles and practices in the field of engineering geology and hydrology. This warranty is in lieu of all other warranties either express or implied.

* * * * * *

SELECTED REFERENCES

Akers, J. P., 1980; The Potential for Developing Ground Water Supplies in the Pescadero Area, San Mateo County, California; U. S. Geological Survey Water Resources Investigations 80-6.

Wood, P. R., 1982; Warheit Water Test Well, Near Pescadero, San Mateo County, California; Report to San Mateo County Department of Public Works; September 13.



From Akers, 1980

◉ Location of Warheit No. 1 Test Well

DESCRIPTION OF MAP UNITS

Qal	ALLUVIUM (HOLOCENE AND PLEISTOCENE)–Gravel, sand, silt, and clay
Qt	TERRACE DEPOSITS (HOLOCENE AND PLEISTOCENE)–Predominantly sand; some silt, clay, and gravel

Unconformity

Tp	PURISIMA FORMATION (PLIOCENE AND MIOCENE)–Siltstone, mudstone, sandstone, and conglomerate
Tsc	SANTA CRUZ MUDSTONE (MIOCENE)
Tsm	SANTA MARGARITA SANDSTONE (MIOCENE)

Unconformity

Tb	BUTANO FORMATION (EOCENE)–Predominantly sandstone, minor shale and conglomerate

Unconformity

Kpp	PIGEON POINT FORMATION (UPPER CRETACEOUS)

EXPLANATION

- Contact–Approximately located
- Fault–Dashed where approximately located; dotted where concealed
- 17 Strike and dip of beds. Number is dip, in degrees
- Anticline–Showing direction of plunge
- Syncline–Showing direction of plunge

SITE PLAN
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A P P E N D I X

APPENDIX

SUBSURFACE EVALUATION

Drilling

One 12-inch diameter test hole was drilled to a depth of 280 feet by a rotary-wash drill rig from Earthflow Drilling Company. This operation was performed from April 4 through 7, 1983. Samples were collected by the driller and were evaluated by our engineering geologist for lithology and water-bearing potential. The sample log of the hole is presented in this Appendix. Following completion of the test hole, a 6-inch diameter PVC casing with 40 feet of screen was set to a depth of 247 feet, to allow development and a 24-hour pumping test to be conducted. The upper portion of the casing was sealed, as discussed earlier and shown on Figure 2.

Electrical Logging

When the test hole was completed, electrical logging was conducted by our engineering geologist. The electrical log measures two quantities. One is the variation of natural electrical current between relatively impermeable clay strata and the more permeable silts, sands, and gravel layers. The drilling water (mud) and the surrounding sediments constitute an electrical resistance. The current flowing through this resistance requires a driving potential (Spontaneous Potential) which is measured in millivolts.

The second quantity is the electrical resistance of the

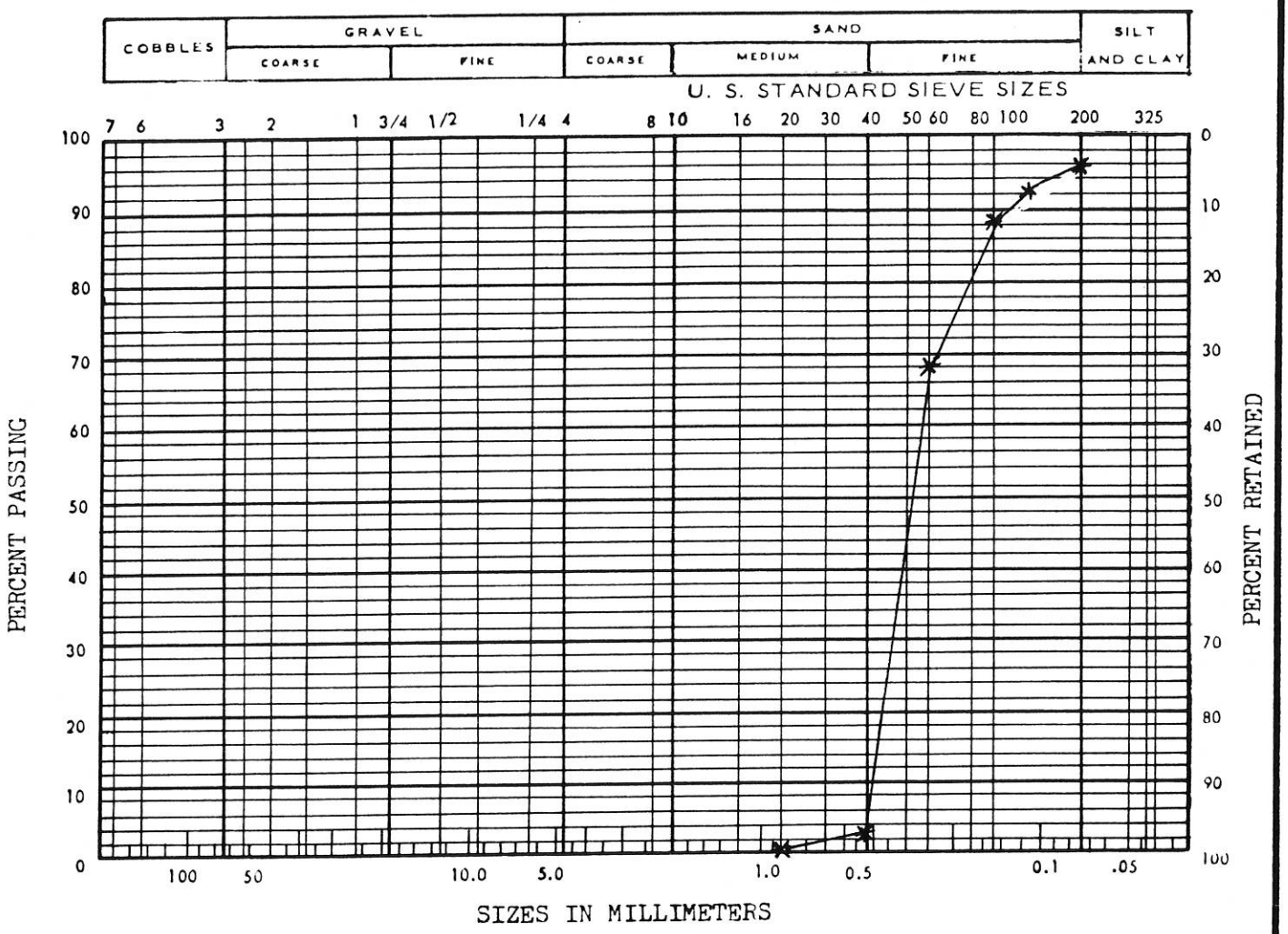
APPENDIX (Continued)

subsurface materials. This resistance is measured in ohms. In general, the more permeable and fresh water-saturated materials display higher resistances.

Sieve Analyses

Two sieve analyses were run on selected samples to serve as a guide in designing the screen and gravel pack. The results are shown on Figures A-1 and A-2.

SIEVE ANALYSIS



SAMPLE NO. _____

LOCATION Warheit Test Well No.1

DEPTH 205'-220'

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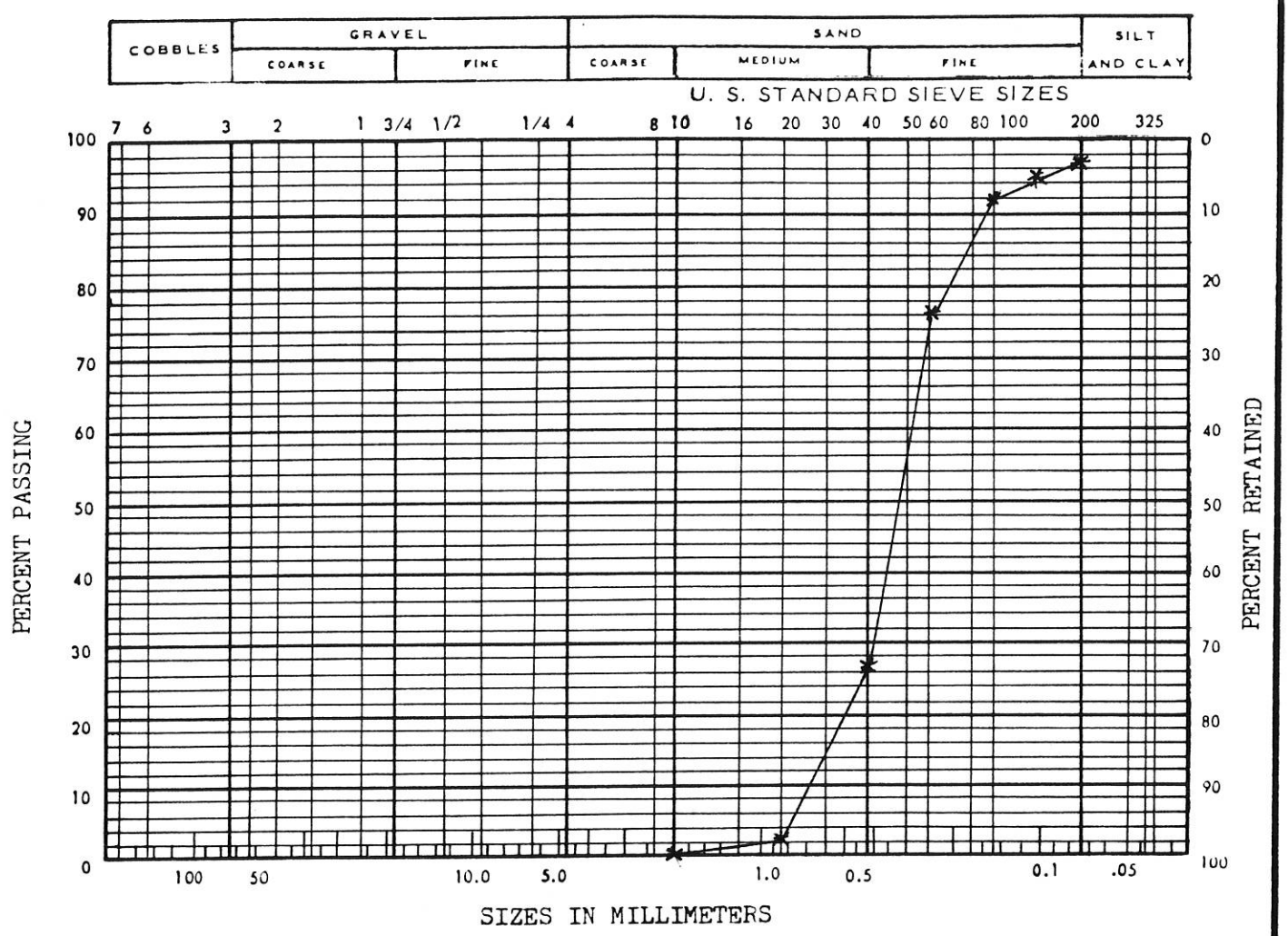
FIGURE A-1

SIEVE ANALYSIS



SAMPLE NO. _____

LOCATION Warheit Test Well No.1

DEPTH 260'-280'

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FIGURE A-2

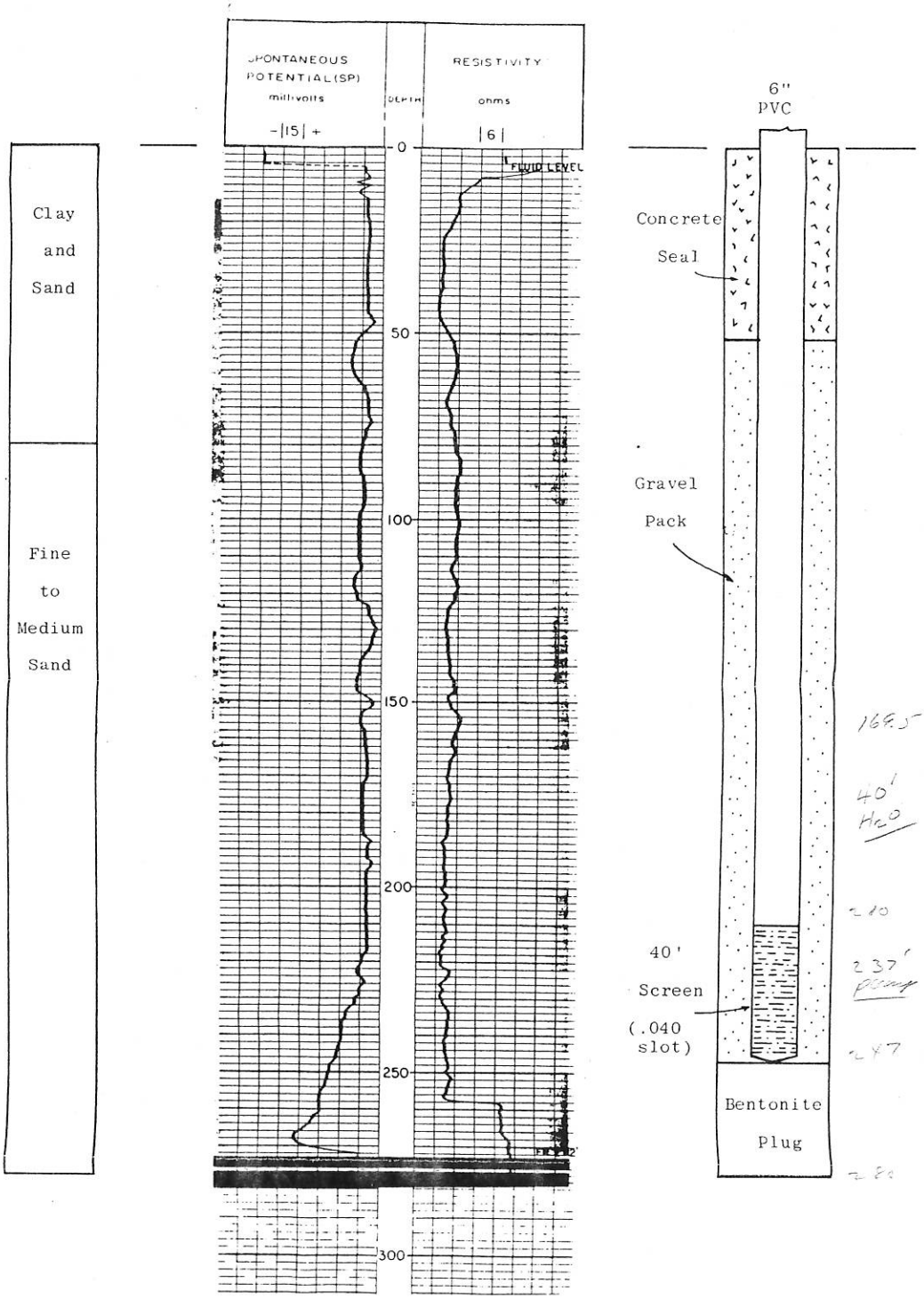
SAMPLE LOG

FEET	DESCRIPTION
0 - 80	Sand; clayey, fine grained, tan color
80 - 280	Sand; fine to medium grained, tan to dark gray; seems to be slightly coarser grained in interval 260 - 280 feet.

SAMPLE LOG

ELECTRICAL LOG

WELL CONSTRUCTION



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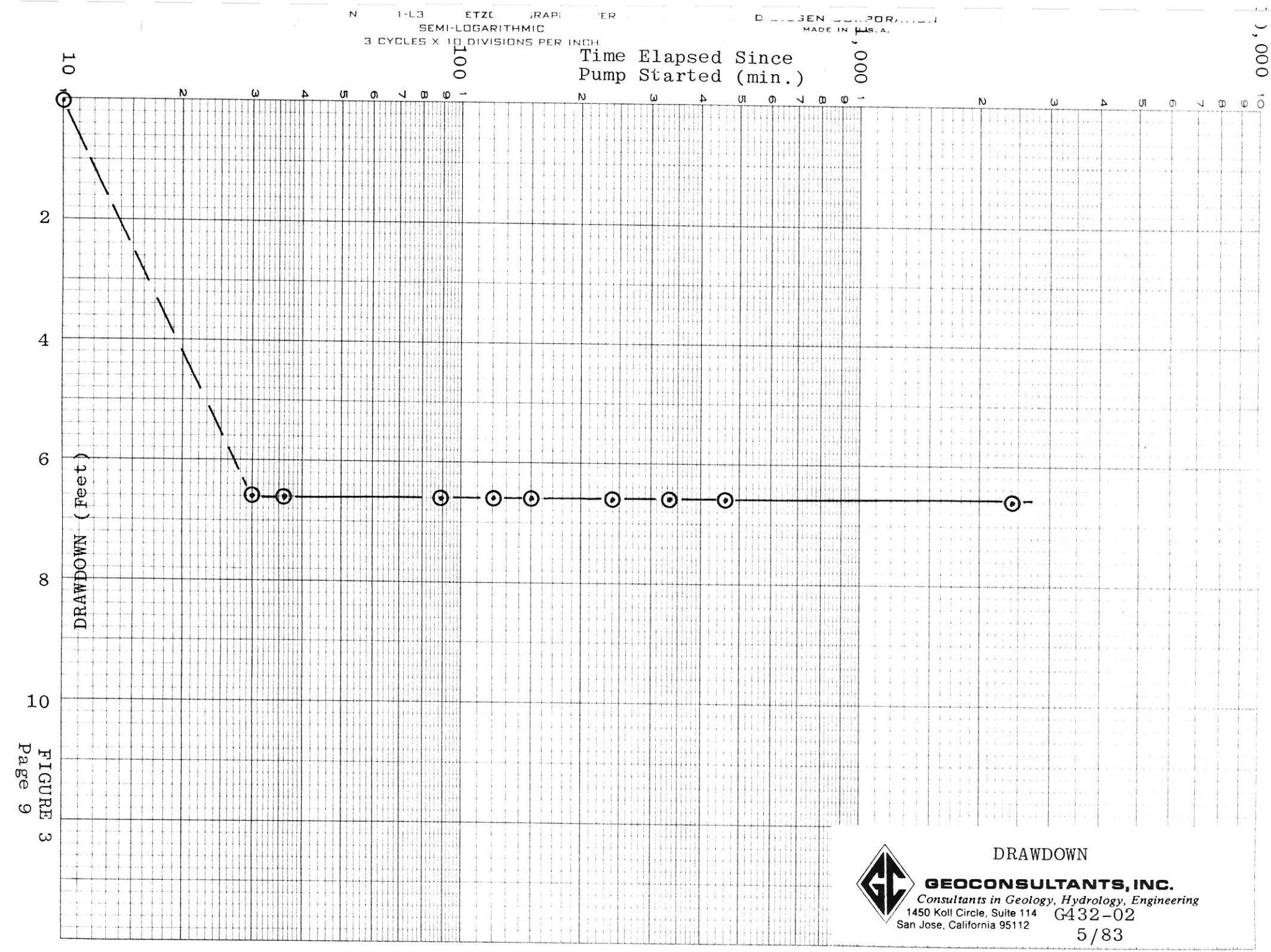

FIGURE 3
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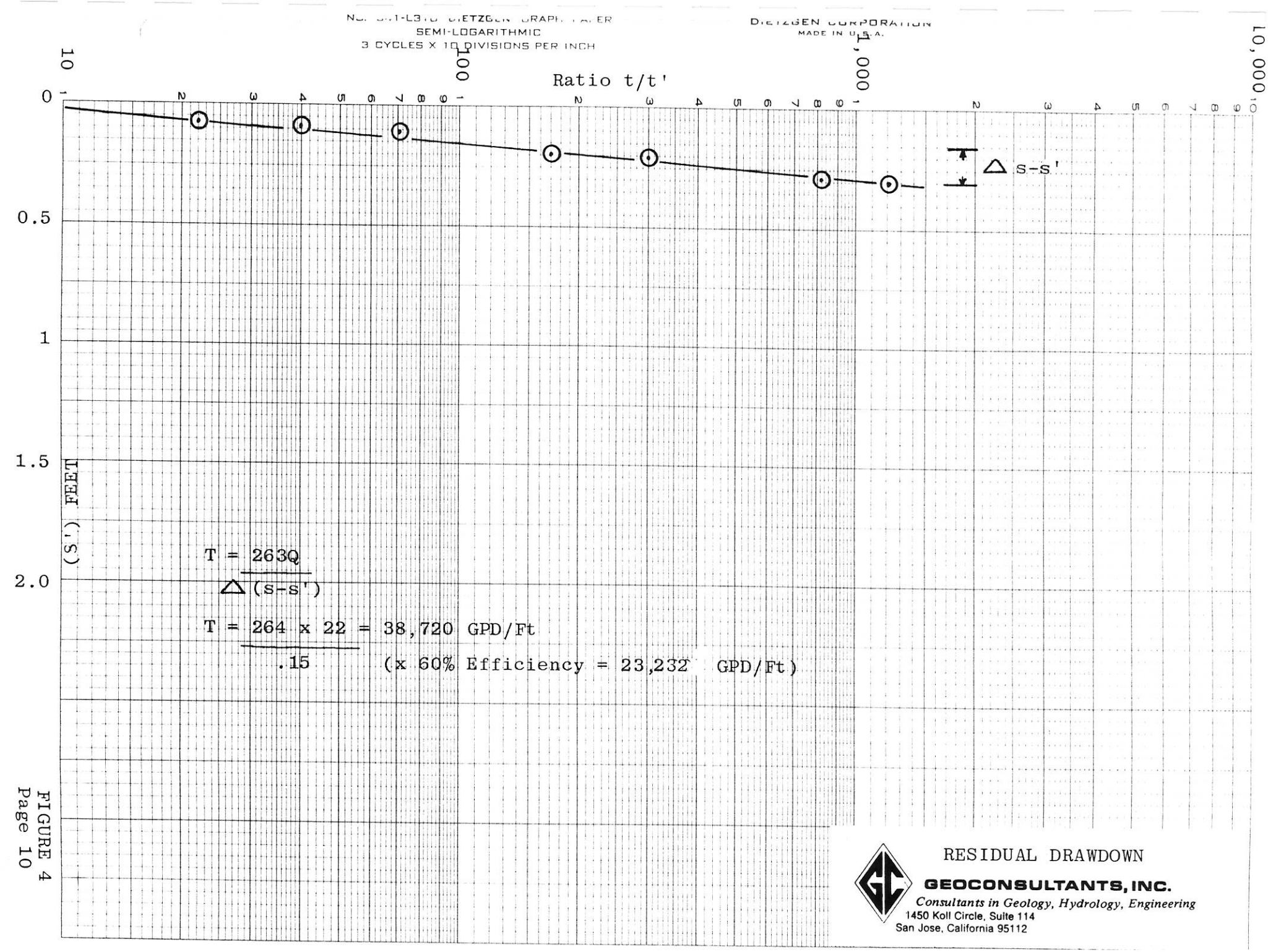

RESIDUAL DRAWDOWN

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FIGURE 4
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