OPEN-FILE REPORT 4

MONITER WELL CONSTRUCTION AND HYDROLOGICAL TESTING, TATUM SALT DOME, LAMAR COUNTY, MISSISSIPPI, MARCH-APRIL 1981

OPEN-FILE REPORT 4

MONITER WELL CONSTRUCTION AND HYDROLOGICAL TESTING, TATUM SALT DOME, LAMAR COUNTY, MISSISSIPPI, MARCH-APRIL 1981

LETTER OF TRANSMITTAL

September 21, 1981

Gentlemen:

The Bureau of Geology is pleased to transmit to you open file report OF-4 entitled "Monitor Well Construction and Hydrological Testing, Tatum Salt Dome, Lamar County, Mississippi, March-April 1981," by Curtis W. Stover, Danny W. Harrelson and W. Howard Johnson. This publication summarizes hydrological testing of the "Local Aquifer" overlying Tatum Dome, and is a contribution to the growing geological information of the state.

Respectfully submitted,

Danny W. Harrelson

Danny W. Harrelson
Chief Ground Water Geologist

DWH:mm

Enclosure

MONITOR WELL CONSTRUCTION AND HYDROLOGICAL TESTING, TATUM SALT DOME, LAMAR COUNTY, MISSISSIPPI, MARCH-APRIL 1981

Prepared by

Curtis W. Stover

Danny W. Harrelson

W. Howard Johnson

Mississippi Department of Natural Resources

Bureau of Geology

OPEN FILE REPORT 4

July 1981

CONTENTS

List of Figures

1.0 Introduction

During March and April 1981, the Mississippi Bureau of Geology conducted a drilling and hydrological testing program at Tatum Salt Dome, Lamar County, Mississippi. Participating in this project were personnel from the Mississippi State Board of Health (Divisions of Radiological Health and Public Water Supply), Mississippi Mineral Resources Institute, and the U. S. Department of Energy - Nevada Operations Office.

2.0 Purpose/Objectives

The purpose of this project was to acquire additional hydrological information on the local aquifer at the Tatum Dome test site in Lamar County. General objectives of this project were to: (1) help determine the approximate rate and direction of ground-water flow in the local aquifer, and (2) provide additional monitor and observation wells to investigate possible migration of any contamination that may be present. Data obtained by this project will supplement data published in the U. S. Department of Energy report NVO-225.

3.0 Authorization

Authorization for the Bureau of Geology to conduct drilling and hydrological testing at Tatum Dome was by letter of agreement dated May 23, 1980, signed by Alton B. Cobb, M.D., State Health Officer, Mississippi State Board of Health, Charlie L. Blalock, Executive Director, Mississippi Department of Natural Resources, and Thomas M. Humphrey, Jr., Tatum Dome Project Manager, Nevada Operations Office, U. S. Department of Energy.

4.0 Drill Site Selection

Two drill sites were selected and mutually agreed upon by officals

of the State of Mississippi and by officials of the U. S. Department of Energy, Nevada Operations Office. The two selected sites provided an ideal over-dome triangulation with previously drilled U. S./D. O. E. well HM-L, located near ground zero. Prior to this project HM-L was the only well on top of the dome completed in the local aquifer. Other desirable site selection qualities were: (1) excellent accessibility by road, (2) excellent to good working and equipment storage area, (3) excellent to fair surface conditions during inclement weather, (4) close proximity to two previously drilled U. S./A. E. C. wells (E-5 and E-7) provided good well control, and (5) no known surface soil or water contamination.

5.0 Pre-Drilling Activities

Several months prior to beginning drilling operations, personnel from the Bureau of Geology and the Division of Radiological Health collected surface soil samples to 6.5 feet in depth at both proposed drill sites. Water samples were collected from Half Moon Creek and from a small branch in the vicinity of U. S./A. E. C. well E-5. All soil and water samples were submitted to the Mississippi State Board of Health laboratory for chemical and radiological analyses. This was done to insure that no possible contaminants from surficial soils or from drilling fluids would be introduced into the local aquifer by drilling operations.

6.0 Drilling Program

On March 23, 1981, the Bureau of Geology began a drilling program at Tatum Salt Dome using the Bureau's Failing 1500 drill rig and supporting equipment. General procedures, responsibilities, and well construction techniques were outlined in a letter of proposal from Mr.

Humphrey dated May 8, 1980. Certain procedural and well construction changes were made during drilling operations which were mutually agreed upon by on-site representatives of participating agencies.

Well construction materials, drilling supplies, special equipment, and on-site services were furnished by Griner Drilling Service, Inc., with the exception of certain services furnished by Mr. B. R. Anderson. Mr. Anderson furnished equipment and labor for road repairs, mud pit construction, and general clean-up or roust-about duties.

Specific objectives of the program were to: (1) drill and construct one six-inch PVC monitor well (designated HM-L2) screened in the local aquifer near U. S./A. E. C. Well E-5, (2) drill and construct one two-inch PVC observation well (designated OW-1) screened in the local aquifer near U. S./A. E. C. Well E-5, and (3) drill and construct one two-inch PVC well (designated OW-2) screened in the local aquifer near U. S./A. E. C. Well E-7.

The order of drilling was OW-2, OW-1, and HM-L2. A 200-gallon portable steel mud pit was used in drilling OW-2 and OW-1 and a dug pit approximately 20 feet long, 8 feet wide, and 4 feet deep was used to drill HM-L2. Resistivity (long and short normal), spontaneous potential, and gamma ray logs were run on all three wells.

6.1 Observation Well OW-2

Location: 535,750 N., 268,350 E., Mississippi Coordinate System, East Zone.

Drilling began 0926 hours, March 24, 1981, and terminated 1700 hours, March 25, 1981, at a total depth of 210 feet. Drilling fluid was obtained from Half Moon Creek and transported to the drill site by vacuum truck. Core samples were collected on 10-foot intervals using

either a thin wall shelby tube or a splitspoon sampler. After recovering a sample from the 160-161 foot interval a mutual decision was made by representatives of participating agencies to cease core sampling. All samples were submitted to State Board of Health personnel for chemical and radiological testing.

Well construction was of 2 inch schedule 40 PVC casing with 10 feet of .008 inch PVC screen set at 180-190 feet (Figure 1). The screened interval was determined by electrical logs.

Well development was accomplished by (1) backwashing clean water through the casing and backwash valve until all drilling fluids were evacuated, (2) high velocity jetting with clean water at 120 p.s.i. through a 3/4 inch pipe fitted with a jetting tool, and (3) blowing the well with compressed air at 40 p.s.i. for approximately one hour. The yield was approximately 20-30 gallons per minute.

The casing was grouted on top of a packer set at 10 feet to the surface using approximately 4 cubic feet of ready-mix cement. A 6-inch hinged steel well cover was constructed over the casing and a 2 foot x 2 foot x 4 inch concrete pad was laid around the well.

6.2 Observation Well OW-1

Location: 537,878.1 N., 267,101.5 E., Mississippi Coordinate System, East Zone

Drilling began 1510 hours, March 26, 1981, and terminated 1144 hours, March 27, 1981, at a total depth of 185 feet. Drilling fluid was pumped from a small branch near the drilling rig. Core samples were recovered from pre-selected depths of 30-31 feet and 60-61 feet using a thin wall shelby tube sampler and from 128-129.5 feet using a splitspoon sampler. All core samples were submitted to State Board of

WELL CONSTRUCTION DIAGRAM

OBSERVATION WELL OW-2

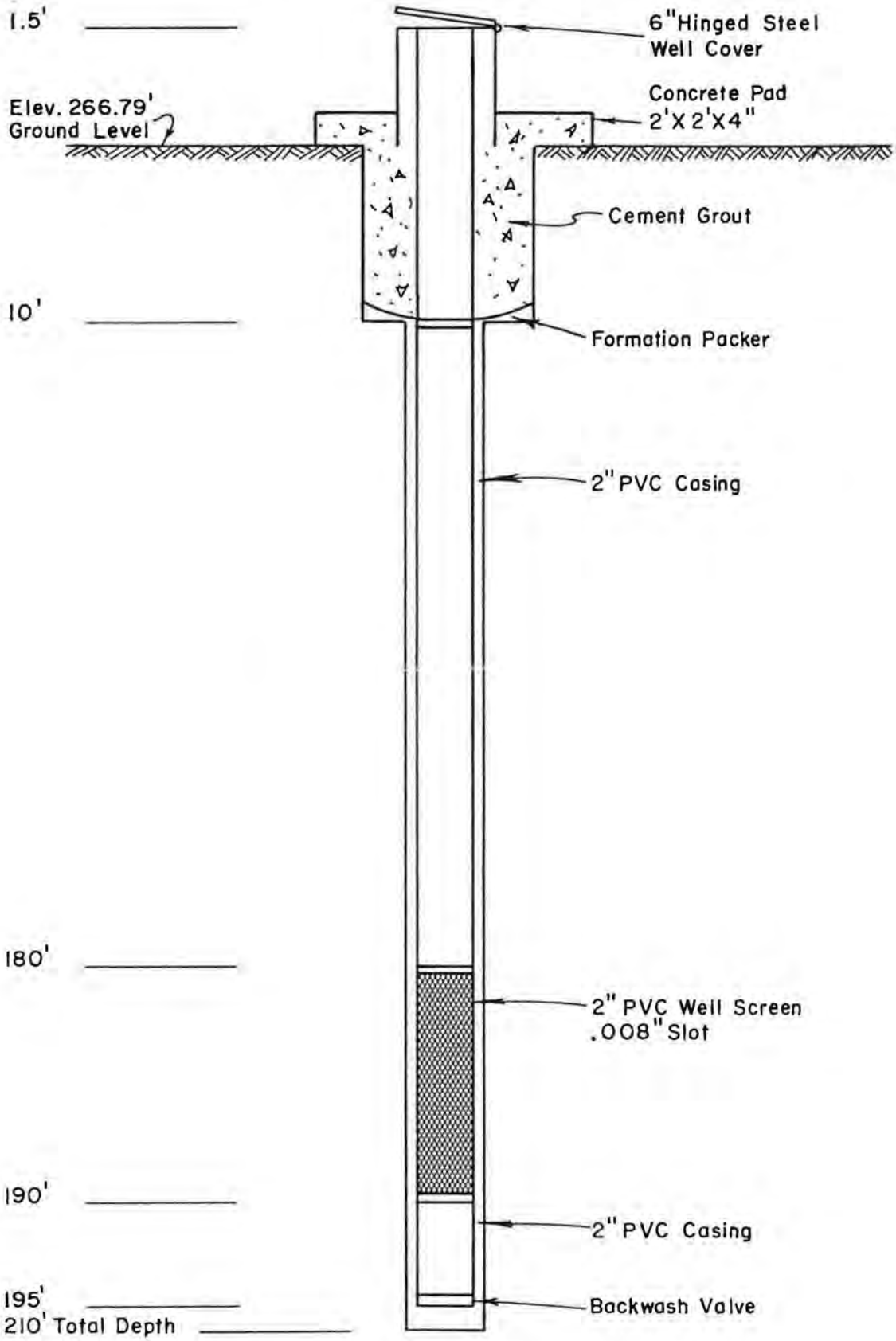


FIGURE 1

Not to Scale

Health personnel for chemical and radiological testing. Cutting samples were collected through all sand zones for sieve analyses.

Well construction was of 2 inch schedule 40 PVC casing with 10 feet of .008 inch PVC screen set at 162-172 feet and 20 feet of .008 inch PVC screen set at 115-135 feet (Figure 2). The screened intervals were determined by electrical logs.

Well development was accomplished by (1) backwashing clean water through the casing and backwash valve until all drilling fluids were evacuated and (2) blowing the well with compressed air at 40 p.s.i. for approximately one hour. The yield was approximately 20-30 gallons per minute.

The casing was grouted on top of a packer set at 14 feet to the surface using approximately 4 cubic feet of ready-mix cement. A 6 inch hinged steel well cover was constructed over the casing and a 2 foot x 2 foot x 4 inch concrete pad was laid around the well.

6.3 Monitor Well HM-L2

Location: 537,878.7 N., 267,221.5 E. Mississippi Coordinate System, East zone

Drilling began 1000 hours, March 31, 1981, and terminated 1145 hours, April 1, 1981, at a total depth of 200 feet. Drilling fluid was pumped from a small nearby branch to a dug pit at the drill site. To facilitate a 6-inch casing the well was first drilled to total depth using a 4 1/2 inch bit, reamed to total depth with an 8 5/8 inch bit, and then reamed to 170 feet with a 12 inch bit. No core samples were taken.

Well construction was of 6 inch schedule 40 PVC casing with 10 feet of .012 inch stainless steel screen set at 178-188 feet (Figure 3).

WELL CONSTRUCTION DIAGRAM

OBSERVATION WELL OW-1

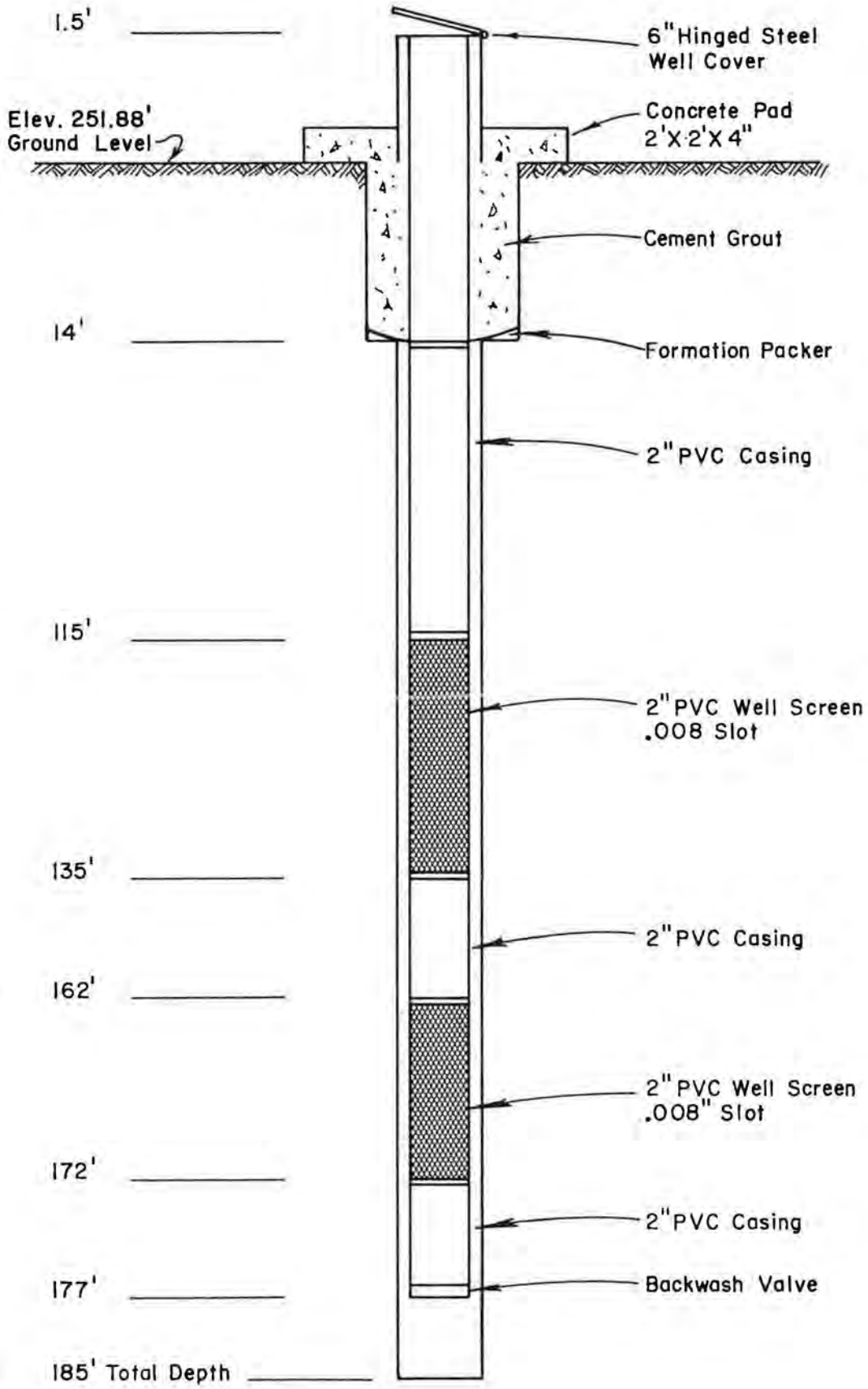


FIGURE 2

Not to Scale

WELL CONSTRUCTION DIAGRAM

MONITOR WELL HM-L2

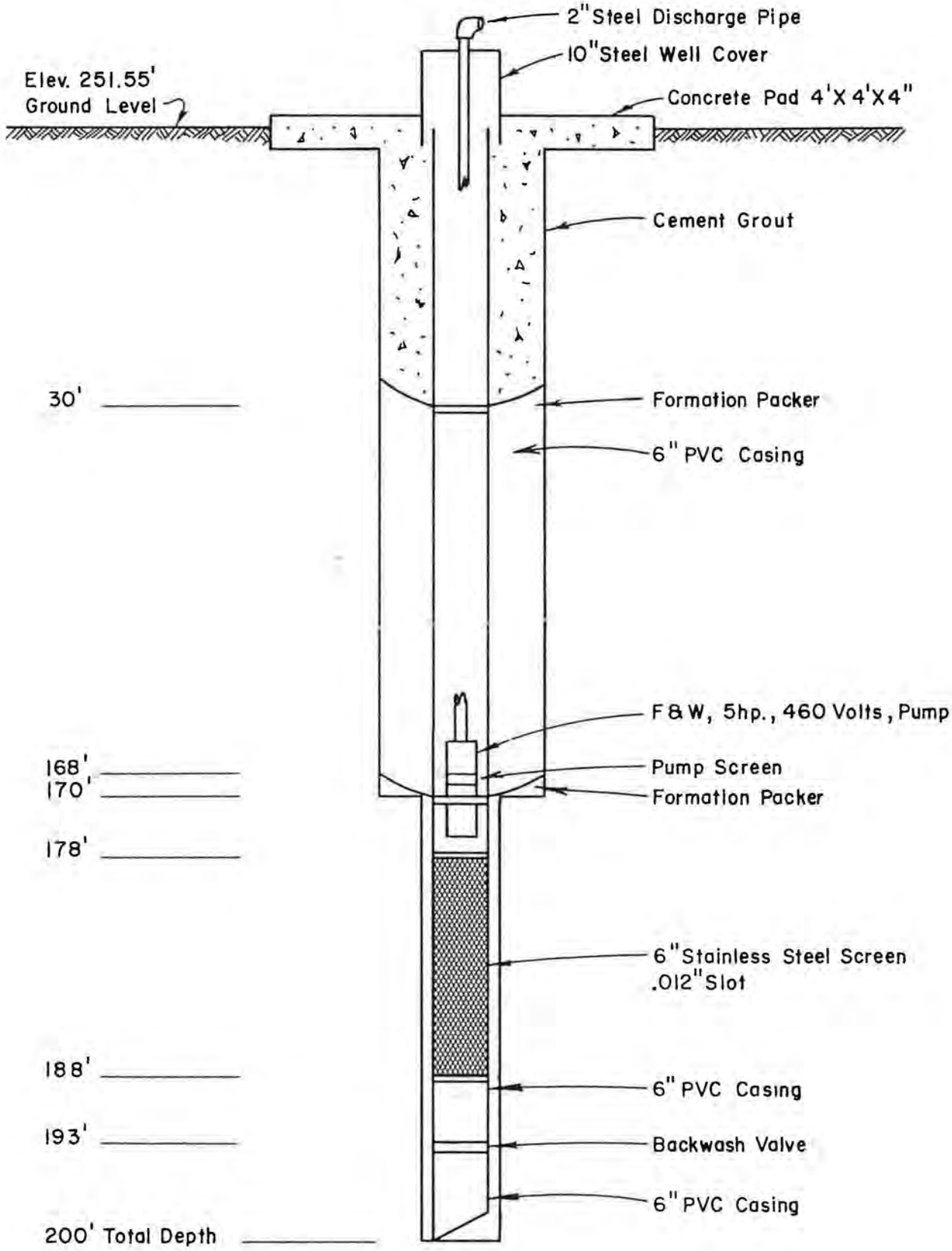


FIGURE 3

Not to Scale

The screened interval was determined by electrical logs and screen size was determined by sieve analyses of samples taken from OW-1 (Figure 4). Formation packers were attached to the casing at depths of 30 feet and 170 feet.

Well development was accomplished by backwashing clean water through the casing and backwash valve until all drilling fluids were evacuated and then alternating water jetting with clean water at 200 p.s.i. and air blowing at 40 p.s.i. This procedure was repeated on 30-minute intervals for 6 hours, yielding approximately 60-70 gallons per minute during air blowing. At the completion of development procedures return water was clear and free of sand.

The casing was grouted on top of a packer set at 30 feet to the surface using approximately 57 cubic feet of ready-mix cement. HM-L2 was completed by constructing a 10-inch well cover over the casing and then laying a concrete pad 4 feet x 4 feet x 4 inches around the well.

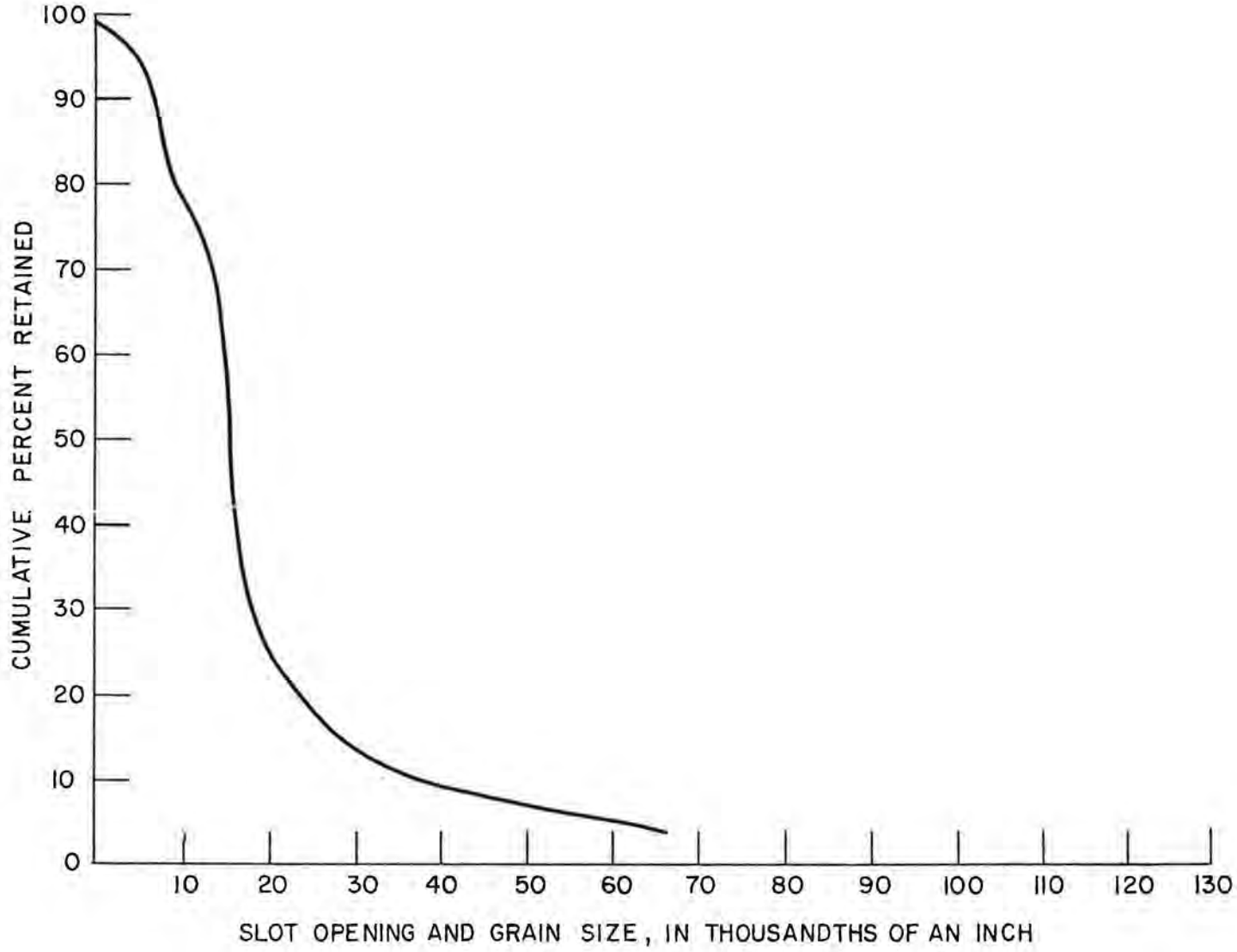
A Flint and Walling, 5 horsepower, 460-volt submersible pump was lowered into the well on 170 feet of 2-inch steel pipe obtained from the Fenix and Scisson pipe yard located at Mr. B. R. Anderson's home. Electrical connections and a permanent power box were installed by a Griner Drilling Company electrician. All electrical connections, pipe fittings, and flow lines necessary for a pump test were installed by 1100 hours, April 6, 1981.

7.0 Hydrologic Program

Personnel from the Ground-Water Section, Bureau of Geology, conducted an aquifer test at the Tatum Dome test site. The purpose of this test was to collect additional hydrologic information about

SAND ANALYSIS

TATUM DOME TEST SITE
WELL OW-1 LOWER SAND



NOTES:
Uniformity Coeff = 2.0
Recommended Slot Opening #12
Recommended Screen: Dia. 6"- Length 10'

FIGURE 4

the local aquifer in order to better determine rate and direction of ground-water flow in that aquifer.

The pump in HM-L2 was started 1400 hours, April 6, 1981. Rate of discharge and drawdown data for HM-L2, HM-L, OW-1, and OW-2 were recorded at specified intervals for a 24-hour period. Water samples were collected hourly for the first 6 hours by personnel of the Mississippi State Board of Health and the U. S./E. P. A. The pump was shut off at 1400 hours, April 7, 1981, and recovery data were collected for an additional 24 hours. Subsequent water-level measurements were recorded in all four wells at later dates.

HM-L2, OW-1, and OW-2 were completed in the "local aquifer" (Miocene undifferentiated) overlying Tatum Dome (Figure 5). These wells and other previously constructed wells (HM-L, HT-2C) were used to gather data to calculate the rate and direction of ground-water movement, transmissibility, permeability, and storage coefficient of the local aquifer (Figures 5-9). HM-L2 was pumped at an average discharge of 69 g.p.m. (open discharge) for 1440 minutes (24 hours). Discharge measurements were obtained by using a 4 inch orifice pipe, 2 1/2 inch orifice plate, and a piezometer tube. Water level data were recorded simultaneously at HM-L2 and OW-1 for the duration of the drawdown and recovery portions of the test. A transducer was utilized to provide drawdown/recovery data at HM-L2 and an electric tape was used to determine the water levels at OW-2, HM-L, and HT-2C (see appendix). During the drawdown portion of the aquifer test, the transducer at HM-L2 was lowered to within one foot of the top of the pump before the test was curtailed.

The data obtained from HM-L2 and OW-1 were used to calculate the

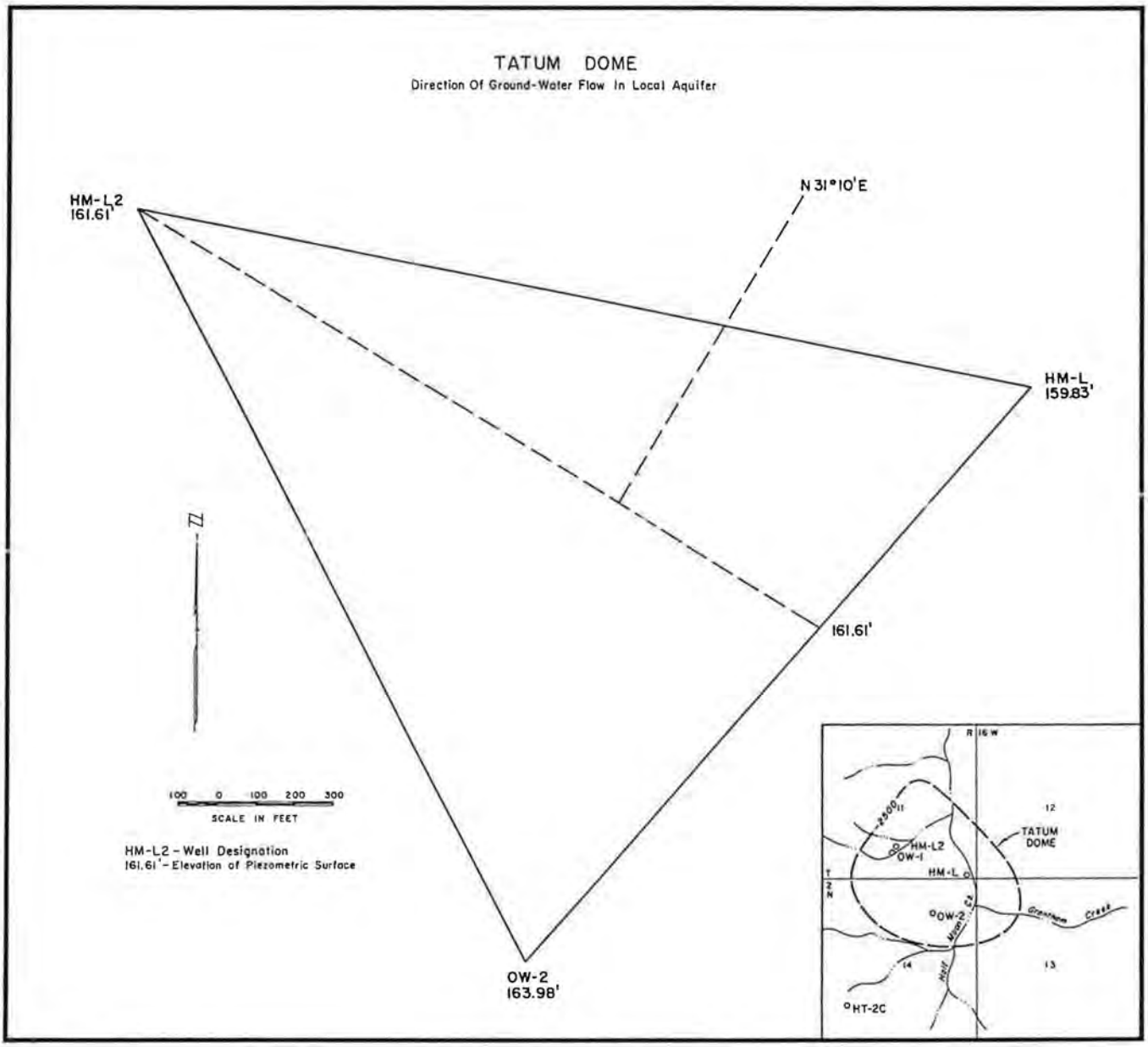
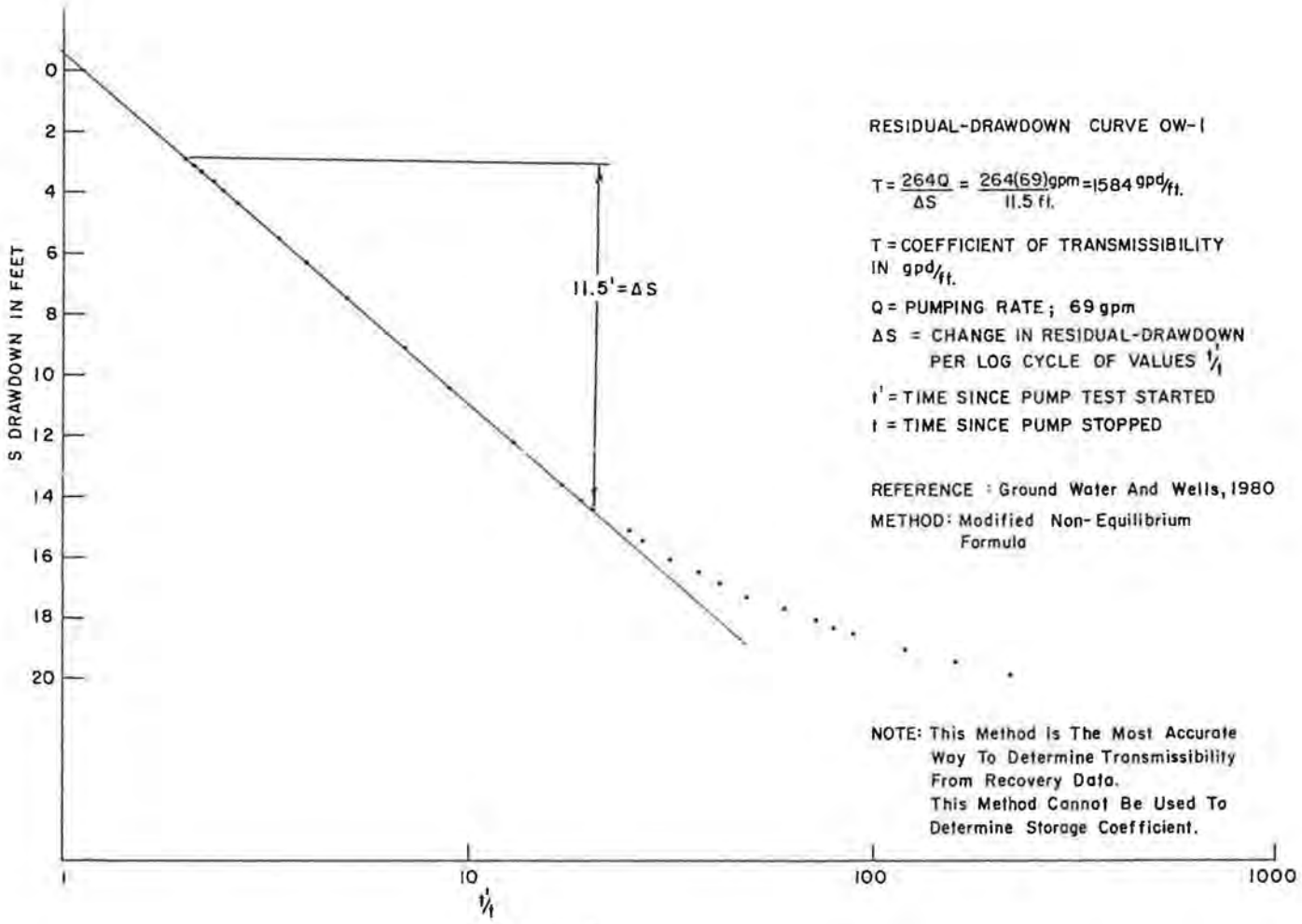

TATUM DOME
Direction Of Ground-Water Flow In Local Aquifer
HM-L2
161.61'
N 31°10'E
HM-L
159.83'
161.61'
OW-2
163.98'
100 0 100 200 300
SCALE IN FEET
HM-L2 - Well Designation
161.61' - Elevation of Piezometric Surface
R 16 W
12
TATUM
DOME
HM-L2
OW-1
HM-L
OW-2
Grayhorn Creek
14
13
HT-2C

FIGURE 5

RESIDUAL-DRAWDOWN CURVE OW-1



RESIDUAL-DRAWDOWN CURVE OW-1

$T = \frac{264Q}{\Delta S} = \frac{264(69)\text{gpm}}{11.5\text{ ft.}} = 1584\ \text{gpd/ft.}$

T = COEFFICIENT OF TRANSMISSIBILITY IN gpd/ft.

Q = PUMPING RATE; 69 gpm

ΔS = CHANGE IN RESIDUAL-DRAWDOWN PER LOG CYCLE OF VALUES t'/t

t' = TIME SINCE PUMP TEST STARTED

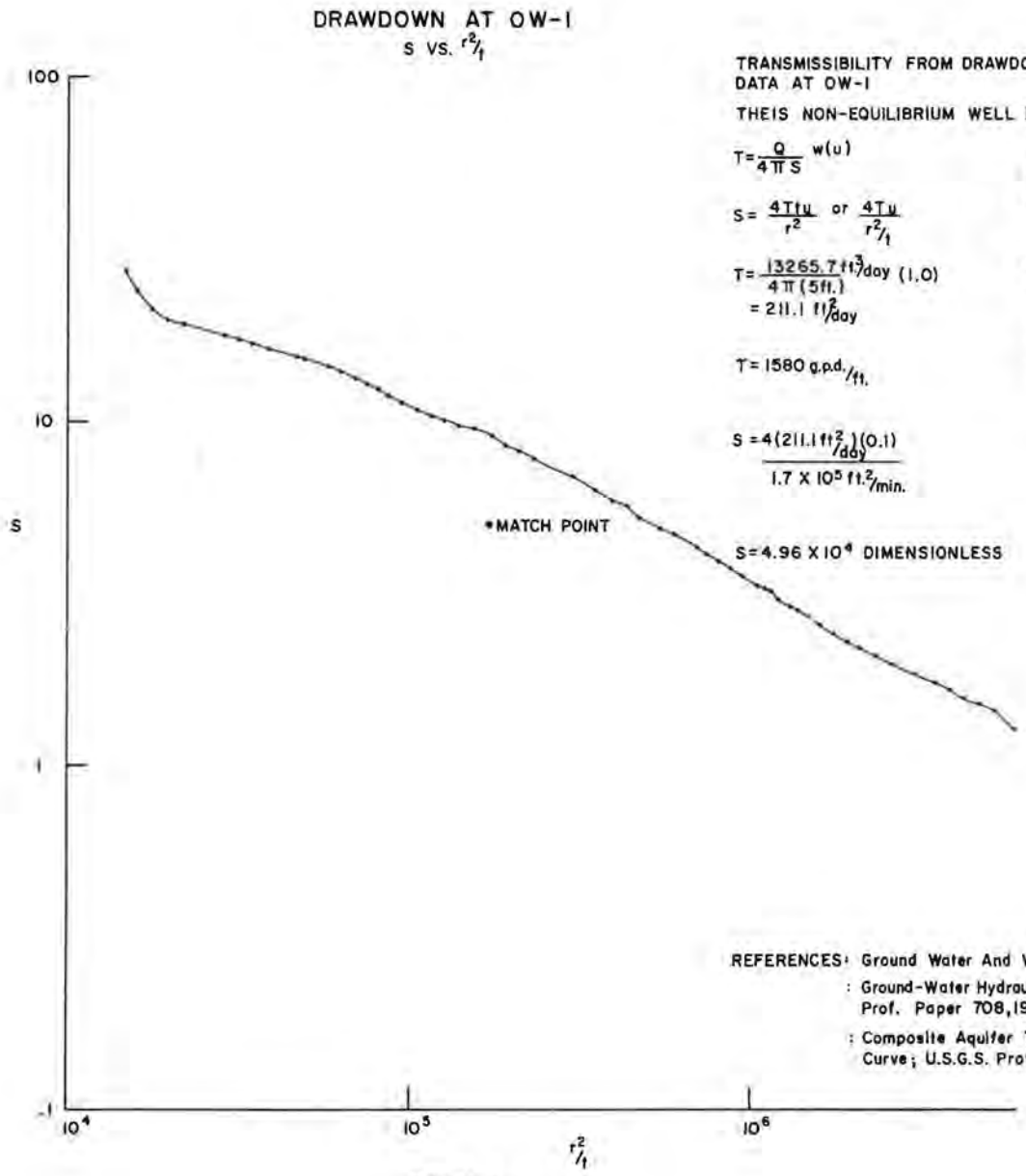
t = TIME SINCE PUMP STOPPED

REFERENCE : Ground Water And Wells, 1980

METHOD: Modified Non-Equilibrium Formula

NOTE: This Method Is The Most Accurate Way To Determine Transmissibility From Recovery Data. This Method Cannot Be Used To Determine Storage Coefficient.

FIGURE 6



TRANSMISSIBILITY FROM DRAWDOWN DATA AT OW-I

THEIS NON-EQUILIBRIUM WELL FORMULA

$$T=\frac{Q}{4\pi S}\,w(u)$$

$$S=\frac{4Ttu}{r^2} \text{ or } \frac{4Tu}{r^2/t}$$

$$T=\frac{13265.7\ ft^3/day\ (1.0)}{4\pi\ (5ft.)}$$

$$=211.1\ ft^2/day$$

$$T=1580\ g.p.d./ft.$$

$$S=\frac{4(211.1\ ft^2/day)(0.1)}{1.7\times10^5\ ft.^2/min.}$$

$S=4.96\times10^{-4}$ DIMENSIONLESS

T = TRANSMISSIBILITY
S = STORAGE COEFFICIENT
Q = FLOW RATE; 13265.7 $ft.^3/day$

MATCH POINT VALUES:
$r^2/t = 1.7\times10^5\ ft^2/min.$
s = 5ft.
u = 0.1 DIMENSIONLESS
w(u) = 1.0 DIMENSIONLESS
r^2 = (DISTANCE BETWEEN HM-L2 & OW-1, 120')^2
t = TIME IN MINUTES

REFERENCES: Ground Water And Wells, 1980
: Ground-Water Hydraulics, U.S.G.S. Prof. Paper 708, 1979
: Composite Aquifer Test Type Curve; U.S.G.S. Prof. Paper 1545-C

FIGURE 7

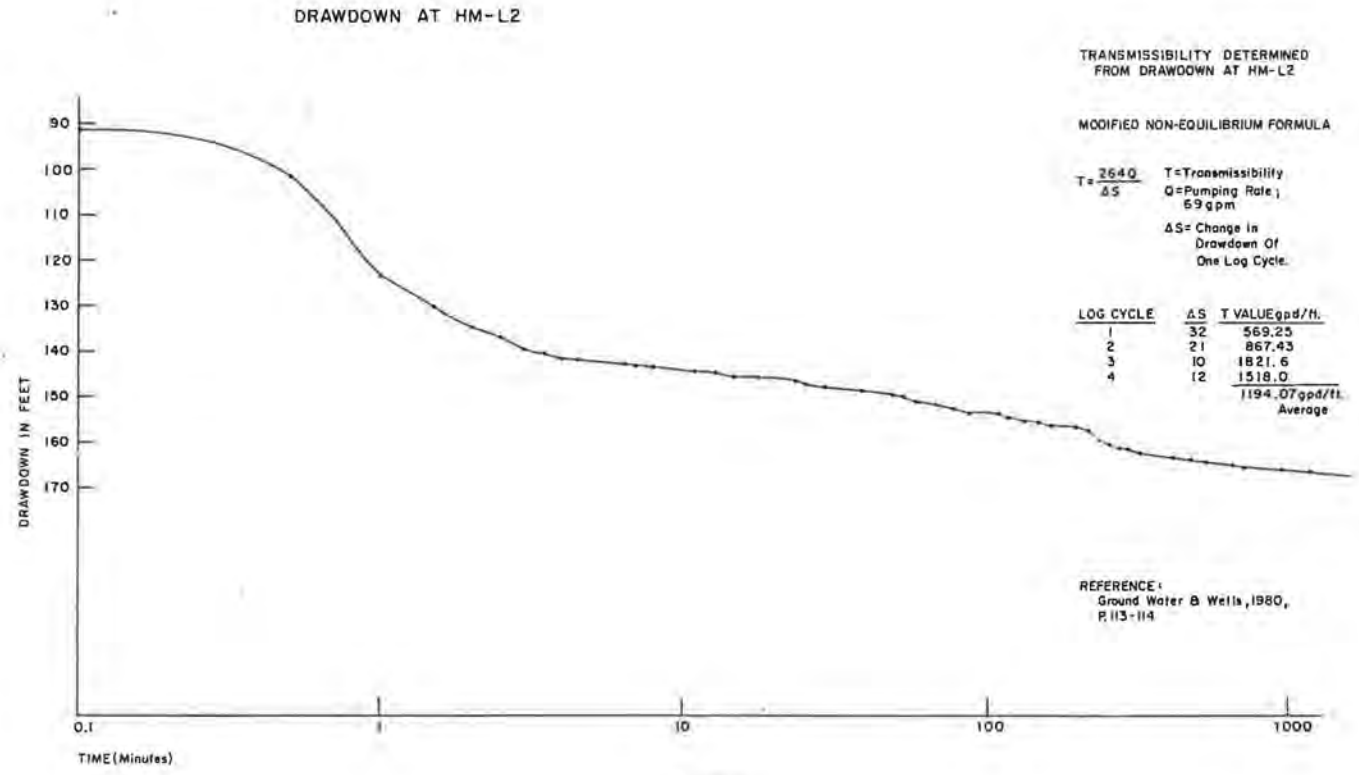

DRAWDOWN AT HM-L2
TRANSMISSIBILITY DETERMINED FROM DRAWDOWN AT HM-L2
MODIFIED NON-EQUILIBRIUM FORMULA
T = 264Q / ΔS
T=Transmissibility
Q=Pumping Rate; 69 gpm
ΔS= Change in Drawdown Of One Log Cycle.
LOG CYCLE | ΔS | T VALUE gpd/ft.
1 | 32 | 569.25
2 | 21 | 867.43
3 | 10 | 1821.6
4 | 12 | 1518.0
1194.07 gpd/ft. Average
REFERENCE: Ground Water & Wells, 1980, P. 113-114
DRAWDOWN IN FEET
90
100
110
120
130
140
150
160
170
0.1
1
10
100
1000
TIME (Minutes)

FIGURE 8

Figure 9a. Ground-Water Velocity Calculations

Method I. Permeability determined from transmissibility at OW-1

Reference: U. S. Geological Survey Professional Paper 708, 1979, p. 6.

$$P = \frac{T}{b}$$

P = Permeability

T = Transmissivity at OW-1, 210.93 $\frac{ft^3pd}{ft}$; determined from transmissibility of 1580 $\frac{gpd}{ft}$

b = Thickness of aquifer, 10 ft.

$$P = \frac{210.93 \frac{ft^3pd}{ft}}{10 \text{ ft}}$$

$$P = 21.093 \frac{ft}{day}$$

Darcy's Law $V = PI$ and $Q = AV$

V = Velocity

P = Permeability, 21.093 $\frac{ft}{day}$

I = Hydraulic gradient; $\frac{11.46 \text{ ft}}{5280 \text{ ft}}$

Q = Volume of flow

A = Area of a 1 foot wide section of 10 foot thick aquifer; 10 ft^2

Velocity: $V = 21.093 \frac{ft}{day} \left(\frac{11.46 \text{ ft}}{5280 \text{ ft}}\right)$

$$V = .0458 \frac{ft}{day} \text{ or } 16.72 \frac{ft}{year}$$

Volume: $Q = 10 \text{ ft}^2 \left(.0458 \frac{ft}{day}\right)$

$$Q = .456 \frac{ft^3}{day} \text{ or } 3.41 \text{ g.p.d.}$$

Figure 9b.

Method II. Permeability determined from equilibrium formula

Reference: Ground Water and Wells, 1980, p. 106.

$$P = \frac{528\ Q\left(\log \frac{r_2}{r_1}\right)}{M\ (h_2 - h_1)}$$

P = Permeability

Q = Pumping rate, 69 g.p.d.

r_2 = Distance to OW-2 from HM-L2; 2,215.67 ft.

r_1 = Distance to OW-1 from HM-L2; 120.13 ft.

M = Thickness of aquifer; 10 ft.

h_2 = Head at OW-2, measured from bottom of aquifer, 84 ft.

h_1 = Head at OW-1, measured from bottom of aquifer, 60 ft. Head measurements were made after 24 hours of pumping.

$$P = \frac{528\ (69\ \text{gpd})\left(\text{Log}\ \frac{2215.67\ \text{ft}}{120.13\ \text{ft}}\right)}{10\ \text{ft}\ (84\ \text{ft} - 60\ \text{ft})}$$

$$P = 192.15\ \frac{\text{gpd}}{\text{ft}^2}\ \text{or}\ 25.65\ \frac{\text{ft}}{\text{day}}$$

Darcy's Law $V = PI$ and $Q = AV$

V = Velocity

P = Permeability, $25.65\ \frac{\text{ft}}{\text{day}}$

I = hydraulic gradient; $\frac{11.46\ \text{ft}}{5280\ \text{ft}}$

Q = Volume of flow

A = Area of a 1 foot wide section of 10 foot thick aquifer, 10 ft^2

Velocity: $V = 25.65\ \frac{\text{ft}}{\text{day}}\ \left(\frac{11.46\ \text{ft}}{5280\ \text{ft}}\right)$

$$V = .05567\ \frac{\text{ft}}{\text{day}}\ \text{or}\ 20.32\ \frac{\text{ft}}{\text{year}}$$

Volume: $Q = 10\ ft^2 \left(.05567 \frac{ft}{day}\right)$

$Q = .5567 \frac{ft^3}{day}$ or 4.17 g.p.d.

coefficient of transmissibility in the local aquifer. The coefficient of storage was calculated from OW-1 drawdown data. Drawdown data from HM-L2 (the pumping well) is not considered very accurate, because within the immediate vicinity of the pumped well there can be some fluctuation of the hydrostatic head. These fluctuations however are smoothed out with distance from the pumped well (Ground Water and Wells, p. 93). Analysis of the drawdown data from HM-L2 by the modified non-equilibrium formula indicates an average transmissibility coefficient value of 1194.07 gpd/ft. Higher values were obtained during latter portions of the test after the rate of water level decline had stabilized.

Observation well 1 (OW-1) located 120.25 feet from HM-L2 is far enough away from the pumping well that hydrostatic head fluctuations will not interfere with water level measurements. Analyzing OW-1 drawdown data by the Theis non-equilibrium well formula indicates a transmissibility coefficient of 1580 gpd/ft and a storage coefficient of 4.96×10^{-4}. Residual drawdown data from OW-1 were analyzed by the modified non-equilibrium formula, resulting in a transmissibility coefficient of 1584 gpd/ft.

7.1 Rate and Direction of Ground-Water Movement

The direction of ground-water movement within the local aquifer was determined by measuring the static water levels at HM-L2, OW-2, and HM-L. These water level values were used in a three point problem to obtain a direction of ground-water movement of north 30° 10' east (Figure 5). The velocity of ground-water movement was calculated by use of Darcy's Law which involves multiplying the permeability coefficient by the hydrologic gradient. The hydrologic gradient was calculated to be 11.46 feet per mile. Two permeability coefficients were

obtained by using the methods described in "Ground-Water Hydraulics," U. S. G. S. Professional Paper 708, 1979, p. 6, and "Ground Water and Wells," 1980, p. 106 (Figure 9). These two permeability coefficients indicate ground-water velocities of 16.72 feet per year and 20.32 feet per year respectively.

8.0 Post-Drilling and Hydrologic Testing Activities

After completion of drilling and well construction all equipment rented from Griner Drilling Company and not needed for the pump test was picked up and returned by Griner personnel. The HM-L2/OW-1 site was scraped and leveled with a grader blade and all trash or garbage was buried in the HM-L2 mud pit. Drilling equipment, tools, and supporting equipment belonging to the Bureau of Geology and not needed for the pump test were cleaned and hosed down at Half Moon Creek. This equipment and all Bureau personnel not needed for the pump test were released for return to Jackson 1600 hours, April 5, 1981.

After completion of the pump test all remaining equipment rented from Griner Drilling Company was picked up and returned by Griner personnel. Materials borrowed from the Fenix and Scisson pipe yard and not used for well construction were returned. Unused materials purchased from Griner were returned for credit.

Invoices which were to be submitted to Fenix and Scisson for materials, rental equipment, and services by both Griner Drilling Company and Mr. B. R. Anderson were reviewed and verified by the Bureau of Geology on-site representative.

All remaining Bureau of Geology personnel and equipment departed the Tatum Dome test site 1600 hours, April 8, 1981.

Surveying data were provided by personnel from the Mississippi

State Board of Health. Well elevation data were submitted to the Bureau of Geology May 28, 1981, and well location data were submitted June 5, 1981.

9.0 Summary

During March and April 1981, the Mississippi Bureau of Geology drilled two observation wells (OW-1 and OW-2) and one monitor well (HM-L2) which can be added to the long-term radiological monitoring program presently being conducted by the U. S./D. O. E. and U. S./ E. P. A. at the Tatum Dome test site. Valuable information concerning the thickness and areal extent of the local aquifer has been gained in drilling these wells. The hydrologic tests have provided more definitive data concerning the rate and direction of flow of ground water in the local aquifer. Additional information has been gained concerning the presence or absence of radiological contaminants in the local aquifer away from ground zero.

10.0 Acknowledgments

A number of individuals representing several state agencies worked as a team to drill and construct these wells and to generate data necessary for this report. In recognition of those who provided not only professional expertise but many hours of hard labor, their agencies, names, and titles are listed below.

Mississippi Mineral Resources Institute

David Booth, Geologist

Mississippi State Board of Health

Warren Green, Engineer

Mississippi Bureau of Geology, Ground-Water Section

Jimmy Bradshaw, Geologic Aide, Driller

Danny Harrelson, Geologist

Howard Johnson, Geologist

Charlie Smith, Geologic Aide

Mississippi Bureau of Geology, Environmental Geology Section

Bob Merrill, Geologist

Mike Seal, Geologist

Mark Smith, Geologist

Curtis Stover, Geologist

APPENDIX

APPENDIX

Contents

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114

MAY 8 1980

Dr. Alton B. Cobb
State Health Officer
Mississippi State Board
of Health
P. O. Box 1700
Jackson, MS 39205

Mr. Charlie Blalock
Executive Director
Mississippi Department
of Natural Resources
P. O. Box 20305
Jackson, MS 39209

Gentlemen:

Your letter of April 17, 1980, with the enclosed suggestion for a three-well hydrologic and water-quality study of the Local Aquifer on top of Tatum Salt Dome has been received and reviewed with much care.

Dr. Paul Fenske, Senior Hydrologist, Desert Research Institute, has determined that the direction of groundwater flow in the Local Aquifer is to the northwest and that the rate of flow is on the order of 10 to 15 feet per year. Dr. Fenske's findings are based on data from the HM-L well, the HT-2C well, and the Purvis municipal well. Because of the approximate eight miles distance and marked stratigraphic changes noted over shorter distances, the precise stratigraphy of the Purvis well can be questioned. Therefore, we are in agreement with you that this program to provide data that cannot be questioned, to determine the rate and direction of flow in the Local Aquifer over the Dome should be carried out.

The Local Aquifer was the only potable aquifer found to contain any radiological material in excess of background. The Local Aquifer was found to contain a maximum concentration of tritium on the order of 1/3 the concentration allowable in a community drinking water system.

The DOE/NV fully approves of the program being carried out on a cooperative basis between Mississippi State organizations and the DOE/NV. We have no objections with the proposed hole locations. However, during exploratory drilling in the 1960's some amount of brine based drilling fluid was lost to the formation in the area to the northwest of ground zero (E-5). For that reason, a slight increase in salinity may be noted in water sampled from this area. For the purposes of this program, we believe this to be the best location for a monitoring well.

We have made only very minor modifications and additions to the suggested program and we hope that these meet with your approval. We are prepared to initiate the program when your approval is received.

Sincerely,

ORIGINAL SIGNED BY
THOMAS M. HUMPHREY

Thomas M. Humphrey, Jr.
Manager
Tatum Dome Project

Enclosure:
Suggested Program

cc w/encl:
Honorable William F. Winter,
Governor
Honorable William A. Allain,
Attorney General

PURPOSE

This project is being developed primarily to acquire additional hydrological information on the Local Aquifer at the Tatum Dome Test Site in Lamar County, Mississippi. The general objectives of this project are to: 1) help determine the approximate rate and direction of groundwater flow in the Local Aquifer over Tatum Dome, and 2) provide additional monitor and observation wells to investigate the possible migration of any contamination that may be present in the Local Aquifer. We propose to construct one permanent monitor well capable of producing 150 gpm and two observation wells of sufficient size to accurately determine the water level in the Local Aquifer over the salt stock. These new wells will be monitored concurrently with wells HT-2C and HM-L to accomplish the above objectives.

PARTICIPATING AGENCIES

I. Department of Energy, Nevada Operations Office (DOE/NV)

The DOE/NV and its support contractor's major areas of responsibility are:

A) Provide all materials required to complete the proposed construction.

B) Provide subcontracts for field services and on-site supervision for these services.

II. Bureau of Geology, Mississippi Department of Natural Resources (DNR/BOG)

The DNR/BOG's major areas of responsibility are:

A) Furnish Failing 1500 drill rig, equipment and crew to complete proposed construction.

B) Furnish logging unit and operator to run electric and natural gamma ray logs on each hole.

C) Provide geological and hydrological advice and/or assistance as required.

III. Mississippi State Board of Health (MSBH)

A) Division of Radiological Health (MSBH/RH)

1) Provide radiological analyses using federally owned equipment at the site, sample ground water brought to the surface by pumping and analyze any soil samples collected.

2) Perform all radiological surveys of equipment and decontamination procedures as required.

3) Provide radiological monitoring in the field as required.

B) Division of Water Supply (MSBH/WS)

1) Coordinate chemical analyses and sampling of ground water brought to the surface by pumping.

2) Provide routine field chemistry on water samples as required.

3) In coordination and in concurrence with DNR/BOG provide technical specifications for well design and construction.

4) Provide a surveyor, equipment, and crew to establish all elevations and locations as required.

5) Perform all sand analyses.

The DNR/BOG and the MSBH are requested to make any necessary contractural arrangements with the site owner relative to site entry and reparation for damage prior to initiation of the hydrologic program.

MATERIAL SPECIFICATIONS

1. Polyvinyl Chloride (PVC) casing and screen shall conform to all requirements of Commercial Standard CS-207-60, Type 1, Grade 1, Schedule 40 dimensions.

   Casing and screen sections shall bear the National Sanitation Foundation seal of approval and comply with the requirements of Type 1, Grade 1 of the ASTM resin spec d-1784-65T.

   Casing sections should not exceed 20' in length.

   Joints: Solvent weld joints shall be of the bell end type with a socket depth of not less than one pipe diameter. The solvent used in the welding process shall be as recommended by the pipe manufacturer.

   Screen shall be factory slotted and sections should not exceed 20 feet in length.

2. All required PVC fittings shall be schedule 40 dimensions.

3. Formation Packers - suitable formation packers for above installation.

TECHNICAL SPECIFICATIONS

General Statements

1. All depths have been taken from an induction electric log run in instrument holes E-5 and E-7 and are subject to reinterpretation.

2. The screen slot size will be determined from analysis of the sand from the water bearing strata.

3. All casings are to be extended at least 18 inches above ground surface.

4. A concrete pad approximately 5' x 5' x 6" will be constructed around each well.

Location

1. The proposed site for the monitor well and one observation well is in the approximate vicinity of instrument hole E-5. The proposed site for the second observation well is in the general vicinity of instrument Hole E-7 (equipment storage yard).

2. The on site technical representatives of DOE/NV, MSBH/WS and DNR/BOG or their designees shall concur on the final well sites.

Test Hole

1. DNR/BOG shall mobilize a drill rig and drill a hole not less than 4 inches in diameter to a depth sufficient to penetrate the Local Aquifer (±180').

2. DNR/BOG shall keep an accurate log of all formations and depths at which each were encountered.

3. Soil samples will be collected at 10' intervals with a split barrel, thin wall tube and/or other appropriate sampling device.

4. Soil samples shall be stored in suitable containers and marked with all pertinent data.

5. After the hole has been drilled to the complete depth, the DNR/BOG shall run an electric log and natural gamma ray log on the full depth of hole.

Observation Well

1. Observation well No. 1 will be constructed in the test hole as shown on Plate No.1.

Observation Well, continued

2. Install ±10 feet of 2 inch PVC screen opposite each of the major aquifer sands and extend the 2 inch casing to 18 inches above ground surface and clamp off in tension.

3. Cement casing in place from the surface with cement grout or pea gravel concrete (see materials list) and allow to cure for a minimum of 12 hours.

4. Develop well and demobilize rig.

5. After the three wells have been developed and after an appropriate recovery time has elapsed, obtain a depth to water measurement in all three wells and also HM-L and HT-2C within the shortest possible time span. All depth to water measurements should be repeated after approximately four hours.

6. Observation well No. 2 will be constructed using same procedure and materials as O.W. #1. O.W. #2 will be located in the general vicinity of E-7 (equipment storage yard), (see Plate 2).

Monitor Well (HM-L-2)

1. HM-L-2 will be located approximately 50' from O.W. #1.

2. DNR/BOG will mobilize a drill rig and drill a 12" hole to a depth as determined by test hole drilling (see Plate 3).

3. Drill an 8-5/8" hole from the base of the 12 inch hole to ±180'.

4. Run an electric log and a natural gamma ray log on full depth of hole.

5. Install ±45 feet of 6 inch PVC screen opposite the aquifer sands and extend the 6 inch PVC casing to 18 inches above ground surface and clamp off in tension.

6. Cement casing in place from the surface with cement grout or pea gravel concrete (see materials list) and allow to cure for 12 hours.

7. Develop well.

8. After the three wells have been developed and after an appropriate recovery time has elapsed, obtain a depth to water measurement in all three wells and also HM-L and HT-2C within the shortest possible time span. All depth to water measurements should be repeated after approximately four hours.

Monitor Well (HM-L-2), continued

9. Install 150 gpm pump with airline and conduct adequate aquifer test.

10. After completion of necessary sampling, replace pump with 50 gpm monitoring pump and add well to annual monitoring program network.

11. Demobilize drill rig.

12. Install pump house.

Any procedural changes in these operations must mutually be agreed upon by the on-site representatives of the participating agencies.

Performance acceptance of each of the aforementioned activities shall be agreed to and concurred in by the on-site representatives of participating agencies.

LIST OF MATERIALS

± 180 feet of 6" PVC casing

± 50 feet of 6" PVC screen

± 380 feet of 2" PVC casing

± 40 feet of 2" PVC screen

12 6" x 6" PVC couplings

20 2" x 2" PVC couplings

2 6" PVC caps

4 2" PVC caps

2 6" x 14" formation packers

2 2" x 6" formation packers

1 Flint & Walling pump Model 50FF11 with all electrical equipment, pump column and discharge line, fittings, etc.

2 2" PVC threaded couplings and steel caps

Adequate supply of cement grout or pea gravel concrete (± 5 yds^3)

Adequate supply of revert drilling mud

Small pump house

160' of 1/4" copper tubing, gage and necessary fittings for airline

Miscellaneous (fittings, valves, lumber, etc. as needed)

MISSISSIPPI
STATE BOARD OF HEALTH
2423 NORTH STATE STREET, P. O. BOX 1700
JACKSON, MISSISSIPPI 39205

ALTON B. COBB, M.D., M.P.H.
STATE HEALTH OFFICER

May 23, 1980

United States Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, Nevada 89114

Attention: Thomas M. Humphrey, Jr.
Manager, Tatum Dome Project

Gentlemen:

On April 17, 1980, the State of Mississippi, through the Department of Natural Resources and the State Board of Health, submitted to your organization a proposal relative to a three-well hydrologic and water-quality study of the Local Aquifer on top of Tatum Salt Dome. Your counter-proposal of May 8, 1980, has been received and reviewed by technical representatives of both Agencies.

On May 22, 1980, during a telephone conversation between Mr. Ronald Forsythe, Mississippi State Board of Health, Division of Radiological Health, and Mr. Thomas Humphrey, Jr., Department of Energy/Nevada Operations Office, a proposed change on your suggested "List of Materials" page was discussed. It was suggested by Mr. Forsythe that the copper tubing specification for the airline be changed to plastic tubing. The change was agreed to by Mr. Humphrey. No other changes were noted and the State is prepared to enter into final and formal Agreement with the Department of Energy concerning the proposed project.

With the exception of the aforementioned change, the State does hereby agree to your proposal submitted under letter of cover dated May 8, 1980, signed by Thomas M. Humphrey, Jr., Manager, Tatum Dome Project. This letter is intended to

satisfy the requirements of the Agreement between duly authorized signatory representatives of the State of Mississippi and the Department of Energy.

Agreed to and approved of
this 23rd day of May, 1980.

Alton B. Cobb, M.D.
State Health Officer
Mississippi State Board
of Health

Charlie L. Blalock
Executive Director
Mississippi Department of
Natural Resources

Agreed to and approved of
this 2 day of June, 1980.

Thomas M. Humphreys Jr.
Nevada Operations Office
United States Department
of Energy

ABC - CLB/og

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114

JUN - 2 1980

Dr. Alton B. Cobb
State Health Officer
Mississippi State Board
of Health
P. O. Box 1700
Jackson, MS 39205

Mr. Charlie Blalock
Executive Director
Mississippi Department
of Natural Resources
P. O. Box 20305
Jackson, MS 39209

Gentlemen:

This responds to your Letter of Agreement dated May 23, 1980, two copies of which have been signed and are returned to you to satisfy the requirements between the duly authorized signatory representatives of the State of Mississippi and the Department of Energy, Nevada Operations Office.

It is my understanding that work will commence on or about June 2, 1980. I look forward to participating in this cooperative venture.

Sincerely,

Thomas M. Humphrey, Jr.

Thomas M. Humphrey, Jr.
Manager
Tatum Dome Project

Enclosure:
As stated

cc w/encl:
Honorable William F. Winter,
Governor, State of Mississippi
Honorable William A. Allain,
Attorney General, State of
Mississippi

cc w/o encl:
Mr. Eddie S. Fuente, Dir.,
Div. of Radiological Health,
Jackson, MS
Mr. John W. Green, Bureau of
Geology, Jackson, MS

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114

MAY 2 8 1980

Mr. Jack A. Cross
Manager, Las Vegas Branch
Fenix & Scisson, Inc.
Post Office Box 15408
Las Vegas, NV 89114

Dear Mr. Cross:

This is your authorization to provide funding not to exceed $13,263.00 for the materials listed on the last page of the attached agreement between Mississippi and the DOE/NV. These materials, or their less expensive equivalents, are to be made available at the Tatum Dome Site, Lamar County, Mississippi, through the Griner Drilling Service, Inc. of Columbia, Mississippi. They are to be made available at the verbal request of Mr. Curtis Stover, Mississippi Bureau of Geology, or his designee, who will be performing tool pusher chores for this operation.

The drilling program for which the materials will be used is scheduled to start at 8:00 A.M. on June 2, 1980. Please notify the Griner Drilling Service, Inc. of these arrangements.

Sincerely,

Thomas M. Humphrey, Jr.

Thomas M. Humphrey, Jr.
Manager
Tatum Dome Project

Enclosure:
As stated

cc w/o encl:
Mr. Curtis Stover/Mr. John W. Green, Bureau of Geology, Jackson, MS
Griner Drilling Service, Inc.
Columbia, MS

BUREAU OF GEOLOGY
BORING LOG

HOLE NUMBER Tatum Dome OW-2 COUNTY Lamar DATE 3-24-81

LOCATION 535,750 N., 268,350 E.

ELEVATION 266.79' TOTAL DEPTH 210' T.D. ELEC. LOG Yes

DRILLER J. Bradshaw, C. Smith GEOLOGIST M. Smith

REMARKS Located in-line with and half-way between auger holes GSY-4 and GSY-5, Bureau has samples.

DEPTH	DESCRIPTION
0' - 2'	Clay; brown, silty
2' - 22'	Clay; gray, stiff, slightly silty, iron-stained, becomes sandy at 10'
22' - 88'	Clay; green, slightly silty, very silty from 56'-58', thin sand layer from 62'-64', several thin streaks of yellowish-brown, very silty clay from 74'-77'
88' - 96'	Clay; mottled gray and brown, becomes brown, very hard, and shaly at 93'
96' - 109'	Clay; green, moderately stiff, several thin sand streaks(no recovery)
109' - 110'	Sand; fine-grained quartz, green interstitial clay
110' - 112'	Silt; green, very soft
112' - 128'	Clay; green very stiff, slightly silty, several sand streaks from 125'-128'
128' - 150'	Silt; green, clayey, several thin streaks of gray, sandy clay
150' - 156'	Sand; fine-grained quartz, silty, green interstitial clay
156' - 176'	Clay; green, very silty
176' - 190'	Sand; medium- to coarse-grained quartz and chert, some pea-gravel, black gravel up to 1cm in size
190' - 210' T.D.	Clay; green, slightly silty
	Core Samples
10' - 11.5'	Shelby Tube
20' - 21.5'	Shelby Tube
30' - 31.5'	Shelby Tube
40' - 41.5'	Shelby Tube
50' - 51.5'	Shelby Tube
60' - 61.5'	No Recovery

BUREAU OF GEOLOGY
BORING LOG

HOLE NUMBER Tatume Dome OW-2 COUNTY Lamar DATE 3-24-81

LOCATION

ELEVATION TOTAL DEPTH ELEC. LOG

DRILLER GEOLOGIST

REMARKS

DEPTH	DESCRIPTION
70' - 71.5'	Split Spoon
78' - 79.5'	No Recovery
88' - 89.5'	Shelby Tube
100' - 101.5'	No Recovery
110' - 11.5'	Split Spoon
120' - 121'	Shelby Tube
130' - 131'	Shelby Tube
140' - 141'	Shelby Tube
150' - 151'	Shelby Tube
160' - 161'	Shelby Tube

BUREAU OF GEOLOGY
BORING LOG

HOLE NUMBER Tatum Dome OW-1 COUNTY Lamar DATE 3-26-81

LOCATION 537,878.1 N., 26,101.5 E.

ELEVATION 251.88' TOTAL DEPTH 185' T.D.' ELEC. LOG Yes

DRILLER J. Bradshaw, C. Smith, M. Seal GEOLOGIST M. Smith

REMARKS Bureau has samples located approx. 50' from HM-L2

DEPTH	DESCRIPTION
0' - 2'	Clay; yellow, stiff
2' - 17'	Clay; gray, with iron staining, moderately stiff
17' - 108'	Clay; green stiff, soft from 17'-23', 3' layer of chocolate brown clay at 53', at 58'-61' clay is fractured and shot-through with hard jagged fragment of rock
108' - 134'	Sand; very fine-grained quartz, silty, green interstitial clay
134' - 136'	Clay; green, stiff, silty
136' - 142'	Sand; very fine-grained quartz, silty, green interstitial clay
142' - 162'	Clay; gray-green, soft, stiff in streaks
162' - 172'	Sand; fine- to medium-grained quartz
172' - 177'	Clay; gray-green stiff
177' - 178'	Sand; fine- to medium-grained quartz, green interstitial clay
178' - 185' T.D.	Clay; gray-green, stiff
	Core Samples
30' - 31'	Shelby Tube
60' - 61'	Shelby Tube
128' - 129.5'	Split spoon

BUREAU OF GEOLOGY
BORING LOG

HOLE NUMBER Tatum Dome HM-L2 COUNTY Lamar DATE 3-31-81

LOCATION 537,878.7 N., 267,221.5 E.

ELEVATION 251.55' TOTAL DEPTH 200' T.D. ELEC. LOG Yes

DRILLER J. Bradshaw, C. Smith, M. Seal GEOLOGIST M. Smith

REMARKS

DEPTH	DESCRIPTION
0' - 2'	Clay; yellow, stiff
2' - 14'	Clay; gray, with iron-staining, stiff
14' - 112'	Clay; green, stiff, slightly silty
112' - 120'	Clay; green, soft, silty
120' - 130'	Sand; fine- grained quartz, silty, green interstitial clay, 2' layer of green, silty clay 124'-126'
130' - 148'	Clay; gray-green, silty, moderately stiff, layers of fine-grained sand 134'-137', 142'-146'
148' - 178'	Clay; gray-green, stiff, slightly silty
178' - 190'	Sand; fine - to medium-grained quartz
190' - 200' T.D.	Clay; gray-green, silty, stiff

WATER WELL
CONTRACTORS

CONDUCTOR
PIPE SERVICE

GRINER DRILLING SERVICE, INC.

TELEPHONE 736-6347
P. O. DRAWER 825
COLUMBIA, MISS. 39429

THIS IS TO VERIFTY DELIVERY, QUANTITIES AND ACCEPTANCE OF MATERIALS AND SERVICES.

Curtis W. Stover

CURTIS W. STOVER
Mississip Bureau of Geology

DATE April 20, 1981

Phone 736-6347 — 6348
P. O. Drawer 825

INVOICE

GRINER DRILLING SERVICE, INC.

Hwy. 98 Bypass
COLUMBIA, MISS. 39429

WATER WELLS — CONDUCTOR

RIG No. | LOCATION Tatum Salt Dome | INV. No. 2443

SOLD TO Fenix & Scisson, Inc. | DATE 4/10/81

ADDRESS 3150 W. Sahara, Suite B-23, Las Vegas, Nevada 89102 | YOUR ORDER No.

CALLENDER Attention: Rick Bacon

3/25/81	Delivering material to job location	
	3 hours driver @ 14.00 per hr.	42.00
	84 miles @ .40 per mile (2 trips)	33.60
	40 bags ready mix @ 3.80 per bag	152.00
	180 ft. 6" schedule 40 PVC pipe @ 2.50 per ft.	450.00
	380 ft. 2" schedule 40 PVC pipe @ .68 per ft.	258.40
	40 ft. 2" schedule 40 PVC screen #8 slot @ 20.07/10 ft.	80.28
	2 - 6" schedule 40 PVC couplings @ 10.02 each	20.04
	9 -2" schedule 40 PVC couplings @ .85 each	7.65
	2 - 6" PVC caps @ 14.57 each	29.14
	4 - 2" PVC caps @ .75 each	3.00
	1 - 5 H.P. 460 volt pump and motor F & W	1,416.00
	2 - 2" PVC male adapters @ .92 each	1.84
	2 - 2" steel caps @ 2.05 each	4.10
	1 - 6" back wash valve	12.00
	2 - 2" back wash valves @ 36.80 each	73.60
	1 - 2" x 1¼ bell reducer	3.75
	1 - 1¼" x 3/4" bushing	1.62
	1 - 4 x 2 bushing	6.17
	2 - pints glue @ 2.98 each	5.96
	1 - pint cleaner	2.33
	2 - 2" female adapters @ 1.04 each	2.08
3/26/81	Delivering material to job.	
	2 hours driver @ 14.00 per hr.	28.00
	42 miles @ .40 per mile	16.80
	2 - 2" female adapters @ 1.04 each	2.08
	2 - 2" male adapters @ .92 each	1.84
	1 - 6" female adapter	17.93
3/27/81	Hauling generator to job.	
	6½ hours winch truck @ 30.00 per hr.	195.00
3/27/81	Wiring generator and testing well.	
	5 hours serviceman @ 22.00 per hr.	110.00
	42 miles @ .40 per mile	16.80
3/31/81	Material picked up at Griner Warehouse	
	2 - 6" steel well covers @ 73.50 each	147.00
	2 - hasps @ 2.50 each	5.00
	2 - locks @ 5.45 each	10.90
	1 - pint PVC glue	2.98
	1 - pint PVC cleaner	2.33
	2 - 6" PVC schedule 40 male adapters @ 13.79 each	27.58
	1 - mud cup (returned to Griner)	N/C

INVOICE

Phone 736-6347 — 6348
P. O. Drawer 825

GRINER DRILLING SERVICE, INC.

Hwy. 98 Bypass
COLUMBIA, MISS. 39

WATER WELLS — CONDUCTOR

RIG No. | LOCATION Tatum Salt Dome | INV. No. 2443

SOLD TO Fenix & Scisson, Inc. | DATE 4/10 81

ADDRESS 3150 W. Sahara, Suite B-23, Las Vegas, Nevada 89102 | YOUR ORDER No.

CALLENDER Attention: Rick Bacon

3/31/81 -	Material picked up at Griner Warehouse (continued)	
	1 - mud funnel (returned to Griner)	N/C
	1 - set mud scales (returned to Griner)	N/C
	500 lbs. drilling gel @ 4.15 per 50 lbs.	41.50
	1 - mud hopper (returned to Griner)	N/C
	10 ft. #12 slot S.S. screen	592.10
	1 - 6" female adapter	17.93
	1 - 6" steel tee (returned to Griner)	N/C
4/2/81	Setting pipe and screen in 6" hole and washing out.	
	10 hours drilling superintendent @ 29.50 per hr.	295.00
	42 miles @ .40 per mile	16.80
	1 - 6" schedule 40 PVC male adapter	13.79
	1 - 10" well cover	92.50
4/3/81	Hauling air compressor and fittings to jbo. Blowing well.	
	4 hours winch truck @ 30.00 per hr.	120.00
	5 hours drilling superintendent @ 29.50 per hr.	147.50
	42 miles @ .40 per mile	16.80
	4 - 2" x 6" galvanized nipples @ 4.65 each	18.60
	1 - 2" bull plug	23.95
	1 - 12"nipple (returned to Griner)	N/C
4/4/81	Delivered material to location	
	3 hours driver @ 18.00 per hr.	54.00
	42 miles @ .40 per mile	16.80
	40 sacks of ready mix @ 3.80 per bag	152.00
4/4/81	Moving generator and air compressor to second well. Bringing air compressor in.	
	3 hours winch truck @ 36.00 per hr.	108.00
	1 - 180 CFM air compressor - 5 day min @ 90.50 per day	452.50
4/5/81	Wiring 5 H.P. pump	
	5 hours serviceman @ 28.00 per hr.	140.00
	42 miles @ .40 per mile	16.80
	180 ft. #14/3 sub. wire @ .36 per ft.	64.80
	2 - rolls tape @ 2.15 each	4.30
	20 bags ready mix @ 3.80 per bag	76.00
/6/81	Delivering diesel fuel to location.	
	3 hours truck and trailer @ 37.00 per hr.	111.00

Phone 738-6347 — 6348
P. O. Drawer 825

INVOICE

GRINER DRILLING SERVICE, INC.

WATER WELLS — CONDUCTOR

Hwy. 98 Bypass
COLUMBIA, MISS. 394

RIG No. | LOCATION Tatum Salt Dome | INV. No. 2443

SOLD TO Fenix & Scisson, Inc. | DATE 4/10/81

ADDRESS 3150 W. Sahara, Suite B-23, Las Vegas, Nevada 89102 | YOUR ORDER No.

CALLED BY Attention: Rick Bacon

4/6/81	Finish wiring pump and pumping well.	
	8 hours serviceman @ 22.00 per hr.	176.00
	42 miles @ .40 per mile	16.80
	2 - ½" LB's w/covers @ 2.62 each	5.24
	10' - ½" ridged conduit @ .62 per ft.	6.20
	1 - 2" x 3/4" bushing	2.10
	8 - ½" lock nuts @ .07 each	.56
	3 - ½" nipples @ .99 each	2.97
	2 - ½" seal tite connectors @ 1.24 each	2.48
	2 ft. ½" seal tite @ .95 per ft.	1.90
	7 - ¼" x 1" bolts and nuts @ .25 each	1.75
	39' No. 14 control wire @ 3.25 per ft.	126.75
	3 - 30 Amp fuses @ 3.04 each	9.12
	1 - 30 Amp 3-phase disconnect	137.98
	1 - size 0, 480 volt, 3 phase starter	106.14
4/7/81	Building control panel stand	
	8½ hours welder @ 28.00 per hr.	238.00
	16 ft. 3-3/8" tubing @ 1.30 per ft.	20.80
	2 ft. x 6 ft. 3/16" plate, 92 lbs @ .40 per lb.	36.80
	1 - ¼" x 6" nipple	1.98
	18" of ½" x 2" flat bar, 6 lbs @ .36 per lb.	2.16
	1 - can paint	5.85
4/7/81	Hauling generator and fuel tank back to Griner Yard.	
	3 hours truck and trailer @ 37.00 per hr.	111.00
	1 - generator for 12 days @ 90.50 per day	1,086.00
	100 gallons of diesel fuel @ 1.40 per gal.	140.00
4/7/81	Delivered tape to location	
	2 hours serviceman @ 22.00 per hr.	44.00
	42 miles @ .40 per mile	16.80
	4 - rolls duct tape @ 4.95 each	19.80
4/8/81	Mr. Curtis Stover returned unused material to Griner Warehouse and picked up fittings.	
	1 - 1½" plug	1.45
	3 - sacks ready mix @ 3.80 each	11.40
		$8,114.50
	5% sales tax	405.73
		$8,520.23

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped _____ Average discharge Transducer calibration

Radius _____ Pump on _____ Pump off _____

Measuring point Top of metal casing Orifice _____

MV+	△MV	t' (Mins.)	Tape held	Wetted	Water level	Depth	Air line	P.S.I.	P-tube	G.P.M.
5.3					91.06	0				
6.8	1.5				100.0	8.94				
8.6	1.8				110.0	18.94				
10.3	1.7				120.0	28.94				
12.0	1.7				130.0	38.94				
13.8	1.8				140.0	48.94				
15.5	1.7				150.0	58.94				
17.3	1.8				160.0	68.94				

Observer D. Harrelson; H. Johnson Page 1

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 GPM

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice 4x2½

Time	t (Mins.)	t' (Mins.)	MV+	△MV	Water level		Air line	P.S.I.	Inches P-tube	G.P.M.
4/6/81 10:52 AM					91.06					
									7.5	72
2:00 PM	0		17.3		91.06					
	.5		13.7	3.6	111.63					
2:01	1.0		11.6	2.1	123.63					
	1.5		10.5	1.1	129.92					
2:02	2.0		9.7	.8	134.49				7.5	72
	2.5		9.3	.4	136.77					
2:03	3.0		8.9	.4	139.05				7.5	72
	3.5		8.7	.2	140.20					
2:04	4.0		8.5	.2	141.34					
	4.5		8.4	.1	141.91					
2:05	5.0		8.4	0					7.5	72
2:06	6.0									
2:0	6.5		8.3	.1	142.49					
2:07	7.0		8.2	.1	143.06					
2:08	8.0		8.1	.1	143.63					
2:09	9.0		8.1	0						
2:10	10		8.1	0					7.5	72
2:11	11		7.9	.1	144.20					
2:12	12		7.9	0						

Observer D. Harrelson; H. Johnson Page 1 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 Gallons per Minute

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice 4x2½

Time	t (Mins.)	t' (Mins.)	MV+	ΔMV	Water level		Air line	P.S.I.	P-tube	G.P.M.
2:13	13		7.8	.1	144.77					
2:14	14		7.8	0						
2:15	15		7.7	.1	145.34				7.5	72
2:16	16		7.7	0						
	17		7.7	0						
	18		7.6	.1	145.91					
	19		7.6	0						
2:20	20		7.6	0					7.5	72
	22		7.6	0					6.0	64
	24		7.5	.1	146.49					
	26		7.4	.1	147.06				6.0	64
	28		7.4	0						
2:30	30		7.3	.1	147.63					
	35		7.3	0						
	40		7.1	.2	148.77					
	45		7.1	0						
	50		7.0	.1	149.34					
	55		6.9	.1	149.91					
3:00	60		6.7	.2	151.06					
	70		6.6	.1	151.63				6.2	65
	80		6.4	.2	152.77					

Observer D. Harrelson; H. Johnson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 GPM

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice 4x2½

Time	t (Mins.)	t' (Mins.)	MV+	ΔMV	Water level		Air line	P.S.I.	P-tube	G.P.M.
3:30	90		6.3	.1	153.34				6.0	64
	100		6.3	0						
	110		6.2	.1	153.91					
4:00	120		6.1	.1	154.49					
	135		6.0	.1	155.06					
4:30	150		5.9	.1	155.62					
	165		5.8	.1	156.20					
5:00	180		5.8	0					5.8	63
	200		5.7	.1	156.77				6.0	64
	220		5.6	.1	157.34					
6:00	240		5.3/6.1	.3	159.05					
Transducer is lowered 5 feet	260		5.9	.2	160.49					
	280		5.8	.1	161.06					
7:00	300		5.7	.1	161.62				8.0	74
7:30	330		5.6	.1	162.20					
8:00	360		5.6	0						
9:00	420		5.4/6.1	.2	163.34					
Transducer is lowered 4 feet 10:00	480		6.0	.1	163.91				8.0	74
11:00	540		5.9	.1	164.48					
12:00	600		5.9	0						
1:00 AM	660		5.8	.1	165.06					

Observer D. Harrelson; H. Johnson Page 3 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 GPM

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice 4x2½

Time	t (Mins.)	t' (Mins.)	MV+	Δ MV	Water level		Air line	P.S.I.	P-tube	G.P.M.
2:00	720		5.7	.1	165.63					
4:00	840									
6:00	960		5.6	.1	166.20				7.0	70
8:00	1080		5.6	0					6.5	68
10:00	1200		5.5	.1	166.77				6.5	68
12:00	1320		5.5	0					7.5	72
2:00 PM	1440		5.5	0					8.0	74

Observer D. Harrelson; H. Johnson Page 4 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 4/7/81

Measuring point Top of metal casing Orifice

Time	t (Mins.)	t' (Mins.)	MV+	△ MV	Water level		Air line	P.S.I.	P-tube	G.P.M.
2:00	0		5.5		166.77					
	.5		8.9	3.4	147.34					
	1.0		11.2	2.3	134.20					
	1.5		12.5	1.3	126.77					
	2.0		13.3	.8	122.2					
	2.5		13.8	.5	119.34					
	3.0		14.0	.2	118.20					
	3.5		14.2	.2	117.00					
	4.0		14.3	.1	116.48					
	4.5		14.4	.1	115.91					
2:05	5.0		14.5	.1	115.34					
	6.0		14.6	.1	114.77					
	7.0		14.7	.1	114.20					
	8.0		14.7	0						
	9.0		14.8	.1	113.63					
2:10	10.0		14.9	.1	113.06					
	11		14.9	0						
	12		14.9	0						
	13		15.0	.1	112.49					
	14		15.0	0						
2:15	15		15.0	0						

Observer D. Harrelson; H. Johnson Page 1 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice

Time	t (Mins.)	t' (Mins.)	MV+	ΔMV	Water level		Air line	P.S.I.	P-tube	G.P.M.
	16		15.1	.1	111.92					
	17		15.1	0						
	18		15.1	0						
	19		15.1	0						
2:20	20		15.2	.1	111.34					
	22		15.2	0						
	24		15.3	.1	110.77					
	26		15.4	.1	110.20					
	28		15.4	0						
2:30	30		15.5	.1	109.63					
	35		15.6	.1	109.06					
	40		15.6	0						
	45		15.7	.1	108.49					
	50		15.8	.1	107.92					
	55		15.9	.1	107.34					
3:00	60		16	.1	106.77					
	70		16.1	.1	106.20					
	80		16.2	.1	105.63					
3:30	90		16.3	.1	105.06					
	100		16.4	.1	104.49					
	110		16.5	.1	103.92					

Observer D. Harrelson; H. Johnson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice

Time	t (Mins.)	t' (Mins.)	MV+	Δ MV	Water level		Air line	P.S.I.	P-tube	G.P.M.
4:00	120		16.6	.1	103.34					
	135		16.7	.1	102.77					
4:30	150		16.8	.1	102.20					
	165		16.9	.1	101.63					
5:00	180		16.9	0						
5:20	200		17.0	.1	101.06					
	220		17.0	0						
6:00	240		17.1	.1	100.49					
	260		17.2	.1	99.92					
	280		17.2	0						
7:00	300		17.2	0						
7:30	330		17.3	.1	99.34					
8:00	360		17.3	0						
9:00	420		17.4	.1	98.77					
10:00	480		17.4	0						
11:00	540		17.4	0						
12:00	600		17.4	0						
1:00	660		17.4	0						
2:00	720		17.4	0						
4:00	840		17.4	0						
5:00	900		17.4	0						

Observer D. Harrelson; H. Johnson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed HM-L2 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius 6" Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of metal casing Orifice

	Time	t (Mins.)	t' (Mins.)	MV¼	ΔMV	Water level		Air line	P.S.I.	P-tube	G.P.M.
	6:00	960		17.4	0						
	8:00	1080		17.4	0						
	10:00	1200		17.5	.1	98.20					
	12:00	1320		17.5	0						
4/8/81	2:00 PM	1440		17.5	0						
4/10/81	12:11 PM	4211				91.59					

Observer D. Harrelson; H. Johnson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/7/81 Formation Miocene;Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 G.P.M.

Radius _____ Pump on 2:00 p.m. 4/6/81 Pump off 2:00 p.m. 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	Water Level	Δ S	R^2/T			Air line	P.S.I.	P-tube	G.P.M.
11:27 am		90.27								
2:00	0	--								
	5	--								
2:01	1.0	--								
	1.5	--								
2:02	2.0	--								
	2.5	--								
2:03	3.0	--								
	3.5	91.55	1.28	5.95 x	10^6					
2:04	4.0	91.72	1.45	5.21 x	10^6					
	4.5	91.77	1.5	4.63 x	10^6					
2:05	5.0	91.81	1.54	4.16 x	10^6					
	5.5	91.95	1.68	3.79 x	10^6					
2:06	6.0	92.0	1.73	3.47 x	10^6					
2:07	7.0	92.11	1.84	2.97 x	10^6					
2:08	8.0	92.25	1.98	2.6 x	10^6					
2:09	9.0	92.37	2.1	2.31 x	10^6					
2:10	10	92.5	2.23	2.08 x	10^6					
2:11	11	92.6	2.33	1.89 x	10^6					
2:12	12	92.72	2.45	1.74 x	10^6					

Observer H. Johnson, D. Harrelson Page 1 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/7/81 Formation Miocene; Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 G.P.M.

Radius _____ Pump on 2:00 p.m. 4/6/81 Pump off 2:00 p.m. 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	Water Level	Δ S	R^2/T			Air line	P.S.I.	P-tube	G.P.M.
2:13	13	92.87	2.6	1.6 x	10^6					
2:14	14	92.98	2.71	1.49 x	10^6					
2:15	15	93.11	2.84	1.39 x	10^6					
2:16	16	93.22	2.95	1.3 x	10^6					
2:17	17	93.33	3.06	1.19 x	10^6					
2:18	18	93.55	3.28	1.16 x	10^6					
2:19	19	93.57	3.3	1.10 x	10^6					
2:20	20	93.59	3.32	1.04 x	10^6					
2:22	22	93.87	3.6	9.4 x	10^5					
	24	94.06	3.79	8.68 x	10^5					
	26	94.25	3.98	8.01 x	10^5					
	28	94.43	4.16	7.44 x	10^5					
2:30	30	94.66	4.39	6.94 x	10^5					
	35	94.94	4.67	5.95 x	10^5					
	40	95.23	4.96	5.2 x	10^5					
	45	95.61	5.34	4.63 x	10^5					
	50	95.96	5.69	4.16 x	10^5					
	55	96.22	5.95	3.79 x	10^5					
3:00	60	96.51	6.24	3.47 x	10^5					
	70	97.11	6.84	2.97 x	10^5					
	80	97.61	7.34	2.6 x	10^5					

Observer H. Johnson, D. Harrelson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/7/81 Formation Miocene;Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 G.P.M.

Radius _____ Pump on 2:00 p.m. 4/6/81 Pump off 2:00 p.m. 4/7/81

Measuring point _____ Orifice _____

Time	t (Mins.)	Water Level	ΔS	R^2/T			Air line	P.S.I.	P-tube	G.P.M.
3:30	90	98.11	7.84	2.31 x	10^5					
	100	98.5	8.23	2.08 x	10^5					
	110	98.92	8.65	1.89 x	10^5					
4:00	120	99.35	9.08	1.74 x	10^5					
4:15	135	99.87	9.6	1.54 x	10^5					
4:30	150	99.89	9.62	1.39 x	10^5					
4:45	165	100.28	10.01	1.26 x	10^5					
5:00	180	100.72	10.45	1.16 x	10^5					
5:20	200	101.24	10.97	1.04 x	10^5					
	220	101.74	11.47	9.46 x	10^4					
6:00	240	102.21	11.94	8.68 x	10^4					
	260	102.72	12.45	8.01 x	10^4					
	280	103.20	12.93	7.44 x	10^4					
7:00	300	103.58	13.31	6.94 x	10^4					
7:30	330	104.18	13.91	6.31 x	10^4					
8:00	360	104.67	14.4	5.78 x	10^4					
9:00	420	105.43	15.16	4.96 x	10^4					
10:00	480	106.15	15.88	4.34 x	10^4					
11:00	540	106.70	16.43	3.86 x	10^4					
12:00	600	107.25	16.98	3.47 x	10^4					
4/7/81 1:00 am	660	107.71	17.44	3.15 x	10^4					

Observer H. Johnson, D. Harrelson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/7/81 Formation Miocene;Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge 69 G.P.M.

Radius _____ Pump on 2:00 p.m. 4/6/81 Pump off 2:00 p.m. 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	Water Level	Δ S	R^2/T			Air line	P.S.I.	P-tube	G.P.M.
2:00	720	108.14	17.87	2.89 x	10^4					
4:00	840	--	--	--						
6:00	960	109.5	19.23	2.17 x	10^4					
8:00	1080	109.97	19.7	1.93 x	10^4					
10:00	1200	110.4	20.13	1.74 x	10^4					
12:00	1320	110.7	20.43	1.58 x	10^4					
2:00 pm	1440	111.03	20.76	1.44 x	10^4					

Observer H. Johnson, D. Harrelson Page 4 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/7/81 - 4/8/81 Formation Miocene, Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius _____ Pump on 2:00 P.M. 4/6/81 Pump off 2:00 P.M. 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	t' (Mins.)	Water Level	ΔS	t'/t		Air line	P.S.I.	P-tube	G.P.M.
2:00 PM	0	1440	111.03	20.76	-------					
	0.5		111							
2:01	1.0	1441	110.93	20.66	1441					
	1.5		110.86							
2:02	2.0	1442	110.76	20.49	721					
	2.5		110.69							
2:03	3.0	1443	110.59	20.32	481					
	3.5		110.5							
2:04	4.0	1444	110.41	20.14	361					
	4.5		110.34							
2:05	5.0	1445	110.25	19.98	289					
	5.5		110.19							
	6.0	1446	110.1	19.83	241					
	7.0	1447	109.97	19.7	206.7					
	8.0	1446	109.84	19.57	181					
	9.0	1449	109.7	19.43	161					
2:10	10.0	1450	109.56	19.29	145					
	11.0	1451	109.41	19.14	131.9					
	12.0	1452	109.30	19.03	121					
	13.0	1453	109.19	18.92	111.76					

Observer H. Johnson; D. Harrelson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/7/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius _____ Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	t' (Mins.)	Water Level	ΔS	t'/t		Air line	P.S.I.	P-tube	G.P.M.
	14.0	1454	109.07	18.8	103.8					
2:15	15.0	1455	108.95	18.68	97					
	16.0	1456	108.82	18.55	91					
	17.0	1457	108.73	18.46	85.7					
	18.0	1458	108.65	18.38	81					
	19.0	1459	108.55	18.28	76.8					
2:20	20.0	1460	108.44	18.17	73					
	22.0	1462	108.23	17.96	66.5					
	24.0	1464	108.05	17.78	61					
	26.0	1466	107.85	17.58	56.4					
	28.0	1468	107.7	17.43	52.4					
2:30	30	1470	107.65	17.38	49					
	35	1475	107.15	16.88	42					
	40	1480	106.8	16.53	37					
	45	1485	106.35	16.1	33					
	50	1490	106.05	15.78	29.8					
	55	1495	105.75	15.48	27					
3:00	60	1500	105.42	15.15	25					
	70	1510	104.97	14.7	21.6					
	80	1520	104.4	14.13	19					
3:30	90	1530	103.9	13.63	17					

Observer H. Johnson; D. Harrelson Page 2 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/7/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius _____ Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	t' (Mins.)	Water Level	ΔS	t'/t		Air line	P.S.I.	P-tube	G.P.M.
	100	1540	103.45	13.18	15.4					
	110	1550	103.05	12.78	14.1					
4:00	120	1560	102.55	12.28	13					
4:15	135	1575	102.05	11.78	11.7					
4:30	150	1590	101.55	11.28	10.6					
4:45	165	1605	101.05	10.78	9.73					
5:00	180	1620	100.68	10.41	9					
	200	1640	100.11	9.84	8.2					
	220	1660	99.7	9.43	7.5					
6:00	240	1680	99.28	9.01	7					
	260	1700	98.87	8.54	6.5					
	280	1720	98.54	8.27	6.1					
7:00	300	1740	98.20	7.93	5.8					
	330	1770	98.17	7.9	5.36					
8:00	360	1800	97.81	7.54	5					
9:00	420	1860	97.17	6.9	4.4					
10:00	480	1920	96.62	6.35	4					
11:00	540	1980	96.12	5.85	3.66					
12:00	600	2040	95.82	5.55	3.4					
1:00	660	2100			3.18					
2:00	720	2160			3					

Observer H. Johnson; D. Harrelson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/7/81 - 4/8/81 Formation Miocene; Local County Lamar

Well observed OW-1 Owner Tatum Dome

Well pumped HM-L2 Average discharge Recovery

Radius _____ Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of PVC casing Orifice _____

Time	t (Mins.)	t' (Mins.)	Water Level	ΔS	t'/t		Air line	P.S.I.	P-tube	G.P.M.
4:00	840	2280	94.6	4.33	2.71					
6:00	960	2400	94.15	3.88	2.5					
8:00	1080	2520	93.9	3.63	2.33					
10:00	1200	2640	93.58	3.31	2.2					
12:00	1320	2760	93.45	3.18	2.09					
2:00 PM	1440	2880	93.18	2.91	2					

Observer H. Johnson; D. Harrelson Page 4 of 4

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/10/81 Formation Miocene; Local County Lamar

Well observed OW-2 Owner Tatum Dome

Well pumped HM-L2 Average discharge

Radius 2,215.07' from HM-L2 Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/81

Measuring point Top of PVC casing 0.3 feet above G.L. Orifice

	Time	t (Mins.)	t' (Mins.)	Tape held	Wetted	Water level		Air line	P.S.I.	P-tube	G.P.M.
	11:35					103.3					
4/6/81	2:00 PM	0				----					
	2:36	36				103.32					
	4:07	127				103.80					
	4:36	156				104.00					
	5:03	183				104.00					
	6:09	249				103.9					
	9:00	420				103.8					
4/7/81	12:07	607				104.0					
	6:15	975				104.0					
	12:12	1332				103.9					
	2:00	1440				103.89					
Recovery											
4/7/81	2:00 PM	0				103.89					
	4:20 PM	140				103.85					
	5:44 PM	224				103.83					
4/8/81	8:43 AM	1123				103.75					
	2:25	1465				102.86					
4/10/81	1:00 PM	4260				103.25					

Observer H. Johnson, D. Harrelson

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/10/81 Formation Miocene; Local County Lamar

Well observed HM-L Owner Tatum Dome

Well pumped HM-L2 Average discharge

Radius 2,388.5' from HM-L2 Pump on 2:00 PM 4/6/81 Pump off 2:00 PM 4/7/8

Measuring point Top of 6" casing 2.52' above GL Orifice

	Time	t (Mins.)	t' (Mins.)	Tape held	Wetted	Water level		Air line	P.S.I.	P-tube	G.P.M.
	12:01					87.18					
	2:00	0				---					
4/6/81	2:45 PM	45				86.90					
	12:15 AM					87.18					
	6:21 AM					87.18					
4/7/81	12:26 PM					87.02					
Recovery											
	2:00 PM	0				87.02					
4/8/81	9:00 AM	1140				86.74					
	3:02 PM	1502				86.76					
4/10/81	1:15 PM	4275				86.47					

Observer H. Johnson, D. Harrelson Page 1 of 1

MISSISSIPPI GEOLOGICAL SURVEY

PUMPING TEST

Date 4/6/81 - 4/7/81 Formation Miocene; Local County Lamar

Well observed HT-2C Owner Tatum Dome

Well pumped HM-L2 Average discharge

Radius Pump on Pump off

Measuring point Top of casing Orifice

	Time	t (Mins.)	t' (Mins.)	Tape held	Wetted	Water level		Air line	P.S.I.	P-tube	G.P.M.
4/6/81	11:49					137.06					
4/7/81	12:25					137.57					

Observer H. Johnson; D. Harrelson

Electrical Log

BUREAU OF GEOLOGY

COMPANY: MISSISSIPPI BUREAU OF GEOLOGY
OWNER: TATUM DOME, MONITOR WELL HM-L2
COUNTY: LAMAR **STATE:** MISSISSIPPI

SEC. 11 **T.** 2N **R.** 16W **FILE NO.** J48

LOCATION: NW 1/4, SW 1/4, SE 1/4

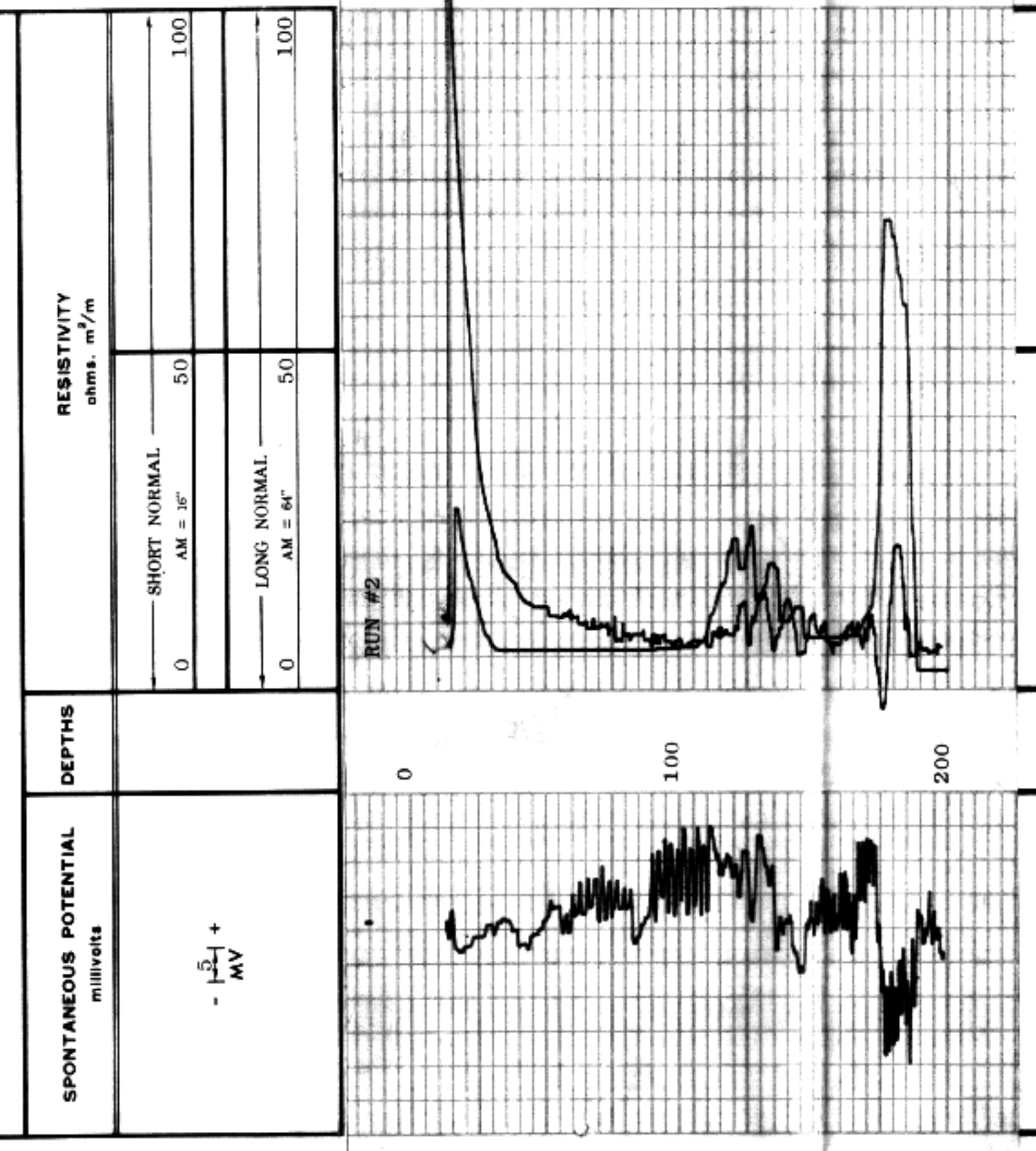
ELEVATION: 250' (Topo) **DATUM:** Ground Level

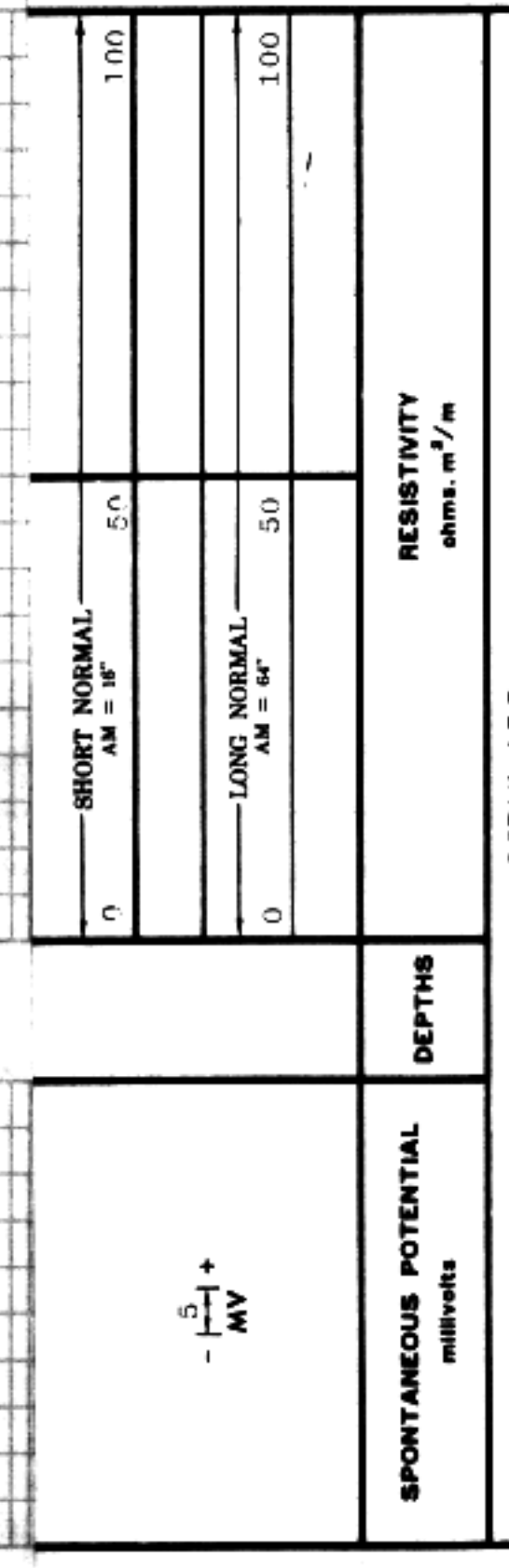
ENGINEER: WARREN GREEN
ADDRESS: MISSISSIPPI STATE BOARD OF HEALTH

DATE	3-31-81	3-31-81	
RUN NO.	1	2	
DEPTH-DRILLER	200'	200'	
DEPTH-LOGGER	200'	200'	
BOTTOM READING	200'	200'	
TOP READING	15'	15'	
CASING-DRILLER			
CASING-LOGGER	@	@	@
BIT SIZE	4 1/2"	4 1/2"	
TYPE FLUID IN HOLE	Gel	Gel	
TIME SINCE CIRC.	1/4 hr.	1/2 hr.	
RECORDED BY	H. Johnson	H. Johnson	
WITNESSED BY	J. Bradshaw	J. Bradshaw	

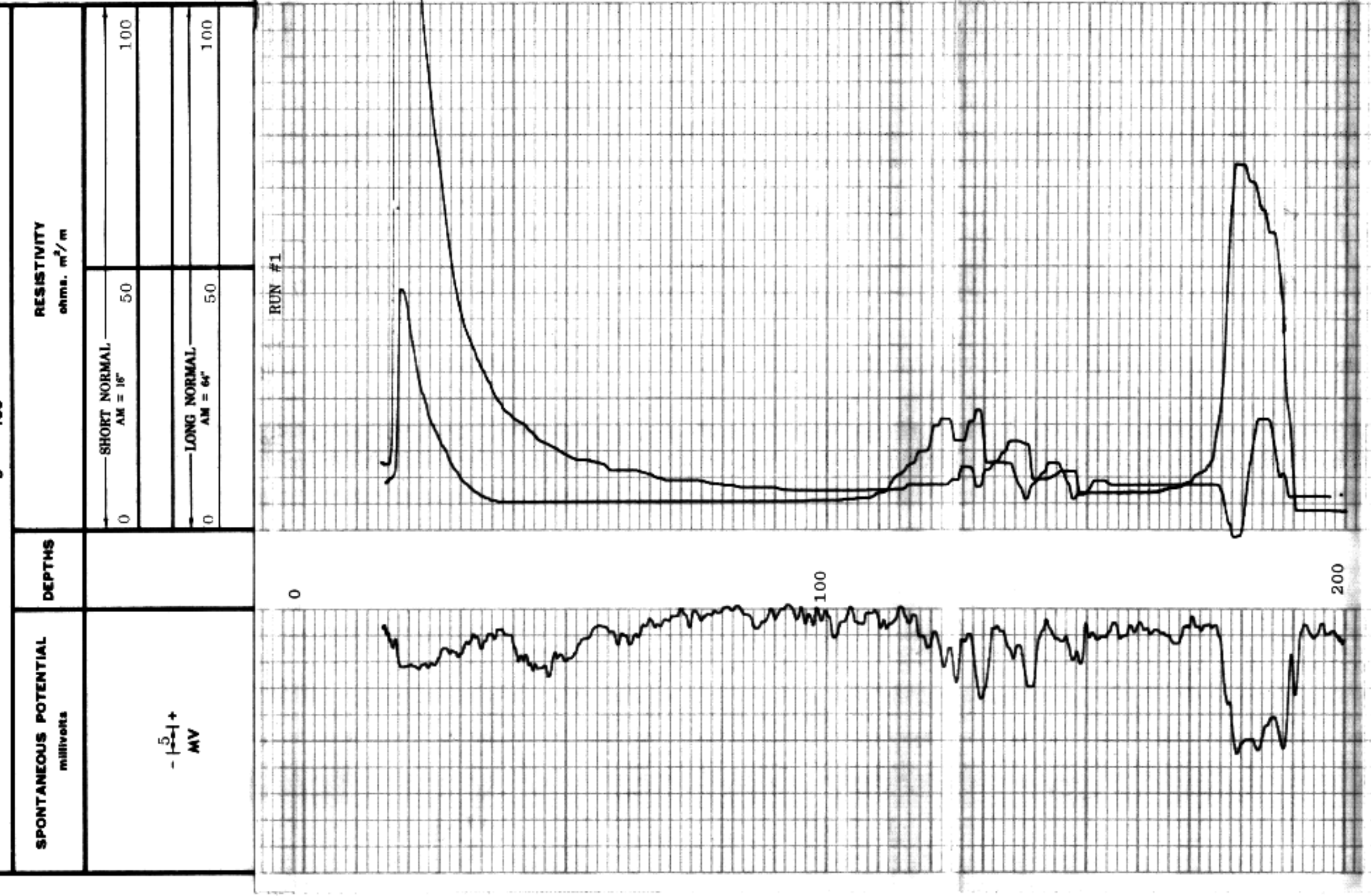
REMARKS: BUREAU HAS NO SAMPLES, POOR GROUND CONNECTION.

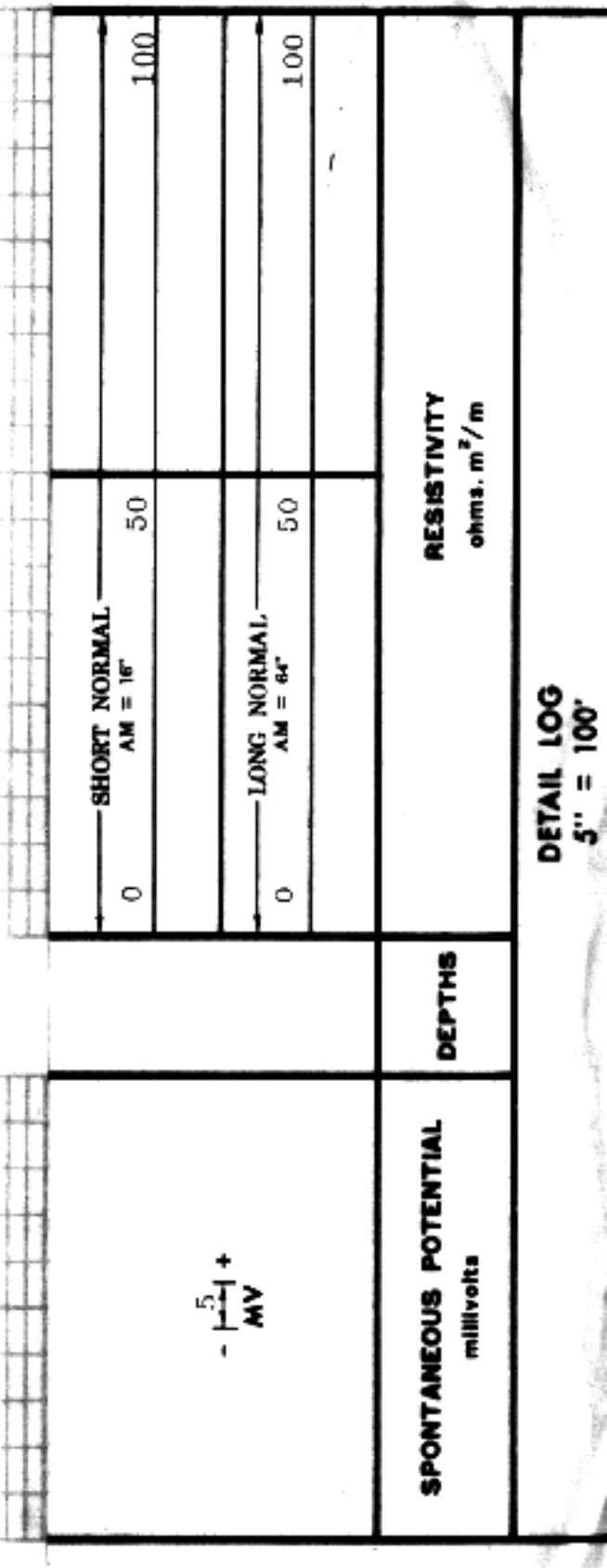
Field Log 3





DETAIL LOG 5" = 100'





DETAIL LOG 5" = 100'

Electrical Log

BUREAU OF GEOLOGY

COMPANY: MISSISSIPPI BUREAU OF GEOLOGY
OWNER: OBSERVATION WELL #2 (OW-2)
COUNTY: LAMAR **STATE:** MISSISSIPPI

SEC. 14 **T.** 2N **R.** 16W
FILE NO. J42

LOCATION: SE/4, NW/4, NE/4

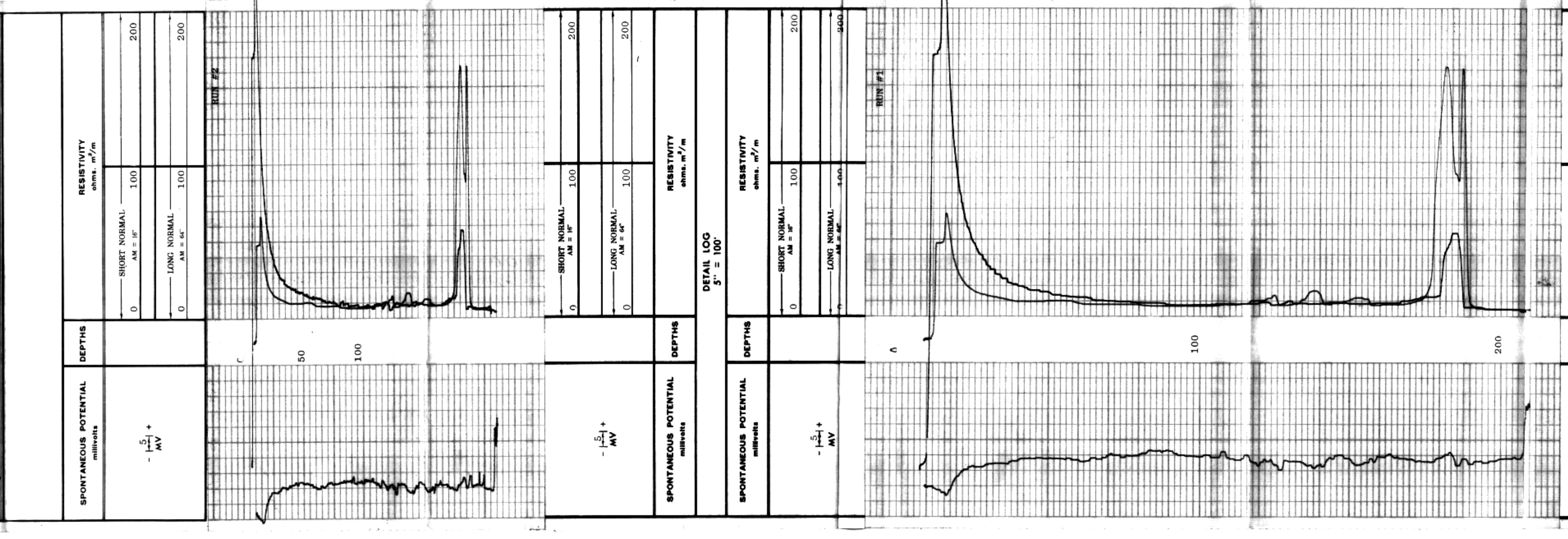
ELEVATION: 269' (Topo Map) **DATUM:** Ground Level

ENGINEER: WARREN GREEN
ADDRESS: MISSISSIPPI STATE BOARD OF HEALTH

DATE	3-25-81	3-25-81	
RUN NO.	1	2	
DEPTH-DRILLER	210'	210'	
DEPTH-LOGGER	210'	210'	
BOTTOM READING	210'	210'	
TOP READING	12'	10'	
CASING-DRILLER			
CASING-LOGGER	@	@	@
BIT SIZE	4 1/2"	4 1/2"	
TYPE FLUID IN HOLE	Gel	Gel	
TIME SINCE CIRC.	1/4 hr.	1/2 hr.	
RECORDED BY	H. Johnson	H. Johnson	
WITNESSED BY	J. Bradshaw	J. Bradshaw	

REMARKS: SURVEY HAS CUTTINGS 0'-210', SHELBY TUBE @ 30' AND SPLIT SPOON @ 61'.

Fold Line



Electrical Log

BUREAU OF GEOLOGY

COMPANY: MISSISSIPPI BUREAU OF GEOLOGY
OWNER: OBSERVATION WELL #1 (OW-1)
COUNTY: LAMAR **STATE:** MISSISSIPPI

SEC. 11 **T.** 2N **R.** 16W **FILE NO.** J43

LOCATION: NW/4, SE/4, SW/4

ELEVATION: 250' (Topo Map) **DATUM:** Ground Level

ENGINEER: WARREN GREEN
ADDRESS: MISSISSIPPI STATE BOARD OF HEALTH (MSBOH)

DATE	3-27-81	3-27-81	
RUN NO.	1	2	
DEPTH-DRILLER	185'	185'	
DEPTH-LOGGER	185'	185'	
BOTTOM READING	185'	185'	
TOP READING	12'	12'	
CASING-DRILLER			
CASING-LOGGER	@	@	@
BIT SIZE	4 1/2"	4 1/2"	
TYPE FLUID IN HOLE			
TIME SINCE CIRC.	1/4 hr.	1/2 hr.	
RECORDED BY	H. Johnson	H. Johnson	
WITNESSED BY	J. Bradshaw	J. Bradshaw	

REMARKS: SURVEY HAS CUTTINGS 0'-185', SHELBY TUBE @ 30', 60' AND SPLIT SPOON @ 120' (POOR RECOVERY).

Fold Line