GLCC-5-914

Chevron Resources Company
A division of Chevron Industries, Inc.
225 Bush Street, San Francisco, California
Mail Address: P.O. Box 3722, San Francisco, CA 94119

January 11, 1980

Dr. H. P. Ross
Earth Science Laboratory
University of Utah Research Institute
420 Chipeta Way, Suite 120
Salt Lake City, UT 84108

Dear Howard:

Enclosed are three blueline and one reversed sepia copies of Figures 1, 2, 3, 4, 5 and 6 from the Senturion Sciences Inc., San Emidio, Nevada Geonoise survey report. These figures had become separated from the remainder of the Senturion report in our files. As a result, they were not included in our original San Emidio, Nevada data package.

Thank you for bringing this to our attention. Please feel free to contact me should you have other questions about our DOE data packages.

Very truly yours,

Doug

D. G. Hill
Senior Geophysicist

Enclosures

Item: San Emidio (CRC)-5
Missing from earlier delivery.
HPRoss 1/17/80

The accompanying sheets are a compilation of the exploration work done by Chevron ~~XMX~~ on the San Emidio Desert geothermal area. (T29N R23E) All the information reported in RFP ET-78-R-08-003 under program descriptions is not necessarily included in the package delivered to ESL.

The Kosmos 1-8 material does not include the Schlumberger gamma ray log although there is a graphic log (SKETCHY W/O a key) of the hole with temperature plots, which signals out areas of gamma ray highs (and SP anamolies). The reported temperature survey done by Agnew and Sweet from 10'-3940' at 20' intervals is not part of the package either. 1-8 does include a progressive temperature survey along with the above mentioned graphic log. However at the end of this temp line a citation was made about a 417° temperature at 9460', this hole was drilled to 4013'. Temperature runs using three thermometers at 3220' were recorded and show a wide degree of variation. The last run possibly indicating the equilibrated temperature was recorded as 205,207,and 207, but this imformation is not conclusive.The core lithology of 38 sidewall samples from 600'-3990' is very sketchy. No lithology of the cuttings has been provided, however no report of such a log is mentioned in the Program description (RFP-ET-78-R-08-003)

Kosmos 1-9 appears to be more complete . Again the subsurface temps. recorded by Agnew and Sweet from 0-5280' at 20' intervals has not been included as part of the deliverables.

The recordings of the thermal gradients and the temperatures at depth (100',200',300',400',500') in the 1977 and 1978 shallow temp. hole reports show discrepancies. The temperatures reported in the field vary from those written in the tables. The temps. recorded in the table of the ~~X~~ 1977 holes varies from the temps. recorded for the same holes in the cummulative 1978 table. It is not always clear the method used to calculate the thermal gradients, which also vary ~~from~~ the 1977 and 1978 reports. Possibly corrections were made for terrain variations although most of the holes were drilled in alluvial fill.

The photogeology covering 50 sq. miles was not included in this package. Information concerning water table levels, repts. on old water wells in the area, and ground water flow was not part of the program or deliverables.

Reports on the shallow temperature holes indicate that a total of 64 holes have been drilled. The~~X~~ tables indicte that a total of 72 holes have been drilled. Lithologies were not provided for SED 1,2,10,11,13 and 3-74: 1,3,4,5,6,8,9,10,12,13,14).

Information included in the Chevron Package for San Emidio Desert, Washoe County, Nevada

I RFP ET-78-R-08-003
- A. Confidentiality Notice
- B. Technical Propasal
  1. Location T29N R32E
  2. Ownership (Figure 1)
  3. Accessibility
  4. Utilization (none at present)
  5. Geology description and map
  6. Thermal Areas
  7. Technical Reasons for site selection
- C. Program Description
  1. Subsurface
    a. Chevron Kosmos 1-8 (11/13/75-11/30/75; TD 4013'; Atlantic Drilling Co.)
      1. Drilling History
      2. Drilling fluids used
      3. Casing and cementing
      4. Mud log, 80'-4013'
        a.bit data, hole size, penetration rate
        b.Lithology
        c.Continuous mud temperatures
      5. Cuttings 80'-4013' (30-50 gms/30')
      6. Core description-38 sidewall samples, 600'-3990'
      7. Electric Logs/Schlumberger,564'-4013'
        a. Dual Induction laterlog
        b. Compensated neutron formation density
        c,.Gamma Ray
        d. Caliper
        e. Four arm high resolution dipmeter
      8. Drill Stem Tests (Johnston Testers)
      9. Temperature Survey
        a. Max. reading thermometers 3243',4013'
        b. Surveys at 20' intervals 10'-3940' (Agnew ¢ Sweet)
    b. Chevron Kosmos 1-9 (1/30/78-3/11/78; TD 5367'; Camay Drilling Co.)
      1. Drilling History
      2. Drilling fluids used
      3. Casing and cementing record
      4. Mud logs 50'-5370'
        a.Bit data, hole size, penetration rate
        b. Lithology
        c. Mud temperatures at 30' intervals
      5. Cuttings, 30-50 gms/30'
      6. Electric Logs/Schlumberger, 500'-5370'
        a. Dual Induction laterlog
        b. Compensated neutron density
        c. Gamma Ray
        d. Caliper
        e. Four arm high resolution dipmeter and fracture identification log
      7. Directional Survey
      8. Drill stem test (Johnston) 5238'-5247'
      9. Fluid Chemistry (Skyline Labs)
      10. Subsurface temperature Survey (Agnew ¢ Sweet) 20' intervals 0-5280'
      11. Core description, 2717'-2727', 4459'-4482'
  2. Surface Data
    a. Geophysical Surveys (Fig. 2)
      1. Electrical Resistivity (Dipole-dipole)
      2. Electrical-SP
      3. Gravity
      4. Seismic Groundnoise
      5. Seismic Reflections

b. Temperature Gradient Holes (64-Fig. 2) 200'-500' deep
1. Stabilized temp. Profiles
2. Lithologic descriptions
c. Photogeology, 50 sq. miles (Intrasearch, 1:24,000, not included)
3. Costs
4. Description of business and management-Chevron Resources Co., a division of Chevron Industry, Inc.. Wholly owned subsidiary of Standard Oil Co. of California, Domiciled in S.F., Ca.
a. Principal Program Personnel
b. Primary business and technical contacts whom DOE may contact
c. Acceptibility of draft contract provisions
d. Resumes
e. Board of Directors Resolution and list of officers

II San Emidio,Nev. Shallow Temperature Holes (Folder One)
A. Temp. Hole locations map
B. Temp. measurement in seismic shot holes
C. Summary of results of thermal gradient surveys for SE#A and SE#B ,8/76
1. Drilling operations
2. Sample Identification
3. Temp. data, field observations
4. Uncorrected data vs. depth plots
5. Uncorrected temp.gradient computer calculation
D. 1977 Temperature Hole Program
Table I of SE 1977 temp holes(19) includes
1. depths
2. °F/100',200',300',TD
3. °F/100' (100-200'),°F/100' (300'-400')
4. Graphic Logs
5. Depth vs. temperature
6. Temp. data (# 1-77 - 19-77)
7. Detailed lithologic Descriptions and mud temps (#1-13)
8. Water analysis 10A-77 (twin of 1-77) and 2-77
a. Cation Geothermometry
b. Silica Geothermometry
c. Chemical Analysis
d. Base temp.
e. Water Temp.
9. Seismic shot point temp.-max. depth 250'/109° F; mostly drilled to 22'/60-7
10. Also included are data for the 1978 program which is described below
E. 1978 Shallow Temperature Hole Program, 32 holes 21-78 - 53-78
1. Depth
2. °F @100',200',300', 400',500'
3. F/100' 100'/50'., 200'/100', 300'/200', 400'/300', 500'/400'
4. Graphic logs with depth vs. △ temp.°F
5. Temp. Data
6. Lithologic descriptions

III. SED Kosmos 1-8 Folder (Ground elevation 4040')
A. Well Summary Report
1. Casing record
2Electric Logs, 564',4013'
3. Temp Depthhs 3940' (?)
B. Drilling history, tubing detail
C. Drift Shots
D.Schlumberger
1. Pressure log
2. Dual induction laterlog
3. Borehole compensated Sonic Log
a. Caliper
b. Bit size
c. SP

d. Sonic
e. Interval Transit time
E. Sidewall samples 600;-3990', sketchy log included
G. Temp. run, 3220', 12 runs, three therm.

IV. SED Kosmos 1-9 Folder (Elevation 4078.8')
A. Well Summary Rept
1. Casing record
2. Electric Logs at 4485',5370'
B. Drilling history, tubing detail
C. Report of subsurface survey
D. Drift Shot
E. Water Analysis (27)
F. Spectrographic Analysis
G. Schlumberger technical report
1. Pressure data and log
2. Borehole compensated sonic log
a. Gamma ray
b. Caliper
c. SP
d. bit size
e. Interval transit time
f. Sonic
H. Lithologic Logs 0-5367'
1. Core description 4453-4482', 2717-2727'

V. Report on Reconnaissance Resisitivity Survey, 2/74 McPhar Geophysics Inc.
A. Report on method, traverses, and results
1. Map of locations,results, and possible anamolous zones at shallow, mediumn and deep
2. Pseudosections of traverses (5)

VI Seismic Groundnoise Survey Senturion Sci. Inc. % 5/5/74
AReport on overview of method, conclusions, and recommmendations
1. Possible structural interpretation of anamoly at the intersection of sections 17,18,19,20
2. Data from 36 stations
3. Statistical interpretation of survey, 1:48000
Outlines SP,Resistivity, and sonic groundnoise anamoly.

VII Western Geophysical CO. (1976)
A. 700% stacked CDP sections with base map

VIII United Geophysical CO. (1977)
A. 1200% stacked CDP sections with base map

IX Photogravity Co.
A. Contoured bouger gravity map (no report)

X SP (Senturion Sciences) May 13-20, 1974
A? Report on the method, conclusions and reliability (26 measurements)
1. Contour map of cummulative SP 1:62500
2. Profiles of cummulative SP traverses
3.,E Field Map/Diagramatic

Geophysical Data
San Emidio, Nevada

Electrical - Resistivity (Dipole - Dipole)

1973 - 74 Mc Phar Geophysics, Inc.

Survey:

Contractor's Report with *attachments

1976 Phoenix Geophysics, Inc.

Survey:

Contractor's Report with *attachments

Electrical - Self Potential

1974 Senturion Sciences, Inc.

Survey:

Contractor's report

Gravity

1975 *Photogravity Co., Inc.

Survey:

Contoured Bouguer Gravity Map

Seismic - Ground Noise

1974 Senturion Sciences, Inc.

Survey:

Contractor's Report with *attachments

Seismic - Reflection

1976 *Western Geophysical Co.

Survey:

700% stacked CDP sections with base map

1977 *United Geophysical Co.

*Indicates that 4th copy is reproducible

Survey:

1200% stacked CDP sections with base map

*Indicates that 4th copy is reproducible

SAN EMIDIO, NV
SHALLOW TEMPERATURE HOLES

1. Geonomics Report
2. San Emidio 1978 Shallow Temperature Hole Program with *Attachments
3. San Emidio 1977 Temperature Hole Program with *Attachments

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SAN EMIDIO, NV
KOSMOS #1-9

1. Drilling History - Summary
2. Directional Drilling, Inc., Survey Data Sheet
3. Report of Analysis, 4-20-78 (Skyline Labs) from DST
4. Drilling History, Kosmos 1-9, detailed
5. Lithologic Well Log, 1-30-78, including core descriptions
6. Johnston-Schlumberger Technical Report - Drill Stem Test 5238'-5247'
* 7. Borehole Compensated Sonic Log, 2-23-78 and 3-7-78, Runs 1 & 2, 500'-5370'
* 8. Dual Induction-SFL, 2-23-78 and 3-7-78, Runs 1 & 2, 500'-5370'
* 9. Fracture Identification Log, 2-23-78 and 3-7-78, 500'-5370'
*10. Continuous Dipmeter, 2-23-78 and 3-7-78, 500'-5370'
*11. Compensated Neutron - Formation Density, 2-23-78 and 3-7-78, 500'-5370' with Gamma Ray and Caliper
*12. Temperature Log, 3-7-78, Run 4 (Schlumberger) to 5370'
*13. Temperature Log, 3-7-78, Run 5 (Schlumberger) to 5370'
*14. Temperature Log, 3-7-78, Run 6 (Schlumberger) to 5370'
*15. Agnew & Sweet Static Temperature Traverse Survey, 3-29-78
*16. Agnew & Sweet Static Temperature Traverse Survey, 5-4-78
*17. Lithologic-Mud Log

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San Emidio, NV
Kosmos #1-8

1. Drilling History, Including Hole Size, Lithologies and Drill Stem Test 3892' - 3898', 11-26-75.
2. Sidewall Samples, 600' - 3990'
3. Maximum Reading Thermometer Surveys 11/22 and 11/28
4. Johnston - Schlumberger Technical Report, Drill Stem Test 11/28, 3877' - 3883'
*5. Lithologic and Mud Temperature Graph
*6. Dual Induction - Laterolog w/Linear Correlation Log, 11-14-75, 2" Scale
*7. Dual Induction - Laterolog w/Linear Correlation Log, 11-24-75, 2" Scale
*8. Borehole Compensated Sonic Log, 11-14-75, Run 1, 2" = 100'
*9. Dual Induction - Laterolog 11-14-75, 5" Scale
*10. Dual Induction - Laterolog, 11-24-75, 564' - 4013', 5" Scale
*11. Continuous Dipmeter, 11-25-75
*12. Continuous Dipmeter 11-25-75, Run 1 (Computed)
*13. Compensated Neutron - Formation Density, 11-25-75, With Gamma Ray and Caliper
*14. Agnew & Sweet, Subsurface Temperature Survey, 1-3-76 to 1-4-76
*15. Agnew & Sweet, Subsurface Temperature Survey, 12-4-75
*16. Agnew & Sweet, Subsurface Temperature Survey, 1-16-76
*17. Agnew & Sweet, Subsurface Temperature Survey, 12-18-75
*18. Structural Geology of the Sam Emidio Area (Intrasearch)

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Geophysical Data
San Emidio, Nevada

Electrical - Resistivity (Dipole - Dipole)

1973 - 74 Mc Phar Geophysics, Inc.

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Contractor's Report with *attachments

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SHALLOW TEMPERATURE HOLES

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KOSMOS #1-9

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