

August 24, 1979

MEMORANDUM

TO: Geothermal Distribution List

FROM: Howard P. Ross and Sharrif Dajany

SUBJECT: OPEN FILE DATA RELEASE, DOE/DGE Industry Coupled Program,
AVAILABILITY OF WELL LOGS, Northern Basin and Range Case Studies,
PRESENTATIONS at the Geothermal Resources Council Annual Meeting,
Reno.
DISTRIBUTION of Earth Science Laboratory and University of Utah
Reports.

September 6 and 7, 1979 are designated as an open-file period for the study and purchase of data made available through the DOE/DGE Industry Coupled Program. This will be the second data release for the Northern Basin and Range Case Studies Program. Reproductions of these data may be requested from the Earth Science Laboratory. The estimated reproduction and handling charges are indicated in the data descriptions, following pages. Orders will be accepted from September 1 through October 31, 1979. Inquiries about the data and requests for reproductions should be directed to Mr. Sharrif Dajany at the Earth Science Laboratory.

The data will be available for study and distribution at:

Earth Science Laboratory
University of Utah Research Institute
420 Chipeta Way, Suite 120
Salt Lake City, Utah 84108
Telephone No. (801) 581-8383

Geophysical well logs have been received for two exploration well tests and two deep thermal gradient holes completed under the DOE/DGE Industry Coupled Program, Northern Basin and Range Case Studies. Well logs are available for:

Desert Peak B-23-1 t.d. 9641' Phillips Petroleum Co.
Humboldt House Campbell "E" No. 2 t.d. 8061' Phillips Petroleum Co.
Soda Lake 11-33 t.d. 2000' Chevron Resources Co.
Soda Lake 63-33 t.d. 2000' Chevron Resources Co.

Reproductions of all geophysical well logs for the subject areas will be available through:

Rocky Mountain Well Log Service
P.O. Box 3150
Denver, Colorado 80201
(303) 825-2181

The availability of the logs will be announced in the Petroleum Information Corp. - Rocky Mountain Well Log Service weekly log listing.

Several data sets or interpretations completed as part of the Industry Coupled Case Study Program or other programs will be presented at the Geothermal Resources Council Annual Meeting, Reno, Nevada, September 24-27, 1979:

Structural Inferences from Geological and Geophysical Data at the Beowawe KGRA, North Central Nevada. Poster Session by Christian Smith, Eric M. Struhsacker and Debra W. Struhsacker.

The Exploration Significance of Low Angle Faulting in the Roosevelt Hot Springs and Cove Fort-Sulphurdale Geothermal Systems, Utah. Poster Session by Dennis Nielson and Joseph Moore.

State Coupled Resource Assessment Program - An Update. Poster Session by Duncan Foley, Phillip M. Wright, Debra W. Struhsacker, Clayton R. Nichols, L. Leroy Mink, Gerald P. Brophy, Paul J. Grim, and George Berry.

Data on display at the Earth Science Laboratory/UURI Exhibit booth, but not included in the above or previously released:

Interpretative Well Log Summary, Utah State 14-2, Roosevelt Hot Springs, Utah.

Interpreted Intrinsic Electrical Resistivity Map and Sections, Cove Fort-Sulphurdale KGRA, Utah.

The following three reports on geothermal research funded by the Department of Energy will be available on September 6, 1979 at no cost.

- (1) "Multielement Geochemical Exploration Data for the Cove Fort-Sulphurdale Area, Beaver and Millard Counties, Utah" by Robert W. Bamford and Odin D. Christensen.

Multielement geochemical exploration data has been acquired for the Cove Fort-Sulphurdale Known Geothermal Resource Area (KGRA). This was accomplished by analysis of both whole rock and +3.3 specific gravity

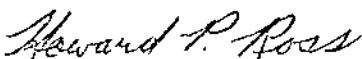
concentrate samples from cuttings composites from shallow rotary drill holes. Areal distributions are reported for arsenic, mercury, lead and zinc. These are elements indicated by previous studies to be broadly zoned around thermal centers in geothermal systems.

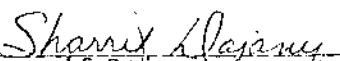
- (2) "Bipole-Dipole Interpretation with Three-Dimensional Models (including a field study of Las Alturas Estates, NM)" by Gerald W. Hohmann and George R. Jiracek.

This report presents a catalog of computed three-dimensional models to aid in understanding and interpreting bipole-dipole resistivity data. Included is an example of the interpretation of field data from the Los Alturas Estates geothermal project in New Mexico.

- (3) "The Telluric-Magnetotelluric Method in Two-And Three-Dimensional Environments" by John A. Stodt, Gerald W. Hohmann, and Sam C. Ting.

The limitations of the telluric-magnetotelluric method in two- and three-dimensional environments are analyzed via computer modeling.


Howard P. Ross
Project Manager


Sharif Dajany
Administrative Analyst

HPR,SD:ns

NORTHERN BASIN & RANGE

ITEM

DESCRIPTION

COLADO, NEVADA (Getty Oil Co.)

Colado (GOC)-3
\$2.35

Temperature survey data for 18 temperature gradient holes (average depth 500 feet)

DIXIE VALLEY, NEVADA (Southland Royalty Co.)

Dixie Valley (SR)-10
\$1.40

Temperature survey data, 6 shallow-gradient holes (500'-1500' t.d.); (NOTE: The lithology data for these holes was released in March, 1979)

BALTAZOR, NEVADA (Earth Power Production Co.)

Baltazor (EPP)-7
\$3.95

Geochemical Map, Geologic Cross Section, Sulfate Map and Microearthquake Survey Map (Supplemental materials not included in March, 1979 release).

SOUTHERN UTAH

Item

Description

Cove Fort-Sulphurdale
\$0.90

Union Oil Co. report "Treatment of Sanded Dolomite" and attached patent description, Procedure for Consolidation of Caving Formation. 13 pages.

The following data have been received through the DOE/DGE Industry Coupled Case Study program, and will be available for study:

- Item 1. Geothermal Power Corporation: Shallow Thermal Gradient Hole Data, Roosevelt Hot Springs Area, Utah.
(Temperature logging, heat flow calculations and lithology of 14 shallow holes).
- Item 2. Geothermal Power Corporation: GeothermEx Report, January 1977, "Geothermal Potential of Lands Leased by Geothermal Power Corporation in the Mineral Mountains, Beaver and Millard Counties, Utah."
- Item 3. Seismic Exploration Inc.: Seismic Emissions Study, Roosevelt Hot Springs, Milford, Utah.
- Item 4. Union Oil Corporation: Cove Fort-Sulphurdale area, Beaver and Millard Counties, Utah.
 - 4.1 Temperature Gradient Investigation, (25 holes).
 - 4.2 Surface Geology and Geothermal Manifestation Study.
 - 4.3 Seismic Survey, Cove Fort, Utah.
 - 4.4 Reconnaissance Resistivity Survey, Phoenix Geophysics Inc., Cove Fort Prospect, Utah.
 - 4.5 Gravity Interpretation, Cove Fort Prospect, Southwestern Utah.
 - 4.6 Geochemical Surveys, Cove Fort, Utah.

These data complete the deliverables of surface geologic, geochemical, and geophysical surveys due the Department of Energy/Division of Geothermal Energy under the present Industry Coupled Case Studies Utah RFP. Future deliverable items will be restricted to subsurface data and drill hole products.

- Item 1 Denver Research Institute: Preliminary Results of Reservoir Flow Tests on Thermal Power Co./AMAX Well 14-2, Roosevelt Hot Springs KGRA, Beaver Co., Utah. (\$1.00)
- Item 2 Getty Oil Company Well #52-21, Roosevelt Hot Springs KGRA, Beaver County, Utah. Well History, Bit Record, Lithology Log, Agnew-Sweet Pressure and Temperature Logs, Water Analysis of Flow Samples. (\$3.10)
- Item 3 Union Oil Company Well Forminco #1, Cove Fort-Sulphurdale KGRA, Millard County, Utah. Technical report including Well Summary, Well History, Mud History, H₂S Kick, Fishing, Cementation and Geological Reports. (\$5.20)
- Item 4 Union Oil Company Well #42-7, Cove Fort-Sulphurdale KGRA, Beaver County, Utah. Technical report including Geologic Report, Well Summary, Well History, Fishing Operations, Bit Record, Cementing, Drilling Fluid Summary, Corrosion Analysis, H₂S Safety Procedures and Flow Testing. (\$10.75) + Initial Flow Test (\$1.35) = \$12.10
- Item 5 Union Oil Company Well #42-7 Cove Fort-Sulphurdale KGRA, Beaver County, Utah Dia-Log Caliper Service Report and Schlumberger Directional Survey results. (\$1.95)

These data present a very detailed picture of drilling problems, drilling technology, lithology and geologic conditions at the Cove Fort-Sulphurdale and Roosevelt Hot Springs KGRAs. Chip boards constructed from the cuttings of these drill holes will be on display at ESL-UURI.

The reproduction and distribution of geophysical well logs for wells #52-21 and #42-7 will be handled by...

- Item 1. Geothermal Power Corporation Thermal Gradient Hole #15, Roosevelt Hot Springs KGRA: well summary, drill report, temperature logs, lithologic log. (\$1.50)
- Item 2. Getty Oil Company Well #52-21, Roosevelt Hot Springs KGRA: Pruett temperature survey; water analyses for flowline samples, wireline samples, and Jefferson water well sample. (\$1.00)
- Item 3. Union Oil Company Well #31-33, Cove Fort/Sulphurdale KGRA: Technical report including well summary, geologic report, well history, temperature-pressure surveys, etc. (\$5.50)
- Item 4. Union Oil Company Well #31-33, Cove Fort Sulphurdale KGRA: Geothermal/Geologic Data Log and summary of Schlumberger directional survey, p. 1-3. (\$0.75)

The Earth Science Laboratory also notes the completion of a detailed aeromagnetic survey covering approximately 190 square miles in Millard and Beaver Counties, Utah. The survey area includes the Dog Valley, Cove Fort, and Sulphurdale areas on the west flank of the Pavant Range. Orders will be accepted for copies of the aeromagnetic data at a map scale of 1:62,500 for reproduction and handling costs of \$0.75.

1. From Thermal Power Company Well Utah State 14-2, Roosevelt Steam Field SW Utah, T27S, R9W, Section 2.
 - a. General Well specifications
 - b. Borehole data
 - (1) Well summary, drilling history and bit record
 - (2) Alpha Beta Gamma Associates, Inc., Lithologic log, 79'-6100'
 - (3) Drill Cutting Samples
 - (4) Agnew & Sweet wireline temperature and pressure logs:
 - Static temperature survey October 16, 1976
 - Static temperature survey November 15, 1976
 - Static temperature survey November 18, 1976
 - Static pressure surveys (2) November 18, 1976
 - (5) Schlumberger logs:

Conventional temperature log	Run 1	110'-1810'
Special high resolution temperature log	Run 2	1500'-6121'
Induction electric log	Runs 1 & 2	650'-6118'
BHC sonic log with gamma ray	Runs 1 & 2	600'-6112'
Compensated neutron formation density log	Runs 1 & 2	600'-6121'
 - c. Production and reservoir data (48 hour flow test)
 - (1) Description of test and testing procedure
 - (2) Flow rates and calculations
 - (3) Fluid temperature and pressure data
 - (4) Analyses of water samples at six hour intervals
 - (5) Steam and water analysis by USGS

2. From Thermal Power Company Well Utah State 72-16, Roosevelt Steam Field T27S, R9W, Section 16.
- a. General well specifications
 - b. Borehole data:
 - (1) Well summary, drilling history and bit record
 - ▷ (2) Alpha Beta Gamma Associates, Inc., lithologic log, 85'-1245'
 - (3) Cut of samples (each 10')
 - (4) Agnew & Sweet wireline temperature and pressure logs:

Static temperature survey	November 17, 1976
Static temperature survey	March 30, 1977
Static pressure survey	March 30, 1977
Shut in pressure survey	April 5, 1977
 - (5) Schlumberger logs:

Conventional temperature log	Run 1	0'-525'
HRT temperature log	Run 2	50'-1012'
VDL-GR cement bond log	Run 1	0'-534'
VDL cement bond log	Run 2	20'-999'
 - c. Production and reservoir data (24 hour flow test)
 - (1) Description of test and testing procedure
 - (2) Flow rates and calculations
 - (3) Fluid temperature and pressure data
 - (4) Analysis of water samples
 - (5) Pressure build-up data

3. Getty Oil Company surface geophysical surveys:
- a. 15 miles of electrical resistivity survey profiles and report by Geonomics, Inc. Survey conducted in June 1976. Two contoured interpretation maps, incorporating these data into those obtained by the University of Utah, Department of Geology and Geophysics.
 - b. 15.75 square miles of ground motion survey conducted by Seismic Exploration, Inc., in January of 1977, including computer analysis of the five stations occupied during the survey.

Chip boards have been constructed by the Earth Science Laboratory-UURI for Thermal Power Company wells Utah State 14-2 and 72-16.

DIXIE VALLEY, NEVADA
Southland Royalty Co.

<u>Item</u>	<u>Description</u>
Dixie Valley (SR)-1 \$3.25	6 Shallow Temperature Gradient Holes (500'-1500' t.d.) lithology data only, 63 pgs.
Dixie Valley (SR)-2 \$11.00	Geothermex Report "Geothermal Potential of the Quest Leasehold Dixie Valley, Nevada"; Dec. 1976, 153 pgs.
Dixie Valley (SR)-3 \$4.25	Keplinger and Assoc. Report "Preliminary Evaluation of Dixie Valley, Nevada: Geothermal Potential and Associated Economics"; Sept. 1977, 51 pgs.
Dixie Valley (SR)-4 \$1.00	EDCON Report "Gravity and Magnetic Survey Over the Humboldt Salt Marsh, Dixie Valley, Nevada; Dec. 1976, 11 pgs.
Dixie Valley (SR)-5 \$3.00	Microgeophysics Report, "Seismicity Report on the Dixie Valley Prospect, Churchill Co., Nevada"; 200 km ² ; Nov. 1976, 58 pgs.
Dixie Valley (SR)-6 \$7.50	Senturion Sciences Inc. Report "High Precision Multi- level Aeromagnetic Survey over Dixie Valley, Nevada; Part 1, Oct. 1977, 100 mi ² ; 5 multilevel profiles, 13 pgs.
Dixie Valley (SR)-7 \$3.75	Senturion Sciences, Inc. Report "High-Precision Multi- level Aeromagnetic Survey over Dixie Valley, Nevada; Part 2; June 1978; 50 mi ² ; 7 multilevel profiles, 18 pgs.
Dixie Valley (SR)-8 \$5.75	Senturion Sciences, Inc. Report "South Dixie Valley, Nevada Scalar Magnetotelluric Survey"; Feb. 1978; 20 mi ² ; 27 scalar stations, 1 tensor, 53 pgs.
Dixie Valley (SR)-9 \$6.00	Keplinger and Assoc. Report "Interim Evaluation of Exploration and Development Status, Geothermal Potential and Associated Economics of Dixie Valley, Nevada, 113 pgs.

BALTAZOR, NEVADA
Earth Power Production Co.

<u>Item</u>	<u>Description</u>
Baltazor (EPP)-1 \$2.25	Geothermex Report "Geothermal Interpretation of Groundwaters, Continental Lake Region, Humboldt Co., Nevada; Dec. 1977, 30 pgs.
Baltazor (EPP)-2 \$1.20	Geothermex Report "Photogeologic Interpretation of the Baltazor-McGee Geothermal Prospects, Humboldt County, Nevada; Feb. 1978, 24 pgs.
Baltazor (EPP)-3 \$5.50	Senturion Sciences, Inc. Report, "N.W. Nevada Micro-earthquake Survey Report for Earth Power Corporation"; Sept. 1977; Two, six-station, 9-km diameter seismometer arrays, 67 pgs.
Baltazor (EPP)-4 \$2.50	27 Shallow Thermal Gradient Holes; temperature and lithology, 27 pgs. plus map
Baltazor (EPP)-5 \$1.25	Aeromagnetic Map, Vya Sheet-1974; 1,015 sq. mi.; Flown at 9000 feet barometric elevation, by Scintrex Mineral Surveys, 1972; Scale 1:62,500.
Baltazor (EPP)-6 \$1.25	Gravity Map compiled from USGS Open File 76-601 and USGS Open File 77-67C; scale 1:62,500; data cover approximately 400 square miles.

COLADO, NEVADA
Getty Oil Co.

<u>Item</u>	<u>Description</u>
Colado (GOC)-1 \$12.25	Electrodyne Surveys Report " <u>An Electrical Resistivity Survey of the Colado Hot Springs Prospect, Pershing Co., Nevada -- Vol. I and II: Electrical resistivity, gravity and magnetic reconnaissance surveys plus detailed electrical resistivity surveys; scalar and vector AMT-MT, roving vector telluric soundings, d.c. resistivity and time domain electric & magnetic field soundings. Surveys cover approximately 100 square miles. 14 maps,</u> 128 pgs.
Colado (GOC)-2 \$0.20	Temperature gradient surveys, Wells #RG-1, #RG-2, Sec. 26, T.28 N., R.32 E., Pershing Co., Nevada; August 1976; Total depths are 450 and 445 feet, 4 pgs.

SAN EMIDIO, NEVADA
Chevron Resources Company

<u>Item</u>	<u>Description</u>
San Emidio (CRC)-1 \$2.75	Electrical resistivity survey, dipole-dipole, 25 line miles; a=2,000 ft., by McPhar Geophysics, Inc., October 1973, 12 pgs.
San Emidio (CRC)-2 \$3.00	Electrical resistivity survey, dipole-dipole, 8 line miles; a=2,000 ft., by Phoenix Geophysics, Inc., May 1976, 9 pgs.
San Emidio (CRC)-3 \$0.40	Self Potential Survey; 126 measurements (spacing 1000 ft.) along three north-south lines with tie; Senturion Sciences, Inc., 1974, 8 pgs.
San Emidio (CRC)-4 \$1.50	Gravity survey, 1056 stations, 1/8 mile spacing, lines 1/2 mile apart, with tie lines, terrain corrected; Photogravity, Inc., October 1975, map.
San Emidio (CRC)-5 \$2.25	Seismic--Ground Noise Survey; 35 stations, 100 square miles; Senturion Sciences, Inc., May 1974, 37 pgs.
San Emidio (CRC)-6 \$4.00	Seismic--Reflection survey; 2.1 line miles high resolution, with 14 hydrophones set at a depth of 18' in holes 33' apart. 0.5 msec sampling; dynamite 0.5-20 lbs; 700% stacked sections migrated: Western Geophysical Co. August 1976, plate only.
San Emidio (CRC)-7 \$3.25	Seismic--Reflection survey; 10 line miles, split spread, 110' group interval, 220' shot interval, dynamite source, 1-10 lbs. @ 0-160'; processed, deconvolved; United Geophysical Corp., Oct. 1977, plate only.
San Emidio (CRC)-8 \$20.00	Temperature gradient holes; temperature and lithologic data from 64 temperature gradient holes drilled to depths of 200-500 feet; temperature gradient report by Geonomics; work done in 1976, 1977, 1978, 300 pgs.
San Emidio (CRC)-9 \$0.50	Aerial and Structural Geology of the San Emidio Area, Washoe Co., Nevada - 1:24,000 scale map of 50 square miles derived from color air photography; Intra-Search.
San Emidio (CRC)-10 \$4.00	KOSMOS #1-9 (t.d.=5370'); Drilling history, summary, directional drilling survey, fluid analysis, lithologic well log with core descriptions; Johnston-Schlumberger Technical report - drill stem test 5238'-5247', 77 pgs.

San Emidio (CRC)-11
\$1.25

KOSMOS #1-8 (t.d.=4013'); Drilling history,
lithologies drill stem test 3892'-3898'; sidewall
sample description, maximum reading thermometer
surveys; Johnston-Schlumberger Technical report - drill
stem test 3877'-3883', 20 pgs.

NOTE: A full suite of geophysical well logs including lithologic and mud
temperature graphs, temperature, etc. for KOSMOS #1-8 and KOSMOS #1-9 has
been forwarded to Rocky Mountain Well Log Service, Denver, Colo. Copies
of these logs should be ordered directly from that office.

BEOWAWE, NEVADA
Chevron Resources Co.

<u>Item</u>	<u>Description</u>
Beowawe (CRC)-1 \$2.25	Electrical resistivity survey, dipole-dipole; McPhar Geophysics, Inc., 1974; six lines, a=2000 feet, 11 pgs.
Beowawe (CRC)-2 \$2.00	Electrical resistivity survey, dipole-dipole; Phoenix Geophysics, Inc., 1976; a=2000 feet, 10 pgs.
Beowawe (CRC)-3 \$11.25	Magnetotelluric survey, Geotronics Corp., 1976 30 square miles, 107 pgs.
Beowawe (CRC)-4 \$2.25	Self Potential survey, Terraphysics, 1977, 10 square miles, map.
Beowawe (CRC)-5 \$4.00	Aeromagnetic survey, Senturion Sciences, 1976; 30 square miles; 80 line miles single level; 14 line miles multilevel, 16 pgs.
Beowawe (CRC)-6 \$4.00	Seismic emissions survey, Seismic Exploration, Inc., 1977; 5 stations of 5 geophone arrays; 16 square miles, 40 pgs.
Beowawe (CRC)-7 \$8.50	Reflection seismic survey, 17.5 line miles; Charles B. Reynolds and Assoc. 1975; 300 lb. weight dropped 3.5 ft. or 700 pound weight dropped 6.5 ft., 8 pgs.
Beowawe (CRC)-8 \$1.00	Ground Noise survey with contoured ground noise power map; Charles B. Reynolds and Assoc.; 1974, map.
Beowawe (CRC)-9 \$22.50	Ground Noise survey - Senturion Services, Inc., 1974. 258 pgs.
Beowawe (CRC)-10 \$2.25	GINN #1-13; (t.d.=9551'). Well summary report and history; subsurface pressure survey 8-22-74; core description @ 9551'; field data; drill stem test, 8605'-9551', 6-18-74; drill stem test 8614-9551', 6-20-74. Water samples, water chemistry. Formation testing service reports (3), 43 pgs.
Beowawe (CRC)-11 \$3.75	ROSSI #21-19; (t.d.=5680') Drilling and completion report, directional survey; Agnew & Sweet static temperature survey 3-28-77; static pressure survey, 3-28-77; flow test; fluid chemistry; drilling record; cuttings description, 70 pgs.

NOTE: A full suite of geophysical well logs including lithologic and mud temperature graphs, temperature, etc. for GINN #1-13 and ROSSI #21-19 has been forwarded to Rocky Mountain Well Log Service, Denver, Colo. Copies of these logs should be ordered directly from that office.

SODA LAKE, NEVADA
(Chevron Resources Company)

<u>Item</u>	<u>Description</u>
Soda Lake (CRC)-1 \$2.50	<u>Dipole-Dipole resistivity survey; McPhar Geophysics, Inc., 1973-74; covers 63 sq. mi., a=2000 ft., n=1 to 4,</u> 13 pgs.
Soda Lake (CRC)-2 \$5.50	Magnetotelluric Survey; 14 stations covering 20 sq. miles; Geotronics Corp., 1975, 104 pgs.
Soda Lake (CRC)-3 \$8.00	Magnetotelluric Survey; Geotronics Corp., 1977, 88 pgs.
Soda Lake (CRC)-4 \$5.00	Reflection seismic survey, weight drop, 24 line miles Charles Reynolds & Assoc.; 1975, 31 pgs.
Soda Lake (CRC)-5 \$3.00	Reflection seismic survey; 1200% stacked CDP sections with base map; 12 line miles; Chevron Geophysical Co., 1977.
Soda Lake (CRC)-6 \$1.00	Temperature gradient survey; eleven 500-foot holes; temperature survey and cuttings description. Boyles Bros., 1974, 16 pgs.
Soda Lake (CRC)-7 \$0.35	Temperature gradient hole 36-78 (t.d. 2000 ft.); drilling history, lithologic description, 6 pgs.
Soda Lake (CRC)-8 \$1.25	Soda Lake #44-5 (t.d. 5070'); drilling and completion history; direction survey; core description; lithologic description, 21 pgs.
Soda Lake (CRC)-9 \$1.25	Soda Lake #1-29 (t.d. 4306'); drilling and completion history; flow test data, report of analysis; production record; static temperature survey, mud log, 22 pgs.

NOTE: A full suite of geophysical logs and mud logs for #44-5 and #1-29 are available from Rocky Mountain Well Log Services, Denver, CO. Two temperature surveys from #36-78 are also available at this source.

ESL Reports to date

1	Numerical Modeling of Apparent Resistivity Profiles - Olkaria, Kenya	Ross
2	Dipole-Dipole Resistivity Survey of a Portion of Coso Hot Springs	Fox
3	Geology and Alteration of the Coso Geothermal Area	Hulen
4	Low-Altitude Aeromagnetic Survey of a Portion of Coso Hot Springs	Fox
5	Geological and Geophysical Analysis of CGEH-1, Coso Hot Springs	Galbraith
6	Geochemistry of Solid Materials from Two US Geothermal Systems	Bamford
7	Three-Dimensional Magnetotelluric Modeling	Hohman, Ting
8	Interpretation of Resistivity Data - USGS Calico Hill	Ross, Lunbeck
9	Stratigraphy and Alteration of 15 Shallow thermal Gradient Holes	Hulen
10	Annotated Bibliography of Roosevelt Hot Springs KGRA	McKinney
11	Topographic Effects in Resistivity Modeling	Hohman et al.
12	Geology of Roosevelt Hot Springs	Nielson et al.
13	Initial Investigation of Soil Mercury Geochemistry	Capuano, Bamford
14	Radon Emanometry as a Geothermal Exploration Technique	Nielson
15	Interactive Dipole-Dipole Resistivity and IP Modeling	Killpack-Hohman
16	Interpretation of Resistivity Data - Kenya	Ross et al.
17	Interpretation of Resistivity Data - Ethiopia	Ross et al.
18	Geology of Cove Fort - Supplemental KGRA	Moore, Smithey, S.H.H.

The following data have been received through the DOE/DGE Industry Coupled Case Study program, and will be available for study:

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|----------------|--|------------|
| <u>Item 1.</u> | Geothermal Power Corporation: Shallow Thermal Gradient Hole Data, Roosevelt Hot Springs Area, Utah.
(Temperature logging, heat flow calculations and lithology of 14 shallow holes). | <u>55</u> |
| <u>Item 2.</u> | Geothermal Power Corporation: GeothermEx Report, January 1977, "Geothermal Potential of Lands Leased by Geothermal Power Corporation in the Mineral Mountains, Beaver and Millard Counties, Utah." | <u>790</u> |
| <u>Item 3.</u> | Seismic Exploration Inc.: Seismic Emissions Study, Roosevelt Hot Springs, Milford, Utah. | <u>995</u> |
| <u>Item 4.</u> | Union Oil Corporation: Cove Fort-Sulphurdale area, Beaver and Millard Counties, Utah. | <u>445</u> |
| 4.1 | Temperature Gradient Investigation, (25 holes). | <u>165</u> |
| 4.2 | Surface Geology and Geothermal Manifestation Study. | <u>455</u> |
| 4.3 | Seismic Survey, Cove Fort, Utah. | <u>310</u> |
| 4.4 | Reconnaissance Resistivity Survey, Phoenix Geophysics Inc., Cove Fort Prospect, Utah. | <u>440</u> |
| 4.5 | Gravity Interpretation, Cove Fort Prospect, Southwestern Utah. | <u>305</u> |
| 4.6 | Geochemical Surveys, Cove Fort, Utah. | <u>30</u> |

These data complete the deliverables of surface geologic, geochemical, and geophysical surveys due the Department of Energy/Division of Geothermal Energy under the present Industry Coupled Case Studies Utah RFP. Future deliverable items will be restricted to subsurface data and drill hole products.

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These data present a very detailed picture of drilling problems, drilling technology, lithology and geologic conditions at the Cove Fort-Sulphurdale and Roosevelt Hot Springs KGRAs. Chip boards constructed from the cuttings of these drill holes will be on display at ESL-UURI.

The reproduction and distribution of geophysical well logs for wells

- Item 1. Geothermal Power Corporation Thermal Gradient Hole #15, Roosevelt Hot Springs KGRA: well summary, drill report, temperature logs, lithologic log. (\$1.50)
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- Item 4. Union Oil Company Well #31-33, Cove Fort Sulphurdale KGRA: Geothermal/Geologic Data Log and summary of Schlumberger directional survey, p. 1-3. (\$0.75)

The Earth Science Laboratory also notes the completion of a detailed aeromagnetic survey covering approximately 190 square miles in Millard and Beaver Counties, Utah. The survey area includes the Dog Valley, Cove Fort, and Sulphurdale areas on the west flank of the Pavant Range. Orders will be accepted for copies of the aeromagnetic data at a map scale of 1:62,500 for reproduction and handling costs of \$0.75.

1. From Thermal Power Company Well Utah State 14-2, Roosevelt Steam Field SW Utah, T27S, R9W, Section 2.
 - a. General Well specifications
 - b. Borehole data
 - (1) Well summary, drilling history and bit record
 - △(2) Alpha Beta Gamma Associates, Inc., Lithologic log, 79'-6100'
 - (3) Drill Cutting Samples
 - △(4) Agnew & Sweet wireline temperature and pressure logs:
 - Static temperature survey October 16, 1976
 - Static temperature survey November 15, 1976
 - Static temperature survey November 18, 1976
 - Static pressure surveys (2) November 18, 1976
 - (5) Schlumberger logs:

Conventional temperature log	Run 1	110'-1810'
Special high resolution		
temperature log	Run 2	1500'-6121'
Induction electric log	Runs 1 & 2	650'-6118'
BHC sonic log with gamma ray	Runs 1 & 2	600'-6112'
Compensated neutron formation density log	Runs 1 & 2	600'-6121'
 - △ c. Production and reservoir data (48 hour flow test)
 - (1) Description of test and testing procedure
 - (2) Flow rates and calculations
 - (3) Fluid temperature and pressure data
 - (4) Analyses of water samples at six hour intervals
 - (5) Steam and water analysis by USGS

- ✓2. From Thermal Power Company Well Utah State 72-16, Roosevelt Steam Field T27S, R9W, Section 16.
- a. General well specifications
 - b. Borehole data:
 - (1) Well summary, drilling history and bit record
 - ▷ (2) Alpha Beta Gamma Associates, Inc., lithologic log, 85'-1245'
 - (3) Cut of samples (each 10')
 - (4) Agnew & Sweet wireline temperature and pressure logs:

Static temperature survey	November 17, 1976
Static temperature survey	March 30, 1977
Static pressure survey	March 30, 1977
Shut in pressure survey	April 5, 1977
 - (5) Schlumberger logs:

Conventional temperature log	Run 1	0'-525'
HRT temperature log	Run 2	50'-1012'
YDL-GR cement bond log	Run 1	0'-534'
YDL cement bond log	Run 2	20'-999'
 - c. Production and reservoir data (24 hour flow test)
 - (1) Description of test and testing procedure
 - (2) Flow rates and calculations
 - (3) Fluid temperature and pressure data
 - (4) Analysis of water samples
 - (5) Pressure build-up data

- ✓3. Getty Oil Company surface geophysical surveys:
- a. 15 miles of electrical resistivity survey profiles and report by Geonomics, Inc. Survey conducted in June 1976. Two contoured interpretation maps, incorporating these data into those obtained by the University of Utah, Department of Geology and Geophysics.
 - b. 15.75 square miles of ground motion survey conducted by Seismic Exploration, Inc., in January of 1977, including computer analysis of the five stations occupied during the survey.

Chip boards have been constructed by the Earth Science Laboratory-UURI for Thermal Power Company wells Utah State 14-2 and 72-16.

DIXIE VALLEY, NEVADA
Southland Royalty Co.

<u>Item</u>	<u>Description</u>
Dixie Valley (SR)-1 \$3.25	6 Shallow Temperature Gradient Holes (500'-1500' t.d.) lithology data only, 63 pgs.
Dixie Valley (SR)-2 \$11.00	Geothermex Report "Geothermal Potential of the Quest Leasehold Dixie Valley, Nevada"; Dec. 1976, 153 pgs.
Dixie Valley (SR)-3 \$4.25	Keplinger and Assoc. Report "Preliminary Evaluation of Dixie Valley, Nevada: Geothermal Potential and Associated Economics"; Sept. 1977, 51 pgs.
Dixie Valley (SR)-4 \$1.00	EDCON Report "Gravity and Magnetic Survey Over the Humboldt Salt Marsh, Dixie Valley, Nevada; Dec. 1976, 11 pgs.
Dixie Valley (SR)-5 \$3.00	Microgeophysics Report, "Seismicity Report on the Dixie Valley Prospect, Churchill Co., Nevada"; 200 km ² ; Nov. 1976, 58 pgs.
Dixie Valley (SR)-6 \$7.50	Senturion Sciences Inc. Report "High Precision Multi- level Aeromagnetic Survey over Dixie Valley, Nevada; Part 1, Oct. 1977, 100 mi ² ; 5 multilevel profiles, 13 pgs.
Dixie Valley (SR)-7 \$3.75	Senturion Sciences, Inc. Report "High-Precision Multi- level Aeromagnetic Survey over Dixie Valley, Nevada; Part 2; June 1978; 50 mi ² ; 7 multilevel profiles, 18 pgs.
Dixie Valley (SR)-8 \$5.75	Senturion Sciences, Inc. Report "South Dixie Valley, Nevada Scalar Magnetotelluric Survey"; Feb. 1978; 20 mi ² ; 27 scalar stations, 1 tensor, 53 pgs.
Dixie Valley (SR)-9 \$6.00	Keplinger and Assoc. Report "Interim Evaluation of Exploration and Development Status, Geothermal Potential and Associated Economics of Dixie Valley, Nevada, 113 pgs.

BALTAZOR, NEVADA
Earth Power Production Co.

<u>Item</u>	<u>Description</u>
Baltazor (EPP)-1 \$2.25	Geothermex Report "Geothermal Interpretation of Groundwaters, Continental Lake Region, Humboldt Co., Nevada; Dec. 1977, 30 pgs.
Baltazor (EPP)-2 \$1.20	Geothermex Report "Photogeologic Interpretation of the Baltazor-McGee Geothermal Prospects, Humboldt County, Nevada; Feb. 1978, 24 pgs.
Baltazor (EPP)-3 \$5.50	Senturion Sciences, Inc. Report, "N.W. Nevada Micro-earthquake Survey Report for Earth Power Corporation"; Sept. 1977; Two, six-station, 9-km diameter seismometer arrays, 67 pgs.
Baltazor (EPP)-4 \$2.50	27 Shallow Thermal Gradient Holes; temperature and lithology, 27 pgs. plus map
Baltazor (EPP)-5 \$1.25	Aeromagnetic Map, Vya Sheet-1974; 1,015 sq. mi.; Flown at 9000 feet barometric elevation, by Scintrex Mineral Surveys, 1972; Scale 1:62,500.
Baltazor (EPP)-6 \$1.25	Gravity Map compiled from USGS Open File 76-601 and USGS Open File 77-67C; scale 1:62,500; data cover approximately 400 square miles.

COLADO, NEVADA
Getty Oil Co.

<u>Item</u>	<u>Description</u>
Colado (GOC)-1 \$12.25	Electrodyne Surveys Report "An Electrical Resistivity Survey of the Colado Hot Springs Prospect, Pershing Co., Nevada -- Vol. I and II: Electrical resistivity, gravity and magnetic reconnaissance surveys plus detailed electrical resistivity surveys; scalar and vector AMT-MT, roving vector telluric soundings, d.c. resistivity and time domain electric & magnetic field soundings. Surveys cover approximately 100 square miles. 14 maps, 128 pgs.
Colado (GOC)-2 \$0.20	Temperature gradient surveys, Wells #RG-1, #RG-2, Sec. 26, T.28 N., R.32 E., Pershing Co., Nevada; August 1976; Total depths are 450 and 445 feet, 4 pgs.

SAN EMIDIO, NEVADA
Chevron Resources Company

<u>Item</u>	<u>Description</u>
San Emidio (CRC)-1 \$2.75	Electrical resistivity survey, dipole-dipole, 25 line miles; a=2,000 ft., by McPhar Geophysics, Inc., October 1973, 12 pgs.
San Emidio (CRC)-2 \$3.00	Electrical resistivity survey, dipole-dipole, 8 line miles; a=2,000 ft., by Phoenix Geophysics, Inc., May 1976, 9 pgs.
San Emidio (CRC)-3 \$0.40	Self Potential Survey; 126 measurements (spacing 1000 ft.) along three north-south lines with tie; Senturion Sciences, Inc., 1974, 8 pgs.
San Emidio (CRC)-4 \$1.50	Gravity survey, 1056 stations, 1/8 mile spacing, lines 1/2 mile apart, with tie lines, terrain corrected; Photogravity, Inc., October 1975, map.
San Emidio (CRC)-5 \$2.25	Seismic--Ground Noise Survey; 35 stations, 100 square miles; Senturion Sciences, Inc., May 1974, 37 pgs.
San Emidio (CRC)-6 \$4.00	Seismic--Reflection survey; 2.1 line miles high resolution, with 14 hydrophones set at a depth of 18' in holes 33' apart. 0.5 msec sampling; dynamite 0.5-20 lbs; 700% stacked sections migrated; Western Geophysical Co. August. 1976, plate only.
San Emidio (CRC)-7 \$3.25	Seismic--Reflection survey; 10 line miles, split spread, 110' group interval, 220' shot interval, dynamite source, 1-10 lbs. @ 0-160'; processed, deconvolved; United Geophysical Corp., Oct. 1977, plate only.
San Emidio (CRC)-8 \$20.00	Temperature gradient holes; temperature and lithologic data from 64 temperature gradient holes drilled to depths of 200-500 feet; temperature gradient report by Geonomics; work done in 1976, 1977, 1978, 300 pgs.
San Emidio (CRC)-9 \$0.50	Aerial and Structural Geology of the San Emidio Area, Washoe Co., Nevada - 1:24,000 scale map of 50 square miles derived from color air photography; Intra-Search.
San Emidio (CRC)-10 \$4.00	KOSMOS #1-9 (t.d.=5370'); Drilling history, summary, directional drilling survey, fluid analysis, lithologic well log with core descriptions; Johnston-Schlumberger Technical report - drill stem test 5238'-5247', 77 pgs.

San Emidio (CRC)-11
\$1.25

KOSMOS #1-8 (t.d.=4013'); Drilling history,
lithologies drill stem test 3892'-3898'; sidewall
sample description, maximum reading thermometer
surveys; Johnston-Schlumberger Technical report - drill
stem test 3877'-3883', 20 pgs.

NOTE: A full suite of geophysical well logs including lithologic and mud
temperature graphs, temperature, etc. for KOSMOS #1-8 and KOSMOS #1-9 has
been forwarded to Rocky Mountain Well Log Service, Denver, Colo. Copies
of these logs should be ordered directly from that office.

BEOWAVE, NEVADA
Chevron Resources Co.

<u>Item</u>	<u>Description</u>
Beowave (CRC)-1 \$2.25	Electrical resistivity survey, dipole-dipole; McPhar Geophysics, Inc., 1974; six lines, a=2000 feet, 11 pgs.
Beowave (CRC)-2 \$2.00	Electrical resistivity survey, dipole-dipole; Phoenix Geophysics, Inc., 1976; a=2000 feet, 10 pgs.
Beowave (CRC)-3 \$11.25	Magnetotelluric survey, Geotronics Corp., 1976 30 square miles, 107 pgs.
Beowave (CRC)-4 \$2.25	Self Potential survey, Terraphysics, 1977, 10 square miles, map.
Beowave (CRC)-5 \$4.00	Aeromagnetic survey, Senturion Sciences, 1976; 30 square miles; 80 line miles single level; 14 line miles multilevel, 16 pgs.
Beowave (CRC)-6 \$4.00	Seismic emissions survey, Seismic Exploration, Inc., 1977; 5 stations of 5 geophone arrays; 16 square miles, 40 pgs.
Beowave (CRC)-7 \$8.50	Reflection seismic survey, 17.5 line miles; Charles B. Reynolds and Assoc. 1975; 300 lb. weight dropped 3.5 ft. or 700 pound weight dropped 6.5 ft., 8 pgs.
Beowave (CRC)-8 \$1.00	Ground Noise survey with contoured ground noise power map; Charles B. Reynolds and Assoc.; 1974, map.
Beowave (CRC)-9 \$22.50	Ground Noise survey - Senturion Services, Inc., 1974. 258 pgs.
Beowave (CRC)-10 \$2.25	GINN #1-13; (t.d.=9551'). Well summary report and history; subsurface pressure survey 8-22-74; core description @ 9551'; field data; drill stem test, 8605'-9551', 6-18-74; drill stem test 8614-9551', 6-20-74. Water samples, water chemistry. Formation testing service reports (3), 43 pgs.
Beowave (CRC)-11 \$3.75	ROSSI #21-19; (t.d.=5680') Drilling and completion report, directional survey; Agnew & Sweet static temperature survey 3-28-77; static pressure survey, 3-28-77; flow test; fluid chemistry; drilling record; cuttings description, 70 pgs.

NOTE: A full suite of geophysical well logs including lithologic and mud temperature graphs, temperature, etc. for GINN #1-13 and ROSSI #21-19 has been forwarded to Rocky Mountain Well Log Service, Denver, Colo. Copies of these logs should be ordered directly from that office.

SODA LAKE, NEVADA
(Chevron Resources Company)

<u>Item</u>	<u>Description</u>
Soda Lake (CRC)-1 \$2.50	Dipole-Dipole resistivity survey; McPhar Geophysics, Inc., 1973-74; covers 63 sq. mi., a=2000 ft., n=1 to 4, 13 pgs.
Soda Lake (CRC)-2 \$5.50	Magnetotelluric Survey; 14 stations covering 20 sq. miles; Geotronics Corp., 1975, 104 pgs.
Soda Lake (CRC)-3 \$8.00	Magnetotelluric Survey; Geotronics Corp., 1977, 88 pgs.
Soda Lake (CRC)-4 \$5.00	Reflection seismic survey, weight drop, 24 line miles Charles Reynolds & Assoc.; 1975, 31 pgs.
Soda Lake (CRC)-5 \$3.00	Reflection seismic survey; 1200% stacked CDP sections with base map; 12 line miles; Chevron Geophysical Co., 1977.
Soda Lake (CRC)-6 \$1.00	Temperature gradient survey; eleven 500-foot holes; temperature survey and cuttings description. Boyles Bros., 1974, 16 pgs.
Soda Lake (CRC)-7 \$0.35	Temperature gradient hole 36-78 (t.d. 2000 ft.); drilling history, lithologic description, 6 pgs.
Soda Lake (CRC)-8 \$1.25	Soda Lake #44-5 (t.d. 5070'); drilling and completion history; direction survey; core description; lithologic description, 21 pgs.
Soda Lake (CRC)-9 \$1.25	Soda Lake #1-29 (t.d. 4306'); drilling and completion history; flow test data, report of analysis; production record; static temperature survey, mud log, 22 pgs.

NOTE: A full suite of geophysical logs and mud logs for #44-5 and #1-29 are available from Rocky Mountain Well Log Services, Denver, CO. Two temperature surveys from #36-78 are also available at this source.

UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI

EARTH SCIENCE LABORATORY
420 CHIPETA WAY, SUITE 120
SALT LAKE CITY, UTAH 84108
TELEPHONE 801-581-5283

July 12, 1979

Claude B. Jenkins
Aminoil USA, Inc.
P. O. Box 11279
Santa Rosa, CA 95406

Dear Mr. Jenkins:

The Department of Energy, Division of Geothermal Energy has an ongoing program in Geothermal Exploration and Assessment Technology. The objective of this program is to improve exploration and assessment cost effectiveness by eliminating technical barriers, and thus aid in the commercialization of geothermal energy. To accomplish this objective, it is necessary that the program be responsive to the needs of the geothermal exploration industry, and thus I am requesting your input into this important program.

Management assistance for DOE/DGE's Geothermal Exploration and Assessment Technology Program is being provided by the Earth Science Laboratory at the University of Utah Research Institute. As outlined in the previous review document (Ward, 1978) and in the Program Plan, initial recommendations for research are proposed by technical review committees which are made up of geothermal experts from industry and research organizations. These committees met on May 14-16, 1979 at the Marriott Inn in Marina del Rey, California. In addition to the review committees of the Geothermal Exploration and Assessment Technology Program, a technical review committee of DOE/DGE's Reservoir Engineering Program was present. The meetings were held jointly to benefit from the interaction of both the engineers and explorationists and to identify research areas of common interest.

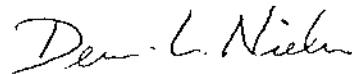
The attached document provides a list of participants, detailed instructions and agenda for the committees, and reports of the individual committees. I have summarized the committee recommendations with assigned priorities and estimated budgets on a separate form. Each committee has set priorities for their own recommendations; however, there has been no overall prioritization of the projects. It is in this respect that your input will be most valuable. Columns are provided on the summary sheet for you to indicate priorities and funding levels needed to achieve required results. Please feel free to recommend additional programs which you feel are needed to overcome

problems in exploration and assessment technology. It is estimated that total funding levels for this program will be in the range of \$1.5 to \$5 million in FY 80. Your input to this program will be included in a program review document and in the next iteration of the Program Plan. The response from industry program managers will help define DOE procurements and guide the research at the Earth Science Laboratory and the Department of Geology and Geophysics at the University of Utah.

You may also wish to respond to the general topics outlined on pages 4-6 of the memo on the Objectives of the Marina del Rey Conference or any of the specific topics suggested for discussion in each of the committees.

Thank you for your participation in this program.

Best regards,



Dennis L. Nielson
Project Manager
Exploration and Assessment
Technology

DLN:srm

cc: B. Gray
M. Reed
C.R. Nichols
L.L. Mink
S.H. Ward

SUMMARY OF RECOMMENDATIONS OF TECHNICAL REVIEW COMMITTEES OF
DOE/DGE's EXPLORATION AND ASSESSMENT TECHNOLOGY PROGRAM

COMMITTEE	RECOMMENDATIONS	PRIORITY	FUNDING	DURATION	YOUR RECOMMENDATIONS		
					PRIORITY	FUNDING	DURATION
STRUCTURE, STRATIGRAPHY, AND IGNEOUS PROCESSES	1. Surface Geology -detailed geologic mapping -aerial photography	1	225K/yr	5 yrs			
	2. K-Ar Dating --to refine models of relationship of magma systems & geoth. systems.	2	75K/yr	5 yrs			
	3. Subsurface Studies Structural Gravity (3 surveys/yr)	3	40K/yr 105K/yr	5 yrs			
	4. Rock Properties	4	30K/yr				
	5. Igneous Studies Models of magma system evolution - chemistry.	5	155K/yr	3-5 yrs			
EXPLORATION ARCHITECTURE	1. Refinement of MT		250K/yr				
	2. Groundwater effects on thermal measurements		100K/yr				
	3. Regional fluid geochem		100K/yr				
	4. Regional gas geochem		100K/yr				
	5. K-Ar dating - regional		100K/yr				
	6. Joint collection and inversion of data.		50K/yr				

COMMITTEE	RECOMMENDATIONS	PRIORITY	FUNDING	DURATION	YOUR RECOMMENDATIONS		
					PRIORITY	FUNDING	DURATION
THERMAL METHODS	1. Bottom hole T during drilling						
	2. Relations between thermal conductivity and physical parameters		60K/yr	3 yrs			
	3. Effects of groundwater flow on thermal measurements		100K/yr	5 yrs			
	4. "Free hole" Program		1000K/yr	5+ yrs			
	5. Shallow & intermediate depth drilling		1500K/yr				
	6. Deep hole T transmission system.		100K/yr	3 yrs			
SEISMIC METHODS	1. Data compilation and dissemination	1	100K/yr				
	2. Rock properties	2	75K/yr	2			
	3. Research in processing & interpretation	3	75K/yr	2			
	4. Seismic @ Valles Caldera	4	200K 100K	1st year 2nd year			
	5. Clear Lake Survey	5	125K 25K	1st year 2nd year			
	6. Microseismic noise @ Beowawe	6	30K 15K	1st year 2nd year			
	7. Microearthquake	7	50K 50K	1st year 2nd year			
	8. Basic research on micro-earthquake processing & interpretation	8	70K/yr	4 yrs			

COMMITTEE	RECOMMENDATIONS	PRIORITY	FUNDING	DURATION	YOUR RECOMMENDATIONS		
					PRIORITY	FUNDING	DURATION
ELECTRICAL METHODS	1. EM modeling & inversion a) cost-effective 2D & 3D modeling programs b) alternate inversion schemes	1	300K/yr	3 yrs			
	2. Controlled source EM field studies	2	100K/yr	2 yrs			
	3. Rock Properties	3	200K/yr	3 yrs			
	4. Regional MT map	1	50K/yr	2 yrs			
	5. Calibration sites & procedures	2	60K/yr	1 yr			
	6. MT Workshop	3	20K/yr				
	7. Testing of following (no budget recommenda- tion provided): -Induced Polarization -Magnetometric Resistivity -Long array MT -Singular coincident loop TPEM.						
WATER/ROCK INTERACTION	1. Mineralogy, geochem- istry, + petrology in geothermal reservoirs.		600K/yr	2 yrs			
	2. Workshop on water/rock in geothermics		25K/yr				
	3. Rock + fluid properties		200K/yr	2 yrs			
	4. Geothermometers		175K/yr	2 yrs			
	5. Obtain core						

June 6, 1979

MEMORANDUM

TO: P. M. Wright, D. Foley, D. L. Nielson, J. Moore, W. E. Glenn,
O. Struhsacker, R. Bamford, O. Christensen, J. Stringfellow

FROM: H. P. Ross

SUBJECT: Informal Status Report of Industry Coupled Case Studies
Program

The following cryptic comments were generated to help ESL staff members respond to questions from outside groups--questions such as:

- Where are all these case studies you are getting paid to do?
- Why does one group get all the case studies?
- Why aren't all these data available?
- Why do these reports take so long to get out?
- How many case studies are there?
- etc., etc., etc.

If they desire more specific comments, please refer them to somebody else.



H. P. Ross

HPR/smk

STATUS REPORT - CASE STUDIES
June 1, 1979

Roosevelt H.S., Utah

- Case study in Geophysics by Ward et al., 1978
- 2 of 5 Industry Coupled contracts still in progress, including 1 deep thermal gradient hole and up to 3 production wells not yet drilled
- flow test on 1 well not yet analyzed or reported to ESL or DOE
- Geologic mapping and geochemical studies already reported, distributed
- Integrated case study in preparation, awaiting more industry data and geophysical interpretation, including well log study.
- Integrated case study to be submitted for publication to journal -GSA?- by mid-September even if the program by industry is not completed.
- All materials from industry received to date have been released to public

Cove Fort - Sulphurdale, Utah

- Geologic mapping completed, report written awaiting DOE approval to distribute
- New aeromag survey flown - distributed Dec 1978
- Resistivity survey completed, interpretation underway
- Last of Union drill holes has been spudded (May 1979); will drill for 2 months?
- Integrated case study will be written upon receipt of drill results from Union, and interpretation of logs here at ESL
- Aiming for submittal to journal before Dec 1979
- All data received to date have been made public

Soda Lake, Nevada

- Geologic studies almost completed
- Geophysical interpretation underway
- Chevron program of new work almost completed, but new work results not yet reported to DOE or ESL
- Need to study two 2000 ft. thermal gradient holes after chips arrive.
- Case study to be submitted to journal by Dec. 31, 1979
- All data received from industry so far has been released to open file.

San Emidio, Nevada

- Contract for existing data only
- All data received from Chevron has been made public
- Detailed geologic mapping in progress, 50% complete
- Geophysical interpretations underway
- Integrated Case Study to be submitted for publication by Dec. 31, 1979

Dixie Valley, Nevada

- All data received from contractor has been released to open file by ESL
- Case study by Mackay School of Mines
- Study due sometime 1981-82

Leach Hot Springs, Nevada

- Some data received; contract states none can be released until first well is completed, about March 1980
- Case study after completion of program about Sept. '81 or later
- See LBL study re geology & geophysics of Grass Valley

Desert Peak, Nevada

- No case study by ESL-insufficient data
- Case study by Phillips, late 1979 or 1980
- Drilling of 10,000 ft. hole completed
- Data not received by ESL

Humboldt House, Nevada

- No case study by ESL, insufficient data
- Drilling of 8,000 ft. hole completed
- Data not received by ESL

Baltazor, Nevada

- Company program just getting under way
- Data received to date has been made public
- Integrated case study will await delivery of data items from company, interpretation; etc.
- Case study not before 1981

Beowawe, Nevada

Colado, Nevada

Comments about the same as above

McCoy, Nevada

Tuscarora, Nevada

Stillwater KGRA, Nevada

- 8000 ft. drill hole completed
- Study of cuttings not yet begun
- insufficient data for case study
- no supporting data received from company
- Topical study on drill results available sometime in 1980

Reply to those individuals and groups critical of the ESL
responsibility for the Case Studies Program

- All data are made public as early as possible in view of DOE contract agreements with participating companies, the limits of ESL staffing and budget, and the variety and amount of materials to be reproduced.
- Progress in developing an integrated case study is tied to and follows, the ongoing exploration effort of any company working on a given area.
- Along with the opportunity to develop technical studies goes the

requirement of managing and supporting the DOE program, the formal requirements of releasing data and reports, and periodic reports to, and review by, DOE. This consumes a large portion of the ESL effort including most of the project manager's time and much time of our administrative assistant, staff scientists and all support people.

- Other organizations (including LBL) have had the opportunity to participate in the Case Studies program but rejected it.
- The Case Studies program is only one of several projects that ESL administers for the DOE - others have major components of pass-through research and little in-house research

May 11, 1979

MEMORANDUM

TO: J. Moore S. Samberg
D. Nielson M. Adams
T. Glenn D. Struhsacker
B. Bamford S. Dajany
C. Smith J. Stringfellow
R. Whipple D. Foley
B. Sibbett R. Capuano
J. Hulen O. Christensen
E. Struhsacker W. Frangos

FROM: H.P. Ross

SUBJECT: Original data sets from the Industry Coupled Program - Utah and Nevada Areas.

We have a continuing stream of people coming by the lab to look at and to obtain copies of the Industry Coupled data which have been released to open file. I need to recover any of these original data items (including blue line prints) which may be in your files so that we can organize two complete data sets: one for printing copies for outside people or ourselves, and one for visitors use which will be filed in the library. We will attempt to develop one or two complete copies for sign-out use by the ESL staff as time and other printing priorities permit - at present there are no third copies for many data sets and any we have are incomplete.

The problem of trying to recover these data has become worse as the data get passed around and as many of us depart for the field for 1 or 2 week periods. We have had great difficulty in trying to recover the early data sets for Roosevelt Hot Springs and Cove Fort, and the Thermal Power Well data in particular. If you are presently working on a data set on a daily basis and do not anticipate being out of town, please give me a list of what you need to keep so your work is not held up. Try to have all other items to me not later than May 17 so I can begin the fun job of organizing and labeling this.

Thanks.

H. P. Ross (srm)
H. P. Ross

HPR:srm

AWARD/CONTRACT

1. CONTRACT (Proc. Inv. Ident.) NO. **DE-AC-73-79ET27007** 2. EFFECTIVE DATE **10/1/78** 3. REQUISITION/PURCHASE REQUEST/PROJECT NO. **T08-78-3577** 4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. **N/A**

5. ORDERED BY **Department of Energy Nevada Operations Office P.O. Box 14100 Las Vegas, Nevada 89114** 6. ADMINISTERED BY **(If other than block 5)** 7. DELIVERY FOB DESTINATION **NATION** **OTHER (See below)**

8. CONTRACTOR NAME AND ADDRESS **Earth Power Production Company P.O. Box 1565 Tulsa, Oklahoma 74101** 9. DISCOUNT FOR PROMPT PAYMENT **N/A** *P/A 3/88*

10. SUBMIT INVOICES (4 copies unless otherwise specified) TO ADDRESS SHOWN IN BLOCK 12 **In duplicate**

EXECUTED COPY

11. SHIP TO/MARK FOR **James B. Cotter, Director Engineering & Energy Applications Div. U.S. Department of Energy, P.O. Box 14100, Las Vegas, Nevada 89114** 12. PAYMENT WILL BE MADE BY **U.S. Department of Energy Nevada Operations Office Finance Division P.O. Box 14100, Las Vegas, Nevada 89114**

13. THIS PROCUREMENT WAS ADVERTISED, NEGOTIATED, PURSUANT TO: 10 U.S.C. 2304 (a)(4) 41 U.S.C. 252 (e)(10)

14. ACCOUNTING AND APPROPRIATION DATA

EB-02-03-HTA

15. ITEM NO.	16. SUPPLIES/SERVICES	17. QUANTITY	18. UNIT	19. UNIT PRICE	20. AMOUNT
	Geothermal Reservoir Assessment Case Study-- Northern Basin and Range Province (Baltazor KGRA)				\$ 573,255

TOTAL AMOUNT OF CONTRACT \$ **573,255**

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. CONTRACTOR'S NEGOTIATED AGREEMENT (Contractor is required to sign this document and return 2 copies to issuing office.) Contractor agrees to furnish and deliver all items or perform all the services set forth or otherwise identified above and on any continuation sheets for the consideration stated herein. The rights and obligations of the parties to this contract shall be subject to and governed by the following documents forming award/contract: (a) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein)

26. AWARD (Contractor is not required to sign this document.) Your offer on Solicitation Number _____, including the additions or changes made by you which additions or changes are set forth in full above, is hereby accepted as to the items listed above and on any continuation sheets. This award consummates the contract which consists of the following documents: (a) the Government's solicitation and your offer, and (b) this award/contract. No further contractual document is necessary.

23. NAME AND TITLE OF SIGNER (Type or print) **Ronald E. Barr President** 24. DATE SIGNED **11-27-78** 25. NAME OF CONTRACTING OFFICER (Type or print) **Robert W. Hall, Assistant Manager for Plans, Engineering & Budgets** 26. DATE SIGNED **11/4/78**

LISTING OF CONTRACT ARTICLES

ARTICLE 1	SCOPE OF WORK
ARTICLE 2	PERIOD OF PERFORMANCE
ARTICLE 3	DELIVERABLES
ARTICLE 4	PAYMENT
ARTICLE 5	OWNERSHIP OF PROPERTY
ARTICLE 6	SERVICE CONTRACT ACT OF 1965, AS AMENDED
ARTICLE 7	GENERAL PROVISIONS
ARTICLE 8	ALTERATIONS TO GENERAL PROVISIONS
ARTICLE 9	DOCUMENTS INCORPORATED

THE CONTRACT SCHEDULE

ARTICLE 1. SCOPE OF WORK

The Contractor shall provide the necessary personnel, materials, facilities, documentation, and all other necessary items to perform the work set forth in Appendix A, Scope of Work.

ARTICLE 2. PERIOD OF PERFORMANCE

The period of performance of this Contract shall be for thirty (30) months from October 1, 1978, through March 31, 1981, unless sooner terminated in accordance with the provisions of the Article of this Contract entitled "Termination for Default or for Convenience of the Government" or unless extended by mutual agreement of the parties.

ARTICLE 3. DELIVERABLES

- A. Specific deliverables are described in Appendix A, Scope of Work.
- B. Reports shall be prepared and submitted as prescribed in Appendix C, Reports.

ARTICLE 4. PAYMENT

A. For Existing Data. Upon delivery and acceptance by DOE of all the existing data included in paragraph D.1, "Scope of Work," the Contractor shall be paid the lump-sum amount of \$37,980.

B. For Program to Acquire New Data

- 1. Drilling Program. Upon drilling and completion of each hole provided for in paragraphs C.1 and C.2, "Scope of Work," and delivery and acceptance by DOE of the data from each hole provided for in paragraphs D.2.a. and D.2.b., "Scope of Work," the Contractor shall be paid the following rates per foot by hole for the total footage of each hole drilled as measured from the surface but not to exceed the maximum amounts stated below for Phases I and II:

	<u>Rate per Foot</u>	<u>Maximum</u>
Phase I (3 holes)	\$19.95	\$ 89,775
Phase II (1 hole)	49.50	445,500

APPENDIX A

SCOPE OF WORK

- A. Earth Power Production Company's proposal dated May 25, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. DE-AC08-79ET27007 except as modified by such Contract. The Contractor shall deliver the existing data described herein and use its best efforts to perform the proposed new work and to acquire and deliver to DOE the resulting new data substantially in accordance with Appendix D, Activity Schedule.
- B. The program to provide existing data encompassed by this Contract shall consist of the delivery of the data described below and enumerated in Section D, Deliverables.
1. Data from shallow gradient hole survey.
 2. Data from two microearthquake surveys.
 3. Aeromagnetic survey.
 4. Gravity survey.
 5. Geochemical report.
 6. Geologic report and map.
- C. The program to provide new data encompassed by this Contract consists of conducting investigations in and near the Baltazor KGRA, T 45, 46, and 47 N, R 27, 28, 29, and 30 E, MDM, Humboldt County, Nevada, as described below and delivering the data enumerated in Section D, Deliverables.
1. Phase I

Drill three temperature gradient holes to about 1,500 feet where drilling conditions permit; run temperature logs and collect drill cuttings samples, if any. In the event that the Contractor encounters conditions which make it impracticable to drill to 1,500 feet on the first or second hole, the Contractor may drill to a greater permitted depth on the subsequent hole(s), such that the aggregate footage drilled shall be approximately 4,500 feet.

Upon completion of Phase I, the Contractor shall have the right to terminate the Contract upon its determination that the data obtained in Phase I does not warrant continuing with

the work. Such right to terminate shall be exercised within 6 months of completion of Phase I field activities or by September 30, 1979, whichever occurs later.

2. Phase II

Drill one deep exploratory hole to approximately 9,000 feet. During the drilling of this hole, the Contractor will collect physical borehole samples, if any, to include drill cuttings, cores (at least one conventional core will be attempted), and fluids. If hole conditions permit, run drill stem tests and geophysical logs, including but not limited to temperature, self-potential, induction, sonic, gamma ray, formation density-compensated neutron, and caliper. The Contractor will log mud returns from the base of the conductor casing (approximately 1,200 feet) to total depth.

3. Phase III

If a productive zone is encountered in the Phase II hole, the Contractor will conduct flow tests, if practicable, to determine reservoir potential. Measure flow line pressures and temperatures and determine well mass flow rate.

In the event that circumstances are encountered through which the Contractor determines it is impracticable to continue drilling operations described in C.1 or C.2 above, the Contractor may terminate the drilling at lesser depths. If a potentially productive zone is encountered at a depth of less than 9,000 feet in the hole described in C.2 above, the Contractor may terminate the drilling operations and proceed with the testing as described in C.3 at such lesser depth.

D. Deliverables, in addition to reports specified in Appendix C, to be provided by the Contractor shall include but not be limited to the following:

1. Existing Data

a. Shallow Gradient Hole Survey (27 holes, average depth 230 feet)

(1) Temperature measurements from 27 holes.

(2) Drill cuttings samples from about 13 of the 27 holes.

(3) Lithologic logs from about 13 of the 27 holes.

- b. Microearthquake Surveys--Data from two 15-day surveys conducted by Senturion Sciences, Inc. Instrument arrays were located around the Baltazor Hot Spring and the Painted Hill mine.
- c. Aeromagnetic Survey--Data from a survey by Scintrex Mineral Surveys, Inc., conducted in 1972.
- d. Gravity Survey--A manually contoured gravity map based on data from various surveys.
- e. Geochemical Report--Data and analyses from report by Geothermex, Inc., December 1977, which included sampling of 22 springs.
- f. Geologic Report--Map showing contacts, lineaments, and faults. Prepared by Geothermex, Inc., December 1977.

2. New Data

- a. Phase I--Three 1,500-Foot Heat Gradient Holes

Provide drill cuttings samples of about 1,000 gm each taken over 20-foot intervals from surface to total depth as drilling conditions permit. Provide all temperature logging data from surface to total depth. This shall include temperature logging data obtained upon completion of drilling and any other temperature logging data obtained during the stabilization period. Provide drilling and completion histories.

- b. Phase II--9,000-Foot Exploratory Hole

Provide drilling, completion, and logging data as follows:

- (1) Drill hole cuttings--approximately 1,000 gm sample at about each 20-foot interval as drilling conditions permit.
- (2) Core samples--approximately 50 percent of total core recovered.
- (3) Fluid samples--approximately 1,000 cc samples representative of fluids recovered during drill stem tests.
- (4) Mud logging data.
- (5) Drill stem testing data.

- (6) Geophysical logging data to include:
 - (a) Temperature survey.
 - (b) Self-potential.
 - (c) Induction.
 - (d) Gamma ray.
 - (e) Formation density-compensated neutron.
 - (f) Sonic.
 - (g) Caliper.
- (7) Drilling and completion history.
- (8) Any analyses from b.(1) through (6) above.

c. Phase III--Flow Test

- (1) Test system design description.
- (2) Flow line pressure and temperature data.
- (3) Flow rates.
- (4) Fluid samples.
- (5) Analyses of data.

E. Transmittal of Deliverables

- 1. Physical samples such as drill cuttings, cores, and fluids shall be delivered to the Geothermal Sample Library, University of Utah, Salt Lake City, Utah, or placed in the custody of a University of Utah representative at the drill site.
- 2. Four copies of all data other than physical samples will be provided. One copy will be delivered to addressee shown in C.1. of Appendix C, and three copies to addressee in C.2. of Appendix C.

F. Schedule for Data Delivery

- 1. Existing data shall be delivered within 30 days after contract execution.

2. New data from Phases I and II shall be delivered within 45 days after completion of each phase.
3. New data from Phase III shall be delivered within 60 days after completion of the flow test.

D. GARDNER

April 13, 1979

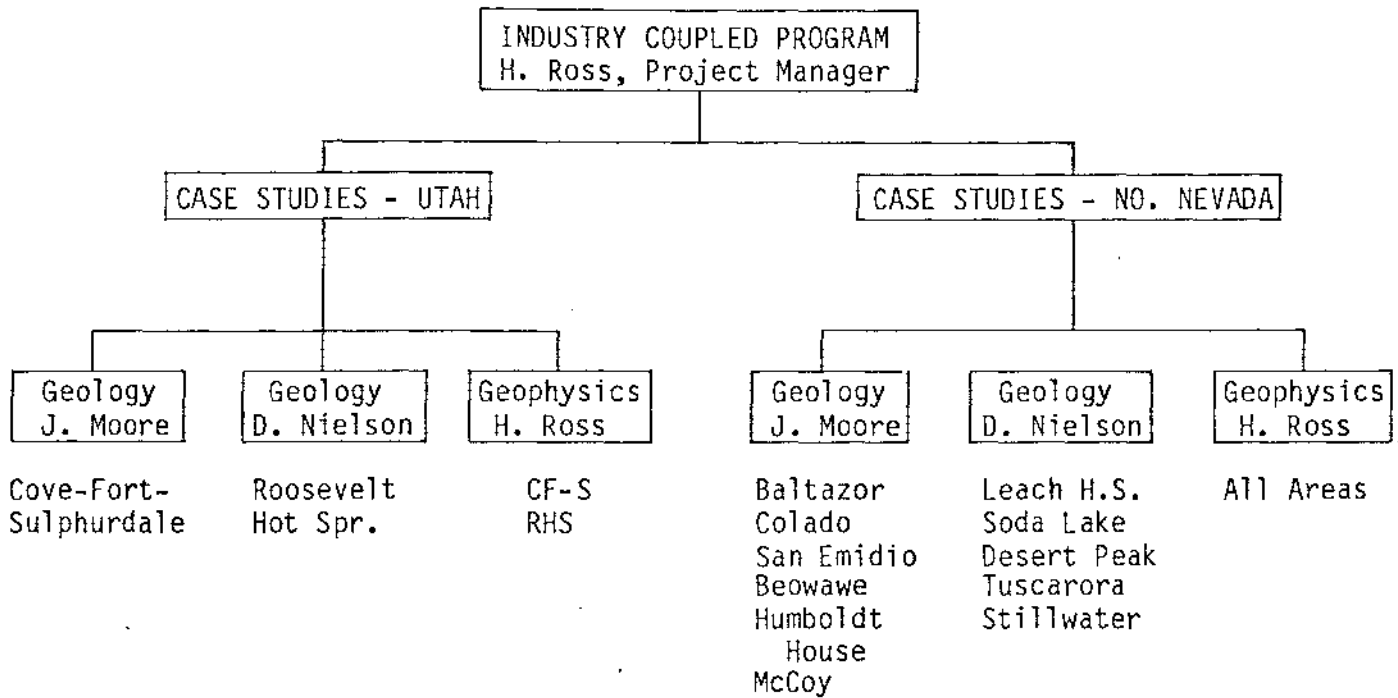
MEMORANDUM

TO: Staff, Industry Coupled Case Studies Project

FROM: H. P. Ross

SUBJECT: Project organization, reporting responsibilities, work areas, etc.

A written statement of the organization, structure, and reporting requirements for this project is long overdue. The organization structure at present is:



Within this general structure Joe Moore and Dennis Nielson will each supervise the geologic study effort for several areas and I will supervise the geophysics. All major cost items like thin section preparation, chemical analysis, use of field vehicles or geophysical survey equipment, or attendance at outside meetings should be cleared through your immediate supervisor.

Dennis, Joe and I will also develop a familiarity with the Dixie Valley case study being carried out by the McKay School of Mines.

With our limited staff it is necessary that most of our professionals will work on multiple areas, reporting to the appropriate supervisor. Many of us will continue to work on other projects as well. The work assignments at present are:

Cove Fort-Sulphurdale	- J. Moore, S. Samberg
Roosevelt Hot Springs	- D. Nielson, B. Sibbett; C. Smith (hydrology) T. Glenn (log analysis)
Leach Hot Springs	- D. Nielson
Baltazor	- J. Moore, J. Hulen, R. Whipple
Colado	- J. Moore, M. Bullett, H. Ross
San Emidio	- J. Moore, S. Samberg; H. Ross
Beowawe	- J. Moore, E. Struhsacker, D. Struhsacker; C. Smith, W. Frangos (MT)
Soda Lake	- D. Nielson, B. Sibbett, W. Frangos (MT), C. Smith (thermal & hydrology)
Desert Peak	- D. Nielson, B. Sibbett
Humboldt House	- J. Moore, S. Samberg (?)
McCoy	- J. Moore
Tuscarora	- D. Nielson, D. Foley
Stillwater	- D. Nielson, B. Sibbett

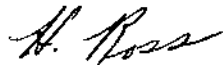
In addition Ted Glenn will lead our well log analysis effort for as many areas as his time permits. It will be some time before we will have substantial data items for Leach Hot Springs, McCoy, Tuscarora and Stillwater. Our studies at Dixie Valley, Desert Peak and Humboldt House will probably be isolated topical studies rather than integrated case studies.

I am aware of sensitivities regarding recognition of an individual's contribution to an area study and with respect to the amount of participation required for authorship of a study. It is necessary for me to assign responsibility for a given study to someone with a proven record of project completion, technical reporting and in-depth understanding, ie Joe Moore or Dennis Nielson for the geologic work. First authorship naturally falls to the lead effort in a technical study. The cutoff level of contribution for junior authors is sometimes questionable but should go well beyond the data gathering or support efforts that are a normal part of our job at ESL. ESL offers an excellent opportunity for junior scientists to participate in authorship, complete with critical review and professional editing and drafting. Jim Stringfellow will compose a better definition of what constitutes authorship drawing upon outside references.

I have noted some instances where geologic maps, lithologic logs and cross sections have been modified for inclusion in another report with the name of the compiler prominently displayed. When this is done mainly for simplification or illustration without a substantial technical effort the original work should be referenced; the names of those compiling and/or

simplifying the information should not appear. I hope our scientists are mature enough to recognize this.

Please see me for clarification of any problems regarding the work structure, reporting, or authorship under the industry coupled program.



Howard P. Ross

HPR/smk

NORTHERN BASIN AND RANGE GEOTHERMAL RESERVOIR
ASSESSMENT PROGRAM SUMMARY, OCTOBER 1978

Eight proposers were selected in August 1978 to provide data from geothermal explorations in the northern portion of the Basin and Range physiographic province. Contracts with two of the proposers have been executed, and the remaining contracts are being processed. The contracts will provide for the acquisition of geothermal reservoir data from various locations throughout northern Nevada. The total estimated cost of the work to be accomplished in FY 1979, 80 and 81 is approximately \$22 million with the DOE share being approximately \$10 million. A summary of the work to be accomplished under twelve separate contracts is as follows:

1. Chevron Resources Company - Drill and test one 4,000 foot exploratory well, and drill two 2000 foot heat gradient holes; conduct various geophysical surveys and provide existing well and geophysical data from previous investigations. The total estimated cost under three executed contracts is about \$5 million with the DOE share being \$1.5 million.
2. Phillips Petroleum Company - Drill one 3,000 foot exploratory well and one 10,000 foot exploratory well and provide existing well and ~~provide~~ geophysical data. The total estimated cost under one executed contract is about \$2.7 million with the DOE share being \$1.3 million.
3. AMAX Exploration, Inc. - Drill and test two 7,500 foot exploratory wells, drill several shallow heat gradient holes and six 2,000 foot heat gradient holes, conduct various geophysical surveys. The total estimated cost under two contracts (in process) is about \$2.3 million with the DOE share being \$1.1 million.
4. Amifoil USA, Inc. - Drill and test two 8,000 foot exploratory wells, drill several shallow heat gradient holes and two 1,000 foot heat gradient holes, conduct various geophysical surveys. The total ^{estimated} cost under one contract (in process) is about \$2.5 million with the DOE share being \$1.3 million.
5. Earth Power Production Company - Drill and test one 9,000 foot exploratory well and drill three 1,500 foot heat gradient holes, provide various heat gradient and geophysical survey data. The total ^{estimated} cost under one contract (in process) is about \$1.5 million with the DOE share being \$0.6 million.

6. Getty Oil Company - Drill and test one 8,000 foot and one 9,500 foot exploratory well, drill several shallow heat gradient holes and two 1,500 foot heat gradient holes, conduct various geophysical surveys. Total estimated cost under two contracts (in process) is about \$3.7 million with the DOE share being \$1.8 million.
7. Southland Royalty Company - Drill and test two 8,500 foot exploratory wells and drill two 1500 foot heat gradient holes, conduct various geological studies and provide existing geophysical data. The total estimated cost under one contract (in process) is about \$2.7 million with the DOE share being \$1.4 million.
8. Union Oil Company - Drill and test two 8,000 foot exploratory wells and provide various existing well and geophysical survey data. The total estimated cost under one contract (in process) is about \$1.4 million with the DOE share being \$0.8 million.

FY Files

March 14, 1979

MEMORANDUM

TO: Geothermal Distribution List

FROM: Howard P. Ross and Sharrif Dajany

SUBJECT: Open File Period for Department of Energy/Division of Geothermal Energy Data -- Northern Basin and Range Case Studies.

March 22 and 23, 1979 is designated as an open file period for the study and purchase of data made available through the DOE/DGE Industry Coupled Program. This will be the first data release for the Northern Basin and Range Case Studies Program. Reproductions of these data may be requested from the Earth Science Laboratory. The estimated reproduction and handling charges are indicated below in the data descriptions. Orders will be accepted from March 22 thru April 30, 1979. Inquiries about the data and requests for reproductions should be directed to Mr. Sharrif Dajany at the Earth Science Laboratory.

The data will be available for study and distribution at our new offices:

Earth Science Laboratory
University of Utah Research Institute
420 Chipeta Way, Suite 120
Salt Lake City, Utah 84108.

Reproductions of all geophysical well logs for the subject area will be available through:

Rocky Mountain Well Log Service
P.O. Box 3150
Denver, Colorado 80201
(303) 825-2181

The availability of the logs will be announced in the Petroleum Information Corp. - Rocky Mountain Well Log Service weekly log listing.

Howard P. Ross
Howard P. Ross
Project Manager

Sharrif Dajany
Sharrif Dajany
Administrative Assistant

HPR,SD:srm

attachments

DIXIE VALLEY, NEVADA
Southland Royalty Co.

<u>Item</u>	<u>Description</u>
Dixie Valley (SR)-1 \$3.25	6 Shallow Temperature Gradient Holes (500'-1500' t.d.) lithology data only, 63 pgs.
Dixie Valley (SR)-2 \$11.00	Geothermex Report "Geothermal Potential of the Quest Leasehold Dixie Valley, Nevada"; Dec. 1976, 153 pgs.
Dixie Valley (SR)-3 \$4.25	Keplinger and Assoc. Report "Preliminary Evaluation of Dixie Valley, Nevada: Geothermal Potential and Associated Economics"; Sept. 1977, 51 pgs.
Dixie Valley (SR)-4 \$1.00	EDCON Report "Gravity and Magnetic Survey Over the Humboldt Salt Marsh, Dixie Valley, Nevada; Dec. 1976, 11 pgs.
Dixie Valley (SR)-5 \$3.00	Microgeophysics Report, "Seismicity Report on the Dixie Valley Prospect, Churchill Co., Nevada"; 200 km ² ; Nov. 1976, 58 pgs.
Dixie Valley (SR)-6 \$7.50	Senturion Sciences Inc. Report "High Precision Multi- level Aeromagnetic Survey over Dixie Valley, Nevada; Part 1, Oct. 1977, 100 mi ² ; 5 multilevel profiles, 13 pgs.
Dixie Valley (SR)-7 \$3.75	Senturion Sciences, Inc. Report "High-Precision Multi- level Aeromagnetic Survey over Dixie Valley, Nevada; Part 2; June 1978; 50 mi ² ; 7 multilevel profiles, 18 pgs.
Dixie Valley (SR)-8 \$5.75	Senturion Sciences, Inc. Report "South Dixie Valley, Nevada Scalar Magnetotelluric Survey"; Feb. 1978; 20 mi ² ; 27 scalar stations, 1 tensor, 53 pgs.
Dixie Valley (SR)-9 \$6.00	Keplinger and Assoc. Report "Interim Evaluation of Exploration and Development Status, Geothermal Potential and Associated Economics of Dixie Valley, Nevada, 113 pgs.

BALTAZOR, NEVADA
Earth Power Production Co.

<u>Item</u>	<u>Description</u>
Baltazor (EPP)-1 \$2.25	Geothermex Report "Geothermal Interpretation of Groundwaters, Continental Lake Region, Humboldt Co., Nevada; Dec. 1977, 30 pgs.
Baltazor (EPP)-2 \$1.20	Geothermex Report "Photogeologic Interpretation of the Baltazor-McGee Geothermal Prospects, Humboldt County, Nevada; Feb. 1978, 24 pgs.
Baltazor (EPP)-3 \$5.50	Senturion Sciences, Inc. Report, "N.W. Nevada Micro-earthquake Survey Report for Earth Power Corporation"; Sept. 1977; Two, six-station, 9-km diameter seismometer arrays, 67 pgs.
Baltazor (EPP)-4 \$2.50	27 Shallow Thermal Gradient Holes; temperature and lithology, 27 pgs. plus map
Baltazor (EPP)-5 \$1.25	Aeromagnetic Map, Vya Sheet-1974; 1,015 sq. mi.; Flown at 9000 feet barometric elevation, by Scintrex Mineral Surveys, 1972; Scale 1:62,500.
Baltazor (EPP)-6 \$1.25	Gravity Map compiled from USGS Open File 76-601 and USGS Open File 77-67C; scale 1:62,500; data cover approximately 400 square miles.

COLADO, NEVADA
Getty Oil Co.

<u>Item</u>	<u>Description</u>
Colado (GOC)-1 \$12.25	Electrodyne Surveys Report "An Electrical Resistivity Survey of the Colado Hot Springs Prospect, Pershing Co., Nevada -- Vol. I and II: Electrical resistivity, gravity and magnetic reconnaissance surveys plus detailed electrical resistivity surveys; scalar and vector AMT-MT, roving vector telluric soundings, d.c. resistivity and time domain electric & magnetic field soundings. Surveys cover approximately 100 square miles. 14 maps, 128 pgs.
Colado (GOC)-2 \$0.20	Temperature gradient surveys, Wells #RG-1, #RG-2, Sec. 26, T.28 N., R.32 E., Pershing Co., Nevada; August 1976; Total depths are 450 and 445 feet, 4 pgs.

SAN EMIDIO, NEVADA
Chevron Resources Company

<u>Item</u>	<u>Description</u>
San Emidio (CRC)-1 \$2.75	Electrical resistivity survey, dipole-dipole, 25 line miles; a=2,000 ft., by McPhar Geophysics, Inc., October 1973, 12 pgs.
San Emidio (CRC)-2 \$3.00	Electrical resistivity survey, dipole-dipole, 8 line miles; a=2,000 ft., by Phoenix Geophysics, Inc., May 1976, 9 pgs.
San Emidio (CRC)-3 \$0.40	Self Potential Survey; 126 measurements (spacing 1000 ft.) along three north-south lines with tie; Senturion Sciences, Inc., 1974, 8 pgs.
San Emidio (CRC)-4 \$1.50	Gravity survey, 1056 stations, 1/8 mile spacing, lines 1/2 mile apart, with tie lines, terrain corrected; Photogravity, Inc., October 1975, map.
San Emidio (CRC)-5 \$2.25	Seismic--Ground Noise Survey; 35 stations, 100 square miles; Senturion Sciences, Inc., May 1974, 37 pgs.
San Emidio (CRC)-6 \$4.00	Seismic--Reflection survey; 2.1 line miles high resolution, with 14 hydrophones set at a depth of 18' in holes 33' apart. 0.5 msec sampling; dynamite 0.5-20 lbs; 700% stacked sections migrated; Western Geophysical Co. August 1976, plate only.
San Emidio (CRC)-7 \$3.25	Seismic--Reflection survey; 10 line miles, split spread, 110' group interval, 220' shot interval, dynamite source, 1-10 lbs. @ 0-160'; processed, deconvolved; United Geophysical Corp., Oct. 1977, plate only.
San Emidio (CRC)-8 \$20.00	Temperature gradient holes; temperature and lithologic data from 64 temperature gradient holes drilled to depths of 200-500 feet; temperature gradient report by Geonomics; work done in 1976, 1977, 1978, 300 pgs.
San Emidio (CRC)-9 \$0.50	Aerial and Structural Geology of the San Emidio Area, Washoe Co., Nevada - 1:24,000 scale map of 50 square miles derived from color air photography; Intra-Search.
San Emidio (CRC)-10 \$4.00	KOSMOS #1-9 (t.d.=5370'); Drilling history, summary, directional drilling survey, fluid analysis, lithologic well log with core descriptions; Johnston-Schlumberger Technical report - drill stem test 5238'-5247', 77 pgs.

San Emidio (CRC)-11
\$1.25

KOSMOS #1-8 (t.d.=4013'); Drilling history,
lithologies drill stem test 3892'-3898'; sidewall
sample description, maximum reading thermometer
surveys; Johnston-Schlumberger Technical report - drill
stem test 3877'-3883', 20 pgs.

NOTE: A full suite of geophysical well logs including lithologic and mud
temperature graphs, temperature, etc. for KOSMOS #1-8 and KOSMOS #1-9 has
been forwarded to Rocky Mountain Well Log Service, Denver, Colo. Copies
of these logs should be ordered directly from that office.

BEOVAWE, NEVADA
Chevron Resources Co.

<u>Item</u>	<u>Description</u>
Beowawe (CRC)-1 \$2.25	Electrical resistivity survey, dipole-dipole; McPhar Geophysics, Inc., 1974; six lines, a=2000 feet, 11 pgs.
Beowawe (CRC)-2 \$2.00	Electrical resistivity survey, dipole-dipole; Phoenix Geophysics, Inc., 1976; a=2000 feet, 10 pgs.
Beowawe (CRC)-3 \$11.25	Magnetotelluric survey, Geotronics Corp., 1976 30 square miles, 107 pgs.
Beowawe (CRC)-4 \$2.25	Self Potential survey, Terraphysics, 1977, 10 square miles, map.
Beowawe (CRC)-5 \$4.00	Aeromagnetic survey, Senturion Sciences, 1976; 30 square miles; 80 line miles single level; 14 line miles multilevel, 16 pgs.
Beowawe (CRC)-6 \$4.00	Seismic emissions survey, Seismic Exploration, Inc., 1977; 5 stations of 5 geophone arrays; 16 square miles, 40 pgs.
Beowawe (CRC)-7 \$8.50	Reflection seismic survey, 17.5 line miles; Charles B. Reynolds and Assoc. 1975; 300 lb. weight dropped 3.5 ft. or 700 pound weight dropped 6.5 ft., 8 pgs.
Beowawe (CRC)-8 \$1.00	Ground Noise survey with contoured ground noise power map; Charles B. Reynolds and Assoc.; 1974, map.
Beowawe (CRC)-9 \$22.50	Ground Noise survey - Senturion Services, Inc., 1974. 258 pgs.
Beowawe (CRC)-10 \$2.25	GINN #1-13; (t.d.=9551'). Well summary report and history; subsurface pressure survey 8-22-74; core description @ 9551'; field data; drill stem test, 8605'-9551', 6-18-74; drill stem test 8614-9551', 6-20-74. Water samples, water chemistry. Formation testing service reports (3), 43 pgs.
Beowawe (CRC)-11 \$3.75	ROSSI #21-19; (t.d.=5680') Drilling and completion report, directional survey; Agnew & Sweet static temperature survey 3-28-77; static pressure survey, 3-28-77; flow test; fluid chemistry; drilling record; cuttings description, 70 pgs.

NOTE: A full suite of geophysical well logs including lithologic and mud temperature graphs, temperature, etc. for GINN #1-13 and ROSSI #21-19 has been forwarded to Rocky Mountain Well Log Service, Denver, Colo. Copies of these logs should be ordered directly from that office.

SODA LAKE, NEVADA
(Chevron Resources Company)

<u>Item</u>	<u>Description</u>
Soda Lake (CRC)-1 \$2.50	Dipole-Dipole resistivity survey; McPhar Geophysics, Inc., 1973-74; covers 63 sq. mi., a=2000 ft., n=1 to 4, 13 pgs.
Soda Lake (CRC)-2 \$5.50	Magnetotelluric Survey; 14 stations covering 20 sq. miles; Geotronics Corp., 1975, 104 pgs.
Soda Lake (CRC)-3 \$8.00	Magnetotelluric Survey; Geotronics Corp., 1977, 88 pgs.
Soda Lake (CRC)-4 \$5.00	Reflection seismic survey, weight drop, 24 line miles Charles Reynolds & Assoc.; 1975, 31 pgs.
Soda Lake (CRC)-5 \$3.00	Reflection seismic survey; 1200% stacked CDP sections with base map; 12 line miles; Chevron Geophysical Co., 1977.
Soda Lake (CRC)-6 \$1.00	Temperature gradient survey; eleven 500-foot holes; temperature survey and cuttings description. Boyles Bros., 1974, 16 pgs.
Soda Lake (CRC)-7 \$0.35	Temperature gradient hole 36-78 (t.d. 2000 ft.); drilling history, lithologic description, 6 pgs.
Soda Lake (CRC)-8 \$1.25	Soda Lake #44-5 (t.d. 5070'); drilling and completion history; direction survey; core description; lithologic description, 21 pgs.
Soda Lake (CRC)-9 \$1.25	Soda Lake #1-29 (t.d. 4306'); drilling and completion history; flow test data, report of analysis; production record; static temperature survey, mud log, 22 pgs.

NOTE: A full suite of geophysical logs and mud logs for #44-5 and #1-29 are available from Rocky Mountain Well Log Services, Denver, CO. Two temperature surveys from #36-78 are also available at this source.

