GL00879

STATUS REPORT - INDUSTRY COUPLED PROGRAM

EVALUATION OF SUCCESS OF PROGRAM

PHASE 1 CASE STUDY - UTAH

Thermal Power Corp. - $282,000. (Roosevelt Hot Springs)

Purchase of data for dissemination and study; new understanding of fluid entry depths as a result of geochemical, flow and geophysical log interpretations. Contract completed.

Seismic Exploration Inc. - $11,740. (Roosevelt Hot Springs)

Small contract, passive seismic survey; information dissemination and technique evaluation; support for geothermal contractor infrastructure. Contract completed.

University of Denver - $67,330 (Roosevelt Hot Springs)

Small contract; development of flow test equipment and procedures; dissemination of temperature and flow rate information for Roosevelt Hot Springs which was then available to all companies who are working to utilize the field, and for production plans and designs. Refined estimates of temperature and pressure as a function of flow rates, up to 580,000 lb/hr. for Utah State Well 14-2 (Thermal Power, AMAX, O'Brian Resources). Work completed, report in preparation.

Getty Oil Co. - $396,000. (Roosevelt Hot Springs)

Some data purchase plus drilling of G. O. C. Well #52-21 to t.d. = 7504 ft. Maximum observed temperature 402°F at 7490 ft. Hole considered hot, but dry, as flow is very small and well did not

respond to stimulation. Well is either: a) south of main reservoir area, or b) missed major conduits of system. DOE funds helped offset Getty exploration expenses and resulted in new information on geothermal system. Getty's future plans here are not known. Contract completed.

Geothermal Power Corp. - $710,468. (Roosevelt Hot Springs)

DOE contribution is a small part of large exploration/drilling program. Most GPC lands appear to be peripheral to main reservoir area as now known. Distributed information from surface studies and reconnaissance thermal gradient drilling program. Contract modification in progress to include as part of DOE program an exploration well test on McDonald land block (40 acres) formerly optioned to City of Bountiful. Land is located along Opal Mound Fault 600-1800 ft North of Utah State 72-16 (probable producing well) and in heart of geothermal system. Excellent chance well will be a producer, subject to fracture controls in the granitic rocks. This well would be substituted for one of three deep (7000 ft) tests in original contract. Contractor is substantially behind schedule. Too early to judge success/failure of DOE/GPC effort.

Union Oil Company - $2,559,258 + mod. (Cove Fort-Sulphurdale)

Major contract of Phase I program. Substantial surface data package. Main program to drill three deep wells; results:

CF-SU-#42-7 - t.d. = 7735 ft; maximum observed temperature 340°F → 357°F at 7327 feet. Pressure below hydrostatic--well dies after shut in;

would make a good injection well; high formation permeability (23,000 md-ft); free standing fluid level during drilling was 1310 ft.

CF-SU #31-33 - t.d. = 5221 ft; maximum observed temperature 294°F at 4700 ft. No substantial flow test information. Probable mixing with cooler waters.

CF-SU #14-29 - t.d. = 2577 ft; maximum observed temperature 196°F at 2464 (bottom after hole caved). Hole abandoned after extreme lost circulation and sloughing hole problems. Temperature would appear to be less than, but similar to, temperatures at similar depths in CF-SU #31-33 (285°F when stable).

Contract work completed, some data and information forthcoming. Union seems to be discouraged by costly drilling problems, subeconomic temperatures. The Cove Fort-Sulphurdale-Dog Valley area is still generally considered to be one of the largest U. S. geothermal systems and Hunt Energy, Chevron, Phillips and other companies remain active in the area. The DOE/Union program has confirmed at least a direct applications reservoir. All of the companies have benefited from the Union data. In addition, the Union drilling studies are considered very valuable by both geothermal and petroleum groups for their drilling technology and procedures.

The Earth Science Laboratory as contractor to DOE/DGE provides management and technical services for the case study program. Detailed geologic

mapping programs have been completed for both the Cove Fort-Sulphurdale and Roosevelt Hot Springs KGRA. The maps have been accepted by the USGS and are being used by industry. New geophysical survey data and interpretations have also been distributed.

Summary Evaluation

The Roosevelt Hot Springs geothermal field was discovered and preliminary drilling was completed without the Industry Coupled Program. The program has certainly speeded development and contributed to discussions in forming a unit. Industry expenses in additional work have been offset and some unsuccessful holes will be avoided through the distribution of the new data.

The program has helped offset extreme drilling costs incurred by Union Oil at Cove Fort-Sulphurdale. Drilling problems and lower than expected temperatures may delay the development of the Cove Fort-Sulphurdale resource. Reservoir temperatures are expected to be similar to Raft River and electric power may eventually be produced. Two private groups have expressed some interest in utilizing moderate temperature waters for space heating, and agricultural or industrial processing.

PHASE II CASE STUDY - NORTHERN BASIN AND RANGE

Chevron Resources Co. $263,000 (San Emidio)

Data purchase for distribution to public; broad data package

including high quality reflection seismic surveys and deep well test results. No new program. Contract completed.

Chevron Resources Co. $273,000 (Soda Lake)

Supplemental surface and subsurface data package. New program for two deep thermal gradient holes to give Chevron a better understanding of the reservoir. Maximum stable temperatures of 297°F and 367°F at depths of 2,000 ft in these holes must be considered very favorable and encouraging. Contract work completed and final reports in progress. Chevron's plans for further work at Soda Lake not announced but DOE-supported results are favorable.

Phillips Petroleum Co. $1,300,000 (Humboldt House and Desert Peak)

(Humboldt House (Rye Patch)) Well test Campbell "E" No. 2 to t.d.= 8,061 ft (KB); Maximum observed temperature 380.5°F at 8,055 ft. Considered a dry hole; completed as an observation hole.

Desert Peak Well No. B-23-1; t.d.=9,641 ft; maximum observed temperature 414.3°F recorded at 9,470 ft. Well flowed initially but died; attempt to kick off well scheduled for August 1979. Candidate well for downhole pump installation, possible future producer.

Phillips contract work almost completed, reports pending.

Union Oil Co. $801,000 + mod. (Stillwater)

Minor existing data and program to drill two deep (8,000 ft) exploration wells. Supplemental funding from Exploration Technology

to include limited reflection seismic survey. Well DeBraga #2 completed to t.d. 6,960 ft. Maximum observed temperature to date 335°F at t.d. Flow test indicated reservoir pressure above saturation indicating reservoir is filled 100% with hot water. Mass flow approximately 152,000 lb/hr. Temperature gradient in last 200 ft is 5.5°F/100 ft. Not a near term producer at this depth.

Second well not yet sited. Success of effort cannot yet be determined.

45-14 9022' 385°F @ 8
66-21 9080' ~340°F
4780' ~360°F

Southland Royalty Co. $1,428,523 + mod (Dixie Valley)

Acquired surface data; new program for thermal gradient drilling and two deep (8,500 ft) exploration wells. First well completed, temperatures below 400°F. Flow tests pending. Second well at 4,850 feet on August 14; moderate flow of hot water (295°F) at 4,700-4,800 ft. This well is 6 miles SSW of the Sun high temperature discovery well. [Our records incomplete for this contract--see Joe Fiore for temperature, depth, flow details] Too early to access success of joint DOE/Southland Royalty venture.

Aminoil USA $1,291,008 (Leach Hot Springs)

Acquired existing data; phased exploration program to include geophysical surveys, thermal gradient studies, two deep (8,000 ft) exploration wells. Surveys in progress, no drill results yet. Too early to evaluate: Promising prospect.

Earth Power Production Co. $573,255 + mod? (Hallazor)

Phased exploration program; favorable results from thermal gradient program suggest a plus 350°F resource. Deep (9,000 ft) well test not yet sited. Too early to evaluate.

Getty Oil Co. $359,330 (Colado)

Phased exploration program; shallow thermal gradient program completed with encouraging results. Deep thermal gradient hole and 8,000 ft exploration well yet to begin. Too early to evaluate.

Getty Oil Co. $989,895 (Beowawe)

Phased exploration program, most geophysics completed, thermal gradient program soon to begin. Deep well test to 9500 ft scheduled later. Too early to evaluate.

Chevron Oil Co. $986,000 + mod. (Beowawe)

Existing data package plus phased exploration program. Thermal gradient program under way. Exploration well (4,000 ft) to be sited in fall. Too early to evaluate, but Chevron feels at least one existing well can be a producer.

AMAX, Inc. $594,500 (McCoy)

Phased exploration program in geophysical survey stage. Will culminate in 7,500 ft exploration well FY-80 or -81. Too early to evaluate. Good prospect.

AMAX, Inc. $559,500 + mod. (Huscarora)

Phased exploration program in geophysical survey stage. Will culminate in 7,500 ft exploration well FY-80 or -81. Too early to evaluate. Good prospect.

DN.

June 16, 1981

R. K. Andrews
Rocky Mountain Well Log Service
P. O. Box 3150
Denver, CO 80201

Dear Mr. Andrews:

Enclosed are the following logs from various Basin and Range holes drilled under the Department of Energy/Division of Geothermal Energy's Industry Coupled Case Studies Program to be made available to the public anytime after July 7, 1981.

McCoy, Nevada #66-8, Sec. 8 T22N R40E
- Compensated Acoustic Velocity Log 2"=100'
- Compensated Acoustic Velocity Log 5"=100'
- Compensated Density Log - Neutron 2"=100'
- Compensated Density Log - Neutron 5"=100'
- Dual Induction Guard Log 2"=100'
- Dual Induction Guard Log 5"=100'
- Cement Bond with Wave Train Display

McCoy, Nevada #14-7, Sec. 7 T23N R40E
- Dual Induction Guard Log
- Compensated Acoustic Velocity Log
- Compensated Density Log

Colado, Nevada #44x-10, Sec. 10 T27N R32E
- Temperature Log, run 1
- Temperature Log, run 2
- Compensated Neutron-Formation Density (4/16/81)
- Compensated Neutron-Formation Density (5/04/81)
- Borehole Compensated Sonic Log (4/16/81)
- Borehole Compensated Sonic Log (5/04/81)
- Continuous Dipmeter (4/16/81)
- Continuous Dipmeter (5/04/81)
- Dual Induction - SFL (4/16/81)
- Dual Induction - SFL (5/04/81)
- Temperature Log (4/17/81)
- Temperature Log (4/26/81)
- Temperature Log (5/05/81)
- Lithologic Log

Beowawe, Nevada #85-18, Sec. 18 T31N R48E

Continuous Dipmeter (3/08/80)
" " Computed (3/08/80)
" " (5/11/80)
" " Computed (5/11/80)
" " (5/28/80)
" " Computed (5/28/80)

Temperature Log (4/04/80)
" " (5/09/80)
" " (5/10/80)
" " (5/11/80) run 1
" " (5/11/80) run 2
" " (5/11/80) run 3
" " (5/27/80)

Borehole Compensated Sonic 2"=100'
" " " 5"=100'
Cement Bond Log
" " " with Gamma Ray
Fracture Identification Log (3/07/80)
" " " (5/11/80)
Dual Induction - SFL
" " " with Correlation
Formation Density Log 2"=100'
" " " 5"=100'
Sonic Logged Down-Casing Checks
Temperature Survey - Triangle
" " - A & S (4/21/80) run 1
" " " " run 2
" " " " run 3
" " " " run 4
" " " (4/22/80)
" " Pruett (4/29/80) run 1
" " " " run 2
" " " " run 3
" " " " run 4
" " " " run 5
" " " " run 6
" " Pruett (6/17/80)
" " " (7/17/80)
" " " (9/16/80) run 1
" " " " run 2
" " " (11/11/80) run 1
" " " (11/11/80) run 2
Lithologic Log

Grass Valley, Nevada, Leach Hot Springs #11-36, Sec. 36 T32N R38E
Neutron Densilog 2"=100'
" " 5"=100'
Dual Induction-BHC Acoustilog 2"-100'
" " " " 5"-100'
Temperature Survey (6/28/80)
" " (6/30/80)
" " (7/01/80)
Lithologic Log

Sincerely,

J. Stringfellow
Earth Science Laboratory

JS/lc

Encl.