GL00919

H. Ross
April 1980

OPEN-FILE ORDER FORM

Open-file reports generated under DOE/DGE's Industry Coupled Program, and Earth Science Laboratory research, are available in reporduction at duplicating and handling cost. Please address all orders to:

Earth Science Laboratory
Publications
420 Chipeta Way, Suite 120
Salt Lake City, Utah 84108

OFR #	DESCRIPTION	COST/1	TOTAL
	COVE FORT-SULPHURDALE AREA, BEAVER & MILLARD COS., UTAH		
UT/CFS/UOC-1	Union Oil Corp, Cove Fort-Sulphurdale area, Beaver & Millard Cos., UT		
	.1 Temperature Gradient Study (25 holes)	1.65	
	.2 Surface Geol & Geotherm Manifestations	4.55	
	.3 Seismic Survey, Cove Fort	3.10	
	.4 Recon Resistivity Survey/ Phoenix Geophysics Inc	4.40	
	.5 Gravity Interpretations	3.65	
	.6 Geochemical Surveys	0.30	
UT/CFS/UOC-2	Union Oil Co, FORMINCO #1, Cove Fort/Sulphurdale; Technical Rpt. including well summary, well hist, mud hist, H_2S kick, & geol	5.20	
UT/CFS/UOC-3	.1 Union Oil, Well 42-7, Cove Fort/Sulphurdale; Technical Report including well summary & history, fluid hist, bit record	10.75	
	.2 Initial Flow Test	1.35	
UT/CFS/UOC-4	Union Oil Co, Well 42-7, Cove Fort/Sulphurdale; Dia-Log Caliper Service Rpt., and Schlumberger Directional Survey results	1.95	
UT/CFS/UOC-5	Union Oil Co, Cove Fort/Sulphurdale, Utah; report "Treatment of Sanded Dolomite" & patent desc. of "Consolidation of Caving"	0.90	
UT/CFS/UOC-6	Union Oil Co, Well 31-33, Cove Fort/Sulphurdale; Technical Report including well summary & hist, geology, temp-press survey	5.50	
UT/CFS/UOC-7	Union Oil Co, Well 31-33, Cove Fort/Sulphurdale; Geothermal/Geologic Data log & summary of Schlumberger Directional Survey	0.75	
UT/CFS/UOC-8	Union Oil Co, Well 14-29, Cove Fort/Sulphurdale; Technical Report with well summary & hist, geol report, temp-press surveys	5.50	
UT/CFS/UOC-9	Union Oil Co, Well 14-29, Cove Fort/Sulphurdale; Schlumberger Directional Survey summary	0.25	
UT/CFS/UOC-10	Union Oil Co, Final Report "Geothermal Reservoir Assessment, Cove Fort/Sulphurdale Unit, Utah"	2.75	

UT/RHS/DRI-1	Utah State well 14-2, Roosevelt HS, Utah; Denver Research Inst. Preliminary Reservoir Flow Results Report	1.00
UT/RHS/DRI-2	Denver Research Inst, Well 14-2, Roosevelt Hot Springs, Utah; Final Report of DRI Flow Test	5.00
UT/RHS/GOC-1	Getty Oil Co, Surface Geophysical Surveys, Roosevelt Hot Springs; .1 15 miles electrical resis survey profiles & report by Geonomics Inc. in June 1976, Two Contoured maps include Univ Utah data	3.50
	.2 15.75 sq mi of ground motion survey by Seismic Exploration Inc in Jan 1977, includes computer analysis of the five stations	2.80
UT/RHS/GOC-2	Getty Oil Co, Well 52-21, Roosevelt Hot Springs; Well history, bit record, litho log, water analysis, temp-press logs	3.10
UT/RHS/GOC-3	Getty Oil Co, Well 52-21, Roosevelt Hot Springs; temp survey, water analysis for flowline, wireline samples, Jefferson sample	1.00
UT/RHS/GPC-1	Geothermal Power Corp; Roosevelt Hot Springs; Shallow Thermal Gradient Hole Data: temp, lithology & heat flow calcs-14 holes	5.55
UT/RHS/GPC-2	Geothermal Power Corp, Roosevelt Hot Springs;Geothermex Report "Geothermal Potential of Lands Leased by GPC in the Mineral Mountains, Beaver & Millard Cos, Utah"	7.90
UT/RHS/GPC-3	Geothermal Power Corp, Thermal Gradient Hole #15, Roosevelt HS; temp survey, water analysis, wireline sample, water sample	1.50
UT/RHS/SEI-1	Seismic Exploration Inc, Roosevelt HS; Seismic Emissions Study	9.95
UT/RHS/TPC-1	Thermal Power Co, Well 14-2, Roosevelt Field, Utah; General well specifications, borehole data, production & reservoir data	2.25
UT/RHS/TPC-2	Thermal Power Co, Well 72-16, Roosevelt HS; General Well Specifications, Borehole data, production & reservoir data	3.00

BALTAZOR HOT SPRINGS, HUMBOLDT CO., NEVADA

NV/BAL/EPP-1	Baltazor Hot Springs, Nevada; Geothermex Report " Geothermal Interpretation of Groundwaters, Continental Lake Region, Humboldt County, Nevada"	2.25
NV/BAL/EPP-2	Geothermex Report "Photogeologic Interpretation of the Baltazor-McGee Geothermal Prospects, Humboldt Co Nevada	1.20
NV/BAL/EPP-3	Senturion Science Inc Report "NW Nevada Microearthquake Survey Report for Earth Power Prod Corp"; Two, six-station, 9-km diameter seismometer arrays	5.50
NV/BAL/EPP-4	27 Shallow Thermal Gradient Holes: temp & lithology	2.50
NV/BAL/EPP-5	Aeromagnetic map, Vya sheet, 1,015 sq mi, scale 1:62,500, flown at 9000 ft by Scintrex Mineral Surveys in 1972	1.25
NV/BAL/EPP-6	Gravity map from USGS Open-file 76-601 and 77-67C, @400 sq mi	1.25
NV/BAL/EPP-7	Geochemical map, geologic cross section, sulfate map, micro-earthquake survey map; Earth Power Prod Co	3.95
NV/BAL/EPP-8	Deep Thermal Gradient Study of 3 holes to @ 1500 ft; temp logs, drilling & completion histories, location map	2.75

BEOWAWE AREA, LANDER & EUREKA COS., NEVADA

NV/BEO/CRC-1	Chevron Resources Co, Beowawe, Nevada; 1974 Electrical Resistivity Survey, dipole-dipole, 6 lines, a=2000 ft, McPhar Geophysics	2.25
NV/BEO/CRC-2	Electrical Resistivity Survey, 1976, dipole-dipole, a=2000ft flown by Phoenix Geophysics Inc	2.00
NV/BEO/CRC-3	Magnetotelluric Survey, Geotronics Corp, 1976, 30 sq mi	11.25
NV/BEO/CRC-4	Self-potential Survey, Terraphysics, 1977, 10 sq mi	2.25
NV/BEO/CRC-5	Aeromagnetic Survey, Senturion Sciences, 1976, 30 sq mi; 80 line mi single level & 14 line mi multilevel	4.00
NV/BEO/CRC-6	Seismic Emissions Survey, Seismic Exploration Inc, 1977; 5 stations of 5 geophone arrays, 16 sq mi	4.00
NV/BEO/CRC-7	Reflection Seismic Survey, Chas B. Reynolds & Assoc, 1975, 17.5 line mi, 300 lb drop 3.5 ft or 700 lb drop 6.5 ft	8.50
NV/BEO/CRC-8	Ground Noise Survey with contoured ground noise power map, Chas B. Reynolds & Assoc, 1974	1.00
NV/BEO/CRC-9	Ground Noise Survey, Senturion Sciences Inc, 1974	22.50
NV/BEO/CRC-10	GINN #1-13(td=9551'), well summary & history, press survey, core desc at 9551', drill stem test, water samples & chem,formation testing service rpts, filed data	2.25
NV/BEO/CRC-11	ROSSI #21-19(td=5680'), drilling & completion report, directional survey, static temp & press surveys, flow test, fluid chemistry, drilling record, cuttings desc	3.75
NV/BEO/GOC-1	Getty Oil Co, Results of Electrodyne Surveys report:grav and magnetic survey, TDEM, MT-AMT and galvanic resistivity, interpretative report, maps & sections	4.95
NV/BEO/GOC-2	Getty Oil Co, Geophysical Surveys part B:Appendix II, III, IV with data from galvanic & magnetotelluric soundings, gravity	1.70

COLADO HOT SPRINGS, PERSHING CO., NEVADA

NV/COL/GOC-1	Getty Oil Co, Colado Hot Springs, Nevada; Electrodyne Surveys Inc report "An Electrical Resistivity Survey of Colado HS, V. I & II"; resis, grav & magnetic recon surveys, detailed elec resis surveys, scalar & vector AMT-MT, roving vector telluric soundings, d.c.resis & time domain elec & mag field soundings; 14 maps, @ 100 sq mi coverage	12.25
NV/COL/GOC-2	Getty Oil Co wells RG-1 and RG-2, Sec 26, T28N, R32E, Pershing Co, Nevada; temperature gradient survey, 1976 (td= 450' & 445')	0.20
NV/COL/GOC-3	Getty Oil Co; Temperature data for 18 temp gradient holes (@500')	2.35
NV/COL/GOC-4	Getty Oil Co;Temp gradient hole IGH#2 (td=1165'); well history and well completion report	0.65

DESERT PEAK, CHURCHILL CO., NEVADA

NV/DP/PPC-1	Phillips Petroleum Co, Desert Peak, Nevada; Geologic Map & 2 cross sections, magnetotelluric slice map	1.25
NV/DP/PPC-2	Ground magnetics map & gravity map, Carson Sink area	1.95
NV/DP/PPC-3	Equilibrium temperature profiles, strat tests #2 & #5	0.75
NV/DP/PPC-4	Desert Peak #21-1 water analysis & drilling reports; DP #21-2 drilling reports; DP #29-1 drilling reports	1.25
NV/DP/PPC-5	Phillips Petroleum Co Final report for Geothermal Reservoir Assessment Case Study; integrated summary of drilling history & results for DP well B-23-1 and Humboldt House well Campbell "E" #2	7.00

DIXIE VALLEY, CHURCHILL CO., NEVADA

NV/DV/SR-1	Southland Royalty Co, Dixie Valley, Nevada; 6 shallow temperature gradient holes (td=500-1500'); lithology data only	3.25
NV/DV/SR-2	Geothermex report "Geothermal Potential of the Quest Leasehold Dixie Valley, Nev", 1976	11.00
NV/DV/SR-3	Keplinger & Assoc report "Preliminary Evaluation of Dixie Valley Geothermal Potential & Associated Economics", 1977	4.25
NV/DV/SR-4	EDCON report "Gravity and Magnetic Survey over the Humboldt Salt Marsh, Dixie Valley Nevada", 1976	1.00
NV/DV/SR-5	Microgeophysics report "Seismicity Report on the Dixie Valley Prospect", 200 sq km; 1976	3.00
NV/DV/SR-6	Senturion Science Inc report "High Precision Multilevel Aeromagnetic Survey Over Dixie Valley Part I" Oct 1977, 100 sq mi; 5 multilevel profiles	7.50
NV/DV/SR-7	Senturion Sciences Inc report "High-Precision Multilevel Aeromag Survey Part II", 1978; 50 sq mi; 7 mutilevel profiles	3.75
NV/DV/SR-8	Senturion Sciences Inc report "South Dixie Valley, Nevada Scalar Magnetotelluric Survey", 1978, 20 sq mi, 27 scalar stations	5.75
NV/DV/SR-9	Keplinger & Assoc report "Interim Evaluation of Expolration & Development Status, Geothermal Potential and Associated Economics of Dixie Valley, Nevada"	6.00
NV/DV/SR-10	Temperature Survey data, 6 shallow thermal gradient holes (td=500-1500')	1.40
NV/DV/SR-11	Southland Royalty Co well Dixie Federal #45-14 (td=9022'); well history, daily drilling report, temp-press surveys, directional surveys, chem analysis of fluid, well summary	3.10

UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI

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

December 7, 1979

MEMORANDUM

TO: Geothermal Distribution List

FROM: H. P. Ross and S. Dajany

SUBJECT: OPEN FILE DATA RELEASE, DOE/DGE Industry Coupled Program, DISTRIBUTION of Earth Science Laboratory and the Department of Geology and Geophysics, University of Utah Reports. AVAILABILITY OF WELL LOGS, Northern Basin and Range Case Studies.

Open File Data Release.

December 13 and 14, 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 third 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 (Attachment No. 1). Orders will be accepted from December 1 through January 31, 1980. Inquiries about the data and requests for reproductions should be directed to Mr. Sharrif Dajany at the Earth Science Laboratory.

Earth Science Laboratory and Department of Geology and Geophysics Technical Reports, Geologic Map, FORTRAN Programs and Reflection Seismic Data.

Several technical reports (Attachment No. 2) have been completed by the staff. These reports may not be of general interest to all those on this distribution list and will be distributed on a request basis only. Please write or phone Mr. Sharrif Dajany to obtain copies of these reports. These reports will be available for distribution at various times between December 13 and December 31, as DOE/ID approval for distribution is received and as printing schedules allow.

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, UT 84108
Telephone No. (801) 581-5283

Geophysical well logs have been received for exloration wells and stratigraphic tests completed under the DOE/DGE Industry Coupled Program. Well logs are available for:

Desert Peak B-21-1, B-21-2, B-23-1 and Strat. Test #7, (Phillips Petroleum Company)

Humboldt House Well Campbell "E"-1 and Strat. Test #4, (Phillips Petroleum Company)

Cove Fort-Sulphurdale #14-29 (Union Oil Company)

Stillwater, DeBraga No. 2 (Union Oil Company)

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
Telephone No. (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
H. P. Ross
Project Manager

S. Dajani
S. Dajani
Administrative Analyst

HPR, SD:ls

ATTACHMENT NO. 1

OPEN FILE DATA

Case Studies - Utah

ITEM	DESCRIPTION
Cove Fort-Sulphurdale (U.O.C) 14-29-1 $5.50	Union Oil Company Well #14-29, Cove Fort-Sulphurdale KGRA; Technical Report including well summary, geologic report, well history, temperature-pressure surveys, etc.
Cove Fort-Sulphurdale (U.O.C) 14-29-2 $0.25	Union Oil Company Well #14-29; Schlumberger Directional Survey summary, 4 pgs.

Case Studies - Northern Basin and Range

Stillwater KGRA, Nevada

Stillwater (U.O.C) #1 $2.70	Union Oil Company Technical Report on Well De Braga #2, Stillwater KGRA, Churchill Co. Report includes well summary, geologic report, history, fluid analysis, etc.
Stillwater (U.O.C) #2 $1.20	Addendum to Technical Report on DeBraga #2, Churchill Co., Nevada; Flow Test and Fluid Sample Data.

Baltazor KGRA, Nevada

Baltazor (EPPC) #7 $2.75	Deep thermal gradient study; three holes to approximately 1500 feet each; temperature logs, drilling and completion histories; location map.

Desert Peak, Nevada (Phillips Pet. Co.)

Desert Peak (PPC)-1 $1.25	Geologic map, and cross sections (2); Magnetotelluric slice map. Desert Peak Area.
Desert Peak (PPC)-2 $1.95	Ground magnetics map and gravity map, Carson Sink Area.
Desert Peak (PPC)-3 $0.75	Equilibrium temperature profiles, Strat. tests No. 2 and No. 5.

Desert Peak (PPC)-4 $1.25	Desert Peak #21-1; Water analyses, drilling reports. Desert Peak #21-2; drilling reports. Desert Peak #29-1; daily drilling reports.
Desert Peak (PPC)-5 $7.00	Phillips Petroleum Co. Final Report for Geothermal reservoir Assessment Case Study, Northern Basin and Range Province, U. S. Dept. of Energy Contract No. ET-78-C-08-1592. Integrated summary of drilling histories and results for Desert Peak well B-23-1 and Humboldt House well Campbell "E" No. 2.

Humboldt House, Nevada (Phillips Petroleum Co.)

Humboldt House (PPC)-1 $0.75	Surface geologic map, geologic cross section Magnetotelluric slice map.
Humboldt House (PPC)-2 $0.75	Well Campbell "E"-1: lithological log, directional well survey, daily drilling report.

(see also Desert Peak, item 5, final drilling report)

Beowawe, Nevada (Getty Oil Co.)

Beowawe, (GOC)-1 $4.95	Results of the Geophysical Surveys in the Beowawe Prospect, Part A. Electrodyne Surveys report to Getty Oil Co., Sept. 1979 - Gravity and magnetic survey, TDEM, MT-AMT and galvanic resistivity surveys; interpretative report. 1) maps and sections.
Beowawe, (GOC)-2 $1.70	Results of the Geophysical Surveys in the Beowawe Prospect, Part B. Appendix II, III, IV, with data from galvanic soundings, magnetotelluric soundings, and gravity survey. Appendix I, Time Domain EM sounding data includes approximately 700 pages and is not included, but is available for inspection at the Earth Science Laboratory.

ATTACHMENT NO. 2

Technical Reports

sent to ID. Glenn, William E., and Hulen, Jeffrey B., 1979, A study of geophysical logs of four wells from the Roosevelt Hot Springs area, Utah. DOE/ET/28392-38 ESL-28 1701.6.1.1.7

sent to ID. Hulen, Jeffrey, 1979, Geology and alteration of the Baltazor Hot Springs and Painted Hills thermal areas, Humboldt County, Nevada. DOE/ET/28392-36 ESL-27 1701.6.1.2.5

Id ok Moore, Joseph N., 1979, Geology map of the San Emidio geothermal area, Washoe and Pershing Counties, Nevada. DOE/ET/28392-33 ESL-23 78-1701.6.1.2.2

Id ok Nielson, D. L., (ed.), 1979, Program review, geothermal exploration and assessment technology program (including a report of the Reservoir Engineering Technical Advisory Group). DOE/ET/27002-6 ESL-29

Petrick, W. R., Jr., Sill, W. R., and Ward, S. H., 1979, Three-dimensional resistivity inversion using Alpha Centers.

sent to ID. Ross, Howard P., 1979, Numerical modeling and interpretation of dipole-dipole resistivity and IP profiles, Cove Fort-Sulphurdale KGRA, Utah. ESL-26 DOE/ET/28392-37 78-1701.6.1.2.8

Id ok Sibbett, Bruce S., 1979, Geology of the Soda Lake geothermal area. 78-1701.6.1.2.3 DOE/ET/28392-34 ESL-24

Id ok Smith, Christian, 1979, Interpretation of electrical resistivity and shallow seismic reflection profiles, Whirlwind Valley and Horse Heaven areas, Beowawe KGRA, Nevada. 78-1701.6.1.2.4 DOE/ET/28392-35 ESL-25

Ting, S. C., and Hohmann, G. W., 1979, Integrial equation modeling of three-dimensional magnetotelluric response.

Id ok Ward, S. H., Ross, H. P., and Nielson, D. L., 1979, A strategy of exploration for high temperature hydrothermal systems in the Basin and Range Province. DOE/ET/27002-5 ESL-22

Wechsler, D. J., and Smith, R. B., 1979, An evaluation of hypocenter location techniques with applications to Southern Utah: regional earthquake distributions and seismicity of geothermal areas.

Yusas, M. R., and Bruhn, R. L., 1979, Structural fabric and in-situ stress analysis of the Roosevelt Hot Springs KGRA.

Mineral Mountains Geologic Map. The geologic mapping of the Mineral Mountains, Beaver and Milford Counties, Utah has been completed. The map will be presented at the U.S.G.S. Public Meeting for the Richfield 2 degree sheet to be held in Salt Lake City on December 13 and 14, 1979 and will also be displayed at the ESL Open File data release on these dates. The map and an

accompanying text by Bruce Sibbett and Dennis Nielson will be available for general distribution in January, 1980.

Earth Science Laboratory FORTRAN Programs. Four computer programs have been developed by the ESL computer staff. Abstracts and order forms are available for each of the programs at no charge. The source code for the programs is available on magnetic tape at a cost for reproduction, handling and postage. The well log plotting program was developed under the Industry Coupled Program and the three geochemical programs were developed under the Geochemical Technique Development Program. The well log plotting program is extremely machine-dependent while the geochemical programs are more portable.

Killpack, Terry, and Atwood, John, 1979, WELLOG.REV1 (Well Log Plotting Program).

Killpack, Terry, 1979, DRILL.REV1 (Geochemical Down Hole Data Management and Manipulation Program).

Withrow, Carol, 1979, SECTION.REV1 (Geochemical Down Hole Data Plotting Program).

Withrow, Carol, 1979, PLANMAP.REV1 (Geochemical Plan Map Data Plotting Program).

Reflection Seismic Data. The Earth Science Laboratory has received one line of 24-fold CDP VIBROSEIS data which crosses the Milford Valley, Roosevelt Hot Springs KGRA, and the Mineral Mountains. The data are part of a speculative survey undertaken by Geophysical Service, Inc., and are made available through the DOE/DGE Exploration Technology Program. The data are available for inspection and study but may not be reproduced.

DATA RELEASE SUMMARY - INDUSTRY COUPLED PROGRAM

ITEMS RELEASED

NUMBER		1 DATE	2 YR.	3	4 CSS-4	5 NB&R	6	7	8	9	
1	1	Jan 23-25	1978		8	—					
	2										
	3	Apr. 20,21	1978		9	—					
	4										
3	5	Aug. 10,11	1978		5	—					
	6										
4	7	Dec 20,21	1978		4	—					
	8										
5	9	March 22,23	1979		—	48					
	10										
6	11	Sept. 6,7	1979		1	3					
	12										
7	13	Dec. 13,14	1979		2 (29)	12 (63)					
	14										
8	15	April 17,18	1980		2 (31)	6 (69)					
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9	17	July 30,31	1980								
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	1 COMPANY	3 AREA	4 RELEASE	5 DESCRIPTION	7	8	9	DATE
1	CHEVRON	BEDWARE	7/81	Drilling reports #85-18; Lithologic descriptions of				5/5/81
2				shallow T holes, T data for shallow T holes, mud				
3				report for 85-18				
4	CHEVRON	BEDWARE	7/81	Well Logs for 85-18				5/5/81
5	GETTY	COLODO	7/81	Cuttings from 44x-10 1215'-7800'				5/14/81
6	MACKAY SCHOOL OF MINES	DIXIE	7/81	Appendix on Environmental Isotope Hydrology V. III				4/6/81
7	AMAX	McCoy		Resistivity Survey				8/10/81
8	UNION	STILLWATER		Geophysical logs for Richard Weishaupt No. 1				8/19/81
9				Final Report for Stillwater				"
10				Final Report for Well Richard Weishaupt No. 1				"
11	Getty	Colodo		Well logs from 44x-10				"
12	AMAX	McCoy		Annual Report				8/24/81
13	"	Tuscarora		Annual Report				"
14	"	"		Corrections for final report				9/18/81
15	Aminoil	LEACH		Report on T-gradient and heat flow - Panther Canyon				9/28/81
16	Getty	BEDWARE		Well Logs from 76-17				10/1/81
17	Getty	Colodo		Drilling history of Colodo USL 44x-10				10/8/81
18	Amax	McCoy		Lith Logs, T-logs, SP, R, resistivity				10/27/81
19				for 25-9 and 38-9				
20	Getty	Beowawe		Drilling Summary Collins #76-17				Logged in data 11/30/81
21	AMAX	McCoy		Annual Report				Logged in data 2/2/82
22	AMINOIL	LEACH		FINAL Rept.				3/5/82
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EFFICIENCY LINE No. 2636 AMPAD

DELIVERABLE DATA RECEIVED

ITEM	1 COMPANY	3 AREA	4 RELEASE	5 DESCRIPTION	8	9	DATE
1	Southland Royalty	Dixie Vall.	Dec 80	Prelim. Blue line (1 ea) copies, Refl. Seismic Sections			9-3-80
2							
3	AMAX	Tuscarora	Dec 80	MT Survey by Terraphysics - Supplemental Data			9-10-80
4							
5	AMAX	Tuscarora	Dec 80	Drilling Summary Tusc #66-5	3 copies, 3 pgs. ea		10-9-80
6							
7	Southland Royalty	Dixie Valley	Dec 80	Temperature gradient survey, well history, SR-3 Lithologic logs, location maps, thin sec. - SR-4,	3 copies each		10-22-80
8							
9	Southland Royalty	Dixie Valley	Dec 80	8 profile plots; 8½ x 11 location map ½ scale Seismic Sections, Film + 3 b.l. prints			12-3-80
10							
11	AMAX	Tuscarora	NO	Deep Thermal Grad. Holes - Chips 860-33, 0-1000' 860-41, 0-1000' 860-42; 0-1740'			12-4-80
12							
13	AMAX	McCoy	JUNE 81	Well Logs #66-8 - sepia + b.l. prints Vault Log plots, wells #66-8, #14-7	1 b.l. print ea		12-8-80
14							
15	Mackay Sch. Mines SOUTHLAND ROYALTY	Dixie Valley	Dec 80	Revised pages for V. III; 7 pages 20, 51, 57, 58, 60, 61, 109			12-12-80
16							
17	Mackay Sch. Mines SOUTHLAND ROYALTY	Dixie Valley	wait for final	APPENDIX F-4 ISOTOPE HYDROLOGY REPORT, DIXIE VALLEY	"For Review" - not final		12-30-80
18							
19	Getty	Beowawe	7/81	Well histories of 14.5 temp grad wells			2/4/82
20							
21	"	"	7/81	2 temp. log surveys of above wells			2/4/82
22							
23	AMAX	Tuscarora	7/81	Soil Geochemistry: F, NH_3, Hg, Sb, As			3/10/81
24							
25	AMAX	McCoy	7/81	1D MT Inversion			3/11/81
26							
27	AMAX	Tuscarora	7/81	1D MT Inversion			3/11/81
28							
29	AMINOIL	Leach	7/81	Vol. III - Drilling + logging data	U.S.A. #11-36		3/13/81
30							
31	AMAX	McCoy	7/81	Resistivity survey results			5/5/81

DELIVERABLE DATA RECEIVED

ITEM #	1 COMPANY	3 AREA	4 RELEASE	5 DESCRIPTION	8	9	DATE
1	AMAX	McCoy	NO	Hg Geochem Survey	Sepia + B.Copy		6-24-
2			Not a contractual deliverable				
3	AMAX	McCoy	July 80	Sepias, 4 Plates, MGeoph. S.P.			7-10-8
4	AMAX	"	July 80	Sepias, 3 Plates, MGeophys.	Gravity		7-10
5	AMAX	"	July 80	Sepias, 7 Plates, MGeophys.	Microeq.		7-10
6	AMAX	Tuscarora	July 80	Sepias, 4 Plates, MGeophys	SP		7-10
7	AMAX	Tuscarora	July 80	Sepias, 7 Plates, MGeophys	Seismicity		7-15
8	AMAX	"	July 80	Sepias, 2 Plates, MGeophys	Gravity		7-15
9	AMAX	Tuscarora	July 80	27sh. Th. Gr. + 6 D. Th. Gr. holes, data + sepias			7-11
10	AMAX	McCoy	?	Well Logs, Well #14-7	2 black lines and 1 sepia		7-15
11							
12	AMAX	Tuscarora	Dec 80	Field notes, thermal logging of Well #66-5			7-15
13							
14	AMAX	TUSCARORA	Dec 80	Well #66-5, Flow test report, 3 copies			7-18
15							
16	AMAX	McCoy	July '80	Thermal Wells, Sepia Map for Printing			7-21
17							
18	AMAX	McCoy	July 80	Tellaric-MT Study of McCoy-Terraphysics Report	3 copies, Text		7-21
19							
20	MACKAY SCH. Mines SOUTHLAND ROY	DIXIE VALLEY	July 80'	Master copy of text Mylar of Plate IIII - to print			7-30
21							
22	AMAX	McCoy	?	Temp Depth field notes, Wells #14-7, #66-8			8-8
23							
24	AMAX	McCoy	?	Geothermal logs and Gradient Plots Well 14-7,	3 copies		8-11-8
25							
26	AMAX	TUSCARORA	Dec 80	Geothermal Log and Gradient Plot Well 66-5	3 copies		8-11-8
27							
28	Southland Royalty	DIXIE VALLEY	Dec 80	Mackay Sch. Mines V. III Soil Geochem & Petrochem embossed master 3 copies.	Dennis?		8-18-8
29							
30	AMAX	TUSCARORA	Dec 80	Lithologic Log Well 66-5	3 copies		9-3-80
31							

DELIVERABLE DATA RECEIVED

	ITEM #	1 COMPANY	3 AREA	4 RELEASE	5 DESCRIPTION	9	DATE
	1	AMAX	TUSCARORA	NO	B.L. Map with colored MT ρ values		2-20-'80
	2						
	3	Southland Roy / McKay Sch Mines	DIXIE VALLEY	NO	Drill Cuttings, D.F. 45-14, 0-3050'	by Mike Bullett	2-28'80
	4						
	5	UNION OIL	COVE FORT SULPHURD	Apr. 80	CF-SU Final Report	3 copies, text,	2-28'80
	6						
	7	SOUTHLAND ROYALTY	DIXIE VALLEY	July 80	MacKAY MIN. RES. INST. Geothermal Reservoir Assess. Case Study	Maps & Text 3 copies	4-1-80
	8						
	9	CHEVRON RESOURCE	SODA LAKE	Apr. 80	Final Report Intermediant Th. Gr. Holes	3 copies	4-7-80
	10						
	11	EARTH POWER PROD. Co.	BALTAZOR H.S.	Dec. 80	Mining Geophys. Inc. Resistivity & S.P. Survey	3 copies	4-7-80
	12						
	13	DENVER RES INST	ROOSEVELT H.S.	Apr. 80	Final Report "Subsurface Investigations at the Roosevelt KGRA, Utah		4-14-80
	14						
	15	GETTY OIL Co.	COLADO	EMWL? July 80	USL-IGH #1 Well History, Compl. Notices Dual Induction, Fm. Dens., Sonic, logs.		4/25/80
	16						
June 81 ?	17	AMINOIL, USA	LEACH	7/81	MT, seismic, Thermal Gradient, HF Study 3 sets, 2 Vols each; Mag. Topos Seismic; Sepias.		5/8/80
	18						
	19	AMAX	TUSCARORA	July 80	MT Data Corrections; Terraphysics Report (sepias not included) 3 copies		5/30/80
	20						
→	21	AMAX	TUSCARORA	July 80 DEC. 80	Well Logs, 2 b.l. + 1 sepia, field copies 86'-5456' #66-5 Tuscarora		6/2/80
	22						
	23	SOUTHLAND ROYALTY	DIXIE VALLEY	July 80	Mylar Plates, 1-7 U. Nev. Mackay School Mines Case Study.		6/2/80
	24						
	25	AMAX	McCoy	July 80	Terraphysics Report - Telluric-MT Survey	3 copies	6/11/80
	26						
	27	Thermal Power	ROOSEVELT H.S.	NO	Drill Cuttings Utah State #24-36 6110'	Freebee	6/11/80
	28						
	29	EARTH POWER PRODUCTION	BALTAZOR H.S.	Dec. 80	GEOCHEM SOIL SURVEY	3 copies	6/16/80
	30						
	31	AMAX	TUSCARORA	Dec 80	GEOCHEM SOIL SURVEY multi-elements	Sepia + b.l.	6/17/80

DELIVERABLE DATA RECEIVED

ITEM #	1 COMPANY	3 AREA	4 RELEASE	5 DESCRIPTION	9	DATE
1	AMAX	TUSCARORA	July 1, 80	Resistivity survey, Mining Geophysics Inc		12-7-79
2						
3	SOUTHLAND ROYALTY	DIXIE VALLEY	JULY 80	Geophysical Well Logs DF 66-21		12-17-
4						
5	SOUTHLAND ROYALTY	DIXIE VALLEY	JULY 80	Drill history, Directional Survey, DF 66-21		1-10-80
6						
7	SOUTHLAND ROYALTY	DIXIE VALLEY	NO	Drill cuttings, 45-14, 66-21		w12-20-79
8						
9	GETTY OIL CO.	COLADO	NOT DELIVERABLE	Detailed gravity, mag & survey notes		1-10-80
10						
11	CHEVRON RES. CO.	SAN EMIDIO	AS REQUEST	Fig 1-6, Senturion Sciences Ground Noise Survey - late delivery	3 b.l. ea. 1 sepia ea.	1-17-80
12						
13	GETTY OIL CO.	COLADO	Apr. 80	USL IGH #2 (11165') Well Completion Report, Well History	3 copies	1-21-80
14						
15	AMAX	McCOY	July 80	Gravity Survey by Microgeophysics	3 copies NO SEPIAS	1-28-80
16						
17	AMAX	TUSCARORA	July 80	Gravity Survey by Microgeophysics	3 copies NO SEPIAS	1-28-80
18						
19	GETTY OIL CO.	COLADO	Apr. 80	Well Logs, IGH #2 BHCS. ΔT, CNFD, CFD, [illegible], DI-SFL,	1 sepia of ΔT; ΔT = 3.6.1	1-30-80
20						
21	AMAX	TUSCARORA	NO	1 [illegible] t of 5 temp, HF Bo Grad, [illegible] maps PRELIMINARY	1 b.l. ea FOR REVIEW	2-4-80
22						
23	UNION	STILLWATER	Apr 80	Reflection seismic survey sections & maps	1 foil 2 b.l. each	2-4-80
24						
25	AMAX	McCOY	NO	Geophysical, geophys report Geologic report	3 sepias (maps) 1 gp report, 3 geol	2-11-80
26						
27	AMAX	TUSCARORA	NO	Geophysics folio geophys report geologic report	3 sepias (maps) 1 gp report + 1 geol	2-11-80
28						
29	UNION	STILLWATER	not released Apr. 80	Seismic Lines 2, 3, 4 Original field records	1 copy	2-13-80
30						
31	AMAX	TOSCARORA	July '80	Terraphysics MT survey 3 copies w blue line prints	3 NO SEPIAS	2-15-80

DELIVERABLE DATA RECEIVED

ITEM #	1 COMPANY	3 AREA	RELEASE	5 DESCRIPTION	9	REC DATE
1	CHEVRON RES	SODA LAKE	[illegible] ANNUAL 9/79	DRAFT FINAL REPORT, WELL LOGS		8/6/79
2				TWO 2000 Ft. Th. Grad. Holes		" "
3						
4	UNION OIL CO.	STILLWATER	12/79	Addendum to Technical Rept, De Braga No. 2		8/15/79
5						
6	AMAX	McCOY	July 80	AEROMAGNETIC MAP		8/17/79
7						
8	UNION OIL CO.	LOVE FORT SULPHUR DALE	12/79	CF-SU #14-29 WELL STUDY, LOGS,		
9				WELL DIRECTIONAL SURVEYS		8/28/79
10						
11						
12	PHILLIPS PET. CO.	DESERT PK	12/79	EXISTING GEOL, WELL, M.T., GEOPHYS DATA		8/28/79
13						
14	PHILLIPS PET. CO.	HUMBOLDT M.	12/79	EXISTING GEOL, WELL, M.T., TEMP, GEOPHYS DATA		8/28/79
15						
16	EARTH POWER PROD. CO.	BALTAZOR	12/79	3 DEEP THERMAL GRADIENT HOLES, TEMP DATA		9/4/79
17						
18	UNIV. DENVER	ROOSEVELT H. S.	Draft	DRAFT FINAL REPT., SUBSURFACE INV. RHS	2 Draft copies	11/19/79
19						
20	GETTY OIL CO.	BEOWAWE	12/79	RESULTS OF THE GEOPHYSICAL SURVEYS	3 copies	11/26/79
21				in the BEOWAWE PROSPECT Electrodyne Surveys, Sept. 1979		
22	AMAX	TUSCARORA	July 80	AEROMAGNETIC MAP	1 sepia, 2 prints	12/26/79
23				AEROMAGNETIC PROFILES	1 sepia, 2 prints	11/28/79
24	GETTY OIL CO.	BEOWAWE	12/79	11 Sepia maps for Electrodyne Surveys		11/28/79
25						
26	GETTY OIL CO.	COLADO	Apr. 80	Geophysical & Lithologic Logs GOC IGH #2. 1165 ft		12/7/79
27						
28	AMAX	TUSCARORA	July 80	Dipole-Dipole Resistivity Profiles and Line Location Maps		12/4/79
29						
30	SOUTHLAND ROYALTY CO.	DIXIE VALLEY	NO	Plate ST-1 - Structural-Tectonic Features in Northern Dixie Valley, Nev	3 b.l. 1:62,500	12/7/79
31						

DELIVERABLE DATA RECEIVED

1. DF # 45-14 [illegible] compl [illegible]

Item #	Company	Area	Release	Description	Date
1	AMAX	McCoy	July 80	Residual Mag. [illegible] 1:62,500, 3-map tubes [illegible] - 25 lines -	Sept. 12 '7[illegible]
2					
3	Phillips Pet. Co.	Humboldt H. Desert Pk.	-NO-	Draft Final Report of Drilling; 3 copies in ring binders; blue	Oct. 3, '7[illegible]
4					
5	CHEVRON RES. CO.	SODA LAKE	-NO-	Velocity & Seismic Processing Record 1 COPY - NOT FOR RELEASE	Oct. 3 '7[illegible]
6					
7	Phillips Pet Co.	Desert Pk	Release 12/79	Pruett Temp. log. Aug. 9, '79 1 sepia 2 Blue lines	Oct. 3 [illegible]
8					
9	SOUTHLAND Roy. Co.	DIXIE	Apr [illegible]	Well History, Dixie Fed # 45-14 3 copies, 8½ x 11	Oct. 11, '7[illegible]
10					
11	SOUTHLAND Roy. Co.	Dixie V[illegible]	Apr [illegible]	Geophysical Well Logs, # 45-14 3 copies	Oct. 11, '7[illegible]
12					
13	SOUTHLAND Roy. Co.	DIXIE VAL	NO	Mackay Minerals Res. Inst. Quarterly Report July 1 - Sept. 30 3 copies 8½ x 11	Oct. 12 '79
14					
15	SOUTHLAND Roy Co.	Dixie Val	NO	Shallow Temperature Survey July, Aug. Sept. 1 copy irreg.	Oct. 12 '7[illegible]
16				Color Photos for Quarterly rep 1 copy 8½ x 11	Oct. 12 '79
17	SOUTHLAND Roy Co.	Dixie Val	Apr [illegible]	DIXIE FEDERAL 45-14 3 copies ea	Oct. 1[illegible], '7[illegible]
18				① Dual Induction - SFL Log 2" & 5" Schlumberger 9/1/79	"
19				② Static Temp Grad Survey, 1" = 2000'; Agnew & Sweet 9/27/79	"
20				③ Static Press. Grad. Survey, 1" = 2000'; Agnew & Sweet 9/27/79	"
21				④ Daily Drilling History DF # 45-14	"
22					
23	AMAX	McCOY	July 80	Microearthquake Survey MICROGEOPHYSICS Corp. Oct. 8, '79 3 copies	Oct. 18, '7[illegible]
24					
25	PHILLIPS PET. Co.	Humboldt H. Desert Pk.	12/[illegible]	FINAL REPORT Geoth. Reservoir Assess. Case Study - NB & RP bound report - 3 copies	Nov. 13, '7[illegible]
26					
27	SOUTHLAND Roy Co.	DIXIE VALLEY	NO	Interim Report Analysis of shallow Gradient Holes loose leaf report ~20 pgs photomicrogr. 3 copies	Nov. 13 '7[illegible]
28					
29	UNION GEOTHERMAL Co	COVE FORT-SULPHURDALE	Draft NO	Draft of Final Report COVE FORT - SULPHURDALE UNIT 25 pg draft 3 copies	Nov. 13 '79
30					
31	CHEVRON RES. Co.	BEOWAWE	Dec 80	Detailed SP map 1" = 1000', July 1979 1 sepia [illegible]	Nov. 9 '79

DELIVERABLE DATA RECEIVED

Item #	1 COMPANY	3 AREA	4 RELEASE	5 DESCRIPTION	9	DATE
1	AMAX	TUSCARORA	July 80	Thermal Lith. gradient data, 20 holes	Phase I ✓	3/22/79
2	AMAX	McCOY	July 80	Thermal Lith. gradient data, 25 holes	Phase I	3/22/79
3						
SR-10 4 $1.40 5	SOUTHLAND ROY	DIXIE VALLEY	9/79	Temperature survey, 6 Th. grad. holes (Lithology rel in march)	EXISTING DATA	3/24/79
UOC 6 $0.90	UNION OIL Co.	COVE FORT-SULPHUR	9/79	Procedure for Caving Formations		3/26/79
8	AMINOIL USA, INC	LEACH H.S.	Dec 80	Water Geochem. & Hydrothermal Alt.	Sepias & 2 prints	4/19/79
9				Gravity Interp.	"	"
10				Geologic Report, Kelsh Plotter Photomapping	"	"
11						
12	CHEVRON RES.	BEOWAWE	Dec 80	SEISMIC REFL. SURVEY		
13						
EPP-7 14 $3.95 15	EARTH PWR PROD	BALTAZOR	9/79	GEOL. CROSS, SEC, MICROEQUAKE GEOCHEM MAP - held over from 1st release		1/79
GOC-3 16 $2.35 17	GETTY OIL Co.	COLADO	9/79	Thermal Gradient Survey, 18 holes, + map		6/12/79
18	UNION OIL Co.	STILLWATER	12/79	DeBragga #2, Well Summary & Logs		6/18/79
19						
20	AMAX	McCOY	July 80	S.P. SURVEY, MICROGEOPHYSICS CORP.	3 Reports (no sepia)	7/19/79
21						
22	AMAX	TUSCARORA	July 80	SEISMICITY SURVEY, MICROGEOPHYSICS Co.		7/20/79
23						
24	AMAX	TUSCARORA	July 80	S.P. SURVEY, MICROGEOPHYSICS COEP.		8/6/79
25						
26	PHILLIPS PET. CO.	DESERT PK	RMNLS 9/79	B-23-1 DRILL LOGS		8/3/79
27		HUMBOLDT H.		CAMPBELL "E" - NO. 2 DRILL LOGS		8/3/79
28						
29						
30						
31						

SF [illegible] PD FORM 26, JULY 1966
[illegible] ADMINISTRATION
[illegible] 41 CFR) 1-16.101

AWARD/CONTRACT

PAGE 1 OF 13

1. CONTRACT (Proc. Inst. Ident.) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING:
DE-AC08-79ET27005	4/1/79	T08-78-3577	N/A

5. ISSUED BY CODE
U Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, Nevada 89114

6. ADMINISTERED BY (If other than block 5) CODE

7. DELIVERY
[X] FOB DESTINATION
[ ] OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS CODE
(Street, city, county, State, and ZIP code)
Aminoil USA, Inc.
Geothermal Resources Division
P.O. Box 11279
Santa Rosa, California 9540

THIS IS A COPY OF THE EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

DISCOUNT FOR PROMPT PAYMENT
N/A

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

11. SHIP TO/MARK FOR CODE
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 CODE
U.S. Department of Energy
Nevada Operations Office
Finance Division
P.O. Box 14100, Las Vegas, Nevada 89114

13. THIS PROCUREMENT WAS [ ] ADVERTISED, [X] NEGOTIATED, PURSUANT TO:
[ ] 10 U.S.C. 2304 (a)( )
[X] 41 U.S.C. 252 (c)(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				$1,291,008
	1ST Data release 1 mo after completion of 1st deep well. about July 1 1980.				

21. TOTAL AMOUNT OF CONTRACT $ 1,291,008

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. [X] 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: (a) this award/contract, (b) 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. OF CONTRACTOR
BY Paul M. Cain
(Signature of person authorized to sign)

27. UNITED STATES OF AMERICA
BY Manlon E. Gates
(Signature of Contracting Officer)

24. NAME AND TITLE OF SIGNER (Type or print)	25. DATE SIGNED	28. NAME OF CONTRACTING OFFICER (Type or print)	29. DATE SIGNED
	4/6/79	Manlon E. Gates, Manager	4/7/79

APPENDIX A

SCOPE OF WORK

A. Aminoil USA, Inc., proposal, dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003, is incorporated herein and made a part of this Contract No. DE-AC08-79ET27005, except as modified by such Contract. The Contractor will provide existing data as specified in D. below and will use its best efforts to perform the new program proposed and to acquire and deliver to DOE the resulting new data enumerated in D. below substantially in accordance with Appendix D, Activity Schedule.

B. The program to acquire new data encompassed by this Contract is as follows:

1. Phase I

   a. Drill approximately 6,000 feet of temperature gradient holes with depths varying from 300 to 2,000 feet in T 30, 31, 32 N, R 38-39 E, Pershing County, Nevada. Total number of holes and their depths to vary depending on results of the previous holes drilled.

   b. Conduct temperature gradient surveys and take drill cuttings samples from each of the above holes.

2. Phase II

   a. Conduct a magneto-telluric survey over the area of T 31-32 N, R 38-39 E, Pershing County, Nevada. Survey size will depend on size of thermal anomaly as determined from gradient program, with from 20-40 stations anticipated.

   b. Acquire and interpret seismic reflection data to cover approximately 15 line miles in T 31-32 N, R 38-39 E, Pershing County, Nevada.

3. Phase III

   a. Drill one exploratory well to approximately 8,000 feet in vicinity of Leach Hot Springs KGRA.

   b. Drill one exploratory well to approximately 8,000 feet in vicinity of Panther Canyon anomaly.

4. Phase IV

Conduct short-term flow test if feasible on each well from Phase III and take temperature, pressure, and flow rate measurements. The flowing period of such tests shall be limited by reserve pit capacity.

C. The Contractor will conduct the four major phases of the program as indicated above, unless the Contractor terminates the Contract as provided in Article 2, Period of Performance.

In the event that circumstances are encountered through which the Contractor determines it is impracticable to continue drilling operations described in B. above, the Contractor may terminate the drilling at lesser depths. If a potentially productive zone is encountered at a depth of less than 8,000 feet in either Phase III well described in B. above, the Contractor may terminate the drilling operations and proceed with the Phase IV testing 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 Surface Geological Data

per April 19, '79

a. Gravity measurements--500 stations

b. Gravity interpretation--900 stations

c. Geochemical survey

d. Surface geology/fracture pattern evaluation/hydrothermal alteration study

2. New Data

a. Phase I

Temperature gradient data and drill cutting samples from an unspecified number of holes; the holes may vary from 300 to 2,000 feet in depth but will total approximately 6,000 feet as stated in B.1 above

b. Phase II

(1) Data and interpretations from a 20-40 station magnetotelluric survey as stated in B.2.a. above.

(2) Data and interpretations from approximately 15 line miles of seismic reflection survey as noted in B.2.b above.

c. Phase III

Drilling, logging, and completion data from B.3. above to include:

(1) Drilling technology

(2) Drilling history

(3) Formation and reservoir evaluation logs including mud logs, electric/radioactive logs, temperature/pressure surveys, and hole deviation surveys.

(4) Physical samples

(a) Drill cuttings samples--Approximately 1,000 gm samples at about each 20- to 30-foot interval as drilling conditions permit.

(b) Core samples--50 percent of core recovered, if any.

(c) Reservoir and miscellaneous fluid samples--1,000 cc samples representative of borehole fluids recovered, if any.

(5) Core analysis

(6) Fluid chemical analysis

d. Phase IV

Flow testing data from B.4. above to include:

(1) Flow line temperatures and pressures and mass flow rate determinations.

(2) Isotope studies.

E. Schedule for Data Delivery and Release

1. Existing data described in D.1. shall be delivered within two months after contract execution and shall be available for public release one month after rig demobilization at the first deep exploratory well.

withold Data

Rig demobil July 2, 1980

2. New data, except physical samples described in D.2.a. and b. (Phases I and II), shall be delivered within three months after completion of Phases I and II field activities and shall be available for public release six months after rig demobilization at the first deep exploratory well.

Release after Jan 2, 1981

3. New data, except physical samples described in D.2.c. (Phase III), applicable to each deep exploratory well shall be delivered within three months after rig demobilization at each well and shall be available for public release nine months after rig demobilization at each well.

Release after Apr. 2, 1981

4. New data, except physical samples described in D.2.d. (Phase IV), shall be delivered within three months and be available for public release within six months after completion of the field activities for the flow test on each well.

5. Physical samples shall be delivered from time to time throughout the field activities of each phase and shall be made available to the public six months after completion of each phase.

F. Data to Be Withheld

The following information shall not be delivered under this Contract:

All computer programs utilized in calculations and evaluations relating to geothermal well bore and production characteristics, geothermal pipeline gathering systems and separators, reservoir simulation, well interference tests, and proprietary interpretation methods and computer algorithms of Contractor data.

G. Transmittal of Deliverables

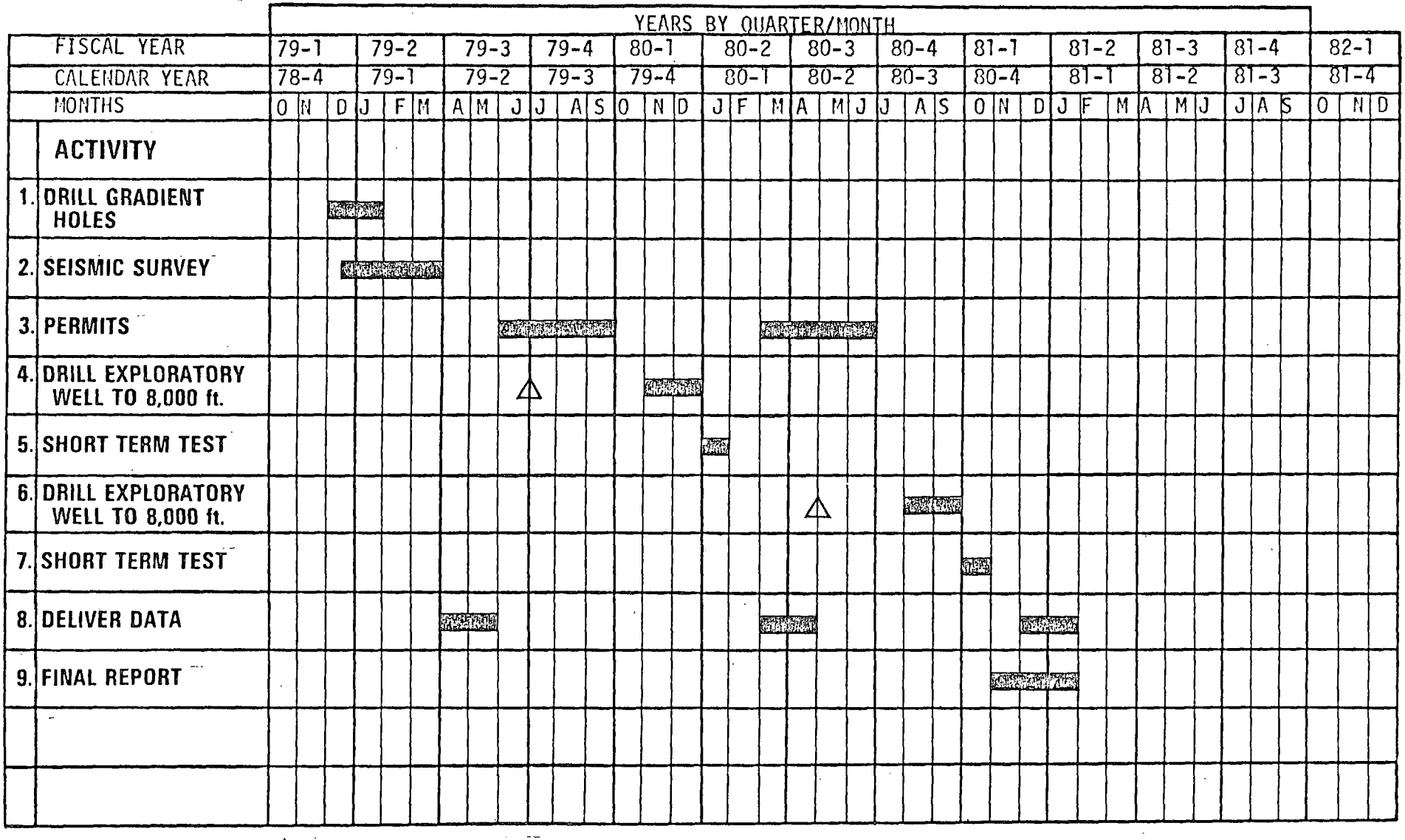
1. Four copies of all data other than physical samples will be provided. One copy will be delivered to addressee in C.1. of Appendix C and three copies to addressee in C.2. of Appendix C.

2. Physical samples shall be delivered to the Geothermal Sample Library, University of Utah, Salt Lake City, Utah (see Appendix C, paragraph D); or placed in the custody of a University of Utah representative at the drill site.

APPENDIX D
ACTIVITY SCHEDULE

AMINOIL USA, INC.

GEOTHERMAL RESERVOIR ASSESSMENT (LEACH HOT SPRINGS AREA)



△ DECISION TO PROCEED

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

LEACH HOT SPRINGS

March 12 '79

FINALIZED S.O.W.
corrected schedule

APPENDIX A

SCOPE OF WORK

A. Aminoil USA, Inc., proposal, dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003, is incorporated herein and made a part of this Contract No. DE-AC08-79ET27005, except as modified by such Contract. The Contractor will provide existing data as specified in D. below and will use its best efforts to perform the new program proposed and to acquire and deliver to DOE the resulting new data enumerated in D. below substantially in accordance with Appendix D, Activity Schedule.

B. The program to acquire new data encompassed by this Contract is as follows:

1. Phase I

   a. Drill approximately 6,000 feet of temperature gradient holes with depths varying from 300 to 2,000 feet in T 30, 31, 32 N, R 38-39 E, Pershing County, Nevada. Total number of holes and their depths to vary depending on results of the previous holes drilled.

   b. Conduct temperature gradient surveys and take drill cuttings samples from each of the above holes.

2. Phase II

   a. Conduct a magneto-telluric survey over the area of T 31-32 N, R 38-39 E, Pershing County, Nevada. Survey size will depend on size of thermal anomaly as determined from gradient program, with from 20-40 stations anticipated.

   b. Acquire and interpret seismic reflection data to cover approximately 15 line miles in T 31-32 N, R 38-39 E, Pershing County, Nevada.

3. Phase III

   a. Drill one exploratory well to approximately 8,000 feet in vicinity of Leach Hot Springs KGRA.

   b. Drill one exploratory well to approximately 8,000 feet in vicinity of Panther Canyon anomaly.

4. Phase IV

Conduct short-term flow test if feasible on each well from Phase III and take temperature, pressure, and flow rate measurements. The flowing period of such tests shall be limited by reserve pit capacity.

C. The Contractor will conduct the four major phases of the program as indicated above, unless the Contractor terminates the Contract as provided in Article 2, Period of Performance.

In the event that circumstances are encountered through which the Contractor determines it is impracticable to continue drilling operations described in B. above, the Contractor may terminate the drilling at lesser depths. If a potentially productive zone is encountered at a depth of less than 8,000 feet in either Phase III well described in B. above, the Contractor may terminate the drilling operations and proceed with the Phase IV testing 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 Surface Geological Data

Received April 19, 1979

a. Gravity measurements--500 stations

b. Gravity interpretation--900 stations

c. Geochemical survey

d. Surface geology/fracture pattern evaluation/hydrothermal alteration study

2. New Data

a. Phase I

Temperature gradient data and drill cutting samples from an unspecified number of holes; the holes may vary from 300 to 2,000 feet in depth but will total approximately 6,000 feet as stated in B.1 above

b. Phase II

(1) Data and interpretations from a 20-40 station magnetotelluric survey as stated in B.2.a. above.

(2) Data and interpretations from approximately 15 line miles of seismic reflection survey as noted in B.2.b above.

c. Phase III

Drilling, logging, and completion data from B.3. above to include:

(1) Drilling technology

(2) Drilling history

(3) Formation and reservoir evaluation logs including mud logs, electric/radioactive logs, temperature/pressure surveys, and hole deviation surveys.

(4) Physical samples

(a) Drill cuttings samples--Approximately 1,000 gm samples at about each 20- to 30-foot interval as drilling conditions permit.

(b) Core samples--50 percent of core recovered, if any.

(c) Reservoir and miscellaneous fluid samples--1,000 cc samples representative of borehole fluids recovered, if any.

(5) Core analysis

(6) Fluid chemical analysis

d. Phase IV

Flow testing data from B.4. above to include:

(1) Flow line temperatures and pressures and mass flow rate determinations.

(2) Isotope studies.

E. Schedule for Data Delivery and Release

1. Existing data described in D.1. shall be delivered within two months after contract execution and shall be available for public release one month after rig demobilization at the first deep exploratory well.

2. New data, except physical samples described in D.2.a. and b. (Phases I and II), shall be delivered within three months after completion of Phases I and II field activities and shall be available for public release six months after rig demobilization at the first deep exploratory well.

3. New data, except physical samples described in D.2.c. (Phase III), applicable to each deep exploratory well shall be delivered within three months after rig demobilization at each well and shall be available for public release nine months after rig demobilization at each well.

4. New data, except physical samples described in D.2.d. (Phase IV), shall be delivered within three months and be available for public release within six months after completion of the field activities for the flow test on each well.

5. Physical samples shall be delivered from time to time throughout the field activities of each phase and shall be made available to the public six months after completion of each phase.

F. Data to Be Withheld

The following information shall not be delivered under this Contract:

All computer programs utilized in calculations and evaluations relating to geothermal well bore and production characteristics, geothermal pipeline gathering systems and separators, reservoir simulation, well interference tests, and proprietary interpretation methods and computer algorithms of Contractor data.

G. Transmittal of Deliverables

1. Four copies of all data other than physical samples will be provided. One copy will be delivered to addressee in C.1. of Appendix C and three copies to addressee in C.2. of Appendix C.

2. Physical samples shall be delivered to the Geothermal Sample Library, University of Utah, Salt Lake City, Utah (see Appendix C, paragraph D); or placed in the custody of a University of Utah representative at the drill site.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

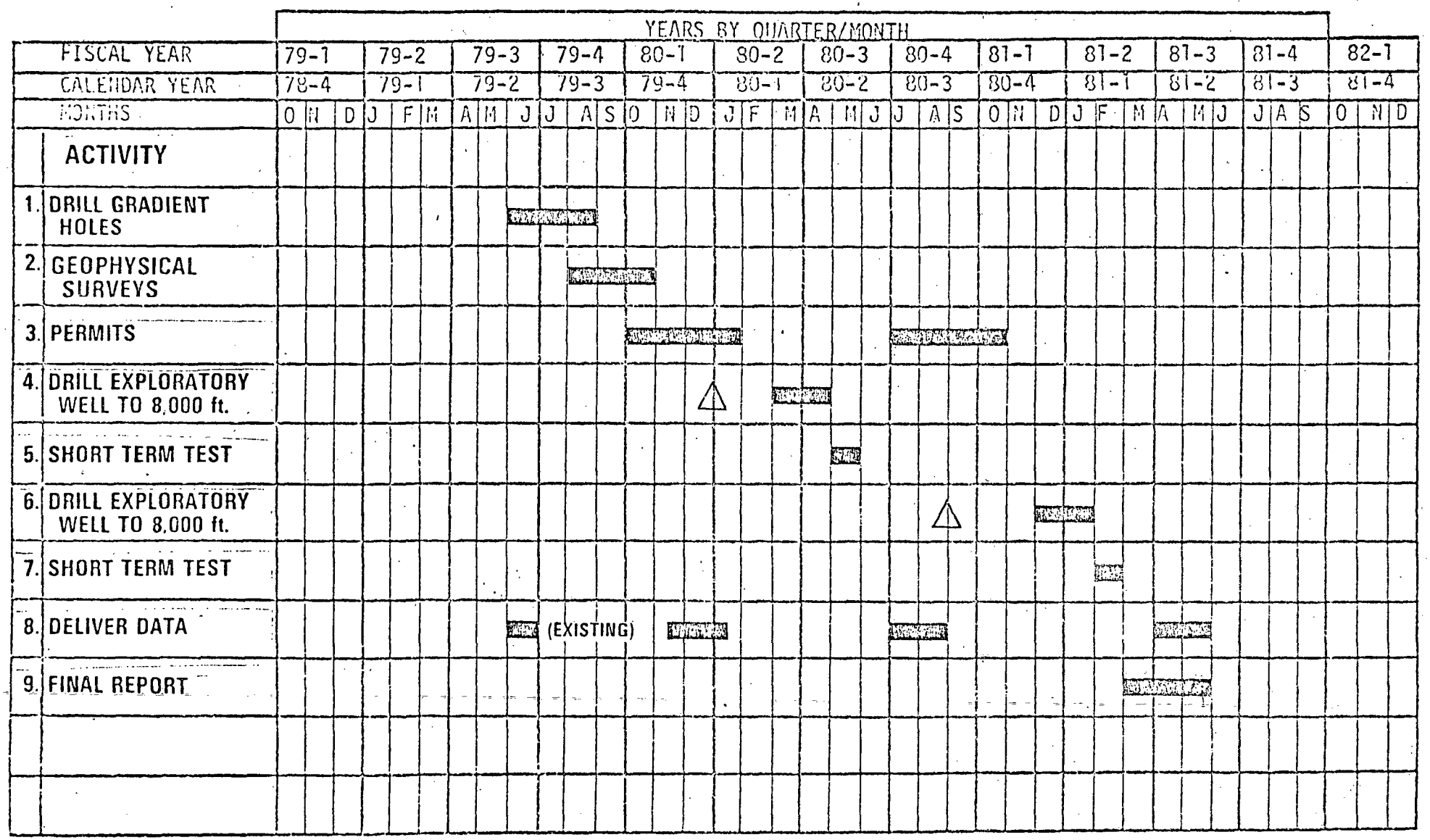
D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

APPENDIX D
ACTIVITY SCHEDULE

AMINOIL USA, INC.

GEOTHERMAL RESERVOIR ASSESSMENT (LEACH HOT SPRINGS AREA)

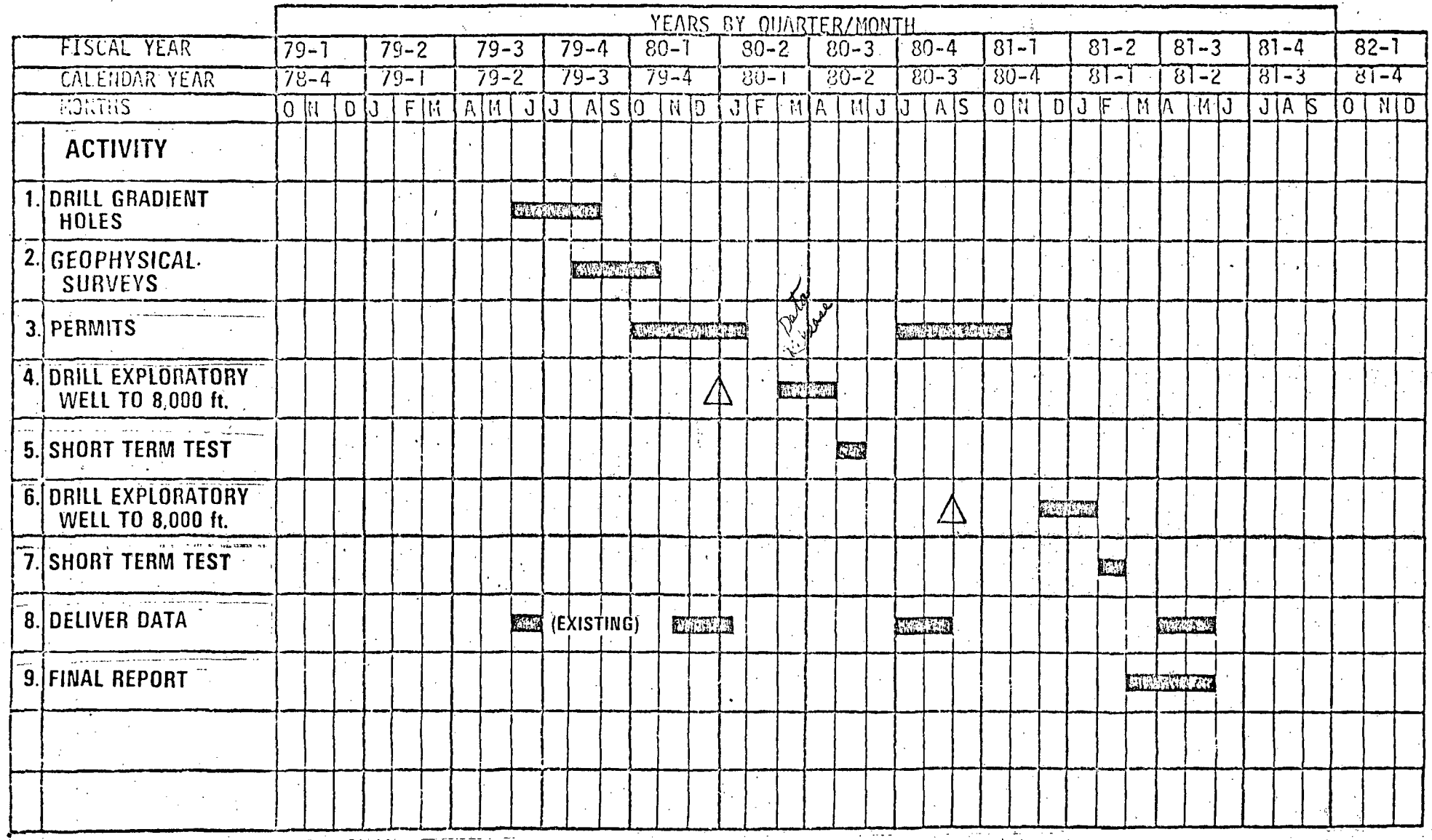


corrected Schedule
5/2/79

APPENDIX B
ACTIVITY SCHEDULE

AMINOIL USA, INC.

GEOTHERMAL RESERVOIR ASSESSMENT (LEACH HOT SPRINGS AREA)



STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.901

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 2

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
M002	see blk 19	08-81ET27005.001	

5. ISSUED BY CODE
U.S. Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, NV 89114

6. ADMINISTERED BY (If other than block 5) CODE

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code)
CODE FACILITY CODE
Aminoil USA, Inc.
P.O. Box 94193
Houston, TX 77018

8.
☐ AMENDMENT OF SOLICITATION NO. _____
DATED _____ (See block 9)
☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-79ET27005
4/1/79 (See block 11)

THIS IS A COPY OF THE EXECUTED DOCUMENT
JUN 9 1981
CONTRACTS & PROCUREMENT DIVISION

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS
☐ The above numbered solicitation is amended as set forth in block 12. The hour a ... d, ☐ is not extended.
Offerors must acknowledge receipt of this amendment prior to the hour and date specif ... llowing methods:
(a) By signing and returning ____ copies of this amendment; (b) By acknowledging rec ... submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF Y ... CMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS
(a) ☐ This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.
(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.
☒ This Supplemental Agreement is entered into pursuant to authority of Section 646(a) of the Department of Energy Organization Act
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Article 2, "Period of Performance," is amended to extend the contract term to December 31, 1981; with proviso that contractor may terminate within ninety (90) days after completion of work described in Appendix A, Paragraph B.3.b. of "Phase III."
2. Appendix A, "Statement of Work," is modified as follows:

A. Paragraph B.3, "Phase III, is revised in its entirety to read as follows:

"a. Drill one exploratory well to approximately 8,000 feet in vicinity of Leach Hot Springs KGRA."

Additional Work →

"b. Drill about 6 to 8 temperature gradient holes to a depth of about 500 ft. each in the vicinity of Panther Canyon anomaly."

"c. Drill one exploratory well to approximately 8,000 feet in vicinity of Panther Canyon anomaly."

B. Paragraph D.2.c., "Phase III," is revised to change the opening sentence to read as follows:

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 3 COPIES TO ISSUING OFFICE

14. OF CONTRACTOR/OFFEROR		17. UNITED STATES OF AMERICA	
BY Paul W. Cain (Signature of person authorized to sign)		BY (Signature of Contracting Officer)	
15. NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED	18. NAME OF CONTRACTING OFFICER (Type or print)	19. DATE SIGNED
P. W. Cain Executive Vice President	4/29/81	Robert W. Taft Contracting Officer	JUN 8 1981

30-101

☆U.S.GPO:1980-0-311-153/5520

"Drilling, logging, and completion date from B.3.a. and c. above to include:

C. Paragraph D.2.c., "Phase III," is revised to add the following:

"(7) Temperature profiles, lithologic descriptions and drill cuttings from B.3.b. above."

D. Paragraph C. is modified to add the following:

"Although the government cost sharing limitation is reached during the conduct of Phase III c. or Phase IV, the Contractor will provide to the government any applicable deliverables enumerated in Appendix A, Section D. under Phase III c. and Phase IV."

STANDARD FORM 26, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41CFR) 1-16.101

AWARD/CONTRACT

McCoy

PAGE 1 OF 12

1. CONTRACT (Proc. Inst. Ident.) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING:
DE-AC08-79ET27010	10/1/78	T08-78-3577	N/A

5. ISSUED BY CODE
U.S. Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, Nevada 89114

6. ADMINISTERED BY (If other than block 5) CODE

7. DELIVERY
☒ FOB DESTINATION
☐ OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS CODE FACILITY CODE
(Street, city, county, State, and ZIP code)
AMAX Exploration, Inc.
4704 Harlan Street
Denver, Colorado 80212

COPY OF EXECUTED CONTRACT

9. DISCOUNT FOR PROMPT PAYMENT
N/A

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

11. SHIP TO/MARK FOR CODE
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 CODE
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)( )
☒ 41 U.S.C. 252 (c)(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 (McCoy Area)				$594,500

21. TOTAL AMOUNT OF CONTRACT $ 594,500

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: (a) this award/contract, (b) 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 OF CONTRACTOR
BY _____ (Signature of person authorized to sign)

27. UNITED STATES OF AMERICA
BY _____ (Signature of Contracting Officer)

24. NAME AND TITLE OF SIGNER (Type or print)	25. DATE SIGNED	28. NAME OF CONTRACTING OFFICER (Type or print)	29. DATE SIGNED
Gerald J. Kitchen Vice President	Nov. 28, 1978	Robert W. Taft, Assistant Manager for Plans, Engineering & Budgets	11/6/78

McC04

APPENDIX A

SCOPE OF WORK

A. AMAX Exploration, Inc.'s proposal (McCoy Area) dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. DE-AC08-79ET27010 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 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.

Release on completion of Ph I rec Jan '79

1. (1) Temperature and lithology data from 15 holes within the investigative area with an average depth of about 125 feet.

2. Computer representations of data, including heat flow determinations, from Item 1 above.

C. The program to provide new data encompassed by this Contract consists of conducting investigations in T 22, 23, and 24 N, R 39 and 40 E, MDM, Churchill and Lander Counties, Nevada, as described below and delivering the data enumerated in Section D., Deliverables.

1. Phase I

Release 4 mo after compl. MT fm Feb 29 w July 1 '80

(2) rec. 3-22-79 a. Drill about 25 gradient/lithology holes to a depth range of about 150 to 350 feet each. Conduct temperature surveys and compile lithologic logs for each hole.

(3) rec. 1-28-80 b. Conduct a gravity survey consisting of about 220 stations over an area of approximately 70 square miles. HG Report written 1 Jan 80

(4) rec. 7-19-79 c. Conduct a self-potential survey consisting of nine lines of approximately 12 miles each with stations spaced about every 450 feet along the lines.

(5) rec. 6-11-80 d. Conduct a magnetotelluric survey using about 30 stations including 10 five-component bases and 20 telemetered orthogonal pair satellites over an approximate 70-square-mile area. Terraphys MT in Field, Jan '80

2. Phase II

Rel. 3 mo after compl. ~~Oct '80~~

rec. 8-17-79 a. Conduct an aeromagnetic survey consisting of 450 line miles with line spacing of about 1 mile flown at an altitude of approximately 1,000 feet.

b. Conduct a passive seismic (microearthquake) survey consisting of about 50 stations covering approximately a 70-square-mile area.

c. Drill three temperature gradient/lithology holes to about 2,000 feet each. Run temperature surveys, collect drill cuttings samples, and compile well bore lithologic descriptions.

3. Phase III

a. Conduct a reflection seismic survey consisting of about 20 line miles. (Transducer Source.)

b. Drill one deep exploratory hole to a maximum depth of about 7,500 feet. Collect physical borehole samples to include drill cuttings, fluids, and cores (at least one conventional core will be attempted, if warranted); run geophysical logs including but not limited to temperature, pressure, induction, acoustic, and densilog; conduct mud logging (if applicable) from the base of the surface casing to total depth. Hole deviation will also be monitored.

4. Phase IV

If well conditions permit, conduct a 24- to 48-hour flow test or a test of such duration that is limited by reserve mud pit capacity.

Depending on the results obtained upon completion of Phases I, II, or III, either party may elect to terminate the Contract. In such event, payment will be limited to costs incurred to date of termination.

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. Map showing location of 15 gradient/lithology holes.

b. Temperature profiles and lithologic description from surface to total depth on each of 15 holes (average depth--120 feet).

c. Computer representation of above temperature data, including heat flow determination.

2. New Data

a. Phase I

(1) Temperature profiles and lithologic descriptions from surface to total depth on 25 holes (range of depth--150 to 350 feet each). Computer representations with heat flow determination shall be included.

(2) Describe station array, provide data, translation of data into meaningful parameters, contoured maps from gravity and self-potential surveys, and contoured sections from magnetotelluric surveys described in Sections C.1.b., c., and d. above.

b. Phase II

(1) Describe station array, provide data, translation of data into meaningful parameters, and appropriate map representations from aeromagnetic and microearthquake surveys described in Sections C.2.a. and b. above.

(2) Provide the following data from each of the 2,000-foot holes described in Section C.2.c.

(a) Drill hole cuttings--approximately 1,000 gm sample over about each 20-foot interval as drilling conditions permit.

(b) Fluid samples--50 percent of fluids sampled (if any).

(c) Temperature log--surface to total depth after a nominal equilibration period and additional runs as appropriate.

(d) Well bore lithologic description.

c. Phase III

(1) Provide test setup description (source and station density), data, translation of data into meaningful parameters, and appropriate map and/or sectional representations from about 20 line miles of reflective seismic survey described in Section C.3.a.

(2) Provide the following data from the 7,500-foot exploratory hole described in Section C.3.b.

(a) Drill hole cuttings--approximately 1,000 gm sample at about 20-foot interval as drilling conditions permit.

(b) Core samples--approximately 50 percent of total core recovered.

(c) Fluid samples--1,000 cc sample size representative of borehole fluids sampled (if any).

(d) Mud logging data.

(e) Hole deviation survey data.

(f) Geohpysical logging data to include:

1) Temperature

2) Pressure

3) Induction or equivalent

4) Acoustic

5) Densilog

(g) Drilling and completion history.

(h) Appropriate analyses and/or interpretations related to Items (2)(a) through (f) above.

d. Phase IV

Provide short-term testing data to include:

(1) Test description

(2) Flow line temperatures and pressures

(3) Flow rates as determined by James method

(4) Static wellhead temperatures and pressures

(5) Fluid samples--1,000 cc sample size representative of individual flowing test.

(6) Appropriate analyses and/or interpretations related to Items (1) through (5) above.

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 Research Institute (UURI), Salt Lake City, Utah, or placed in the custody of a UURI 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 in C.1 of Appendix C and three copies to addressee in C.2 of Appendix C.

F. Schedule for Data Delivery and Release

1. Existing data: Simultaneously with delivery of Phase I new data.

2. Phase I data: Four months after completion of Phase I.

3. Phases II, III, and IV data: Three months after completion of each phase.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final or Yearly Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final or Yearly Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities or at the end of each contract year, whichever occurs first. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

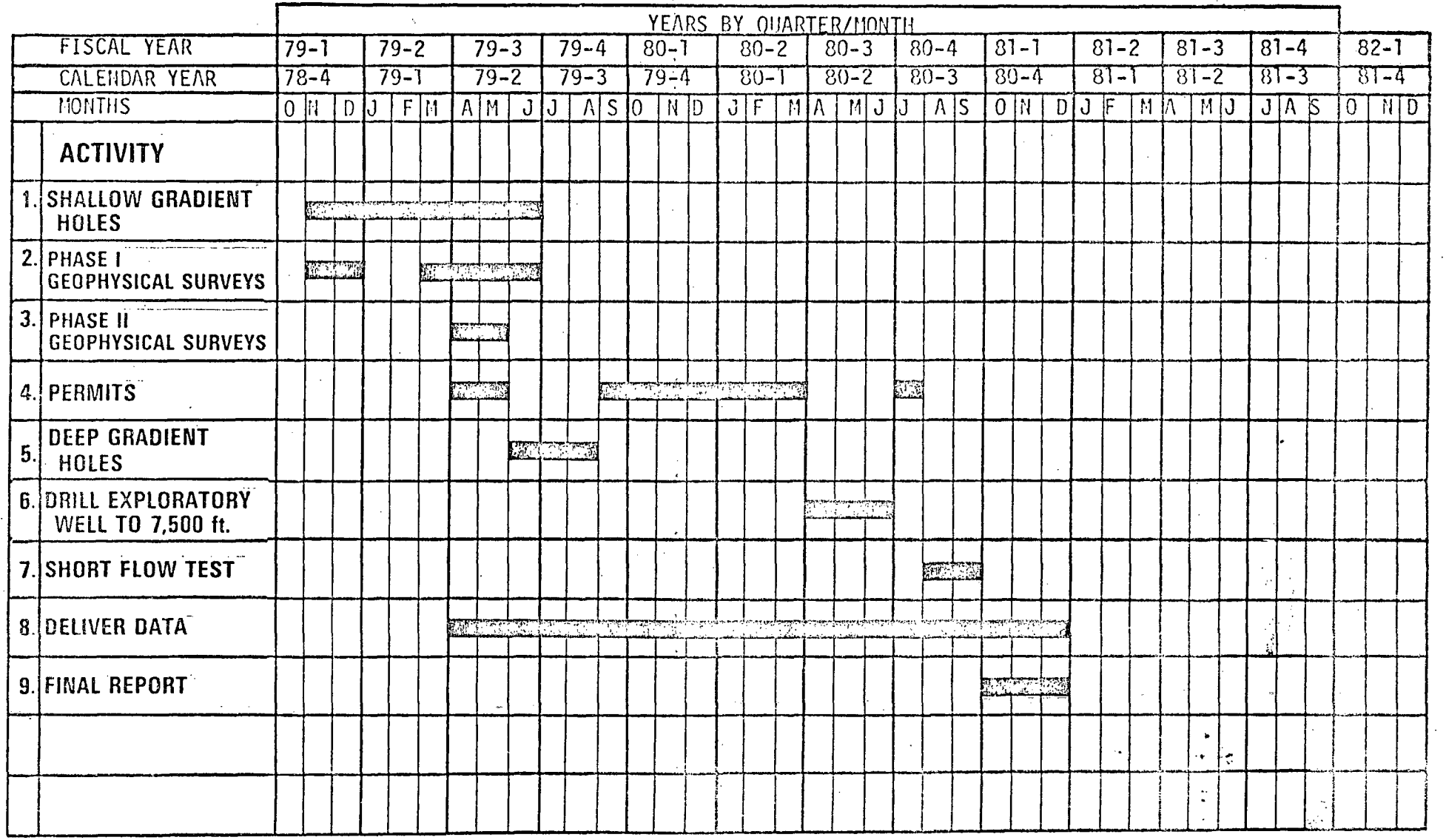
D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

APPENDIX D
ACTIVITY SCHEDULE
(ESTIMATED)

AMAX EXPLORATION, INC.

GEOTHERMAL RESERVOIR ASSESSMENT (McCOY AREA)



STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
M002	See Block 19		

5. ISSUED BY CODE

U.S. Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

6. ADMINISTERED BY (If other than block 5) CODE

MAR 2 7 1981

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code) CODE FACILITY CODE

AMAX Exploration, Inc.
7100 West 44th Avenue
Wheat Ridge, CO 80033

8.
☐ AMENDMENT OF SOLICITATION NO. _____
DATED _____ (See block 9)
☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-79ET27010
DATED 10/1/78 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) ☐ This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) ☒ This Supplemental Agreement is entered into pursuant to authority of Section 646(a) of the Department of Energy Organization Act

It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Article 2, "Period of Performance," is amended to extend the contract term to September 30, 1982.

3. Appendix A, "Statement of Work," is modified as follows:

a. Paragraph C.2. is amended to add the following:

"d. Drill about 10 temperature gradient/lithology holes to a depth range of about 400 to 500 feet each or an aggregate footage of about 4,000 to 5,000 feet. Obtain a temperature profile and compile a lithologic log of each hole.

"e. Drill 5 temperature gradient/lithology holes to a depth range of about 2,200 to 2,500 feet each or to an aggregate footage of about 11,000 to 12,500 feet. Obtain a temperature profile and compile a lithologic log of each hole.

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 3 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR		17. UNITED STATES OF AMERICA	
BY _____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	
15. NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED	18. NAME OF CONTRACTING OFFICER (Type or print)	19. DATE SIGNED
Gerald J. Kitchen Vice President	Mar. 16, 1981	Robert W. [illegible]	MAR 25 1981

30-101

☆U.S.GPO:1980-0-311-153/5520

"f. Conduct a Dipole-Dipole resistivity survey consisting of three east-west trending lines with an aggregate extent of about 25 line miles. The survey parameters shall be subject to DOE approval."

b. Paragraph D.2.b(2) is modified to change the opening sentence to the following:

Provide the following data from each of the holes described in Section C.2.c and C.2.e.

C. Paragraph D.2. is modified to add the following:

"b. (3) Describe survey parameters; provide field data, maps, graphical representations, analyses and interpretations from C.2.f. in accordance with accepted geophysical industry standards.

"e. Data from Phase III and IV above, which may be conducted within the performance period of the Contract, while not included under the Government cost-sharing allocation, shall be provided to the Government within the delivery schedule set forth in Appendix A subject to the restriction that such data shall not be released by the Government until one year after expiration of the Contract performance period."

Tuscarora

APPENDIX A

SCOPE OF WORK

A. AMAX Exploration, Inc.'s proposal (Tuscarora Area) dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. ET-78-C-08-1594 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 acquire and deliver to DOE the resulting new data.

B. The program to provide existing data encompassed by this Contract shall consist of the delivery of the data described below and enumerated in Deliverables, Section D.1.

1. Temperature and lithology data from four holes within the investigative area with depths ranging from about 150 to 200 feet.

2. Computer representations of data, including heat flow determinations, from Item 1 above.

C. The program to provide new data encompassed by this Contract consists of conducting investigations in T 40, 41, and 42 N, R 50 and 51 E, MDM, Elko County, Nevada, as described below and delivering the data enumerated in Deliverables, Section D.2.

1. Phase I

   a. Drill about 20 gradient/lithology holes to a depth of about 150 to 250 feet each. Conduct temperature surveys and compile lithologic log for each hole.

   b. Conduct a gravity survey consisting of about 150 stations over an area of approximately 70 square miles.

   c. Conduct a self-potential survey consisting of 12 lines of about 9 miles each.

   d. Conduct a magnetotelluric survey using about 30 stations including 10 five-component bases and 20 telemetered orthogonal pair satellites over an approximate 70-square-mile area.

2. Phase II

   a. Conduct an aeromagnetic survey consisting of about 375 line miles with line spacing of about 1 mile flown at an altitude of approximately 1,000 feet.

b. Conduct a passive seismic (microearthquake) survey consisting of about 50 stations covering approximately a 70-square-mile area.

c. Drill three temperature gradient/lithology holes to about 2,000 feet each. Run temperature surveys, collect drill cuttings samples, and compile well bore lithologic descriptions.

3. Phase III

Drill one deep exploratory hole to a maximum depth of about 7,500 feet. Collect physical borehole samples to include drill cuttings, fluids, and cores (at least one conventional core will be attempted, if warranted); run geophysical logs including but not limited to temperature, pressure, induction, acoustic, and densilog; conduct mud logging (if applicable) from the base of the surface casing to total depth. Hole deviation will also be monitored.

4. Phase IV

If well conditions permit, conduct a 24- to 48-hour flow test or a test of such duration that is limited by reserve mud pit capacity.

Depending on the results obtained upon completion of Phases I, II, or III, either party may elect to terminate the Contract. In such event, payment will be limited to costs incurred to date of termination.

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:

Rec. 12-5-78 and found to be complete; HRP

1. Existing Data

a. Map showing location of 15 gradient/lithology holes.

b. Temperature profiles and lithologic description from surface to total depth on each of 15 holes (average depth--120 feet).

c. Computer representation of above temperature data, including heat flow determination.

2. New Data

a. Phase I

(1) Temperature profiles and lithologic descriptions from surface to total depth on 20 holes (range of depth--150 to 350 feet each). Computer representations with heat flow determination shall be included.

(2) Describe station array, provide data, translation of data into meaningful parameters, contoured maps from gravity and self-potential surveys, and contoured sections from magnetotelluric surveys described in Sections C.1.b., c., and d. above.

b. Phase II

(1) Describe station array, provide data, translation of data into meaningful parameters, and appropriate map representations from aeromagnetic and microearthquake surveys described in Sections C.2.a. and b. above.

(2) Provide the following data from each of the 2,000-foot holes described in Section C.2.c.

(a) Drill hole cuttings--approximately 1,000 gm sample over about each 20-foot interval as drilling conditions permit.

(b) Fluid samples--50 percent of fluids sampled (if any).

(c) Temperature log--surface to total depth after a nominal equilibration period and additional runs as appropriate.

(d) Well bore lithologic description.

c. Phase III

Provide the following data from the 7,500-foot exploratory hole described in Section C.3.

(1) Drill hole cuttings--approximately 1,000 gm sample at about 20-foot interval as drilling conditions permit.

(2) Core samples--approximately 50 percent of total core recovered.

(3) Fluid samples--1,000 cc sample size representative of borehole fluids sampled (if any).

(4) Mud logging data.

(5) Hole deviation survey data.

(6) Geohpysical logging data to include:

(a) Temperature

(b) Pressure

(c) Induction or equivalent

(d) Acoustic

(e) Densilog

(7) Drilling and completion history.

(8) Appropriate analyses and/or interpretations related to Items (1) through (6) above.

d. Phase IV

Provide short-term testing data to include:

(1) Test description

(2) Flow line temperatures and pressures

(3) Flow rates as determined by James method

(4) Static wellhead temperatures and pressures

(5) Fluid samples--1,000 cc sample size representative of individual flowing test.

(6) Appropriate analyses and/or interpretations related to Items (1) through (5) above.

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 Research Institute (UURI), Salt Lake City, Utah, or placed in the custody of a UURI 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 in C.1 of Appendix C and three copies to addressee in C.2 of Appendix C.

F. Schedule for Data Delivery and Release

1. Existing data: Simultaneously with delivery of Phase I new data.

2. Phase I data: Four months after completion of Phase I.

3. Phases II, III, and IV data: Three months after completion of each phase.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final or Yearly Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final or Yearly Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities or at the end of each contract year, whichever occurs first. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
   ATTN: Engineering & Energy Applications
   Division (E&EAD)
   Department of Energy
   Nevada Operations Office
   Post Office Box 14100
   Las Vegas, NV 89114

2. Dr. H. P. Ross
   Earth Science Laboratory (ESL)
   University of Utah Research
   Institute (UURI)
   391 Chipeta Way
   Salt Lake City, UT 84108

D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

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STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 3

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
A001			

5. ISSUED BY CODE

U. S. Department of Energy
Nevada Operations office
P. O. Box 14100
Las Vegas, NV 89114

6. ADMINISTERED BY (If other than block 5) CODE

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code) CODE FACILITY CODE

AMAX Exploration, Inc.
4704 Harlan Street
Denver, CO 80212

8.
☐ AMENDMENT OF SOLICITATION NO. _____
DATED _____ (See block 9)
☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-78ET27011
DATED 10/1/78 (See block 11)

9 THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

AE-30-01-05, 89X0210, NV-90-91

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) ☐ This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) ☒ This Supplemental Agreement is entered into pursuant to authority of 41 U.S.C. 252(c)(10)
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Appendix A, "Scope of Work," is modified as follows:

a. Paragraph C is amended by adding the following to Item 2:

"d. Conduct an electrical resistivity (Dipole-Dipole) survey with about a 30 line mile extent consisting of one north trending and two east-west trending lines.

"e. Conduct a geochemical survey along three separate traverse lines totaling about 30 line miles. The survey shall consist of collecting and analyzing about 150 soil, stream sediment and rock samples. About 50 samples in the orientation phase shall receive multielement analyses for up to 15 elements as determined by the contractor, and the remaining 100 samples shall receive more specific analyses as determined by the contractor.

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT. ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR AMAX EXPLORATION, INC.
BY _____ (Signature of person authorized to sign)
Gerald J. Kitchen, Vice President
15. NAME AND TITLE OF SIGNER (Type or print)

16. DATE SIGNED 8-8-79

17. UNITED STATES OF AMERICA
BY _____ (Signature of Contracting Officer)

18. NAME OF CONTRACTING OFFICER (Type or print)
Robert W. Taft, Assistant Manager for Plans, Engineering & Budgets

19. DATE SIGNED 7/30/79

b. Paragraph D is amended by adding the following to Item 2.b.:

"(3) Field data plus map and appropriate graphical representation from the electrical resistivity survey in C.d. above.

Map showing sample points plus results of analyses from C.e. above.

2. Appendix C, "Reports," is modified to add the following sentence to Paragraph A, Item 3:

"Describe the results of the electrical resistivity, and geochemical surveys in relation to other existing and new data. Explain the value of the various types of data with respect to exploration for geothermal resources in the Tuscarora area.

3. The Contract Schedule is modified as follows:

a. Article 4, "Estimated Cost and Cost-Sharing," is modified as follows:

(1) Paragraph B is revised in its entirety to read as follows:

"B. It is estimated that the cost of performing the work under this Contract to acquire the new data from the program described in Appendix A, "Scope of Work," except for C.d. and C.e. above will be $1,111,000. It is estimated that the cost of performing the work in C.d. and C.e. above will be $20,000.

For the performance of the work under this Contract to acquire new data except for C.d. and C.e. above, the Contractor shall be reimbursed for 50 percent of the costs of performance, exclusive of costs identified in paragraph E. below, determined to be allowable in accordance with Clause 3.1 of the General Provisions entitled "Allowable Cost, Fixed Fee, and Payment." The remaining 50 percent of the costs of performance so determined shall constitute the Contractor's share for which it will not be reimbursed by the Government.

For the performance of the work to acquire the new data from the program described in Appendix A, "Scope of Work," C.d. and C.e. above, the Contractor shall be reimbursed for 100 percent of the costs of performance not to exceed $20,000, exclusive of costs identified in paragraph E. below, determined to be allowable in accordance with Clause 3.1 of the General Provisions entitled "Allowable Cost, Fixed Fee, and Payment."

(2) Paragraph C is revised in its entirety to read as follows:

"C. For purposes of Clause 3.2.2 of the General Provisions entitled "Limitation of Cost (Cost Sharing)," the total cost to the Government is hereby established as $579,500.

b. Article 5, "Limitation of Funds," is modified by adding $20,000 increasing the total obligations since the inception of the Contract to $579,500.

Denver
234-3131
303 457-2783
Mike Boling
EIF

BEOWAWE 4 R I

STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 3

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
A002	6/1/79		

5. ISSUED BY CODE

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

6. ADMINISTERED BY (If other than block 5) CODE

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code) CODE FACILITY CODE

Chevron Resources Company BEOWAWE
A Division of Chevron Industries, Inc.
320 Market Street
San Francisco, CA 94111

8.
☐ AMENDMENT OF SOLICITATION NO. _____
DATED _____ (See block 9)
☒ MODIFICATION OF CONTRACT/ORDER NO. ET-78-C-08-1590
DATED _____ (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

AE-30-01-05, 89X0210, NV-90-91

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) ☐ This Change Order is issued pursuant to _____

The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) ☒ This Supplemental Agreement is entered into pursuant to authority of 41 U.S.C. 252(c)(10)

It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. The Contract Number is changed from ET-78-C-08-1590 to DE-AC08-78ET27101.

2. Appendix A, "Statement of Work," is modified as follows:

a. Paragraph B is amended by adding the following:

"3. Conduct a shallow thermal gradient hole survey consisting of approximately 25 holes drilled to a depth of about 500ft. each or to such depth as the contractor determines practical.

"4. Conduct an electrical spontaneous potential (S.P.) survey over an area of approximately three square miles.

"5. Conduct a geochemical survey over an area of approximately two square miles. The survey shall include collecting about 200 soil and/or rock samples and analyzing each for mercury.

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR		17. UNITED STATES OF AMERICA	
BY _____ (Signature of person authorized to sign)		BY _____ (Signature of Contracting Officer)	
15. NAME AND TITLE OF SIGNER (Type or print) C. DAHLSTROM, VICE PRESIDENT AND GENERAL MANAGER	16. DATE SIGNED	18. NAME OF CONTRACTING OFFICER (Type or print) Robert W. Taft, Assistant Manager for Plans, Engineering & Budgets	19. DATE SIGNED 6/14/79

30-101

b. Paragraph D is amended by adding the following:

"6. Drill cuttings samples (approximately 500 gms sample size) from each 10 to 20ft. interval, drilling history, lithology log and temperature profiles from each gradient hole in B.3 above.

"7. Field data plus map or graphical representation from S.P. survey in B.4. above.

"8. Results of analyses from B.5. above."

3. Appendix C, "Reports" is modified to add the following sentence to Paragraph A, Item 3.

"Describe results of thermal gradient, S.P., and geochemical surveys in relation to other existing and new data. Explain the value of the various types of data with respect to the siting of the 4,000ft. hole and overall assessment of the geothermal resource."

4. The Contract Schedule is modified as follows:

a. Article 2, "Period of Performance," is revised by extending the expiration date from September 30, 1979 to March 31, 1980.

b. Article 4, "Estimated Cost and Cost-Sharing," is modified as follows:

(1) Paragraph B is revised in its entirety to read as follows:

"B. It is estimated that the total cost of performing the work under this Contract to acquire the new data from the program described in Appendix A, "Statement of Work," Paragraph B. Items 1 and 2 will be $816,500. For the performance of this work, the Contractor shall be reimbursed 50 percent of the costs of performance determined to be allowable in accordance with Clause 3.1 of the General Provisions entitled "Allowable Cost, Fixed Fee, and Payment." The remaining 50% of the costs of performance so determined shall constitute the Contractor's share for which it will not be reimbursed by the Government."

Upon delivery and acceptance by DOE of the new data described in Appendix A, "Statement of Work," Paragraph D, Item 6, the Contractor shall be paid $3,000 per each gradient hole but not to exceed a total of $75,000 for 25 holes.

Upon delivery and acceptance by DOE of the new data described in Appendix A, "Statement of Work," Paragraph D, Item 7, the Contractor shall be paid a lump sum of $5,000.

Upon delivery and acceptance by DOE of the new data described in Appendix A, "Statement of Work," Paragraph D, Item 8. the Contractor shall be paid the lump sum amount of $1,000.

(2) Paragraph C is modified to change the amount from "$986,000" to "$1,067,000."

c. Article 5, "Limitation of Funds," is modified by adding $81,000 increasing the total obligations since the inception of the Contract to $1,067,000.

APPENDIX A

STATEMENT OF WORK

A. Chevron Resources Company's Beowawe proposal dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. ET-78-C-08-1590 except as modified by such Contract. The Contractor shall use its best efforts to perform the proposed work described herein and to acquire and deliver to DOE the resulting new data and will deliver existing data described below.

B. The program to acquire new data encompassed by this Contract is as follows:

1. Conduct a reflection seismic survey consisting of 8 line miles in the vicinity of the proposed new exploratory well.

2. Drill a geothermal exploratory hole in Section 17 or Section 18, T 31 N, R 48 E, MDM, to a depth of approximately 4,000 feet, or such lesser depth as Contractor may determine in the event that fluids, which in Contractor's opinion, are of a commercial temperature are encountered at a lesser depth or drilling conditions are encountered which, in Contractor's opinion, makes further drilling unduly hazardous or impractical. The drilling program including logging and short-term (12- to 24-hour) flow testing shall be substantially as set forth in Appendices I and II of above-referenced Chevron Resources Company proposal; PROVIDED, HOWEVER, Contractor shall be required to conduct short-term flow testing only after the exploratory well is drilled to its objective depth and logged and only if such short-term flow test is deemed warranted by Contractor.

C. The program to provide existing data encompassed by this Contract is as follows:

1. Provide existing drilling, logging, completion, and drill stem testing data from the 9,563-foot-deep Chevron-Ginn Well No. 1-13 and the 5,680-foot-deep Chevron-Rossi Well No. 21-19. The data will include physical samples and printed material as described in the Chevron proposal incorporated herein and enumerated in D. below.

2. Provide existing geophysical survey data described in the above Chevron proposal and enumerated in D. below.

D. Deliverables to be provided by the Contractor are as follows:

1. Results from the reflection seismic survey of B.1. above.

2. Drilling, logging, and short-term flow testing data from B.2. above to include:

   a. Drill hole cuttings--approximately 1,000 gm sample over each 10- to 20-foot interval as drilling conditions permit.

   b. Core samples--approximately 50 percent of total core recovered.

   c. Fluid samples--approximately 1,000 cc samples representative of the short-term flowing period and 50 percent of any samples taken during drilling.

   d. Mud logging data

   e. Geophysical logging data

   f. Short-term flow testing data

   g. Drilling and completion histories

   h. Any analyses from a. through f. above

3. Data From Chevron-Ginn Well No. 1-13

   a. Cuttings samples (30 to 50 gm at 10-foot intervals from 125 feet to 9,551 feet)

   b. Core description (9,551 feet to 9,563 feet)

   c. Fluid samples data from drill stem tests

   d. Drilling and completion history

   e. Mud logging data

   f. Geophysical logs

      (1) Induction electric

      (2) Dual induction laterolog

      (3) Compensated neutron

(4) Compensated formation density

(5) Gamma ray

(6) Caliper

(7) Dipmeter

(8) Temperature

(9) Pressure

4. Data From Chevron-Rossi Well No. 21-19

a. Cuttings samples (30 to 50 gm at 10-foot intervals from approximately 50 feet to 5,680 feet)

b. Fluid sample analysis, drill stem test (4,370 feet to 5,680 feet)

c. Mud logging data

d. Drilling and completion histories

e. Geophysical logging data

(1) Log run No. 1, Welex 10/18/76 (200 feet to 1,998 feet)

(a) Induction

(b) Compensated acoustic velocity

(c) Dipmeter

(d) Caliper

(2) Log run No. 2, Schlumberger 11/20/76 (1,988 to 4,371 feet)

(a) Dual induction laterolog

(b) Compensated formation density

(c) Gamma Ray

(d) Caliper

(e) Dipmeter

(f) Sonic

(3) Log run No. 3, Schlumberger 12/3/76 (4,374 to 5,680 feet)

(a) Dual induction laterolog

(b) Compensated neutron

(c) Compensated formation density

(d) Gamma ray (5,590 to 5,680 feet)

(e) Caliper

(f) Dipmeter

(g) Sonic

(4) Directional surveys (various intervals)

(5) Temperature surveys from surface to 5,580 feet on 12/8/76, 2/8/77, 3/7/77, 3/28/77, and 4/15/77

(6) Pressure surveys 3/7/77 and 4/15/77

5. Existing geophysical survey data shall be provided from the following surveys:

a. Resistivity over 40 square miles

b. Magneto-telluric over ~~60~~ 30 (MT) square miles

c. Self-potential over approximately 10 square miles

d. Aeromagnetic over 30 square miles

e. Microearthquake over 8 square miles

f. Reflection seismic over 17.5 line miles

g. Ground noise over 1.5 square miles

E. Delivery and release schedule for above data as follows:

1. Existing data shall be delivered within 60 days of contract execution and released by DOE anytime thereafter.

2. New data shall be delivered within 30 days after drilling is completed but shall not be released by DOE until six months after drilling is completed.

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3. Physical samples such as drill cuttings, core samples, and fluid samples will 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.

Four copies of all other deliverable data described above will be required, with distribution as shown in paragraph B.1. of Appendix C, Reports.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
   ATTN: Engineering & Energy Applications
   Division (E&EAD)
   Department of Energy
   Nevada Operations Office
   Post Office Box 14100
   Las Vegas, NV 89114

2. Dr. H. P. Ross
   Earth Science Laboratory (ESL)
   University of Utah Research
   Institute (UURI)
   391 Chipeta Way
   Salt Lake City, UT 84108

D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

SODA LAKE

APPENDIX A

STATEMENT OF WORK

A. Chevron Resources Company's Soda Lake proposal dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. ET-78-C-08-1591 except as modified by such Contract. The Contractor shall use its best efforts to perform the proposed work described herein and to acquire and deliver to DOE the resulting new data and will deliver existing data described below.

B. The program to acquire new data encompassed by this Contract is as follows:

1. Drill two temperature gradient holes in Sections 28, 32, and/or 33, T 20 N, R 28 E, MDM, to approximately 2,000 feet, or such lesser depth as Contractor may determine in the event drilling conditions are encountered which, in Contractor's opinion, makes further drilling unduly hazardous or impractical. The drilling program shall be substantially as set forth in Appendix I of the referenced Chevron Resources Company proposal.

2. Run resistivity, self-potential, gamma ray, and temperature logs in each 2,000-foot gradient hole.

C. The program to provide existing data encompassed by this Contract is as follows:

Rec. 12-1-78
Inventory Completed 12-6-78
Data Complete HPK 12-7-78

1. Provide existing drilling, completion, logging, and drill stem testing data from the 4,306-foot-deep Chevron-Phillips Soda Lake Well No. 1-29 and the 5,070-foot-deep Chevron Soda Lake Well No. 44-5. The data will include physical samples and printed material as described in the referenced Chevron proposal and enumerated in D.2. below.

2. Provide existing drilling, temperature, and lithology data from the 2,000-foot Chevron Soda Lake temperature gradient hole No. 36-78 and existing temperature and lithology data from eleven 500-foot temperature gradient holes as described in the referenced Chevron proposal and enumerated in D.2. below.

3. Provide existing geophysical survey data as enumerated in D.2. below.

D. Deliverables to be provided by the Contractor are as follows:

1. New data from two 2,000-foot gradient holes of B.1. and B.2. above.

a. Drill hole cuttings (samples at 20-foot intervals to total depth)

b. Logging data

(1) Resistivity

(2) Self-potential

(3) Gamma ray

(4) Temperature (one run at completion, one run 30 days later)

c. Drilling and completion histories

d. Any analyses from a. and/or b. above

2. Existing data from Items C.1, C.2, and C.3 above.

a. Chevron-Phillips Soda Lake Well No. 1-29

(1) Cuttings samples (30 to 50 gm samples at 10-foot intervals from 1,008 to 4,306 feet)

(2) Core description (cored interval not described)

(3) Flow test data including fluid chemistry description from two drill stem tests (1,008 to 1,531 feet and 791 to 980 feet)

(4) Drilling and completion history

(5) Mud logging data (1,008 to 4,306 feet)

(6) Geophysical logs

(a) Log run No. 1, 12/13/74 (53 to 1,025 feet)--Induction log

(b) Log run No. 2, 12/28/74 (1,013 to 4,305 feet)

1) Dual induction laterolog

2) Compensated neutron

3) Compensated sonic

4) Formation density--gamma ray

5) Caliper

6) Dipmeter

(c) Temperature surveys

1) Max recording thermometer (two runs)

2) Continuous recording survey, with stops at 20-foot intervals from 20 to 4,270 feet, four runs (1/10/75, 1/27/75, 2/27/75, and 4/29/75)

b. Chevron Soda Lake Well No. 44-5

(1) Cuttings samples (30 to 50 gm at 30-foot intervals to total depth)

(2) Drilling and completion history

(3) Mud logging data (83 to 5,069 feet)

(4) Geophysical logs

(a) Log run No. 1, 1/12/78 (500 to 4,970 feet)

1) Dual induction SFL

2) Compensated formation density and neutron

3) Gamma ray

4) Caliper

5) Dipmeter

6) Sonic

7) Temperature

(b) Directional surveys at various intervals

(c) Temperature surveys

Continuous recording through 2 7/8-inch tubing, with stops at 20-foot intervals (40 to 5,016 feet), two runs (2/25/78 and 3/28/78)

c. Chevron Soda Lake Temperature Gradient Hole No. 36-78

(1) Drilling history

(2) Lithologic description

(3) Temperature surveys (3/17/78 and 3/24/78)

d. Eleven 500-foot temperature gradient holes

(1) Cutting descriptions (each hole)

(2) Temperature survey (each hole)

e. Geophysical data shall be provided from the following surveys:

(1) Resistivity over 63 square miles

(2) Magneto-telluric over 20 square miles

(3) Reflection seismic (weight drop) over 24 line miles

(4) Reflection seismic (dynamite) over 12 line miles

E. Delivery and Release schedules for the data enumerated in D. above is as follows:

1. **New data** from D.1. above shall be delivered within 30 days after drilling is completed but **shall not be released to the public until 6 months after drilling is completed.**

2. **Existing data** from D.2. above shall be delivered within 60 days of contract execution and **may be released by DOE anytime thereafter.**

3. Physical samples such as drill cuttings, core samples, and fluid samples will 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.

Four copies of all other deliverable data described above will be required, with distribution as shown in paragraph B.1 of Appendix C, Reports.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

SAN EMIDIO

THE CONTRACT SCHEDULE EXISTING DATA ONLY

ARTICLE 1. PERIOD OF PERFORMANCE

The period of performance of this Contract shall be for three months from October 1, 1978, through December 31, 1978, unless sooner terminated in accordance with the provisions of the clause of this Contract entitled "Termination for Default or for Convenience of the Government" or unless extended by mutual agreement of the parties.

ARTICLE 2. DELIVERABLES

Within 60 days after the effective date of this Contract, the Contractor shall provide DOE four copies of data from its San Emidio area, Nevada, Chevron Kosmos Wells 1-8 and 1-9 and the geophysical, temperature gradient, and photogeologic studies described in detail below:

Physical samples such as drill cuttings, core samples, and fluid samples will be delivered to the Geothermal Sample Library, University of Utah, Salt Lake City, Utah.

Four copies of all other deliverable data described above will be required, with one copy to the Contracting Officer and three copies to Dr. H. P. Ross at the address below:

1. Contracting Officer
   Attn: Engineering & Energy Applications
   Division (E&EAD)
   Department of Energy
   Nevada Operations Office
   Post Office Box 14100
   Las Vegas, NV 89114

2. Dr. H. P. Ross
   Earth Science Laboratory (ESL)
   University of Utah Research Institute (UURI)
   391 Chipeta Way
   Salt Lake City, UT 84108

A. From Chevron Kosmos Well 1-8

   1. Drilling history

   2. Drilling fluids used

   3. Casing and cementing record

   4. Mud log 80'-4,013'

      a. Bit data, hole size, penetration rate

b. Lithology

c. Continuous mud temperature (in and out)

5. Cuttings samples 80'-4,013'

Approximately 30-50 gm samples at 30' intervals will be furnished.

6. Core Description

38 sidewall samples in interval 600'-3,990'.

7. Electric Logs

Contractor:	Schlumberger 517 Houston Street Sacramento, CA 95823
Log Run:	564'-4,013' (11/25/75)
	dual induction laterolog
	compensated neutron formation density
	gamma ray
	caliper
	four-arm high-resolution dipmeter

8. Drill Stem Tests

Contractor:	Johnston Testers Bakersfield, CA
Intervals Tested:	3,892'-3,898' (11/26/75) 3,877'-3,883' (11/28/75)

9. Temperature Surveys

a. Surveys run by Chevron personnel with maximum reading thermometers:

Date	Depth
11/22/75	3,243'
11/28/75	4,013'

b. Surveys at 20' intervals, 10'-3,940'

Contractor: Agnew & Sweet
3914 Gilmore Avenue
Bakersfield, CA 93308

12/4/75

12/18/75

1/4/76

1/16/76

B. From Chevron Kosmos Well 1-9

✓1. Drilling history

✓2. Drilling fluids used

✓3. Casing and cementing record

✓4. Mud log, 50'-5,370', run by Chevron geologists at well site

✓ a. Bit data, hole size, penetration rate

✓ b. Lithology

✓ c. Mud temperature (in and out) at 30' intervals

5. Cutting Samples

✓ Approximately 30-50 gm samples at 30' intervals will be furnished.

6. Electric Logs

Contractor: Schlumberger
517 Houston Street
Sacramento, CA 95823

Log Run: 500'-5,370' (3/7/78)

✓ dual induction laterolog

✓ compensated neutron density

✓ gamma ray

- caliper

four-arm high-resolution continuous dipmeter and fracture identification log

borehole compensated sonic log

temperature log

7. Directional surveys taken by Chevron field foreman at various intervals

8. Drill Stem Test

Contractor:	Johnston Testers Bakersfield, CA
Interval Tested:	5,238'-5,247' (3/2/78)

9. Fluid Chemistry

Contractor:	Skyline Labs, Inc. 12090 West 50th Place Wheat Ridge, CO 80033
Analysis of fluids recovered from DST:	5,238'-5,247'

10. Subsurface Temperature Surveys

Contractor:	Agnew & Sweet 3914 Gilmore Avenue Bakersfield, CA 93308
Temperature logged at 20' intervals in 2 7/8" tubing:	0'-5,280' (3/24/78)

11. Core Description

Cored Intervals:	2,717'-2,727' 4,459'-4,482'

C. Geophysical, Temperature Gradient, and Photogeologic Studies

1. Geophysical Surveys

a. Electrical--Resistivity (Dipole-Dipole)

Contractor: McPhar Geophysics, Inc.
Tucson, AZ
(Later became Phoenix Geophysics, Inc.)

Surveyed October 1973:

25 miles

a = 2,000'

n = 1 to 4

f = 0.125 HZ

Contractor: Phoenix Geophysics, Inc.
4690 Ironton Street
Denver, CO 80239

Eight miles of line, surveyed May 1976:

a = 500'

n = 1 to 6

f = 0.125 HZ

Electrical--Self-Potential

Contractor: Senturion Sciences, Inc.
P.O. Box 15447
Tulsa, OK 74112

Surveyed: 1974

126 measurements of SP differences (over 1,000' using a kiethley 155 microvoltmeter) along three north-south lines with tie.

Output: 1 contour map relative to a base station.

b. Gravity

Contractor: Photogravity Co., Inc.
Houston, TX

Surveyed: October 1975

1,056 stations, 1/8 mile spacing, lines 1/2 mile apart, with tie lines, terrain corrected.

Output: Contoured Bouguer gravity map.

c. Seismic--Ground Noise

Contractor: Senturion Sciences, Inc.
P.O. Box 15447
Tulsa, OK 74112

35 stations, 100 square miles. Surveyed May 1974.

Seismic--Reflection

Contractor: Western Geophysical Co.
Houston, TX

2.1 line miles

Shot August 1976

The high-resolution survey was recorded with 14 hydrophones set at a depth of 18' in holes 33' apart. 0.5 msec. sampling; dynamite 0.5-20 lbs.

Output: 700% Stacked Sections migrated.

Contractor: United Geophysical
Denver, CO

10 line miles

Shot October 1977

Split Spread, 110' group interval, 220' shot interval, dynamite source, 1-10 lbs. @ 0-160'. Processing edit, gain adjust, deconvolution.

2. Temperature Gradient Holes

Temperature and lithologic data from 64 temperature gradient holes drilled to depths of 200 to 500 feet in the San Emido project area.

3. Photogeology

A 1:24,000 scale geologic map covering an area of approximately 50 square miles in the Lake Range.

ARTICLE 3. PAYMENT

For Existing Data. Upon delivery and acceptance by DOE of all the existing data included in Article 2, "Deliverables," the Contractor shall be paid the lump-sum amount of $263,000.

ARTICLE 4. OWNERSHIP OF PROPERTY

It is understood that DOE will not acquire any rights, title, or interest in the leased land, well, and appurtenant facilities by virtue of this Contract.

ARTICLE 5. GENERAL PROVISIONS

The General Provisions of this Contract are set forth in Appendix A, "General Provisions."

ARTICLE 6. ALTERATIONS TO GENERAL PROVISIONS

The following alterations are made to the General Provisions:

A. Clause 2.5 of the General Provisions is invoked as being applicable to this Contract and Clauses 2.2, 2.3, 2.4, 2.8, 6.5, 6.7, and 7.3 are deleted.

B. Clause 6.8 is revised in its entirety to read as follows:

"6.8 RIGHTS TO PROPOSAL DATA

"Except for technical data contained on pages 6 through 14, Optional Form 60 and Attachments C-1, C-2, and Figures 1 and 2 of the Contractor's proposal dated May 1978, which are asserted by the Contractor as being proprietary data, it is agreed that as a condition of the award of this Contract, and notwithstanding the provisions of any notice appearing on the proposal, the Government shall have the right to use, duplicate, and disclose, and have others do so for any purpose whatsoever, the technical data contained in the proposal upon which this Contract is based."

ARTICLE 7. DOCUMENTS INCORPORATED

The following listed documents are physically incorporated in this Contract:

STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 2

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
A001	9/1/79		

5. ISSUED BY CODE

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

6. ADMINISTERED BY (If other than block 5) CODE

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code) CODE FACILITY CODE

Earth Power Production Company
P. O. Box 1566
Tulsa, OK 74101

THIS IS A COPY OF THE EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

8. ☐ AMENDMENT OF SOLICITATION NO. _____
DATED _____ (See block 9)

☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-79ET27007
DATED 10/1/78 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

89X0213 NV-93-91 AE-30-01-05

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) ☐ This Change Order is issued pursuant to _____

The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

☒ This Supplemental Agreement is entered into pursuant to authority of 41 U.S.C. 252(c)(10)

It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Appendix A, "Scope of Work," is modified as follows:

a. Paragraph C., Item 2., "Phase II," is modified to add the following:

"a. Conduct an electrical resistivity (Dipole-Dipole) survey consisting of four lines with a total extent of about 10 line miles. Three of the lines shall be northwest-southeast trending in the Baltazor Hot Springs vicinity and one line shall be east-west trending in the Painted Hills Mine vicinity.

"b. Conduct a spontaneous potential (SP) survey consisting of eight lines totaling about 20 line miles and encompassing the areas included in a. above.

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR
BY EARTH POWER PRODUCTION CO
(Signature of person authorized to sign)

15. NAME AND TITLE OF SIGNER (Type or print)
[signature]

16. DATE SIGNED
25 SEP 79

17. UNITED STATES OF AMERICA
BY [signature]
(Signature of Contracting Officer)

18. NAME OF CONTRACTING OFFICER (Type or print)
Robert W. Taft, Assistant Manager for Plans, Engineering & Budgets

19. DATE SIGNED
9/19/79

30-101

"c. Conduct a geochemical survey in the approximate vicinity of the surveys in a. and b. above. The survey shall consist of collecting and analyzing about 500 soil samples for Mercury and Arsenic content as determined appropriate by the Contractor."

b. Paragraph D., Item 2., "New Data," is modified to add the following:

"d. Survey parameters, field data, maps, graphical representations and analyses from the electrical resistivity, spontaneous potential and geochemical surveys of 1.a., 1.b. and 1.c. above."

2. Appendix C, "Reports," is modified to add the following to paragraph A., Item 2:

"Describe the results of the electrical resistivity, spontaneous potential and geochemical surveys in relation to other existing and new data. Explain the value of the various types of data with respect to exploration for geothermal resources in the Baltazor area."

3. Article 4., "Payment," is modified as follows:

a. Paragraph B. is modified to add the following:

"2. Upon delivery and acceptance by DOE of the data specified in Appendix A, paragraph D.2.d. above, the Contractor shall be paid the amount of $18,500."

4. The total amount of the Contract is increased by $18,500 from $573,255 to $591,755.

BALTAZOR

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. ET-78-C-08-1586 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.

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), ~~so long as~~ the aggregate footage drilled ~~does not exceed~~ 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 substantially in accordance with the drilling program set forth in Exhibit 6 of the previously referenced Earth Power Production Company proposal. 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.

d. fluid rate, temperature, SP, resistivity

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.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Final or Annual Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Final or Annual Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due at the end of each contract year or 45 days after completion of all field activities, whichever occurs first. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

3. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

EARTH POWER M.
BACTAZOR H. S.

CONTRACT PRICING PROPOSAL PHASE 1.
(RESEARCH AND DEVELOPMENT) ADD-ON 1.

Office of Management and Budget Approval No. 29-RO184

This form is for use when (i) submission of cost or pricing data (see FPR 1-3.807-3) is required and (ii) substitution for the Optional Form 59 is authorized by the contracting officer.

PAGE NO. | NO. OF PAGES

NAME OF OFFEROR: EARTH POWER PRODUCTION COMPANY

SUPPLIES AND/OR SERVICES TO BE FURNISHED: None

HOME OFFICE ADDRESS: P. O. Box 1566, Tulsa, OK 74101

DIVISION(S) AND LOCATION(S) WHERE WORK IS TO BE PERFORMED:

TOTAL AMOUNT OF PROPOSAL: $ 18,500.00

GOV'T SOLICITATION NO. Contract #DE-AC08-79ET27007

DETAIL DESCRIPTION OF COST ELEMENTS

	EST COST ($)	TOTAL EST COST[1]	REFERENCE[2]
1. DIRECT MATERIAL (Itemize on Exhibit A)			
a. PURCHASED PARTS			
b. SUBCONTRACTED ITEMS			
c. OTHER—(1) RAW MATERIAL			
(2) YOUR STANDARD COMMERCIAL ITEMS			
(3) INTERDIVISIONAL TRANSFERS (At other than cost)			
TOTAL DIRECT MATERIAL			
2. MATERIAL OVERHEAD[3] (Rate %X$ base=)			

3. DIRECT LABOR (Specify)	ESTIMATED HOURS	RATE/HOUR	EST COST ($)	TOTAL EST COST	REFERENCE
TOTAL DIRECT LABOR					

4. LABOR OVERHEAD (Specify Department or Cost Center)[3]	O.H. RATE	X BASE=	EST COST ($)	TOTAL EST COST	REFERENCE
TOTAL LABOR OVERHEAD					

	EST COST ($)	TOTAL EST COST	REFERENCE
5. SPECIAL TESTING (Including field work at Government installations)			
TOTAL SPECIAL TESTING			
6. SPECIAL EQUIPMENT (If direct charge) (Itemize on Exhibit A)			
7. TRAVEL (If direct charge) (Give details on attached Schedule)	EST COST ($)		
a. TRANSPORTATION			
b. PER DIEM OR SUBSISTENCE			
TOTAL TRAVEL			
8. CONSULTANTS (Identify—purpose—rate)	EST COST ($)		
TOTAL CONSULTANTS			
9. OTHER DIRECT COSTS (Itemize on Exhibit A)		18,500.00	
10. TOTAL DIRECT COST AND OVERHEAD		18,500.00	
11. GENERAL AND ADMINISTRATIVE EXPENSE (Rate % of cost element Nos.)[3]			
12. ROYALTIES[4]			
13. TOTAL ESTIMATED COST		18,500.00	
14. FEE OR PROFIT		None	
15. TOTAL ESTIMATED COST AND FEE OR PROFIT		18,500.00	

OPTIONAL FORM 60
October 1971
General Services Administration

This proposal is submitted for use in connection with and in response to (Describe RFP, etc.)

Contract #DE-AC08-79ET27007 (ADD-ON #1.)

and reflects our best estimates as of this date, in accordance with the Instructions to Offerors and the Footnotes which follow.

TYPED NAME AND TITLE	SIGNATURE
Ronald C. Barr, President	Ronald C. Barr

NAME OF FIRM	DATE OF SUBMISSION
Earth Power Production Company	8-15-79

EXHIBIT A—SUPPORTING SCHEDULE (Specify. If more space is needed, use reverse)

COST EL NO.	ITEM DESCRIPTION (See footnote 5)	EST COST ($)
	Dipole-Dipole Electrical Resistivity, 10 line miles at $750 per mile.	7,500.00
	Self-Potential Survey, $500 per day times 5 days	2,500.00
	Geochemical Sampling (two men 10 days in field plus travel to and from Salt Lake City, Utah).	3,000.00
	Laboratory Analyses, 500 samples @ $6.00 each	3,000.00
	Mobilization (Electrical and S.P. Equipment, two days travel time, Tucson, Arizona to Denio, Nevada and return).	2,500.00
	Note: The quotes for the dipole-dipole and S-P are direct without mark-up from Mining Geophysical Surveys, Inc. The laboratory quote is from Rocky Mountain Geochemical.	

i. HAS ANY EXECUTIVE AGENCY OF THE UNITED STATES GOVERNMENT PERFORMED ANY REVIEW OF YOUR ACCOUNTS OR RECORDS IN CONNECTION WITH ANY OTHER GOVERNMENT PRIME CONTRACT OR SUBCONTRACT WITHIN THE PAST TWELVE MONTHS?

☐ YES ☒ NO (If yes, identify below.)

NAME AND ADDRESS OF REVIEWING OFFICE AND INDIVIDUAL	TELEPHONE NUMBER/EXTENSION

ii. WILL YOU REQUIRE THE USE OF ANY GOVERNMENT PROPERTY IN THE PERFORMANCE OF THIS PROPOSED CONTRACT?

☐ YES ☒ NO (If yes, identify on reverse or separate page)

iii. DO YOU REQUIRE GOVERNMENT CONTRACT FINANCING TO PERFORM THIS PROPOSED CONTRACT?

☐ YES ☒ NO (If yes, identify.): ☐ ADVANCE PAYMENTS ☐ PROGRESS PAYMENTS OR ☐ GUARANTEED LOANS

IV. DO YOU NOW HOLD ANY CONTRACT (Or, do you have any independently financed (IR&D) projects) FOR THE SAME OR SIMILAR WORK CALLED FOR BY THIS PROPOSED CONTRACT?

☒ YES ☐ NO (If yes, identify.): #DE-AC08-79ET27007

V. DOES THIS COST SUMMARY CONFORM WITH THE COST PRINCIPLES SET FORTH IN AGENCY REGULATIONS?

☒ YES ☐ NO (If no, explain on reverse or separate page)

INSTRUCTIONS TO OFFERORS

1. The purpose of this form is to provide a standard format by which the offeror submits to the Government a summary of incurred and estimated costs *(and attached supporting information)* suitable for detailed review and analysis. Prior to the award of a contract resulting from this proposal the offeror shall, under the conditions stated in FPR 1-3.807-3 be required to submit a Certificate of Current Cost or Pricing Data (See FPR 1-3.807-3(h) and 1-3.807-4).

2. In addition to the specific information required by this form, the offeror is expected, in good faith, to incorporate in and submit with this form any additional data, supporting schedules, or substantiation which are reasonably required for the conduct of an appropriate review and analysis in the light of the specific facts of this procurement. For effective negotiations, it is essential that there be a clear understanding of:

a. The existing, verifiable data.
b. The judgmental factors applied in projecting from known data to the estimate, and
c. The contingencies used by the offeror in his proposed price.

In short, the offeror's estimating process itself needs to be disclosed.

3. When attachment of supporting cost or pricing data to this form is impracticable, the data will be described *(with schedules as appropriate)*, and made available to the contracting officer or his representative upon request.

4. The formats for the "Cost Elements" and the "Proposed Contract Estimate" are not intended as rigid requirements. These may be presented in different format with the prior approval of the Contracting Officer if required for more effective and efficient presentation. In all other respects this form will be completed and submitted without change.

5. By submission of this proposal the offeror grants to the Contracting Officer, or his authorized representative, the right to examine, for the purpose of verifying the cost or pricing data submitted, those books, records, documents and other supporting data which will permit adequate evaluation of such cost or pricing data, along with the computations and projections used therein. This right may be exercised in connection with any negotiations prior to contract award.

FOOTNOTES

1 Enter in this column those necessary and reasonable costs which in the judgment of the offeror will properly be incurred in the efficient performance of the contract. When any of the costs in this column have already been incurred (e.g., on a letter contract or change order), describe them on an attached supporting schedule. Identify all sales and transfers between your plants, divisions, or organizations under a common control, which are included at other than the lower of cost to the original transferror or current market price.

2 When space in addition to that available in Exhibit A is required, attach separate pages as necessary and identify in this "Reference" column the attachment in which the information supporting the specific cost element may be found. No standard format is prescribed; however, the cost or pricing data must be accurate, complete and current, and the judgment factors used in projecting from the data to the estimates must be stated in sufficient detail to enable the Contracting Officer to evaluate the proposal. For example, provide the basis used for pricing materials such as by vendor quotations, shop estimates, or invoice prices; the reason for use of overhead rates which depart significantly from experienced rates (reduced volume, a planned major re-arrangement, etc.); or justification for an increase in labor rates (anticipated wage and salary increases, etc.). Identify and explain any contingencies which are included in the proposed price, such as anticipated costs of rejects and defective work, or anticipated technical difficulties.

3 Indicate the rates used and provide an appropriate explanation. Where agreement has been reached with Government representatives on the use of forward pricing rates, describe the nature of the agreement. Provide the method of computation and application of your overhead expense, including cost breakdown and showing trends and budgetary data as necessary to provide a basis for evaluation of the reasonableness of proposed rates.

4 If the total cost entered here is in excess of $250, provide on a separate page the following information on each separate item of royalty or license fee: name and address of licensor; date of license agreement; patent numbers, patent application serial numbers, or other basis on which the royalty is payable; brief description, including any part or model numbers of each contract item or component on which the royalty is payable; percentage or dollar rate of royalty per unit; unit price of contract item; number of units; and total dollar amount of royalties. In addition, if specifically requested by the contracting officer, a copy of the current license agreement and identification of applicable claims of specific patents shall be provided.

5 Provide a list of principal items within each category indicating known or anticipated source, quantity, unit price, competition obtained, and basis of establishing source and reasonableness of cost.

GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 1

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
M002	see block19		

5. ISSUED BY — CODE

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

6. ADMINISTERED BY (If other than block 5) — CODE

THIS IS A COPY OF THE EXECUTED DOCUMENT
MAR 23 1981

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code) — CODE — FACILITY CODE

Earth Power Production Company
P.O. Box 1566
Tulsa, OK 74101

8. ☐ AMENDMENT OF SOLICITATION NO. _____

DATED _____ (See block 9)

☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-79ET27007

DATED 10/1/78 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) ☐ This Change Order is issued pursuant to _____

The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

☒ This Supplemental Agreement is entered into pursuant to authority of Section 646(a) of the Department of Energy Organization Act

It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Article 2, "Period of Performance," is amended to extend the contract term to December 31, 1981.

2. Article 4, "Payment," is amended to change the number of holes in Phase II from one to two.

3. Appendix A, "Statement of Work," is modified as follows:

   a. Subparagraph 2 and 3 of Paragraph C are revised in their entirety to read as follows:

      2. Phase II
      Drill two deep exploratory holes to approximately 6,000 feet each substantially in accordance with the drilling program set forth in Earth Power Production Company proposal dated January 6, 1981. During the drilling of these holes, 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

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 3 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR	17. UNITED STATES OF AMERICA
Ronald C. Barr	BY
(Signature of person authorized to sign)	(Signature of Contracting Officer)

15. NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED	18. NAME OF CONTRACTING OFFICER (Type or print)	19. DATE SIGNED
RONALD C. BARR, PRESIDENT	MAR 16, '81	Robert W. Taft Contracting Officer	MAR 25 1981

10-101

★U.S.GPO:1980-0-311-153/5520

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 20 feet) to total depth of each hole.

3. Phase III

If productive zones are encountered in the Phase II holes, 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 6,000 feet in the holes 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.

b. The title of Paragraph D.2.b is changed from "Phase II - 9,000 Foot Exploratory Hole" to "Phase II - Two 6,000 Foot Exploratory Holes."

STA[illegible] FORM 26, JULY 1966
GENER[illegible] ADMINISTRATION
[illegible] (41CFR) 1-16.101

AWARD/CONTRACT

COLADO

PAGE 1 OF 12

1. CONTRACT (Proc. Inst. Ident.) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG 2 AND/OR DMS REG. 1. RATING:
DE-AC08-79ET27008	10/1/78	T08-78-3577	N/A

5. ISSUED BY CODE	6. ADMINISTERED BY (If other than block 5) CODE	7. DELIVERY
U.S. Department of Energy Nevada Operations Office P.O. Box 14100 Las Vegas, Nevada 89114		[X] FOB DESTINATION [ ] OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS CODE	FACILITY CODE	9. DISCOUNT FOR PROMPT PAYMENT
Getty Oil Company P.O. Box 5237 Bakersfield, California 93308 (Street, city, county, State, and ZIP code)		N/A

THIS IS A COPY OF THE EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

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

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

13. THIS PROCUREMENT WAS [ ] ADVERTISED, [X] NEGOTIATED, PURSUANT TO: [ ] 10 U.S.C. 2304 (a)( ) [X] 41 U.S.C. 252 (c)(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 (Colado Area)				$859,330

21. TOTAL AMOUNT OF CONTRACT $ 859,330

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. [X] 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: (a) this award/contract, (b) 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 OF CONTRACTOR

BY _____ (Signature of person authorized to sign)

27. UNITED STATES OF AMERICA

BY _____ (Signature of Contracting Officer)

24. NAME AND TITLE OF SIGNER (Type or print)	25. DATE SIGNED	28. NAME OF CONTRACTING OFFICER (Type or print)	29. DATE SIGNED
E. H. SHULER Vice President	NOV 16 1978	Robert W. Taft, Assistant Manager for Plans, Engineering, and Budgets	11/6/78

APPENDIX A

SCOPE OF WORK

A. Getty Oil Company's Colado Area 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-AC08-79ET27008 except as modified by such Contract. The Contractor shall deliver the existing data described herein and shall use its best efforts to perform the proposed new work and 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.

Rec Jan 30, 1979

1. Temperature data from two 435-foot mineral core holes.

Rec Feb 5, 1979

2. Gravity-magnetic survey over a 70-square-mile area.

Rec Feb 5, 1979

3. Resistivity survey over a 48-square-mile area.

C. The program to provide new data encompassed by this Contract consists of conducting investigations in the Colado KGRA, T 27 N and 28 N, R 32 E, MDM, Pershing County, Nevada, as described below and delivering the data enumerated in Section D, Deliverables.

1. Phase I

per

Drill 18 temperature gradient holes to about 500 feet each; run temperature profiles and collect drill cuttings samples.

2. Phase II

Drill one temperature gradient hole to about 1,500 feet; run induction, sonic, and temperature logs and collect drill cuttings samples.

3. Phase III

Drill one deep exploratory hole to approximately 8,000 feet. During the drilling of this well, the Contractor will collect physical borehole samples to include drill cuttings, cores (at least one conventional core will be attempted), and fluids; and run geophysical logs, including but not limited to temperature, formation density-compensated neutron, gamma ray-sonic, caliper, and induction. Mud logging will be conducted continuously from the base of the conductor casing to total depth.

4. Phase IV

Conduct a 24- to 48-hour flow test using the "James Method" to determine well mass flow capability.

D. In the event that circumstances are encountered through which the Contractor determines it is impracticable to continue drilling operations described in C.1., C.2., or C.3. above, the Contractor may terminate the drilling at a lesser depth. If a potentially productive zone is encountered at a depth of less than 8,000 feet in the well described in C.3. above, the Contractor may terminate the drilling operations and proceed with the testing as described in C.4. at such lesser depth.

E. 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. Temperature Surveys--Temperature measurements at 50-foot intervals to a total depth of about 435 feet in two mineral core holes located in Section 26, T 28 N, R 32 E, MDM.

Rec. Jan 30, 1979

b. Gravity-Magnetic Survey--Data from a survey conducted in September and October 1977 over a 70-square-mile area. Survey was conducted by Lanton Surveys and Electrodyne Survey Services.

Rec. Feb. 5, 1979

c. Resistivity Survey--Data from a survey conducted from November 1977 to February 1978 over a 48-square-mile area. Survey was conducted by Electrodyne Survey Services.

Rec. Feb. 5, 1979

2. New Data

a. Provide drill cuttings samples at about 30-foot intervals from surface to total depth on each of the 18 Phase I holes, and provide temperature survey data derived from surface monitoring of the flow line and subsurface surveys utilizing thermistors from surface to total depth upon completion and 30 days after completion of each Phase I hole.

Rec cuttings March-April '79

Rec temp logs June 12, 1979

b. Provide drill cuttings samples at about 30-foot intervals from surface to total depth on the 1,500-foot Phase II hole, and data from induction, sonic, and temperature logs from surface to total depth at completion and a temperature log 30 days after completion of the Phase II hole.

c. Provide drilling, logging, and short-term flow testing data from Phases III and IV, Section C, to include:

(1) Drill hole cuttings--approximately 500 gm sample at about each 30-foot interval as drilling conditions permit, representing 50 percent of samples taken.

(2) Core samples--approximately 50 percent of total core recovered, if any.

(3) Fluid samples--approximately 1,000 cc samples representative of the 24- to 48-hour flowing period and 50 percent of any samples taken during drilling.

(4) Mud logging data.

(5) Geophysical logging data to include:

(a) Temperature survey.

(b) Formation density-compensated neutron.

(c) Gamma ray-borehole sonic.

(d) Induction.

(e) Caliper.

(6) Short-term flow testing data to include surface flowing pressures and temperatures and determination of mass flow rate from "James Method" test system.

(7) Drilling and completion histories.

(8) Analyses of physical samples, if any.

F. 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 B.1. of Appendix C, and three copies to addressee in B.2. of Appendix C.

G. Schedule for Data Delivery

1. Existing data shall be delivered within 45 days after contract execution.

2. New data from Phases I, II, and III shall be delivered within 45 days after completion of each phase.

3. New data from Phase IV shall be delivered within 90 days after completion of the short-term flow test.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them. Letter format. Submit monthly with one copy to B.1. addressee below and three copies to B.2. addressee below. Due 10 working days after month ends.

2. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as-needed" basis to assist in maintaining overall project coordination.

B. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy
Applications Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

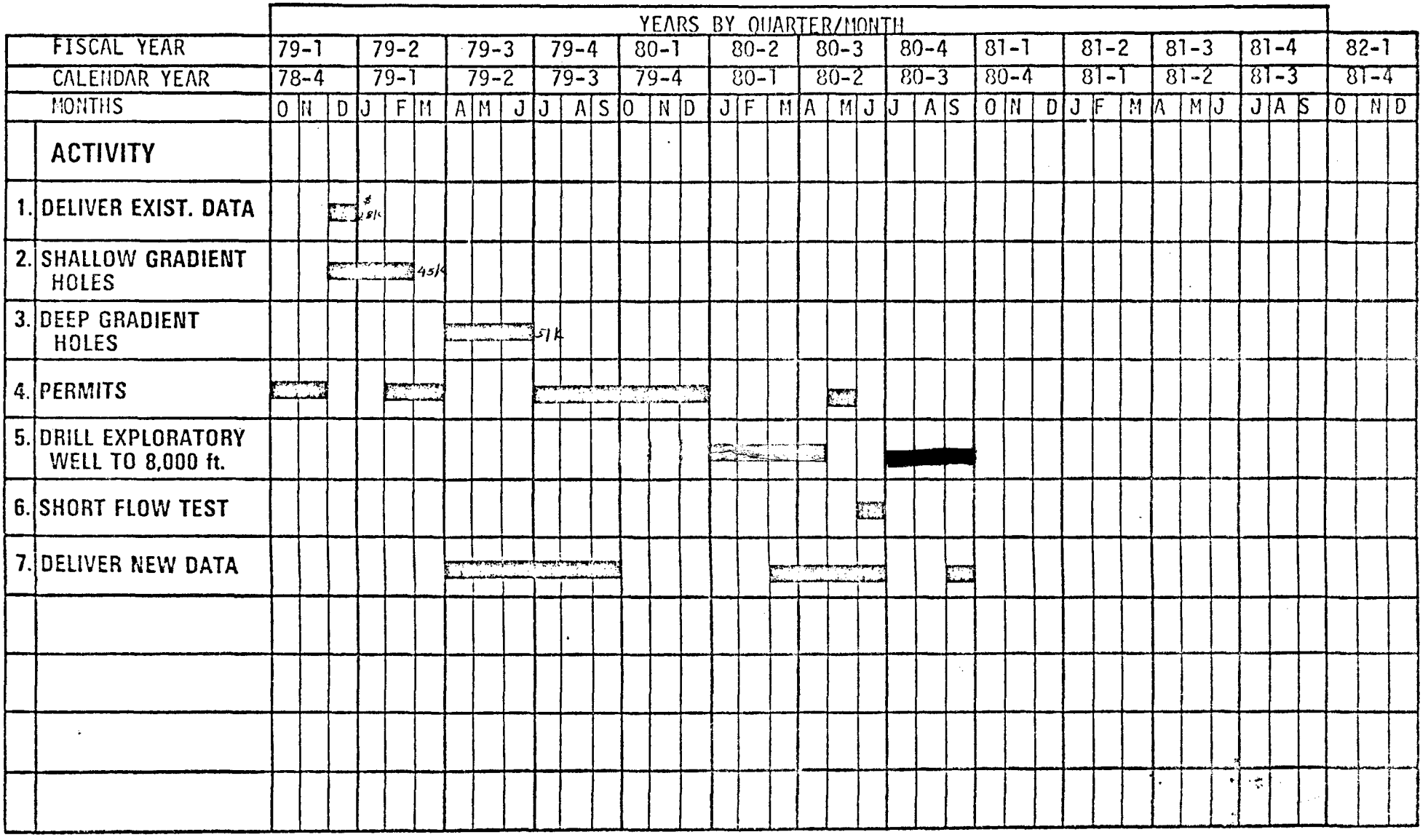
C. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

APPENDIX D
ACTIVITY SCHEDULE

GETTY OIL COMPANY

GEOTHERMAL RESERVOIR ASSESSMENT (COLADO AREA)



STANDARD FORM 26, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41CFR) 1-16.101

AWARD/CONTRACT

BEOWAWE

PAGE 1 OF 12

1. CONTRACT (Proc. Inst. Ident.) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING:
DE-AC08-79ET27009	10/1/78	T08-78-3577	N/A

5. ISSUED BY	CODE	6. ADMINISTERED BY (If other than block 5)	CODE	7. DELIVERY
U.S. Department of Energy Nevada Operations Office P.O. Box 14100 Las Vegas, Nevada 89114				[X] FOB DESTINATION [ ] OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS (Street, city, county, State, and ZIP code)	CODE	9. DISCOUNT FOR PROMPT PAYMENT
Getty Oil Company P.O. Box 5237 Bakersfield, California		N/A

THIS IS A CONFORMED EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

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

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

13. THIS PROCUREMENT WAS [ ] ADVERTISED, [X] NEGOTIATED, PURSUANT TO: [ ] 10 U.S.C. 2304 (a)( ) [X] 41 U.S.C. 252 (c)10

14. ACCOUNTING AND APPROPRIATION DATA

EB-02-03-HTA

15. NO.	16. SUPPLIES/SERVICES	17. QUANTITY	18. UNIT	19. UNIT PRICE	20. AMOUNT
	Geothermal Reservoir Assessment Case Study-- Northern Basin and Range Province (Beowawe Area)				$989,895

21. TOTAL AMOUNT OF CONTRACT $ 989,895

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. [X] 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: (a) this award/contract, (b) 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 OF CONTRACTOR

BY _____ (Signature of person authorized to sign)

27. UNITED STATES OF AMERICA

BY _____ (Signature of Contracting Officer)

24. NAME AND TITLE OF SIGNER (Type or print)	25. DATE SIGNED	28. NAME OF CONTRACTING OFFICER (Type or print)	29. DATE SIGNED
E. H. SHULER Vice President	NOV 16 1978	Robert W. Taft, Assistant Manager for Plans, Engineering, and Budgets	11/6/78

APPENDIX A

SCOPE OF WORK

A. Getty Oil Company's Beowawe Area 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-AC08-79ET27009 except as modified by such Contract. The Contractor shall use its best efforts to perform the proposed work described herein and to acquire and deliver to DOE the resulting data described below substantially in accordance with Appendix D, Activity Schedule.

B. The program to provide data encompassed by this Contract consists of conducting investigations in the Beowawe KGRA, T 31 N, R 47 and 48 E, MDM, Eureka and Lander Counties, Nevada, as described below and delivering the data enumerated in Section D, Deliverables.

1. Phase I

Rec. Nov 26, 1979 ✓ a. Conduct a gravity-magnetic survey over a 25-square-mile area.

Rec. Nov 26, 1979 ✓ b. Conduct a resistivity survey over a 21-square-mile area.

c. Drill 14 temperature gradient holes to about 500 feet each; run temperature profile and collect drill cuttings samples.

2. Phase II

Drill one temperature gradient hole to about 1,500 feet; run induction, sonic, and temperature logs and collect drill cuttings samples.

3. Phase III

Drill one deep exploratory hole to approximately 9,500 feet. During the drilling of this well, the Contractor will collect physical borehole samples to include drill cuttings, cores (at least one conventional core will be attempted), and fluids; and run geophysical logs, including but not limited to temperature, formation density-compensated neutron, gamma ray-sonic, caliper, and induction. Mud logging will be conducted continuously from the base of the conductor casing to total depth.

4. Phase IV

Conduct a 24- to 48-hour flow test using the "James Method" to determine well mass flow capability.

C. In the event that circumstances are encountered through which the Contractor determines it is impracticable to continue drilling operations described in B.1, B.2, or B.3 above, the Contractor may terminate the drilling at a lesser depth. If a potentially productive zone is encountered at a depth of less than 9,500 feet in the well described in B.3 above, the Contractor may terminate the drilling operations and proceed with the testing as described in B.4 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. Gravity-Magnetic Survey--Data from a field survey to be conducted over a 25-square-mile area including portions of Lander and Eureka Counties, Nevada. The data shall include contoured interpretation maps.

2. Resistivity Survey--Data from a field survey to be conducted over a 21-square-mile area including portions of Lander and Eureka Counties, Nevada. The data shall include contoured interpretation maps.

3. Provide drill cuttings samples at about 30-foot intervals from surface to total depth on each of the 14 Phase I holes, and provide temperature survey data derived from surface monitoring of the flow line and subsurface surveys utilizing thermistors from surface to total depth upon completion and 30 days after completion of each hole.

4. Provide drill cuttings samples at about 30-foot intervals from surface to total depth on the 1,500-foot Phase II hole, and data from induction, sonic, and temperature logs from surface to total depth at completion and a temperature log 30 days after completion of the Phase II hole.

5. Provide drilling, logging, and short-term flow testing data from Phases III and IV, Section B, to include:

a. Drill hole cuttings--approximately 500 gm sample at about each 30-foot interval as drilling conditions permit, representing 50 percent of samples taken.

b. Core samples--approximately 50 percent of total core recovered, if any.

c. Fluid samples--approximately 1,000 cc samples representative of the 24- to 48-hour flowing period and 50 percent of any samples taken during drilling.

d. Mud logging data.

e. Geophysical logging data to include:

(1) Temperature survey.

(2) Formation density-compensated neutron.

(3) Gamma ray-borehole sonic.

(4) Induction.

(5) Caliper.

f. Short-term flow testing data to include surface flowing pressures and temperatures and determination of mass flow rate from "James Method" test system.

g. Drilling and completion histories.

h. Analyses of physical samples, if any.

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 B.1. of Appendix C, and three copies to addressee in B.2. of Appendix C.

F. Schedule for Data Delivery

1. Data from Phases I, II, and III shall be delivered within 45 days after completion of each phase.

2. Data from Phase IV shall be delivered within 90 days after completion of the short-term flow test.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them. Letter format. Submit monthly with one copy to B.1. addressee below and three copies to B.2. addressee below. Due 10 working days after month ends.

2. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as-needed" basis to assist in maintaining overall project coordination.

B. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research
Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

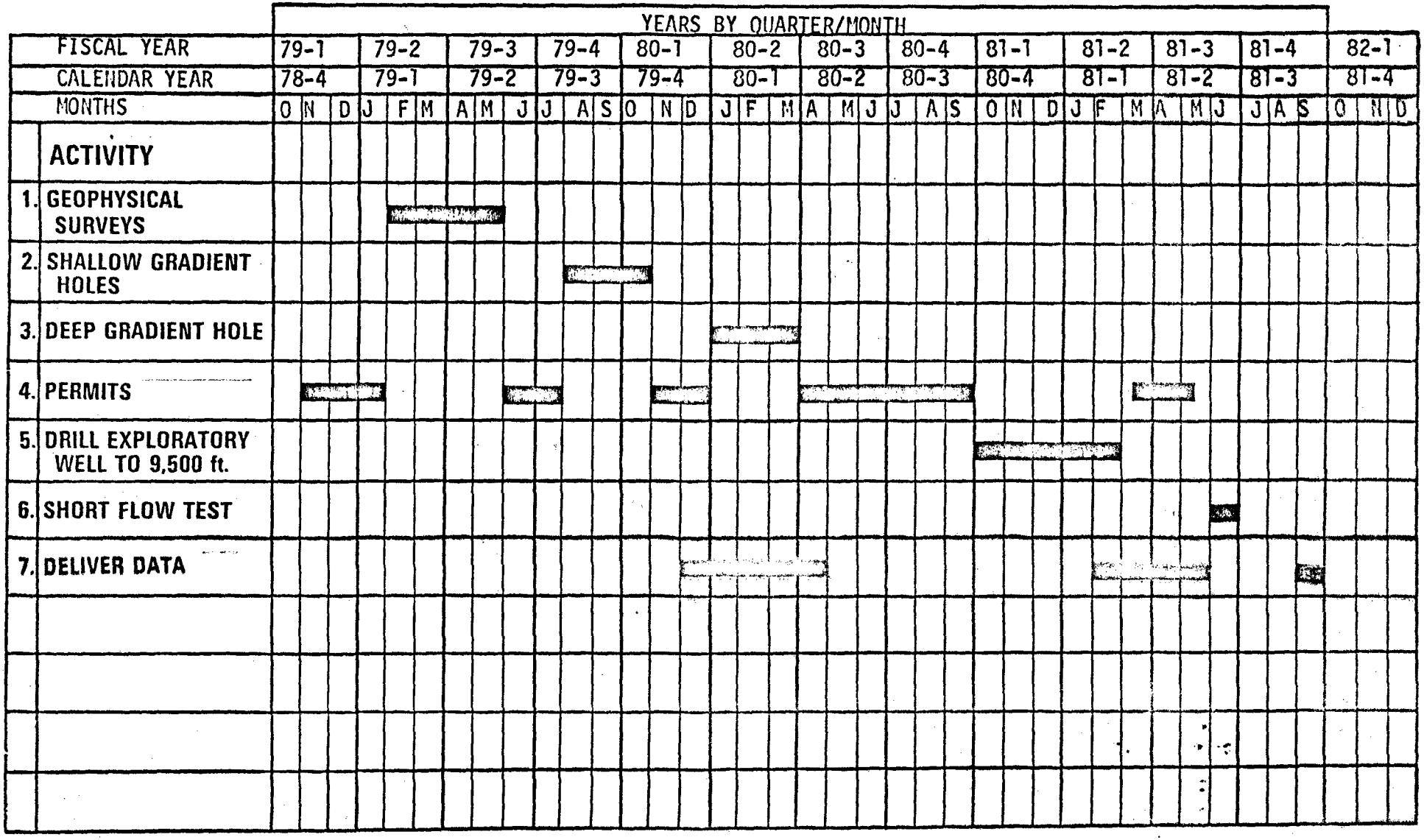
C. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research
Institute
391 Chipeta Way
Salt Lake City, UT 84108

APPENDIX D
ACTIVITY SCHEDULE

GETTY OIL COMPANY

GEOTHERMAL RESERVOIR ASSESSMENT (BEOWAWE AREA)



DESERT PEAK
HUMBOLDT HOUSE

APPENDIX A

SCOPE OF WORK

A. Phillips Petroleum Company's proposal dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. ET-78-C-08-1592 except as modified by such Contract. The Contractor will deliver the existing data described herein and use its best efforts to perform the drilling program proposed and to acquire and deliver to DOE the resulting new data.

B. The program to acquire new data encompassed by this Contract consists of conducting investigations as described below and delivering the data enumerated in Section D.1.

1. Phase I--Drill Humboldt House Campbell "E" Well No. 2 to approximately 8,000 feet substantially in accordance with the procedures in Exhibit II of the above-referenced proposal. The well is located in NW NW SE Section 15, T 31 N, R 33 E, MDM, Pershing County, Nevada. Conduct a 24-hour flow test if possible.

2. Phase II--Drill Desert Peak B Well No. 23-1 to approximately 10,000 feet substantially in accordance with the procedures in Exhibit I of the above-referenced proposal. The well is located in SW SW NW Section 23, T 22 N, R 27 E, MDM, Churchill County, Nevada. Conduct a 24-hour flow test if possible.

Either party has the right to terminate this Contract at the completion of Phase I. In the event that circumstances are encountered which make it impossible or impractical to continue drilling, or the wells are completed at lesser depths as potentially commercial producers, the Contractor may, at its option, terminate the work. If the Contractor elects to plug and abandon (P&A) either of the above wells while the drilling rig is still mobilized on location, such P&A work will be within the scope of this Contract and be subject to the payment provisions contained herein.

C. Provide existing data from prior investigations as described in D. below.

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:

Final Report Received Nov. 13, 1979
HHL

1. Phases I and II Exploratory Wells

   a. Drill hole cuttings--approximately 1,000 gm sample taken over about each 20-foot interval as drilling conditions permit.

   b. Core samples--approximately 50 percent of total core recovered.

   c. Fluid samples--approximately 1,000 cc samples representative of short-term (12- to 24-hour) flowing period and 50 percent of any samples taken during drilling.

   d. Copies of mud logging data.

   e. Copies of well logs to include:

      (1) Temperature

      (2) Compensated neutron-formation density

      (3) Dual induction (IES)

      (4) Sonic

      (5) Gamma ray

   f. Flow testing data to include:

      (1) Test description

      (2) Flow line temperatures and pressures

      (3) Flow rates

   g. Drilling and completion histories

   h. Analyses from Items a. through f. above, if any.

2. Existing Data From Prior Investigations

   Phase I--Humboldt House

   a. Surface map

   b. Lithologic log of Campbell E-1

   c. Subsurface temperature survey of Campbell E-1

d. Subsurface temperature survey of Stratigraphic Test No. 4

e. Geologic cross sections

f. Magnetotelluric slice map

g. Directional well survey of Campbell E-1

Phase II--Desert Peak

a. Geologic map

b. Geologic cross sections

c. Subsurface temperature survey of Stratigraphic Test No. 7

d. Equilibrium temperature profile, Stratigraphic Test No. 2

e. Equilibrium temperature profile, Stratigraphic Test No. 5

f. Magnetotelluric slice map

g. Water analyses, Desert Peak 21-1

h. Mud log, Desert Peak 21-2

i. Temperature surveys

j. Daily drilling reports

k. Ground magnetic and gravity data

E. Transmittal of Deliverables

1. Physical samples such as drill cuttings, core samples, and fluid samples will 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 other deliverable data described above will be required, with distribution as shown in paragraph B.1. of Appendix C, Reports.

F. Schedule for Data Delivery

All data from each specific phase shall be delivered not later than 60 days after the conclusion of that phase.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Cost Report--Submit a monthly cost management report in accordance with instructions to be provided by the Contracting Officer.

3. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Cost Report--Format, number of copies, and due dates shall be in accordance with instructions to be provided.

3. Final Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 60 days after completion of all field activities. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

4. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
   ATTN: Engineering & Energy Applications
   Division (E&EAD)
   Department of Energy
   Nevada Operations Office
   Post Office Box 14100
   Las Vegas, NV 89114

2. Dr. H. P. Ross
   Earth Science Laboratory (ESL)
   University of Utah Research Institute (UURI)
   391 Chipeta Way
   Salt Lake City, UT 84108

D. Addressee for Geophysical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research Institute
391 Chipeta Way
Salt Lake City, UT 84108

STANDARD FORM 26, JULY 1966
GENERAL SERVICES ADMINISTRATION
FPR (41 CFR) REG. (41CFR) 1-16.101

AWARD/CONTRACT

DIXIE VALLEY

1. CONTRACT (Proc. Inst. Ident.) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING:
DE-[illegible]08-79ET27006	10/1/78	T08-78-3577	N/A

5. ISSUED BY	CODE	6. ADMINISTERED BY (If other than block 5)	CODE	7. DELIVERY
U. Department of Energy Nevada Operations Office Post Office Box 14100 Las Vegas, NV 89114				[X] FOB DESTINATION [ ] OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS (Street, city, county, State, and ZIP code) — CODE — FACILITY CODE

Southland Royalty Company
1000 Fort Worth Club Tower
Fort Worth, Texas 76102

--THIS IS A COPY OF THE EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

9. DISCOUNT FOR PROMPT PAYMENT

N/A

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

In duplicate

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

13. THIS PROCUREMENT WAS [ ] ADVERTISED, [X] NEGOTIATED, PURSUANT TO:
[ ] 10 U.S.C. 2304 (a)( )
[X] 41 U.S.C. 252 (c)(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				$1,428,523

21. TOTAL AMOUNT OF CONTRACT $ 1,428,523

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. [X] 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: (a) this award/contract, (b) 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 OF CONTRACTOR	27. UNITED STATES OF AMERICA
BY [signature] (Signature of person authorized to sign)	BY T. E. Wade (Signature of Contracting Officer)

24. NAME AND TITLE OF SIGNER (Type or print)	25. DATE SIGNED	28. NAME OF CONTRACTING OFFICER (Type or print)	29. DATE SIGNED
President & Chief Executive Officer	11/20/78	for Mahlon E. Gates, Manager Contracting Officer	11/13/78

APPENDIX A

SCOPE OF WORK

A. Southland Royalty Company's proposal dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003, is incorporated herein and made a part of Contract No. DE-AC08-79ET27006 except as modified by such Contract. The Contractor shall deliver the existing data described herein and shall use its best efforts to perform the proposed new work and 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 data from the Dixie Valley, Nevada, investigative area as described below and enumerated in Section D, Deliverables.

1. Multilevel Aeromagnetic Survey

2. Magnetotelluric Survey

3. Thermal Gradient Hole Survey (4 x 1,500 feet, 2 x 500 feet)

4. Geothermex Report

5. Keplinger Report

C. The program to provide new data encompassed by this Contract shall consist of conducting investigations in Dixie Valley, Nevada, as described below and delivering the data enumerated in Section D, Deliverables.

1. Drill two temperature gradient holes to approximately 1,500 feet each. Conduct temperature surveys and collect physical borehole samples.

2. Drill two geothermal exploratory wells to approximately 8,500 feet. Collect physical borehole samples to include drill cuttings and fluids and run geophysical logs, including but not limited to temperature, density, gamma ray-neutron, caliper, and induction.

3. If possible, conduct short-term flow tests upon completion of each well in 2. above. Such tests should include a flowing period of about 12 to 24 hours or such period as is limited by fluid retention capacity of the reserve mud pit.

4. Perform hydrologic-hydrochemical, structural-tectonic, and petrologic alteration studies to include the following major tasks:

   a. Hydrologic-Hydrochemical

      (1) Review available hydrologic-hydrochemical data.

      (2) Sample selected wells, springs, and fumaroles.

      (3) Perform selected trace element and isotopic analyses.

      (4) Collect temperature data from existing wells and springs.

      (5) Determine recharge and groundwater flow rates and estimate reservoir geometry.

      (6) Construct an aquifer flow model.

   b. Structural-Tectonic

      (1) Review and evaluate available fault and lineament maps and high-altitude photography.

      (2) Conduct low sun angle and "snow lapse" photography studies.

      (3) Conduct field structural mapping.

      (4) Correlate and interpret data and develop a structural model.

   c. Petrologic Alteration

      (1) Analyze subsurface samples from thermal gradient hole drilling and representative surface samples.

      (2) Describe lithology and petrologic variation in drill holes.

      (3) Conduct detailed mapping of the primary stratigraphic units of the valley fill.

      (4) Review existing lithology and mineralogy data.

      (5) Integrate the above pretrologic studies with the structural-tectonics studies.

5. Conduct a shallow depth temperature survey consisting of periodic measurements in about 200 one-meter-deep holes.

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 8,500 feet in either of the wells 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. Multilevel Aeromagnetic Survey--Provide data and interpretation from a survey over approximately 150 square miles in Dixie Valley.

b. Magnetotelluric Survey--Provide data and interpretation from survey which included about 27 scalar and 1 tensor station in Dixie Valley.

c. Thermal Gradient Holes--Provide lithologic and temperature data from four holes drilled to approximately 1,500 feet and two holes drilled to approximately 500 feet. Data shall include but not be limited to temperature logs, lithologic logs from drill cuttings analyses, any borehole geophysical logs run, drill cuttings samples, and fluid samples.

d. Geothermex Report--Provide the report titled "Geothermal Potential of Dixie Valley, Nevada," by Geothermex, Inc., dated December 1976. Data in the report shall include seismicity, gravity, magnetic, and gradient hole surveys.

e. Keplinger Report--Provide the report titled "Preliminary Evaluation of Dixie Valley, Geothermal Potential and Associated Economics" by Keplinger and Associates, Inc., Houston, September 1977.

2. New Data

a. Temperature logs and drill cuttings samples from the two 1,500-foot gradient holes of C.1. above.

b. Drilling, logging, and completion data from the two 8,500-foot holes of C.2. above to include:

(1) Drill hole cuttings--Approximately 1,000 gm sample over each 10- to 20-foot interval as drilling conditions permit.

(2) Core samples--Approximately 50 percent of total core recovered (if any).

(3) Fluid samples (if any)--Approximately 1,000 cc sample size.

(4) Geophysical logs, including but not limited to:

(a) Temperature

(b) Gamma ray-neutron

(c) Caliper

(d) Induction

(e) Density

(5) Drilling and completion histories.

(6) Analyses (if any) from (1) through (4) above.

c. Short-term testing data from C.3. above to include:

(1) Test description

(2) Flow line temperatures and pressures

(3) Flow rates

(4) Subsurface measurements (if obtained)

(5) Fluid samples

(6) Analyses (if any) from (2) through (5) above.

d. Analyses from investigations in C.4. and C.5. above in the form of an integrated study describing the geologic model of Dixie Valley with respect to a geothermal system.

E. Transmittal of Deliverables

1. Four copies of all data other than physical samples will be provided. One copy will be delivered to addressee in C.1. of Appendix C and three copies to addressee in C.2. of Appendix C.

2. Physical samples such as drill cuttings, cores, and fluids, except those portions required for studies in C.4. above, shall be delivered to the Geothermal Sample Library, University of Utah, Salt Lake City, Utah.

F. Schedule for Data Delivery

1. Existing data shall be delivered within 60 days of Contract execution.

2. New data from C.1. above shall be delivered within 60 days after completing the second gradient hole.

3. New data from C.2. above shall be delivered within 60 days after the completion of each exploratory well.

4. New data from C.3. shall be delivered within 90 days after completion of all field activities.

5. Analyses from C.4. and C.5. shall be delivered within 90 days after the completion of the second deep exploratory well.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Final or Annual Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due at the end of each contract year or 90 days after completion of all field activities whichever occurs first. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

3. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

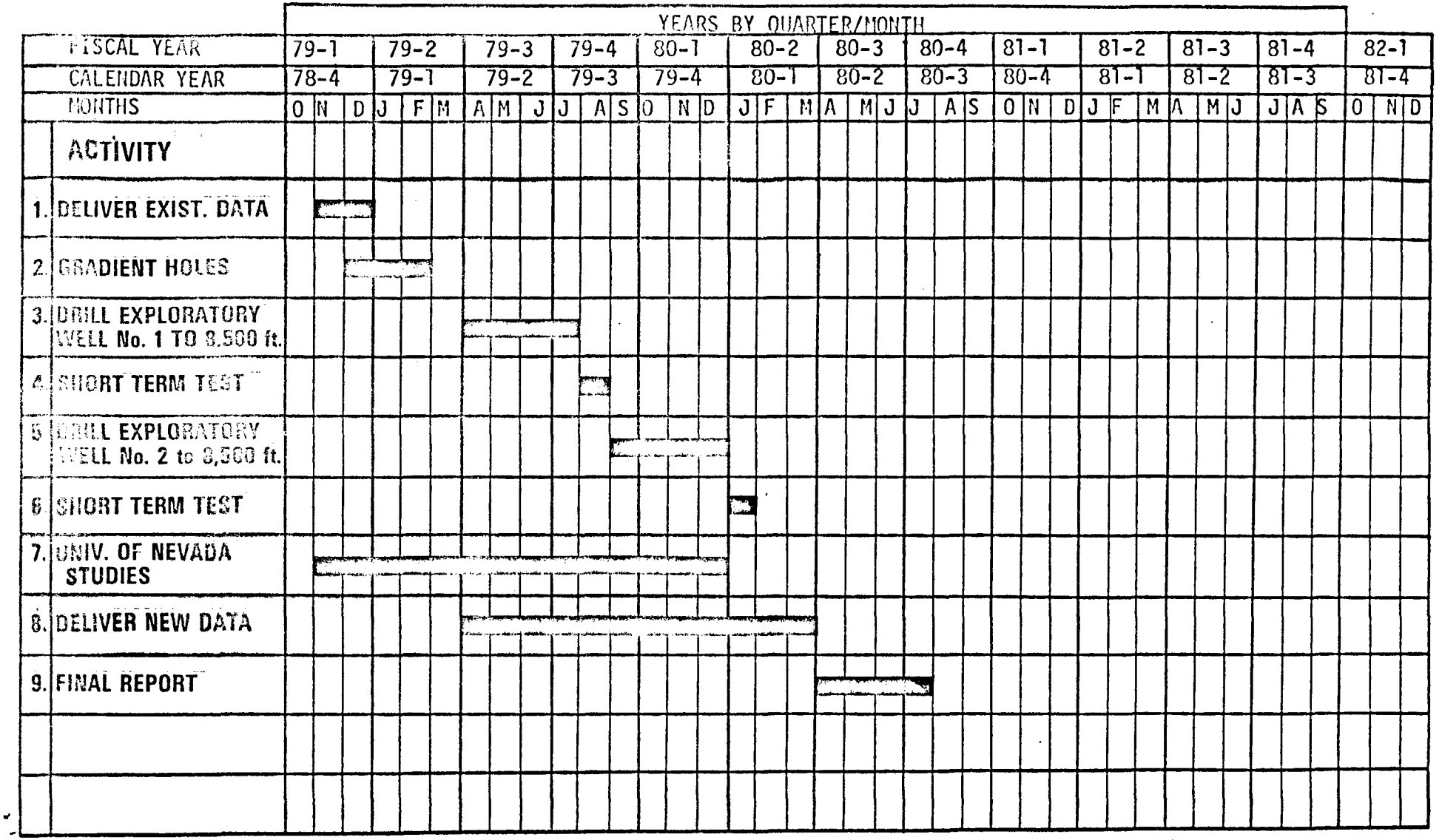
D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research Institute
391 Chipeta Way
Salt Lake City, UT 84108

APPENDIX D
ACTIVITY SCHEDULE

SOUTHLAND ROYALTY COMPANY

GEOTHERMAL RESERVOIR ASSESSMENT (DIXIE VALLEY AREA)



STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED PROC REG 141 CFR 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 2

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
A001	9/1/79		

5. ISSUED BY — CODE

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

6. ADMINISTERED BY (If other than block 5) — CODE

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code) — CODE — FACILITY CODE

Southland Royalty Company
1000 Fort Worth Club Tower
Forth Worth, TX 76102

8.
☐ AMENDMENT OF SOLICITATION NO. _____
DATED _____ (See block 9)
☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-79ET27006
DATED 10/1/78 (See block 11)

9. THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods: (a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

89X0213 NV-93-91 AE-10-02-02

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

(a) ☐ This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) ☒ This Supplemental Agreement is entered into pursuant to authority of 41 U.S.C. 252(c)(10)
It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Appendix A, "Scope of Work," is modified as follows:

a. Paragraph C is modified to add the following:

"6. Conduct a reflection seismic survey consisting of two east-west trending lines and one north-south tie line (about 16 line miles total). The north-south line shall intersect both wells in C. 2. and the northerly most east-west line shall intersect one of the wells in C. 2. The survey shall utilize a Vibroseis source with design parameters as follows:

a. 2400 percent coverage
b. 110 foot group spacing
c. 10 to 20 seconds sweeps
d. 16 sweeps minimum

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT. ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR
BY _____ (Signature of person authorized to sign)

15. UNITED STATES OF AMERICA
BY _____ (Signature of Contracting Officer)

16. NAME AND TITLE OF SIGNER (Type or print)
JERE DENTON
DISTRICT MANAGER

17. DATE SIGNED
9/20/79

18. NAME OF CONTRACTING OFFICER (Type or print)
Mahlon E. Gates, Manager

19. DATE SIGNED
9/18/79

0-101

"7. Conduct a surface geochemical survey encompassing approximately 30 square miles in the Dixie Valley Nevada investigative area. The survey shall consist of collecting and analyzing about 400 soil samples for Mercury and Arsenic content. Samples shall be collected on both broad scale and detailed grid networks and along traverse lines as determined most appropriate by the Contractor.

"8. Conduct a subsurface geochemical survey consisting of multi-element analyses of drill hole cuttings at 100 foot intervals for each of the holes in C. 2. A total of approximately 180 samples shall be collected, prepared and analyzed for Arsenic, Antimony, Lead, Zinc and Mercury.

"9. Synthesize and interpret the data from the above geochemical surveys."

b. Paragraph D., Item 2. "New Data," is modified to add the following:

"e. Field data including survey parameters from the reflection seismic survey in paragraph C. Item 6 above and appropriate analyses and interpretation in accordance with seismic data processing methods standard to the industry.

"f. Results of analyses from the surface and subsurface geochemical surveys in paragraph C. Items 7 and 8 above."

2. Appendix C, "Reports," is modified as follows:

a. Paragraph A, Item 2 is modified to add the following:

"Describe the results of the reflection seismic and geochemical surveys in relation to other existing and new data. Explain the relative value and/or effectiveness of the various types of data with respect to exploration for geothermal resources in Dixie Valley."

3. Article 4., "Payment," is modified as follows:

a. Paragraph B is modified to add the following:

"4. Upon delivery and acceptance by DOE of the new surface data from the reflection seismic survey, the Contractor shall be paid $6,875 per line mile but not to exceed a total of $110,000.

"5. Upon completion and acceptance of the data specified in Appendix A, paragraph D. 2. f. above, the Contractor shall be paid the amount of $21,458."

4. The total amount of the Contract is increased by $131,458 from $1,428,523 to $1,559,981.

STANDARD FORM 26, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41CFR) 1-16.101

AWARD/CONTRACT

STILLWATER

PAGE 1 OF 12

1. CONTRACT (Proc. Ins. Ident.) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING:
DE-AC08-79ET27012	10/1/78	IOS-78-3577	N/A

5. ISSUED BY CODE
U.S. Department of Energy
Nevada Operations Office
P.O. Box 14100
Las Vegas, Nevada 89114

6. ADMINISTERED BY (If other than block 5) CODE

7. DELIVERY
☒ FOB DESTINATION
☐ OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS CODE

(Street, city, county, State, and ZIP code)
Union Oil Company of California
Union Geothermal Division
Union Oil Center
461 South Boylston Street
Los Angeles, California 90017

THIS IS A COPY OF THE EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

9. DISCOUNT FOR PROMPT PAYMENT
N/A

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

11. SHIP TO/MARK FOR CODE
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 CODE
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)( )
☒ 41 U.S.C. 252 (c)(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				$801,000

21. TOTAL AMOUNT OF CONTRACT $ 801,000

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: (a) this award/contract, (b) the solicitation, if any, and (c) such provisions, representations, certifications, and specifications, as are attached or incorporated by reference herein. (Attachments are listed herein.)

23. NAME OF CONTRACTOR
BY Carel Otte
(Signature of person authorized to sign)

24. NAME AND TITLE OF SIGNER (Type or print)
Carel Otte, President

25. DATE SIGNED
11-22-78

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.

27. UNITED STATES OF AMERICA
BY _____
(Signature of Contracting Officer)

28. NAME OF CONTRACTING OFFICER (Type or print)
Robert W. Taft, Assistant Manager
for Plans, Engineering & Budgets

29. DATE SIGNED
11/27/78

APPENDIX A

SCOPE OF WORK

A. Union Oil Company's proposal dated May 30, 1978, submitted in response to RFP No. ET-78-R-08-0003 is incorporated herein and made a part of this Contract No. DE-AC08-79ET27012 except as modified by such Contract. The Contractor shall deliver the existing data pursuant to the terms and conditions described herein and use its best efforts to perform the proposed new work and acquire and deliver to DOE the resulting new data substantially in accordance with Appendix D, Activity Schedule.

B. The program to acquire new data encompassed by this Contract is as follows:

Phase I--Drill Well De Braga No. 2 to approximately 8,000 feet in Section 6, T 19 N, R 31 E, Churchill County, State of Nevada.

Phase II--Drill second well to approximately 8,000 feet. The well location will be contingent upon the results of De Braga No. 2 well.

Phase III--Conduct short-term (12- to 24-hour) flow tests on each of the above wells if such tests are feasible.

C. The Contractor will proceed with due diligence and reasonable dispatch to carry out the program outlined in B. above. In the event that circumstances are encountered through which drilling is deemed impossible or impracticable, or a potentially productive zone is encountered at a depth of less than 8,000 feet in either of the above wells, the Contractor, at its option, may vary the program and continue or terminate the work. In the event the Contractor elects to terminate, DOE will be liable for payment in accordance with the payment provisions of this Contract.

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 Surface Data

   a. Dipole-dipole resistivity survey--four lines covering about 20 miles.

   b. Telluric survey--four lines covering about 23 miles.

c. Gravity measurements--48 stations observed, resulting in a Bouguer gravity map and a number of computed depth estimates of valley fill.

2. Subsurface Data

a. Existing

(1) Temperature data from 16 temperature gradient holes with an average depth of about 275 feet each.

(2) Complete drilling history including all subsurface data such as lithological, temperature, wireline, and penetration logs from four existing deep temperature gradient wells, Weishaupt No. 1 and No. 2, De Braga No. 1, and Wisnefski No. 1. Total depths of these wells are 3,450 feet, 5,532 feet, 2,672 feet, and 3,637 feet, respectively.

b. New

Drilling, logging, and short-term flow testing data from B. above to include:

(1) Drill hole cuttings--Approximately 1,000 gm sample over each 10- to 20-foot interval as drilling conditions permit.

(2) Core samples--Approximately 50 percent of total core recovered and core analyses, if performed.

(3) Fluid samples--Approximately 1,000 cc samples representative of short-term (12- to 24-hour) flowing period and 50 percent of any samples taken during drilling phases and fluid analyses, if performed.

(4) Lithologic data.

(5) Geophysical logging data throughout drilled intervals to include, when feasible:

(a) Temperature log.

(b) Dual Induction Laterolog.

(c) Continuous dipmeter.

(d) Neutron-Gamma Ray.

(6) Short-term flow testing data.

(7) Drilling and completion histories.

E. Schedule for Data Delivery

1. Existing data to be delivered within three months of completion of the second well. If it is decided not to proceed with the program after completing the Well De Braga No. 2, then all data is to be submitted within three months of completion of De Braga No. 2.

2. Phase I--Drilling of Well De Braga No. 2. Data to be delivered within three months of completion of the well.

3. Phase II--Drilling of the second well. Data to be delivered within three months of completion of the well.

4. Phase III--Short flow tests. Data to be delivered within three months of each flow test.

F. 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 deliverable data other than physical samples will be provided. One copy will be delivered to the addressee in C.1. of Appendix C and three copies to addressee in C.2. of Appendix C.

G. Nondeliverables

It is further understood and agreed that none of the items described on pages 84 through 89 of the Contractor's proposal dated May 30, 1978, shall be delivered under this Contract.

APPENDIX C

REPORTS

Reporting requirements under this Contract are as follows:

A. Description of Reports

1. Technical Progress Report--Summarize the work performed during the reporting period and describe planned activities for the next period. Identify significant problems encountered or anticipated and actions taken or proposed to resolve them.

2. Final Technical Report--Provide a comprehensive description of the drilling operations including approach used, problems encountered, results obtained, and recommendations. Provide a description of each well as completed, including downhole and surface equipment and configuration.

B. Format, Frequency, Number of Copies, Due Dates

1. Technical Progress Report--Letter. Submit monthly with one copy to C.1. addressee below and three copies to C.2. addressee below. Due 10 working days after month ends.

2. Final Technical Report--Formal report including cover page, title page, abstract, and table of contents. Submit three copies in draft form to each addressee listed in C. below. The draft report shall be due 45 days after completion of all field activities. The Director, Engineering and Energy Applications Division (E&EAD), will compile comments on the draft report and notify the Contractor of approval or of recommended changes. The report will then be prepared in final form and resubmitted in accordance with Technical Information Reporting Instructions to be provided.

3. Informal Reports--Telephone communications between the Contractor and DOE shall be conducted on an "as needed" basis to assist in maintaining overall project coordination.

C. Addressees for Reports and Deliverables Other Than Physical Samples

1. Contracting Officer
ATTN: Engineering & Energy Applications
Division (E&EAD)
Department of Energy
Nevada Operations Office
Post Office Box 14100
Las Vegas, NV 89114

2. Dr. H. P. Ross
Earth Science Laboratory (ESL)
University of Utah Research Institute (UURI)
391 Chipeta Way
Salt Lake City, UT 84108

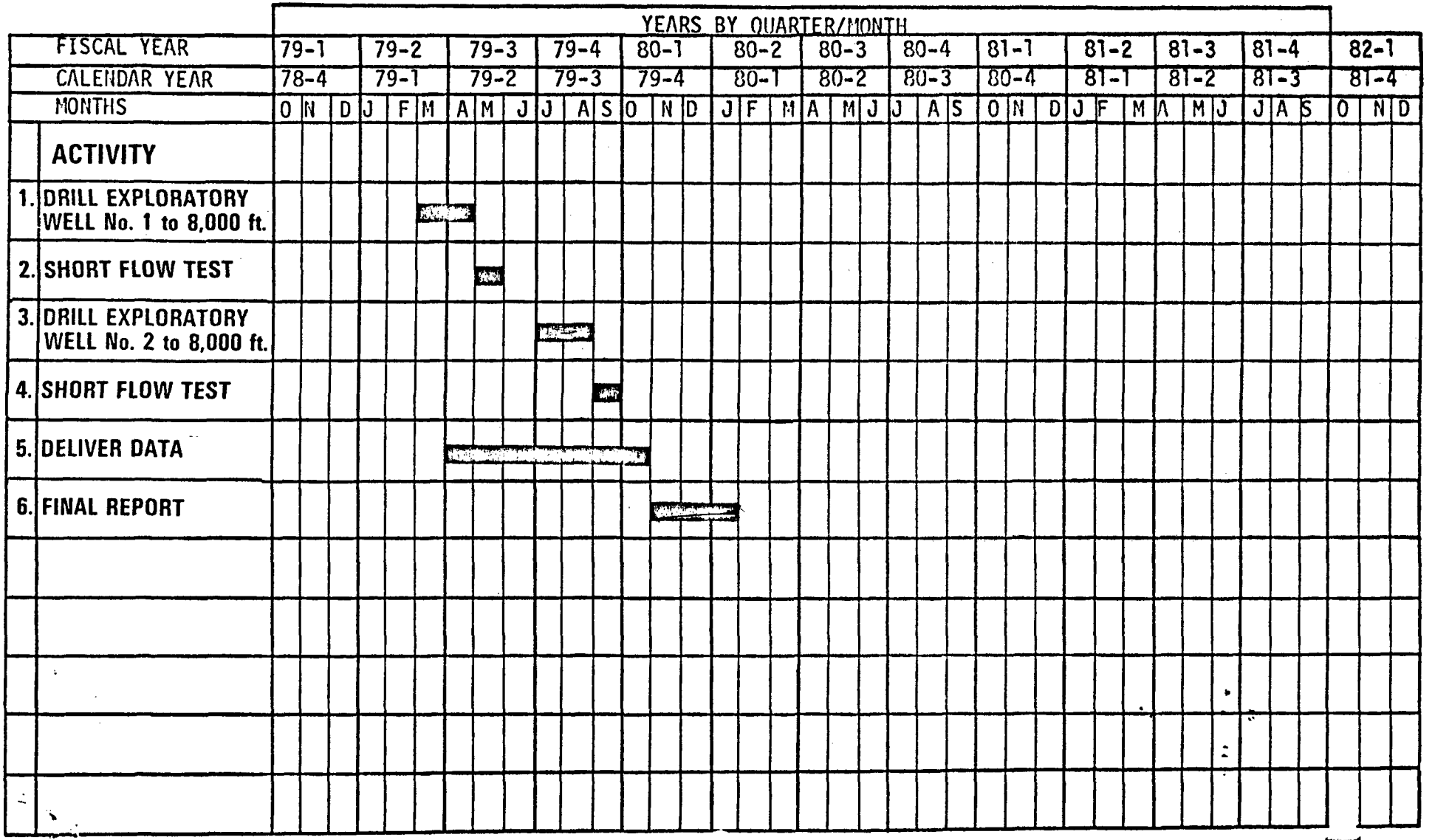
D. Addressee for Physical Samples

Mr. M. Bullett
Geothermal Sample Library
University of Utah Research Institute
391 Chipeta Way
Salt Lake City, UT 84108

APPENDIX D
ACTIVITY SCHEDULE

UNION OIL COMPANY

GEOTHERMAL RESERVOIR ASSESSMENT (STILLWATER AREA)



URI STILLWATER

STANDARD FORM 30, JULY 1966
GENERAL SERVICES ADMINISTRATION
FED. PROC. REG. (41 CFR) 1-16.101

AMENDMENT OF SOLICITATION/MODIFICATION OF CONTRACT

PAGE 1 OF 2

1. AMENDMENT/MODIFICATION NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST NO.	4. PROJECT NO. (If applicable)
1	7/1/79		

5. ISSUED BY CODE
U. S. Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114

6. ADMINISTERED BY (If other than block 5) CODE

7. CONTRACTOR NAME AND ADDRESS (Street, city, county, state, and ZIP Code)
CODE FACILITY CODE
Union Oil Company of California
Union Geothermal Division
Union Oil Center
P. O. Box 7600
Los Angeles, CA 90051

THIS IS A COPY OF THE EXECUTED DOCUMENT
CONTRACTS & PROCUREMENT DIVISION

8. ☐ AMENDMENT OF SOLICITATION NO. _____ DATED _____ (See block 9)
☒ MODIFICATION OF CONTRACT/ORDER NO. DE-AC08-79ET27012 DATED 10/1/78 (See block 11)

9 THIS BLOCK APPLIES ONLY TO AMENDMENTS OF SOLICITATIONS

☐ The above numbered solicitation is amended as set forth in block 12. The hour and date specified for receipt of Offers ☐ is extended, ☐ is not extended.

Offerors must acknowledge receipt of this amendment prior to the hour and date specified in the solicitation, or as amended, by one of the following methods:

(a) By signing and returning _____ copies of this amendment; (b) By acknowledging receipt of this amendment on each copy of the offer submitted; or (c) By separate letter or telegram which includes a reference to the solicitation and amendment numbers. FAILURE OF YOUR ACKNOWLEDGEMENT TO BE RECEIVED AT THE ISSUING OFFICE PRIOR TO THE HOUR AND DATE SPECIFIED MAY RESULT IN REJECTION OF YOUR OFFER. If, by virtue of this amendment you desire to change an offer already submitted, such change may be made by telegram or letter, provided such telegram or letter makes reference to the solicitation and this amendment, and is received prior to the opening hour and date specified.

10. ACCOUNTING AND APPROPRIATION DATA (If required)

AE-30-01-05, 89X0210, NV-90-91

11. THIS BLOCK APPLIES ONLY TO MODIFICATIONS OF CONTRACTS/ORDERS

☐ This Change Order is issued pursuant to _____
The Changes set forth in block 12 are made to the above numbered contract/order.

(b) ☐ The above numbered contract/order is modified to reflect the administrative changes (such as changes in paying office, appropriation data, etc.) set forth in block 12.

(c) ☒ This Supplemental Agreement is entered into pursuant to authority of 41 U. S. C. 252(c)(10)

It modifies the above numbered contract as set forth in block 12.

12. DESCRIPTION OF AMENDMENT/MODIFICATION

1. Appendix A, "Statement of Work," is modified as follows:

a. Paragraph B is amended by adding the following: i.e. new data

"Perform a reflection seismic survey consisting of two east-west lines and one north-south tie line (about 12 line miles total) over the geothermal prospect in T19N, R31E, MDM, Churchill County, Nevada. The survey shall utilize either a Vibroseis or dynamite source."

b. Paragraph D is amended by adding the following:

"New Surface Data

Provide the field data including survey parameters from the reflection seismic survey and provide appropriate analyses and interpretation in accordance with seismic data processing methods standard to the industry."

Except as provided herein, all terms and conditions of the document referenced in block 8, as heretofore changed, remain unchanged and in full force and effect.

13. ☐ CONTRACTOR/OFFEROR IS NOT REQUIRED TO SIGN THIS DOCUMENT ☒ CONTRACTOR/OFFEROR IS REQUIRED TO SIGN THIS DOCUMENT AND RETURN 2 COPIES TO ISSUING OFFICE

14. NAME OF CONTRACTOR/OFFEROR
BY Carel Otte (Signature of person authorized to sign)

17. UNITED STATES OF AMERICA
BY (Signature of Contracting Officer)

15. NAME AND TITLE OF SIGNER (Type or print)	16. DATE SIGNED	18. NAME OF CONTRACTING OFFICER (Type or print)	19. DATE SIGNED
Carel Otte, President	6-19-79	Robert W. Taft, Asst. Manager for Plans, Engineering & Budgets	6/14/79

c. Paragraph E is amended by adding the following:

"New surface data from the reflection seismic survey to be delivered within 60 days after completion of field data acquisition phase."

2. Appendix C, "Reports" is modified to add the following sentence to Paragraph A, Item 2:

"Describe the results of the reflection seismic survey and its relation to other surface and subsurface data with respect to exploration for geothermal resources in the Stillwater area."

3. The Contract Schedule is modified as follows:

Article 4, "Payment" is amended by adding the following:

"c. Upon delivery and acceptance by DOE of the new surface data from the reflection seismic survey, the Contractor shall be paid $7,083 per line mile but not to exceed a total of $85,000."

4. The total amount of the Contract is increased by $85,000 from $801,000 to $886,000.

GEOPHYSICAL SERVICE INC.
SERVICES GROUP
TEXAS INSTRUMENTS
INCORPORATED

June 15, 1983

Mr. Robert B. Smith
Professor of Geophysics
University of Utah

Dear Mr. Smith:

Geophysical Service Inc. is happy to grant permission for you to use Utah spec line 5-OPW5W, shotpoints 897 to 1317, for teaching and research, as we have discussed on the telephone. We understand that you will be using the data to examine the geometry and the attitude of normal faulting in that area. We also understand that you will be publishing all or parts of this line with your research, but that the exact location of the line will not be revealed.

We thank you for including our data in your interpretations. Please advise if we may be of assistance in any other way. We appreciate your cooperation and interest.

With regards,

Richard A. Maxwell
Area Manager, Rocky Mountain Division

MAILING ADDRESS: 2460 W. 26TH AVENUE, SUITE 130-C • DENVER, COLORADO 80231 • TELEPHONE 303-455-2783

Department of Energy
Nevada Operations Office
P. O. Box 14100
Las Vegas, NV 89114-4100

MAY 3 1 1983

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

GEOPHYSICAL SERVICES, INC., CLOSEOUT OF CONTRACT NO. DE-AC08-79NV10047

Since all work associated with the subject contract has been completed and final payment has been made, the Government intends to proceed with administrative closeout of the contract. Even though the contract will be administratively closed out, the obligation of the Government to maintain as proprietary the seismic data identified in the contract for a five year period shall remain, and the contract clause cited below shall be considered in force until August 1, 1985.

> "The reflection seismic data shall be maintained as proprietary to GSI for a period of five years after the effective date of this Contract and the data shall not be reproduced during that period by the Government. However, the Government and/or its representatives shall be permitted to interpret the data and publish interpretations and descriptions of the seismic sections and make the sections available for visual inspection by any person without any recourse whatsoever by GSI against such person or the Government. GSI during this five year period and thereafter, may market the data to other commercial business, and GSI shall retain the proceeds of any sales."

You are requested to take particular care in the protection of the five year proprietary provision in Contract DE-AC08-79NV10047 even though the contract is closed out.

Your cooperation in this matter is greatly appreciated.

J. B. Cotter, Director
Energy Applications Division

EAD:JNF-1952

cc:
R. A. Maxwell, Geophysical Services, Inc.
D. K. Parker, FIN
R. C. Amick, OCC

ROOSEVELT 4 RI-ES4

STANDARD FORM 26 (REV. 1/66)
GENERAL SERVICES ADMINISTRATION
AND FPMR (41 CFR) 1-16.101

AWARD/CONTRACT

PAGE 1 OF 2

CONTRACT (PROCUREMENT INSTRUMENT) NO.	2. EFFECTIVE DATE	3. REQUISITION/PURCHASE REQUEST/PROJECT NO.	4. CERTIFIED FOR NATIONAL DEFENSE UNDER BDSA REG. 2 AND/OR DMS REG. 1. RATING:
DE-AS08-79ET12047	8/1/79		

5. ISSUED BY	CODE	6. ADMINISTERED BY (If other than block 5)	CODE	7. DELIVERY
U. S. Department of Energy Nevada Operations Office P. O. Box 14100 Las Vegas, NV 89114				[X] FOB DESTINATION [ ] OTHER (See below)

8. CONTRACTOR NAME AND ADDRESS (Street, city, county, State and ZIP Code)	CODE	FACILITY CODE	9. DISCOUNT FOR PROMPT PAYMENT
Geophysical Services, Inc. 2460 W. 26th Avenue, Suite 400-C Denver, CO 80211			

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

11. SHIP TO/MARK FOR	CODE	12. PAYMENT WILL BE MADE BY	CODE
Howard P. Ross University of Utah Research Institute Earth Science Laboratory 420 Chipeta Way, Suite 120 Salt Lake City, Utah 84108		U. S. Department of Energy Nevada Operations Office Finance Division P. O. Box 14100 Las Vegas, NV 89114	

13. THIS PROCUREMENT WAS [ ] ADVERTISED, [X] NEGOTIATED, PURSUANT TO:
[ ] 10 U.S.C. 2304 (a)( )
[X] 41 U.S.C. 252 (c)(10)

14. ACCOUNTING AND APPROPRIATION DATA

AE-30-01-05, 89X0210, NV-90-91

15. ITEM NO.	16. SUPPLIES/SERVICES	17. QUANTITY	18. UNIT	19. UNIT PRICE	20. AMOUNT
	Reflection Seismic Survey Data from the Roosevelt Hot Springs Known Geothermal Resource Area in Southwestern Utah. The data is specifically described as follows: Geophysical Services, Inc. reflection seismic survey data in Southwestern Utah, 1978 Program. Phase II, Line 5, VP 981-1561 21.97 mi Phase III, Line OPTSW, VP 847-979 5.00 mi 26.97 mi				$22,401

TOTAL AMOUNT OF CONTRACT $ 22,401

CONTRACTING OFFICER WILL COMPLETE BLOCK 22 OR 26 AS APPLICABLE

22. [X] 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: (a) this award/contract, (b) 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 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 OF CONTRACTOR		27. UNITED STATES OF AMERICA	
Richard A Maxwell (Signature of person authorized to sign)		BY (Signature of Contracting Officer)	
24. NAME AND TITLE OF SIGNER (Type or print) Richard A Maxwell Manager	25. DATE SIGNED 8/15/79	28. NAME OF CONTRACTING OFFICER (Type or print) Robert W. Taft, Assistant Manager for Plans, Engineering & Budgets	29. DATE SIGNED 9/6/79

Seismic Source - TR Vibrators (minimum of 2 working)

Recording	- 96 trace, DFS V	- 16 sweeps per VP
	- 200 foot vibrator point interval	- 12 second sweep
	- 24 fold CDP	- 12 Hz-60Hz sweep band

Processing parameters	- Correlation	- CDP stack
	- TAR	- Filtering
	- Deconvolution	- Scaling
	- Velocity analyses	- Display
	- Residual static correction	

Six data tapes

One copy of the data and the tapes is to be delivered to Howard P. Ross at the address shown in Block 11 within 60 days after Contract execution date.

The reflection seismic data shall be maintained as proprietary to GSI for a period of five years after the effective date of this Contract and the data shall not be reproduced during that period by the Government. However, the Government and/or its representatives shall be permitted to interpret the data and publish interpretations and descriptions of the seismic sections and make the sections available for visual inspection by any person without any recourse whatsover by GSI against such person or the Government. GSI during this five year period and thereafter, may market the data to other commercial business, and GSI shall retain the proceeds of any sales.

At the end of the five-year period the data shall become the property of the Government and the obligation of the Government to maintain the data as proprietary to GSI and to refrain from copying and distributing the data shall terminate.

Standard Form 32, "General Provisions (Supply Contract)," along with the alterations and additions thereto, are incorporated into and made a part of this Contract.

APR 27 1979

GEOPHYSICAL SERVICE INC.

SERVICES GROUP

TEXAS INSTRUMENTS
INCORPORATED

April 24, 1979

Purchasing Department
U. of U. Research Institute
420 Chipeta Way, Suite 100
Research Park
Salt Lake City, Utah 84108

Dear Sir:

Geophysical Service Inc. is pleased to submit the following proposal to provide a Vibrator crew for your prospect in northern Utah. It is understood that about 18 miles of program is involved.

Field Crew

Equipment

- 1 DFS IV 48 channel recording system
- 1 CFS System, 48 trace
- 3 T.I. X2 Vibrators equipped with high frequency electronics, (two working at all times)
- 1 Vibrator service truck
- Auxiliary vehicles as required
- *200 strings of phones (9 phones per string)
- 72 groups of cables

Personnel

- Party Manager
- Surveyor
- 3 Vibrator Operators
- 1 Vibrator Mechanic
- 1 Instrument Engineer
- 13 Line Helpers

* 18 phones per group maximum.

Collection Parameters

- 48 trace recording
- 2 millisecond sample rate
- 2400% coverage
- 18 geophones per group
- 12 second sweep length
- 4 second final record length

Data Processing

Data collected will be processed using the following sequences.

Preliminary Stack

- Correlation
- True Amplitude Recovery
- Trace Edit
- Time Variant (or Invariant) Deconvolution
- Time Variant Scaling
- Normal Moveout
- Datum Correction
- Preliminary Stack
- Band Pass Digital Filter (Gould Display)

Analysis

- Velocity Analysis at 1 mile intervals (Gould Displays)
- Residual Static Analysis

Final Stack

- Normal Moveout
- Residual Static Application
- Final CDP Stack
- Band Pass Digital Filter
- Time Variant Equalization (One film and one print)
- Migration (One film and one print)

Excluded from the price quotations are the following items:

- Cost of any processing tapes to be retained by COMPANY
- Cost of reproductions of sections other than those listed above.
- Cost of special processing other than specified above.

Compensation

Mobilization - No charge, if the award is announced by May 1, 1979. Otherwise - $6000.

Production -

24 fold, 16 sweeps/VP, 110' G.I., 48 trace - $7530/mile

Per extra sweep per mile - $207

Other -

Parameter testing time will be provided at $535 per hour.
Standby time due to client cause, lack of program, permits, etc., $500 per hour (10 hours per day maximum).

Ancillary Costs

The following costs incurred by GSI will be reimbursed by COMPANY at invoice cost plus 7½% handling fee.

1. Permit fees and damages, unless due to GSI negligence.
2. Dozer charges, if required.

The crew will be available about May 5, 1979, unless committed to other work prior to acceptance of this proposal by UURI.

If you have any questions, please feel free to call me at our Denver office. Thank you for this opportunity to be of service.

Sincerely yours,

Richard A Maxwell

Richard A. Maxwell
Area Manager

No.

Geodata Corporation
P.O. Box 3476
211 South Cheyenne
Tulsa, Oklahoma 74101

Geophysical Service Incorporated
Box 5621 MS 954
Dallas, Texas 75222

Mr. Mike Boling
Party Chief, Rocky Mountain Operation

Teledyne Exploration Company
~~5825 Chimney Rock Road~~
~~P.O. Box 36269~~
~~Houston, Texas 77036~~
014 North Big Spring Midland, Texas 79701

Mr. E. L. Campbell

Western Geophysical
10,001 Richmond Avenue
P.O. Box 2469
Houston, Texas 77001

Mr. Charles W. Dick
Vice President, Western U.S. Operations

Geophysical Systems Corporation
Geosystems
1024 South Arroyo Parkway
Pasadena, California 91105

Mr. S. J. Dillon

CGG
1515 Arapahoe Street
Denver, Colorado 80202

Dear Sir

Seismograph Service Corporation
P.O. Box 1590
Tulsa, Oklahoma 74102

Mr. D.R. Seifert
Area Manager

Seiscom Delta, Inc.
7636 Harwin Drive
Houston, Texas 77036

No

Kary Data, Inc.
Geophysical Brokers
1138 Republic Building
1612 Tremont Place
Denver, Colorado 80202

No

North American Exploration Co.
1567 Marion St. Denver 80218
biggest spec-data brokers.
~~(Dana Goodman)~~
G.L. Scott
Pres.

United Geophysical
2650 E Foothill Boulevard
~~Pasadena 213 449 4200~~
Pasadena, California 91109

Mr. A.D. Christensen
Engineering Manager

UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI

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

May 21, 1979

Mr. Joe Fiore
DOE/NVO
P.O. Box 14100
Las Vegas, Nevada 89114

Dear Joe:

Here is some additional information concerning the GSI speculative seismic data which we have recommended that DOE/NVO purchase with supplemental Case Studies funding from Exploration Technology.

Data Description

Geophysical Service Inc. speculative reflection seismic survey data in southwestern Utah, 1978 Program.

Phase II, Line 5, VP 981-1561	21.97 mi
Phase III, Line OPTSW, VP 847-979	5.00 mi
	26.97 mi

Seismic source - TR-2 Vibrators (minimum of 2 working)

Recording - 96 trace, DFS V	- 16 sweeps per VP
- 200 foot group interval	- 12 second sweep
- 400 foot vibrator point interval	- 12 Hz-60Hz sweep band
- 24 fold CDP	
Processing parameters - Correlation	- CDP stack
- TAR	- Filtering
- Deconvolution	- Scaling
- Velocity analysis	- Display
- Residual static correction	

Data Cost

The data are available for purchase, including the migrated section at a cost of $815 per line mile. Total cost for the survey data requested, Line 5 VP981-1561 and line OPT 5W, VP847-979

26.97 mi @ $815/mi = $21,980.55

It is also desirable to purchase the data tapes to permit additional processing in the future. These are available at a small additional cost (about $70).

Source

The data may be purchased from:

Mr. Richard A. Maxwell,
Area Manager
Geophysical Service Inc.
2460 W. 26th Avenue, Suite 400-C
Denver, Colorado 80211
Telephone (303) 455-2783

Reference may be made to earlier discussion concerning these data between Dr. W. E. (Ted) Glenn of the Earth Science Laboratory, UURI, and Mr. Mike Boling, GSI Party Chief.

Discussion

These reflection seismic data represent state of the art data already recorded in a key area of geothermal interest. The seismic line crosses the center of the Roosevelt Hot Springs KGRA, the Mineral Mountains to the east and Milford Valley on the west. The data have been examined and are of excellent quality, showing several coherent reflections and indicating fault structures in the Milford Valley and in the area of the successful geothermal wells. There are few if any coherent reflections through the Mineral Mountains area, probably because of a lack of density and velocity contrasts within the crystalline rock complex.

As part of a speculation survey these data are available at a greatly reduced cost of $815 per line mile including processing compared to $7000-$8000 per line mile plus mobilization changes for a new privately contracted survey effort. In addition there are no delays resulting from environmental and permitting requirements and contracting and scheduling seismic crews.

Since the data were obtained and are sold on a specialation basis by GSI, purchasers are not permitted to reproduce or distribute copies of the data. The Earth Science Laboratory would be permitted to describe, interpret, and publish interpretations based on these data, and would be permitted to make the data available for inspection by industry and the public in general. This would fulfill an important service in evaluating the effectiveness of this expensive method in geothermal environments. The interpretaton of these data will contribute substantially to the understanding of the Roosevelt Hot Springs geothermal system. Through a more precise delineation of major faults bordering the Mineral Mountains and within the Milford Valley these data will also support the environmental baseline induced seismicity studies currently being funded by DOE.

The accompanying map shows the location of the seismic lines with respect to the Roosevelt Hot Springs KGRA.

If you need additional information regarding these data do not hesitate to call.

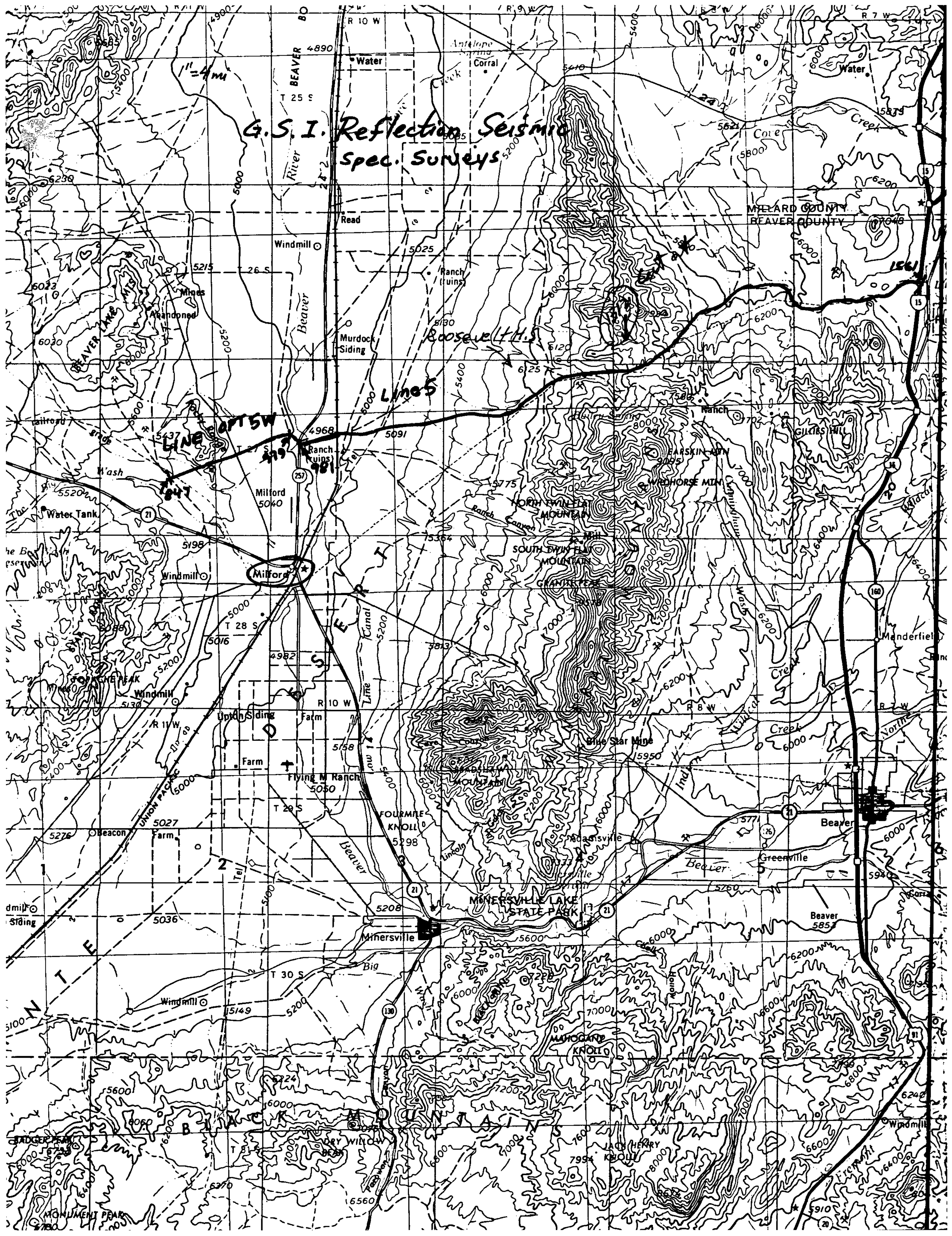
Sincerely,

Howard

Howard P. Ross
Project Manager

HPR/smk

encl.



1" = 4 mi
G.S.I. Reflection Seismic
Spec. Surveys
Roosevelt H.S.
Line 5
LINE 80PT5W
1847
4968
979
981
1561
MILLARD COUNTY
BEAVER COUNTY
Milford
5040
Read
Windmill
Murdock Siding
Ranch (ruins)
Water
Corral
Antelope Spring
Water Tank
Mines
Abandoned
BEAVER LAKE MTS
T 25 S
T 26 S
T 27 S
T 28 S
T 29 S
T 30 S
R 10 W
R 11 W
R 9 W
R 8 W
R 7 W
Cove Creek
EARSKIN MTN
9095
WILDHORSE MTN
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Upton Siding
Farm
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FOURMILE KNOLL
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Greenville
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MINERSVILLE LAKE STATE PARK
Minersville
Beaver River
Indian Creek
Wildcat Creek
North Creek
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JACK HENRY KNOLL
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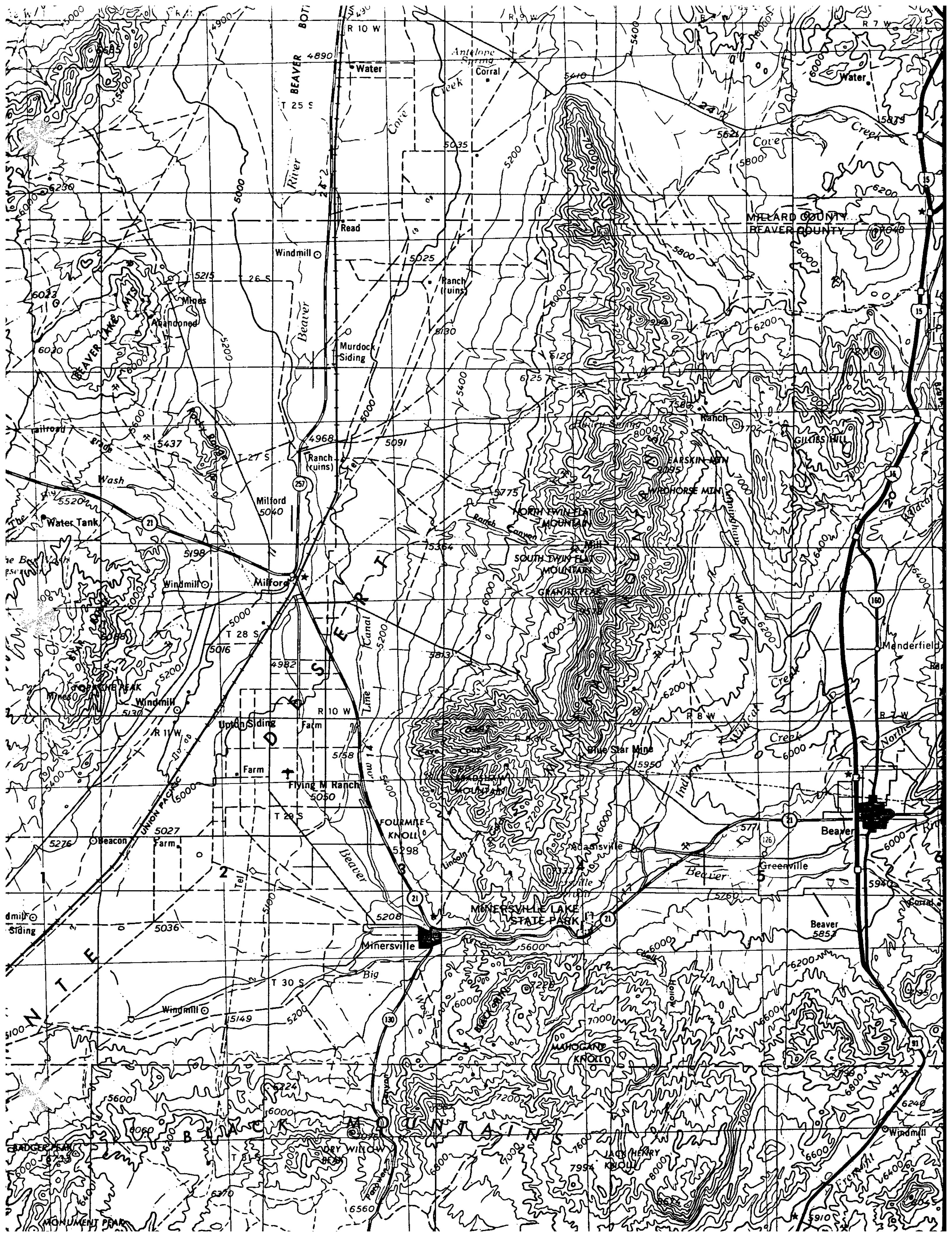

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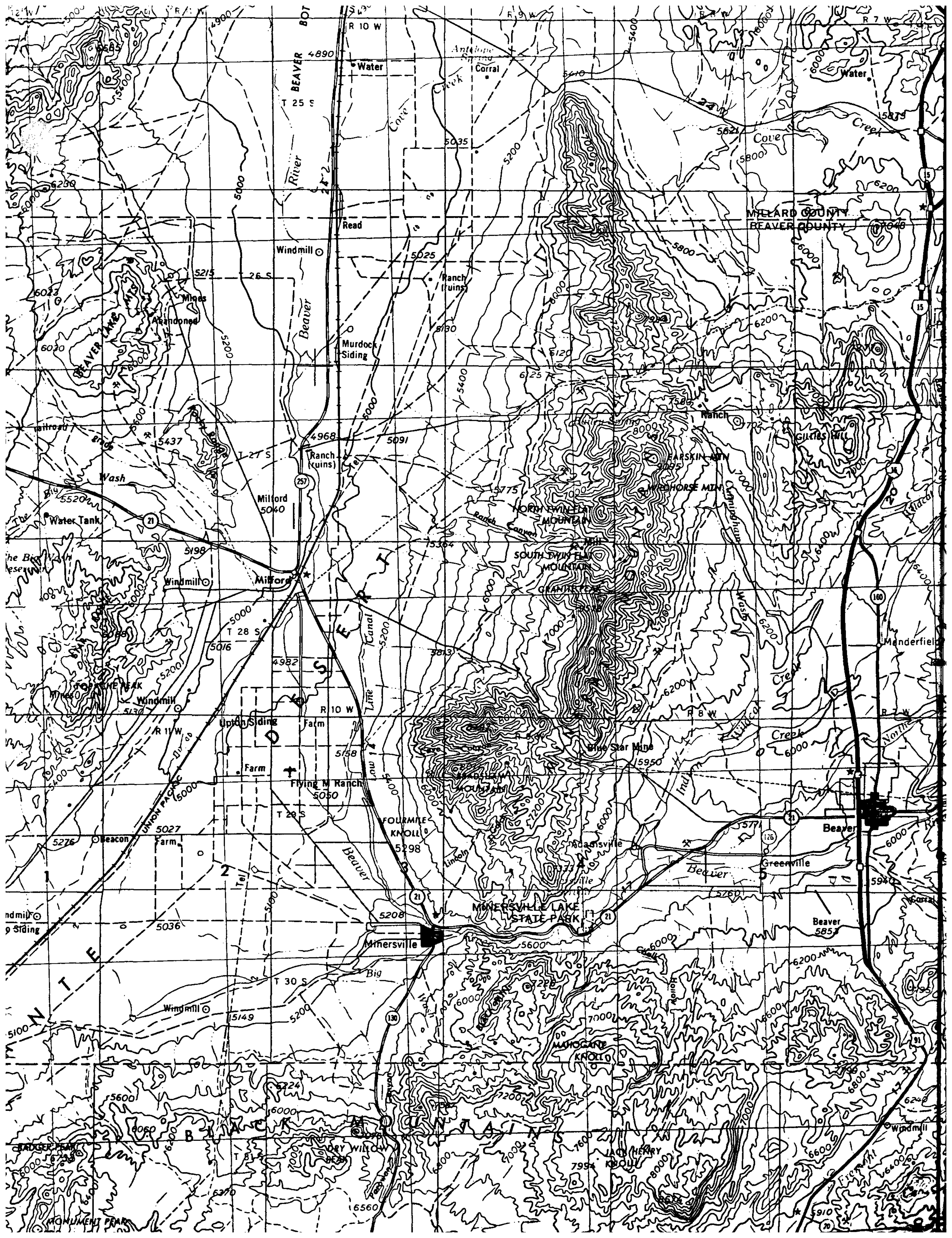
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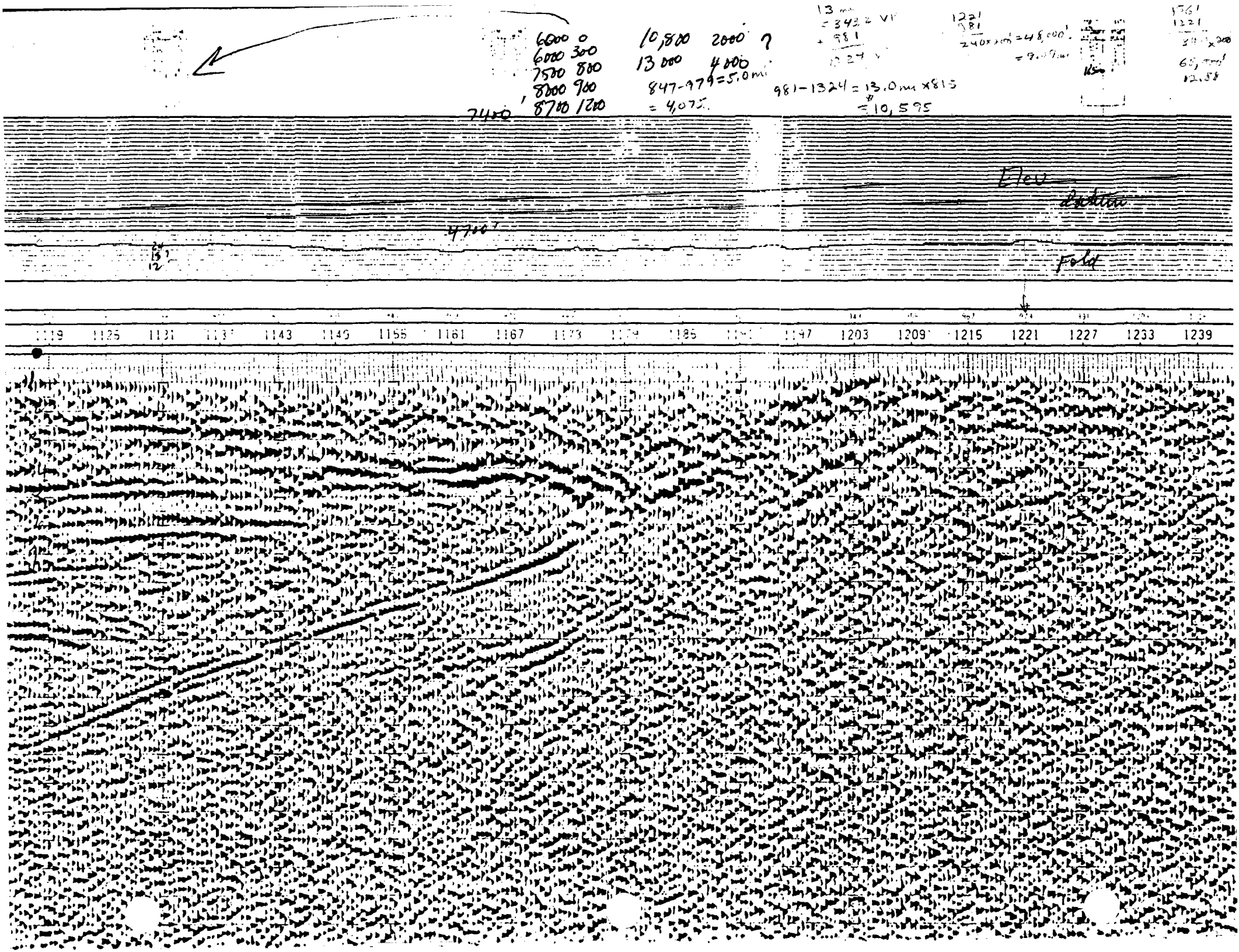
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UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI

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

November 30, 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, DISTRIBUTION of Earth Science Laboratory Reports.

December 13 and 14, 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 third 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 December 1 through January 31, 1980. 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, UT 84108
Telephone No. (801) 581-8383

Geophysical well logs have been received for exploration well and stratigraphic tests completed under the DOE/DGE Industry Coupled Program. Well logs are available for:

Desert Peak B-21-1, B-21-2, B-23-1 and Strat. Test #7, (Phillips Petroleum Co.)
Humboldt House Well Campbell "E"-1 and Strat. Test #4. (Phillips Petroleum Co.)

Cove Fort-Sulphurdale #14-29 (Union Oil Co.)
Stillwater, DeBraga No. 2 (Union Oil 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.

Earth Science Laboratory Technical Reports

Several technical reports have been completed by the ESL staff. These reports may not be of general interest to all those on this distribution list and will be distributed on a request basis only. Please write or phone Mr. Sharrif Dajany to obtain copies of these reports. These reports will be available for distribution at various times between December 13 and December 31, as DOE/ID approval for distribution is received and as printing schedules allow. The reports included are:

Glenn, William E., and Hulen, Jeffrey B., 1979, A study of geophysical logs of four wells from the Roosevelt Hot Springs area, Utah.

Hulen, Jeffrey, Geology and alteration of the Baltazor Hot Springs and Painted Hills thermal areas, Humboldt County, Nevada.

Moore, Joseph N., 1979, Geology map of the San Emidio geothermal area, Washoe and Pershing Counties, Nevada.

Ross, Howard P., 1979, Numerical modeling and interpretation of dipole-dipole resistivity and IP profiles, Cove Fort-Sulphurdale KGRA, Utah.

Sibbett, Bruce S., 1979, Geology of the Soda Lake geothermal area.

Smith, Christian, 1979, Interpretation of resistivity and shallow seismic reflection profiles, Whirlwind Valley and Horse Heaven areas, Beowawe KGRA, Nevada

Ward, S. H., Ross, H. P., and Nielson, D. L., 1979, A strategy of exploration for high temperature hydrothermal systems in the Basin and Range Province.

Mineral Mountains Geologic Map. The geologic mapping of the Mineral Mountains, Beaver and Milford Counties, Utah has been completed. The map will

be presented at the U.S.G.S Public Meeting for the Richfield 2 degree sheet to be held in Salt Lake City on December 13 and 14, 1979 and will also be displayed at the ESL Open File data release on these dates. The map and an accompanying text by Bruce Sibbett and Dennis Nielson will be available for general distribution in January, 1980.

Sincerely,

Howard P. Ross

Sharrif Dajany

HPR,SD:ls

Enclosures

OPEN FILE DATA

Case Studies - Utah

ITEM	DESCRIPTION
Cove Fort-Sulphurdale (U.O.C) 14-29-1 $	Union Oil Company Well #14-29, Cove Fort-Sulphurdale KGRA; Technical Report including well summary, geologic report, well history, temperature-pressure surveys, etc.
Cove Fort-Sulphurdale (U.O.C) 14-29-2 $0.20	Union Oil Company Well #14-29; Schlumberger Directional Survey summary, 4 pgs.
~~Roosevelt Hot Springs (D.R.I.) #1 $~~ Delete	~~Denver Research Institute Final Report, Subsurface Investigations at the Roosevelt (Hot Springs) KGRA, Utah; A complete report of pressure-temperature flow tests in well Utah State 14-2, including an analysis of two-phase flow conditions~~

Case Studies - Northern Basin and Range

Stillwater KGRA, Nevada

Stillwater (U.O.C) #1 $	Union Oil Company Technical Report on Well De Braga #2, Stillwater KGRA, Churchill Co. Report includes well summary, geologic report, history, fluid analysis, etc.
Stillwater (U.O.C) #2 $	Addendum to Technical Report on DeBragga #2, Churchill Co., Nevada; Flow Test and Fluid Sample Data.

Baltazor KGRA, Nevada

Baltazor (EPPC) #7 $	Deep thermal gradient study; three holes to approximately 1500 feet each; temperature logs, drilling and completion histories; location map.

Desert Peak, Nevada (Phillips Pet. Co.)

Desert Peak (PPC)-1 $	Geologic map, and cross sections (2); Magnetotelluric slice map. Desert Peak Area.
Desert Peak (PPC)-2 $	Ground magnetics map and gravity map, Carson Sink Area.
Desert Peak (PPC)-3 #	Equilibrium temperature profiles, Strat. tests No. 2 and No. 5.

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$	No. 2 and No. 5.
Desert Peak (PPC)-4 $	Desert Peak #21-1; Water analyses, drilling reports. Desert Peak #21-2; drilling reports. Desert Peak #29-1; daily drilling reports.
Desert Peak (PPC)-5 $	Phillips Petroleum Co. Final Report for Geothermal reservoir Assessment Case Study, Northern Basin and Range Province, U. S. Dept. of Energy Contract No. ET-78-C-08-1592. Integrated summary of drilling histories and results for Desert Peak well B-23-1 and Humboldt House well Campbell "E" No. 2.

Humboldt House, Nevada (Phillips Petroleum Co.)

Humboldt House (PPC)-1 $	Surface geologic map, geologic cross-section Magnetotelluric slice map.
Humboldt House (PPC)-2 $	Well Campbell "E"-1: lithological log, directional well survey, daily drilling report.

(see also Desert Peak, item 5, final drilling report)

Beowawe, Nevada (Getty Oil Co.)

Beowawe, (GOC)-1 $	Results of the Geophysical Surveys in the Beowawe Prospect, Part A. Electrodyne Surveys report to Getty Oil Co., Sept. 1979 - Gravity and magnetic survey, TDEM, MT-AMT and galvanic resistivity surveys; interpretative report. 1½ maps and sections.

eleven

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

45.50
13.75
12.45
42.00
63.00
21.80
206.40

RW on 4-10-79

O received 3-26-79

DIXIE VALLEY, NEVADA
Southland Royalty Co.

Item	Description
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.

$45.50

520 pgs

O received 3-26-78

BALTAZOR, NEVADA
Earth Power Production Co.

Item	Description
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 Microearthquake 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.

#13.95

COLADO, NEVADA
Getty Oil Co.

Item	Description
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.

2 Items

12.45

SAN EMIDIO, NEVADA
Chevron Resources Company

Item	Description
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 1.25 42.90	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.

Item	Description
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 ~~$3.75~~ 63.75	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)

Item	Description
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 27.85	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.

HPR

UNIVERSITY OF UTAH RESEARCH INSTITUTE

UURI

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

MEMORANDUM

March 14, 1979

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.

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Howard P. Ross
Howard P. Ross
Project Manager

Sharrif Dajany
Sharrif Dajany
Administrative Assistant

HPR,SD:srm

attachments

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Southland Royalty Co.

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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.
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COLADO, NEVADA
Getty Oil Co.

Item	Description
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

Item	Description
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.

SODA LAKE, NEVADA
(Chevron Resources Company)

Item	Description
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
391 CHIPETA WAY, SUITE A
SALT LAKE CITY, UTAH 84108
801-581-5283

January 3, 1978

MEMORANDUM

TO: Geothermal Distribution List

FROM: Howard P. Ross

SUBJECT: Open File Period for Department of Energy/Division of Geothermal Energy Utah Case Studies Data.

January 23 through January 25, 1978 is hereby designated as an open file period for the study, viewing, and selected reproduction of the subject data. The data will be displayed from 8:00 AM to 5:00 PM in the Library, Earth Science Laboratory, University of Utah Research Institute, 391 Chipeta Way in Research Park.

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

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

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.

Howard P. Ross
Project Manager,
Industry Coupled Program

HPR:srm

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.

The Earth Science Laboratory staff extends Season's Greetings and best wishes for a productive New Year.

Howard P. Ross

Howard P. Ross
Project Manager,
Industry Coupled Program

HPR:srm

MEMORANDUM

February 3, 1983

TO: W. L. Forsberg
S. F. Dajany

FROM: D. L. Nielson

SUBJECT: Industry Coupled Case Studies Program - Technical Assistance, Utah

Our milestone charts for FY82 show an open-file data release for Utah programs scheduled for June. This data release was scheduled for data from the last Industry Coupled contract which was still in place, that with Geothermal Power Corp. (GPC). As documented by the attached letter from Mr. Robert Taft of DOE to Mr. Frank Metcalfe of GPC, the project was never completed and DOE withdrew its funding. Thus we have no data to release from Utah, but are continuing to release data from Industry Coupled Program areas in Nevada.

Dan L. Nielson

DLN:jp