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Federal Express
September 8, 1986

Ms. Susan M. Prestwich
DOE Project Officer
U.S. Dept. of Energy
785 DOE Place
Idaho Falls, Idaho 83402

Ref: Cascades Geothermal Research
DOE Cooperative Agreement No. DE-FC07-86ID12654
MZI-11A

Subj: Project Plans
File 01-100

Dear Susan:

Enclosed are the following reports which are required deliverables under Cooperative Agreement DE-FC07-86ID12654:

1. The Project Management Plan
2. The Project Drilling Plan
3. The Project Data Collection Plan
4. The Project Institutional Plan

The Cooperative Agreement Scope of Work states that the DOE must approve the Drilling and Data Collection Plans prior to drilling. Our current schedule calls for a field meeting with the USFS on September 9 and initiation of drill pad preparation on September 10. We anticipate having the rotary rig spud the well between September 12 and 15. We encourage DOE to review and approve these plans timely.

Very truly yours,

A handwritten signature in black ink, appearing to read 'Jim', written in a cursive style.

James L. Moore
Vice President Operations

DMcC:sr:42

Encs. (3 of each document)

cc: Mr. Mike Wright, UURI (1 enc. of document)

Cascades Geothermal Research

PROJECT MANAGEMENT PLAN

Mazama Deep Temperature Gradient

Hole MZI-11A

Winema National Forest
Klamath County, Oregon

California Energy Company, Inc.
3333 Mendocino Avenue, Suite 100
Santa Rosa, CA 95401

Agreement No. DE-FC07-86ID12654

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1.0 Introduction

1.1 Abstract

This Project Management Plan is intended to define procedures pertaining to Cooperative Agreement between the United States Department of Energy (DOE) and California Energy Company, Inc. (CECI). This volume includes procedures for activities between CECI's home office and field personnel, DOE, regulatory agencies and other parties. The drilling, institutional, and data collection procedures are covered in separate volumes.

This manual is a guide for use by management administrative and field personnel. It defines certain specifics pertaining to the drilling deep Temperature Gradient Well MZI-11A.

1.2 Project Description and Objective

CECI plans to drill a deep temperature gradient hole located at SE 1/4, SW 1/4, Sec. 10, T31S, R7-1/2E, Klamath County, Oregon. The gradient well will be logged by CECI, and the data collected will be transferred to the DOE for publication.

1.3 CECI's Responsibilities

CECI will furnish the materials, facilities, equipment, personnel, services and all other necessary and related items for the drilling of, data-collection from, and plugging and abandonment of MZI-11A. CECI is also responsible for obtaining all necessary licenses and permits and providing DOE all data collected under the Cooperative Agreement.

1.4 DOE's Responsibilities

DOE will provide a specific amount of financial assistance, will monitor the project as specified elsewhere in this document, and will act upon CECI's request for approval in those instances in which DOE approval is required.

2.0 Organization

2.1 CECI Project Team

The Company is organized into functional areas which include, administration and finance, project development, exploration, land management, drilling operations reservoir production management and power plant development. Each area is supervised by a senior staff Vice President who reports to the President.

Project teams are organized according to the technical requirements of the job. Key personnel are assigned based on experience and technical abilities. A senior staff member is assigned overall project management responsibilities. The Project Manager coordinates all discipline managers and is responsible for management of the project schedule and budget. The Project Drilling Manager

will be in charge of all activities at the project site including safety, environmental control of the drill site, and coordination of subcontractors and service contractors.

Key Personnel:

Project Manager: Jim Moore, Senior Vice President Exploration
Alt: Dave McClain, Mgr., Project Development

Drilling Supervisor: Robert Pryde, Vice President Drilling Operations
Alt: Gordon Gollan, Manager, Drilling

Data Collection: Joe LaFleur, Senior Geologist
Well Site Geologist Alt: Paul Brophy, Geologist
Richard Nosker, Geologist

Environmental: Dave McClain, Manager Project Development
Alt: Anna Carter, Compliance Manager

Admin. Controller: Richard Nishkian, Vice President Finance
Alt: Dave Workman

Subcontractors:

Site Preparation: Local Contractor

Drilling Equipment: Longyear Drilling Company
Duane Wilson

Mud Supply: Westera Drilling Supply

Cement Supply: Halliburton

Well Logging: Dresser Atlas
Dennis A Lynch

Water Quality Monitoring: Century West Engineering
Dave Williams

Noise Monitoring: R & W Engineering
Harry Reeder

2.2 DOE & UURI Project Team

DOE Project Team is organized to provide technical and contract/finance oversight of the project. DOE may also designate certain DOE contractors to act in DOE's behalf regarding technical oversight. University of Utah Research Institute (UURI) will provide for DOE the primary earth science technical review and EG & G, Idaho Inc. will provide the environmental technical review for DOE.

Key Personnel:

DOE Project Officer: Susan Prestwich, Geologist
Advanced Technology Division

DOE Contracts Officer: Elizabeth Bowhan
Contracts Sepcialist
Contract Management Division

DOE Environmental Officer: Cliff Clark
Environmental Manager
Environmental Division

DOE Public Information Officer: Pete Mygatt
Public Information Officer
Office of External Affairs

E.G. & G. Environmental Support Staff: Sue Steiger

UURI Team Leader: Mike Wright, Director UURI

UURI Geologist: Dennis Neilson
Head Geological Group

UURI Geochemist: Joe Moore
Head Geochemical Group

2.3 Addresses:

California Energy Company, Inc.

CECI Corporate Headquarters
3333 Mendocino Ave., Ste. 100
Santa Rosa, CA 95401

Phone: 707-526-1000 Telex: 520-744-2088 Telecopy: 707-526-0504

CECI Sunriver Office
P.O. Box 3399
201 Sunriver Plaza
Sunriver, OR 97702

Phone: 503-593-2414 or 2415

CECI Subcontractors

Longyear Drilling Company
308 E. Pima St.
Phoenix, AZ 85004

Phone: 602-258-6543

Dresser Industries, Inc.
2421 Portola Road
Ventura, CA 93003

Phone: 805-642-7774

Century West Engineering
P.O. Box 1174
Bend, OR 97709

Phone: 503-388-3800

R & W Engineering, Inc.
6415 SW Canyon Court, Ste 100
Portland, OR 97221

Phone: 503-297-5676

DOE:

U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, ID 84302

Phone: 208-526-1147
Telecopier No. 208-526-6524

University of Utah Research Institute
391 Chipeta Way
Salt lake City, UT 841-81295

Phone: 801-524-4322
Telecopier: 801-524-3453

2.4 CECI Personnel Responsibilities

2.4.1 The Project Manager is responsible for the management of the project, reporting to both California Energy Company and DOE management. The Project Manager will have overall responsibility and authority for the management and control of the project for California Energy Company, and will be the prime contact with the DOE. He will have complete responsibility for planning, scheduling, administration, design, cost control and execution of all aspects of the work performance and cost. The Project Manager will direct the members of the project team and coordinate their activities to accomplish the work task according to the schedule. He will review all documents and reports for conformance with the project requirements and based on his experience and knowledge, review and evaluate all cost to ensure that they are complete and accurate.

The Project Manager is responsible for administration of the Project Management Plan, to organize, plan, budget, schedule, monitor and report all phases of the project. The Project Management Plan identifies interrelated, well-defined, controllable tasks with critical interfaces between task, subcontractors and regulatory agencies clearly described.

Project review will be performed at regular intervals consisting of the following activities:

- o Comparison of control budgets and actual expenditures.
- o Evaluation of planned and actual schedule accomplishment.
- o Forecasting estimates at completion.

Results of project review will be summarized in periodic reports to DOE and California Energy Company management.

2.4.2 The Drilling Supervisor will report directly to the Project Manager and will be in charge of all activities at the drill site and its immediate vicinity. The Drilling Supervisor will have complete authority regarding safety and drill rig operations. He will direct day to day drilling operations and supervise all subcontractors and equipment suppliers. He will coordinate with the senior geologist regarding data collection during drilling and supervise the safe collection of data while the rig is on location. The Drilling Supervisor will manage all site preparation, mobilization, drilling, logging and completion operations in accordance with the Project Drilling Plan.

2.4.3 The Senior Geologist will report directly to the Project Manager and will be responsible for supervising field assistance and will direct collection of all rock and fluid samples and directing all logging activities. The Senior Geologist will coordinate all activities with the Drilling Superintendent to assure safe and complete data recovery. The Senior Geologist will prepare the Project Data Collection Plan and supervise the interpretation of the data and preparation of reports.

2.4.4 The Project Environmental Coordinator will report directly to the Project Manager and will be responsible for, environmental monitoring and onsite compliance. The Environmental Coordinator will interface with the Winema National Forest, Bureau of Land Management, State and local authorities regarding compliance with all permits and environmental approvals. He will supervise environmental monitoring subcontractors preparation of environmental monitoring reports.

2.4.5 The Compliance Manager will report to the Project Manager and will be responsible for preparation of the Project Institutional Plan and coordination of document control. The Compliance Manager will be responsible for distribution of reports to responsible agencies and will keep the Project Manager apprised of the status of all reporting requirements. The Compliance Manager will assist in the development of all Project Plans and will develop a project reporting procedure to assure compliance with all permits and DOE reporting requirements.

2.5 DOE Personnel Responsibilities

2.5.1 The Project Manager for DOE is the person who shall be CECI's contact for all technical matters pertaining to the Cooperative Agreement. DOE's Project Manager is DOE's technical representative for the Agreement and has the following responsibilities: monitors and assesses the status of progress toward achieving the program milestones and objectives; reviews and evaluates all technical reports prepared by CECI; represents DOE at program review meetings; reviews cost vouchers; and coordinates with CECI in choosing among alternatives for future program activities. The Project Manager will be assisted by designated DOE Contractor personnel in carrying out these responsibilities.

2.5.2 The Contracting Officer has the responsibility/authority for executing, amending, and terminating award instruments. In addition, the Contracting Officer, or designee, has the responsibility for: conducting negotiations concerning the statement of work, costs, and schedule; administration of the agreement; arranging for audits, as appropriate, and resolving audit findings; assuring policies and procedures are implemented approving payments, and taking actions required to close-out the agreement.

3.0 Work Breakdown

3.1 Work Breakdown Philosophy

The work breakdown is organized to accomplish drilling a deep thermal gradient hole to a depth of 5000 feet and perform data collection both during and subsequent to drilling. The work tasks for this Project have been developed based on DOE's and CECI's objectives. The work breakdown is organized to coordinate all interdependent tasks in a scheduled and controlled manner.

The work breakdown structure (List of Tasks) and the person with primary responsibility for each of the tasks follows. Where all or a portion of a task will be subcontracted, the subcontractor is also listed.

3.2 Work Breakdown Structure

	<u>Task</u>	<u>Responsibility</u>
Area 01	Project Administration	Jim Moore/Dave McClain
Task 100	Project Management Plan	
200	Project Control/Management	
300	Clerical	
400	Control	
Area 02	Drilling Operations	Robert Pryde/ Longyear Drilling
Task 100	Project Drilling Plan	
200	Drilling Supervision	
300	Site Preparation	
400	Mobilization/Demobilization	

500 Drilling Operations
600 Supplies
700 Core Logging
800 Completion
900 Abandonment

Area 03 Data Collection Joe LaFleur

Task 100 Project Data Collection Plan
200 Rock Sampling
300 Fluid Sampling
400 Geophysical Logging
500 Reporting

Area 04 Permitting and Environmental Reporting Dave McClain

Task 100 Project Institutional Plan
200 Permit Compliance
300 Environmental Evaluation Report
400 Environmental Monitoring
500 Reporting

Area 05 Project Reporting Anna Carter

Task 100 BLM Drilling Reports
200 Winema National Forest Reports
300 Oregon DOGAMI Reports
400 DOE Drilling and Data Reports

3.3 Task Descriptions

Area 01 Project Administration

This task includes functions necessary for administration throughout the life of the project. These functions include project management, scheduling, monitoring, accounting, reporting, and clerical support.

Area 02 Drilling Operations

This task includes functions and actions necessary for drilling, hole completion, and maintenance.

Site access is by existing logging roads. The hole, upon completion, will consist of approximately 550 feet of 4-1/2 inch casing cemented back to surface using Halliburton. Below the shoe of the 4-1/2 inch casing the hole will be cored to total depth. Should excessive hole problems be encountered, the hole will be cased through the problem zone (after open hole logging) and hole size reduced. It is planned to core the entire hole from the shoe of the 4-1/2 inch surface pipe to total depth. In addition to the fact that core drilling will provide excellent, continuous subsurface rock samples, it also allows drilling even if circulation is lost.

Drilling fluids will consist of EPA approved, non-toxic additives. It is anticipated that these fluids will be allowed to desiccate in the sump until they can either be hauled off or worked into the native materials, dependent on chemical content and the surface manager's direction.

The well will be completed as a deep observation hole with 1-3/4 inch water filled tubing extending from surface to total depth. Access to the tubing will be secured with a locked bull plug.

Drill rig will be capable of drilling or coring to a depth of at least 5000 feet using mud, air or aerated mud as a drilling fluid. The rig will be truck mounted. In addition to the drilling rig, a truck will be available to haul drilling water. Mud will be contained in steel and/or earthen pits during the drilling process and at completion of the well will be allowed to desiccate on site or hauled to an approved disposal site.

As per BLM regulations, the well will be fitted with Blow Out Equipment (BOE) as described in permit stipulations. After completion of the drilling operation, the BOE will be removed from the master gate and well containment/control will be achieved by use of that valve.

No permanent site facilities will be constructed. It is anticipated, however, that both California Energy Company and its drilling contractor will have an office trailer on location.

Drilling Procedure

The proposed program calls for drilling 7-7/8" hole with mud, aerated mud, or air (depending on subsurface conditions encountered) to 550+ feet and cementing 550' of 4-1/2" casing to surface with "Halliburton". The remainder of the hole will be cored. Coring provides better geological information requires less drilling fluid (lowering potential for "washing out" in highly fractured or unconsolidated rocks), and increased flexibility in protective casing strings.

1. Set 5'+ of 8-5/8" conductor pipe with back-hoe and cement with Ready-Mix in a 5' x 5' x 7' deep cellar.
2. Move in and rig up a combination core and rotary rig. Approximate location size 100' x 60'.
3. Spud 7-7/8" hole and drill to approximately 550'+ using a fresh water and gel drilling mud. Standby air drilling equipment will be part of the rig package to aerate the drilling mud if any serious lost circulation is encountered. Collect drill cuttings at 10 foot intervals, no electrical logs to be run over this interval.
4. 4-1/2" casing will be run and cemented at 550' to surface with Halliburton.
5. Weld on casing head flange. Nipple up to 4-1/2" casing with a master valve and hydraulic operated annular B.O.P. Pressure test all equipment to 500 psi, with advance notification to BLM to witness test.

6. Drill out cement plug to 2' below 4-1/2" casing shoe with 4-3/4" bit.
7. Start core drilling with 2.500" ID x 3.783" OD (HQ) wireline coring system. Reduce hole and core size as mandated by drilling conditions. Appropriate electric logs will be run to correlate with rock properties observed in the core. Logs will reflect temperature, porosity and lithologic parameters. It is anticipated that in addition to temperature logs, S.P., Gamma Ray, electric induction and acoustic logs will be run.
8. At completion, run 1-3/4" tubing or equivalent (BQ) drill rod to total depth; fill w/water and cap.
9. Run periodic temperature surveys up to twelve months after completion.

After completion of surveys; plug and abandon the hole in conformance with federal Geothermal Resources Operational Orders.

All surface casing design will exceed 10% of total depth.

Area 03 Data Collection

This task includes those functions and actions necessary for completion of the Data Collection Plan and distribution of the data reports. The following data collection task will be included in the Data Collection Plan.

Data Collection During Drilling

Proposed data collection during drilling operation will include the following major activities:

- o Sampling of drill cuttings of every 10' during rotary drilling prior to cementing of surface casing. Preparation of detailed lithologic log. Depth 0' - 550'.
- o Continuous wireline core sampling. Labelling and photographic record of core. Preparation of detailed structural, mineralogical and lithologic logs by qualified staff geologist. Sampling for thin section description as warranted by geologic conditions. Depth 550' - 5000'.
- o Daily recording of core recovery as a percentage of total depth drilled. In addition, a rock quality designation (RQD) will be determined as an indication of the degree of fracturing within the hole. Depth 550' - 5000'.
- o Drilling and mud service contractors to be required to report all lost circulation zones together with depth encountered and time of lost circulation. Will be monitored by well site geologist. Depth 0' - 5000'.

- o Any artesian flow during drilling will be sampled and formation water flow tested. Depth: as necessary.
- o Temperature Logging. Drilling mud flowline temperatures will be recorded while drilling is in progress. Non-equilibrated bottom hole temperature will be taken when drilling operations permit.
Depth 550' - 5000'.

Data Collection After Drilling

At the cessation of drilling operations and prior to completion of the hole, the following program of data collection will be undertaken.

Geophysical Well Logs. Assuming no intermediate casing is set, logs will be run from beneath the surface casing at 550 ft. to bottomhole. If it is necessary to run intermediate casing, the same logs will be run prior to that casing operation.

Well Logging Contractor: Dresser Atlas or Schlumberger
 Well Logs: Gamma Ray Log - Lithologic characteristic
 Electric Induction/SP log - Resistivity variation
 Acoustic Log - Formation velocity/porosity

All tools used will be designed for high temperature, hostile environments and rated to a minimum of 450°F.

Temperature Logging. At completion of drilling operations and subsequent to open hole geophysical logging, 1-3/4" tubing will be run in the hole. The tubing will be filled with water. Temperature logs will be run inside the tubing within the first week, after one month and at one year following completion of drilling.

Area 04 Permitting and Environmental Reporting

This task includes all regulatory, compliance and monitoring programs for the project. Compliance and monitoring requirements for the project and identified in the Project Institutional Plan. Environmental monitoring will include water quality, noise, and visual monitoring.

Area 05 Reporting

This task includes all compliance reports for the BLM, Winema National Forest, Oregon DOGAMI, and DOE.

4.0 Schedule

The Project Schedule has been outlined to assure successful completion of the drilling of the deep temperature gradient well and provides for close coordination and integration of all project tasks. California Energy will use a 12 month schedule to complete all drilling well completion and data logging and reporting operations. A major schedule constraint to operations at this

location is the winter snow season. All site operations must be completed by November 30 to avoid extreme weather conditions. Operations will also be constrained by winter snow pack which can restrict site access from November through April.

The schedule in Figure 1 identifies the time requirements to accomplish the task identified in the work breakdown structure.

5.0 Project Status Evaluation

5.1 Cost Control

5.1.1 Direct Labor System

CECI uses a direct labor system for payroll and billing. It records project task numbers weekly for each employee. Billing and payroll are generated and controlled by the system. All CECI time sheets for this project will note Job Code 42 denoting the Mazama Prospect Area unit account and task descriptions will identify the specific well number and the work breakdown area and task numbers as shown in Figure 2 Example Time Sheet.

5.1.2 Cost Accounting

DOE will receive a semi-monthly invoice itemizing all charges against the project. The cost accounting system to support this invoice and provide backup invoice data is in two sections: payroll-related costs and non-payroll costs.

The basis for all payroll-related costs is the employee's time card. Individuals record their time worked on each task in the Work Breakdown Structure to the nearest hour on weekly time cards, which are approved by that individual's supervisor. This information is entered into the direct labor system. The project manager is responsible for approval of the hours charged to the project. Once the information is verified and approved, it is combined with the employee's actual payrates to produce project labor costs and billings. These hours and costs are also used to update the actual expended portion of the project control system. This system is such that any labor charge can be easily tracked back to the original signed time card.

Non-payroll costs are billed semi-monthly. The project manager is responsible for verifying and approving all non-payroll charges against the project.

5.1.3 Approval of on Site Materials Purchased

The Project Manager is responsible for approval of purchase of all materials. He may delegate this responsibility to the Drilling Manager on site or to the drilling subcontractor. The Project Manager will be responsible for verifying these changes and approving that the invoice is chargeable against the project.

5.1.4 CECI Vehicle Cost

Actual mileage logs will be recorded for CECI vehicles used in connection with this project. The mileage log will record the total miles driven semi-monthly, vehicle license number, and employees name.

5.1.5 Subcontractor

The Project Manager will be responsible for approval of all subcontracts and will review and approve all subcontractor invoices.

5.2 Performance Evaluation

CECI will send the DOE a detailed progress report monthly which will include the project progress, schedule and will relate the expenditures to budget. Cost to date will also be estimated on the daily drilling reports telecopied to UURI and DOE.

6.0 Administrative Procedures

6.1 Project Files

Project files are established to facilitate document retrieval. The project file will be set up by the Project Manager and be indexed to the work breakdown structure.

6.2 Communications

6.2.1 Incoming Correspondence

Project Manager: Reviews correspondence, assigns routing instructions, then returns all original correspondence to Secretary for disposition.

6.2.2 Outgoing Correspondence

All outgoing project correspondence shall be reviewed and signed by the Project Manager. In the Project Manager's absence, to avoid unnecessary delay, another responsible member of the project team may review and sign the correspondence. However, in such cases, signators shall sign their own name and write the word "for" above the typed name for the Project Manager.

Correspondence initiated by California Energy includes the following reference:

Cascades Geothermal Research
DOE Cooperative Agreement No. DE-FC07-86ID12654
MZI-11A

Outgoing correspondence is distributed according to the Project Manager.

6.2.3 Notes of Conference

Notes of conference will be taken for all meetings. Index and subject file numbers are assigned according to the project file index.

6.2.4 Telephone

Telephone conversations of major importance to the project (change in scope, contractual matters, etc.) shall be formally confirmed by a letter.

6.2.5 Telecommunications

Telecommunications consist of telexed, telecopied, computer telecommunicated correspondence. Subject file numbers are assigned according to the project file index. Daily drilling reports will be telecopied using the report form found in Figure 3.

6.2.6 Document Transmittal

Copies of outgoing document transmittals are maintained by the Secretary. If acknowledgment of receipt is required by the project, the signed acknowledgement copy is filed with the outgoing copy of the transmittal.

6.3 Business Management

6.3.1 Estimated Cost

The total estimated cost of the work under this Agreement is \$605,000. For performance of work under this Agreement, the agreed share ratio of allowable direct labor and indirect costs is 38% DOE and 62% CECI and the agreed share ratio of allowable travel, purchases, and subcontracts is 50% DOE and 50% CECI. CECI shall be reimbursed by DOE for not more than 38% of the direct labor and indirect costs and 50% of the travel, purchases, and subcontract costs of the project determined to be allowable in accordance with General Provision No. 29, entitled "Allowable Cost and Payment." The remaining cost of the project so determined shall constitute CECI's share for which it will not be reimbursed by DOE. If at any time CECI has reason to believe that this or any revised estimate is in error, CECI shall so notify DOE in writing and provide DOE with a new estimate within thirty days.

6.3.2 DOE's Financial Support

The total cost to DOE for all the work under this project is Two Hundred Eighty-Five Thousand Dollars (\$285,000), and under no circumstances will DOE's support exceed this amount. This limitation includes termination costs, if any.

6.3.3 CECI's Financial Support

All costs in excess of the Two Hundred Eighty-Five Thousand Dollars (\$285,000) to be provided by DOE will be provided by CECI.

6.3.4 Obligated Funds

The amount of funds presently obligated to this Agreement by DOE is Two Hundred Eighty-Five Thousand Dollars (\$285,000).

6.3.5 Payments

Progress payments will be made on the basis of allowable costs incurred subject to the applicable cumulative ceiling. Invoices shall be submitted to DOE upon completion of each of the following milestones:

<u>Milestone</u>	<u>Maximum Cumulative Amount Payable by DOE</u>
1. Rig Mobilization	\$ 25,850
2. Drill to a Depth of 1400'	\$ 86,950
3. Drill to a Depth of 2800'	\$143,350
4. Drill to a Depth of 4000' and Demobilize	\$199,710
5. Well Data to DOE	\$210,203
6. Complete Site Maintenance and Restoration	\$215,000

Payments approximate costs associated with respective phases but do not exactly correspond. The schedule is for progress payments only; actual allowable costs will be determined in accordance with Article III and General Provision No. 29.

6.3.6 Payment Methods

- A. Four copies of invoices shall be submitted to the address specified on Block 12 of the NFAA (DOE Form 4600.1).
- B. Payments due for amounts properly invoiced in accordance with the terms and conditions specified elsewhere in the Cooperative Agreement shall be made either by Treasury check(s) payable to CECI or by electronic funds transfer(s) to a financial institution designated by CECI. The method of payment shall be determined by the Government at the time of payment in accordance with applicable Department of Treasury requirements.
- C. After award but no later than fourteen (14) days before an invoice or bill is submitted for payment, CECI shall designate a financial institution for the receipt of electronic funds transfer payments hereunder; and provide the appropriate Government representative (Contracting Officer or finance official as determined by the Government) with the name of the designated financial institution, financial institution's or correspondent financial institution's 9-digit American Bankers Association identifying number, telegraphic abbreviation of such financial institution, and account number at the designated financial institution to be credited with the funds.

- D. In the event CECI during the performance of the Cooperative Agreement elects to designate a different financial institution for the receipt of any payment made using electronic funds transfer procedures, notification of such change and the information as specified in paragraph B. above must be received by the appropriate Government representative thirty (30) days prior to the date such change is to become effective.

6.4 Procurement Procedure

California Energy Company, Inc. ("CECI" or "Cal Energy") maintains a Code or standard of conduct that shall govern the performance of its officers, employees or agents engaged in the awarding and administration of contracts using Federal funds.

1. No employee, officer or agent shall participate in the selection, award or administration of a contract in which Federal funds are used, where, to his knowledge, he or his immediate family, partners or organization in which he or his immediate family or partner has a financial interest, or with whom he is negotiating or has an arrangement concerning prospective employment.
2. Cal Energy's officers, employees or agents shall neither solicit nor accept gratuities, favors or anything of monetary value from contractors or potential contractors.
3. All procurement transactions shall be conducted in a manner to provide to the maximum extent practical, open and free competition.
4. Proposed procurement actions shall follow a procedure to assure the avoidance of purchasing unnecessary or duplicative items.
5. Where appropriate, an analysis shall be made of lease and purchase alternatives to determine which would be the most economical, practical procurement.
6. Solicitations for goods and services shall be based upon clear and accurate description of the technical requirements for the material, product or service to be procured. Such a description shall not, in competitive procurements, contain features which unduly restrict competition.
7. Positive efforts shall be made by CECI to utilize small business and minority-owned business sources of supplies and services.
8. The type of procuring instruments used (e.g., fixed price contracts, cost reimbursable contracts, purchase orders, incentive contracts) shall be determined by CECI but must be appropriate for the particular procurement and for promoting the best interest of the program involved. The "cost-plus-a-percentage of cost" method of contracting shall not be used.
9. Contracts shall be made only with responsible contractors who possess the potential ability to perform successfully under the terms and conditions of a proposed procurement. Consideration shall be given to such matters as

contractor integrity, record of past performance, financial and technical resources or accessibility to other necessary resources.

10. All proposed sole source contracts or where only one bid or proposal is received in which the aggregate expenditure is expected to exceed \$5,000 shall be subject to prior approval at the discretion of the Federal sponsoring agency.
11. Some form of price or cost analysis should be made in connection with every procurement action.
12. Procurement records and files for purchases in excess of \$10,000 shall include the following:
 - a. Basis for contractor selection;
 - b. Justification for lack of competition when competitive bids or offers are not obtained; and
 - c. Basis for award cost or price.
13. A system for contract administration shall be maintained to ensure contractor conformance with terms, conditions and specifications of the contract.
14. Contracts in excess of \$10,000 shall contain contractual provisions or conditions that will allow for administrative, contractual or legal remedies in instances in which contractors violate or breach contract terms, and provide for remedial actions as may be appropriate.
15. All contracts in excess of \$10,000 shall contain suitable provisions for termination by Cal Energy.
16. All contracts for construction for more than \$100,000 shall have required bonding.

6.5 DOE Project Monitoring

DOE will closely monitor the performance of work under the cooperative agreement. This monitoring shall include: frequent telephone communications; site visits with frequency and duration as dictated by program needs; onsite monitoring; participation in program review meetings; review of specified program reports; determination that milestones are satisfactorily accomplished; and generally handling routine contract administration activities as necessary to maintain the program budget and schedule within established limits.

In addition, DOE may assign an on-site or resident technical monitor for a portion of the program performance. The principal responsibility of the resident technical monitor will be to maintain frequent communications regarding project technical progress status with DOE program and project management personnel.

7.0 Coordination of Information and Communication

7.1 Project Information System

CECI shall prepare and submit to DOE and it designates (postage prepaid) the plans and reports indicated on the Reporting Checklist. Preparation of the specified plans and reports shall be in accordance with DOE Order 1332.2, Uniform Reporting System for Federal Assistance (grants and cooperative agreements). CECI shall be responsible for acquiring data from any subcontractors, to ensure that data submitted are compatible.

CECI shall not claim that any report contains any trade secrets or commercial or financial information deemed by the Participant to be privileged or confidential, or that the Participant has any proprietary interest in any report.

CECI and DOE will coordinate public disclosure or dissemination of new data or information arising out of the design, construction or operation of the project, it being understood that the intent is to release all data and information to the greatest practicable extent in order to achieve the objective of obtaining maximum public value from the results of this project. It is understood that the foregoing is not intended to afford either party the right to prevent a public release by the other. CECI will distribute reports to the following distribution list:

U.S. Department of Energy
Idaho Operations Office
785 DOE Place
Idaho Falls, ID 83402

Susan M. Prestwich, Geologist
Advanced Technology Division

Elizabeth M. Bowhan
Contracts Specialist
Contracts Management Division

Earl G. Jones
Director
Financial Management Division

U. S. Department of Energy
Technical Information Center
Oak Ridge, TN 37830

University of Utah Research Institute
391 Chipeta Way
Salt Lake City, UT 84108

Mike Wright, Director
Earth Science Laboratory

7.2 Media Information Procedure

All activity concerning the media will be coordinated through California Energy Company and the Winema National Forest.

Interviews will be granted only when prearranged. This may be done by phone at any time by contacting Jim Moore or Joe LaFleur at:

Santa Rosa Office: 707-526-1000

7.3 Public Tours

None of the proposed sites are in areas of heavy public use. During operation the sites will be occupied on a 24 hour per day by Company and contractor personnel. Persons not directly involved in the operations will be restricted from the site.

Tours given by California Energy, DOE or the Winema National Forest for the benefit of the media or the general public will be prearranged at least 24 hours ahead of time.

All planned visiting guests will be met and escorted by California Energy personnel. Guests will meet at the Chiloquin Junction, Highway 97 and Road 2308. From there they will follow CECI into the forest and onto the drillsite.

The entire drillsite is a designated hard hat area. Visitors are to first proceed to the drilling managers trailer office to receive and don hard hats.

7.4 Third Party Communications

The Bureau of Land Management (BLM) and Winema National Forest (WNF) have established responsibilities and authorities for communication (refer to the Introduction to the Mazama Core Hole Manual in the Project Institutional Plan).

FIGURE 1

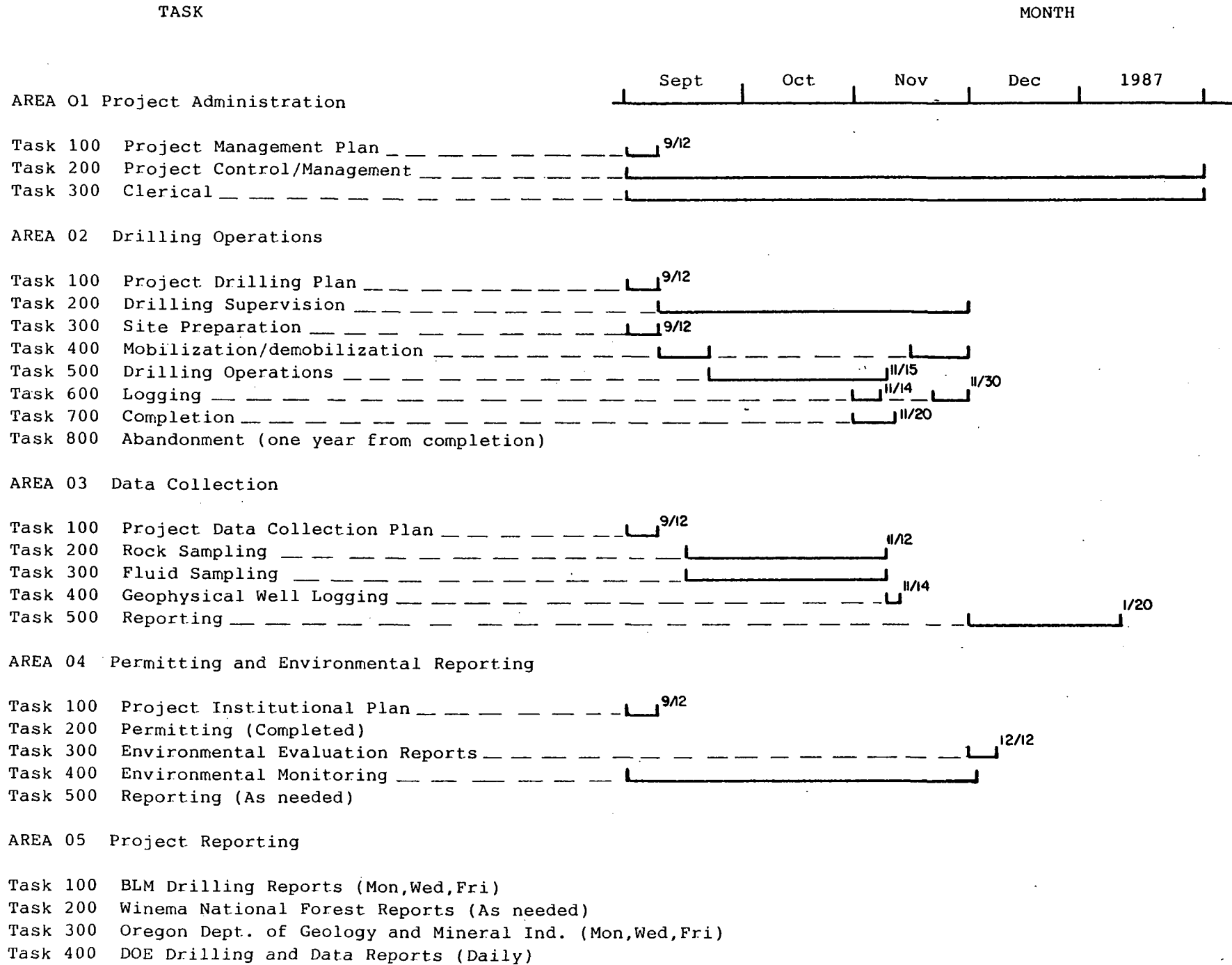


FIGURE 2.

California Energy Company, Inc.

Time Sheet

NAME LaFleur, Joe					Sunriver	Exempt									
					LOCATION	WEEK ENDING 9/17	LABOR CODE								
JGB/ OVERHEAD	G	R	PP	TL	DESCRIPTION	TOTAL HR.		SAT	SUN	MON	TUES	WED	THUR	FRI	
						ST	O/T								
42		X			11A - 02 - 300	20				8	8	4			
42		X			11A - 02 - 400	12						4	8		
42		X			11A - 03 - 200	4								4	
41					11A - 02 - 200	4								4	
G = GENERAL					VACATION										
R = RESOURCE					HOLIDAY										
PP = POWER PLANT					SICK										
TL = TRANSMISSION LINE					OTHER										
					GRAND TOTAL (ST+O/T)		TOTAL	40			8	8	8	8	8

EMPLOYEE'S SIGNATURE _____ TYPED EXAMPLE

APPROVED SIGNATURE _____ TYPED EXAMPLE

Cascades Geothermal Research

PROJECT DRILLING PLAN

Mazama Deep Temperature Gradient

Hole MZI-11A

**Winema National Forest
Klamath County, Oregon**

**California Energy Company, Inc.
3333 Mendocino Avenue, Suite 100
Santa Rosa, CA 95401**

Agreement No. DE-FC07-86ID12654

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PROJECT DRILLING PLAN
MZI-11A

1.0 Introduction

1.1 Abstract

This Project Drilling Plan is intended to summarize drilling procedures pertaining to drilling MZI-11A under a Cooperative Agreement between the United States Department of Energy (DOE) and California Energy Company, Inc. (CECI). This volume includes drilling procedures for CECI's field personnel based on the Bureau of Land Management (BLM) and Oregon Department of Geology and Mineral Industries (DOGAMI) drilling permits.

1.2 Project Description and Objective

CECI plans to drill a deep temperature gradient hole located at SE 1/4, SW 1/4, Sec. 10, T31S, R7-1/2E, Klamath County, Oregon. The gradient well will be logged by CECI, and the data collected will be transferred to the DOE for publication.

2.0 Drill Site

2.1 MZI-11A Site Location

The MZI-11A site is located in the SE 1/4, SW 1/4, Sec. 10, T31S, R7-1/2E in the Winema National Forest (see location map Figure 1). The drill site is an old log landing accessible by existing roads, at an elevation of approximately 6050 feet. The permitted source of water for drilling and miscellaneous use is the main fork of Scott Creek about 1/2 mile north of the drill site (see Figure 2).

2.2 Geologic Setting

Mount Mazama is located at the north end of the Klamath Graben, where this large NNW trending Basin and Range rift bends northward into coincidence with the High Cascades trend. The zone of crustal weakness created by this intersection was apparently facilitated by the repeated influx of mafic magma from great depth and the evolution of upper level silicic magma chambers.

The Mazama Quaternary stratovolcano lies on a pile of interspersed shields, stratocones, small monogenetic volcanoes and valley fillings of basalts and andesites that compose the volcanic rocks of the High Cascades. This base of older High Cascades volcanics may date back to 7 million years B.P. At greater depth, the volcanic rocks of the Western Cascades group probably underlie the Mazama massif. This group is composed of subequal amounts of basalts, andesites and rhyolitic tuffs and flows that range in age from 15 to 35 million years. About 20 km west of Crater Lake the Western Cascades group is roughly 18,000 feet thick and dips gently westward; however, the depth and thickness of this sequence beneath Mt. Mazama is speculative. The nature of the older basement rocks underlying the Mazama area is unknown, but Paleozoic metasediments are suspected.

The east flank of the Mazama massif consists of an older silicic volcanic field composed of dacitic domes and associated lava flows. Many of these dacitic domes are aligned in northwest trending vent linears. Two such vent trends comprise the NW trending ridges that flank the Scott Creek drainage. They may reflect older fault zones that facilitated magma ascension. Whether the NW linear trend of Scott Creek is fault controlled is undetermined but possible.

Mount Scott, a large and prominent volcanic vent, is centered about 2-1/4 miles NW and up-hill of the MZI-11A site. Lava flows from Mount Scott extend down to the area of the MZI-11A site and presumably overlie older dacite flows of the east-side dome field.

2.3 Site Preparation

The drill site is a level area which was recently used as a logging landing. The site is covered with scattered logging slash material and a small amount of natural revegetation material.

Site preparation will include removal of brush leveling the pad with a backhoe bucket blade and digging and lining with plastic the mud sumps. Brush will be stockpiled along the side of the pad to be used for reclamation cover after abandonment. An open area approximately 200 x 200 feet is available for pad construction without any additional clearing. Additional parking areas for trucks and equipment is available along the main access road. Two sumps will be constructed by a backhoe and be approximately 6 x 10 x 20 feet each and lined with visquine.

3.0 Drilling

3.1 Drilling Operations

Drill rig will be capable of drilling or coring to a depth of at least 5000 feet using mud, air or aerated mud as a drilling fluid. The rig will be truck mounted. In addition to the drilling rig, a truck will be available to haul drilling water. Mud will be contained in steel and/or earthen pits during the drilling process and at completion of the well will be allowed to dessicate on site.

The proposed program calls for drilling 7-7/8" hole with mud, aerated mud, or air (depending on subsurface conditions encountered) to 550+ feet and cementing 550' of 4-1/2" casing to surface with "Halliburton." The remainder of the hole will be cored. Coring provides better geological information, requires less drilling fluid (lowering potential for "washing out" in highly fractured or unconsolidated rocks), and increased flexibility in protective casing strings.

As per BLM regulations, the well will be fitted with Blow Out Equipment (BOE) as described in permit stipulations. After completion of the drilling operation, the BOE will be removed from the master gate and well containment/control will be achieved by use of that valve.

No permanent site facilities will be constructed. It is anticipated, however, that both California Energy Company and its drilling contractor will have an office trailer on location.

The planned hole design consists of the following:

1. Set 5'+ of 8-5/8" conductor pipe with backhoe or rotary rig and cement with Ready-Mix.
2. Move in and rig up a combination core and rotary rig. Approximate location size 100' x 60'. Cellar as necessary.
3. Spud 7-7/8" hole and drill to approximately 550'+ using a fresh water and gel drilling mud. Standby air drilling equipment will be part of the rig package to aerate the drilling mud if any serious lost circulation is encountered. Collect drill cuttings at 10 foot intervals, no electrical logs to be run over this interval.
4. 4-1/2" casing will be run and cemented at approximately 550' to surface with Halliburton.
5. Weld on casing head flange. Nipple up to 4-1/2" casing with a master valve and hydraulic operated annular B.O.P. Pressure test all equipment to 500 psi, with advance notification to BLM to witness test.
6. Drill out cement plug to 2' below 4-1/2" casing shoe with 4-3/4" bit.
7. Start core drilling with a 2.500" ID x 3.783" OD (HQ) wireline coring system. Reduce hole and core size as mandated by drilling conditions. Appropriate electric logs will be run to correlate with rock properties observed in the core. Logs will reflect temperature, porosity and lithologic parameters. It is anticipated that in addition to temperature logs, S.P., Gamma Ray, electric induction and acoustic logs will be run.
8. At completion, run 1-3/4" tubing or equivalent (BQ) drill rod to total depth; fill w/water and cap. It may be necessary to run open ended, depending on hole conditions.
9. Run periodic temperature surveys up to twelve months after completion.

After completion of surveys, plug and abandon the hole in conformance with federal Geothermal Resources Operational Orders.

3.2 Drilling Fluids and Disposal Method

Drilling fluids will consist of EPA approved, non-toxic additives. It is anticipated that these fluids will be allowed to dessicate in the sump until they can either be hauled off or worked into the native materials, dependent on chemical content and the surface manager's direction.

3.3 Hole Completion

The hole, upon completion, will consist of approximately 550 feet of 4-1/2 inch casing cemented back to surface using Halliburton. Below the shoe of the 4-1/2" casing the hole will be cored to total depth.

The well will be completed as a deep observation hole with 1-3/4" water filled tubing extending from surface to total depth. Access to the tubing will be secured with a locked bull plug.

3.4 Anticipated Hole Problems

Potential downhole problems include loss of tools, deviation in hole direction and loss of circulation. Loss of tools can occur for several reasons, the most likely will be twisting off. If a mechanical failure occurs an attempt will be made to fish out the tools and resume drilling. If deviation in hole direction occurs corrective measures may include using a stiffer drill string, and/or pulling back, plugging and re-drilling through the problem area. Should excessive hole problems be encountered, the hole will be cased through the problem zone (after open hole logging) and hole size reduced. It is planned to core the entire hole from the shoe of the 4-1/2" surface pipe to total depth. In addition to the fact that core drilling will provide excellent, continuous subsurface rock samples, it also allows drilling even if circulation is lost.

Loss of circulation is most critical in setting the 550 feet of surface casing. Recirculation of the cement to the surface is a requirement of the BLM permit. If lost circulation occurs in the first 550 feet of hole cement plugs will be used to block off the problem zone. If localized plugs are not effective, then the hole can either be filled with Ready-Mix, and drilled out or a shorter string of surface casing set above the problem zone. The BLM permit requires surface casing be at least 10% of the total depth. Exemptions to this rule can be obtained but depend upon the type of cement job and length of the casing eventually set. The Project Manager will keep DOE informed if lost circulation can not be controlled and a shorter surface casing must be set. Lost circulation during surface casing program at CECI's North Newberry core hole caused a two week delay and \$60,000 cost overrun. This example is considered a typical situation.

4.0 Schedule

<u>Activity</u>	<u>Period</u>
Site Preparation	Completed by 9/12/86
Mobilization	Rotary Rig on site by 9/12/86 Coring Rig on site by 9/20/86
Set Surface Casing	Completed by 9/20/86
Initiate Coring	9/24/86 (late start)
Total Depth	11/15/86 (early completion)
Completion	11/20/86
Temperature Logging	11/30/86
Abandonment	1/20/87

5.0 Permits

Drilling operations are governed by GRO #4 and the permit stipulations in the BLM and DOGAMI permits. Copies of these permits are enclosed in the Project Institutional Plan.

T
30
S

CRATER LAKE

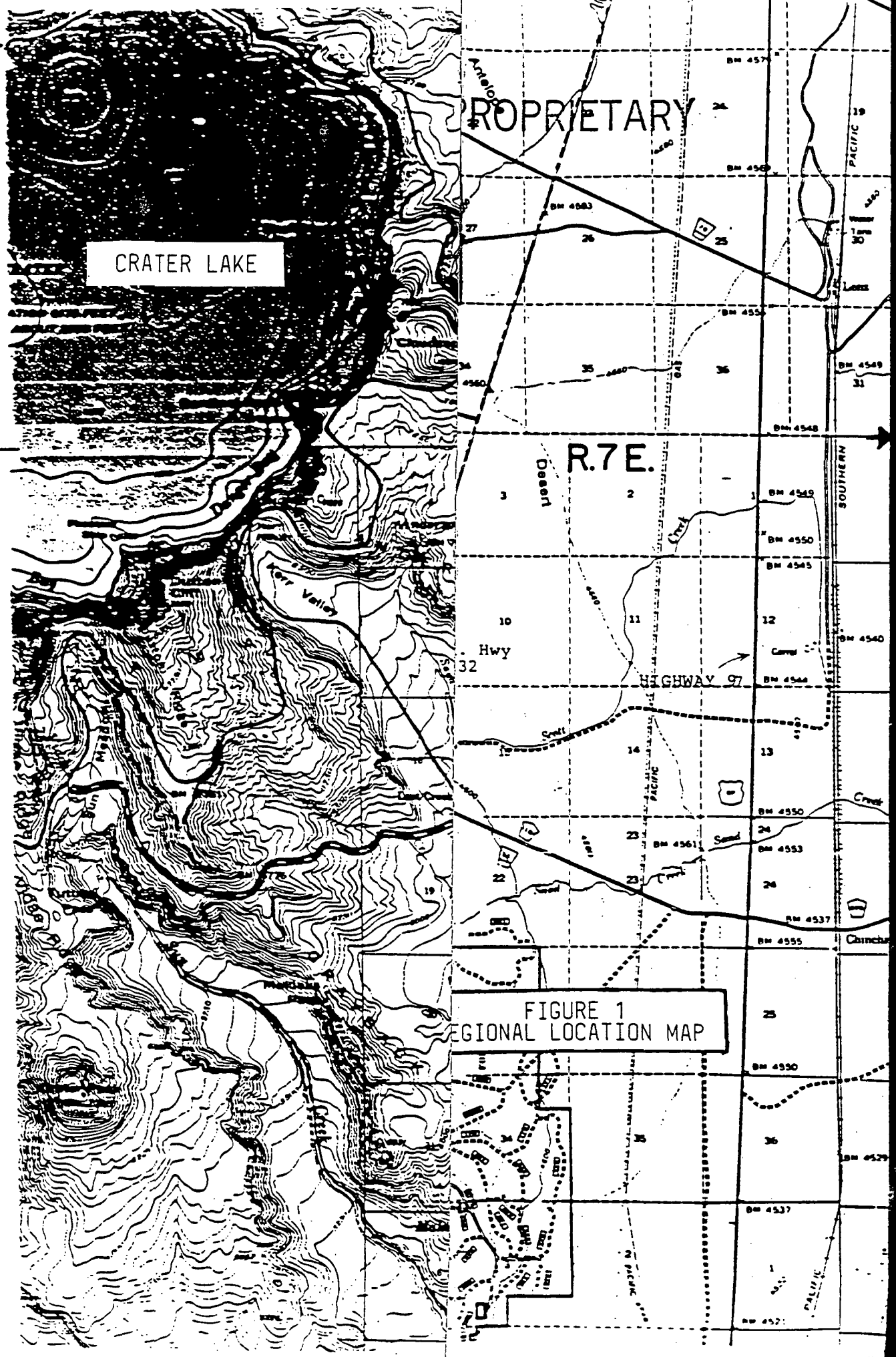
T
31
S

PROPRIETARY

R.7E.

HIGHWAY 97

FIGURE 1
REGIONAL LOCATION MAP



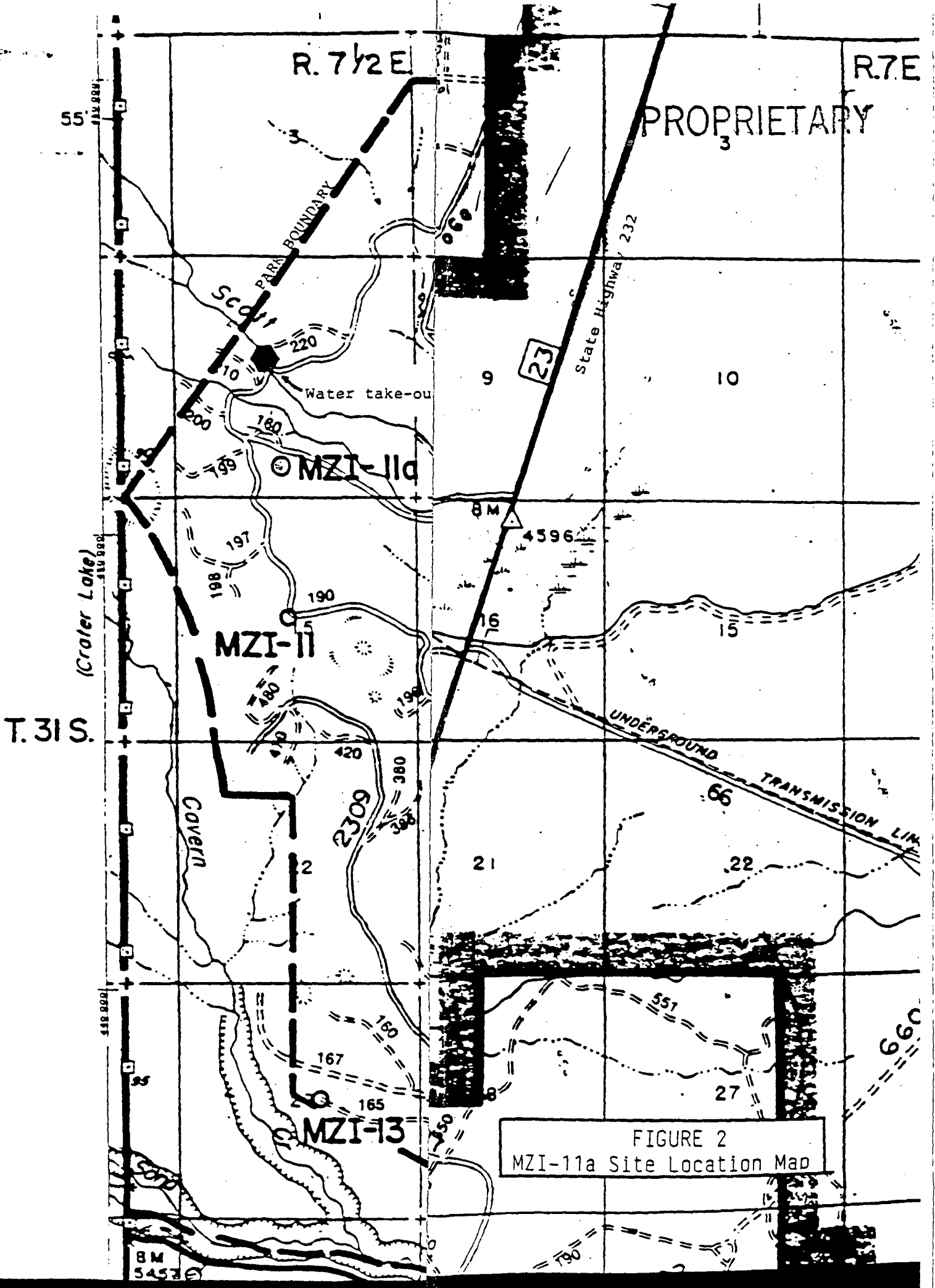


FIGURE 2
MZI-11a Site Location Map

Cascades Geothermal Research

PROJECT INSTITUTIONAL PLAN

Mazama Deep Temperature Gradient

Hole MZI-11A

**Winema National Forest
Klamath County, Oregon**

California Energy Company, Inc.
3333 Mendocino Avenue, Suite 100
Santa Rosa, Ca. 95401

Agreement No. DE-FC07-86ID12654

INSTITUTIONAL PLAN

California Energy Company/DOE
Cost Share Agreement DE-FC07-86ID12654

Deep Temperature Gradient Core Hole MZI-11A

BACKGROUND

The MZI-11A site is on Winema National Forest (WNF) lands in Klamath County, Oregon, on Lease No. OR 34669. The U.S. Bureau of Land Management (BLM) issued California Energy unitized (Mazama I and II Units) and nonunitized geothermal leases in the WNF under the USFS Contingent Right Stipulations procedure on January 1, 1984.

BLM is the lead agency responsible for administration of the leases and operations on the leases. Permitting and operating procedures for exploration and development on leases are set forth in regulations promulgated under the Geothermal Steam Act of 1970 and in the federal Geothermal Resources Operational Orders (GROs) administered by BLM. Proposed operations are permitted through submittal of plans of operation and applications for permits (as set forth in GRO No. 5) to the BLM Portland Office. BLM Inspections and Enforcement personnel administer compliance with the GROs for subsurface (drilling) operations through their Lakeview or Prineville District Offices.

WNF, the surface manager, works closely with BLM in the environmental documentation process, coordinates operations and maintains communications with interested parties, Crater Lake National Park and Klamath County. WNF is the lead agency for administering USFS regulations and issuing and administering surface use permits (road use, water access, fire prevention, etc.). For this project, WNF is also taking a more active role in administering compliance with BLM GRO No. 4 - General Environmental Protection Requirements.

On January 29, 1984, a Plan of Exploration was submitted to BLM identifying 24 sites for drilling of temperature gradient (TG) core holes up to 4,000' in depth. BLM and WNF proceeded to prepare an Environmental Assessment (EA) for the proposed drilling. Applications for Permits to Drill nine holes were submitted to BLM on March 29, 1984 under an assumption that the environmental process would be completed in time to allow drilling during the 1984 field season. BLM and WNF issued a Draft EA and Preliminary Finding of No Significant Impact (FONSI) on May 14, 1984.

Concerns about possible impacts on Crater Lake National Park, expressed late in the EA process, received careful consideration at all levels and delayed issuance of the Final Amended EA, FONSI and Decision Record until December 12, 1984. In consideration of the environmental/regulatory delay, and in accordance with the provisions of the leases and the USFS Contingent Right Stipulation procedures under which these leases were approved for issuance, BLM granted California Energy a temporary suspension of the obligations of the Mazama I and II Units from April 1, 1984 to May 1, 1985.

PERMITTING AND COMMUNICATIONS

All permits and environmental approvals necessary to complete the MZI-11A hole have been obtained. Copies of any changes to permits and approvals, and all completion reports will be submitted to DOE as they are generated.

California Energy has maintained close communications with regulatory agencies, conducted tours of the sites, and has been responsive to requirements and requests throughout the history of the permitting of this project.

In order to ensure compliance in the field with the stipulations of permits, and to maintain appropriate communications, California Energy has developed a "Mazama Core Hole Manual." The manual contains an introduction to regulatory agency permits, a list and copies of permits and supporting documents and a list of Authorities and Communications. The Mazama Core Hole Manual is distributed to California Energy management, geological and drilling personnel, with courtesy copies to BLM and WNF.

The "Mazama Core Hole Manual" is made a part of this Institutional Plan by reference and is attached hereto as Exhibit I.

Cascades Geothermal Research

PROJECT DATA COLLECTION PLAN

Mazama Deep Temperature Gradient

Hole MZI-11A

**Winema National Forest
Klamath County, Oregon**

**California Energy Company, Inc.
3333 Mendocino Avenue, Suite 100
Santa Rosa, CA 95401**

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2.0	Geotechnical Data Collection After Drilling	2
3.0	Environmental Monitoring and Data Collection	3
4.0	Coordination of Research Activities	4

DATA COLLECTION PLAN
MZI-11A

1.0 Geotechnical Data Collection During Drilling

The surface hole will be drilled with tri-core bit to approximately 550'. Cuttings for DOE will be collected at 10 foot intervals in four unwashed splits of at least 500 grams each. Separate samples for the Oregon Department of Geology and Mineral Industries (DOGAMI) will be collected at 30 foot intervals then washed and dried. A field-quality lithologic log will be prepared and accompany the DOE cuttings.

Surface casing will be set to a depth of approximately 550'. Below this the hole will be deepened to total depth by continuous diamond core. Continuous core will be recovered by wireline retriever. The core will be washed, boxed, photographed and temporarily stored at CECI's field office at 201N Sunriver Plaza, Sunriver, Oregon. An accompanying field quality lithologic log will be prepared for all the core. This log will include core recovery percentage, primary lithologic description, secondary mineralization/ alteration, description of fractures, fracture coatings and veining.

All of the core, except for approximately two dozen 4" to 6" pieces requested by DOGAMI and possibly a few small samples selected by CECI for thin sectioning, will be collected by and stored at the University of Utah Research Institute.

The drilling contractor will note all lost circulation zones; recording lost circulation amounts, depth and time.

The "hydraulic head" or depth to fluid in the hole will be repeatedly monitored throughout the day whenever the wireline core retriever is re-lowered into the hole. A daily record of the fluid level will be maintained and the time and hole depth of significant changes will be recorded.

If artesian flow is encountered, the drilling contractor will perform a simple flow test and record the rate of flow. The temperature of the artesian water will be recorded and representative samples will be collected for chemical analysis. At least 2 liters of clear, filtered water will be collected in plastic bottles and sealed to prevent evaporation. A two liter sample of the drilling fluid in use prior to the artesian flow will also be provided.

Mud flowline temperatures will be recorded while core drilling is in progress (approx. 550' to T.D.). During intervals of established circulation, mud temperatures will be recorded every two hours by the drilling contractor. At least once every 48 hours, non-equilibrated bottom hole temperatures will be recorded during core retrieval operations.

2.0 Geotechnical Data Collection After Drilling

Geophysical well logs will be run from the base of surface casing (approximately 550' depth) to total depth. Geophysical logging will be performed prior to casing any of this interval. The logging tools employed will provide indication of lithologic and porosity parameters. These logs will include gamma ray, electric induction/self potential, and acoustic velocity logs. The logging tools employed will be designed for high temperature, hostile environments and rated to a minimum of 450°F.

Temperature logging procedures will be conducted subsequent to the open-hole geophysical logging. 1-3/4" tubing or equivalent drill rod (BQ) will be run in the hole to T.D. This tubing will be filled with water and allowed to thermally equilibrate with formation temperatures. Temperature logs will be run inside the tubing after one week, after one month, and after one year following completion of drilling.

3.0 Environmental Monitoring and Data Collection

Visual

CECI will photograph the site prior to surface disturbance, and will compile a photographic record of the project. The site will also be photographed after completion of drilling and site reclamation. Photographs of the site will also be taken from the top of Mt. Scott and Rim Drive during drilling.

Water Quality

Up to five water quality monitoring stations will be established near the project area. Water samples will be collected and evaluated by an independent subcontractor (Century West Engineering, Bend, Oregon). Water samples will be collected prior to drilling to establish the baseline water quality. Water samples will also be collected during and after drilling to document any influence of drilling operations on water quality. The following water quality monitoring stations have been selected:

T31S, R7-1/2E:

- Section 10: Scott Creek Crossing of USFS Rd. 2388 (water truck loading)
: Large spring on Scott Creek, 200 yds. north of drill site
- Section 11: Confluence of north and south forks of Scott Creek
- Section 13: Scott Creek upstream of Scott Creek Campground

Noise

Noise monitoring will be conducted by the BLM and CECI. BLM personnel will collect data independent from CECI. CECI will use a third party subcontractor (R & W Engineering, Portland, Oregon). Noise monitoring stations will be established by CECI at the following locations:

- 1) At the Drill Site
- 2) At the National Park Boundary approximately .43 mile NW of the drilling
- 3) At the top of Mt. Scott within Crater Lake National Park
- 4) At Lost Creek Campground, 2 miles west of the drill rig within Crater Lake National Park

Ambient noise levels will be recorded prior to drilling by CECI at each of these locations. Noise levels will be recorded during core drilling at each of these locations during a one week period when the coring operations is between 550 feet and 1500 feet. BLM will monitor for noise periodically during all phases of the operation. All noise data will be exchanged between BLM and CECI. Oregon Department of Environmental Quality and GRO #4 standards will be used by the CECI subcontractor to collect the noise data.

4.0 Coordination of Research Activities

- . All inquiries for release of technical data regarding MZI-11A will be directed by CECI to UURI.
- . CECI will make daily drilling reports by telecopier to DOE and UURI during drilling operations.
- . CECI will provide UURI copies of field recorded data within 30 days after completion of drilling and logging and will provide DOE copies of all completion and survey reports as submitted to regulatory agencies.
- . All rock cuttings and core will be temporarily stored at CECI's office at 201N Sunriver Plaza, Sunriver, Oregon. Examination of the core at this facility by DOE, UURI, DOGAMI, BLM, and USGS personnel will be allowed by CECI with prior notification and DOE approval. Inquiries by industry representative to examine the core will not be granted by CECI until after the core is transferred to UURI.
- . Access to the drilling site hardhat area (to observe data collection) will be limited to CECI personnel, regulatory representatives and authorized DOE representatives.
- . Access by DOE to log the well will be coordinated through CECI project manager or project geologist.
- . CECI will maintain a record of samples and data provided to state and federal agencies.
- . CECI and DOE will exchange any data collected within one year of completion of MZI-11A.



U.S. Department of Energy

Idaho Operations Office
785 DOE Place
Idaho Falls, ID 83402

August 21, 1987

Mr. James Moore
California Energy Company, Inc.
3313 Medicino Avenue
Santa Rosa, CA 95401

SUBJECT: Cooperative Agreement DE-FC07-86ID12654

Dear Jim:

I have been informed by Mr. Phil Esner and Joe LaFleur of CECI the current status of the appeal filed causing an extended delay in the Mazam (Crater Lake) thermal gradient hole project.

In my discussions with Mr. Esner yesterday, I expressed that DOE is at the present time receptive to continuing their agreement with CECI. CECI should submit to DOE their estimate of the impact of the appeal decision process to the agreement work schedule.

CECI should provide DOE a copy of any formal correspondence, etc. concerning the appeal, drilling permit, or other project matters which impact the DOE/CECI agreement.

The current agreement has a completion date of August 22, 1988. This should give enough time for both parties to be able to evaluate the continuation of the project.

We hope the resolution of the appeal and BLM permit are soon so the drilling can be on track by next spring/summer.

Very truly yours,

Susan M. Prestwich
Project Manager
Advanced Technology Division

cc: M. Reed, DOE-HQ
M. Wright, UURI
S. Stiger, EG&G

