

6101898

California Energy Company, Inc.

MAZAMA CORE HOLE MANUAL

Deep Temperature Gradient Core Holes

Winema National Forest
Klamath County, Oregon

August 1986

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MAZAMA I AND II UNITS
Deep Temperature Gradient Core Holes

PERMITS

PLEASE READ ALL PERMITS AND RULES SO THAT YOU WILL BE ABLE TO ANTICIPATE REQUIRED NOTIFICATIONS, TECHNICAL CONSTRAINTS AND REPORTS. READ THE DOE DATA COLLECTION PLAN FOR MZI-11A. SEE MAP AT END POCKET FOR APPROVED ACCESS ROUTES TO THE SITES AND TO WATER SOURCES. KEEP THE SUNRIVER OFFICE INFORMED OF YOUR FIELD HOUSING PHONE NUMBERS.

BLM and WINEMA NF:

BLM and Winema NF have approved a four-hole drilling program. BLM is permitting the holes one at a time and has issued a permit for the MZI-11A site. As soon as we determine whether we are going to drill MZII-1, we must notify BLM.

BLM will be conducting a noise monitoring program. They will give Crater Lake National Park an opportunity to witness any monitoring in the Park. California Energy will be subcontracting a supplemental noise monitoring program.

Winema NF will be conducting fire inspections to ensure compliance with their rules (communication equipment, proper muffling, spark arrestors, fire fighting tools, water, extinguishers, etc.). See USFS Fire Rules for details.

Winema NF has issued a road use permit designating the roads to be used for access to sites. Be especially careful that equipment is restricted to the authorized access route to the MZII-1 hole to the south. HEAVY EQUIPMENT MUST NOT USE THE ANNIE CREEK BRIDGE.

DOGAMI:

BLM and DOGAMI have coordinated their stipulations for the hole (see BLM letter of July 12, 1985). DOGAMI will also receive cuttings from the surface hole and will select core samples from the lithologic log (see DOGAMI letter of August 27, 1986). Dennis Simontacchi, BLM, will handle communications with DOGAMI regarding drilling operations.

OR WATER RESOURCES DEPARTMENT:

OR WRD has issued permits to appropriate water from specific locations for specific well sites. Water withdrawal from sites other than those specified can be done only with concurrence of the Winema NF. Check the authorized water diversion points noted on the maps in the end pocket.

DOE COST SHARING:

DOE is cost-sharing the MZI-11A hole with Cal Energy. In addition to the notices required under the BLM, WNF and DOGAMI permits, we must send a daily drilling report to DOE and the University of Utah Research Institute (UURI). Call in the report to Santa Rosa for typing and transmittal by telecopy. UURI will be providing technical advice to DOE and must be provided access to the drillsite. Please coordinate all media releases through DOE.

AUTHORITIES AND COMMUNICATIONS

The Bureau of Land Management (BLM) and Winema National Forest (WNF) have established the following responsibilities and authorities:

BLM	Drilling compliance/GROs/DOGAMI contact/noise monitoring.
WNF	Surface compliance/GRO 4/Fire/Access/Public information.

Bob Fujimoto, BLM Portland (503-231-6946) is responsible for administration of California Energy BLM permits. Communications are to be directed to the contact persons listed below, in the order listed. See the permits for additional names and numbers if you are unable to reach the parties named below.

DRILLING/DOWNHOLE COMPLIANCE

BLM (Lead Agency):

1st	DENNIS SIMONTACCHI Inspector, Lakeview	Day: 503-947-2177 Night: 503-947-2355
2nd	DENNIS DAVIS Inspector, Bend	Day: 503-447-4115 Night: 503-382-3440

DOGAMI - Oregon Department of Geology and Mineral Industries:

DENNIS SIMONTACCHI (BLM, above) will handle communications with DOGAMI.

Dennis Olmstead (DOGAMI)	Day: 503-229-5580 Night: 503-231-3835
--------------------------	--

CALIFORNIA ENERGY COMPANY, INC.:

1st	BOB PRYDE/GORDY GOLLAN	Field Phone: Day/Night (to be supplied) Santa Rosa: 707-526-1000
2nd	DESIGNATED DRILLSITE GEOLOGIST	Field Phone: Day/Night (to be supplied) Santa Rosa: 707-526-1000 Sunriver Office: 503-593-2414
3rd	JIM MOORE	Santa Rosa: 707-526-1000

* For major drilling decisions, coordinate with DOE or their UURI designate.

SURFACE: ON- AND OFF-SITE COMPLIANCE
(Site Construction, Water, Roads, Fire):

WINEMA NATIONAL FOREST (Lead Agency):

1st BILL JENSEN, Chemult Ranger District: 503-365-2229
2nd MARV STUMP, Winema NF, K. Falls: 503-883-6799

BLM:

Dennis Simontacchi 503-947-2177

CALIFORNIA ENERGY COMPANY, INC.:

Field Operations: Bob Pryde/Designated Drillsite Geologist
Environmental Monitoring/Permits/Reports: Dave McClain/Anna Carter

PUBLIC INFORMATION
(Media/Public Inquiries, Tours, Press Releases, Drillsite Visitors):

Generally, coordinate any press releases through Winema NF, BLM and DOE.

WINEMA NATIONAL FOREST (Lead Agency):

1st DEE WESTERBERG, Public Information Officer: 503-883-6715
2nd ART DUFAULT, Forest Supervisor: 503-883-6714

BLM:

1st STEVE SHERMAN, Klamath Falls Area Manager: 503-883-6916
2nd ED CILIBERTI, Chief, Public Info, Portland: 503-231-6274

DOE:

Susan Prestwich, DOE Project Officer 503-526-1147
Pete Mygatt, Director, Office of External Affairs 503-526-1318

PUBLIC INFORMATION

Continued

CALIFORNIA ENERGY COMPANY, INC.:

1st*	DAVE McCLAIN	Santa Rosa:	707-526-1000
2nd*	ANNA CARTER	Santa Rosa:	707-526-1000

*Within Cal Energy, inquiries are to be referred for response as follows:

Exploration Planning/Policy	Jim Moore
Land/Lease/Unit Administration	Phil Essner
Geology/Geotechnical/Hydrology	Joe La Fleur/Paul Brophy
Drilling Operations	Bob Pryde/Jim Moore
Environmental Compliance/Monitoring/ Permits-Reports	Dave McClain/Anna Carter

DOE AND UURI CONTACTS

U.S. DEPARTMENT OF ENERGY (DOE)

Idaho Operations Office
785 DOE Place
Idaho Falls, Id. 94302

Telecopier 208-526-0524 Xerox
208-526-1184 3M
Confirmation 208-526-1503 (Bernice)

Susan Prestwich
DOE Project Officer
Role: Technical Oversight

208-526-1147
Home 208-522-3356

Elizabeth Bowhan
Contracts Specialist
Role: Contract/Finance Oversight

208-526-1229

Cliff Clark
Role: Environmental Review

208-526-0457

Sue Steiger: E.G. & G.
Role: Support to Cliff Clark

Public Relations: Prestwich/Bowhan (for releases prepared by others)

DOE Public Information
Pete Mygatt, Director
Office of External Affairs
Role: DOE Generated Releases

208-526-1318

UNIVERSITY OF UTAH RESEARCH INSTITUTE (UURI)

391 Chipeta Way
Salt Lake City, Ut. 841-8-1295

Contact Secretary: Beth Orvin 801-524-3422
Carolyn Davidson
Telecopier: 801-524-3453

Role: Technical Advisors to DOE

Mike Wright (Primary contact)
Director Earth Science Laboratory
(Geophysicist)

801-524-3422
Home 801-277-8330

Dennis Nielson, Assoc. Director
Earth Science Laboratory
Geologist - Head Geologic Group

Joe Moore, Head Geochemist Group
Project Geochemist

NOTE: Send copy of all plans as submitted to DOE to Phillip Michael Wright, Director, Earth Science Laboratory, UURI.

CALIFORNIA ENERGY COMPANY, INC.

Santa Rosa Headquarters:

707-526-1000

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

Sunriver Field Office:

503-593-2414 or 2415

California Energy Company, Inc.
201 N Sunriver Plaza
Sunriver Business Park
P. O. Box 3399
Sunriver, OR. 97702

Mazama Drillsite Rig Phones - 24 Hours:

503-

Robert A. Pryde/Gordy Gollan - Coso Rig Phones:

619-375-1818

Radio Phone

619-375-1128

Heritage Inn, Ridgecrest
Bar S Motel, Ridgecrest

619-446-6543

619-446-2551

Reference Numbers:

CTC House, Sunriver, OR.

503-593-2404 (2405)

Thunderbird Motel, Klamath Falls, OR.
Spring Creek Ranch, Chiloquin, OR.
Ft. Creek Resort, Ft. Klamath, OR.

503-882-8864

503-783-2775

503-381-2207

Mike Wright



August 1, 1986

Express Mail

Mr. Bob Fujimoto
Division of Mineral Resources
Oregon State Office
Bureau of Land Management
825 N.E. Multnomah Street
Portland, Oregon 97201

RE: Temperature Gradient Core Hole Drilling - 1986
North and South Newberry, Deschutes National Forest
Mazama I & II Units, Winema National Forest

Dear Bob:

Cal Energy's exploration plans for this field season have now been confirmed, as follows. Begin the North and South Newberry TG core holes on about August 11, the MZI-11A site on about September 1, and (tentatively) the MZII-1 site about September 15, 1986.

Submitted herewith are originals and two copies of Sundry Notices proposing modifications to the Drilling Program for the following holes:

Cal Energy Desig.	BLM Permit	Deschutes NF Permit	DOGAMI Permit	Lease #	Leaseholder
CE-NB-4	OR-920-86-DNB-003		129	OR-11985	Delta Funds
CE-NB-3		5-22-85*	127	OR-12668	Christian F. Murer
MZI-11A	OR-920-85-WN-001		116	OR-34669	Calif. Energy
MZII-1	**		117	OR-34681	Calif. Energy

*Cal Energy has agreed with Deschutes NF that we will comply with the stipulations of BLM's permit issued for CE-NB-4 in the drilling of CE-NB-3.

**We understand that BLM may want to withhold approval of the changes to the MZII-1 hole until near-completion of the MZI-11A hole.

The proposed changes to the downhole program are as follows:

- (1) Depth: It is intended to drill up to 5000'±. However, the surface casing will be run to 550' to allow drilling to 5500' if allowed by drilling conditions and if necessary to obtain meaningful data).
- (2) Surface casing will be 4-1/2" instead of 5-1/2".
- (3) Wireline coring will begin with 3.782 OD (HQ).

RECEIVED

AUG 6 1986

ADVANCED TECHNOLOGY
SERVICES

We are also submitting these changes to DOGAMI and the surface managers, by copy of this letter and enclosures.

Please call if you need clarification or further information.

Very truly yours,



Anna K. Carter
Compliance Manager

AKC:41/42

Enclosures

cc: Steve Henderson, BLM Portland (all)
Dennis Simontacchi, BLM Lakeview (all)
Dennis Davis, BLM Prineville (all)

Hal Seigworth, Deschutes NF (CE-NB-3 and CE-NB-4)
Donna Owens, Deschutes NF " "

Art DuFault, Winema NF (MZI-11A and MZII-1)
Marv Stump, Winema NF " "

Dennis Olmstead, DOGAMI (all)

Susan Prestwich, DOE, Idaho Falls (MZI-11A)
Elizabeth Bowhan, DOE, Idaho Falls "

Form: USGS 9-1958

UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
 Budget Bureau No. _____

GEOLOGICAL SURVEY NOTICE

The U.S. Geological Survey requests this form or other Supervisor approved form to be prepared and filled in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operations.

1a. WELL TYPE: PRODUCTION () DETECTION () HEAT EXCHANGE () OBSERVATION () OTHER <input checked="" type="checkbox"/>		4. LEASE SERIAL NO. OR 34669	
Temperature Gradient Core Hole		5. SURFACE REGIONS: BIA () FR (X) Winema NF Other ()	
1b. WELL STATUS: Not yet drilled.		6. UNIT AGREEMENT NAME Mazama I	
2. NAME OF LESSEE/OPERATOR California Energy Company, Inc.		7. WELL NO. MZI-11A	
3. ADDRESS OF LESSEE/OPERATOR 3333 Mendocino Ave., Ste. 100, Santa Rosa, CA 95401		8. PERMIT NO. See above	
13. LOCATION OF WELL OR FACILITY Approx. 2225'E and 725' N of SW Corner Sec. 10 T31S R7½E		9. FIELD OR AREA Winema Nat'l Forest	
		10. SEC. T., R., S. & N. Sec. 10 T31S R7½E	
		11. COUNTY Klamath	
		12. STATE Oregon	
14. TYPE OF WORK			
CHANGE PLANS <input checked="" type="checkbox"/>	CONVERT TO DETECTION ()	FULL OR ALTER CASING ()	
SITE AND ROAD CONSTRUCTION ()	FRACTURE TEST ()	MULTIPLE COMPLETE ()	
CONSTRUCT NEW PRODUCTION FACILITIES ()	SHOOT OR ACIDIZE ()	ABANDON ()	
ALTER EXISTING PRODUCTION FACILITIES ()	REPAIR WELL ()	OTHER ()	

15. DESCRIBE PROPOSED OPERATIONS (Use this space for well activities only. See instructions for current well conditions on reverse)

To change the drilling program to reflect new proposed depth of 5000±. A revised drilling permit form is attached for convenience in documentating the changes. See Items 19 and 21, and attached Drilling & Coring Procedures.

16. DESCRIBE PROPOSED OPERATIONS (Use this space for all activities other than well work)

17. I hereby certify that the foregoing is true and correct (Use reverse side if needed)

SIGNED James L. Moore TITLE Senior Vice President Exploration DATE 7/31/86
 James L. Moore

(This space for Federal use)

APPROVED BY _____ TITLE _____ DATE _____
 CONDITIONS OF APPROVAL, IF ANY:

This permit is required by Law (30 U.S.C. 1023); regulations: 30 CFR 270.34, 30 CFR 270.35, 30 CFR 270.45, 30 CFR 270.71-1, 30 CFR 270.72; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

GEOTHERMAL DRILLING PERMIT

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operation.

1a. TYPE OF WORK: DRILL NEW WELL () REDRILL () DEEPEN () PLUG BACK () DIRECTIONALLY DRILL () OTHER **Drill/Core Temperature Gradient Core Hole**

1b. WELL TYPE: PRODUCTION () INJECTION () HEAT EXCHANGE () OBSERVATION () WATER SUPPLY () OTHER () **Temperature Gradient Core Hole**

1c. WELL STATUS:

2. NAME OF LESSEE/OPERATOR
California Energy Company, Inc. (707) 526-1000

3. ADDRESS OF LESSEE/OPERATOR
3333 Mendocino Ave., Ste. 100, Santa Rosa, CA 95401

15. LOCATION OF WELL
At surface **Approx. 2,225 feet east and 725 feet north of the SW corner, Section 10, T31S, R7½E**
At proposed prod. zone

16. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE
Approx. .43 miles SE of MZ I Unit boundary

17. DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR ON THIS LEASE
Approx. .6 miles north of MZ I-11

4. LEASE SERIAL NO.
OR 34669

5. SURFACE MANAGER: BLM () FS **Winema National Forest**

6. UNIT AGREEMENT NAME
Mazama I

7. WELL NO.
MZI - 11A*

8. PERMIT NO.

13. SEC. T., R., S. & M.
SE½, SW½, Sec. 10 T31S, R7½E Willamette B & M

11. COUNTY
Klamath

12. STATE
Oregon

13. APPROX. STARTING DATE
September 7, 1986

14. ACRES ASSIGNED (WELL SPACING)
N/A

18. DRILLING MEDIA AND CHARACTERISTICS: AIR WATER () MUD FOAM () Other ()

19. PROPOSED DEPTH MEASURED: **5500'**
TRUE VERTICAL:

20. ELEVATIONS: ESTIMATED FINAL ()
6050'
REFERENCE DATUM: GR OR MAT () DP () KB () RT () CASINGHEAD FLANGE () OTHER ()

21. EXISTING AND/OR PROPOSED CASING AND CEMENTING PROGRAM (List existing program first, followed by proposed program, and separate by a sufficient space to clearly distinguish the two programs)

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	COUPLING (Collars & Threads)	GRADE	SETTING DEPTH		QUANTITY OF CEMENT
					Top	Bottom	
Set 6-7' of	8-5/8" conductor pipe (optional).				Surf.	6-7'	To Surface
7-7/8"	4-1/2"	11.5#	8RD ST&C	K55	Surf.	550'	To Surface
Drill out cement plug and resume drilling with 3.782 OD (HQ) wireline coring system.							
Reduce core size to 2.980 OD (NQ), as mandated by drilling conditions.							

22. PROPOSED WORK SUMMARY

*Approximate Kettleman designation: 47-10.

See attached Proposed Drilling and Coring Procedure.

(Use additional space on reverse side of form)

23. *James L. Moore* Senior Vice President Exploration July 31, 1986

SIGNED James L. Moore TITLE DATE

(This space for Federal use)

APPROVED BY _____ TITLE _____ DATE _____

CONDITIONS OF APPROVAL, IF ANY:

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.71; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

PROPOSED DRILLING AND CORING PROCEDURE

All drilling operations will conform with or exceed the safety and environmental protection requirements of the federal Geothermal Resources Operational Orders (GROs), stipulations of the Forest Service, and the Department of Geology and Mineral Industries' Laws and Administrative Rules Relating to Geothermal Exploration and Development in Oregon.

The proposed program for drilling and completion is outlined below. The 4-1/2" surface casing will be set and cemented in a 7-7/8" hole rotary drilled with either mud or air as prescribed by subsurface conditions. The remainder of the hole, 550'-5000'± will be drilled by using conventional wireline coring equipment. With this technique, two progressive reductions in hole size are permitted if 1-1/2" tubing is to be run for final temperature measurement. Previous recent drilling experience from the flanks of Newberry suggests that such a designed program should not have any significant difficulty in reaching the planned total depth of 5000'±.

Drilling Procedures

1. Prepare site and set 7'± 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.
3. Spud 7-7/8" hole and drill to 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.
4. 4-1/2" casing will be run at 550' and cemented to surface. Surface casing is designed to exceed 10% of total depth.
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 USFS/BLM/DOGAMI to witness test.
6. Drill out cement plug to 2' below 4-1/2" casing shoe with HQ core bit.
7. Start wireline core drilling with 3.782' OD bit (HQ) reducing to 2.980 (NQ) as deemed necessary by drilling conditions.
8. At completion, run 1-1/2" tubing to total depth; fill w/water and cap.
9. Run periodic temperature surveys up to one year after completion.
10. After completion of temperature surveys, plug and abandon the hole in conformance with stipulations of the Forest Service, Federal GROs and DOGAMI's Laws and Administrative Rules relating to Geothermal Exploration and Development in Oregon.

Form: USGS 9-1956

UNITED STATES DEPARTMENT OF THE INTERIOR
 GEOLOGICAL SURVEY, CONSERVATION DIVISION

Form Approved
 Budget Bureau No. _____

GEOTHERMAL SURVEY NOTICE

The U.S. Geological Survey requests this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operations.

1a. WELL TYPE: PRODUCTION () INJECTION () HEAT EXCHANGE () OBSERVATION () OTHER <input checked="" type="checkbox"/>		4. LEASE SERIAL NO. OR34681
Temperature Gradient Core Hole		5. SURFACE MANAGER: BLM () FS () Other () Winema N.F.
1b. WELL STATUS: Not yet drilled.		6. UNIT AGREEMENT NAME Mazama II
2. NAME OF LESSEE/OPERATOR California Energy Company, Inc.		7. WELL NO. MZII-1
3. ADDRESS OF LESSEE/OPERATOR 3333 Mendocino Ave., Ste. 100, Santa Rosa, CA 95401		8. PERMIT NO.
13. LOCATION OF WELL OR FACILITY 2000'N and 2050' W of SE Corner, Section 13		9. FIELD OR AREA
14. TYPE OF WORK		10. SEC. T., R., S. & N. Sec. 13, T32S, R6E WM
CHANGE PLANS <input checked="" type="checkbox"/>	CONVERT TO INJECTION ()	PULL OR ALTER CASING ()
SITE AND ROAD CONSTRUCTION ()	FRACTURE TEST ()	MULTIPLE COMPLETE ()
CONSTRUCT NEW PRODUCTION FACILITIES ()	SHOOT OR ACIDIZE ()	ABANDON ()
ALTER EXISTING PRODUCTION FACILITIES ()	REPAIR WELL ()	OTHER ()

15. DESCRIBE PROPOSED OPERATIONS (Use this space for well activities only. See instructions for current well conditions on reverse)
 To change the drilling program to reflect new proposed depth of 5000±. A revised drilling permit form is attached for convenience in documenting the changes. See Items 19 and 21 and attached Drilling & Coring Procedures.

16. DESCRIBE PROPOSED OPERATIONS (Use this space for all activities other than well work)

17. I hereby certify that the foregoing is true and correct (Use reverse side if needed)
 SIGNED James L. Moore TITLE Senior Vice President Exploration DATE 7/31/86
 James L. Moore
 (This space for Federal use)

APPROVED BY _____ TITLE _____ DATE _____
 CONDITIONS OF APPROVAL, IF ANY:

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.34, 30 CFR 270.35, 30 CFR 270.45, 30 CFR 270.71-1, 30 CFR 270.72; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

GEOTHERMAL DRILLING PERMIT

The U.S. Geological Survey requires this form or other Supervisor approved form to be prepared and filed in triplicate with requisite attachments with the Supervisor. The Supervisor must approve this permit prior to any lease operation.

1a. TYPE OF WORK: DRILL NEW WELL () REDRILL () DEEPEN () PLUG BACK () DIRECTIONALLY DRILL () OTHER **Drill/Core Temperature Gradient Core Hole**

1b. WELL TYPE: PRODUCTION () INJECTION () HEAT EXCHANGE () OBSERVATION () WATER SUPPLY () OTHER ()

1c. WELL STATUS:

2. NAME OF LESSEE/OPERATOR
California Energy Company, Inc. (707) 526-1000

3. ADDRESS OF LESSEE/OPERATOR
3333 Mendocino Ave., Ste. 100, Santa Rosa, CA 95401

15. LOCATION OF WELL
At surface **2000' N and 2050' W of SE Corner, Section 13**
At proposed prod. zone

16. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE
Approx. 1600' from Unit Boundary

17. DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR ON THIS LEASE
No proposed nor existing geothermal wells.

4. LEASE SERIAL NO.
OR34681

5. SURFACE MANAGER: BLM () FS ()
Winema N.F. Other ()

6. UNIT AGREEMENT NAME
Mazama II

7. WELL NO.
MZII-1

8. PERMIT NO.

9. FIELD OR AREA

10. SEC. T., R., B. & M.
**Section 13, T32S, R6E
WM**

11. COUNTY
Klamath

12. STATE
Oregon

13. APPROX. STARTING DATE
Sept. 15, 1986

14. ACRES ASSIGNED (WELL SPACING)
N/A

18. DRILLING MEDIA AND CHARACTERISTICS: AIR
WATER () MUD FOAM () Other ()

19. PROPOSED DEPTH MEASURED: **5500'**
TRUE VERTICAL:

20. ELEVATIONS: ESTIMATED FINAL () **4665'**
REFERENCE DATUM: GR MAT () OF () KB () RT ()
CASINGHEAD FLANGE () OTHER ()

21. EXISTING AND/OR PROPOSED CASING AND CEMENTING PROGRAM (List existing program first, followed by proposed program, and separate by a sufficient space to clearly distinguish the two programs)

SIZE OF HOLE	SIZE OF CASING	WEIGHT PER FOOT	COUPLING (Collars & Threads)	GRADE	SETTING DEPTH		QUANTITY OF CEMENT
					Top	Bottom	
Set 6-7' of	8-5/8" conductor pipe (optional).				Surf.	6-7'	To Surface
7-7/8"	4-1/2	11.5#	8RD ST&C	K55	Surf.	550'	To Surface
Drill out cement plug and resume drilling with 3.782 OD (HQ) wireline coring system.							
Reduce core size to 2.980 OD (NQ), as mandated by drilling conditions.							

22. PROPOSED WORK SUMMARY

See attached Proposed Drilling and Coring Procedure.

(Use additional space on reverse side of form)

23. **James L. Moore** Senior Vice President Exploration July 31, 1986

SIGNED **James L. Moore** TITLE DATE

(This space for Federal use)

APPROVED BY TITLE DATE

CONDITIONS OF APPROVAL, IF ANY:

This permit is required by law (30 U.S.C. 1023); regulations: 30 CFR 270.71; Federal Geothermal Lease Terms and Stipulations and other regulatory requirements. The United States Criminal Code (18 U.S.C. 1001) makes it a criminal offense to make a willfully false statement or representation to any Department or Agency of the United States as to any matter within its jurisdiction.

(See instructions on reverse side)

PROPOSED DRILLING AND CORING PROCEDURE

All drilling operations will conform with or exceed the safety and environmental protection requirements of the federal Geothermal Resources Operational Orders (GROs), stipulations of the Forest Service, and the Department of Geology and Mineral Industries' Laws and Administrative Rules Relating to Geothermal Exploration and Development in Oregon.

The proposed program for drilling and completion is outlined below. The 4-1/2" surface casing will be set and cemented in a 7-7/8" hole rotary drilled with either mud or air as prescribed by subsurface conditions. The remainder of the hole, 550'-5000'± will be drilled by using conventional wireline coring equipment. With this technique, two progressive reductions in hole size are permitted if 1-1/2" tubing is to be run for final temperature measurement. Previous recent drilling experience from the flanks of Newberry suggests that such a designed program should not have any significant difficulty in reaching the planned total depth of 5000'±.

Drilling Procedures

1. Prepare site and set 7'± 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.
3. Spud 7-7/8" hole and drill to 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.
4. 4-1/2" casing will be run at 550' and cemented to surface. Surface casing is designed to exceed 10% of total depth.
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 USFS/BLM/DOGAMI to witness test.
6. Drill out cement plug to 2' below 4-1/2" casing shoe with HQ core bit.
7. Start wireline core drilling with 3.782" OD bit (HQ) reducing to 2.980 (NQ) as deemed necessary by drilling conditions.
8. At completion, run 1-1/2" tubing to total depth; fill w/water and cap.
9. Run periodic temperature surveys up to one year after completion.
10. After completion of temperature surveys, plug and abandon the hole in conformance with stipulations of the Forest Service, Federal GROs and DOGAMI's Laws and Administrative Rules relating to Geothermal Exploration and Development in Oregon.



August 1, 1986

TO: DISTRIBUTION LIST, Attached

RE: MZI-11A Temperature Gradient Core Hole, Winema NF
Cost- and Data-Sharing with Department of Energy

The U.S. Department of Energy (DOE) will be cost-sharing the drilling of the temperature gradient core hole MZI-11A under Cooperative Agreement No. DE-FC07-86ID12654 with California Energy Company. DOE will be using the support services of E.G.&G. for environmental review and the University of Utah Research Institute (UURI) for geological/technical review and liaison with Cal Energy. As soon as DOE's designated technical support staff are identified to us, we anticipate that there will be convened a meeting or conference call(s) among BLM, Winema NF, DOGAMI, DOE, E.G.&G., UURI and Cal Energy staff to exchange pleasantries.

DOE's involvement and rights to data will in no way alter our reporting requirements to permitting agencies, although it will affect Cal Energy decisions as to what data will be identified as proprietary. Because DOE is cost-sharing this hole, much of the data generated will become public information through Cal Energy reports to DOE and reports generated by UURI or other DOE designates. It has been the experience of DOE personnel that, during drilling, they receive phone calls asking how the hole is doing. Because the hole is being cost-shared with "public funds" some response is appropriate (DOE usually gives the depth reached that day and the date a press release will be forthcoming).

Cal Energy must submit management, technical and institutional plans to DOE that identify Authorities and Responsibilities for all aspects of this project. We have previously submitted copies of all plans and permits and the Environmental Assessment prepared by BLM and Winema NF to DOE. Our Institutional Plan to DOE must identify what data will be released, when, by whom and in what form. We would like to have your input, if any, before formalizing the plan.

Attached is a list of Regulatory Authority and Communications for the Mazama holes, drafted last year after a planning meeting in Klamath Falls with BLM and Winema NF. This list (originally intended for distribution to Cal Energy's staff in the field) will be expanded to add DOE contacts and their designates. Please review the draft list for accuracy and relay your questions; concerns or preferences regarding the coordination of dissemination of information to the public (or any other issue arising from DOE cost-sharing) to Jim Moore, Dave McClain or me at 707-526-1000.

AUG 6 1986

We intend to submit the technical, insitutional and management plans required under the DOE agreement within about ten days and hope to begin drilling this hole by about September 1, 1986.

Very truly yours,



Anna K. Carter
Compliance Manager

AKC:z6242/C5

Enclosure: Authorities and Communications

cc: Jim Moore, Senior Vice President/Exploration
Phil Essner, Vice President/Lands
Bob Pryde, Vice President/Drilling Operations
Gordy Gollan, Drilling Supervisor
Joe LaFleur, Senior Exploration Geologist
Paul Brophy, Senior Geothermal Geologist
Dave McClain, Manager/Project Development
Susan Mitcham, Administrative Assistant, Lands

DISTRIBUTION LIST - 8-01-86

U.S. Bureau of Land Management

Pat Geehan, Deputy State Director for Mineral Resources, Portland
Bob Fujimoto, Physical Scientist, . Division of Mineral Resources, Portland
Jack Feuer, Geologist, Inspections & Enforcement, Portland
Steve Henderson, Petroleum Engineer, Inspections & Enforcement, Portland

Gerry Asher, District Manager, Lakeview
Dennis Simontacchi, Geologist, Lakeview
Dennis Davis, Prineville

Steve Sherman, Area Manager, Klamath Falls Resource Area
Mr. Tom Cottingham, Environmental Specialist, Klamath Falls

U.S. Forest Service

Carlin Jackson, Director, Lands and Minerals, Portland

Art DuFault, Forest Supervisor, Winema National Forest, Klamath Falls
Marv Stump, Energy Coordinator, Winema NF
Ms. Dee Westerberg, Public Information Officer, Winema NF
Tom Neal, Road Maintenance

Bill Jensen, Chemult Ranger District (Mazama I Unit)
Dave Pederson, Klamath Ranger District (Mazama II Unit)

Oregon Department of Geology and Mineral Resources

Don Hull, State Geologist, Portland
Dennis Olmstead, Petroleum Engineer/Geologist, Portland

U.S. Department of Energy

Elizabeth Bowhan, Contract Specialist, R & D Branch, Idaho Falls
Ms. Susan Prestwich, Geologist, Geothermal Program Manager, Idaho Falls

REGULATORY AUTHORITY AND COMMUNICATIONS

The Bureau of Land Management (BLM) and Winema National Forest (Winema) have established the following responsibilities and authorities:

BLM	Drilling compliance/GROs/DOGAMI contact
Winema NF	Surface compliance/GRO 4/Public information.

Jack Feuer, Inspections and Enforcement, BLM Portland (503-231-6991) is responsible for administration of our BLM permits. All communications, however, are to be directed to the contact persons listed below, in the order listed.

DRILLING/DOWNHOLE COMPLIANCE

BLM (Lead Agency):

1st	DENNIS SIMONTACCHI	Day:	503-947-2177
	Inspector, Lakeview	Night:	503-947-2355
2nd	DENNIS DAVIS	Day:	503-447-4115
	Inspector, Bend	Night:	503-382-3440

DOGAMI - Oregon Department of Geology and Mineral Industries:

DENNIS SIMONTACCHI (BLM, above) will handle communications with DOGAMI.

Dennis Olmstead (DOGAMI)	Day:	503-229-5580
	Night:	503-231-3835

California Energy Company:

1st	BOB PRYDE	Field Phone:	Day/Night (to be supplied)
		Santa Rosa:	707-526-1000
		Home:	707-585-2063
2nd	GORDY GOLLAN	Field Phone:	Day/Night (to be supplied)
		Santa Rosa:	707-526-1000
		Home:	707-894-4128

SURFACE: ON- AND OFF-SITE COMPLIANCE
(Site Construction, Water, Roads, Fire):

Winema National Forest (Lead Agency):

1st BILL JENSEN, Chemult Ranger District: 503-365-2229
2nd MARV STUMP, Winema NF, K. Falls: 503-883-6799

BLM:

Dennis Simontacchi 503-947-2177
(Environmental monitoring plan compliance)

California Energy Company:

Field Operations: Bob Pryde/Gordy Gollan
Environmental/Permits/Reports: Dave McClain/Anna Carter

PUBLIC INFORMATION

(Tours, Media Contact, Press Releases, Drillsite Visitors):

Winema National Forest (Lead Agency):

1st DEE WESTERBERG, Public Information Officer: 503-883-6715
2nd ART DUFAULT, Forest Supervisor: 503-883-6714

BLM:

1st STEVE SHERMAN, Klamath Falls Area Manager: 503-883-6916
2nd ED SALIBERTI: 503-883-6916

California Energy Company:

1st* DAVE McCLAIN	Santa Rosa:	707-526-1000
	Sunriver Ofc:	503-593-2414
	Night:	503-389-2204
2nd* ANNA CARTER	Santa Rosa:	707-526-1000
	Night:	707-526-7924

*Within Cal Energy, inquiries are to be referred for response as follows:

Public Information - continued

Exploration Planning/Policy

Jim Moore

Land/Lease/Unit Administration

Phil Essner

Geology/Geotechnical/Hydrology

Joe La Fleur/Paul Brophy

Drilling Operations

Bob Pryde/Gordy Gollan/Jim Moore

Environmental Compliance/Monitoring/
Permits-Reports

Dave McClain/Anna Carter

AKC:42:7-85
Z6242



September 15, 1986

TO: Dennis Simontacchi, BLM Lakeview
Bob Fujimoto, BLM Portland
Tom Jensen, Chemult RD, Winema NF
Marvin Stump, Winema NF

RE: Courtesy Copy of "Mazama Core Hole Manual"

Transmitted herewith is a courtesy copy of a compilation of permits and reference materials related to the drilling of MZI-11A.

This manual is issued to California Energy Company management and field operations staff to provide ready reference to permit stipulations and to facilitate compliance.

A copy of the Winema NF road use permit will be transmitted for inclusion as soon as we receive it (this week).

Very truly yours,

Anna K. Carter
Compliance Manager

AKC:lat

Enclosures

cc: w/out Manual, w/Table of Contents and Authorities and Communications:

Leroy Mohorich, BLM Portland
Steve Henderson, BLM Portland
Jack Feuer, BLM Portland
Gerry Asher, BLM Lakeview

Carlin Jackson, USFS, Portland
Art DuFault, Winema NF, Klamath Falls
Dee Westerberg, Winema NF, Klamath Falls

Susan Prestwich, DOE, Idaho Falls
Mike Wright, UURI, SLC Utah

cc: w/Manual: Robert A. Pryde
James L. Moore
Joseph LaFleur
Philip H. Essner
Dave McClain
CECI Sunriver Office
Longyear Rig (Drillsite)



October 1, 1986

Mr. Bob Fujimoto
Division of Mineral Resources
U.S. Bureau of Land Management
825 N.E. Multnomah Street
P. O. Box 2965
Portland, OR 97232

RE: Emergency Contingency Plans - Newberry and Mazama Core Hole Drilling

Dear Bob:

Enclosed is a copy of the Safety/Emergency Procedures/H₂S Contingency Plans for the Newberry and Mazama coring.

As you know, Bob Pryde, Vice President Drilling Operations, arranged for Exlog-Smith to provide H₂S monitoring devices, air packs (breathing masks), a wind sock and training of drillsite personnel in their use. Such services have already been provided at the Newberry CE-NB-3 and CE-NB-4 sites and will be performed at the MZI-11A site within one to two days of testing of the BOP.

Copies of the plans (which differ only in the list of regulatory agencies at the end) are being mailed, under cover of this letter, as noted below.

Very truly yours,

Anna K. Carter
Compliance Manager

Enclosure: (1 Newberry, 1 Mazama)

cc: Dennis Davis, BLM Prineville (2 Newberry)
Dennis Simontacchi, BLM Lakeview (2 Mazama)

Donna Owens, Deschutes NF, Ft. Rock RD (1 Newberry)
Hal Siegworth, Deschutes NF (1 Newberry)

Bill Jensen, Winema NF, Chemult RD (1 Mazama)
Marv Stump, Winema NF, SO (1 Mazama)
Dave Pederson, Winema NF, Klamath RD (1 Mazama)

Susan Prestwich, DOE Idaho Falls, (1 Mazama)
✓ Mike Wright, UURI (1 Mazama)

*Add to your
books (1 each)*

*CC: RAP
JLM
PHE
DUCC
AKC (2)*



October 1, 1986

TO: Paul Brophy/Joe LaFleur

FM: Anna *Anna*

RE: Safety/Emergency/H₂S Contingency Plans - Newberry and Mazama Holes

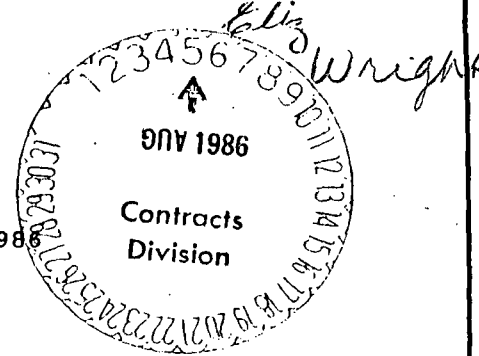
.....
Enclosed are Safety Practices and Emergency Contingency Plans, including H₂S Contingency Plans for your holes.

These are pieced together from the ones we did for the Coso Project for geothermal wells--they are overkill but will cover our assets. I've added caveats to the effect that they were developed for "worst-case" situations in drilling geothermal wells but that the procedure for responding is the same. Bob Pryde has given them his blessing.

Please distribute to appropriate drilling personnel and have them sign the last page and return to you. Please also insert a copy in the drillsite permit books, just behind the Emergency Phone Numbers. I'm sending copies to BLM and USFS as noted in the attached.

AKC:41/42:z6141

Enclosures: Paul (24 - Newberry)
Joe (12 - Mazama)



July 30, 1986

Mr. Dennis Olmstead
Petroleum Engineer/Geologist
Oregon Department of Geology
and Mineral Industries
910 State Office Building
1400 S.W. Fifth Avenue
Portland, OR 97201

RE: Agreement between Cal Energy and DOGAMI Regarding Distribution of
Core and Cuttings from MZI-11A Hole in the Winema National Forest,
Klamath County, Oregon

Dear Dennis:

This letter of agreement outlines and confirms procedures by which the Oregon Department of Geology and Mineral Industries (DOGAMI) will receive selected core and cutting samples from the proposed deep temperature gradient hole MZI-11A to be drilled by California Energy Company, Inc. (Cal Energy). The hole will be drilled with cost sharing funds from the U.S. Department of Energy (DOE) under terms defined by US DOE Agreement No. DE-FC07-86ID 12654 of July 24, 1986.

The following sampling procedures will be adopted for MZI-11A and any other hole drilled by Cal Energy under DOE assistance contracts in Oregon:

1. Cal Energy will rotary drill the surface casing to a maximum depth of 550' with cutting samples taken approximately every 10 feet for routine identification and logging. An additional 100 gram sample will be taken approximately every 30' throughout the rotary drilled section specifically for DOGAMI's use. This sample will be washed, dried, labeled and forwarded to DOGAMI within 60 days of completion of the hole.
2. It is proposed that MZI-11A will be cored from the shoe of the surface casing to total depth (T.D.). A detailed lithologic description of the core with relevant associated data will be compiled and forwarded to DOGAMI following completion of the hole. From the lithologic log DOGAMI will select individual core samples they require for their permanent core repository. It is anticipated that each sample will be four to six inches in length with an approximate maximum of 20 samples throughout the hole. These samples will be collected and documented by Cal Energy and forwarded to DOGAMI within 60 days of selection by DOGAMI.
3. A courtesy copy of the photographic record of the core will also be forwarded to DOGAMI.
4. Initial storage of all cuttings and cores will be at Cal Energy's field office at Sunriver Business Park, Sunriver, OR. Within one year of completion, cuttings and cores will be transferred to a permanent facility as defined by the DOE cost share Agreement.
5. Cal Energy will provide DOGAMI a copy of the DOE Agreement for their reference.

Person says OK unless critical area.

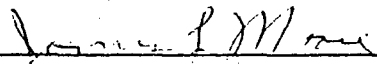
July 30, 1986
Page 2

6. DOGAMI will maintain the right at any time to access the complete set of cores and cuttings at either Sunriver or at the permanent storage facility.
7. It is understood that all data provided to DOGAMI by Cal Energy on MZI-11A or other holes or wells from the Mazama Federal units will remain proprietary for a period of at least 8 years pursuant to DOGAMI Board Order of June 7, 1985 unless otherwise agreed by Cal Energy.

We look forward to working with you on this and other geothermal exploration projects in Oregon. Please sign the enclosed copy of this agreement letter and return to our office. Thank you.

Agreed to:

Agreed to:



James L. Moore
Senior Vice President Exploration
California Energy Company, Inc.

Donald Hull, State Geologist
Oregon Department of Geology and
Mineral Industries

Date: _____

Date: _____

PB:lat:42

cc: Donald Hull, DOGAMI
Elizabeth Hyster-Bowhan, DOE
Gerry Asher, BLM Lakeview
Dennis Simontacchi, BLM Lakeview
Dennis Davis, BLM Prineville
Marvin Stump, Winema NF