

**GEOHERMAL DRILLING PERMIT**

Form Approved  
Budget Bureau No. \_\_\_\_\_

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.

**Clackamas 5000' Thermal Gradient Hole (CTGH)**

1a. TYPE OF WORK: DRILL NEW WELL ( ) REDRILL ( ) DEEPEN ( ) PLUG BACK ( ) DIRECTIONALLY DRILL ( ) OTHER (X)

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

1c. WELL STATUS: Proposed

2. NAME OF LESSEE/OPERATOR: Thermal Power Company

3. ADDRESS OF LESSEE/OPERATOR: 3333 Mendocino Avenue, Suite 120  
Santa Rosa, California 95401

15. LOCATION OF WELL  
At surface: Approximately 2200' N and 1500' W of SE Corner of Sec. 28  
At proposed prod. zone: Same as Surface Location

16. DISTANCE FROM PROPOSED LOCATION TO NEAREST PROPERTY OR LEASE LINE: 1500' W of East Line of Sec. 28

17. DISTANCE FROM PROPOSED LOCATION TO NEAREST WELL, DRILLING, COMPLETED, OR APPLIED FOR ON THIS LEASE: No previous well drilled or applied for on this lease.

4. LEASE SERIAL NO.: OR 12344

5. SURFACE MANAGER: BLM ( ) FS (X) Other ( )

6. UNIT AGREEMENT NAME: N/A

7. WELL NO.: CTGH-1

8. PERMIT NO.:

9. FIELD OR AREA: Squirrel Creek

10. SEC. T., R., S. & M.: Sec. 28 T8S R8E Willamette Meridian

11. COUNTY: Marion

12. STATE: Oregon

13. APPROX. STARTING DATE: 1 June 1986

14. ACRES ASSIGNED (WELL SPACING): N/A

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

19. PROPOSED DEPTH MEASURED: 5000  
TRUE VERTICAL: 5000

20. ELEVATIONS: ESTIMATED (X) FINAL ( )  
REFERENCE DATUM: GR (X) NAT ( ) DP ( ) KB ( ) RT ( ) CASING HEAD 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	
14-3/4"	11-3/4"	28 lbs.	N/A	1/4" Wall	0	30	25 cu. ft.
10" or 9-7/8"	7"	26 lbs.	Buttress	K-55	0	500	266 cu. ft.
6" or 5-5/8"	4-1/2"	11.6 lbs.	Long	K-55	450	4000	605 cu. ft.

22. PROPOSED WORK SUMMARY

Prepare 160' x 200' drillsite pad and lined sump adjacent to existing access road into clear cut parcel 30. Move in truck mounted rig. Drill 14-3/4" hole to 30' depth, run 11-3/4" conductor to bottom and cement to surface. Drill 10" hole to 500' depth; run 7" K-55 26 pound Buttress casing to bottom and cement to surface. Install casing head on 7" casing, then BOPE consisting of a double control gate and Hydril. Test BOPE per BLM regulations. Diamond core with HQ heads to 5000'. Run geophysical borehole log suite to 5000'. Open HQ hole with 6" bit to 4000' or other selected depth; run 4-1/2" K-55 11.6 pound LT&C casing to 4000'; cement solid from shoe to lap in 7" casing at 450'-500' depth. Briefly flow well to obtain expected geothermal fluid samples. Hang 2-7/8" J-55 tubing string to 5000'; fill same with water. Release rig; leave CTGH-1 shut-in awaiting DOE high precision temperature log.

This will be a vertical borehole; no directional drilling/coring practices will be applied. However, borehole directional surveys will be run with the geophysical logging suite.

This deep thermal gradient hole would be drilled under a Cooperative Agreement between Thermal Power Company and the U. S. Department of Energy as part of the DOE program to 1) gather data to characterize the deep hydrothermal resource of the Cascades volcanic region and 2) transfer this data to the public in order to stimulate further development of hydrothermal resources.

23. \_\_\_\_\_ (Use additional space on reverse side of form)

SIGNED: *[Signature]* W. L. D'Olier  
TITLE: Vice President, Geothermal Exploration  
DATE: 14 November 1985

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)