

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
GEOTHERMAL DRILLING PERMIT

FORM APPROVED
OMB NO. 1004-0132
Expires: September 30, 1990

The Bureau of Land Management (BLM) requires this form or other BLM approved forms to be prepared and filed in triplicate with requisite attachments with the authorized officer. The authorized officer must approve this permit prior to any lease operation.

7. Lease Serial No. OR36951

8. Surface Manager: BLM FS
 Other

9. Unit Agreement Name

10. Well No. TGC 61-10
11. Permit No. GDP-030-95-01

12. Field or Area Vale

13. Sec., T., R., B. & M. Sec 10, T19S, R45E, Willamette B&M

14. County Malheur

15. State Oregon

16. Approx. Starting Date 4/1/95

17. Acres Assigned (Well Spacing) 40

1a. Type of Work: Drill New Well Redrill Deepen Plug Back Directionally Drill Other

1b. Well Type: Production Injection Heat Exchange Observation Water Supply Other Exploratory

1c. Well Status: New well

2. Name of Lessee/Operator Trans-Pacific Geothermal Corporation

3. Address of Lessee/Operator 1901 Harrison, Ste 1590, Oakland CA 94612

4. Location of Well
At surface 3709'E, 224'S of NW corner of Sec 10, T19S, R45E Willamette B&M
At proposed prod. zone Same

5. Distance from Proposed Location to Nearest Property or Lease Line 6777'

6. Distance from Proposed Location to Nearest Well, or Previously Applied for Well Location on this Lease. 4114'

18. Drilling Media and Characteristics: Air Mud Foam Other

19. Proposed Depth Measured: 5000' ± True Vertical: 5000' ±

20. Elevations: Estimated 2570' Final
Reference Datum: GR MAT DF KS 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	
12 1/4"	10"	0.375" wall	welded	n/a	0	±30	8 cubic ft.
8 3/4"	7"	23 lb/ft	BT&C	K-55	0	±500	113 cubic' (50% excess)
6 1/4"	4 1/2"	10.5 lb/ft	ST&C	K-55	0	±3000	467 cubic' (50% excess)
HMQ 3.85"	3 1/2"	7.7 lb/ft	Buttress	K-55	±2900	±5000	not cemented

22. Proposed Work Summary
The Proposed well to be drilled at the Vale Geothermal Prospect is an exploratory well designed for the purpose of exploring for and testing a possible hot water reservoir at a depth of 3000'-5000' below surface. The well will be drilled using slimhole rotary and coring methods. Temperatures of 300°F are expected below a depth of 3000'. Upon completion, the well will be injection and/or flow tested. A detailed drilling program is provided in Attachment A.

23. Signed  President 2/14/95

(This space for Federal use) Approved by Michael R. Crouse Acting Deputy State Director for Resource Planning, Use&Protection 3/29/95

APPROVED SUBJECT TO THE ATTACHED CONDITIONS

Title 18 U.S.C. Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.

CONDITIONS OF APPROVAL FOR GEOTHERMAL DRILLING PERMIT TGC 61-10

Permit No. GDP-030-95-01

Company: TransPacific Geothermal Corp. Well No.: TGC 61-10

Location: NW $\frac{1}{4}$ NE $\frac{1}{4}$, Sec.10, T. 19 S. R. 45 E.
3709 ft. east, 224 ft. south from the NW corner of Sec. 10
Lease No.: OR 36591

BUREAU OF LAND MANAGEMENT (BLM) CONTACTS

The Authorized Officer (A.O.) is:

William L. Bradley
Deputy State Director for
Resource Planning, Use, & Protection
Bureau of Land Management
P.O. Box 2965
Portland, Oregon 97208

A. Contacts

For drilling operations matters and in case of emergency or undesirable events, such as spills or fires, contact one of the following A. O. - Designated Representatives in the order listed:

- | | |
|---|--|
| 1. Dennis Simontacchi, Lakeview District
Inspector | Day (503) 947-6160
Night (503) 947-2355 |
| 2. Dennis Davis, Prineville District
Inspector | Day (503) 447-4115
Night (503) 475-2927 |
| 3. Eric Hoffman, Oregon State Office
Acting Chief, Branch of Physical Sciences | Day (503) 952-6039
Night (503) 643-7578 |

B. General - Drilling

Unless otherwise directed by the A.O., the lessee/operator shall comply with the following minimum requirements:

1. All operations are to be conducted in accordance with the terms and conditions noted in the approval letter dated March 29, 1995, Standard and Special Lease Stipulations, Geothermal Resources Operational Orders, and

the regulations contained in 43 CFR 3260. Variances from the approved Plan of Exploration, Geothermal Drilling Permit, or well program must be approved in advance by the A.O.

2. A copy of this permit with attached Conditions of Approval, GRO Orders and approved drilling program, with all subsequently approved amendments (Sundry Notices), and Blowout and Hydrogen Sulfide Contingency Plans, shall be retained at the well site for reference at all times.
3. The A.O. shall be contacted at least 24 hours prior to actual entry onto the land and prior to the start of drilling operations. Contact shall be made as noted in Item A, above.
4. A verbal report shall be phoned in to Dennis Simontacchi on Monday, Wednesday, and Friday mornings at approximately 8:30 am Mountain Time Zone, until the well is completed or abandoned. The reports should include bottom hole depth, significant temperatures encountered, e.g. in- and out-flow temperatures and any bottom hole temperatures taken. Any problems, spills, or unusual conditions encountered should also be reported. Daily written drilling and testing reports shall be mailed first-class or sent by FAX to Dennis Simontacchi (FAX (503) 947-2143). All information submitted that is to be held as proprietary must be clearly noted and labeled.
5. Within 30 days of well completion, a complete well history shall be submitted to the BLM Deputy State Director for Resource Planning, Use & Protection, (OR-932), P.O. Box 2965, Portland, OR 97208. Duplicate copies shall be submitted to Dennis Simontacchi, Bureau of Land Management, P.O. Box 151, Lakeview, OR 97630. This completion/abandonment report shall contain the following information:
 - a. A final hole designation and location;
 - b. A driller's log showing drilling activities, lost circulation, water encounters, pressures, abnormal and unusual drilling conditions and events, and the formation being drilled.
 - c. The method of completion, including cementing, and casing and tubing used with the wellhead components. The completion method may be presented by engineering drawings;
 - d. Trans-Pacific's plans for using the well (temperature/pressure monitoring, injection, future flow testing, etc.);
 - e. Complete details of abandonment procedures;

- f. All temperature and reservoir data, lithologic logs (surface to T.D.), and other logs/data or surveys run if not previously submitted in writing.

Any subsequent logs or surveys, and abandonment report, are to be submitted within 30 days of completion. All information submitted that is to be held as proprietary must be clearly noted and labeled.

6. Variances from the approved well program shall be approved by the Authorized Officer or, in emergency situations, verbal approval may be obtained from his Designated Representative, as listed in Item A above. Any verbal approvals shall be followed up by submitting a Sundry Notice to the Authorized Officer within 24 hours of approval.
7. The BLM shall be given the opportunity to witness all BOPE and other pressure tests, cementing jobs, flow tests, injection tests, sampling, and plugging and abandonment operations. A 24-hour notice shall be given to the BLM representative as indicated in Item A above.

Blowout Prevention Equipment

8. The BOP shall be tested following repairs that require disconnecting seals, and prior to drilling out plugs or casing shoes.
9. All BOPE controls shall be plainly labelled.
10. The blowdown/choke line shall contain at least one gate valve at the wellhead, and one gate valve and one adjustable choke valve. The blowdown/choke line shall extend to the reserve pit, and shall be anchored at all bends.
11. The kill line shall contain one positive shut-off valve and one check valve, or two positive shut-off valves.
12. The BOPE controls shall include one remote station located on the drilling floor and one station located at least 50 feet away from the wellhead.
13. The entire BOPE shall be function tested at least once per week, alternating the control stations. The annular preventer shall be function tested once per week on drill pipe. The blind rams shall be function tested once each trip, and the pipe rams shall be function tested once each trip or once each day, whichever is more frequent.
14. The accumulator shall be capable of closing all hydraulically-operated BOPE equipment with at least 1000 psig remaining in the accumulator.

15. While drilling the 8 3/4" surface hole, mud shall be conditioned and circulated before pulling pipe.

Temperature Measurement / Maximum Temperatures

16. Bottom hole temperatures (BHT) shall be measured at least as frequently as described in the following table (may be revised based on actual casing setting depth or actual fracture gradient):

8 3/4" surface hole:

0-500'	Every 250'
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Below the 7" casing:

BHT < 220°	Every 400'
220°F < BHT < 280°F	Every 200'
280°F < BHT < 310°F	Every 100'
310°F < BHT	Every 50'

Below the 4 1/2" casing:

BHT < 425°F	Every 400'
425°F < BHT < 485°F	Every 200'
485°F < BHT < 515°F	Every 100'
515°F < BHT	Every 50'

17. If, while drilling the 8 3/4" surface hole, the BHT exceeds 125°F, drilling shall stop and casing shall be set.
18. If, while drilling below the 7" surface casing, the BHT exceeds 340°F, drilling shall stop and casing shall be set.
19. If, while drilling below the 4 1/2" casing, the BHT exceed 545°F, drilling shall stop and the well shall be completed or abandoned.

Miscellaneous

20. At least 500 bbls of water shall be retained on site at all times. The water container(s) shall be connected to the well in such a way that the water can be immediately pumped into the kill line in case of an emergency.
21. After drilling 5-10 feet of new, uncemented hole below the 7" casing shoe, drilling shall stop and the casing shoe shall be tested to .7 psi/ft for 30 minutes. Drilling shall not continue until a successful test is obtained. A surface pressure bleed-off of less than 10% is considered successful.

22. After drilling 5-10 feet of new, uncemented hole below the 4 1/2" casing shoe, drilling shall stop and the casing shoe shall be tested to .7 psi/ft for 30 minutes. Drilling shall not continue until a successful test is obtained. A surface pressure bleed-off of less than 10% is considered successful.

Plugging and Abandonment

23. The downhole abandonment program shall be in accordance with Geothermal Resources Operational Order #3, or in such other manner as approved in advance by the A.O.

C. Surface Protection

For matters relating to the following surface protection conditions contact:

Ken Thacker, Vale District
Surface Protection Specialist

(503) 473-3144

1. If archaeological or paleontological material is uncovered during the exploration activities, surface disturbance must cease in the area and the Authorized Officer must be notified. The material shall remain intact until an examination of the material is completed by an archaeologist acceptable to the Authorized Officer, including but not limited to archaeological salvage or other measures to protect and preserve the materials. Such materials shall remain the property of the United States.
2. Intact ruts of the Oregon Trail which might be encountered during exploration activities are to be avoided.
3. If surface disturbing activities become necessary outside the area which has received cultural resources survey, the BLM archaeologist will be notified and arrangements will be made to have the new area surveyed, prior to surface disturbance.
4. Drill site F shall be located so as not to be visible from Lytle Boulevard. Work at the location will not be conducted until it has been determined by the Authorized Officer that such work is in compliance with Section 106 of the National Historic Preservation Act.
5. The drill pad area will have 6 to 10 inches of soil stripped and stockpiled prior to pad construction. No construction material or equipment operation will be allowed within the ephemeral drainage adjacent to the pad.
6. Water only will be used for dust abatement on roads and pads, if needed.

7. If excessive soil erosion occurs, as determined by the Authorized Officer, during exploration activities, check-dams composed of straw bales, sand bags, silt fences, or other techniques will be employed to minimize additional impacts.
8. All vehicles will be limited to the designated access road and constructed drill pad.
9. The lessee shall confine access to existing roads within the Lytle Boulevard District of the Oregon National Historic Trail. These roads may be upgraded only with prior approval of the Authorized Officer.
10. Exploration roads and drill pads which would remain as a permanent part of the project would be reduced in size and reclaimed areas revegetated with a permanent seed mixture approved by the Authorized Officer.
11. Final reclamation of areas no longer needed will include ripping of compacted surfaces, reshaping to the approximate original contour, reapplication of salvaged soil, and revegetating with a permanent seed mixture, as determined by the Authorized Officer.
12. Project activities will not occur within 1/2 mile of active nests during the critical nesting season for raptors (March 1 - August 1) and long-billed curlews (April 1 - July 1). Site-specific surveys by BLM approved biologist will be completed before surface disturbance occurs. Raptor nests or burrowing owl burrows will be avoided, even if not presently in use. Surveys for special status species reptiles and reptile habitat will be completed within the area to be disturbed before the project commences.
13. New information on wildlife critical winter range indicates the KGRA leased area is not critical winter range for deer, pronghorn antelope or other wildlife species; therefore, exploration and development will be allowed from August 1 to March 1 (previously prohibited time period).
14. Drilling equipment will be removed from site F during the primary recreation use season (Memorial Day through Labor Day) to avoid unnecessary impacts to the Oregon Trail setting.
15. Any road improvements on road segments observable from Lytle Boulevard should be limited to the minimum needed to insure the safe passage of drilling equipment.
16. Within fifteen days of completion of drilling at site F, equipment must be relocated to a previously approved location which is outside the viewshed of Lytle Boulevard.

17. All drilling equipment, materials and vehicles will be stored only on the constructed drill pad of site F.
18. All noxious weeds found on any site disturbed by the exploration process herein permitted must be eradicated within two weeks of identification. Eradication may proceed as outlined in the discussion in the revised Environmental Assessment, "Proposed Action".
19. All known sites of the plant, Malheur forget-me-not, are to be documented on working maps for all field-going personnel. Foremen and company officials must be aware of this species, the localized nature of its habitat, and the known locations within the exploration area. All work associated with exploration activities, including pad construction and road construction, will avoid all direct and indirect disturbances to plants and their habitat.
20. Any debris, including soil and vegetation, produced during road and pad construction near Malheur forget-me-not sites must be spread and disposed of in such a manner that no impact will occur to the plant sites during subsequent run-off events.