



**JOE LOMBARDO**  
*Governor*

STATE OF NEVADA  
COMMISSION ON MINERAL RESOURCES  
**DIVISION OF MINERALS**  
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<http://minerals.nv.gov/>



**ROBERT GHIGLIERI**  
*Administrator*

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## **GEOHERMAL CONDITIONS OF APPROVAL FOR MCGEE PROJECT PRODUCTION WELL DRILLING PERMIT 1703**

Submit forms and correspondence to: **Nevada Division of Minerals**  
400 West King Street  
Suite 106  
Carson City, NV 89703-4212

**Operator: Ormat Nevada, Inc.**  
**Lease Name: NVNV105724980**  
**Well: 23-26**  
**Permit: 1703**

A COPY OF THESE CONDITIONS OF APPROVAL MUST BE FURNISHED  
TO YOUR FIELD REPRESENTATIVE TO ENSURE COMPLIANCE

Communications with the Division shall be directed to:

Dustin Holcomb, Fluid Minerals Program Manager  
Office 775-684-7045      Email [dholcomb@minerals.nv.gov](mailto:dholcomb@minerals.nv.gov)  
Cell 775-721-2726

Robert Ghiglieri, Division Administrator  
Office 775-684-7048      Email [rghiglieri@minerals.nv.gov](mailto:rghiglieri@minerals.nv.gov)  
Cell 775-291-7825

Crystal Cruson, Program Officer II  
Office 775-684-7042      Email [fluids@minerals.nv.gov](mailto:fluids@minerals.nv.gov)

Voicemail is available on all cell phones and office phones. Please leave a message if you are unable to speak to someone and we will return your call as quickly as possible.

By provision of the current Memorandum of Understanding between NDOM and BLM, you may contact the following individuals for information or approvals. Approvals under the MOU apply to Fee and Federal lease locations.

Alexander Jensen, Acting Branch Chief, Reno

Office 775-861-6564      Email [aajensen@blm.gov](mailto:aajensen@blm.gov)  
Cell 775-560-2191  
Fax 775-861-6711

Mutasim "Tas" Elganzoory, Petroleum Engineer

Office 775-861-6570      Email [melganzoory@blm.gov](mailto:melganzoory@blm.gov)  
Cell 775-895-2139

Michael Erickson, PET, Reno

Office 775-861-6641      Email [merickson@blm.gov](mailto:merickson@blm.gov)  
Cell 775-686-8351

**PERMIT 1703**  
**YOUR APPLICATION TO DRILL THE MCGEE PROJECT PRODUCTION WELL IS APPROVED**  
**SUBJECT TO THE FOLLOWING PERMIT CONDITIONS**

1. **Posting Requirements:** These conditions and the minimum Blow Out Prevention Equipment (BOPE) requirements must be posted at the well site and read by all company personnel associated with the subject well.
2. **Notification Requirements:** The operator must give notification at least 48 hours prior to spudding, drill stem testing, or production or injection testing operations. A 24-hour notification is required before testing the casing or BOPE. These notifications may be made by telephone or email. Please refer to the contacts list on page one of this notice.
3. **Cementing Mix and CBL Requirements:** If the cementing mix for the lead cement in this program includes 10 lb/sk of Spherelite, a spherical additive for reducing the density of the cement mix, a high-resolution CBL may be required if the cement does not reach the surface or if the cementing of the casing appears inadequate. This additive has been found to interfere with normal cement bond logging (CBL). The product manufacturer has stated that good logging may be achieved with a high-resolution CBL. This log can be more expensive and difficult to schedule. The operator is notified that if this mix is used and a CBL is required by regulatory agencies, high-resolution logging may also be required if the CBL is found inadequate in evaluating the cement behind the casing, unless an alternative satisfactory method of confirming cement bonding is approved by the regulatory agencies.
4. **Cementing Casing-** NAC 534A.260 (1,2,3) requires surface and intermediate casing to be cemented to surface. If one hundred percent (100%) returns are not obtained during the cementing operation, or if the cement falls back in the annulus, a top cement job shall be required, unless another cement program has been approved. If unconventional cement formulations are used, there must be a cased-hole logging technique available to determine the adequacy of cement bonding and hydraulic seal for the particular unconventional cement product used.
5. **Well Cellars:** For corrosion prevention, the cellar must be engineered, constructed, and/or maintained to prevent standing water from long-term contact with the casing or wellbore assembly. The top of the surface casing must be a minimum of 24 inches above the cellar floor or ground level if a cellar is not present. Surface casing must be as high as possible around intermediate casing with excess, tapered cement so water does not pool on top of the cement. Upon completion of the well, the drilling pad must be contoured to drain water away from the cellar or surface casing if a cellar is not present.

6. **Change in Plans:** NAC 534A.540 (3) specifies that the operator must submit a sundry for permission to change the construction of the wellbore. Verbal permission may be granted for a sundry notice due to the urgency of a particular matter.
7. **Surface Casing** - NAC 534A.260 (3) requires that surface casing be sufficient to protect fresh water aquifers and not less than 10% of the proposed total depth of well, or a minimum 200 feet, whichever is greater. The cementing of casing strings shall be done using the standard procedure of inside casing displacement, unless other methods are approved prior to the cementing procedure.
8. **NAC 534A.270 - Prevention of Blowout; Testing of Equipment for Prevention of Blowout; Submission of Test Data and Supporting Information to Division; Recording of Results in Daily Drilling Log (NRS 513.063, 534A.090).**
  - a. **Well Control and Safety:** An operator must take all necessary precautions to keep wells under control and operating safely at all times. Well control and wellhead assemblies used in any geothermal well must meet the minimum specifications prescribed by the **American Petroleum Institute (API)** in the most current edition of **Standard 53**, "Blow Out Prevention Equipment Systems for Drilling Wells," or as otherwise prescribed by the Administrator. The most current edition is available from API, 200 Massachusetts Avenue NW Suite 1100 Washington, DC 20001-5571, by telephone at (877) 562-5187, or at [www.api.org](http://www.api.org), for \$183. Equipment for the prevention of a blowout, capable of shutting in the well during any operation, must be installed on the surface casing and maintained in good operating condition at all times. This equipment must have a pressure rating greater than the maximum anticipated pressure at the wellhead. Equipment for the prevention of a blowout is required on any well where temperatures may exceed **200°F**.
  - b. **Submission of Test Data:** The operator must submit the pressure data and supporting information for the blowout prevention equipment to the Division as soon as practicable after the conclusion of the test conducted pursuant to subsection 3. The operator must record the results of each test in the daily drilling log.
9. **Directional Drilling:** NAC 534A.550 requires directional surveys (inclination and azimuth) to be run on any permitted directionally drilled well. Division conditions of approval further require directional surveys (inclination and azimuth) where the inclination exceeds 5 degrees or the projected bottom hole location is 100 feet or less from the lease boundary, unless otherwise approved by the Division of Minerals. Directional surveys must be performed at least every 250 feet in the directionally drilled portion of the wellbore. The operator is advised that cased-hole logging for the evaluation of cement bonding and hydraulic seal may also be required as part of the well completion. The cased-hole logging technique(s) used by the operator must provide conclusive results regarding the initial quality of cement bonding and hydraulic seal.

10. **NAC 534A.280 - Measurements of Temperature Requirement for Mud Cooling Equipment (NRS 513.063, 534A.090)**
- Temperature Monitoring:** The operator must continuously observe the temperature of the mud returned up the wellbore during drilling whenever the surface temperature of the drilling fluids reaches **125°F**. These temperatures must be recorded in the well log after each joint of pipe has been drilled.
  - Mud Cooling Equipment:** Mud cooling equipment is required when the flow line temperature reaches **125°F**.
11. **Hydrogen Sulfide:** If hydrogen sulfide is encountered, the well must be shut-in until the measured amounts are determined. The values of hydrogen sulfide encountered must be reported to the Division of Minerals.
12. **Air/Aerated Drilling Operations:** For air/aerated drilling operations, the following equipment must be utilized: a banjo box (or equivalent) and a staked-down blooie line directed to the reserve pit with a minimum distance of 100 feet.
13. **Samples – NAC 534A.310:** Samples of cuttings or splits of core must be collected and submitted to the Nevada Bureau of Mines and Geology (NBMG). Division conditions of approval further require samples at a minimum of 30-foot intervals from the surface to the total depth, unless otherwise approved in the permit. Core must be submitted in skeletonized format.
- Submission Requirements:** Two separate sets of cuttings and one split of core must be sent prepaid to the Great Basin Science Sample and Records Library, Nevada Bureau of Mines and Geology, 2175 Raggio Parkway, Reno, Nevada 89512. For more information, phone 775-682-8766 or email [nbmrg@unr.edu](mailto:nbmrg@unr.edu).
  - Cuttings Specifications:** Each set of cuttings must consist of at least 15 milliliters per sampling interval, cleaned, dried, and placed into 3"x5" sample envelopes. The envelopes must be placed in order by interval into common drill cutting boxes with approximate dimensions of 3"x5"x20". The envelopes must be identified by the Division permit number, well name/number as noted on the Geothermal Resource Development Permit Application, and interval.
  - Proper Identification:** Each box must have legibly written on one end the name of the operator and well, as noted on the Geothermal Resource Development Permit Application, Division permit number, total interval (missing intervals noted), and set number.
  - Submission Note:** The samples must not be sent to the Division of Minerals but directly to the NBMG. The samples are due within 60 days of well completion. The operator is responsible for the cost of any further handling of the samples by the NBMG required to meet the standards set out in this permit condition.
14. **Drilling Reports:** The Nevada Division of Minerals must be included on the daily morning operational report distribution list during the drilling/completion of the well, starting from the spud date through the date of drill rig release, or the date of completion rig and/or

completion equipment release, whichever occurs last. The operational morning report must be emailed to the Fluid Minerals Distribution List ([fluids@minerals.nv.gov](mailto:fluids@minerals.nv.gov)).

15. **Operational Morning Reports:** The operational morning reports must include the date of the report, the spud date, casing information (size, grade, weight, hole size, setting depth), and, as needed, the amount and type of cement used, top of cement, depth of cementing tools, casing test method, lithological descriptions of sections drilled, intervals perforated, tested, acidized, fractured, and results obtained, as well as the dates all work was performed.
16. **Well Completion Report:** NAC 534.550 (1)(a) requires a well completion form to be filed with the Division of Minerals within 30 days of the cessation of drilling (rig release date).
17. **Logging:** NAC 534A.550 (1)(c-d) requires two copies of all well logs run, including lithological and electrical, neutron-gamma or similar, to be filed with the Division. Computed results in LAS format must also be submitted to the Division for each electric log run. These logs must be submitted within 30 days of the completion of the well.
18. **Emergency Notification:** In the event of a serious accident, blowout, spill, or fire, immediately notify the Division of Minerals (see page one for contact information).
19. **Spills:** Spills or accidental discharge of hydrocarbons in excess of 25 gallons must be reported to the Nevada Division of Environmental Protection at 1-888-331-6337.
20. **Plugging:** NAC 534A.540 requires all plugging and abandonment programs to be approved prior to commencing plugging and abandonment work. Verbal approval may be given. Subsequent submission of forms is required within 30 days of the completion of plugging operations.
21. **Fluid Chemistry:** If water chemistry indicates corrosion, precautions and/or cathodic protection may be necessary. The operator must be prepared to document water chemistry and protective measures taken to permit injection into the well via a UIC permit. For further information, contact the NDEP Bureau of Water Pollution Control at 775-687-9418 or visit their website at [ndep.nv.gov/water](http://ndep.nv.gov/water).
22. **Abandoned Mines Brochure:** The enclosed Abandoned Mines brochure must be posted at the well site alongside the Conditions of Approval and the Minimum Blow Out Prevention Equipment Requirements and read by all company personnel associated with the subject well. The operator must inform all drilling personnel and contractors of the potential dangers, including bodily injury, associated with the exploration of abandoned mine workings and the disturbance of possible bat habitats.
23. **Casing String Centering:** The operator must ensure proper centering of the casing strings for new wells with downhole centralizers and center the top of the casing with the drilling rig during and immediately after cement is put in place. The operator must also ensure that the

number and depths of casing centralizers are recorded in a contemporaneous log during the installation of the casing strings.

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**SUNDRY NOTICES  
OIL, GAS AND GEOTHERMAL**

Verbal approval for the following work may be given by the Division:

1. Any emergency work necessary to prevent or control blow outs or other situations with significant potential to result in injury to the crew or damage to the environment or resource.
2. Any kick-offs necessary to by-pass bad hole or fish left in hole.
3. Changes in casing points due to bad hole.
4. Deepening, attempting to encounter resource.
5. Necessary well work to keep geothermal power plants operating.
6. Drilling equipment failure.
7. Squeeze or plug backs to prevent any geothermal or oil field waters from contaminating other water zones.

The operator is required to file a written sundry notice with the Division subsequent to verbal approval if the sundry notice has not already been filed. Verbal approvals will not be given for any work that can be planned in advance, such as acidizing, changes in casing points or completion, etc., reentry of a well, remedial work, production or injection testing.