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SEP 15 2017

DIVISION OF MINERALS

STATE OF NEVADA  
COMMISSION ON MINERAL RESOURCES  
DIVISION OF MINERALS  
400 W. King Street, Suite 106  
Carson City, Nevada 89703  
(775) 684-7040 | Fax (775) 684-7052  
http://minerals.nv.gov

Date Received	
API Number	27-019-90049
County	LYON
Permit Number	1441
FOR DIVISION USE ONLY	

**GEOHERMAL RESOURCE DEVELOPMENT PERMIT APPLICATION**

Name or Corporate/Business Name  
Homestretch Geothermal 2010 LLC

Street Address 1147 Daybreak Drive  
City Washington State UT Zip Code 84780

hereby makes application for a geothermal development permit, State of Nevada, Division of Minerals.

(If applicant is a corporation, show state and date of incorporation; if a partnership, list names of partners.)

Delaware Limited Liability Company  
Organized 10-27-2010  
Members, Homestretch Geothermal, LLC Wabuska Geothermal, LLC

This application is for a  Domestic well  Commercial well  Industrial well  
Other, specify:  Observation well  Thermal Gradient well  Re-entry

Note: Re-entry includes workover, deepening, or plugging back operations.

Applicant is:  Land Owner  Lease Holder  
Well Name: PW5  
Lease Name/No: N/A Split Estate?  Yes  No  
Land Type:  Federal (BLM, USFS, etc.)  Private  State

Location of Well:

Domestic: Street: \_\_\_\_\_  
City: \_\_\_\_\_ County: \_\_\_\_\_

Commercial and Industrial:

NW \_\_\_\_\_ ¼ of, SW \_\_\_\_\_ ¼ in Section 15  
Township 15N \_\_\_\_\_, Range 25E \_\_\_\_\_

UTM Northing 4337214.00 N; UTM Easting 311720.00 E (NAD83 Datum)

County Lyon

(If applicable, give street address below.)

Street: 15 Julian Lane  
City: Yerington  
State: NV Zip: 89447

Operator's Name: Homestretch Geothermal 2010 LLC  
Address: 611 W 1760 N  
City, St Zip: Washington, UT 84780

Drilling Contractor's Name: Welsco Drilling Corp.  
Address: PO Box 5245  
City, St Zip: Fallon, NV 89406

Rotary Rig Description: \_\_\_\_\_

Hole Size: 26" Casing Size: 20" Weight/Gauge: 94 #/ft

Estimated Well Head Temperature: 212 F

Size of BOP:  2000 psi  3000 psi  5000 psi

Planned Use of Geothermal Resource:

Power Generation

Planned Disposal of Spent Geothermal Fluid:

Surface Disposal

Type and Amount of Bond: Surety \$50,000  
(Exempt for Domestic Class)

Bond Issued by: Old Republic Serial No. UL1149718

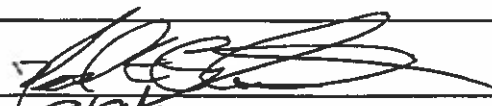
The Source of the Proposed Geothermal Resource is:

Wabuska

(List name of hot spring, geologic formation(s) or other source.)

Total Depth to be Drilled: 700'

Drilling will Commence On or Before: 9/30/2017

Signature of Applicant/Agent:   
Date: 9/9/17

Please attach a detailed drilling program including the following information:

1. Well design schematic; casing and mud programs; potential water supply; drilling rig to be used and pad layout; blow out prevention equipment diagram and testing program; directional drilling information if applicable; map of location and access roads. Additional information may be required upon review.
2. The required fee per NAC 534A 210 or 534A.212.

CONDITIONS OF PERMIT

1. All permittees must comply with appropriate sections of the Geothermal Rules and Regulations of the Division of Minerals and with applicable rules and regulations of other local, state, and federal agencies.
2. During the drilling of domestic geothermal wells, all water strata above the geothermal horizon being used must be sealed or separated in order to prevent their contents from passing into other strata.
3. All fresh water and water of value or possible value for other beneficial uses must be confined to their respective strata and be adequately protected by methods approved by the Division. Precautions must be taken in drilling and abandoning wells to guard against any loss of fresh water from the strata in which it occurs, and the contamination of any fresh water by objectionable water.
4. The operator of any well must shut off and exclude all water from any geothermal resource-bearing stratum to the satisfaction of the Division.
5. See attached Conditions of Approval.
6. Please send daily drilling reports to : Lowell Price.....[lprice@minerals.nv.gov](mailto:lprice@minerals.nv.gov)  
and  
Linda Wells.....[lwells@minerals.nv.gov](mailto:lwells@minerals.nv.gov)
7. Additional Conditions/Comments

A.	SEE ATTACHED COA'S
B.	
C.	

This permit does not extend the permittee the right of ingress and egress on public, private or corporate lands.

The issuance of this permit does not waive the requirements that the permit holder obtain other permits from State, Federal, and local agencies.

**PERMIT APPROVAL**

Approved 9-25-2017 with the conditions noted above.  
Date

Permit Number ~~27-019-90049~~ DP  
1441

  
\_\_\_\_\_  
Administrator  
Division of Minerals



**BRIAN SANDOVAL**  
Governor

STATE OF NEVADA  
COMMISSION ON MINERAL RESOURCES  
**DIVISION OF MINERALS**  
400 W. King Street, Suite 106  
Carson City, Nevada 89703  
(775) 684-7040 • Fax (775) 684-7052  
<http://minerals.nv.gov/>

Las Vegas Office: 2030 E. Flamingo Rd. #220, Las Vegas, NV 89119  
Phone: (702) 486-4343; Fax: (702) 486-4345



**RICHARD PERRY**  
Administrator

**GEOHERMAL  
CONDITIONS OF APPROVAL  
FOR DRILLING PERMIT**

Submit forms and correspondence to: Nevada Division of Minerals  
400 W. King Street, #106  
Carson City, NV 89703

Communications with the Division shall be directed to:

Lowell Price, Oil, Gas and Geothermal Program Manager  
Office 775-684-7045      Email [lprice@minerals.nv.gov](mailto:lprice@minerals.nv.gov)  
Cell 775-721-1774  
Fax 775-684-7052

Rich Perry, Division Administrator  
Office 775-684-7047      Email [ryperry@minerals.nv.gov](mailto:ryperry@minerals.nv.gov)  
Cell 775-721-0282  
Fax 775-684-7052

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.

John Menghini, Fluid Minerals Team, Petroleum Engineer, Reno  
Office 775-861-6573      Email [John\\_Menghini@blm.gov](mailto:John_Menghini@blm.gov)  
Cell 775-223-1359  
Fax 775-861-6711

YOUR APPLICATION TO DRILL THE WABUSKA PRODUCTION W WELL 5  
PRODUCTION WELL IS APPROVED SUBJECT TO THE FOLLOWING PERMIT  
CONDITIONS

1. Production Well 5 will twin Production Well 2 once drilled. In the event Production Well 5 is productive at an industrial scale, Production Well 2 must be plugged and abandoned. If neither Production Well 5 nor Production Well 2 is deemed appropriate for industrial scale production, at least one of the two wells must be plugged and abandoned.
2. These conditions and the minimum Blow Out Prevention Equipment (BOPE) requirements shall be posted at the well site and read by all company personnel associated with the subject well.
3. The operator shall give notification at least 48 hours prior to spudding, drill stem testing, or production or injection testing operations. 24 Hours notification is required prior to the testing of casing or BOPE. These notifications may be by telephone or email. Please refer to the contacts list on page one of this notice.
4. If the cementing mix for the lead cement in this program includes a 10 lb/sk of Spherelite, a spherical additive for reducing density of cement mix, and a high resolution CBL may be required if the cement does not reach 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 here notified that if this mix is used and a CBL is required by the regulatory agencies, a high resolution logging may also be required if the CBL is found to be inadequate in the evaluation of the cement behind casing, unless an alternative satisfactory method of confirming cement bonding is approved by the regulatory agencies.
5. Well Cellars - For corrosion prevention, the cellar must be engineered, constructed, and/or maintained, to preclude standing water from long-term contact with the casing or wellbore assembly.
6. Change in Plans - NAC 534A.540 (3) (g) specifies the operator will submit a sundry for permission for change of drilling plans. Verbal permission may be granted. Subsequent sundry form submission is required. Please refer to attached Sundry Notice Requirements.
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 or well or minimum 50 feet. The cementing of casing strings shall be done using the standard procedure of inside casing displacement or tab-in methods, unless other methods are approved prior to the cementing procedure.
8. Liner Lap – All liner laps with previously run casing or liner must be a minimum of 100 feet.
9. Cementing - NAC 534A.260 (3, 4, 5) 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.

10. BOPE - After surface casing is set, all wells shall be equipped with at least the minimum required Blowout Prevention Equipment (BOPE), unless otherwise approved. NAC 534A.260 (5) requires BOPE to be tested to at least 500 psig for 30 minutes with <10% pressure loss or as approved by the Division. BOPE should be in accordance with good established oil field practice with adequate kill lines and good working order.
11. Formation Integrity Test (FIT) at all casing shoes – A successful FIT, or casing shoe pressure test, must be performed before drilling deeper. The operator is to drill out no further than five feet out of the casing shoe, and then pressure up to approximately 10% below the known or estimated fracture gradient for a minimum of 30 minutes. In order to pass an FIT there can be no more than a 10% pressure loss over the course of the minimum 30 minute test. In the event of a failed FIT, a cement squeeze job must be performed below the casing shoe. A successful FIT must be performed before drilling deeper. The following formula is to be used for the applied surface pressure calculation:

Calculate the downhole pressure for a specified or targeted pressure gradient  
Specified Pressure Gradient {(psi/ft) x vertical depth (ft)} = Pressure G (psi)

Calculate the downhole pressure due to the current mud in the hole  
Mud Density {ppg} x vertical depth (ft) x 0.052 = Pressure M (psi)

Calculate the surface required to test formation or shoe to a specified gradient  
Pressure G - Pressure M = Required Surface Pressure (psi)

Example of Formation Integrity Test at 20" Surface Casing Shoe:

Casing Shoe at 271 ft (TVD)

Mud Weight- 9.0 ppg

Specified Pressure Gradient to test casing the 20" shoe - 0.6 psi/ft

Pressure G = 0.6 psi/ft x 271 ft = 162.6 psi

Pressure M = 9.0 ppg x 271 ft x 0.052 = 126.8 psi

Required Surface Pressure = Pressure G - Pressure M = 162.6 - 126.8 = 35.8 psi

12. Production liner – If a production liner is utilized the liner hanger must be located at least 100 feet above the intermediate casing shoe.
13. Directional Drilling - NAC 534A.360 requires directional surveys (inclination and azimuth) to be run on any well permitted directionally drilled well. Division conditions of approval further require directional survey (inclination and azimuth) where the inclination exceeds 5 degrees or the projected bottom hole location would be 100 feet or less from the lease boundary, unless otherwise approved by the Division of Minerals. Direction surveys must be performed at least every 250 feet in the directionally drilled portion of the wellbore.
14. Hydrogen Sulfide – If hydrogen sulfide is encountered well must be shut-in until measured amounts are determined. Values of hydrogen sulfide encountered must be reported to the Division of Minerals.

15. Air/Aerated Drilling Operations – For air/aerated drilling operations, the following equipment shall be utilized: banjo box (or equivalent), and a staked down blooie line directed to the reserve pit with a minimum distance of 100 feet.
16. **Cuttings** – *NAC 534A.310 requires samples of cutting shall be collected and submitted to Nevada Bureau of Mines and Geology (NBMG). Division conditions of approval further require a minimum of 30-intervals from surface to the surface casing point and require 10-foot intervals from the surface casing shoe to total depth.*
- a. TWO separate sets of cuttings are to 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 e-mail [nbmg@unr.edu](mailto:nbmg@unr.edu).*
  - b. EACH SET is to consist of at least 15 milliliters of cuttings per sampling interval that must be cleaned, dried, and placed into 3"x5" sample envelopes. The envelopes are to be placed in order by interval into common drill cutting boxes with approximate dimensions of 3"x5"x20". The envelopes are to be identified by the Division permit number, well name/number as noted on the Geothermal Resource Development Permit Application (Kettleman number alone with suffice if given), and interval.*
  - c. The sets are to be PROPERLY IDENTIFIED as follows: Each box is to 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.*
  - d. NOTE: the cuttings are not to be sent to the Division of Minerals. The cuttings are due within 15 days of completion of the well. The operator will be responsible for the cost of any further handling of your samples by the NBMG required to meet the standards set out in this permit condition.*
17. **Drilling Reports** - A minimum of one drilling report shall be submitted to the Division of Minerals each week during drilling operations, notifying the Division of the drilling process. The Division of Minerals requests daily drilling reports. These reports may be submitted via mail, fax or email.
18. **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).
19. **Logging** - NAC 534A.350 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. Electronic files are to be provided on CD Rom. These logs are to be submitted within 60 days of the completion of the well.
20. **Survey Plat** - NAC 534A.205 requires a certified plat of the location by a professional land surveyor of the well must be filed with the Division of Minerals within **60 days** of completion of the construction of the well.

21. Emergency Notification - In the event of a serious accident, blow out, spill or fire, immediately notify the Division of Minerals (see page one for contact information).
22. 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.
23. Plugging - NAC 534A.540 require 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 with 30 days of completion of plugging operations.
24. *The enclosed Abandoned Mine brochure shall be posted at the well site alongside the Conditions of Approval and Minimum Blow Out Prevention Equipment Requirements and read by all company personnel associated with the subject well. The operator shall inform all drilling personnel and contractors associated with the drilling of the well of potential dangers, including bodily injury, associated with the exploration of abandoned mine workings, as well as the disturbance of possible bat habitats.*

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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 bypass 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 injected 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.

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., re-entry of a well, remedial work, production or injection testing.



### **Wildlife Background for Mine Features With regard to Geothermal**

Nevada has an estimated 200,000 to 300,000 historical mine features in the state (Durbin and Coyner, 2002). These abandoned mine features have become important artificial roost sites for a number of Nevada's 23 species of bat for at least a portion of their life processes. The Townsend's big-eared bat (*Corynorhinus townsendii*), one of the species in Nevada most dependent on mines and caves is also a species of Conservation Concern in western North America. This species is highly sensitive to disturbance at roost sites. During the most critical periods such as hibernation and reproduction abandoned mines provide valuable habitat in terms of temperature and protection. Human disturbance during these important life processes can not only result in loss of the habitat for bats but also loss of the animals themselves by abandonment of pups and mortality during the hibernation season.

White-nose syndrome (WNS) is a disease responsible for unprecedented mortality in hibernating bats in the northeastern U.S. First discovered in 2006 in New York State, WNS is spreading rapidly across eastern North America and currently affects seven species. Mortality associated with WNS is causing a regional collapse and is believed to lead to regional extinction of the little brown Myotis (*Myotis lucifugus*), previously one of the most common bat species in North America. Diseases like WNS can have serious impacts on native populations, which in turn can have substantial impacts on ecosystem integrity. All available evidence indicates that WNS is caused by an infectious agent, and therefore can potentially be spread by all known modes of disease transmission including human vectors. All state and Federal agencies that survey cavernous bat habitat are following the Fish & Wildlife WNS protocol decontamination procedure to assist in the prevention and spread of this disease in Nevada. Any entry into these abandoned mines by unauthorized public jeopardize bat populations and the efforts of Nevada biologists and authorized personnel to prevent this disease from infecting Nevada's bat populations.

Nevada Department of Wildlife are not aware if there are any negative impacts to bat roosts in abandoned mine from geothermal pumping, extraction of the heated water and subsequent reinsertion. Maternal use by bats of mines heated by geothermal activity is a result of the warm temperatures they provide. NDOW will closely monitor maternity roosts in mines that are heated by geothermal and are in close proximity to geothermal wells to assess if there are temperature changes and any other possible impacts.

- ❖ NDOW asks for your support in the protection and Conservation of wildlife habitat provided by historical mine features by not entering any mine features