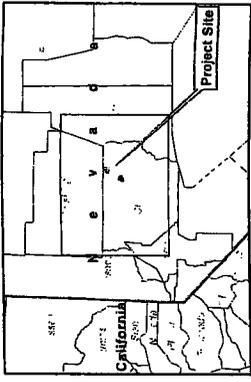


**Docket No. 11-06014**

**Application**

**Volume 2 of 2**

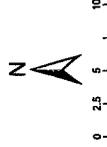
Figures



**LEGEND**

- Dixie Meadows Lease Area
- Coyote Canyon Lease Area
- Lamb Mineral Interest (see Note)
- Overland Travel Routes
- Limited Access Highway
- Highway
- Local Road

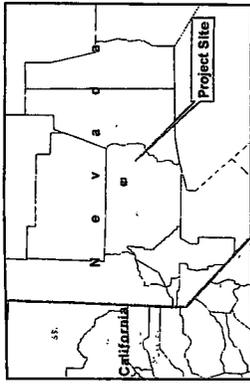
Note: TGP owns the mineral rights for this land, along with the right to surface use in exercise of mineral rights. The U.S. Navy owns the land surface.



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Bureau of Land Management  
Stillwater Field Office  
Carson City District Office  
5665 Morgan Mill Road  
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**Figure 1**  
Project Location  
Coyote Canyon and Dixie Meadows  
Geothermal Exploration EA

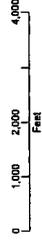




**Legend**

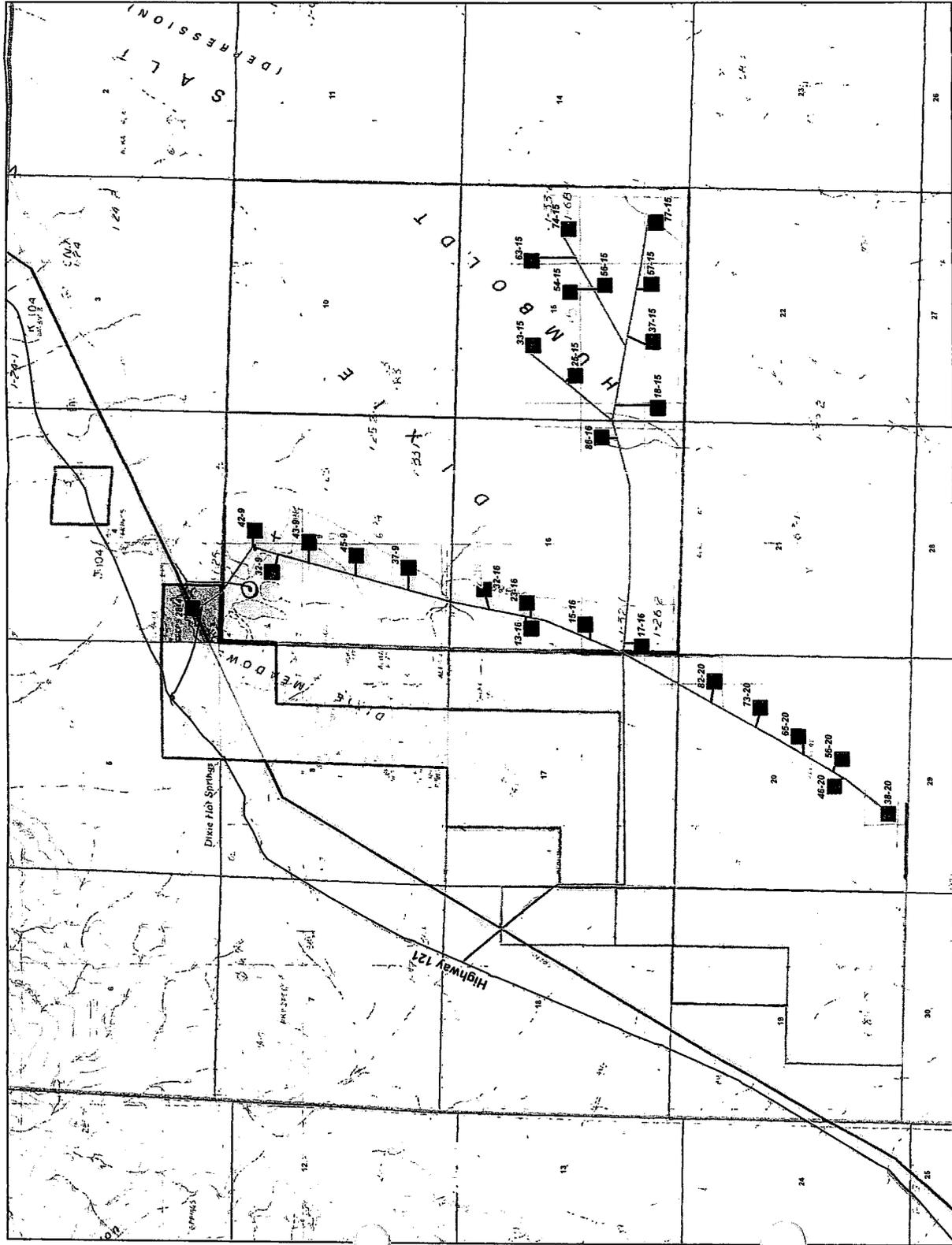
- Proposed Well Sites
- Potential Branch Access Road
- Potential Access Road
- Within Geothermal Lease
- Potential Access Road
- Outside Geothermal Lease
- Project Area
- Lamb Mineral Interest (see Note)
- N-60685
- N-60686
- Existing Transmission Line
- Existing 200' ROW
- Township/Range Boundary
- Section Boundary
- Bureau of Land Management
- Navy (See Note)
- Private

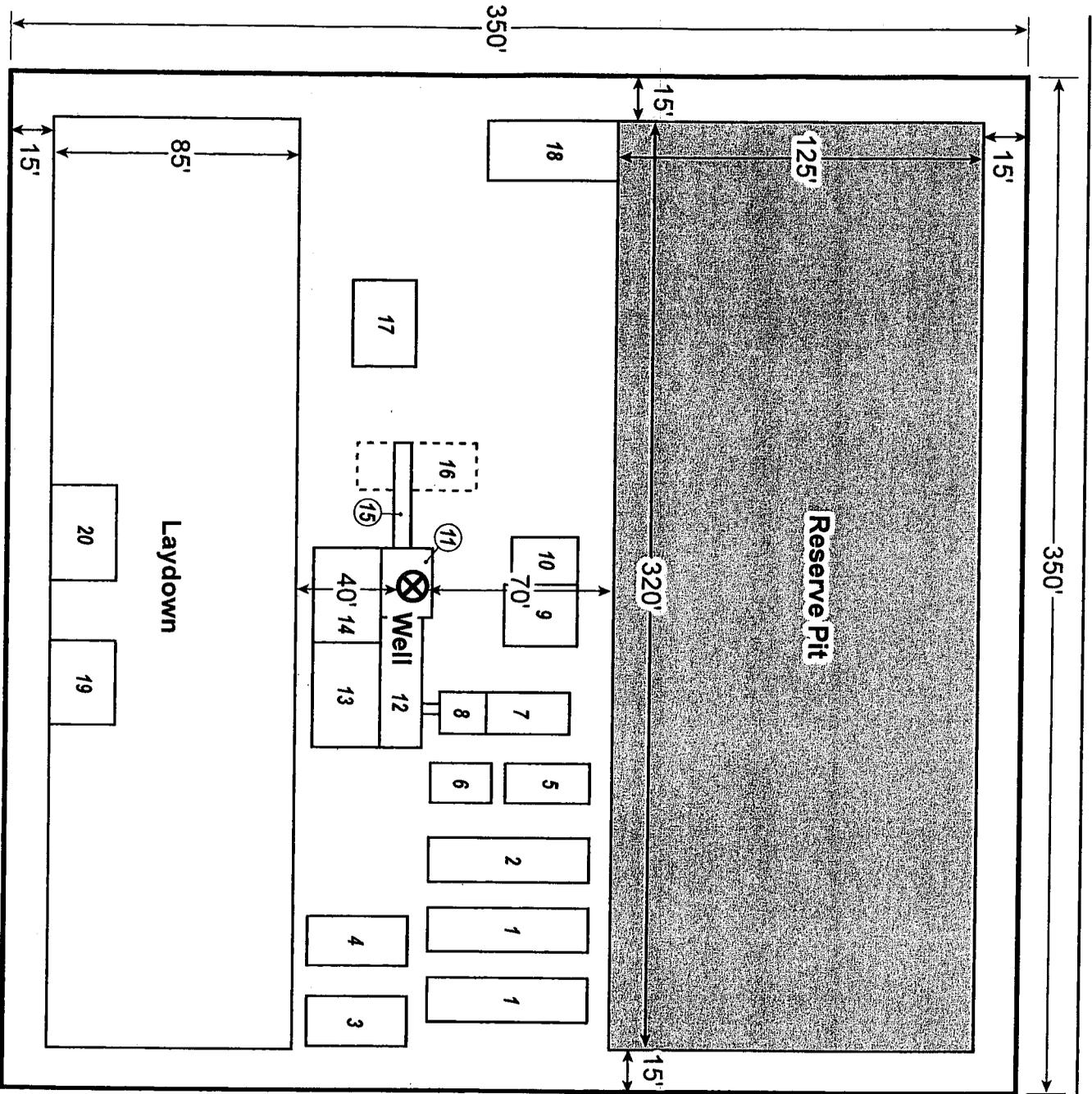
Note: TGP owns the mineral rights for this land, along with the right to surface use in exercise of mineral rights. The U.S. Navy owns the land surface.



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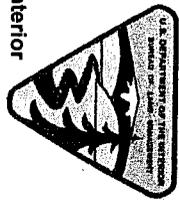
**Figure 3**  
 Dixie Meadows Proposed Action Lease Areas  
 Coyote Canyon and Dixie Meadows  
 Geothermal/Exploration EA





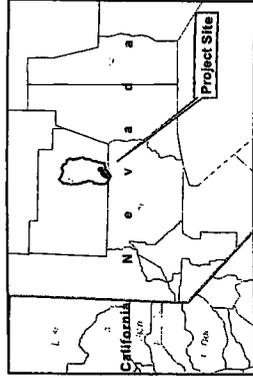
**LEGEND**

- 1 Air Compressors
- 2 Mud Tank
- 3 Fuel Tank
- 4 Water Tank
- 5 Mud Storage
- 6 Generator
- 7 Change House
- 8 Accumulator
- 9 Mud Pit
- 10 Shale Shaker
- 11 Rig Floor
- 12 Draw Works
- 13 Storage
- 14 Dog House
- 15 Catwalk
- 16 Pipe Rack
- 17 Electric Logger
- 18 Mud Logger
- 19 Trailer House
- 20 Trailer Office



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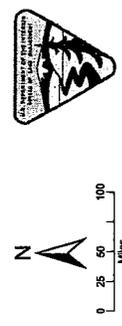
**Figure 4**  
 Typical Well Pad Layout  
 Coyote Canyon and Dixie Meadows  
 Geothermal Exploration EA



**LEGEND**

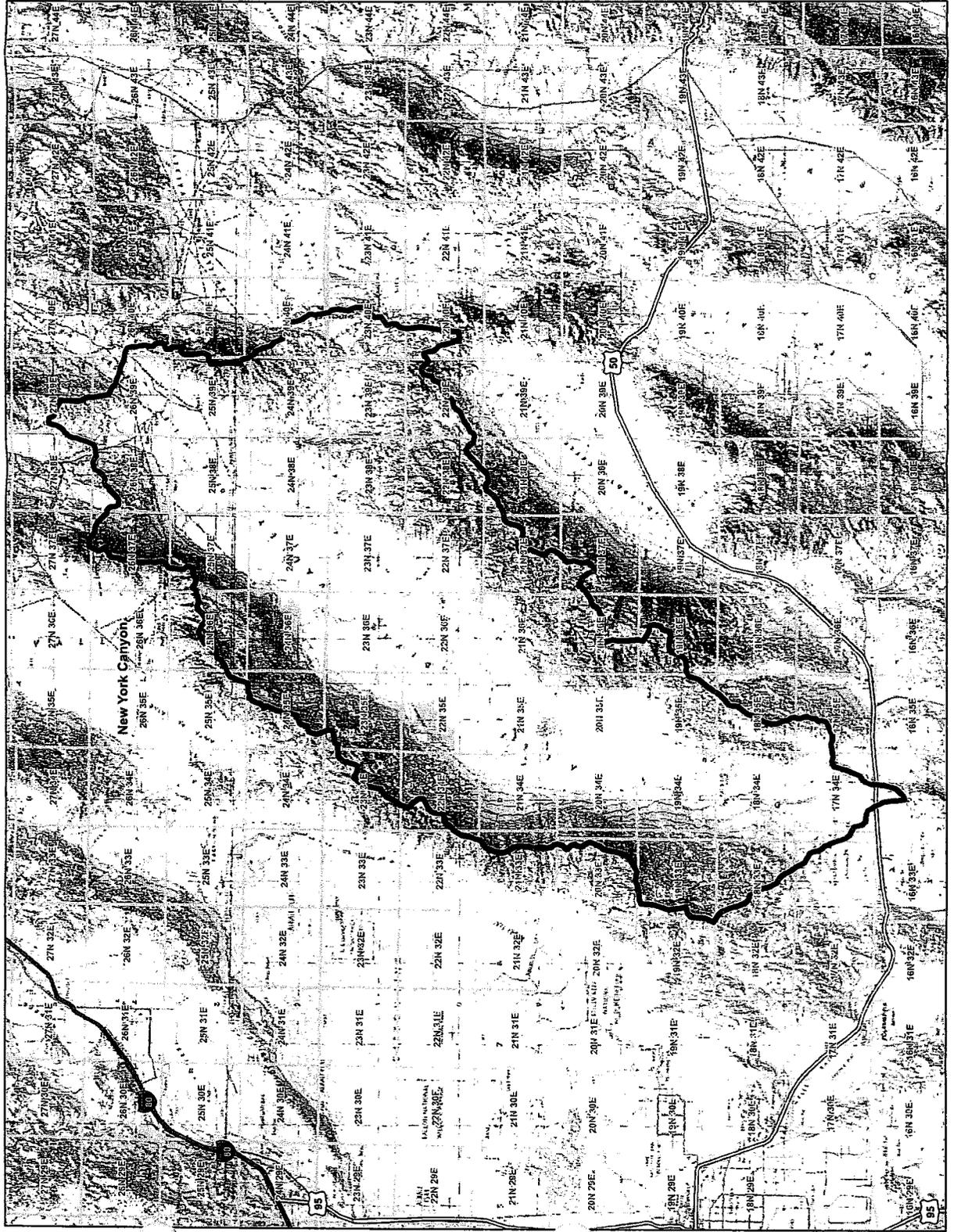
- TGP Coyote Canyon
- Geothermal Lease Areas
- TGP Dixie Meadows
- Geothermal Lease Areas
- Dixie Valley Groundwater Basin (Basin 128)\*
- Township/Range Boundary

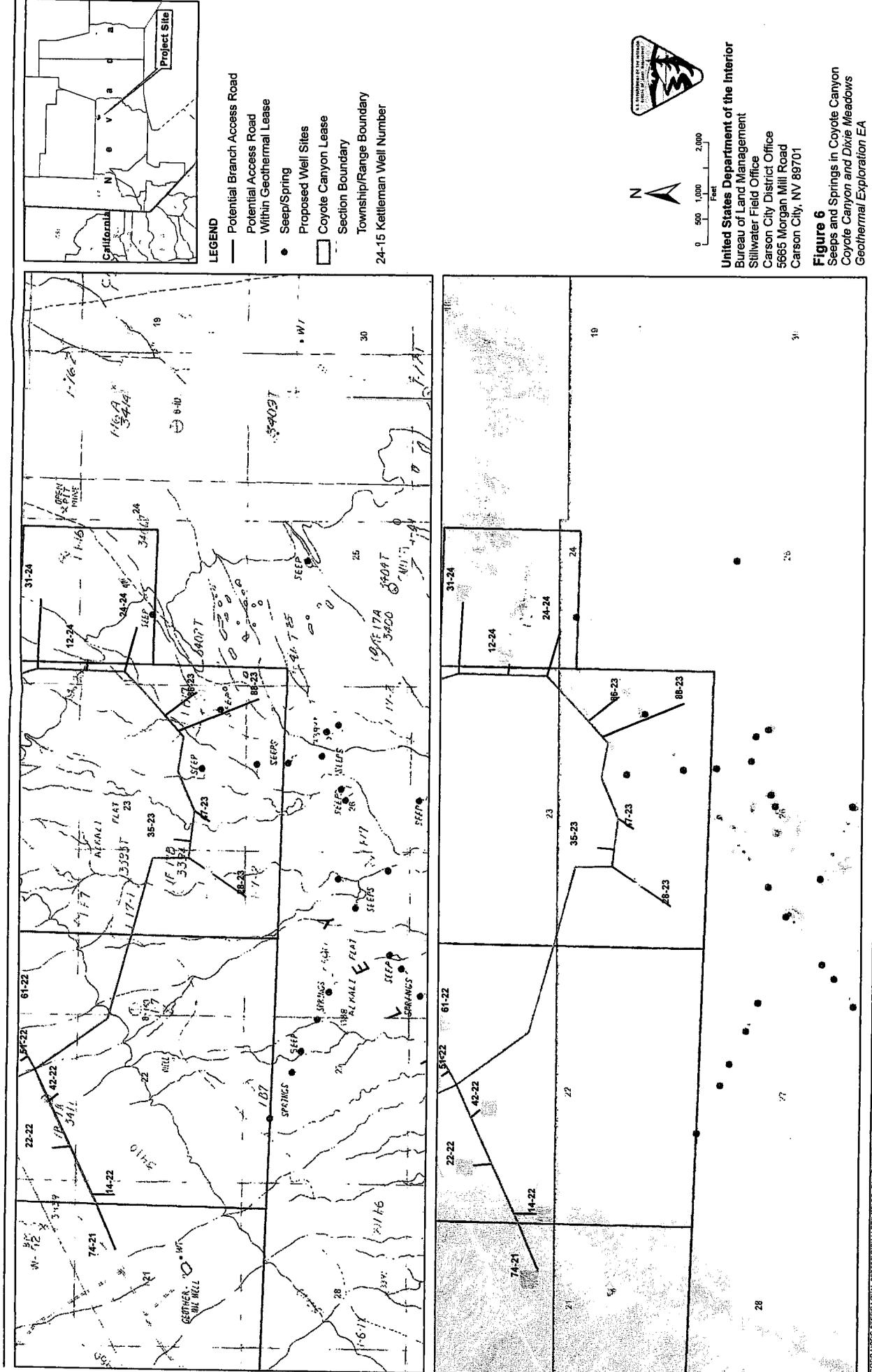
\*Source: Department of Conservation and Natural Resources  
Office of the State Engineer  
Division of Water Resources



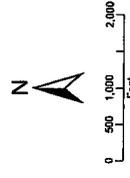
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**Figure 5**  
Groundwater Basin 128 (Dixie Valley)  
Coyote Canyon and Dixie Meadows  
Geothermal Exploration EA

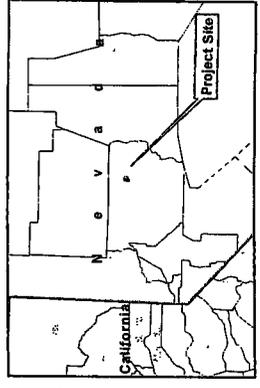
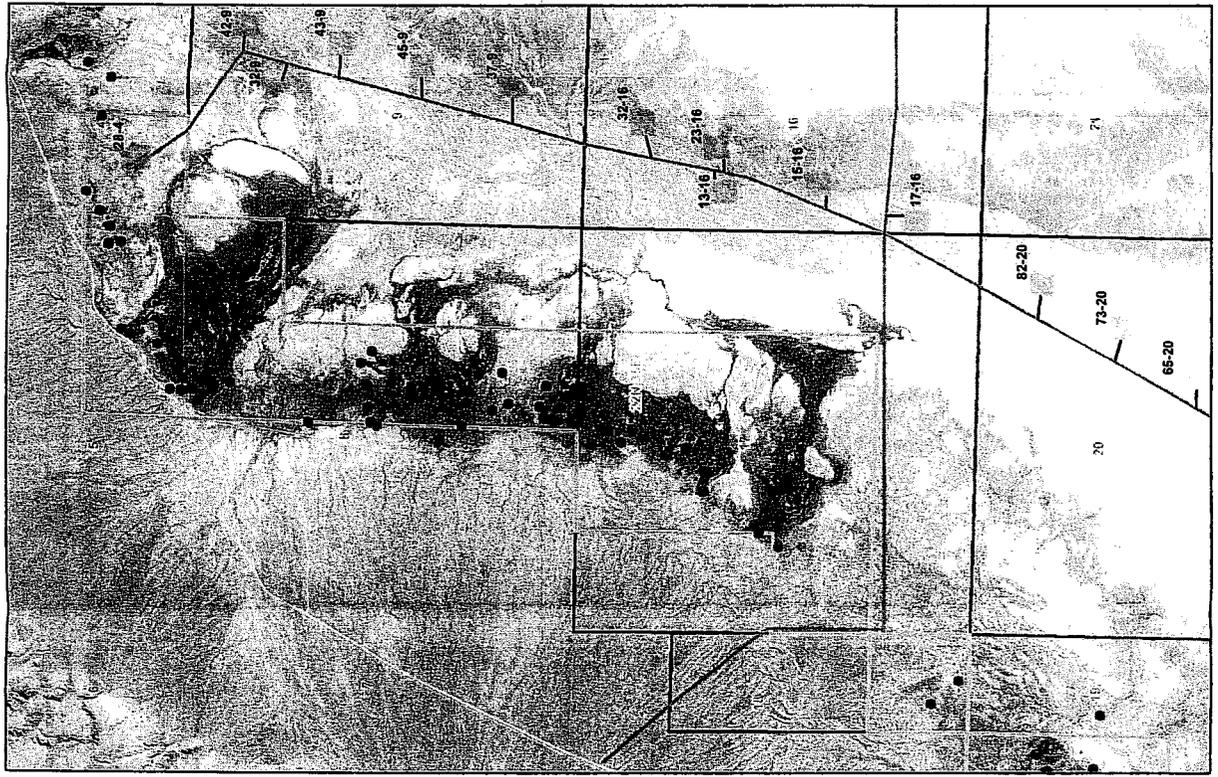
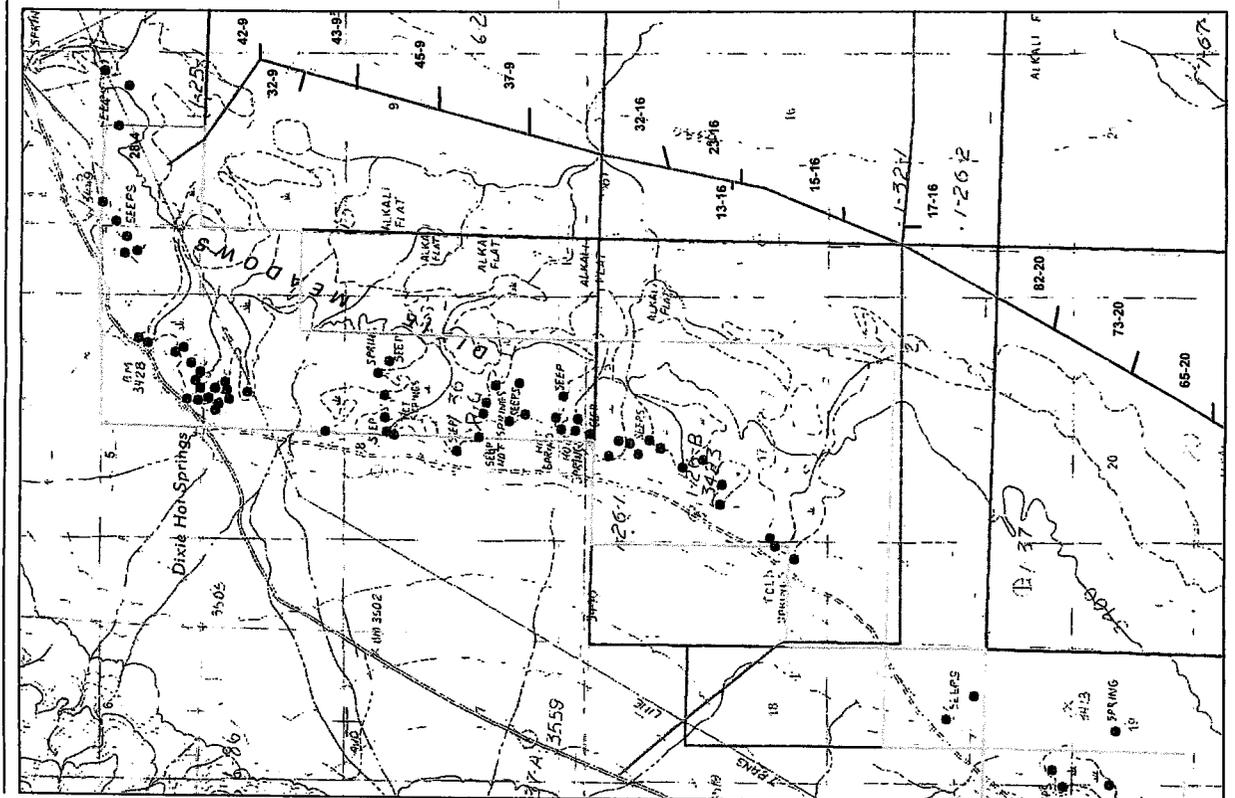




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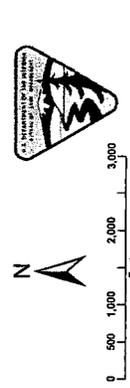






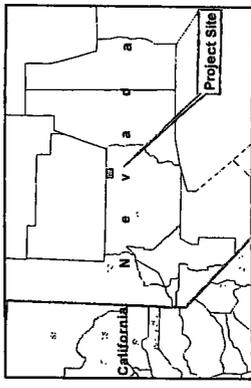
- LEGEND**
- Potential Branch Access Road
  - Potential Access Road
  - Within Geothermal Lease
  - Potential Access Road
  - Outside Geothermal Lease
  - Seep/Spring
  - Dixie Meadows Lease
  - Lamb Mineral Interest (see Note)
  - Proposed Well Sites
  - Section Boundary
  - Township/Range Boundary
  - 24-15 Kettleman Well Number

Note: TGP owns the mineral rights for this land, along with the right to surface use in exercise of mineral rights. The U.S. Navy owns the land surface.



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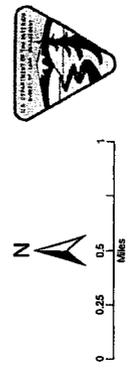
**Figure 8**  
 Seeps and Wetlands in Dixie Meadows  
 Coyote Canyon and Dixie Meadows  
 Geothermal Exploration EA



**LEGEND**

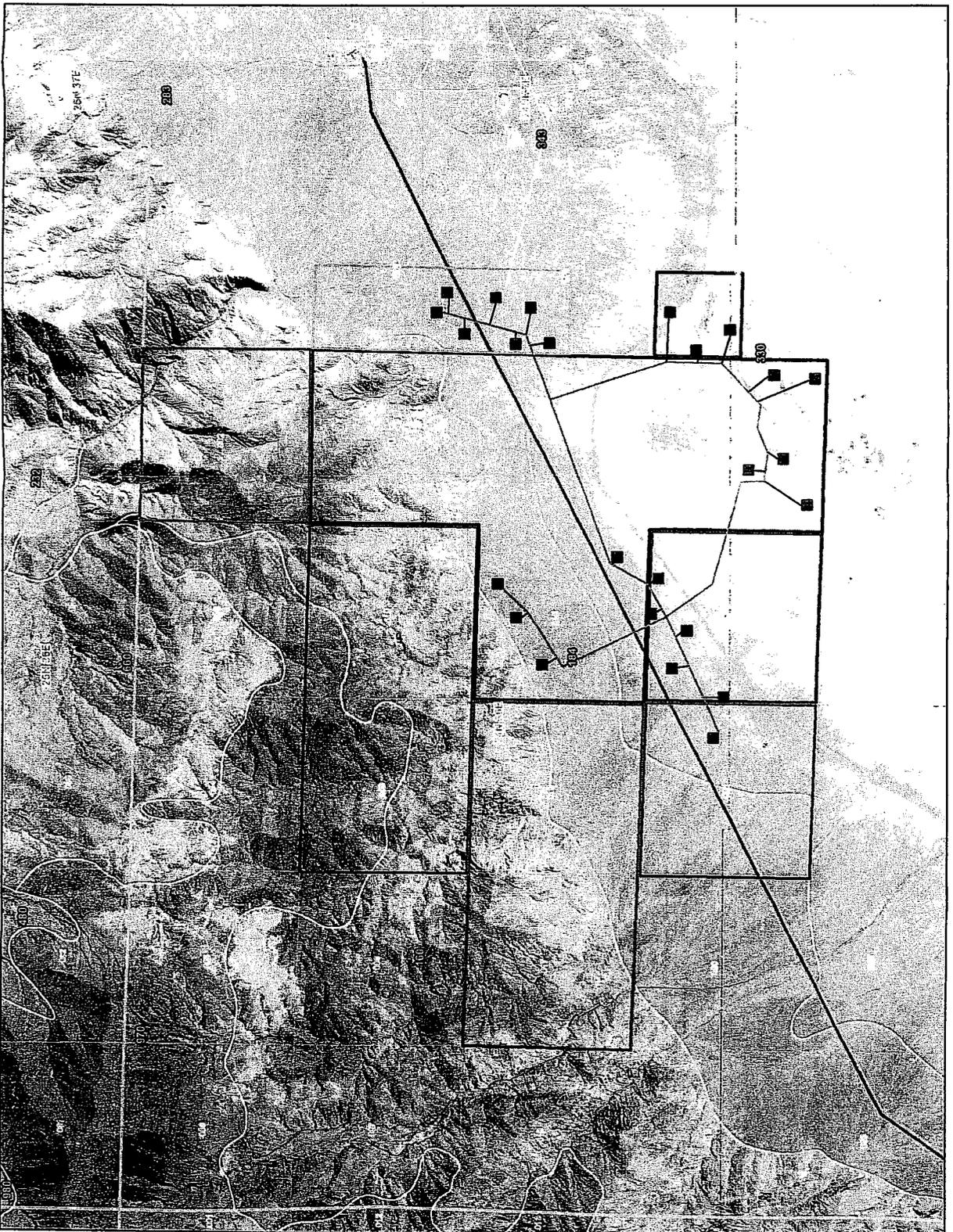
- Potential Branch Access Road
- Potential Access Road
- Inside Geothermal Lease
- Proposed Well Sites
- Existing Transmission Line
- Existing 200' ROW
- Soil Unit Boundary
- N-17282
- N-17283A
- N-60687
- N-60688
- N-61705
- N-61707
- N-62956
- N-86892
- Township/Range Boundary
- Section Boundary

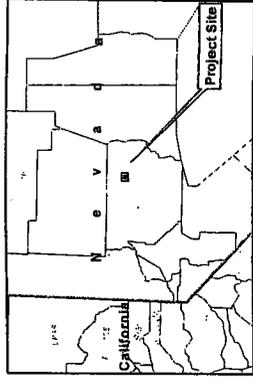
- Soils Code Descriptions:**
- 160 - Singaise-Rock outcrop association
  - 184 - Bluewing-Pineval association
  - 330 - Settlement-Louderback-Rusligate associatio
  - 343 - Slaw-Trocken-Chuckles association
  - 970 - Jobpeak-Teguro-Rock outcrop association



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**Figure 9**  
 Soil Map-Coyote Canyon  
 Coyote Canyon and Dixie Meadows  
 Geothermal Exploration EA





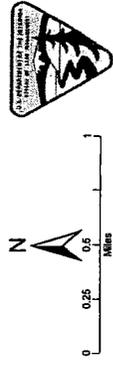
**LEGEND**

- Potential Branch Access Road
- Potential Access Road
- Within Geothermal Lease
- Potential Access Road
- Outside Geothermal Lease
- Proposed Well Sites
- Existing Transmission Line
- Existing 200' ROW
- Lamb Mineral Interest (see Note)
- N-60685
- N-60686
- Township/Range Boundary
- Section Boundary

Note: TGP owns the mineral rights for this land, along with the right to surface use in exercise of mineral rights. The U.S. Navy owns the land surface.

**Soil Code Descriptions:**

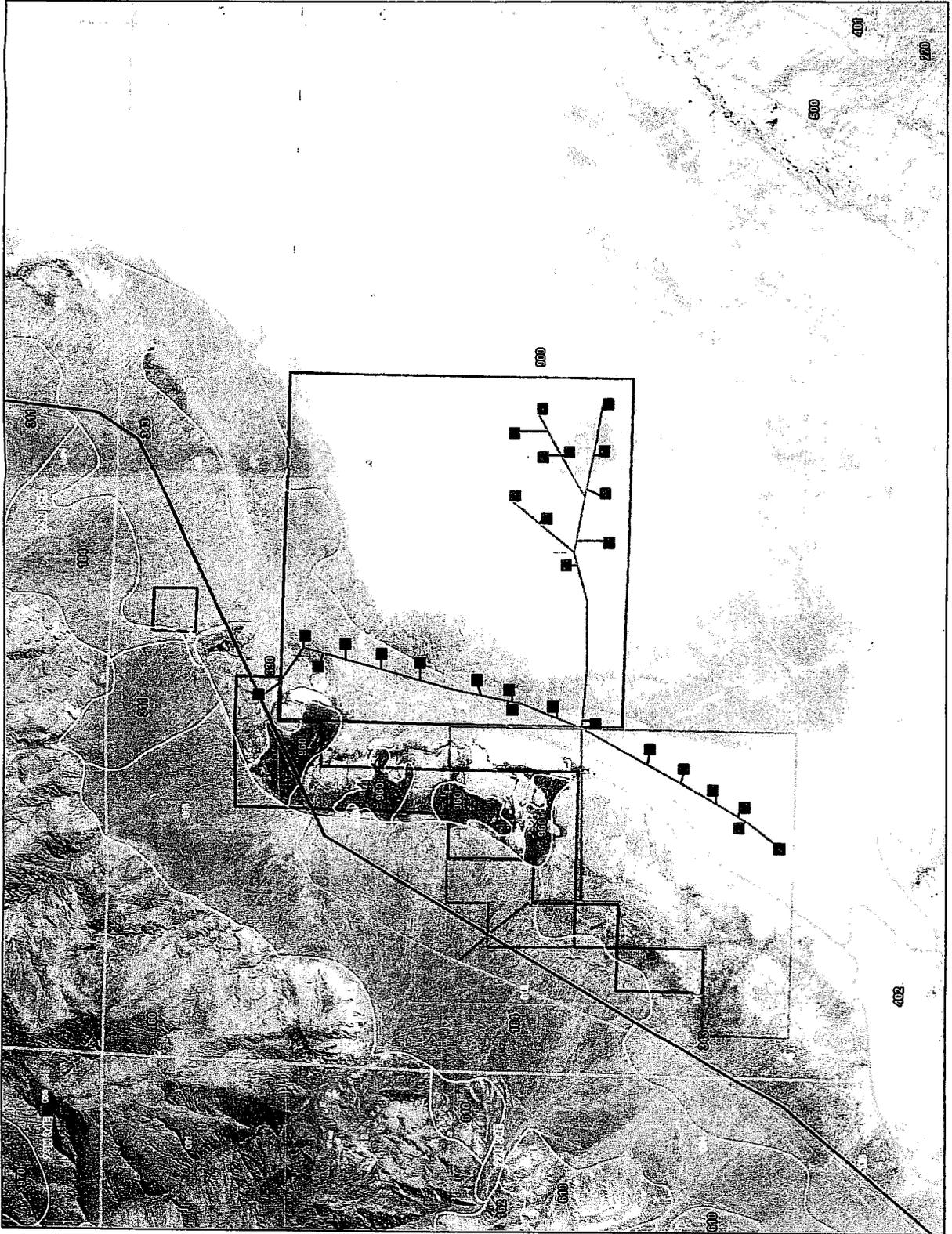
- 900 - Playa
- 330 - Settlement-Louderback-Rustigate associatio
- 184 - Bluewing-Pineval associatio
- 343 - Slaw-Trocken-Chuckles associatio
- 960 - Kolda-Umberland associatio



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**Figure 10**

Soil Map-Dixie Meadows  
 Coyote Canyon and Dixie Meadows  
 Geothermal Exploration EA



**Appendix A**  
**Geothermal Leases and Stipulations**

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial Number N-17282

USGS - KGRA Determination:

**GEOHERMAL RESOURCES LEASE**  
 Competitive  Noncompetitive

4-1-74

In consideration of the terms and conditions contained herein, and the grant made hereby, this lease is entered into by the UNITED STATES OF AMERICA (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau") of the Department of the Interior (hereinafter called the "Department"), and  
**Republic Geothermal, Inc., 11823 East Slauson Ave., Suite One, Santa Fe Springs, California 90670**

(hereinafter called the "Lessee").  
This lease is made pursuant to the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 U.S.C. 1001-1025) (hereinafter called "the Act") to be effective on **NOV 01 1977** (hereinafter called the "effective date").

It is subject to all the provisions of the Act and to all the terms, conditions, and requirements of (a) all regulations promulgated by the Secretary of the Interior (hereinafter called "the Secretary") in existence upon the effective date, specifically including, but not limited to, 43 CFR Parts 3000 and 3200 and 30 CFR Parts 270 and 271, (b) all geothermal resources operational orders (hereinafter called "GRO orders") issued pursuant thereto, all of which are incorporated herein and by reference made a part hereof, and (c) any regulations hereafter issued by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference) all of which shall be, upon their effective date, incorporated herein and, by reference, made a part hereof.

Sec. 1. GRANT - The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal steam and associated geothermal resources, (hereinafter called "geothermal resources"), in or under the following described lands situated within the County of **Churchill** State of **Nevada**

National Resource Lands		Acquired Lands	
T. 24 N.	R. 36 E. ; Mt. Diablo Meridian	T.	R. ; Meridian
sec. 11:	A11;		
sec. 14:	A11;		
sec. 15:	A11;		
sec. 23:	A11.		
<p>RECEIVED Bureau of Land Management NEVADA LAND OFFICE</p> <p>10:00 A.M. SEP 28 1977</p> <p>NEVADA STATE OFFICE RENO, NEVADA</p> <p>Total Area <b>2,560.00</b></p>		<p>Total Area</p>	

Containing **2,560.00** acres (hereinafter called the "leased area" or "leased lands"), together with:

- (a) The nonexclusive right to conduct within the leased area geological and geophysical exploration in accordance with applicable regulations; and
- (b) The right to construct or erect and to use, operate, and maintain within the leased area, together with ingress and egress thereupon all wells, pumps, pipes, pipelines, buildings, plants, sumps, brine pits, reservoirs, tanks, waterworks, pumping stations, roads, electric power generating plants, transmission lines, industrial facilities, electric, telegraph or telephone lines, and such other works and structures and to use so much of the surface of the land as may be necessary or reasonably convenient for the production, utilization, and processing of geothermal resources or to the full enjoyment of the rights granted by this lease, subject to compliance with applicable laws and regulations; *Provided that*, although the use of the leased area for an electric power generating plant or transmission facilities or a commercial or industrial facility is authorized hereunder, the location of such facilities and the terms of occupancy therefor shall be under separate instruments issued under any applicable laws and regulations; and
- (c) The nonexclusive right to drill potable water wells in accordance with state water laws within the leased area and to use the water produced therefrom for operations on the leased lands free of cost, provided that such drilling and development are conducted in accordance with procedures approved by the Supervisor of the Geological Survey (hereinafter called "Supervisor"); and
- (d) The right to convert this lease to a mineral lease under the Mineral Leasing Act of February 25, 1920, as amended, and supplemented (30 U.S.C. 181-287) or under the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), whichever is appropriate, if the leasehold is primarily valuable for the production of one or more valuable by-products which are leasable under those statutes, and the lease is incapable of commercial production or utilization of geothermal steam: *Provided that*, an application is made therefor prior to the expiration of the lease extension by reason of by-product production as hereinafter provided, and subject to all the terms and conditions of said appropriate Acts. The Lessee is also granted the right to locate mineral deposits under the mining laws (30 U.S.C. 21-54), which would constitute by-products if commercial production or utilization of geothermal steam continued, but such a location to be valid must be completed within ninety (90) days after the termination of this lease. Any conversion of this lease to a mineral lease or a mining claim is contingent on the availability of such lands for this purpose at the time of the conversion. If the lands are withdrawn or acquired in aid of a function of any Federal Department or agency, the mineral lease or mining claim shall be subject to such additional terms and conditions as may be prescribed by such

### Sec. 3. RENTALS AND ROYALTIES

(a) *Annual Rental* - For each lease year prior to the commencement of production of geothermal resources in commercial quantities on the leased lands, the Lessee shall pay the Lessor on or before the anniversary date of the lease a rental of \$ 2.00 for each

or fraction thereof.

(b) *Escalating Rental* - Beginning with the sixth lease year and for each year thereafter until the lease year beginning on or after the commencement of production of geothermal resources in commercial quantities, the Lessee shall pay on or before the anniversary date of the lease an escalated rental in an amount per acre or fraction thereof equal to the rental per acre for the preceding year and an additional sum of one (1) dollar per acre or fraction thereof. If the lease is extended beyond ten (10) years for reasons other than the commencement of production of geothermal resources in commercial quantities, the rental for the eleventh year and for each lease year thereafter until the lease year beginning on or after the commencement of such production will be the amount of rental for the tenth lease year. If any expenditures are made in any lease year for diligent exploration on the leased lands in excess of the minimum required expenditures for that year, the excess may be credited against any rentals

in excess of \$ 2.00 per acre or fraction thereof due the Lessor for that or any future year.

(c) *Royalty* - On or before the last day of the calendar month after the month of commencement of production in commercial quantities of geothermal resources and thereafter on a monthly basis, the Lessee shall pay to the Lessor:

(1) A royalty of 10 percent on the amount or value of steam, or any other form of heat or other associated energy produced, processed, removed, sold, or utilized from this lease or reasonably susceptible to sale or utilization by the Lessee.

(2) A royalty of 5 percent of the value of any by-product derived from production under this lease, produced, processed, removed, sold, or utilized from this lease or reasonably susceptible of sale or utilization by the Lessee, except that as to any by-product which is a mineral named in Sec. 1 of the Mineral Leasing Act of February 25, 1920, as amended, (30 U.S.C. 181), the rate of royalty for such mineral shall be the same as that provided in that statute the maximum rate of royalty for such mineral shall not exceed the maximum royalty applicable under that statute.

(3) A royalty of 5 percent of the value of commercially demineralized water which has been produced from the leased lands, and has been sold or utilized by the Lessee or is reasonably susceptible of sale or utilization by the Lessee. In no event shall the Lessee pay to the Lessor, for the lease year beginning on or after the commencement of production in commercial quantities on the leased lands or any subsequent lease year, a royalty of less than two (2) dollars per acre or fraction thereof. If royalty paid on production during the lease year has not satisfied this requirement, the Lessee shall pay the difference on or before the expiration date of the lease year for which it is paid.

(d) *Waiver and Suspension of Rental and Royalties* - Rentals or royalties may be waived, suspended, or reduced pursuant to the applicable regulations on the entire leasehold or any portion thereof in the interest of conservation or for the purpose of encouraging the greatest ultimate recovery of geothermal resources if the Lessor determines that it is necessary to do so to promote such development, or because the lease cannot be successfully operated under the terms fixed herein.

(e) *Undivided Fractional Interests* - Where the interest of the Lessor in the geothermal resources underlying any tract or tracts described in Sec. 1 is an undivided fractional interest, the rentals and royalties payable on account of each such tract shall be in the same proportion to the rentals and royalties provided in this lease as the individual fractional interest of the Lessor in the geothermal resources underlying such tract is to the full fee interest.

(f) *Readjustments* - Rentals and royalties hereunder may be readjusted in accordance with the Act and regulations to rates not in excess of the rates provided therein, and at not less than twenty (20) year intervals beginning thirty-five (35) years after the date geothermal steam is produced from the lease as determined by the Supervisor.

4. *PAYMENTS* - It is expressly understood that the Secretary may establish the values and minimum values of geothermal resources to compute royalties in accordance with the applicable regulations. Unless otherwise directed by the Secretary, all payments to the Lessor will be made as required by the regulations. If there is no well on the leased lands capable of producing geothermal resources in commercial quantities, the failure to pay rental on or before the anniversary date shall cause the lease to terminate by operation of law except as provided by Sec. 3244.2 of the regulations. If the time for payment falls on a day on which the

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into which royalties under this lease are paid. However, in lieu of any part of such drilling and production, with the consent of the Supervisor, the Lessee may compensate the Lessor in full each month for the estimated loss of royalty through drainage in the amount determined by said Supervisor.

(b) At the Lessee's election, and with the approval of the Supervisor, the Lessee shall drill and produce other wells in conformity with any system of well spacing or production allotments affecting the field or area in which the leased lands are situated, which is authorized by applicable law.

(c) After due notice in writing, the Lessee shall diligently drill and produce such wells as the Supervisor shall require so that the leased lands may be properly and timely developed and for the production of geothermal steam and its by-products, including commercially demineralized water for beneficial uses in accordance with applicable state laws. However, the Supervisor may waive or modify the requirements of this subparagraph (c) in the interest of conservation of natural resources or for economic feasibility or other reasons satisfactory to him. If the products or by-products of geothermal production from wells drilled on this lease are susceptible of producing commercially demineralized water for beneficial uses, and a program therefor is not initiated with due diligence, the Lessor may at its option elect to take such products or by-products and the Lessee shall deliver all or any portion thereof to the Lessor at any point in the Lessee's geothermal gathering or disposal system without cost to the Lessee, if the Lessee's activities, under the lease, would not be impaired and such delivery would otherwise be consistent with field and operational requirements. The retention of this option by the Lessor shall in no way relieve the Lessee from the duty of producing commercially demineralized water where required to do so by the Lessor, except when the option is being exercised and then only with respect to wells where it is being exercised, or limit the Lessor's right to take any action under Sec. 25 to enforce that requirement.

Sec. 7. *INSPECTION* - The Lessee shall keep open at all reasonable times for the inspection of any duly authorized representative of the Lessor the leased lands and all wells, improvements, machinery, and fixtures thereon and all production reports, maps, records, books, and accounts relative to operations under the lease, and well logs, surveys, or investigations of the leased lands.

Sec. 8. *CONDUCT OF OPERATIONS* - The Lessee shall conduct all operations under this lease in a workmanlike manner and in accordance with all applicable statutes, regulations, and GRO orders, and all other appropriate directives of the Lessor to prevent bodily injury, danger to life or health, or property damage, and to avoid the waste of resources, and shall comply with all requirements which are set forth in 43 CFR Group 3200, including, but not limited to, Subpart 3204, or which may be prescribed by the Lessor pursuant to the regulations, and with the special stipulations which are attached to the lease, all of which are specifically incorporated into this lease. A breach of any term of this lease, including the stipulations attached hereto, will be subject to all the provisions of this lease with respect to remedies in case of default. Where any stipulation is inconsistent with a regular provision of this lease, the stipulation shall govern.

### Sec. 9. INDEMNIFICATION

(a) The Lessee shall be liable to the Lessor for any damage suffered by the Lessor in any way arising from or connected with the Lessee's activities and operations conducted pursuant to this lease, except where damage is caused by employees of the Lessor acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the Lessor from all claims arising from or connected with the Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

Sec. 10. *CONTRACTS FOR SALE OR DISPOSAL OF PRODUCTS* - The Lessee shall file with the Supervisor not later than thirty (30) days after the effective date thereof any contract, or evidence of other arrangement for the sale or disposal of geothermal resources.

Sec. 11. *ASSIGNMENT OF LEASE OR INTEREST THEREIN* - Within ninety (90) days from the date of execution thereof, the Lessee shall file for approval by the Authorized Officer any instruments of transfer made of this lease or of any interest therein, including assignments of record title and working or other interests.

Sec. 12. *REPORTS AND OTHER INFORMATION* - At such

the minimum expenditures required to qualify the operations on the leased lands as diligent exploration under the regulations.

**Sec. 14. PROTECTION OF THE ENVIRONMENT (LAND, AIR AND WATER) AND IMPROVEMENTS** - The Lessee shall take all mitigating actions required by the Lessor to prevent: (a) soil erosion or damage to crops or other vegetative cover on Federal or non-Federal lands in the vicinity; (b) the pollution of land, air, or water; (c) land subsidence, seismic activity, or noise emissions; (d) damage to aesthetic and recreational values; (e) damage to fish or wildlife or their habitats; (f) damage to or removal of improvements owned by the United States or other parties; or (g) damage to or destruction or loss of fossils, historic or prehistoric ruins, or artifacts. Prior to the termination of bond liability or at any other time when required and to the extent deemed necessary by the Lessor, the Lessee shall reclaim all surface disturbances as required, remove or cover all debris or solid waste, and, so far as possible, repair the offsite and onsite damage caused by his activity or activities incidental thereto, and return access roads or trails and the leased lands to an acceptable condition including the removal of structures, if required. The Supervisor or the Authorized Officer shall prescribe the steps to be taken by Lessee to protect the surface and the environment and for the restoration of the leased lands and other lands affected by operations on the leased lands and improvements thereon, whether or not the improvements are owned by the United States. Timber or mineral materials may be obtained only on terms and conditions imposed by the Authorized Officer.

**Sec. 15. WASTE** - The Lessee shall use all reasonable precautions to prevent waste of natural resources and energy, including geothermal resources, or of any minerals, and to prevent the communication of water or brine zones with any oil, gas, fresh water, or other gas or water bearing formations or zones which would threaten destruction or damage to such deposits. The Lessee shall monitor noise, air, and water quality conditions in accordance with any orders of the Supervisor.

**Sec. 16. MEASUREMENTS** - The Lessee shall gauge or otherwise measure all production, sales, or utilization of geothermal resources and shall record the same accurately in records as required by the Supervisor. Reports on production, sales, or utilization of geothermal resources shall be submitted in accordance with the terms of this lease and the regulations.

**Sec. 17. RESERVATIONS TO LESSOR** - All rights in the leased area not granted to the Lessee by this lease are hereby reserved to the Lessor. Without limiting the generality of the foregoing such reserved rights include:

(a) *Disposal* - The right to sell or otherwise dispose of the surface of the leased lands or any resource in the leased lands under existing laws, or laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) *Rights-of-way* - The right to authorize geological and geophysical explorations on the leased lands which do not interfere with or endanger actual operations under this lease, and the right to grant such easements or rights-of-way for joint or several use upon, through or in the leased area for steam lines and other public or private purposes which do not interfere with or endanger actual operations or facilities constructed under this lease;

(c) *Mineral Rights* - The ownership of and the right to extract oil, hydrocarbon gas, and helium from all geothermal steam and associated geothermal resources produced from the leased lands;

(d) *Casing* - The right to acquire the well and casing at the fair market value of the casing where the Lessee finds only potable water, and such water is not required in lease operations; and

(e) *Measurements* - The right to measure geothermal resources and to sample any production thereof.

**Sec. 18. ANTIQUITIES AND OBJECTS OF HISTORIC VALUE** - The Lessee shall immediately bring to the attention of the Authorized Officer any antiquities or other objects of historic or scientific interest, including but not limited to historic or prehistoric ruins, fossils, or artifacts discovered as a result of operations under this lease, and shall leave such discoveries intact. Failure to comply with any of the terms and conditions imposed by the Authorized Officer with regard to the preservation of antiquities may constitute a violation of the Antiquities Act (16 U.S.C. 431-433). Prior to operations, the Lessee shall furnish to the Authorized Officer a certified statement that either no archaeological values exist or that they may exist on the leased lands to the best of the of the Lessee's knowledge and belief and that they might be impaired by geothermal operations. If the Lessee furnishes a statement that archaeological values exist on the leased

granting to the Lessee any right in any land outside the leased area.

**Sec. 20. OVERRIDING ROYALTIES** - The Lessee shall not create overriding royalties of less than one-quarter (1/4) of one percent of the value of output nor in excess of 50 percent of the rate of royalty due to the Lessor specified in Sec. 3 of this lease except as otherwise authorized by the regulations. The Lessee expressly agrees that the creation of any overriding royalty which does not provide for a prorated reduction of all overriding royalties so that the aggregate rate of royalties does not exceed the maximum rate permissible under this section, or the failure to suspend an overriding royalty during any period when the royalties due to the Lessor have been suspended pursuant to the terms of this lease, shall constitute a violation of the lease terms.

**Sec. 21. READJUSTMENT OF TERMS AND CONDITIONS** - The terms and conditions of this lease other than those related to rentals and royalties may be readjusted in accordance with the Act at not less than ten-year intervals beginning ten (10) years after the date geothermal steam is produced from the leased premises as determined by the Supervisor.

**Sec. 22. COOPERATIVE OR UNIT PLAN** - The Lessee agrees that it will on its own, or at the request of the Lessor where it is determined to be necessary for the conservation of the resource or to prevent the waste of the resource, subscribe to and operate under any reasonable cooperative or unit plan for the development and operation of the area, field, or pool, or part thereof embracing the lands subject to this lease as the Secretary may determine to be practicable and necessary or advisable in the interest of conservation. In the event the leased lands are included within a unit, the terms of this lease shall be deemed to be modified to conform to such unit agreement. Where any provision of a cooperative or unit plan of development which has been approved by the Secretary, and which by its terms affects the leased area or any part thereof, is inconsistent with a provision of this lease, the provisions of such cooperative or unit plan shall govern.

**Sec. 23. RELINQUISHMENT OF LEASE** - The Lessee may relinquish this entire lease or any officially designated subdivision of the leased area in accordance with the regulations by filing in the proper BLM office a written relinquishment, in triplicate, which shall be effective as of the date of filing. No relinquishment of this lease or any portion of the leased area shall relieve the Lessee or its surety from any liability for breach of any obligation of this lease, including the obligation to make payment of all accrued rentals and royalties and to place all wells in the leased lands to be relinquished in condition for suspension or abandonment, and to protect or restore substantially the surface or subsurface resources in a manner satisfactory to the Lessor.

**Sec. 24. REMOVAL OF PROPERTY ON TERMINATION OR EXPIRATION OF LEASE**

(a) Upon the termination or expiration of this lease in whole or in part, or the relinquishment of the lease in whole or in part, as herein provided, the Lessee shall within a period of ninety (90) days (or such longer period as the Supervisor may authorize because of adverse climatic conditions) thereafter remove from the leased lands, no longer subject to the lease all structures, machinery, equipment, tools, and materials in accordance with applicable regulations and orders of the Supervisor. However, the Lessee shall, for a period of not more than six (6) months, continue to maintain any such property needed in the relinquished area, as determined by the Supervisor, for producing wells or for drilling or producing geothermal resources on other leases.

(b) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee, as provided above, which are allowed to remain on the leased lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Supervisor. If the Supervisor directs the Lessee to remove such property, the Lessee shall do so at its own expense, or if it fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

**Sec. 25. REMEDIES IN CASE OF DEFAULT**

(a) Whenever the Lessee fails to comply with any of the provisions of the Act, or the terms and stipulations of this lease, or of the regulations issued under the Act, or of any order issued pursuant to those regulations, and that default shall continue for a period of thirty (30) days after service of notice by the Lessor, the Lessor may (1) suspend operations until the requested action is taken to correct the noncompliance, or (2) cancel the lease in accordance with Sec. 12 of the Act (30 U.S.C. 1011). However, the 30-day notice provision applicable to this lease under Sec. 12 of the Act shall

Act and in the regulations promulgated thereunder.

(e) Upon cancellation, the Lessee shall remove all property in accordance with Sec. 24 hereof, and shall restore the leased lands in a manner acceptable to the Lessor or as may be otherwise required by the Lessor.

Sec. 26. HEIRS AND SUCCESSORS IN INTEREST - Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns, of the respective parties hereto.

Sec. 27. UNLAWFUL INTEREST - No Member of, or Delegate to Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Sec. 3741 of the Revised Statutes (41 U.S.C. Sec. 22), as amended, and Sections 431, 432, and 433 of Title 18 of the United States Code, relating to contracts made or entered into, or accepted by or on behalf of the United States, form a part of this lease so far as the same may be applicable.

Sec. 28. MONOPOLY AND FAIR PRICES - The Lessor reserves full power and authority to protect the public interest by promulgating and enforcing all orders necessary to insure the sale of the production from the leased lands at reasonable prices, to prevent monopoly, and to safeguard the public interest.

Sec. 29. EQUAL OPPORTUNITY CLAUSE - The Lessee agrees that, during the performance of this contract:

(1) The Lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising, layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee will, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee will send to each labor union or representative of workers with which Lessee has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Lessee will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Secretary

of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the Lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee will include the provisions of Paragraphs (1) through (7) of this Section (29) in every contract, subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor, or subcontract, or purchase order as the Secretary may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor, or vendor as a result of such direction by the Secretary, the Lessee may request the Lessor to enter into such litigation to protect the interests of the Lessor.

Sec. 30. CERTIFICATION OF NONSEGREGATED FACILITIES - By entering into this lease, the Lessee certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, or restaurants or other eating areas, time clocks, or locker rooms, and other storage or dressing rooms, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. Lessee further agrees that (except where it has obtained identical certifications from proposed contractors and subcontractors for specific time periods) it will obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that it will retain such certifications in its files; and that it will forward the following certification to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods); it will notify prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Nonsegregated Facilities, as required by the May 9, 1967 Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 31. SPECIAL STIPULATIONS - (stipulations, if any, are attached hereto and made a part hereof)

The attached Fort Churchill-Clan Alpine Special Stipulations apply to all lands within this lease.

*JMS*

FORT CHURCHILL-CLAN ALPINE .  
SPECIAL STIPULATIONS

The Lessee shall comply with the following special conditions and stipulations unless they are modified by mutual agreement of the Lessee, the Supervisor and the Authorized Officer:

1. Surface occupancy within 500 feet (horizontal measurement) of any canal, ditch, slough, pond, lake, spring, or open body of water may be restricted or denied where deemed necessary by the appropriate surface management agency to protect wildlife and other resources. Other buffer zones and areas of restricted surface occupancy may be required to protect other resource values, including but not limited to, critical or rare or endangered species habitat.
2. The certified statement required by Section 18 of the lease form must be completed by a qualified archaeologist, acceptable to the Authorized Officer.
3. The use of wide or balloon-tired vehicles and/or helicopters may be required for any activities in off-road areas where deemed necessary to protect the soil and other resources.
4. Springs and water developments on Federal lands may be used only with the prior written approval of the Authorized Officer.





# United States Department of the Interior BUREAU OF LAND MANAGEMENT



Nevada State Office  
P.O. Box 12000 (1340 Financial Blvd.)  
Reno, Nevada 89520-0006  
<http://www.nv.blm.gov>

SEP 12 2007

In Reply Refer To:  
N-43282X et al  
3280/3282  
3210/3220  
NV923.d

CERTIFIED MAIL - RETURN RECEIPT REQUESTED  
7005 2570 0001 8534 6261

## DECISION

Caithness Dixie Valley, LLC :  
9590 Prototype Ct., Suite 200 : Geothermal  
Reno, NV 89521 :

### Unit and Participating Area Boundaries Expanded Leases Consolidated Segregated and Expired

The geothermal leases listed below have been partially committed to the following Unit Agreement (UA) and or Participating Area (PA):

#### Dixie Valley Unit Agreement and Participating Area, N-43282X, N-4328201

(Unit Name)

May 1, 2007  
(Commitment Date)

Caithness Dixie Valley, LLC  
(Operator)

Departmental regulations 43 CFR 3210.10(1) provide for the segregation of leases committed in part to a unit agreement. Due to the unit expansion, the unitized lands are retained in the original lease; the non-unitized lands are segregated and assigned new serial numbers. The terms of leases included in the expansion of the UA are extended until such time as the subject unit terminates or if the lands are eliminated from the unit agreement (43 CFR 3208.10(4)). The anniversary date for all leases remains unchanged. Rental will be due on the next anniversary date of each lease located within the unit but outside of the PA. Leases or portions of leases within the PA will be subject to royalties. After expansion, lease N-17282 is totally within the Dixie Valley UA. The segregated leases expired on their own terms effective June 30, 2007. The descriptions of the base leases and the segregated leases are as follows:

N-17283A (unitized lands)  
T. 24 N., R. 36 E., MDM, Nevada  
sec. 22, all.

Containing 640.00 acres

N-84040 (nonunitized lands)  
T. 24 N., R. 36 E., MDM, Nevada  
sec. 20, E2;  
sec. 21, all.  
Containing 960.00 acres  
Expired June 30, 2007

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0034  
Expires: August 31, 1989

RECEIVED

JUL 24 1991

OXBOW GEOTHERMAL CORP

ASSIGNMENT OF RECORD TITLE INTEREST IN A  
LEASE FOR OIL AND GAS OR GEOTHERMAL RESOURCES

Mineral Leasing Act of 1920 (30 U.S.C. 181 et seq.)  
Act for Acquired Lands of 1947 (30 U.S.C. 351-359)  
Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025)  
Department of the Interior Appropriations Act, Fiscal Year 1981 (42 U.S.C. 6508)

Lease Serial No. N-17283-A
Lease Effective Date (Anniversary Date) November 1, 1977
New Serial No.

Type or print plainly in ink and sign in ink.

PART A: ASSIGNMENT

1. Assignee\* **Oxbow Geothermal Corporation**  
Street **200 South Virginia Street, Suite 450**  
City, State, ZIP Code **Reno, NV 89501**

\*If more than one assignee, check here  and list the name(s) and address(es) of all additional assignees on the reverse of this form or on a separate attached sheet of paper.

This record title assignment is for: (Check one)  Oil and Gas Lease, or  Geothermal Lease

Interest conveyed: (Check one or both, as appropriate)  Record Title,  Overriding Royalty, payment out of production or other similar interests or payments

This assignment conveys the following interest:

Land Description <small>Additional space on reverse, if needed. Do not submit documents or agreements other than this form; such documents or agreements shall only be referenced herein.</small>	Percent of Interest			Percent of Overriding Royalty or Similar Interests	
	Owned	Conveyed	Retained	Reserved	Previously reserved or conveyed
	a	b	c	d	e
Churchill County, Nevada Township 24 North, Range 36 East, MDM  Section 20: E/2 Section 21: All Section 22: All  Containing 1600.00 acres m/l	50%	50%	-0-	-0-	-0-

FOR BLM USE ONLY—DO NOT WRITE BELOW THIS LINE

UNITED STATES OF AMERICA

Assignment is approved solely for administrative purposes. Approval does not warrant that either party to this assignment holds legal or title to this lease.

Assignment approved for above described lands;

Assignment approved effective JUL 1 1991

Assignment approved for attached land description

Assignment approved for land description indicated on reverse of this form.

Chief, Branch of Lands  
& Minerals Operations

*Marla B. Bohl*

JUL 24 1991

N-17283A

**PART B: CERTIFICATION AND REQUEST FOR APPROVAL**

- The assignor certifies as owner of an interest in the above designated lease that he/she hereby assigns to the above assignee(s) the rights specified above.  
 Assignee certifies as follows: (a) Assignee is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the law of the United States or of any State or territory thereof. For the assignment of NPR-A leases, assignee is a citizen, national, or resident alien of the United States or an association of such citizens, nationals, resident aliens or private, public or municipal corporations. (b) Assignee is not considered a minor under the laws of the State in which the lands covered by this assignment are located; (c) Assignee's chargeable interests, direct and indirect, in either public domain or acquired lands, do not exceed 200,000 acres in oil and gas options or 246,080 in oil and gas leases in the same State, or 300,000 acres in leases and 200,000 acres in options in each leasing District in Alaska, if this is an oil and gas lease issued in accordance with the Mineral Leasing Act of 1920 or 51,200 acres in any one State if this is a geothermal lease; (d) All parties holding an interest in the assignment are otherwise in compliance with the regulations (43 CFR Group 3100 or 3200) and the authorizing Acts; (e) Assignee is in compliance with reclamation requirements for all Federal oil and gas lease holdings as required by sec. 17(g) of the Mineral Leasing Act; and (f) Assignee is not in violation of sec. 41 of the Mineral Leasing Act.
- Assignee's signature to this assignment constitutes acceptance of all applicable terms, conditions, stipulations and restrictions pertaining to the lease described herein.

For geothermal assignments, an overriding royalty may not be less than one-fourth (1/4) of one percent of the value of output, nor greater than 50 percent of the rate of royalty due to the United States when this assignment is added to all previously created overriding royalties (43 CFR 3241).

I certify that the statements made herein by me are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 24<sup>th</sup> day of May, 19 91 Executed this \_\_\_\_\_ day of \_\_\_\_\_, 19 \_\_\_\_\_

Name of Assignor as shown on current lease T.G.S. Associates - undivided 50% Interest  
Please type or print

Assignor \_\_\_\_\_  
By: [Signature]  
\_\_\_\_\_  
(Signature)

Assignee Oxbow Geothermal Corporation  
By: [Signature]  
\_\_\_\_\_  
(Signature)

149 Broadway, Suite 612  
\_\_\_\_\_  
(Oakland, CA 94612)  
\_\_\_\_\_  
(Oakland, CA 94612)  
\_\_\_\_\_  
(Oakland, CA 94612)

Title 18 U.S.C. Sec. 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.

IN REPLY REFER TO:



United States Department of the Interior  
BUREAU OF LAND MANAGEMENT  
NEVADA STATE OFFICE

N-8488 et al  
3210/3220  
(NV-943.3)

850 Harvard Way  
P.O. Box 12000  
Reno, Nevada 89520

DEC 30 1986

RECEIVED

DEC 31 1986

Certified Mail  
Return Receipt Requested

OXBOW GEOTHERMAL CORP

DECISION

Oxbow Geothermal Corporation  
200 South Virginia No. 450  
Reno, NV 89501

:  
: Geothermal Resources  
:

LEASES EXTENDED

Washington Office Instruction Memorandum No. 85-63 provides policy for continuing geothermal leases committed to a unit containing a well capable of production committed to a bona fide sales contract.

The following geothermal leases committed to the Dixie Valley Unit meet the above criteria and are hereby extended for the duration of the unit.

Serial Number

N-8488	N-17283
N-8489	N-17283-A
N-8491	N-17284
N-8491-A	N-17285
N-14972	N-17286
N-14974	N-18398
N-14975	N-18399
N-14977	N-18400
N-14978	N-21454
N-14979	

If you have any questions, please call Joan Woodin at (702) 784-5703.

FOR Marla B. Bohl, Chief  
Branch of Lands and Minerals Operations

UNITED STATES-17283A  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OMB NO. 1004-0074  
Expires: April 30, 1985

Serial No.	N-17283A
New Serial No.	

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

Oxbow Geothermal Corporation  
200 South Virginia St.  
Suite 450  
Reno, Nevada 89501

OXBOW - RENO, NV  
FAX # (702) 322-1362  
TELEPHONE # (702) 322-1300

TO: \_\_\_\_\_  
FAX # \_\_\_\_\_  
FROM: \_\_\_\_\_

DATE: \_\_\_\_\_ PAGES: \_\_\_\_\_

The undersigned, as owner of 50% percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)

T24N R36E MDB&M  
Section 20: E½  
Section 21: All  
Section 22: All  
Containing 1600.00 acres in Churchill County, Nevada

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 00%

4. What part of the record title interest is being retained by assignor(s)? None

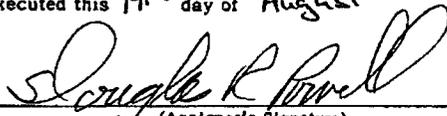
5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3241.7-2 on limitation of overriding royalties) None

b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) See Exhibit A

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 19th day of August, 1986

  
\_\_\_\_\_  
(Assignor's Signature)  
Vice President

Oxbow Geothermal Company  
\_\_\_\_\_  
(Assignor's Address)  
200 South Virginia St., Suite 450  
\_\_\_\_\_  
Reno Nevada 89501  
(City) (State) (Zip Code)

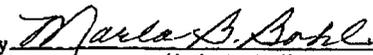
Title 18 U.S.C., Section 1001, makes it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious, or fraudulent statements or representations as to any matter within its jurisdiction.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

SAME AS ITEM 2

Assignment approved effective SEP 01 1986

By   
\_\_\_\_\_  
(Authorized Officer)

Chief, Branch of Lands  
& Minerals Operations  
\_\_\_\_\_  
(Title)

SEP 16 1986  
\_\_\_\_\_  
(Date)

ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

N-17283A

A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions)
4. Filing fee of \$50 is attached (See Item 2 of General Instructions)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 19<sup>th</sup> day of August, 1986

  
 (Assignee's Signature)  
 Vice President

Oxbow Geothermal Corporation  
 200 South Virginia St., Suite 450  
 Reno, Nevada 89501

(Address, include zip code)

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.

GENERAL INSTRUCTIONS

1. Use of form - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. Filing and number of copies - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. Effective date of assignment - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. Overriding royalties or payments out of production - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. Effect of assignment - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

PART II

A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. Statement of interests - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

STATE OF NEVADA     )  
                          )ss  
COUNTY OF WASHOE    )

On this 19th day of August, A.D. 1986, personally appeared before me, a notary public in and for Washoe County, Douglas R. Powell, known to me to be the person(s) whose name is subscribed to the within instrument.

*Jane M. Bianucci*  
Notary Public

My commission expires:

November 12, 1989



Exhibit A

N-17283A

W.M. Hughes, et al., have reserved a 5% ORRI on geothermal steam, and a 2-1/2% ORRI on dissolved minerals. (Created in assignment of 26-1/2% interest in lease).

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Southland Royalty Company has reserved a Net Operating Profit ("NOP") interest of 5% until Oxbow recovers \$3,000,000.00 in gross profits; thereafter, NOP interest of 10% until Oxbow recovers \$6,000,000.00 in gross profits; thereafter, NOP interest of 15% until Southland recovers \$15,000,000.00.

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UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

N-17283A

FORM APPROVED  
OMB NO. 1004-0074  
Expires: April 30, 1985

Serial No.
N-17283-A
New Serial No.

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

Oxbow Geothermal Corporation  
200 South Virginia St. Suite 450  
Reno, NV 89501

1.

The undersigned, as owner of 50% percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)

Township 24N, Range 36E: MDM

Section 20: E/2  
Section 21: A11  
Section 22: A11

Containing 1,600.00 Acres, more or less, Churchill County, Nevada

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 100%

4. What part of the record title interest is being retained by assignor(s)? NONE

5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3241.7-2 on limitation of overriding royalties) Production Payment described on attached Exhibit "A"

b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) See Exhibits "B" and "C" attached

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 12<sup>th</sup> day of August, 1985

TRANS-PACIFIC GEOTHERMAL INC.

*P. Meidan*  
(Assignor's Signature)

TRANS-PACIFIC GEOTHERMAL INC.

(Assignor's Address)

1419 Broadway Suite 415  
Oakland, CA 94612

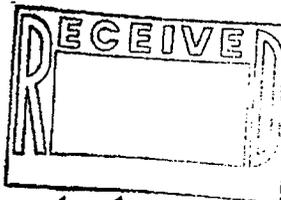
(City) (State) (Zip Code)

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.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

SAME AS ITEM 2



Assignment approved effective OCT 01 1985

By *Marla B. Bohl*  
(Authorized Officer)

Chief, Branch of Lands  
& Minerals Operations

OCT 30 1985

(Title) (Date)

## PART II

N-17203A

## ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

## A. ASSIGNEE CERTIFIES THAT

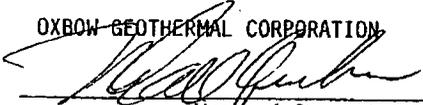
1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (*information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions*)
4. Filing fee of \$50 is attached (*See Item 2 of General Instructions*)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2).

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 12th day of August, 1985

OXBOW GEOTHERMAL CORPORATION

  
 (Assignee's Signature)  
 Michael Aquilina, Vice-Chairman  
 200 South Virginia St. Suite 450  
 Reno, NV 89501

(Address, include zip code)

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## GENERAL INSTRUCTIONS

1. *Use of form* - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. *Filing and number of copies* - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. *Effective date of assignment* - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. *Overriding royalties or payments out of production* - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. *Effect of assignment* - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. *Statement of interests* - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

## EXHIBIT A

Attached hereto and made a part of that certain  
Letter Agreement dated as of August 21, 1984 by and between  
Thermal Power Company and Trans-Pacific Geothermal, Inc.

Federal Lease Serial Number	Description
<u>North Block</u>	
<u>T24N-R36E, MDM</u>	
N-8392	Section 16: All
N-8392	Section 17: All
N-17283 A	Section 20: East 1/2
N-17283 A	Section 21: All
N-17283 A	Section 22: All
<u>South Block</u>	
<u>T23N-R35E, MDM</u>	
N-8498	Section 11: All
N-10706	Section 12: All
N-8498	Section 13: All
N-11583	Section 14: All

On each of the five leases listed above, TPC reserves a production payment of ten dollars (\$10.00) per net acre per year (i.e., five dollars \$5.00 per year for each acre held by TPC in each of the North and South Blocks), up to a total payment of \$1,000,000 for the North and South Blocks taken together, such payments to commence with respect to each Block at the time commercial production commences on the respective Block. Such payments shall only be made from actual revenues from production established on, therefrom, said production payments shall cease as to both the North and South Blocks, and TGI will have no further obligation to make any payments to TPC. In the event that the North Block and/or the South Block is unitized together with other lands, and production is allocated to the North Block and/or the South Block pursuant to such unitization agreement, whether or not there is actual production from the North Block or the South Block, the production payment payable hereunder shall be calculated by multiplying the production payment otherwise payable if there were actual production from such lands, by the respective percentage of unit production allocated to the North Block and/or the South Block, as the case may be.

the respective  
Block, and at  
the the TPC has  
received an  
aggregate of  
1 million

*[Handwritten signature]*

EXHIBIT "B"

- 1) 5% overriding royalty interest on the value of steam, or any other form of heat or other associated energy produced, processed, removed, sold or utilized from the lease;
- 2) 2½% overriding royalty interest on the value of any by-product derived from production from the lease or produced, processed, removed, sold or utilized from the lease; and,
- 3) 2½% overriding royalty interest on the value of commercially demineralized water which is produced from the lease.

## EXHIBIT "C"

- (1) Southland Royalty Company reserves the following:
  - (i) A net operating profit interest of 5% until TGS Associates recovers \$3,000,000 in gross profits from the sale of geothermal resources produced from assets conveyed in that certain Agreement dated September 23, 1981 by and between Southland Royalty Company and TGS Associates, (hereafter called Agreement); and thereafter
  - (ii) A net operating profit interest of 10% until TGS Associates recovers \$6,000,000 in gross profit from the sale of geothermal resources produced from assets conveyed in that certain Agreement dated September 23, 1981 by and between Southland Royalty Company and TGS Associates; and thereafter
  - (iii) A net operating profit interest of 15% until Southland Royalty Company has received a total of \$15,000,000 in proceeds from the net operating profits interest.
- (2) At such time as Southland Royalty Company has recovered a total of \$15,000,000 from the net operating profit interest described in items (i), (ii) and (iii) above, the net operating profit shall cease.
- (3) The net operating profit interest shall be subject to and calculated in accordance with the terms of the Agreement.

UNITED STATES N-17283A  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial No.
N-17283A
New Serial No.

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

RECEIVED  
Bureau of Land Management  
NEVADA LAND OFFICE

1. TRANS-PACIFIC GEOTHERMAL, INC:00  
1419 Broadway, Suite 612 A.M.  
Oakland, CA 94612

SEP 11 1984

NEVADA STATE OFFICE  
RENO, NEVADA

The undersigned, as owner of 50% percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)

TOWNSHIP 24N, RANGE 36E: MDM

Section 20: E/2  
Section 21: All  
Section 22: All

Containing 1,600.00 Acres, more or less, Churchill County, Nevada

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 100%

4. What part of the record title interest is being retained by assignor(s)? NONE

5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3241.7-2 on limitation of overriding royalties) Production Payment described on attached Exhibit "A"

b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) See Exhibits "B" and "C" attached.

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 2nd day of April, 1984

THERMAL POWER COMPANY

(Assignor's Signature)

W. L. D'Olier, Vice President

THERMAL POWER COMPANY

(Assignor's Address)

601 California Street  
San Francisco, CA 94108

(City) (State) (Zip Code)

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.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

**SAME AS ITEM 2**

Assignment approved effective OCT 01 1984

By (Authorized Officer)

Chief, Branch of Lands  
& Minerals Operations

(Title)

FEB 06 1985

(Date)

NOTE: This form may be reproduced provided that copies are exact reproductions on one sheet of both sides of this official form in accordance with the provisions of 43 CFR 3241.2-4.

## PART II

N-17283A  
ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

## A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (*information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions*)
4. Filing fee of \$50 is attached (*See Item 2 of General Instructions*)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 30 day of August, 1984

TRANS-PACIFIC GEOTHERMAL, INC.



(Assignee's Signature)

Tsvi Meidav, President

Trans-Pacific Geothermal, Inc.  
1419 Broadway, Suite 612  
Oakland, CA 94612

(Address, include zip code)

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## GENERAL INSTRUCTIONS

1. *Use of form* - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. *Filing and number of copies* - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. *Effective date of assignment* - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. *Overriding royalties or payments out of production* - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. *Effect of assignment* - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. *Statement of interests* - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

STATE OF CALIFORNIA

)  
) SS.  
)

City and County of San Francisco

On April 2nd, 19 84, before me the undersigned, a Notary Public in and for the said State, personally appeared W. L. D'Olier personally known to me (or proved to me on the basis of satisfactory evidence) to be the person who executed the within instrument as Vice President on behalf of the corporation therein named and acknowledged to me that the corporation executed it.



*Denise La Musga*  
Notary Public in and for said State

**EXHIBIT A**

Attached hereto and made a part of that certain Letter Agreement dated as of August 21, 1984 by and between Thermal Power Company and Trans-Pacific Geothermal, Inc.

Federal Lease Serial Number	Description
<b>North Block</b>	
<b><u>T24N-R36E, MDM</u></b>	
N-8392	Section 16: All
N-8392	Section 17: All
N-17283 A	Section 20: East 1/2
N-17283 A	Section 21: All
N-17283 A	Section 22: All
<b>South Block</b>	
<b><u>T23N-R35E, MDM</u></b>	
N-8498	Section 11: All
N-10706	Section 12: All
N-8498	Section 13: All
N-11583	Section 14: All

On each of the five leases listed above, TPC reserves a production payment of ten dollars (\$10.00) per net acre per year (i.e., five dollars \$5.00 per year for each acre held by TPC in each of the North and South Blocks), up to a total payment of \$1,000,000 for the North and South Blocks taken together, such payments to commence with respect to each Block at the time commercial production commences on the respective Block. Such payments shall only be made from actual revenues from production established on, therefrom, said production payments shall cease as to both the North and South Blocks, and TGI will have no further obligation to make any payments to TPC. In the event that the North Block and/or the South Block is unitized together with other lands, and production is allocated to the North Block and/or the South Block pursuant to such unitization agreement, whether or not there is actual production from the North Block or the South Block, the production payment payable hereunder shall be calculated by multiplying the production payment otherwise payable if there were actual production from such lands, by the respective percentage of unit production allocated to the North Block and/or the South Block, as the case may be.

*the respective Block, and at the time TPC has received an aggregate of 1 million*




EXHIBIT "B"

- 1) 5% overriding royalty interest on the value of steam, or any other form of heat or other associated energy produced, processed, removed, sold or utilized from the lease;
- 2) 2½% overriding royalty interest on the value of any by-product derived from production from the lease or produced, processed, removed, sold or utilized from the lease; and,
- 3) 2½% overriding royalty interest on the value of commercially demineralized water which is produced from the lease.

## EXHIBIT "C"

- (1) Southland Royalty Company reserves the following:
  - (i) A net operating profit interest of 5% until TGS Associates recovers \$3,000,000 in gross profits from the sale of geothermal resources produced from assets conveyed in that certain Agreement dated September 23, 1981 by and between Southland Royalty Company and TGS Associates, (hereafter called Agreement); and thereafter
  - (ii) A net operating profit interest of 10% until TGS Associates recovers \$6,000,000 in gross profit from the sale of geothermal resources produced from assets conveyed in that certain Agreement dated September 23, 1981 by and between Southland Royalty Company and TGS Associates; and thereafter
  - (iii) A net operating profit interest of 15% until Southland Royalty Company has received a total of \$15,000,000 in proceeds from the net operating profits interest.
- (2) At such time as Southland Royalty Company has recovered a total of \$15,000,000 from the net operating profit interest described in items (i), (ii) and (iii) above, the net operating profit shall cease.
- (3) The net operating profit interest shall be subject to and calculated in accordance with the terms of the Agreement.

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial No.

N-17283-A

New Serial No.

18876

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

TGS ASSOCIATES c/o Trans-Pacific Geothermal, Inc.  
1419 Broadway, Suite 612  
Oakland, California 94612

The undersigned, as owner of 50% percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)  
Township 24 North, Range 36 East; Mount Diablo Meridian

Section 20: E $\frac{1}{2}$ ;  
Section 21: All;  
Section 22: All.

Containing 1,600.00 Acres, more or less, located in Churchill County, Nevada.

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 100%

4. What part of the record title interest is being retained by assignor(s)? NONE

5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3231.7-2 on limitation of overriding royalties) See Exhibit "B" attached to and made part of this Assignment.  
b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) See Exhibit "A" attached to and made part of this Assignment.

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 21st day of October, 1981.  
SOUTHLAND ROYALTY COMPANY

*C. J. Caskey*  
(Assignor's Signature)

1000 Fort Worth Club Tower

(Assignor's Address)

C. J. CASKEY, Vice President

ATTEST:

*Patricia A. Cox*  
Asst. Secretary

Fort Worth TX

(City) (State)

76102

Zip Code

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THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

**SAME AS ITEM 2**

Assignment approved effective DEC 01 1981

By

*Richard G. Morrison*

(Authorized Officer)

Chief, Branch of Lands  
& Minerals Operations

(Title)

APR 30 1982

(Date)

NOTE: This form may be reproduced provided that copies are exact reproductions on one sheet of both sides of this official form in accordance with the provisions of 43 CFR 3241.2-4.

## ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

## A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions)
4. Filing fee of \$50 is attached (See Item 2 of General Instructions)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 30th day of October, 1981

TGS ASSOCIATES

By: TRANS-PACIFIC GEOTHERMAL, INC.,  
H. (General Partner) *H. Meidav*  
(Assignee's Signature)

7:

H. TSVI MEIDAV (PRESIDENT)

TGS ASSOCIATES  
c/o TRANS-PACIFIC GEOTHERMAL, INC.  
1419 Broadway  
Oakland, CA (Address include zip code)

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## GENERAL INSTRUCTIONS

1. Use of form - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. Filing and number of copies - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. Effective date of assignment - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. Overriding royalties or payments out of production - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. Effect of assignment - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 7 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. Statement of interests - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

Form 3007-17  
(March 1973)

UNITED STATES DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial No. N-17283A  
New Serial No. Same

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

Thermal Power Company  
601 California Street  
San Francisco, California 94108

RECEIVED  
MAY 18 1979  
TPC

The undersigned, as owner of 100 percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)  
Township 24N-Range 36E MDM: Churchill County, Nevada  
Section 20: E/2  
Section 21: A11  
Section 22: A11

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 50%  
4. What part of the record title interest is being retained by assignor(s)? 50%  
5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3231.7-2 on limitation of overriding royalties) None  
b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) 5% Geothermal Steam and 2% Dissolved Minerals

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 26th day of February, 1979  
Southland Royalty Company

By C. J. Caskey  
(Assignor's Signature)

Southland Royalty Company  
1000 Fort Worth Club Tower  
(Assignor's Address)

C. J. Caskey, Vice President

Fort Worth, Texas 76102  
(City) (State) (Zip Code)

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.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

Same as item 2.  
Containing 1600.00 acres.

Assignment approved effective 4-1-79

By Roger A. Jarrell  
(Authorized Officer)

Chief, Lands & Minerals Operations 5-15-79  
(Title) (Date)

NOTE: This form may be reproduced provided that copies are exact reproductions on one sheet of both sides of this official form in accordance with the provisions of 43 CFR 3241.2-4.

## ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

## A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions)
4. Filing fee of \$50 is attached (See Item 2 of General Instructions)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of under-signed's knowledge and belief and are made in good faith.

Executed this 8th day of March, 1979

THERMAL POWER COMPANY

By

(Assignee's Signature)

W. L. D'Olier, Vice President

Thermal Power Company  
601 California Street  
San Francisco, California 94108

(Address, include zip code)

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.

## GENERAL INSTRUCTIONS

1. *Use of form* - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. *Filing and number of copies* - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. *Effective date of assignment* - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. *Overriding royalties or payments out of production* - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. *Effect of assignment* - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. *Statement of interests* - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

UNITED STATES N-17283A  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial No.

N-17283

New Serial No.

N-17283-A

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

Southland Royalty Company  
1000 Fort Worth Club Tower  
Fort Worth, Texas 76102

RECEIVED  
BUREAU OF LAND MANAGEMENT  
JAN 18 AM 10 11

The undersigned, as owner of 73-1/2% percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)

Township 24N-Range 36E MDM: Churchill County, Nevada

Section 20: E/2 + 320  
Section 21: All  
Section 22: All

= 1600

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 100%

4. What part of the record title interest is being retained by assignor(s)? None

5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3231.7-2 on limitation of overriding royalties) 5% Geothermal Steam, 2-1/2% Dissolved Minerals

b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) None

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this. 16 day of January, 1979

*W. M. Hughes*  
(Assignor's Signature)

W. M. Hughes, et al  
618 Fair Foundation Building

(Assignor's Address)

*James W. ...*  
*Ferry H. Clay*

Tyler, Texas 75702

(City) (State) (Zip Code)

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.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

T. 24 N., R. 36 E., MDM, Nevada - Churchill County

sec. 20, E1/2;

sec. 21, All;

sec. 22, All.

Containing 1600.00 acres.

Assignment approved effective 2/1/79

By William K. Stovess Acting  
(Authorized Officer)

Chief, Lands & Minerals Operations  
(Title)

2/2/79  
(Date)

NOTE: This form may be reproduced provided that copies are exact reproductions on one sheet of both sides of this official form in accordance with the provisions of 43 CFR 3241.2-4.

018876-00

## PART II

N-17283A

## ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

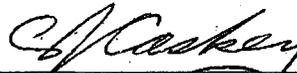
## A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (*information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions*)
4. Filing fee of \$50 is attached (*See Item 2 of General Instructions*)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (*43 CFR 3201.2*)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 16 day of January, 1979



Vice President (Assignee's Signature)

Southland Royalty Company  
1000 Fort Worth Club Tower  
Fort Worth, Texas 76102

(Address, include zip code)

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.

## GENERAL INSTRUCTIONS

1. *Use of form* - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. *Filing and number of copies* - File three (3) completed and manually signed copies in proper ELM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. *Effective date of assignment* - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. *Overriding royalties or payments out of production* - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. *Effect of assignment* - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. *Statement of interests* - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

UNITED STATES N-17283A  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial No.

N-17283

New Serial No.

N-17283-A

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

Southland Royalty Company  
1000 Fort Worth Club Tower  
Fort Worth, Texas 76102

The undersigned, as owner of 26-1/2% percent of record title of the above-designated geothermal resources lease issued effective (date) November 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)

Township 24N-Range 36E MDM: Churchill County, Nevada

Section 20: E/2  
Section 21: All  
Section 22: All

3. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 100%

4. What part of the record title interest is being retained by assignor(s)? None

5a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3231.7-2 on limitation of overriding royalties) 5% Geothermal Steam, 2-1/2% Dissolved Minerals

b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) None

It is agreed that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

I CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 16 day of January, 19 79

Thomas W. King  
(Assignor's Signature)

Millican Oil Company  
908 Town & Country Boulevard  
(Assignor's Address)

Houston, Texas 77024  
(City) (State) (Zip Code)

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.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

T. 24 N., R. 36 E., MDM, Nevada - Churchill County  
sec. 20, E/2;  
sec. 21, All; Containing 1600.00 acres.  
sec. 22, All.

Assignment approved effective 2/1/79

By William K. Stowers Acting  
(Authorized Officer)

Chief, Lands &  
Minerals Operations 2/2/79  
(Title) (Date)

NOTE: This form may be reproduced provided that copies are exact reproductions on one sheet of both sides of this official form in accordance with the provisions of 43 CFR 3241.2-4.

018876-001

## PART II

N-17283A

## ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

## A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (*information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions*)
4. Filing fee of \$50 is attached (*See Item 2 of General Instructions*)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 16 day of January, 1979

  
Vice President (Assignee's Signature)

Southland Royalty Company  
1000 Fort Worth Club Tower  
Fort Worth, Texas 76102

(Address, include zip code)

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.

## GENERAL INSTRUCTIONS

1. *Use of form* - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. *Filing and number of copies* - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. *Effective date of assignment* - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. *Overriding royalties or payments out of production* - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. *Effect of assignment* - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

4. *Statement of interests* - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

N-17283A

Serial No.

N-17283

New Serial No.

Same

ASSIGNMENT AFFECTING RECORD TITLE  
TO GEOTHERMAL RESOURCES LEASE  
PART I

W. M. Hughes  
618 Fair Foundation Bldg.  
Tyler, Texas 75702

RECEIVED  
BUREAU OF LAND MANAGEMENT  
NEVADA STATE OFFICE  
1978 APR 26 AM 11 00

The undersigned, as owner of 100 percent of record title of the above-designated geothermal resources lease issued effective (date) Nov. 1, 1977, hereby transfers and assigns to the assignee shown above, the record title interest in and to such lease as specified below.

2. Describe the lands affected by this assignment (43 CFR 3241.2-5)

T 24 N, R 36 E, Mount Diablo Meridian, Nevada  
Sec. 19; Lots 1, 2, 3, 4, E 1/2, E 1/2 W 1/2 (ALL)  
Sec. 20 ALL  
Sec. 21, ALL  
Sec. 22, ALL  
Total Area: 2,542.92 Churchill County

- 1. What part of assignor(s) record title interest is being conveyed to assignee? (Give percentage or share) 73.5%
- 1. What part of the record title interest is being retained by assignor(s)? 26.5%
- a. What overriding royalty or production payments is the assignor reserving herein? (See Item 4 of General Instructions; specify percentage; no assignment will be approved which does not comply with 43 CFR 3231.7-2 on limitation of overriding royalties) -0-
- b. What overriding royalties or production payments, if any, were previously reserved or conveyed? (Percentage only) -0-

I agree that the obligation to pay any overriding royalties or payments out of production of geothermal resources created herein, which, when added to overriding royalties or payments out of production previously created, aggregate in excess of 50 percent, of the rate of royalty due the United States, shall be suspended.

CERTIFY That the statements made herein are true, complete, and correct to the best of my knowledge and belief and are made in good faith.

Executed this 21st day of April, 1978  
MILICAN OIL COMPANY

By Thomas W. Clark, President  
(Assignor's Signature)

Suite 400 - 908 Town & Country Blvd.  
(Assignor's Address)

Houston TX 77024

(City) (State) (Zip Code)

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.

THE UNITED STATES OF AMERICA

Assignment approved as to the lands described below:

Same as item #2.

Assignment approved effective August 1, 1978

By Roger A. Jarrell  
(Authorized Officer)

Chief, Lands & Minerals Operations 7/31/78

(Title) (Date)

## ASSIGNEE'S REQUEST FOR APPROVAL OF ASSIGNMENT

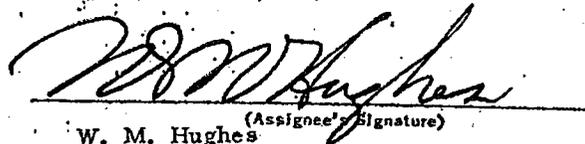
## A. ASSIGNEE CERTIFIES THAT

1. Assignee is qualified to hold a geothermal resources lease under 43 CFR 3202.1
2. Assignee is  Individual  Municipality  Association  Corporation
3. Assignee is the sole party in interest in this assignment (*information as to interests of other parties in this assignment must be furnished as prescribed in Specific Instructions*)
4. Filing fee of \$50 is attached (*See Item 2 of General Instructions*)
5. Assignee's interests, direct and indirect, in geothermal resources leases, do not exceed 20,480 chargeable acres (43 CFR 3201.2)

B. ASSIGNEE AGREES to be bound by the terms and provisions of the lease described here, provided the assignment is approved by the Authorized Officer.

C. IT IS HEREBY CERTIFIED That the statements made herein are true, complete, and correct to the best of undersigned's knowledge and belief and are made in good faith.

Executed this 21st day of April, 1978

  
(Assignee's signature)

W. M. Hughes

618 Fair Foundation Bldg.  
Tyler, Texas 75702

(Address, include zip code)

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.

## GENERAL INSTRUCTIONS

1. *Use of form* - Use only for assignment of record title interest in geothermal resources leases, and for assignments of working or royalty interests, operating agreements, or subleases. An assignment of record title may only cover lands in one lease. If more than one assignment is made out of a lease, file a separate instrument of transfer with each assignment.
2. *Filing and number of copies* - File three (3) completed and manually signed copies in proper BLM office. A \$50 nonrefundable filing fee must accompany assignment. File assignment within ninety (90) days after date of final execution.
3. *Effective date of assignment* - Assignment, if approved, takes effect on the first day of the month following the date of filing of all required papers.
4. *Overriding royalties or payments out of production* - Describe in an accompanying statement any overriding royalties or payments out of production created by assignment but not set out therein. If payments out of production are reserved by assignor, outline in detail the amount, method of payment, and other pertinent terms.
5. *Effect of assignment* - Approval of assignment of a definitely described portion of the leased lands creates separate leases. Assignee, upon approval of assignment, becomes lessee of the Government as to the assigned interest and is responsible for complying with all lease terms and conditions, including timely payment of annual rental and maintenance of any required bond; except in the case of assignment of undivided interests, royalties, and operating agreements.
6. A copy of the executed lease, out of which this assignment is made, should be made available to assignee by assignor.

## SPECIFIC INSTRUCTIONS

(Items not specified are self-explanatory)

## PART I

Item 1 - Type or print plainly, in ink, between and below heavy dots, the assignee's full name and mailing address, including zip code.

## PART II

## A. Certification of assignee

3. If assignee is an association or partnership, assignee must furnish a certified copy of its articles of association or partnership, with a statement that (a) it is authorized to hold geothermal resources leases; (b) that the person executing the assignment is authorized to act on behalf of the organization in such matters; and (c) names and addresses of members controlling more than 10 percent interest.

If assignee is a corporation, it must submit a statement containing the following information: (a) State in which it was incorporated; (b) that it is authorized to hold geothermal resources leases; (c) that officer executing assignment is authorized to act on behalf of the corporation in such matters; and (d) percentage of voting stock and percentage of all stock owned by aliens or those having addresses outside the United States. If 10 percent or more of the stock of any class is

owned or controlled by or on behalf of any one stockholder, a separate showing of his citizenship and holdings must be furnished.

If evidence of qualifications and ownership has previously been furnished as required by the above, reference by serial number of record in which it was filed together with a statement as to any amendments. Qualifications of assignee must be in full compliance with the regulations (43 CFR 3241.1-2).

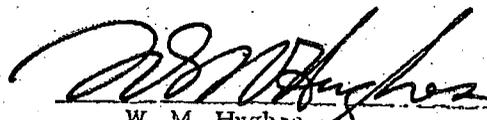
4. *Statement of Interests* - Assignee must indicate whether or not he is the sole party in interest in the assignment; if not, assignee must submit, at time assignment is filed, a signed statement giving the names of other interested parties. If there are other parties interested in the assignment, a separate statement must be signed by each assignee, giving the nature and extent of the interest of each, the nature of agreement between them, if oral; and a copy of agreement, if written. All interested parties must furnish evidence of their qualifications to hold such lease interests. Separate statements and written agreements, if any, must be filed with the filing of the assignment.

STATEMENT OF PRIMARY ASSIGNEE

I, W. M. HUGHES, being named Assignee in the Assignment of the ~~Oil~~ <sup>Oil and Gas</sup> Resources Lease to which this statement is attached, certify that the interests involved in the beneficial ownership of this lease are as follows:

Jerry H. Clay	43%
W. M. Hughes	43%
James W. Knowles	14%

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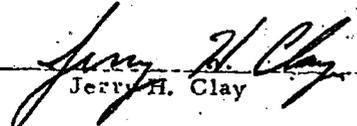
  
 W. M. Hughes

STATEMENT OF PARTY IN INTEREST

The undersigned party in interest in that certain Assignment of Geothermal Resources Lease to which this statement is attached does hereby certify that:

- 1) He is qualified to hold a Geothermal Resources Lease under CFR 3202.1.
- 2) He is an individual.
- 3) He is a 43% party in interest as to the beneficial ownership of said Assignment.
- 4) His interests either direct or indirect in Geothermal Resources Leases do not exceed 20,480 chargeable acres.
- 5) He agrees to be bound by the terms and provisions of the lease described herein.
- 6) He certifies that the statements made herein are true, complete, and correct to the best of his knowledge and belief and are made in good faith.

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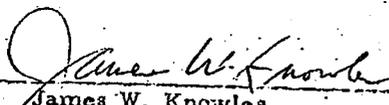
  
 \_\_\_\_\_  
 Jerry H. Clay

STATEMENT OF PARTY IN INTEREST

The undersigned party in interest in that certain Assignment of Geothermal Resources Lease to which this statement is attached does hereby certify that:

- 1) He is qualified to hold a Geothermal Resources Lease under CFR 3202.1.
- 2) He is an individual.
- 3) He is a 14% party in interest as to the beneficial ownership of said Assignment.
- 4) His interests either direct or indirect in Geothermal Resources Leases do not exceed 20,480 chargeable acres.
- 5) He agrees to be bound by the terms and provisions of the lease described herein.
- 6) He certifies that the statements made herein are true, complete, and correct to the best of his knowledge and belief and are made in good faith.

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 James W. Knowles

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

N-17283A Serial Number N-17283

RECEIVED USGS - KGRA Determination:  
Bureau of Land Management

GEOTHERMAL RESOURCES LEASE

Competitive  Noncompetitive

SEP 26 1977

RECEIVED  
Bureau of Land Management

NEVADA STATE OFFICE 10:00 A.M. OCT 19 1977

In consideration of the terms and conditions contained herein, and the grant made hereby, this lease is entered into by the UNITED STATES OF AMERICA (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau") of the Department of the Interior (hereinafter called the "Department"), and RENO, NEVADA NEVADA STATE OFFICE Milligan Oil Company, 908 Town & Country Blvd., Suite 400, Houston, TX 77024

(hereinafter called the

"Lessee"). This lease is made pursuant to the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 U.S.C. 1001-1025) (hereinafter called "the Act") to be effective on NOV 01 1977 (hereinafter called the "effective date"). It is subject to all the provisions of the Act and to all the terms, conditions, and requirements of (a) all regulations promulgated by the Secretary of the Interior (hereinafter called "the Secretary") in existence upon the effective date, specifically including, but not limited to, 43 CFR Parts 3000 and 3200 and 30 CFR Parts 270 and 271, (b) all geothermal resources operational orders (hereinafter called "GRO orders") issued pursuant thereto, all of which are incorporated herein and by reference made a part hereof, and (c) any regulations hereafter issued by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference) all of which shall be, upon their effective date, incorporated herein and, by reference, made a part hereof.

Sec. 1. GRANT - The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal steam and associated geothermal resources, (hereinafter called "geothermal resources"). In or under the following described lands situated within the County of Churchill Nevada State of Nevada

National Resource Lands		Acquired Lands	
T. 24 N.	R. 36 E.	T.	R.
Mt. Diablo Meridian			
sec. 19:	Lots 1, 2, 3, 4, E <sub>1/2</sub> , E <sub>1/4</sub> (A11);		
sec. 20:	A11;		
sec. 21:	A11;		
sec. 22:	A11.		
Total Area 2,542.92		Total Area	

Containing 2,542.92 acres (hereinafter called the "leased area" or "leased lands"), together with:

(a) The nonexclusive right to conduct within the leased area geological and geophysical exploration in accordance with applicable regulations; and

(b) The right to construct or erect and to use, operate, and maintain within the leased area, together with ingress and egress thereupon all wells, pumps, pipes, pipelines, buildings, plants, sumps, brine pits, reservoirs, tanks, waterworks, pumping stations, roads, electric power generating plants, transmission lines, industrial facilities, electric, telegraph or telephone lines, and such other works and structures and to use so much of the surface of the land as may be necessary or reasonably convenient for the production, utilization, and processing of geothermal resources or to the full enjoyment of the rights granted by this lease, subject to compliance with applicable laws and regulations; *Provided that*, although the use of the leased area for an electric power generating plant or transmission facilities or a commercial or industrial facility is authorized hereunder, the location of such facilities and the terms of occupancy therefor shall be under separate instruments issued under any applicable laws and regulations; and

(c) The nonexclusive right to drill potable water wells in accordance with state water laws within the leased area and to use the water produced therefrom for operations on the leased lands free of cost, provided that such drilling and development are conducted in accordance with procedures approved by the Supervisor of the Geological Survey (hereinafter called "Supervisor"); and

(d) The right to convert this lease to a mineral lease under the Mineral Leasing Act of February 25, 1920, as amended, and supplemented (30 U.S.C. 181-287) or under the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), whichever is appropriate, if the leasehold is primarily valuable for the production of one or more valuable by-products which are leasable under those statutes, and the lease is incapable of commercial production or utilization of geothermal steam; *Provided that*, an application is made therefor prior to the expiration of the lease extension by reason of by-product production as hereinafter provided, and subject to all the terms and conditions of said appropriate Acts. The Lessee is also granted the right to locate mineral deposits under the mining laws (30 U.S.C. 21-54), which would constitute by-products if commercial production or utilization of geothermal steam continued, but such a location to be valid must be completed within ninety (90) days after the termination of this lease. Any conversion of this lease to a mineral lease or a mining claim is contingent on the availability of such lands for this purpose at the time of the conversion. If the lands are withdrawn or acquired in aid of a function of any Federal Department or agency, the mineral lease or mining claim shall be subject to such additional terms and conditions as may be prescribed by such Department or agency for the purpose of making operations thereon consistent with the purposes for which these lands are administered; and

(e) The right, without the payment of royalties hereunder, to reinject into the leased lands geothermal resources and condensates to the extent that such resources and condensates are not utilized, but their reinjection is necessary for operations under this lease in the recovering or processing of geothermal resources. If the Lessee, pursuant to any approved plan, disposes of the unusable brine and produced waste products into underlying formations, he may do so without the payment of royalties.

Sec. 2. TERM

(a) This lease shall be for a primary term of ten (10) years from the effective date and so long thereafter as geothermal steam is produced or utilized in commercial quantities but shall in no event continue for more than forty (40) years after the end of the primary term. However, if at the end of that forty-year period geothermal steam is being produced or utilized in commercial quantities, and the leased lands are not needed for other purposes, the Lessee shall have a preferential right to a renewal of this lease for a second forty-year term in accordance with such terms and conditions as the Lessor deems appropriate.

(b) If actual drilling operations are commenced on the leased lands or under an approved plan or agreement on behalf of the leased lands prior to the end of the primary term,

and are being diligently prosecuted at the end of the primary term, this lease shall be extended for five (5) years and so long thereafter, but not more than thirty-five (35) years, as geothermal steam is produced or utilized in commercial quantities. If at the end of such extended term geothermal steam is being produced or utilized in commercial quantities, the Lessee shall have a preferential right to a renewal for a second term as in (a) above.

(c) If the Lessor determines at any time after the primary term that this lease is incapable of commercial production and utilization of geothermal steam, but one or more valuable by-products are or can be produced in commercial quantities, this lease shall be extended for so long as such by-products are produced in commercial quantities but not for more than five (5) years from the date of such determination.

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### Sec. 3. RENTALS AND ROYALTIES

(a) *Annual Rental* - For each lease year prior to the commencement of production of geothermal resources in commercial quantities on the leased lands, the Lessee shall pay the Lessor on or before the anniversary date of the lease a rental of **\$2.00** for each acre or fraction thereof.

(b) *Escalating Rental* - Beginning with the sixth lease year and for each year thereafter until the lease year beginning on or after the commencement of production of geothermal resources in commercial quantities, the Lessee shall pay on or before the anniversary date of the lease an escalated rental in an amount per acre or fraction thereof equal to the rental per acre for the preceding year and an additional sum of one (1) dollar per acre or fraction thereof. If the lease is extended beyond ten (10) years for reasons other than the commencement of production of geothermal resources in commercial quantities, the rental for the eleventh year and for each lease year thereafter until the lease year beginning on or after the commencement of such production will be the amount of rental for the tenth lease year. If any expenditures are made in any lease year for diligent exploration on the leased lands in excess of the minimum required expenditures for that year, the excess may be credited against any rentals in excess of **\$ 2.00** per acre or fraction thereof due the Lessor for that or any future year.

(c) *Royalty* - On or before the last day of the calendar month after the month of commencement of production in commercial quantities of geothermal resources and thereafter on a monthly basis, the Lessee shall pay to the Lessor:

(1) A royalty of **10** percent on the amount or value of steam, or any other form of heat or other associated energy produced, processed, removed, sold, or utilized from this lease or reasonably susceptible to sale or utilization by the Lessee.

(2) A royalty of **5** percent of the value of any by-product derived from production under this lease, produced, processed, removed, sold, or utilized from this lease or reasonably susceptible of sale or utilization by the Lessee, except that as to any by-product which is a mineral named in Sec. 1 of the Mineral Leasing Act of February 25, 1920, as amended, (30 U.S.C. 181), the rate of royalty for such mineral shall be the same as that provided in that statute and the maximum rate of royalty for such mineral shall not exceed the maximum royalty applicable under that statute.

(3) A royalty of **5** percent of the value of commercially demineralized water which has been produced from the leased lands, and has been sold or utilized by the Lessee or is reasonably susceptible of sale or utilization by the Lessee. In no event shall the Lessee pay to the Lessor, for the lease year beginning on or after the commencement of production in commercial quantities on the leased lands or any subsequent lease year, a royalty of less than two (2) dollars per acre or fraction thereof. If royalty paid on production during the lease year has not satisfied this requirement, the Lessee shall pay the difference on or before the expiration date of the lease year for which it is paid.

(d) *Waiver and Suspension of Rental and Royalties* - Rentals or royalties may be waived, suspended, or reduced pursuant to the applicable regulations on the entire leasehold or any portion thereof in the interest of conservation or for the purpose of encouraging the greatest ultimate recovery of geothermal resources if the Lessor determines that it is necessary to do so to promote such development, or because the lease cannot be successfully operated under the terms fixed herein.

(e) *Undivided Fractional Interests* - Where the interest of the Lessor in the geothermal resources underlying any tract or tracts described in Sec. 1 is an undivided fractional interest, the rentals and royalties payable on account of each such tract shall be in the same proportion to the rentals and royalties provided in this lease as the individual fractional interest of the Lessor in the geothermal resources underlying such tract is to the full fee interest.

(f) *Readjustments* - Rentals and royalties hereunder may be readjusted in accordance with the Act and regulations to rates not in excess of the rates provided therein, and at not less than twenty (20) year intervals beginning thirty-five (35) years after the date geothermal steam is produced from the lease as determined by the Supervisor.

Sec. 4. *PAYMENTS* - It is expressly understood that the Secretary may establish the values and minimum values of geothermal resources to compute royalties in accordance with the applicable regulations. Unless otherwise directed by the Secretary, all payments to the Lessor will be made as required by the regulations. If there is no well on the leased lands capable of producing geothermal resources in commercial quantities, the failure to pay rental on or before the anniversary date shall cause the lease to terminate by operation of law except as provided by Sec. 3244.2 of the regulations. If the time for payment falls on a day on which the proper office to receive payment is closed, payment shall be deemed to be made on time if made on the next official working day.

Sec. 5. *BONDS* - The Lessee shall file with the Authorized Officer of the Bureau (hereinafter called the "Authorized Officer") shall maintain at all times the bonds required under the regulations to be furnished as a condition to the issuance of this lease or prior to entry on the leased lands in the amounts established by the Lessor and to furnish such additional bonds or security as may be required by the Lessor upon entry on the lands or after operations or production have begun.

### Sec. 6. WELLS

(a) The Lessee shall drill and produce all wells necessary to protect the leased land from drainage by operations on lands not the property of the Lessor, or other lands of the Lessor leased at a lower royalty rate, or on lands to which royalties and rentals are paid into different lands from those

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into which royalties under this lease are paid. However, in lieu of any part of such drilling and production, with the consent of the Supervisor, the Lessee may compensate the Lessor in full each month for the estimated loss of royalty through drainage in the amount determined by said Supervisor.

(b) At the Lessee's election, and with the approval of the Supervisor, the Lessee shall drill and produce other wells in conformity with any system of well spacing or production allotments affecting the field or area in which the leased lands are situated, which is authorized by applicable law.

(c) After due notice in writing, the Lessee shall diligently drill and produce such wells as the Supervisor shall require so that the leased lands may be properly and timely developed and for the production of geothermal steam and its by-products, including commercially demineralized water for beneficial uses in accordance with applicable state laws. However, the Supervisor may waive or modify the requirements of this subparagraph (c) in the interest of conservation of natural resources or for economic feasibility or other reasons satisfactory to him. If the products or by-products of geothermal production from wells drilled on this lease are susceptible of producing commercially demineralized water for beneficial uses, and a program therefore is not initiated with due diligence, the Lessor may at its option elect to take such products or by-products and the Lessee shall deliver all or any portion thereof to the Lessor at any point in the Lessee's geothermal gathering or disposal system without cost to the Lessee, if the Lessee's activities, under the lease, would not be impaired and such delivery would otherwise be consistent with field and operational requirements. The retention of this option by the Lessor shall in no way relieve the Lessee from the duty of producing commercially demineralized water where required to do so by the Lessor, except when the option is being exercised and then only with respect to wells where it is being exercised, or limit the Lessor's right to take any action under Sec. 25 to enforce that requirement.

Sec. 7. *INSPECTION* - The Lessee shall keep open at all reasonable times for the inspection of any duly authorized representative of the Lessor the leased lands and all wells, improvements, machinery, and fixtures thereon and all production reports, maps, records, books, and accounts relative to operations under the lease, and well logs, surveys, or investigations of the leased lands.

Sec. 8. *CONDUCT OF OPERATIONS* - The Lessee shall conduct all operations under this lease in a workmanlike manner and in accordance with all applicable statutes, regulations, and GRO orders, and all other appropriate directives of the Lessor to prevent bodily injury, danger to life or health, or property damage, and to avoid the waste of resources, and shall comply with all requirements which are set forth in 43 CFR Group 3200, including, but not limited to, Subpart 3204, or which may be prescribed by the Lessor pursuant to the regulations, and with the special stipulations which are attached to the lease, all of which are specifically incorporated into this lease. A breach of any term of this lease, including the stipulations attached hereto, will be subject to all the provisions of this lease with respect to remedies in case of default. Where any stipulation is inconsistent with a regular provision of this lease, the stipulation shall govern.

### Sec. 9. INDEMNIFICATION

(a) The Lessee shall be liable to the Lessor for any damage suffered by the Lessor in any way arising from or connected with the Lessee's activities and operations conducted pursuant to this lease, except where damage is caused by employees of the Lessor acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the Lessor from all claims arising from or connected with the Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

Sec. 10. *CONTRACTS FOR SALE OR DISPOSAL OF PRODUCTS* - The Lessee shall file with the Supervisor not later than thirty (30) days after the effective date thereof any contract, or evidence of other arrangement for the sale or disposal of geothermal resources.

Sec. 11. *ASSIGNMENT OF LEASE OR INTEREST THEREIN* - Within ninety (90) days from the date of execution thereof, the Lessee shall file for approval by the Authorized Officer any instruments of transfer made of this lease or of any interest therein, including assignments of record title and working or other interests.

Sec. 12. *REPORTS AND OTHER INFORMATION* - At such times and in such form as the Lessor may prescribe, the Lessee shall comply with all reporting requirements of the geothermal resources leasing, operating, and unit regulations and shall submit quarterly reports containing the data which it has collected through the monitoring of air, land, and water quality and all other data pertaining to the effect on the environment by operations under the lease. The Lessee shall also comply with such other reporting requirements as may be imposed by the Authorized Officer or the Supervisor. The Lessor may release to the general public any reports, maps, or other information submitted by the Lessee except geologic and geophysical interpretations, maps, or data subject to 30 CFR 270.79 or unless the Lessee shall designate that information as proprietary and the Supervisor or the Authorized Officer shall approve that designation.

Sec. 13. *DILIGENT EXPLORATION* - In the manner required by the regulations, the Lessee shall diligently explore the leased lands for geothermal resources until there is production in commercial quantities applicable to this lease. After the fifth year of the primary term the Lessee shall make at least

the minimum expenditures required to qualify the operations on the leased lands as diligent exploration under the regulations.

**Sec. 14. PROTECTION OF THE ENVIRONMENT (LAND, AIR AND WATER) AND IMPROVEMENTS** - The Lessee shall take all mitigating actions required by the Lessor to prevent: (a) soil erosion or damage to crops or other vegetative cover on Federal or non-Federal lands in the vicinity; (b) the pollution of land, air, or water; (c) land subsidence, seismic activity, or noise emissions; (d) damage to aesthetic and recreational values; (e) damage to fish or wildlife or their habitats; (f) damage to or removal of improvements owned by the United States or other parties; or (g) damage to or destruction or loss of fossils, historic or prehistoric ruins, or artifacts. Prior to the termination of bond liability or at any other time when required and to the extent deemed necessary by the Lessor, the Lessee shall reclaim all surface disturbances as required, remove or cover all debris or solid waste, and, so far as possible, repair the offsite and onsite damage caused by his activity or activities incidental thereto, and return access roads or trails and the leased lands to an acceptable condition including the removal of structures, if required. The Supervisor or the Authorized Officer shall prescribe the steps to be taken by Lessee to protect the surface and the environment and for the restoration of the leased lands and other lands affected by operations on the leased lands and improvements thereon, whether or not the improvements are owned by the United States. Timber or mineral materials may be obtained only on terms and conditions imposed by the Authorized Officer.

**Sec. 15. WASTE** - The Lessee shall use all reasonable precautions to prevent waste of natural resources and energy, including geothermal resources, or of any minerals, and to prevent the communication of water or brine zones with any oil, gas, fresh water, or other gas or water bearing formations or zones which would threaten destruction or damage to such deposits. The Lessee shall monitor noise, air, and water quality conditions in accordance with any orders of the Supervisor.

**Sec. 16. MEASUREMENTS** - The Lessee shall gauge or otherwise measure all production, sales, or utilization of geothermal resources and shall record the same accurately in records as required by the Supervisor. Reports on production, sales, or utilization of geothermal resources shall be submitted in accordance with the terms of this lease and the regulations.

**Sec. 17. RESERVATIONS TO LESSOR** - All rights in the leased area not granted to the Lessee by this lease are hereby reserved to the Lessor. Without limiting the generality of the foregoing such reserved rights include:

(a) *Disposal* - The right to sell or otherwise dispose of the surface of the leased lands or any resource in the leased lands under existing laws, or laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) *Rights-of-way* - The right to authorize geological and geophysical explorations on the leased lands which do not interfere with or endanger actual operations under this lease, and the right to grant such easements or rights-of-way for joint or several use upon, through or in the leased area for steam lines and other public or private purposes which do not interfere with or endanger actual operations or facilities constructed under this lease;

(c) *Mineral Rights* - The ownership of and the right to extract oil, hydrocarbon gas, and helium from all geothermal steam and associated geothermal resources produced from the leased lands;

(d) *Casing* - The right to acquire the well and casing at the fair market value of the casing where the Lessee finds only potable water, and such water is not required in lease operations; and

(e) *Measurements* - The right to measure geothermal resources and to sample any production thereof.

**Sec. 18. ANTIQUITIES AND OBJECTS OF HISTORIC VALUE** - The Lessee shall immediately bring to the attention of the Authorized Officer any antiquities or other objects of historic or scientific interest, including but not limited to historic or prehistoric ruins, fossils, or artifacts discovered as a result of operations under this lease, and shall leave such discoveries intact. Failure to comply with any of the terms and conditions imposed by the Authorized Officer with regard to the preservation of antiquities may constitute a violation of the Antiquities Act (16 U.S.C. 431-433). Prior to operations, the Lessee shall furnish to the Authorized Officer a certified statement that either no archaeological values exist or that they may exist on the leased lands to the best of the of the Lessee's knowledge and belief and that they might be impaired by geothermal operations. If the Lessee furnishes a statement that archaeological values may exist where the land is to be disturbed or occupied, the Lessee will engage a qualified archaeologist, acceptable to the Authorized Officer, to survey and salvage, in advance of any operations, such archaeological values on the lands involved. The responsibility for the cost for the certificate, survey, and salvage will be borne by the Lessee, and such salvaged property shall remain the property of the Lessor or the surface owner.

**Sec. 19. DIRECTIONAL DRILLING** - A directional well drilled under the leased area from a surface location on nearby land not covered by the lease shall be deemed to have the same effect for all purposes of this lease as a well drilled from a surface location on the leased area. In such circumstances, drilling shall be considered to have been commenced on the nearby land for the purposes of this lease, and production of geothermal resources from the leased area through any directional well located on nearby land, or drilling or reworking of any such directional well shall be considered production or drilling or reworking operations (as the case may be) on the leased area for all purposes of this lease. Nothing contained in this section shall be construed as

granting to the Lessee any right in any land outside the leased area.

**Sec. 20. OVERRIDING ROYALTIES** - The Lessee shall not create overriding royalties of less than one-quarter (1/4) of one percent of the value of output nor in excess of 50 percent of the rate of royalty due to the Lessor specified in Sec. 3 of this lease except as otherwise authorized by the regulations. The Lessee expressly agrees that the creation of any overriding royalty which does not provide for a prorated reduction of all overriding royalties so that the aggregate rate of royalties does not exceed the maximum rate permissible under this section, or the failure to suspend an overriding royalty during any period when the royalties due to the Lessor have been suspended pursuant to the terms of this lease, shall constitute a violation of the lease terms.

**Sec. 21. READJUSTMENT OF TERMS AND CONDITIONS** - The terms and conditions of this lease other than those related to rentals and royalties may be readjusted in accordance with the Act at not less than ten-year intervals beginning ten (10) years after the date geothermal steam is produced from the leased premises as determined by the Supervisor.

**Sec. 22. COOPERATIVE OR UNIT PLAN** - The Lessee agrees that it will on its own, or at the request of the Lessor where it is determined to be necessary for the conservation of the resource or to prevent the waste of the resource, subscribe to and operate under any reasonable cooperative or unit plan for the development and operation of the area, field, or pool, or part thereof embracing the lands subject to this lease as the Secretary may determine to be practicable and necessary or advisable in the interest of conservation. In the event the leased lands are included within a unit, the terms of this lease shall be deemed to be modified to conform to such unit agreement. Where any provision of a cooperative or unit plan of development which has been approved by the Secretary, and which by its terms affects the leased area or any part thereof, is inconsistent with a provision of this lease, the provisions of such cooperative or unit plan shall govern.

**Sec. 23. RELINQUISHMENT OF LEASE** - The Lessee may relinquish this entire lease or any officially designated subdivision of the leased area in accordance with the regulations by filing in the proper BLM office a written relinquishment, in triplicate, which shall be effective as of the date of filing. No relinquishment of this lease or any portion of the leased area shall relieve the Lessee or its surety from any liability for breach of any obligation of this lease, including the obligation to make payment of all accrued rentals and royalties and to place all wells in the leased lands to be relinquished in condition for suspension or abandonment, and to protect or restore substantially the surface or subsurface resources in a manner satisfactory to the Lessor.

**Sec. 24. REMOVAL OF PROPERTY ON TERMINATION OR EXPIRATION OF LEASE**

(a) Upon the termination or expiration of this lease in whole or in part, or the relinquishment of the lease in whole or in part, as herein provided, the Lessee shall within a period of ninety (90) days (or such longer period as the Supervisor may authorize because of adverse climatic conditions) thereafter remove from the leased lands, no longer subject to the lease all structures, machinery, equipment, tools, and materials in accordance with applicable regulations and orders of the Supervisor. However, the Lessee shall, for a period of not more than six (6) months, continue to maintain any such property needed in the relinquished area, as determined by the Supervisor, for producing wells or for drilling or producing geothermal resources on other leases.

(b) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee, as provided above, which are allowed to remain on the leased lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Supervisor. If the Supervisor directs the Lessee to remove such property, the Lessee shall do so at its own expense, or if it fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

**Sec. 25. REMEDIES IN CASE OF DEFAULT**

(a) Whenever the Lessee fails to comply with any of the provisions of the Act, or the terms and stipulations of this lease, or of the regulations issued under the Act, or of any order issued pursuant to those regulations, and that default shall continue for a period of thirty (30) days after service of notice by the Lessor, the Lessor may (1) suspend operations until the requested action is taken to correct the noncompliance, or (2) cancel the lease in accordance with Sec. 12 of the Act (30 U.S.C. 1011). However, the 30-day notice provision applicable to this lease under Sec. 12 of the Act shall also apply as a prerequisite to the institution of any legal proceedings by the Lessor to cancel this lease while it is in a producing status. Nothing in this subsection shall be construed to apply to, or require any notice with respect to any legal action instituted by the Lessor other than an action to cancel the lease pursuant to Sec. 12 of the Act.

(b) Whenever the Lessee fails to comply with any of the provisions of the Act, or of this lease, or the regulations, or of any GRO Orders, or other orders, and immediate action is required, the Lessor without waiting for action by the Lessee may enter on the leased lands and take such measures as it may deem necessary to correct the failure, including a suspension of operations or production, all at the expense of the Lessee.

(c) A waiver of any particular violation of the provisions of the Act, or of this lease, or of any regulations promulgated by the Secretary under the Act, shall not prevent the cancellation of this lease or the exercise of any other remedy or remedies under paragraphs (a) and (b) of this section by reason of any other such violation, or for the same violation occurring at any other time.

(d) Nothing herein shall limit or affect the Lessee's right to a hearing and appeal as provided in Sec. 12 of the

and in the regulations promulgated thereunder.  
(e) Upon cancellation, the Lessee shall remove all property in accordance with Sec. 24 hereof, and shall store the leased lands in a manner acceptable to the Lessor or as may be otherwise required by the Lessor.

**Sec. 26. HEIRS AND SUCCESSORS IN INTEREST** - Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns, of the respective parties hereto.

**Sec. 27. UNLAWFUL INTEREST** - No Member of, or Delegate to Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Sec. 3741 of the Revised Statutes (41 U.S.C. Sec. 22), as amended, and Sections 431, 432, and 433 of Title 18 of the United States Code, relating to contracts made or entered into, or accepted by or on behalf of the United States, form a part of this lease so far as the same may be applicable.

**Sec. 28. MONOPOLY AND FAIR PRICES** - The Lessor reserves full power and authority to protect the public interest by promulgating and enforcing all orders necessary to insure the sale of the production from the leased lands at reasonable prices, to prevent monopoly, and to safeguard the public interest.

**Sec. 29. EQUAL OPPORTUNITY CLAUSE** - The Lessee agrees that, during the performance of this contract:

(1) The Lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee will, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee will send to each labor union or representative of workers with which Lessee has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Lessee will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Secretary

of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the Lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

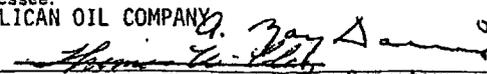
(7) The Lessee will include the provisions of Paragraphs (1) through (7) of this Section (29) in every contract, subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor, or subcontract, or purchase order as the Secretary may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor, or vendor as a result of such direction by the Secretary, the Lessee may request the Lessor to enter into such litigation to protect the interests of the Lessor.

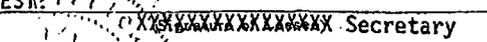
**Sec. 30. CERTIFICATION OF NONSEGREGATED FACILITIES** - By entering into this lease, the Lessee certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, or restaurants or other eating areas, time clocks, or locker rooms, and other storage or dressing rooms, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. Lessee further agrees that (except where it has obtained identical certifications from proposed contractors and subcontractors for specific time periods) it will obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that it will retain such certifications in its files; and that it will forward the following certification to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods): it will notify prospective contractors and subcontractors of requirement for certification of nonsegregated facilities: A Certification of Nonsegregated Facilities, as required by the May 9, 1967 Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

**Sec. 31. SPECIAL STIPULATIONS** - (stipulations, if any, are attached hereto and made a part hereof)

The attached Fort Churchill-Clan Alpine Special Stipulations apply to all lands within this lease.

In witness whereof the parties have executed this lease.

Lessee:  
**MILLICAN OIL COMPANY**  
BY:   
(signature of Lessee)

ATTEST:   
Secretary

September 22, 1977  
[SEA] (Date)

THE UNITED STATES OF AMERICA, Lessor:

By:   
(Authorized Officer)

ACTING Chief, Lands & Minerals Operations  
(Title)

OCT 26 1977

(Date)

(e) Upon cancellation, the Lessee shall remove all property in accordance with Sec. 24 hereof, and shall restore the leased lands in a manner acceptable to the Lessor as may be otherwise required by the Lessor.

Sec. 26. HEIRS AND SUCCESSORS IN INTEREST - Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns, of the respective parties hereto.

Sec. 27. UNLAWFUL INTEREST - No Member of, or Delegate to Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Sec. 3741 of the Revised Statutes (41 U.S.C. Sec. 22), as amended, and Sections 431, 432, and 433 of Title 18 of the United States Code, relating to contracts made or entered into, or accepted by or on behalf of the United States, form a part of this lease so far as the same may be applicable.

Sec. 28. MONOPOLY AND FAIR PRICES - The Lessor reserves full power and authority to protect the public interest by promulgating and enforcing all orders necessary to insure the sale of the production from the leased lands at reasonable prices, to prevent monopoly, and to safeguard the public interest.

Sec. 29. EQUAL OPPORTUNITY CLAUSE - The Lessee agrees that, during the performance of this contract:

(1) The Lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee will take affirmative action to ensure that applicants are employed, and that

investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the Lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee will include the provisions of Paragraphs (1) through (7) of this Section (29) in every contract, subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor, or subcontract, or purchase order as the Secretary may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor, or vendor as a result of such direction by the Secretary, the Lessee may request the Lessor to enter into such litigation to protect the interests of the Lessor.

Sec. 30. CERTIFICATION OF NONSEGREGATED FACILITIES - By entering into this lease, the Lessee certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of

CORPORATION ACKNOWLEDGEMENT

THE STATE OF TEXAS, }  
COUNTY OF HARRIS

BEFORE ME, the undersigned, a Notary Public in and for said County and State, on this day personally appeared

~~Thomas W. Clay, President~~ *A. Ray Davis, Secretary*

whose name is subscribed to the foregoing instrument and acknowledged to me that the same was the act of the said

MILLICAN OIL COMPANY

a corporation, and that he executed the same as the act of such corporation for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the 22nd day of September A. D. 1977

(L.S.)

*Doris J. Davis*

Notary Public in and for Harris County, Tex.

access to its books, records, and accounts by the Secretary

or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 31. SPECIAL STIPULATIONS - (stipulations, if any, are attached hereto and made a part hereof)

The attached Fort Church 111-Clan Alpine Special Stipulations apply to all lands within this lease.

In witness whereof the parties have executed this lease.

Lessee:  
MILLICAN OIL COMPANY

BY: *[Signature]*  
(signature of Lessee)

THE UNITED STATES OF AMERICA, Lessor:

By *[Signature]*  
(Authorized Officer)

ATTEST: *[Signature]*  
Secretary

Chief, Lands & Minerals Operations  
(Title)

September 22, 1977

OCT 26 1977

(Date)

(Date)

FORT CHURCHILL-CLAN ALPINE .  
SPECIAL STIPULATIONS

The Lessee shall comply with the following special conditions and stipulations unless they are modified by mutual agreement of the Lessee, the Supervisor and the Authorized Officer:

1. Surface occupancy within 500 feet (horizontal measurement) of any canal, ditch, slough, pond, lake, spring, or open body of water may be restricted or denied where deemed necessary by the appropriate surface management agency to protect wildlife and other resources. Other buffer zones and areas of restricted surface occupancy may be required to protect other resource values, including but not limited to, critical or rare or endangered species habitat.
2. The certified statement required by Section 18 of the lease form must be completed by a qualified archaeologist, acceptable to the Authorized Officer.
3. The use of wide or balloon-tired vehicles and/or helicopters may be required for any activities in off-road areas where deemed necessary to protect the soil and other resources.
4. Springs and water developments on Federal lands may be used only with the prior written approval of the Authorized Officer.

10:00  
 A. M.  
 RECEIVED  
 Dir. of Land Management  
 OCT 19 1977  
 NEVADA STATE OFFICE  
 RENO, NEVADA

In witness whereof the parties have executed this lease.

Lessee:  
**MILlican Oil Company**  
 BY: [Signature]  
 (signature of Lessee)

THE UNITED STATES OF AMERICA, Lessor:

By [Signature]  
 (Authorized Officer)

ATTEST: [Signature]  
 Secretary

Acting **Chief, Lands & Minerals Operations**  
 (Title)

September 22, 1977

OCT 26 1977

[SEAL]

(Date)

(Date)

JUN 20 1996

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No. N-60687

1. Designated (see reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025).

Read Instructions Before Completing

RECEIVED  
Bur. of Land Management  
NEVADA LAND OFFICE

9:00 A.M. MAR 25 1996  
NEVADA STATE OFFICE  
RENO, NEVADA

Name OXBOW GEOTHERMAL CORPORATION

Street 5250 S VIRGINIA ST SUITE 304

City, State, Zip Code RENO NV 89502

2. Surface managing agency if other than BLM: \_\_\_\_\_ Unit/Project \_\_\_\_\_

Legal description of land requested (segregate by public domain and acquired lands):

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

Total acres applied for \_\_\_\_\_

Percent U.S. interest \_\_\_\_\_

remitted: Filing fee \$ \_\_\_\_\_

Rental fee \$ \_\_\_\_\_

Total \$ \_\_\_\_\_

DO NOT WRITE BELOW THIS LINE

Land included in lease:

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

PARCEL NUMBER 25

T. 24 N., R. 36 E., MDM, Nevada  
sec. 02, lots 1-4, S $\frac{1}{2}$ N $\frac{1}{2}$ , S $\frac{1}{2}$ .  
Churchill County

Total acres in lease 640.36

Rental retained \$ 1282.00

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of the geothermal resources in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance and, when not consistent with lease rights granted or specific provisions of this lease, regulations and formal orders hereafter promulgated.

THE UNITED STATES OF AMERICA

*[Signature]*  
Chief, Mining Law Operations Section  
(Title)

JUN 18 1996

*[Redacted Signature]*  
(Date)

of lease:  
 Competitive  
 Competitive  
 Other

EFFECTIVE DATE OF LEASE

                     JUL 01 1996

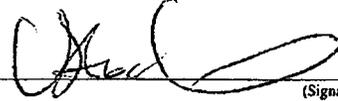
## 4. (a) Undersigned certifies that:

(1) Offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, any State or the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR 3200 and the authorizing Act; (3) Offeror's chargeable interests, direct and indirect, do not include any lands covered by this offer are located.

(b) Undersigned agrees that signature on this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendments or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payment. Title 18 U.S.C. Sec. 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.

Duly executed this 22nd day of March, 19 96



(Signature of Lessee or Attorney-in-fact)

### LEASE TERMS

**Sec. 1. Rentals**—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: \$1 for noncompetitive leases and \$2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

**Sec. 2. Royalties**—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water. Lessor reserves the right to establish reasonable minimum values on production after giving notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than \$2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

**Sec. 3. Bonds**—Lessee shall file and maintain any bond required under regulations.

**Sec. 4. Diligence, rate of development, unitization, and drainage**—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

**Sec. 5. Documents, evidence, and inspection**—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor. Any information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

**Sec. 6. Conduct of operations**—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by

lessor to accomplish the intent of this section. To the extent consistent with leased rights granted such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

**Sec. 7. Production of byproducts**—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

**Sec. 8. Damages to property**—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

**Sec. 9. Protection of diverse interests and equal opportunity**—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

**Sec. 10. Transfer of lease interests and relinquishment of lease**—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

**Sec. 11. Delivery of premises**—At such time as all or portions of this lease are returned to lessor, lessee shall place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

**Sec. 12. Proceedings in case of default**—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

**Sec. 13. Heirs and successors-in-interest**—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

**ORIGINAL**  
UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OBM NO. 1004-0038  
Expires January 31, 1986

**OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES**

Serial No. **N-60688**

(Designated (see reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025).

Read Instructions Before Completing

1. Name **DIXIE VALLEY POWER PARTNERSHIP**

Street **1114 AVENUE OF THE AMERICAS**

City, State, Zip Code **NEW YORK NY 10036-7790**

RECEIVED  
Bur. of Land Management  
NEVADA LAND OFFICE

9:00  
A.M. **MAR 27 1996**

NEVADA STATE OFFICE  
RENO, NEVADA

Surface managing agency if other than BLM: \_\_\_\_\_ Unit/Project \_\_\_\_\_

Legal description of land requested (segregate by public domain and acquired lands):

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

Total acres applied for \_\_\_\_\_

Percent U.S. interest \_\_\_\_\_

Total \$ \_\_\_\_\_

Amount remitted: Filing fee \$ \_\_\_\_\_

Rental fee \$ \_\_\_\_\_

**DO NOT WRITE BELOW THIS LINE**

Land included in lease:

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

PARCEL NUMBER 26

T. 24 N., R. 36 E., MDM, Nevada  
sec. 09, all, excl Min Pat;  
sec. 10, all, excl Min Pat.  
Churchill County

Record Posted	Date	By
MT Plat		
OG Plat		
USE Plat	7/11/96	KB
HI Plat	7/11/96	KB
GDI Filing		

Total acres in lease **1236.75**

Rental retained \$ **2474.00**

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance and, when not inconsistent with lease rights granted or specific provisions of this lease, regulations and formal orders hereafter promulgated.

THE UNITED STATES OF AMERICA

by Judith M. [Signature]  
Chief, Mining Law Operations Section  
(Title)

**JUN 18 1996**

[Redacted Signature]

EFFECTIVE DATE OF LEASE \_\_\_\_\_

**JUL 01 1996**

- lease:
- Noncompetitive
- Competitive
- Other \_\_\_\_\_

cyb

## 4. (a) Undersigned certifies that:

(1) Offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, any State or the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR 3200 and the authorizing Act; (3) Offeror's chargeable interests, direct and indirect, do not exceed that allowed under the Act; and (4) Offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any other or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payment. Title 18 U.S.C. Sec. 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.

Duly executed this 26th day of March, 19 96.

(Signature of Lessee or Attorney-in-fact)

Agent

## LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: \$1 for noncompetitive leases and \$2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due, and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than \$2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

Information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by

lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

RECORDS AND REPORTS  
TITLE RECORD DEPARTMENT  
SUNOCO ENERGY DEVELOPMENT COMPANY  
12700 Park Central Plaza, Suite 1500  
Dallas, Texas 75251

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

ORIGINAL PAPERS

Serial Number N-12393

USGS - KGRA Determination:

**GEOHERMAL RESOURCES LEASE**  
 Competitive  Noncompetitive

In consideration of the terms and conditions contained herein, and the grant made hereby, this lease is entered into by the UNITED STATES OF AMERICA (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau") of the Department of the Interior (hereinafter called the "Department"), and

**Sunoco Energy Development Company, 12700 Park Central Place, Suite 1500, Dallas, TX 75251** (hereinafter called the "Lessee").

This lease is made pursuant to the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 U.S.C. 1001-1025) (hereinafter called "the Act") to be effective on **June 1, 1976** (hereinafter called the "effective date"). It is subject to all the provisions of the Act and to all the terms, conditions, and requirements of (a) all regulations promulgated by the Secretary of the Interior (hereinafter called "the Secretary") in existence upon the effective date, specifically including, but not limited to, 43 CFR Parts 3000 and 3200 and 30 CFR Parts 270 and 271, (b) all geothermal resources operational orders (hereinafter called "GRO orders") issued pursuant thereto, all of which are incorporated herein and by reference made a part hereof, and (c) any regulations hereafter issued by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference) all of which shall be, upon their effective date, incorporated herein and, by reference, made a part hereof.

Sec. 1. GRANT - The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal steam and associated geothermal resources, (hereinafter called "geothermal resources"), in or under the following described lands situated within the County of **Churchill** State of **Nevada**

National Resource Lands			Acquired Lands		
T.	R.	Meridian	T.	R.	Meridian
T. 24 N.,	R. 37 E.,	Mount Diablo Meridian			
sec. 17, All;					
sec. 18, Lots 2, 3, 4, E $\frac{1}{2}$ , SE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ ;					
sec. 19, Lots 1, 2, 3, 4, E $\frac{1}{2}$ , E $\frac{1}{2}$ (All)					
<u>T. 24 N., R. 36 E., Mount Diablo Meridian</u>					
sec. 24, All.					
Total Area <b>2455.33</b>			Total Area		

Containing **2455.33** acres (hereinafter called the "leased area" or "leased lands"), together with:

(a) The nonexclusive right to conduct within the leased area geological and geophysical exploration in accordance with applicable regulations; and

(b) The right to construct or erect and to use, operate, and maintain within the leased area, together with ingress and egress thereupon all wells, pumps, pipes, pipelines, buildings, plants, sumps, brine pits, reservoirs, tanks, waterworks, pumping stations, roads, electric power generating plants, transmission lines, industrial facilities, electric, telegraph or telephone lines, and such other works and structures and to use so much of the surface of the land as may be necessary or reasonably convenient for the production, utilization, and processing of geothermal resources or to the full enjoyment of the rights granted by this lease, subject to compliance with applicable laws and regulations; *Provided that*, although the use of the leased area for an electric power generating plant or transmission facilities or a commercial or industrial facility is authorized hereunder, the location of such facilities and the terms of occupancy therefor shall be under separate instruments issued under any applicable laws and regulations; and

(c) The nonexclusive right to drill potable water wells in accordance with state water laws within the leased area and to use the water produced therefrom for operations on the leased lands free of cost, provided that such drilling and development are conducted in accordance with procedures approved by the Supervisor of the Geological Survey (hereinafter called "Supervisor"); and

(d) The right to convert this lease to a mineral lease under the Mineral Leasing Act of February 25, 1920, as amended, and supplemented (30 U.S.C. 181-287) or under the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), whichever is appropriate, if the leasehold is primarily valuable for the production of one or more valuable by-products which are leasable under those statutes, and the lease is incapable of commercial production or utilization of geothermal steam; *Provided that*, an application is made therefor prior to the expiration of the lease extension by reason of by-product production as hereinafter provided, and subject to all the terms and conditions of said appropriate Acts. The Lessee is also granted the right to locate mineral deposits under the mining laws (30 U.S.C. 21-54), which would constitute by-products if commercial production or utilization of geothermal steam continued, but such a location to be valid must be completed within ninety (90) days after the termination of this lease. Any conversion of this lease to a mineral lease or a mining claim is contingent on the availability of such lands for this purpose at the time of the conversion. If the lands are withdrawn or acquired in aid of a function of any Federal Department or agency, the mineral lease or mining claim shall be subject to such additional terms and conditions as may be prescribed by such Department or agency for the purpose of making operations thereon consistent with the purposes for which these lands are administered; and

(e) The right, without the payment of royalties hereunder, to reinject into the leased lands geothermal resources and condensates to the extent that such resources and condensates are not utilized, but their reinjection is necessary for operations under this lease in the recovering or processing of geothermal resources. If the Lessee, pursuant to any approved plan, disposes of the unusable brine and produced waste products into underlying formations, he may do so without the payment of royalties.

Sec. 2. TERM

(a) This lease shall be for a primary term of ten (10) years from the effective date and so long thereafter as geothermal steam is produced or utilized in commercial quantities but shall in no event continue for more than forty (40) years after the end of the primary term. However, if at the end of that forty-year period geothermal steam is being produced or utilized in commercial quantities, and the leased lands are not needed for other purposes, the Lessee shall have a preferential right to a renewal of this lease for a second forty-year term in accordance with such terms and conditions as the Lessor deems appropriate.

(b) If actual drilling operations are commenced on the leased lands or under an approved plan or agreement on behalf of the leased lands prior to the end of the primary term,

and are being diligently prosecuted at the end of the primary term, this lease shall be extended for five (5) years and so long thereafter, but not more than thirty-five (35) years, as geothermal steam is produced or utilized in commercial quantities. If at the end of such extended term geothermal steam is being produced or utilized in commercial quantities, the Lessee shall have a preferential right to a renewal for a second term as in (a) above.

(c) If the Lessor determines at any time after the primary term that this lease is incapable of commercial production and utilization of geothermal steam, but one or more valuable by-products are or can be produced in commercial quantities, this lease shall be extended for so long as such by-products are produced in commercial quantities but not for more than five (5) years from the date of such determination.

### Sec. 3. RENTALS AND ROYALTIES

(a) **Annual Rental** - For each lease year prior to the commencement of production of geothermal resources in commercial quantities on the leased lands, the Lessee shall pay the Lessor on or before the anniversary date of the lease

a rental of \$ **1.00** for each acre or fraction thereof.

(b) **Escalating Rental** - Beginning with the sixth lease year and for each year thereafter until the lease year beginning on or after the commencement of production of geothermal resources in commercial quantities, the Lessee shall pay on or before the anniversary date of the lease an escalated rental in an amount per acre or fraction thereof equal to the rental per acre for the preceding year and an additional sum of one (1) dollar per acre or fraction thereof. If the lease is extended beyond ten (10) years for reasons other than the commencement of production of geothermal resources in commercial quantities, the rental for the eleventh year and for each lease year thereafter until the lease year beginning on or after the commencement of such production will be the amount of rental for the tenth lease year. If any expenditures are made in any lease year for diligent exploration on the leased lands in excess of the minimum required expenditures for that year, the excess may be credited against any rentals in excess of \$ **1.00** per acre or fraction thereof due the Lessor for that or any future year.

(c) **Royalty** - On or before the last day of the calendar month after the month of commencement of production in commercial quantities of geothermal resources and thereafter on a monthly basis, the Lessee shall pay to the Lessor:

(1) A royalty of **10** percent on the amount or value of steam, or any other form of heat or other associated energy produced, processed, removed, sold, or utilized from this lease or reasonably susceptible to sale or utilization by the Lessee.

(2) A royalty of **5** percent of the value of any by-product derived from production under this lease, produced, processed, removed, sold, or utilized from this lease or reasonably susceptible of sale or utilization by the Lessee, except that as to any by-product which is a mineral named in Sec. 1 of the Mineral Leasing Act of February 25, 1920, as amended, (30 U.S.C. 181), the rate of royalty for such mineral shall be the same as that provided in that statute and the maximum rate of royalty for such mineral shall not exceed the maximum royalty applicable under that statute.

(3) A royalty of **5** percent of the value of commercially demineralized water which has been produced from the leased lands, and has been sold or utilized by the Lessee or is reasonably susceptible of sale or utilization by the Lessee. In no event shall the Lessee pay to the Lessor, for the lease year beginning on or after the commencement of production in commercial quantities on the leased lands or any subsequent lease year, a royalty of less than two (2) dollars per acre or fraction thereof. If royalty paid on production during the lease year has not satisfied this requirement, the Lessee shall pay the difference on or before the expiration date of the lease year for which it is paid.

(d) **Waiver and Suspension of Rental and Royalties** - Rentals or royalties may be waived, suspended, or reduced pursuant to the applicable regulations on the entire leasehold or any portion thereof in the interest of conservation or for the purpose of encouraging the greatest ultimate recovery of geothermal resources if the Lessor determines that it is necessary to do so to promote such development, or because the lease cannot be successfully operated under the terms fixed herein.

(e) **Undivided Fractional Interests** - Where the interest of the Lessor in the geothermal resources underlying any tract or tracts described in Sec. 1 is an undivided fractional interest, the rentals and royalties payable on account of each such tract shall be in the same proportion to the rentals and royalties provided in this lease as the individual fractional interest of the Lessor in the geothermal resources underlying such tract is to the full fee interest.

(f) **Adjustments** - Rentals and royalties hereunder may be readjusted in accordance with the Act and regulations to rates not in excess of the rates provided therein, and at not less than twenty (20) year intervals beginning thirty-five (35) years after the date geothermal steam is produced from the lease as determined by the Supervisor.

**Sec. 4. PAYMENTS** - It is expressly understood that the Secretary may establish the values and minimum values of geothermal resources to compute royalties in accordance with the applicable regulations. Unless otherwise directed by the Secretary, all payments to the Lessor will be made as required by the regulations. If there is no well on the leased lands capable of producing geothermal resources in commercial quantities, the failure to pay rental on or before the anniversary date shall cause the lease to terminate by operation of law except as provided by Sec. 3244.2 of the regulations. If the time for payment falls on a day on which the proper office to receive payment is closed, payment shall be deemed to be made on time if made on the next official working day.

**Sec. 5. BONDS** - The Lessee shall file with the Authorized Officer of the Bureau (hereinafter called the "Authorized Officer") shall maintain at all times the bonds required under the regulations to be furnished as a condition to the issuance of this lease or prior to entry on the leased lands in the amounts established by the Lessor and to furnish such additional bonds or security as may be required by the Lessor upon entry on the lands or after operations or production have begun.

### Sec. 6. WELLS

(a) The Lessee shall drill and produce all wells necessary to protect the leased land from drainage by operations on lands not the property of the Lessor, or other lands of the Lessor leased at a lower royalty rate, or on lands as to which royalties and rentals are paid into different funds from those

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into which royalties under this lease are paid. However, in lieu of any part of such drilling and production, with the consent of the Supervisor, the Lessee may compensate the Lessor in full each month for the estimated loss of royalty through drainage in the amount determined by said Supervisor.

(b) At the Lessee's election, and with the approval of the Supervisor, the Lessee shall drill and produce other wells in conformity with any system of well spacing or production allotments affecting the field or area in which the leased lands are situated, which is authorized by applicable law.

(c) After due notice in writing, the Lessee shall diligently drill and produce such wells as the Supervisor shall require so that the leased lands may be properly and timely developed and for the production of geothermal steam and its by-products, including commercially demineralized water for beneficial uses in accordance with applicable state laws. However, the Supervisor may waive or modify the requirements of this subparagraph (c) in the interest of conservation of natural resources or for economic feasibility or other reasons satisfactory to him. If the products or by-products of geothermal production from wells drilled on this lease are susceptible of producing commercially demineralized water for beneficial uses, and a program therefor is not initiated with due diligence, the Lessor may at its option elect to take such products or by-products and the Lessee shall deliver all or any portion thereof to the Lessor at any point in the Lessee's geothermal gathering or disposal system without cost to the Lessee, if the Lessee's activities, under the lease, would not be impaired and such delivery would otherwise be consistent with field and operational requirements. The retention of this option by the Lessor shall in no way relieve the Lessee from the duty of producing commercially demineralized water where required to do so by the Lessor, except when the option is being exercised and then only with respect to wells where it is being exercised, or limit the Lessor's right to take any action under Sec. 25 to enforce that requirement.

**Sec. 7. INSPECTION** - The Lessee shall keep open at all reasonable times for the inspection of any duly authorized representative of the Lessor the leased lands and all wells, improvements, machinery, and fixtures thereon and all production reports, maps, records, books, and accounts relative to operations under the lease, and well logs, surveys, or investigations of the leased lands.

**Sec. 8. CONDUCT OF OPERATIONS** - The Lessee shall conduct all operations under this lease in a workmanlike manner and in accordance with all applicable statutes, regulations, and GRO orders, and all other appropriate directives of the Lessor to prevent bodily injury, danger to life or health, or property damage, and to avoid the waste of resources, and shall comply with all requirements which are set forth in 43 CFR Group 3200, including, but not limited to, Subpart 3204, or which may be prescribed by the Lessor pursuant to the regulations, and with the special stipulations which are attached to the lease, all of which are specifically incorporated into this lease. A breach of any term of this lease, including the stipulations attached hereto, will be subject to all the provisions of this lease with respect to remedies in case of default. Where any stipulation is inconsistent with a regular provision of this lease, the stipulation shall govern.

### Sec. 9. INDEMNIFICATION

(a) The Lessee shall be liable to the Lessor for any damage suffered by the Lessor in any way arising from or connected with the Lessee's activities and operations conducted pursuant to this lease, except where damage is caused by employees of the Lessor acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the Lessor from all claims arising from or connected with the Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

**Sec. 10. CONTRACTS FOR SALE OR DISPOSAL OF PRODUCTS** - The Lessee shall file with the Supervisor not later than thirty (30) days after the effective date thereof any contract, or evidence of other arrangement for the sale or disposal of geothermal resources.

**Sec. 11. ASSIGNMENT OF LEASE OR INTEREST THEREIN** - Within ninety (90) days from the date of execution thereof, the Lessee shall file for approval by the Authorized Officer any instruments of transfer made of this lease or of any interest therein, including assignments of record title and working or other interests.

**Sec. 12. REPORTS AND OTHER INFORMATION** - At such times and in such form as the Lessor may prescribe, the Lessee shall comply with all reporting requirements of the geothermal resources leasing, operating, and unit regulations and shall submit quarterly reports containing the data which it has collected through the monitoring of air, land, and water quality and all other data pertaining to the effect on the environment by operations under the lease. The Lessee shall also comply with such other reporting requirements as may be imposed by the Authorized Officer or the Supervisor. The Lessor may release to the general public any reports, maps, or other information submitted by the Lessee except geologic and geophysical interpretations, maps, or data subject to 30 CFR 270.79 or unless the Lessee shall designate that information as proprietary and the Supervisor or the Authorized Officer shall approve that designation.

**Sec. 13. DILIGENT EXPLORATION** - In the manner required by the regulations, the Lessee shall diligently explore the leased lands for geothermal resources until there is production in commercial quantities applicable to this lease. After the fifth year of the primary term the Lessee shall make at least

the minimum expenditures required to qualify the operations on the leased lands as diligent exploration under the regulations.

**Sec. 14. PROTECTION OF THE ENVIRONMENT (LAND, AIR AND WATER) AND IMPROVEMENTS** - The Lessee shall take all mitigating actions required by the Lessor to prevent: (a) soil erosion or damage to crops or other vegetative cover on Federal or non-Federal lands in the vicinity; (b) the pollution of land, air, or water; (c) land subsidence, seismic activity, or noise emissions; (d) damage to aesthetic and recreational values; (e) damage to fish or wildlife or their habitats; (f) damage to or removal of improvements owned by the United States or other parties; or (g) damage to or destruction or loss of fossils, historic or prehistoric ruins, or artifacts. Prior to the termination of bond liability or at any other time when required and to the extent deemed necessary by the Lessor, the Lessee shall reclaim all surface disturbances as required, remove or cover all debris or solid waste, and, so far as possible, repair the offsite and onsite damage caused by his activity or activities incidental thereto, and return access roads or trails and the leased lands to an acceptable condition including the removal of structures, if required. The Supervisor or the Authorized Officer shall prescribe the steps to be taken by Lessee to protect the surface and the environment and for the restoration of the leased lands and other lands affected by operations on the leased lands and improvements thereon, whether or not the improvements are owned by the United States. Timber or mineral materials may be obtained only on terms and conditions imposed by the Authorized Officer.

**Sec. 15. WASTE** - The Lessee shall use all reasonable precautions to prevent waste of natural resources and energy, including geothermal resources, or of any minerals, and to prevent the communication of water or brine zones with any oil, gas, fresh water, or other gas or water bearing formations or zones which would threaten destruction or damage to such deposits. The Lessee shall monitor noise, air, and water quality conditions in accordance with any orders of the Supervisor.

**Sec. 16. MEASUREMENTS** - The Lessee shall gauge or otherwise measure all production, sales, or utilization of geothermal resources and shall record the same accurately in records as required by the Supervisor. Reports on production, sales, or utilization of geothermal resources shall be submitted in accordance with the terms of this lease and the regulations.

**Sec. 17. RESERVATIONS TO LESSOR** - All rights in the leased area not granted to the Lessee by this lease are hereby reserved to the Lessor. Without limiting the generality of the foregoing such reserved rights include:

(a) *Disposal* - The right to sell or otherwise dispose of the surface of the leased lands or any resource in the leased lands under existing laws, or laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) *Rights-of-way* - The right to authorize geological and geophysical explorations on the leased lands which do not interfere with or endanger actual operations under this lease, and the right to grant such easements or rights-of-way for joint or several use upon, through or in the leased area for steam lines and other public or private purposes which do not interfere with or endanger actual operations or facilities constructed under this lease;

(c) *Mineral Rights* - The ownership of and the right to extract oil, hydrocarbon gas, and helium from all geothermal steam and associated geothermal resources produced from the leased lands;

(d) *Casing* - The right to acquire the well and casing at the fair market value of the casing where the Lessee finds only potable water, and such water is not required in lease operations; and

(e) *Measurements* - The right to measure geothermal resources and to sample any production thereof.

**Sec. 18. ANTIQUITIES AND OBJECTS OF HISTORIC VALUE** - The Lessee shall immediately bring to the attention of the Authorized Officer any antiquities or other objects of historic or scientific interest, including but not limited to historic or prehistoric ruins, fossils, or artifacts discovered as a result of operations under this lease, and shall leave such discoveries intact. Failure to comply with any of the terms and conditions imposed by the Authorized Officer with regard to the preservation of antiquities may constitute a violation of the Antiquities Act (16 U.S.C. 431-433). Prior to operations, the Lessee shall furnish to the Authorized Officer a certified statement that either no archaeological values exist or that they may exist on the leased lands to the best of the of the Lessee's knowledge and belief and that they might be impaired by geothermal operations. If the Lessee furnishes a statement that archaeological values may exist where the land is to be disturbed or occupied, the Lessee will engage a qualified archaeologist, acceptable to the Authorized Officer, to survey and salvage, in advance of any operations, such archaeological values on the lands involved. The responsibility for the cost for the certificate, survey, and salvage will be borne by the Lessee, and such salvaged property shall remain the property of the Lessor or the surface owner.

**Sec. 19. DIRECTIONAL DRILLING** - A directional well drilled under the leased area from a surface location on nearby land not covered by the lease shall be deemed to have the same effect for all purposes of this lease as a well drilled from a surface location on the leased area. In such circumstances, drilling shall be considered to have been commenced on the nearby land for the purposes of this lease, and production of geothermal resources from the leased area through any directional well located on nearby land, or drilling or reworking of any such directional well shall be considered production or drilling or reworking operations (as the case may be) on the leased area for all purposes of this lease. Nothing contained in this section shall be construed as

granting to the Lessee any right in any land outside the leased area.

**Sec. 20. OVERRIDING ROYALTIES** - The Lessee shall not create overriding royalties of less than one-quarter (1/4) of one percent of the value of output nor in excess of 50 percent of the rate of royalty due to the Lessor specified in Sec. 3 of this lease except as otherwise authorized by the regulations. The Lessee expressly agrees that the creation of any overriding royalty which does not provide for a prorated reduction of all overriding royalties so that the aggregate rate of royalties does not exceed the maximum rate permissible under this section, or the failure to suspend an overriding royalty during any period when the royalties due to the Lessor have been suspended pursuant to the terms of this lease, shall constitute a violation of the lease terms.

**Sec. 21. READJUSTMENT OF TERMS AND CONDITIONS** - The terms and conditions of this lease other than those related to rentals and royalties may be readjusted in accordance with the Act at not less than ten-year intervals beginning ten (10) years after the date geothermal steam is produced from the leased premises as determined by the Supervisor.

**Sec. 22. COOPERATIVE OR UNIT PLAN** - The Lessee agrees that it will on its own, or at the request of the Lessor where it is determined to be necessary for the conservation of the resource or to prevent the waste of the resource, subscribe to and operate under any reasonable cooperative or unit plan for the development and operation of the area, field, or pool, or part thereof embracing the lands subject to this lease as the Secretary may determine to be practicable and necessary or advisable in the interest of conservation. In the event the leased lands are included within a unit, the terms of this lease shall be deemed to be modified to conform to such unit agreement. Where any provision of a cooperative or unit plan of development which has been approved by the Secretary, and which by its terms affects the leased area or any part thereof, is inconsistent with a provision of this lease, the provisions of such cooperative or unit plan shall govern.

**Sec. 23. RELINQUISHMENT OF LEASE** - The Lessee may relinquish this entire lease or any officially designated subdivision of the leased area in accordance with the regulations by filing in the proper BLM office a written relinquishment, in triplicate, which shall be effective as of the date of filing. No relinquishment of this lease or any portion of the leased area shall relieve the Lessee or its surety from any liability for breach of any obligation of this lease, including the obligation to make payment of all accrued rentals and royalties and to place all wells in the leased lands to be relinquished in condition for suspension or abandonment, and to protect or restore substantially the surface or subsurface resources in a manner satisfactory to the Lessor.

**Sec. 24. REMOVAL OF PROPERTY ON TERMINATION OR EXPIRATION OF LEASE**

(a) Upon the termination or expiration of this lease in whole or in part, or the relinquishment of the lease in whole or in part, as herein provided, the Lessee shall within a period of ninety (90) days (or such longer period as the Supervisor may authorize because of adverse climatic conditions) thereafter remove from the leased lands, no longer subject to the lease all structures, machinery, equipment, tools, and materials in accordance with applicable regulations and orders of the Supervisor. However, the Lessee shall, for a period of not more than six (6) months, continue to maintain any such property needed in the relinquished area, as determined by the Supervisor, for producing wells or for drilling or producing geothermal resources on other leases.

(b) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee, as provided above, which are allowed to remain on the leased lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Supervisor. If the Supervisor directs the Lessee to remove such property, the Lessee shall do so at its own expense, or if it fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

**Sec. 25. REMEDIES IN CASE OF DEFAULT**

(a) Whenever the Lessee fails to comply with any of the provisions of the Act, or the terms and stipulations of this lease, or of the regulations issued under the Act, or of any order issued pursuant to those regulations, and that default shall continue for a period of thirty (30) days after service of notice by the Lessor, the Lessor may (1) suspend operations until the requested action is taken to correct the noncompliance, or (2) cancel the lease in accordance with Sec. 12 of the Act (30 U.S.C. 1011). However, the 30-day notice provision applicable to this lease under Sec. 12 of the Act shall also apply as a prerequisite to the institution of any legal proceedings by the Lessor to cancel this lease while it is in a producing status. Nothing in this subsection shall be construed to apply to, or require any notice with respect to any legal action instituted by the Lessor other than an action to cancel the lease pursuant to Sec. 12 of the Act.

(b) Whenever the Lessee fails to comply with any of the provisions of the Act, or of this lease, or the regulations, or of any GRO Orders, or other orders, and immediate action is required, the Lessor without waiting for action by the Lessee may enter on the leased lands and take such measures as it may deem necessary to correct the failure, including a suspension of operations or production, all at the expense of the Lessee.

(c) A waiver of any particular violation of the provisions of the Act, or of this lease, or of any regulations promulgated by the Secretary under the Act, shall not prevent the cancellation of this lease or the exercise of any other remedy or remedies under paragraphs (a) and (b) of this section by reason of any other such violation, or for the same violation occurring at any other time.

(d) Nothing herein shall limit or affect the Lessee's right to a hearing and appeal as provided in Sec. 12 of the

(e) Upon cancellation, the Lessee shall remove all property in accordance with Sec. 24 hereof, and shall restore the leased lands in a manner acceptable to the Lessor or as may be otherwise required by the Lessor.

Sec. 26. HEIRS AND SUCCESSORS IN INTEREST - Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns, of the respective parties hereto.

Sec. 27. UNLAWFUL INTEREST - No Member of, or Delegate to Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Sec. 3741 of the Revised Statutes (41 U.S.C. Sec. 22), as amended, and Sections 431, 432, and 433 of Title 18 of the United States Code, relating to contracts made or entered into, or accepted by or on behalf of the United States, form a part of this lease so far as the same may be applicable.

Sec. 28. MONOPOLY AND FAIR PRICES - The Lessor reserves full power and authority to protect the public interest by promulgating and enforcing all orders necessary to insure the sale of the production from the leased lands at reasonable prices, to prevent monopoly, and to safeguard the public interest.

Sec. 29. EQUAL OPPORTUNITY CLAUSE - The Lessee agrees that, during the performance of this contract:

(1) The Lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee will, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee will send to each labor union or representative of workers with which Lessee has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Lessee will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Secretary

of the Department or the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the Lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee will include the provisions of Paragraphs (1) through (7) of this Section (29) in every contract, subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor, or subcontract, or purchase order as the Secretary may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor, or vendor as a result of such direction by the Secretary, the Lessee may request the Lessor to enter into such litigation to protect the interests of the Lessor.

Sec. 30. CERTIFICATION OF NONSEGREGATED FACILITIES - By entering into this lease, the Lessee certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, or restaurants or other eating areas, time clocks, or locker rooms, and other storage or dressing rooms, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. Lessee further agrees that (except where it has obtained identical certifications from proposed contractors and subcontractors for specific time periods) it will obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that it will retain such certifications in its files; and that it will forward the following certification to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods): It will notify prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Nonsegregated Facilities, as required by the May 9, 1967 Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 31. SPECIAL STIPULATIONS - (stipulations, if any, are attached hereto and made a part hereof)

165219

OFFICIAL RECORDS  
MURCHILL COUNTY, NEVADA  
RECORDED BY

SUNOCO ENERGY DEVELOPMENT CO.

79 JUN 6 AM 9:43

INDEXED

STEVE E. HILL  
COUNTY RECORDER

FEE 6.00 DEP

VERIFIED

The certified statement required by Section 18 of the lease form must be completed by a qualified archaeologist, acceptable to the Authorized Officer.

In witness whereof the parties have executed this lease.

THE UNITED STATES OF AMERICA, Lessor:

SUNOCO ENERGY DEVELOPMENT CO.

W. L. Parcinman, Jr.  
(Signature of Lessee)

By A. John Hillsamer  
(Authorized Officer)

W. L. Parcinman, Jr.  
Agent and Attorney-in-Fact

(Signature of Lessee)

(Title)

February 18, 1976

A. John Hillsamer, Chief  
Lands & Minerals Operations 5/14/76

SEAL

(Date)

(Date)

TITLE RECORD DEPARTMENT  
SUNOCO ENERGY DEVELOPMENT CO.  
12700 Park Central Place - Suite 1500

END OF DOCUMENT

GPO 858-471

Form 3200 and A  
(May 1962)  
TITLE RECORD DEPT.  
SUNOCO ENERGY DEVELOPMENT  
12700 Park Central Place, Suite 1500  
Dallas, Texas 75251

N-61707

RECEIVED

PAGE 800886

UNITED STATES Bureau of Land Management  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
A. H. MAY 21 1976  
GEOHERMAL RESOURCES LEASE  
 Competitive  Noncompetitive

Serial Number N-12863  
USGS - KGRA Determination:  
April 1, 1974  
NEVADA STATE OFFICE  
RENO, NEVADA

In consideration of the terms and conditions contained herein, and the grant made hereby, this lease is entered into by the UNITED STATES OF AMERICA (hereinafter called the "Lessor"), acting through the Bureau of Land Management (hereinafter called the "Bureau") of the Department of the Interior (hereinafter called the "Department"), and

Sunoco Energy Development Co., 12700 Park Central Place, Suite 1500, Dallas, TX 75251 (hereinafter called the "Lessee").

This lease is made pursuant to the Geothermal Steam Act of 1970 (84 Stat. 1566; 30 U.S.C. 1001-1025) (hereinafter called "the Act") to be effective on July 1, 1976 (hereinafter called the "effective date"). It is subject to all the provisions of the Act and to all the terms, conditions, and requirements of (a) all regulations promulgated by the Secretary of the Interior (hereinafter called "the Secretary") in existence upon the effective date, specifically including, but not limited to, 43 CFR Parts 3000 and 3200 and 30 CFR Parts 270 and 271, (b) all geothermal resources operational orders (hereinafter called "GRO orders") issued pursuant thereto, all of which are incorporated herein and by reference made a part hereof, and (c) any regulations hereafter issued by the Secretary (except those inconsistent with any specific provisions of this lease other than regulations incorporated herein by reference) all of which shall be, upon their effective date, incorporated herein and, by reference, made a part hereof.

Sec. 1. GRANT - The Lessor hereby grants and leases to the Lessee the exclusive right and privilege to drill for, extract, produce, remove, utilize, sell, and dispose of geothermal steam and associated geothermal resources, (hereinafter called "geothermal resources"), in or under the following described lands situated within the County of Churchill State of Nevada

National Resource Lands	Acquired Lands
T. 24 N., ; R. 36 E., ; Mount Diablo Meridian sec. 12, NE $\frac{1}{4}$ , NW $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ ; sec. 13, All.	T. ; R. ; Meridian
T. 24 N., R. 37 E., Mount Diablo Meridian sec. 7, Lots 1, 2, 3, NE $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , E $\frac{1}{2}$ SE $\frac{1}{4}$ ; sec. 8, All.	
Total Area 2308.59	Total Area

Containing 2308.59 acres (hereinafter called the "leased area" or "leased lands"), together with:  
(a) The nonexclusive right to conduct within the leased area geological and geophysical exploration in accordance with applicable regulations; and

(b) The right to construct or erect and to use, operate, and maintain within the leased area, together with ingress and egress thereon all wells, pumps, pipes, pipelines, buildings, plants, tanks, brine pits, reservoirs, waterworks, pumping stations, roads, electric power generating plants, transmission lines, industrial facilities, electric, telegraph or telephone lines, and such other works and structures and to use so much of the surface of the land as may be necessary or reasonably convenient for the production, utilization, and processing of geothermal resources or to the full enjoyment of the rights granted by this lease, subject to compliance with applicable laws and regulations; *Provided that*, although the use of the leased area for an electric power generating plant or transmission facilities or a commercial or industrial facility is authorized hereunder, the location of such facilities and the terms of occupancy therefor shall be under separate instruments issued under any applicable laws and regulations; and

(c) The nonexclusive right to drill potable water wells in accordance with state water laws within the leased area and to use the water produced therefrom for operations on the leased lands free of cost, provided that such drilling and development are conducted in accordance with procedures approved by the Supervisor of the Geological Survey (hereinafter called "Supervisor"); and

(d) The right to convert this lease to a mineral lease under the Mineral Leasing Act of February 25, 1920, as amended, and supplemented (30 U.S.C. 181-287) or under the Mineral Leasing Act for Acquired Lands (30 U.S.C. 351-359), whichever is appropriate, if the leasehold is primarily valuable for the production of one or more valuable by-products which are leasable under those statutes, and the lease is incapable of commercial production or utilization of geothermal steam; *Provided that*, an application is made therefor prior to the expiration of the lease extension by reason of by-product production as hereinafter provided, and subject to all the terms and conditions of said appropriate Acts. The Lessee is also granted the right to locate mineral deposits under the mining laws (30 U.S.C. 21-54), which would constitute by-products if commercial production or utilization of geothermal steam continued, but such a location to be valid must be completed within ninety (90) days after the termination of this lease. Any conversion of this lease to a mineral lease or a mining claim is contingent on the availability of such lands for this purpose at the time of the conversion. If the lands are withdrawn or acquired in aid of a function of any Federal Department or agency, the mineral lease or mining claim shall be subject to such additional terms and conditions as may be prescribed by such Department or agency for the purpose of making operations thereon consistent with the purposes for which these lands are administered; and

(e) The right, without the payment of royalties hereunder, to reinject into the leased lands geothermal resources and condensates to the extent that such resources and condensates are not utilized, but their reinjection is necessary for operations under this lease in the recovering or processing of geothermal resources. If the Lessee, pursuant to any approved plan, disposes of the unusable brine and produced waste products into underlying formations, he may do so without the payment of royalties.

Sec. 2. TERM

(a) This lease shall be for a primary term of ten (10) years from the effective date and so long thereafter as geothermal steam is produced or utilized in commercial quantities but shall in no event continue for more than forty (40) years after the end of the primary term. However, if at the end of that forty-year period geothermal steam is being produced or utilized in commercial quantities, and the leased lands are not needed for other purposes, the Lessee shall have a preferential right to a renewal of this lease for a second forty-year term in accordance with such terms and conditions as the Lessor deems appropriate.

(b) If actual drilling operations are commenced on the leased lands or under an approved plan or agreement on behalf of the leased lands prior to the end of the primary term,

and are being diligently prosecuted at the end of the primary term, this lease shall be extended for five (5) years and so long thereafter, but not more than thirty-five (35) years, as geothermal steam is produced or utilized in commercial quantities. If at the end of such extended term geothermal steam is being produced or utilized in commercial quantities, the Lessee shall have a preferential right to a renewal for a second term as in (a) above.

(c) If the Lessor determines at any time after the primary term that this lease is incapable of commercial production and utilization of geothermal steam, but one or more valuable by-products are or can be produced in commercial quantities, this lease shall be extended for so long as such by-products are produced in commercial quantities but not for more than five (5) years from the date of such determination.

**Sec. 3. RENTALS AND ROYALTIES**

(a) *Annual Rental* - For each lease year prior to the commencement of production of geothermal resources in commercial quantities on the leased lands, the Lessee shall pay the Lessor on or before the anniversary date of the lease

a rental of \$ **2.00** for each acre or fraction thereof.

(b) *Escalating Rental* - Beginning with the sixth lease year and for each year thereafter until the lease year beginning on or after the commencement of production of geothermal resources in commercial quantities, the Lessee shall pay on or before the anniversary date of the lease an escalated rental in an amount per acre or fraction thereof equal to the rental per acre for the preceding year and an additional sum of one (1) dollar per acre or fraction thereof. If the lease is extended beyond ten (10) years for reasons other than the commencement of production of geothermal resources in commercial quantities, the rental for the eleventh year and for each lease year thereafter until the lease year beginning on or after the commencement of such production will be the amount of rental for the tenth lease year. If any expenditures are made in any lease year for diligent exploration on the leased lands in excess of the minimum required expenditures for that year, the excess may be credited against any rentals in excess of \$ **2.00** per acre or fraction thereof due the Lessor for that or any future year.

(c) *Royalty* - On or before the last day of the calendar month after the month of commencement of production in commercial quantities of geothermal resources and thereafter on a monthly basis, the Lessee shall pay to the Lessor:

(1) A royalty of **10** percent on the amount or value of steam, or any other form of heat or other associated energy produced, processed, removed, sold, or utilized from this lease or reasonably susceptible to sale or utilization by the Lessee.

(2) A royalty of **5** percent of the value of any by-product derived from production under this lease, produced, processed, removed, sold, or utilized from this lease or reasonably susceptible of sale or utilization by the Lessee, except that as to any by-product which is a mineral named in Sec. 1 of the Mineral Leasing Act of February 25, 1920, as amended, (30 U.S.C. 181), the rate of royalty for such mineral shall be the same as that provided in that statute and the maximum rate of royalty for such mineral shall not exceed the maximum royalty applicable under that statute.

(3) A royalty of **5** percent of the value of commercially demineralized water which has been produced from the leased lands, and has been sold or utilized by the Lessee or is reasonably susceptible of sale or utilization by the Lessee. In no event shall the Lessee pay to the Lessor, for the lease year beginning on or after the commencement of production in commercial quantities on the leased lands or any subsequent lease year, a royalty of less than two (2) dollars per acre or fraction thereof. If royalty paid on production during the lease year has not satisfied this requirement, the Lessee shall pay the difference on or before the expiration date of the lease year for which it is paid.

(d) *Waiver and Suspension of Rental and Royalties* - Rentals or royalties may be waived, suspended, or reduced pursuant to the applicable regulations on the entire leasehold or any portion thereof in the interest of conservation or for the purpose of encouraging the greatest ultimate recovery of geothermal resources if the Lessor determines that it is necessary to do so to promote such development, or because the lease cannot be successfully operated under the terms fixed herein.

(e) *Undivided Fractional Interests* - Where the interest of the Lessor in the geothermal resources underlying any tract or tracts described in Sec. 1 is an undivided fractional interest, the rentals and royalties payable on account of each such tract shall be in the same proportion to the rentals and royalties provided in this lease as the individual fractional interest of the Lessor in the geothermal resources underlying such tract is to the full fee interest.

(f) *Readjustments* - Rentals and royalties hereunder may be readjusted in accordance with the Act and regulations to rates not in excess of the rates provided therein, and at not less than twenty (20) year intervals beginning thirty-five (35) years after the date geothermal steam is produced from the lease as determined by the Supervisor.

**Sec. 4. PAYMENTS** - It is expressly understood that the Secretary may establish the values and minimum values of geothermal resources to compute royalties in accordance with the applicable regulations. Unless otherwise directed by the Secretary, all payments to the Lessor will be made as required by the regulations. If there is no well on the leased lands capable of producing geothermal resources in commercial quantities, the failure to pay rental on or before the anniversary date shall cause the lease to terminate by operation of law except as provided by Sec. 3244.2 of the regulations. If the time for payment falls on a day on which the proper office to receive payment is closed, payment shall be deemed to be made on time if made on the next official working day.

**Sec. 5. BONDS** - The Lessee shall file with the Authorized Officer of the Bureau (hereinafter called the "Authorized Officer") shall maintain at all times the bonds required under the regulations to be furnished as a condition to the issuance of this lease or prior to entry on the leased lands in the amounts established by the Lessor and to furnish such additional bonds or security as may be required by the Lessor upon entry on the lands or after operations or production have begun.

**Sec. 6. WELLS**

(a) The Lessee shall drill and produce all wells necessary to protect the leased land from drainage by operations on lands not the property of the Lessor, or other lands of the Lessor leased at a lower royalty rate, or on lands as to which royalties and rentals are paid into different funds from those

into which royalties under this lease are paid. However, in lieu of any part of such drilling and production, with the consent of the Supervisor, the Lessee may compensate the Lessor in full each month for the estimated loss of royalty through drainage in the amount determined by said Supervisor.

(b) At the Lessee's election, and with the approval of the Supervisor, the Lessee shall drill and produce other wells in conformity with any system of well spacing or production allotments affecting the field or area in which the leased lands are situated, which is authorized by applicable law.

(c) After due notice in writing, the Lessee shall diligently drill and produce such wells as the Supervisor shall require so that the leased lands may be properly and timely developed and for the production of geothermal steam and its by-products, including commercially demineralized water for beneficial uses in accordance with applicable state laws. However, the Supervisor may waive or modify the requirements of this subparagraph (c) in the interest of conservation of natural resources or for economic feasibility or other reasons satisfactory to him. If the products or by-products of geothermal production from wells drilled on this lease are susceptible of producing commercially demineralized water for beneficial uses, and a program therefor is not initiated with due diligence, the Lessor may at its option elect to take such products or by-products and the Lessee shall deliver all or any portion thereof to the Lessor at any point in the Lessee's geothermal gathering or disposal system without cost to the Lessee, if the Lessee's activities, under the lease, would not be impaired and such delivery would otherwise be consistent with field and operational requirements. The retention of this option by the Lessor shall in no way relieve the Lessee from the duty of producing commercially demineralized water where required to do so by the Lessor, except when the option is being exercised and then only with respect to wells where it is being exercised, or limit the Lessor's right to take any action under Sec. 25 to enforce that requirement.

**Sec. 7. INSPECTION** - The Lessee shall keep open at all reasonable times for the inspection of any duly authorized representative of the Lessor the leased lands and all wells, improvements, machinery, and fixtures thereon and all production reports, maps, records, books, and accounts relative to operations under the lease, and well logs, surveys, or investigations of the leased lands.

**Sec. 8. CONDUCT OF OPERATIONS** - The Lessee shall conduct all operations under this lease in a workmanlike manner and in accordance with all applicable statutes, regulations, and GRO orders, and all other appropriate directives of the Lessor to prevent bodily injury, danger to life or health, or property damage, and to avoid the waste of resources, and shall comply with all requirements which are set forth in 43 CFR Group 3200, including, but not limited to, Subpart 3204, or which may be prescribed by the Lessor pursuant to the regulations, and with the special stipulations which are attached to the lease, all of which are specifically incorporated into this lease. A breach of any term of this lease, including the stipulations attached hereto, will be subject to all the provisions of this lease with respect to remedies in case of default. Where any stipulation is inconsistent with a regular provision of this lease, the stipulation shall govern.

**Sec. 9. INDEMNIFICATION**

(a) The Lessee shall be liable to the Lessor for any damage suffered by the Lessor in any way arising from or connected with the Lessee's activities and operations conducted pursuant to this lease, except where damage is caused by employees of the Lessor acting within the scope of their authority.

(b) The Lessee shall indemnify and hold harmless the Lessor from all claims arising from or connected with the Lessee's activities and operations under this lease.

(c) In any case where liability without fault is imposed on the Lessee pursuant to this section, and the damages involved were caused by the action of a third party, the rules of subrogation shall apply in accordance with the law of the jurisdiction where the damage occurred.

**Sec. 10. CONTRACTS FOR SALE OR DISPOSAL OF PRODUCTS** - The Lessee shall file with the Supervisor not later than thirty (30) days after the effective date thereof any contract, or evidence of other arrangement for the sale or disposal of geothermal resources.

**Sec. 11. ASSIGNMENT OF LEASE OR INTEREST THEREIN** - Within ninety (90) days from the date of execution thereof, the Lessee shall file for approval by the Authorized Officer any instruments of transfer made of this lease or of any interest therein, including assignments of record title and working or other interests.

**Sec. 12. REPORTS AND OTHER INFORMATION** - At such times and in such form as the Lessor may prescribe, the Lessee shall comply with all reporting requirements of the geothermal resources leasing, operating, and unit regulations and shall submit quarterly reports containing the data which it has collected through the monitoring of air, land, and water quality and all other data pertaining to the effect on the environment by operations under the lease. The Lessee shall also comply with such other reporting requirements as may be imposed by the Authorized Officer or the Supervisor. The Lessor may release to the general public any reports, maps, or other information submitted by the Lessee except geologic and geophysical interpretations, maps, or data subject to 30 CFR 270.79 or unless the Lessee shall designate that information as proprietary and the Supervisor or the Authorized Officer shall approve that designation.

**Sec. 13. DILIGENT EXPLORATION** - In the manner required by the regulations, the Lessee shall diligently explore the leased lands for geothermal resources until there is production in commercial quantities applicable to this lease. After the fifth year of the primary term the Lessee shall make at least

the minimum expenditures required to qualify the operations on the leased lands as diligent exploration under the regulations.

**Sec. 14. PROTECTION OF THE ENVIRONMENT (LAND, AIR AND WATER) AND IMPROVEMENTS** - The Lessee shall take all mitigating actions required by the Lessor to prevent: (a) soil erosion or damage to crops or other vegetative cover on Federal or non-Federal lands in the vicinity; (b) the pollution of land, air, or water; (c) land subsidence, seismic activity, or noise emissions; (d) damage to aesthetic and recreational values; (e) damage to fish or wildlife or their habitats; (f) damage to or removal of improvements owned by the United States or other parties; or (g) damage to or destruction or loss of fossils, historic or prehistoric ruins, or artifacts. Prior to the termination of bond liability or at any other time when required and to the extent deemed necessary by the Lessor, the Lessee shall reclaim all surface disturbances as required, remove or cover all debris or solid waste, and, so far as possible, repair the offsite and onsite damage caused by his activity or activities incidental thereto, and return access roads or trails and the leased lands to an acceptable condition including the removal of structures, if required. The Supervisor or the Authorized Officer shall prescribe the steps to be taken by Lessee to protect the surface and the environment and for the restoration of the leased lands and other lands affected by operations on the leased lands and improvements thereon, whether or not the improvements are owned by the United States. Timber or mineral materials may be obtained only on terms and conditions imposed by the Authorized Officer.

**Sec. 15. WASTE** - The Lessee shall use all reasonable precautions to prevent waste of natural resources and energy, including geothermal resources, or of any minerals, and to prevent the communication of water or brine zones with any oil, gas, fresh water, or other gas or water bearing formations or zones which would threaten destruction or damage to such deposits. The Lessee shall monitor noise, air, and water quality conditions in accordance with any orders of the Supervisor.

**Sec. 16. MEASUREMENTS** - The Lessee shall gauge or otherwise measure all production, sales, or utilization of geothermal resources and shall record the same accurately in records as required by the Supervisor. Reports on production, sales, or utilization of geothermal resources shall be submitted in accordance with the terms of this lease and the regulations.

**Sec. 17. RESERVATIONS TO LESSOR** - All rights in the leased area not granted to the Lessee by this lease are hereby reserved to the Lessor. Without limiting the generality of the foregoing such reserved rights include:

(a) *Disposal* - The right to sell or otherwise dispose of the surface of the leased lands or any resource in the leased lands under existing laws, or laws hereafter enacted, subject to the rights of the Lessee under this lease;

(b) *Rights-of-way* - The right to authorize geological and geophysical explorations on the leased lands which do not interfere with or endanger actual operations under this lease, and the right to grant such easements or rights-of-way for joint or several use upon, through or in the leased area for steam lines and other public or private purposes which do not interfere with or endanger actual operations or facilities constructed under this lease;

(c) *Mineral Rights* - The ownership of and the right to extract oil, hydrocarbon gas, and helium from all geothermal steam and associated geothermal resources produced from the leased lands;

(d) *Casing* - The right to acquire the well and casing at the fair market value of the casing where the Lessee finds only potable water, and such water is not required in lease operations; and

(e) *Measurements* - The right to measure geothermal resources and to sample any production thereof.

**Sec. 18. ANTIQUITIES AND OBJECTS OF HISTORIC VALUE** - The Lessee shall immediately bring to the attention of the Authorized Officer any antiquities or other objects of historic or scientific interest, including but not limited to historic or prehistoric ruins, fossils, or artifacts discovered as a result of operations under this lease, and shall leave such discoveries intact. Failure to comply with any of the terms and conditions imposed by the Authorized Officer with regard to the preservation of antiquities may constitute a violation of the Antiquities Act (16 U.S.C. 431-433). Prior to operations, the Lessee shall furnish to the Authorized Officer a certified statement that either no archaeological values exist or that they may exist on the leased lands to the best of the of the Lessee's knowledge and belief and that they might be impaired by geothermal operations. If the Lessee furnishes a statement that archaeological values may exist where the land is to be disturbed or occupied, the Lessee will engage a qualified archaeologist, acceptable to the Authorized Officer, to survey and salvage, in advance of any operations, such archaeological values on the lands involved. The responsibility for the cost for the certificate, survey, and salvage will be borne by the Lessee, and such salvaged property shall remain the property of the Lessor or the surface owner.

**Sec. 19. DIRECTIONAL DRILLING** - A directional well drilled under the leased area from a surface location on nearby land not covered by the lease shall be deemed to have the same effect for all purposes of this lease as a well drilled from a surface location on the leased area. In such circumstances, drilling shall be considered to have been commenced on the nearby land for the purposes of this lease, and production of geothermal resources from the leased area through any directional well located on nearby land, or drilling or reworking of any such directional well shall be considered production or drilling or reworking operations (as the case may be) on the leased area for all purposes of this lease. Nothing contained in this section shall be construed as

granting to the Lessee any right in any land outside the leased area.

**Sec. 20. OVERRIDING ROYALTIES** - The Lessee shall not create overriding royalties of less than one-quarter (1/4) of one percent of the value of output nor in excess of 50 percent of the rate of royalty due to the Lessor specified in Sec. 3 of this lease except as otherwise authorized by the regulations. The Lessee expressly agrees that the creation of any overriding royalty which does not provide for a prorated reduction of all overriding royalties so that the aggregate rate of royalties does not exceed the maximum rate permissible under this section, or the failure to suspend an overriding royalty during any period when the royalties due to the Lessor have been suspended pursuant to the terms of this lease, shall constitute a violation of the lease terms.

**Sec. 21. READJUSTMENT OF TERMS AND CONDITIONS** - The terms and conditions of this lease other than those related to rentals and royalties may be readjusted in accordance with the Act at not less than ten-year intervals beginning ten (10) years after the date geothermal steam is produced from the leased premises as determined by the Supervisor.

**Sec. 22. COOPERATIVE OR UNIT PLAN** - The Lessee agrees that it will on its own, or at the request of the Lessor where it is determined to be necessary for the conservation of the resource or to prevent the waste of the resource, subscribe to and operate under any reasonable cooperative or unit plan for the development and operation of the area, field, or pool, or part thereof embracing the lands subject to this lease as the Secretary may determine to be practicable and necessary or advisable in the interest of conservation. In the event the leased lands are included within a unit, the terms of this lease shall be deemed to be modified to conform to such unit agreement. Where any provision of a cooperative or unit plan of development which has been approved by the Secretary, and which by its terms affects the leased area or any part thereof, is inconsistent with a provision of this lease, the provisions of such cooperative or unit plan shall govern.

**Sec. 23. RELINQUISHMENT OF LEASE** - The Lessee may relinquish this entire lease or any officially designated subdivision of the leased area in accordance with the regulations by filing in the proper BLM office a written relinquishment, in triplicate, which shall be effective as of the date of filing. No relinquishment of this lease or any portion of the leased area shall relieve the Lessee or its surety from any liability for breach of any obligation of this lease, including the obligation to make payment of all accrued rentals and royalties and to place all wells in the leased lands to be relinquished in condition for suspension or abandonment, and to protect or restore substantially the surface or subsurface resources in a manner satisfactory to the Lessor.

**Sec. 24. REMOVAL OF PROPERTY ON TERMINATION OR EXPIRATION OF LEASE**

(a) Upon the termination or expiration of this lease in whole or in part, or the relinquishment of the lease in whole or in part, as herein provided, the Lessee shall within a period of ninety (90) days (or such longer period as the Supervisor may authorize because of adverse climatic conditions) thereafter remove from the leased lands, no longer subject to the lease all structures, machinery, equipment, tools, and materials in accordance with applicable regulations and orders of the Supervisor. However, the Lessee shall, for a period of not more than six (6) months, continue to maintain any such property needed in the relinquished area, as determined by the Supervisor, for producing wells or for drilling or producing geothermal resources on other leases.

(b) Any structures, machinery, equipment, tools, appliances, and materials, subject to removal by the Lessee, as provided above, which are allowed to remain on the leased lands shall become the property of the Lessor on expiration of the 90-day period or any extension of that period which may be granted by the Supervisor. If the Supervisor directs the Lessee to remove such property, the Lessee shall do so at its own expense, or if it fails to do so within a reasonable period, the Lessor may do so at the Lessee's expense.

**Sec. 25. REMEDIES IN CASE OF DEFAULT**

(a) Whenever the Lessee fails to comply with any of the provisions of the Act, or the terms and stipulations of this lease, or of the regulations issued under the Act, or of any order issued pursuant to those regulations, and that default shall continue for a period of thirty (30) days after service of notice by the Lessor, the Lessor may (1) suspend operations until the requested action is taken to correct the noncompliance, or (2) cancel the lease in accordance with Sec. 12 of the Act (30 U.S.C. 1011). However, the 30-day notice provision applicable to this lease under Sec. 12 of the Act shall also apply as a prerequisite to the institution of any legal proceedings by the Lessor to cancel this lease while it is in a producing status. Nothing in this subsection shall be construed to apply to, or require any notice with respect to any legal action instituted by the Lessor other than an action to cancel the lease pursuant to Sec. 12 of the Act.

(b) Whenever the Lessee fails to comply with any of the provisions of the Act, or of this lease, or the regulations, or of any GRC Orders, or other orders, and immediate action is required, the Lessor without waiting for action by the Lessee may enter on the leased lands and take such measures as it may deem necessary to correct the failure, including a suspension of operations or production, all at the expense of the Lessee.

(c) A waiver of any particular violation of the provisions of the Act, or of this lease, or of any regulations promulgated by the Secretary under the Act, shall not prevent the cancellation of this lease or the exercise of any other remedy or remedies under paragraphs (a) and (b) of this section by reason of any other such violation, or for the same violation occurring at any other time.

(d) Nothing herein shall limit or affect the Lessee's right to a hearing and appeal as provided in Sec. 12 of the

(e) Upon cancellation, the Lessee shall remove all property in accordance with Sec. 24 hereof, and shall restore the leased lands in a manner acceptable to the Lessor or as may be otherwise required by the Lessor.

Sec. 26. HEIRS AND SUCCESSORS IN INTEREST - Each obligation hereunder shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns, of the respective parties hereto.

Sec. 27. UNLAWFUL INTEREST - No Member of, or Delegate to Congress, or Resident Commissioner, after his election or appointment, either before or after he has qualified, and during his continuance in office, and no officer, agent, or employee of the Department shall be admitted to any share or part in this lease or derive any benefit that may arise therefrom; and the provisions of Sec. 3741 of the Revised Statutes (41 U.S.C. Sec. 22), as amended, and Sections 431, 432, and 433 of Title 18 of the United States Code, relating to contracts made or entered into, or accepted by or on behalf of the United States, form a part of this lease so far as the same may be applicable.

Sec. 28. MONOPOLY AND FAIR PRICES - The Lessor reserves full power and authority to protect the public interest by promulgating and enforcing all orders necessary to insure the sale of the production from the leased lands at reasonable prices, to prevent monopoly, and to safeguard the public interest.

Sec. 29. EQUAL OPPORTUNITY CLAUSE - The Lessee agrees that, during the performance of this contract:

(1) The Lessee will not discriminate against any employee or applicant for employment because of race, color, religion, sex, or national origin. The Lessee will take affirmative action to ensure that applicants are employed, and that employees are treated during employment, without regard to their race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Lessee agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Lessor setting forth the provisions of this Equal Opportunity clause.

(2) The Lessee will, in all solicitations or advertisements for employees placed by or on behalf of the Lessee, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, or national origin.

(3) The Lessee will send to each labor union or representative of workers with which Lessee has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the Lessor, advising the labor union or workers' representative of the Lessee's commitments under this Equal Opportunity clause, and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

(4) The Lessee will comply with all provisions of Executive Order No. 11246 of September 24, 1965, as amended, and of the rules, regulations, and relevant orders of the Secretary of Labor.

(5) The Lessee will furnish all information and reports required by Executive Order No. 11246 of September 24, 1965, as amended, and by the rules, regulations, and orders of the Secretary of Labor, or pursuant thereto, and will permit access to its books, records, and accounts by the Secretary

of the Interior and the Secretary of Labor for purposes of investigation to ascertain compliance with such rules, regulations, and orders.

(6) In the event of the Lessee's noncompliance with the Equal Opportunity clause of this lease or with any of said rules, regulations, or orders, this lease may be canceled, terminated or suspended in whole or in part and the Lessee may be declared ineligible for further Federal Government contracts or leases in accordance with procedures authorized in Executive Order No. 11246 of September 24, 1965, as amended, and such other sanctions as may be imposed and remedies invoked as provided in Executive Order No. 11246 of September 24, 1965, as amended, or by rule, regulation, or order of the Secretary of Labor, or as otherwise provided by law.

(7) The Lessee will include the provisions of Paragraphs (1) through (7) of this Section (29) in every contract, subcontract or purchase order unless exempted by rules, regulations, or orders of the Secretary of Labor issued pursuant to Section 204 of Executive Order No. 11246 of September 24, 1965, as amended, so that such provisions will be binding upon each contractor, subcontractor, or subcontract, or purchase order as the Secretary may direct as a means of enforcing such provisions including sanctions for noncompliance; provided, however, that in the event the Lessee becomes involved in, or is threatened with, litigation with a contractor, subcontractor, or vendor as a result of such direction by the Secretary, the Lessee may request the Lessor to enter into such litigation to protect the interests of the Lessor.

Sec. 30. CERTIFICATION OF NONSEGREGATED FACILITIES - By entering into this lease, the Lessee certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The Lessee agrees that a breach of this certification is a violation of the Equal Opportunity clause of this lease. As used in this certification, the term "segregated facilities" means, but is not limited to, any waiting rooms, work areas, rest rooms and wash rooms, or restaurants or other eating areas, time clocks, or locker rooms, and other storage or dressing rooms, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise. Lessee further agrees that (except where it has obtained identical certifications from proposed contractors and subcontractors for specific time periods) it will obtain identical certifications from proposed contractors and subcontractors prior to the award of contracts or subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity clause; that it will retain such certifications in its files; and that it will forward the following certification to such proposed contractors and subcontractors (except where the proposed contractor or subcontractor has submitted identical certifications for specific time periods): it will notify prospective contractors and subcontractors of requirement for certification of nonsegregated facilities. A Certification of Nonsegregated Facilities, as required by the May 9, 1967 Order (32 F.R. 7439, May 19, 1967) on Elimination of Segregated Facilities, by the Secretary of Labor, must be submitted prior to the award of a contract or subcontract exceeding \$10,000 which is not exempt from the provisions of the Equal Opportunity clause. The certification may be submitted either for each contract and subcontract or for all contracts and subcontracts during a period (i.e., quarterly, semiannually, or annually).

Sec. 31. SPECIAL STIPULATIONS - (stipulations, if any, are attached hereto and made a part hereof)

The certified statement required by Section 18 of the lease form must be completed by a qualified archaeologist, acceptable to the Authorized Officer.

The attached Fort Churchill-Alpine Special Stipulations apply to all lands within this lease.

In witness whereof the parties have executed this lease.

Lessee:  
Sunoco Energy Development Co.

*W. L. Parchman, Jr.*  
(Signature of Lessee)

W. L. Parchman, Jr.  
Agent and Attorney-in-fact

(Signature of Lessee)

May 14, 1976

(SEA) (Date)

THE UNITED STATES OF AMERICA, Lessor:

By *Maena J. Holland* Acting  
(Authorized Officer)

A. John Hillsamar, Chief  
Lands & Minerals Operations

(Title)

June 2, 1976

(Date)

FORT CHURCHILL-CLAN ALPINE  
SPECIAL STIPULATIONS

The Lessee shall comply with the following special conditions and stipulations unless they are modified by mutual agreement of the Lessee, the Supervisor and the Authorized Officer:

1. Surface occupancy within 500 feet. (horizontal measurement) of any canal, ditch, slough, pond, lake, spring, or open body of water may be restricted or denied where deemed necessary by the appropriate surface management agency to protect wildlife and other resources. Other buffer zones and areas of restricted surface occupancy may be required to protect other resource values, including but not limited to, critical or rare or endangered species habitat.
2. The certified statement required by Section 18 of the lease form must be completed by a qualified archaeologist, acceptable to the Authorized Officer.
3. The use of wide or balloon-tired vehicles and/or helicopters may be required for any activities in off-road areas where deemed necessary to protect the soil and other resources.
4. Springs and water developments on Federal lands may be used only with the prior written approval of the Authorized Officer.

VERIFIED

INDEXED

165220

OFFICIAL RECORDS  
CHURCHILL COUNTY, NEVADA  
RECORDED BY

SUNOCO ENERGY DEVELOPMENT CO.

79 JUN 6 AM 9:44

STEVE L. ...  
COUNTY RECORDER

FEE 7<sup>00</sup> DEP

Record and Return to  
TITLE RECORD DEPARTMENT  
SUNOCO ENERGY DEVELOPMENT CO.  
12700 Park Central Place - Suite 1500  
Dallas, Texas 75251

END OF DOCUMENT

(November 1984)

DEC 30 1998

DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Expires January 31, 1986

N62956

Serial No.

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Read Instructions Before Completing

RECEIVED  
Bur. of Land Management

1. Name

OXBOW GEOTHERMAL CORPORATION  
Suite 220, 9790 Gateway Drive  
Reno, NV 89511

5:00  
A.M. OCT - 1 1998

Street

NEVADA STATE OFFICE  
RENO, NEVADA

City, State, Zip Code

2. Surface managing agency if other than BLM: \_\_\_\_\_ Unit/Project \_\_\_\_\_

Legal description of land requested (segregate by public domain and acquired lands):

T. 24 North R. 36 East Meridian MDM State Nevada County Churchill

Section 16: ALL  
Section 17: ALL

Total acres applied for 1280.00

Percent U.S. Interest 100%

Total \$ 1355.00

Submitted: Filing fee \$ 75.00

Rental fee \$ 1280.00

DO NOT WRITE BELOW THIS LINE

3. Land included in lease:

T. R. Meridian State County

T. 24 N., R. 36 E., MDM, Nevada  
sec. 16, all;  
sec. 17, all.

containing 1280.00 acres

rental fee \$1280.00

Churchill County

Total acres in lease \_\_\_\_\_

Rental retained \$ \_\_\_\_\_

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance and, when not inconsistent with lease rights granted or specific provisions of this lease, regulations and formal orders hereafter promulgated.

THE UNITED STATES OF AMERICA

by [Signature] (Signing Officer)

Deputy State Director, Minerals Management

DEC 28 1998

Type of lease:

Competitive

Competitive

Other \_\_\_\_\_

(Title)

(Date)

EFFECTIVE DATE OF LEASE

JAN 01 1999

## 4. (a) Undersigned certifies that:

(1) Offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, any State or the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR 3200 and the authorizing Act; (3) Offeror's chargeable interests, direct and indirect, do not conflict with the Act; and (4) Offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendments or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payment. Title 18 U.S.C. Sec. 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.

OXBOW GEOTHERMAL CORPORATION

Duly executed this 1 day of October, 1998.

By: [Signature]  
(Signature of Lessee or Attorney-in-Fact)

### LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: \$1 for noncompetitive leases and \$2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than \$2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by

lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threats to or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease operations that would result in the destruction of such species or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee shall pay lessor for damage to lessor's improvement and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessor nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

Serial No.

NVN86892

**OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES**  
**(For New Leases Issued Under the Energy Policy Act of 2005 [August 5, 2005])**

The undersigned (see page 2) offers to lease all or any of the lands in item 2 that are avail  
Steam Act of 1970, as amended (30 U.S.C. 1001-1025).

Future rental payments must be made on or  
before the anniversary date to:

Minerals Management Service  
Royalty Management Program  
P.O. Box 5640  
Denver, CO 80217

**READ INSTRUCTIONS BEFORE COMPLETING**

1. Name TGP DEVELOPMENT COMPANY LLC		1a. Street 9590 PROTOTYPE CT STE 200	
1b. City RENO		1c. State NV	
		1d. Zip Code 89521	

2. Surface managing agency if other than BLM. \_\_\_\_\_ Unit/Project: \_\_\_\_\_

Legal description of land requested (segregate by public domain and acquired lands): Enter T., R., Meridian, State and County

Total Acres Applied for \_\_\_\_\_

Percent U.S. interest \_\_\_\_\_

Amount remitted: Processing Fee \$ \_\_\_\_\_ Rental Fee \$ \_\_\_\_\_ Total \$ \_\_\_\_\_

**DO NOT WRITE BELOW THIS LINE**

3 Land included in lease: Enter T., R., Meridian, State and County

T.0240N, R.0360E, 21 MDM, NV  
Sec. 021 ALL;  
Churchill County

Total Acres in Lease 640.00

Rental Retained \$ 1280.00

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in Item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years and subsequent extensions thereof in accordance with 43 CFR subpart 3207. Rights granted are subject to: applicable laws; the terms, conditions, and attached stipulations of this lease; the Secretary of the Interior's regulations and formal orders in effect as of lease issuance; and, when not inconsistent with the provisions of this lease, regulations and formal orders hereafter promulgated.

Type of Lease:

- Competitive
- Noncompetitive
- Noncompetitive direct use (43 CFR subpart 3205)

Comments:

THE UNITED STATES OF AMERICA

BY \_\_\_\_\_

*Atanda Clark*  
(Signing Official)

ATANDA CLARK

(Printed Name)

Chief, Branch of Minerals Adjudication AUG 07 2009

(Title)

(Date)

EFFECTIVE DATE OF LEASE

SEP - 1 2009

Check if this is a converted lease

EFFECTIVE DATE OF LEASE CONVERSION \_\_\_\_\_

## 4 (a) The undersigned certifies that

- (1) The offeror is a citizen of the United States, an association of such citizens, a municipality, or a corporation organized under the laws of the United States, any State or the District of Columbia, (2) All parties holding an interest in the offer are in compliance with 43 CFR part 3200 and the authorizing Act, (3) The offeror's chargeable interests, direct and indirect, do not exceed those allowed under the Act, and (4) The offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located
- (b) The undersigned agrees that signing this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which the offeror has been given notice. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the proper BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations or if it is not accompanied by the required payments. Title 18 U.S.C. § 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.

Duly executed this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_

(Printed Name of Lessee or Attorney-in-fact)

(Signature of Lessee or Attorney-in-fact)

## LEASE TERMS

Sec. 1. Rentals—Rentals must be paid to the proper office of the lesser in advance of each lease year. Annual rental rates per acre or fraction thereof, as applicable, are:

(a) Noncompetitive lease (includes post-sale parcels not receiving bids, a direct use lease or a lease issued to a mining claimant) \$1 00 for the first 10 years; thereafter \$5 00, or

(b) Competitive lease \$2 00 for the first year, \$3 00 for the second through tenth year, thereafter \$5 00

Annual rental is always due by the anniversary date of this lease (43 CFR 3211.13), regardless of whether the lease is in a unit or outside of a unit, the lease is in production or not, or royalties or direct use fees apply to the production

Rental may only be credited toward royalty under 43 CFR 3211.15 and 30 CFR 218.303. Rental may not be credited against direct use fees. Failure to pay annual rental timely will result in late fees and will make the lease subject to termination in accordance with 43 CFR 3215.14

Sec. 2. (a) Royalties—Royalties must be paid to the proper office of the lesser. Royalties are due on the last day of the month following the month of production. Royalties will be computed in accordance with applicable regulations and orders. Royalty rates for geothermal resources produced for the commercial generation of electricity but not sold in an arm's length transaction are 1.75 percent for the first 10 years of production and 3.5 percent after the first 10 years. The royalty rate is to be applied to the gross proceeds derived from the sale of electricity in accordance with 30 CFR part 206 subpart 11

The royalty rate for byproducts derived from geothermal resource production that are minerals specified in section 1 of the Mineral Leasing Act (MLA), as amended (30 U.S.C. 181), is 5 percent, except for sodium compounds, produced between September 29, 2006 and September 29, 2011 (Pub. L. No. 109-338, §102, note to 30 U.S.C. 362) for which the royalty rate is 2 percent. No royalty is due on byproducts that are not specified in 30 U.S.C. § 181 (43 CFR 3211.19)

If this lease or a portion thereof is committed to an approved communitization or unit agreement and the agreement contains a provision for allocation of production, royalties must be paid on the production allocated to this lease.

(b) Arm's length transactions—The royalty rate for geothermal resources sold by you or your affiliate at arm's length to a purchaser is 10 percent of the gross proceeds derived from the arm's length sale (43 CFR 3211.17, 3211.18)

(c) Advanced royalties—In the absence of a suspension, if you cease production for more than one calendar month on a lease that is subject to royalties and that has achieved commercial production, your lease will remain in effect only if you make advanced royalty payments in accordance with 43 CFR 3215(a) and 30 CFR 218.305

(d) Direct use fees—Direct use fees must be paid in lieu of royalties for geothermal resources that are utilized for commercial, residential, agricultural, or other energy needs other than the commercial production or generation of electricity, but not sold in an arm's length transaction (43 CFR 3211.18, 30 CFR 206.356)

This requirement applies to any direct use of federal geothermal resources (unless the resource is exempted as described in 30 CFR 202.351(b) or the lessee is covered by paragraph (e), below) and is not limited to direct use leases. Direct use fees are due on the last day of the month following the month of production

(e) If the lessee is a State, tribal, or local government covered by 43 CFR 3211.18(a)(3) and 30 CFR 206.366, check here  A lessee under this paragraph is not subject to paragraph (d), above. In lieu of royalties, the lessee under this paragraph must pay a nominal fee of \$ \_\_\_\_\_

Sec. 3. Bonds—A bond must be filed and maintained for lease operations as required by applicable regulations.

Sec. 4. Work requirements, rate of development, unitization, and drainage—Lessee must perform work requirements in accordance with applicable regulations (43 CFR 3207.11, 3207.12), and must prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves the right to specify rates of development and production and to require lessee to commit to a communitization or unit agreement, within 30 days of notice, if in the public interest. Lessee must drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in the amount determined by lessor. Lessor will exempt lessee from work requirements only where the lease overlies a mining claim that has an approved plan of operations and where BLM determines that the development of the geothermal resource on the lease would interfere with the mining operation (43 CFR 3207.13)

Sec. 5. Documents, evidence, and inspection—Lessee must file with the proper office of the lesser, not later than (30) days after the effective date thereof, any contract or evidence of other arrangement for the sale, use, or disposal of geothermal resources, byproducts produced, or for the sale of electricity generated using geothermal resources produced from the lease. At such times and in such form as lessor may prescribe, lessee must furnish detailed statements and all documents showing (a) amounts and quality of all geothermal resources produced and used (either for commercial production or generation of electricity, or in a direct use operation) or sold, (b) proceeds derived therefrom or from the sale of electricity generated using such resources, (c) amounts that are unavoidably lost or rejected before use, used to generate plant parasitic electricity (as defined in 30 CFR 206.351) or electricity for lease operations, or otherwise used for lease operations related to the commercial production or generation of electricity, and (d) amounts and quality of all byproducts produced and proceeds derived from the sale or disposition thereof. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest

In a format and manner approved by lessor, lessee must keep a daily drilling record, a log, and complete information on well surveys and tests, keep a record of subsurface investigations, and furnish copies to lessor when required

Lessee must keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee must maintain copies of all contracts, sales agreements, accounting records, billing records, invoices, gross proceeds and payment data regarding the sale, disposition, or use of geothermal resources, byproducts produced, and the sale of electricity generated using resources produced from the lease, and all other information relevant to determining royalties or direct use fees. All such records must be maintained in lessee's accounting offices for future audit by lessor and produced upon request by lessor or lessor's authorized representative or agent. Lessee must maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor

Sec. 6. Conduct of operations—Lessee must conduct operations in a manner that minimizes adverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee must take reasonable measures deemed necessary by lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-way. Such uses will be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessee. Prior to disturbing the surface of the leased lands, lessee must contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessor may require lessee to complete minor inventories or short term special studies under guidelines provided by lessor. If, in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee must immediately contact lessor. Lessee must cease any operations that are likely to affect or take such species, or result in the modification, damage or destruction of such habitats or objects

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee

Sec. 8. Damages to property—Lessee must pay lessor for damage to lessor's improvements, and must save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations

Sec. 9. Protection of diverse interests and equal opportunity—Lessee must maintain a safe working environment in accordance with applicable regulations and standard industry practices, and take measures necessary to protect public health and safety. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly. Lessee must comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor may maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee must file with lessor any assignment or other transfer of an interest in this lease. Subject to the requirements of 43 CFR subpart 3213, lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which will be effective as of the date BLM receives it, subject to the continued obligation of the lessee and surety to be responsible for: paying all accrued rentals and royalties, plugging and abandoning all wells on the relinquished land, restoring and reclaiming the surface and other resources, and complying with 43 CFR 3200.4

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee must place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of productive wells or continued protection of the environment

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease or other applicable requirements under 43 CFR 3200.4, and the noncompliance continues for 30 days after written notice thereof, this lease will be subject to termination in accordance with the Act and 43 CFR 3213. This provision will not be construed to prevent the exercise by lessor of any other legal and equitable remedy or action, including waiver of the default. Any such remedy, waiver, or action will not prevent later termination for the same default occurring at any other time. Whenever the lessee fails to comply in a timely manner with any of the provisions of the Act, this lease, the regulations, or other applicable requirements under 43 CFR 3200.4, and immediate action is required, the lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the lessee's expense

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease will extend to and be binding upon, and every benefit hereof will inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto

## INSTRUCTIONS

## A General

- 1 Items 1 and 2 need to be completed only by parties filing for a noncompetitive lease. The BLM will complete the front of the form for other types of leases. The BLM may use the "Comments" space under Item 3 to identify when the lessee has elected to make all lease terms subject to the Energy Policy Act of 2005 under 43 CFR 3200.7(a)(2) or 43 CFR 3200.8(b) (box labeled "converted lease" must also be checked); the lease is being issued noncompetitively to a party who holds a mining claim on the same lands as is covered by the lease under 43 CFR 3204.12; the lease is a direct use lease issued to a State, local, or tribal government (box at section 2(e) under Lease Terms must also be checked); the lease is a competitive lease with direct-use-only stipulations attached; or other special circumstances exist. A lessee who seeks to convert only the royalty rate of a lease under 43 CFR 3212.25 or who qualifies for a case-by-case royalty rate determination under 43 CFR 3211.17(b)(1)(i) should not use this form, but should instead use an addendum to the existing lease.
- 2 Entries must be typed or printed plainly in ink. The offeror must sign the form (Item 4) in ink.
- 3 An original and two copies of this offer must be prepared and filed in the proper BLM State Office. See regulations at 43 CFR 1821.10 for office locations.
- 4 If more space is needed, additional sheets must be attached to each copy of the form submitted.

## B. Specific

Item 1—Enter the offeror's name and billing address.

Item 2—Indicate the agency managing the surface use of the land and the name of the unit or project of which the land is a part. The offeror may also provide other information that will assist in establishing status of the lands. The description of land must conform to 43 CFR 3203.10. Total acres applied for must not exceed that allowed by regulations (43 CFR 3203.10; 43 CFR 3206.12).

Payments. For noncompetitive leases, the amount remitted must include the processing fee for noncompetitive lease applications (43 CFR 3204.10; 43 CFR 3000.12) and the first year's rental at the rate of \$1 per acre or fraction thereof. If the United States owns only a fractional interest in the geothermal resources, you must pay a prorated rental under 43 CFR 3211.11(d). The BLM will retain the processing fee even if the offer is completely rejected or withdrawn. To maintain the offeror's priority, the offeror must submit rental sufficient to cover all the land requested. If the land requested includes lots or irregular quarter-quarter sections, the exact acreage of which is not known to the offeror, rental should be submitted on the assumption that each such lot or quarter-quarter section contains 40 acres. If the offer is withdrawn or rejected in whole or in part before a lease issues, the BLM will return the rental remitted for the parts withdrawn or rejected.

The BLM will fill in the processing fee for competitive lease applications (43 CFR 3203.17; 43 CFR 3000.12) and the first year's rental at the rate of \$2 per acre or fraction thereof.

Item 3—The BLM will complete this space.

## NOTICES

The Privacy Act of 1974 and the regulation at 43 CFR 2.48(d) provide that you be furnished with the following information in connection with information required by this geothermal lease application.

AUTHORITY: 30 U.S.C. 1000 et seq.

PRINCIPAL PURPOSE—The information is to be used to process geothermal lease applications.

ROUTINE USES: (1) The adjudication of the lessee's rights to the land or resources. (2) Documentation for public information in support of notations made on land status records for the management, disposal, and use of public lands and resources. (3) Transfer to appropriate Federal agencies when concurrence is required prior to granting uses or rights in public lands or resources. (4) Transfer to the appropriate Federal, State, local, or foreign agencies, when relevant to civil, criminal, or regulatory investigations or prosecutions.

RIPARIAN AREAS STIPULATION

The lessee shall comply with the following special conditions and stipulations unless they are modified by mutual agreement of the Lessee and the Authorized Officer (AO):

No surface occupancy or disturbance will be allowed within 650 feet (horizontal measurement) of any surface water bodies, riparian areas, wetlands, playas, or 100-year floodplains to protect the integrity of these resources (as delineated by the presence of riparian vegetation and not actual water). Exceptions to this restriction may be considered on a case-by-case basis if the BLM determines at least one of the following conditions apply: 1) additional development is proposed in an area where current development has shown no adverse impacts, 2) suitable off-site mitigation will be provided if habitat loss is expected, or 3) BLM determines development proposed under any plan of operations ensures adequate protection of the resources.

	<u>Description of Lands</u>
PARCEL NV-09-07-007 THRU PARCEL NV-09-07-008	ALL LANDS
PARCEL NV-09-07-015 THRU PARCEL NV-09-07-017	ALL LANDS
PARCEL NV-09-07-020	ALL LANDS
PARCEL NV-09-07-025	
PARCEL NV-09-07-027 THRU PARCEL NV-09-07-028	ALL LANDS
PARCEL NV-09-07-032 THRU PARCEL NV-09-07-033	ALL LANDS
PARCEL NV-09-07-040 THRU PARCEL NV-09-07-051	ALL LANDS
PARCEL NV-09-07-055 THRU PARCEL NV-09-07-057	ALL LANDS
PARCEL NV-09-07-060 THRU PARCEL NV-09-07-067	ALL LANDS
PARCEL NV-09-07-074	ALL LANDS

NATIVE AMERICAN CONSULTATION STIPULATION

The lessee shall comply with the following special conditions and stipulations unless they are modified by mutual agreement of the Lessee and the Authorized Officer (AO):

All development activities proposed under the authority of this lease are subject to the requirement for Native American consultation prior to BLM authorizing the activity. Depending on the nature of the lease developments being proposed and the resources of concerns to tribes potentially effected, Native American consultation and resulting mitigation measures to avoid significant impacts may extend time frames for processing authorizations for development activities, as well as, change in the ways in which developments are implemented.

	<u>Description of Lands</u>
PARCEL NV-09-07-007 THRU PARCEL NV-09-07-008	ALL LANDS
PARCEL NV-09-07-015 THRU PARCEL NV-09-07-017	ALL LANDS
PARCEL NV-09-07-020	ALL LANDS
PARCEL NV-09-07-025 THRU PARCEL NV-09-07-028	ALL LANDS
PARCEL NV-09-07-032 THRU PARCEL NV-09-07-033	ALL LANDS
PARCEL NV-09-07-040 THRU PARCEL NV-09-07-051	ALL LANDS
PARCEL NV-09-07-055 THRU PARCEL NV-09-07-057	ALL LANDS
PARCEL NV-09-07-060 THRU PARCEL NV-09-07-067	ALL LANDS
PARCEL NV-09-07-074	ALL LANDS
PARCEL NV-09-07-079	ALL LANDS

NV-030-NA-1

ENDANGERED SPECIES ACT  
SECTION 7 CONSULTATION STIPULATION

The lease area may now or hereafter contain plants, animals, or their habitats determined to be threatened, endangered, or other special status species. BLM may recommend modifications to exploration and development proposals to further its conservation and management objective to avoid BLM-approved activity that will contribute to a need to list such a species or their habitat. BLM may require modifications to or disapprove proposed activity that is likely to result in jeopardy to the continued existence of a proposed or listed threatened or endangered species or result in the destruction or adverse modifications of a designated or proposed critical habitat. BLM will not approve any ground-disturbing activity that may affect any such species or critical habitat until it completes its obligations under applicable requirements of the Endangered Species Act, 16 USC § 1531 *et seq.*, as amended, including completion of any required procedure for conference or consultation.

**CULTURAL RESOURCE PROTECTION**  
**LEASE STIPULATION**

This lease may be found to contain historic properties or resources protected under the National Historic Preservation Act, American Indian Religious Freedom Act, Native American Graves Protection and Repatriation Act, EO 13007, or other statutes and executive orders. The BLM will not approve any ground-disturbing activities that may affect any such properties or resources until it completes its obligations under applicable requirements of the NHPA and other authorities. The BLM may require exploration or development proposals to be modified to protect such properties, or it may disapprove any activity that is likely to result in adverse effects that could not be successfully avoided, minimized, or mitigated.

WO IM 2005-003  
10/05/04

DOC # 396990

12/03/2007 03:00 PM

Official Record

Recording requested by  
FIRST AMERICAN TITLE INSURANCE CO

Churchill County - NV

Vicky Tripp - Recorder

Page 1 of 3 Fee: \$41.00  
Recorded By: AM RPTT: #9



396990

A.P.N.s: 004-211-01 (BLM); 004-211-02 (US); 004-211-03 (US)  
004-211-04 (US); and 004-211-05 (US)

File No: 302441-05 (js)  
R.P.T.T.: \$0.00 C

When Recorded Mail To  
And mail Tax Statements To:

Nevada PowerVestors, LLC  
c/o Caithness Corporation  
565 5th Avenue, 29th floor  
New York, New York 10017  
Attn: Gail Conboy

**NCS-302441-05 GRANT, BARGAIN and SALE DEED**

FOR A VALUABLE CONSIDERATION, receipt of which is hereby acknowledged, Caithness Dixie Valley, LLC, a Delaware limited liability company, does hereby GRANT, BARGAIN and SELL to Nevada PowerVestors, LLC, a Delaware limited liability company, the real property described as follows:

ONE HUNDRED PERCENT 100% MINERAL INTEREST IN THE FOLLOWING PROPERTIES SITUATED IN TOWNSHIP 22 NORTH, RANGE 35 EAST, M.D.M., IN THE COUNTY OF CHURCHILL, STATE OF NEVADA ACCORDING TO THE OFFICIAL PLAT THEREOF:

- A. SW 1/4 OF SW 1/4, SW 1/4 OF NE 1/4 OF SECTION 4.
- B. S 1/2 OF SE 1/4 OF SECTION 5.
- C. NE 1/4 OF NE 1/4, W 1/2 OF NE 1/4, W 1/2 OF SE 1/4 OF SECTION 8.
- D. W 1/2 OF NE 1/4, E 1/2 OF NW 1/4, N 1/2 OF SW 1/4, NW 1/4 OF SE 1/4 OF SECTION 17.
- E. SE 1/4 of SE 1/4 of SECTION 18.
- F. W 1/2 of NE 1/4 of SECTION 19.

Subject to:

- 1. All general and special taxes for the current fiscal year.
- 2. Covenants, Conditions, Restrictions, Reservations, Rights, Rights of Way and Easements now of record (including, but not limited to, those restrictions set forth in the Grant, Bargain and Sale Deed recorded on May 12, 1988 as Instrument No. 237175).



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12/03/2007  
002 of 3

TOGETHER with all tenements, hereditaments and appurtenances, including easements and water rights, if any, thereto belonging or appertaining, and any reversions, remainders, rents, issues or profits thereof.

CAITHNESS DIXIE VALLEY, LLC, a Delaware limited liability company

By:   
Its: Executive Vice President and Chief Financial Officer



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12/03/2007  
003 of 3

STATE OF NEW YORK  
COUNTY OF New York ) SS.  
On 11/21/07 before me,

GAIL CONBOY, a notary public for said county and said state, personally appeared CHRISTOPHER MC CALLION

CHRISTOPHER MC CALLION personally known to me (or proved to me on the basis of satisfactory evidence) to be the person(s) whose name(s) is/are subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their authorized capacity(ies), and that by his/her/their signature(s) on the instrument the person(s), or the entity upon behalf of which the person(s) acted, executed the instrument.

WITNESS my hand and official seal.

Signature   
(This area for official notarial seal)

GAIL M. CONBOY  
Notary Public, State of New York  
No. 4964579  
Qualified in New York County  
Commission Expires 4/2/10

Escrow No. CH-28778-AG

237175

When recorded mail to  
Judith L. Lamson, Esq.  
Beckley, Singleton, Delaney,  
Jamison & List, Chartered  
50 West Liberty Street, Second Floor  
Reno, Nevada 89501

NORTHERN NEVADA TITLE CO  
MAY 12 PM 1:25  
88 MAY 12  
COUNTY RECORDER

Mail tax statements to:  
Oxbow Geothermal Corporation  
333 Elm Street  
Dedham, Massachusetts 02026

Documentary Transfer DEP. *DE*  
Tax is: \$ 742.50

GRANT, BARGAIN AND SALE DEED

PICK-E RANCHES, which acquired title as PICK-E-RANCHES, a Nevada partnership, as represented by the Amended Articles of Partnership dated January 1, 1975, recorded in Book 93, Page 462 at the Churchill County Recorder's Office, composed of SHELDON W. LAMB and ISABEL H. LAMB, husband and wife, DARWIN LAMB, Trustee of the Darwin and Mary Lamb Living Trust dated January 4, 1972, and EDWARD M. CARSE, a married man dealing with his sole and separate property, and the aforescribed persons individually, hereinafter collectively referred to as GRANTORS, in consideration of the sum of Ten Dollars (\$10.00) lawful money and for other good and valuable consideration, the receipt of which is hereby acknowledged, grant, bargain and sell to OXBOW GEOTHERMAL CORPORATION, a Delaware corporation, hereinafter referred to as GRANTEE, whose address is 200 South Virginia Street, Suite 450, Reno, Nevada 89501, all oil, gas, mineral, geothermal mineral and geothermal water resource rights in, under and appurtenant to the property more particularly described in the Grant, Bargain, Sale Deed in favor of the United States of America, recorded in the Official Records of Churchill County, Nevada on December 30, 1986 as Document No. 224638, and described as follows:

Parcel A ("Boyer Ranch")

Churchill County, Nevada:

*Parcel*  
T24N. R36E. MDB&M  
Section 12: SE 1/4 of SE 1/4

T24N. R37E. MDB&M  
Section 7: Lot 4  
Section 18: Lot 1, NE 1/4 of NW 1/4

Parcel B ("Hillman Ranch")

Churchill County, Nevada:

T24N, R37E, MDB&M

Section 7: E 1/2 of SW 1/4, W 1/2 of SE 1/4

Parcel C ("Dixie Meadows")

Churchill County, Nevada:

T22N, R35E, MDB&M

Section 4: SW 1/4 of SW 1/4, SW 1/4 of NE 1/4

Section 5: S 1/2 of SE 1/4

Section 8: NE 1/4 of NE 1/4, W 1/2 of NE 1/4, W 1/2 of SE 1/4

Section 17: W 1/2 of NE 1/4, E 1/2 of NW 1/4, N 1/2 of SW 1/4, NW 1/4 of SE 1/4

Section 18: SE 1/4 of SE 1/4

Section 19: W 1/2 of NE 1/4

which Deed provides that the use of the surface of said property in exercise of said rights shall be subject to the following specific limitations:

1. Any structures shall be directly related to and necessary for operations conducted in conjunction with the exploration for, or extraction of, or the production and/or transmission of oil, gas, minerals, geothermal products, or electrical energy.
2. No permanent structures shall be more than 50 feet in height above the surface of the land.
3. No structure, vehicle, or other facility within or upon the property may be used or maintained for purposes of permanent human habitation or extended residential use. This restriction shall not prohibit occasional and/or temporary use of a structure as shelter for drilling, construction, operation or maintenance personnel and/or watch/security personnel.
4. The real property encompassed by this deed may be subject to geothermal leases that appear of record. Nothing contained herein shall operate to limit or restrict surface use or access upon the subject property contained in or related to any such leases, or any continuation or renewal thereof; nor shall Grantors' endorsement hereof serve to validate or acknowledge the continuing effect or validity of said leases, to the extent such validity may be otherwise subject to challenge.

Grantors make no warranty, express or implied, with respect to title to the Geothermal and Mineral rights described above as Parcel C.

WITNESS our hands this 5th day of May, 1988.

PICK-E RANCHES, a Nevada Partnership

By Sheldon W. Lamb  
SHELDON W. LAMB

By Isabel H. Lamb  
ISABEL H. LAMB

By Edward M. Carse  
EDWARD M. CARSE

By Darwin W. Lamb  
DARWIN W. LAMB, Trustee of the Darwin and Mary Lamb Living Trust dated January 4, 1972

Sheldon W. Lamb  
SHELDON W. LAMB, a married man, as an individual

Isabel H. Lamb  
ISABEL H. LAMB, a married woman, as an individual

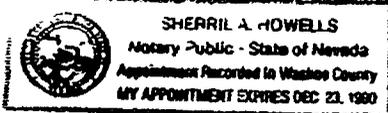
Darwin W. Lamb  
DARWIN LAMB, a married man, as an individual dealing with his sole and separate property

Edward M. Carse  
EDWARD M. CARSE, a married man, as an individual dealing with his sole and separate property

ACKNOWLEDGMENT

STATE OF NEVADA )  
 ) ss.  
COUNTY OF WASHOE )

On this 5th day of May, in the year 1988, before me, Sherril A. Howells, a Notary Public in and for said county and state, personally appeared EDWARD M. CARSE, personally known to me (or proved to me on the basis of satisfactory evidence) to be one of the partners of PICK-E RANCHES, the partnership that executed the within instrument, and acknowledged to me that such person executed the same, both individually and as such partner and that such partnership also executed the same.

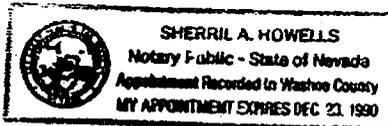


*Sherril A. Howells*  
NOTARY PUBLIC

ACKNOWLEDGMENT

STATE OF NEVADA )  
 ) ss.  
COUNTY OF WASHOE )

On this 5th day of May, in the year 1988, before me, Sherril A. Howells, a Notary Public in and for said county and state, personally appeared DARWIN W. LAMB, personally known to me (or proved to me on the basis of satisfactory evidence) to be one of the partners of PICK-E RANCHES, the partnership that executed the within instrument, and acknowledged to me that such person executed the same, both individually and as such partner and that such partnership also executed the same.



*Sherril A. Howells*  
NOTARY PUBLIC

**ORIGINAL**  
UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT

FORM APPROVED  
OBM NO. 1004-0038  
Expires January 31, 1986

**OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES**

Serial No. N-60685

undersigned (see reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025).

Read Instructions Before Completing

Name DIXIE VALLEY POWER PARTNERSHIP  
Street 1114 AVENUE OF THE AMERICAS  
City, State, Zip Code NEW YORK, NY 10036-7790

RECEIVED  
Bur. of Land Management  
NEVADA LAND OFFICE

9:00  
A.M.

MAR 27 1996

*Jed*

NEVADA STATE OFFICE  
RENO, NEVADA

2. Surface managing agency if other than BLM: \_\_\_\_\_ Unit/Project \_\_\_\_\_

Legal description of land requested (segregate by public domain and acquired lands):

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

Total acres applied for \_\_\_\_\_  
Percent U.S. interest \_\_\_\_\_  
Total \$ \_\_\_\_\_

Amount remitted: Filing fee \$ \_\_\_\_\_ Rental fee \$ \_\_\_\_\_

**DO NOT WRITE BELOW THIS LINE**

3. Land included in lease:

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

PARCEL NUMBER 17

T. 22 N., R. 35 E., MDM, Nevada  
sec. 09, all;  
sec. 10, all;  
sec. 15, all;  
sec. 16, all;  
Churchill County

Record Posted	Date	By
MT Plat	_____	_____
OG Plat	_____	_____
USE Plat	<u>7/11/96</u>	<u>KR</u> <u>sw</u>
Hi Plat	<u>7/11/96</u>	<u>KR</u> <u>sw</u>
GDI Filing	_____	_____

Total acres in lease 2560.00  
Rental retained \$ 5120.00

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of the geothermal resources in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance and, when not consistent with lease rights granted or specific provisions of this lease, regulations and formal orders hereafter promulgated.

THE UNITED STATES OF AMERICA

by Jessie A. Moffitt  
Chief, Mining Law Operations Section

JUN 18 1996

(Title)

(Date)

EFFECTIVE DATE OF LEASE

JUL 01 1996

lease:  
Noncompetitive  
Competitive  
Other \_\_\_\_\_

*Jed*

## 4. (a) Undersigned certifies that:

- (1) Offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States, the District of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR 3200 and the authorizing Act; (3) Offeror's chargeable interests, direct or indirect, are those that allowed under the Act; and (4) Offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.
- (b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. Title 18 U.S.C. Sec. 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.

Duly executed this 26th day of MARCH, 19 96.

  
(Signature of Lessee or Attorney-in-fact)

AGENT

## LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: \$1 for noncompetitive leases and \$2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

A minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than \$2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

At the termination of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes diverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by

lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease; and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of this lease, the regulations, or formal orders, and immediate action is required, the Lessor may enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.

OFFER TO LEASE AND LEASE FOR GEOTHERMAL RESOURCES

Serial No. N-60686

Designated (see reverse) offers to lease all or any of the lands in item 2 that are available for lease pursuant to the Geothermal Steam Act of 1970 (30 U.S.C. 1001-1025).

Read Instructions Before Completing

RECEIVED  
Bur. of Land Management  
NEVADA LAND OFFICE

1. Name DIXIE VALLEY POWER PARTNERSHIP

Street 1114 AVENUE OF THE AMERICAS

City, State, Zip Code NEW YORK NY 10036-7790

9:00 A.M. MAR 27 1996

NEVADA STATE OFFICE  
RENO, NEVADA

2. Surface managing agency if other than BLM: \_\_\_\_\_ Unit/Project \_\_\_\_\_

Legal description of land requested (segregate by public domain and acquired lands):

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_

*See BLM Decision  
Letter of 2/4/98  
dropping Acquired lands  
Total acres = 1400.00*

Total acres applied for \_\_\_\_\_  
Percent U.S. interest \_\_\_\_\_  
Total \$ \_\_\_\_\_

Amount remitted: Filing fee \$ \_\_\_\_\_ Rental fee \$ \_\_\_\_\_

DO NOT WRITE BELOW THIS LINE

Land included in lease:

T. \_\_\_\_\_ R. \_\_\_\_\_ Meridian \_\_\_\_\_ State \_\_\_\_\_ County \_\_\_\_\_

PARCEL NUMBER 19

T. 22 N., R. 35 E., MDM, Nevada  
sec. 17, E $\frac{1}{2}$ E $\frac{1}{2}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ ;  
sec. 17, W $\frac{1}{2}$ NE $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ , (AQUIRED);  
sec. 18, SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ ;  
sec. 18, SE $\frac{1}{4}$ SE $\frac{1}{4}$ , (AQUIRED);  
sec. 19, E $\frac{1}{2}$ NE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ ;  
sec. 19, W $\frac{1}{2}$ NE $\frac{1}{4}$ , (AQUIRED);  
sec. 20, all.

Churchill County

Record Posted	Date	By
MT Plat		
OG Plat		
USE Plat	7/11/96	KB
HI Plat	7/11/96	KB
QDI Filing		

1400.00

Total acres in lease 1800.00  
Rental retained \$ 3600.00

In accordance with the above offer, or the previously submitted competitive bid, this lease is issued granting the exclusive right to drill for, extract, produce, remove, utilize, sell, and dispose of all the geothermal resources in the lands described in item 3 together with the right to build and maintain necessary improvements thereupon, for a primary term of 10 years. Rights granted are subject to applicable laws, the terms, conditions, and attached stipulations of this lease, the Secretary of the Interior's regulations and formal orders in effect as of lease issuance and, when not inconsistent with lease rights granted or specific provisions of this lease, regulations and formal orders hereafter promulgated.

THE UNITED STATES OF AMERICA

by [Signature]  
Chief, Mining Law Operations Section

JUN 18 1996

(Title) \_\_\_\_\_ (Date) \_\_\_\_\_

EFFECTIVE DATE OF LEASE [Redacted] JUL 01 19

Lease:  
 Noncompetitive  
 Competitive  
 Other \_\_\_\_\_

## 4. (a) Undersigned certifies that:

(1) Offeror is a citizen of the United States; an association of such citizens; a municipality; or a corporation organized under the laws of the United States of Columbia; (2) All parties holding an interest in the offer are in compliance with 43 CFR 3200 and the authorizing Act; (3) Offeror's chargeable interests, direct or indirect, in the lands covered by this offer are located in the State of Colorado; and (4) Offeror is not considered a minor under the laws of the State in which the lands covered by this offer are located.

(b) Undersigned agrees that signature to this offer constitutes acceptance of this lease, including all terms, conditions and stipulations of which offeror has been given notice, and any amendment or separate lease that may cover any land described in this offer open to lease application at the time this offer was filed but omitted for any reason from this lease. The offeror further agrees that this offer cannot be withdrawn, either in whole or part, unless the withdrawal is received by the BLM State Office before this lease, an amendment to this lease, or a separate lease, whichever covers the land described in the withdrawal, has been signed on behalf of the United States.

This offer will be rejected and will afford the offeror no priority if it is not properly completed and executed in accordance with the regulations, or if it is not accompanied by the required payments. Title 18 U.S.C. Sec. 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.

Duly executed this 26th day of March, 19 96.

(Signature of Lessee or Attorney-in-fact)

Agent

## LEASE TERMS

Sec. 1. Rentals—Rentals shall be paid to proper office of lessor in advance of each lease year until there is production in commercial quantities from the leased lands. Annual rental rates per acre or fraction thereof are: \$1 for noncompetitive leases and \$2 for competitive leases.

If this lease or a portion thereof is committed to an approved cooperative or unit plan which includes a well capable of producing leased resources, and the plan contains a provision for allocation of production, royalties shall be paid on the production allocated to this lease. However, annual rentals shall continue to be due for those lands not within a participating area.

Failure to pay annual rental, if due, on or before the anniversary date of this lease (or next official working day if office is closed) shall automatically terminate this lease by operation of law. Rentals may be suspended by the Secretary upon a sufficient showing by lessee.

Sec. 2. Royalties—Royalties shall be paid to proper office of lessor. Royalties shall be computed in accordance with regulations and orders. Royalty rates on production are: 10 percent for steam, heat, or energy; 5 percent for byproducts; and 5 percent for demineralized water.

Lessor reserves the right to establish reasonable minimum values on production after giving lessee notice and an opportunity to be heard. Royalties shall be due and payable on the last day of the month following the month in which production occurred.

Minimum royalty shall be due for any lease year beginning on or after the commencement of production in commercial quantities in which royalty payments aggregate less than \$2 per acre. Lessee shall pay such difference at the end of lease year. This minimum royalty may be waived, suspended, or reduced, and the above royalty rates may be reduced for all or portions of this lease if the Secretary determines that such action is necessary to encourage the greatest ultimate recovery of the leased resources, or is otherwise justified.

Sec. 3. Bonds—Lessee shall file and maintain any bond required under regulations.

Sec. 4. Diligence, rate of development, unitization, and drainage—Lessee shall perform diligent exploration as required by regulations and shall prevent unnecessary damage to, loss of, or waste of leased resources. Lessor reserves right to specify rates of development and production in the public interest and to require lessee to subscribe to a cooperative or unit plan, within 30 days of notice, if deemed necessary for proper development and operation of the area, field, or pool embracing these leased lands. Lessee shall drill and produce wells necessary to protect leased lands from drainage or pay compensatory royalty for drainage in amount determined by lessor.

Sec. 5. Documents, evidence, and inspection—Lessee shall file with proper office of lessor, not later than (30) days, after effective date thereof, any contract or evidence of other arrangement for the sale or disposal of production. At such times and in such form as lessor may prescribe, lessee shall furnish detailed statements showing amounts and quality of all products removed and sold, proceeds therefrom, and amount used for production purposes or unavoidably lost. Lessee may be required to provide plats and schematic diagrams showing development work and improvements, and reports with respect to parties in interest, expenditures, and depreciation costs.

In the form prescribed by lessor, lessee shall keep a daily drilling record, a log, and complete information on well surveys and tests and keep a record of subsurface investigations and furnish copies to lessor when required. Lessee shall keep open at all reasonable times for inspection by any authorized officer of lessor, the leased premises and all wells, improvements, machinery, and fixtures thereon, and all books, accounts, maps, and records relative to operations, surveys, or investigations on or in the leased lands. Lessee shall maintain copies of all contracts, sales agreements, accounting records, and documentation such as billings, invoices, or similar documentation that support costs claimed as manufacturing, preparation, and/or transportation costs. All such records shall be maintained in lessee's accounting offices for future audit by lessor. Lessee shall maintain required records for 6 years after they are generated or, if an audit or investigation is underway, until released of the obligation to maintain such records by lessor.

During existence of this lease, information obtained under this section shall be closed to inspection by the public in accordance with the Freedom of Information Act (5 U.S.C. 552).

Sec. 6. Conduct of operations—Lessee shall conduct operations in a manner that minimizes diverse impacts to the land, air, and water, to cultural, biological, visual, and other resources, and to other land uses or users. Lessee shall take reasonable measures deemed necessary by

lessor to accomplish the intent of this section. To the extent consistent with leased rights granted, such measures may include, but are not limited to, modification to siting or design of facilities, timing of operations, and specification of interim and final reclamation measures. Lessor reserves the right to continue existing uses and to authorize future uses upon or in the leased lands, including the approval of easements or rights-of-ways. Such uses shall be conditioned so as to prevent unnecessary or unreasonable interference with rights of lessees.

Prior to disturbing the surface of the leased lands, lessee shall contact lessor to be apprised of procedures to be followed and modifications or reclamation measures that may be necessary. Areas to be disturbed may require inventories or special studies to determine the extent of impacts to other resources. Lessee may be required to complete minor inventories or short term special studies under guidelines provided by lessor. If in the conduct of operations, threatened or endangered species, objects of historic or scientific interest, or substantial unanticipated environmental effects are observed, lessee shall immediately contact lessor. Lessee shall cease any operations that would result in the destruction of such species or objects.

Sec. 7. Production of byproducts—If the production, use, or conversion of geothermal resources from these leased lands is susceptible of producing a valuable byproduct or byproducts, including commercially demineralized water for beneficial uses in accordance with applicable State water laws, lessor may require substantial beneficial production or use thereof by lessee.

Sec. 8. Damages to property—Lessee shall pay lessor for damage to lessor's improvements, and shall save and hold lessor harmless from all claims for damage or harm to persons or property as a result of lease operations.

Sec. 9. Protection of diverse interests and equal opportunity—Lessee shall maintain a safe working environment in accordance with standard industry practices and take measures necessary to protect the health and safety of the public. Lessor reserves the right to ensure that production is sold at reasonable prices and to prevent monopoly.

Lessee shall comply with Executive Order No. 11246 of September 24, 1965, as amended, and regulations and relevant orders of the Secretary of Labor issued pursuant thereto. Neither lessee nor lessee's subcontractor shall maintain segregated facilities.

Sec. 10. Transfer of lease interests and relinquishment of lease—As required by regulations, lessee shall file with lessor, any assignment or other transfer of an interest in this lease. Lessee may relinquish this lease or any legal subdivision by filing in the proper office a written relinquishment, which shall be effective as of the date of filing, subject to the continued obligation of the lessee and surety to pay all accrued rentals and royalties.

Sec. 11. Delivery of premises—At such time as all or portions of this lease are returned to lessor, lessee shall place all wells in condition for suspension or abandonment, reclaim the land as specified by lessor, and within a reasonable period of time, remove equipment and improvements not deemed necessary by lessor for preservation of producible wells or continued protection of the environment.

Sec. 12. Proceedings in case of default—If lessee fails to comply with any provisions of this lease, and the noncompliance continues for 30 days after written notice thereof, this lease shall be subject to cancellation in accordance with the Act. However, if this lease includes land known to contain a well capable of production in commercial quantities, it may be cancelled only by judicial proceedings. This provision shall not be construed to prevent the exercise by lessor or any other legal and equitable remedy, including waiver of the default. Any such remedy or waiver shall not prevent later cancellation for the same default occurring at any other time.

Whenever the lessee fails to comply in a timely manner with any of the provisions of the this lease, the regulations, or formal orders, and immediate action is required, the Lessor enter on the leased lands and take measures deemed necessary to correct the failure at the expense of the Lessee.

Sec. 13. Heirs and successors-in-interest—Each obligation of this lease shall extend to and be binding upon, and every benefit hereof shall inure to, the heirs, executors, administrators, successors, or assigns of the respective parties hereto.



**United States Department of the Interior**  
**BUREAU OF LAND MANAGEMENT**  
 Nevada State Office  
 850 Harvard Way, P.O. Box 12000  
 Reno, Nevada 89520-0006

In Reply Refer To:  
 N-60686  
 3220  
 NV923f

Certified Mail  
 Return Receipt Requested

February 4, 1998

DECISION

Dixie Valley Power Partnership :  
 1114 Avenue of the America's : Geothermal Resources  
 New York, NY 10036-7790 :

Lease Cancelled in Part

A recent audit of geothermal resources lease N-60686 has revealed an error as to the lands that were available at the time of lease issuance. The lands in the lease were listed as parcel 19, on the March 6, 1996 Competitive Geothermal Sale List. All acquired lands in parcel 19 were listed in error. The entities who sold these lands to the United States, reserved "all oil, gas, mineral, geothermal mineral and geothermal water resource rights.....". Therefore, the acquired lands in parcel 19 were unavailable for geothermal leasing.

This decision hereby cancels lease N-60686 in part, more specifically, all acquired lands within the lease. The legal description of the lands within the original lease and the corrected lease are listed below:

Original lease:

Corrected to:

T. 22 N., R. 35 E., MDM, Nevada	T. 22 N., R. 35 E., MDM, Nevada	
sec. 17, E $\frac{1}{2}$ E $\frac{1}{2}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ ;	sec. 17, E $\frac{1}{2}$ E $\frac{1}{2}$ , W $\frac{1}{2}$ NW $\frac{1}{4}$ , S $\frac{1}{2}$ SW $\frac{1}{4}$ , SW $\frac{1}{4}$ SE $\frac{1}{4}$ ;	160+80+80+40= 360 ac
sec. 17, W $\frac{1}{2}$ NE $\frac{1}{4}$ , E $\frac{1}{2}$ NW $\frac{1}{4}$ , N $\frac{1}{2}$ SW $\frac{1}{4}$ , NW $\frac{1}{4}$ SE $\frac{1}{4}$ , (Acquired);	sec. 18, SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ ;	80 ac
sec. 18, SE $\frac{1}{4}$ NE $\frac{1}{4}$ , NE $\frac{1}{4}$ SE $\frac{1}{4}$ ;	sec. 19, E $\frac{1}{2}$ NE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ ;	320 ac
sec. 18, SE $\frac{1}{4}$ SE $\frac{1}{4}$ , (Acquired);	sec. 20, all;	640 ac
sec. 19, E $\frac{1}{2}$ NE $\frac{1}{4}$ , E $\frac{1}{2}$ SW $\frac{1}{4}$ , SE $\frac{1}{4}$ ;		<u>1400 ac</u>
sec. 19, W $\frac{1}{2}$ NE $\frac{1}{4}$ , (Acquired);		
sec. 20, all.		
containing 1800.00 acres	containing 1400.00 acres	

Lease N-60686 was listed as parcel 19, on the March 6, 1996, competitive sale. A bid in the amount of \$4500.00 was accepted for the 1800.00 acres included in the parcel. A refund will be authorized for part of the bonus bid, along with a refund of rental as described below:

400.00 acres X \$2.50 per acre - bonus bid	\$1000.00
400.00 acres X \$2.00 Per acre - '96 rental year	800.00
400.00 acres X \$2.00 Per acre - '97 rental year	<u>800.00</u>
Total Amount authorized for refund:	\$2600.00

This decision may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations that are contained in 43 CFR, Part 4 and the enclosed Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office (at the above address) within 30 days from receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to regulation contained in 43 CFR 4.21 (58 FR 4939, January 19, 1993) (request) for a stay (suspension) of the effectiveness of this decision during the time that your appeal is being reviewed by the Board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. Copies of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

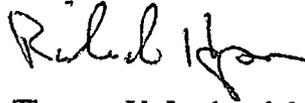
#### Standards for Obtaining a Stay

Except as otherwise provided by law or other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

- (1) The relative harm to the parties if the stay is granted or denied,
- (2) The likelihood of the appellant's success on the merits,
- (3) The likelihood of immediate and irreparable harm if the stay is not granted, and
- (4) Whether the public interest favors granting the stay.

The bonus bid and the rental refund, for the amount stated above, will be authorized upon expiration of the appeal period. All other terms and conditions of the lease remain the same.

If you have any questions, please call Jack Lewis at (702) 785-6538.



**Acting** Thomas V. Leshendok  
Deputy State Director, Minerals Management

## **EXHIBIT 8**

EA Utilization - November/2010

## ENVIRONMENTAL ASSESSMENT

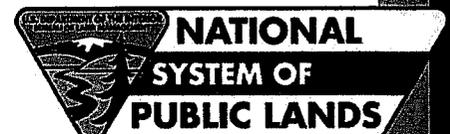
**TGP Dixie Development Company, LLC**

# Coyote Canyon Geothermal Utilization

DOI-BLM-NV-C010-2011-0001-EA

U.S. Department of the Interior  
Bureau of Land Management  
Carson City District  
Stillwater Field Office  
5665 Morgan Mill Road  
Carson City, NV 89701  
775-885-6000

**November 2010**



**DECISION RECORD**  
**TGP COYOTE CANYON UTILIZATION PROJECT**  
**IN CHURCHILL COUNTY, NEVADA**

**Environmental Assessment**  
**DOI-BLM-NV-C010-2011-0001-EA**  
**Dixie Valley Participating Area NVN-43282X**  
**and Geothermal Lease NVN-86892**

**1. INTRODUCTION**

TGP Dixie Development Company LLC (TGP) proposed to construct a 70 MW geothermal power plant and associated production/injections wells, pipelines, and support facilities in Dixie Valley in Churchill County, Nevada. Their utilization plan involves the Dixie Valley Participating Area NVN-43282X comprised of the following federal leases: NVN-17283A, NVN-17282, NVN-61705, NVN-61707, and an adjacent federal lease NVN-86892. This Coyote Canyon utilization plan area is entirely on federal leases managed by the BLM Carson City Stillwater Field Office. Power generated by the plant would be delivered to the existing transmission line via a short tie-in line from the power plant.

The purpose of the proposed action is to develop the geothermal resource within the TGP Coyote Canyon lease area in response to EO 13212, which directs the BLM in a timely manner to support efforts to increase energy production from federal minerals, while preserving the health of public lands.

This EA, DOI-BLM-NV-C010-2011-0001-EA, evaluates the impacts on the natural and human environment that could result from implementation of this geothermal development project on federal land. The impact analysis in the EA characterizes the potential for impacts for each resource in the project area. The determination of environmental risk is resource-specific and is based on a number of factors, including the presence and extent of resources within the proposed lease section, the extent of resources in the surrounding area, and the quality of existing data.

**2. DECISION**

I approve the proposed construction of a 70 MW geothermal power plant and associated production/injections wells, pipelines, and support facilities as describe in the Proposed Action of DOI-BLM-NV-C010-2011-0001-EA. This decision is contingent on meeting all lease stipulations, conditions of the geothermal drilling permits, and conditions/mitigation identified in the EA for electrical generation facilities. The Conditions of Approval for utilization of the geothermal resources are attached to this Decision Record. As referenced in the EA, before starting to prepare the facility site a BLM geothermal site license agreement and construction permit must be obtained by TGP. An approved commercial use permit is necessary prior to commencing commercial operations from the facility. Conditions may be identified in those authorizations.

**3. RATIONALE**

The Proposed Action and COAs meets the criteria described in the Federal Land Policy and Management Act of 1976 to prevent undue and unnecessary degradation of public land; the 43

CFR 3200, 3250 and 3260. The Proposed Action is in conformance with the Carson City Field Office Consolidated Resource Management Plan (2001) which states that the BLM desired outcome is to encourage development of energy and mineral resources in a timely manner to meet national, regional and local needs consistent with the objectives for other public land uses. The action must comply with the conditions of permit for the Nevada Division of Minerals Geothermal Resource Development Permit Application and with applicable rules and regulation of other local, state, and federal agencies

Teresa J. Knutson  
Teresa J. Knutson, Manager  
Stillwater Field Office  
Carson City District Office

03/07/2011  
Date

Attachment: Exhibit B Conditions of Approval

**FINDING OF NO SIGNIFICANT IMPACT  
TGP COYOTE CANYON UTILIZATION PROJECT  
IN CHURCHILL COUNTY, NEVADA**

**Environmental Assessment  
DOI-BLM-NV-C010-2011-0001-EA  
Dixie Valley Participating Area NVN-43282X  
and Geothermal Lease NVN-86892**

**INTRODUCTION**

TGP Dixie Development Company LLC (TGP) proposed to construct a 70 MW geothermal power plant and associated production/injections wells, pipelines, and support facilities in Dixie Valley in Churchill County, Nevada. Their utilization plan involves the Dixie Valley Participating Area NVN-43282X comprised of the following federal leases: NVN-17283A, NVN-17282, NVN-61705, NVN-61707, and an adjacent federal lease NVN-86892. This Coyote Canyon utilization plan area is entirely on federal leases managed by the BLM Carson City Stillwater Field Office. Power generated by the plant would be delivered to the existing transmission line via a short tie-in line from the power plant.

The purpose of the proposed action is to develop the geothermal resource within the TGP Coyote Canyon lease area in response to EO 13212, which directs the BLM in a timely manner to support efforts to increase energy production from federal minerals, while preserving the health of public lands.

This EA, DOI-BLM-NV-C010-2011-0001-EA, evaluates the impacts on the natural and human environment that could result from implementation of this geothermal development project on federal land. The impact analysis in the EA characterizes the potential for impacts for each resource in the project area. The determination of environmental risk is resource-specific and is based on a number of factors, including the presence and extent of resources within the proposed lease section, the extent of resources in the surrounding area, and the quality of existing data.

**PLAN CONFORMANCE AND CONSISTENCY**

The Proposed Action has been reviewed for conformance with the Carson City Field Office Consolidated Resource Management Plan (2001) and is found to be consistent with current BLM policies, plans and programs. The proposed action is consistent with Churchill County ordinances, policies and plans.

**FINDING OF NO SIGNIFICANT IMPACT DETERMINATION**

Based on the analysis of the TGP Coyote Canyon Utilization Project, environmental assessment DOI-BLM-NV-C010-2011-0001-EA, I have determined that the action will not have a significant effect on the human environment and an environmental impact statement (EIS) will not be prepared. This finding is based on the context and intensity of the project as described:

**Context:**

The proposed power plant and associated production/injections wells, pipelines, and support facilities development of the federal geothermal resources will produce renewable energy that may exist in the project area. BLM approves the projects under the Conditions of Approval attached hereto as Exhibit B.

**Intensity:**

The Council on Environmental Quality (CEQ) regulations includes the following ten considerations for evaluating intensity:

*1) Impacts that may be both beneficial and adverse.*

None of the environmental effects discussed in detail in the EA are considered significant, nor do the effects exceed any known threshold of significance, either beneficial or adverse. The Proposed Action is geothermal resource development consisting of construction of a geothermal power plant and associated production/injections wells, pipelines, and support facilities and their associated activity as described in the EA, as well as reclamation of these disturbances if these structures are not developed.

*2) The degree to which the selected alternative will affect public health or safety:*

The Proposed Action is to construct a power plant and associated production/injections wells, pipelines, and support facilities and development of the geothermal resources for electrical generation in the project area analyzed in the EA. It is reasonable to expect further resource exploration and development if the company determines the geothermal resource can generate additional power and any future activities which could affect public health or safety but those types of activities would be subject to further environmental analysis when considered. These types of issues could be addressed through conditions of approval for further exploration and development actions as determined by federal and state agencies.

*3) Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farm lands, wetlands, wilderness, wild and scenic rivers, or ecologically critical areas.*

There are no park lands, prime farm lands, wild and scenic rivers, or ecologically critical areas in or near the sites proposed. BLM has considered the Area of Potential Effect (APE) relative to cultural resources and historic properties, providing oversight for a full inventory of the project area. Based on the cultural inventory, BLM determined that historic properties are present in the APE and TGP shall avoid these sites. BLM conducted reasonable and good faith government-to-government consultation with the Fallon Paiute-Shoshone Tribe. Through this process, BLM determined that impacts would be negligible for the proposed exploration drilling project relative to cultural resources in proximity to the APE. The Nevada State Historic Preservation Officer (SHPO) has concurred with these determinations and procedures.

4) *The degree to which the effects on the quality of the human environment are likely to be highly controversial.*

The effects of the Proposed Action on the human or natural environment were determined to be negligible. Development for geothermal resources and its potential effects on resources in this project area has been analyzed in this EA.

5) *The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.*

The Proposed Action is not unique or unusual. The action described in the EA is power plant construction and associated production/injections wells, pipelines, and support facilities to develop the geothermal resource. There are no predicted effects on the human environment that are considered highly uncertain or involve unique or unknown risks. Public comment has been minimal.

6) *The degree to which the action may establish a precedent for future actions with significant effects or presents a decision in principle about a future consideration.*

As additional development of energy generation facilities is proposed on a geothermal lease, an environmental analysis maybe warranted to assess impacts resulting from these types of projects. The progression of the project from leasing to exploration to development is customary and expected. It is reasonable to expect further resource exploration and development if the company determines the geothermal resource can generate additional power and any future activities which could affect public health or safety but those types of activities would be subject to further environmental analysis when considered.

7) *Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.*

Resource values, as identified in this EA, were evaluated for cumulative impacts and determined that cumulative impacts would be negligible for the proposed exploration project. Subsequent actions for geothermal resource development would be evaluated for cumulative impacts in associated environmental analysis that may be warranted and would be addressed through mitigation of the proposed future action and through development of conditions of approval.

8) *The degree to which the action may adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places or may cause loss or destruction of significant scientific, cultural, or historical resources.*

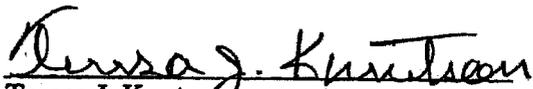
As described in the EA, the project will not adversely affect districts, sites, highways, structures, or other objects listed in or eligible for listing in the National Register of Historic Places, nor will it cause loss or destruction of significant scientific, cultural, or historical resources.

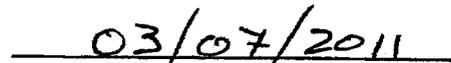
9) *The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under ESA of 1973.*

As described in the EA, no known threatened or endangered species or critical habitat has been identified in the project area considered in the EA. Any future exploration and development actions would be evaluated in a future environmental analysis for the future project.

10) *Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.*

As described in the EA, the Proposed Action does not violate any known Federal, State, or local law or requirement imposed for protection of the environment. Resource specialists from the BLM Stillwater Field Office, the State of Nevada, Churchill County, and the Fallon Paiute-Shoshone Tribe were notified of the proposal.

  
Teresa J. Knutson  
Stillwater Field Manager  
Carson City District Office

  
Date



## United States Department of the Interior



BUREAU OF LAND MANAGEMENT  
Carson City District – Stillwater Field Office  
5665 Morgan Mill Road  
Carson City, Nevada 89701-1448  
[http://www.blm.gov/nv/st/en/fo/carson\\_city\\_field.html](http://www.blm.gov/nv/st/en/fo/carson_city_field.html)

OCT 26 2010

In Reply Refer To:  
N86892,17283A, 17282,61705,61707  
3200/1792

Dear Reader:

The Bureau of Land Management (BLM), Carson City District, Stillwater Field Office, has completed an environmental assessment (EA) for the *Coyote Canyon Geothermal Utilization* proposed by TGP Dixie Development Company (TGP). The EA will be available for review for a 30-day public comment period. The BLM is accepting written comments on this EA until December 1, 2010. The proposed geothermal utilization project is located in Dixie Valley approximately 27 miles east of Fallon, Nevada, Churchill County.

The primary objective of the project is to utilize geothermal resources for power generation. TGP is proposing to design, construct, and operate a nominal 70-MW geothermal power plant facility, geothermal production and injection wells, pipelines and support facilities, and a 230-kV gen-tie transmission line (less than a mile) to connect to an existing 230-kV transmission line.

A copy of this EA is available at [www.blm.gov/nv/st/en/fo/carson\\_city\\_field.html](http://www.blm.gov/nv/st/en/fo/carson_city_field.html). Please send written comments to: Desna Young, Planning & Environmental Coordinator, Stillwater Field Office, 5665 Morgan Mill Road, Carson City, NV 89701. Comments may also be received via email at [desna\\_young@blm.gov](mailto:desna_young@blm.gov). Email should include "Coyote Canyon Geothermal Utilization EA" in the subject line. A hardcopy can be provided upon request. A copy of the EA is also available in the Carson City District BLM office during the comment period.

Public comments submitted for this proposed project, including names and addresses of those who commented will be available for public review at the Carson City District BLM office during regular business hours 7:30 a.m. to 4:30 p.m., Monday through Friday, except federal holidays. Before including your address, phone number, e-mail address, or other personal information in your comment, you should be aware that your entire comment-including your personal information- may be publicly available at any time. While you ask us in your comment to withhold personal identifying information from public review, we cannot guarantee that we will be able to do so. After the public review period has ended, comments will be analyzed and considered part of the decision-making process. If you have any questions, please contact Desna Young at (775) 885-6078 or at the above address.

Sincerely,

Teresa J. Knutson  
Manager,  
Stillwater Field Office

It is the mission of the Bureau of Land Management to sustain the health, diversity, and productivity of the public lands for the use and enjoyment of present and future generations.

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# Acronyms and Abbreviations

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afy	acre-feet per year
APLIC	Avian Power Line Interaction Committee
AUM	animal unit month
BLM	Bureau of Land Management
BMP	best management practice
C <sub>4</sub> H <sub>10</sub>	isobutane/butane
C <sub>5</sub> H <sub>12</sub>	isopentane/pentane
CC	Coyote Canyon
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CH <sub>4</sub>	methane
CO	carbon monoxide
CO <sub>2</sub>	carbon dioxide
CRMP	Carson City Consolidated Resources Management Plan
EA	environmental assessment
EO	Executive Order
EPA	U.S. Environmental Protection Agency
FAA	Federal Aviation Administration
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Program Mapping
GHG	Greenhouse gas
gpd/ft	gallons per day per foot
H <sub>2</sub> S	hydrogen sulfide
kV	kilovolt
MBTA	Migratory Bird Treaty Act
meq/L	milliequivalents per liter
mg/L	milligram(s) per liter

MOA	Military Operating Area
MW	megawatt
N <sub>2</sub>	nitrogen
NAAQS	National Ambient Air Quality Standards
NAS Fallon	Naval Air Station-Fallon
NCG	non-condensable gas
NDEP	Nevada Division of Environmental Protection
NDEP-BAPC	NDEP-Bureau of Air Pollution Control
NDOM	Nevada Division of Minerals
NDOW	Nevada Department of Wildlife
NDWR	Nevada Division of Water Resources
NEPA	National Environmental Policy Act
NO <sub>2</sub>	nitrogen dioxide
NPS	National Park Service
NRHP	National Register of Historic Places
OHV	off-highway vehicle
PEIS	programmatic environmental impact statement
PFYC	Potential Fossil Yield Classifications
PM <sub>10</sub>	particulate matter smaller than 10 microns in aerodynamic diameter
PM <sub>2.5</sub>	particulate matter smaller than 2.5 microns in aerodynamic diameter
RFFA	Reasonably foreseeable future action
ROW	right-of way
SFHA	special flood hazard area
SHPO	State Historic Preservation Office
SO <sub>2</sub>	sulfur dioxide
SPCC	Spill Prevention, Control, and Countermeasures
SWReGAP	Southwest Regional Gap Analysis Project
TDS	total dissolved solid
TGP	TGP Dixie Development Company, LLC
USC	United States Code

USDA NRCS	U.S. Department of Agriculture National Resource Conservation Service
USDI	U.S. Department of the Interior
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound

## SECTION 1

# Introduction / Purpose and Need

---

## 1.1 Introduction

Geothermal resources are underground reservoirs of hot water or steam created by heat from the earth. Geothermal steam and hot water can reach the surface of the earth in the form of hot springs, geysers, mud post, or steam vents. These resources also can be accessed by wells, and the heat energy can be used for generating electricity or for other direct uses, such as heating greenhouses and aquaculture operations or for dehydrating vegetables.

It is the policy of the Department of the Interior, consistent with Section 2 of the Mining and Mineral Policy Act of 1970 and Sections 102(a)(7), (8), and (12) of the Federal Land Policy and Management Act of 1976, to encourage the development of mineral resources, including geothermal resources, on federal lands. The Geothermal Steam Act of 1970 (43 Code of Federal Regulations [CFR] Part 3200, et seq., as amended) provides regulatory guidance for geothermal leasing by the Bureau of Land Management (BLM).

There are four stages of geothermal resource development within a lease: (1) exploration, (2) development, (3) production, and (4) closeout. Each of the four stages under the lease requires separate BLM authorization and compliance with the National Environmental Policy Act (NEPA) of 1969 when ground-disturbing activities are proposed. As described in Chapter 2, this environmental assessment (EA) addresses the proposed development of geothermal resources in the Dixie Valley area. Figure 1-1 (all figures are provided at the end of their respective sections) provides the locations of the Proposed Action at Coyote Canyon.

The Coyote Canyon and Dixie Meadows Geothermal Exploration Environmental Assessment (BLM, 2010), Finding of No Significant Impact and Decision Record was signed June 7, 2010. This document evaluated potential impacts associated with geothermal exploration. Geothermal exploration activities authorized by BLM are current and ongoing. Currently at Coyote Canyon, four of the leases shown below are committed to the existing Dixie Valley Geothermal Unit, serial number NVN-43282X: NVN-61705, NVN-61707, NVN-17282, and NVN-17283A (Figure 1-2).

Leases held and the date they were obtained by TGP Dixie Development Company, LLC, (TGP) and its subsidiaries for the Proposed Action at Coyote Canyon are shown in Table 1-1 and Figure 1-3.

**TABLE 1-1**  
Coyote Canyon Geothermal Leases

Lease Number	Section Number	Township, Range	Date of Lease Purchase/Acquisition
N-86892	Section 21	T24N, R36E	September 2009
N-17283A	Section 22	T24N, R36E	December 2008
N-17282	Sections 14-15 and 23	T24N, R36E	December 2008
N-61705	Section 24	T24N, R36E	December 2008
N-61707	Sections 12 and 13	T24N, R36E	December 2007 and 2008

TGP submitted to the BLM, Stillwater Field Office, a Utilization Plan for the development and production of the Coyote Canyon (CC) and Dixie Meadows project areas. The projects were split out for separate analysis. This EA analyzes the potential impacts for the Proposed Action at CC that are associated with the proposed construction and operation of a geothermal power plant; drilling, testing, and operation of geothermal production and injection wells; conversion of exploration wells to production or injection wells; construction and operation of pipelines to carry geothermal fluid between well fields and the power plant; and a 230-kilovolt (kV) transmission tie line (referred to as a gen-tie) and associated structures interconnecting the geothermal power plant to the existing 230-kV transmission line in Dixie Valley, Churchill County, Nevada.

## 1.2 Purpose and Need

The purpose of the Proposed Action is to develop and utilize geothermal resources at CC. The need for the action is established by BLM's responsibility under the Geothermal Steam Act of 1970; the regulations under 43 CFR 3270; the Minerals Leasing Act of 1920, as amended; and Secretarial Order No. 3285 A1 of February 22, 2010.

## 1.3 Land Use Plan Conformance Statement

The Proposed Action is consistent with the BLM Carson City Field Office Consolidated Resource Management Plan (CRMP), May 2001, as amended, and with other federal state, and local laws, regulations. The CRMP states that the desired outcome for minerals and energy management is to "encourage development of energy and mineral resources in a timely manner to meet national, regional, and local needs consistent with the objectives for other public land uses (MIN-1)."

The Proposed Action is consistent with the Churchill County Master Plan, Update 2010. This Master Plan Update established policies for minerals on federal lands and recognizes that the development of Nevada's mineral resources is desirable and necessary to the nation, state, and Churchill County. The Master Plan also identifies that the expansion and development of geothermal resources should be promoted on lands under federal land management.

## 1.4 Relationship to Laws, Regulations, Policies, and Other Plans

The EA has been prepared in accordance with the following statutes and implementing regulations, policies, and procedures:

- NEPA of 1969, as amended (Public Law 91-190, 42 United States Code [USC] 4321 et seq.)
  - 40 CFR 1500 et seq. Regulations for Implementing the Procedural Provisions of NEPA
  - Considering Cumulative Effects under NEPA (Council on Environmental Quality [CEQ], 1997)
  - 43 CFR Part 46, Implementation of NEPA of 1969; Final Rule, effective November 14, 2008
  - U.S. Department of the Interior (USDI) requirements (Departmental Manual 516, Environmental Quality (USDI, 2008)
  - BLM NEPA Handbook (H-1790 1), as updated (BLM, 2008b)
- The Geothermal Steam Act of 1970 (30 USC 1001-1025)
- 43 CFR 3200, Geothermal Resources Leasing and Operations; Final Rule, May 2, 2007
- The 2005 Energy Policy Act; The National Energy Policy, Executive Order 13212, and best management practices (BMPs) as defined in *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, Fourth Edition (Gold Book)* (BLM, 2007a)
- Federal Land Policy and Management Act of 1976, as amended.
- Churchill County Master Plan (2010 Update)

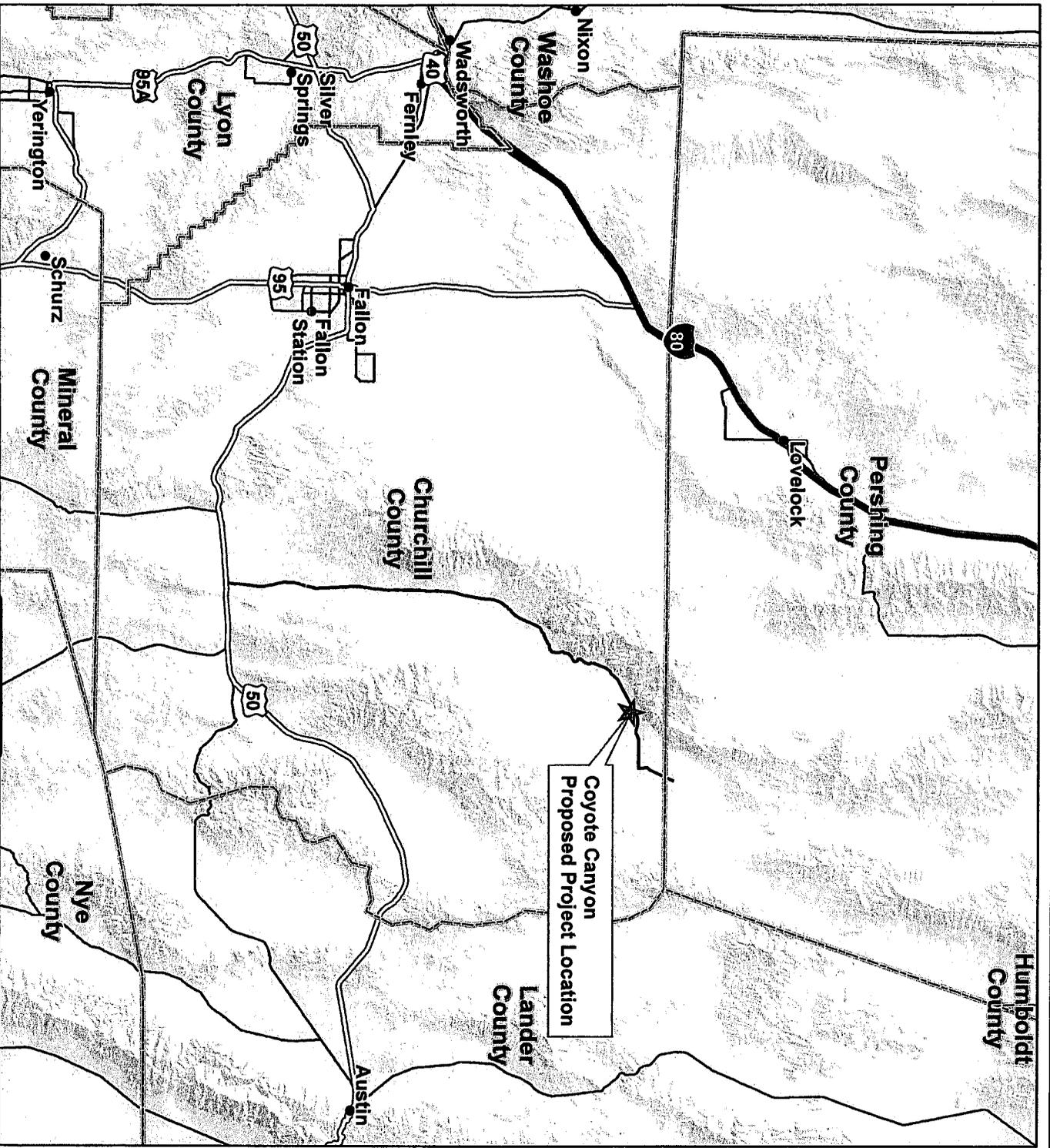
## 1.5 Authorizing Actions

The Proposed Action would be subject to other applicable state and local permits listed in Table 1-2 prior to beginning construction.

**TABLE 1-2**  
List of Federal, State, and County Permits

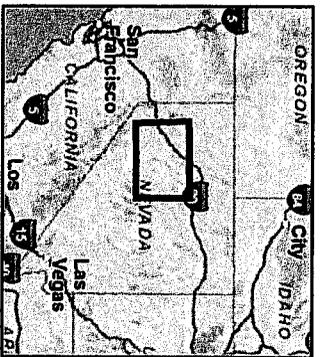
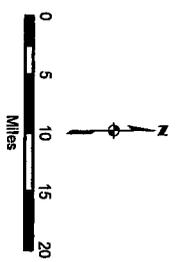
<b>Regulatory Agency</b>	<b>Authorizing Action</b>
BLM	Geothermal Drilling Permit
BLM	Facility Construction Permit
BLM	Site License
Nevada Division of Minerals	State Drilling Permit
Nevada Division of Environmental Protection –Bureau of Water Pollution Control	Construction Stormwater Permit
Nevada Division of Environmental Protection –Bureau of Water Pollution Control	Industrial Stormwater Permit
Nevada Division of Environmental Protection –Bureau of Water Pollution Control	Temporary Working in Water Ways Permit
Nevada Division of Environmental Protection –Bureau of Water Pollution Control	Groundwater Discharge Permit
Nevada Division of Environmental Protection –Bureau of Water Pollution Control	Commercial Septic Systems Permit
Nevada Division of Environmental Protection –Bureau of Water Pollution Control	Underground Injection Control Permit
Nevada Division of Environmental Protection –Bureau of Air Quality Planning	Chemical Accident Prevention Program
Nevada Department of Conservation and Natural Resources, Division of Water Resources	Temporary Consumptive Water Use Permit
Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Air Pollution Control	Surface Area Disturbance Permit
Nevada Department of Conservation and Natural Resources, Division of Environmental Protection, Bureau of Air Pollution Control	Class I Operating Permit
Churchill County	Special Use Permit
Public Utilities Commission of Nevada	Utility Environmental Protection Act Permit

Insert Section 1 figures (3 total)



**Figure 1-1:  
Project Location  
Coyote Canyon**

- Cities
- County Boundaries
- ▬ Interstate Highway
- ▬ US Highways
- ▬ Local Road



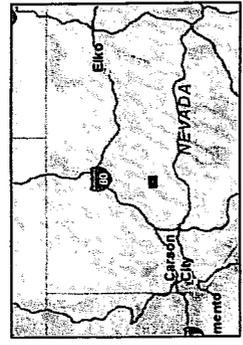
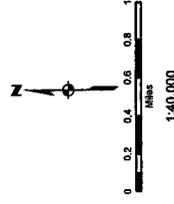
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**Figure 1-2  
TGP Coyote Canyon Leases  
and Dixie Valley Unit**

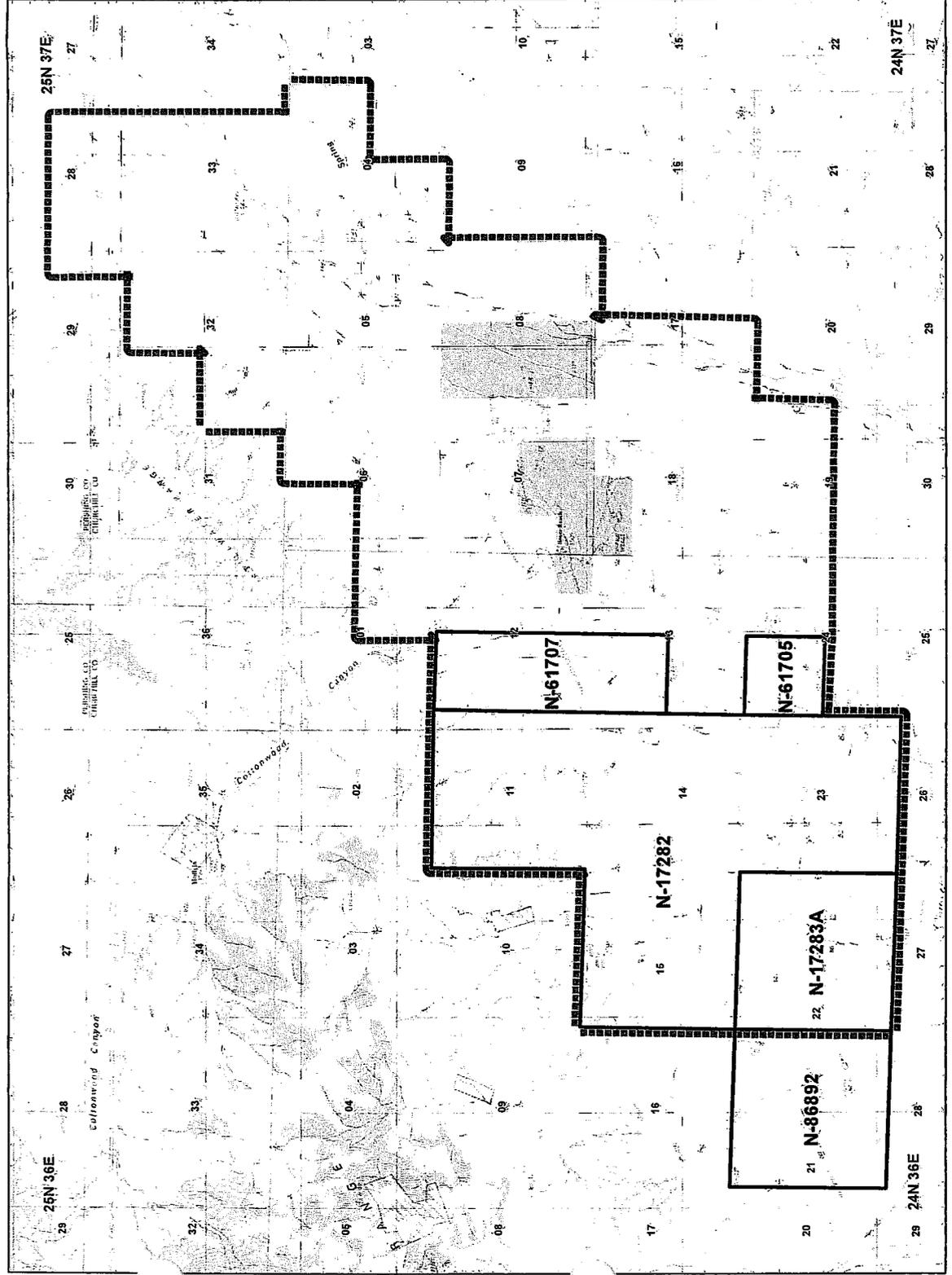
-  Dixie Valley Unit
-  Bureau of Land Management
-  Private
-  Coyote Canyon BLM Leases
-  Navy



No warranty is made by the Bureau of Land Management as to the accuracy, reliability, or completeness of these data for individual use or aggregate use with other data.

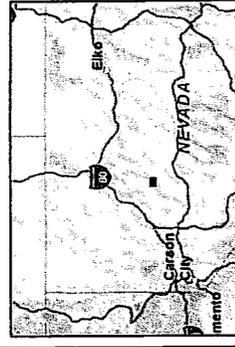
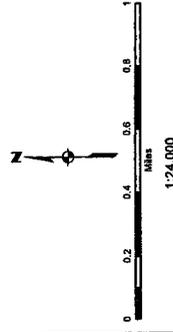


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**Figure 1-3  
TGP Coyote Canyon Leases**

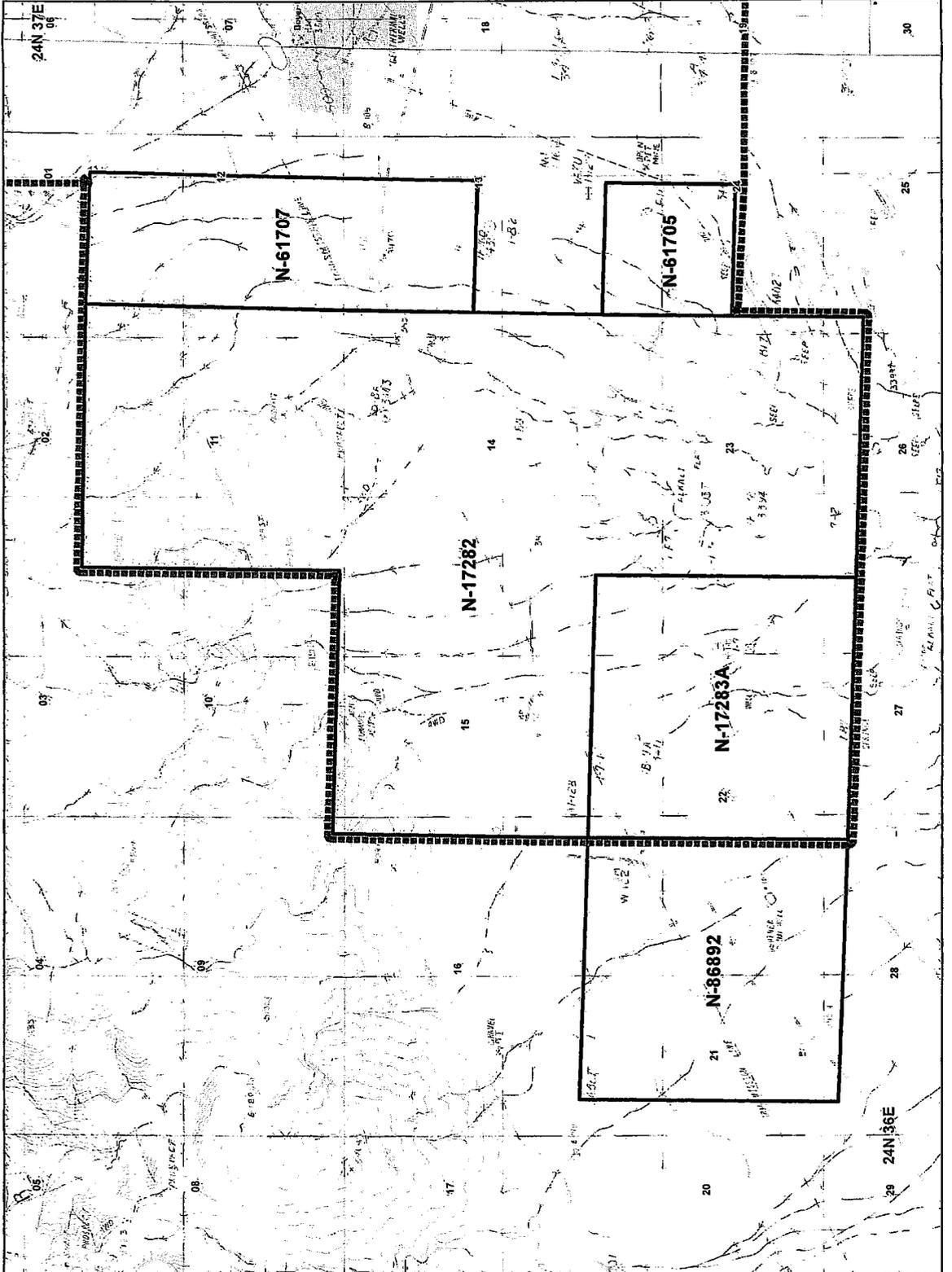
-  Coyote Canyon BLM Leases
-  Dixie Valley Unit
-  Bureau of Land Management
-  Private
-  Navy



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## SECTION 2

# Proposed Action and Alternative

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This section presents the Proposed Action and the No Action Alternative.

## 2.1 Proposed Action

TGP proposes to construct and operate a nominal 70-megawatt (MW), utility-grade geothermal power plant in Dixie Valley, Churchill County, Nevada (Figure 1-1). The power plant would generate electricity from the geothermal resources within the CC lease area. Once commercial operations begin, power would be delivered via the California Independent System Operator.

The Proposed Action consists of construction and operation of the following:

- A nominal 70-MW geothermal power plant facility
- Geothermal production and injection wells, pipelines, and support facilities
- A 230-kV gen-tie, less than 1 mile long
- A non-potable water well

### 2.1.1 Overview of Proposed Action

The following sections present information concerning components of the Proposed Action. TGP proposes to conduct geothermal utilization in a portion of the CC lease area called the Proposed Action area. The CC geothermal leases held by TGP contain 7,681 acres (see Figure 1-3).

#### 2.1.1.1 Location

Figure 2-1 shows the approximate layout of the Proposed Action. To allow for flexibility, TGP has identified a portion of the lease area called the Proposed Action area where the proposed power plant facilities would be constructed. Four potential locations are shown for the proposed power plant facilities. Only one of the four locations would be constructed. The selected location would be defined by TGP upon completion of its exploration program. Up to 30 additional production or injection wells would be drilled at the 15 well pads previously approved by the BLM for a total of 45 wells. Potential gen-tie locations are shown for each of the four potential power plant locations. Table 2-1 summarizes the proposed facilities along with estimated area of permanent or temporary disturbance for each.

**TABLE 2-1**  
Proposed Action Disturbed Areas

Facility	Number Required	Area/Dimensions per Structure	Disturbed Area (acres)
<b>New Facilities Included in the Proposed Action</b>			
Pipeline Supports <sup>a</sup>	1,692	Up to 0.70 sq. ft. per structure	0.03
Gen-tie Support Structures <sup>b</sup>	3	Up to 24 sq. ft. permanent disturbance per structure	Permanent: 0.002 acre
		Up to 13,200 sq. ft. temporary disturbance per structure	Temporary: 1 acre
Power Plant Facilities <sup>c</sup>	NA	1,170 feet by 2,240 feet	60
<b>Total New Disturbed Area</b>			<b>61</b>

<sup>a</sup> Pipeline support structures would be placed an average of 30 feet apart, for a total of approximately 1,692 structures along the expected length of pipeline.

<sup>b</sup> Gen-tie support structures would be placed at up to eight structures per mile, for a total of approximately three structures along the expected maximum length of gen-tie.

<sup>c</sup> Construction and operations of the power plant facility are expected to occupy the entire 1,170- by 2,240-foot area.

### 2.1.1.2 Proposed Action Facilities

The Proposed Action includes construction and operations of roads, parking and laydown areas; production and injection wells and associated structures; pipelines; power plant infrastructure; electrical systems, including substation, gen-tie and ring bus collector; and associated control and safety systems.

#### Roads, Parking, and Laydown Areas

Limited roads and parking areas would be required for vehicle access and parking within the fenced, 60-acre facility area. A parking area approximately 100 feet long by 25 feet wide would be constructed outside the maintenance building and a second parking area approximately 175 feet long by 25 feet wide would be constructed adjacent to the office building. Less than 2,500 feet of new access road would need to be constructed within the facility area to provide for safe and efficient movement of facility maintenance vehicles. These access roads would generally be 25 feet wide or less. All roads and parking areas within the facility area would have gravel cover to minimize the generation of dust and sediment. A laydown area of approximately 400 by 600 feet would be constructed near the parking area to store equipment and materials prior to or during construction activities.

The power plant facility would include the main plant components and support facilities, wells, gen-tie, and pipelines described above. Roads, wells, and well pads approved by the BLM for exploration purposes would be converted to permanent use for plant operations under the Proposed Action. Table 2-2 summarizes the conversion of exploration facilities included as part of this Proposed Action. Figure 2-2 shows the projected plant general arrangement. The entire 60-acre footprint of the plant site would be permanently disturbed by access roads, parking, and laydown areas.

**TABLE 2-2**  
Coyote Canyon Facilities to be Converted from Exploration Use

Facility	Length (feet)	Dimensions	Disturbed Area (acres)
<b>Facilities to be Converted from Exploration Use</b>			
Well Pads	NA	15 well pads, 350 x 350 ft, plus one non-potable water well pad, 150 x 150 ft	42.7
Access and Branch Roads	50,754	25 feet wide, plus turnouts	30.3
<b>Total Area to be Converted from Exploration Use</b>			<b>72.5</b>

### Production and Injection Wells

Up to 15 exploration wells and associated well pads were previously permitted for the Proposed Action site by the BLM. These exploration wells would be converted to either production or injection wells under the Proposed Action. In addition, TGP would drill up to 30 additional production and injection wells on the 15 previously permitted well pads (Figure 2-1). Multiple wells could be drilled on one well pad. The injection wells would be constructed to dispose of water into the geothermal reservoir to maintain pressure support for the resource. As described under Power Plant Infrastructure below, the total flow rate of geothermal fluid required for plant operation would be up to 5.9 million pounds per hour [19,050 acre-feet per year (afy)] of geothermal fluid. The actual number of wells drilled would depend on the well and resource productivity. If individual wells show higher production rates (fluid flow, temperature), fewer wells would be drilled because the total flow rate of geothermal fluid required for the plant operations would not exceed 5.9 million pounds per hour (19,050 afy).

A detailed geothermal drilling program would be submitted to the BLM for review and approval prior to beginning drilling operations. This section summarizes the well drilling activities for purposes of evaluating potential environmental consequences. If necessary, the BLM may include additional provisions or conditions needed to address environmental concerns or other site-specific issues with the geothermal drilling permit.

Each well would be drilled using a large diesel rotary drilling rig. During drilling, the top of the drill rig derrick would be up to 160 feet above the ground surface, depending on the rig used. The typical drill rig and associated support equipment (rig floor and stands; draw works; mast; drill pipes; trailers; mud, fuel and water storage tanks; diesel generators; air compressors) would be brought to the previously permitted pad on seven to ten large tractor-trailer trucks. An average of six to eight small trucks/service vehicles/workers' vehicles could be driven to the active well site each day throughout the typical 8-week drilling process. Drilling would be conducted 24 hours per day, 7 days per week by a crew of up to 12 workers per well. Typically, one drill rig would be onsite at a time but TGP may choose to drill up to three wells at once, bringing the total crew to as many as 36. Crews would include the drilling supervisor, geologists, suppliers, and operators.

Secondary containment structures would be provided for all chemical and petroleum/oil storage areas during drilling operations. Additionally, absorbent pads or sheets would be placed under likely spill sources and spill kits would be maintained onsite during

construction and drilling activities to provide prompt response to accidental leaks or spills of chemicals and petroleum products.

Upon completion of the drilling operations, clean-out and flow tests would be performed on the wells to define the geothermal resource characteristics. Flow testing would typically run for an average of 3 days (24 hours a day) for each well, but the duration may vary depending on well characteristics. During these tests, the flow would be routed to the previously permitted reserve pits. It is anticipated that the initial flow rates of fluid from each well into its reserve pit would be approximately 500 to 1,500 gallons per minute (810 to 2,420 afy), on average, depending on the productivity of the well.

After completing and testing each well, it may be necessary to conduct well stimulation operations to enhance flow in the well bore, either from the well (production) or into the well (injection). Well stimulation operations could involve injecting a dilute mixture of 35 percent solution of hydrochloric (muriatic) acid down the well. The amount of dilute acid placed in the well bore could vary from 10,000 to 50,000 gallons or more based on well characteristics. Concentrated hydrochloric acid would be trucked to the site and diluted onsite. After well stimulation, the well would be back-flowed and the well flow would be tested, neutralized if necessary, and discharged to the reserve pit.

TGP may decide to conduct directional drilling at each site based on the location and extent of geothermal resources in proximity to the well site. Directional drilling would likely result in a deep bottom hole located under BLM lease areas. TGP Geothermal Drilling Permit applications would be submitted to the BLM for the drilling of these wells, pursuant to 43 CFR 3260.11.

A hydrological monitoring program has been developed to monitor potential effects to water resources on public lands caused by the Proposed Action. The BLM-approved monitoring program includes, but is not limited to, monitoring groundwater quality, levels, and temperatures. As drilling and development continue, data would be collected to establish hydrologic baseline characteristics.

### **Well-field Structures**

**Production Wells.** Each production well would be designed to have a well head, geothermal fluid separation equipment, well pad services building with an associated emergency generator (diesel), and brine transfer pump that would be located within a fenced area of the pad. Equipment on the well pad would be less than 65 feet tall and would be painted to blend into the environment, consistent with BLM guidance.

During well start up or transient (or upset) conditions, geothermal fluid would be transferred to a one-million-gallon brine holding pond located adjacent to each production well (the reserve pits constructed during exploration drilling operations would be converted to brine storage ponds for facility operations).

Chemical scale inhibitors are anticipated to be at the production well pads. These inhibitors would be injected into the production wells to inhibit scale accumulation. The actual type and amount of inhibitors would be determined after the wells have been tested. The inhibitor injection system, including injection pumps and metering systems, would be stored in a tank in a bermed area on the well pad.

**Injection Well Structures.** The injection well pads would include a well head, a manual throttle valve, an isolation valve, a pump for injecting fluid, and connecting pipelines.

### **Well Connection Pipelines**

TGP proposes to construct aboveground pipelines to carry geothermal fluids from production wells to the plant, and to return spent geothermal fluids (brine) for injection into the geothermal resource through injection wells. The aboveground pipelines would be in the Proposed Action area as shown on Figure 2-1.

The new aboveground pipelines would be constructed within the 200-foot right-of way (ROW) of the access roads built during exploration drilling operations. These access roads were permitted with a width of 25 feet, including a travel way, shoulder, and drainage swales on each side. The pipelines would be situated on the shoulder of the travel way, which would allow for sufficient travel way for vehicle traffic. Figure 2-1 shows the anticipated locations of the aboveground pipeline corridors for the Proposed Action.

The pipelines would be constructed of welded carbon steel pipe that would be covered with 2 to 3 inches of insulation. It is anticipated that the pipelines would range in diameter from 16 inches to 48 inches and would be constructed 2 to 3 feet above the ground surface with structural supports located about every 30 feet. Pipeline thermal expansion would be accommodated by a series of sliding pipe supports, expansion loops, and strategically placed anchored pipe supports. All expansion loops are expected to be horizontal outside the plant area (between the plant and the wells); vertical expansion loops may be required within the plant area where space may be limited and access required. Some portions of the pipe runs may need to be buried, especially at road crossings where safety is a concern.

Condensate “pots” would be installed in numerous locations under each new production pipeline to minimize the chance for inadvertent leaking of geothermal fluid from the pipelines into area soils. The exact location and the total number of condensate pots have yet to be determined.

### **Power Plant Infrastructure**

The power plant would encompass an area of approximately 60 acres (or 1,170 by 2,240 feet), excluding the disturbed area for the gen-tie and pipelines. The power plant site would be confirmed as part of the facility’s final design; Figure 2-1 shows the potential power plant sites.

A chain link fence would be installed around the main facility area to prevent unwarranted access to the facility by the public and to prevent wildlife from entering the facility/electrical generation area. The chain link fence would be equipped with controlled-entry gates to allow vehicle egress/ingress.

Existing access roads would be used to the extent possible, and upgraded as necessary to support construction and operational vehicle traffic. The primary access to the CC lease area would be via U.S. Highway 50. From Highway 50, State Route 121 leads to the lease area.

Limited roads would be required for vehicle access within the fenced, 60-acre facility area (Figure 2-2). Less than 2,500 feet of new access road would need to be constructed within the facility area to provide safe and efficient movement of facility maintenance vehicles. These access roads generally would be 25 feet wide or less. All roads within the facility area would

be provided with a gravel cover to minimize the generation of dust and sediment. Roads within the facility area would be constructed in keeping with the BLM's Gold Book standards (BLM, 2007a).

The 230-kV gen-tie would be constructed within a corridor up to 200 feet wide between the proposed substation and the existing 230-kV transmission line. No new roads would be constructed for the gen-tie.

The construction and operation of the Proposed Action would require several types of structures and ancillary equipment, including steam separators, power turbine(s), heat exchangers, condensers and cooling equipment, and a 230-kV electrical substation. Additional communication lines, if needed, would be located on or near the existing transmission line within the existing ROW. Buildings required at the power plant include an office/control room and maintenance/storage buildings with associated parking areas. A gen-tie would need to be constructed at the site to interconnect the power plant with the existing 230-kV transmission line, which runs through the Proposed Action area. Table 2-3 provides a summary of the facility structures, dimensions, and a summary of their uses. The proposed plant general arrangement is shown on Figure 2-2.

**TABLE 2-3**  
Facility Structures and Dimensions

Structure	Proposed Dimensions	Use
Office/Control Room	75 x 50 feet	An office and restrooms
Electrical Room/Control Room Building	75 x 50 feet	House switchgear, motor control center, the control room
Electrical Substation	175 x 125 feet	Voltage control and power distribution
Gen-tie	50 x 2,000 feet	Used to interconnect power plant to existing transmission line
Maintenance Building	75 x 100 feet	Storage and maintenance of equipment/vehicles
Electrical Generator Facility	250 x 150 feet	Converts steam into electricity
Binary Power System (Heat Exchangers and Power Turbine)	100 x 50 feet (up to seven required)	Transfer heat from brine to working fluid and converts to electricity
Air Cooled Condensers (Dry Cooling) or hybrid	325 x 60 feet (up to seven required)	Removal of waste process heat from system
Brine Containment Basin	~ 45,000 ft <sup>2</sup>	Collect excess flows from rock mufflers, cooling towers, stormwater, and equipment drains
Septic Disposal/Leaching Field	100 x 50 feet	Disposal of sanitary wastes generated in typical office/plant setting
Water Storage Tank	30 feet diameter x 40 feet tall	Storage of water for fire suppression
Fire Pump House	25 x 25 feet	Houses fire control equipment
Lube Oil & Diesel Fuel Tank Secondary Containment Area	Tank size TBD; secondary containment area = 50 x 30 feet	Storage of lube oil and diesel fuel
Non-Condensable Gas Removal System	50 x 30 feet	Remove non-condensable gases from steam

The tallest permanent structure would be the electrical gen-tie towers (power poles) at 85 feet. If the flash technology is selected, the crane reaching over the steam turbine generator set would reach 75 feet and would be the second-tallest structure. Other plant equipment would have structures lower than 75 feet.

All power plant buildings (not including power plant equipment) would be rigid, steel-frame, pre-engineered structures with steel panel walls and steel roofs. The exterior of the buildings would be painted an appropriate color based on BLM's standards to blend in with the surrounding environment.

Lighting at the power plant and production and injection wells would be designed in compliance with the Federal Aviation Administration (FAA) requirements and other applicable laws and regulations. Additionally, lighting would be designed to effectively reduce light pollution wherever possible. Where practical, lighting would be directional and would be hooded or shielded.

### **Power Generation Technology**

The proposed facility would utilize either a flash, binary, or combined-cycle technology to produce electricity from the geothermal resource. The final technology selection would be determined by TGP based on final resource evaluation and construction costs.

**Flash Unit.** Geothermal fluid (approximately 5.9 million pounds per hour or 19,050 afy), received from the production wells, enters the plant and moves through a series of high- and low-pressure separators where steam is separated from the geothermal fluid. The spent geothermal fluid (brine) is injected back into the geothermal resource. The steam is sent to a steam turbine generator where the thermal energy in the steam is converted into mechanical energy by rotating the steam turbine rotor, which turns a generator to produce electrical energy.

The steam is then condensed back to a liquid state for reuse in the process and ultimately injected back into the geothermal resource. The steam can also contain gases (referred to as non-condensable gases or NCGs) that would not condense (primarily carbon dioxide). These gases are removed from the system using a vacuum pump and vented to the atmosphere. A variety of gases would be entrained in the geothermal fluids produced from the production wells. The majority of these gases separate into the steam phase during the flashing operations. The largest component in the gas stream would be carbon dioxide (CO<sub>2</sub>), generally comprising greater than 95 percent of the total, with smaller amounts of other gases such as hydrogen sulfide (H<sub>2</sub>S), nitrogen (N<sub>2</sub>), and methane (CH<sub>4</sub>). These gases would collect in the condenser and must be removed for proper operation of the condenser. Removed NCGs would be routed to the cooling system before being emitted to the atmosphere. Figures 2-3 and 2-4 illustrate the flash unit production and generation process respectively.

The cooling process used to condense the steam would be either a dry cooling system or a hybrid cooling system. The dry cooling system operates similar to an automobile radiator where steam from the steam turbine enters the cooling unit (or radiator) and a series of fans blow ambient air over the cooling unit (or radiator) to condense the steam. No water is used for process cooling.

The hybrid cooling system is being evaluated for possible use when ambient air temperatures are too high to efficiently condense steam. The hybrid cooling system uses a combination of water cooling and dry cooling technologies to accomplish the process cooling required. This hybrid cooling technology results in a significant reduction in water consumption over a traditional wet cooling system. If a hybrid cooling system is selected, the power plant is expected to use up to 550 afy (341 gpm) of water for cooling purposes. The process water would be obtained by drilling and permitting a non-potable water well with the Nevada Division of Water Resources (NDWR). The process water well is discussed in more detail later in this section.

As required to initiate well/plant startup or when upset conditions occur, produced steam would be vented to an abovegrade rock box, which is used to reduce the noise when the steam is vented off into the atmosphere, located adjacent to each plant site.

**Binary Unit.** The binary unit uses a secondary organic working fluid, such as pentane ( $C_5H_{12}$ ), isopentane ( $C_5H_{12}$ ), butane ( $C_4H_{10}$ ), isobutane ( $C_4H_{10}$ ) or a refrigerant such as R245fa, to extract heat from the geothermal fluid. The working fluid is vaporized, due to a lower boiling point, in a heat exchanger to drive special organic fluid turbines (similar to the flash unit described above). The working fluid is condensed in an air-cooled condenser. It then repeats the process as it is operated in a closed-loop system. The Organic Rankine Cycle technology is expected to use the same quantity of geothermal fluid as the flash system.

The binary cycle would also produce NCGs similar to the flash technology and the NCGs would also be vented to the atmosphere. Figures 2-5 and 2-6 illustrate the binary unit production and generation process respectively.

**Geothermal Combined Cycle.** The geothermal combined cycle utilizes both flash and binary technologies combined in a single power plant. The steam and geothermal fluid that exits the flash unit's steam turbine generator would be directed to the binary unit (as described above) to generate additional electrical power. The combined cycle system would use the dry cooling technology to condense the steam for injection into the geothermal resource.

The combined cycle would produce the same amount of NCG as the flash and binary systems. Figures 2-7 and 2-8 illustrate the combined cycle production and generation process respectively.

### **Process Water**

Depending on the cooling technology selected, up to 550 afy (341 gpm) of water would be used in the operation of the power plant. An approximately 500-foot-deep, non-potable water well would be constructed at the plant site. Applicable authorizations would be requested from the NDWR. The operations of the hybrid cooling system would not be restricted by the water quality of the non-potable water well and water with high salinity and levels of dissolved solids could be used.

In addition to cooling, process water uses at that plant site would include fire suppression, general maintenance water, water for dust suppression, water for the domestic water system (up to 50 afy) and water for operation of the hybrid-cooling system (up to 500 afy). Drinking water for onsite personnel would be provided from bottled water. Water for the domestic water system (emergency showers, eye wash stations, toilets, etc.) would undergo

basic treatment with chlorination as needed to prevent bacterial growth but it would not be treated to meet drinking water quality standards.

### Electrical Substation

The power plant facility would include an electrical substation that would convert the electrical power generated to a voltage of 230 kV. The substation would include circuit breakers and transformers, which would contain insulating gases and oils. A main control building would contain instrumentation and telecommunications equipment.

The substation would measure up to 250 by 175 feet and would be surrounded by an 8-foot-tall chain link fence with vehicle and personnel access gates.

### Interconnection Line

The power plant facility would connect to TGP's existing 230-kV transmission line via a 0.4-mile-long 230-kV gen-tie. The proposed gen-tie routes are shown on Figure 2-1. Only one route would be selected based on the final location of the power plant. The gen-tie would consist of a single 230-kV circuit on H-frame or three-pole wooden structures that would be approximately 85 feet tall. Figures 2-9 and 2-10 show examples of the H-frame and three-pole structures, respectively. Construction of each gen-tie pole would require a temporary disturbance of 0.5 acre and an approximately of a 30- by 40-foot area for installing the electrical conductors or line. Installation of each wooden pole would require a permanent disturbance of approximately 6 to 8 square feet per pole.

The gen-tie would interconnect to the existing 230-kV transmission line via a ring bus collector that would measure up to 250 by 175 feet and would be surrounded by an 8-foot-tall chain link fence with vehicle and personnel access gates. A summary of the proposed interconnection line structures is provided in Table 2-4.

**TABLE 2-4**  
Proposed Interconnection Line Structures

Feature	Description
Maximum line length	0.4 mile
Type of pole structures	Wood pole structures; either H-frame or three-pole
Structure height	80 feet to 85 feet
Span length	Approximately 800 to 1,200 feet depending on terrain
Number of structures/mile	5 to 8 depending on terrain
ROW width	Up to 200 feet
Voltage	230 kV
Circuit configuration	230 kV, three-phase, single conductor per phase
Conductor size	954-kcmil ACSR, 1.716-inch diameter
Ground clearance of conductor	35 feet minimum
Structure foundation depth	7 to 14 feet depending on structure location, geology and structure type
Temporary work areas required	220- x 60-foot work space; 30 x 40 feet for line construction equipment

### Project Construction Schedule

TGP anticipates construction would begin in spring 2011, and the power plant facility would be operational in summer 2013. TGP would need to test facility equipment and operations for approximately 3 months prior to commencing commercial operations.

### Site Preparation and Mobilization Activities

Site preparation and mobilization activities would include setup of temporary onsite lodging and transport and staging of equipment required for construction to a laydown area in the power plant area. Onsite lodging would be used to supplement lodging in nearby communities; however, construction workers would stay in surrounding areas as much as possible.

It is estimated that up to 150 workers would be involved during the 24-month construction of the power generation facility with the onsite workforce ranging between 80 and 100 during the initial 12 months; peaking at about 150 from month 13 to month 18; and gradually reducing during the last 6 months of construction. Operation of the power plant following construction would require a permanent workforce of up to 16 professionals in addition to regular maintenance activities supported by outside contractors.

Table 2-5 details the total number of onsite personnel that are estimated to be required during construction and operation of the facility. TGP has also provided an estimate of indirect and/or induced jobs that could result from the construction of the facility, including permitting professionals, jobs created or maintained from manufacturing of facility building components and equipment and jobs created offsite during construction activities based on established data provided by the Geothermal Energy Association (Kagel, 2006).

**TABLE 2-5**  
Estimated Workforce for Construction and Operation

Project Phase	Onsite Workforce Requirements	Indirect/Induced Jobs	Duration of Jobs (months)
Permitting	0	4	18
Power Plant Equipment Manufacturing	0	60	18
Construction	150	60	24
Operation and Maintenance	16	15	360
<b>Total Jobs Created</b>	<b>166</b>	<b>139</b>	

### Waste and Hazardous Materials Management

Secondary containment structures would be provided for all chemical and petroleum/oil storage areas during drilling and construction operations. Additionally, absorbent pads or sheets would be placed under likely spill sources and spill kits would be maintained onsite during construction and drilling activities to provide prompt response to accidental leaks or spills of chemicals and petroleum products.

Solid wastes generated by the Proposed Action would be stored onsite until transported offsite to an appropriate landfill facility in accordance with BLM and Churchill County

regulations. A septic system would be installed in accordance with BLM and Nevada Division of Environmental Protection (NDEP) regulations and requirements.

A project hazardous material spill and disposal contingency plan would describe the methods for cleanup and abatement of any petroleum hydrocarbon or other hazardous material spill. The hazardous material spill and disposal contingency plan would be submitted to and approved by the BLM and made readily available onsite before operations begin.

Handling, storage, and disposal of hazardous materials, hazardous wastes, and solid wastes would be conducted in conformance with federal and state regulations to prevent soil, groundwater, or surface water contamination and associated adverse effects on the environment or worker health and safety.

### **Plans for Surface Reclamation**

The estimated life of the project is 30 years or its useful life, whichever is longer. TGP would prepare site reclamation plans for BLM approval prior to plan implementation. The reclamation plans would conform to BLM and Nevada Division of Minerals (NDOM) requirements, including BLM Gold Book recommendations (BLM, 2007a). Final drill site/access road reclamation plans would be developed for the Proposed Action depending on final well locations (BLM, 2007a) and as required by BLM. The following information is provided for purposes of evaluating potential environmental impacts from the Proposed Action.

The plans would address restoring the surface grades, surface drainage, and revegetation of cleared areas. Project-related equipment and machinery would be decommissioned and, where possible, reused or sold as salvage. Wells would be plugged and abandoned as required by BLM, NDEP, and NDOM regulations. Equipment with no resale value would be sold or given as scrap. Additionally, aboveground pipelines would be removed. Prior to removal, pipelines would be flushed and any remaining fluids would be properly disposed of. TGP would restore the area to the original landform or, if restoration of the original landform is not feasible, recontour to blend in with the surrounding landform. Salvaged topsoil would be respread evenly over the entire disturbed area to ensure successful revegetation. Disturbed areas would be reseeded with a mix specified previously in this section, and erosion-control measures and measures to control invasive non-native plants and noxious weeds would be implemented in accordance with appropriate BLM guidelines. To help mitigate the contrast of recontoured slopes, reclamation would include measures to feather cleared lines of vegetation. Other techniques to improve reclamation success could be implemented at BLM's direction.

#### **2.1.1.3 Standard Operating Procedures, Best Management Practices, and Proposed Mitigation**

TGP would comply with the special lease stipulations attached to federal geothermal leases (see Appendix A).

Standard operating procedures and BMPs would reduce the effects on the human and natural environment. In addition to procedures identified in The State of Nevada State Conservation Commission's Best Management Practices Handbook (1994) and the conditions of approval identified in the *Coyote Canyon and Dixie Meadows Geothermal*

*Exploration Environmental Assessment* (BLM, 2010), *Finding of No Significant Impact and Decision Record, 2010*, the following mitigation measures would be followed to reduce any impacts:

- TGP would comply with any requirements prescribed by the Nevada Division of Environmental Protection-Bureau of Air Pollution Control.
- Dust abatement techniques, such as watering on unpaved, unvegetated surfaces, would be used during construction to minimize airborne dust.
- Speed limits would be posted and enforced during construction and operation to reduce fugitive dust (speed limit of 25 miles per hour within the project site, as necessary).
- Equipment and vehicle idling times during construction activities would be minimized.
- The Proposed Action would be designed to avoid sites determined eligible for listing on the National Register of Historic Places (NRHP).
- A 30-meter buffer would be placed around identified historic properties to avoid adverse effects.
- Wells would be grouted and cased so that flood water could not penetrate if well pads are inundated.
- Weed infestations would be mapped and treated prior to disturbance or during construction, using certified weed-free seed and mulching materials.
- The underside of all heavy equipment would be cleaned by water before entering public lands. Driving through or parking on noxious weed infestations would be avoided.
- Implement a noxious weed control program consisting of monitoring and removal of species listed on the Nevada Designated Noxious Weeds List (NRS 555.010).
- Components of the Proposed Action that would result in direct habitat loss within migratory bird nesting habitat would either occur prior to the nesting season or nest surveys would be conducted by a qualified biologist acceptable to the BLM prior to implementation. If nests are found, coordination with the BLM would occur to develop appropriate protection measures, which may include avoidance, timing constraints, and/or buffers.
- Adhere to Suggested Practices for Avian Protection on Power Lines (APLIC, 2006) guidelines for design overhead utilities such as installation of perch deterrents.
- Hazardous materials would be properly stored in separate containers to prevent mixing, drainage or accidents. Hazardous materials would not be drained onto the ground or into streams or drainage areas.
- A Spill Prevention, Control, and Countermeasures (SPCC) plan would be developed, secondary containment structures would be used on site, and workers would be trained in spill prevention and cleanup methods.
- Solid wastes would be transported offsite to an authorized landfill.

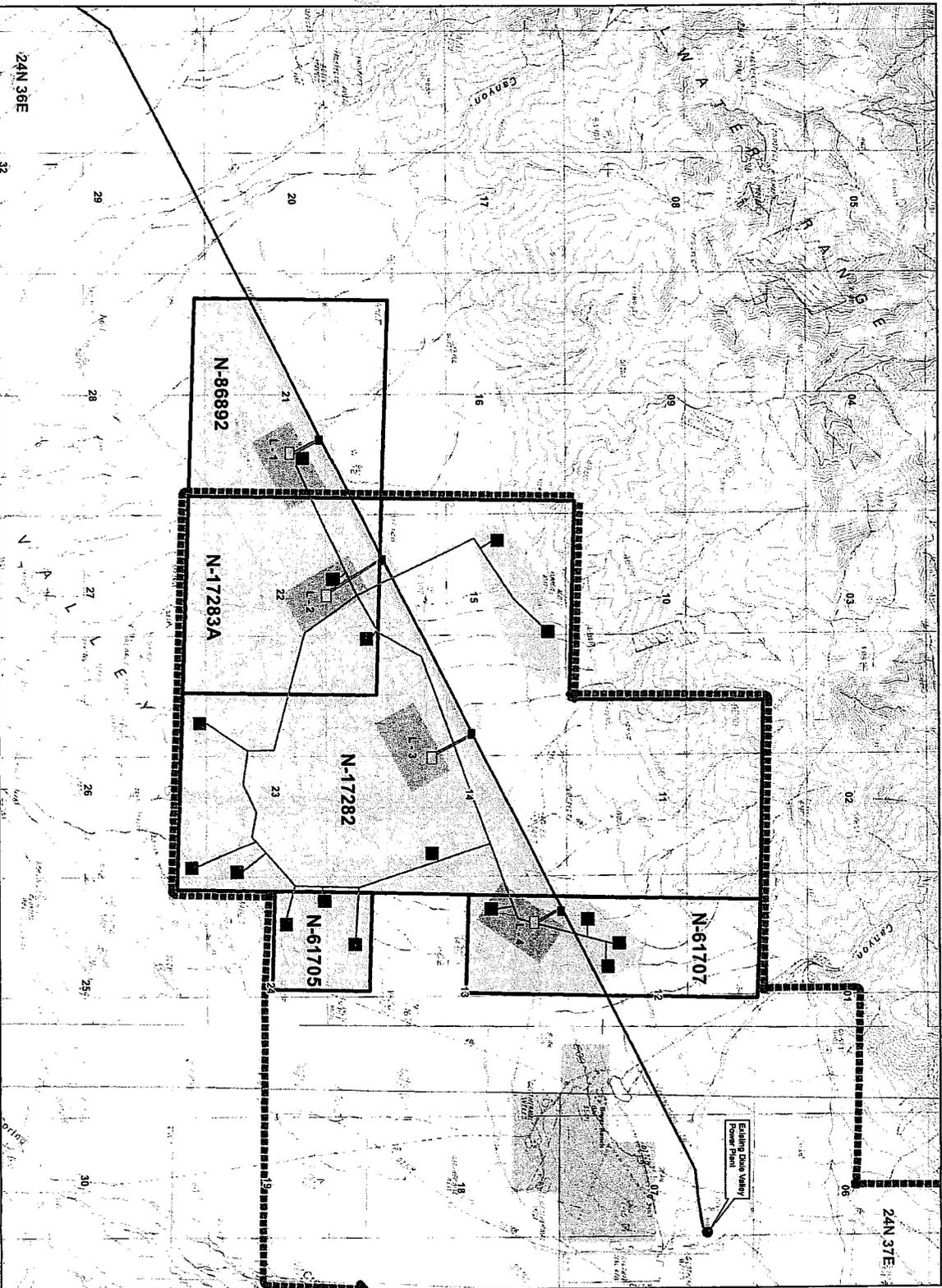
- Provide and maintain temporary sanitary facilities maintained by a contractor during construction.
- A hydrologic evaluation and monitoring plan would be submitted to the BLM for approval prior to drilling and implemented once approved.
- Monitor flow and pressure of pipelines and well pumps.
- Install pipeline valve shutdown features.
- Piping would be routinely maintained to ensure reliability and integrity, and would be predominantly located above ground, so that leaks, if any, can be visually identified more quickly than with buried piping.
- Engineer and construct pipes to current industry standards to handle anticipated temperature, pressure, and corrosion potential of the fluids being transmitted.
- Condensate “pots” would be installed in numerous locations under each new production pipeline to minimize the chance for inadvertent leaking of geothermal fluid from the pipelines into area soils.
- A BLM-approved grouting and casing program for well construction would be implemented to prevent water quality effects on groundwater during or after well installation.
- Borehole geophysics analyses (cement bond logs) would be conducted to document that well-casing grouting activities provide an effective seal, isolating the geothermal aquifer from shallow alluvial aquifers.
- All semi-permanent and permanent facilities would be painted to blend with the natural surroundings using standard environmental colors.
- Soils and rock excavated but not used to backfill or restore contour would be evenly spread onto cleared areas.
- All lighting would be limited to that required to safely conduct operations, and would be shielded and/or directed in a manner which focuses direct light to the immediate work area.
- Erosion control measures, including but not limited to silt fencing, diversion ditches, water bars, temporary mulching and seeding, and application of gravel or rip rap, would be installed where necessary immediately after completion of construction activities to avoid erosion and runoff.
- Temporarily disturbed areas would be reseeded where previously vegetated using a BLM-approved seed mixture.
- Topsoil would be salvaged and reused whenever possible and in a timely manner.
- Following project construction, areas of disturbed land no longer required for operations would be reclaimed to promote the reestablishment of native plant and wildlife habitat.

- All construction and operating equipment would be equipped with applicable exhaust spark arresters. Fire extinguishers would be available on the active sites. Water used for construction and dust control would be available for fire fighting. Personnel would be allowed to smoke only in designated areas.

## **2.2 No Action Alternative**

Under the No Action Alternative, a power production facility at the CC lease area would not be constructed and the geothermal resources would not be utilized.

Insert Section 2 figures (10 total)



**Figure 2-1**  
**TGP Coyote Canyon Proposed Action**

Proposed Action Area  
 Production / Injection Well Pads  
 Potential Plant Site (with water well)  
 (Only One Plant Will Be Constructed)  
 Substations  
 Ring Bus Collector Site  
 Gen Tie  
 Access Roads / Pipelines  
 Existing TGP 230 kV Transmission Line  
 Dixie Valley Unit  
 Bureau of Land Management  
 Private  
 Navy

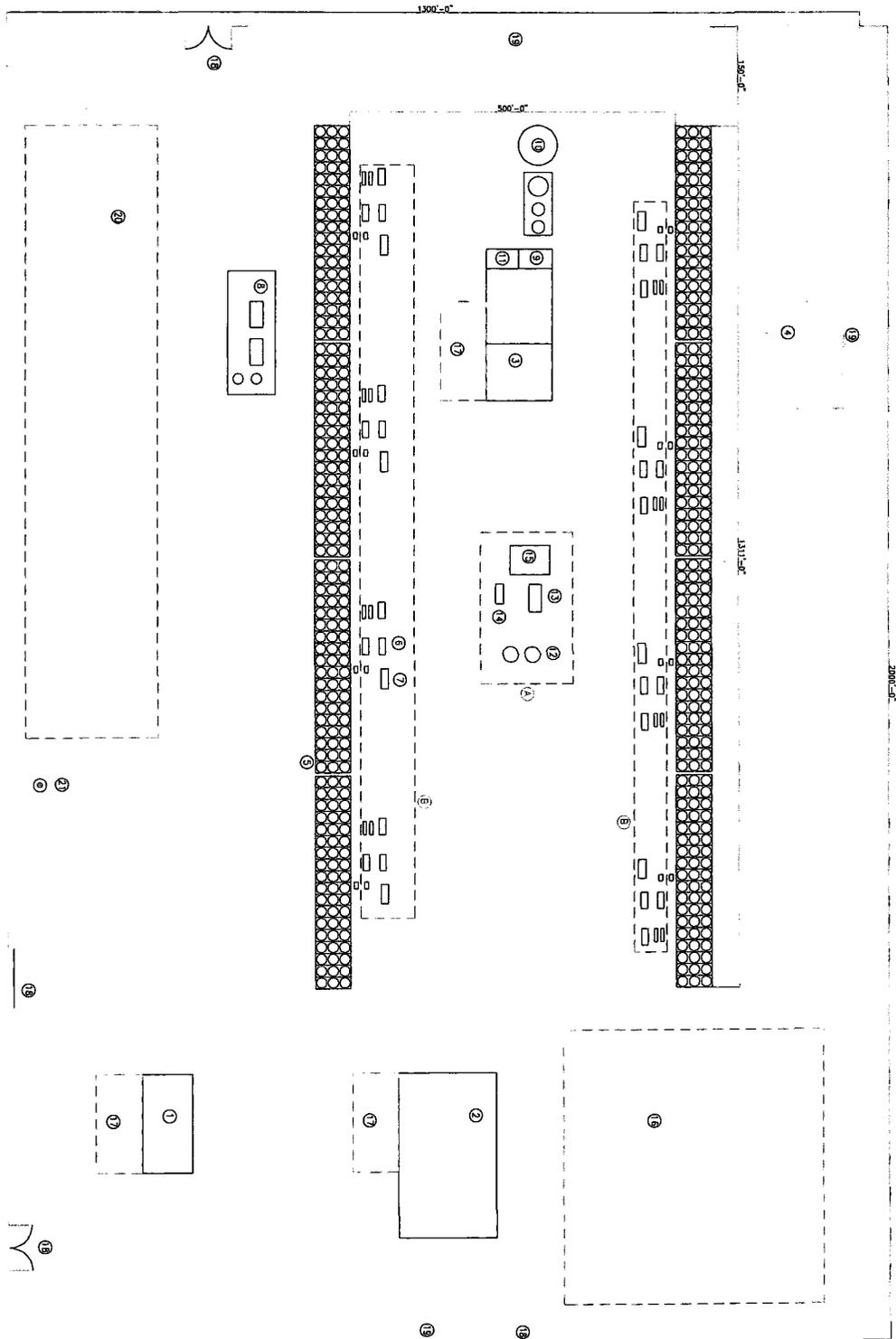
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**Figure 2-2:  
Plant General Arrangement  
Coyote Canyon**



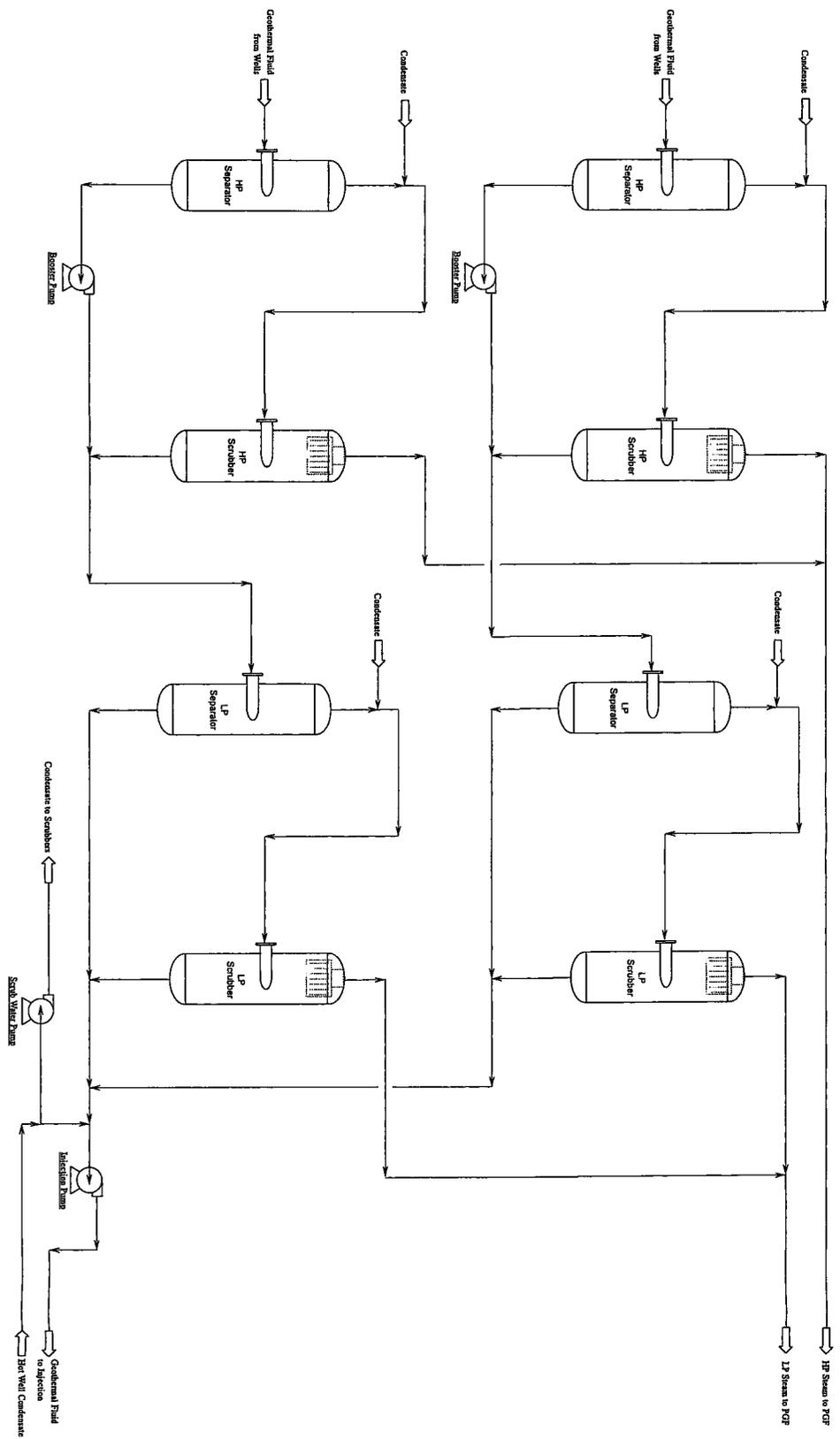
- ① ADMINISTRATION BUILDING
- ② WAREHOUSE
- ③ CONTROL BUILDING/MCC ROOM
- ④ SUBSTATION
- ⑤ AIR COOLED CONDENSERS
- ⑥ BINARY ORC EQUIPMENT
- ⑦ ORC ELECTRICAL ROOM
- ⑧ CHEMICAL STORAGE
- ⑨ AIR COMPRESSORS
- ⑩ PHE / STORAGE WATER TANK
- ⑪ PHE PUMPS / EMERGENCY GENERATOR
- ⑫ HP SEPARATOR/DEAERATOR
- ⑬ STEAM TURBINE
- ⑭ STEAM TURBINE ELECTRICAL BUILDING
- ⑮ STEAM TURBINE CONDENSER/HEAT EXCHANGERS
- ⑯ WATDOWN AREA (CONSTRUCTION AND PLANT USE)
- ⑰ PARKING
- ⑱ GATES
- ⑲ FENCE
- ⑳ SLUMP
- ㉑ PLANT INJECTION WELL
- ① STEAM TURBINE EQUIPMENT REQUIRED FOR FLASH OR COMBINED CYCLE
- ② BINARY EQUIPMENT REQUIRED FOR BINARY OR COMBINED CYCLE
- ③ COMBINED CYCLE REQUIRED BOTH STEAM AND BINARY EQUIPMENT
- \*ALL OTHER EQUIPMENT IS COMMON TO ALL TECHNOLOGIES

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**Figure 2-3:  
Steam Flash  
Production Process Flow Diagram  
Coyote Canyon**

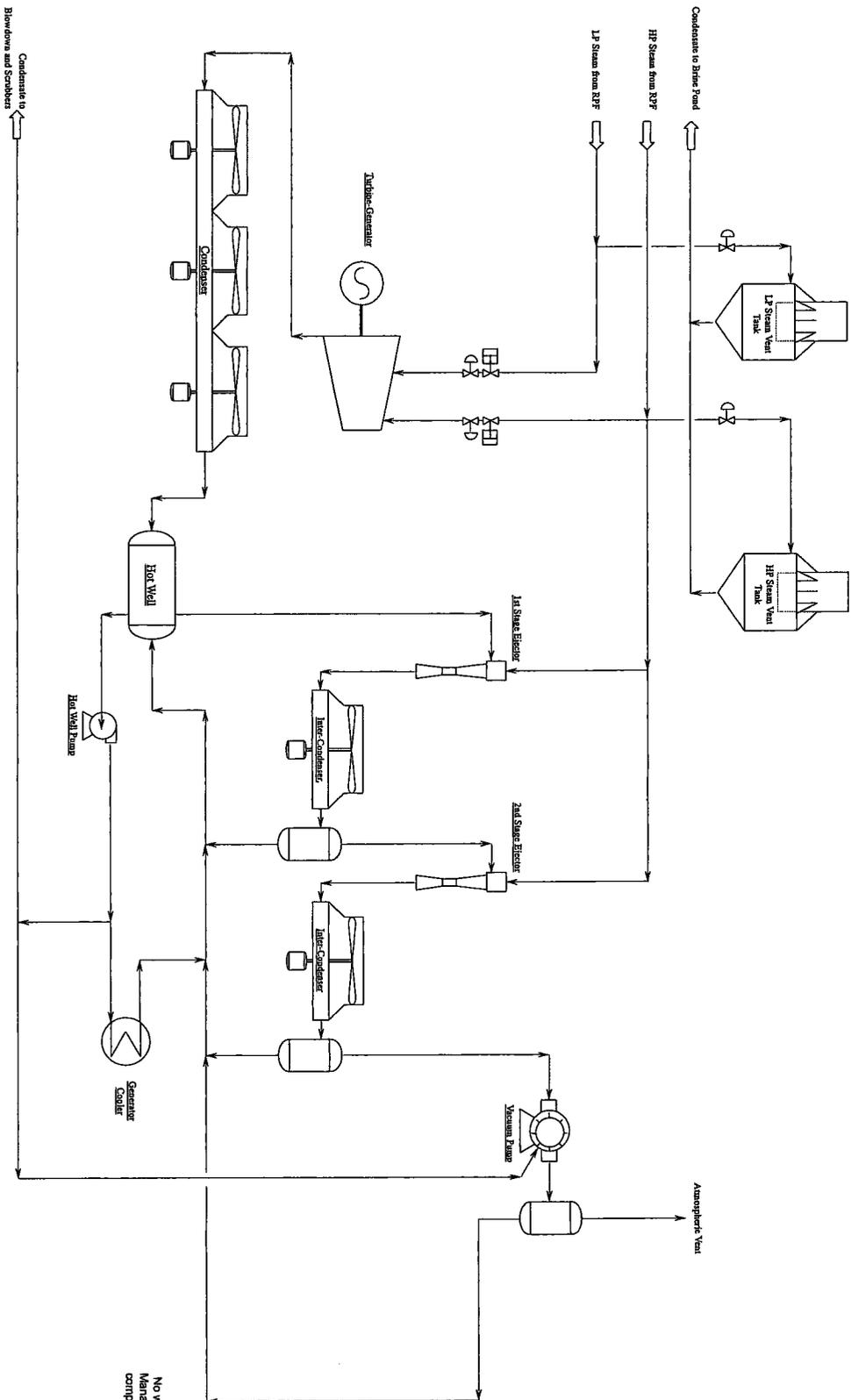


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**Figure 2-4:**  
**Steam Flash**  
**Generation Process Flow Diagram**  
**Coyote Canyon**

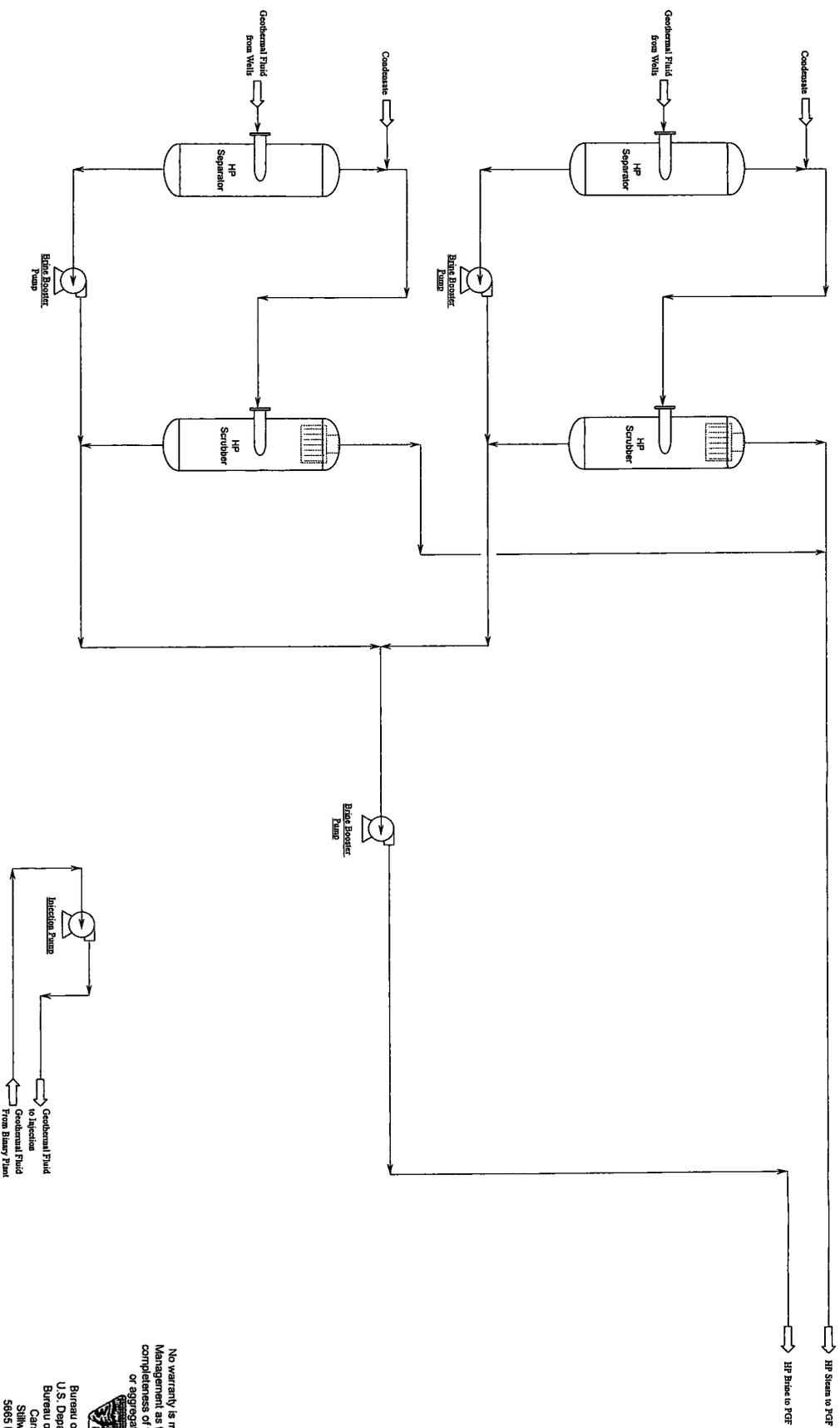


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**Figure 2-5:**  
**Binary Cycle**  
**Production Process Flow Diagram**  
**Coyote Canyon**

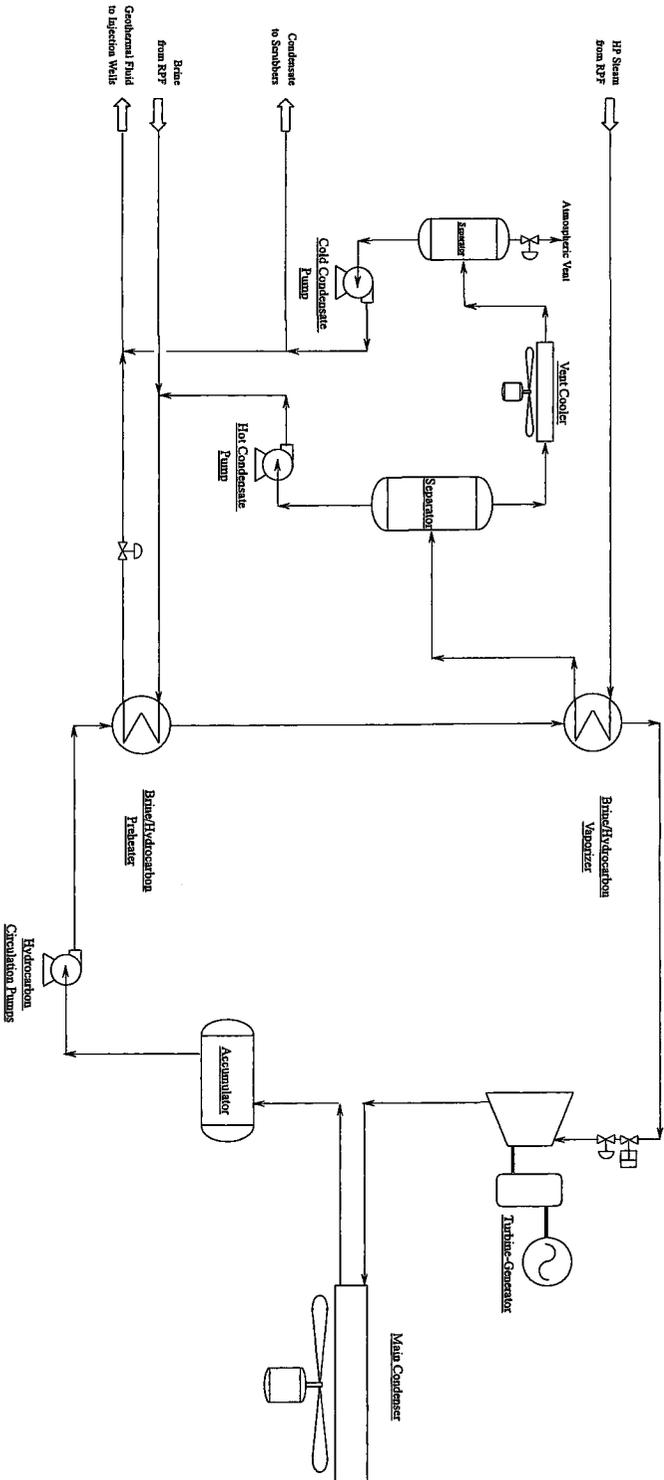


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**Figure 2-6:  
Binary Cycle  
Generation Process Flow Diagram  
Coyote Canyon**



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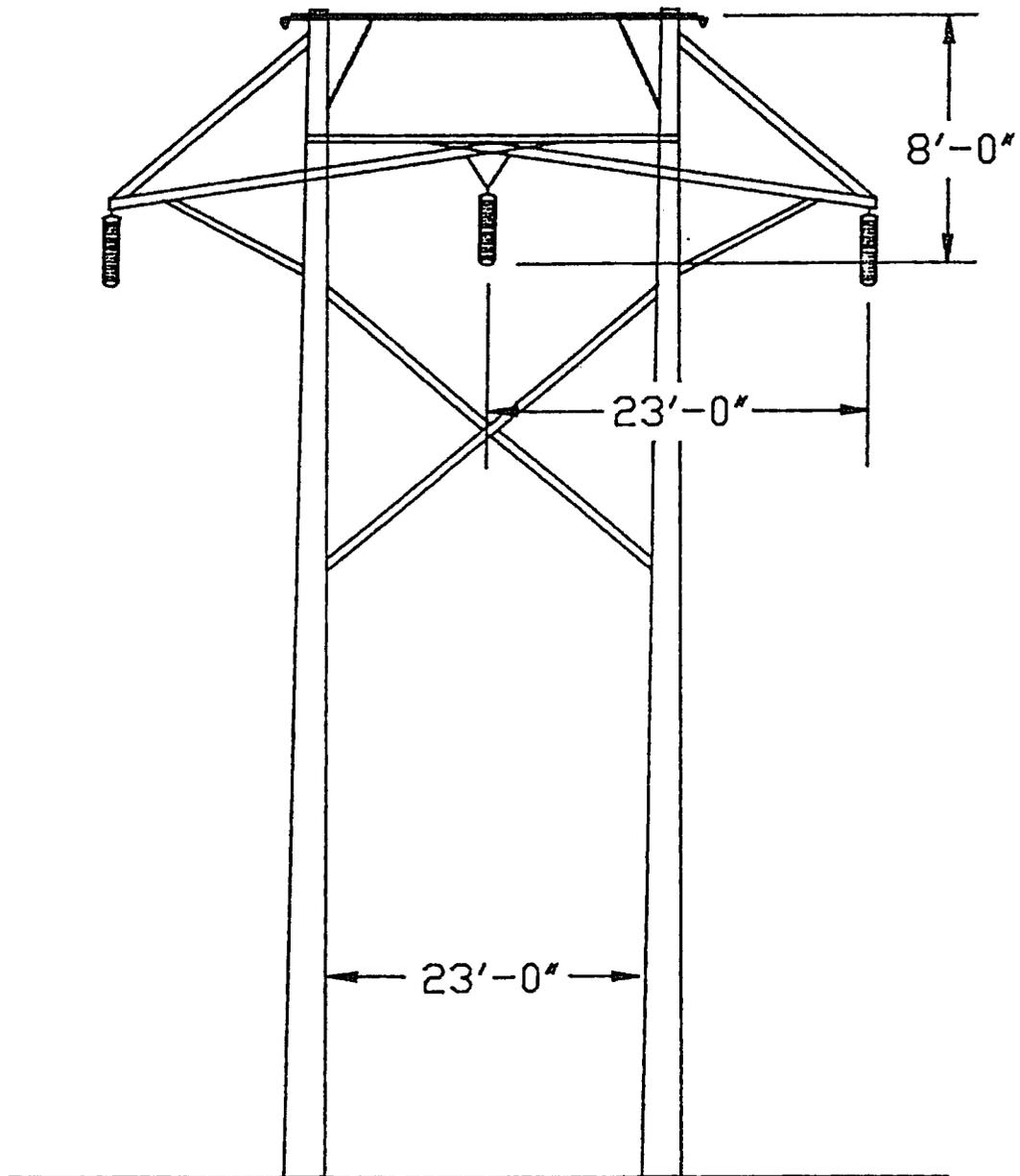


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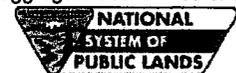




**Figure 2-9:  
Typical H-Frame Pole Structure  
Coyote Canyon**

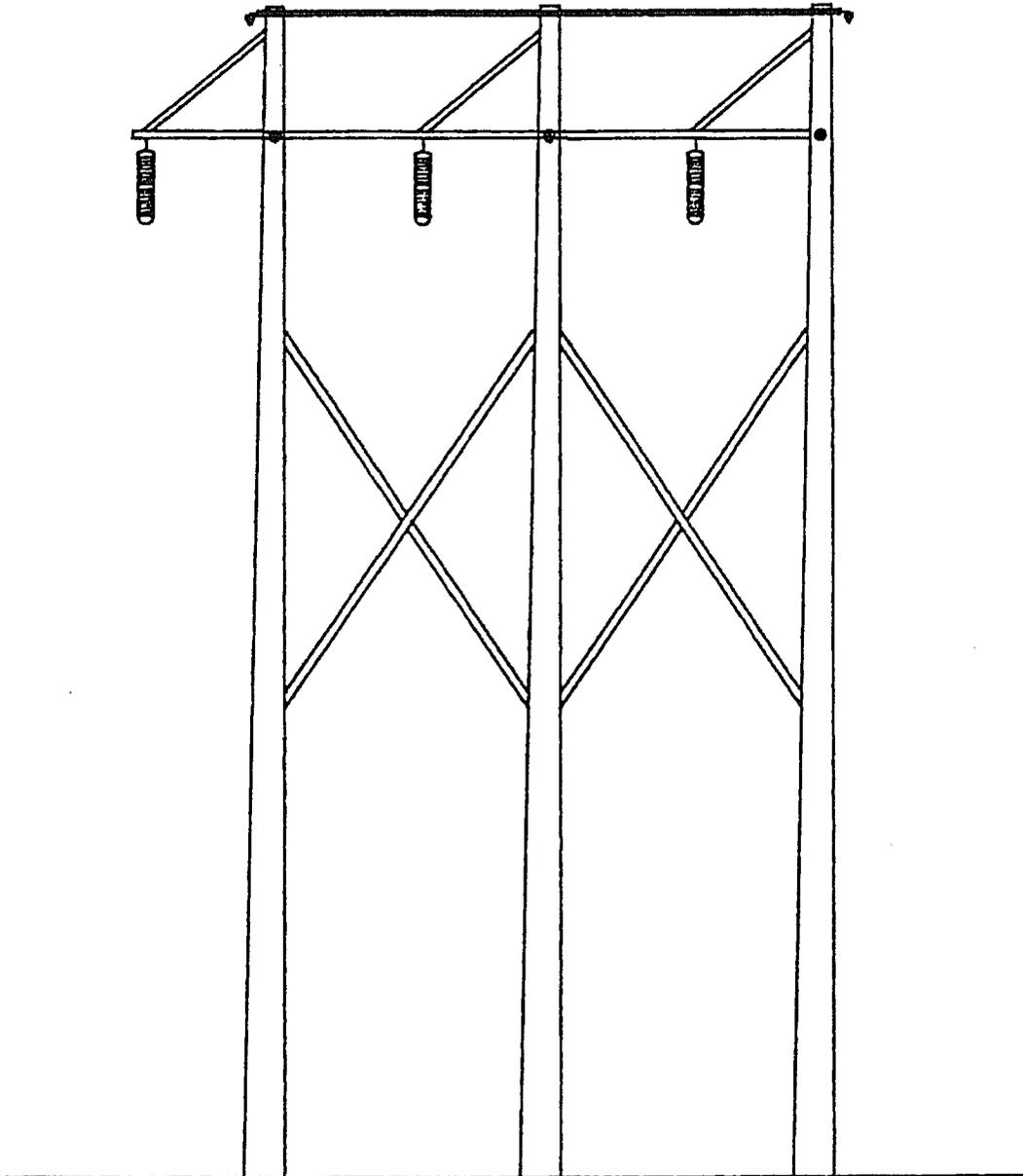


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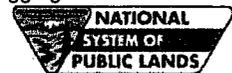


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**Figure 2-10:  
Typical 3-Pole Structure  
Coyote Canyon**



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## SECTION 3

# Affected Environment and Environmental Consequences

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## 3.1 Scoping and Issue Identification

Internal and external (public) scoping was completed to identify any agency and/or public concerns, respectively, associated with the Proposed Action. Internal scoping was conducted by BLM resource specialists on August 2, 2010. Public scoping was conducted in coordination with the Churchill County Commission meeting on August 18, 2010. A 30-day public scoping period began on August 5, with notification to local newspapers of the intent to develop geothermal resources in Dixie Valley. Representatives from Nevada Division of Wildlife (NDOW), Churchill County, and Naval Air Station-Fallon (NAS Fallon) met with BLM staff and TGP on August 18, 2010, to discuss issues and concerns regarding the Proposed Action. These agencies, along with the U.S. Fish and Wildlife Service (USFWS), are coordinating partners concerning the Proposed Action. The following predominant issues were identified during internal and public scoping: possible exchange between deep reservoir fluid and shallow aquifer and preparation of a water monitoring program by TGP to assess water-related impacts. Written scoping comments were received during the 30-day scoping period. The only comment pertinent to this Proposed Action was from the public in favor of geothermal development in Dixie Valley.

### 3.1.1 Proposed Action General Setting

The Proposed Action area is approximately 55 miles northeast of Fallon, at elevations ranging from approximately 3,400 to 3,600 feet in the northern part of Dixie Valley. The Proposed Action area is on the eastern slope of the Stillwater Range in an area dominated by mixed salt desert scrub vegetation. Terrains within the Proposed Action area are gently sloping alluvial fans and valley bottom. Site drainage is mostly by sheet flow toward small southwest-to-northeast-trending ephemeral drainages, which may contain water during periods of heavy precipitation.

### 3.1.2 Supplemental Authorities

Appendix 1 of BLM's NEPA Handbook (H-1790-1) identifies Supplemental Authorities that are subject to requirements specified by statute or executive order and must be considered in all BLM environmental documents. Supplemental Authorities that may be affected by the Proposed Action are further described in this EA.

**TABLE 3-1**  
**Supplemental Authorities and Rationale for Detailed Analysis for the Proposed Action**

Elements <sup>a</sup>	Not Present <sup>b</sup>	Present/ Not Affected	Present/ May Be Affected <sup>c</sup>	Rationale
Air Quality			X	Carried forward in Section 3.2.
Areas of Critical Environmental Concern	X			
Cultural Resources			X	Carried forward in Section 3.3.
Environmental Justice	X			
Farm Lands (prime or unique)	X			
Forests and rangelands (Healthy Forests Restoration Area projects only)				Not applicable
Human Health and Safety (herbicide projects)				Not applicable
Floodplains	x			
Invasive, Nonnative, and Noxious Species			X	Carried forward in Section 3.4.
Migratory Birds			X	Carried forward in Section 3.5.
Native American Religious Concerns			X	Carried forward in Section 3.8.
Threatened and/or Endangered Species	X			After consulting with the BLM wildlife biologist and the USFWS website for Nevada, there are no federally listed threatened or endangered species within the project area (USFWS, 2010). See Appendix B.
Wastes, Hazardous or Solid			X	Carried forward in Section 3.9.
Water Quality (Surface/Ground)			X	Carried forward in Section 3.11.
Wetlands/Riparian Zones	X			
Wild and Scenic Rivers	X			
Wilderness	X			

<sup>a</sup> See BLM Handbook H-1790-1(2008a) Appendix 1 *Supplemental Authorities to be Considered*.

<sup>b</sup> Supplemental Authorities determined to be Not Present or Present/Not Affected need not be carried forward or discussed further in the document.

<sup>c</sup> Supplemental Authorities determined to be Present/May Be Affected must be carried forward in the document.

### 3.1.3 Resources Other Than Supplemental Authorities

Resources or uses that are not Supplemental Authorities as defined by BLM's Handbook H-1790-1 (BLM, 2008a), are present in the Proposed Action area. BLM specialists have evaluated the potential impact of the Proposed Action on these resources and documented

their findings in Table 3-2. Resources or uses that may be affected by the Proposed Action are further described in this EA.

**TABLE 3-2**  
Resources Other Than Supplemental Authorities

Resource or Issue	Present/ Not Affected <sup>a</sup>	Present/May Be Affected <sup>b</sup>	Rationale
Visual Resource Management		X	Carried forward in Section 3.12.
Recreation		X	Carried forward in Section 3.13.
Military Lands		X	Carried forward in Section 3.14.
Livestock Grazing		X	Carried forward in Section 3.15.
Lands		X	Carried forward in Section 3.16.
Geology/Minerals		X	Carried forward in Section 3.10.
Noise	X		
Soil		X	Carried forward in Section 3.17.
Vegetation		X	Carried forward in Section 3.18.
Wildlife		X	Carried forward in Section 3.6.
Special-status Species BLM Sensitive		X	Carried forward in Section 3.7.
Paleontological Resources		X	Carried forward in Section 3.19.

<sup>a</sup> Resources or uses determined to be Present/Not Affected need not be carried forward or discussed further in the document.

<sup>b</sup> Resources or uses determined to be Present/May Be Affected must be carried forward in the document.

### 3.1.4 Resources or Uses Present and Brought Forward for Analysis (All Supplemental and Resources)

The following resources are present in the Proposed Action area, may be affected by the Proposed Action, and are carried forward for analysis:

- Air Quality
- Cultural Resources
- Invasive, Nonnative and Noxious Species
- Migratory Birds
- Wildlife
- Special-status Species/BLM Sensitive
- Native American Religious Concerns
- Wastes, Hazardous or Solid
- Geology/Minerals
- Water Quality (surface/ground)
- Visual Resource Management
- Recreation
- Military Lands
- Livestock Grazing

- Lands
- Soils
- Vegetation
- Paleontological Resources

## 3.2 Air Quality

### 3.2.1 Regulatory Environment

The U.S. Environmental Protection Agency (EPA) Office of Air Quality Planning and Standards and the NDEP have set National Ambient Air Quality Standards (NAAQS) and Nevada ambient air quality standards for the following criteria pollutants: nitrogen dioxide (NO<sub>2</sub>), sulfur dioxide (SO<sub>2</sub>), carbon monoxide (CO), particulate matter smaller than 10 microns in aerodynamic diameter (PM<sub>10</sub>), particulate matter smaller than 2.5 microns in aerodynamic diameter (PM<sub>2.5</sub>), ozone, and lead. In addition to the above-listed criteria pollutants, NDEP has established an ambient air quality standard for H<sub>2</sub>S. Nevada Administrative Code 445B.22097 provides the minimum standards of quality for Nevada ambient air.

Attainment is achieved when the existing background concentrations for criteria air pollutants are less than the maximum allowable ambient concentrations defined in the NAAQS. Nevada is mandated to identify geographic areas that do not meet federal and state air quality standards. The state uses air quality data gathered by monitoring networks to determine the areas within the state not attaining standards. Areas that violate federal or state standards are referred to as "nonattainment areas" for the relevant pollutants.

### 3.2.2 Affected Environment

The Proposed Action area is located in a sparsely populated rural area with minimal industrial sources or potential impacts to the airshed. Activities associated with the Proposed Action would occur in Groundwater Basin 128 in Churchill County, Nevada. Groundwater basins in the state of Nevada correspond to airsheds and, therefore, Groundwater Basin 128 is the analysis area for air quality. This basin is in attainment for all NAAQS and Nevada air quality standards.

### 3.2.3 Environmental Consequences

Air emissions from the Proposed Action would occur during construction and operation of the geothermal power plant. Air emissions are also expected from drilling and testing wells. The following summarizes these anticipated air emissions resulting from the Proposed Action.

#### 3.2.3.1 Air Emissions During Construction

The primary pollutants of concern during construction activities would be PM<sub>10</sub> and PM<sub>2.5</sub> in the form of fugitive dust. Fugitive dust would be generated from earth-moving activities and vehicle travel on unpaved roads during construction. Fugitive dust emissions would be localized and temporary. To minimize these impacts, TGP would provide dust-control measures throughout construction activities and gravel would be placed on access roads and other work areas to control dust.

Tail-pipe emissions would result from the construction equipment (including drill rigs and support equipment), construction workforce, and delivery vehicles used to access the Proposed Action area. These emissions are expected to be temporary and finite since they

would be generated only during the construction phase of the Proposed Action and would not be expected to cause or contribute to a violation of any federal or state ambient air quality standards.

A Surface Area Disturbance permit from the NDEP-Bureau of Air Pollution Control (NDEP-BAPC) would be required for the construction of the Proposed Action. This permit would specify measures to be implemented for reducing fugitive dust from project construction. These measures may include application of water to actively disturbed areas or soil-binding agents, and use of wind-breaks.

### **Air Emissions During Operation**

Air emissions expected during operation of the proposed geothermal power plant include:

- Greenhouse gas (GHG), PM<sub>10</sub>/PM<sub>2.5</sub>, and volatile organic compounds (VOC)
- H<sub>2</sub>S
- Combustion emissions (NO<sub>2</sub>, CO, PM<sub>10</sub>/PM<sub>2.5</sub>, SO<sub>2</sub>, VOCs, and lead)

These emissions are anticipated to be generated by the operation of the geothermal technologies used to produce electricity from the geothermal resources, an emergency diesel fire pump engine, emergency generators located on production pads, and a black-start diesel generator. No air emissions are anticipated from the air-cooled heat rejection system because the systems use air to cool the process steam similar to an automotive radiator. If a hybrid cooling technology is selected, then emissions of H<sub>2</sub>S, GHG, PM<sub>10</sub>/PM<sub>2.5</sub>, and VOC would be expected. Well testing, periodic plant/well maintenance, and upset power plant conditions would also generate H<sub>2</sub>S and GHG emissions. Operational air emissions would be regulated by the NDEP-BAPC, which must ensure that air emissions from the Proposed Action do not exceed federal or state ambient air quality standards and comply with applicable regulations.

The Proposed Action would also produce combustion emissions from the operation of an emergency diesel fire pump engine, emergency generators, and black-start generator. Specific sizes and models for these engines are not available, and therefore the potential air emissions cannot yet be estimated. Combustion emissions from the Proposed Action are expected to be minimal because of the limited operation of the fire pump and emergency generators (for monthly operational testing/maintenance and in the case of an emergency) and these engines would be subject to federal emission standards outlined in 40 CFR Part 60 Subpart IIII, 40 CFR Part 60 Subpart JJJJ, and 40 CFR Part 63 Subpart ZZZZ.

TGP would utilize either flash, binary, or combined-cycle technology to produce electricity from the geothermal resource, with the final technology selection made based on the final resource evaluation and construction cost considerations. GHG, H<sub>2</sub>S, and VOC emissions may be emitted from the flash, binary, and combined-cycle technologies. The anticipated air emissions from each possible technology to produce electricity from the geothermal resources are described below.

**Flash System.** Air emissions are generated when the steam used to power the steam turbine generator is condensed. In the condensing process, the steam is cooled to the point it changes from a gas to a liquid. The steam also contains NCGs (e.g., CO<sub>2</sub>, H<sub>2</sub>S) that are not condensed to a liquid but remain as gases. The NCGs collect in the condenser and require removal by a pump. The pump discharges the NCGs to the atmosphere via cooling fan

shrouds dispersal. Air emissions from the flash systems would be regulated and monitored under a Class I (major) permit issued by the NDEP-BAPC to ensure that ambient air quality standards are not exceeded.

**Binary Cycle.** The binary cycle would produce the same amount of NCGs as the flash system. In addition, the working fluid used in the binary cycle also produces small amounts of VOC emissions associated with leaks and periodic maintenance operations. These VOC emissions would be periodically vented to a vapor recovery unit for recycling. Emissions from the binary system would be regulated and monitored under a Class I (major) permit issued by the NDEP-BAPC to ensure that ambient air quality standards are not exceeded.

**Combined Cycle.** The combined-cycle system integrates both the flash and binary systems, therefore, it is expected to emit the same quantity of air emissions as the flash or binary systems. Emissions from the combined-cycle system would also be regulated and monitored under a Class I (major) permit issued by the NDEP-BAPC to ensure that ambient air quality standards are not exceeded.

### Well Testing

Small quantities of naturally occurring NCGs, such as H<sub>2</sub>S and GHG (carbon dioxide and much smaller amounts of methane) would be emitted to the air during well testing. H<sub>2</sub>S initial concentrations in geothermal fluids are estimated at approximately 70 parts per million, and methane concentrations are estimated at less than 2 percent of NCGs, based on historical data (Freeman, 1986). This estimate is conservative in that more recent tests at the existing Dixie Valley Power Plant indicate lower concentrations (TGP, 2009). As discussed in Chapter 2 of this EA, up to 45 (combined production and injection) wells up to 10,000 feet deep would be drilled and performance tested at the site. Well testing would be conducted for an average of 3 days (24 hours per day) for each well. It is anticipated that the initial flow rates of fluid from each well into its reserve pit (and to the existing Dixie Valley Power Plant sumps, as required) would be approximately 500 to 1,500 gallons per minute on average (with up to 700,000 pounds per hour geothermal flow) depending upon the productivity of the well. Based on this estimate, total potential emissions from the proposed well testing would be approximately 2 tons H<sub>2</sub>S per well at the site.

Air emission sources that exceed 5 tons per year of criteria air pollutant emissions require an air permit from the NDEP BAPC. The Proposed Action would require a temporary permit because project-related emissions would be greater than 5 tons per year and performance testing would last less than 1 year. If the total activity duration were extended beyond 1 year, TGP would obtain a stationary source permit which would ensure that AAQs are not exceeded.

The measures identified in Section 2 would be taken by TGP to minimize potential impacts to air quality resources during construction, operation, and well testing at the site.

### 3.3 Cultural Resources

Cultural resources include historic and prehistoric sites of interest and may include structures, archaeological sites, or religious sites of importance to Native American cultures. Section 106 of the National Historic Preservation Act as amended (16 USC 40 et seq.) requires federal agencies to take into account the effects of their actions on properties listed or eligible for listing on the NRHP. The National Park Service (NPS) defines archaeological and historic resources as “the physical evidences of past human activity, including evidences of the effects of that activity on the environment. What makes a cultural resource significant is its identity, age, location, and context in conjunction with its capacity to reveal information through the investigatory research designs, methods, and techniques used by archeologists.” Ethnographic resources are defined as any “site, structure, object, landscape, or natural resource feature assigned traditional legendary, religious, subsistence, or other significance in the cultural system of a group traditionally associated with it” (NPS, 1998).

The basic cultural chronology of the western Great Basin includes the Pre-Archaic and Archaic Periods (Elston, 1986). A more thorough background of the prehistoric, historic, and ethnographic resources found in the area can be found in the inventory report conducted for the Proposed Action (Young and Garner, 2009). Below is a very brief summary of these 12,000 years of human occupation in western Nevada.

The Pre-Archaic period is defined by artifacts including Clovis and Folsom fluted lanceolate projectile points and Lake Mojave lanceolate projectile points. Reliance on big game hunting dominated the Pre-Archaic subsistence strategy. The main indicator of the shift to the Archaic period is a change to a broader strategy focused on hunting and gathering of resources. The projectile points became smaller and more suited for hunting smaller game, although they were still mounted on the ends of a dart or spear, and there was an increase in the number and type of stone grinding implements used for plant and seed processing. The material culture diversified greatly with the contemporaneous introduction of pottery and the bow and arrow with smaller projectile points. By around A.D. 1200, an expansion of Numic-speaking peoples into the area seems to have replaced or displaced the previous inhabitants (Bettinger and Baumhoff, 1982). Archaeologically, the primary material culture of the Numic includes Intermountain Brownware pottery and Desert Side Notched and Cottonwood Triangular arrow points. The subsistence strategy appears to have shifted back to a focus on hunting and gathering, although there is some evidence of at least limited reliance on horticulture. The Numic-speaking peoples, including the Northern Paiute, were the occupants of the Great Basin upon the initial arrival of Europeans and their influences.

Cultural resource investigations of the Proposed Action area were conducted in July 2009 (Young and Garner, 2009), June 2010 (Spurling, 2010), and additional investigations occurred in September 2010 (Spurling, 2010). Previously completed investigations included a Class I literature review of both State of Nevada and BLM field office files and a Class III pedestrian inventory of the Proposed Action area.

Forty-seven previously recorded sites were identified within a 1-mile buffer of the Proposed Action area. Most of these sites are small, simple lithic and ground stone scatters. Most of the prehistoric sites are generally located on the gentle alluvial fan on the west side of Dixie Valley. Historic resources previously documented include historic roads, homesteads, and a

borax mine. All previously recorded sites within the Proposed Action area were revisited during the cultural resource surveys conducted for the Proposed Action.

### **3.3.1 Affected Environment**

Portions of the Proposed Action area were surveyed for cultural resources, either by Far Western (Young and Garner, 2009), SWCA Environmental Consultants (Spurling, 2010), or by other recent investigations in the area for small geothermal exploration or testing projects (McGuire, 1993). Additional surveys for the remainder of the project area occurred in September 2010. To date, seventeen cultural resource sites have been identified in the Proposed Action area, two of which were combined into one site based on the recommendations of the cultural resources study, resulting in a total of 16 cultural resource sites. Prehistoric sites dominate the assemblage; one historic site was identified during a previous investigation (McGuire, 1993). The historic site consists of a small-scale mining venture with associated artifacts and was previously recommended as not eligible. The site was reexamined and updated during the current inventory and is recommended as not eligible to the NRHP (Young and Garner, 2009).

Of the remaining 15 cultural resource sites, six prehistoric sites have been determined to be eligible for listing to the NRHP based on the potential to yield data that would contribute to the understanding of the prehistoric occupation of the area. All recommendations for site eligibility for listing on the NRHP are based on preliminary field recommendations and are subject to review and possible changes during BLM and State Historic Preservation Office (SHPO) consultations.

### **3.3.2 Environmental Consequences**

The Proposed Action currently has the potential to impact six archeological sites recommended as eligible for NRHP listing within the project area. To avoid impacts, the Proposed Action would implement the proposed mitigation measures identified in Section 2.1.1.3 and avoid archeological sites recommended eligible for NRHP listing.

Consultation with the SHPO on Determinations of Eligibility and Finding of Effect for cultural resources located within the Proposed Action area is ongoing. Construction and operation of the Proposed Action would avoid all known resources identified during the survey activities in accordance with the State Protocol Agreement between the BLM and the SHPO for Implementing the National Historic Preservation Act, 2009, Appendix G., Sections A and B (BLM and SHPO, 2009).

Construction of the Proposed Action also has the potential to affect undiscovered or subsurface resources.

Based on the avoidance of known sites and the established protocol for the discovery of any new site, there would be no impact on cultural resources.

No impacts would occur during decommissioning. Only previously disturbed areas would be disturbed during decommissioning. All cultural sites would be avoided. Adverse effects would not occur.

## 3.4 Invasive, Nonnative, and Noxious Species

### 3.4.1 Affected Environment

The State of Nevada lists 47 noxious weed species that require control (Nevada Administrative Code 555.10; Nevada Department of Agriculture, 2008). Of these, saltcedar (*Tamarix ramosissima*) was the only noxious weed identified in the Proposed Action area during field surveys. In addition, the following invasive, non-native species were identified within or in the vicinity of the Proposed Action area: Russian olive (*Elaeagnus angustifolia*), cheat grass (*Bromus tectorum*), Russian thistle (*Salsola kali*), and common sowthistle (*Sonchus oleraceus*).

### 3.4.2 Environmental Consequences

The Proposed Action has the potential to increase the spread of invasive, non-native, and noxious species. Seeds can germinate when soils are disturbed by construction and drilling activities, particularly where soil moisture is increased by applying water for dust suppression. Construction equipment brought to the project from infested areas and using seed mixtures or mulching materials that contain undesirable seeds could also introduce non-native and noxious species into the area. Power plant operations would have less likelihood of increasing the spread of invasive, non-native and noxious species because vehicles would use access roads for travel.

The potential for the Proposed Action to increase the spread of invasive, non-native and noxious plants species would be minimized by using measures described in Section 2.1.1.3, including mapping and treating weed infestations prior to disturbance or during construction, using certified weed-free seed and mulching materials, and washing heavy equipment prior to entering public lands. Additionally, a noxious plant control program would be implemented. By using these measures, no long-term impacts associated with invasive, non-native, and noxious species are expected to occur from the Proposed Action.

## 3.5 Migratory Birds

### 3.5.1 Affected Environment

On January 11, 2001, President Clinton signed Executive Order 13186 (EO) placing emphasis on the conservation and management of migratory birds. Migratory birds are protected under the Migratory Bird Treaty Act of 1918 (MBTA), and the EO addresses the responsibilities of federal agencies to protect migratory birds by taking actions to implement the MBTA. BLM management for migratory bird species on BLM-administered lands is based on Instruction Memorandum No. 2008-050 (BLM, 2007b). Based on this Instruction Memorandum, migratory bird species of conservation concern include "Species of Conservation Concern" and "Game Birds Below Desired Conditions." These lists were updated in 2008 (USFWS, 2008a).

#### 3.5.1.1 Golden Eagle

The Bald and Golden Eagle Protection Act (1940 as amended 1959, 1962, 1972, 1978) prohibits the take or possession of bald and golden eagles with limited exceptions. *Take*, as defined in the Eagle Act, includes "to pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb." *Disturb* means "to agitate or bother a bald or golden eagle to a degree that causes or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding or sheltering behavior."

*Important eagle-use area* is defined in the Eagle Act as an eagle nest, foraging area, or communal roost site that eagles rely on for breeding, sheltering, or feeding, and the landscape features surrounding such nest, foraging area, or roost site are essential for the continued viability of the site for breeding, feeding, or sheltering eagles.

BLM requires consideration and NEPA analysis of golden eagles and their habitat for all renewable energy projects (BLM Instruction Memorandum No. 2010-156). Golden eagles use Dixie Valley for foraging and the nearby mountain ranges for nesting, but no documented nests are within 6 miles of the lease area (NDOW, 2010a).

Key habitats found within the Proposed Action area that support life requisites of migratory birds are described in detail in Section 3.7, Wildlife.

Table 3-3 lists migratory birds potentially present at the CC lease area.

**TABLE 3-3**  
**Migratory Bird Species of Concern, Habitat Association, and Presence/Absence of Suitable Habitat at the CC Lease Area**

<b>Common Name</b>	<b>Scientific Name</b>	<b>Habitat Association</b>	<b>Presence/Absence of Suitable Habitat</b>
<b>Game Birds of Conservation Concern</b>			
Dove, mourning	<i>Zenaida macroura</i>	Open woodland, forest edge, cultivated lands with scattered trees and bushes, parks and suburban areas, arid and desert country and second growth.	Present
<b>Bird Species of Conservation Concern</b>			
Blackbird-tricolored	<i>Agelaius tricolor</i>	Breeds near fresh water, preferably in emergent wetlands, with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. Feeds in grassland and cropland habitats.	May be present
Eagle, golden	<i>Aquila chrysaetos</i>	Generally open country, in prairies, arctic and alpine tundra, open wooded country, and barren areas, especially in hilly or mountainous regions.	Present; observed at existing Dixie Valley Power Plant
Falcon, prairie	<i>Falco mexicanus</i>	Primarily open situations, especially in mountainous areas, steppe, plains or prairies.	Present; observed in Coyote Canyon
Finch, black rosy	<i>Leucostricte atrata</i>	Breeds in alpine areas, usually near rock piles, and cliffs. Winters in open country, including mountain meadows, high deserts, valleys, and plains	May be present
Flycatcher, willow	<i>Empidonax trailii</i>	Breeds in moist, shrubby areas, often with standing or running water. Winters in shrubby clearings and early successional growth.	May be present
Harrier, northern	<i>Circus cyaneus</i>	Marshes, meadows, grasslands, and cultivated fields.	May be present
Hawk, ferruginous	<i>Buteo regalis</i>	Grasslands and semidesert shrublands; nest in isolated trees, on rock outcrops, or ground	Present
Hummingbird, calliope	<i>Stellula calliope</i>	Open montane forest, mountain meadows, and willow and alder thickets, in migration and winter also in chaparral, lowland brushy areas, deserts and semi-desert regions.	May be present
Owl, burrowing	<i>Athene cunicularia</i>	Open dry shrub/steppe grasslands, agricultural and rangelands, and desert habitats associated with burrowing animals.	Present
Shrike, loggerhead	<i>Lanius ludovicianus</i>	Open county with scattered trees and shrubs, savanna, desert scrub, and occasionally open woodland.	Present; observed in lease area

**TABLE 3-3**  
Migratory Bird Species of Concern, Habitat Association, and Presence/Absence of Suitable Habitat at the CC Lease Area

Common Name	Scientific Name	Habitat Association	Presence/Absence of Suitable Habitat
Sparrow, black-chinned	<i>Spizella atrogularis</i>	Dry, brushy chaparral in rocky, rugged landscapes in habitats characterized by sagebrush, greasewood, chamise, mesquite, cactus, and other arid scrub plants.	
Sparrow, Brewer's	<i>Spizella breweri</i>	Strongly associated with sagebrush over most of range, in areas with scattered shrubs and short grass.	Present
Sparrow, sage	<i>Amphispiza belli</i>	Strongly associated with sagebrush for breeding; also found in saltbush brushland, shadscale, antelope brush, rabbitbrush, black greasewood, mesquite, and chaparral.	Present
Swift, black	<i>Cypseloides niger</i>	This is a species that breeds in mountainous areas, but ranges far from nesting sites to forage.	Foraging habitat may be present
Thrasher, sage	<i>Oreoscoptes montanus</i>	Found in relatively undisturbed shrub-steppe habitats within areas of tall/dense big sagebrush.	May be present
Towhee, green-tailed	<i>Pipilo chlorurus</i>	Dry, shrubby hillsides. Breeds in areas with a high diversity of shrub species providing dense, low cover. During migration and winter, it is found in similar habitats, often near streams.	May be present
Vireo, Gray	<i>Vireo vicinior</i>	Inhabits hot, semi-arid, shrubby habitats.	Present
Warbler, Virginia's	<i>Vermivora virginiae</i>	Preferred breeding habitat includes chaparral; open stands of pinyon-juniper, yellow pine, and scrub oak; mountain mahogany thickets and other low brushy habitats on dry mountainsides; open ravines and canyons; and flat mountain valley bottoms.	May be present

### 3.5.2 Environmental Consequences

Construction of a power plant, gen-tie, well connection pipelines, and surface disturbance from roads, parking, and laydown areas would result in permanent, direct loss of cold desert scrub habitat that sagebrush breeders such as sage thrasher, sage sparrow, and Brewer's sparrow, also utilize as support habitat. The gen-tie and towers associated with drilling also could result in direct mortality from bird strikes. Indirect temporary effects from noise, human presence, and heavy equipment present during construction activities may lead to reduced nesting success for individuals that are not displaced but are affected by the fragmentation and/or overall footprint of the project, or to individuals being

displaced into surrounding areas. This in turn may affect foraging opportunities for species that prey on adults, nestlings, or eggs. Raptor species, such as prairie falcon, that prey on rodents and lizards also may be affected by these activities.

Direct and indirect effects from permanent noise associated with a power plant or pipeline pumps affect species differently. For example, birds with higher-frequency calls were less likely to avoid roadways than birds with lower-frequency calls (Barber et al. 2009, and references therein).

However, because of the minimal extent of noise effects from the power plant, the low decibels emanating from the pipeline pumps (BLM regulations mandate that noise at one-half mile – or at the lease boundary if closer – from a major geothermal operations shall not exceed 65 A-weighted decibels (43 CFR 3200.4[b])), and the small habitat acreage loss (134 acres) relative to the hundreds of thousands of acres of available cold desert scrub habitat in Dixie Valley, population viability for any one species is not expected to be in jeopardy as a result of the components of the Proposed Action. Installing perch deterrents and bird diverters on the gen-tie and conducting pre-construction migratory bird nest surveys would minimize and/or eliminate impacts on individual birds by minimizing avian collisions with transmission facilities and preventing electrocution. Additionally, because no known golden eagle nests are within 6 miles of the project area, there are hundreds of thousands of acres of available cold desert scrub habitat for foraging in Dixie Valley, and negligible prey impacts, no “Take” or disturbance to “Important Eagle Use Areas” is reasonably expected.

## 3.6 Wildlife

### 3.6.1 Affected Environment

Based on the Southwest Regional GAP Analysis Project, the Nevada Department of Wildlife's Wildlife Action Plan (2006) characterized Nevada's vegetative land cover into eight broad ecological system groups and linked those with Key Habitat types, which are further refined into Ecological Systems characterized by plant communities or associations (USGS, 2005). Along with survey data, Key Habitats can be used to infer likely occurrences of wildlife species assemblages. Key Habitat types that potentially would be affected directly or indirectly by the Proposed Action are Cold Desert Scrub and Desert Playas and Ephemeral Pools. The latter includes several minor wetlands created from seeps stemming from historical seismic exploration drilling (Section 3.13, Wetlands/Riparian Zones). When playas contain water for extended periods of time, lush vegetation can grow in addition to producing many aquatic invertebrates that provide forage for shorebirds, waterfowl, and small water birds. However, the playa area adjacent to the CC lease area does not contain a large permanent water source; therefore, it does not currently and is unlikely in the future to contribute this kind of permanent wildlife habitat within the influence of the Proposed Action.

Wildlife found during field surveys conducted in June, July, and August 2009 in the CC lease area is typical of these habitats. Wildlife species observed included various birds (see Section 3.6, Migratory Birds), coyote (*Canis latrans*), black-tailed jackrabbit (*Lepus californicus*), cottontail (*Sylvilagus* spp.), white-tailed antelope squirrel (*Ammospermophilus leucurus*), desert horned lizard (*Phrynosoma platyrhinos*), zebra-tailed lizard (*Callisaurus draconoides*), western whiptail (*Aspidoscelis tigris*), side-blotched lizard (*Uta stansburiana*), long-nosed leopard lizard (*Gambelia wislizenii*), and mule deer (*Odocoileus hemionus*) (CH2M HILL, 2009a). Although no bat roosting habitat is found in the CC lease area, habitat is found in mines, caves, and rock crevices of the Stillwater Range, and bats may use the area for foraging.

#### 3.6.1.1 Big Game

Big game species that may travel from the Stillwater Range to the west through the CC lease area to the Clan Alpine Mountains to the east largely consist of mule deer (*Odocoileus hemionus*), mountain lion (*Felis concolor*), and desert bighorn sheep (*Ovis canadensis nelsoni*).

### 3.6.2 Environmental Consequences

Construction of a power plant, gen-tie, well connection pipelines, and surface disturbance from roads, parking, and laydown areas would result in permanent direct loss of habitat and potential mortality for lizards and small mammals that forage and/or have burrow complexes within the cold desert scrub habitat. Indirect effects from noise, human presence, and heavy equipment present during construction activities may lead to reduced breeding success for individuals that are not displaced but are affected by the fragmentation of the overall footprint of the project, or to individuals being displaced into surrounding areas. This in turn may affect distribution of large mammals and raptors that forage on rodents and small mammals.

Direct and indirect effects from permanent noise associated with a power plant or pipeline pumps affect species differently. For example, bats (e.g., pallid bat) that find their prey from noise that the prey makes instead of echolocation have been shown to avoid noisy areas. Bats using echolocation were unaffected because those ultrasonic signals are above the spectrum of human noise. Rodents that use chirps to warn of predators may be susceptible to increased predation because these chirps may be masked from the power plant noise (Barber et al., 2010). Big game species may avoid the area when traveling between mountain ranges.

However, because of the minimal extent of noise effects from the power plant, the low decibels emanating from the pipeline pumps (up to 65 decibels per BLM guidelines), and the small habitat acreage loss (134 acres) relative to the hundreds of thousands of acres of available cold desert scrub habitat in Dixie Valley, population viability for any one species is not expected to be in jeopardy as a result of the components of the Proposed Action. Additionally, game species would not reasonably incur additional physiological stress leading to decreased survival by avoiding the CC lease area when crossing between mountain ranges.

### 3.7 Special-status Species – BLM Sensitive

Sensitive species are defined in BLM Manual 6840 (Special Status Species Management) as native species found on BLM-administered lands for which the BLM has the capability to significantly affect the conservation status of the species through management and either one of the following:

1. There is information that a species has recently undergone, is undergoing, or is predicted to undergo a downward trend such that the viability of the species or a distinct population segment of the species is at risk across all or a significant portion of the species range; or
2. The species depends on ecological refugia or specialized or unique habitats on BLM-administered lands, and there is evidence that such areas are threatened with alteration such that the continued viability of the species in that area would be at risk (BLM, 2008b).

#### 3.7.1 Affected Environment

A list of sensitive species associated with BLM administered lands in Nevada was signed in 2003 (BLM, 2003). Table 3-4 presents BLM-designated Sensitive Species and their habitat association within the CC lease area.

Key habitats found within the CC lease area that support life requisites of BLM-designated Sensitive Species are described in detail in Section 3.7, Wildlife.

**TABLE 3-4**  
Nevada BLM Sensitive Species, Habitat Association, and Presence/Absence of Suitable Habitat in the CC Lease Area

Common Name	Scientific Name	Habitat Association	Presence/Absence of Suitable Habitat
Golden eagle	<i>Aquila chrysaetos</i>	Generally open country, in prairies, arctic and alpine tundra, open wooded country, and barren areas, especially in hilly or mountainous regions	Present; observed at existing Dixie Valley Power Plant
Ferruginous hawk	<i>Buteo regalis</i>	Grasslands and semidesert shrublands; nest in isolated trees, on rock outcrops, or ground	Present
Swainson's hawk	<i>Buteo swainsoni</i>	Found in open grassland steppe areas, but typically requires scattered trees for nesting.	May be present
Prairie falcon	<i>Falco mexicanus</i>	Primarily open situations, especially in mountainous areas, steppe, plains or prairies.	Present; observed in Coyote Canyon
Burrowing owl	<i>Athene cunicularia</i>	Open dry shrub/steppe grasslands, agricultural and rangelands, and desert habitats associated with burrowing animals	Present

**TABLE 3-4**  
Nevada BLM Sensitive Species, Habitat Association, and Presence/Absence of Suitable Habitat in the CC Lease Area

Common Name	Scientific Name	Habitat Association	Presence/Absence of Suitable Habitat
Short -eared owl	<i>Asio flammeus</i>	Marshland and open grasslands, tundra, open fields, forest clearings, sagelands, deserts, pastures, prairies, lower mountain slopes, canyons, arroyos, dunes, meadows, and coastal salt marshes. The primary requirement of any habitat is an abundance of prey.	May be present
Long -eared owl	<i>Asio otus</i>	Dense vegetation adjacent to open grassland or shrubland, and open forests.	May be present
Juniper titmouse	<i>Baeolophus griseus</i>	Warm, dry open woodland, especially juniper woodlands.	
Loggerhead shrike	<i>Lanius ludovicianus</i>	Open county with scattered trees and shrubs, savanna, desert scrub, and occasionally open woodland.	Present; observed in CC lease area
Vesper sparrow	<i>Poocetes gamineus</i>	Plains, prairie, dry shrub lands, savanna, weedy pastures, fields, sagebrush, arid scrub and woodland clearings	Present
Tricolored blackbird	<i>Agelaius tricolor</i>	Breeds near fresh water, preferably in emergent wetlands, with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. Feeds in grassland and cropland habitats.	May be present
Black rosy finch	<i>Leucostricte atrata</i>	Breeds in alpine areas, usually near rock piles, and cliffs. Winters in open country, including mountain meadows, high deserts, valleys, and plains	May be present
Gray vireo	<i>Vireo vicinior</i>	Inhabits hot, semi-arid, shrubby habitats	Present
Western pipistrelle bat	<i>Pipistrellus hesperus</i>	Deserts and lowlands, desert mountain ranges, desert scrub flats, and rocky canyons	Present
Pallid bat	<i>Antrozous pallidus</i>	Arid deserts and grasslands, often near rocky outcrops and water	Present
Spotted bat	<i>Euderma maculatum</i>	Found in various habitats from desert to montane coniferous stands, including open ponderosa pine, pinyon-juniper woodland, canyon bottoms, open pastures, and hayfields	Present
Yuma myotis	<i>Myotis yumanensis</i>	More closely associated with water than most North American bats. Found in a variety of upland and lowland habitats, including riparian, desert scrub, moist woodlands and forests, but usually found near open water.	May forage in Proposed Action area

**TABLE 3-4**  
Nevada BLM Sensitive Species, Habitat Association, and Presence/Absence of Suitable Habitat in the CC Lease Area

Common Name	Scientific Name	Habitat Association	Presence/Absence of Suitable Habitat
Western red bat	<i>Lasiurus blossevilli</i>	Riparian habitats dominated by cottonwoods, oaks, sycamores, and walnuts; rarely found in desert habitats. Summer roost usually in tree foliage.	May forage in Proposed Action area but unlikely.
Silver-haired bat	<i>Lasionycteris noctivagans</i>	Prefers forested (frequently coniferous) areas adjacent to lakes, ponds, and streams	May forage in CC lease area
Townsend's big-eared bat	<i>Corynorhinus townsendii</i>	Maternity and hibernation colonies typically are in caves and mine tunnels	May forage in CC lease area
Big brown bat	<i>Eptesicus fuscus</i>	Various wooded and semi-open habitats, including cities	Present
Hoary bat	<i>Lasiurus cinereus</i>	Prefers deciduous and coniferous forests and woodlands.	May forage in CC lease area
Brazilian free-tailed bat	<i>Tadarida brasiliensis</i>	Roosts primarily in caves	May forage in CC lease area
Long-eared myotis	<i>Myotis evotis</i>	Mostly forested areas, especially those with broken rock outcrops; also shrubland, over meadows near tall timber, along wooded streams, over reservoirs	May forage in CC lease area
Fringed myotis	<i>Myotis thysanodes</i>	Primarily at middle elevations for 1,200-2,150 meters in desert, grassland, and wooded habitats	Present
California myotis	<i>Myotis californicus</i>	Western lowlands; sea coast to desert, oak-juniper, canyons, riparian woodlands, desert scrub, and grasslands	Present
Small-footed myotis	<i>Myotis ciliolabrum</i>	Generally inhabits desert, badland, and semiarid habitats	Present
Little brown myotis	<i>Myotis lucifugus</i>	Adapted to using human-made structures for resting and maternity sites, also uses caves and hollow trees; foraging habitat is generalized, usually in woodlands near water	May forage in CC lease area
Long-legged myotis	<i>Myotis volans</i>	Primarily in montane coniferous forests; also riparian and desert habitats	May forage in CC lease area
Desert bighorn sheep	<i>Ovis canadensis nelsoni</i>	Steep slopes on or near mountains with a clear view of surrounding area	Present in Stillwater Range western portion of Proposed Action area
Pallid wood nymph	<i>Cercoyonis oetus pallescens</i>	Alkaline flats	Present
Sand Mountain blue	<i>Euphilotes pallescens arenamontana</i>	No data	Present; known to occur within Dixie Valley

TABLE 3-4

Nevada BLM Sensitive Species, Habitat Association, and Presence/Absence of Suitable Habitat in the CC Lease Area

Common Name	Scientific Name	Habitat Association	Presence/Absence of Suitable Habitat
Nevada dune beardtongue	<i>Penstemon arenarius</i>	Deep, volcanic, sandy soils at 1,200-1,350 meter elevation; common associates include fourwing saltbush, littleleaf horsebrush, and greasewood	Potentially present; not known to occur in Dixie Valley
Lahontan beardtongue	<i>Penstemon palmeri</i> var. <i>macranthus</i>	Along washes, roadsides, and canyon floors, particularly on carbonate-containing substrates, usually where subsurface moisture is available throughout most of the summer; unknown if restricted to calcareous substrates	Present; known to occur within Dixie Valley

### 3.7.2 Environmental Consequences

Consequences are the same for BLM-designated Sensitive Species as are described for migratory birds and wildlife in Sections 3.6 and 3.7, respectively. Construction of a power plant, gen-tie, well connection pipelines, and surface disturbance from roads, parking, and laydown areas would result in permanent direct loss of foraging and nesting habitat, as well as potential mortality for some species that may collide with the gen-tie and towers associated with drilling operations. Indirect effects from noise, human presence, and heavy equipment present during construction activities may lead to reduced breeding success for individuals that are not displaced but are affected by the fragmentation of the overall footprint of the project, or to individuals being displaced into surrounding areas. This in turn may affect distribution of raptors that forage on rodents and small mammals.

Direct and indirect effects from permanent noise associated with a power plant or pipeline pumps affect species differently. For example, bats (e.g., pallid bat) that find their prey from noise that the prey makes instead of echolocation have been shown to avoid noisy areas. Bats using echolocation were unaffected because those ultrasonic signals are above the spectrum of human noise. Rodents that use chirps to warn of predators may be susceptible to increased predation because these chirps may be masked from the power plant noise (Barber et al., 2010). Noise stemming from drilling operations would be temporary. Desert bighorn sheep may avoid the area when traveling between mountain ranges.

However, because of the minimal extent of noise effects from the power plant, the low decibels emanating from the pipeline pumps (up to 65 decibels per BLM guidelines), and the small habitat acreage loss (134 acres) relative to the hundreds of thousands of acres of available cold desert scrub habitat in Dixie Valley, population viability for any one species is not expected to be in jeopardy as a result of the components of the Proposed Action. Additionally, desert bighorn sheep would not reasonably incur additional physiological stress leading to decreased survival by avoiding the Proposed Action area when crossing between mountain ranges.

## **3.8 Native American Religious Concerns**

### **3.8.1 Affected Environment**

Consultation was initiated with the Fallon Paiute-Shoshone Tribe on July 6, 2009. Correspondence provided the results of the initial cultural resources inventory and subsequent final report (October 27 and November 30, 2009). Face-to-face meetings were conducted between the BLM and tribal staff on January 12, 2010, and August 25, 2010. Correspondence included a description of the Proposed Action, cultural resource reports, and a map.

### **3.8.2 Environmental Consequences**

Consultation regarding the Proposed Action area between the BLM and federally recognized Native American tribes is ongoing. During consultation for the Proposed Action, cultural resources including historic properties and other resources were identified and potentially may be affected by the Proposed Action.

Archaeological sites can and would be avoided through project design. If human remains are identified during construction of any of the components of the Proposed Action, work within 300 feet of the discovery would be stopped and the remains would be protected from further exposure or damage. If the remains are determined to be Native American, the agencies would follow the procedures set forth in 43 CFR Part 10, Native American Graves Protection and Repatriation Regulations.

## 3.9 Wastes, Hazardous or Solid

### 3.9.1 Affected Environment

No hazardous wastes or hazardous materials are known to occur in the CC lease area. Numerous federal and state laws and regulations have been enacted and are enforced by the NDEP Bureau of Waste Management to ensure that hazardous materials, hazardous waste and solid wastes are properly handled, stored, and disposed. There are no existing landfills located within the CC lease area. The nearest landfill is located in Lovelock, Nevada, approximately 30 miles from the CC lease area.

### 3.9.2 Environmental Consequences

Diesel fuel, lubricants, hydraulic fluids, and drilling chemicals (e.g., drilling mud, caustic soda, barite, scale inhibitors) would be transported to, stored on, and used at the project site. If a binary or combined-cycle unit is selected for power generation, a secondary organic working fluid, such as pentane ( $C_5H_{12}$ ), isopentane ( $C_5H_{12}$ ), butane ( $C_4H_{10}$ ), isobutane ( $C_4H_{10}$ ) or a refrigerant such as R245fa would be used in a closed system.

The Proposed Action must conform to federal and state requirements for handling these hazardous materials. The storage and use of these materials could result in minor, incidental spills of diesel fuel or oil to the ground during fueling of equipment, filling of fuel storage tanks, and handling lubricants. Other incidental spills could be associated with equipment failures such as ruptured hoses. BMPs presented in Section 2.1.1.3 including development of an SPCC plan, use of secondary containment structures, and worker training would be used to prevent the release of hazardous wastes to the environment.

Wastes (solid and liquid) would be transported offsite for appropriate disposal consistent with state and federal regulatory requirements. The Proposed Action would generate minimal levels of hazardous waste and would be classified as a Conditionally Exempt Small Quantity Generator under federal regulations. Implementation of these procedures would prevent or minimize potential impacts on the environment from project-related hazardous or non-hazardous wastes.

## 3.10 Geology and Minerals

### 3.10.1 Affected Environment

The non-mountainous portions of the CC lease area, where wells would be installed as part of the Proposed Action, are located at elevations ranging from approximately 3,400 feet to 3,600 feet in the northern part of Dixie Valley. Dixie Valley is a north-northeast/south-southwest-trending elongated valley in west-central Nevada, within the Great Basin Section of the Basin and Range Physiographic Province. The western edge of Dixie Valley is defined by the Stillwater Range and the eastern edge is defined by the Clan Alpine Mountains. Alluvial fans and pediment surfaces flank the area between the mountains and the valley interior. The Proposed Action is located on alluvial fans at the base of the Stillwater Range on the western edge of Dixie Valley.

Wells at the existing Dixie Valley plant (Figure 3-1) have penetrated marine siltstone, shale, sandstone, and volcanoclastic rocks exposed in the Stillwater Range (Bruton et al., 1997). A sequence of Triassic tuff, andesite, and Miocene basalt (tertiary basalt and tuff) overlies older sedimentary and igneous rocks (basement or down-dropped basement) at a depth of approximately 7,000 to 8,000 feet within Dixie Valley. It is overlain by a 1,500- to 4,000-foot-thick sequence of late Tertiary basin-fill sediments, including lacustrine, playa, and alluvial fan sediments (valley fill). Figure 3-2 shows the location of the geologic cross section. The cross section depicts a sequence of faults associated with the down-dropped basement rocks underlying Dixie Valley near the Senator Fumaroles, immediately north of the CC lease area. Structurally, Dixie Valley is an elongated down-dropped block, or graben, bounded by high-angle faults of Holocene age (Ryall and Vetter, 1982). The faulting associated with the geothermal reservoir is located beneath the west valley edge at the base of the Stillwater Range. Figure 3-3 is a map that shows the approximately locations of the faults in Dixie Valley and the location of the Proposed Action.

Seismic activity subsequent to the tectonism that formed the Dixie Valley graben has further deformed the bedrock, resulting in a complex series of faults in the bedrock beneath the valley floor near the Stillwater Range front (Smith, et al. 2001). Dixie Valley is located in an active seismic area. A major earthquake of magnitude 6.8 occurred in 1954 beneath Dixie Valley and created a visible scarp along the portions of the west margin of Dixie Valley (Ryall and Vetter, 1982).

Precious metals have historically been mined in the Clan Alpine Mountains bordering Dixie Valley. Existing mines in Churchill County are located around its periphery, far from Dixie Valley, which is situated in the central part of the county. Based on a review of existing mines (Willden and Speed, 1974) and the online Mineralogy Databases (Mindat.org, 2010), there are no current commercial industrial mining operations in Dixie Valley. There are currently 100 active unpatented lode mining claims within Township 24N, Range 26E. There is a material community pit near the Proposed Action area in Township 24N, Range 36E, Section 16.

### 3.10.2 Environmental Consequences

A history of recent (1954) seismicity associated with the Dixie Valley fault zone led Ryall and Vetter (1982) to suggest that Dixie Valley would have a potential for induced seismicity if injection of geothermal fluids into deep wells occurs. Induced seismicity is associated most commonly with high-pressure injection of either wastewater (such as at Rocky Mountain Arsenal in Colorado) or water into dry or steam-dominated thermal rock zones, such as at The Geysers in California (Ryall and Vetter, 1982, and Bromley and Mongillo, 2008). This latter practice, in which otherwise water-limited or non-water bearing hot rocks are artificially fractured using high-pressure fluids, can induce seismicity during the hydraulic fracturing stage and during the long-term operations stage. Induced seismicity is not expected to be associated with the Proposed Action because hydraulic fracturing technology is not planned for use and because the geothermal fluid withdrawal/injection process would be conducted in a manner intended to maintain relatively consistent pressures rather than to dramatically increase (or decrease) pore water pressures in the geothermal reservoir as occurs by design with high-pressure injection intended to induce fracturing. The current injection system at the existing Dixie Valley geothermal facility has not caused any significant seismicity issues, and given the close proximity to the Proposed Action area, the Proposed Action is not expected to have any increase in seismicity.

The Proposed Action does not involve mineral extraction and would not affect current or anticipated future mineral exploration, extraction or processing activities beyond the physical impediment presented by project infrastructure (roads, pipelines, drill pads and appurtenant features).

## 3.11 Water Resources (Surface/Ground)

### 3.11.1 Surface Water

#### 3.11.1.1 Affected Environment

Based on analysis of U.S. Geological Survey (USGS) topographic maps, Nevada Division of Water Resources groundwater basin mapping, and on wetland field surveys conducted March 26–April 1, 2010 (CH2M HILL, 2010), the Proposed Action would be located in an internally drained desert basin that is a great distance from and lacks hydrographic connectivity to major rivers and water bodies. Therefore, there are no navigable waters of the U.S. within Rivers and Harbors Act jurisdiction (as defined by 33 CFR part 329) and no waters of the U.S. within Clean Water Act jurisdiction (as defined by 33 CFR 328) in the CC project area. A formal wetland delineation was conducted by CH2M HILL on March 26–April 1, 2010. This delineation also concluded that the basin is internally drained and contains no waters of the U.S. within Clean Water Act jurisdiction.

No ponds or wetlands exist within the CC project site. The USGS 7.5-minute topographic map of the area (Bolivia, Nevada Quadrangle 1990) shows ephemeral washes flowing southeast across the alluvial fan and valley bottom within the CC lease area and into the Humboldt Salt Marsh within Dixie Valley. These ephemeral washes only flow from significant rainfall or snowmelt events.

No springs or seeps have been mapped within the lease area.

#### 3.11.1.2 Environmental Consequences

No effect on surface water resources is expected because of the lack of surface water resources in the Proposed Action area.

### 3.11.2 Groundwater

#### 3.11.2.1 Affected Environment

The CC lease area is located in the internally drained Dixie Valley groundwater basin (Nevada Division of Water Resources-designated Administration Groundwater Basin 128). Dixie Valley is located in Nevada Hydrographic Region 10 (Central Region) (Nevada Division of Water Resources, 2005) and is in the Great Basin hydrographic area.

Groundwater Basin 128 has an area of 1,303 square miles and a perennial yield of 15,000 afy. The basin has committed underground water rights of 18,076 afy and geothermal water rights of 13,428 afy (Nevada Division of Water Resources, 2009). By Order 715, dated June 8, 1978, the Nevada State Engineer has “designated” the Dixie Valley groundwater basin, which indicates that the permitted groundwater rights approach or exceed the estimated average annual recharge and the water resources are being depleted or require additional administration (Nevada Division of Water Resources, 2009).

In Dixie Valley, groundwater generally occurs in the alluvial basin fill sediments and in the underlying bedrock. In the northern portion of Dixie Valley, where the CC project area is located, groundwater moves south through the valley, east from the Stillwater Mountains, and west from the Clan Alpine Mountains. Recharge to groundwater occurs from precipitation,

primarily snowmelt, at higher elevations in the Stillwater Range and Clan Alpine Range west and east of Dixie Valley and in the alluvial fans and landslide deposits at the base of these mountains. The Humboldt Salt Marsh (playa) is the ultimate groundwater sink for Dixie Valley and six subbasins that are adjacent to Dixie Valley (Fairview, Pleasant, Jersey, Eastgate, Cowkick, and Stingaree valleys). Groundwater flows away from the surrounding mountains and toward the center of the valley and discharges on the playa. Groundwater moves vertically upward in the central part of the valley, in response to hydraulic gradients, where it discharges to the playa and is lost to evaporation and transpiration.

### **Shallow Groundwater**

Groundwater occurs in two separate aquifer systems in Dixie Valley: a shallow, non-thermal, alluvial aquifer system and a deep, thermal, bedrock aquifer system (Karst, 1987). Groundwater in the alluvium occurs under both unconfined and confined conditions. Hydraulic heads for confined conditions are typically beneath the elevation of the valley floor (Nevada Division of Water Resources, 2010). TGP Dixie Development Company well files for geothermal wells 66-21 and 62-23 in the CC lease describe valley fill deposits as undifferentiated Quaternary alluvium to depths of approximately 4,300 feet (Figure 3-4).

The majority of wells located within 1 mile of the CC lease area were dry (Nevada Division of Water Resources, 2010) with total depths ranging from 105 to 495 feet (Table 3-5 and Figure 3-4). Wells that did encounter water had total depths ranging from 50 to 1,500 feet deep. The varying degrees of saturation and confinement observed in shallow aquifer water wells are the result of the complex depositional environment of the valley fill sediments along with post-deposition deformation. Consequently, this has led to a complex sequence of variably saturated, water-bearing zones and intervals of unsaturated interbedded low-permeability confining layers (Nimz et al., 1999).

Limited information is available on the hydraulic characteristics of basin fill water-bearing zones. The record of one well located in the CC lease area (Nevada state well number 21293) (Figure 3-4) indicates that it is 300 feet deep and was tested for 48 hours at a pumping rate of 300 gallons per minute, after which it exhibited 180 feet of drawdown, for a specific capacity of about 1.7 gallons per minute per foot of drawdown (Nevada Division of Water Resources, 2010). Using the confined aquifer empirical Jacob's approximation method (Driscoll, 1986), this specific capacity value correlates to an estimated transmissivity of 3,300 gallons per day per foot (gpd/ft) and translates to an average hydraulic conductivity of about 330 gallons per day per square foot (40 feet per day or 0.016 centimeter per second) for the lower of the two water-bearing intervals tapped by the well (assuming the upper zone was temporarily dewatered during the pumping test). Because of the nature of the alluvial deposits (interbedded and interfingering sand, silt, and clay), the bulk vertical permeability within the alluvial basin fill is expected to be much lower than the bulk horizontal permeability.

**TABLE 3-5**  
Existing Wells Located Within One Mile of the CC Lease

Log Number	Township	Range	Section	Quarter, Quarter Section	Date Completed	Total Depth (ft)	Static Water Level (ft bgs)	Casing Diameter (in.)
21891	N24	E36	13	NW NE	11/4/1976	105	NA	NA
21892	N24	E36	21	SE NE	11/6/1976	345	NA	NA
21893	N24	E36	16	NE SE	5/14/1979	1,500	150.00	1
21894	N24	E36	21	SE NW	4/9/1978	200	NA	1
21895	N24	E36	28	SE NW	12/19/1976	495	NA	NA
21897	N24	E36	28	NW NW	11/5/1976	300	NA	1.25
22821	N24	E36	21	NW SE	9/28/1979	7,195	NA	7
43262	N24	E36	23	NW NE	12/13/1993	11,778	NA	13.38
47412	N24	E36	14	NE SW	10/2/1994	11,713	NA	13.38
21293	N24	E36	12	NE SE	6/1/1974	300	125	16
21906	N24	E37	18	NE SW	11/3/1976	495	NA	NA
21907	N24	E37	18	NW NW	5/4/1979	7,255	NA	7
21910	N24	E37	19	NE SW	10/16/1976	480	NA	NA
66-21	N24	E36	21	NE SE	9/28/1979	9780	NA	13.38
62A-23	N24	E36	23	SW NE	12/11/1993	11,778		20
24W-5	N24	E37	05	SW NW	1/11/1997	1805		16.25
45W-5	N24	E37	05	SW NW	11/1/1985	285	20	5.63

### Geothermal Groundwater

Thermal groundwater in Dixie Valley is confined and generally occurs in fracture zones associated with faulting within the basement rock. The geothermal reservoir in the CC lease area is expected at a depth of up to 10,000 feet. Morin et al. (1998) conducted a series of aquifer tests to evaluate the hydraulic characteristics of the geothermal reservoir in Dixie Valley. The tests were conducted on wells penetrating the Stillwater fault at the Dixie Valley Power Plant south of the CC lease area. The transmissivity values (uncorrected for viscosity) ranged from 5 to 67 gpd/ft for wells that did not show enhanced permeability associated with faulting. These values were suggested by Morin et al. to reflect the bulk primary permeability of the basement rock. In the two wells that reflected enhanced secondary permeability related to fault brecciation, the uncorrected transmissivity values ranged from 26,000 to 140,000 gpd/ft. Consequently, localized brecciation associated with faulting can increase the capacity for the basement rocks to transmit water near faults by roughly three to four orders of magnitude. These areas of enhanced permeability appear to be limited in extent; however, thermal gradient measurements indicate that the high thermal gradients in the CC lease area are separated from adjacent areas of high thermal gradients (including that associated with the Dixie Valley Power Plant) suggesting limited lateral hydraulic connection between these areas (Blackwell et al., 2007).

Generally, the deep geothermal reservoir and the shallower alluvial groundwater are separated by a confining sequence thousands of feet thick, composed of shale, siltstone,

volcaniclastic rocks, and a complex of intrusive and extrusive igneous rocks (Bruton et al., 1997). This zone of enhanced permeability in the basement rocks associated with range front faulting may provide a pathway for thermal water to reach the basin-fill rock and sediments. These basin-fill deposits have generally much lower vertical permeability than horizontal permeability. Consequently, deep hot water near the bedrock fault zones has difficulty migrating vertically upward to the surface, and instead may flow laterally for some distance as it works its way upward to where it exits as hot springs. The connection between the deep geothermal reservoirs and hot springs at the surface, therefore, is typically indirect within the Basin and Range Physiographic Province (Blackwell et al., 2003; Smith et al., 2001). However, Kennedy and van Soest (2006) used helium isotope data to evaluate the degree of mixing of thermal and non-thermal groundwater in Dixie Valley. The isotope results identified that features such as fumaroles emanating directly from the Stillwater fault had a helium isotopic content that was indistinguishable from that of the geothermal reservoir, and that all the various wells, springs, and fumaroles tested had evidence of mixing with thermal water based on helium isotope data. The geochemistry of thermal groundwater in the CC lease area is presented in Table 3-6.

TABLE 3-6  
Well 66-21 Major Fluid Chemistry

Sample Name	pH (lab)	SiO <sub>2</sub> *	Na	K	Li	Ca	Mg	Sr	F	Cl	Br
DV98-104	6.51	325	876	86.9	4.89	40.0	0.35	2.61	3.06	1440	1.05

\*Sample filtered acidified  
Source: Goff et al. 2002

Specifically for the CC lease area, a significant sequence of impermeable clay in well 66-21 (Figure 3-4) was noted to exist above the geothermal reservoir. The well information indicated that the clay was abundant from about 2,000 to 4,500 feet. This impermeable clay layer was also noted to exist in the SW Lamb #1 (log number 21907) well located within the current TGP producing area (Figure 3-4). Beneath this impermeable clay layer both wells produce high temperature geothermal fluids under high pressures. The existence of this clay layer is significant because it serves as a barrier or "cap" between the deeper geothermal resource and shallow non-thermal groundwater (Mackey Mineral Research Institute, UNR, 1980).

Table 3-7 compares thermal groundwater from the existing Dixie Valley Power Plant with non-thermal groundwater in the basin-fill sediments. Based on generally similar geologic and hydrogeologic conditions, the contrasts indicated in Table 3-7 are anticipated to be similar to those exhibited in the CC lease area. Widespread mixing between groups of water within Dixie Valley (that is, thermal groundwater and non-thermal shallow alluvial groundwater) is not evident (Nimz et al., 1999).

**TABLE 3-7**  
Comparison of Thermal and Non-thermal Groundwater Quality in the Vicinity of the Existing Dixie Valley Power Plant

Ion Pairs	Thermal Water Typical Range	Non-Thermal Water Typical Range
Sodium + Potassium	90 to >95 percent meq/L	20 to 80 percent meq/L
Calcium + Magnesium	<5 to 10 percent meq/L	20 to 80 percent meq/L
Chloride + Sulfate	25 to 90 percent meq/L	25 to 85 percent meq/L
Bicarbonate + Carbonate	5 to 75 percent meq/L	5 to 75 percent meq/L

Notes: Data from interpretation of trilinear diagrams presented by Nimz et al. (1999). Samples collected from wells throughout the Dixie Valley study area.

meq/L = milliequivalents per liter, or milligrams per liter divided by the combining weights of the indicated ions.

As indicated in Table 3-7, the greatest contrast between thermal and non-thermal groundwater involves positively charged ions (cations). The differences in cation concentrations noted in Table 3-7 are useful in evaluating potential effects of the Proposed Action on shallow groundwater quality.

The total dissolved solids (TDS) concentration in shallow alluvial groundwater in Dixie Valley varies over a broad range based on data and modeling completed by Karst (1987). Based on the output of a three-dimensional, two-tier model of Dixie Valley, the upper (non-thermal) tier had a simple, non-weighted average TDS of 1,900 milligrams per liter (mg/L). Thermal groundwater in the area generally has higher dissolved solids content, with an average modeled TDS of 8,800 mg/L (Karst, 1987). However, the geothermal wells at the existing Dixie Valley Power Plant have an average TDS of approximately 2,100 mg/L, with similar water quality expected in the proposed wells, indicating that Karst's modeling overestimated actual TDS values in the geothermal reservoir.

### 3.11.2.2 Environmental Consequences

Power plant operation involves constructing up to 45 geothermal extraction and injection wells to depths of up to 10,000 feet and operating them in a manner that balances water withdrawals with water injection. The operating design would avoid net consumption of geothermal fluids.

The proposed power generating facility would use either a dry or hybrid cooling system. If dry cooling is used, no water is used in the cooling process; therefore, no impacts would occur to water resources. If hybrid cooling is used, the system would require approximately 550 afy (341 gpm) of water. Under the hybrid cooling system, some evaporation of geothermal fluids would occur as described in Section 2; however, under this scenario, fluids lost via evaporation or other means would be replaced with groundwater from a shallow aquifer water well such that the injection process would replace the same quantity of geothermal fluid as was removed during the production process. Given the lack of groundwater development in and near the CC lease area, no impact to groundwater or users is expected to occur. The Proposed Action includes the construction and development of a water well to provide supplemental makeup water as needed for injection. Water rights for this well will be obtained from existing water rights within the basin.

No impacts to shallow groundwater are expected from pumping and injecting back into the geothermal aquifer. According to available information, the hydraulic connection between the deep thermal aquifer system and the shallow basin-fill aquifer system is poor outside of localized areas adjacent to faulting. Also, the occurrence of an impermeable clay layer separating the geothermal resource from the shallow basin-fill alluvium was identified within the CC lease area. This clay layer provides a significant barrier between shallow non-thermal groundwater and deeper thermal groundwater.

The geothermal extraction and injection wells associated with the power plant would be constructed to maintain the separation between the deep geothermal reservoir and shallow alluvial groundwater. Wells would be subjected to periodic mechanical integrity testing to confirm that they effectively maintain this separation.

Thermal fluids would be transported and handled at the ground surface as part of normal plant operation. As described in Section 3.11.2.1, Affected Environment, thermal groundwater has generally higher dissolved solids than non-thermal groundwater. The saline thermal fluids involved with geothermal development could cause localized groundwater quality effects in the shallow non-thermal aquifer if inadvertently released because of a pipe or valve failure. However, the risk of a significant adverse effect is low because mitigation measures identified in Section 2.1.1.2 would be implemented.

The Proposed Action would have temporary, localized impacts on groundwater during the well testing phase. No other direct or indirect impacts are anticipated except for limited use of alluvial groundwater to replace geothermal water lost to evaporation. Therefore, the Proposed Action would have only temporary contributions to impacts on water resources and water quality, and only a limited effect on water resources (associated with shallow groundwater use).

## 3.12 Visual Resource Management

### 3.12.1 Affected Environment

Based on information contained in the CRMP (BLM, 2001), the CC lease area is located within a Class IV VRM area. The objective for this class is to provide for management activities that allow major modifications of the existing character of the landscape. The level of change to the characteristic landscape can be high. Activities in a Class IV category may dominate the view and be the major focus of viewer attention. However, every attempt should be made to minimize the impact of these activities through careful location, minimal disturbance, and repeating the basic landscape elements.

Sensitive receptors in the CC lease area include people recreating in the area. Recreational activities can include hiking, hunting, sightseeing, nature photography, mountain biking, and off-highway vehicle (OHV) use. The closest transportation route is Dixie Valley Road, which is designated State Route 121 and runs through the Proposed Action area. Current motorized travel in the Dixie Valley area is authorized on existing roads and cross-country travel is prohibited.

The closest urban sensitive receptor (park, church, residence, school, or hospital) is located in Lovelock, Nevada, approximately 32 miles northwest of the Proposed Action area. The Stillwater Range, with peaks higher than 8,500 feet, is located between the Proposed Action area and Lovelock. The closest receptor would be the 7 Devils Ranch located approximately 14 miles northeast of the CC lease area.

### 3.12.2 Environmental Consequences

During the approximately 2-month drilling process and 3-day well-testing process, the top of the drill rig would be up to 160 feet above the ground surface (depending on the drill rig used). Construction would last approximately 30 months. Drilling and construction would add short-term and temporary line, form, color, and texture contrasts to the existing landscape.

Long-term impacts would include approximately 61 acres of new surface disturbance from the construction of the power plant and approximately 73 acres of disturbance from access roads and well pads being converted from temporary use to permanent use. Additionally, facility structures would be constructed. All newly constructed structures would be below 85 feet.

The Proposed Action would be consistent with the Class IV VRM established for the area. Impacts would be further reduced by implementing the BMPs and mitigation measures identified in Section 2.1.1.3.

The Stillwater Range, with peaks higher than 8,500 feet, is between the CC lease area and Lovelock. The Proposed Action is, therefore, not visible from the Lovelock area and no adverse affects to visual resources are expected.

## 3.13 Recreation

### 3.13.1 Affected Environment

The recreational use can be described as “Dispersed Recreation” indicating that at the present time there are no designated trails, campgrounds, or permitted recreational activities that take place within the CC lease area. These lands are open to all individual, commercial, and competitive outdoor recreation uses. In accordance with the CRMP, the BLM-managed lands in the CC lease area is designated as open to OHV use on BLM lands within Dixie Valley. Opportunities for exploring the back-country by vehicle, hunting, camping, sightseeing, and hiking are encouraged (BLM, 2001).

The CC lease area is located within hunting unit 183 (NDOW, 2010b). Big game hunting in this hunting unit consists of desert big horn sheep and mule deer. Desert big horn sheep are predominantly found on the western slopes of the Clan Alpine Mountains at elevations between 3,411 feet and 9,993 feet. Mule deer are predominantly found in mountain ranges at elevations between 4,000 feet and 10,000 feet.

A number of hot springs throughout Dixie Valley are used for recreation; however, most of these springs are not well-defined bathing spots (Trails.com, 2009). There are no recreational springs within the CC lease area.

### 3.13.2 Environmental Consequences

According to the CRMP, all ROW permit holders must “permit free and unrestricted public access to and upon the right-of-way for all lawful and proper purposes, except in areas designated as restricted by the Bureau in order to protect the public safety or facilities constructed on the right-of-way” (BLM, 2001). Thus, access to areas of the project not deemed a public safety hazard shall remain open to recreational users. Plant security features such as perimeter fencing would potentially reduce the amount of area accessible for recreational use by approximately 61 acres. The construction of pipelines connecting the well areas and the power plant area could break up routes for OHV use but because recreation in the area is so dispersed, there would be no adverse impacts from the Proposed Action.

Highway 121 would be used to access the CC lease area and access roads being converted from temporary use to permanent use roads would be consistent with the current vehicle travel designation within the CC lease area. Additionally; project taxes going to Churchill County would be used to improve existing roads.

The presence of the geothermal plant and associated facilities where none previously existed would affect the visual conditions of the area, and cause some impacts to the recreational experience. Given the relatively small footprint of the Proposed Action, impacts to recreation would be minimal. A more detailed discussion of potential visual impacts from the Proposed Action activities is provided in Section 3.14.

## **3.14 Military Lands**

### **3.14.1 Affected Environment**

The Dixie Valley Settlement Area was acquired by the Navy in the 1980s for a supersonic operating area and electronic warfare training range. The U.S. Navy owns 8,480 acres in the Dixie Valley Settlement Area, including 1,440 acres in north Dixie Valley. Just east of the CC lease area, the Navy owns property in Township 24N, Range 36E, in Sections 12 and 13; and Township 24N, Range 37E, in Sections 7, 8, and 18. No components of the Proposed Action would be placed on Navy-owned land. In addition, the Department of Defense operates the Gabbs North Military Operating Area (MOA) designated for low-level supersonic flight operations in the vicinity of the Proposed Action.

### **3.14.2 Environmental Consequences**

The Department of Defense operates the Fallon Range Training Complex, a portion of an MOA designated for low-level supersonic flight operations over the Dixie Valley region. Impacts to the MOA are reviewed by the FAA if the FAA obstruction thresholds are triggered. The Proposed Action would not trigger the FAA obstruction thresholds (14 CFR Part 77.13).

TGP has discussed the Proposed Action with NAS Fallon management. The primary concern expressed by the Navy was the height of electric transmission facilities required for the project. The Navy requested that transmission lines stay below 100 feet in height. In addition, they requested that markings (such as bird flight diverters) be placed on the electric transmission lines. TGP would work with the Navy to select and place markers that meet Navy criteria. Because the proposed lines would be less than 100 feet tall and markers would be placed, there is no unacceptable impact to NAS Fallon activities. A memorandum signed by Commanding Officer R.M. Wilke is included with this document as Appendix C.

## 3.15 Livestock Grazing

BLM manages rangelands on public lands under 43 CFR Part 4100 and BLM Handbooks 4100 to 4180. BLM conducts grazing management practices in accordance with BLM Manual H-4120-1 (BLM, 1984).

Under this management, ranchers may obtain a grazing permit for an allotment of public land on which a specified number of livestock may graze. An allotment is an area of land designated and managed for livestock grazing. The number of permitted livestock on a particular allotment on public land is determined by how many animal unit months (AUMs) that land would support. An AUM is the amount of forage needed to sustain one mature cow, five sheep, or five goats for 1 month (BLM, 2008a).

### 3.15.1 Affected Environment

The CC lease area lies within the Boyer Ranch Allotment, which comprises approximately 127,194 acres and 1,789 AUMs of currently authorized grazing capacity. Within this allotment, one AUM is equal to approximately 71 acres.

The grazing allotments within the CC lease area consist entirely of public lands administered by the BLM Carson City District Office. Table 3-8 lists land ownership in the Boyer Ranch Allotment (BLM, 2009a).

**TABLE 3-8**  
Livestock Permit Information—Boyer Ranch Allotment

Permit	Number of Livestock	On Date	Off Date	Animal Unit Months
A	179 cows	5/1	6/30	359
B	179 cows	7/1	9/30	541
C	179 cows	10/1	2/28	889

### 3.15.2 Environmental Consequences

The Proposed Action would disturb approximately 61 acres. In addition, approximately 73 acres of area disturbed during the exploration phase would be converted to permanent use. The total of 134 acres constitutes less than one percent of the 127,194 acres comprising the Boyer Ranch Allotment, permanently reducing the 1,790 AUMs within the allotment by approximately 1.9 AUMs or less than 0.1 percent. No reduction in authorized grazing use would be required.

## 3.16 Lands

Most of the land in Dixie Valley is federal land managed by the BLM and nearly all of it is designated as having the highest geothermal resource potential of any BLM-managed public lands in the state (BLM, 2001). The federal government administers more than 82 percent of the land in Churchill County.

Several ROWs or other authorizations have been granted on public lands within the CC lease area. These include ROWs for transmission lines, roads, and geothermal leases. There are 24 BLM-registered geothermal well leases in the vicinity of the CC lease area.

BLM also has prepared a programmatic environmental impact statement (PEIS) for geothermal leasing in the Western U.S. (BLM, 2008c), which analyzes potential impacts of geothermal development and provides a list of stipulations and BMPs related to geothermal leasing and related development on BLM-managed public land. In 2008, BLM issued a Record of Decision for geothermal leasing in the Western U.S., including adoption of Resource Management Plan amendments related to geothermal leasing (BLM, 2008d). In accordance with the BLM PEIS for Geothermal Development (BLM, 2008c) and the Churchill County Master Plan (2010), the expansion and development of geothermal resources is supported and promoted for federal lands in this region in support of a national energy policy for renewable energy.

### 3.16.1 Affected Environment

The existing Dixie Valley Power Plant is just north of the CC lease area, and a small private ranch is approximately 12 miles northeast of the existing Dixie Valley Power Plant. The area is relatively undeveloped and most of the valley is used for livestock grazing, with BLM assuming grazing management responsibility on adjacent military-controlled lands. Military land ownership and uses are described above in Section 3.16.

Several non-producing geothermal leases and lease agreements are located within the CC lease area (BLM, 2009b).<sup>1</sup> East of the CC lease area is a ROW granted to the Navy by BLM for a remote relay station (ROW grant NVN 043665). Just east of the Proposed Action area is a transmission ROW associated with the existing Dixie Valley 230-kV transmission line (NVN 040324), which runs southwest to northeast through the CC lease area. There are also 100 active unpatented lode mining claims located across the CC lease area (BLM, 2009b).

### 3.16.2 Environmental Consequences

The Proposed Action would not preempt other current uses of the land identified above.

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<sup>1</sup> Based on the BLM Legacy Rehost (LR 2000) Report System and the BLM National Integration Land System GeoCommunicator

## 3.17 Soils

Soil types in the Proposed Action area were identified using the “Churchill County Area, Parts of Churchill and Lyon Counties” soil survey (U.S. Department of Agriculture National Resource Conservation Service [NRCS], 2009). Descriptions of the soil types found in the CC lease area are provided in this section.

### 3.17.1 Affected Environment

Figure 3-5 shows soil units delineated by the NRCS within the CC lease area and in the surrounding area. Soil units 184, 330, and 343 are present in the Proposed Action area.

Soil unit 184 is the Bluewing-Pineval association. Bluewing soils occur on 4-8 percent sloping fans or washes, are excessively drained, and flood rarely to occasionally, but never pond. Pineval soils occur on 4-8 percent slopes, are well drained, and rarely flood and never pond.

Soil unit 330 is the Settlement-Louderback-Rustigate association. Settlement soils occur on 0-2 percent slopes, are poorly drained, have a water table depth of 12 to 36 inches, rarely flood and never pond, and are slightly to moderately saline. Louderback soils occur on 0-2 percent slopes, are somewhat poorly drained, have a water table at 36 to 40 inches, rarely flood and never pond, are very slightly or slightly saline, and support saline meadow vegetation. Rustigate soils occur on 0-2 percent slopes, are somewhat poorly drained, have a water table at 36 to 40 inches, rarely flood and never pond, and support a saline meadow vegetation community.

Soil unit 343 is the Slaw-Trocken-Chuckles association. Slaw soils occur on 0-4 percent slopes; are well drained; can occasionally flood, but never pond; and are moderately to strongly saline. Trocken soils occur on 0-2 percent slopes, are well drained, occasionally flood, but never pond, and are moderately to strongly saline. Chuckles soils occur on 0-2 percent slopes, are moderately well drained, never flood or pond, and are moderately to strongly saline.

Soil units 284, 330, and 343 have a slight hazard of off-road or off-trail erosion and are moderately suited for natural surface road construction, primarily due to low strength and sandiness (NRCS, 2009).

### 3.17.2 Environmental Consequences

The release of hazardous materials to the environment could affect soil resources. BMPs to prevent such a release, including development of a SPCC plan, are described in Section 2.1.1.3.

Erosion and loss of soil productivity would be minimized by implementing the BMPs described in Section 2.1.1.3 during construction.

## 3.18 Vegetation

Biological surveys, including a vegetation assessment and general wildlife observations, were conducted on June 29, 30, and July 1, 2009 (CH2M HILL, 2009a). An additional assessment of vegetation in portions of the Proposed Action area was conducted August 24 to 27, 2009. Southwest Regional Gap Analysis Project (SWReGAP) landcover data were supplemented and updated with field explorations and reference to *Intermountain Flora, Volume 1* (USGS, 2004; Cronquist et al., 1972).

### 3.18.1 Affected Environment

Alluvial fan surfaces above 3,430 feet above sea level and below the mountain front support the intermountain basins mixed salt desert scrub community, with the exception of dry wash channels, which contain intermountain basins greasewood flats. The area between 3,430 feet above sea level and the edge of the intermountain basin playa community (approximately 3,390 feet above sea level) is composed of a mosaic of halophytic (salt-tolerant) and hydrophytic (wetland) plant communities. The halophytic communities include intermountain basins greasewood flats, saltgrass (*Distichlis spicata* var. *stricta*) meadows, and iodinebush (*Allenrolfea occidentalis*) scrub. The hydrophytic communities are primarily marshes typified by cattail (*Typha latifolia*), rush (*Juncus* spp. and *Scirpus* spp.), and common reed (*Phragmites australis*). The playa is largely barren of vegetation.

The intermountain basins mixed salt desert scrub community is characterized by open shrubland dominated by shadscale (*Atriplex confertifolia*) with scattered bush seepweed (*Suaeda moquinii*), yellow rabbitbrush (*Chrysothamnus viscidiflorus*), Nevada jointfir (*Ephedra nevadensis*), spiny hopsage (*Grayia spinosa*), budsage (*Artemisia spinescens*), broom snakeweed (*Gutierrezia sarothrae*), winterfat (*Krascheninnikovia lanata*), Indian ricegrass (*Achnatherum hymenoides*), and cheatgrass (*Bromus tectorum*). Despite its apparent diversity there is much barren ground between the shrubs, and there is little grass cover. Cheesebush (*Hymenoclea salsola*) and desert trumpet (*Eriogonum inflatum* var. *deflatum*) were found occupying disturbed areas during field observations.

The intermountain basins greasewood flats community is dominated by greasewood (*Sarcobatus vermiculatus*) and contains sparsely scattered Torrey's saltbush (*Atriplex torreyi*), yellow rabbitbrush, saltlover (*Halogeton glomeratus*), budsage, and bush seepweed. Bare ground is common and the substrate usually possesses the poorly developed soils of wash-bottoms. Again there are few perennial grasses.

At the fringe of the playa, where the salt concentration appears too great for greasewood, more salt-tolerant communities such as saltgrass meadow and iodinebush scrub are found. Marshes are found at springs, seeps, and around open water in the CC project area. These palustrine emergent wetlands are surrounded by desert vegetation or playa. The marsh vegetation is adapted to saturated soil conditions and includes species of rush, knotweed (*Polygonum* spp.), canarygrass (*Phalaris* spp.), spikerush (*Eleocharis* spp.), duckweed (*Lemna* sp.), as well as common reed and cattail. Riparian trees and shrubs are not common and are restricted to isolated stands of willow (*Salix* sp.), wild rose (*Rosa woodsii*), Russian olive (*Eleaagnus angustifolia*), and saltcedar (*Tamarix ramosissima*), the latter two being introduced species, invasive in many hydric habitats.

The CC project area and the associated access routes are primarily located in intermountain basins mixed salt desert scrub community and salt-tolerant communities (e.g., intermountain basins greasewood flats, saltgrass meadow, and iodinebush scrub). A small part of the CC project area may be located within the intermountain basin playa community, some of which may be in the vicinity of marsh vegetation associated with seeps and springs, based on analysis of aerial photographs and field surveys.

### **3.18.2 Environmental Consequences**

The specific locations of the power plant and 30 additional wells to be installed as part of the Proposed Action would be determined prior to construction. Limited additional impacts would occur as a result of pipeline construction because it would occur along roadways that were approved during exploration. Approximately 134 acres would be disturbed by the Proposed Action; however, a portion of the disturbance would occur on intermountain basins playa, which generally lacks vegetation, therefore, total acres of disturbed vegetation would be less than 134 acres. Disturbance to small areas of wetland vegetation on the fringes of seeps and springs would be minimized by implementation of the project-specific BMPs identified in Section 2.1.1.3.

## 3.19 Paleontological Resources

### 3.19.1 Affected Environment

An initial paleontological resources assessment for the Proposed Action area was completed in August 2009 (CH2M HILL, 2009b). In it, the initial Potential Fossil Yield Classifications (PFYC) of the geological units affected by the Proposed Action were determined following the guidance of BLM's Instructional Memorandum No. 2008-009 (BLM, 2007c). Initial PFYC classifications were based on the results of literature searches and record reviews, as well as an analysis of remote imagery of the Proposed Action area. In the Proposed Action area, there are sediments designated as possessing low paleontological sensitivity (PFYC = 2), and those possessing unknown sensitivity but which have yielded scientifically important fossils in other parts of the Great Basin (PFYC = 3b). The latter are sediments that were similar in character and geomorphic setting to those laid down on the margins of Pleistocene (Ice Age) lakes and at ancient springs, both of which are found in the Proposed Action area. Satellite imagery was used to estimate the extent of these sediments, and then these findings were field checked during a paleontological resources survey.

A paleontological survey of the areas with a PFYC of 3b was completed in September 2009 to more specifically characterize their paleontological sensitivity. This field work included surveys of areas with the potential to yield fossil material, in-field determinations of "low" paleontological sensitivity based on (especially) topographic position and nature of the sediments (e.g., alluvium vs. lacustrine silt), and spot-checking areas with a PFYC of 2 to confirm their low paleontological sensitivity.

Fossil material was discovered in only one restricted part of the Proposed Action area. In the case of most of area, however, field evidence justifies a downgrade of areas with an initial PFYC of 3b (unknown) to a PFYC of 2 (low). Areas identified in remote imagery as paleospring deposits based on their albedo and hue were actually found to be salt-encrusted playa surface. Playa sediment normally possesses low paleontological sensitivity near the surface because bone and other organic debris are not only quickly oxidized, but also mechanically degraded by the seasonal dissolution and recrystallization of salts in these soil environments.

The location of remaining areas where sediments possess sensitivity is confidential resource information, and maps showing these areas are documented separately with the BLM.

Alluvium seldom yields fossils, and therefore the alluvial fan sediments that comprise most of the surfaces of Sections 12, 13, 14, 15, 21, and 22 (Township 24N, Range 36E) were given a "low" PFYC of 2. Portions of Sections 13, 14, 15, 21, 22, 23, and 24 that were assigned an initial PFYC of 3b (unknown) were subsequently subject to survey and field review. The subsequent field review and survey established the low paleontological potential (PFYC = 2) of all these areas except portions of Sections 14 and 15.

In portions of Sections 14 and 15 subfossil wood consisting primarily of the logs of pinyon (*Pinus monophylla*) and Utah juniper (*Juniperus osteosperma*) were found on the alluvial fans of two of the larger canyons issuing from the Stillwater Range. Similar wood material was observed outside the Proposed Action area on the surface on the Cottonwood Canyon alluvial fan several miles to the northeast. Woodland currently lies several miles into the

Stillwater Range and more than 1,500 feet higher in elevation. Unlike conventional paleontological material, subfossil wood is simply “mummified” in the dry climate, and its scientific potential lies in its dendrochronological, paleoecological, and surface-age dating potential. Therefore, the portions of Sections 14 and 15 where subfossil wood was found were assigned a PFYC Class 4 (high potential).

### **3.19.2 Environmental Consequences**

Direct impacts on paleontological resources could result from the mechanical destruction of fossils as a consequence of uncontrolled excavations of paleontologically sensitive sedimentary units. This includes grading, and excavating and drilling. Other activities, such as laying roadway gravel over the top of paleontologically sensitive sediment, would have little or no impact on paleontological resources. Indirect effects to paleontological resources could include unauthorized fossil collection after fossil-rich sediment is exposed by excavation, in the absence of measures to restrict public access to such sites or to educate workers on paleontological resource avoidance.

Proposed construction activities that include surface disturbance of the immediate subsurface at the northernmost well pad in Section 15 would have the potential to impact paleontological resources because subfossil wood occurs in the immediate vicinity (PFYC = 4). Prior to construction at this site, this impact would be mitigated by moving the well to the west away from this resource, staking for avoidance that area within Sections 14 and 15 where subfossil wood exists, subsequent avoidance of the area during construction, and by worker education that would include the importance of paleontological resources avoidance. The paleontological potential of the other 24 well pads and their access routes is low (PFYC Class 2); therefore, impacts on paleontological resources are not expected.

Of the 25 well sites in the Proposed Action area, only one possesses high paleontological sensitivity (PFYC Class 4) because of the presence of subfossil wood on the surface in the immediate vicinity. The subsurface potential of all other well pads in the Proposed Action area is considered to be low (PFYC Class 2) because they are located at sites underlain by alluvium or oxidized playa sediments. Impacts on paleontological resources from project development in the area therefore would not occur because the one area designated PFYC Class 4 (high sensitivity) would be avoided by relocation of the well pad and by educating workers on paleontological resources avoidance.

## **3.20 No Action Alternative**

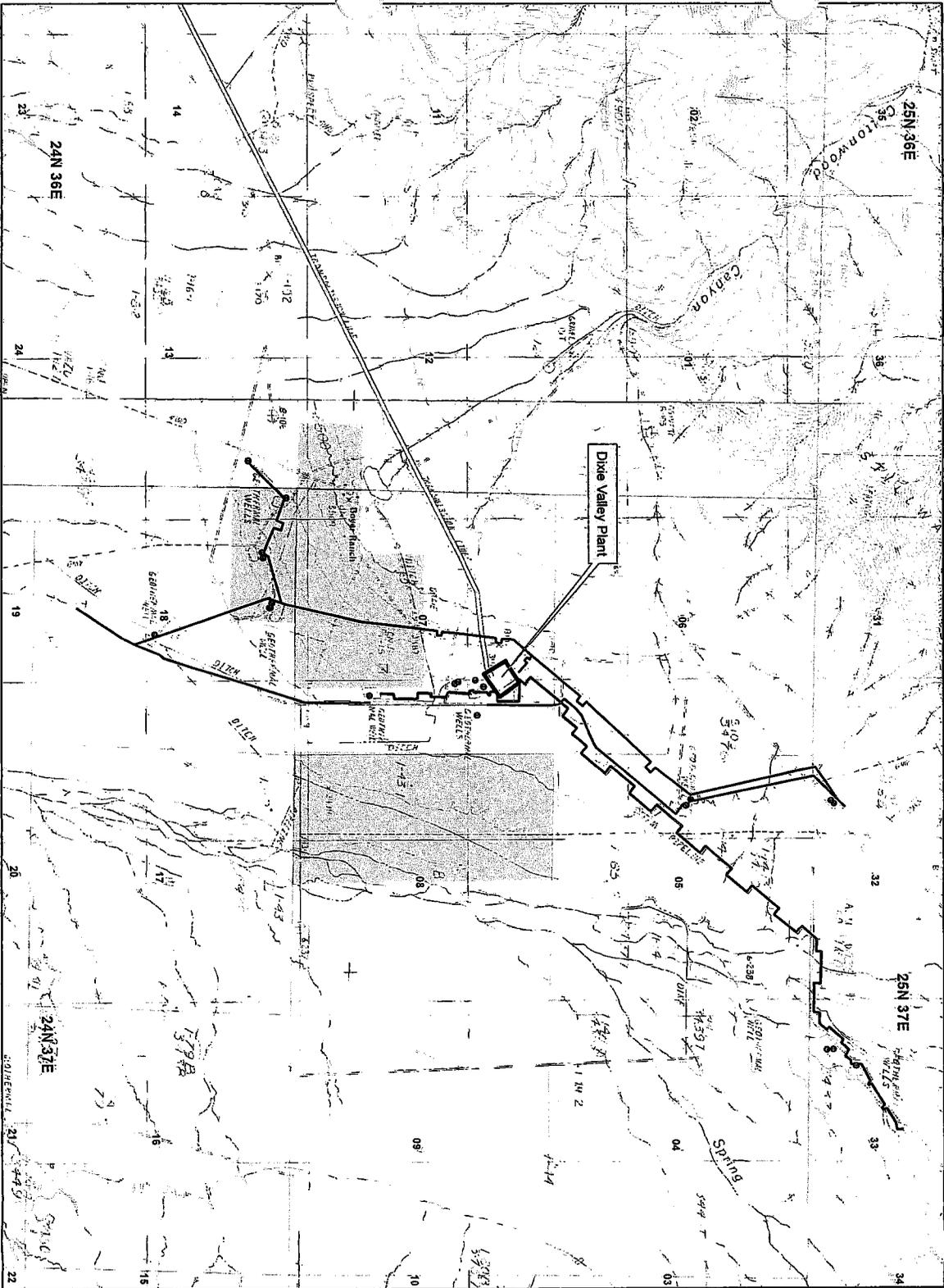
Project features would not be constructed under the No Action Alternative. Therefore, none of the resources described in Section 3 would be affected by the Proposed Action.

### 3.21 Residual Impacts

Solid waste would be generated as a result of the Proposed Action, resulting in residual impacts. The waste would be disposed in approved, permitted disposal facilities. Impacts to vegetation and soils would be mitigated by the BMPs described in the relevant sections of the analysis above. Impacts to wildlife, including migratory birds and sensitive species, would be limited in nature and mitigated through the use of BMPs described above. The potential introduction of invasive, non-native species as a result of the Proposed Action would be minimized through the use of BMPs. Visual resources would be impacted due to the presence of the plant, ancillary structures, wells, pipelines, substation, and transmission line. However, these visual modifications do not exceed VRM Class IV objectives. Plant security features such as perimeter fencing would potentially reduce the amount of area accessible for recreational use.

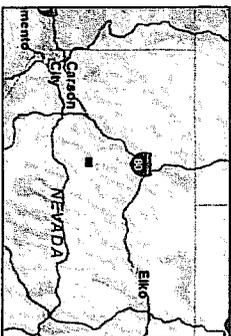
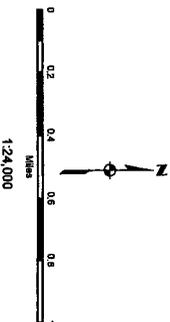


Insert Section 3 figures (4 total)



**Figure 3-1**  
**Existing Dixie Valley Plant Facilities**

- Production Well
- Injection Well
- Production Pipelines
- Injection Pipelines
- Existing TGP 230 KV Transmission Line
- Bureau of Land Management
- Private
- Navy

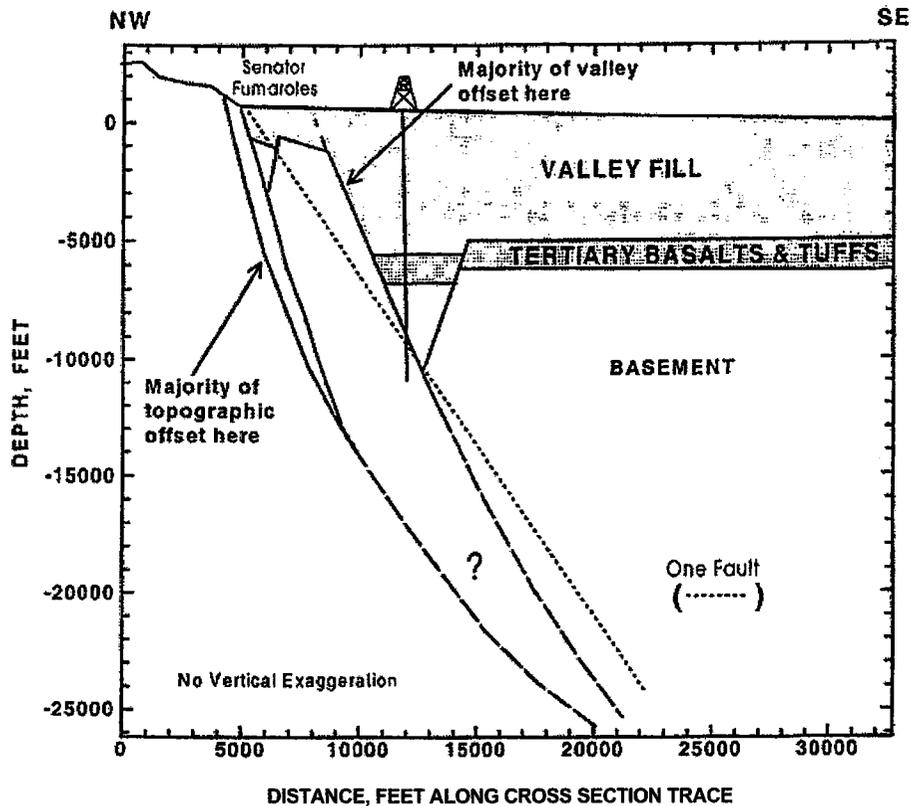
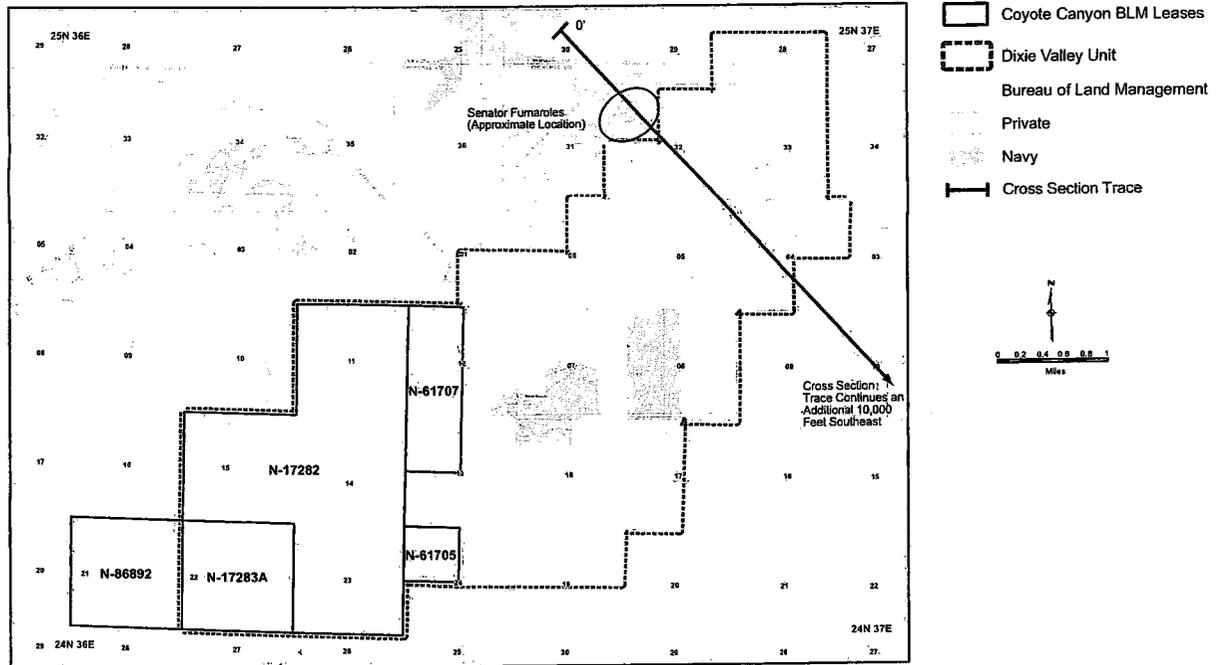


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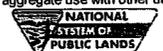
**Figure 3-2:  
Geologic Cross Section  
Coyote Canyon**



Source: Blackwell and others, 1999.

Note: Schematic cross section showing sequence of faults associated with the down-dropped basement rocks underlying Dixie Valley near the senator fumaroles

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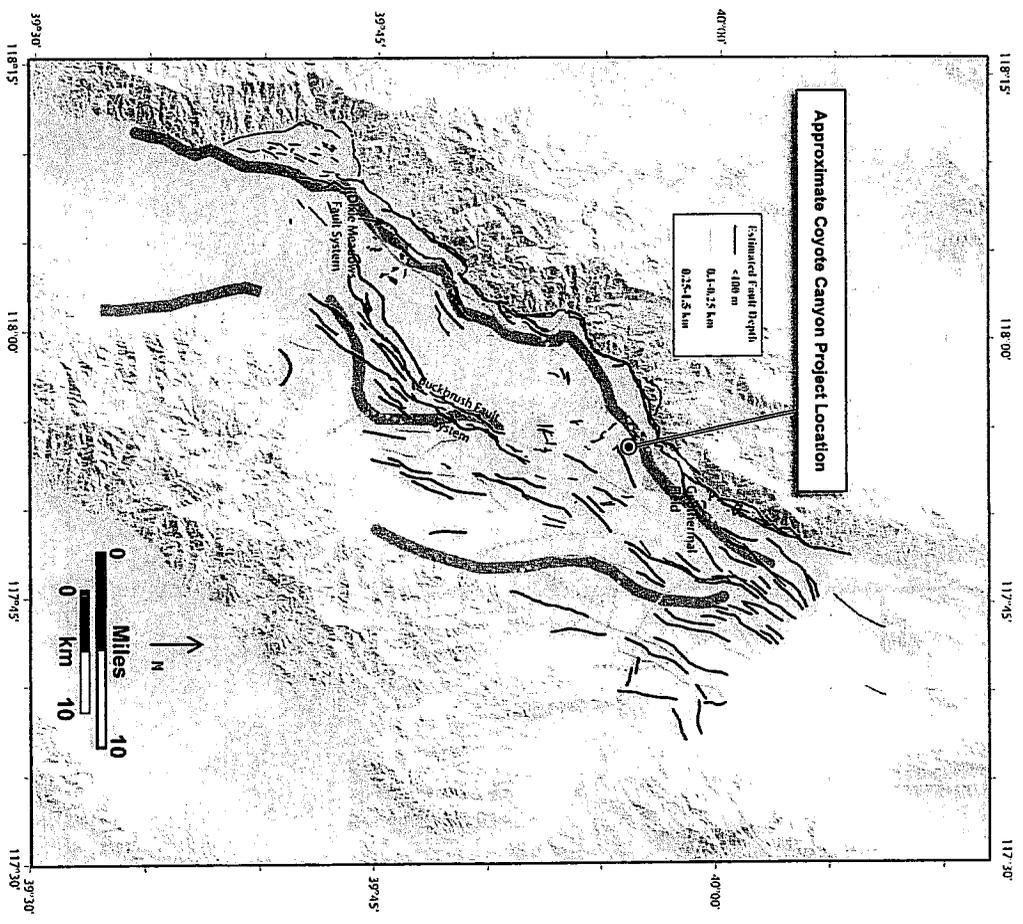


Figure 3-3:  
Dixie Valley Faults

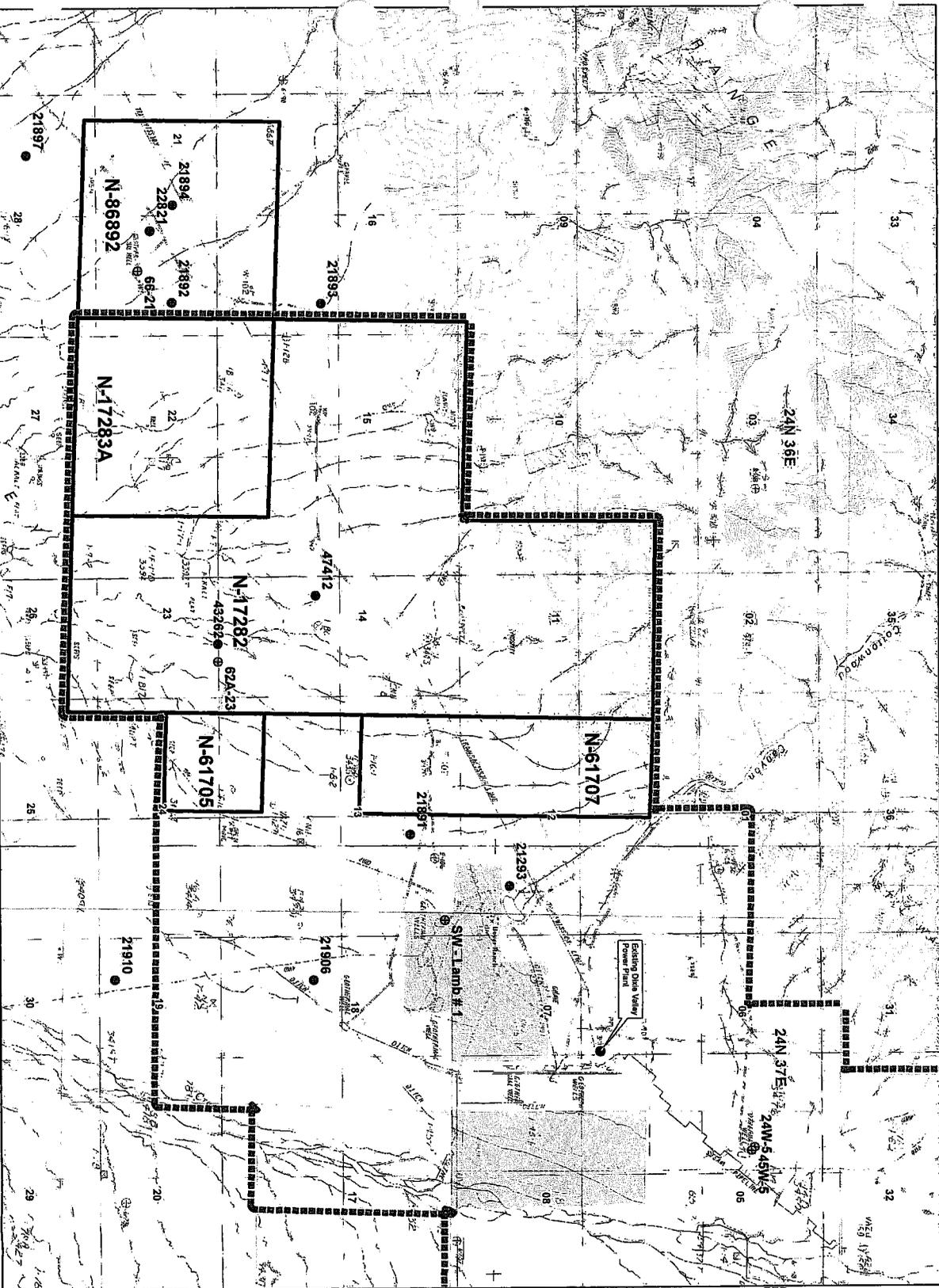
*Horizontal Gravity Gradient Maxima (wide gray lines), Faults indicated by the Magnetic data, and Faults Mapped at the Surface. Black lines = faults mapped based on surface evidence (scraps, lineaments); Red and Orange colored lines = faults indicated by high-resolution aeromagnetic data. Surface evidence of piedmont faults & intrabasinal faults occurs on or near gravity gradient maxima.*

Source: Blackwell et al. 2007. Exploration and Development at Dixie Valley, Nevada. Summary of DOE Studies. Proceedings of the Thirty-second Workshop on Geothermal Reservoir Engineering, Stanford University, Stanford, California, January 22-24, 2007.



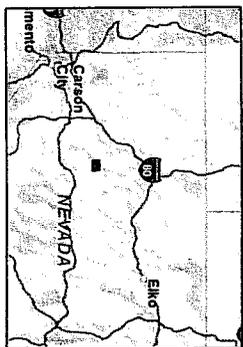
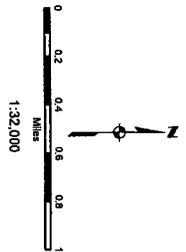
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**Figure 3-4**  
**Existing Well Locations**  
**Around Coyote Canyon**

- Nevada Division of Water Resources well log on file within one mile of the Coyote Canyon lease area
- ⊕ Dixie Valley Power Plant Observation Wells
- Dixie Valley Unit
- Bureau of Land Management
- Private
- Navy

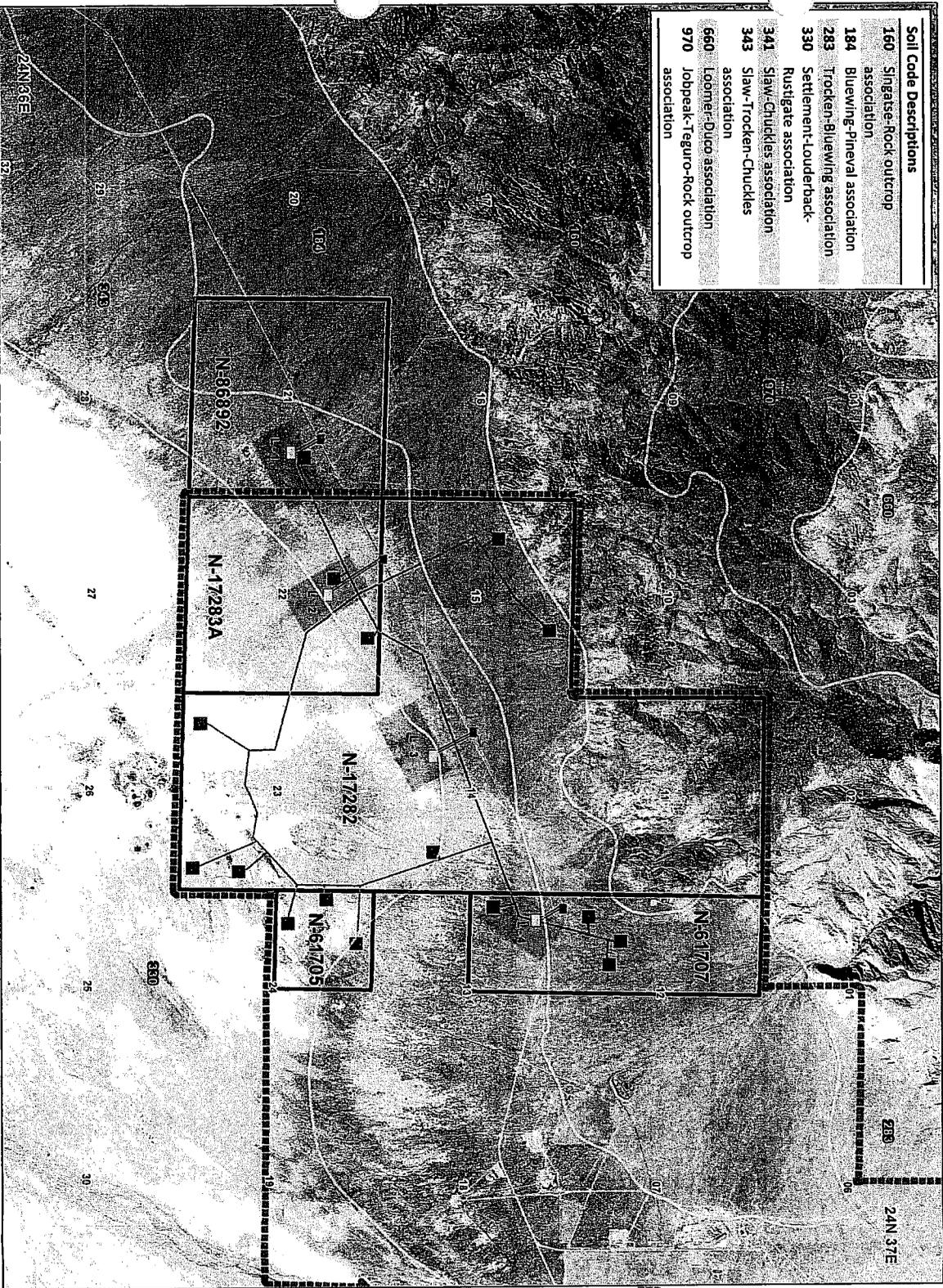


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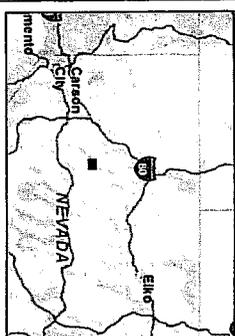
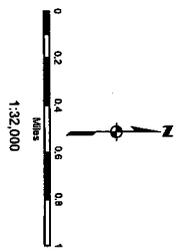
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Soil Code Descriptions	
160	Singaise-Rock outcrop association
184	Bluewing-Pineval association
283	Trocken-Bluewing association
330	Settlement-Louderback-Rustigate association
341	Slaw-Chuckles association
343	Slaw-Trocken-Chuckles association
660	Loomer-Duoc association
970	Jobpeak-Teguro-Rock outcrop association



**Figure 3-5**  
**TGP Coyote Canyon Soils**

- Soil Unit Boundary
- Production / Injection Well Pads
- Potential Plant Site  
(Only One Plant Will Be Constructed)
- Substations
- Ring Bus Collector Site
- Gen Tie
- Access Roads / Pipelines
- Dixie Valley Unit



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## SECTION 4

# Cumulative Impacts Analysis

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Cumulative Impacts are defined by the CEQ in 40 CFR 1508.7 as “impacts on the environment which result from the incremental impact of the action when added to other past, present and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions.” Cumulative impacts can result from individually minor but collectively significant actions taking place over time. The analysis area for the cumulative impact analysis is the same as the analysis area for each resource found in Section 3.

## 4.1 Past and Present Actions

Current land use activities in the vicinity include geothermal energy production, military operations, dispersed casual recreation, hunting units 182 and 183 (mule deer, desert bighorn sheep in particular), and livestock grazing. In the past, mining claims were active in the vicinity, but no mining activities are currently known. A BLM ROW planning corridor exists within Dixie Valley with the express purpose of providing an outlet for geothermal power to be produced in the valley (BLM, 2008c). Currently, there is a transmission line within this corridor, and the 62-MW Dixie Valley Power Plant has been producing energy here for more than 20 years (see Figure 3-1). Multiple geothermal leases are currently authorized, and geothermal exploration is permitted in Dixie Meadows.

## 4.2 Reasonably Foreseeable Future Actions

Reasonably foreseeable future actions (RFFAs) constitute those actions that are known or could reasonably be anticipated to occur within the analysis area for each resource, within a time frame appropriate to the expected impacts from the Proposed Action. For the Proposed Action, the time frame for potential future actions is reasonably assumed to be the duration of the lease, or approximately 35 years. RFFAs include grazing; dispersed recreation, including off-highway vehicle use and hunting; continued geothermal energy production from the Dixie Valley Power Plant; and geothermal development in Dixie Meadows. There are also multiple geothermal leases authorized within the scope of this analysis that may lead to exploration and development. There are plans by Churchill County to obtain water from the Dixie Valley groundwater basin.

## 4.3 Cumulative Impacts

### 4.3.1 Water Resources (Surface/Ground)

The well testing phase would have temporary, localized effect on surface and groundwater. No other direct or indirect impacts are anticipated except for limited use of alluvial groundwater to replace geothermal water lost to evaporation. Therefore, project operations would have only temporary contributions to any cumulative impacts on water resources

and water quality, and only a limited effect on resources associated with shallow groundwater use.

### **4.3.2 Wildlife (including Migratory Birds and BLM-designated Sensitive Species)**

Wildlife may be affected negatively by displacement or disruption of normal behavioral patterns due to any of the RFFAs, but particularly construction, project operations and maintenance, and site rehabilitation from geothermal exploration and/or development. In addition, some of these projects and actions could increase traffic, conflicts with humans, and competition for habitat niches. Some of these actions may also decrease forage quality, quantity, and composition due to groundwater depletion.

Based on the analysis in Chapter 3, the minimal extent of noise effects from the power plant, the low decibels emanating from the pipeline pumps, and the small habitat acreage loss relative to the hundreds of thousands of acres of available cold desert scrub habitat in Dixie Valley, the Proposed Action would only have a negligible contribution to wildlife impacts within the area of analysis when combined with past and present actions and RFFAs.

### **4.3.3 No Action Alternative**

Under the No Action Alternative, the project site would not be developed at this time and would be available for development in the future. There would be no impacts from the Proposed Action to any of the identified resources or activities from implementation of the No Action Alternative.

All resource values have been evaluated for cumulative impacts. It has been determined that cumulative impacts would be negligible as a result of the proposed action or alternative.

## **4.4 Monitoring**

Monitoring described in the Proposed Action is sufficient for this action.

## SECTION 5

# Consultation and Coordination

---

## 5.1 Consultation and Coordination

Name	Agency	Project Expertise
Jeryl Gardner	Bureau of Water Pollution Control, NDEP	Water Resources
Kristine Hansen	USACE, Reno District Office	Wetlands and Waters of the U.S.
Karen Clementsen	USACE, Reno District Office	Wetlands and Waters of the U.S.
Tom McKay	Natural Resource Conservation Service	Soils
Melissa Marr	Nevada Division of Water Resources (NDWR)	Water Resources
Ken Haffey	Nevada Division of Water Resources (NDWR)	Water Resources
	Fallon Paiute Shoshone Tribe	Native American Consultation

## 5.2 List of Preparers

Name	Project Expertise
<b>BLM Stillwater Field Office</b>	
Desna Young	NEPA PM, Environmental Justice, Public Health and Safety, and Social and Economic Values
Jim deLaureal	Air Quality, Farmlands, Floodplains/Wetlands/Riparian Zones, Noxious Species, and Soils
Dan Westermeyer	Visual Resources, Recreation, and Special Designation Lands
Linda Appel	Livestock/Grazing
John Wilson	Migratory Birds, Special Status Species, Noise, Vegetation, and Wildlife
Carla James	Project Lead/Geology/Minerals
Jason Wright	Cultural Resources, Native American Religious Concerns, National Scenic and Historic Trails, and Paleontology
Dave Schroeder	Wastes and Hazardous or Solid Materials
Gabriel Venegas	Water Quality (Surface/Ground)
Eric Pignata	Land Use Authorizations, Air Space, and Access

Name	Project Expertise
<b>CH2M HILL</b>	
Linnea Eng, P.E.	Project Description; Cumulative Impacts Analysis, Wastes, Hazardous or Solid Materials, and Noise
W. Geoffrey Spaulding, Ph.D.	Paleontological Resources
Amy Hammontree	Livestock/Grazing and Recreation
Katy Oakes	Migratory Birds, Special Status Species, and Wildlife
Aaron Fergusson	Cultural Resources and Native American Religious Concerns.
Becky Allen	Floodplains/Wetlands/Riparian Zones, Invasive Nonnative Species, Soils; and Vegetation
Kenneth Shump, P.G.	Geology; Water Quality (Surface/Ground)
Jennifer Claghorn, P.E.	Air Quality
Staci Hill, P.E.	Special Designation Lands and Visual
Carrie Andrews	Land use Authorization, Air Space, and Access
Amy Lahav	Permitting Specialist
Jerry Salamy	Permitting specialist
<b>Intertech Services Corporation</b>	
Mike Baughman, Ph.D.	NEPA compliance, senior review

### 5.3 List of Agencies, Tribes, Organizations Contacted

Rochanne Downs	Vice Chair	Fallon-Paiute Shoshone Tribe
Nevada State Clearinghouse		
Commanding Officer	NAS Fallon	
Kris Urguhart	Nevada Division of Wildlife	
Brad T. Goetsch	Churchill County Manager	

## SECTION 6

# References

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# **EXHIBIT 9**

Special Use Permit

Vince S.

OC # 418350  
01/19/2011 02:56 PM  
Official Record  
Recording requested By  
CHURCHILL CO PLANNING  
Churchill County - NV  
Joan Sims - Recorder  
Page 1 of 3 Fee \$15.00  
Recorded By TH RPTT

APN 005-271-01 (Special Use Permit)

NOTICE OF FINAL ACTION, DECISION OR ORDER  
OF THE CHURCHILL COUNTY PLANNING COMMISSION



TO: Vince Signorotti  
TGP Coyote Canyon, LLC  
9590 Prototype Court, Suite 200  
Reno, NV 89521

Pursuant to NRS 278.315, notice is hereby given that on the 8<sup>th</sup> day of December, 2010, A.D., the Churchill County Planning Commission upon making the findings of fact granted a:

Special Use Permit under section 16.08.220(D) of the Churchill County Code to develop and construct a 70 MW geothermal power plant and associated support facilities.

as authorized by the provisions of NRS 278.010 to NRS 278.630, inclusive, with respect to the following described property: located off Dixie Valley Road, Highway 121, approximately 50 miles north of Highway 50, Assessor's Parcel Number 005-271-01 consisting of 23,000 acres of non-water righted property in the RR-20 land use district; the plant and associated support facilities will be located in portions of sections 11, 12, 13, 14, 15, 21, 22, 23 & 24, Township 24 North, Range 36 East, M.D.B.&M.

**SUBJECT TO THE FOLLOWING CONDITIONS PLACED ON THE SPECIAL USE PERMIT:**

- Acquisition and maintenance of a county business license.
- Acquisition of building permits and septic permits.
- During construction use the roads between Highway 50 and the plant as the main roads and not I-80 for construction purposes.
- A lighting plan will be designed in compliance with Federal Aviation Administration, Occupational Safety and Health Administration, NAS Fallon and BLM Resource Advisory Council requirements and recommendations. A copy will be provided to Churchill County.
- Brine holding ponds—the ponds will be fenced to keep wildlife and people out. Fencing will conform to BLM standards.
- Semi-permanent and permanent structures will be painted a color that blends in with the natural surroundings, as required by BLM.
- Temporary living quarters—the temporary living quarters are for use during construction of the power plant only. If they are needed after construction is complete, applicant shall apply for a temporary use permit for watchman's quarters. Sanitary facilities will be maintained by a contractor and bottled water will be brought in.
- Signage will conform to County Code and all other applicable regulations. Signs will consist of traffic control, hazardous materials location, and company information. The signage plan will be submitted with other engineering plans.
- A chain link fence will be installed around the main facility area. No landscaping or screening is required.
- Proof of liability insurance covering all aspects of the facility operation in the amount of at least one million dollars (\$1,000,000) shall be provided to Churchill County prior to initiating operations.
- TGP shall consult with Fallon/Churchill Fire Department and Office of Emergency Management to prepare an emergency plan.
- The following reports will be prepared in consultation with and approved by the County Engineering Department:

RECEIVED

2/4 2011



- Within 120 days of completion of exploration, a conceptual aquifer model and the base-line data/information used to develop the model shall be provided to the County.
- A monitoring plan, based on the conceptual aquifer model, must be developed within 60 days of acceptance by the Engineering Department of the conceptual aquifer model.
- A numerical model shall be developed in consultation with the Engineering Department.
- Road requirements:
  - A maintenance agreement between the County and TGP is required. The agreement will address general road maintenance and repairs of all County roads utilized by TGP throughout construction and upon construction completion.
  - Turnarounds will be provided for emergency access vehicles as per an agreement with Fallon/Churchill Fire Marshal.
  - Access roads from Dixie Valley Road to the plant and wells will be constructed within a 200-foot corridor with a width of 25 feet including a travelled way, shoulder, and drainage swales on both sides.
  - Roads are constructed according to the BLM Gold Book (Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development).
- Reclamation: TGP will submit a reclamation plan to BLM in accordance with BLM's Gold Book. The reclamation plans will conform to BLM and Nevada Division of Minerals requirements. A copy will be provided to Churchill County.
- Permits from state and federal agencies, including but not limited to:
  - Federal Energy Regulatory Commission
  - Public Utilities Commission of Nevada
  - Bureau of Land Management
  - Nevada Division of Environmental Protection
    - Bureau of Air Pollution Control
    - Bureau of Air Quality Planning
    - Bureau of Water Pollution Control
  - Nevada Division of Water Resources
  - Nevada Division of Minerals
- Copies of reports submitted to state and federal agencies shall be provided digitally to Churchill County.
- Compliance with BLM standards, regulations, requirements and mitigation recommendations.
- Compliance with Churchill County Code.

Within twelve months of issuance of this notice, applicant must demonstrate that steps have been taken to enact this Special Use Permit. In the event that circumstances beyond the control of the applicant result in failure to complete applicable conditions and construct or commence the use prior to the expiration date, the applicant may, in writing, request one single extension for twelve (12) calendar months from the original date of inception. The applicant must submit this request to the Planning Department thirty (30) days prior to the expiration date. Failure to demonstrate enactment or submitting a written request for extension may result in termination of the special use permit.

State of Nevada § County of Churchill  
 19th January 2011  
 DATED: This 20<sup>th</sup> day of ~~December, 2010~~, A.D.

Terri Pereira  
 Eleanor Lockwood, Director of Planning  
 Terri Pereira, Associate Planner

SUBSCRIBED and SWORN to before me  
 19th January 2011  
 this 20<sup>th</sup> day of ~~December, 2010~~, A.D.

D. Kissick  
 Notary Public



D. KISSICK  
 Notary Public - State of Nevada  
 Appointment Recorded in Churchill County  
 No: 09-06138-4 - Expires April 27, 2011

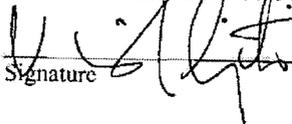


418350

01/19/2011  
003 of 3

I, VINCENT J. Siquero understand the conditions and terms placed on this special use permit and agree to comply with them as per this notice. Further, any/all other oaths, bonds, covenants, expectations, promises or conditions of use previously granted to the applicant pursuant to a special use permit, whether written or not, express or implied, are hereby merged with this special use permit; that this special use permit granted me, with its conditions and terms of land-use set forth herein, as applicable to the above-described property, shall supersede any/all other special use permit(s), previously granted me pursuant to

Churchill County Code 16.04.020.C.

Signature 

Date: 1/11/2011

# **EXHIBIT 10**

BLM Drilling Permits

**UNITED STATES  
DEPARTMENT OF THE INTERIOR  
BUREAU OF LAND MANAGEMENT  
GEOHERMAL DRILLING PERMIT**

FORM APPROVED  
OMB NO. 1004-0132  
Expires: July 31, 2010

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

7. Lease Serial No.  
NVN-17282

8. Surface Manager:  BLM  FS  
 Other

9. Unit Agreement Name  
Proposed Coyote Canyon Unit

10. Well No.  
76-14

11. Permit No.

12. Field or Area  
Northern Dixie Valley

13. Sec., T., R., B. & M.  
Section 14, T24N, R38E

14. County  
Churchill

15. State  
NV

16. Approx. Starting Date  
08/15/2010

17. Acres Assigned (Well Spacing)  
640

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

1c. Well Status: New

2. Name of Lessee/Operator TGP Dixie Development Company, LLC

3. Address of Lessee/Operator 9590 Prototype Ct., Suite 200, Reno, NV 89521

4. Location of Well  
At surface 778' W and 1586' N of the SE corner Section 14 (UTM NAD83 N 4422059m, E 423819m)  
At proposed prod. Zone 778' W and 1586' N of the SE corner Section 14

5. Distance from Proposed Location to Nearest Property or Lease Line  
820' W of NVN-12883 lease line

6. Distance from Proposed Location to Nearest Well or Previously Applied for Well Location on this Lease.  
2,768 feet West and 408 feet North to 36-14

18. Drilling Media and Characteristics:  Air  Water  Mud  Foam  Other

19. Proposed Depth  
Measured: 10,000'  
True Vertical: 10,000'

20. Elevations:  Estimated  Final 3450' and -30' KB  
Reference Datum:  GR  MAT  DF  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	
26"	20"	64#	BTC	K-55	0	100'	Annular volume + 50% excess + 10' shoe 40.2160 bbls
17-1/2"	13-3/8"	72#	DWC	L-80	0	1000'	Annular volume + 35% excess + 40' shoe 275.6726 bbls
12-1/4"	9-5/8"	47#	DWC	L-80	0	6,500'	Annular volume + 35% excess + 80' shoe 666.6673 bbls
8-3/4"	7" Slotted	26#	DWC	L-80	6,200'	10,000'	Hung - no cement

22. Proposed Work Summary  
See attached program.

23. Missy Miller Sr. Compliance Coordinator 08/24/2010  
Signed \_\_\_\_\_ Title \_\_\_\_\_ Date \_\_\_\_\_

(This space for Federal use)  
Approved by Thomas J. Kuntz Title Stillwater FM Date 08/31/2010  
Conditions of Approval, if any: see attached

Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212 make 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  
GEOTHERMAL DRILLING PERMIT**

**TGP DIXIE DEVELOPMENT COMPANY, LLC  
COYOTE CANYON GEOTHERMAL EXPLORATION PROJECT  
CHURCHILL COUNTY, NEVADA**

**Coyote Canyon: Churchill County, Nevada**  
**GEOTHERMAL LEASE NVN 61707/NVN 17282**  
Observation Well 76-14, MDBM T24N, R36E, Section 14

**TGP DIXIE DEVELOPMENT COMPANY, LLC  
COYOTE CANYON AND DIXIE MEADOWS GEOTHERMAL EXPLORATION  
ENVIRONMENTAL ASSESSMENT, DOI-BLM-NV-C010-2010-0010-EA**

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

**Agency Contacts**

**BUREAU OF LAND MANAGEMENT**

Nevada State Office  
PO Box 12000 (1340 Financial Blvd)  
Reno NV. 89520-0006  
(775) 861-6400

Petroleum Engineer: John Menghini  
Office Telephone: (775) 861-6573  
Cell: (775) 223-1359  
jmenghin@nv.blm.gov

Stillwater Field Office  
5665 Morgan Mill Road  
Carson City, NV 89701  
Geothermal Program Lead: Carla James  
Office Telephone: (775) 885-6131  
Fax: (775) 885-6147  
carla\_james@blm.gov

**NEVADA DIVISION OF  
MINERALS**

Nevada Division of Minerals  
400 W. King Street # 106  
Carson City, NV 89703  
(775) 684-7040

Oil, Gas and Geothermal Program Lead:  
Lowell Price  
Office Telephone: (775) 684-7045  
Cell: (775) 721-1774  
Fax: (775) 684-7052

August 2010

TGP Dixie Development Company, LLC, Coyote Canyon Geothermal Exploration Project

### **CONDITIONS OF APPROVAL (COAs)**

**Term:** The term is for two (2) years from the date of approval, but may be extended by BLM. The term is intended to be commensurate with the Nevada NRS 534A.070

#### **Pre-Construction**

1. All access roads will be constructed and maintained to BLM road standards (BLM Manual Section 9113).
2. Roads to be constructed, improved or reclaimed as part of the Projects would be reviewed by the BLM and required to conform to the requirements of BLM Manual 9113 and the "Gold Book", as applicable to the intended Project Use.
3. Off road travel will be restricted to terrain with less than 30 percent slopes unless approved by the authorized BLM officer.
4. Proposed surface disturbance and vehicular travel will be limited to the approved well location and access route.
5. Any changes in well location, facility location, and access or site expansion must be approved by the authorized BLM officer in advance.
6. Inform Fallon Naval Air Station regarding drilling dates, locations, and mast heights.
7. The underside of all heavy equipment will be cleaned by water before entering public lands to do work. Driving through or parking on noxious weed infestations will be avoided.
8. Prior to the kickoff meeting for the construction crew, the Archeological Monitor will be provided a confidential copy of the Cultural Report and the shape files of the maps contained therein.

#### **Well Pad and Facility Construction**

1. A site diagram depicting the location of production facilities, recontoured slopes and stabilization measures shall be approved by an authorized BLM officer prior to installation of production facilities.
2. The design of all facilities, including well pads, roads, pumps, and

pipelines, shall be approved by the authorized BLM officer prior to construction to avoid unnecessary conflicts with visual resources management objectives.

3. The reserve pit shall be fenced in conformance with the Gold Book.
4. Drainage from disturbed areas will be confined or directed so that erosion of undisturbed areas is not increased. In addition, no runoff water (including that from roads) will be allowed to flow into intermittent or perennial waterways without first passing through a sediment-trapping mechanism. Erosion control structures may include: waterbars, berms, drainage ditches, sediment ponds, or other devices.
5. Access road construction for exploratory wells shall be planned such that a permanent road can later be constructed in the event of field development.
6. Construction of access roads on steep hillsides and near watercourses will be avoided where alternate routes provide adequate access.
7. Access roads requiring construction with cut and fill will be designed to minimize surface disturbance and take into account the character of the landform, natural contours, cut material, depth of cut, where the fill material will be deposited, resource concerns and visual contrast.
8. Fill material will not be cast over hilltops or into drainages. Cut slopes should normally be no steeper than 3:1 and fill slopes no steeper than 2:1.
9. As required, fill slopes surrounding culverts will be rip-rapped with a well graded mixture of rock sizes containing no material greater than two feet or smaller than three inches. The ratio of maximum to minimum dimension of any rock shall not exceed 6:1.
10. Water turnouts needed to provide additional drainage will be constructed not to exceed two percent slope to minimize soil erosion.
11. Well site layout shall take into account the character of the topography and landform. Deep vertical cuts and steep long fill slopes shall be avoided. All cut and fill slopes should be constructed to the least percent slope practical.
12. Trash will be retained in portable trash cages and hauled to an authorized disposal site for disposal. Burial or burning of trash will not be allowed unless done at an authorized site.
13. No drilling or storage facilities will be allowed within 650 feet of any

pond, reservoir, canal, spring or stream. Other protective areas near water will be required to protect riparian habitat and T&E species.

14. Springs and water developments on public lands shall be used only with the prior written approval of the authorized BLM officer or the water rights holder.
15. To maintain esthetics values, all semi-permanent and permanent facilities will be painted to blend with the natural surroundings. The Standard Environmental Colors will be used for color selection.
16. Fences shall not be cut without prior approval of the authorized BLM officer. Before cutting through any fences, the operator shall firmly brace the fence on both sides of the cut; a temporary gate will be installed for use during the course of operations, unless the fence is immediately repaired. Upon completion of operations, fences shall be restored to at least their original condition.
17. As directed by the authorized BLM officer, cattle guards will be installed whenever access roads are through pasture gates or fences. These cattle guards shall be maintained. This includes cleaning out under cattle guard bases when needed.
18. The depth of surface soil material to be removed and stockpiled will be specified by the authorized BLM officer. If topsoil is stockpiled for more than one year, the stockpile shall be seeded or otherwise protected from wind and water erosion. The stockpile shall be marked or segregated to avoid loss or mixing with other subsurface materials. Any trees removed will be separated from soils and stockpiled separately.
19. Mud, separation pits and other containments used during the exploration or operation of the lease for the storage of oil and other hazardous materials shall be adequately fenced, posted or covered.
20. Lessee/operator shall comply with all regulatory requirements for storage and handling of hazardous materials and wastes.
21. If historic or archaeological materials are uncovered during construction, the operator is to immediately stop work that might further disturb such materials, and contact the authorized BLM officer. Within five working days the authorized BLM officer will inform the operator as to:
  - a. whether the materials appear eligible for the National Register of Historic Places;

- b. the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
  - c. a time frame for the authorized BLM officer to complete an expedited review under 36 CFR 800.11 or other applicable Programmatic Agreement, to confirm, through the State Historic Preservation Officer, that the findings of the authorized BLM officer are correct and that mitigation is appropriate.
22. If the operator wishes, at any time, to relocate activities to avoid the expense of mitigation and/or the delays associated with the process described in item 20 above for inadvertent discovery of cultural resources, the authorized BLM officer will assume responsibility for whatever recordation and stabilization of the exposed materials may be required. Otherwise, the operator will be responsible for mitigation costs. The authorized BLM officer will provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the authorized BLM officer that the required mitigation has been completed, the operator will then be allowed to resume construction.
23. No surface use will be permitted within 0.6 miles of occupied raptor aeries (nests) during the nesting and fledging period.
24. Fences shall be flagged with bright colored flagging at least every rod from visibility to wild horses. All fences should be constructed using green steel posts with white or silver tops to increase visibility. Fences should also avoid obvious horse migration routes (deep trails, stud piles) if at all possible.

### **Field Operation**

1. Operations shall be done in a manner which prevents damage, interference, or disruption of water flows and improvements associated with all springs, wells, or impoundments. It is the operator's responsibility to enact the precautions necessary to prevent damage, interference, or disruptions.
2. Unauthorized use or failure to lock gates during specified time frames by the lessee or its subcontractors would be considered a violation of the terms of the GPD or associated grants.
3. The operator shall regularly maintain all roads used for access to and within the lease units. A Maintenance and Dust Management Plan may be

required. A regular maintenance program may include, but not be limited to: BLM authorized upgrading of existing roads, blading, ditching, culvert, drainage installation, and graveling or capping of the roadbed.

4. Management actions within riparian areas will be designed to maintain or, where possible, improve riparian habitat condition.
5. Noxious weeds which may be introduced due to soil disturbance and reclamation will be treated by methods to be approved by the authorized BLM officer. These methods may include biological, mechanical, or chemical. Should chemical methods be approved, the lessee must submit a Pesticide Use Proposal to the authorized BLM officer 60 days prior to the planned application date.
6. The lessee will institute and pay for a hydrologic evaluation program, which will be site specific and its intensity will be commensurate with the level of developmental drilling. The lessee will develop this evaluation program working with the BLM Carson City Stillwater Field Office Hydrogeologist and with BLM consent will implement. The number of aquifers encountered, their properties, their quality, and their saturated thickness may be documented. This type of information will be submitted to the BLM and would support future NEPA documentation as development progresses and may be useful to determine adverse impacts on surface water expressions of the geothermal reservoir (hot springs). The evaluation program may include the quality, quantity, and temperature of any hot springs or other water resource within the project area.
7. TGP Dixie Development Company will inventory and monitor other existing and newly constructed and developed wells in the geothermal lease units. Existing wells in the lease units will be evaluated to determine their suitability for use as monitor wells. Where necessary, monitor wells will be installed at appropriate locations and depths to monitor geothermal exploration drilling and development.
8. TGP Dixie Development Company will collect standard aquifer test data during and after well testing from completed cased geothermal explorations wells. Data collection will include but not be limited to static water levels, well drawdown, and other data that characterizes the aquifer(s) and that can be used to predict future scenarios as well as determine boundary affects. The data collection applies to both unconfined and confined aquifers.
9. TGP Dixie Development Company will collect baseline hydrologic data from both geothermal lease units. Data will include ground and surface water temperature, chemistry, groundwater elevations, and surface water

flows (springs). Data will be collected to support and expand upon the required hydrologic monitoring program.

10. All drill rig and well test facility lights will be limited to those required to safely conduct the operations, and will be shielded and/or directed in a manner which focuses direct light to the immediate work area.
11. If previously unrecorded cultural resources are encountered during grading or other surface-disturbing activities, all grading or other surface-disturbing activities at the location of the discovery will cease within 100 meters/330 feet of the discovery, and the BLM would be notified. No surface disturbing activities will be allowed until the BLM Authorized Officer issues a Notice to Proceed (NTP) based upon the evaluation, mitigation, as necessary, and the acceptance of a summary description of the fieldwork performed for the discovery situation.
12. The locations of the historic properties will be provided to TGP Dixie Development Company and flagged for avoidance. If avoidance of currently documented historic properties is not possible a resolution of adverse effects will be followed as defined in 36 CFR 800.6.
13. An archaeological monitor shall be present during any ground disturbing activities. Prior to construction, the monitor shall coordinate with the BLM archaeologist. The monitor shall also provide BLM with brief updates during the construction period and file a post construction report with BLM, which will provide the information the BLM archaeologist requests. They shall have the authority to halt all earth moving activities in the area of the discovery if prehistoric or historic artifacts are discovered until the find can be assessed. In the event of an inadvertent discovery all construction will cease within 100 meters/330 feet of the discovery.
14. Petroleum products such as gasoline, diesel fuel, helicopter fuel, crankcase oil, lubricants, and cleaning solvents used to fuel, lubricate, and clean vehicles and equipment will be containerized in approved containers.
15. Hazardous material shall be properly stored in separate containers to prevent mixing, drainage or accidents. Hazardous materials shall not be drained onto the ground or into streams or drainage areas.
16. Totally enclosed containment shall be provided for all solid construction waste including trash, garbage, petroleum products and related litter will be removed to an authorized sanitary landfill approved for the disposal of these classes of waste.
17. All construction, operation, and maintenance activities shall comply with all applicable federal, state, and local laws and regulations regarding the

use of hazardous substances and the protection of air and water quality.

18. In construction areas where recontouring is not required, vegetation will be left in place wherever possible and the original contour will be maintained to avoid excessive root damage and allow for resprouting.
19. Watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) will be repaired or replaced if they are damaged or destroyed by construction activities to its pre-disturbed condition as required by the authorized BLM officer.

### **Reclamation and Abandonment**

1. The operator or contractor will contact the authorized BLM officer 48 hours prior to reclamation work.
2. Restoration work may not begin on the well site until the reserve pits are completely dry.
3. Disturbed areas will be recontoured to blend as nearly as possible with the natural topography prior to revegetation with a BLM approved seed mix. This includes removing all berms and refilling all cuts. Compacted portions of the pad will be ripped to a depth of 12 inches unless in solid rock.
4. Site preparation for reclamation may include contour furrowing, terracing, and reduction of steep cut and fill slopes, installation of water bars, etc.
5. All portions of the access roads not needed for other uses as determined by the authorized BLM officer will be reclaimed.
6. The stockpiled topsoil will be spread evenly over the disturbed area.
7. The operator will be required to construct waterbars and re-open drainages on abandoned access roads and pipeline routes to minimize erosion as required. Water bars will be spaced appropriately dependant upon topography and slope. Pipeline routes shall be water-barred perpendicular to the fall-line of the slope.
8. The area is considered to be satisfactorily reclaimed when all disturbed areas have been recontoured to blend with the natural topography, erosion stabilized and an acceptable vegetative cover has been established.
9. Rehabilitation shall be planned on the sites of both producing and abandoned wells. The entire site or portion thereof not required for the

continued operation of the well should be restored as nearly as practical to its original condition. Final grading of back-filled and cut slopes will be done to prevent erosion and encourage establishment of vegetation.

10. When sites are abandoned, they will be inventoried for the presence of noxious weeds and treated if noxious weeds are present.
11. Seed and mulch used to reclaim disturbed areas must be weed free. Mulching of the seedbed following seeding will be required under certain conditions (i.e., expected severe erosion), as determined by the authorized BLM officer.
12. Seed will be broadcast between October 1 and March 15 using a site-specific seed mixture and depth of planting as determined by the authorized BLM officer. Seed may be applied with a rangeland drill at half the rate of broadcast seeding. All seeding application rates will be in pounds of pure live seed per acre. Seed should be adapted varieties.

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

FORM APPROVED  
OMB NO. 1004-0132  
Expires: July 31, 2010

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

7. Lease Serial No.  
NVN-86889

8. Surface Manager:  BLM  FS  
 Other

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

1c. Well Status: **New**

2. Name of Lessee/Operator: **TGP Dixie Development Company, LLC**

3. Address of Lessee/Operator: **9590 Prototype Ct., Suite 200, Reno, NV 89521**

4. Location of Well:  
At surface: **895m North, 504m East of SW corner Section 32 (UTM NAD83 N 4417830m, E 418012m)**  
At proposed prod. Zone: **895m North, 504m East of SW corner Section 32 (Straight Hole)**

5. Distance from Proposed Location to Nearest Property or Lease Line: **895m North of NVN-88416 lease line**

6. Distance from Proposed Location to Nearest Well or Previously Applied for Well Location on this Lease: **2671m South and 2363m West of DVPP 66-21**

9. Unit Agreement Name: **Proposed Coyote Canyon Unit**

10. Well No.: **34-32TCH**

11. Permit No.:

12. Field or Area: **Coyote Canyon**

13. Sec., T., R. B. & M.: **Section 32, T24N, R36E**

14. County: **Churchill**

15. State: **NV**

16. Approx. Starting Date: **04/15/2011**

17. Acres Assigned (Well Spacing): **60**

18. Drilling Media and Characteristics:  Air  Water  Mud  Foam  Other

19. Proposed Depth:  
Measured: **9,500'**  
True Vertical: **9,500'**

20. Elevations:  Estimated  Final **1033m** asl  
Reference Datum:  GR  MAT  DF  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	
12.25"	8-5/8"	40#	BTC	K-55	0	50'	3.2 bbls
8.5"	7"	23#	BTC	K-55	0	950'	43 bbls (100% excess)
8.125"	3-1/2"	9.12#	10 Round Line Pipe	A53B	0'	3500'	151 bbls (100% excess)
3.03"	NRQ Core Rod				0'	9500'	Core Rod not Cemented

22. Proposed Work Summary  
See attached program.

23. Missy Miller Sr. Compliance Coordinator 03/02/2011  
Signed Title Date

(This space for Federal use)

Approved by Tracy J. Kuntzian Title St. Invesator Field Mgr. Date 03/23/2011  
Conditions of Approval, if any:

**CONDITIONS OF APPROVAL  
GEOTHERMAL DRILLING PERMIT**

**Terra-Gen Dixie Valley LLC  
COYOTE CANYON GEOTHERMAL EXPLORATION PROJECT  
CHURCHILL COUNTY, NEVADA**

**Coyote Canyon: Churchill County, Nevada**  
**GEOTHERMAL LEASE NVN-086889**  
Observation Well 34-32TCH, MDBM T24N, R36E, Section 32

**TGP DIXIE DEVELOPMENT COMPANY, LLC  
COYOTE CANYON AND DIXIE MEADOWS GEOTHERMAL EXPLORATION  
ENVIRONMENTAL ASSESSMENT, DOI-BLM-NV-C010-2010-0010-EA**

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

**Agency Contacts**

**BUREAU OF LAND MANAGEMENT**

Nevada State Office  
PO Box 12000 (1340 Financial Blvd)  
Reno NV. 89520-0006  
(775) 861-6400

Petroleum Engineer: John Menghini  
Office Telephone: (775) 861-6573  
Cell: (775) 223-1359  
Fax: (775) 861-6711  
jmenghin@nv.blm.gov

Petroleum Engineer Tech: Darrell Carter  
Office Telephone: (775) 861-6538  
Cell: (775) 527-8586  
darell\_carter@blm.gov

Stillwater Field Office  
5665 Morgan Mill Road  
Carson City, NV 89701  
Geothermal Program Lead: Carla James  
Office Telephone: (775) 885-6131  
Fax: (775) 885-6147  
carla\_james@blm.gov

**NEVADA DIVISION OF  
MINERALS**

Nevada Division of Minerals  
400 W. King Street # 106  
Carson City, NV 89703  
(775) 684-7040  
Oil, Gas and Geothermal Program Lead:  
Lowell Price  
Office Telephone: (775) 684-7045  
Cell: (775) 721-1774  
Fax: (775) 684-7052

March 2011

TGP Dixie Development Company, LLC, Coyote Canyon Geothermal Exploration Project

## **CONDITIONS OF APPROVAL (COAs)**

**Term:** The term is for two (2) years from the date of approval, but may be extended by BLM. The term is intended to be commensurate with the Nevada NRS 534A.070

### **Pre-Construction**

1. All access roads will be constructed and maintained to BLM road standards (BLM Manual Section 9113).
2. Roads to be constructed, improved or reclaimed as part of the Projects would be reviewed by the BLM and required to conform to the requirements of BLM Manual 9113 and the "Gold Book", as applicable to the intended Project Use.
3. Off road travel will be restricted to terrain with less than 30 percent slopes unless approved by the authorized BLM officer.
4. Proposed surface disturbance and vehicular travel will be limited to the approved well location and access route.
5. Any changes in well location, facility location, and access or site expansion must be approved by the authorized BLM officer in advance.
6. Inform Fallon Naval Air Station regarding drilling dates, locations, and mast heights.
7. The underside of all heavy equipment will be cleaned by water before entering public lands to do work. Driving through or parking on noxious weed infestations will be avoided.
8. Prior to the kickoff meeting for the construction crew, the Archeological Monitor will be provided a confidential copy of the Cultural Report and the shape files of the maps contained therein.

### **Well Pad and Facility Construction**

1. A site diagram depicting the location of production facilities, recontoured slopes and stabilization measures shall be approved by an authorized BLM officer prior to installation of production facilities.
2. The design of all facilities, including well pads, roads, pumps, and

pipelines, shall be approved by the authorized BLM officer prior to construction to avoid unnecessary conflicts with visual resources management objectives.

3. The reserve pit shall be fenced in conformance with the Gold Book.
4. Drainage from disturbed areas will be confined or directed so that erosion of undisturbed areas is not increased. In addition, no runoff water (including that from roads) will be allowed to flow into intermittent or perennial waterways without first passing through a sediment-trapping mechanism. Erosion control structures may include: waterbars, berms, drainage ditches, sediment ponds, or other devices.
5. Access road construction for exploratory wells shall be planned such that a permanent road can later be constructed in the event of field development.
6. Construction of access roads on steep hillsides and near watercourses will be avoided where alternate routes provide adequate access.
7. Access roads requiring construction with cut and fill will be designed to minimize surface disturbance and take into account the character of the landform, natural contours, cut material, depth of cut, where the fill material will be deposited, resource concerns and visual contrast.
8. Fill material will not be cast over hilltops or into drainages. Cut slopes should normally be no steeper than 3:1 and fill slopes no steeper than 2:1.
9. As required, fill slopes surrounding culverts will be rip-rapped with a well graded mixture of rock sizes containing no material greater than two feet or smaller than three inches. The ratio of maximum to minimum dimension of any rock shall not exceed 6:1.
10. Water turnouts needed to provide additional drainage will be constructed not to exceed two percent slope to minimize soil erosion.
11. Well site layout shall take into account the character of the topography and landform. Deep vertical cuts and steep long fill slopes shall be avoided. All cut and fill slopes should be constructed to the least percent slope practical.
12. Trash will be retained in portable trash cages and hauled to an authorized disposal site for disposal. Burial or burning of trash will not be allowed unless done at an authorized site.
13. No drilling or storage facilities will be allowed within 650 feet of any

pond, reservoir, canal, spring or stream. Other protective areas near water will be required to protect riparian habitat and T&E species.

14. Springs and water developments on public lands shall be used only with the prior written approval of the authorized BLM officer or the water rights holder.
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18. The depth of surface soil material to be removed and stockpiled will be specified by the authorized BLM officer. If topsoil is stockpiled for more than one year, the stockpile shall be seeded or otherwise protected from wind and water erosion. The stockpile shall be marked or segregated to avoid loss or mixing with other subsurface materials. Any trees removed will be separated from soils and stockpiled separately.
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- b. the mitigation measures the operator will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and,
  - c. a time frame for the authorized BLM officer to complete an expedited review under 36 CFR 800.11 or other applicable Programmatic Agreement, to confirm, through the State Historic Preservation Officer, that the findings of the authorized BLM officer are correct and that mitigation is appropriate.
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2. Unauthorized use or failure to lock gates during specified time frames by the lessee or its subcontractors would be considered a violation of the terms of the GPD or associated grants.
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required. A regular maintenance program may include, but not be limited to: BLM authorized upgrading of existing roads, blading, ditching, culvert, drainage installation, and graveling or capping of the roadbed.

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6. The lessee will institute and pay for a hydrologic evaluation program, which will be site specific and its intensity will be commensurate with the level of developmental drilling. The lessee will develop this evaluation program working with the BLM Carson City Stillwater Field Office Hydrogeologist and with BLM consent will implement. The number of aquifers encountered, their properties, their quality, and their saturated thickness may be documented. This type of information will be submitted to the BLM and would support future NEPA documentation as development progresses and may be useful to determine adverse impacts on surface water expressions of the geothermal reservoir (hot springs). The evaluation program may include the quality, quantity, and temperature of any hot springs or other water resource within the project area.
7. TGP Dixie Development Company will inventory and monitor other existing and newly constructed and developed wells in the geothermal lease units. Existing wells in the lease units will be evaluated to determine their suitability for use as monitor wells. Where necessary, monitor wells will be installed at appropriate locations and depths to monitor geothermal exploration drilling and development.
8. TGP Dixie Development Company will collect standard aquifer test data during and after well testing from completed cased geothermal explorations wells. Data collection will include but not be limited to static water levels, well drawdown, and other data that characterizes the aquifer(s) and that can be used to predict future scenarios as well as determine boundary affects. The data collection applies to both unconfined and confined aquifers.
9. TGP Dixie Development Company will collect baseline hydrologic data from the geothermal lease unit. Data will include ground and surface water temperature, chemistry, groundwater elevations, and surface water

flows (springs). Data will be collected to support and expand upon the required hydrologic monitoring program.

10. All drill rig and well test facility lights will be limited to those required to safely conduct the operations, and will be shielded and/or directed in a manner which focuses direct light to the immediate work area.
11. If previously unrecorded cultural resources are encountered during grading or other surface-disturbing activities, all grading or other surface-disturbing activities at the location of the discovery will cease within 100 meters/330 feet of the discovery, and the BLM would be notified. No surface disturbing activities will be allowed until the BLM Authorized Officer issues a Notice to Proceed (NTP) based upon the evaluation, mitigation, as necessary, and the acceptance of a summary description of the fieldwork performed for the discovery situation.
12. The locations of the historic properties will be provided to TGP Dixie Development Company and flagged for avoidance. If avoidance of currently documented historic properties is not possible a resolution of adverse effects will be followed as defined in 36 CFR 800.6.
13. An archaeological monitor shall be present during any ground disturbing activities. Prior to construction, the monitor shall coordinate with the BLM archaeologist. The monitor shall also provide BLM with brief updates during the construction period and file a post construction report with BLM, which will provide the information the BLM archaeologist requests. They shall have the authority to halt all earth moving activities in the area of the discovery if prehistoric or historic artifacts are discovered until the find can be assessed. In the event of an inadvertent discovery all construction will cease within 100 meters/330 feet of the discovery.
14. Petroleum products such as gasoline, diesel fuel, helicopter fuel, crankcase oil, lubricants, and cleaning solvents used to fuel, lubricate, and clean vehicles and equipment will be containerized in approved containers.
15. Containment structures sufficiently impervious to prevent a discharge to waters of the United States, such as containment dikes, containment wall, drip pans, or equivalent protection actions are to be constructed and maintained around all qualifying bulk oil and liquid hydrocarbon tanks. The containment structure must have sufficient volume to contain, at a minimum, the content of the largest storage tank containing liquid hydrocarbons within the facility and sufficient freeboard to contain precipitation, unless more stringent protective requirements are deemed necessary by the authorized officer. Drip pans should be routinely checked and cleaned of petroleum or chemical discharges and designed to prevent access by wildlife and livestock. Containment dikes are NOT to

be constructed with topsoil or coarse, insufficiently impervious spoil material. Chemicals should be placed within secondary containment and stored so that the containers are not in contact with soil or standing water and product and hazards labels are not exposed to weathering.

16. Hazardous material shall be properly stored in separate containers to prevent mixing, drainage or accidents. Hazardous materials shall not be drained onto the ground or into streams or drainage areas.
17. Totally enclosed containment shall be provided for all solid construction waste including trash, garbage, petroleum products and related litter will be removed to an authorized sanitary landfill approved for the disposal of these classes of waste.
18. All construction, operation, and maintenance activities shall comply with all applicable federal, state, and local laws and regulations regarding the use of hazardous substances and the protection of air and water quality.
19. In construction areas where recontouring is not required, vegetation will be left in place wherever possible and the original contour will be maintained to avoid excessive root damage and allow for resprouting.
20. Watering facilities (e.g., tanks, developed springs, water lines, wells, etc.) will be repaired or replaced if they are damaged or destroyed by construction activities to its pre-disturbed condition as required by the authorized BLM officer.

### **Drilling**

1. The BOP/BOPE test shall include a low pressure test from 250 - 300 psig. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. The high pressure test (3.3.9 in Program) will be 1000 psig for depths greater than 3500 feet and using the same testing parameters as the low test.
2. Prior to drilling out the casing shoe after cementing, all casing strings set at a depth of 500 ft or greater, except for the conductor casing, shall be pressure tested to a minimum pressure of 1,000 psi or 0.2 psi/ft whichever is greater.
3. As provided by GRO #2, Item #6: " No producing interval of any well shall be located within 30 meters (100 feet) of the outer boundaries of the lease lands, except where approved by the Supervisor.

### **Reclamation and Abandonment**

1. Interim reclamation will begin within 30 days of completion of the well. Interim reclamation consists of minimizing the footprint of disturbance by reclaiming all portions of the well site not needed for production operations. The portions of the cleared well site not needed for operational and safety purposes are recontoured to a final or intermediate contour that blends with the surrounding topography as much as possible. Sufficient level area remains for setup of a workover rig and to park equipment. In some cases, rig anchors may need to be pulled and reset after recontouring to allow for maximum reclamation.
2. The operator or contractor will contact the authorized BLM officer 48 hours prior to reclamation work.
3. Restoration work may not begin on the well site until the reserve pits are completely dry.
4. Disturbed areas will be recontoured to blend as nearly as possible with the natural topography prior to revegetation with a BLM approved seed mix. This includes removing all berms and refilling all cuts. Compacted portions of the pad will be ripped to a depth of 12 inches unless in solid rock.
5. Site preparation for reclamation may include contour furrowing, terracing, and reduction of steep cut and fill slopes, installation of water bars, etc.
6. All portions of the access roads not needed for other uses as determined by the authorized BLM officer will be reclaimed.
7. The stockpiled topsoil will be spread evenly over the disturbed area.
8. The operator will be required to construct waterbars and re-open drainages on abandoned access roads and pipeline routes to minimize erosion as required. Water bars will be spaced appropriately dependant upon topography and slope. Pipeline routes shall be water-barred perpendicular to the fall-line of the slope.
9. The area is considered to be satisfactorily reclaimed when all disturbed areas have been recontoured to blend with the natural topography, erosion stabilized and an acceptable vegetative cover has been established.
10. Rehabilitation shall be planned on the sites of both producing and abandoned wells. The entire site or portion thereof not required for the continued operation of the well should be restored as nearly as practical to its original condition. Final grading of back-filled and cut slopes will be done to prevent erosion and encourage establishment of vegetation.

11. When sites are abandoned, they will be inventoried for the presence of noxious weeds and treated if noxious weeds are present.
12. Seed and mulch used to reclaim disturbed areas must be weed free. Mulching of the seedbed following seeding will be required under certain conditions (i.e., expected severe erosion), as determined by the authorized BLM officer.
13. Seed will be broadcast between October 1 and March 15 using a site-specific seed mixture and depth of planting as determined by the authorized BLM officer. Seed may be applied with a rangeland drill at half the rate of broadcast seeding. All seeding application rates will be in pounds of pure live seed per acre. Seed should be adapted varieties.

# **EXHIBIT 11**

List of Remaining Permits

Terra-Gen Power, LLC  
 Coyote Canyon Geothermal Project  
 UEPA Amended Application  
 Date: 6/10/2011

<b>FEDERAL</b>	
Federal Energy Regulatory Commission (FERC) Contact: Kimberly D Bose, Secretary 888 First Street, NE, Washington Phone: (202) 502-088	
Notice of Self Certification as a Qualifying Small Power Producing Facility	Permit application not yet submitted as of 6/10/2011
U.S. Bureau of Land Management (BLM) Contact: Teresa Knutson, Stillwater Field Office Manager 5665 Morgan Mill Road, Carson City, NV 89701 Phone: (775) 885-6000	
Drilling Operations	Environmental Assessment for Geothermal Exploration Approved by BLM 4/8/2011
Geothermal Utilization	Environmental Assessment of Geothermal Utilization Approved by BLM 3/7/2011
Transmission Development	Not yet submitted
Coyote Canyon Geothermal Project Environmental Assessment	Approved, FONSI and Decision Record Issued: 4/8/2010
Geothermal Unit Agreement Approval	Approved Date: 5/1/2011
Mineral Material Sale Contract (Gravel)	Not yet submitted
Facilities Construction Permit	Not yet submitted
Commercial Use Permit	Not yet submitted
U.S. Bureau of Reclamation (BOR) Contact: Peter Neugebauer, Water and Lands Specialist Lahontan Basin Area Office, 702 North Plaza, Room 320; Carson City, NV 89701 Phone: (775) 882-3436	
Coyote Canyon Geothermal Project Environmental Assessment	Approved, FONSI and Decision Record Issued: 4/8/2010

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<b>STATE</b>	
Nevada Department of Environmental Protection (NDEP)	
<i>Bureau of Air Pollution Control</i> Contact: Francisco Vega, Minor Source Permits Supervisor 901 South Stewart Street, Suite 4001 , Carson City, NV 89701-5249 Phone: (775) 687-9349	
Surface Area Disturbance Permit	Not yet submitted
Class II Air Quality Operating Permit	Not yet submitted
Chemical Accident Prevention Program (CAPP)	Permit to Construct and Permit to Operate Applications not submitted as of 6/10/2011
<i>Bureau of Water Pollution Control</i> Contact: Alan Tinney, Permit Group Supervisor 901 South Stewart Street, Suite 4001, Carson City, NV 89701-5249 Phone: (775) 687-4670	
Underground Injection Control Permit	Class V geothermal wells permit application not submitted as of 6/10/2011
Commercial Septic Discharge Permit	Permit application not yet submitted as of 6/10/2011
Storm water Pollution Prevention Plan (SWPPP)	Permit application not yet submitted as of 6/10/2011
<i>Nevada Division of Water Resources</i> Contact: Jason King; P.E. State Engineer 901 South Stewart Street, Suite 2002, Carson, NV 89701 Phone: (775) 684-2800	
Water Appropriation Permit	Permit application not yet submitted as of 6/10/2011
<i>Nevada Division of Industrial Relations</i> Contact: L. Tom Czehowski, Acting Administrator 400 West King Street, Suite 400, Carson City, Nevada 89703 Phone: (775) 684-7260	
Pressure vessel inspection and permitting	Permit application not yet submitted as of 6/10/2011
<i>Nevada Division of Minerals</i> Contact: Linda Wells, Administrative Assistant 400 West King Street, Suite 106, Carson City, Nevada 89703 Phone: (775) 684-7040	
Geothermal Project Area Permit	Permit application not yet submitted as of 6/10/2011

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Public Utilities Commission of Nevada Contact: Garrett Weir, Legal Case Manager 1150 East William Street, Carson City, NV 89701-3109 Phone: (775) 684-6176	
Utility Environmental Protection Act (UEPA) Permit	Application in progress
<b>COUNTY</b>	
Churchill County Contact: Eleanor Lockwood, Planning Director 155 North Taylor Street, Fallon, NV 89406 Phone: (775) 423-5136	
Special Use Permit, Coyote Canyon Geothermal Project	Approved 1/19/2011
Building Permit	Permit application not yet submitted as of 6/10/2011
Special Use Permit, Gravel Pit	Permit application not yet submitted as of 6/10/2011

# **EXHIBIT 12**

Draft Notice

**Draft Notice of Application for Applications, Petitions and Complaints  
(Pursuant to NAC 703.162)**

- I. Include a title that describes the relief requested, or proceeding scheduled pursuant to Nevada administrative Code (“NAC”) 703.160(4)(a).**

Application of TGP DIXIE DEVELOPMENT COMPANY, LLC (“TGP”) for a Permit to Construct the TGP Coyote Canyon Geothermal Project pursuant to the provisions of the Utility Environmental Protection Act.

- II. Include the name of the applicant, complainant, petitioner, or the name of the agent pursuant to NAC 703.160(4)(b).**

TGP Dixie Development Company, LLC.

- III. A brief description of the purpose of the filing including, without limitation, a clear and concise introductory statement that summarizes the relief requested or the type of proceeding scheduled, and the affect of the relief or proceeding upon consumers, pursuant to NAC 704.160(4)(c).**

This is TGP’s Application for approval of a permit to construct electric facilities pursuant to the Utility Environmental Protection Act set forth in NRS 704.820-704.890 and NAC 703.415-703.427, as amended (“UEPA”). Under the provisions of UEPA, after a federal agency conducts an environmental analysis of a proposed utility facility, the project sponsor is required to file with the Nevada Public Utilities Commission (“PUCN”) an application under UEPA. The UEPA application for a

permit to construct must (a) describe the location and the nature of the proposed utility facility; (b) summarize studies which were previously made of the environmental impact of the construction of the facilities; (c) describe the reason that the facilities will be located as proposed; (d) describe the environmental effects of the construction and operation of the proposed utility facility, and (e) describe the measures that will be implemented to mitigate those temporary impacts, as required by NRS 704.870(2)(b) and NAC 703.423.

The proposed utility facilities in this application are generally described as the construction of a nominal 70 MW geothermal power plant and associated production/injection wells, pipelines, and support facilities in Dixie Valley, Churchill County, Nevada. More specifically, the facilities consist of the following:

- A nominal 70 MW geothermal power plant;
- Geothermal production and injection wells, pipelines and support facilities;
- A 230 kV transmission line (gen-tie) approximately one-half mile in length which will connect to an existing 211 mile 230 kV transmission line which extends from Terra-Gen Power, LLC's existing Dixie Valley geothermal power plant to the control substation located near Bishop, California;
- H frame transmission pole structures; and
- A non potable water well.

The proposed utility facilities will be located wholly within Churchill County, approximately 40 miles south of Lovelock, Nevada.

The purpose of the Coyote Canyon project is to develop utility geothermal resources located at the project site in Churchill County, Nevada. The energy from the project will be utilized to serve electric needs in the western region and to meet the demand for additional renewable electric power.

**Pursuant to NAC 703.160(5)(c), the effect of the relief upon consumers.**

If granted, Commission issuance of the UEPA permit to construct will provide TGP the authority to construct the proposed facilities. Construction of the foregoing facilities should have little, if any, affect upon utility customers in the state of Nevada.

**IV. A declaration by the applicant, petitioner, or complainant whether a consumer session is required by Nevada Revised Statutes (“NRS”) 704.069(1).**

A consumer session is not required for this application.

**V. If the draft notice pertains to a tariff filing, please include the tariff number and the section number(s) or schedule number(s) being revised.**

Not applicable.