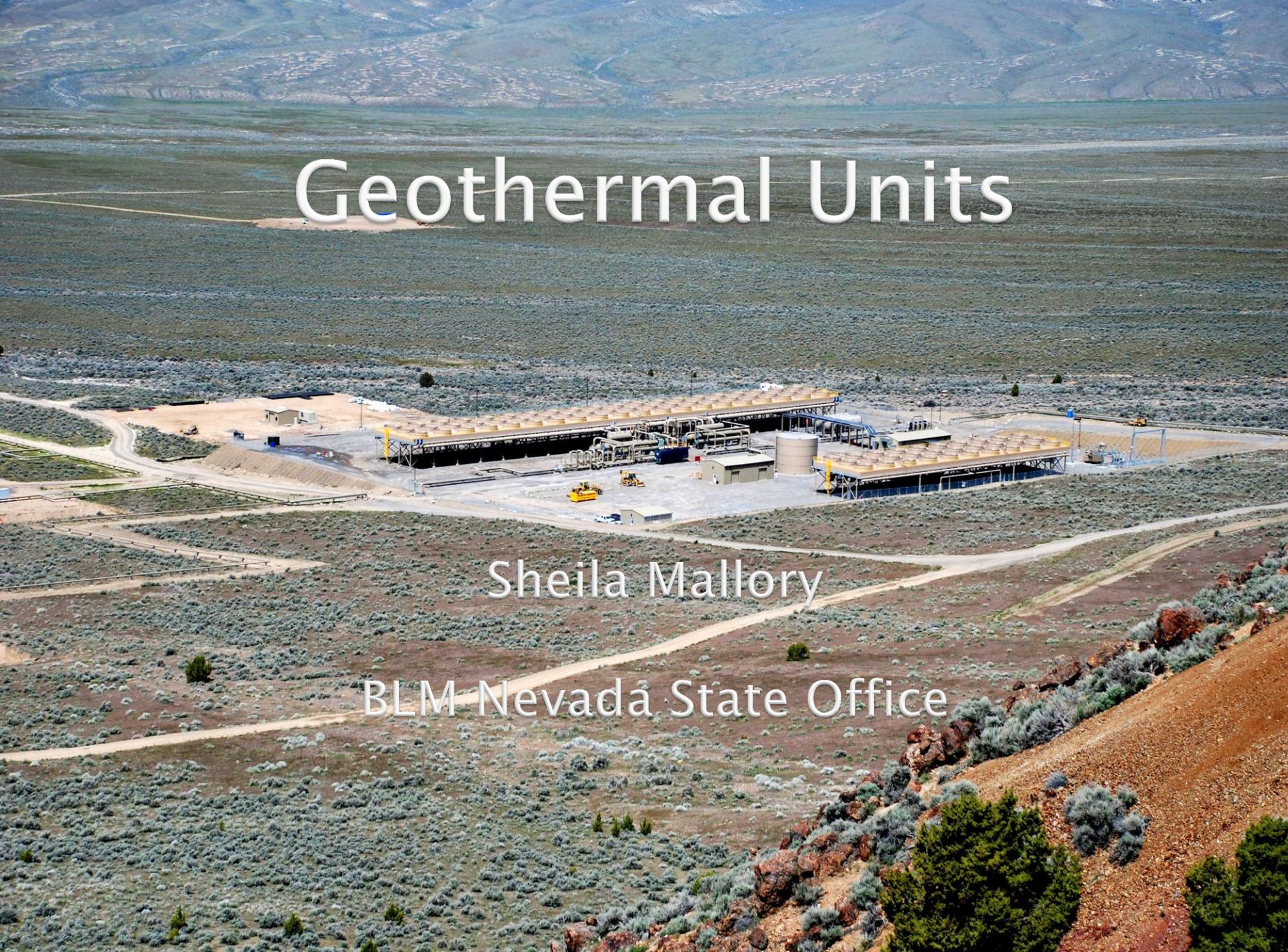


Geothermal Units

An aerial photograph of a geothermal power plant facility. The plant consists of several large, rectangular buildings with yellow roofs, interconnected by a network of pipes and walkways. A large cylindrical storage tank is visible in the center. The facility is situated in a vast, flat desert landscape with sparse, low-lying vegetation. In the background, there are rolling hills and mountains under a clear sky. The overall scene is a mix of industrial infrastructure and natural desert environment.

Sheila Mallory

BLM Nevada State Office

Purpose of Unitization

- ▶ To provide holders of federal and non-federal geothermal leases and owners of non-federal mineral interests the opportunity to unite under a Federal geothermal unit agreement to explore for and develop geothermal resources in a manner that is necessary or advisable in the public interest.[43 CFR 3280.1(a)]



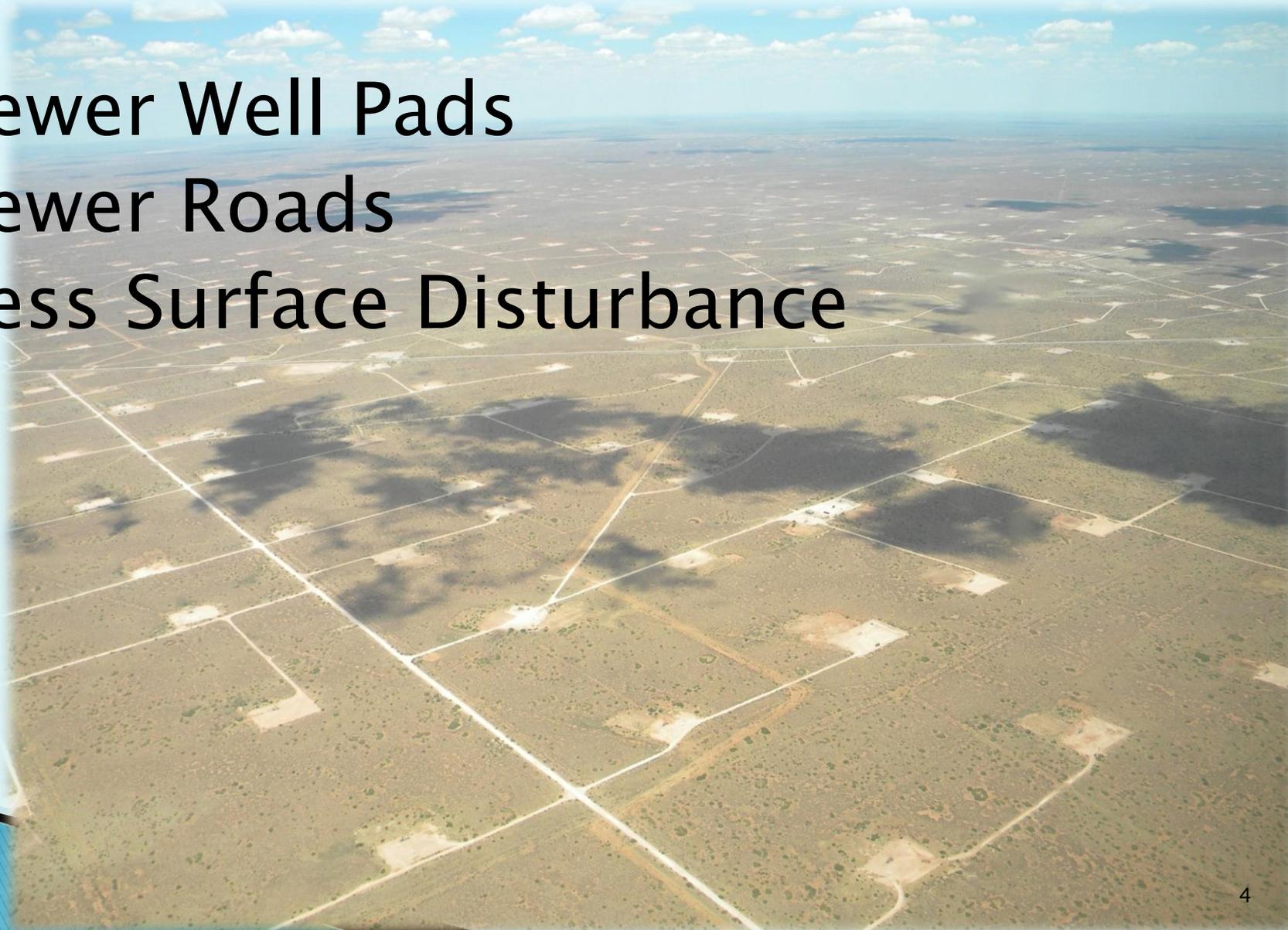
Benefits of Units

- ▶ Environmental Benefits
- ▶ Geothermal Resource Benefits
- ▶ Lease Benefits
- ▶ Other



Environmental Benefits

- ▶ Fewer Well Pads
- ▶ Fewer Roads
- ▶ Less Surface Disturbance



Geothermal Resource Benefits

- ▶ Drill only where needed
- ▶ No regards for lease lines
- ▶ Reduced waste – higher recovery
- ▶ Develop different leases under common ownership
 - The reservoir is under control of a single unit operator, which allows for maximum recovery of the resource through appropriate well spacing, and the use of enhanced recovery and recycling methods as needed.
- ▶ Common facilities
 - Power Plant(s) for one field
 - Production & Injection well locations balanced for resource

Lease Benefits

- ▶ Operations anywhere within the unit benefits all committed leases
- ▶ Leases can be extended without actual lease production
- ▶ Federal leases exempt from 51,200 acre limit

Other Benefits

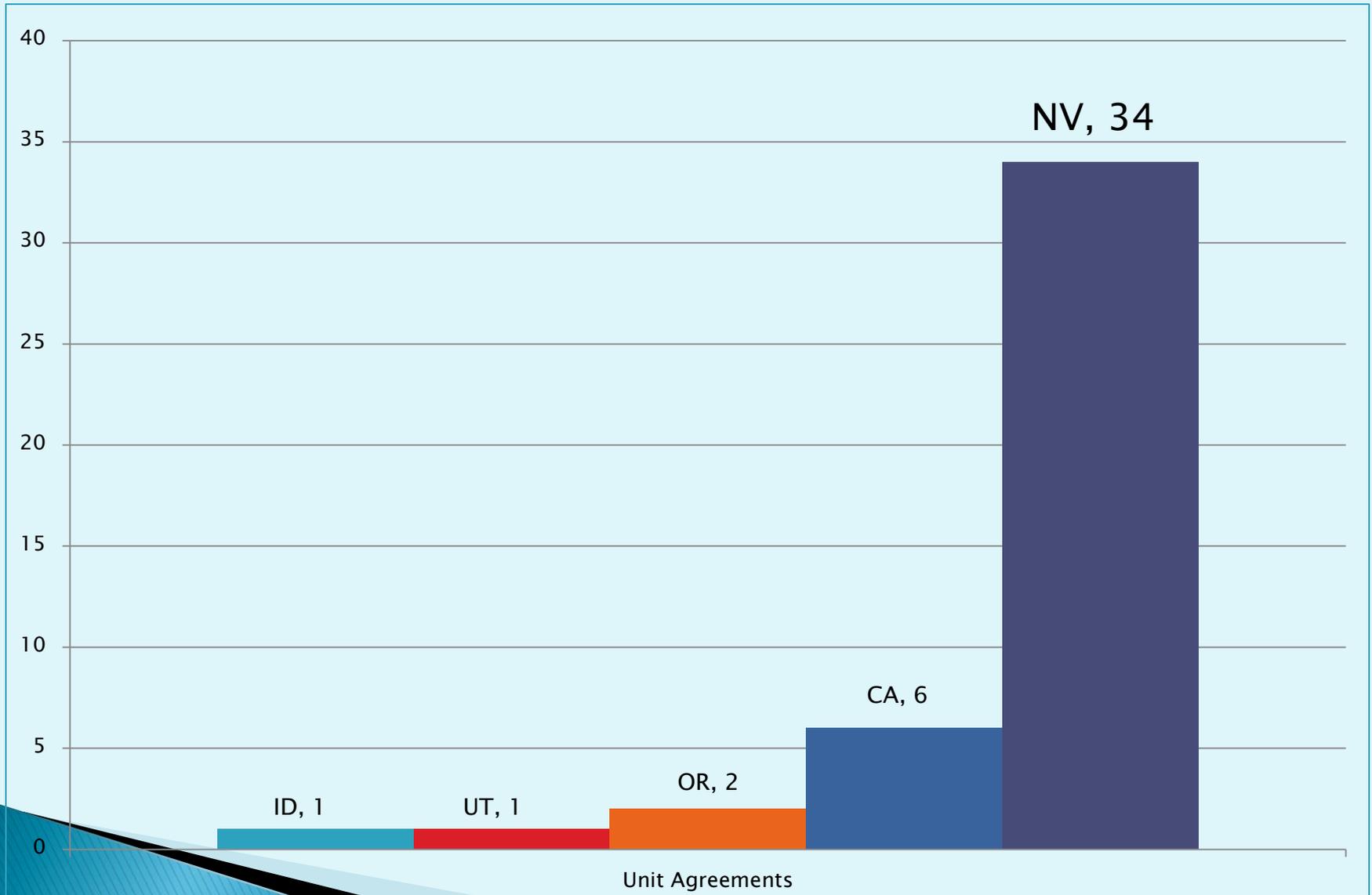
- ▶ A Right of Way (ROW) is not required for activities that occur across lease lines (e.g. roads, pipelines, etc.)



Active Historical Unit Agreements

State	Name of Unit Agreement	Date Approved
UT	Roosevelt Hot Springs	4/19/1976
NV	Soda Lake	9/16/1977
NV	Desert Peak	4/2/1979
NV	Beowawe	11/16/1979

Approved Geothermal Units



Authorities

- ▶ 30 U.S.C. §1017
- ▶ Codified at 43 C.F.R §3280's
- ▶ Policy
 - No written policy for Geothermal Unitization
 - Draft Guidelines are available

Oil and Gas vs. Geothermal Units

- ▶ Geothermal Unitization based on Oil & Gas
 - Same terminology & concepts
 - Processing steps are similar
- ▶ Statutes are different
 - 1930 MLA amendments vs. 2005 Energy Policy Act
- ▶ Case law – 80 years vs. limited decisions
- ▶ Regulations are different
- ▶ Model Form is different
- ▶ Policy

Examples of differences between geothermal and oil and gas units

- ▶ Unitized leases **do not** automatically have the same terms as the unit–operator must formally request this 60 days before lease expiration(43 CFR 3207.17(b))
- ▶ Leases eliminated from the unit **do not** get an automatic 2–year extension–it must meet general regulatory extension requirements (43 CFR 3207.18) as given in 43 CFR 3207.10

Examples of differences between geothermal and oil and gas units

- ▶ Exploratory types operations may be used to meet initial unit obligation (43 CFR 3281.15(c).
- ▶ Unit Agreements can be extended beyond the five year term if a well is drilled at least every 6 months (model form 4.3) (90 day timeframe in oil and gas)



BLM's Responsibility



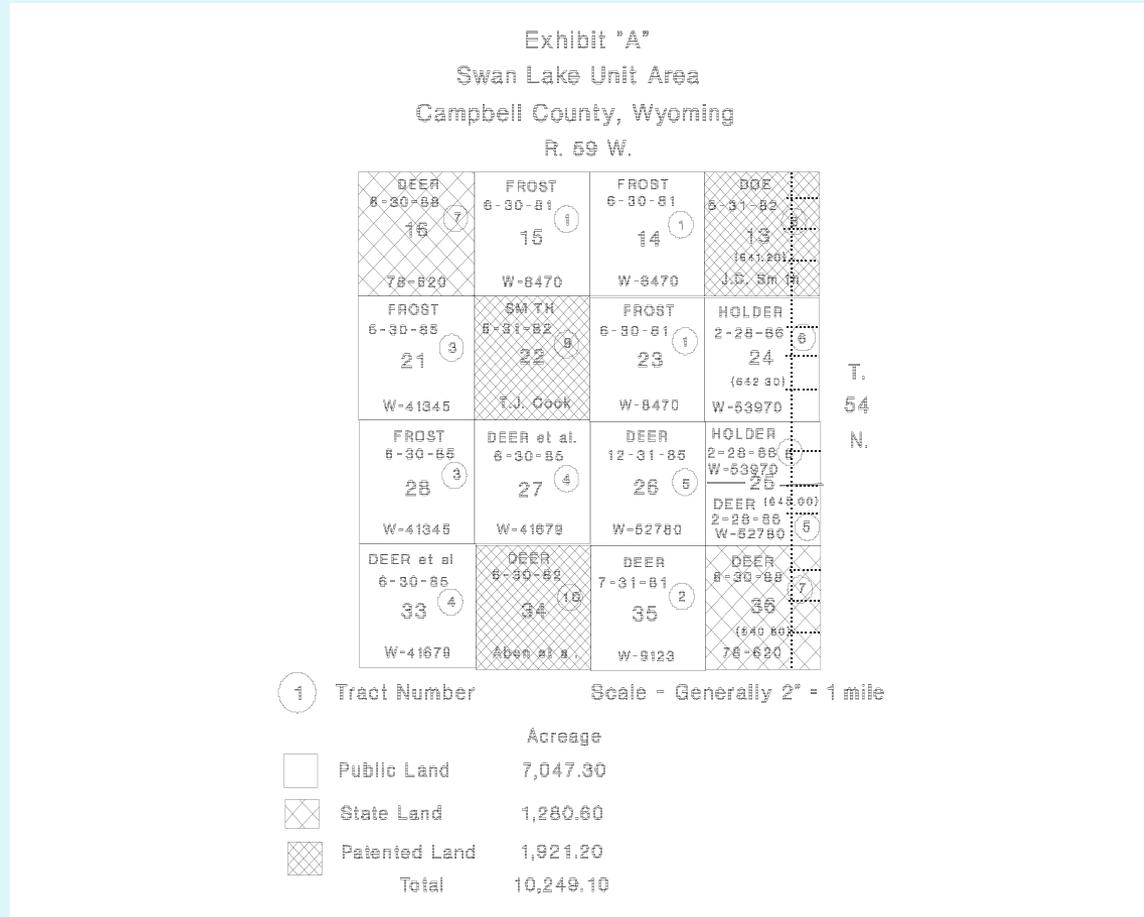
BLM

Administering the Federal Unit involves:

- ▶ Approval
- ▶ Monitoring
- ▶ Termination

Approval Process

- ▶ Designation
- ▶ Final Approval



Designation

- ▶ Application includes:
 - ✓ Unit area **geology**
 - ✓ Description of the initial unit obligation
 - ✓ Unit boundary (map and land description)
 - ✓ Draft Plan of Development
 - General Resource
 - ✓ Identifies Unit operator
 - ✓ Any changes from the model unit form

Nevada Exhibit A

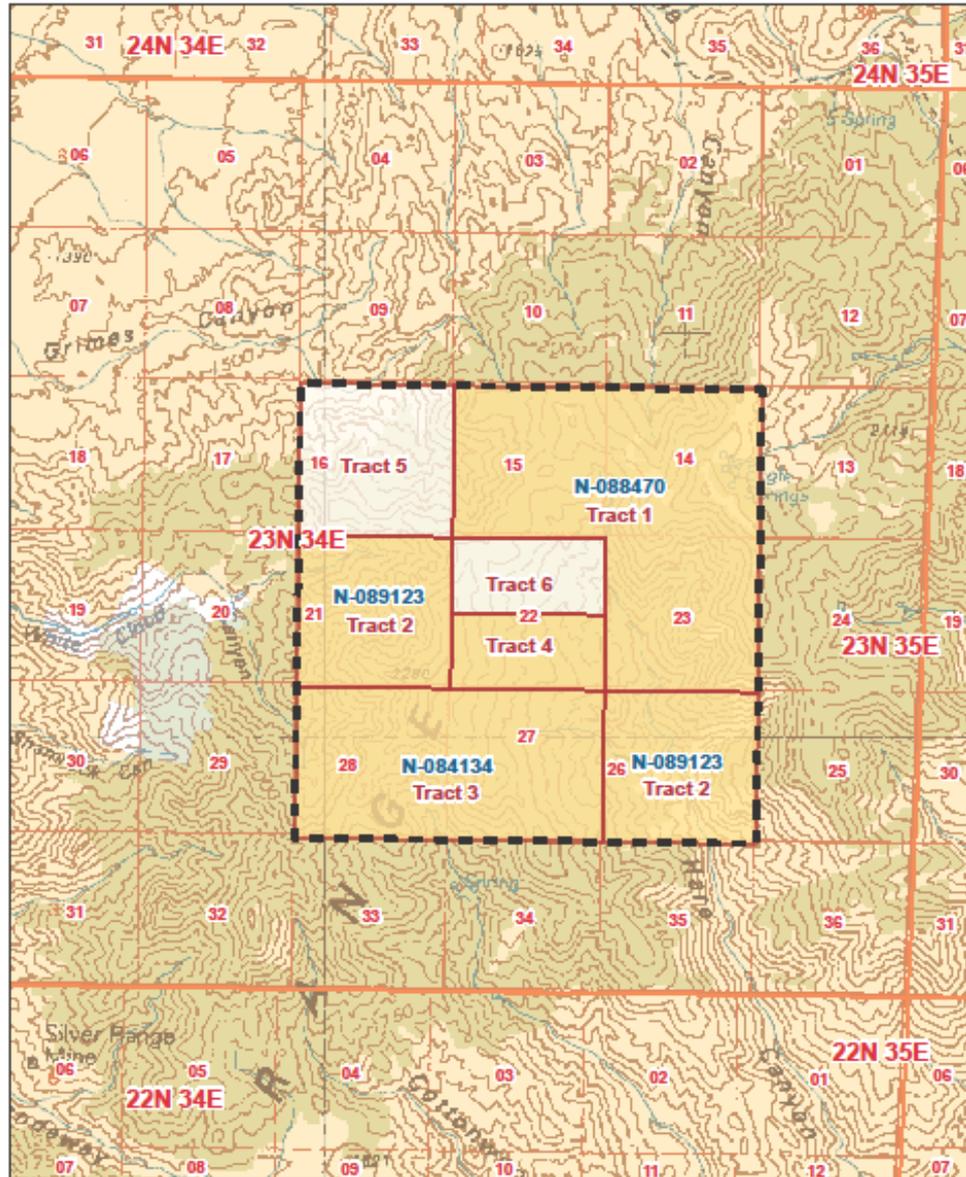


Exhibit "A"

_____ Unit
 _____ County, Nevada

Exhibit A

-  Example Unit Boundary
-  Lease/Tract Boundary
-  Bureau of Land Management
-  Private



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.

9-1-2010
 JPT

Nevada Exhibit B

Exhibit "B"

Unit

County, Nevada

Tract	Description of Land	Acres	Serial No. and Expiration Date of Lease	Surface Owner or Management Agency and Address	Mineral Interest Owner	Basic Royalty Owner and Percentage	Lessee of Record and Percentage	Overriding Royalty and Percentage	Working Interest and Percentage	Commitment Status
Federal Lands										
(including split estate)										
1	T. 23 N., R. 34 W. Sec. 14: All Sec. 15: All Sec. 23: All	1,920	N-088470 10/31/2012	BLM	U.S.A	U.S.A. 100%	Frost Geothermal Company 100 %	T.J. Cook 2%	Frost Geothermal Company 100%	
2	T. 23 N., R. 34 W. Sec. 26: All Sec. 21: All	1,280	N-089123 11/30/2014	BLM	U.S.A	U.S.A. 100%	O.M. Odom 100 %	O.M. Odom 1%	Deer Geothermal Company 100%	
3	T. 23 N., R. 34 W. Sec. 27: All Sec. 28: All	1,280	N-084134 06/20/2011	Jenny Johnson 123 Wright Way Reno, NV 89502	U.S.A	U.S.A. 100%	Max Penn 50% Sam Small 50%	None	Frost Geothermal Company 100%	
4	T. 23 N., R. 34 W. Sec. 22: S2	320	<u>Unleased</u>	BOR	U.S.A	U.S.A. 100%	None	None	None	
4 Federal tracts totaling			4,800.00 acres or 84.00% of Unit Area							
State Lands										
None										
0 State Tracts totaling			0.0 acres or 0.00% of the Unit Area							

Nevada Exhibit B cont'd

Tract	Description of Land	Acres	Serial No. and Expiration Date of Lease	Surface Owner or Management Agency and Address	Mineral Interest Owner	Basic Royalty Owner and Percentage	Lessee of Record and Percentage	Overriding Royalty and Percentage	Working Interest and Percentage	Commitment Status
Patented Lands										
(including split estate)										
5	T. 23 N., R. 34 W. Sec. 16: All	640		John Little 345 Nowhere Rd Reno, NV 89502	John Little	<u>Unleased</u>				
6	T. 23 N., R34 W. Sec 22: N2	320	06/30/2015	BLM	Stacy Smith 50% James Roach 50%	Stacy Smith 50% James Roach 50%	Frost Geothermal Company 100%	None	Frost Geothermal Company 100%	
2 Patented tracts totaling			960.00 acres or 16.00% of the Unit Area							
Total: 6 tracts			5,760.00 acres in the entire unit							

Unit Commitment

- ▶ In Exploratory Units:
 - 85% of acreage within the unit boundary must be committed to agreement
 - Non-committed acreage does not receive any benefits of the unit

Unit Obligations

Addressed in Plan of Development:

- ▶ Unit operator must drill at least one unit well on a tract committed to the unit agreement within the specified timeframe
- ▶ The location and the minimum depth and/or geologic structure to which the initial unit well will be drilled must be specified

Unit Obligations

Addressed in Plan of Development:

- ▶ BLM may require more than one unit obligation well
- ▶ BLM and the unit operator may agree to include exploration work
 - e.g. temperature gradient wells
- ▶ Any work done prior to unit approval cannot be used to meet obligations

Designation

- ▶ Area and Depth Meeting to discuss Unit proposed with BLM is strongly recommended



“It’s simple, really – unless and until all our demands are met, we keep crying.”

Designation Approval

- ▶ Upon BLM Designation Approval, Unit Operators should
 - Send out request for joinders (if applicable)
 - Finalize Plan of Development
 - Prepare Unit Agreement
 - Prepare Joinders, Operating and Lease Agreements for submittal to BLM

Unit Agreement Components

- ▶ Identifies unit operator
- ▶ Size and location of the unit area
- ▶ How to revise the unit and participating area
- ▶ How to amend the unit agreement
- ▶ Effective date and term of the unit
- ▶ Initial unit obligations
- ▶ BLM modification provision of the rate development
- ▶ Periodic BLM review
- ▶ Agreement will be “void” if the minimum initial unit obligations are not met

(43 CFR 3281.14)

Unit Agreement Components (cont.)

- ▶ Plan of Development
 - Resource general
- ▶ Unit contraction and expansion
- ▶ Termination clause five years after its effective date unless:
 - ❖ Operator requests extension
 - ❖ Operator requests termination of the unit
 - ❖ Formation is determined not capable of production
 - ❖ Participating area is formed
- ▶ The agreement may include any other provisions or terms that BLM and the unit operator agree are necessary for proper resource exploration and development, and management of the unit area.

Operating Agreement

- ▶ Required by model form (Art 9.2)
- ▶ Third-party document between Working Interest owners
- ▶ BLM is not a party
- ▶ Three executed copies filed with BLM
- ▶ Among other items, must address:
 - Sharing of benefits (Art 9.3)
 - Allocation of unitized substances (Art 13.3)
 - Relinquishment of leases (Art 14.1 & 14.3)
 - Operations on non-participating land (Art 16.2)
 - Subsequent joinders (Art 25.2 & 25.3)

Final Approval

- ▶ Applicant must show:
 - All parties within unit area have been invited to join the unit, and
 - 85% of acreage within the unit area is committed to the unit agreement (effective unit control)

Unit Reporting Requirements

- ▶ Authorized Officer needs to be notified when the unit wells are drilled to ensure that obligations are being met
- ▶ Upon completion of a successful production well a unit well determination is made by BLM

Unit Terms

- ▶ Initial Unit Term is 5 years
- ▶ Under regulations, a obligation well must be drilled every 6 months until a well is determined by BLM to be capable of producing is commercial quantities
- ▶ Unit is reviewed at least every five years

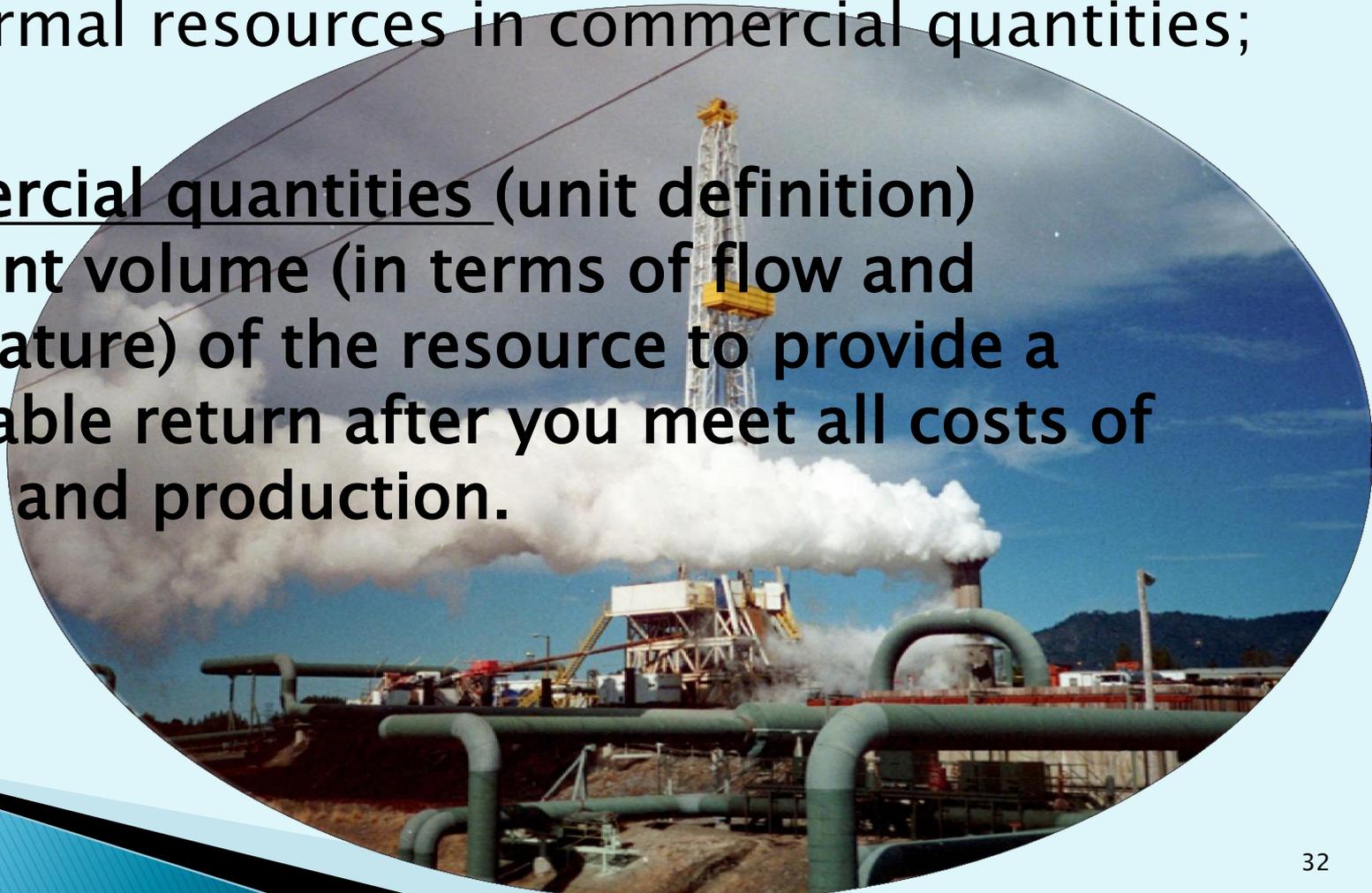
Unit Revisions

- ▶ Exhibits A and B shall be revised by the Unit Operator whenever changes in the Unit Area render such revision necessary, or when requested by the authorized officer, and not less than five copies of the revised Exhibits shall be filed with the authorized officer.

How a unit well is determined

Unit Well a well designed to produce or utilize geothermal resources in commercial quantities;

Commercial quantities (unit definition) sufficient volume (in terms of flow and temperature) of the resource to provide a reasonable return after you meet all costs of drilling and production.



How a unit well is determined

- ▶ pressure transient test data are analyzed to verify the permeability–thickness of the reservoir
- ▶ Discounted cash flow analysis was prepared to determine if a reasonable rate of return could be achieved after considering the costs of drilling and producing the well.

Participating Area (PA)

- The combined portion of the unitized area which BLM determines:
 - (1) Is reasonably proven to produce geothermal resources; or
 - (2) Supports production in commercial quantities, such as pressure support from injection wells.

When is submittal of a PA required?

- ▶ You must have an established BLM–approved participating area to allocate production and royalties
- ▶ 60 days after receiving BLM's determination that a unit well will produce in commercial quantities

OR

- ▶ 30 days before the initiation of commercial operations

Participating Area Components

- ▶ Map and Legal Land Description of the Proposed Participating Area (Exhibit A and B)
- ▶ Geologic and Engineering Report
 - Reports should contain all information obtained since the original designation of area, including interpretive data that would support this delineation of all land then regarded as reasonably proved to be productive. This should include:
 - (1) a geologic map showing the location of the proposed participating area,
 - (2) a discussion of the geology and engineering aspects of the area, and the geologic and engineering data used to prepare this discussion, including all available well data for wells drilled within the participating area, and
 - (3) a discussion of the criteria for delineating the participating area, including interpretative data used.

Nevada Exhibit A

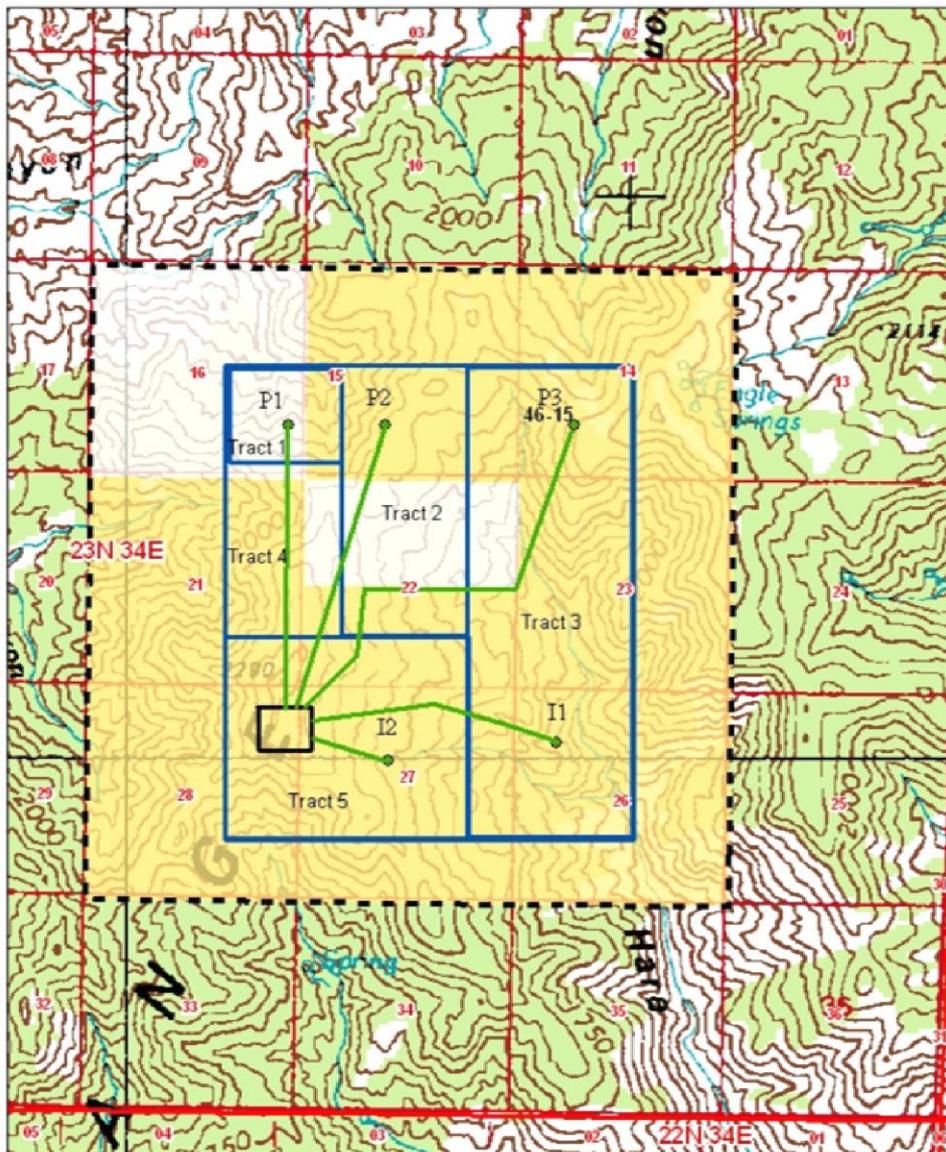


Exhibit "A"

----- Participating Area
 ----- County, Nevada

-  Pipeline
-  Power Plant
-  Wells
-  Participating Area
-  Example Unit Boundary
-  Bureau of Land Management
-  Private

0 0.25 0.5 1 Miles



This document is made by the Bureau of Land Management as to the accuracy, reliability, and completeness of those data for individual users is appropriate, see web site data.

9-1-2010
 JPT

Nevada Exhibit B

Exhibit "B"

_____ Participating Area
 _____ County, Nevada



Tract	Description of Land	Acres	Serial No. of Lease	Basic Royalty and Percentage	Percentage Participation
1	T. 23 N., R. 34 W. Sec. 14: W2W2 Sec. 15: E2 Sec. 23: W2W2	640	N-088470	U.S.A. 100%	59.26%
2	T. 23 N., R. 34 W. Sec. 26: NWNW	40	N-089123	U.S.A. 100%	3.70%
3	T. 23 N., R. 34 W. Sec. 27: N2NE	80	N-084134	U.S.A. 100%	7.40%
4	T. 23 N., R. 34 W. Sec. 22: SE	160	<u>Unleased</u>	U.S.A. 100%	14.82%
6	T. 23 N., R34 W. Sec 22: NE	160	Fee	James Roach 100%	14.82%
Total Acreage of Participating Area		1,080			100%



PA Affects to Unit and Lease Terms

- ▶ When a PA is approved, the Unit is extended 5 years
- ▶ Leases within the PA receive a production extension
- ▶ Upon contraction of Unit to the PA boundary lands outside the PA are segregated
- ▶ Lands that are segregated must qualify for a lease extension

PA Revisions

- ▶ New production/injection well is drilled
- ▶ New technical information

Rental and Royalty Requirements

- ▶ For Pre-EPact Leases (issued before August 8, 2005)
 - Leases with BLM determined producible wells pay minimum royalty
 - Upon commercial generation, those leases pay 10% federal royalty
 - Rent is not required on producible leases

Rental and Royalty Requirements

- ▶ Post-EPact Leases (issued after August 8, 2005)
- ▶ Converted Leases
 - Minimum Royalty not required
 - Royalty required on leases in actual production
 - 1.75% for first 10 years
 - 3.5% after the first 10 years
 - Rent is ALWAYS required

Lease Extension Requirements

- ▶ How is the term of my lease affected by commitment to a unit?
 - (a) If your lease is committed to a unit agreement and its term would expire before the unit term would, BLM may extend your lease to match the term of the unit. We will do this if unit development has been diligently pursued while your lease is committed to the unit.
 - (b) To extend the term of a lease committed to a unit, the unit operator must send BLM a **request for lease extension** at least 60 days before the lease expires showing that unit development has been diligently pursued.

3207.17

Lease Extensions

§ 3207.18 Can my lease be extended if it is eliminated from a unit?

- ▶ If your lease is eliminated from a unit under §3283.6, it is eligible for an extension if it meets the requirements for such extension.
 - Drilling Extension (3207.14)
 - Production Extension (3207.15)



Communitization Agreements

43 CFR 3217.11

- ▶ Also called drilling agreements, operators who cannot independently develop separate tracts due to well spacing or well development programs may cooperatively develop such tracts.
- ▶ Lessees may ask BLM to approve a communitization agreement or, in some cases, we may require the lessees to enter into such an agreement.

Communitization Agreements

- ▶ No communitization agreements in geothermal to date
 - State of Nevada has no spacing regulations

API or State Units

- ▶ Little or no Federal acreage or Federal participation
- ▶ BLM has no jurisdictional or administrative responsibilities for these unit agreements
 - NV and CA have no state geothermal unit regulations

Handouts Provided

- ▶ Geothermal Unit Presentation
- ▶ Draft Geothermal Unit Handbook
- ▶ Commitment Status Definitions
- ▶ Nevada Recommended Unit Exhibit A and B
- ▶ Nevada Recommended PA Exhibit A and B
- ▶ Oil and Gas Operators Handbook for Unit Agreement Submittals
- ▶ 43 CFR 3280–Geothermal Units

Questions?

