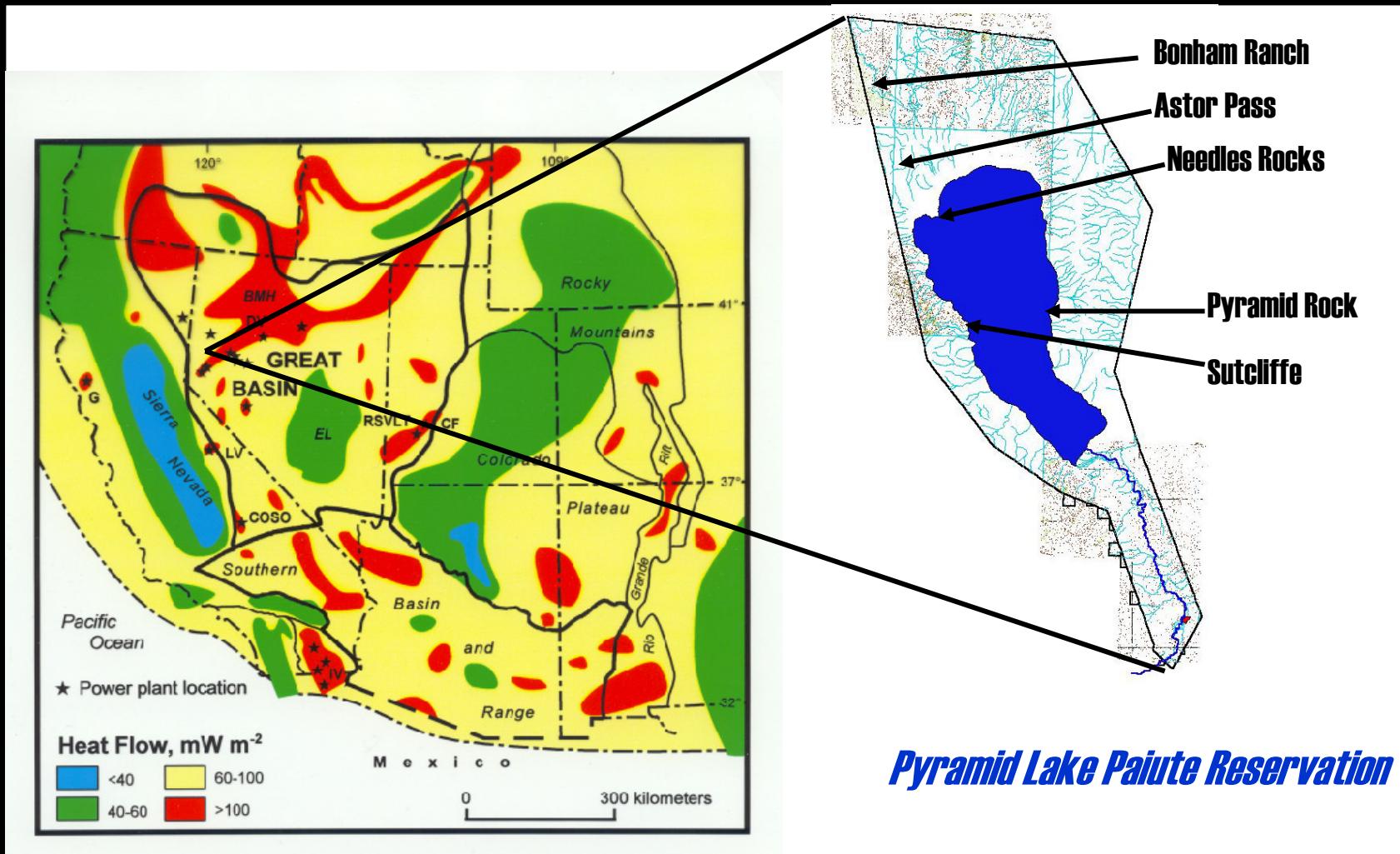


Pyramid Lake Paiute Tribe Geothermal Energy Project

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GEOTHERMAL RESOURCES



PYRAMID LAKE PAIUTE TRIBE

- Largest Nevada Reservation in land base and population, 2300 members
- Reservation encompasses 470,000 acres & 330,000 acres cattle range
- Pyramid Lake 115,000 acre lake surface
- Terminus lake with Truckee River connector to Lake Tahoe, 31 Truckee River miles included on Reservation
- Paiute People have lived here for 600 years, geothermal areas spiritual
- Needles Geothermal drilling; 1961 and continued early 1980's
- Cultural and Spiritual beliefs prohibited development

OVERVIEW

- Generate database
- Geologic mapping
- Mapping fault structures
- Geophysics
- Site gradient well
- NEPA through BIA

OBJECTIVES

- To identify all geothermal resources
- Preserve cultural and spiritual sites
- Provide tribal economic opportunities
- Develop geothermal resources that are economically and culturally feasible

ASTOR PASS DRILL TARGET

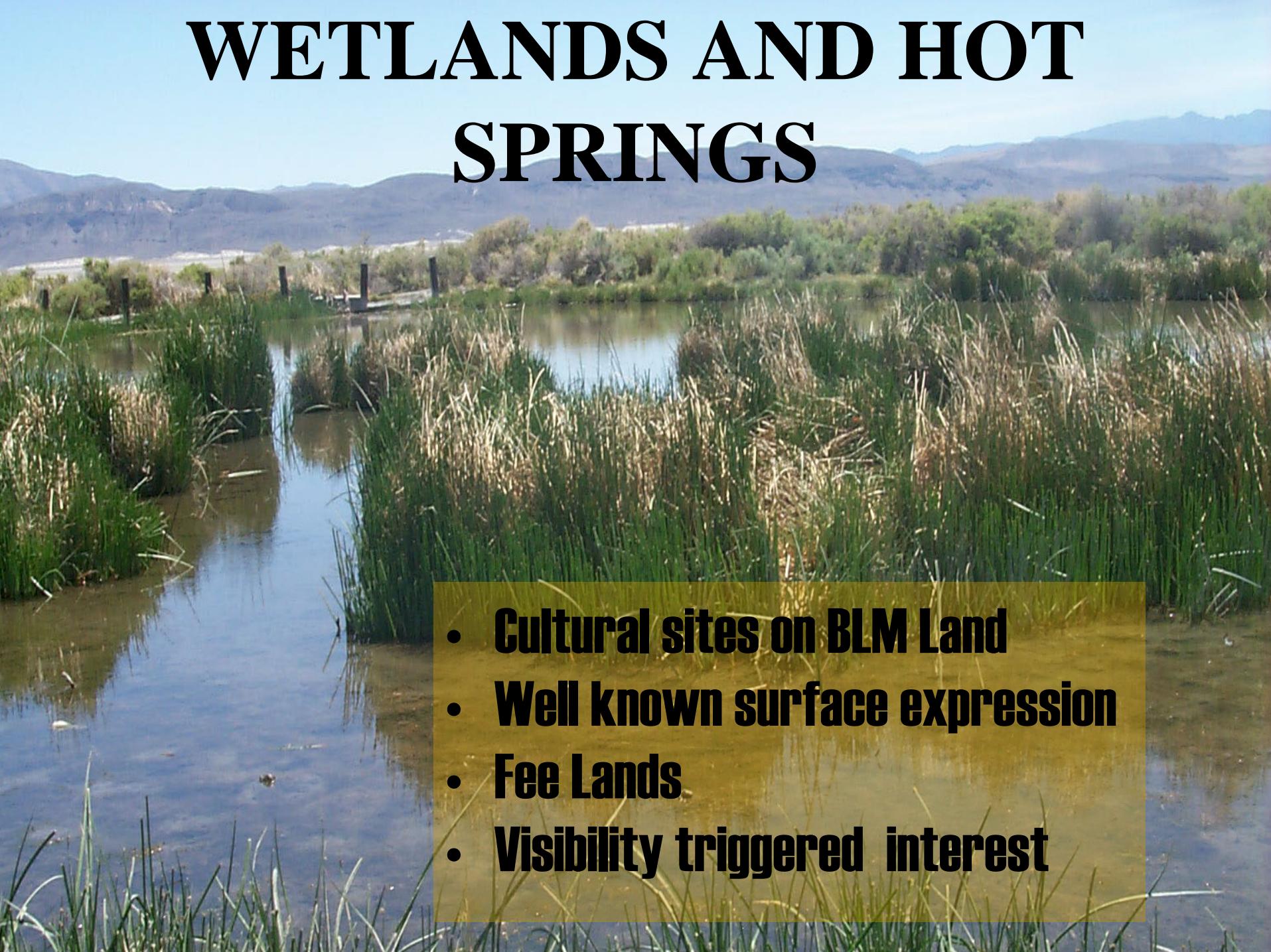
- 3 Gradient wells to about 500 feet
- Isothermal tail near lake
- Tufa align with faulting
- Not connected to Needles fault
- Blind system
- Last follow-up hole 205° @ 185 feet

SMOKE CREEK DRILL TARGET



- 6 gradient wells sited, 3 drilled
- High water table, desert playa
- “Not to Exceed” Drill contract

WETLANDS AND HOT SPRINGS

- 
- A photograph of a wetland area. In the foreground, there are tall, green reeds growing out of a body of water. In the background, there are more reeds and some low-lying bushes. Further back, there are several hills or mountains under a clear blue sky.
- Cultural sites on BLM Land
 - Well known surface expression
 - Fee Lands
 - Visibility triggered interest

GRADIENT WELL SAMPLING



Accomplishments

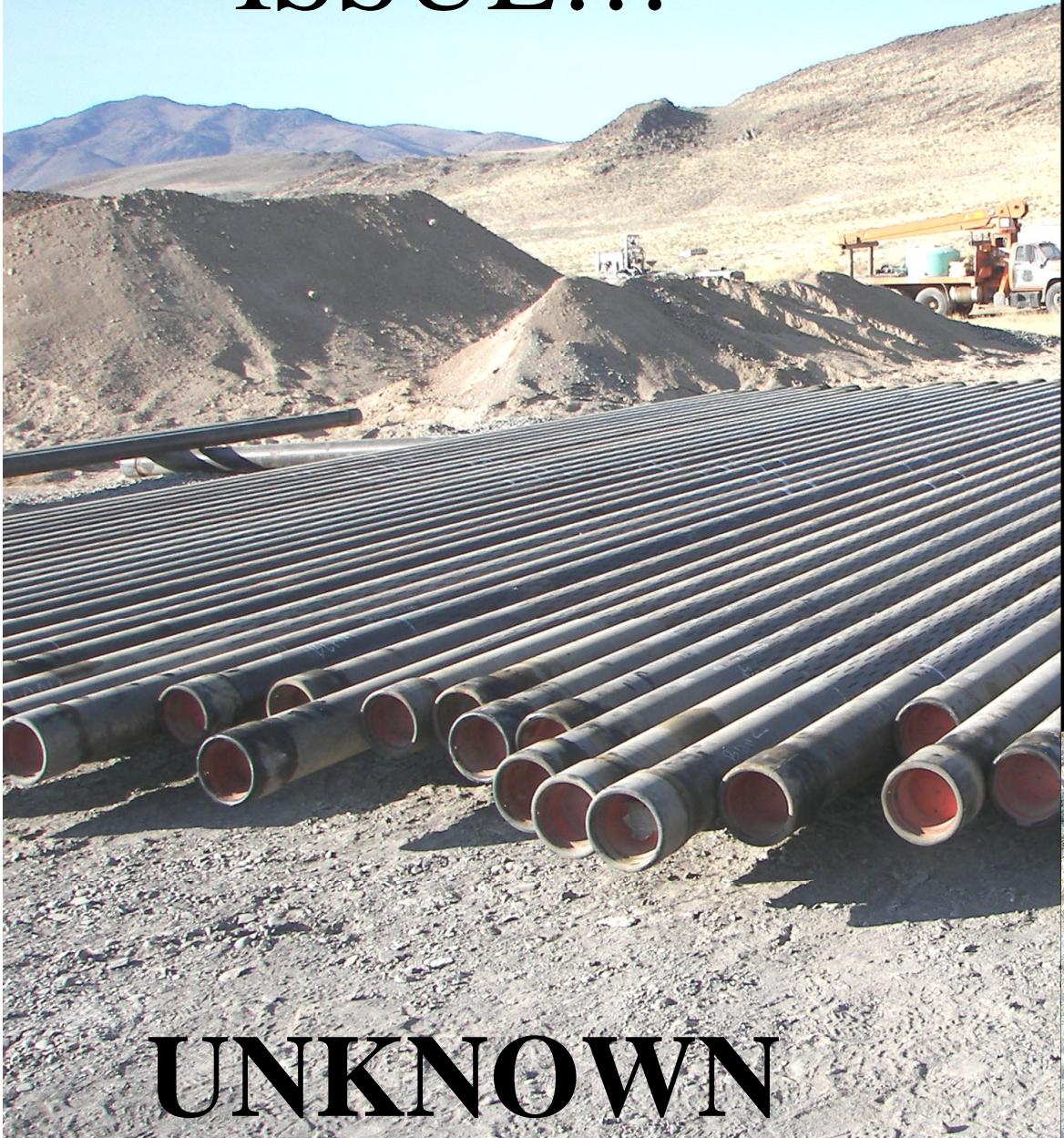
- Geothermal Resources are known for the Reservation
- 7 Gradient Wells drilled
- 1 Slim Hole Well Drilled to 1831 Feet
- Initiated Target Resource Testing
- Began setting up Tribal Corporation
- Performed scoping for Environmental Assessment

TECHNICAL & MANAGEMENT ISSUES

A landscape photograph showing a dry, hilly terrain under a clear sky. In the middle ground, a small industrial facility, likely a drilling rig, is visible on a flat plain. The background consists of several hills and mountains, some with sparse vegetation and others appearing more arid. The lighting suggests either early morning or late afternoon.

- **Drill Rig Availability**
- **Supply and Demand cost increase**
- **Unexpected Problems**
- **Hidden Costs**
- **High Fuel Cost; equipment and trucking**

ISSUE...



UNKNOWN



ISSUE... LIVING IN REMOTE AREA



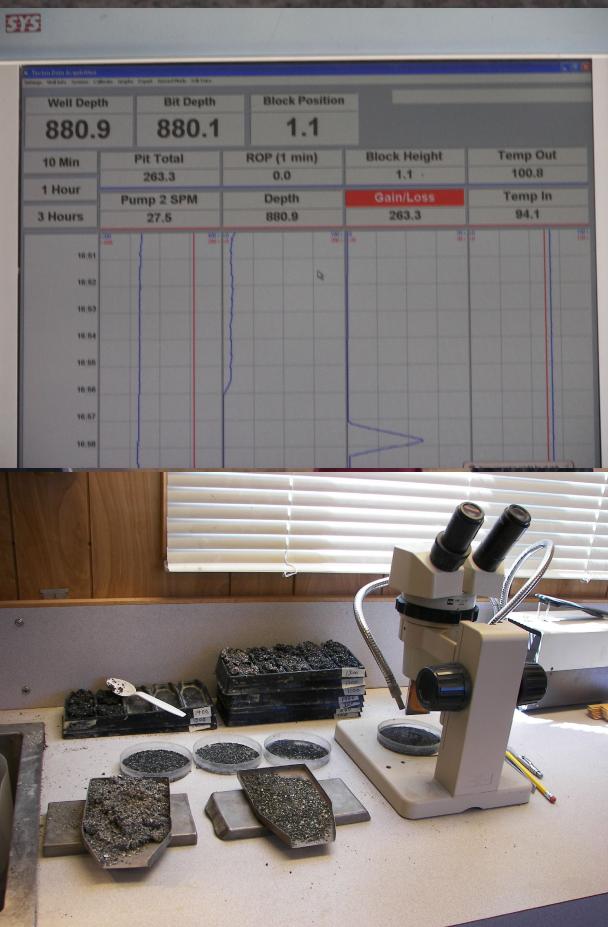
- Costs add up when building a town site
- Drinking Water
- Wastewater & Solid Waste
- Generator

ISSUE... BUY SMALL QUIPMENT



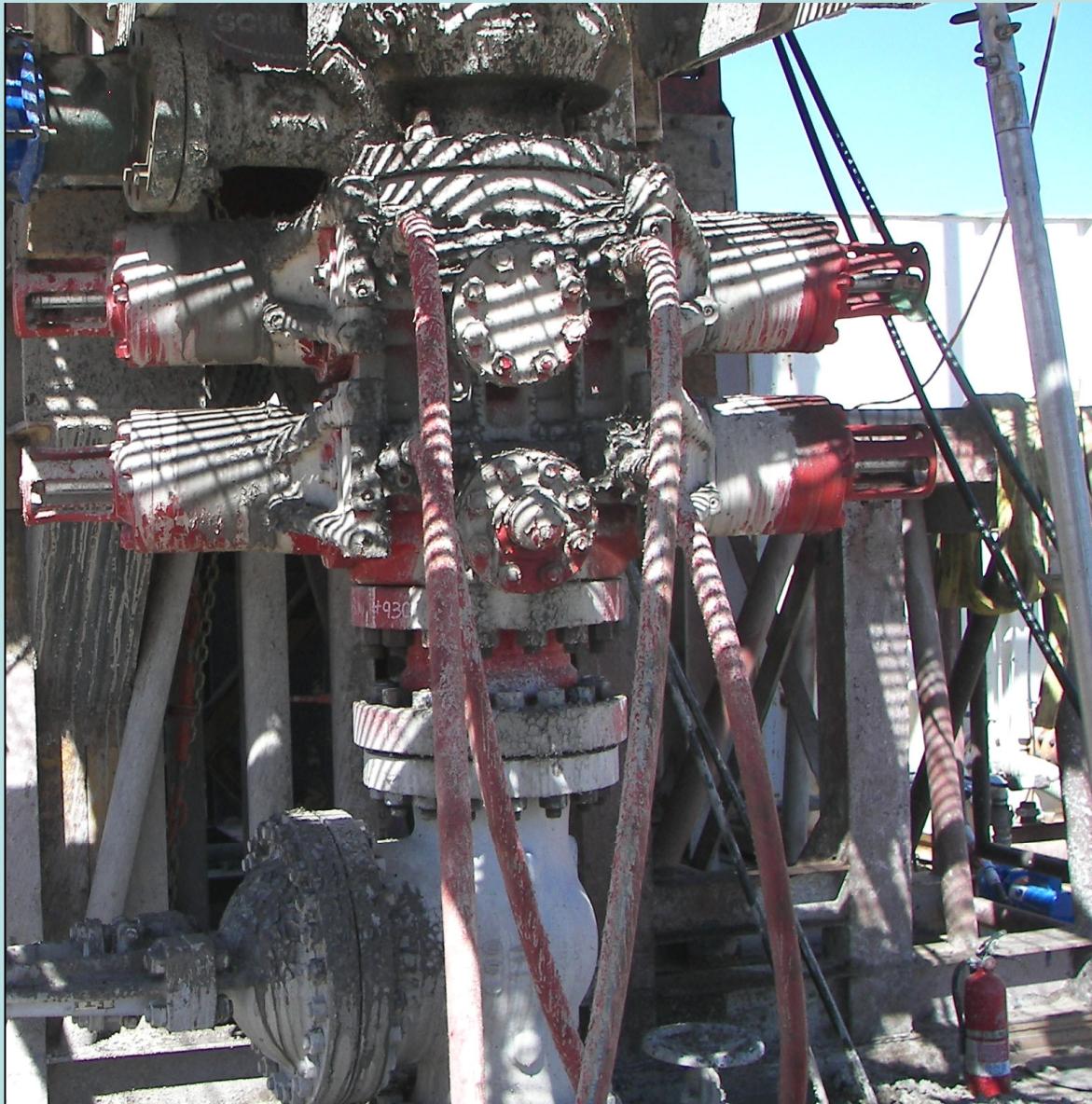
ISSUE

ELECTRONICS



- Supply your own computers, rentals are expensive

...BLOW OUT PROTECTION RENTAL



ISSUE... TIME DELIVERY

- Stand-by
- Drill rig not working
- Experienced drill engineer
- Cement note: test water



CEMENT 454' CASING

Halliburton technical cement mixing



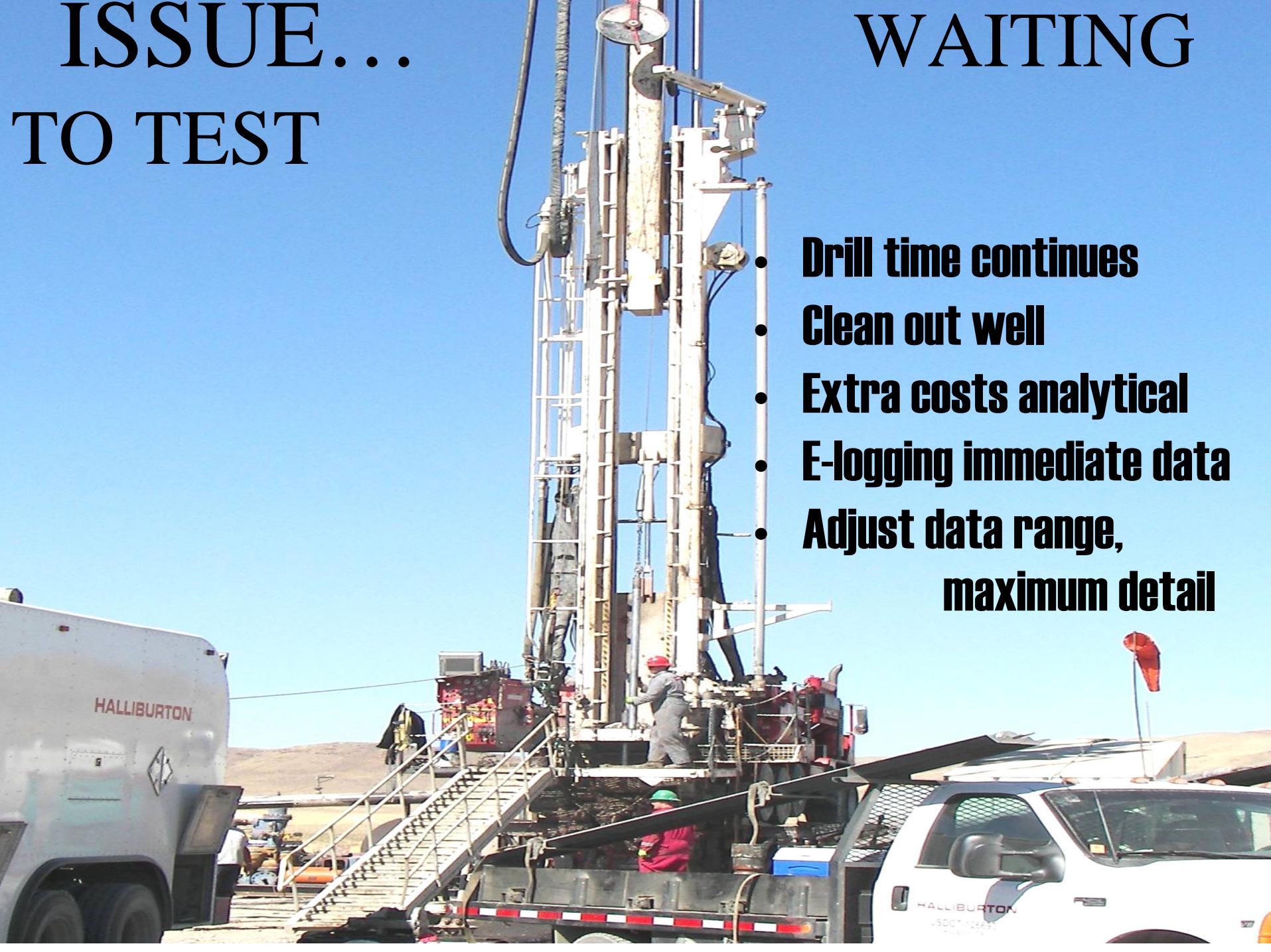
Communication and Safety were the primary concerns for the Astor Pass Drilling Project



ISSUE... TO TEST

WAITING

- Drill time continues
- Clean out well
- Extra costs analytical
- E-logging immediate data
- Adjust data range,
maximum detail



HI-TECH E-LOG RIG

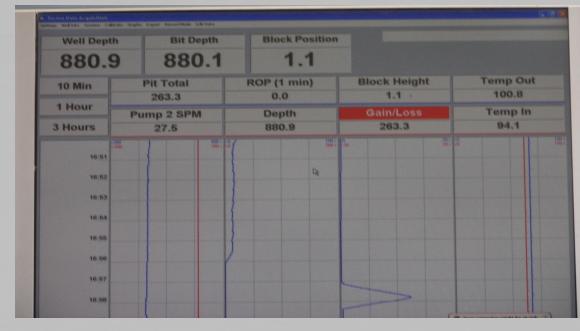


E-LOG MONITORING

- Real time measurements
- Adjustable to max precision
- Sloughing fractures
- Max. depth 1760
- Parameters graphic display, during descent



ACCOUNTING ON ISSUE... SITE



ISSUE... CONFIDENTIALITY

- News travels fast in town and faster in geothermal circles
- Developers frequently have an agenda & interest in a specific company or process
- Build Trust with Consultants; Short term contract with specific tasks
- Consultants have a unique skill not found in tribal employees
- Everyone must Work for the Best Interest of the Tribe

ISSUE... TRIBAL EXPECTATIONS

- Consultants promise big money, before hot water is located**
- Decision makers believe speculation**
- Drilling initiates the onslaught of developers**
- Chairmen/Councils can be persuaded by unscrupulous promoters
when technical tribal employees are not involved**
- Knowledgeable corporation/board must make decisions**

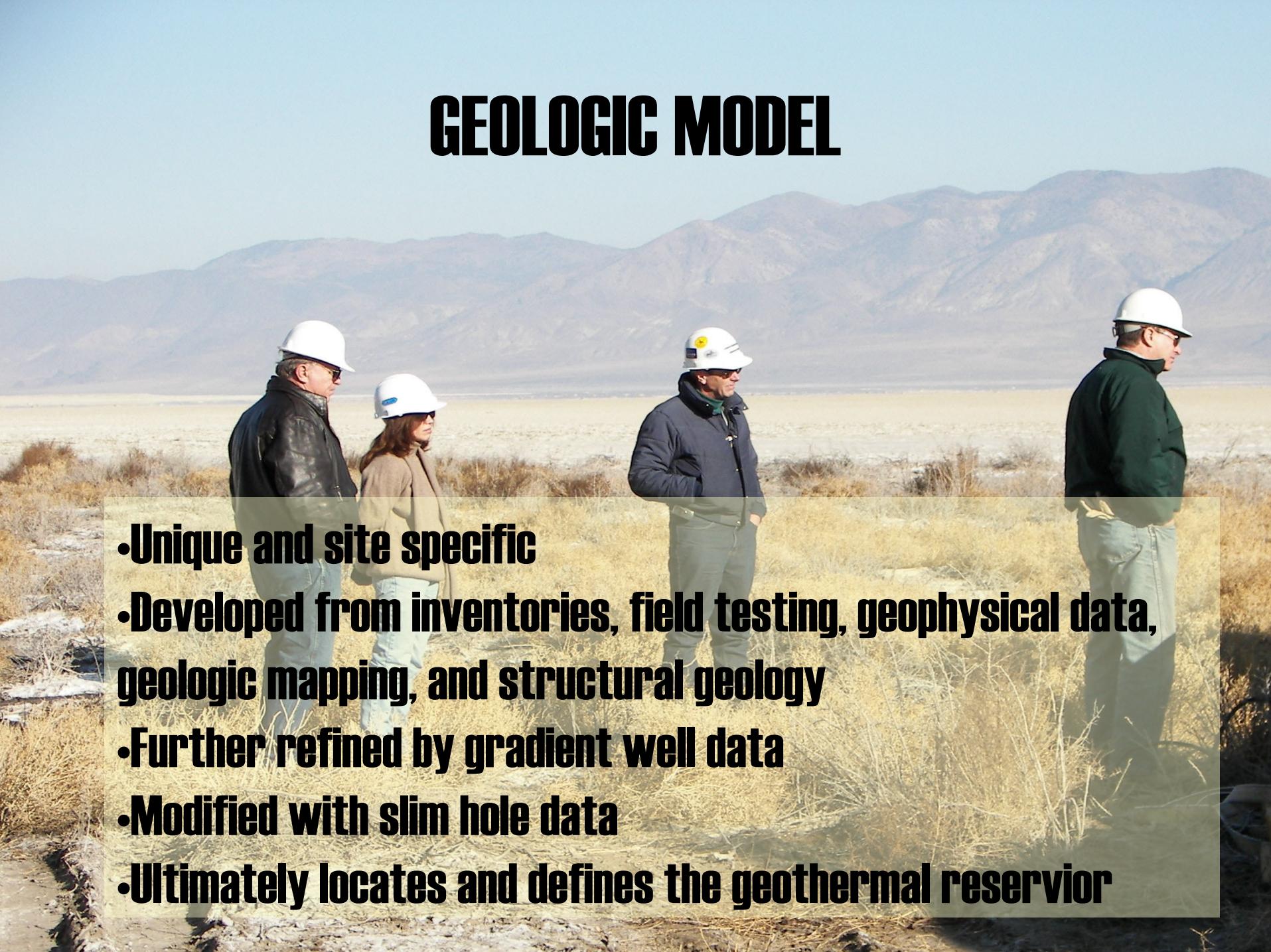
PROJECT PARTICIPANTS

- 
- *Experienced Professionals; UNR Geothermal Group, Bill Ehni, Ray Collins*
 - *Skilled Drilling & good crew; Jim Biffle Welsco Drilling*
 - *Government Agencies; PIPT Tribal Council, DOE, BIA*
 - *Congressional Support; Senator Harry Reid*

WORK IN PROGRESS

- 
- Slim well tests: Spinner/Temperature
 - Halliburton e-log length of well
 - Geochemical Analysis, drill cuttings & Soil sampling
 - Modify Geologic Model
 - Site new Slim Hole, casing cool zone
 - Prepare Environmental Assessment

GEOLOGIC MODEL

- 
- A photograph showing four geologists in hard hats and work clothes standing in a dry, open landscape. They are looking towards the left of the frame. In the background, there are low, rolling mountains under a clear sky.
- Unique and site specific
 - Developed from inventories, field testing, geophysical data, geologic mapping, and structural geology
 - Further refined by gradient well data
 - Modified with slim hole data
 - Ultimately locates and defines the geothermal reservoir

NEXT STEPS

- By collecting and integrating all data into the Geologic Model site next slim hole
- Confirm the geothermic reservoir; site the production well
- Characterize the geothermal reservoir; site injection well
- Determine economic options for geothermal development in the best interest of the tribe
- Request development agreement proposals from a variety of developers on all viable production uses

Questions?

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