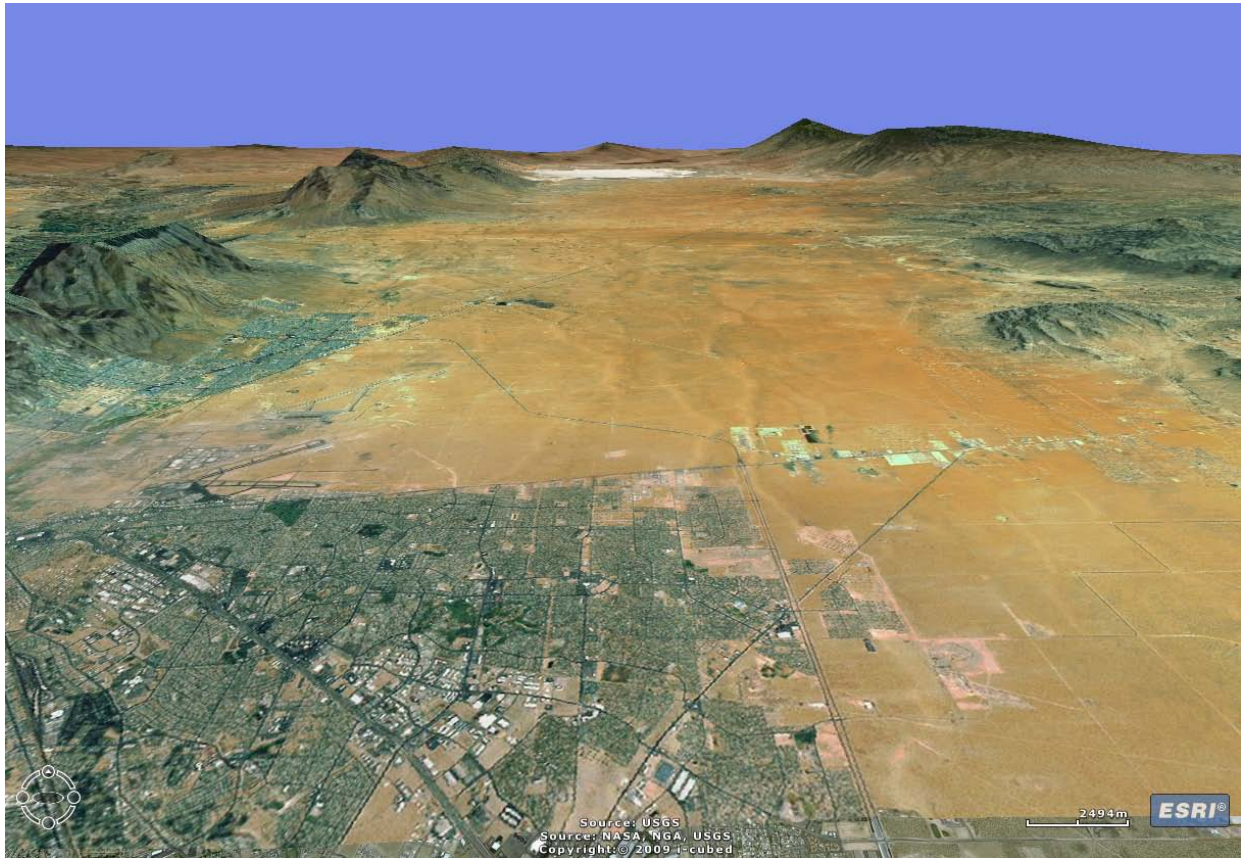

El Paso County Geothermal Project at Fort Bliss

May 18, 2010

Presenters:
Jon M. Lear, Principal Investigator
Ruby Mountain Inc.
With
Marylin Segall, Ph.D. and
Greg Nash, Ph.D.
Energy & Geoscience Institute at the University of Utah

Mandatory Overview Slide

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Project Goal

Detailed Assessment Geothermal Resource on Fort Bliss - McGregor Range

Timeline

- Final DOE Contract received by El Paso County March 31, 2010
- Implementation team received contracts May 10, 2010
- Estimated project completion date: January 31, 2013

Budget

- Total Project Budget totals $9,812,500 which consist of:
  - DOE funding of $5,000,000
  - Matching funds of $4,812,500 contributed by project partners
- No drawdown on federal funds to date

Project Partners

- El Paso County Government
- Fort Bliss
- Ruby Mountain Inc. (Jon M. Lear, Principal Investigator)
- Energy & Geoscience Institute at the University of Utah (EGI)
- Aerospect, L.L.C. and Radion Energy, L.L.C.

Relevance/Impact of Research

The Geothermal Project at Fort Bliss has three primary objectives:

Objective 1: Determine if, and where, economically viable low temperature geothermal resources might exist in the McGregor test area – or if necessary at other lesser known sites that exist on the Fort Bliss Military Reservation – and to determine at what location they can be best accessed without compromising the tactical and strategic missions of Fort Bliss.

Objective 2: Determine if identified resources have adequate temperatures and flow rates/volumes to justify development at any scale, with an eye toward the 20 megawatt target identified. Over base need: 45 megawatts.

Objective 3: If the resource is adequate, determine where facilities can be located for the production of power, as well as if, and how, such facilities address the needs of Fort Bliss.

Scientific/Technical Approach

- Integration of proven techniques with new and novel analysis tools
  - Exploration
    - Remote Sensing: regional & local
    - Soil mercury survey: local
    - Gravity survey: local
    - “Green” temperature gradient survey: local
    - Exploration GIS database development
    - Conceptual geologic/geothermal system modeling
  - Slim-hole drilling & Resource testing
    - Core/cuttings analysis including XRD
    - Integrated wellbore chemostratigraphic-chronostratigraphic evaluation
    - Well testing
    - Updating of geologic/geothermal conceptual model
    - Evaluation by an outside expert
  - Milestones
    - 2009: None
    - 2010
      - Work began May 15, 2010
      - Literature/data review, initial GIS development: June 30, 2010
      - Initial geologic characterization completion: August 30, 2010 Milestone 1

Accomplishments, Expected Outcomes and Progress

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Progress to date

- Literature/data review is underway
  - DEMs
  - Landsat imagery
  - SMU Geothermal Laboratory heat-flow data (D. Blackwell)
  - USGS gravity data
  - GIS database started

Regional effort to define a local prospect to be completed by 8/30/10

Qualifications and Facilities

Marylin Segall, Ph.D., 20+ years experience in petrography and stratigraphy

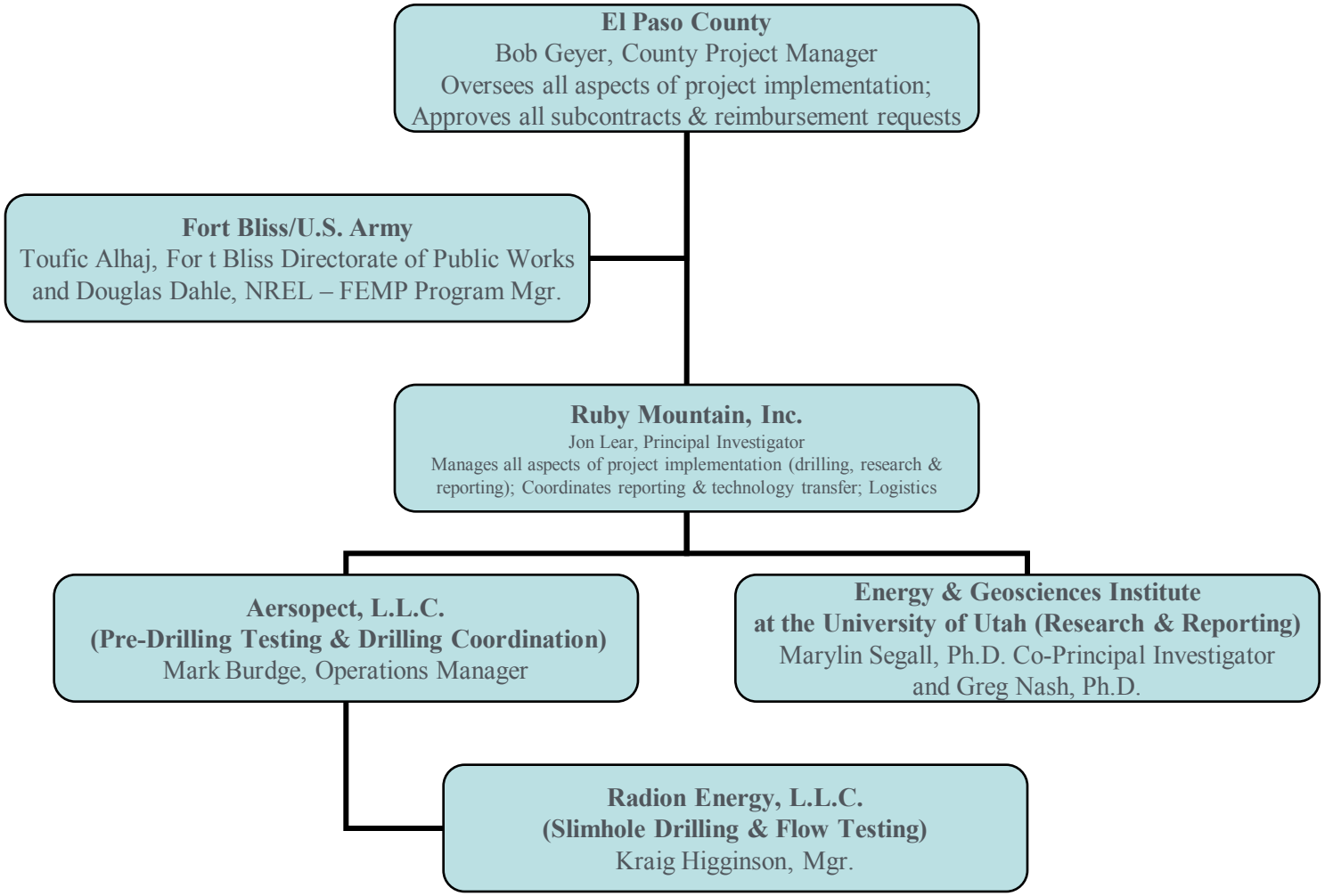
Greg Nash, Ph.D
- 20+ years experience in geothermal exploration, remote sensing, GIS development

Joe Moore
- 35 years experience in geothermal exploration and system characterization

EGI	AeroSpect, LLC	Radion, LLC
QEMSCAN	HeliDrilling	Slim-hole drilling & testing
XRD		

Project Management/Coordination

Contract to El Paso County administered by DOE Golden Field Office



Anticipated Project Phasing

Phase 1: Resource Survey & Evaluation

- Estimated Duration: 6 - 12 months, beginning 4-15-10
- Primary Activities: Geologic characterization & model development; gravimetry, thermal gradient and mercury surveys, integrated wellbore chemostratigraphic-chronostratigraphic evaluation

Phase 2: Slimhole Drilling

- Estimated Duration: 8 - 12 months
- Primary Activities: Drilling plan development, slimhole drilling, core collection & logging, Assessment Point for Each Slimhole

Phase 3: Resource Testing & Assessment

- Estimated Duration: 6 - 12 months, concluding around 12-31-13
- Primary Activities: Well testing, water chemistry analysis, flow testing, evaluation by independent DOE expert, chemostratigraphic and chronostratigraphic analyses; final assessment

National Geothermal Data Systems Participation (NGDS)

EGI is currently a consortium member of NGDS and will direct data contributions. It is anticipated significant contributions will be made to the following sections of the NGDS interactive data tree:

- Field Data
  - Geologic
  - Remote Sensing
  - Geophysical
- Wells and Boreholes
  - Drilling information
  - Down-hole logs
  - *In Situ* measurements
  - Well Testing

Project Management/Coordination

Anticipated Spending Plan

Phase/Activity		Amount	Duration (Est.)
Phase 1: Exploration Resource Evaluation and Reporting		$ 790,500	**8 Months**
Total Resource Evaluation and Reporting	**$ 790,500**		
Phase 2: SlimHole Drilling, Coordination		$6,346,938.80	**8 Months**
Total SlimHole, Coordination Administration	**$6,346,938.80**		
Phase 3: Resource Testing and Assessment and Final Reporting/Data Transfer		$ 2,655,067.20	**16 Months**
Total Resource Testing Assessment Coordination	**$2,655,067.20**		
Total Project Budget	**$9,812,500**		

Future Directions

Task 1.0 Geologic Characterization

Literature/Data Review and Remote Sensing Analysis & Interpretation

Existing geologic data, well data, heat flow data, gravity data, multispectral data, panchromatic imagery, DEMs, and written reports will be evaluated and data combined into an ArcGIS™ database for ease of interpretation.

Remotely sensed data will be interpreted for regional structure and hydrothermal alteration and locally, upon prospect selection, for structure, hydrothermal alteration, and lithology.

Anticipated Start Date: May 15, 2010

Anticipated End Date: August 30, 2010

Specific Deliverable(s):

1) ArcGIS exploration database completion; and,
2) A series of geologic, geophysical, and geothermal prospect maps rated for high, moderate or low geothermal prospectivity/prospect selection (Milestone 1)

Future Directions

Task 2.0 Gravimetry

A detailed gravity survey will be mobilized over the final geothermal prospect to provide a better understanding of the structure and depth to bedrock. ***Milestone #2***

Anticipated Start Date: October 1, 2010

Anticipated End Date: January 30, 2011

Specific Deliverable(s): Gravity survey data, gravity contours, and structural interpretation results in an ArcGIS database.

Task 3.0 Thermal Gradient Survey

Temperature gradient wells will be sited using the results of Task 1. …the results of this effort will be compiled into a GIS database where the data will be contoured using ^{o}C/km values. ***Milestone #3***

Anticipated Start Date: November 1, 2010

Anticipated End Date: January 30, 2011

Specific Deliverable(s): An ArcGIS database with borehole locations, raw data, and temperature gradient maps.

Future Directions

Task 4.0 Mercury Survey

We propose the collection of soil samples for Hg analysis during field validation. Selected representative samples will be analyzed for Hg and standard statistical methods (e.g. cumulative probability plots) will be evaluated to determine the values of background and anomalous populations. In particular, we will include samples across fault zones identified during the geologic investigations. Analysis will be done using ICP Mass Spectrometry. ***Milestone #4.***

Anticipated Start Date: October 1, 2010

Anticipated End Date: January 30, 2011

Specific Deliverable(s): An ArcGIS database containing sample station locations, raw mercury values, and a mercury concentration contour map.

Task 5.0 Data Integration and Geologic Model Development

Data generated by the work detailed in the project proposal will be integrated into a GIS system and other software as appropriate for synthesis, visualization, and analysis. Data from past studies will also be reviewed and added if appropriate. This will facilitate creating a top-down geologic model. The results will be used to site the slimhole drilling locations. ***Milestone #5.***

Anticipated Start Date: May 30, 2010

Anticipated End Date: January 30, 2012

Specific Deliverable(s): An ArcGIS database containing all data collected up to this time and a geologic model.

Future Directions

Task 6.0 Integrated Wellbore Chemostratigraphic-Chronostratigraphic Evaluation

Chemostratigraphic and chronostratigraphic correlations have never been used for classifying geothermal resource systems that can be extended to a regional interpretation. Chemostratigraphic tools include those that designate the chemistry of a unit, formation, system, or area. These markers are distinctive and unique, and as such, provide excellent diagnostic criteria. Chronostratigraphic analysis provides detailed age and environmental designations for the same samples examined chemostratigraphically. Together, interpretations from these techniques provide powerful evidence for the evolution of a geothermal system.

Existing samples from previously-drilled area wells will be evaluated chemostratigraphically for evidence of local and regional hydrothermal alteration events. These analyses will be conducted utilizing QEMSCAN and XRD technology. ***Milestone #6.***

Anticipated Start Date: June 1, 2010

Anticipated End Date: November 30, 2010

Specific Deliverable(s):

1) Mineralogic data in the form of tables, graphs, and where appropriate, areal distribution;

2) Temperature/diagenetic alteration profiles attributable to hydrothermal fluids; and,

3) Report detailing the results of the chemostratigraphic analyses.

Next Steps (Summer 2010)

- Collect all existing geophysical data to maximize understanding of the site
- Coordination with Fort Bliss to obtain necessary permission for access to the site (times, locations, etc.)
- Determination of exact locations for initial assessments
- Establish meeting & briefing schedules with Fort Bliss
- Regional to local scale effort leading to prospect and drilling location selections
- The integration of proven and novel exploration and well characterization tools used in a cost-effective and environmental friendly methodology

Mandatory Summary Slide

- Regional to local scale exploration effort leading to prospect and drilling location selections

- The integration of proven and novel exploration, well characterization, and drilling tools used in a cost-effective and environmental friendly methodology