

Fueling Innovation and Adoption by Sharing Data on the DOE Geothermal Data Repository



Lava Butte in Newberry National Volcanic Monument, Oregon
9/15/2005, courtesy Wikimedia Commons

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GTO 2013 Program Peer Review

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Sharing data on the National Geothermal Data System is important to:

- “reduce the inherent risk in early stages of development and encourage an independent investment market”
- “provide developers and investors with a much-needed framework for investment evaluation”

- Deloitte LLP, *Geothermal Risk Mitigation Strategies* (2008)

The DOE-GDR is currently being developed by the National Renewable Energy Lab as part of the OpenEI platform.



It is already collecting data from DOE GTO funds recipients. This data will be publicly accessible in a variety of formats.

Plans are in place to register the DOE-GDR as a node on the NGDS. 



Why OpenEI?



OpenEI is a free and open knowledge sharing platform created to facilitate access to energy-related data, models, tools, and information.

- Leveraging Existing Infrastructure and Outreach
- Use of Linked Open Data
- Integration with existing data models
 - Geothermal Areas
 - Exploration techniques

OpenEI | OPENENERGYINFO

Wiki | Apps | Datasets | Community | Linked Data

Browse | Page Actions | View | Get Involved | Help

Page | Edit with form | History

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GEOTHERMAL ENERGY Geothermal Home

Resource Area: Beowawe Hot Springs Geothermal Area

Details | Power Plants (1) | Projects (0) | Activities (8)

Area Overview

The Beowawe Geothermal Area is located on the border of Eureka and Lander counties in Whirlwind Valley, Nevada about 10 miles East of the town of Beowawe. It is one of the state's

is home to the Beowawe power plant, with an original installed capacity of 17.7 MW in 1985. In 2006 it was increased to 17.7 MW after improvements made in reinjection strategies, and in 2011 a new binary plant was added, producing an additional 1.5 MW using water from the existing double-flash geothermal plant, funded by a \$2 million DOE Recovery Act grant and an additional \$10 million from private investors.^[3] The project provided 19 construction jobs and created 19 construction jobs. The plant is owned by Beowawe Power, LLC and operated by Terra-Gen Power.

Geology and Hydrothermal System

The Beowawe Geothermal Area has an obvious feature, s

Geothermal Area Profile	
Location	Beowawe, Nevada
Exploration Region	Central Nevada Seismic Zone
GEA Development Phase	Operational
Coordinates	40.57°, -116.58°
	Display map
USGS Resource Estimate	
Mean Reservoir Temp	215°C

Installed Geothermal Capacity

+ Add a new Energy Generation Facility

[Upload Data](#)

OpenEI Statistics *

- 1,239,000+ visitors from 200+ countries
- **Over 840 datasets**
- Creation of **over 56,000 content pages**
- Upload of over 7,500 images and files
- More than 620,000 contributor actions
- Over 939,000 unique visitors
- More than 5,000 registered users
- Over 8,000 Twitter followers
- More than 600 Facebook likes
- **Over 19 million RDF triples**

*per Google Analytics as of March 5, 2013

OPEN GOV

Open Government Initiative

OpenEI supports the U.S. Department of Energy's fulfillment of open government standards: transparency, public participation, and collaboration.

What kinds of data does DOE want?



- Maps, charts, photos, logs, reports, etc.
- “All data generated from projects funded by the GTO”
 - “DOE Geothermal Data Repository” OpenEI: Open Energy Information. NREL. 1-15-2013 Web.
- Including raw data

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The Value of Raw Data



- Raw data can aid the understanding of aggregate findings and summaries
 - Summary information can be filtered
- Raw data is *re-useful*
 - Remains free to be used in any context, including topics unrelated
- Raw data can be used again and again in unforeseen ways
 - Fuels innovation



What kinds of data does DOE *not* want?

- Personally Identifiable Information (PII)
 - Social security numbers
 - Bank account numbers
 - Home phone numbers and personal addresses of individuals not involved directly in the authoring of the data
 - *“Any piece of information or combination of pieces that could be used to compromise the identity of an individual”*
 - *“DOE Geothermal Data Repository” OpenEI: Open Energy Information. NREL. 1-15-2013 Web.*
- Data not suitable for eventual public release
 - Precautionary Measures have been taken for protected data



DOE-GDR Data Submission

Submitting data is a 3 Step Process:

1 Register for an account on OpenEI

Create an OpenEI account or [login](#) to submit data.

2 Submit data using one of the 3 options



3 (Optionally) Modify or Cancel and Resubmit:

- These options allow submitters a chance to alter or rescind their submissions

Questions?

Check out our FAQ

- <http://gdr.openei.org/faq>

Contact your DOE Project Officer

- For individual submission requirements

Email GDRHelp@ee.doe.gov

- For assistance with the submission site



The 3 Data Submission Options



Upload files individually using a web form to describe each file

- Limited to 1GB* per file.
- No limit on number of files.

[View Tutorial](#)

[Upload Individual Files](#)



Upload an archive of files and a metadata file describing each archived file

- Archive file must be smaller than 1GB*. Supports .zip, .gz, and .tar.
- A GDR Metadata File must accompany this submission.
- Requires ability to compress and archive files.

[View Tutorial](#)

[Upload an Archive](#)



Mail us a DVD or hard drive and upload a metadata file describing each file

- A GDR Metadata File must accompany this submission.
- No limit on number of files or size.

[View Tutorial](#)

[Mail Your Data](#)

What is Metadata?

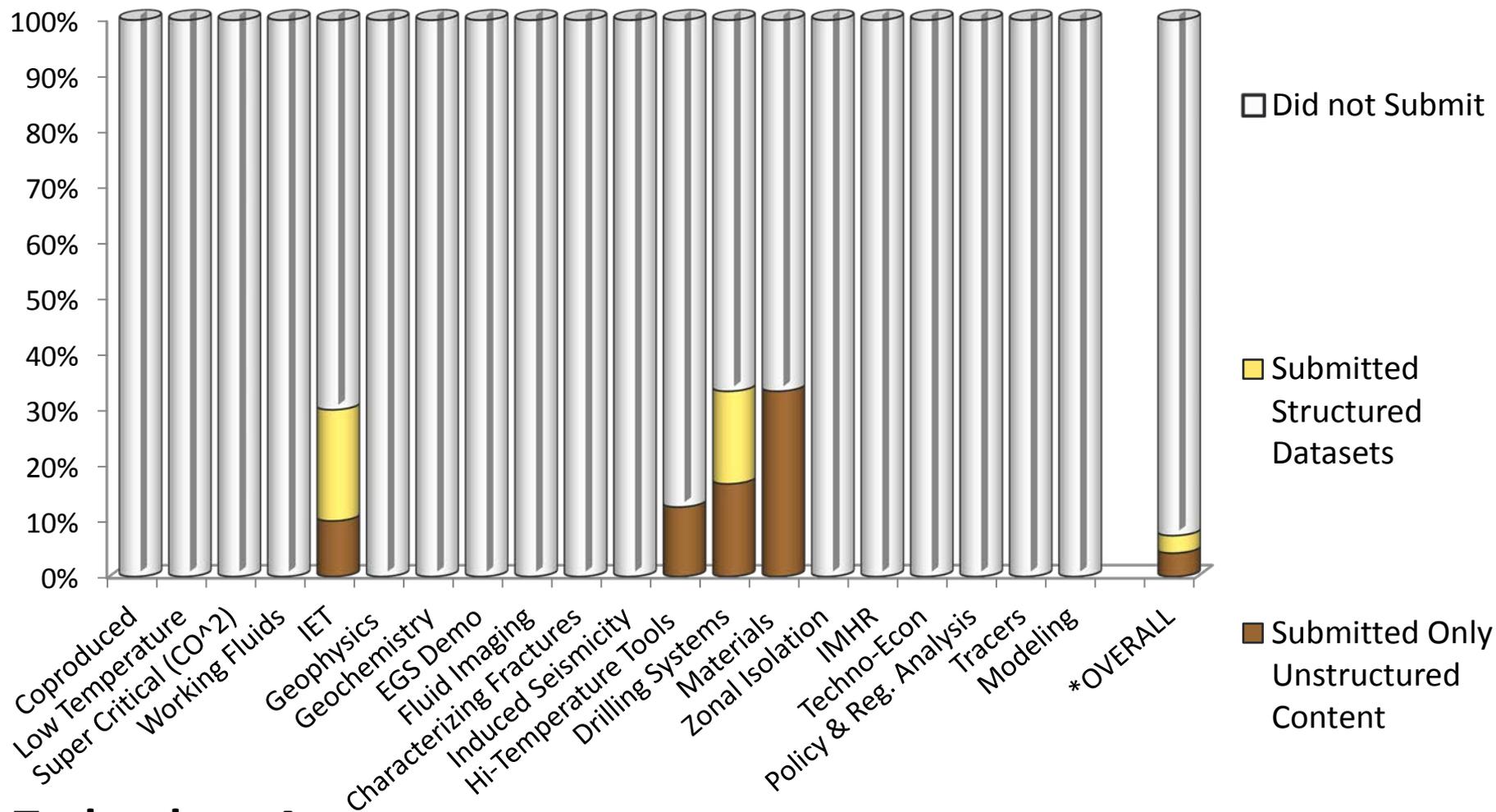
- Metadata is “data about data”
- Typical metadata includes:
 - Author or Contributor
 - Contact Info
 - Publication Date
 - Location
 - Description
 - Keywords



Why is it necessary?

- Metadata is used primarily for **enabling data discovery**
 - Searching *keywords can be matched to search terms*
 - Browsing *location can be used to display data on a map*
 - Associating like data *recommendation engines*

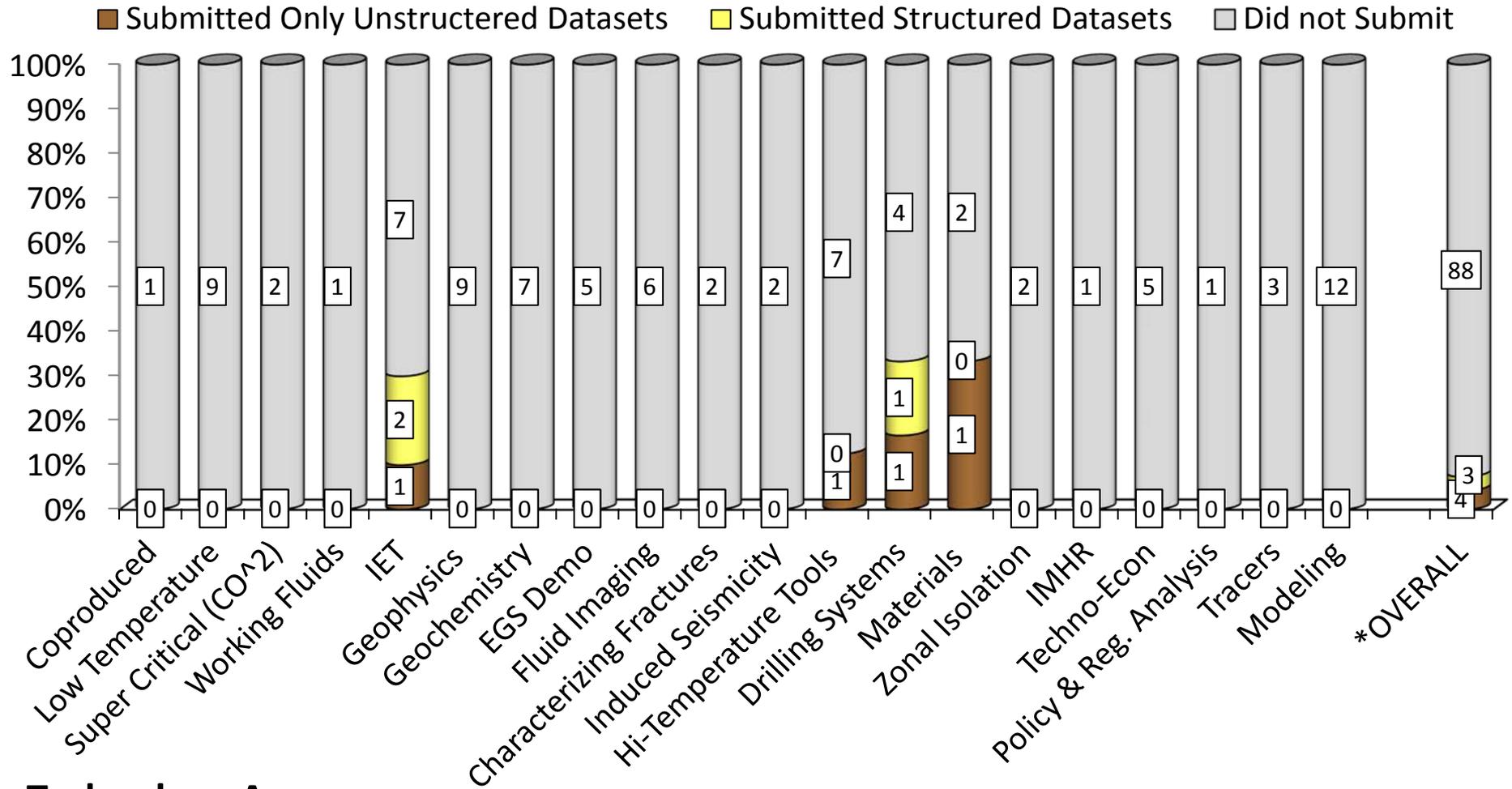
GDR Data Submitters 2013 Peer Reviewed Projects



Technology Area

***OVERALL** total number of submitters (95) in all technology areas compared to structured & unstructured datasets.

GDR Data Submitters 2013 Peer Reviewed Projects



Technology Areas

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Structured Data Submitters

1	A	G	H	I	J	K	L	M
1	ID	drill_method	loop_type	borehole_ft	dominant_geo	price_ft	price_includes	CC
	1	mud	Vertical	150	hard rock	\$13.00	drill/trench, loop test, looping, grouting, headering, headering	8
2								
	5	hammer	Vertical	400				

Bob Lawrence & Associates, Inc.

A.J. (Chip) Mansure

1	A	B	C	D	E
1	Clear Lake CA 20,000 ft EGS Well				
2					
3	Casing Schedule	Material	Depths (ft)	Length (ft)	Hole (in)
4	Conductor Pipe	Line pipe	50	50	48.00
5	Surface Casing	X-56, Line Pipe	500	500	36.00

Sandia National Laboratories

Motor Speed

1	A	B	C	D	E	F	G	H	I	J	K	L
1	Motor Torque	Motor Speed	Air Pressure									
2	0.811691	-0.461175	0.134572									
3	0.771868	-0.081816	0.134572									
4	0.771868	-0.145043	0.134572									
5	0.779833	-0.01859	0.134572									
6	0.771868	-0.01859	0.134572									
7	0.763904	-0.145043	0.138093									
8	0.763904	-0.081816	0.138093									
9	0.755939	-0.081816	0.138093									
10	0.755939	-0.145043	0.138093									
11	0.771868	-0.081816	0.138093									
12	0.771868	-0.145043	0.136901									
13	0.763904	-0.081816	0.136901									
14	0.763904	-0.081816	0.136901									
15	0.779833	-0.081816	0.136901									
16	0.755939	-0.145043	0.136901									
17	0.779833	-0.01859	0.139099									
18	0.763904	-0.145043	0.139099									
19	0.763904	-0.145043	0.139099									

Hattensburg, Dilley, and Linnell, LLC

1	A	B	C	D	E	F	G
1	Source - Hattensburg Dilley & Linnell - Rock Sampling and Fluid Inclusion Gas Analysis						
2	Date: 5/15/2012						
3	Revised: 1/30/13						
4							
5	Type	Geothermal Province	State	Field	Well ID	Sample ID	Depth (ft)
6	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-001	120
7	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-002	140
8	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-003	160
9	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-004	180
10	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-005	200
11	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-006	220
12	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-007	240
13	Sedimentary	Imperial Valley	California	El Centro	NAFEC 3	11-USNGPO 01-008	260

Structured Data Submitters (cont.)

Geysers Power Company, LLC

PRATI-5 St1 PTS TRAVERSE 8-23-11.txt - Notepad

File Edit Format View Help

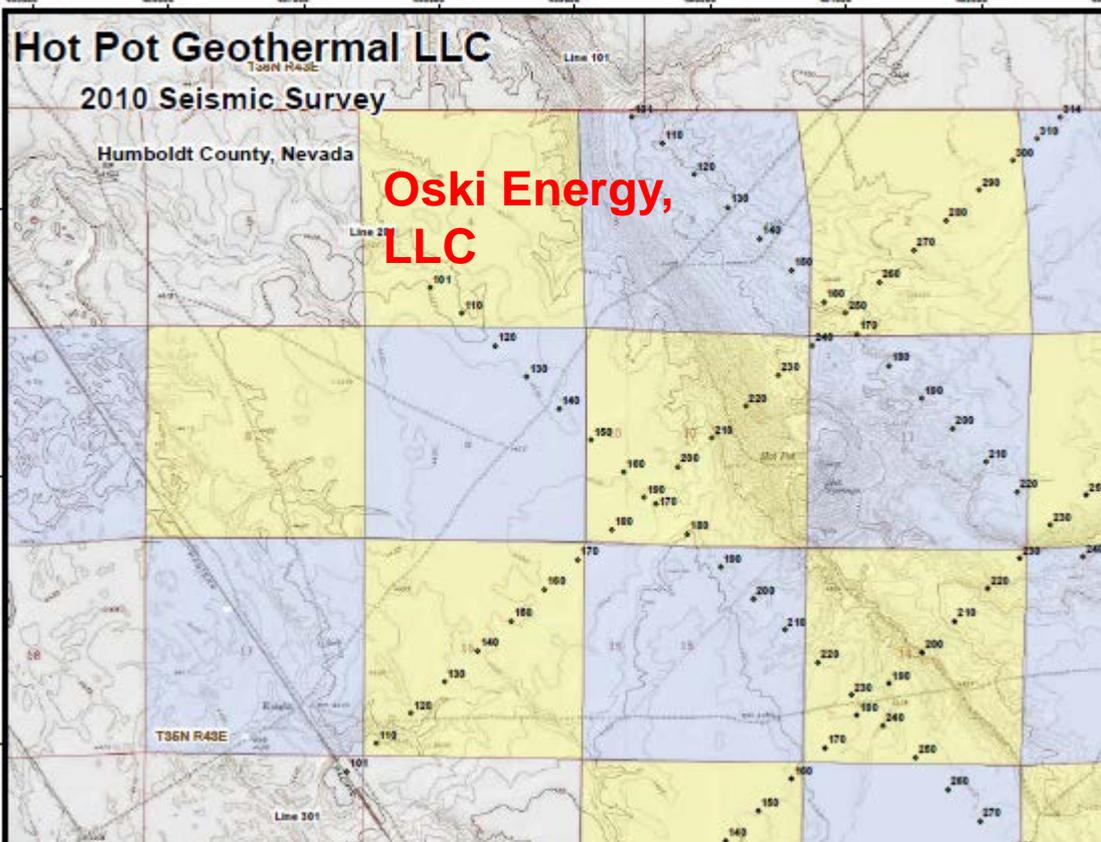
Gauge Serial Number: GS5028
Gauge Model Number: K10 Strain
Gauge Manufacturer: Kuster Company
Maximum Recorder Range: 5000
Date of Last Calibration: 09/14/2010
Pressure Units: Psig
Temperature Units: F°

mm/dd/yyyy	Time	Pressure	Temperature	Flow(RPM)	Depth(Feet)	Speed(Feet/sec)
08/23/2011	12:56:36	158.077	403.45	10053.820	2255.15	0.54
08/23/2011	12:56:37	158.061	403.46	10216.820	2255.70	0.55
08/23/2011	12:56:38	158.097	403.			
08/23/2011	12:56:39	158.044	403.			
08/23/2011	12:56:40	158.116	403.			
08/23/2011	12:56:41	158.100	403.			
08/23/2011	12:56:42	158.127	403.			
08/23/2011	12:56:43	158.137	403.			
08/23/2011	12:56:44	158.173	403.			
08/23/2011	12:56:45	158.194	403.			
08/23/2011	12:56:46	158.143	403.			
08/23/2011	12:56:47	158.114	403.			
08/23/2011	12:56:48	158.125	403.			
08/23/2011	12:56:49	158.191	403.			
08/23/2011	12:56:50	158.177	403.			
08/23/2011	12:56:51	158.097	403.			
08/23/2011	12:56:52	158.169	403.			
08/23/2011	12:56:53	158.161	403.			
08/23/2011	12:56:54	158.120	403.			
08/23/2011	12:56:55	158.130	403.			
08/23/2011	12:56:56	158.184	403.			
08/23/2011	12:56:57	158.120	403.			
08/23/2011	12:56:58	158.180	403.			
08/23/2011	12:56:59	158.117	403.			
08/23/2011	12:57:00	158.102	403.			

Hot Pot Geothermal LLC
2010 Seismic Survey

Humboldt County, Nevada

Oski Energy, LLC



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Thank You!

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Sources

1. Deloitte LLP, [Geothermal Risk Mitigation Strategies Report](#). 2008.
2. "DOE Geothermal Data Repository." *OpenEI: Open Energy Information*. National Renewable Energy Laboratory, 15 Jan. 2013. Web.
<https://gdr.openei.org>.
3. "Frequently Asked Questions." *DOE Geothermal Data Repository on OpenEI*. National Renewable Energy Laboratory, 15 Jan. 2013. Web.
<https://gdr.openei.org/faq>.