

Geysers Steamline

GEYSERS GEOTHERMAL ASSOCIATION

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Dennis Gilles interview with U18 in the background.
Photo courtesy of Calpine.

Geysers Hot News Topic!

In 2007 green house gases, carbon footprints, global warming, climate change, renewable energy, and renewable portfolio standards are all hot topics in the media and in state and federal legislatures. With all of this attention on clean and green energy The Geysers has become a hotbed for media requests and tours of our facilities.

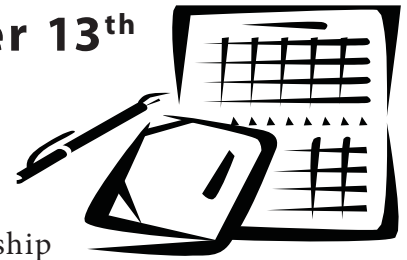
Although The Geysers recently completed its 47th year of commercial operation it remains largely unknown, even locally. Unlike wind turbines in Altamont along a major freeway and solar panels springing up on rooftops all over town, The Geysers and other geothermal facilities are located in relatively remote areas and far from public view. We see and appreciate geothermal every day but unless we continue to tell the story geothermal will continue to be forgotten about and underappreciated under the media blitz of wind, solar and fuel cells among others.

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GGA Fall Dinner

November 13th

Reserve
your spot today
for the GGA
Annual Membership
Fall Dinner on



Tuesday, November 13th at Charlies at Windsor Golf Club, 1320 19th Hole Drive, Windsor. No host bar begins at 6:00 PM. Dinner buffet begins 6:30 PM.

The Buffet includes Tri-tip, Lemon Chicken, Pasta with Gorgonzola Sauce, Mixed Greens, Seasonal Vegetable and Dessert. The cost is \$35.00 per person.

Kenneth MacLeod, President and CEO of Western GeoPower Corp. will speak about the exciting developments at The Geysers. (Please see Western GeoPower Corporation article on page 5.)

IMPORTANT!!! If You make a reservation and are unable to attend, you will still be responsible for the \$35 fee.

Contact Margaret Lewis, Calpine at (707) 431-6132 or e-mail at lewism@calpine.com.

Bottle Rock Power Plant Status: Commercial

The Bottle Rock Power Plant commenced commercial operation on 01 October 2007. This marked a significant achievement for the Plant that had ceased operation in September 1990 while owned and operated by the California Department of Water Resources.

Bottle Rock completed the requisite reliability and start-up tests, including the output net rate capacity test, all of which were necessary to receive the approval of

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President's Message

By Ron Suess

Steam in them thar Hills!

“Thar’s gold in them there hills” is an anonymous quote that might well say, “Thar’s steam in them there hills”. At the very least, there seems to be bags of gold ready for investment in the geothermal industry to find, develop, and use geothermal fluids to generate electricity as well as other uses. And some of that “gold” creates an exciting time to be associated with the geothermal industry, and especially at The Geysers.

At the recently concluded Geothermal Resource Council’s (GRC) annual meeting in Sparks, Nevada, there was ample evidence that financiers, funds, and feverish business were at work around the floor. Exciting and heady times are these, indeed!

It is very evident that the interest, funding, and new awareness are broad based. Certainly green, renewable energy has been spurred by the advent of Renewable Portfolio Standard (RPS) laws already effective in a number of states. There is now a band wagon on which to ride, and new people are getting on board. A couple of events illustrate what’s happening.

The recent BLM leasehold auction in Reno set a record for dollars spent to obtain the steam lease rights for a single geothermal leasehold. It was quite an exciting time not seen in the geothermal industry, at least in recent memory. That sale definitely created a buzz in the industry and is indicative of the interest in and funding available for areas suitable for geothermal development.

Perhaps an even more telling event is occurring on a remote island located near the equator in the far Pacific Ocean. The reason that this is significant is that it involves the federal government.

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GRC Annual Meeting Highlights Geysers’ Technical Papers

Mitch Stark of Calpine Corporation chaired a notable technical session on The Geysers during the GRC Annual Meeting September 30 through October 3, 2007. Five papers on The Geysers were presented during this session providing technical overviews of Geysers production, injection, seismicity, and non-condensable gas performance, especially since the start of major injection augmentation starting in 1997. Other Geysers’ papers included proposed development on the Western GeoPower Corporation leasehold near the old Unit 15 area in the Southwest Geysers, the lessons learned in the recent re-powering and startup of the Bottle Rock Power Plant in the northern Geysers’ area and Geysers Power Plant Modeling using Thermoflow software. Here is a brief summary of three of the papers.

Goyal and Pingol of Calpine in a paper titled “*Geysers Performance Update Through 2006*” concluded that since startup in 2003, injection from the Santa Rosa Geysers Recharge Project has provided a gain of 86 MW by the end of 2006. Also, Calpine continues to focus its efforts at The Geysers toward extending the life of the field and increasing or maintaining the field output by extracting additional heat energy through water injection, improving plant efficiency, and developing untapped reserves.

Rutqvist and Oldenburg of Lawrence Berkeley Laboratory, in a paper title “*Analysis of Cause and Mechanism for Injection-induced Seismicity at The Geysers Geothermal Field, California*” concluded that most of the injection-induced seismicity occurs near injection and production wells, and can spread several kilometers below injection wells. Moreover, the analysis shows a typical

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BLM Lease Auction

A competitive auction of lease parcels for geothermal energy resources on Federal public lands in Nevada and California held in Reno August 14, 2007 brought nearly \$20 million in bids, including the highest per-acre bid in history. The results of the Bureau of Land Management's second competitive sale of geothermal leases signal significant expansion of this renewable, low-emission source of energy.

"We were extremely pleased with the unexpectedly high interest in our first competitive sale, in June, for lands in Idaho and Utah," said BLM Deputy Director Henri Bisson, "and the success of today's sale is a harbinger of continued rising interest in developing the Nation's considerable geothermal energy resources, most of which are found on public lands."

A total of 49 parcels – 43 in Nevada and six in California – were offered for lease in the combined sale. More than 2,700 acres in the famed Geysers geothermal field of California brought bids totaling over \$8 million, including the historically high bid of \$14,000 per acre for a 470-acre parcel. This bid by Binkley Geo Resources, LLC, of Santa Monica, California, surpassed the previous record of \$11,000 per acre, in a 1982 sealed-bid sale of a 440-acre Geysers parcel. The second-highest bid for a California parcel offered in the sale was \$2,000 per acre.

Fifty percent of all revenues from the lease sale – including bonus bids, rentals and royalty monies collected on the leases – are distributed to the State in which the leased lands are located; 25 percent is distributed to the respective county. The remaining 25 percent is distributed to the BLM.

Almost half of the nation's geothermal energy production occurs on public lands, and about 90 percent of U.S. geothermal resources are found on Federal lands. The BLM is currently preparing a Programmatic Environmental Impact Statement

Bottle Rock Power Plant:



Bottle Rock Power Plant

the affected agencies and companies so as to begin commercial operation. Bottle Rock is delivering 15 megawatts per hour (net) of electricity to the grid. That amount of electricity will increase noticeably when two more new wells are completed during November of this year and added to the Plant's total steam production.

Prior to commencing commercial operation, Bottle Rock sold energy to the supplemental energy market under a Test Energy Schedule. Such an endeavor allowed the Plant to refine its operation protocols and to adjust its new digital control system as well.

~ Ron Suess, Bottle Rock Power LLC

GGA Mission Statement

The GGA is dedicated to dealing with issues related to the geothermal industry at The Geysers and serving as an educational and exchange forum for our members. We also strive to promote public understanding of the contributions our industry makes to Lake and Sonoma Counties and the State through working committees set up to address health, safety, legislative and environmental issues.

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GGA BUSINESS DIRECTORY

Support the businesses that support the GGA

*The following businesses are Corporate Members who are the backbone of the GGA.
Keep our organization strong by calling on them when you need the following services:*

CONSULTANTS & ENGINEERS	CONSULTANTS & ENGINEERS	DRILLING SERVICES	EQUIPMENT & MATERIAL SUPPLIERS	SPECIAL SERVICES
<p>Blaydes and Assoc. • Paula E. Blaydes 1275 Fourth Street, #214 Santa Rosa, CA 95404 707 537-8727</p>	<p>Ronald E. Suess Company (RES Co.) • Ronald E. Suess 1275 Fourth St., No. 105 Santa Rosa, CA 95404 707 541-0976</p>	<p>ChemTech Services • Boyd Green P. O. Box 1369 Cobb CA, 95426 707 928-4676</p>	<p>Jim Jonas, Inc. Jonas Oil • Jim Jonas P.O. Box 277 Lower Lake, CA 95457 707 994-6535</p>	<p>Northern Industrial Construction • Frank Karp P.O. Box 1352 Kelseyville CA 95451 707 279-0381</p>
<p>Carlenzoli and Assoc. • Leroy E. Carlenzoli 325 Tesconi Circle Santa Rosa, CA 95401 707 542-6465</p>	<p>Tecton Geologic, Inc. • Alan Frazer 5610 Skylane Blvd., St. A Santa Rosa, CA 95403 707 571-1700</p>	<p>Nelson Drilling Tool P.O. Box 477 Rio Vista, CA 94571</p>	<p>Petrochem Inc. • Brian Benson 110 Corporate Place Vallejo CA 94590 707 644-6968</p>	<p>Southwest Contractors • Frank Bowman184 3235 Unicorn Road Bakersfield, CA 93308 661 588-3092</p>
<p>Carlile•Macy • Bruce Jarvis 15 Third Street Santa Rosa CA 95401 707 542-6451</p>	<p>ThermaSource LLC • Louis Capuano 3883 Airway Drive Suite 340 Santa Rosa, CA 954035 707 523-2960</p>	<p>Obie's Drill Pipe Service, Inc. • Obie Sanders P.O. Box 647 Middletown, CA 95461 707987-2001</p>	<p>SPECIAL SERVICES</p>	<p>Turbocare • Dave Stenson 184 Malbert Street Perris, CA 92570 800 659-5908</p>
<p>EGS, Inc • Paul Brophy 3883 Airway Drive Suite 340 Santa Rosa CA 95403 707 544-0955</p>	<p>Thomason Mechanical Corp. • Bruce Perry 2150 E. 37th Street Vernon, CA 90058 310 639-3523</p>	<p>Team Casing P.O. Box 1723 Marysville, CA 95901</p>	<p>Action Sanitary, Inc. • Jerry L. Campo P.O. Box 492 Lower Lake, CA 95457 707 994-5068</p>	<p>Universal Environ- mental, Inc 4101 Industrial Way Benecia, CA 707 747-6699 x122</p>
<p>Graphic Vision • Kathy Eneyd 3883 Airway Drive Suite 340 Santa Rosa CA 95403 707 636-5815</p>	<p>Trident Environmental and Engineering • Joe Martin 110 L Street Antioch, CA 94509 925 706-6931</p>	<p>EQUIPMENT & MATERIAL SUPPLIERS</p>	<p>Alliance Cooling Products 123 West North Street Healdsburg, CA 95448 707 431-0108</p>	<p>STEAM SUPPLIERS & POWER PLANT OPERATORS</p>
<p>MHA Environmental Consulting • Laurie McClenahan 4 W. Fourth Ave, St. 303 San Mataeo CA 94402 650 373-1200</p>	<p>Two Phase Engineering • Doug Jung 3209 Franz Valley Rd. Santa Rosa, CA 95405 707 523-4585</p>	<p>C-K Supply, Inc. • Gene Kirkendall P.O. Box 550 Lakeport, CA 95453 707 263-7700</p>	<p>BV Nevada Corp. • Stanley W. Levers P.o. Box 32 Wadsworth, NV 89442 775 221-3798</p>	<p>Bottle Rock Power LLC • Ron Suess 7385 High Valley Road Cobb, CA 95426 707 928-4578</p>
<p>Nick Voegtly Safety & Loss Control • Nick Voegtly 11725 Loch Lomond Rd. Middletown CA 95461 707 349-7233</p>	<p>Veizades and Association Inc. • Harry Veizades One Hallidie Plaza, St. 838 San Francisco CA 94102 415 394-8855</p>	<p>Den Beste Transportaion, Inc. 7705 Conde Lane Windsor, CA 95492</p>	<p>Data Instincts 239 Windsor River Rd Windsor, CA 95492</p>	<p>Calpine Corporation • Ralph Aviles 10350 Socrates Mine Rd. Middletown, CA 95461 707 431-6000</p>
		<p>Jackson Equipment Co • Wayne Jackson P.O. Box 669 Middletown, CA 95461 707 987-3660</p>	<p>Geothermal Resources Council • Curt Robinson 2001 Second St. . 5 Davis, CA 95616 530 758-2360</p>	<p>Northern California Power Agency • Steve Eneyd P.O. Box 663 Middletown, CA 95461 707 987-4033</p>

Environmental Process Approval for Initial 6 Wells at The Geysers

Western GeoPower Corp., a renewable energy development company, announced October 1 that the California Division of Oil, Gas and Geothermal Resources has approved the environmental process for the drilling of up to six wells on four existing pads and utilizing existing roads at the company's Unit 1 geothermal project at The Geysers Geothermal Field in Northern California.

The company is engaged in securing a Conditional Use Permit from Sonoma County, along with related State and County permits required to commence the six-well drilling program and expects receipt of these permits by the end of November 2007. Permitting for additional wells beyond the initial six is being applied for under a separate application to Sonoma County for a Conditional Use Permit to construct the power plant, with approval projected for 2008.

"The timely receipt of the initial drilling permit is an important milestone for the Unit 1 project," said Kenneth MacLeod, Western GeoPower's President and CEO. "This ensures that the project remains on schedule for a Commercial Operations Date in early 2010, as agreed to under the terms of the Power Purchase Agreement with Pacific Gas & Electric."

In a feasibility report dated October 2006, independent consultants GeothermEx, Inc. projected that the Unit 1 leasehold, comprising approximately 600 acres at that date, will commercially support a 25.5 megawatt (net) power plant for a minimum

of 20 years, with generation continuing at a slightly reduced factor through 30 years. In April 2007, the leasehold was increased by 413 acres to 1,017 acres. Earlier production records from the extended leasehold show one well that had an initial capacity of 7 megawatts, suggesting the potential for an increase in capacity beyond 25.5 megawatts (net) for the proposed Unit 1 power plant, or the possibility of a second plant should additional capacity be demonstrated.

Western GeoPower is scheduling the start of drilling for December 2007, subject to receipt of the requisite permits in November. The selection of a drilling contractor will be completed by mid-October and an announcement will immediately follow. With each well expected to take up to 90 days to drill, test and skid or move to the next location, the initial six well program is projected to take from 15 to 18 months to complete. Additional wells will be drilled prior to the Commercial Operations Date to deliver the optimum capacity for the steam field and plant operations.

The majority of the equity component of project financing for the Unit 1 project has been accomplished through the recently announced funding of \$18.6 million. Additional equity injections are expected to be raised through the exercise of outstanding warrants which expire in December 2008. The balance of project financing is anticipated to be secured during 2008, through a combination of construction loan and long-term debt financing.

~ 10/01/07 news release from Western GeoPower Corp.

GRC Geysers Papers:

time lag between seasonal peak injection rates and peaks in induced seismicity. Also, shear slip along existing fractures as a result of reduced minimum principal compressive stress is the most likely mechanism of induced-seismicity. Near injection and production wells thermal-elastic cooling shrinkage is the dominant cause for stress changes leading to injection-induced seismicity.

Beall and Wright of Calpine, along with Hulen in a paper titled "*Pre- and Post-Development Influences on Fieldwide Geysers NCG Concentrations*" presented a revised top of steam contour map and concluded that the structurally highest steam, as well as present day fumarolic activity, coincides with the lowest initial NCG concentrations and shallowest felsite. With the addition of massive quantities of injection into The Geysers reservoir, NCG concentrations in steam have become largely dependent upon the distribution of injection and boiling efficiency in the reservoir.

~Steve Eneidy, NCPA

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BLM Auction:

(PEIS) that will further guide future geothermal leasing on Federal lands in the West and identify the steps necessary to facilitate the processing of the approximately 100 pending geothermal lease applications.

The BLM administers 29 geothermal power plants, which use Federal resources in California, Nevada and Utah. They have a total capacity of 1250 MW and supply the needs of 1.2 million homes.

~8/14/07 BLM news release

New GGA Board Member

Magaret Lewis with Calpine Corporation is replacing Pam Bordi of NCPA as GGA Public Relation Chair.

New to the Geothermal industry, Margaret joined the Calpine Team in 2004. Margaret currently supports John Farison , Director – Environmental, Health & Safety, which includes the EHS managers, staff, chemistry lab, hazardous material, safety, etc.

Prior to Calpine, Margaret was the Office Manager and Executive Assistant to the Director and Manager of a Nevada State agency, while residing in Elko , Nevada . Before moving to Nevada , Margaret worked for Blue Shield of California and held various positions while there.

Margaret and her husband have been residents of Loch Lomond since 1987, with the exception of 8 years in Elko , Nevada.

The GGA Board would like to thank Pam Bordi for all her hard work and wonderful contributions she has made to the GGA. The Board would also like to recognize the continued support of Jane Suess with the dinner plans and table decorations.

Bottle Rock Featured

Bottle Rock Power and Thermasource have recently been featured on television. ABC 7 ran a short piece on Geysers activity on November 2. An article and video can be viewed at this link: http://abclocal.go.com/kgo/story?section=global_warm&id=5739531.

In addition, Eco-Tech on the Science Channel has a 60 minute segment called "Powering Up" featuring geothermal energy at The Geysers. The next showing is November 12 at 9 PM.

GEYSERS in the NEWS!

Part of the story is the major contribution the Geysers clean green baseload power has made and continues to make renewable generation in California. The Geysers remains the largest single geothermal field in the world with current annual average generation capacity of about 850 mw. (Rough figures by company are Calpine 725mw, NCPA 115mw, Bottle Rock 15mw). The project is also the single largest producer of clean renewable energy in California. According to California Energy Commission statistics, in 2005 geothermal energy produced about half of total renewable energy in California (excluding large hydro). Of this total, The Geysers generates about 7,000 gigawatts per year which is about one quarter of total renewable generation statewide.

Here is a brief summary of Calpine's ongoing media efforts to tell the Geysers story and to describe the benefits of geothermal energy.

Calpine hosted a legislative/media day on May 31 to formally announce its plans for a five year \$200 million capital program to sustain, optimize and expand generation from its facilities at The Geysers. We are currently drilling wells and extending water pipelines into the northwest portion of the field as the first part of this program. This event received wide coverage in print media including the Press Democrat, LA Times, San Jose Mercury News and others.

Calpine has hosted a number of video crews this year including:

- National Geographic (photos above) was here in March to highlight The Geysers in their upcoming one hour overview on geothermal. The Geysers will be given about 15 minutes. The editing is reportedly complete and this program will air on National Geographic's cable channel in early 2008 as part of their program called "Mega-green".
- Discovery Channel programs "Really Big Things" and "What's That About". These programs are currently being edited with no announced airing date.



National Geographic at Sulfur Springs Thermal area
Photo courtesy of Calpine.

The Geysers has many interesting sounds that are a natural for radio. As I recently learned from conducting three recent audio tours of Calpine's Geysers facilities for the BBC, and local radio stations KPFA and KQED, the Geysers is a sound engineer's delight. Sounds include the bubbling waters and hissing steam of fumaroles in thermal areas, the faint whistle of steam flowing through insulated pipelines, the drone of the turbine-generator and electrical buzz of switchyards and of course my sonorous voice. The programs air and then go into their online archives or disappear. For the latest Geysers audio interview go to KQED Quest.

<http://www.kqed.org/quest/radio/view/641>

The Geysers recently went multi-media with article in the Contra Costa times with a newspaper article and companion web article along with photos, mini-video. Check it out at:

http://www.contracostatimes.com/ci_7110971

If you have ideas for additional positive press coverage for geothermal or The Geysers please contact me at (707) 431-6061 or jfarison@calpine.com. Thank you!

~ John Farison, Calpine Corporation

GGA President Note:

The government is developing a deep and broad crusade to utilize renewable energy in its various modes to provide electric power for its installations and for the civilian inhabitants on this particular island.

Such scenarios are being repeated around the world. Geothermal is right at the top for exploration and development to help meet the energy needs at these locations. It strikes me as a little noticed but significant commitment by the government to develop the use of renewable energy with particular attention being given to geothermal.

I see this as a new commitment by a significant branch of the government to finding, developing, and using renewable energy, with an equal emphasis being given to geothermal. Statements made by key government officials at the GRC buttress this newfound recognition and commitment to geothermal energy by the federal government.

Indeed, there is new gold to be had and to be used to expand the role of geothermal energy. Let's take advantage of this golden opportunity to firmly cement the place of geothermal energy in the energy portfolio of this country and around the world.

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