

# The Geysers Steamline

GEYSERS GEOTHERMAL ASSOCIATION

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WWW.theGGA.org

FALL 2009

## GGA Fall Membership Dinner November 10—don't miss it!

Just a reminder: The annual Fall Membership Dinner will be held Tuesday, November 10 at Charlie's overlooking Windsor Golf Course. Guests can mingle during the social beginning at 6:00 and enjoy a delightful gourmet buffet-style dinner at 7:00.

An exciting program, *Understanding Seismicity at The Geysers*, will be presented by Bill Smith, and will include a PowerPoint contribution from Dr. David Oppenheimer of the USGS. Both are recognized seismic experts familiar with The Geysers.

Invitations have been sent, so mark your calendar now and make your reservation soon, as this will be a popular program.

## Ram, WesternGeo and Polaris complete merger

Ram Power Corporation (formerly GTO Resources Inc.), finalized its merger with Polaris Geothermal Inc. and Western GeoPower Corp. on October 19. The arrangement received strong support from security holders of all three corporations, according to a news release issued by the three companies. The newly merged entities are called Ram Power, Inc.

Western GeoPower has two projects in development, a project at The Geysers and in Meager Creek in British Columbia, Canada. Polaris Geothermal is extending the power plant at San Jacinto in Nicaragua. Ram/GTO Resources was formed in 2007 by former executives of Ormat Technologies, led by Hezy Ram.

According to *Project Finance*, Ram Power will lead the newly merged firm. It took control of the two companies after a reverse takeover of GTO Resources, listed on the Toronto Stock Exchange. The company also recently raised \$165 million (U.S.) in a placement.

Source: various websites.

See <http://thinkgeoenergy.com/archives/2758> for additional information.

## AltaRock Energy updates EGS demonstration project

By Susan Petty

On September 2, 2009, AltaRock Energy Inc. announced it had suspended its drilling operations in the southeast Geysers on the Northern California Power Agency (NCPA) leasehold. AltaRock had planned to redrill NCPA well E-7 into the felsite, the intrusive rock underlying the Geysers steam reservoir, to a total depth of 12,000 feet as part of a DOE-funded Enhanced Geothermal Systems project to demonstrate the ability to create multiple fracture zones in one well. Following the redrill, the plan was to inject at low temperature and pressure to create multiple stimulated zones. E-7 was originally drilled in 1988 and was an active injector at the time of the workover.

An Environmental Assessment was completed, including an analysis of the risk of induced seismicity, for the Bureau of Land Management as part of NEPA/CEQA compliance for the project. The BLM issued a Finding of No Significant Impact (FONSI) with mitigation for the project on June 9, 2009. The BLM and AltaRock are in the process of negotiating a protocol for mitigation of any potential impacts from the stimulation. Separate NEPA compliance is required for the DOE grant and that process is currently in review while AltaRock redesigns its drilling plan with input from NCPA.

AltaRock attempted to redrill E-7 three separate times from starting depths of 3,202 feet, 1,674 feet and 2,733 feet. Each attempt reached a total depth in the range of 4,100-4,400 feet, before the drilling assembly became stuck due to the hole collapsing in the unstable serpentine and mélange. AltaRock is currently reviewing the reasons for the particularly unstable behavior of the formation below E-7. However, long term injection into the area may have contributed to the problems.

Drilling is an inherently risky business with high incidences of failure. The Geysers is an especially challenging and unique drilling environment because of

*Continued on page 3*



## President's Message

By Ron Sues

Recently, I've been reflecting about the Geysers Geothermal Association: its founding, purpose, mission, and history. The GGA has and continues to serve the geothermal industry and particularly our local community very admirably.

The GGA was founded in 1983 by local industry leaders, who believed that by joining forces, The Geysers geothermal industry could address safety issues, permitting matters, and topics of common interest with regular and open communication with each other. Just as importantly, they believed that they would promote the benefits of geothermal energy and educate the public about it with one unified voice.

More than twenty-five years have passed since the GGA's founding. The operational milieu of The Geysers has changed considerably during this time, as have the nature and number of operators.

Even though the basic mission and purpose of the GGA remain unchanged, our organization continues to evolve and adapt to changes within our unique community. It remains vital to advocating geothermal energy, especially here in The Geysers area.

Educating the public about geothermal energy remains the core mission of the GGA. Moreover, the GGA continues to provide open and regular communication between industry members and individuals so as to help each other and speak as one large voice on those matters that have impact upon us individually and collectively.

There is a fresh breath in the geothermal industry brought about in part by the push for clean energy and improved technologies. These are exciting times. As the GGA continues to meaningfully serve our special corner within the industry opportunities to contribute to the group and interact with one another grow as well. This is truly a great time to join a committee or serve on the Board.

I'm certain that all GGA members who have served as officers, committee chairs, or Board members for our Association look back at the past and count it as an honor and a privilege to have so served. I know, personally, that it has been and continues to be very special to be an active participant in this great

organization. The other current officials share that same sense. All of us, each and collectively, have built a firm foundation and continue to build the legacy for the GGA.

That said, the current set of GGA officials invite any and all other GGA members to think about serving in such a manner. Consider this a solicitation to step forward and offer to serve in a capacity that matches your specific personal interest. This is an opportunity to infuse new perspectives and verve into our corner of the geothermal world.

Interested? Contact me or any member of the Board to get started. We're looking forward to hearing from you. For contact information visit our website, theGGA.org and click on GGA Board.

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## Ken McLeod resigns as CEO of Western GeoPower

In a precursor to the October Ram Power merger, on September 1 Kenneth MacLeod, president, CEO and a director of Western GeoPower announced his resignation. Daryl Clark was named President and CEO on an interim basis.

In a company announcement Clark praised MacLeod for his leadership of Western since its launch in 2001. He said MacLeod "...has been a significant contributor to the company's ongoing success and was instrumental in creating a strategic vision and implementing a plan to make Western GeoPower an important geothermal developer in the US."

Ken is a member of GGA.

### Geysers Geothermal Association

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Vice President/Finance Officer - Ralph Aviles  
Secretary - Ben Barker

## Alta Rock

the existence of serpentized peridotite, which contains clays and fibrous material that will become unstable and collapse or flow when exposed to water over an extended period of time. Below the serpentine, the mélangé (a jumble of large blocks of varied lithologies, including more serpentine) and fractured greywacke present additional challenges. Lastly, reworking an existing well (as required by the DOE grant) limited the possible range of solutions to drilling and completion problems.

It is our hope that EGS power can impact the environmental and economic landscape of America by delivering baseload, carbon-free power. In cooperation with NCPA and the US Department of Energy, we are evaluating possible paths forward at The Geysers and elsewhere for demonstrating our capabilities. Currently AltaRock has a portfolio of about 20 patent filings relating to EGS and is actively continuing to develop its proprietary technology in this area. We believe EGS is a clean, renewable-energy alternative that holds the potential to significantly reduce our country's dependence on fossil fuels and create a more sustainable future.

### About Susan Petty

Susan Petty is President/Chief Technology Officer and an AltaRock founder.

Petty has 30 years of experience in the geothermal industry that includes well testing, and reservoir engineering and management.

Petty was a founding partner in Black Mountain Technology, a geothermal consulting firm. She has designed and implemented more than 25 geothermal well stimulations, and was involved in early stage EGS fracture stimulations.

Petty is a named inventor on numerous AltaRock patent applications and supervises AltaRock's technology development program. She was a significant contributor to the 2007 EGS study conducted by MIT.

AltaRock Energy is a renewable energy development company focused on the research and development of Engineered Geothermal Systems ("EGS"). The company has its corporate headquarters in Sausalito and its technology development office in Seattle, Washington.

## SHEL Committee to meet; new members welcome

No meetings have been held this year. A meeting date has been set for November 18, 10:00 to 11:00 a.m. at the Calpine Visitor Center with RSVP requested to committee chair, Nick Voegtly (Nick Voegtly Safety & Loss Control) at 707 349-7233 or [nvoegtly@jnb.com](mailto:nvoegtly@jnb.com).

Items for the agenda are:

- 1) Committee Membership
- 2) Discuss what issues the SHEL Committee should be addressing.
  - Update The Geysers Project Landing Pad Location Map
  - Green House Gas regulations
  - Other as suggested by attendees in their RSVP.
- 3) Committee Meeting Frequency

SHEL stands for Safety, Health, Environmental and Legal—formerly four separate committees. Meetings are open to anyone who works at The Geysers and who has an interest in any of the above areas.

Nick has assumed chairmanship of SHEL committee from Wayne Stith, NCPA. GGA is grateful to Wayne for his years as SHEL chairman, and to Nick for taking the reins.



Photo courtesy Bubba Suess

## Geothermal Fact

The Geysers geothermal field provides nearly 70 percent of the average power demand in the North Coast Region of California from the Golden Gate Bridge to the Oregon State line. That is enough electricity to power one million Northern California households of 4 people per household.

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## Calpine signs new long-term power contracts as part of California plan for clean, reliable power

Calpine Corporation announced October 30 that it has entered into several new power supply contracts with Pacific Gas and Electric Company. Calpine has executed new contracts to replace existing contracts it signed with the State of California during the energy crisis, as well as to increase the supply of renewable power delivered to PG&E from The Geysers.

According to the news release, Calpine was the first power company to enter into long-term contracts with the State in response to California's program to manage the energy crisis of 2000-2001. And Calpine was the first company to voluntarily renegotiate more favorable terms for the State.

Now, in furtherance of the California Public Utilities Commission's and the State's policy objectives of removing the California Department of Water Resources (DWR) from its energy crisis role as the power purchaser of last resort, Calpine and PG&E have finalized contracts to replace two of these DWR contracts to ensure ratepayers continue to enjoy the benefits of Calpine's clean, reliable, cost-effective and well-located power facilities.

In addition to an extension of Calpine Northern California Peaking Power Plant Contract and a new agreement to facilitate an upgrade of Los Esteros Critical Energy Facility in San Jose, Calpine and PG&E have agreed to a significant extension of the term and an increase in the volume under the existing contracts for delivery of electricity from The Geysers geothermal facility.

Calpine currently provides PG&E a total of 375 MW of power under two contracts through 2012 and 2014. The parties have agreed to increase the volume to 425 MW through 2017. From 2018 through the end of 2021, Calpine will supply PG&E 250 MW of renewable energy from The Geysers. These agreements will be submitted to the California Public Utilities Commission by PG&E for approval.

The extension and increases in volume under these new contracts will not only assist PG&E in meeting its renewable goals, but will provide Calpine with the resources required to continue its efforts to maintain and increase the energy output from The Geysers, the largest geothermal facility in the United States.

*Source: Calpine news release*

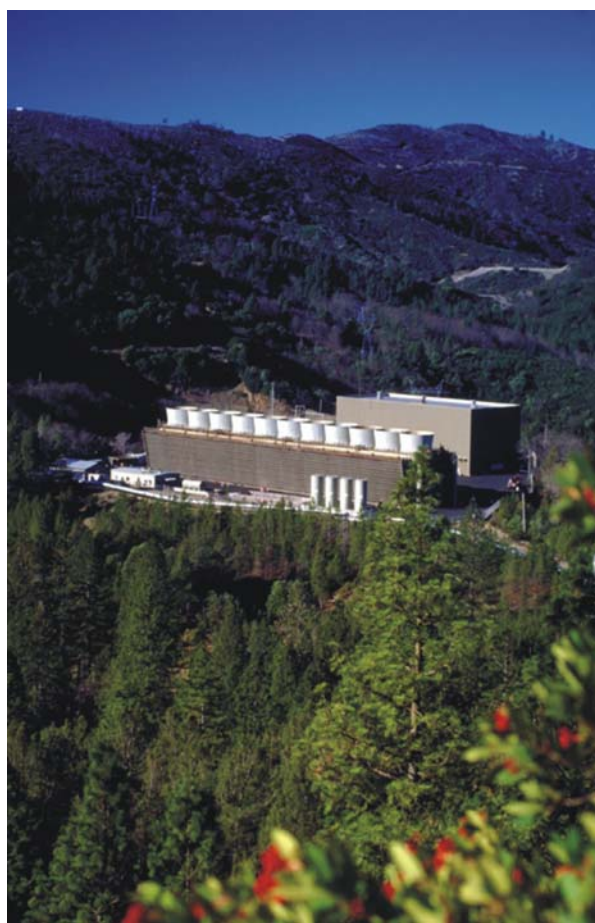


Photo from Calpine

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## Calpine reports a good third quarter following down spell

HOUSTON—(BUSINESS WIRE)—Oct. 30, 2009—Calpine Corporation (NYSE:CPN) today reported Adjusted EBITDA of \$1,374 million for the nine months ended September 30, 2009, which matched the results reported for the same period of 2008 despite generally weaker market conditions. Commodity Margin for the first nine months of 2009 was \$1,947 million, down slightly from \$1,988 million in the prior year period.

Meanwhile, the company also reported strong 2009 nine-month Adjusted Free Cash Flow of \$520 million. Net income during the nine months ended September 30, 2009, was \$192 million, or \$0.39 per diluted share, compared to net income of \$119 million, or \$0.25 per diluted share, in 2008.

“Our performance this quarter demonstrates our strong and continuing commitment to operating excellence, a hedging strategy that mitigates market price risk in a difficult economic environment, a customer-focused approach to our business, the opportunistic restacking of our debt, and our organic growth strategy,” said Jack Fusco, Calpine’s President and Chief Executive Officer.

“This combination of achievements, in addition to our solid year over year financial performance, shows that the building blocks of a strong foundation are in place and we are well-positioned for the future.”

“Operationally, we improved availability across the fleet, and our capacity factor was up significantly during the quarter, while our adjusted EBITDA and other results show that our hedging program worked well,” said Fusco. “On the business development front, we announced today significant new and restructured contracts with key customers and previously announced the successful commissioning of Otay Mesa, both of which speak to our commitment to delivering clean, reliable energy to the markets we serve. Financially, we demonstrated progress and an ability to access capital markets on favorable terms with a unique and successful exchange of \$1.2 billion of term loans for bonds, which pushed out our maturities and improved our covenant terms to provide future flexibility. Finally, in addition to implementing our turbine blades upgrade program, we also have announced the upgrade of Los Esteros that will add 120 MW and improve the operating efficiency of the plant.”

Source: Calpine news release. For more see [http://www.calpine.com/3Q09\\_Press\\_Release.pdf](http://www.calpine.com/3Q09_Press_Release.pdf)

## Bottle Rock EIR meeting draws heat from area residents

Lake County officials hosted a scoping meeting October 27 at the Little Red Schoolhouse in Cobb to gather input for inclusion in the County’s environmental impact report for Bottle Rock Power Plant’s proposed geothermal expansion project.

Led by Community Development Director, Rick Coel, the presentation group included Brent Schroeder, environmental project consultant representing EDAAW, the environmental firm hired by Lake County to prepare the EIR; California Energy Commission project manager Matt Trask along with CEC compliance manager Dale Rundquist; and Bottle Rock Power Geo Resource representative, Bob Giguere.

The meeting drew at least 30 people from the community who came to express their concerns and frustrations over issues surrounding the plant’s current operation. According to a report in the Lake County News, Coel had to remind some attendees to stay on topic and to keep their tone cordial. The public comment period ends November 12.

Concerns included, greatly increased traffic and dust, impact on property values, noise, damage to roads, earthquakes, lights, mercury in the air and gasses causing nosebleeds and headaches. Possibility of erosion from heavy excavation, botanical issues and other environmental and aesthetic issues, including trash along the roadside, were also brought up. Most felt the plant was too industrial to be so close to the community.

The proposed expansion calls for two new well pads near the existing facility. Each pad would have 11 production wells and one injection well. Associated roads and pipelines are included in the proposal. Department of Water Resources, Bottle Rock’s previous owner, operated the plant at 55 megawatts. With current production at 15 megawatts, plant officials expect the added wells to increase the amount to 35 megawatts, enough energy to serve as many as 20,000 homes.

Source: Lake County News website and other web sites.  
<http://www.lakeconews.com/>  
<http://www.energy.ca.gov/sitingcases/bottlerock/index.html>  
<http://thinkgeoenergy.com/>

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Would you like to add your website to the above business information? Call or email Marilyn Sanborn, 530 472-6552 msanborn@frontiernet.net

Do we have your contact information up to date? Let us know if there are changes.

## Exciting interactive map of The Geysers displays seismic monitoring real-time on LBNL web site

Induced seismicity associated with energy production and waste disposal will become an increasingly important issue as energy production in a climate constrained earth progresses.

New technologies that utilize injection wells and in some cases, deep hole drilling, are presently being explored, and although induced seismicity has been noted for many years and associated with a variety of causes, recent attention has been focused on oil and gas, geothermal and potential CO<sub>2</sub> sequestration development sites.

The Earth Science Division's EGS page on the LBNL web site is meant to provide the public with useful information regarding these three technologies and to grant public access to their interactive maps of The Geysers, Desert Peak and Brady's Hot Springs. These maps are a unique resource that track seismic activity in real-time at those locations.

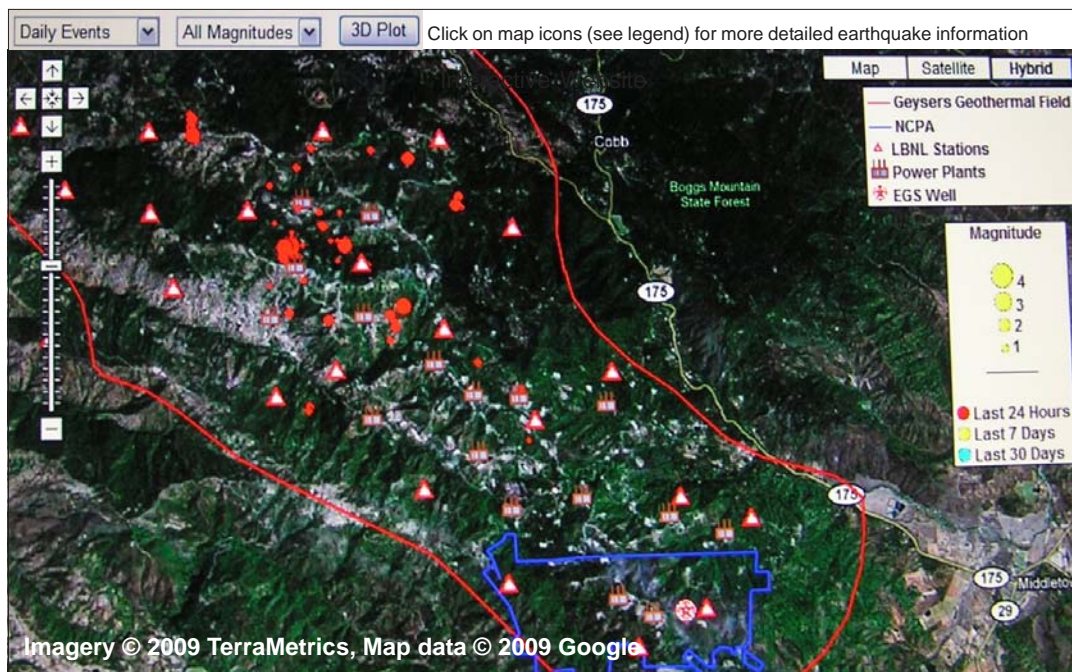
Initial emphasis is on geothermal, but as the web site is developed, oil and gas as well as CO<sub>2</sub> sequestration topics will be expanded.

Go to [http://esd.lbl.gov/research/projects/induced\\_seismicity/egs/](http://esd.lbl.gov/research/projects/induced_seismicity/egs/) and click on *Interactive real-time map of The Geysers*. You will see a Google satellite map showing The Geysers field and NCPA boundaries along with power plants and LBNL stations. Click on an icon to see pop-up names and locations of each plant and station.

You will also see various-size red dots indicating seismic events that happened during the past 24 hours. Large dots are 3.0 magnitude, medium are 2.0, and small dots equal 1.0 magnitude. You can choose to look at one, two or three magnitude earthquakes by clicking on the *All Magnitudes* drop-down menu above the map.

To see previous seismic activity, click on the *Daily Events* drop-down menu. Choose *Weekly* (yellow dots) or *Monthly* (blue dots).

To see a one-year overview, click on the *3D Plot* menu and an interactive three dimensional graph shows distribution of earthquakes at The Geysers over the past year (approximately 9,400).



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## Magma encounter changes drilling plans in Krafla field

Much effort is being invested in deep hole drilling these days, and like any new technology, there is still much to learn. The valiant AltaRock Energy venture at The Geysers had a disappointing finish upon encountering hole collapse in unstable serpentine and mélangé. But it was not the only deep hole to encounter unexpected problems this year.

As reported in Icelandic publication, *Viðskiptablaðið* last month, a deep drilling experiment at the Krafla geothermal field in the North of Iceland in June came up short of its targeted 4,500 meter depth because drillers encountered magma at a depth of 2,000 meters, putting the project on hold. At 4,500 meters backers had hoped to find super critical fluid at 375 centigrade and pressure of more than 220 bar.

But even though specialists at the National Energy Authority in Iceland are convinced that drilling deeper at the Krafla field is impossible, there is speculation that the well could still be utilized using a different scenario.

It is hoped that the well might be capable of producing dry steam by pumping cold water down the hole, however, it is unclear how sustainable this would turn out to be. The article emphasized that this is currently only an idea, but there has been talk that this well could conceivably turn out to be the highest temperature system currently used in the world.

On other fronts, the Icelandic Deep Drilling Project (IDDP) is exploring the possibility of drilling on the Reykjanes peninsula. A well was drilled there to 2,800 meters in the fall of 2008 with reportedly good results, although a number of technical issues with regard to high heat and high pressure need to be worked out.

Companies involved in the IDDP include Landsvirkjun (Iceland's National Power Company), HS Orka hf, Reykjavik Energy, the National Energy Authority, Alcoa Inc. and Statoil New Energy AS.

Source: <http://thinkgeonergy.com/archives/2868>



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