Geothermal technologies
U.S. Department of Energy

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DOE Geothermal Funding Increased by Congress

Congress has appropriated $27 million for the U.S. Department of Energy's Geothermal Energy Program for fiscal year 2001, which began October 1, 2000. This is an increase of $3 million over last year's funding and will provide additional support for the Program's mission to work in partnership with U.S. industry to establish geothermal energy as an economically competitive contributor to the U.S. energy supply.

The Program has three goals:

(1) By 2006, double the number of states with geothermal electric power facilities to eight.

(2) By 2007, reduce the levelized cost of generating geothermal power to 3-5 cents per kilowatt-hour.

(3) By 2010, supply the electrical power or heat energy needs of 7 million homes and businesses in the U.S.

To attain these goals, the Program funds three principal areas of research:

Geoscience and Supporting Technologies	$11.0 million
Drilling Research	5.5 million
Energy Systems Research and Testing	10.5 million
	$27.0 million

GEOSCIENCE AND SUPPORTING TECHNOLOGIES

DOE funds core research in the areas of materials, geofluids, geochemistry, geophysics, rock properties, and reservoir modeling to ensure that the U.S. continues to lead the world in geothermal energy sciences. This core research promotes understanding of complex geothermal processes and facilitates development of technology to maximize geothermal resources.

DOE also funds cost-shared Enhanced Geothermal Systems (EGS) projects that employ rock fracturing, water injection, and water circulation technologies to sweep heat from unproductive areas of existing geothermal fields, or from new fields that lack sufficient production capacity. Projects have been competitively selected; in this fiscal year, two or three of the most promising designs will be selected for further development and field verification.

Work also is performed in heat flow and temperature-gradient R&D, reservoir dynamics and two-phase flow, and stress and thermal history of fractures. In addition, funds will be devoted to further development of the borehole induction-logging tool, and to detection and mapping of open fractures and permeable zones to improve overall productivity of geothermal

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well fields. Researchers will use chemical tracers to determine flow paths of injected water through geothermal reservoirs, and conduct geologic mapping of existing fields.

DRILLING RESEARCH

For the past several years, the Program has committed significant funding to developing the Geothermal Advanced Drilling System, which promises to provide dramatic improvements in the economics of drilling wells in deep, hard, and fractured rock. The system will combine several improved and innovative subsystems that are currently under development, such as lost circulation detection, hard-rock drill bits, high-temperature sampling and monitoring instrumentation, and wireless data telemetry.

The principal subsystem component of the Geothermal Advanced Drilling System is a high-speed data link that will provide drilling and rock characteristic information to the driller in real time, which allows for faster and cheaper drilling. In fiscal year 2001, a proof-of-concept test will be conducted to demonstrate the benefits of Diagnostics-While-Drilling (DWD), thereby providing a basis for development of a robust, cost-effective telemetry link and major system components that rely on the flow of high-speed data.

Funds are also committed to a field demonstration of polyurethane foam for solving a major lost-circulation problem at a geothermal development in Nevada, along with near-term technology improvements, such as acid-resistant cements, a valve-changing assembly, high-temperature mud motors, foam cements, and a percussive mud hammer.

ENERGY SYSTEMS RESEARCH AND TESTING

Development of new technologies for generating electricity from geothermal resources will continue in fiscal year 2001. Areas of investigation include air-cooled condensation of binary working fluids, control of heat exchanger fouling, and instrumentation for process monitoring.

Another important activity in this area is field-verification of small-scale geothermal power plants. Several prototype systems will be constructed and field-tested in fiscal year 2001 to establish performance characteristics of small-scale plants and economic benefits of improved electric power generation technology in geothermal applications. These projects involve cost-shared, competitively selected contracts.

A major thrust of the FY01 Program is "GeoPowering the West," an initiative that fosters awareness of the availability and benefits of geothermal energy throughout the western U.S., where geothermal resources are most readily available. The initiative has begun with education, awareness, and outreach activities aimed at a variety of stakeholders such as businesses, government organizations, Native American groups, and the general public.

For more information, please contact Allan Jelacic, DOE-OWGT, 202.586.6054, or allan_jelacic@hq.doe.gov.

In December, the National Renewable Energy Laboratory (NREL) issued a Request for Proposals (RFP) on behalf of the U.S. Department of Energy's Geothermal Energy Program. The two-phased project is for development and field-verification of innovative geothermal direct-use system concepts. The project encompasses direct-use applications of geothermal resources, including wells or springs in the approximate temperature range of 80 to 350 °F located in the U.S. using a minimum thermal load of 20 kWt (600 million BTU per year). Proposals are currently due February 22, 2001.

Interested parties are directed to the RFP document available at www.nrel.gov/contracts/rfps/ under RFP No. RAA-1-31402. A hard copy may be requested by mail, e-mail, or fax from the contact listed below. Please be sure to include the RFP No. with any requests.

For more information, please contact Jim Fox, National Renewable Energy Laboratory, 1617 Cole Boulevard, Golden, CO 80401, jim_fox@nrel.gov, Fax: 303.384.7352

owering the West Workshop

The first New Mexico* GeoPowering the West *workshop, hosted by DOE and Sandia National Laboratories, was held in Albuquerque on August 23, 2000, to begin to define opportunities for and barriers to advancing geothermal use in New Mexico. As a result of the meeting, 21 stakeholders formed the New Mexico Geothermal Working Group to address technological, financial, regulatory, policy, and related issues.

Peter Goldman, director of DOE's Office of Wind and Geothermal Technologies, stated the purpose of the meeting: to launch an effort to determine why the abundant geothermal resources in New Mexico are not being developed. He stressed the need for a change in policy, an educational effort about this energy resource, and an aggressive R&D program.

Chris Wentz, director of the Energy Conservation and Management Division of the NM Energy, Minerals and Natural Resources Department, which has statutory responsibility for renewable energy development in New Mexico, spoke about his perception of a renewed interest in geothermal energy. Wentz listed factors affecting geothermal energy use in New Mexico, such as technologies involved in electricity generation, direct use, and exploration, and electric restructuring issues such as the disclosure and interconnection rules. He mentioned that his office has a report entitled, "Guide to Geothermal Resource Development in New Mexico."

Representatives from companies developing the six DOE partnerships in New Mexico spoke about their projects. Ormat International, Lightning Dock, Exergy, Vulcan Power, and Americulture discussed projects including small-scale power plant field verification, slim-hole drilling, hot dry rock technology, resource exploration and definition, and aquaculture technology.

Jim Witcher of New Mexico State University said that New Mexico leads the nation in geothermally heated greenhouses, with more than half of the greenhouse facilities in NM using the resource.

Michael Ripperger of the New Mexico Public Regulation Commission discussed New Mexico's Renewable Portfolio Standard.

Melinda Hall of the State of New Mexico Environment Department spoke about the department's $4-million-dollar-per-year fund to provide service and education to unserved or underserved areas, including reservations.

Russ Rhoades, Public Service Company of New Mexico, said that barriers to geothermal development include aspects of New Mexico's Utility Restructuring Act, reluctance of customers to pay premiums for renewables, very low per capita income, perceptions of geothermal risk, unfavorable views about building new transmission lines and distribution systems, and the fact that more than half of the population lives in small communities and rural areas. Positive issues are abundant resources and the potential market for aggregate customers, including schools, institutions, and large industries. Rhoades also mentioned that their customer survey suggested that some customers were willing to pay more for clean energy.

Joe Torrez of the Bureau of Land Management discussed the NEPA process for the Known Geothermal Resource Area project.

The meeting was adjourned by asking for volunteers to serve on New Mexico's Geothermal Working Group. Twenty-one attendees signed up, and scheduled the next meeting for December.

For more information, please contact Roger Hill, Sandia National Laboratories, 505.844.6111, rrhill@sandia.gov.

DOE's next GeoPowering the West state kick-off workshop will be held in Idaho in May 2001. For more information, please contact Bob Neilson, Idaho National Engineering and Environmental Laboratory, 208.526.8274, RMN@inel.gov.

In early October, the governing body of the Geothermal Implementing Agreement (GIA) of the International Energy Agency (IEA) approved a new international collaboration on advanced geothermal drilling.

Paris-based IEA is an autonomous agency linked with the Organization for Economic Co-operation and Development. Formed as a result of the OPEC oil embargoes of the 1970s, it provides a forum for the 25 member countries that are committed to joint measures to meet oil supply emergencies. The U.S. Department of Energy represents the United States in the IEA.

The IEA fosters energy technology collaboration in fossil fuels, nuclear fusion, renewable energies, and energy end use through a number of Implementing Agreements.

The GIA, dated March 1997, is organized into Annexes. Three Annexes have been active:

- Environmental Impacts of Geothermal, led by New Zealand
- Hot Dry Rock, led by Japan
- Deep Geothermal Resources, led by Japan

A new Annex covering Advanced Geothermal Drilling Technology was formally approved by the GIA Executive Committee at their October meeting at the Soultz Hot-Dry Rock site in northern France. Mike Prairie of Sandia National Laboratories, on behalf of DOE, will lead this new Annex. The objectives are as follows:

1) Identify and develop improved and new technologies for significantly reducing the cost of geothermal well construction in order to lower the cost of electricity produced with geothermal resources;

In October, 2000, The Executive Committee for the Geothermal Implementing Agreement of the IEA visited the drill rig at the Soultz Hot-Dry-Rock site in northern France.

2) Communicate these drilling technologies to the international geothermal community; and

3) Increase the long-term economic viability of geothermal energy as a sustainable, environmentally benign energy source in global energy markets.

Japan's New Energy and Industrial Technology Development Organization (NEDO) has agreed to join the new Annex and is working with Sandia to develop additional participants.

For more information about the new Annex or the GIA, contact Allan Jelacic, U.S. Department of Energy, 202.586.6054, allan_jelacic@hq.doe.gov, or Mike Prairie, Sandia National Laboratories, 505.844.7823, mrprair@sandia.gov.

More information about the IEA can be found at http://www.IEA.org/.

ube Coatings

est Phase

To reduce capital and maintenance costs of geothermal heat exchangers, a DOE-sponsored laboratory-industry team has been evaluating and field-testing dozens of low-cost, high-thermal-conductivity polymer coatings applied to inexpensive, carbon-steel, shell-and-tube heat exchangers. Field-testing has been conducted at two sites in California, and is due to begin at a site in Utah. The formulation showing the most value to date is ready to undergo commercial application and operation at a power plant in southern California. Initial studies indicate that the coating will allow capital cost reductions of up to 67%, and significant maintenance cost reductions. The commercialization efforts are the culmination of a decade of work.

The team includes the National Renewable Energy Laboratory (NREL), Brookhaven National Laboratory (BNL), Mammoth Pacific LP (MPLP), FPL Energy, ThermoChem, and suppliers of coating materials and services, such as Ticona Corp., American Chemical Corp., Bob Curran & Sons, Applied Surface Technology, and Lauren Manufacturing. CalEnergy Operating Company (CEOC) hosted many field tests in the Salton Sea area.

The many coating formulations tested in the lab and field included traditional and exotic materials with varying amounts of silicon carbide, antioxidants, Teflon® particles, and other additives. Results showed that early polymer concrete coatings didn't hold up under high-pressure scale cleaning, but they did perform well thermally. Phenolic compounds were thin enough for adequate heat transfer, and exhibited a glasslike surface that resisted scale adhesion, but they didn't bond well to the steel, and their upper temperature limit was not high enough for many geothermal applications (greater than 320 degrees F). The team even looked at a porcelain coating with a diamond powder surface finish, but the porcelain did not provide sufficient corrosion resistance in continuous contact

Coating test rig installed at the Mammoth Lakes Power Plant.

with geothermal fluid. The right formulation came from Dr. Toshi Sugama (three-time R&D 100 award winner) of BNL, who developed a polyphenylene sulfide (PPS) coating system that was inexpensive, slick enough to enable easy scale removal, and most important, able to withstand the high temperatures and mixed chemistry of geothermal brines and completely protect the underlying steel. Ticona Corp. supplies the custom formulation.

Over a number of years, field tests were conducted at CEOC's Hoch power plant in the Salton Sea area using the polymer concrete material, phenolics, and PPS. These tests used 20-ft.-long tubes mounted in a shell-and-tube heat exchanger, and data on pressure drop and heat transfer were available throughout the tests. The tests accessed geothermal fluid at 225 degrees F and total dissolved and suspended solid material levels of 25% to 30%. These tests exposed the coatings to the most aggressive geothermal environment available. The most promising coating resulting from that work was the PPS.

Field tests were then begun in August 2000 using a sidestream of geothermal fluid at Mammoth Pacific's Mammoth Lakes Power Plant in northern California. NREL, BNL, and MPLP will experiment at this site with varying formulations of PPS, silicon carbide, and Teflon® to provide the best combination of corrosion protection, wear resistance, thermal conductivity, and ease of scale

removal. The latest versions have a hard, glossy finish that will be even easier to clean. Two test rigs have been installed at Mammoth Lakes to expose the coated tubes to production and injection fluids, and their design is largely similar to those used in the Hoch experiments.

In all coating tests so far, the team has used only environmentally benign zinc-phosphate primers; however, manganese-phosphate primers, also environmentally safe, are now being considered because some priming shops already use them for many applications. BNL, together with American Chemical Corp., developed a priming method for single tubes that is faster than the flood-and-drain techniques used in the lab. In this new method, cleaning solutions and warm zinc-phosphate solution are pumped through tubes connected in series. Sandblasting the tube interiors is no longer necessary, and large numbers of single tubes can be primed simultaneously.

To test the coating "live," and to evaluate the coating as applied by a commercial coater (Bob Curran & Sons) in another geothermal environment, a testing partner was found at FPL Energy's (a subsidiary of Florida Power & Light Co.) East Mesa binary plant in southern California. This plant will be the first test site for commercially coated tubes in an operating binary plant heat exchanger. Single tubes, retrofitted in heat exchangers, will be coated with zinc- or manganese-phosphate primer, two layers of PPS coating, and a third layer of PPS coating toughened with silicon carbide and augmented with Teflon® particles for improved cleaning ability.

To enable these single, coated heat exchanger tubes to be retrofitted, another type of coating is used at the tube/tubesheet junction because the PPS is removed where roller expansion and seal welding occur. This fluoropolymer-based coating, being commercially developed in collaboration with Lauren Manufacturing, has excellent hydrothermal stability and good adhesion to the tube surfaces. It cures well at ambient temperatures, can easily be field-applied, and is abrasion-resistant.

The next step will be to test an entire coated tube bundle, again with the coating applied by the commercial coating partner. (The fluoropolymer coating will not be necessary for the tube bundle.)

Another geothermal testing environment is the Roosevelt Hot Springs area in Utah. Paul Hirtz of ThermoChem plans to test PPS-coated tubes along with uncoated tubes made of a variety of alloys downstream of the Roosevelt flash plant. These tests will determine how the coatings react to untreated geothermal fluid and fluid treated with silica inhibitors and acid. The coatings will be applied by a commercial applicator.

While progress is being made in tests in geothermal environments, the commercial coater has already started marketing the PPS coating to other industries operating chemical and high-temperature processes. The PPS has been shown to bond well to stainless steel without primers, and is being used for protection of stainless steel in especially harsh environments.

Power plant builders and operators will realize significant cost savings with this new PPS coating. Compared to equally corrosion-resistant titanium or stainless steel, the coated carbon-steel tubes will result in up to 67% capital cost reduction. Maintenance costs and plant downtime will be reduced because the tubes can be cleaned faster, and fewer will require replacement. The coating has high thermal performance due to thinness of the layers and the addition of silicon carbide. Commercial verification of these benefits should be available in the next several months.

For more information, please contact Dr. Keith Gawlik, NREL, 303.384.7515, keith_gawlik@nrel.gov.

Mammoth Lakes Power Plant, California.

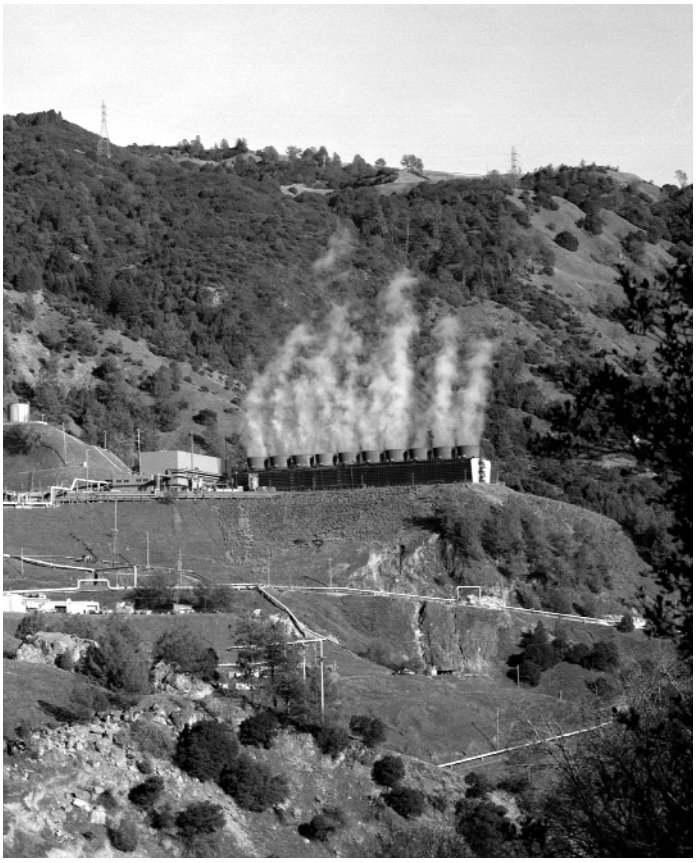
The U.S. Department of Energy has committed $2 million to a planned expansion of The Geysers steam recharge system that will further increase power production from the world's premier geothermal steam field. DOE's Geothermal Energy Program funds will be combined with contributions from the geothermal industry, state and local government agencies, and the U.S. Environmental Protection Agency. The planned expansion will cost a total of $24 million and is expected to be online by 2001. Planners estimate an increase in power at The Geysers of up to 20 megawatts when the expansion is fully operational.

The project, known as Phase 2 of Lake County, California's "Clear Lake Basin 2000" (formerly called the "Southeast Geysers Effluent Injection System"), is a follow-on to the initial project that was dedicated in 1997 and is credited with a major reversal of diminishing power production at the northern California geothermal steam field. The Phase I system, also supported by DOE, delivers 7.8 million gallons of lake water and treated wastewater per day from Lake County through a 30-mile pipeline to the southeastern section of the field, supplementing the natural water which has been depleted over the years. Depletion has resulted in significantly reduced electricity generation from the field, and the closing of several geothermal power plants.

Phase 1 injection has already produced the equivalent of 54 megawatts in increased generation capacity, and geothermal reservoir experts project even greater returns over time as larger amounts of effluent-based steam are recovered. At a DOE-sponsored Geysers recharge technical seminar, participants agreed that the system is producing impressive results with national and international implications for the geothermal industry.

The Phase 2 project will build on this success by extending the effluent pipeline 20 miles to acquire an additional 1,000-2,000 gallons per minute of effluent from two Lake County wastewater treatment plants. This new effluent will provide a 20% increase in injection volume during normal weather years, and a 150% increase during dry years. (The increase is greater during dry years because less lake water will be available to the system, meaning that wastewater will represent a greater share of the total.)

The Phase 2 expansion will include a dual recycling feature never before employed. After leaving the treatment plants, the wastewater will first be used to restore watershed wetlands along the pipeline route, providing habitat for wildlife and further "polishing" the treated wastewater. Farther downstream, water will be withdrawn from the wetlands and piped to The Geysers to produce electricity in an environmentally benign manner. The project will provide the additional benefit of improving the water quality of Clear Lake, California's largest natural fresh water lake.



A power plant at The Geysers.

The objectives of the effluent injection system are to enhance the United States' international leadership in geothermal innovation, to support the competitiveness of the geothermal industry in deregulated electricity markets by reducing electricity generation costs, to extend the useful life of The Geysers, and to protect the multi-billion-dollar public and private investment in the field and its surrounding communities.

An initial segment of the pipeline extension has been completed, and all environmental clearances have been obtained. The public/private partnership is now assembling final funding for the project's remaining components.

Industry and environmentalists alike view The Geysers effluent injection system favorably, as it turns the liability of wastewater into an asset of geothermally generated electricity.

eds Promote Use

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The U.S. Department of Energy Seattle Regional Office (SRO) and the Federal Energy Management Program (FEMP) hosted two workshops to promote use of green power, including geothermal, in federal facilities. The federal government consumes 2% of the nation's electricity,

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unded by the DOE Geothermal Energy Program

Twenty-seven university geothermal research grants were recently funded by DOE's Geothermal Energy Program through the Idaho Operations Office (DOE-ID). The University Research Grant Program is designed to provide applied research solutions to problems related to the production of geothermal power. The fiscal year 2001 operating budget for these grants is $2.5–$3 million, an important part of the Geothermal Geoscience budget of $11 million.

These grants are the result of competitive solicitations focused on three research areas: (1) detection and characterization of new geothermal resources, (2) permeability characterization and modeling techniques to improve the efficiency of operating fields, and (3) geochemistry. These research areas are consistent with industry needs and DOE Geothermal Energy Program strategic objectives.

Most of these projects are summarized in research summaries found at **http://geothermal.id.doe.gov**. Peer-reviewed publication is encouraged. Additional information can be found in proceedings from the Geothermal Resources Council Annual Meeting and the Stanford Geothermal Reservoir Engineering Workshop.

For further information, please contact the principal investigator (PI) or Bob Creed at DOE-ID at creedrj@id.doe.gov or 208-526-9063.

Research title	PI	University	Phone/E-mail
A Thermoelastic Hydraulic Fracture Design Tool for Geothermal Reservoir Development	Ahmad Ghassemi*	University of North Dakota	701-777-3213, **ahmad Ghassemi@mail.und.noddak.edu**
Imaging Tools for Electrical Resistivity in the Borehole Environment	Alan C. Tripp	University of Utah	435-462-2112, **actripp@mines.utah.edu**
Modeling Production/Injection Strategies in Fracture-Dominated Geothermal Reservoirs	Daniel Swenson*	Kansas State University	785-532-2320, **swenson@ksu.edu**
Numerical Analysis of Three-Component Induction Logging in Geothermal Reservoirs	David Alumbaugh*	University of Wisconsin	608-262-3835 **alumbaugh@engr.wisc.edu**
Geothermal Resource Analysis and Structure of Basin and Range Geothermal Systems, especially Dixie Valley, Nevada	David D. Blackwell*	Southern Methodist University	214-768-2745, **blackwel@passion.isem.smu.edu**
Development of Gas Analysis as a Geothermal Exploration Tool	David I. Norman	NMT	505-835-5404, **dnorman@nmt.edu**
Geothermal Reservoirs: Products of Cooling Plutons	Denis L. Norton	School of Thought	208-774-3735
Application of an Innovative Thermodynamic Cycle for Geothermal Power	Dr. Yogi Goswami**	University of Florida	352-392-0812, **solar@cimar.me.ufl.edu**
Improved Technologies for Geothermal Resource Evaluation	Gregory D. Nash	University of Utah	**gnash@egi.utah.edu**
Characterization of Fracture Patterns and Densities in The Geysers Geothermal Reservoir by Analyzing Shear-Wave Splitting from Micro-Earthquakes	J. A. Rial*	University of North Carolina	919-966-4553, **Jose Rial@unc.edu**
CD-ROM Access to the Resources of the Global Volcanism Program	James F. Luhr*	Smithsonian Institution	**luhr@volcano.si.edu**
Field Studies of Geothermal Reservoirs, Rio Grande Rift, New Mexico	James Witcher	NMSU	505-646-3949, **jwitcher@nmsu.edu**
Characterization and Conceptual Modeling of Plutonically Heated and "Deep-Circulation" High-Temperature Hydrothermal Systems in the Western United States	Jeffrey B. Hulen	University of Utah	801-581-8497, **jhulen@egi.utah.edu**
Geothermal Energy Program Information Dissemination, Public Outreach, and Technical Analysis Activities	John W. Lund	OIT, Geo-Heat Center,	541-885-1750, **lundj@oit.edu**

**Contact the PI for Web site and software availability information*

***Competitively awarded during DOE-ID's Phase II "Geothermal Power Initiative" solicitation*

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*(**University Research**—continued from page 7)*

Research title	PI	University	Phone/E-mail
Geothermal Direct-Heat Utilization Assistance	John W. Lund*	OIT, Geo-Heat Center,	541-885-1750, **lundj@oit.edu**
Improving Exploration Models of Andesite-Hosted Geothermal Systems	Joseph Moore	University of Utah	801-585-6931, **jmoore@egi.utah.edu**
Tracing Geothermal Fluids-	Mike Adams	University of Utah	801-585-7784, **madams@egi.utah.edu**
Chemical Modeling Technology to Increase Geothermal Energy Productivity	Nancy Moller*	UCSD	858-534-6374, **nweare@ucsd.edu**
Greatly Enhanced Detectability of Geothermal Tracers through Laser-Induced Fluorescence	Peter E. Rose	University of Utah	801-585-7785, **prose@egi.utah.edu**
Development of Tools for Managing Injection in Geothermal Reservoirs	Peter E. Rose	University of Utah	801-585-7785, **prose@egi.utah.edu**
Inhibition of Silica Scale in Geothermal Brines	Peter J. Heaney	Penn State University	814-865-6821, **heaney@geosc.psu.edu**
Cutting Geothermal Costs by Locating High-Production Wells: A Test of the Volcanoseismic Approach to Finding "Blind" Resources	Peter Malin	Duke University	919-681-8889, **p.malin@duke.edu**
Experimental and Theoretical Investigation of the Production of HCI and Some Metal Chlorides during Magmatic-Hydrothermal Aqueous Exolution	Philip Candela	University of Maryland	301-405-2783, **candela@geol.umd.edu**
Enhanced Data Acquisition and Inversion for Electrical Resistivity Structure in Geothermal Exploration and Reservoir Assessment	Philip E. Wannamaker*	University of Utah	801-581-3547, **pewanna@egi.utah.edu**
Direct Use Geothermal/District Energy	R. Gordon Bloomquist	Washington State University	360-956-2016, **bloomquistr@energy.wsu.edu**
Fundamentals of Steam-Water Flow	Roland N. Horne	Stanford University	650-723-9595, **horne@stanford.edu**
Behavior of Rare Earth Elements in Geothermal Systems: A New Exploration/Exploitation Tool	Scott A. Wood	University of Idaho	208-885-5966, **swood@iron.mines.uidaho.edu**

**Contact the PI for Web site and software availability information*

*(**Feds Promote Green Power**—continued from page 6)*

spending $8 billion per year. Curtis Framel of SRO said, "Using the power of the government, we can move the market" for renewables.

The two workshops were held in September in San Diego and Seattle. Both were well attended by facility managers, energy providers, and other industry representatives. Framel and Beth Shearer, FEMP director, discussed President Clinton's Executive Order No. 13123 to reduce energy use in federal facilities by 35% by 2010 and to expand the use of renewables. DOE is aiming to obtain 3% of its energy from non-hydro renewables by 2005, and 7.5% by 2010. Said Shearer, "This is the right time to be buying renewables." Framel stated that DOE was "looking for opportunities to level the playing field and integrate renewables" in the government's power use matrix. Ron Kreizenbeck, acting deputy regional administrator for the U.S. Environmental Protection Agency, said, "The government's job is to tip the scale in favor of new technologies. Federal agencies can drive up the options, drive down the costs, and be part of the solution for those who follow."

How to Reach Us

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