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NEW DIRECTIONS FOR THE DOE GEOTHERMAL PROGRAM

Marshall J. Reed

Program Manager
Office of Geothermal & Wind Technology
U.S. Department of Energy
e-mail: Marshall.Reed@ee.doe.gov

During the current fiscal year (FY 2000) the DOE Geothermal Program is shifting its focus from laboratory based R&D that results in technology improvements to field verification projects that result in the deployment of new technologies. This change in focus will emphasize cost-shared field tests with industry, and the laboratory and computational research that supports field verification. The requested budget for fiscal year 2001 will reflect the change in direction.

A new structure is being used to organize the Geothermal Program. All aspects of this structure will place strong consideration on cost-shared, joint projects with the geothermal industry. The major components of the new structure are described below, and the tentative proportion of funding is indicated.

Energy Systems Research and Testing (32% of budget):

This will encompass small-scale field verification in which several prototype systems will be constructed and tested, performance characteristics will be established, and the economic benefits of improved technology will be documented. Cost-shared projects will be solicited to realize the benefits from geothermal energy development. Work on advanced plant systems will include air-cooled condensation of binary fluids, control of heat exchanger fouling, and instrumentation for process monitoring. Energy system research and testing will provide support to the U.S. industry through the resolution of near-term technical and institutional problems and through enhanced technology transfer for both domestic and international energy markets.

Geoscience and Supporting Technologies (46% of budget):

Core research to provide understanding of complex geothermal processes and facilitate development of suitable technologies for use of geothermal resources will continue in the areas of materials, geofluids, geochemistry, geophysics, rock properties, and reservoir modeling. The Enhanced Geothermal Systems project will apply the technologies of rock fracturing, water injection, and water circulation to new areas or to unproductive areas of existing geothermal fields. University research will expand geothermal knowledge in the fundamental areas of geoscience, including heat flow and temperature gradient interpretation, reservoir dynamics and two-phase flow, the stress regime and thermal history of fractures, areas of active faulting, and evolution of plutonic hydrothermal systems. Seismic exploration will rely on collaboration between industry and researchers to advance methods of data collection and interpretation in geothermal prospects and to advance the analysis of seismic data. Fracture detection and mapping will continue development of exploration technologies to locate and characterize permeable faults and fractures. The work includes finding and confirming new resources and the development of tracers to determine flow paths through geothermal reservoirs.

Drilling Research (22% of budget):

Innovative subsystems will provide improvements in control of lost circulation, fabrication of hard-rock drill bits, deployment of high-temperature well sampling and monitoring instrumentation, and wireless data telemetry. Near-term technology development will provide incremental improvements to existing tools and equipment including a valve-changing assembly, downhole motor stator, foam cements, and a percussive mud hammer. Diagnostics while drilling technology will provide drilling data and information on rock characteristics to the surface in real time for better decision making by drillers.

This structure of the Geothermal Program takes advantage of previous and continuing research projects while providing flexibility for new initiatives. Emphasis on field verification places a stronger reliance on industry cost-shared joint projects to test new technology under actual operating conditions in geothermal fields.