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ERDA GEOTHERMAL COMPONENT TEST FACILITY (GCTF)
East Mesa, Imperial Valley, California

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TEST OPERATIONS

MANAGEMENT PLAN

Managed for the Energy Research and Development Administration by the Lawrence Berkeley Laboratory, University of California, and operated by LBL in cooperation with the Bureau of Reclamation, U. S. Department of the Interior.

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PURPOSES OF THE FACILITY

The ERDA Geothermal Component Test Facility has been established by ERDA to assist in rapid commercialization of the geothermal energy potential by providing geothermal fluid and supporting services for tests of heat extraction and energy conversion equipment and materials. The Facility will also actively promote the exchange of reliable information among investigators within the energy community, and with the general public.

OPERATING POLICIES

Service

The Test Facility is organized and operated to provide services as nearly like an industrial test lab as possible considering the field environment. Investigators with components adequately tested and de-bugged in their own facilities are to encounter as few difficulties as possible in making the transition to using actual geothermal fluids. Services provided at the Facility allow investigators to concentrate on solving the unique problems posed by geothermal fluids.

Conflicts

Conflicts in flow scheduling or well maintenance schedules are resolved on site between the LBL Site Supervisor and the resident Bureau Manager. Scheduling conflicts among test site users are resolved by the affected groups in consultation with the LBL Site Supervisor. If there is no resolution the LBL Site Supervisor decides the issue in consultation with the Test Operations Manager.

Safety, Environmental

The LBL site supervisor follows LBL and USBR site regulations on safety and environmental questions and consults with LBL Safety Services personnel regularly. The resident Bureau Manager vetos any actions which threaten to violate USBR site regulations. Equipment to be tested on site is to be designed and constructed according to OSHA regulations and other applicable codes just as though tests were to be conducted at the investigator's plant.

Investigator Activities

All activities which would be expected at an industrial test site or test laboratory are accommodated at GCTF. There are no provisions for overnight facilities except the normal second and third shift work areas. There are no living space trailer hookups and none are planned. Sanitary facilities are limited to rest rooms in the permanent buildings. No live-in arrangements will be permitted. Parking space for air-conditioned instrumentation trailers will be provided on the assigned test pad and power usage will be considered part of the power requested for the test. Amenities such as bottled water in these trailers are provided by the investigator.

The principal investigator will be asked to sign a Facility Use Agreement specifying site occupation time and any unusual requirements.

Shops and Equipment

Shop equipment and shop space is used jointly for ERDA Test Operations and Bureau desalting activity support under supervision of the LBL Site Supervisor.

Test Certification

The GCTF does not provide for test certification does not formally witness tests nor verify adequacy, validity or accuracy of data. These functions are the responsibility of the principal investigator and his sponsor. In the future, if demand warrants, GCTF will consider providing calibration and certification services for instrumentation.

ORGANIZATION

Facility organization and relationships among the four major participants is shown on the following chart.

EAST MESA TEST SITE FUNCTIONAL ORGANIZATION

LAWRENCE BERKELEY LABORATORY

Organization

The ERDA GCTF Test Operations Program is one of several geothermal development activities comprising the Geothermal and Geosciences Program of LBL. The Geothermal and Geosciences Program is under jurisdiction of the Energy and Environment Division accountable to the LBL Director. LBL is dedicated to the development of alternative energy sources, providing consulting services to industry and ERDA as one of the national centers of excellence in geothermal technology.

Responsibilities

Lawrence Berkeley Laboratory (LBL) has been designated by ERDA to organize the Test Operations Program and to manage the Program during the initial stages until permanent management arrangements can be determined. LBL is responsible for all liaison and direct services to investigators and for any liaison required between investigators and the Bureau of Reclamation.

A Test Operations Advisory Board will be appointed by LBL to recommend experiment project priorities and to review Facility policies and operations.

Individual Responsibilities

Test Operations Manager—The LBL Test Operations Manager is accountable to ERDA for quality of service and responsiveness to investigator needs and for successful achievement of the Facility purposes. He is accountable within LBL through the Geothermal and Geosciences Program for operation within LBL regulations. Commensurate authority over personnel and operating funds is delegated to the Test Operations Manager. All line

functions which affect his ability to meet investigators' needs are within this authority. He makes initial contacts with investigators, assesses future Facility requirements, assigns a dedicated project coordinator to each investigator, presents cases for Test Operations Advisory Board action, sets priorities for test site occupancy using approved guidelines, delegates responsibility for test site services to the LBL Site Supervisor and monitors Facility performance. He reports continually to the LBL Geothermal and Geosciences Program leader and deputy, frequently to the ERDA DGE Program Manager and cognizant SAN program coordinator and periodically to the Test Operations Advisory Board. He assures that the LBL Site Supervisor has the tools, equipment, and personnel to accomplish the assigned test support functions. The Test Operations Manager is based at LBL in Berkeley.

Project Coordinators - These individuals are based at LBL in Berkeley.

They are competent to assist potential investigators develop test programs for a wide variety of geothermal components. They are the investigator's single point of contact with the Facility until the equipment is received at the Site. They may act as the investigator's advocate before the Advisory Board or may help him prepare presentations for Board consideration. They transmit technical information to the investigator to describe the Facility interfaces and services. They make any special arrangements required for a particular test, introduce the test and the investigator's personnel to the LBL Site Supervisor and do anything else necessary to smooth the transition from the investigator's home base to the Facility.

Site Supervisor - This individual is an LBL career employee, resident in the Imperial Valley and dedicated to serving investigators full time at GCTF. He is in charge of all ERDA Test Facility activities at GCTF and supervises the operating personnel. As a journeyman machinist, welder, rigger and mechanic he personally helps the investigator set up his equipment or delegates competent members of his crew to the work and personally supervises them. He maintains a stock of expendable supplies and secures local equipment on rental as needed. He coordinates activities with the Bureau of Reclamation Site Manager daily. He is accountable for all ERDA and LBL equipment on the Site and provides security as necessary for that equipment. He communicates with the Project Coordinators and the Test Operations Manager concerning requirements for incoming experiments, makes arrangements to receive the investigator's equipment and stores it until arrival of the investigator's party. He may initiate or receive GBL's as necessary. He maintains Government vehicles as necessary, qualifies and licenses operators and controls vehicle usage. He travels as necessary to attend coordination meetings but is usually at the Facility.

Funding

Through the existing contract W-7405-ENG-48, LBL is funded to provide a Test Operations Manager, Project Coordinators, a resident Site Supervisor, construction consultation as required, and necessary equipment, supplies, and services to serve each investigator adequately. Equipment may include, for example, machine tools and accessories, safety gear, inspection tools such as ultrasonic instruments, calibration tooling, welding sets and flow controls. Supplies may include pipe fittings, miscellaneous piping, electrical fittings, conduit, wiring, expendable tooling, welding rod, welding gases, office supplies, and expendable safety devices. Expenses

may include travel, vehicle rental, local crane service, shipping charges when GBL's are not available, extra local personnel as necessary to cover peak periods or casual labor needs. The budget for these items is fixed on a fiscal year basis and consequently will be monitored closely and controlled for maximum effectiveness in supporting the largest number of investigators. Requests for unusual financial support of an individual project will be referred to the Test Operations Advisory Board for a recommendation and then to ERDA DGE for funding or denial. Individual investigators may, of course, request unusual services and reimburse ERDA DGE for the cost of those services. Blanket field purchase orders are opened by LBL with the best local suppliers for miscellaneous items obtainable locally. Equipment purchases and travel are administered from LBL in the normal way.

BUREAU OF RECLAMATION

Organization

The Bureau of Reclamation, through its Lower Colorado Region Planning Division, carries out investigation of desalting and concurrent power production development in support of its geothermal program. Well siting, drilling, construction specifications and construction have been supervised by the Bureau. Desalting tests and geophysical and geothermal research programs are carried out on a continuing basis.

Responsibilities

The Bureau of Reclamation is responsible for brine supply and disposal, physical maintenance of the site, utilities, supporting services, and construction as required for ERDA activities. Specifically these responsibilities require: maintenance of production and injection wells; maintenance of brine delivery systems up to the manifold flanges and brine injection or other disposal systems downstream from the manifold flanges; cooling tower, cooling water, water treatment and cooling water delivery systems; custodial, housekeeping services and general site maintenance; chemical laboratory supervision, staffing, supplies and maintenance; secretarial and reception services; utilities, including telephone system, electrical power, water and sewer, and construction as might from time to time be mutually agreed upon with ERDA. In addition, all Environmental Impact Assessments, Reports or Statements required by regulation are prepared by the Bureau in consultation with ERDA and LBL.

Funding

ERDA funds the above activities through an interagency agreement and transfer administered by the ERDA San Francisco Operations Office.

OPERATIONS CONTRACTOR

Contract

The Contractor supplying the operating crew is under contract directly to ERDA through the San Francisco Operations Office. Contractor selection, contract negotiation and contract management are under ERDA/SAN jurisdiction. LBL assists ERDA/SAN in developing the contract statement of work and in reviewing contract proposals. LBL is delegated responsibility as supervisor of contractor personnel for day to day activities at GCTF. LBL sets job qualifications for operating personnel, reviews them for satisfactory performance and is empowered to replace them as necessary.

Qualifications

The Test Operations contractor supplying personnel for direct support of the ERDA Test Facility is experienced in geothermal field work. His personnel are experienced, versatile, highly skilled technicians. The contractor is not required to provide professional technical expertise either in the field or at a home office. He is required to provide high-quality people with an attitude of service as demonstrated by their previous records.

The contractor performs the administrative functions for this group from an off-site location.

Work areas, expendable supplies, safety equipment, and normal industrial amenities are supplied by ERDA funded facilities or LBL purchases.

The contractor is engaged in no activities which might conflict with the interests of investigators using the Facility.

Personnel

These personnel, under direction of the LBL supervisor, use initiative and judgment to do whatever is necessary to assure that investigators are set up quickly and safely and are serviced as required during their tenancy at the Test Facility. They frequently are required to work independently with minimum supervision. They are technicians with at least two of the following skills: pipefitting, mechanics, electrical, welding, machining, instrumentation, rigging. They must have significant experience in an environment where they exhibited a high degree of initiative and flexibility. Four of them may be designated as Shift Supervisors as the need arises.

Each individual supplies his own hand tools.

One storekeeper maintains material control for the LBL Site Supervisor, ordering supplies, controlling inventory and providing clerical support as necessary.

TEST OPERATIONS ADVISORY BOARD

The Test Operations Advisory Board is an independent body composed of five members appointed by the LBL Director from the geothermal community.

Purpose of the Board is to involve industry and provide a forum for input to program direction. Members will have exhibited technical competence in some phase of geothermal-related activity. They are readily available for ad hoc actions in addition to the regularly scheduled twice yearly meetings. The membership elects its own chairman. A secretary is provided by LBL to record minutes and obtain minutes approval. Each member's term is two years; the first year two members are appointed for only one year and three for the full two years. Ex-officio members of the Advisory Board are the LBL Associate Director for Energy and Environment, the ERDA DGE Program Manager in charge of the GCTF Program, the cognizant ERDA San Francisco Operations Office Program Manager, the LBL Geothermal and Geosciences Program Leader, and the Director, Lower Colorado Region, Bureau of Reclamation. The Test Operations Program Manager presents a report of operations at each Board meeting and is in attendance at all times except for executive sessions. Physical arrangements for Board meetings are the responsibility of the Test Operations Manager.

Board members are appointed in a balanced manner as nearly representative as possible of the geothermal community as a whole. Potential sources of members are: investigators--past and future users of the Facility who have personal knowledge of Facility operations; sponsors--those who have

or who will provide funds for a component development and test program; consultants--those who have neither investigator nor sponsor status but who have unique insight and expertise to offer in the way of specialized technical knowledge or experience; entrepreneurs--those who have the ability to bring geothermal developments to market because of manufacturing or marketing capability but who do not fall into one of the above categories; financial--those who are CPA's specializing in resource accounting, venture capital promoters, investment bankers, commercial bank loan officers.

Duties of the Board are to review experiments requiring Facility test time or other support which is of such large scope that a serious disruption of other tests would result, to approve or disapprove such requests, to recommend approval or disapproval, priorities, and cost reimbursement levels for them and to set reporting requirements. Generally requests of this nature will arrive when Board meetings are not scheduled. In these cases an ad hoc Board action will be required which may be carried out through correspondence at the option of the Chairman. At regularly scheduled meetings the Test Operations Manager presents a report of Facility operations. The Board reviews this report and any other information and recommends appropriate actions in anticipation of future needs or to correct operating inadequacies. The Board ratifies guidelines which the Test Operation Manager uses. For instance, rules defining which experiments require Board review and which the Manager may schedule into the Facility without prior review, and rules used in setting priorities in the absence of specific Board action. Cognizant ERDA personnel from either headquarters or the San Francisco Operations Office

approve or disapprove of Board recommendations.

Advisory Board members are reimbursed for travel expenses and recompensed by honoraria for time devoted to GCTF activities. Funding is provided to LBL by ERDA DGE for this purpose and disbursements are approved by LBL's Associate Director for Energy and Environment according to LBL policies.

EXPERIMENT PROCESSING

Test Acceptance

Acceptance of a test for scheduling into the queue is automatic upon approval by the Test Operations Manager who may grant approval under the following conditions:

- the test requirement is for "normal" flows, space, length of time and Facility support
- the test objectives are clearly directed at answering unanswered geothermal questions
- the funding source is ERDA or some other U. S. , state, or local government, OR
- the organization and funding source are non-profit, OR
- the organization or funding source are private, for-profit, but results will be fully disclosed publicly in a timely manner.

If the above conditions are not met the Test Operations Manager will refer the request for test time to the Test Operations Advisory Board along with a short report and recommendation. The principal investigator may then present the case to the Board in person if he wishes.

Scheduling and Priorities

The basic scheduling rule is "first arrival at the Site, first served."

Prior to shipment the Test Operations Manager must have approved the schedule, reserved the time and agreed to a shipping date. Priorities for advance scheduling will be worked out in conjunction with the Test Operations Advisory Board. But because of the sometimes uncertain nature of hardware development work, actual scheduling at the Site will be flexible. The "first come, first served" rule is intended to maximize Site usage and prevent holding open a test pad waiting for equipment which is experiencing difficulties in the shop while an experiment with lower priority waits on the Site ready for test. The LBL Project Coordinators maintain close liaison with all experimenters to minimize schedule interference and to provide schedule changes to the Manager. Investigators are encouraged to adhere to published schedules, but if problems come up they are requested to make them known as soon as possible to avoid penalizing other investigations.

Cost Reimbursement

Some experiments may fall within ERDA regulations requiring cost recovery. The Test Operations Advisory Board may be asked to express an opinion to ERDA in these cases. Examples of this kind are: proprietary tests with funding and results not disclosed; abnormal support requirement for privately funded experiments, as overtime, special machining, or other unusual expense. An account is set up for those experiments and maintained by the Contractor clerk on site. All expenses are approved by both the LBL Site Supervisor and the investigator's test manager on Site. At the conclusion of the test, the investigator reimburses ERDA at the agreed-upon rate, and ERDA in turn reimburses either LBL or the Contractor depending on the circumstances. In general this practice will be held to a minimum in keeping with ERDA's goal of providing this Facility cost-free to encourage rapid geothermal development.

Activities Flow Chart

The attached chart shows graphically the usual flow of an investigator's activities and relationships to elements of the Test Operations Program. Refer to the appropriate section of this management plan for a more detailed description of each element.