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THE ERDA-DGE/LBL GEOTHERMAL RESERVOIR
ENGINEERING MANAGEMENT PROGRAM

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INTRODUCTION

Lawrence Berkeley Laboratory (LBL) has been assigned responsibility by ERDA/Division of Geothermal Energy (DGE) for developing and then implementing a plan for support of research in geothermal exploitation engineering. Although historically referred to as REMP (Reservoir Engineering Management Program), the scope of the activity encompasses many aspects of geothermal exploitation engineering; and reservoir engineering (as traditionally defined to include well testing and modeling mass and energy transport) is, in fact, a subset of the whole program.

A diagram showing the elements that make up the program is shown in Figure 1. The elements are shown in boxes on the figure.

PURPOSE OF THE ACTIVITY

The ultimate purpose of this activity is to establish a higher level of capability than currently exists in all the elements shown in Figure 1. The figure shows the key questions facing an exploiter of geothermal resources. The elements for which planning for research is being done form the basis for answers to these questions. Of fundamental importance are the questions:

- How large is the resource?
- What is the spatial distribution of temperature, porosity, permeability, and other parameters that are important to understanding the resource?

Knowing the answers to these, the question of primary importance then becomes: How will the resource behave in the future, as it is produced to service the needs of an electric generating power plant or a nonelectrical application?

Ultimately one would like to have a reliable plan for exploiting a given resource - reliable in the sense that the plan can be done technically in an environmentally acceptable way and that it is a financially attractive thing to do.

PROCEDURE IN DEVELOPING THE PLAN

In order to improve existing capabilities--to conduct and interpret borehole geophysical surveys, for example--it is necessary to understand first of all what an existing capability really is, then envision a desired status, and finally generate and implement a way "to get there."

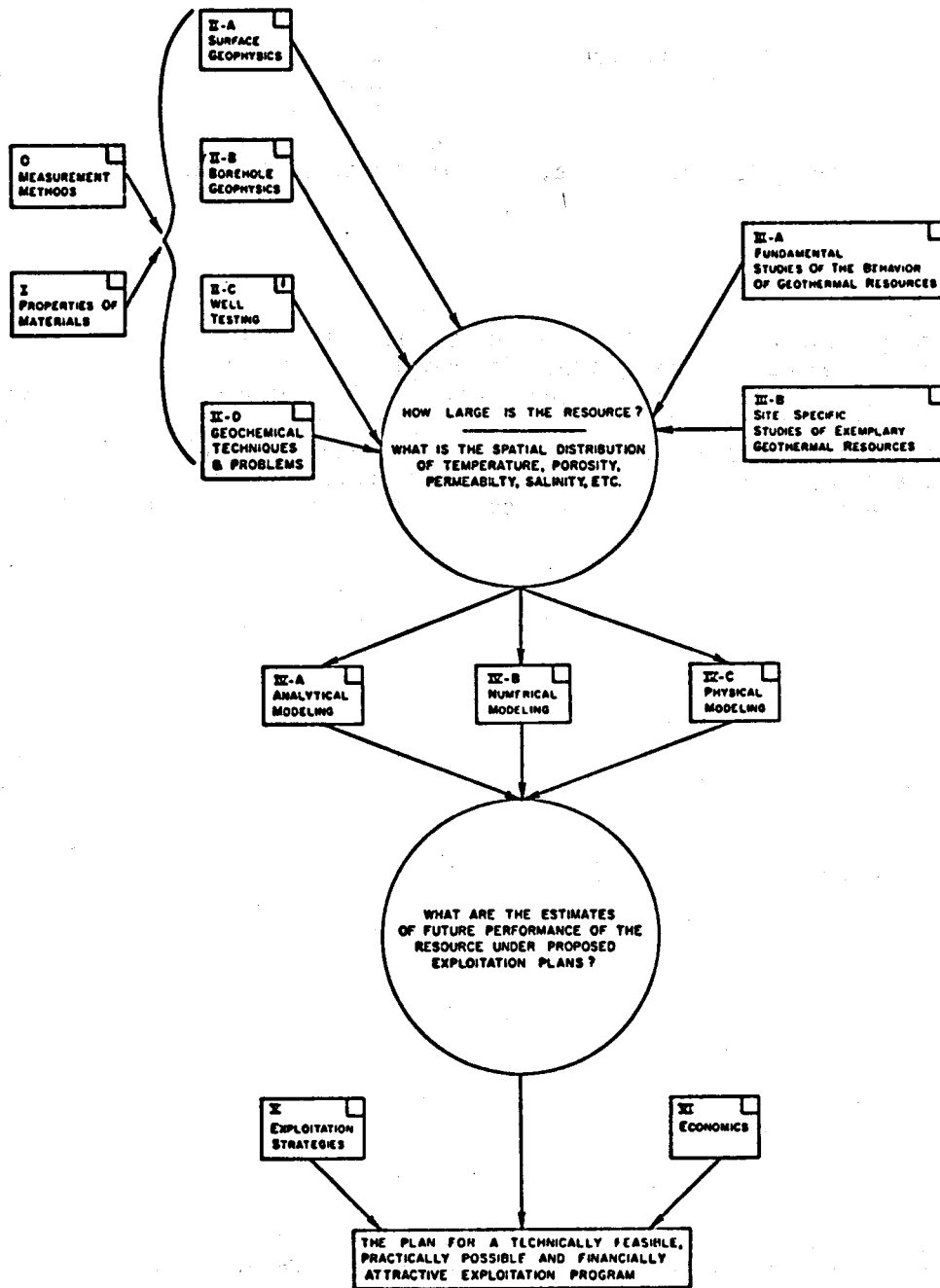


Figure 1. Overview of Geothermal Reservoir Engineering Program

The procedure used by REMP is similar to that used by another LBL management activity to develop a research plan for subsidence due to production of geothermal resources (1). The procedure involves an iterative method between a planning group and a review task force.

The planning group, on the one hand, develops various draft plans. The review task force, on the other, is responsible for commentary on the drafts and for a statement in general terms regarding the completeness of the plan and the priorities of the tasks identified in the plan. The final form of the plan will incorporate improvements resulting from exchanges between the planning group and review task force. The document will include a statement of all tasks that should be carried out and an assignment of priorities to each of them. The product of all this activity is a document to be used as a guide in supporting research in geothermal exploitation engineering.

IMPLEMENTATION OF THE PLAN

Development of a planning document is only a part of the overall program. Implementation of the plan is also the responsibility of LBL. It must be done in view of the constraints imposed by the following factors:

- availability of ERDA/DGE budget for this purpose
- existence of ongoing federally funded research on certain tasks
- the availability and suitability of contractors to carry out various research tasks

Items identified as first priority items will be supported as funds allow in fiscal year 1978, which will be the first year of implementation of the plan. Contracts for various research tasks will be determined by public announcement of requests for proposals (RFPs). Technical personnel and administrative personnel, principally but not exclusively from LBL, will be called upon to review the proposals and negotiate acceptable contracts for research work.

It is expected that the plan will evolve with time and that after fiscal year 1978 needs for research and availability of qualified researchers will guide the budgetary needs of the program.

LBL is also expected to monitor progress of the contracts and to assist in dissemination of research results.

The review task force has been asked to continue its service into fiscal year 1978, to provide commentary of the way in which the plan is actually being carried out, and to suggest new directions of effort, as appropriate.

BUDGET

During fiscal year 1977, the principal implementation activity under this plan has been to assist in the continuation of support to geothermal projects initiated under the National Science Foundation's RANN program. These responsibilities were assigned to ERDA/DGE upon formation of ERDA. The budget for such continuations was approximately \$500,000. Work at Stanford, University of California - Riverside, Princeton University, University of Colorado, and Systems, Science and Software were supported.

During fiscal year 1978, the budget for implementing the plan is anticipated to be in the range of 1 to 2 million dollars.

INTERACTIONS WITH OTHER GROUPS

It is important to realize that although this entire activity is under the supervision of ERDA/DGE, its implementation will take place with cognizance of activities of other groups. The work being supported by EPRI is included among these other activities. It is clearly ERDA/DGE's desire to work effectively with EPRI to enhance the establishment of the capabilities noted in Figure 1 and to disseminate new knowledge.

REFERENCE

- (1) Lawrence Berkeley Laboratory. Geothermal Subsidence Research, Program Plan. LBL-5983, University of California Lawrence Berkeley Laboratory. Berkeley, California, 1977.