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The ERDA-DGE/LBL Geothermal
Reservoir Engineering
Management Program

J.H. Howard

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THE ERDA-DGE/LBL GEOTHERMAL RESERVOIR

ENGINEERING MANAGEMENT PROGRAM

J. H. Howard

Lawrence Berkeley Laboratory, University of California
Berkeley, California 94720

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INTRODUCTION

Lawrence Berkeley Laboratory (LBL) has been assigned responsibility by ERDA/Division of Geothermal Energy (DGE) for developing then implementing a plan for support of research in geothermal exploitation engineering. Although historically referred to as "REMP" (an acronym for Reservoir Engineering Management Program), the scope of the activity encompasses many aspects of geothermal exploitation engineering. Reservoir engineering, as traditionally defined, (including 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.

OBJECTIVE

The objective of this activity is to establish a higher level of capability than currently exists in all the elements shown in Figure 1, which shows the key questions regarding exploitation of geothermal resources. The elements for which research planning is being done form the basis for answers to these questions.

Of fundamental importance are these 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 these, the question of primary importance then becomes:

- How will the resource behave in the future while it is produced to serve the needs of an electric generating power plant or a non-electrical application?

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

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 what the existing capability really is, then envision a desired status, and finally to generate and implement a way "to get there."

The procedure used by REMP is similar to that used by another LBL group to develop a research plan to study subsidence resulting from production of geothermal resources (see LBL-5983). The procedure involves an iterative method between a Planning Group and a Review Task Force.

The Planning Group develops various draft plans, and the Review Task Force 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 plan will incorporate improvements that have been recognized as a result of exchanges between the Planning Group and Review Task Force. It will include a statement of all tasks that should be carried out and an assignment of priorities to each of them. The end result is a guide for research in geothermal exploitation engineering.

IMPLEMENTATION OF THE PLAN

Development of a plan is only a part of the overall program. Implementation is also the responsibility of LBL, to be done within the constraints imposed by the following factors:

- the availability of ERDA/DGE funds for this purpose;
- the existence of on-going federally funded research on certain tasks;
- the availability of suitable contractors to carry out various research tasks.

Items identified as first priority will be supported as funds allow in FY 78, the first full year of implementation of the plan. Contracts for various research tasks will be awarded after publicized requests for proposals (RFPs). Technical and administrative personnel, principally from LBL, will be called upon to review the proposals and to negotiate acceptable contracts for research work.

It is expected that the plan will evolve with time and that after FY 78, the requirements for research and availability of qualified researchers will guide the budget for the program.

LBL is 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 FY 78 to provide commentary on the way in which the plan is actually being carried out and to suggest new directions of effort if appropriate.

BUDGET

During FY 77, the principal implementation activity under this plan has been to assist in continuation of support to geothermal projects initiated under the NSF-RANN program. These responsibilities were assigned to ERDA/DGE upon formation of ERDA. The budget for such continuations was approximately \$0.5M. Work at Stanford University, University of California at Riverside, Princeton University, University of Colorado, and Systems Science and Software were supported.

During FY 78, the budget for implementing the plan is anticipated to be in the range of 1 to 2 million dollars.

INTERACTIONS WITH OTHER GROUPS

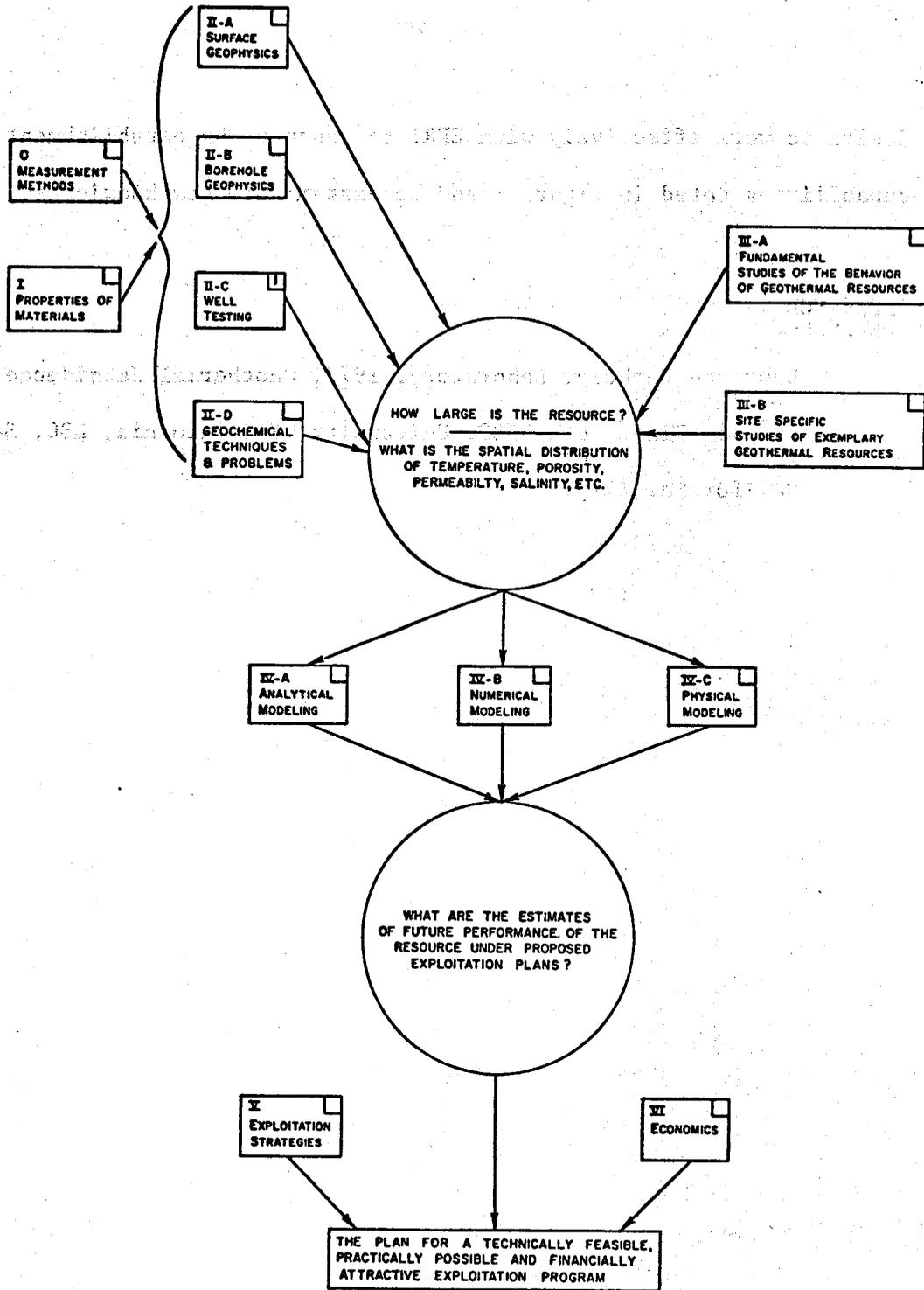
It is important to realize that, although this entire activity is under the supervision of ERDA/DGE, its implementation will take place with an awareness of the activities of other groups. The work being supported by EPRI is included among these other activities. It is clearly ERDA/DGE's

desire to work effectively with EPRI to enhance the establishment of the capabilities noted in Figure 1 and to disseminate new knowledge.

REFERENCE

Lawrence Berkeley Laboratory, 1977, Geothermal Subsidence Research, Program Plan: LBL-5983, University of California, LBL, Berkeley, California, 111p.

Work performed under the auspices of the U. S. Energy Research and Development Administration.



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Figure 1. Overview of the Geothermal Reservoir Engineering Program.