

PHASE 0 STUDY FOR A GEOTHERMAL SUPERHEATED
WATER PROOF-OF-CONCEPT FACILITY

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The TRW Systems and Energy organization is performing a Phase 0 study under a grant from the National Science Foundation. The Phase 0 study is directed to the selection of a representative liquid-dominated geothermal resource of moderate salinity and temperature, selection and conceptual design of a nominal 10-MWe energy conversion system, and implementation planning for Phase 1: Subsystem (component, experiments) and Phase 2: Final design, construction, and operation of experimental research facilities.

The objective of the overall program is to demonstrate the technical and economic viability of utilizing moderate temperature and salinity liquid-dominated resources with acceptable environmental impact, and thus encourage commercial scale development of geothermal electrical power generation. Inasmuch as the stimulation of commercial investment is a fundamental program objective, expert advisors were invited from municipal and public owned utilities and the Sierra Club who have participated in planning sessions and design reviews. The advisors include H. Hess (Sierra Club), T. Hinrichs (SDGE), L. Rasband (SCE), E. Ross (City of Riverside) and J. Woodburn (City of Burbank). The advisor's identification of development risks and economic and environmental requirements has beneficially enhanced the project planning and design decisions. Also the TRW technical resources have been extended by the retained services of recognized geothermal consultants Doctors J. Combs, G. Keller, L. Handy, and Rogers Engineering Co. adding the benefits of their experience and judgment to assuring project technical viability (Fig. 1).

The overall project is aligned to the RANN phased project planning approach as follows:

- (1) Phase 0: Advanced Research and Systems Analysis
 - (a) KGRA assessment, evaluation, and site selection.
 - (b) Energy conversion candidate assessment and concept selection.
 - (c) Conceptual design, requirements specification, and critical technology identification.

- (d) Phase 1 and preliminary Phase 2 implementation planning.
- (e) Utilization planning.
- (2) Phase 1: Systems Definition and Subsystem (Component) Testing
 - (a) Drilling and proving out wells.
 - (b) Experimental test bed development.
 - (c) Critical component testing.
 - (d) Phase 2 implementation planning.
- (3) Phase 2: Final Design, Construction and Operation of Experimental Research Facilities
 - (a) 10-MWe (nominal) power plant.

The project status to date includes the selection of the East Mesa, California, anomaly as a representative moderate temperature (350°F) and salinity (3000 to 25,000 ppm) resource. The project site selected is adjacent to the Bureau of Reclamation desalting experimental facilities. Energy conversion cycle concepts being analyzed and evaluated, to utilize this resource, are single- and two-stage flashed steam, binary and hybrid dual (flashed steam and binary). System selection will be finalized by October 15, and Phase 1 and 2 implementation planning will be completed in December 1974 (Fig. 2).

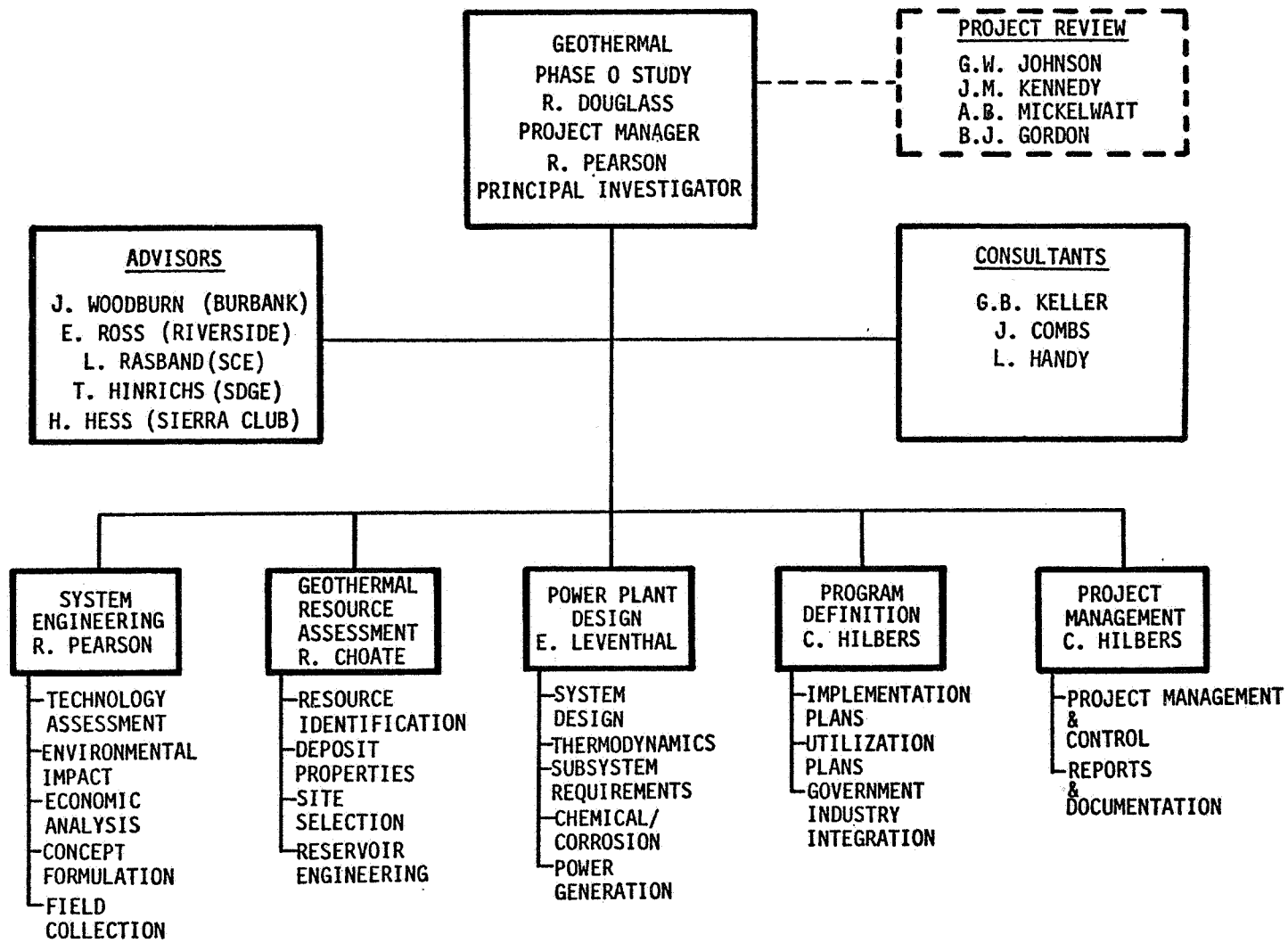


Fig. 1. Geothermal Phase 0 study functional organization

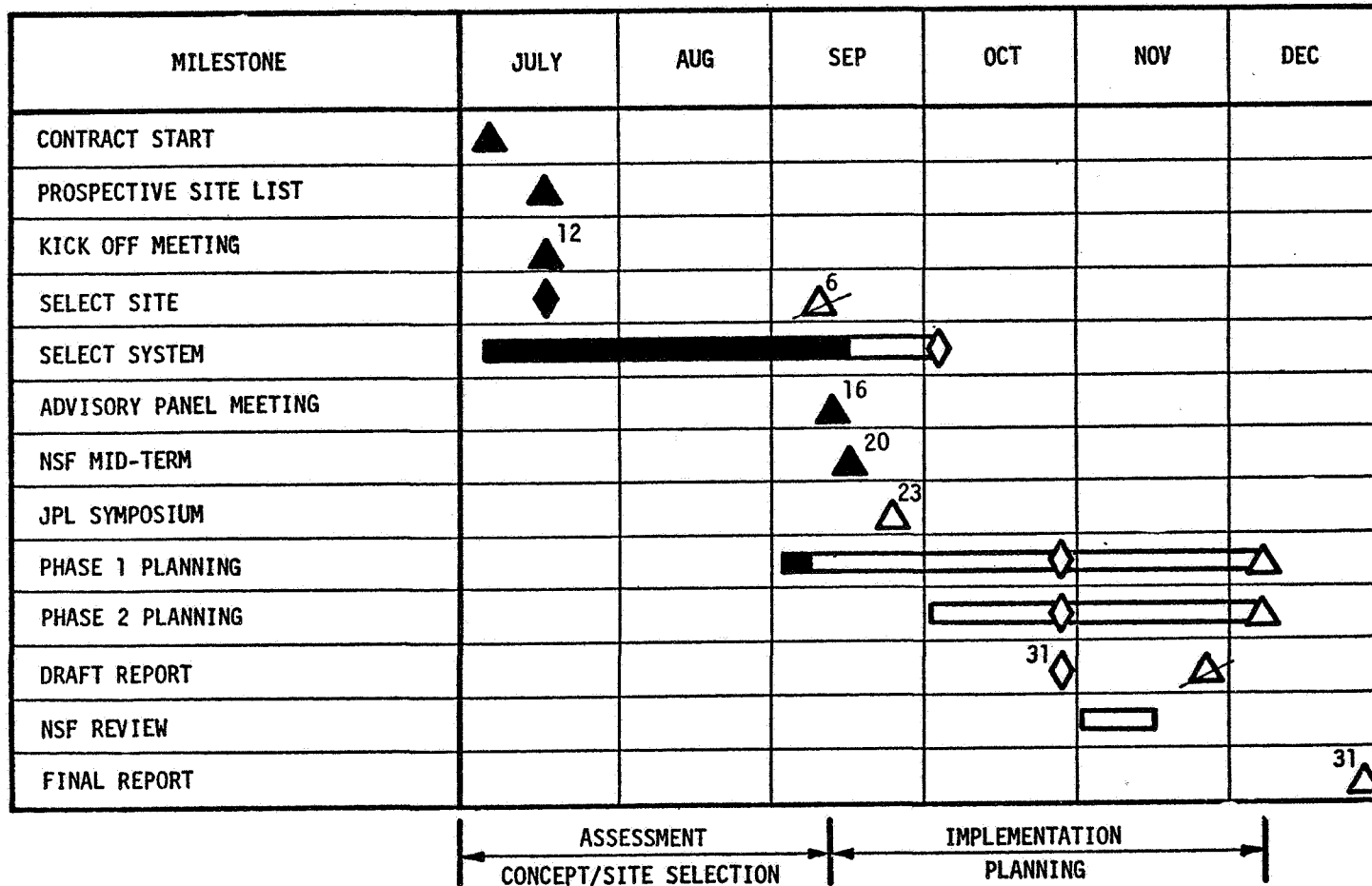


Fig. 2. Geothermal Phase 0 schedule