DOE/SF/16299--T1

QUARTERLY PROJECT STATUS REPORT

Meridian Corporation
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DOE/SF/16299--T1

DE87 003434

Contract No: DE-AC03-86SF-16299

Contract Title: Technical Analyses in Geothermal Development

Reporting Period: September - November 30, 1986

SUMMARY STATUS ASSESSMENT

Upon receipt of the executed contract at the end of September 1986, Meridian commenced mobilization of personnel and initiated planning in October for accomplishing the assigned tasks. The first task initiated was Task 4 - "Development of a Decision-Making Model for Geothermal Sludge and Solid Waste Disposal ---". Initial efforts for this reporting period were directed at preparing a literature survey and review of in-house studies and data held in the over-1500 volume geothermal library maintained by Meridian. Data gaps were identified and plans developed to address those gaps. Contingency plans were also developed for alternative means of constructing the model, dependent upon degree of success in closing the data gaps.

Task 2 - "Development of a Framework for Integrated Economic Analysis ---," was initiated in November of this reporting period with commencement of documentation of technical options for putting the four geothermal data bases (hydrothermal, geopressured, hot dry rock, magma) into a common format. Task 1 - "Assessment of Incremental Royalty Income ---," not scheduled for formal start-up until the beginning of the next reporting period, was initiated slightly early in mid-November with the establishment of contacts with the western states Bureau of Land Management offices to obtain the most recent (FY 86) geothermal leasing statistics. Analysis was also initiated on

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the existing historical leasing data base (exclusive of FY 86) which was obtained from BLM. Meridian also initiated activities under Task 5 - "Technical and Engineering Analysis ---," to prepare materials and procedures to assess R&D impacts for use by geothermal R&D managers as a tool for strategic R&D planning. The remaining contract task, Task 3 - "Impact of Artificial Intelligence/Expert Systems Technology on Geothermal Well Drilling Costs" is scheduled for initiation early in the next reporting period. The activities undertaken this reporting period on Task 3 consisted of planning for personnel mobilization and for the remaining work activities under this task.

STATUS BY TASK:

Task 1 - Assessment of Incremental Royalty Income from Enhanced Geothermal Development

This task was not scheduled for start-up until the beginning of the next reporting period. Due to the availability of data and personnel late in this reporting period, however, some gearing-up for this task was accomplished. During this reporting period most of the western state offices of the Bureau of Land Management were contacted to obtain current leasing statistics. The FY 86 figures were in preparation at the BLM offices and will be forwarded to Meridian as they become available. Efforts were also initiated in analyzing the comprehensive historical geothermal leasing data base (exclusive of FY 86) which was obtained in hard copy from BLM. These two activities are integral to preparation of the profiles of KGRA's and selected non-competitive geothermal areas which form the basis for the remaining activities under this task.

Over the coming reporting period the profiles developed for DOE by others in 1981 will be updated to current status in preparation for the remaining analyses under this task.

Task 2 - Development of a Framework for Integrated Economic Analysis of U.S. Geothermal Energy Availability

This task was initiated in late November with commencement of documentation of technical options for presentation of energy cost and supply data within a common format across the four geothermal technologies (hydrothermal, geopressured, hot dry rock and magma). Accomplishment of this effort provides the basis for the remainder of the task activities in developing the integrated economic analysis framework.

Over the coming reporting period, Meridian anticipates completing the following subtasks:

1) Develop the integrated economic analysis frame work. This will be in the form of recommendations, for review by organizations that hold the relevant data bases and models, and review/approval by SAN.

2) Determine availability of data bases and models. This entails discussions with DOE R&D program managers, and working with them to develop working relationships with National Laboratory and other contractor personnel who have the best knowledge of the status of these items. Interview those staff to ascertain status and capabilities of data bases and models.

3) Establish criteria for comparison of data bases and models. Complete a preliminary comparative analysis of existing analytical capabilities, to form basis of options for least cost procedures on how to attain the required results.

Task 3 - Impact of Artificial Intelligence/Expert Systems (AI/ES) Technology on Geothermal Well Drilling Costs

This task was not scheduled for initiation during this reporting period. The task will be initiated in December with conduct of an in-house literature survey, augmented by accessing both computerized and published bibliographies. The purpose of the literature search and review process is to:

1) determine the scope and extent of artificial intelligence/expert systems applications and development within the U.S. industry (oil/gas/geothermal); and

2) develop a list of potential AI/ES applications to the drilling process, and within the drilling process by major activity or phase.

During the coming reporting period the detailed methodology for assessing the impact of potential AI/ES applications on geothermal drilling and costs will also be established. Contacts will be made with industry researchers and within the DOE geothermal R&D program to provide further information on trends in AI/ES drilling R&D and potential applications. Coincident with this effort will be initiation of participation in the task by R. Rinaldi, Meridian's drilling consultant. Mr. Rinaldi will assist with the identification of potential AI/ES applications, and most particularly with the inputs needed to assess the impacts upon drilling and well costs.

Task 4 - Development of a Decision-Making Model for Geothermal Sludge and Solid Waste Disposal Versus Pollutant Removal Techniques

By the end of the reporting period the in-house literature from Meridian's geothermal library had been surveyed with respect to studies identifying the composition and volumes of solid wastes emanating from geothermal power plant operation, federal and state laws regulating the transport and disposal of solid and hazardous wastes, and existing and advanced processes/techniques for treating geothermal solid wastes. The survey indicates that the following major data gaps exist and must be addressed:

1) solid waste/sludge components and concentrations over a range of geothermal fields

2) processes and procedures for alternative disposal treatment/practices

3) projected costs for alternative treatment processes and practices.

Over the coming reporting period, these gaps will be addressed through accessing computerized and published bibliographic data bases and contacts with vendors and researchers in solid waste treatment processes and techniques. The

technical interim report issued by the USEPA (Wastes from the Exploration, Development and Production of Crude Oil, Natural Gas and Geothermal Energy - EPA/530-SW-86-051) obtained during this reporting period, will also be reviewed for pertinent information. If the data and information to fill these gaps does not exist or is not obtainable, the accuracy of the model with respect to at least alternative treatment processes may be impacted. Should this be the case, two alternative approaches are being considered for construction of the model. The first alternative approach is to develop a general economic model which would require extensive cost inputs by the user. The second approach is to develop a model which addresses current treatment/disposal practices and costs as the basis against which to evaluate alternative treatment/disposal practices and costs. This second approach would use a decision-tree analysis for defining the base case (current practices). The benefit of this approach is that, in the event that insufficient cost data is available for alternative treatment/disposal practices, relative comparisons to the base case could still be made and would provide a rational basis for determining the benefit of alternatives on the costs of geothermal plant operation. It is anticipated that the decision between the two approaches will be made in early January, at which time construction of the model itself will commence. By the end of the next reporting period, it is anticipated that development of the draft decision model will be nearing completion.

Task 5 - Technical and Engineering Analyses Associated with Strategic Planning of Geothermal R&D

During this reporting period, Meridian was tasked by SAN with preparation of ~~means~~ materials and procedures for assisting geothermal R&D managers in evaluating R&D program impacts including development of suitable reports and ~~materials~~ summaries for

technical interim report issued by the USEPA (Wastes from the Exploration, Development and Production of Crude Oil, Natural Gas and Geothermal Energy - EPA/530-SW-86-051) obtained during this reporting period, will also be reviewed for pertinent information. If the data and information to fill these gaps does not exist or is not obtainable, the accuracy of the model with respect to at least alternative treatment processes may be impacted. Should this be the case, two alternative approaches are being considered for construction of the model. The first alternative approach is to develop a general economic model which would require extensive cost inputs by the user. The second approach is to develop a model which addresses current treatment/disposal practices and costs as the basis against which to evaluate alternative treatment/disposal practices and costs. This second approach would use a decision-tree analysis for defining the base case (current practices). The benefit of this approach is that, in the event that insufficient cost data is available for alternative treatment/disposal practices, relative comparisons to the base case could still be made and would provide a rational basis for determining the benefit of alternatives on the costs of geothermal plant operation. It is anticipated that the decision between the two approaches will be made in early January, at which time construction of the model itself will commence. By the end of the next reporting period, it is anticipated that development of the draft decision model will be nearing completion.

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management review and for use in strategic planning of R&D initiatives. With guidance from DOE, Meridian prepared a statement of work which was submitted to a suggested systems management subcontractor. The resulting technical and cost proposal received from the subcontractor was under Meridian review at the end of this reporting period. Meridian anticipates award of a contract to the subcontractor during the next reporting period to assist with this assignment, pending satisfactory completion of the reviews.

BUDGET STATUS:

Total Contract Value:	$214,580.00
Costs Incurred This Period:	11,407.45
Budget Remaining:	$203,172.55