INTRODUCTION

The Third Workshop on Geothermal Reservoir Engineering convened at Stanford University on December 14, 1977, with 104 attendees from six nations. In keeping with the recommendations expressed by the participants at the Second Workshop, the format of the Workshop was retained, with three days of technical sessions devoted to reservoir physics, well and reservoir testing, field development, and mathematical modeling of geothermal reservoirs. The program presented 33 technical papers, summaries of which are included in these Proceedings.

Although the format of the Workshop has remained constant, it is clear from a perusal of the Table of Contents that considerable advances have occurred in all phases of geothermal reservoir engineering over the past three years. Greater understanding of reservoir physics and mathematical representations of vapor-dominated and liquid-dominated reservoirs are evident; new techniques for their analysis are being developed, and significant field data from a number of newer reservoirs are analyzed.

The objectives of these workshops have been to bring together researchers active in the various physical and mathematical disciplines comprising the field of geothermal reservoir engineering, to give the participants a forum for review of progress and exchange of new ideas in this rapidly developing field, and to summarize the effective state of the art of geothermal reservoir engineering in a form readily useful to the many government and private agencies involved in the development of geothermal energy. To these objectives, the Third Workshop and these Proceedings have been successfully directed.

Several important events in this field have occurred since the Second Workshop in December 1976. The first among these was the incorporation of the Energy Research and Development Administration (ERDA) into the newly formed Department of Energy (DOE) which continues as the leading Federal agency in geothermal reservoir engineering research. The Third Workshop under the Stanford Geothermal Program was supported by a grant from DOE through a subcontract with the Lawrence Berkeley Laboratory of the University of California. A second significant event was the first conference under the ERDA (DOE)-ENEL cooperative program where many of the results of well testing in both nations were discussed. The Proceedings of that conference should be an important contribution to the literature.

These Proceedings of the Third Workshop should also make an important contribution to the literature on geothermal reservoir engineering. Much of the data presented at the Workshop were given for the first time, and full technical papers on these subjects will appear in the professional journals. The results of these studies will assist markedly in developing the research programs to be supported by the Federal agencies, and in reducing the costs of research for individual developers and utilities. It is expected that future workshops of the Stanford Geothermal Program will be as successful as this third one.

Planning and execution of the Workshop was carried out with the assistance of a great many individuals. The Program Committee consisted of Robert Christiansen (USGS-Menlo Park), George Frye (Aminoil USA), Roland Horne (Stanford Geothermal Program), John Howard (Lawrence Berkeley Laboratory), Paul Kruger (Stanford Geothermal Program), Lloyd Mann (Chevron Oil Company), Stephen Lipman (Union Oil Company), Henry J. Ramey, Jr. (Stanford Geothermal Program), and Werner Schwarz (Lawrence Berkeley Laboratory).

The Program Committee recommended two novel sessions for the Third Workshop, both of which were included in the program. The first was the three overviews given at the Workshop by George Pinder (Princeton) on the Academic aspect, James Bresee (DOE-DGE) on the Government aspect, and Charles Morris (Phillips Petroleum) on the Industry aspect. These constituted the invited slate of presentations from the several sectors of the geothermal community. The Program Committee acknowledges their contributions with gratitude.

Recognition of the importance of reservoir assurance in opting for geothermal resources as an alternate energy source for electric energy generation resulted in a Panel Session on Various Definitions of Geothermal Reservoirs. Special acknowledgments are offered to Jack Howard and Werner Schwarz (LBL) and to Jack Howard as moderator; to the panelists: James Leigh (Lloyd's Bank of California), Stephen Lipman (Union Oil), Mark Mathisen (PG&E), Patrick Muffler (USGS-MP), and Mark Silverman (DOE-SAN); and to the rapporteurs: George Frye (Aminoil), Vasel Roberts (Electrical Power Research Institute), and Alexander Graf (LBL), whose valuable summaries are included in the Proceedings.

Special thanks are also due Roland Horne, Visiting Professor from New Zealand and Program Manager of the Stanford Geothermal Program, for his efforts with the Program graduate students in conducting the Workshop. Further thanks go to Marion Wachtel, who in spite of tremendous personal hardship, administered the Workshop and prepared the Proceedings in a timely and professional manner. Professor Ramey and I also express our appreciation to the Department of Energy, whose financial support of the Workshop made possible the program and these Proceedings.

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