

4.1.4 Creation of an Enhanced Geothermal System through Hydraulic and Thermal Stimulation

Presentation Number: 009

Investigator: Rose, Peter (University of Utah)

Objectives: To create an Enhanced Geothermal System on the margin of the Coso field through the hydraulic, thermal, and/or chemical stimulation of one or more tight injection wells; to increase the productivity of the Coso field by 10 MWe; and to develop and calibrate geomechanical, geochemical, and fluid flow models in order to extend the Coso/EGS concepts to wherever appropriate tectonic and thermal conditions apply.

Average Overall Score: 2.0/4.0

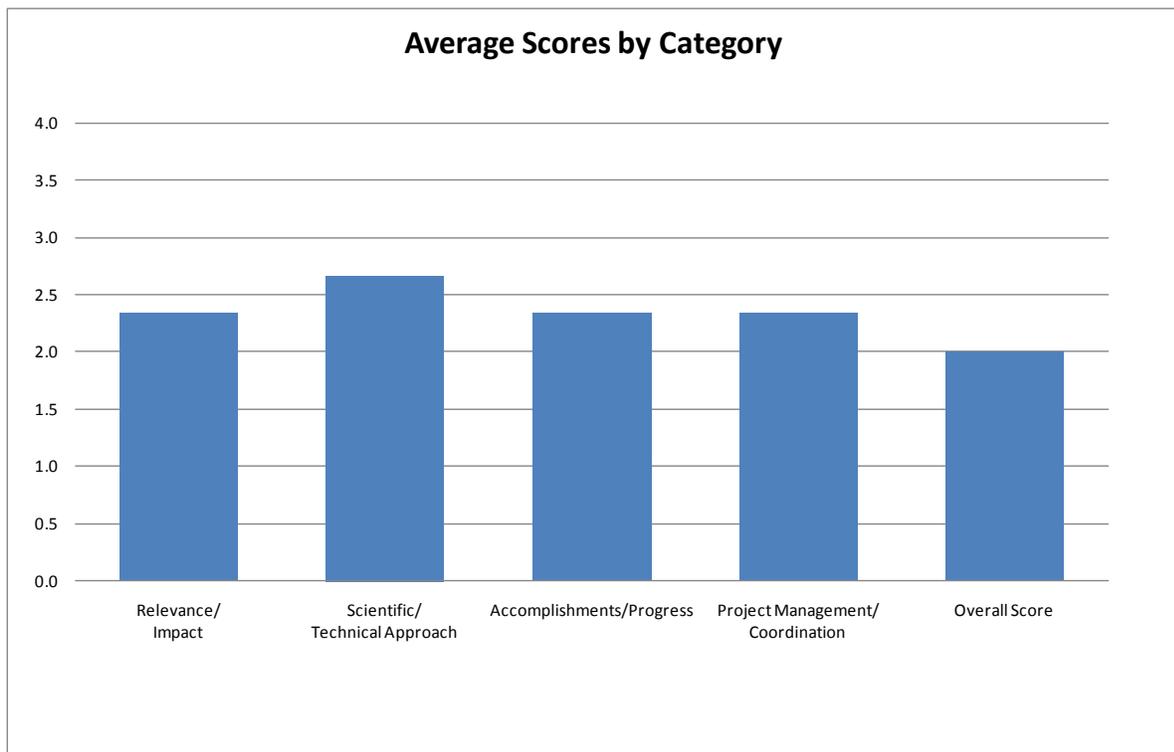


Figure 8: Creation of an Enhanced Geothermal System through Hydraulic and Thermal Stimulation

4.1.4.1 Relevance/Impact of the Research

Ratings of Three-member Peer Review Panel: Poor (1), Outstanding (4), Fair (2)

Supporting comments:

- Increased understanding of the Coso geothermal field was developed but the project is complete and did not result in a demonstration of EGS concepts and did not result in increased production. An increased understanding of the geomechanical setting and fluid flow were developed but at an unjustified price of about \$11 million.

- The project, now essentially finished, was of primary importance to EGS development on the periphery of known hydrothermal systems, and was well funded. It was only partly successful as an EGS demonstration due to the drill encountering high permeability fractures in 34-9RD2, obviating the need for a stimulation experiment. Low pressure stimulation of 34-9A produced a good injector. An EGS reservoir was never produced. A great deal of new information was obtained from this project, so while it might have failed as an EGS demonstration, it was a success at developing information and experience valuable elsewhere.
- This Coso EGS demonstration project, if successful, might make a contribution to the Geothermal Program mission. The project activities could illuminate, not necessarily solve, known technical barriers, such as stimulating permeability in tight wells and improving connectivity? If this project is successfully completed, this reviewer believes that the EGS program will benefit somehow and that the results will surely add to the EGS technology knowledge base and toolbox. This program is the oldest EGS project in the portfolio and encountered severe drilling problems. It is not clear from the presentation if project goals have been met at all. It is not clear from vast amount of studies if anything tangible was produced.

4.1.4.2 Scientific/Technical Approach

Ratings of Three-member Peer Review Panel: Good (3), Good (3), Fair (2)

Supporting comments:

- The quality of the technical/scientific approach of this project is sound, however the primary objectives of the project were not met.
- The technical approach was good.
- The overall technical approach is reasonable, however, the details are not clearly presented. This work is not state-of-the-art R&D but rather applied technology, which is appropriate for a demonstration project. There are adequate resources and more than sufficient rigor of the work elements, procedures and methods but it doesn't look like the project objectives will be met. The overall design of the project is straightforward and deemed reasonable and the technical approach is adequately described and clearly laid-out in the tasks provided and project timeline but it is not clearly spelled-out in the presentation as to why it took almost 8 years to do a proper stimulation. That being said, many studies have been accomplished in that time period.

4.1.4.3 Accomplishments, Expected Outcomes and Progress

Ratings of Three-member Peer Review Panel: Fair (2), Good (3), Fair (2)

Supporting comments:

- While an increased understanding of the Coso field was developed and the personnel involved were outstanding, the project was plagued with problems and did not meet the primary objectives. Were it not for the quality science associated with this project, poor would have been the score.

- The project team was well qualified for this project, and included university, government and industry scientists and engineers.
- The overall quality of the research team, equipment and facilities is adequate. The reviewer does not know the PI but some of the researchers on this team are known to this reviewer and are high caliber. Relevant experience and the balance of appropriate skills on the research team are good. Was not able to ascertain the cost or schedule variance to date since current costing and original schedule were not supplied. Clearly, the most important task in this 8+ year project, the stimulation, has not been successfully done yet for some reason.

4.1.4.4 Project Management/Coordination

Ratings of Three-member Peer Review Panel: Fair (2), Good (3), Fair (2)

Supporting comments:

- The material provided made it difficult to assess the quality of project management - however the results of the project biased this reviewer to a fair rating.
- Project management was good.
- The technical, policy, business, and spend plans for the project are well thought-out, make sense and are, at least logistically, on track. There are no decision points presented in the schedule, though a decision point was mentioned in the text.

4.1.4.5 Overall

Ratings of Three-member Peer Review Panel: Poor (1), Good (3), Fair (2)

Supporting comments:

- As noted previously, good science was achieved for this project, but the project was a failure. The reviewer is not pointing fingers here but this was a project to demonstrate EGS viability. The program needs to ensure that demonstration projects result in demonstration activities. Is it possible for some science to be postponed in demonstration projects until the viability of demonstration efforts are established?
- The results of this project have been well publicized in the literature during the last half dozen years. Although the project was well conceived, it largely failed as an EGS demonstration. However, the base of knowledge and experience gained makes this an interesting and informative case study.
- Overall, this is a very fair project and this reviewer recommends that the project be re-evaluated before proceeding. The report was not made available to the reviewer, only the presentation. Information was not made available in the presentation in order to assess project schedule and cost variance nor assess project success. Also, it was not explained as to why the project has continued so long.

4.1.4.6 PI Response

No response.