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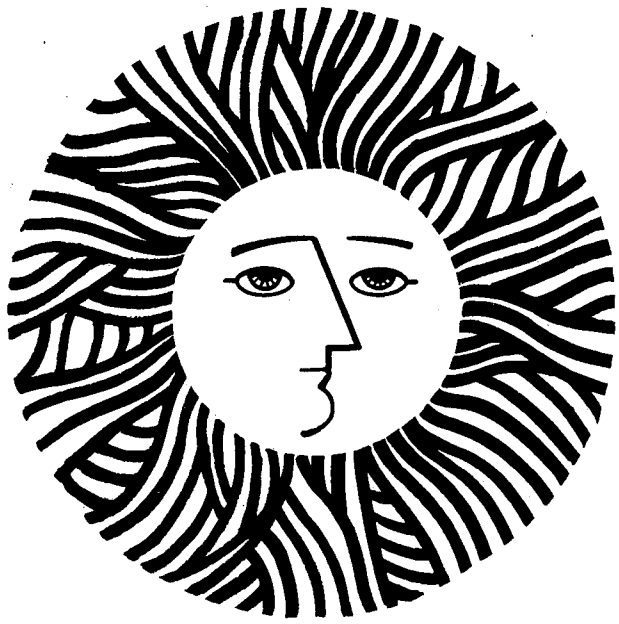

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May 15, 1981

TO: Charles Grua, Brian Harney, and Art Hartstein

FROM: Peter Persoff, Bill Hall, Mohsen Mehran, and Phyllis Fox

RE: Monthly Progress Report for April
Control Technology for In-Situ Oil Shale Retorts
LBID-398

PRESENTATIONS AND PUBLICATIONS

The paper "Hydrogeologic Consequences of the Modified In-Situ Retorting Process, Piceance Creek Basin, Colorado" by M. Mehran, T. N. Narasimhan, and J. P. Fox was presented at the Fourteenth Oil Shale Symposium, Golden, Colorado, April 24, 1981, and will appear in the Proceedings of this symposium.

TASK 3. BARRIER OPTIONS

Evaluation of Set Retarders for Class C Fly Ash

Several set retarders for Comanche Fly Ash (class C) have been evaluated in time of set tests. The most effective of these is citric acid, which is effective at 0.1% addition.

Improved Test Procedures for Second Series of Candidate Grouts

Triaxial compressive strength tests on the first series of candidate grouts (series Q) have been inconclusive. Expected increase in stiffness with confining pressure was not observed. To resolve this, in the next series of tests, samples will be presaturated, and pore pressure measured during consolidation. Saturation is measured by the parameter $B = \Delta u/\Delta\sigma$ where Δu is the increase in pore pressure and $\Delta\sigma$ is the increase in axial stress. Presaturation is accomplished by jacketing the specimen with filter paper and flexible membranes, and standing it (not submerged) in de-aired water under a vacuum, in a manner similar to that used for permeability tests. For a sample of grout R-1, B was measured initially at 0.18, and after 10 days at 0.97. Complete saturation would theoretically give $B = 1.0$. Triaxial tests with this presaturation step are expected to show increased stiffness with confining pressure, which is believed to be actually indicative of in-situ behavior.

In this second series of tests, the permeability test will also be improved by forcing water through the specimens against a back pressure as opposed to atmospheric pressure.

Development of Work Plan for Surface Spent Shale Disposal

We are now investigating industry proposals for disposal of surface spent shales. A work plan to investigate the problems of fugitive air emissions (from hot spent shale and from retort water used to moisten spent shale) and transport of leachates within and from disposal piles is being written.

TASK 5. LEACHING OPTIONS

Leaching of Organics from Spent Oil Shale

Work continues on fitting experimental data to the leaching model. Efforts were concentrated on the investigation of the kinetics of TOC transfer between the solid and liquid phases. We are presently investigating the effects of the inorganic salt concentration (TDS) in the leachate on the TOC mass transfer coefficients. The transfer of TOC occurs over a relatively wide range of TDS. For example, in a typical column leachate TDS ranges from about 8000 mg/l at the start of a run to less than 500 mg/l at the end. These investigations do not require any additional experimental work since EC (electrical conductivity) and pH were measured routinely in all samples along with TOC.

We have begun to prepare a draft of the final report for the study.

TASK 6. GEOHYDROLOGIC MODIFICATIONS

The program ROCMAS has now been modified to exclude stress computations for more efficient flow computations. It can handle the flow of water and heat simultaneously. This program is also capable of handling fracture flow, by treating fractures as material elements.

The program is now being checked against an analytic solution. The next step will be inclusion of unsaturated flow.

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