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## Recent Work

### Title

CONTROL TECHNOLOGY FOR IN-SITU OIL SHALE RETORTS

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# Lawrence Berkeley Laboratory

UNIVERSITY OF CALIFORNIA

## ENERGY & ENVIRONMENT DIVISION

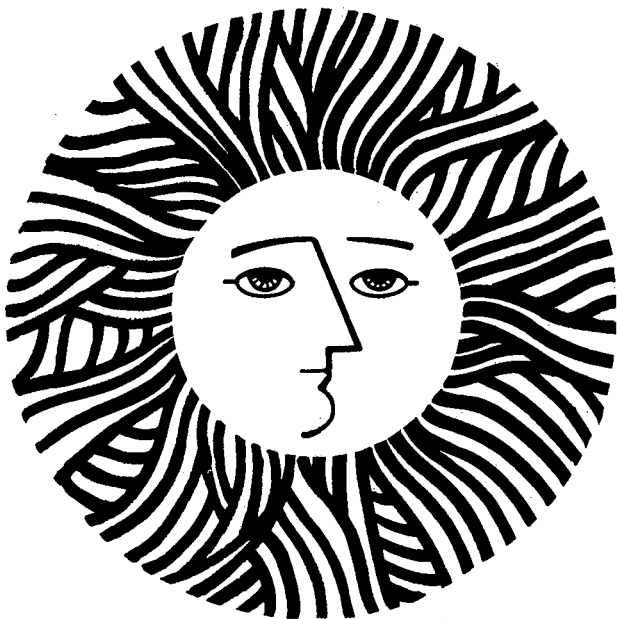
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February 9, 1981

TO: Charles Grua, Brian Harney, and Art Hartstein  
FROM: Peter Persoff, Bill Hall, Mohsen Mehran, and Phyllis Fox  
RE: Monthly Progress Report for January  
Control Technology for In-Situ Oil Shale Retorts  
LBID-364

TASK 3. BARRIER OPTIONS

Evaluation of Fly Ashes as Grout Ingredients

Previous work has shown that class C fly ash containing  $C_3A$ , with added gypsum, improves the strength of grouted cores. Additional samples of class C fly ashes are being acquired and examined by X-ray diffraction for  $C_3A$ . A program has been initiated to determine the optimum level of gypsum addition.

Penetration of Non-Newtonian Grouts through Beds of Packed Particles

Bentonite-water slurries which are Bingham fluids have been injected into vertical circular lucite tubes to determine the relationship between pore diameter, injection pressure, yield stress of the fluid, and penetration distance. Preliminary results confirm Raffle and Greenwood's relationship:

$$L = \frac{(P_1 - P_2) R}{2\tau_y}$$

where L = penetration distance

$P_1$  = injection pressure

$P_2$  = pressure at grout front

R = pore radius

$\tau_y$  = yield stress of grout

when grout displaces air. When grout displaces water, however, penetration is greater, due apparently to the lubricating effect of a thin film of water between the grout and the tube wall.

TASK 5. LEACHING OPTIONS

Leaching of Organics from Spent Shale

Work continued on the statistical analysis of data from batch and small column leaching experiments. This experimental work is now completed. The only remaining experimental work, leaching of 1 ft diameter by 10 ft long spent shale columns, is being delayed until data analysis from small columns is complete.

TASK 6. GEOHYDROLOGIC MODIFICATION

Dewatering and Reinvasion Calculations

Reviewers' comments are being incorporated in the report "An Investigation of Dewatering for the Modified In-Situ Retorting Process, Piceance Creek Basin, Colorado (LBL-11819)". This groundwater flow model will next be modified to handle solute transport. Several existing solute transport models are being reviewed to evaluate the ability of control technologies to mitigate in-situ leaching.

This report was done with support from the Department of Energy. Any conclusions or opinions expressed in this report represent solely those of the author(s) and not necessarily those of The Regents of the University of California, the Lawrence Berkeley Laboratory or the Department of Energy.

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