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Title
CONTROL TECHNOLOGY FOR IN-SITU OIL SHALE RETORTS

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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$_3$A, 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$_3$A. 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 penetra­
tion 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.
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