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THE PARTITIONING OF MAJOR, MINOR, AND TRACE ELEMENTS DURING SIMULATED IN-SITU OIL SHALE RETORTING

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Authors

Cantor, Jeremy
Joseph, Laura H.
Persoff, Peter
et al.

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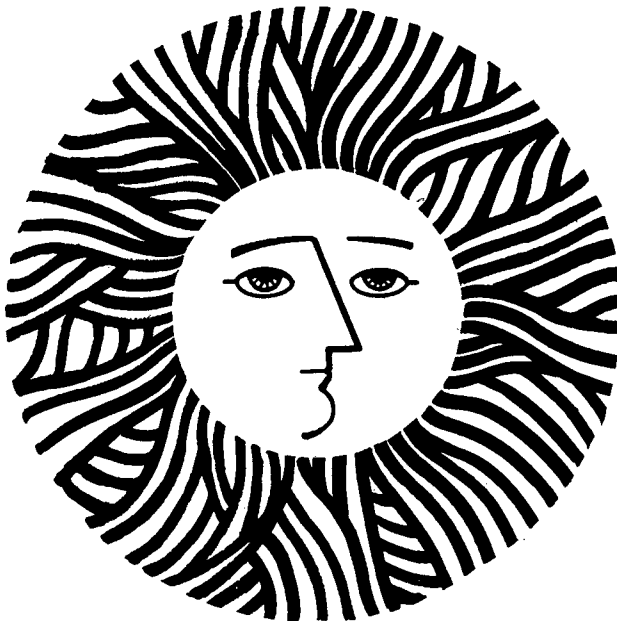
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January 7, 1981

TO: Brian Harney and Art Hartstein
 FROM: J. Cantor, L. Joseph, P. Persoff, and P. Fox
 RE: December Monthly Progress Report
 The Partitioning of Major, Minor, and Trace Elements
 During Simulated In-Situ Oil Shale Retorting
 LBID-336

ARSENIC SPECIATION STUDIES

HPLC/GFAA analysis of retort waters from the interlaboratory study, plus one from LBL's experimental retort, is continuing. Table 1 shows the compounds identified to date.

Table 1. Arsenic compounds identified in retort waters by HPLC/GFAA.

Water	o = absent		+ = present	
	Methyl- arsonic acid	Phenyl- arsonic acid	Arsenate	Arsenic peak at solvent front
OXY-6 condensate	o	o	o	+
OXY-6 process	+	o	+	+
Geokinetics 17	+	o	+	+
Paraho-77/78	+	o	+	+ ^a
Diluted Paraho-77/78	+	o	+	+
LBL-06	+ ^b	o	+	+

^aidentified as arsenite

^bdoubled peak

Retention times are apparently affected by the ionic strength of the sample matrix. This shortening of retention times was greatest for the Paraho water. Reliable identification, based upon column retention time

and confirmed by spiking, is possible for methylarsonic acid, phenylarsonic acid, and arsenate, while compounds which interact weakly with the ion exchange resin are rapidly eluted by other ions in the sample and appear as an arsenic peak at the solvent front. This peak could be arsenite, cacodylic acid, other weakly interacting compounds, or neutral compounds. This solvent front peak was noted for all waters tested. In the case of the Paraho-77/78 water, we were able to identify this peak in isolation from most of the sample matrix by collecting the solvent front and reinjecting it, i.e., by using the column preparatively. The reinjected sample showed one peak, identified as arsenite by retention time, and no arsenic at the solvent front. This identification was confirmed by spiking the sample with a known amount of arsenite. We have not yet been able to accomplish this with any other retort waters. In order for this method to be useful, the compound(s) at the solvent front must be present in sufficiently high concentrations to still be detectable after the approximately eightfold dilution that occurs between injection and collection. This may limit the method's usefulness.

ERRATUM

November Monthly Progress Report
The Partitioning of Major, Minor, and Trace Elements
During Simulated In-Situ Oil Shale Retorting
LBID-323

In paragraph three, line 2 change "greater retention times" to
"shorter retention times".

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UNIVERSITY OF CALIFORNIA
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