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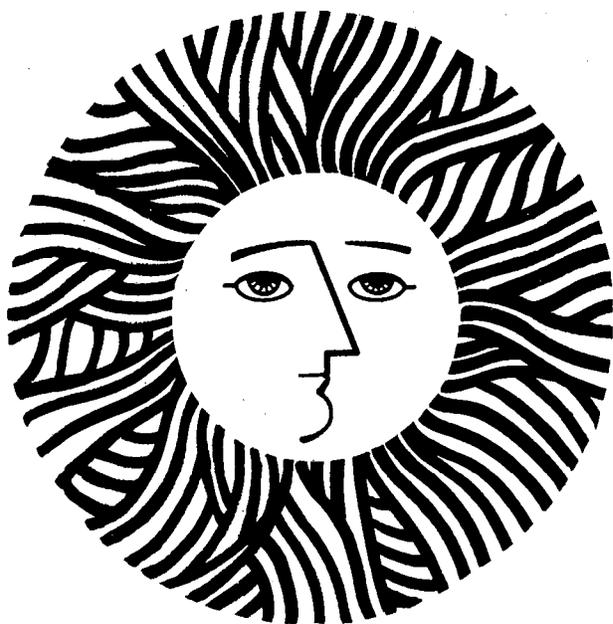
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July 1, 1981

TO: Charles Grua

FROM: Richard Sakaji and Bonnie Jones; Frank Pearson and  
Christian Daughton (SERL)

RE: Monthly Progress Report for June  
Steam Stripping Project  
LBID- 425

ANALYTICAL METHODS DEVELOPMENT

Ammonia Determination

Results for ammonia determined by our modification of Weatherburn's version of the phenate method compared favorably with results from the standard distillation/acidimetric titration method. Five replicate determinations for ammonia in Oxy-6 gas condensate by the phenate and titrimetric methods gave mean values for  $\text{NH}_3\text{-N}$  (mg/L) of 6806 (rsd = 1.43%) and 6759 (rsd = 1.05%), respectively. The reproducibility of 3-5% rsd for previous determinations by the phenate method has been improved to 1.5% rsd. This method is sufficiently insensitive to volatile amines; the close agreement of the data from the two methods therefore indicated that there were not sufficient quantities of volatile amines present in Oxy-6 gas condensate to produce a positive interference in the titrimetric method. The advantages of the phenate method are speed and capacity for sample handling.

Experimentation using a Beckman ammonia electrode suggested that although an adequate calibration curve can be prepared, the applicability of the method is limited. For the ammonia determination, an excess of sodium hydroxide must be added to each sample. High concentrations of hydroxide ion, however, cause an unstable response with a severe drift. Furthermore, since the response is logarithmic, any instability in response can result in very large errors at high concentrations of ammonia. Frequent membrane replacement might improve this condition. Determination by the technique of standard additions was attempted according the manufacturer's instructions, but results were incorrect by more than an order of magnitude.

### Carbon Analysis

A major problem with the quartz combustion tube of the Coulometrics Carbon Analyzer is its susceptibility to attack by salts. This necessitates the dilution of all oil shale process waters. We have therefore replaced the quartz combustion tube of a Coulometrics Carbon Analyzer with the more durable ceramic combustion tube from a Beckman 915A Carbon Analyzer. The tube was packed with Beckman's materials according to the manufacturer's instructions. The modified analyzer was then tested with both organic (potassium acid phthalate) and inorganic (sodium carbonate) carbon standards with 94 and 100% recovery, respectively. In preliminary tests with Oxy-6 retort water, injection of undiluted sample yielded a total organic carbon concentration that was 98.7% of the value calculated from samples diluted 1:50. Although, the injection of undiluted samples increases analysis time from 3 to 6 minutes, it saves time that would otherwise be required for trial-and-error dilutions, eliminates errors and artifacts caused by dilution, and eliminates instrument downtime due to broken quartz tubes.

### STEAM STRIPPER DESIGN

#### Fabrication

The control panel for the steam stripper has been fabricated. The controls have been installed in the panel, and the final wiring will be completed when the sensors are assembled and installed on the steam stripper. Wiring from the main electrical switchboard to the control panel and load points was begun.

The machining of the stainless steel flanges has begun and about half of the drilling and tapping has been completed. The tungsten inert gas welder, which will be used to construct the stainless steel steam stripper, was made operational after general problems were overcome. Construction of the stripper can begin as soon as the stainless steel pipe arrives.

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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