The University of Kansas
Space Technology Center

PROGRESS REPORT

FOR

THE PERIOD SEPTEMBER-NOVEMBER

FOR

SKYLAB STUDY OF WATER QUALITY

NASA CONTRACT NAS 9-13271

EREP PROPOSAL NO. 540-G1

TASK-347

SITES-416 + 423

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SUMMARY OF RESEARCH OBJECTIVES

Two Kansas reservoirs will be studied using Skylab data in conjunction with simultaneous ground truth information in an attempt to detect and monitor various parameters of water quality. Water samples will be collected from the reservoir or reservoirs under investigation and low-level aircraft support missions will be flown to acquire photographs which will approximate the spectral coverage of forthcoming Skylab photographs. Image analysis and data processing techniques will be developed to aid in the correlation of Skylab data with ground truth data and supporting aerial photography.

A. OVERALL STATUS

One EREP data taking mission was executed in conjunction with this study on Sept. 18, 1973 along track 58. This mission did not cover our primary study areas, Perry and Tuttle Creek reservoirs, in northeast Kansas, but did gather data over four reservoirs in southeast Kansas. These four lakes, Redmond, Toronto, Fall River and Elk City reservoirs where sampled on the day of the mission as nearly as possible to the time of actual overflight. Water samples were collected from ten stations on Redmond, Toronto and Elk City and from six stations on Fall River.

These samples have been analyzed by the Geochemistry Section of the Kansas Geological Survey. Each sample has been analyzed for the following ion concentrations: bicarbonate, carbonate, calcuim, magnesium, potassium, sodium, sulfate and chloride. In addition, total solids, total heat-stable solids, suspended solids, heat-stable suspended solids, and pH have been determined.

Low level aircraft support had been proposed to coincide with ground truth gathering during EREP data missions, however mechanical failure prohibited this during the September 18th mission. A subsequent accident incurred during landing has placed the CRINC-owned aircraft out of commission indefinitely. It is likely that the aerial photographic equipment can be adapted to a smaller plane which will be rented to carry out photographic missions for upcoming EREP data missions.

B. RECOMMENDATIONS CONCERNING DECISIONS AND/OR ACTIONS REQUIRED TO ENSURE ATTAINMENT OF THE EXPERIMENTS SCIENTIFIC OBJECTIVES

NONE.

C. EXPECTED ACCOMPLISHMENTS DURING THE NEXT REPORTING PERIOD.

Data recorded during the September 18th EREP mission should be received during the next reporting period. Comparison of this data with water sample analyses will then begin to determine those water parameters which can be detected and potentially monitored. The IDECS (Image Discrimination Enhancement and Combination System) of the Remote Sensing Lab and as well as tape reading programs will be used in this endeavor.

D. SIGNIFICANT RESULTS AND THEIR RELATIONSHIP TO PRACTICAL APPLICATIONS OR OPERATIONAL PROBLEMS.

NONE.

E. SUMMARY OUTLOOK FOR THE REMAINING EFFORT TO BE PERFORMED.

Potential EREP missions performed by the third manned Skylab flight will occur during the winter. Past experience has shown that freezing of Kansas reservoirs begins in late November, and partial freezing is likely from that time to March. In addition, several periods of total freeze-over are likely during this time, even for the largest reservoirs. As a result, ground truth gathering during the next Skylab mission will be constrained by the amount of open water.

Any data acquired during the forthcoming mission will be useful in determining the utility of Skylab's sensors in detecting water quality variations during low sun angle conditions. Study of ERTS-1 imagery has shown it to be of marginal usefulness in studying water when the sun angle is low. It is hoped that the Skylab sensors will be more efficient under such conditions.

F. TRAVEL SUMMARY AND PLANS.

NONE.

FINANCIAL REPORT

A statement of financial status for this project will be sent under separate cover by the CRINC accounting office.