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FIRST QUARTERLY PROGRESS REPORT
(8 March - 8 June 1973)

APPLICABILITY OF SATELLITE REMOTE SENSING FOR MONITORING SURFACE MINING ACTIVITIES

SKYLAB EREP INVESTIGATION 9669
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1.0 INTRODUCTION

The objective of this investigation is to evaluate EREP imagery as a means of detecting and monitoring strip mines, their effects, and reclamation activities. EREP S-190 A and S-190 B imagery of a tri-state test area will be analyzed, and some S-192 thermal imagery during a night time pass is desired in hopes of detecting acid waste waters whose temperatures might exceed those of the surrounding environment.

Initially, the investigation will consist of a census of active and inactive strip mines along with estimates of disturbed and reclaimed acreage. Notable damage to the environment will also be included.

The primary test site (816556) extends from latitude 39°00'N to 40°30'N, and longitude 80°00'W to 83°00'W; and encompasses portions of Ohio, West Virginia, and Pennsylvania. The alternate test site (816557) extends from latitude 37°00'N to 39°00'N, and longitude 86°00'W to 89°00'W; and encompasses portions of Indiana, Kentucky, and Illinois.

2.0 PROGRESS (8 March 1973 to 8 June 1973)

2.1 SURFACE MINE CENSUS

Letter and telephone communications have been made during this reporting period with state officials in Ohio, West Virginia, Pennsylvania, and Kentucky. We now have surface mine directories for all of these states, with the exception of Pennsylvania.

The authors of this report visited Charleston, West Virginia, and met with West Virginia state personnel from the Bureau of Mines, Bureau of Reclamation, and Department of Legislative Services. After much "door-knocking", we found West Virginia surface mine locations on 7.5 minute quadrangles. We transferred the site information onto our own 7.5 minute quadrangles, and also onto 1:250,000 topographic maps. State officials also gave us a guided tour of the state's largest surface mine (in Kanawha County).

We also visited Columbus, Ohio, and met with Ohio state personnel from the Bureau of Mines, Bureau of Reclamation, and the Ohio Geological Survey. The Bureau of Reclamation has an index of all active surface mines in Ohio, in terms of Township, Range, and Section. This information has since been transferred to a 1:500,000 Ohio Lands Survey Map, and also to 1:250,000 topographic maps.

2.2 LITERATURE SEARCH

A search for existing literature on this study topic was initiated during this reporting period. Many documents have been requested, and most of these have been received.

2.3 PHOTOS TO SUPPORT GROUND TRUTH

It has been ascertained that the U.S. Department of Agriculture has aerial photo coverage of our test sites; this photography is available upon request.

The U.S. Department of Interior has photographic coverage of the majority of the test areas (816556 and 816557). This photography is not always current, but will be valuable for assessing temporal modifications of terrain. This may be of benefit to reclamation areas.

The ERTS Browse File was also reviewed; however, the detail in the Browse File was not deemed sufficient to delineate surface mining activities.

2.4 MICRO-DENSITOMETER USAGE

Preliminary arrangements for the use of a micro-densitometer at NASA/Wallops Station for our study task have been made with Drs. Maurer and Oberholtzer of NASA Wallops. The micro-densitometer will potentially be utilized with the EREP data to establish digital pattern recognition techniques for detection and investigation of surface mining techniques.

3.0 PROBLEMS

The only significant problem to date has been the lack of response from Pennsylvania state officials. Presumably, this lack of response is due to our not contacting the right people in Harrisburg. We plan a "door-knocking" session in Harrisburg in late June 1973 to obtain our desired information.

4.0 PLANS

During the next reporting period (8 June 1973 to 8 September 1973), we plan to visit the West Virginia Geological Survey at Morgantown, West Virginia; and the Pennsylvania Bureau of Mines in Harrisburg, Pennsylvania.

Arrangements will be made to obtain the pertinent U.S. Department of Agriculture and U.S. Department of Interior aerial photography for our calibration areas.

Detailed on-site ground truth data will be initiated only after successful EREP data-takes in our calibration areas. This is to insure that our detailed ground truth information will be applicable to EREP data.

Indiana and Illinois state personnel will be contacted via telephone and letter for surface mine information.