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*file*

December 5, 1988

TO: John Whitehead, Permit Supervisor  
FROM: Richard V. Smith, Geologist *RVS*  
RE: Request to Amend Subsidence Monitoring Plan, Utah Power and Light Company, Cottonwood/Wilberg Mine, ACT/015/019-88D, Folder #2, Emery County, Utah

Synopsis of Proposed Amendment

The operator has submitted a proposal to amend the subsidence monitoring program above the Cottonwood/Wilberg Mine from a combination of conventional transit and photogrammetric surveying, in specified locations, to solely photogrammetric monitoring over all mined areas.

The operator contends through comparison of conventionally and photogrammetrically derived subsidence contour maps that data from both surveying methods correlate closely and photogrammetric surveying gives greater detail in the pattern of subsidence.

Review of Proposed Amendment

The operator has provided sets of photogrammetrically and conventionally derived subsidence contour maps for 1984, 1985 and 1986. The subsidence contour maps encompass the area above the Deer Creek 5th - 8th East and Wilberg 5th - 13th Right workings where longwall mining has occurred. In addition, the operator has provided a study that compares photogrammetry and ground surveys for monitoring subsidence above the Deer Creek 5th - 8th East and Wilberg 5th - 13th Right workings (Cousins, 1986).

The subsidence contour maps show an overall similarity in pattern between those derived from conventional surveying and those derived by photogrammetric methods. Moreover, the photogrammetric data indicate maximum vertical subsidence is greater (approximately 1.0 foot) than that measured by conventional methods. The contour maps derived from photogrammetric data convey more detail due to the greater number of surveyed stations.

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The study by Cousins (1986) compared photogrammetrically and conventionally derived subsidence data at 18 common points. The comparison indicated 16 of the common points (89 percent) had an accuracy of +/- 0.5 feet and all points had an accuracy of +/- 1.0 feet.

#### Summary

Subsidence contour maps and the attendant comparison of vertical movement data indicate photogrammetric methods provide a relatively accurate characterization of mining-induced subsidence that is adequate for assessing potential impacts to surface land use.

#### Recommendation

It is recommended that Amendment ACT/015/019-88D be approved with the condition that a revised subsidence monitoring plan be submitted for insertion into the Permit Application Package. The revision must delete all references to conventional surveying in the subsidence monitoring plan.

#### Reference

Cousins, R. L., 1986, A Comparison Of Analytical Photogrammetry and Ground Surveys for Monitoring Coal Mine Subsidence: Unpublished M.S. Thesis, Colorado School of Mines, 186 pages.

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