

Directors Approval 7-8-83



107-148
Pecora file
(recd. 7-18-83)

Geologic applications of side-looking
airborne radar data in the central Appalachian Mountains

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(distributed
7-20-83)

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Side-looking airborne radar has provided a sufficiently detailed synoptic view of the central Appalachian Mountains that the images give an unparalleled representation of the size and nature of the folds within the Valley and Ridge province. The radar data show that fold wavelengths decrease abruptly south of the region of the Pennsylvania, Maryland, and West Virginia State lines. Concomittantly, this decrease in fold wavelength is accompanied by an increase in both frequency and length of disturbed zones (narrow bands of intense folding and faulting, mapped in the field). These disturbed zones are inferred to be surface manifestations of splay faults genetically related to the folds.

The model predicted by the combination of the radar images and field observations suggests a broad lateral ramp connecting a deeper decollement north of the Pennsylvania, Maryland and West Virginia State lines with a shallower decollement to the south. Seismic and drill hole data as well as a conspicuous inflection along the Appalachian structural front support the model.

This model of up-to-the-south ramps appears to be applicable to other areas in the central Appalachians, including the Roanoke Recess, and indicates that abrupt changes in fold wavelengths as seen on radar images may be used to predict changes in depth to major decollements.