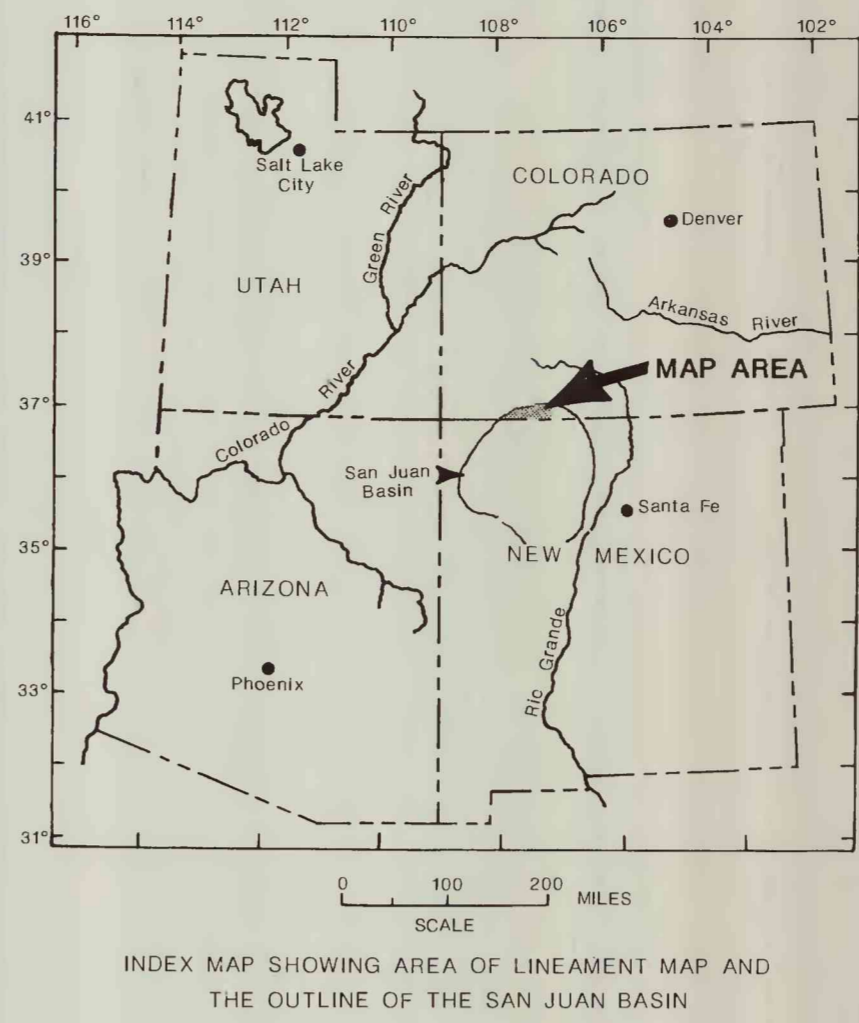
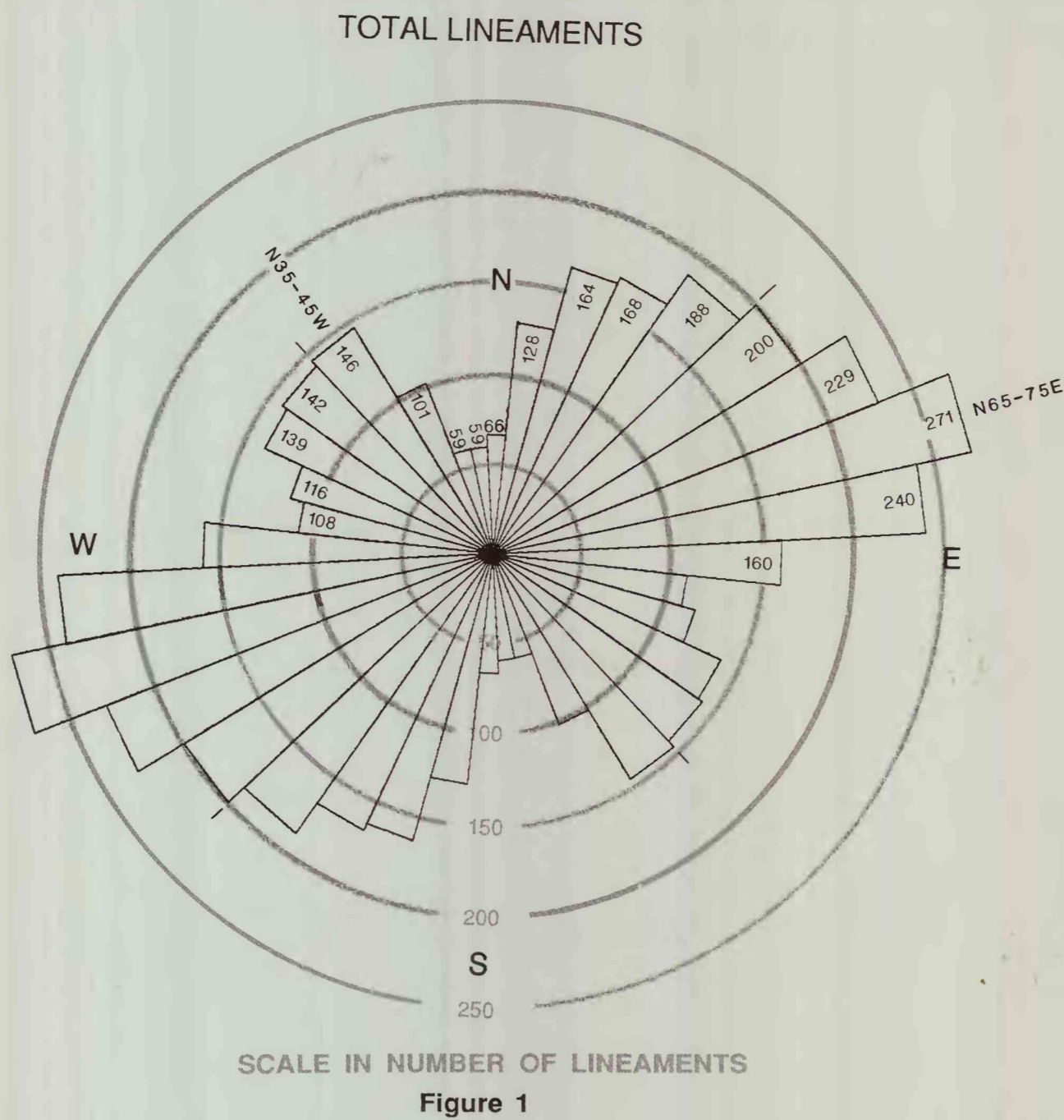


PREPARED IN COOPERATION WITH  
THE BUREAU OF INDIAN AFFAIRS



MAP DESCRIPTION

This map shows lineaments in part of the Southern Ute Indian Reservation in the northern San Juan Basin of southwestern Colorado. Formations outcropping in the map area are Eocene San Jose and Blanco Basin, Paleocene Nacimiento, Paleocene-Upper Cretaceous Animas, and Upper Cretaceous Kirtland, Fruitland, Pictured Cliffs, and Lewis, Steven, 1974. The lineament map was generated using a Kern PG2 plotter with stereo aerial photographs (color and black and white at scales of 1:15,840 and 1:20,000). The features plotted include natural linear and curvilinear features such as streams, ridges, joints, and other more subtle features. Some areas show few or no lineaments due to surface disturbances caused by man's activities, dense natural vegetation, relatively unconsolidated overburden, or lack of lineaments. Selected lineaments were field checked for strike, dip, and geologic or geomorphic feature type; some of those lineaments, apparent on aerial photographs, proved clearly to be joints or fractures, while others were obscure. The finished map was digitized to analyze lineament azimuth trends. For analysis, a computer program recorded the number of lineaments with azimuths in each 10° interval of a circle. Each 10° interval was then plotted as a fan shaped polygon. The radius of each polygon represents half the number of lineaments in each 10° interval.

Figure 1 shows all of the lineaments within the map area, while figures 2-7 each include lineaments from rectangular subsections of the map which are approximately 6 mi. wide (east to west) and 18 mi. long (north to south). When subsections were computer selected on the basis of stratigraphy or structure the trends of lineaments within these subsections did not show significant deviation from the trends in figure 1. Deviations from the trends in figure 1 are shown in figures 2-7. A lineament trend with an azimuth of N. 60-80° E. recurs over most of the map area. Another less consistent trend has an azimuth of N. 35-70° W. Previous workers Kelly and Clinton, 1960, mapped joints with similar trends; Condon, 1988, mapped joint sets, of which the youngest set has an orientation similar to the northwest-southeast trend in figure 1. Knepper, 1983, and Kelly and Clinton, 1960, mapped similar trends and lineament densities from Landsat images and aerial photographs.

Oil and gas production can be enhanced by natural fractures and joints in producing zones. Fractures and joints in these producing zones may be correlated with more readily detectable surface lineament, fracture, and joint trends. This map, augmented by seismic, oriented core, and outcrop joint and fracture studies may be used to predict fracture and joint trends in oil and gas producing zones.

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ACKNOWLEDGEMENTS

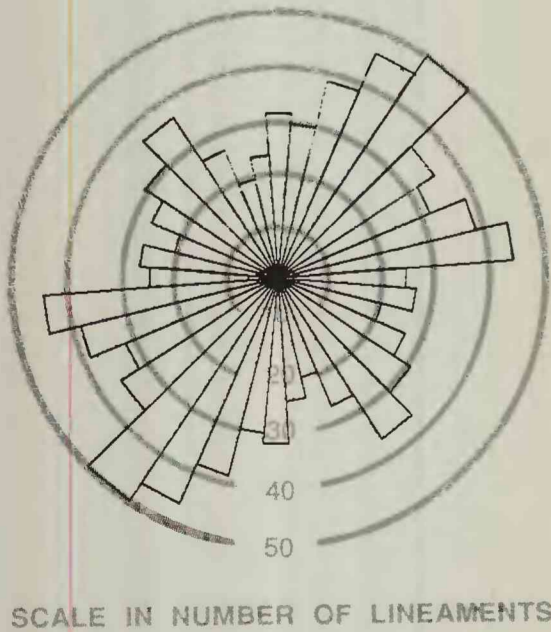
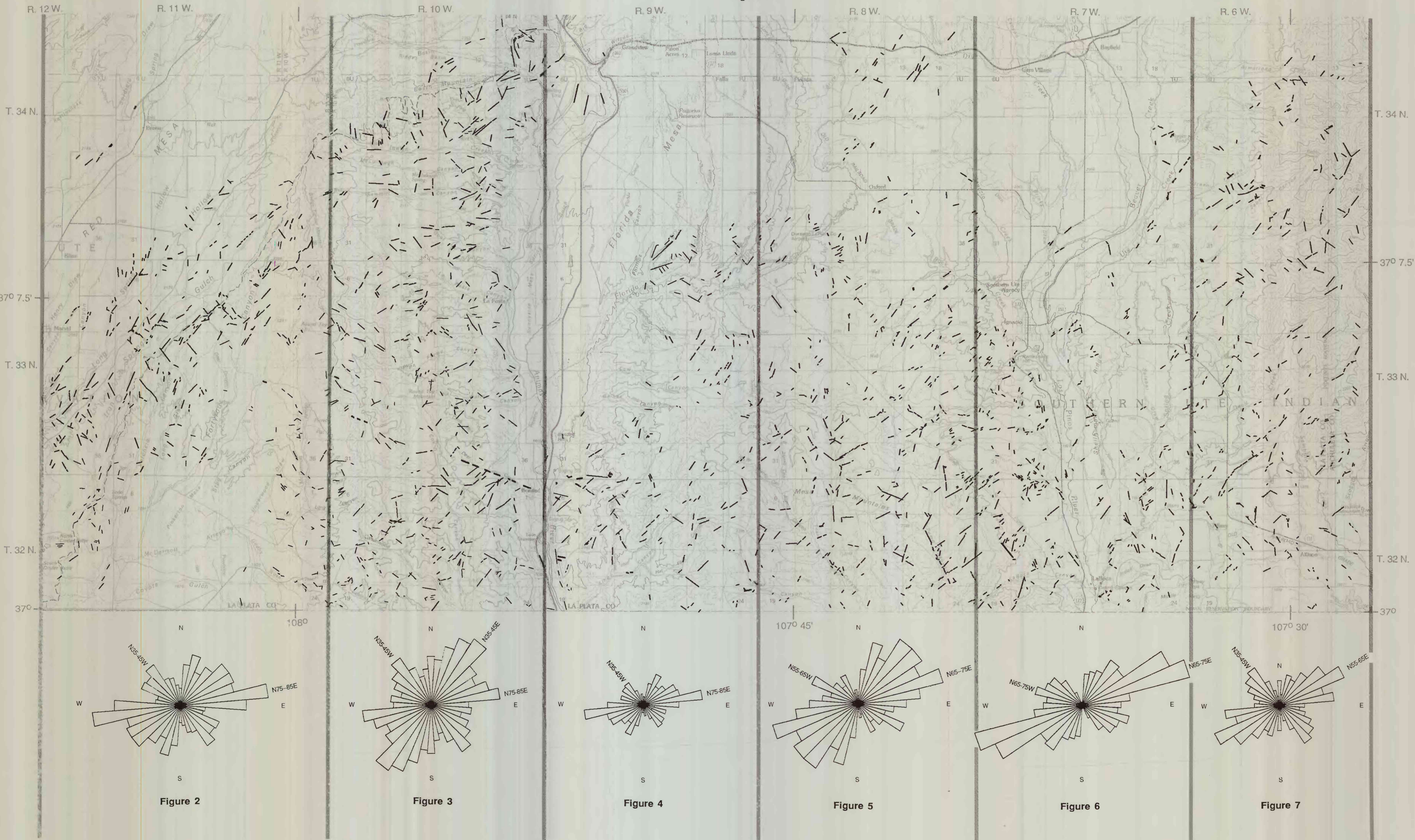
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EXPLANATION

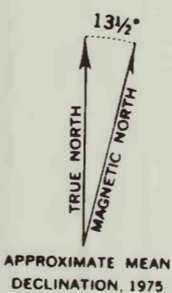
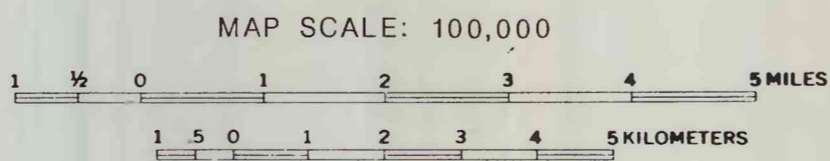
- Lineament
- - - Fault, inferred fault or joint
- ~~~~~ Pictured Cliffs Formation and Fruitland Formation contact in outcrop

Any use of trade names is for descriptive purposes and does not imply endorsement by the U.S. Geological Survey

This map is preliminary and has not been edited or reviewed for conformity with Geological Survey standards.



Base by U.S. Geological Survey using parts of the following 30 x 60 minute quadrangles: Cortez, 1982 Durango, 1983



LINEAMENT MAP OF PART OF THE SOUTHERN UTE RESERVATION, SAN JUAN BASIN, SOUTHWESTERN COLORADO

BY  
CRAIG J. WANDREY  
1989