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GEOLOGIC MAP OF THE MINE MOUNTAIN AREA, NEVADA TEST SITE, SOUTHERN NEVADA

By

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TABLE OF CONTENTS

ILLUSTRATIONS

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rocks in this area belonged to different facies assemblages and could not all have been emplaced in the same thrust sheet from a single direction (Trexler and others, 1996; Cole

largely stratigraphic and not a thrust, as previously mapped by Johnson and Theobald (1957) and by Orkild (1968). The unusually thin Guilmette is attributed to non-deposition or erosion coincident with the karst formation (Trexler and others, 1996).

Clastic rocks in the head of Slick Draw consist of uniform, dark green-brown and red-brown shale, along with sparse folded and dismembered beds of bioclastic limestone, impure quartzite, and a few beds of chert-granule conglomerate. Outcrop is poor, but

bedding attitudes and stratigraphic facing directions suggest that this lithic assemblage lies conformably on top of Eleana unit Mei, which crops out west of the head of the Draw. We show this unit as Chainman Shale based on its distinctive association of shale, quartzite, and bioclastic limestone (Trexler and others, 1996). If correct, our interpretation would indicate the Chainman lithotype was deposited over the Eleana lithotype in this area (shown in cross- section A-A'), whereas the two units are time-equivalent but mutually exclusive in all other southern Nevada localities (Trexler and others, 1996). The presence of chert-lithic conglomerate, typical of Eleana clastic source-areas, in this Slick Draw section may indicate local co-mingling of sources during late Chesterian time. Due to the extreme structural complications in this area, however, we cannot preclude the possibility that the Chainman in Slick Draw was emplaced from the east during hinterland-vergent thrusting as a tectonic slice derived from the pre-existing Chainman footwall of a foreland-vergent Belted Range thrust element beneath the Eleana (see cross-section A-A').

FORELAND-VERGENT STRUCTURE

The principal evidence for foreland-vergent thrusting is implied by map relations indicated in fig. 1 and by regional stratigraphic arguments. The Eleana Formation at Mine Mountain was originally deposited west of the Chainman Shale preserved in the Syncline Ridge area (Trexler and others, 1996). Its present location east and south of the Syncline Ridge area requires east-vergent emplacement. Drill hole UE-1m, located on the northeast flank of Mine Mountain north of the 1-6C jeep trail, penetrated about 177 ft of steeply-dipping Eleana before entering 337 ft of flat-lying Chainman Shale (Cole and others, 1997). We interpret these relations to indicate UE-1m penetrated an east-vergent thrust in the subsurface (cross section A-A'). The broad arch of the Mine Mountain anticline and the diffuse anticline in the Eleana near UE-1m are both thought to have formed during east-vergent deformation (along with the Syncline Ridge fold), but both folds have been modified by younger deformation. As a result, bedding does not statistically define asymmetric fold limbs or an inclined hinge surface that would clarify the vergence direction during folding.

Small-scale folds and overturned beds in Eleana unit Mei south and west of Slick Draw indicate eastward vergence. These structures may be subsidiary folds on the east limb of the Mine Mountain anticline, or they may have formed during emplacement of a higher thrust plate. The slab of Sevy and Laketown Dolomite between Slick Draw and Gray Hill may be a relic of such a plate. Bedding in the dolomites generally dips westward, as does the fault contact with Eleana on the east, and this is the geometry that is displayed by foreland-vergent thrust-duplex blocks farther north in the Eleana Range (fig. 1; Cole and Cashman, 1997). This interpretation is illustrated in cross-section A-A'.

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The combined effect of these slices is to distribute the total stratigraphic offset between the Cambrian Nopah Formation and the Mississippian Eleana Formation into imbricate thrust sheets. At the west end of the ridge, all structural elements bend toward the south and progressively verge toward the west. This change of trend is interpreted to have formed concurrent with folding and thrusting and is consistent with the irregular and local nature of the CP thrust structures on a regional basis (Cole and Cashman, 1997).

South Knob largely consists of an overturned flap of the Devonian carbonate section that was emplaced generally westward over the Mississippian Eleana Formation, as illustrated in cross-section B-B'. The direction of overturning in this upper plate, and in the footwall Eleana, shows that this flap is a very local feature because it verges toward the northwest, toward the west, toward the southwest, and toward the south along its lateral margins. These geometric characteristics (similar to glacial or extrusive flow forms) suggest the South Knob flap was extruded upward and outward toward the west and that it flattened and spread over the Eleana wherever resistance was least. A similar structural style is inferred north of the Mine Mountain Road at North Knob and Four Quad Hill from the arcuate trends of bedding and overturning directions in the Devonian carbonates, but the leading edges of these local thrust plates have been displaced by a younger high-angle fault.

Chainman Shale in the upper part of Slick Draw contains beds of bioclastic limestone and chert-granule conglomerate that are overturned toward the west, as indicated by inverted graded beds. We interpret these relations to indicate the overlying dolomites, which were originally emplaced toward the east as part of the Belted Range thrusting, have been displaced westward by a younger CP thrust that propagated through the older thrust stack (shown in cross-section A-A').

and the supporting studies, shows that the foreland- and hinterland-vergent thrusting are the major factors in the distribution of rock units. Extension is clearly recorded by the detailed fault-slip indicators, but the amount of slip does not appear to have translated major blocks of rock to significantly different positions.

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