



INTRODUCTION

The information presented on this sheet was collected as part of a joint U.S. Geological Survey-Geological Survey of Pakistan program sponsored by the U.S. Agency for International Development. As a project within this program, the coal-bearing Ghazij Formation (Eocene) was investigated in the northeastern part of Balochistan east and south of the provincial capital of Quetta. Strata exposed in this area range in age from Permian to Holocene and crop out as a belt of folded and thrust rocks that form a southeast-facing orocline. In this region of Pakistan, the Ghazij can usually be divided into three parts. The lower part is the thickest (probably more than 1,000 m) and consists of gray-weathering calcareous mudrock (shale, mudstone, and impure claystone) and a few tabular bodies of fine- to medium-grained calcareous sandstone. The middle part (27-300 m) consists of gray-weathering calcareous mudrock and tabular to lenticular bodies of fine- to medium-grained calcareous sandstone; beds of carbonaceous shale and coal are common (in the Mach area, the middle part of the formation also contains numerous individual beds of muddy limestone). The upper part (as thick as 533 m) contains reddish-weathering calcareous mudrock that contains scattered lenticular bodies of fine- to medium-grained calcareous sandstone. Fossil plant debris is common in mudrock of the lower and middle parts of the Ghazij and bivalves and gastropods are common in the middle part of the formation; the upper part of the Ghazij is usually unfossiliferous. Underlying the Ghazij are the carbonate rocks of the Dungan Formation (or its equivalent), and overlying the Ghazij are the mostly carbonate rocks of the Eocene Kirthar Formation (or its equivalent). Both contacts can be conformable or unconformable. All of the pre-Neogene rocks in Balochistan are greatly deformed by the collision of India and Pakistan. The Ghazij is especially susceptible to regional compressional tectonics because it contains large amounts of shale and is sandwiched between thick carbonate units. As a result, bedding-plane faults and isoclinal folds are very common. As part of our study of the Ghazij Formation, five stratigraphic sections were measured: one near Pir Ismail Ziarat, one in the Sor Range, two in the vicinity of Mach, and one near the Mohai. Each area's section is published separately.

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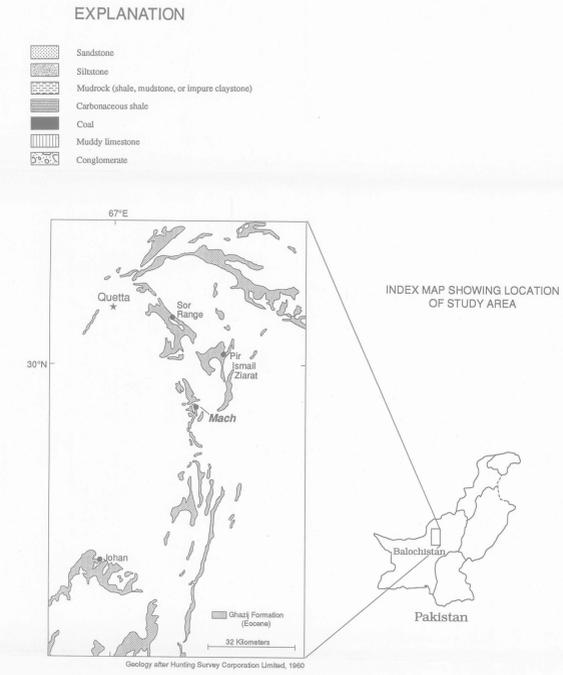
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**PRINCIPAL REFERENCE SECTION FOR PART OF THE EOCENE GHAZIJ FORMATION,
GISHTARI NALA AREA, MACH COAL FIELD, BALOCHISTAN, PAKISTAN**

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