

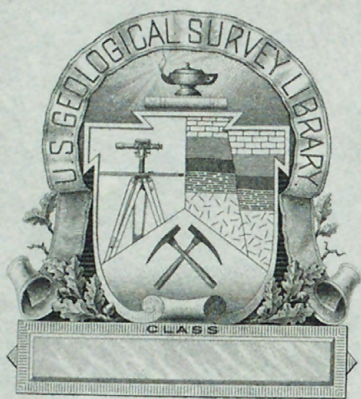
Magnetometer survey of the Methgal iron  
deposit, Saudi Arabia

by

W.E. Davis and R.V. Allen

(200)  
R29o  
No. 1694







(200)  
R290  
no 1694



UNITED STATES  
DEPARTMENT OF THE INTERIOR  
U.S. GEOLOGICAL SURVEY

*[Reports - Open file series]*

Saudi Arabia Investigation Report  
(IR) SA-34

MAGNETOMETER SURVEY OF THE METHGAL IRON DEPOSIT

SAUDI ARABIA

by

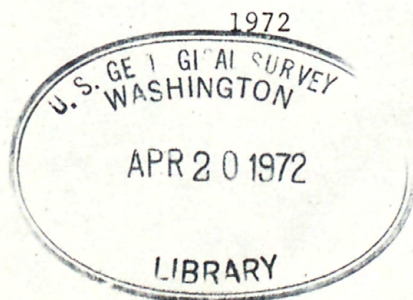
W. E. Davis and R. V. Allen  
U. S. Geological Survey

*cm  
pr*

U. S. Geological Survey  
OPEN FILE REPORT

234003

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



(200)

18290 Weld - Int. 2905

no. 1694

U.S. GEOLOGICAL SURVEY

WASHINGTON, D. C.

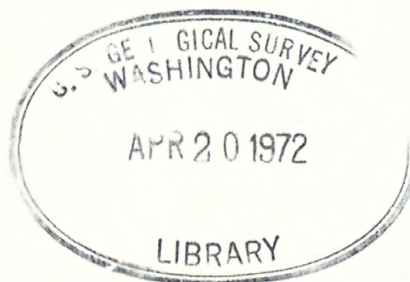
20242

[Reports - Open file series]

For release APRIL 20, 1972

The U.S. Geological Survey is releasing in open file the following reports. Copies are available for inspection in the Geological Survey Libraries, 1033 GSA Bldg., Washington, D.C. 20242; Bldg. 25, Federal Center, Denver, Colo. 80225; and 345 Middlefield Rd., Menlo Park, Calif. 94025:

1. Geophysical exploration in the Jabal Samran area, Saudi Arabia, by Willard E. Davis and Rex V. Allen. 9 p., 7 figs.
2. Geophysical exploration in the Mahad adh Dhahab district, Saudi Arabia, by W. E. Davis, Rex V. Allen, and M. N. Akhrass. 4 p., 2 figs.
3. Magnetometer survey of the Methgal iron deposit, Saudi Arabia, by W. E. Davis and R. V. Allen. 2 p., 2 figs.
4. Geochemical sampling in the Wadi Shugea-Wadi Hawara area, Saudi Arabia, by Richard Goldsmith. 7 p., 2 figs., 1 table.
5. Notes on field trips to the At Ta'if-Bilad Zahran area, Saudi Arabia, June 7-August 1, 1964, and August 22-29, 1964, by Richard Goldsmith and James Kouther. 10 p.
6. Mineral reconnaissance of the southern part of the Wadi Qaraqir quadrangle, Saudi Arabia, by Robert F. Johnson and Virgil A. Trent. 4 p., 1 fig.
7. Geology and mineral deposits of the Jabal ash Shunta quadrangle, Kingdom of Saudi Arabia, by Charles L. Hummel and Abdullah O. Ankary. 29 p., 1 pl., 3 figs., 1 table.
8. Geology and mineral deposits of the Wadi an Nuqumi quadrangle, Kingdom of Saudi Arabia, by Charles L. Hummel. 18 p., 1 pl., 2 figs., 1 table.





## PREFACE

In 1963, in response to a request from the Ministry of Petroleum and Mineral Resources, the Saudi Arabian Government and the U. S. Geological Survey, U. S. Department of the Interior, with the approval of the U. S. Department of State, undertook a joint and cooperative effort to map and evaluate the mineral potential of central and western Saudi Arabia. The results of this program are being released in USGS open files in the United States and are also available in the Library of the Ministry of Petroleum and Mineral Resources. Also on open file in that office is a large amount of material, in the form of unpublished manuscripts, maps, field notes, drill logs, annotated aerial photographs, etc., that has resulted from other previous geologic work by Saudi Arabian government agencies. The Government of Saudi Arabia makes this information available to interested persons, and has set up a liberal mining code which is included in "Mineral Resources of Saudi Arabia, a Guide for Investment and Development," published in 1965 as Bulletin 1 of the Ministry of Petroleum and Mineral Resources, Directorate General of Mineral Resources, Jiddah, Saudi Arabia.

MAGNETOMETER SURVEY OF THE METHGAL IRON DEPOSIT

SAUDI ARABIA

by

W. E. Davis and R. V. Allen  
U. S. Geological Survey



MAGNETOMETER SURVEY  
OF THE  
METHGAL IRON DEPOSIT,  
SAUDI ARABIA

by  
W. E. Davis and R. V. Allen

A magnetometer survey was made of the Methgal iron deposit (Fig.1) in the Wadi Sitarra district as a part of the exploration program conducted by the Ministry of Petroleum and Mineral Resources. The survey was requested by Mr. C. W. Smith, who visited the area in early March 1965 and found the deposit to consist of several magnetite exposures that are of sufficient size to warrant geophysical study. Owing to the fact that the area is not accesible by car, the investigation was delayed until helicopter support became available. Field measurements were made by the authors during November 1965 while geologic mapping was conducted from a camp near Jabal Farason about 48 kilometers to the west. Magnetometer data were obtained primarily to delineate the deposit and to determine if it is large enough to justify test-drilling.

The area is near latitude  $22^{\circ}42'N$ . longitude  $39^{\circ}51'E$ . in a small branch of Wadi Sitarra about 65 kilometers northeast of Kulayyah. It occupies a low ridge and bordering lowland in the central part of the wadi branch. The ridge rises to a height of 25 meters above the wadi floor, which lies about 720 meters above sea level and is broad and fairly flat with considerable brush and small trees.

Pods and lenses of magnetite with moderate amounts of hematite intermixed crop out over a distance of 400 meters along the crest of the ridge. The exposures range from 10 to 20 meters in width and are connected by small veins or feeders along a contact of diorite with sediments, which strikes about  $N.20^{\circ}E$ . and dips to the west. These outcrops seem to be parts of a vein system that terminates abruptly to the south but may extend northward beneath wadi sediments beyond the ridge.



Torsion and fluxgate vertical-force magnetometers with scale constants of 12 and 50 gammas per dial division, respectively, were used in making the survey. Instrument readings were made 12-1/2 meters apart along traverses spaced 50 to 70 meters perpendicular to a base line trending N.22°E. through the middle of the area. Horizontal control was established by means of Brunton compass and tape. The readings were referenced to a base station, which was occupied at intervals of three hours or less. Data were not corrected for diurnal variation, which was found to be very small and insignificant compared to the magnitudes of anomalies observed in the area.

Vertical intensity magnetic profiles (Fig.2) over the outcrop zone show a narrow anomaly that coincides with the magnetite exposures. The most prominent part of the anomaly is associated with the larger outcrops in the northern part of the zone. Southward the anomaly is comparatively weak over the central part, but becomes strong again over the main southern exposure. Profiles and additional reconnaissance measurements north and south of the zone show only minor magnetic relief that is attributed to the country rock.

The variation in magnitude of the anomaly indicates that the outcrops are not parts of a concealed large magnetite mass. Apparently most of the exposures dip steeply and are connected by small veins and stringers as observed by Smith. The magnetite-bearing zone is inferred from the magnetic data to terminate abruptly near the northern and southern exposed bodies; and to be about as wide as the outcrop belt.

Results of the survey suggest that the deposit contains pods and lenses of magnetite and hematite, which are not much larger than the outcrops; and which probably do not represent a sufficient quantity to be of commercial interest. In our opinion the deposit is not large enough to warrant test-drilling.



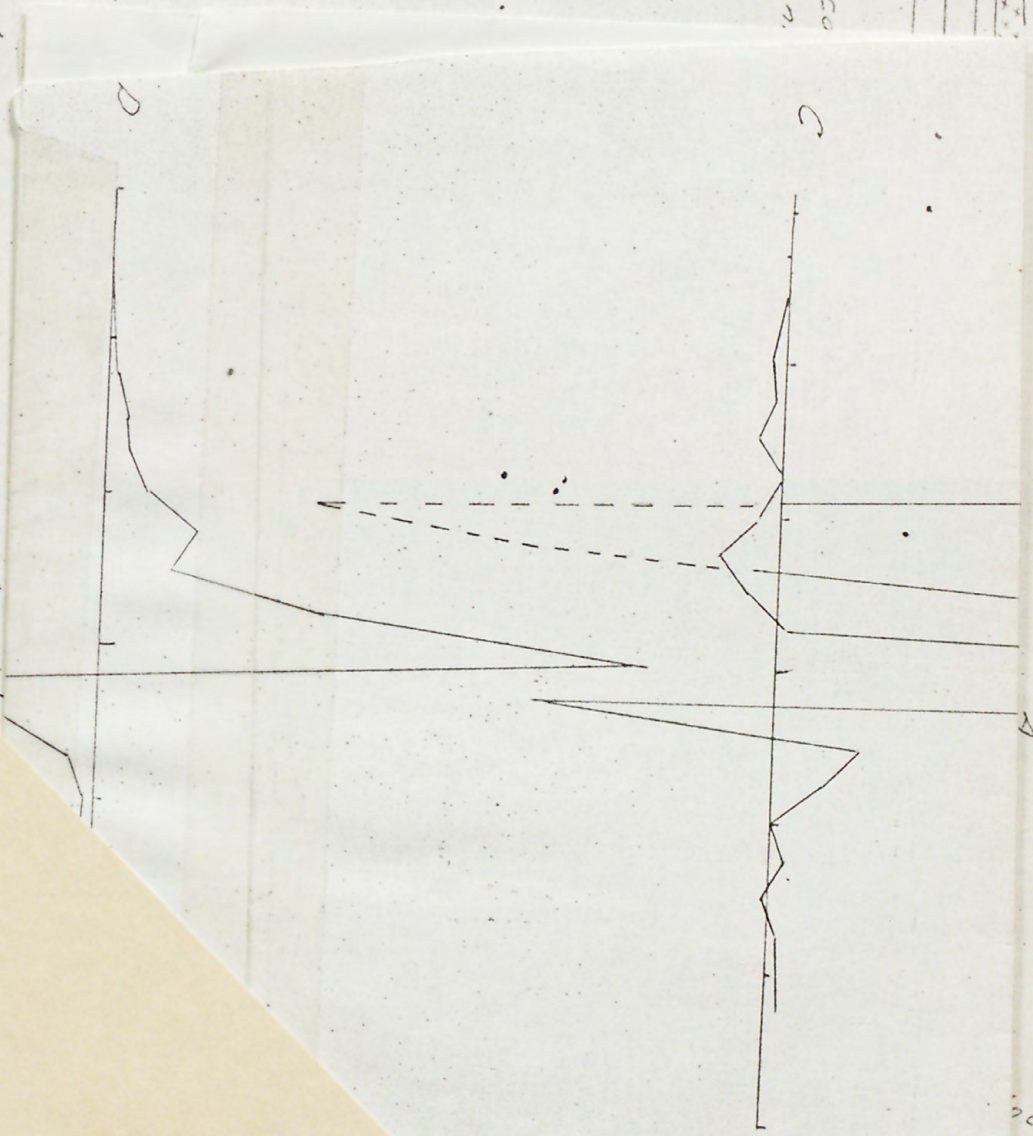






Magnetite

500  
Con.







USGS LIBRARY-RESTON  
3 1818 00077535 1