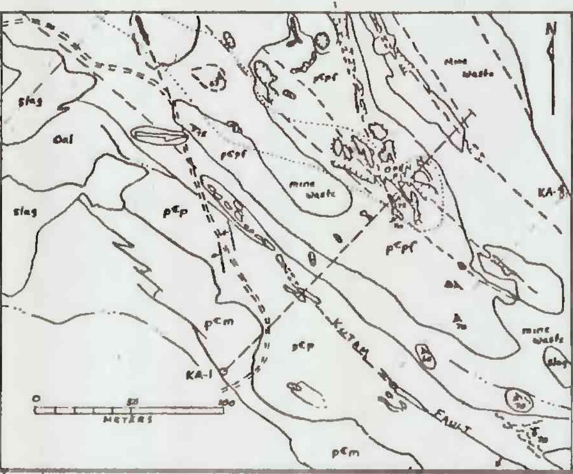
78-519

KINGDOM OF SAUDI ARABIA
Ministry of Petroleum and Mineral Resources
Directorate General of Mineral Resources

U S Geological Survey

Mineral Occurrence
KUTAM PROSPECT
Drill Hole Number: KA I

References



Date started: 9/3/74 | Hole size: Nx– 0- 66.40
Date completed: 10/6/74 | Bx– 66.40-236.95
Driller: ADC | Ax–

Survey Data

Collar Coords: Lat 17°35'53"N Long 43°34'10"E

Subsurface

Depth	Inclination	Azimuth
Collar	-43°	49°
	(Tropari)	
82m	-35°	46°
150m	-36°	45°
200m	-30°	45°
236m	-27°	45°

Logged by: W. P. PUFFETT

Structure (intersection angle with core axis)

- Foliation marked by biotite — 60°
- Fault zone?
- Quartz-calcite vein — 40°
- Quartz-calcite vein — 50°; Base actinolite-rich zone — 50°
- Quartz-carbonate vein — 60°
- Quartz stringer ⊥ to core
- Kutam Fault? based on rock type change. Basal contact of tremolite-rich rock — 80°
- Foliation — 65°–70°
- Foliation — 75°
- Foliation — 80°
- Foliation — 85°
- Foliation — 80°
- Foliation — 80°
- Foliation — 75°
- Foliation — 80°
- Foliation — 80°
- Foliation — 80°
- Foliation — 80°
- "Healed" breccia?
- Quartz breccia
- Brecciation — Fault breccia
- Foliation — 90°
- Indistinct foliation — 85°
- 236.95 END OF HOLE

Lithology

- Massive, light gray, medium-grained quartz porphyry with fine garnet and fine-grained biotite. Quartz phenocrysts 45% of rock.
- Dark green mafic dike. Broken quartz vein. Core broken.
- Light gray-green, massive, mafic rock. No quartz phenocrysts. Occas. thin gray stringers quartz-carbonate.
- Occas. pink garnet. No sulfides.
- Mafic rock (amphibolite) dark green. Very uniform.
- 33.05 / 34.10: Medium-grained amphibolite with abundant? actinolite needles.
- Fine to medium-grained amphibolite.
- Mafic dike. Gray quartz porphyry, no garnet; pyrite on widely separated fractures.
- Quartz porphyry, rare tiny pink garnets. Generally massive.
- 57.00 / 57.80: Fine-grained mafic dike.
- Gray, siliceous quartz porphyry, no garnets, no sulfides. Quartz phenocrysts 2–5 mm.
- 69.80 / 71.00: Grades into quartz-sericite rock with only rare quartz phenocrysts. Small lenses (2–4 mm) sulfides – chalcopyrite 73.50–73.70.
- Mainly finely white tremolite with scattered chalcopyrite.
- Siliceous, sericitic quartz porphyry. Widely separated pyrite blebs 1–2 mm.
- Massive gray-green, chloritic quartz porphyry; scattered pyrite blebs; quartz phenocrysts ? mm across ? % of rock. Tiny sulfide blebs ... Tiny garnets after 82.00.
- Chloritic quartz porphyry; garnets increase in abundance. Scattered pyrite and chalcopyrite. Quartz phenocrysts more abundant. Saussuritized feldspar phenocrysts conspicuous after 89.00.
- Mafic dike. Sericitic, chloritic, quartz-porphyry with 3–5% garnets, 1–3 mm across. Pyrite and chalcopyrite.
- Color change from medium gray to olive drab. Chlorite content increases. Hanging wall limit of chlorite zone?
- Chloritic, sericitic quartz porphyry with garnets.
- Quartz phenocrysts ? mm across; garnets 2–4 mm across. Sulfides sparsely disseminated. Chlorite sparse – footwall limit of chlorite zone.
- Chlorite-sericite-quartz schist with pink garnets; quartz phenocrysts rare if present.
- Chalcopyrite in widely separated blebs and streaks in chlorite-sericite-quartz rock. Rock becomes increasingly siliceous.
- Gray sericitic schist with widely separated stringers chalcopyrite and pink garnet parallel to foliation. Sparse sphalerite with chalcopyrite. Sulfide stringers 20 to 60 cm apart. Host rock is strongly silicified.
- Silicification not as strong; sericite more prominent.
- Gray sericitic quartz schist. Strong silicification.
- Gray sericitic quartz schist with thin garnetiferous clay-rich zones; some with sulfides. No garnets in barren rock. Well silicified with narrow zones of sericite and clay.
- Light gray sericitic quartz schist, ?, ? crenated. Much white ? clay. Strong silicification with sericite and clay.
- Occasional quartz phenocryst.
- Rock very quartzose. Some ? ...
- Abundant white-yellow clay laminae. Much vein quartz – in part brecciated – amphibolite? – serpentinized.
- 198.40: Chloritic quartz porphyry with garnet, quartz phenocrysts 10% rock, garnet 1–2%.
- 207.00 / 208.15: Fine grained mafic "dike" – feldspar porphyry. Tiny garnets.
- 208.65: Yellowish-green chloritic quartz porphyry.
- Massive garnet, ferrous, chloritic quartz porphyry, 1–3% garnet, 10–15% quartz phenocrysts. Occas. lens of abundant hornblende (?) needles.
- Garnets 0.3–0.9 cm wide. Quartz phenocrysts 0.4–0.6 cm.
- Garnets tend to be in "layers" parallel to foliation.
- Garnets = 5%–10% of rock.
- Quartz phenocrysts = 10–15% of rock.
- 236.95 END OF HOLE

Mineralization

- Grain of chalcopyrite
- Rare pyrite or chalcopyrite – fine-grained
- Diss. pyrite or chalcopyrite. Pyrite on Fr.
- Stringer chalcopyrite
- Scattered chalcopyrite, sphalerite and galena
- Pyrite
- Pyrite and chalcopyrite
- Sulfides 1–2% rock
- Sphalerite and chalcopyrite disseminated and in distinct bands as indicated below (sph/cp, sph/cp, barren, sph/cp, sph/cp)
- Bi?Cu crystals
- Chalcopyrite
- Garnet + chalcopyrite with vein quartz
- Pyrrhotite, chalcopyrite and sphalerite
- Scattered streaks of sulfides parallel foliation
- Chalcopyrite, streaks of pyrrhotite, massive chalcopyrite along fractures
- Sulfides very sparse
- Stringer chalcopyrite

Core recovery (length)

50, [illegible], 40, 100, 210, 113, 88, 115, 262, 36, 80, 293, 106, 100, 270, 185, 186, 106, 82, 195, 234, 240, 58, 298, 106, 160, 305, 244, 130, 92, 80, 270, [illegible], 118, 276, [illegible], 287, 237, 116, 265, 155, 140, 296, 103, 148, 174, 280, 58, 170, 305, 123, 119, 290, 182, 60, 191, 247, 90, 200, 285, 60, 31, 182, 296, 100, 204, 153, 150, 65, 142, 124, 130, 155, 285, 190, 120, 293, 150, 146, 300, 202, 65, 235, 285, 75, 315, 270, 270, 32, 150, 305, 100, 126, 305, 185, 166, 200, 205, 101, 285, 180, 115, 305, 80, 140, 160, 295, 135, 170, 195, 75, 145, 165, 205, 165, 30, 65, 195, 115, 220, 80, 285, 180, 45, 280, 240, 80, 195, 90, 145, 105, 90, 107, 195, 107

Sample Data

Depth	Length	Sample Number	Au g/t	Ag g/t	Cu %	Pb %	Zn %
15.00	100	106007	.08	1.15	.037	<.001	.006
17.00	100	106008	.04	1.00	.008	<.001	.005
18.00	100	106009	.04	1.00	.010	<.001	.004
19.00	100	106010	.04	0.83	.011	0.001	0.004
19.70	70	106011	.04	1.00	.066	<.001	0.006
20.70	100	106012	.03	1.60	0.02	<.001	0.005
21.70	100	106013	.08	1.20	0.02	<.001	0.006
22.70	100	106020	.03	1.20	0.02	<.001	0.005
23.70	100	106021	.03	1.00	0.01	<.001	0.005
24.41	77	106022	.04	0.90	0.002	0.001	0.004
25.00	58	106012	<0.04	0.83	0.007	<.001	0.002
26.00	100	106013	<0.04	1.00	0.02	<.001	0.004
26.49 / 27.00	100	106014	<0.04	0.83	0.008	<.001	0.002
28.00	100	106015	.04	0.83	0.009	<.001	0.002
29.00	100	106016	.08	0.83	0.07	<.001	0.002
30.00	100	106017	.04	1.00	0.007	<.001	0.003
31.00	100	106018	.04	0.86	0.019	<0.001	0.002
32.00	100	106019	0.8	1.00	0.007	<.001	0.004
33.00	100	106020	<0.04	0.83	0.019	<.001	0.003
34.00	100	106021	<0.04	0.83	0.01	<.001	0.002
35.00	100	106022	.04	.93	0.01	<.001	0.002
36.00	100	106023	<.04	1.50	0.02	<.001	0.004
37.00	100	106024	0.10	1.18	0.003	<.001	0.004
38.00	100	106025	0.04	0.83	0.002	<.001	0.003
39.00	100	106026	<0.04	1.00	0.01	<.001	0.004
40.00	100	106027	<0.04	0.83	0.006	<.001	0.002
41.00	100	106028	<0.04	0.83	0.007	<.001	0.003
42.00	100	106029	<0.04	1.00	0.005	<.001	0.004
43.00	100	106030	.04	1.00	0.03	<.001	0.007
44.00	100	106031	<.04	0.83	0.01	<.001	0.005
45.00	100	106032	<.04	0.83	0.007	<.001	0.004
46.00	100	106033	<.04	0.83	0.005	<.001	0.004
47.00	100	106034	<.04	0.83	0.01	<.001	0.005
47.60 / 48.00	100	106035 TS	<.04	0.83	0.01	<.001	0.006
49.00	100	106036	<.04	0.50	0.004	<.001	0.007
50.00	100	106037	<.04	0.34	0.002	<.001	0.003
51.00	100	106038	<.04	0.50	0.003	0.002	0.004
52.00	100	106039	<.04	0.50	0.001	0.001	0.004
53.00	100	106040	<.04	0.50	0.001	0.002	0.006
54.00	100	106041	<.04	0.50	0.002	0.002	0.005
55.00	100	106042	<.04	0.34	0.003	0.002	0.004
56.00	100	106043	<.04	0.50	0.003	<0.001	0.005
57.00	100	106044	<.04	0.45	0.004	0.001	0.003
58.00	100	106045	<.04	0.45	0.002	0.001	0.004
59.00	100	106046	<.04	0.66	0.003	<.001	0.005
60.00	100	106047	0.04	0.83	0.001	<.001	0.005
61.00	100	106048	<.04	0.50	0.003	<.001	0.005
62.00	100	106049	0.04	0.50	0.003	<.001	0.005
63.00	100	106050	0.04	0.45	0.003	<.001	0.003
64.00	100	106051	0.04	0.45	0.003	<.001	0.007
65.00	100	106052	0.04	0.50	0.006	<.001	0.006
66.00	100	106053	0.04	0.50	0.003	<.001	0.007
67.00	100	106054	0.04	0.50	0.004	<.001	0.006
68.00	100	106055	0.04	0.50	0.004	<.001	0.006
69.00	100	106056	<0.04	0.50	0.004	<.001	0.006
70.00	100	106057	0.04	0.50	0.004	<.001	0.005
71.00	100	106058	0.04	0.34	0.002	<.001	0.004
72.00	100	106059	0.04	0.50	0.001	<.001	0.004
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
191.00	100	106097	<.04	0.84	0.04	<.001	0.06
192.00	100	106098	.04	0.50	0.03	<.001	0.02
193.00	100	106099	.08	0.84	0.004	0.001	0.01
194.00	100	106100	.04	0.10	0.004	0.001	0.01
195.00	100	106101	.04	1.05	0.004	0.001	0.02
196.00	100	106102	.06	1.35	0.002	0.003	0.02
197.00	100	106103	.04	1.70	0.005	0.002	0.01
198.00	100	106104	.04	1.35	0.005	0.002	0.005
198.50 / 199.00	100	104201-TS / 106105	.04	0.90	0.002	<.001	<.001
200.00	100	106106	.04	0.88	0.001	<.001	<.001
201.00	100	106107	.12	0.70	0.003	<.001	<.001
202.00	100	106108	.04	0.70	0.003	0.001	0.005
203.00	100	106109	.04	0.70	0.001	0.001	0.005
204.00	100	106110	.04	0.70	0.001	0.002	<.001
205.00	100	106111	.04	0.70	0.005	0.002	<.001
206.00	100	106112	<.04	0.70	0.001	<.001	<.001
207.00	100	106113	.04	0.70	0.006	0.003	0.006
208.00	100	106114	<.04	0.88	0.003	0.002	0.006
209.00	100	106115	<.04	1.70	0.003	0.002	0.01
210.00	100	106116	<.04	1.85	0.006	0.002	0.01
211.00	100	106117	<.04	1.40	0.002	0.002	0.006
212.00	100	106118	.04	0.70	<.001	<.001	0.006
213.00	100	106119	<.04	0.65	<.001	<.001	0.006
214.00	100	106120	<.04	0.65	0.001	0.003	0.005
215.00	100	106121	<.04	1.05	0.003	0.002	0.008
216.00	100	106122	<.04	1.20	0.01	0.002	0.007
217.00	100	106123	<.04	0.70	0.01	0.003	0.005
218.00	100	106124	<.04	0.70	0.01	0.001	0.005
219.00	100	106125	<.04	0.70	0.01	0.002	0.005
220.00	100	106126	<.04	0.65	0.001	0.002	0.005
221.00	100	106127	<.04	1.20	0.005	0.002	0.01
222.00	100	106128	<.04	1.10	0.002	0.003	0.02
223.00	100	106129	<.04	0.90	0.005	0.003	0.01
224.00	100	106130	.06	2.15	0.25	0.003	0.02
225.00	100	106131	.04	1.65	0.08	0.003	0.02
226.00	100	106132	<.04	1.56	0.02	0.002	0.02
227.00	100	106133	<.04	1.10	0.04	0.002	0.02
228.00	100	106134	<.04	1.10	0.05	0.002	0.02
229.00	100	106135	<.04	0.90	0.05	0.002	0.04
230.00	100	106136	.04	1.45	0.05	0.003	0.03
231.00	100	106137	.04	1.00	0.01	0.004	0.005
232.00	100	106138	<.04	0.90	0.001	0.004	0.01
233.00	100	106139	<.04	0.90	0.01	0.003	0.01
234.00	100	106140	<.04	0.90	0.02	0.002	0.01
235.00	100	106141	<.04	0.88	0.01	0.002	0.01
236.00	100	106142	<.04	0.75	0.02	0.003	0.01
236.95	95	106143	<.06	0.88	0.02	0.003	0.01

Averages: Semi Quant — Cu ppm, Zn ppm [illegible]