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

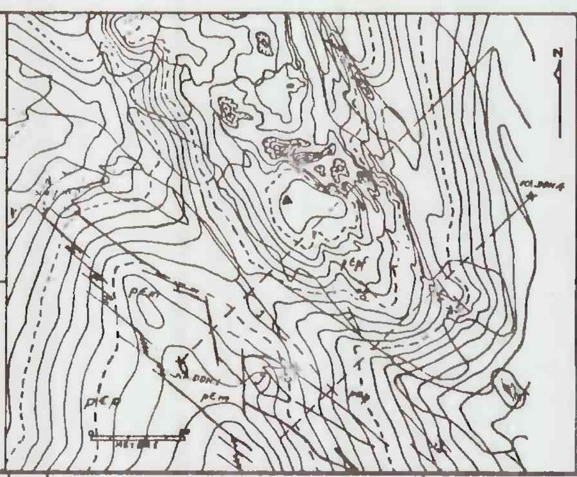
U S Geological Survey

Mineral Occurrence

KUTAM PROSPECT

Drill Hole Number: KA-4

References



78-519

Date started: 9/1/75
Date completed: 6/2/75
Driller: ADC
Hole size: Nx- 0 - 98.05
Bx- 98.05-230.0
Ax-

Survey Data

Collar Coords: Lat 17° 35' 55" N Long 43° 34' 10" E

Subsurface

Depth	Inclination	Azimuth
Collar	45	225
	(Tropari)	
51	43	225
100	30	224
150	9	223
198	2	223
230	0	223

Logged by: A. M. HELABY

Log (Core recovery / Structure / Lithology / Mineralization)

Depth (m)	Core box	Structure	Angle with core axis	Lithology / Mineralization
0		Core much broken and weathered, very poor core recovery		Quartz porphyry, highly siliceous, somewhat weathered but massive, with chlorite as mafic mineral
4.50	1	Contact; Foliation	45°; 40°	4.50–6.50 Chlorite schist, interlayered with siliceous rock
9.35		Core much broken & poor recovery		Gradually becomes more siliceous and garnetiferous
11	2	Faint foliation	60°	
13.30	3	Foliation	35°	Garnetiferous quartz porphyry — gradual change (no clear contact); garnet phenocryst of ~1 cm ø
19.40	4	Faint contact	25°	Garnetiferous, chlorite schist
22		Foliation	30°	Garnet phenocryst ~ 6% of rock
24.80	5	Contact	70°	Quartz porphyry, with blue quartz eyes, siliceous, with chlorite mafic mineral
28		Foliation	35°	
29.45–29.95	6	Quartz veinlet ?		Silica enrichment; rock becomes more massive
31.30	7	Faint foliation	35°	Rock gradually becomes sericitic, more chlorite and less siliceous; sericite, chlorite schist, fine grained
36.85–37.40	8	Breccia - Fault		Rock somewhat porphyritic - Dark? feldspar porphyry; rock is of fine grained, mafic
39.50				Rock is somewhat porphyritic; rock is of fine grained and more chloritic
41.75	9	Brecciated faulted zone 38.55–41.75; Foliation	40°	Garnetiferous chlorite schist, amphibolite; green, round phenocryst (epidote?) & quartz phenocryst. Min.: 42.00–43.40 Conc. of 1–3 mm stringers (bands) of CP & PY; sparse CP & PY; stringers of C.P.; sparse PY, elsewhere
47.10	10	Faint contact; Foliation	30°; 25°	Siliceous sericite schist - quartz porphyry; no sulfide seen if any
51.70–52.70	11	Foliation; Foliation	30°; 40°	Slivers of chlorite schist with few grains of CP in sericite schist. Min.: A few grains of CP
	12	Foliation	30°	Sericite schist becomes more siliceous
	13			Talc bearing siliceous sericite schist
60		Foliation	30°	
64.60	14	Foliation	35°	Slivers of garnetiferous chlorite schist interlayered with siliceous sericite schist; garnet phenocryst of ~ 5 mm ø. Min.: few shines of sulfide, with light concentration of stringers of CP, PY & SP(?)
68.80	15	Foliation	45°	Min.: stringers of CP, PY; few shines of SP
	16	Foliation	40°	Talc gradually decreases. Min.: 73.00 3 cm light concentration of CP; 75.01 1 cm light concentration of mm stringers of SP
	17	Foliation	35°	Min.: wisps, & light concentration of CP
	18	Foliation	40°	Min.: light concentration of CP, some concentration of CP, mm thick wisps of CP & PY; light conc. of CP & PY
	19–20	Foliation	45°	Increase in silica. Min.: 3 cm stringers of CP & PY; 1.5 cm stringers, light conc. of CP & PY; a few shines of CP & PY; light concentration of stringers of CP
	21–22	Foliation; Foliation	35°; 45°	Min.: with thick stringers of CP; light concentration of stringers of CP, PY & (SP?)
99.45		At 101.50–101.70 is massive quartz (broken core up?)		Becomes highly siliceous, less sericitic; interlayered with chlorite. Min.: wisps of CP
	23	Foliation	45°	Min.: wisps of CP; light conc. of mm stringers of CP; stringers of CP
	24	Core is much broken at interval of 109.20–110.30; Foliation	45°	Decrease again in chlorite; increase in chlorite
	25	Foliation	40°	
	26	Quartz veinlet? 2 cm; Foliation	35°	Siliceous chlorite sericite schist. Min.: conc. of mm stringers of CP & SP & a few shines of bornite (?)
		Foliation	60°	Gradually becomes garnetiferous, sericitic, chloritic, somewhat schistose, quartz porphyry with garnet & blue quartz phenocryst sparsely distributed. Min.: wisps & stringers of mm thick of SP, CP
	27–28			
135.50	29	Foliation - contact	45°	Decrease in silica & more schistose; amphibolite ? 135.50 – 137.25; gradually becomes garnetiferous chlorite schist; garnet phenocryst of up to 1 cm ø. Min.: sporadic shines and light conc. of thin stringers of CP; sparse mm wisps of SP & CP; sparse & sporadic shines of SP & CP
147.50	30–31	Faint contact	70°	Quartz porphyry, green & brown biotite bearing, with blue quartz & sparse garnet phenocryst. Min.: very light conc. of SP, CP & (bornite?)
152.70		Quartz vein(?) at 152.70–153.?		Increase in chlorite
	32	Faint foliation - contact		
163.80	33	Faint foliation	50°	Gradually becomes more chloritic, more schistose and less porphyritic. Min.: 163.? Light wisps of SP & CP
	34	Foliation; Sporadic 2–3 mm quartz veinlets		Chlorite schist with layers of brown biotite - amphibolite
169.?				Becomes more massive and finer grained & greenish
	35	Sporadic quartz veinlets		Green stone (?): chloritic, actinolite (?), siliceous, massive, greenish grey colored, fine grained, metamorphic rock, and no sulfide
177.80				Sporadic brown biotite
180.?	36	Contact; Faint foliation		Quartz porphyry with blue quartz phenocryst and also green & brown biotite & chlorite; silica matrix increases
	37			Garnet phenocryst observed
191.?	38	Quartz veinlets; quartz veinlets of up to 1 cm thick		Garnetiferous, quartz porphyry with blue quartz & garnet phenocryst, and chlorite, green & brown biotite and sericite in the matrix
198.40–198.90	39	Contact	60°	Increase in silica content; chloritic, biotitic, siliceous schist
201.20		1 cm quartz veinlet at 201.20; Foliation	40°	Brown biotite enrichment at interval 201.20–201.60; silica enrichment at interval 201.60–203.?
203.55	40	Sharp contact; KUTAM FAULT 203.50 – 208.70	60°	Garnetiferous quartz porphyry? with some quartz & garnet phenocryst; rock is greenish grey colored - amphibolite?
206.95		Core is broken at contact		Chloritic, siliceous rock; rock is green colored, amphibolite? Min.: very sparse shines of sulfide
208.70	41	Contact	70°	Garnetiferous quartz porphyry, massive, with biotite & chlorite mafic. Min.: no sulfide seen
	42			Gradually darker colored due to increase in mafic minerals
219.15	43			More massive, & increase in silica (decrease in mafic); rock becomes lighter colored
228.70	44			Increase again in mafic mineral content
230.0				230.0 END OF HOLE

Sample Data

Depth	Length	Sample number	Au g/t	Ag g/t	Cu %	Pb %	Zn %
41.75–43.50	175	104570	0.40	7.80	1.95	.005	0.81
44.50	100	104571	0.80	2.30	.0485	.0074	.140
45.50	100	104572	0.80	2.30	.001	.002	.036
46.50	100	104573	0.54	3.60	0.105	<.001	.007
47.50	100	104574	0.16	2.50	.037	<.001	.056
48.75	125	104575	0.16	1.10	<.001	<.001	.01
49.75	100	104576	0.16	1.00	<.001	<.001	.045
50.75	100	104577	0.76	1.00	.001	<.001	.001
52.00	100	104578	0.26	1.10	.008	<.001	.019
53.10	110	104579	0.26	1.10	.014	.002	.036
54.10	100	104580	0.26	1.40	.012	<.001	.010
55.10	100	104581	0.26	1.10	.007	.001	.006
56.10	100	104582	0.10	0.80	.001	.001	.006
57.20	110	104583	0.16	0.50	.001	<.001	.004
58.20	100	104584	0.16	0.80	.003	<.001	.004
59.20	100	104585	0.16	0.50	<.001	<.001	.004
60.20	100	104586	0.16	0.50	.001	<.001	.004
61.10	90	104587	0.16	0.50	<.001	.001	.007
62.10	100	104588	0.32	1.00	.001	<.001	.001
63.10	100	104589	0.32	1.00	.003	<.001	.001
64.10	100	104590	0.16	0.50	<.001	.002	.004
65.20	110	104591	0.16	0.80	.005	<.001	.010
66.20	100	104592	0.16	0.80	0.004	.001	.030
67.20	100	104593	0.16	1.40	.039	<.001	.065
68.50	130	104594	0.36	4.00	0.940	0.001	0.600
69.80	130	104595	0.26	3.90	0.505	<.001	0.150
70.80	100	104596	0.26	1.20	.018	.001	0.112
71.70	90	104597	0.26	1.20	.075	.001	0.550
72.60	90	104598	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
73.50	90	104599	0.16	2.60	0.445	<.001	0.176
74.25	75	104600	0.38	4.10	1.875	.004	0.315
75.25	100	104601	<.04	2.90	0.790	.004	0.325
76.60	135	104602	0.36	[illegible]	0.325	.005	0.840
77.60	100	104603	0.36	1.40	.087	.008	.053
78.90	100	104604	0.36	3.10	2.600	.006	0.490
79.90	100	104605	0.36	1.80	0.250	.005	0.180
80.90	100	104606	0.36	<.10	.040	<.001	.035
82.05	115	104607	0.16	2.50	0.075	.008	.042
83.05	100	104608	0.26	1.00	0.150	.003	.032
84.05	100	104609	0.36	1.00	.019	.002	.053
85.05	100	104610	0.36	1.20	0.495	.004	.078
86.55	150	104611	[illegible]	1.80	0.700	.004	.031
87.55	100	104612	0.36	2.80	0.345	.004	.098
88.55	100	104613	0.36	2.90	1.450	.006	0.120
89.55	100	104614	0.40	1.60	.085	.004	.048
91.00	145	104615	0.16	2.40	0.260	.004	.070
92.00	100	104616	0.36	2.40	0.325	.004	.095
93.00	100	104617	0.46	1.10	0.095	.005	.088
94.00	100	104618	0.26	5.00	1.050	.016	0.180
95.50	150	104619	0.16	2.90	0.045	.014	.044
96.50	100	104620	[illegible]	[illegible]	0.800	.005	.035
97.50	100	104621	0.16	1.30	0.150	.008	.019
98.25	75	104622	0.36	2.30	0.205	.006	.017
99.85	160	104623	0.36	3.80	0.800	.01	.061
100.85	100	104624	[illegible]	[illegible]	0.305	.006	.053
101.85	100	104625	0.36	1.90	.050	.006	.081
102.85	100	104626	[illegible]	[illegible]	0.170	.006	.004
103.85	100	104627	[illegible]	[illegible]	0.225	.008	0.107
104.65	100	104628	[illegible]	[illegible]	0.470	.006	.036
105.45	80	104629	0.80	4.60	1.335	.006	0.162
106.45	100	104630	[illegible]	[illegible]	1.150	.005	0.116
107.45	100	104631	0.60	4.30	0.560	.006	.080
108.45	100	104632	[illegible]	[illegible]	2.440	.006	0.250
109.45	100	104633	0.36	4.50	0.270	<.001	0.210
110.45	100	104634	0.36	1.40	0.100	<.001	.073
111.30	85	104635	<.04	1.50	0.100	<.001	0.250
112.30	100	104636	[illegible]	[illegible]	.018	[illegible]	.016
113.30	100	104637	0.48	4.40	0.085	<.001	0.210
114.30	100	104638	0.20	[illegible]	.034	<.001	.032
115.30	100	104639	0.12	1.00	.003	<.001	.020
116.30	100	104640	[illegible]	[illegible]	[illegible]	<.001	.033
117.20	90	104641	<.04	1.30	.043	<.001	.044
118.20	100	104642	0.12	1.80	0.070	<.001	0.650
119.20	100	104643	0.38	3.50	0.920	.005	1.470
120.20	100	104644	0.12	1.40	.025	<.001	0.460
121.20	100	104645	0.12	0.40	.005	<.001	.020
122.20	100	104646	0.12	0.50	.020	.002	.032
123.25	105	104647	0.57	2.50	0.370	<.001	1.650
124.25	100	104648	<.04	1.50	.070	<.001	.073
125.25	100	104649	0.15	2.00	0.150	<.001	.073
126.25	100	104650	0.12	1.30	.088	<.001	.093
127.25	100	104651	<.04	1.80	.045	<.001	0.110
128.25	100	104652	<.04	1.00	.029	.002	0.182
129.20	95	104653	<.04	1.30	.025	<.001	0.104
130.20	100	104654	<.04	1.30	.047	<.001	.078
131.20	100	104655	<.04	1.00	.013	<.001	.037
132.20	100	104656	<.04	[illegible]	.022	<.001	.070
133.20	100	104657	<.04	0.80	.013	<.001	.047
134.20	100	104658	<.04	1.00	.027	<.001	.052
135.10	90	104659	<.04	1.10	.013	<.001	.061
136.10	100	104660	.04	1.50	.037	<.001	.057
137.10	100	104661	.04	2.40	.075	<.001	0.160
138.10	100	104662	.04	1.80	.030	<.001	.090
139.10	100	104663	<.04	2.30	.070	<.001	0.105
140.00	90	104664	.08	5.00	0.170	.012	1.490
140.95	95	104665	<.04	3.60	.070	.025	0.500
141.95	100	104666	.04	5.00	.095	0.190	0.380
142.95	100	104667	<.04	5.80	0.165	0.115	0.810
143.95	100	104668	<.04	3.90	0.180	0.094	0.780
144.95	100	104669	<.04	2.80	.015	0.119	.044
145.95	100	104670	.04	5.60	0.190	.005	0.215
146.75	80	104671	.04	2.80	.035	0.124	0.110
147.75	100	104672	.04	4.00	0.100	0.101	0.840
148.75	100	104673	<.04	0.40	.007	.002	.014
149.75	100	104674	<.04	0.40	.003	<.001	.004
150.75	100	104675	<.04	0.60	.004	<.001	.007
151.75	100	104676	<.04	0.60	.004	<.001	.007
152.80	105	104677	<.04	0.60	.037	<.001	.006
153.80	100	104678	<.04	0.40	.005	<.001	.007
154.80	100	104679	<.04	0.70	.009	<.001	.007
155.80	100	104680	<.04	0.60	.007	<.001	.008
156.80	100	104681	<.04	0.80	.005	<.001	.007
157.80	100	104682	<.04	0.60	.008	<.001	.008
158.80	100	104683	<.04	0.80	.005	<.001	.008
159.80	100	104684	<.04	0.40	<.001	<.001	.008
160.80	100	104685	<.04	0.40	.006	<.001	.006
161.80	100	104686	<.04	0.60	.046	.003	.007
162.80	100	104687	<.04	0.60	.003	.003	.007
163.80	100	104688	<.04	19.70	.039	<.001	<.001
164.75	95	104689	.08	15.60	0.000	0.350	1.190
165.75	100	104690	.08	1.36	.033	.011	.011
166.75	100	104691	<.04	0.70	.004	.001	.006
167.55	100	104692	<.04	0.30	<.001	<.001	.005
168.55	100	104693	<.04	0.40	<.001	<.001	.005
169.55	100	104694	<.04	1.22	.013	<.001	.009
170.60	105	104695	<.04	1.10	.019	.006	.021
172.00	100	104696	<.04	2.22	.015	.008	.025
173.00	100	104697	<.04	1.60	.018	<.001	.003
174.00	100	104698	<.04	1.80	.022	<.001	.008
175.00	100	104699	<.04	1.00	<.001	.002	.003
176.00	100	104700	<.04	1.25	.030	<.001	.006
176.80	80	104701	<.04	1.36	.034	.004	.006
177.80	100	104702	<.04	1.20	.051	.006	.010
178.80	100	104703	<.04	0.60	.002	.003	.007
179.80	100	104704	<.04	0.60	.003	.003	.006
180.60	100	104705	<.04	0.60	.003	.004	.007
181.60	100	104706	<.04	1.10	.005	.002	.007
182.50	90	104707	<.04	1.00	.004	<.001	.006
183.50	100	104708	<.04	0.70	.001	.001	.007
184.50	100	104709	0.20	0.70	.004	.001	.008
185.50	100	104710	<.04	1.56	.004	.001	.011
186.50	100	104711	<.04	0.80	.008	.002	.010
187.50	100	104712	<.04	1.16	.006	.001	.011
188.30	80	104713	<.04	0.70	.006	.001	.008
189.30	100	104714	0.17	0.90	.009	.001	.007
190.30	100	104715	<.04	0.90	.003	.001	.007
191.30	100	104716	<.04	0.90	.002	<.001	[illegible]
192.10	80	104717	<.04	0.30	.004	.003	.008
193.15	100	104718	<.04	0.94	.006	.002	.009
193.95	85	104719	<.08	0.90	.008	.003	.006
195.15	100	104720	<.04	0.70	.004	.001	.007
196.15	100	104721	<.04	0.60	.003	.001	.004
197.15	100	104722	<.04	0.60	.003	.001	.006
198.15	100	104723	<.04	0.90	.005	.001	.006
199.15	100	104724	.04	1.36	.015	.001	.009
200.15	100	104725	<.04	0.94	.010	.001	.005
201.15	100	104726	<.08	0.98	.088	.001	.004
202.15	100	104727	<.04	1.26	.014	.001	.005
203.15	100	104728	<.04	1.26	.014	.001	.006
204.15	100	104729	<.04	1.00	.014	.001	.008
205.00	85	104730	<.04	0.70	.005	.001	.004
205.85	85	104731	<.04	0.60	.002	.001	.004
206.85	100	104732	<.04	0.50	.004	.001	.003
207.85	100	104733	<.04	0.90	.014	.001	.004
208.85	100	104734	<.04	0.78	.005	.001	.004
209.85	100	104735	<.04	0.30	.003	.001	.009
210.85	100	104736	<.04	0.30	.004	.001	.010
211.80	100	104737	<.04	0.30	.002	.001	.009
212.80	100	104738	<.04	0.30	.004	.001	.004
213.80	100	104739	<.04	0.40	.006	.001	.007
214.80	100	104740	<.04	0.30	.003	.001	.004
215.80	100	104741	<.04	0.20	.001	.001	.006
216.80	100	104742	<.04	0.20	.003	.001	.009
217.55	75	104743	<.04	0.20	.002	.001	.004
218.55	100	104744	<.04	0.60	.037	.001	.012
219.55	100	104745	<.04	0.30	.004	.001	.007
220.55	100	104746	<.04	0.60	.007	.001	.006
221.55	100	104747	<.04	0.20	.003	.001	.004
222.55	100	104748	<.04	0.40	.006	.001	.013
223.60	105	104749	<.04	0.40	.004	.001	.009
224.60	100	104750	<.04	0.40	.013	<.001	.008
225.60	100	104751	<.04	0.30	.006	<.001	.006
226.60	100	104752	<.04	0.30	.004	<.001	.003
227.60	100	104753	<.04	0.30	.002	<.001	.004
228.60	100	104754	<.04	0.30	.004	<.001	.004
229.35	85	104755	<.04	0.20	.005	<.001	.006
230.00	65	104756	<.04	0.90	.014	<.001	.008

Averages:
- 4.5 m/s (samples 104629–104633): 0.394% Zn, 591 [illegible], 0.61 Au, 0.1% Cu
- 3.0 m/s (samples 104642–104644): 0.17% Au, 2.8 Ag, 0.38% Cu, 1.18 Zn