केवल सरकारी प्रयोग हेतु
For official use only

GOVERNMENT OF INDIA

GEOLOGICAL SURVEY OF INDIA

INVESTIGATION FOR GOLD IN SANGLI MINE BLOCK, GADAG GOLD FIELDS, DHARWAR DISTRICT, KARNATAKA

(Annual Interim Report for the FS 1987-88)

By

C. Chakrabarti
B. V. Ganesh
Geologists (Jr.)

Geological Survey of India

ECONOMIC GEOLOGY DIVISION –I

OPERATIONS KARNATAKA & GOA SOUTHERN REGION

BANGALORE

1989

INVESTIGATION FOR GOLD IN SANGLI MINE BLOCK, GADAG GOLD FIELDS, DHARWAR DISTRICT, KARNATAKA

(Annual Interim Report for the FS 1987-88)

By

C. Chakrabarti
B. V. Ganesh
Geologists (Jr.)
Geological Survey of India

CONTENTS

vi) Borehole Sections SMP-1 to SMP-10

vii) Bore hole section SMP-11 to 18

viii) Bore Hole Section SMP-19 to 23.

GEOLOGICAL SURVEY OF INDIA

INVESTIGATION FOR GOLD IN SANGLI MINE BLOCK, GADAG GOLD FIELDS, DHARWAR DISTRICT, KARNATAKA

(Annual Interim report for the FS 1987-88)

By

C. Chakrabarthi, Geologist (Jr)

B.V. Ganesh, Geologist (Jr)

Geological Survey of India

ABSTRACT

By detailed mapping and trenching, three almost parallel lodes have been established totalling a cumulative strike length of 3.6 km.

Drilling has been taken up to test the lodes at two levels, about 60m and 100m vertical depth from a convenient datum on the surface and at 100m strike interval. On the basis of the first series of boreholes intersections at 100m interval, three sections namely Sangli North, Sangli Central and Sangli South, have been delineated on Temple East Lode (TEL). In the first two sections, drilling at 50m interval is completed at 680m and 640m RL. In Sangli South, drilling is in progress at 50m interval for both the levels.

Drilling indicated a probable reserve of 0.48 million tonnes with an average grade of 4.04 gm/t over an average width of 2.12m in Sangli North Section and 0.38 million tonnes with an average grade of 4.06m gm/t over an average width of 3.36m. A few deeper boreholes for about 500m RL intersections have been planned in all three sections, and one such is in progress in Sangli North Section.

Trenching carried out to trace the southern continuity of the TEL beyond the area mapped has added a fresh 230m strike length of mineralised zone.

GEOLOGICAL SURVEY OF INDIA

INVESTIGATION FOR GOLD IN SANGLI MINE BLOCK, GADAG FOLD FIELDS, DHARWAR DISTRICT, KARNATAKA

(Annual interim report for the FS 1987-88

By

C. Chakrabarti, Geologist (Jr)

B.V. Ganesh, Geologist (Jr)
Geological Survey of India

I. INTRODUCTION

The exploration for gold in Sangli Mine Block (SMB) of Gadag Gold Fields in Gadag Schist Belt, commenced during the field season 1985-86 and has been continued in 1987-88 field season. Detailed geological mapping on 1:2,000 scale and bulk of the trenching work were carried out during the previous two field seasons. This report deals mainly with the exploration carried out and results obtained during the field season 87-88. However, a brief resume of the geology and mineralisation is given for convenience.

II HIGHLIGHTS OF THE EXPLORATION CARRIED OUT AS ON 30.9.88

By mapping and trenching, three almost parallel lodes have been established on the surface, totalling a cumulative strike length of 3600m. Out of the three lodes, TEL has a strike length of 2100m. On the basis of the assay date of borehole intersections, three sections have been delineated, wiz.,1) Sangli North, where a probable reserve of 0.48 million tonnes of ore with an average grade of 4.04 gm/t and average width of 2.12m has been estimated. 2) Sangli Central, having a probable reserve of 0.38 million tonnes of 4.06 gm/t of average grade over average width of 3.36m, and 3) Sangli South, where drilling is under progress and the results so far obtained are very encouraging.

The following quantum of work has been carried out during the field season 87-88.

Trenching	: 163 cu.m.	
Drilling	: 2538.65 m	
Sampling	: 534	479 boreholes samples
		55 trench samples

III GEOLOGY OF SANGLI MINE BLOCK

SMB forms the southern part of the Gadag Gold Fields, which lies in Gadag Schist Belt, which in turn, forms the northern continuation of the well known Chitradurga Schist Belt. The rock types in SMB include metavolcanics (meta-andesite with a few narrow, linear bands of meta-acid volcanic and associated narrow chert bands), meta-sedimentaries (argillite-arenite-arkose-greywacke suite) and a few meta-gabbroic intrusive bodies (Plate I) Two prominent dolerite dykes, one trending NNW-SSE and the other NE-SW cut across the litho formations.

The bedding planes are well marked in meta-sedimentaries and trend in a general NNW-SSE direction with amount of dip varying from 20º to 50º towards ENE in the northern part of the block and in the south, trend swings to a general NNE-SSW, with dip varying between 25º and 35º towards ESE. The dominant schistosity (= regional schistosity) of the rocks, both in meta-volcanics and meta-sedimentaries, trends parallel / sub-parallel to the bedding. A number of shear zones, parallel or sub-parallel to the bedding planes and schistosity are present at or near the contact between the meta-volcanics and meat-sedimentaries.

IV. <u>DESCRIPTION OF MINERALISED ZONES</u>

In SMB, the gold bearing zones at or near the surface have been extensively worked by the ancients as evidenced by the presence of a series of depressions and shallow inclines at places. Auriferous zones are present both within the meta-volcanics and meta-sedimentaries as well as near the contact of the units, ad trend in a general NNW-SSE direction, parallel or sub-parallel to bedding/schistosity. These zones are characterised by intense shearing, brecciation, chloritisation, sericitisation,

Kaolinisation and permeation of quartz-carbonate veins and veinlets. Dissemination and segregation clots of pyrite, pyrrhotite, arsenopyrite and chalcopyrite are common.

Based on detailed geological mapping and trenching, 3 parallel to sub-parallel auriferous zones (Plate-II) were delineated as shown below :-

Name of the Lode (from E to W)	**Strike Length**
1. Temple East Lode (TEL)	2100 m
2. New East Lode	820 m
3. Middle Lode	680 m

A brief account of the various lodes is given below:-

Temple East Lode (TEL):- This forms the southern continuity of the Mysore Mine East Lode and occurs within the argillite-greywacke suite of rocks. This lode has been extensively worked by the ancients. Underground mine development was carried out on this lode during the early part of this Century by the erstwhile Sangli Mines Limited at 200' (648 m R. L.), 300' (635 m R.L.), 460' (618 m R.L) and 600' (599 m R.L.) levels (Plate III)

Trenches put across this lode have invariably exposed ancient working, mostly in the form of shallow inclines along the dip of the lode. The lode is traceable continuously for a strike length of 2100 m with a gap of about 80 m, immediately south of Sortur-Doni road (Plate-II). The strike of this lode varies from N20ºW – S20ºE at its northern end through N-S to N25º - 825ºW at its southern end, with dip varying between 27º and 40º towards east. The variation of strike is due to the superposition of a later fold deformation on an E-W axis, producing broad, open folds on all scale. The width of the mineralised zone varies from 0.50 to 3.00 m. The lode is characterised by intense brecciation, silicification and carbonatisation with limited wall-rock alteration such as sericitisation and chloritisation. Veins and veinlets of quartz, carbonate and disseminations or pyrite, pyrrhotite, arsenopyrite and chalcopyrite are commonly observed. Groove samples collected from trenches have indicated consistently significant gold values over the entire strike length of the lode. Gold values of individual samples range from 1.00 to 30.00 g/t over individual sample length (true width) ranging from 0.20 to 0.50 m. In many of the trenches, ancient

mine fills were met with indicating that the richer portions have been mined out. In such cases only the wall rocks were sampled.

New East Lode:- This lode occurs within the meta-sedimentaries and lies at a distance of about 30 to 50 m west of Temple East Lode (TEL). It runs parallel or sub-parallel to the TEL and has been delineated by trenching over a cumulative strike length of about 820 m in 3 sections. Trenches put across this lode exposed either ancient workings or weakly mineralised portion left behind by the ancients. Groove samples showed gold values varying from 0.1 to 12.35 g/t over individual sample lengths ranging from 0.25 to 0.45 m. The width of the mineralised zone varies from 0.25 to 1.00 m.

Middle Lode:- This lode lies 10 to 20 m west of the New East lode, and Occurs within the meta volcanics. It has been delineated by trenching over a cumulative strike length of 680 m in 2 disconnected sections in the northern part of SMB. Trenches exposed ancient workings and inclines and the gold value vary from 0.2 to 4.75 g/t over individual sample lengths ranging from 0.2 to 0.45 m. This lode is similar in its nature and correlatable to the Middle lode in Mysore Mine Block. The width of the mineralised zone varies from 0.40 to 1.30 m.

V EXPLORATION

Trenching: Trenching was confined to the southern part of the SMB, beyond the mapped area, mainly to establish the southern continuity of the TEL, further southwest from the last exposures of old working. South of the trench 557 - 118 (completed during the last field season 86-87), for a strike length of about 80m, the trench does not show any surface indication of mineralisation. Further south, a zone of alteration marked by incipient development of sericite and discontinuous length, bands of highly shared quartz within the shared meta argillite (chlorite phyllite), could be traced continuously for a strike length of about 230a. Intensity of sharing is not uniform over the length. The shear development is seen over rather all discrete stretches and is marked by both ductile and brittle types of deformation. The width of the zone of alteration varies from 20cm to maximum of 30cm. A few trenches exposed old workings closing at the bottom. The strike of the litho formation and that of the mineralised zone changes from N10W to N25E with about 30 easterly dip. A

strike length of 230m of mineralised zone has been established we far (between 557-118A and 557-137). Though most of the trenches exposed the mineralised zone, the groove samples assayed uniformly poor values ranging between <0.1 and 0.6 g/t.

Drilling: Exploratory drilling was taken up to test the TEL and New East Lode. Initially the boreholes were drilled at 100m strike interval to intersect the lodes at about 680m RL. As the intersections of New East Lode were not found to be consistently significant and the values not encouraging, the lode was not explored throughout it strike length, whereas the TEL which was more promising, has been investigated in details. Till the end of the field season 86-87, 49 boreholes were completed (GDS-1 to GDS-50) and 2 boreholes (GDS-48 and GDS-51) were in progress. During the field season 87-88, 16 more boreholes were completed and (upto GDS-65) and 2 boreholes (GDS-66 and GDS-67) were in progress.

On the basis of essay data of borehole intersections at 100m strike interval, three sections have been delineated of TEL where gold values are more than 2.0 gm/t over a true width of 1.50m. They are i) Sangli North Section, ii) Sangli Central Section and iii) Sangli South section

In the first two sections, drilling at 50 m interval is completed with intersections at 680 and 640 m. R.L. In South Sections, drilling is in progress at 50 m interval for lode intersections at 640 m. R.L. Besides, a few deeper boreholes (-500 m. R.L. intersections) have been planned in all the sections and one such is in progress in North Section. The results of exploratory drilling in these three sections are discussed below section - wise:-

Sangli North Section:-

This covers the area between Air Shaft in the north and North Shaft in south (Plate-I). 25 boreholes were drilled at 2 to 3 levels in this section along 12 profile lines spaced at 50 m interval. One borehole for deeper (at 500 m. R.L.) intersection has been completed and the other is under progress to find out the continuity of lode at depth. Cross sections along the boreholes were drawn correlating the Temple East Lode on all the profile lines. It is found that the dip of the lode changes both along the

strike and dip, indicating broad warps. The amount of dip varies form 27º to 35º towards ESE.

A major dolerite dyke trending sub-parallel to the Temple East Lode and having a width of about 10m, lies at a distance of about 100 m towards east. Borehole intersections indicate that the dyke has steep easterly dip (75º). A longitudinal section along the dip plane of the Temple East Lode has been prepared presuming an average dip of 30º (Plate-III). The borehole intersections (Assay/True width) and the old mine developments have been shown on the L-Section. The N-S trending dyke, described earlier, has been found to intersect the plane of the ore body between 650 and 680 m R.L.

A drill indicated probable reserve (= C_1 category of Russian classification) of 0.48 million tonnes has been estimated in this section upto a depth of 580 m. R.L. The near surface portion of the lode upto a vertical depth of 30 m has not been taken into consideration for reserve estimation. Also the areas covered by the boreholes with poor intersections (i.e. < 2.0 g/t and 1.5 m true width) has not been taken into account for reserve estimation. Though GDS-14 intersection is marginal, the adjoining boreholes GDS-16 and 18 show good grades. So this particular intersection, though just falling outside the area demarcated for computation, has been taken into consideration for reserve estimation. The tenor of the ore varies from 2.11 to 6.41 g/t, the average being 4.04 g/t. The width varies from 1.5 to 4.92 m, the average width being 2.12 m. The details of borehole intersections of Temple East Lode with gold assay values, true width etc., are furnished in Annexure – I.

Sangli Central Section:-

This section lies on either side of the South Shaft and has a strike length of 300 m. 10 boreholes along 7 profiles, spaces at 50 m interval, were drilled. Cross sections along the boreholes showed the dip of the lode varying between 27º and 32º towards NSE (Plate VII). The dolerite dyke intersects the plane of the lode between 640 and 680 m R.L. The strike separation between the lode and dyke increases towards south. Most of the intersections were planned at the hanging wall side of the dyke, to accommodate the broad range (40 m) of the level of intersection between the

dyke the lode and to give allowance for the back of the mine. Hence, reserve was estimated for the section lying below the dyke.

The longitudinal section along the dip plane of the lode has been prepared taking an average dip of 30º (Plate-IV). The borehole intersections (Assay/True width) and old mine developments have been shown on the plane of the section. An ore shoot, having a strike length of about 300 m and pitching about 35º southerly, has been delineated on the basis of two levels of intersections.

A drill indicated probable reserve of 0.38 million tonnes of ore has been estimated from this shoot upto a depth of 580 m R.L. The grade varied from 2.86 to 6.54 g/t over width ranging from 1.51 to 6.52 m, the average being 4.06 g/t over 3.36 m. The portion of the lode above the dyke has not been taken into consideration for reserve estimation for reasons (i) the near surface portion upto a vertical depth of 30 m has been left as back of the mine and (ii) it forms the area covered by poor intersections (i.e. < 2.0 g/t and 1.3 m true width). The details of the borehole intersections are shown in Annexure-I.

Sangli South Section:-

This forms the southern end of the Sangli Mine Block and covers a strike length of 400 m, where the exploratory drilling is under progress at 50 m strike interval. Drilling so far carried out at 640 m R.L. through 7 boreholes has indicated an ore shoot of 250 m strike length (Plate-VII). Cross sections along the boreholes showed the dip of the lode is varying between 27° and 30° towards ESE (Plate-VIII). Results of 3 boreholes show the grade varying between $\frac{2.37}{1.48}$ to $\frac{5.40\text{gm}}{1.57\text{m.}}$. The other intersections are good and results are awaited. Second series of intersection is being planned. However, the details of the borehole intersections are given in the Annexure-I.

VI. CONCLUSIONS AND RECOMMENDATIONS:

1. Of the 3 lodes present in Sangli Mine Block, the Temple East Lode which has a strike length of 2100 m, is the most persistent and promising.

2. (Exploratory drilling is completed (in North Section establishing a strike length of 400 m of payable lode in 2 sections separated by a lean zone of 100 m. A drill indicated probable reserve (C_1 category of Russian classification) of 0.48 million tonnes with an average grade 4.04 g/t over an average width of 2.12 m has been established upto a depth of 580 m. R.L. in this section. One borehole (GDS-58) with deeper intersection at 500 m. R.L. is completed establishing the depth continuity of the lode. One more borehole (GDS-66) is in progress to test the lode at the same R.L. in the southern part.

3. Exploratory drilling is completed in Central Section, establishing a payable are shoot of 300 m strike length. A drill indicated probable reserve of 0.38 million tonnes of ore with an average grade 4.06 g/t over an average width of 3.36 m, has been estimated in this section. One borehole (GDS-61) with deeper intersection at 500 m. R.L. is completed establishing the depth continuity of the ore shoot; one more is being planned to intersect the shoot at about the same R.L. in the southern part.

4. Results of exploratory drilling strongly warrant detailed sub-surface exploration (exploratory mining) of the Temple East Lode at two levels in both North and Central Sections.

5. Since there was considerable underground mine development in both the sections, the available old mine data should be properly evaluated to decide whether mine reclamation of fresh mine development will be suitable for confirming grade and width of the deposit.

6. Trenching should be continued in the southern extension of Sangli Mine Block (South Section) to trace the strike continuity of the mineralised zone.

7. Drilling in South Section to test the TEL at two levels coupled with one or two deeper intersections should be continued as programmed.

VII ACKNOWLEDGEMENTS

The authors are highly thankful to Shri W.K.Natarajan, Director, Economic Geology I, GSI, for valuable suggestions in course of the work. Thanks are also due to Dr.E.B.Sugavanam, the present Director who took over charge from Shri W.K.Natarajan on this superannuation is June, 1988, for his guidance and encouragement. Shri U.S.Reddy, Geologist (Sr), who co-ordinated the work till his transfer in April, 1988 is thanked for his constant help and stimulating discussion. Shri S.Sridhar, J.T.A.(S), helped in survey and drawing work.

(C. CHAKRABARTI)

ANNEXURE – I

DETAILS OF BOREHOLE INTERSECTION IN SANGLI MINE BLOCK, NORTH SECTION

Profile Line No.	Bore Hole No.	Angle with Horizontal	Auriferous zone borehole From (m)	Along To (m)	Length (m)	True width (m)	Average gold value (g/t)	R.L. of intersection
1	2	3	4	5	6	7	8	9
SMP-4	GDS-4	79º	54.25	55.85	1.60	1.50	2.60	687
SMP-4A	GDS-49	V	74.37	76.20	1.83	1.50	2.51	670
	GDS-62	86º	206.80	207.35	0.55	-	-	582
SMP-5	GDS-6	67º	28.70	31.40	2.70	-	-	750
	GDS-11	67º	44.00	49.12	5.12	4.92	4.09	715
	GDS-5	80º	112.80	114.50	1.70	1.50	3.13	660
	GDS-40	84º	195.05	195.35	0.30	0.30	2.60	604
SMP-5A	GDS-32	V	138.95	140.70	1.75	1.50	5.46	634
SMP-6	GDS-9	60º	32.65	34.35	1.70	1.70	6.50	726
	GDS-13	V	46.60	49.75	3.15	2.64	4.50	703
	GDS-26	83º	127.95	129.60	1.65	1.50	2.30	639
	GDS-47	73º	163.55	165.15	1.60	1.55	3.21	590
SMP-6A	GDS-45	78º	141.09	143.75	2.66	2.41	6.41	617

1	2	3	4	5	6	7	8	9
SMP-7	GDS-16	87º	28.50	33.27	4.77	4.16	2.97	693
	GDS-31	72º	119.86	120.85	0.99	0.90	1.91	632
	GDS-52	74º	144.70	146.20	1.50	0.26	3.00	592
	GDS-58	86º	215.02	216.37	1.85	1.66	1.73	520
SMP-7A	GDS-42	60º	100.50	101.30	0.80	0.80	1.06	644
SMP-8	GDS-14	82º	27.00	28.15	1.15	1.05	2.26	693
	GDS-28	69º	102.15	103.65	1.50	1.50	6.08	631
	GDS-51	80º	143.16	144.76	1.60	1.50	3.13	590
SMP-8A	GDS-36	59º	86.20	87.92	1.72	1.72	3.29	629
SMP-9	GDS-18	65º	20.00	21.52	1.52	1.52	5.31	684
	GDS-23	66º	77.70	79.20	1.50	1.50	2.11	637
	GDS-38	81º	126.60	128.65	2.05	1.96	1.35	597
SMP-9A	GDS-65	82º	147.60	148.80	1.20			467
	GDS-66	85º	Under progress				Assay results waited	

* passed through the ancient workings.

1	2	3	4	5	6	7	8	9
				CENTRAL SECTION				
SMP-13	GDS-29	45º	32.00	34.25	2.25	2.15	4.50	677
	GDS-10	74º	80.05	81.35	1.30	0.75	0.80	639
SMP-13A	GDS-33	78º	67.55	69.35	1.80	1.75	2.86	642
SMP-14	GDS-12	73º	70.85	77.55	6.70	6.53	3.27	648
	GDS-44	80º	148.75	149.10	0.35	0.35	1.80	578
SMP-14A	GDS-35	70º	68.90	73.95	5.05	4.97	4.23	639
SMP-15	GDS-15	74º	72.85	74.42	1.57	1.57	3.42	634
	GDS-39	77º	120.95	124.15	3.20	3.00	6.54	590
SMP-15A	GDS-34	70º	95.20	98.70	3.50	2.80	5.27	622
	GDS-61	70º	244.43	245.53	1.10	1.08	3.52	496
SMP-16	GDS-17	82º	54.10	55.60	1.50	1.38	1.40	666
	GDS-30	V	89.75	91.45	1.70	1.50	3.31	621
	GDS-48	80º	156.45	158.90	2.45	2.30	1.46	568
				SOUTH SECTION				
SMP-19	GDS-21	77º	75.98	77.20	1.22	1.18	0.98	673
	GDS-50	65º	137.32	138.47	1.15	1.14	1.63	600
SMP-19A	GDS-37	73º	79.10	80.05	0.95	0.90	1.25	666

1	2	3	4	5	6	7	8	9
SMP-20	GDS-24	64º	83.20	84.70	1.50	1.50	1.80	668
	GDS-46	85º	92.80	94.45	1.65	1.50	5.82	627
SMP-20A	GDS-41	75º	70.00	70.75	0.75	0.72	1.00	672
SMP-21	GDS-25	63º	83.00	84.52	1.52	1.50	7.80	679
	GDS-43	72º	106.85	108.80	1.95	1.92	2.14	633
SMP-21A	GDS-53	84º	104.25	106.95	2.70	2.38	4.68	629
SMP-22	GDS-59	79º	77.34	79.01	1.67	1.57	5.40	638
	GDS-60	78º	152.55	154.30	1.75			555
SMP-22A	GDS-63	45º	108.18	110.80	2.62			642
SMP-23	GDS-64	60º	116.30	118.25	1.95			642
SMP-23A	GDS-67	64º	Under progress					

SUMMARISED LITHOLOGS OF BOREHOLES

BORCHOLE: CDS-4B

Location: SMP-15 **Bearing and angle:** S80W/80

Date of com.: 9.9.87 **Date of closing:** 13.10.87

RL of the collar: 721.41a **Depth of the borehole:** 163.45m

0.00	1.00	Soil
1.00	16.50	Predominantly argillite
18.50	58.60	Dominantly arenite/feldspathic arenite with frequent stretches of Argillite of varying width.
58.60	80.65	Predominantly argillite (phyllite)
80.65	92.75	Dominantly arenite
92.75	122.40	Dom.argillite interbanded with arenite
122.40	137.55	Arenite/feldspathic arenite to gritty arkose
137.55	155.55	Argillite (phyllite) with short stretches of arenite
155.55	158.90	Argillite (chlorite schist), slightly carbonaceous as Places with high impregnation of quartz-carbonated as bands. length and clots and with associated dissemination and segregation of pyrite, little arsenopyrite (temple East Lode)
158.90	163.45	Arenite/feldspathic arenite

BOREHOLE: GDS-51

Location: SMP-8 **Bearing and angle:** S70W/80

Date of Com: 23.9.87 **Date of closing:** 7.10.87

RL of the caller: 731.60 m **Depth of the borehole:** 149.05 m

0.00	0.50	Soil
0.50	14.60	Argillite (Phyllitic)
14.60	26.35	Dom. Arenite/feldspathic arenite
26.35	51.40	Argillite with occasional stretches of arenite
51.40	85.70	Alternate stretches of argillite and arenite of varying width
85.70	102.90	Predom.argillite (phyllite)
102.90	120.40	Arenite/feldspathic arenite
120.40	142.80	Alternate bands of arenite and argillite in almost equal proportion
142.80	144.80	Argillite (chl schist). at places arenaceous, with profuse veins, lenses and clots of qtz, carbonate and with strong pyrite, arsenopyrite dissemination mild brecciation (Temple East Lode)
144.00	149.05	Arenite/feldspathic arenite

BORCHOLE CDS-52

Location: SMP-7 **Bearing and angle:** S70W/74

Date of com.: 26.9.87 **Date of closing:** 14.12.87

RL of the collar: 733.350 **Depth of the borehole:** 169.75 m

0.00	1.50	Soil
1.50	8.05	Argillite
8.05	29.50	Arenite/feldspathic arenite
29.50	37.25	Dom.argillite
37.25	63.25	Alternate bands of arenite and argillite (phyllite) in almost equal proportion
63.25	106.40	Argillite (phy) with occasional short stretches of arenite
106.40	145.05	Dom. Arenite/feldspathic arenite
145.05	146.20	Argillite (chl schist) with a 30cm qtz vein and with high impregnation if lenses, clots of qtz and carbonates, profuse development of sericite, strong dissemination of pyrite, arsenopyrite and mild brecciation (TEL)
146.20	169.75	Arenite/feldspathic arenite with occasional stretches argillite and one stretch of acid volcanic

BOREHOLE GDS-53

Location: SMP-21A **Bearing and angle:** S80W/84

Date of comm: 20.10.87 **Date of closure:** 31.10.87

RL of the collar: 731.80 **Depth of the borehole:** 110.00 m

0.00	6.30	Soil
6.30	35.55	Argillite with occasional short stretches of arenite
35.55	63.10	Predom, arenite/feldspathic arenite
63.10	67.70	Argillite (Phyllitic) with frequent short stretches
67.70	104.05	Predom. arenite
104.05	106.90	Arenite with high impregnation of thick bands, lenses, clots and veins of qtz and carbonates and with strong dissemination of pyrite, arsenopyrite, pyrrhotite, mild brecciation (TEL)
106.90	110.00	Arenite

BOREHOLE GDS-54

Location: SMP-16A | **AL of collar:** 716.59m

Bearing and angle: 560W/74 | **Depth of the borehole:** 109.10

Date of comm.: 7.11.87, 26.10.87 | **Date of Closure:** 7.11.87

0.00	1.20	Soil
1.20	35.65	Dom. Argillite (phyllitic) with frequent stretches of arenite
55.65	44.00	Arenite/ feldspathic arenite with occassional, short stretches of argillite
44.00	77.45	Argillite with occasional short stretches of arenite
77.45	90.35	Dom. Arenite/feldspathic arenite with a few short stretches of argillite
90.35	100.50	Argillite (phyllite)
100.50	101.45	Argillite (chl schist) with high impregnation of qtz and carbonate as veins, lenses and clots and with minerals dissemination of pyrites-pyrrhotite and mild brecciation (TEL)
101.45	109.10	Arenite/feldspathic arenite

BOREHOLE GDS-55

Location: SMP-21 | **Bearing and angle:** 580W/85

Date of comm.: 11.11.87 | **Date of closure:** 1.12.87

BL of the cellar: 710.40m | **Depth of the borehole:** 150.45m

0.00	9.00	Soil
9.00	15.00	Arenite
15.00	40.50	Predom. argillite (phyllite)
40.50	48.25	Dom. Arenite/feldspathic arenite with little argillite inter-
48.25	92.20	Alternate bands of argillite (phyllite) and arenite
92.20	108.00	Arenite/feldspathic arenite
108.00	128.60	Predom, argillite
128.60	141.65	Arenite/feldspathic arenite
141.65	142.85	Arenite with stretches rich in chlorite with high impregnation of bands, lenses and clots of qtz and carbonates and strong dissemination of pyrite and arsenopyrite (TEL)
142.85	150.45	Arenite/feldspathic arenite to gritty arkose

BOREHOLE GDS-56

Location: SMP-17 **Bearing and angle:** 580W/84

Date of comm.: 16.11.87 **Date of closure:** 8.12.87

RL of the cellar: 727.99m **Depth of the borehole:** 134.95m

0.00	2.00	Soil
2.00	21.50	Arenite with irregular patches of argillite
21.50	70.60	Arenite and argillite bands of varying widths and proportions alternate
70.60	104.80	Dom. argillite with thin bands of arenite
104.80	130.65	Arenite and argillite bands of varying widths and proportions alternate
130.65	132.50	Arenite with high impregnation veins, lenses, bands and stringers of qtz and carbonates and with moderate dissemination of pyrite, mild brecciation (TEL)
132.50	134.95	Arenite/feldspathic arenite

BOREHOLE GDS-57

Location: SMP-20 **Bearing and angle:** 580W/85

Date of comm.: 10.12.87 **Date of closure:** 26.12.87

RL of the collar: 698.78m **Depth of the boreholes:** 132.85m

0.00	1.00	Soil
1.00	57.55	Interbanded sequence of argillite and arenite in varying proportions and widths
57.55	86.20	Predom. argillite (phyllitic)
86.20	103.30	Arenite
103.30	112.90	Argillite (phyllite)
112.90	123.40	Arenite/feldspathic arenite
123.40	126.45	First 90cm siliceous volcanic, brecciated with few lenses of qtz-carbonate and dissemination of pyrite; rest arenite with lenses of chlorite schist and profuse veins, lenses of qtz-carbonate and work pyrite dissemination (TEL)
126.45	132.85	Arenite/feldspathic arenite

BOREHOLE GDS-58

Location: SMP-7 **Bearing and angle:** 570W/86

Date of comm.: 30.12.87 **Date of closure**: 12.3.88

RL of the collar: 734.26m **Depth of the borehole:** 226.20m

0.00	2.10	Soil
2.10	13.65	Predom, argillite (phyllitic)
13.65	29.30	Arenite/feldspathic arenite with thin bands of argillite
29.30	43.80	Dom. argillite (phyllitic) with a few thin bands of arenite
43.80	99.15	Arenite/feldspathic arenite with one 6m stretch of argillite
99.15	127.00	Interbanded sequence of argillite (phyllite) and arenite with varying width
127.00	183.00	Dom. argillite (phyllite) with bands of arenite
183.00	201.75	Arenite/f.arenite to gritty arkose
201.75	217.70	Predom, argillite
217.70	221.95	Argillite (chl schist) with thick bands of quartz and profuse veins, stringers and lenses of quartz and carbonates and associated pyrite, arsenopyrite dissemination (TEL)
221.95	226.20	Arenite/f.arenite

BOREHOLE GDS-59

Location: SMP-22 **Bearing and angle:** 560W/79

Date of comm.: 31.12.87 **Date of closure:** 20.1.88

RL of the collar: 714.05m **Depth of the borehole:** 90.60m

0.00	15.40	Interbanded sequence of argillite and arenite
15.40	48.60	Argillite (phyllitic) with rare thin bands of arenite
48.60	58.55	Arenite/ feldspathic arenite
58.55	69.75	Argillite (phyllitic)
69.75	77.60	Arenite to sub arkose
77.60	78.60	Arenite with bands and lenses of argillite (chlorite schist) and high impregnation of veins, lenses of qtz and carbonate and strong pyrite and arsenopyrite dissemination (TEL)
78.60	90.60	Dom. arenite/f.arenite

BOREHOLE GDS-60

Location: SMP-22 **Bearing and angle:** 580W/78

Date of comm.: 4.2.88 **Date of closure:** 8.3.88

RL of the collar: 705.00m **Depth of the borehole:** 163.35m

0.00	2.00	Soil
2.00	44.80	Predom. arenite/f.arenite
44.80	68.20	Predom.argillite (phyllite)
68.20	131.55	Interbanded sequence of arenite/feldspathic arenite and argillite in varying widths and proportions
131.55	151.30	Arenite to gritty arkose
151.30	154.05	Argillaceous arenite with high impregnation of veins, lenses stringers of qtz and carbonate and strong dissemination of pyrite and arsenopyrite; mild brecciation (TEL)
154.05	161.05	Arenite/f.arenite
161.05	163.35	Meta andesite (siliceous)

BOREHOLE GDS-61

Location: SMP-16A **Bearing and angle:** 580W/70

Date of comm.: 26.2.88 **Date of closure:** 21.4.88

RL of the collar: 723.40m **Depth of the borehole:** 262.30m

0.00	2.70	Soil
2.70	39.75	Argillite with thin intercalation of arenite
39.75	72.35	Arenite with very few short stretches of argillite
72.35	84.05	Alternate bands of argillite and arenite
84.05	157.00	Predom. arenite with a few short stretches of argillite
157.00	227.35	Interbanded sequence of argillite and arenite in varying proportion and width
227.35	239.30	Dom. argillite
239.30	244.80	Arenite/f.arenite
244.80	245.20	Argillite (chl schist)with profuse lenses, veins and stringers of qtz and carbonate and moderate dissemination of pyrite and arsenopyrite; mild brecciation (TEL)
245.80	262.30	Arenite/f.arenite

BOREHOLE GDS-62

Location: SMP-4 **Bearing and angle:** 570W/86

Date of comm..: 30.3.88 **Date of closing:** 27.6.88

RL of the collar: 758.35m **Depth of the borehole:** 215.50m

0.00	82.50	Dominantly meta arenite with alternation and intercalation of meta argillite in varying scale and proportion; compositional variation in both units.
82.50	145.95	Alternating sequence of meta arenite and meta argillite in varying proportion intercalation of one unit with in the other in small scale prevalent.
145.96	206.80	Dominantly meta arenite/feldspathic arenite/arkose/grey-wacke arenite with alternating stretches of meta argillite meta arenite and meta argillite may be highly carbonaceous at places and may be contain impregnation of quartz, carbonate veins, lenses over short stitches.
206.80	209.35	Dark meta argillite (Chlorite schist) with extreme impregnation of quartz, carbonate lenses pods stringers over shut stretches and with weak pyrite dissemination (TEMPLE EAST LODE)
209.35	215.50	Same as that as 145.95-206.80

BOREHOLE GDS-63

Location: SMP-22A **Bearing and angle:** N65W/45

Date of comm. 11.4.88 **Date of closing:** 13.5.88

RL of the BH collar: 718.21m **Depth of the borehole:** 118.10m

0.00	3.00	Soil
3.00	90.95	Alternating sequence of meta argillite (chlorite schist/phyllite) and meta arenite with the former dominating over the later in relative proportion: each unit contains, in turn, thinner intercalation of other.
90.95	114.25	Same, but the argillite is highly carbonaceous
107.54	110.80	meta arenite, highly sheared, mylonitised with fans short stretches of meta argillite (dark chlorite phyllite), highly permeated with irregular veins/lenses/stringers of quartz, carbonate, with pyrite, arsenopyrite dissemination – (TEMPLE EAST LODE)
114.25	118.10	Coarse meta greywacke

BOREHOLE GDS-64

Location: SMP-23 **Bearing and angle:** N65W/60

Date of comm. 1.6.88 **Date of closing:** 16.7.88

RL of the BH collar: 742.10m **Depth of the borehole:** 122.15m

0.00	3.00	Soil (Chloritic)
3.00	11.80	Gritty chlorite soil with fragments of mottled meta argillite (Chlorite phyllite)
11.80	116.00	Alternating sequence of meta argillite (Chlorite phyllite/schist) and meta arenite/greywacke arenite in varying proposition and width: intimate intercalation of one unit in other common; greywacke-arenite grades to gritty arkose at new places fresh pyrite in arenite/arkose stretches; meta argillite carbonaceous at many places.
116.00	120.10	Meta argillite (chl schist) slightly arenaceous with extreme impropriation of small trees, stingers, pods of quartz and moderate dissemination of fine pyrite and arsenopyrite; mild brecciation (TEL)
120.10	122.15	Alternating sequence of meta argillite (Chlorite phyllite/schist) and meta arenite/greywacke arenite in varying proposition and width: intimate intercalation of one unit in other common; greywacke-arenite grades to gritty arkose at new places fresh pyrite in arenite/arkose stretches; meta argillite carbonaceous at many places.

BOREHOLE GDS-65

Location: SMP-9A **Bearing and angle:** 570W/82

Date of comm. 12.7.88 **Date of closing:** 16.8.88

RL of the BH collar: 733.80m **Depth of the borehole:** 171.00m

0.00	54.45	Alternating sequence of meta argillite and meta arenite in varying width and proportion in large scale, frequent intercalation of one unit in the other common in small scale
54.45	79.15	Dominantly meta argillite (phyllitic) with occasional stretches of meta arenite
79.15	82.00	Meta greywacke
82.00	127.25	Alternating sequence of dark, carbonaceous meta argillite and meta arenite in varying width and proportion in large scale and intimate intercalation in small scale
27.25	147.90	Dominantly meta feldspathic arenite/sub arkose with occassional stretches of meta argillite
97.90	148.80	Meta argillaceous arenite, impregnation with veins, lenses and pods of quartz and carbonate and pyrite dissemination, and a thick quartz vein. (TEMPLE EAST LODE)
148.80	171.00	Same as that in 127.26-147-90