R-23

ANNEXURE-1

FINAL TECHNICAL REPORT ON THE EXPLORATION WORK CARRIED OUT IN RAJSAMUND RP (GMSI/RP-68), RAJASTHAN

I. INTRODUCTION

The Government of Rajasthan State granted a Reconnaissance permit over an area of 767.75 sq km to M/s Geomysore Services (India) Pvt. Ltd. in the Rajsamund district of Rajasthan vide Letter No. F 18(4) Mines GR.2.2005 dated 11 February 2008 and M/S Geomysore Services (India) Pvt. Ltd (GMSI) executed the R.P. deed on 19.8.2008.

The location of the granted R.P. Block and the co-ordinates for its corner points are given **Annexures-2 and 3 respectively.** After executing the R.P. deed, GMSI began in right earnest reconnaissance exploration in the R.P. Block. GMSI has submitted all six monthly reports and annual reports of the exploration work carried out. This report summarizes the entire exploration work carried out by GMSI during the RP period which ended on 19.8.2011.

II. LOCATION

The Rajsamund RP is located in the southern part of the Rajasthan State (**Annexure-2 and 3).** The Udaipur-Chittorgarh four-lane express way passes through the central part of the RP. Udaipur is about 40km to the west from the western border of the RP. The Udaipur-Chittorgarh railway line passes through the northwestern part of the RP. The interior areas of the RP are connected by all weather roads.

III. GEOLOGICAL SETTING

Regional geological map of the RP area is shown in **Annexure-4.** The Rajsamund RP covers the southern parts of north-south trending Panchmata-Bhinder belt and parts of the basement gneisses on its either side. The gneisses here have been considered to represent the oldest recognizable Archaean gneissic rocks in Rajasthan (Mewar Gneiss) and have been

emplaced by the ca. 2.5 Ga Berach granite. The Panchmata-Bhinder belt is a part of the Rajpur-Dariba-Bhinder-Pur-Banera belt. Recent studies suggest that this belt is Palaeoproterozoic in age. The contact between the supracrustal belt and the basement gneisses is marked by ductile shear zones, though occasionally a deformed unconformity is reported. The Panchamata-Bhinder belt is dominated by metasediments which include, quartzite, garnetiferous mica schist, dolomite, calc-silicate, kyanite-staurolite-graphite-mica schist, rare meta volcanics, and meta rhyolitic tuff. Quartz vein and pegmatites have emplaced into these rocks. The generalized stratigraphy of the RP area is given in table 1 below.

		Pegmatites and quartz veins	
Rajpura-Dariba- Bhinder -Pur-Banera belt		Quartzite, garnetiferous mica schist, dolomite,calc-silicate, kynaite-staurolite-graphite-mica schist, meta volcanics.	Palaeoproterozoic
~~	~Unconformity~~~~	~~~~~~~~~~~~~~~~~~~~~~ Berach granite	Archaean
Mewar gneiss with enclaves of older supracrustals			Archaean

Table 1. *Generalised stratigraphy of the Rajsamund RP*

IV. ECONOMIC POTENTIAL AND EXPLORATION HISTORY

A number of ancient prospecting/mining sites have been reported from the southern and central part of the Panchamata-Bhinder belt. Modern exploratory work was carried out by GSI/MECL in a few of them. These include prospects such as Wari, Rawatia, Dariba (Akola) and Gujaron-Ki-Bhagal. Among these the latter two prospects fall within the Rajsamund RP. In the Dariba (Akola) block, GSI observed the presence of three parallel, easterly dipping mineralized zones, along a N-S trending shear zone, coinciding with a gravity-cum-aeromagnetic discontinuity. On the basis of 10 bore holes (~2236.80), GSI reported 3.0 million tonnes of copper ore of possible category with 0.74% Cu at 0.4% cut off over a strike length of 1.4 km upto a vertical depth of 150m. Subsequently MECL carried

out drilling in this block. They estimated total mineable reserves of 3.2 million tonnes with 0.48% Cu at 0.2% cut-off, estimated upto a vertical depth of 105m below surface.

In the Gujaron-Ki-Bhagal block, copper mineralization is mainly observed in meta rhyolite, garnet-mica schist, and amphibole quartzite over a strike length of 1900m. Two lodes were identified by GSI, varying in thickness from 1m to 16m. A possible resource of of 8.5 million tonnes of copper ore at 0.4% cut off with average grade of 0.7% copper was estimated by GSI. Subsequently MECL carried out drilling and estimated 9.23 million tonnes of ore reserves with 0.735% Cu at 0.5% Cu cut off. At 0.2% cut off, the total ore reserves estimated are 28.89 million tonnes. Beneficiation studies conducted by MECL yielded 83.70% recovery from a concentrate assaying 25.90% copper.

The main strategy adopted in the RP stage of exploration was aimed at locating additional potential targets as well as in assessing the immediate extensions of the known prospects besides exploring to locate new targets through geological, geochemical and geophysical methods .

V. REMOTE SENSING STUDIES

Visual interpretation of the LANDSAT False Colour Composite **(Annexure-5)** was carried out for the entire RP area. The FCC shows a strongly weathered gneissic domain in the northern half of the RP, a rugged granite-gneiss domain in the southern half and distinct N-S striking strike ridges marking the Panchmata-Bhinder supracrustal belt, which is the southern most part of the Rajpura-Dariba-Bhinder-Pur-Banera belt.

The weathered gneiss domain of the northern part of the block appears in rusty brown colour and is under well developed soil cover. The southern granite--gneiss domain is seen in pale pink colour. The supracrustal belt appears in shades of blue.

The imagery shows that the N-S trending Panchamata-Bhinder belt cuts across complexly folded gneissic banding. This suggests that the gneiss constitutes the basement over which the sediments were initially deposited.

Careful plotting of contact and trend lines **(Annexure-6)** indicates that the gneiss has been involved in polyphase folding. Early folds with axial plane parallel foliation appear to have been refolded by folds having N-S to NW-SE striking axial planes.

The latter folds are open and have distinct planar fabric superposed on folded foliation banding. The Panchmata-Bhinder belt of supracrustal rocks have been isoclinally folded along N-S axis. The foliation in granite gneiss close to the contact with the supracrustal belt appears to be guided by the contact, suggesting the gneiss may have got remobilized during the deformation of the supracrustal rocks. The gneiss-supracrustal relation as interpreted from the LANDSAT imagery suggests that the gneiss on either side of Panchmata-Bhinder belt is a part of the Mewar gneiss and that it might have been remobilized close to the Panchamata- Bhinder belt when the supracrustal rocks of the belt where folded.

Number of NW-SE faults causing dextral displacement of the Bhinder belt are observed. They are found between Mannakhera, east of Menar and west of Negra. Rare instances of ENE-WSW faults are also noted to the east of Menar and Chapra. The faults appear to be largely brittle faults, although slight bending of formation contact east of Menar suggests that the deformation here could be of brittle-ductile nature. Most of the known base metal occurrences in the RP block are located along shear zones marking the western and eastern margins of the supracrustal belt.

VI. GROUND MAGNETIC SURVEYS

It is observed that the known prospects in the Panchamata-Bhinder belt are all along either the eastern or the western margin of the belt. From north to south, prospects along the eastern margin include Matuniya, Rawatiya, Pari. Prospects along the western margin include Dariba (Akola), Udakhera and Bhilakhera blocks. Gujaron-ki-Bhagal prospect is the only prospect which is located within the belt.

It was therefore felt necessary to trace the continuity of mineralization along the strike. Physical tracing in the highly soil covered area was difficult to implement. Therefore, ground magnetic survey was carried out, covering the main Panchmata-Bhinder belt and parts of the basement gneisses. The total area covered by magnetic survey is 249.625 sq km and the total line km covered is 2651.30.

Table -2 . Details of the blocks covered by ground magnetic survey during this month.

Sl. No.	Block Name	Line Km	Area sq.km
I	Dhavadiya	277.19	28.16
II	Kedriya	33.56	3.25
III	Mannakhera	72.15	7.21
IV	Panchmata- Bhinder block	2268.4	211
	Total:	**2651.30**	**249.625**

Traverses were taken at 100m interval along N70E-S70W. The data was processed and derivative maps showing the analytical signal (AS), first vertical derivative (1-VD), Horizontal Gradient (HG) and Total Magnetic Indensity (TMI) were prepared.

The 1-VD map highlights that part of the magnetic intensity which directly from vertically below the traverse lines. In other words this process effectively reduces the signal from the away from the traverse. As a result, the 1-VD map can be considered as nearest to the geological map. The AS map highlights the vertical component over a larger area across the traverse line. The HG, highlights the horizontal component of magnetic intensity. The TMI map shows the total magnetic intensity over a wider area, across the traverse lines, without exaggerating the vertical components. Maps showing the various signals for each block are presented in the **Annexures-7IA-D (Dhavadiaya block), 7IIA-D(Kedariya block), 7IIIA-D (Mannakhera Block), 7IVA-D (Panchmata -Bhinder block).**

VII. GEOLOGICAL STUDIES AND PROSPECT MAPPING

Geological studies were initially carried out around the known prospects in the RP area to understand the lithological and structural setting of copper mineralization in the Panchmata-Bhinder belt. Reconnaissance Traverse Mapping has been carried out in parts of the RP, mostly around the ancient prospects and also to verify the strike extension of known prospects. During the latter phase large scale mapping was carried out in selected prospects such as Gujraon ki Bhagel, Dariba –Akola, Dhavidiya prospect etc. on 1:1000 to 1:5000 scale.

Gujaron-ki-Bhagal Block: The prospect is located about 500m SW of the Gujaron-ki-Bhagal village. The all weather road from Kir-ki-Chouki to Tana passes through the eastern part of the prospect. An ephemeral river, a tributary of Berach river flows south east ward through the prospect. Mineralized areas are observed on either banks of the river. Detailed outcrop mapping on 1:1,000 scale was carried out in Gujaron-ki-Bhagal prospect using hand held GPS to understand the lithological and structural controls of copper mineralization in this prospect. The rock types encountered in this prospect are dolomite, calc-silicate, amphibole-quartzite, staurolite-biotite schist, meta-rhyolitic tuff, and psammopelitic rocks, carbonaceous staurolite-biotite schist. Prospect map of Gujaron –Ki- Bhagel is presented in **Annexure-8.**

Surface indications of mineralization are restricted within a 200m zone striking approximately N-S. Within this zone, indications of mineralization are observed in carbonaceous staurolite-biotite schist, metarhyolitic tuff and amphibole-quartzite, from west to east. An ancient working is observed in the carbonaceous-staurolite-biotite schist.

The amphibole-quartzite is lightgreyish green, foliated and shows at places banded nature with bands alternately rich in amphiboles and quartz. The amphiboles show radiating nature at places, with needles upto 1cm long. The matrix between amphibole rich layers is composed of fine grained, light grey to white, granular, quartz grains. This rock shows

disseminations of pyrite and chalcopyrite. Malachite encrustation are also observed extensively. Some of the sulphide grains are oxidized to goethite. The amphibole-quartz rock, at places looks like a calc-gneiss. This is light greenish grey, medium grained, foliated with gneiss fabric and with nearly equal proportion of amphiboles and fine grained quartz. Thin sections of the banded calc-silicate shows bluish green to yellowish green, hornblende with fine grained quartz. Rarely plagioclase is observed. Epidote grains are present.

The thin sections of meta rhyolitic tuff shows fine grained quartz, slightly elongated defining a foliation, rare k-feldspar grains and dusty opaques. Psammopelitic rocks in the block are light grey, poorly foliated with mostly quartz and sericite. Rare garnets are observed at places. The psammopelitic rock shows very fine grained subrounded grains of quartz within a matrix of very fine grained sericitic mica. Biotite flakes are also observed. Overall the rock appears to have deposited not far from the province. Staurolite-Biotite schist occurs in the eastern part of the Gujaron-ki-Bhagal prospect. This rock shows large porphyroblasts of staurolite, at places even upto 3-4cm long.

The dolomitic calc-outcrop in the NW part of the prospect shows a broad Z-fold developed on bedding planes. Hinge portion of this fold shows nearly orthogonal relation between bedding planes and axial planer foliation and therefore this fold has been interpreted to be F_1 fold. The (F_1) fold plunges at 40° towards 152°. At other places folds developed on foliation planes are observed. These also plunge toward SE at angles ranging from 25-30 degrees. This suggests the rocks have undergone co-axial refolding, although mappable fold hinges of F_2 are not observed. As a result hook-shaped patterns can be expected in the map pattern. This also will have implications in understanding the disposition of the lodes.

Dariba-Akola Block: This area is located along the contact between Mangalwar complex and Pur-Banera group of rocks. Outcrop scale mapping was carried out in the Dariba-Akola Block **(Annexure-9)**. Litho units of the Pur-Banera group exposed in the block comprise psammitic rock, calc-gneiss, dolomite marble and amphibolite. The western parts of the block is located in Mangalwar complex while the eastern parts expose Pu-Banera rocks. Psmmatic rocks are light grey in color, foliated and contain rounded quartz grains with or without amphibole and appear feldspathic at places. Light grey color dolomitic-

marble is observed in the southern part of the block. Sulphides (mostly chalcopyrite, pyrite and bornite) are observed in the granite gneiss, psmmatic rock, amphibole and quartz veins as veins, stringers and disseminations. Malachite stains are observed at places. Two old workings are observed in Dariba village with dimensions of 15m to 25m X 10m to 15 m. These are extended along NNE – SSW. In this area a huge slag dump is also noticed. The rocks here strike NNW to NNE and dip steeply to NE to SE. Well dump samples of in amphibolites traversed by quartz veins and sulphides veins were collected from near Mannakhera village. Cu values in these samples range from **0.25%to1.59%** . Another well dump sample of meta pyroxenite reported **0.3% Cu %.** On the basis of geochemical sampling an anomalous zone extending in strike length for about1.2km has been delineated. In the Dagioan ki Bhgal area, well dump samples of amphibolites with chalcopyrite and pyrite stringers reported up to **0.72% Cu %** .

Bhatewar Block: This block is located in the western part of the RP in the Bhatewar - Vana area. Most parts of this block is soil covered with no major hills. Dug wells show 15-20m thick soil cover. The rock types in this area are grey granite gneiss, amphibolite, pink granite, quartz and rare pegmatite veins. Among them, medium grained, foliated granite gneiss with amphibole and chlorite is observed in most of the well spoils. Well dumps in Menar village show grey granite gneiss traversed by sulphides stringers and quartz veins (GPS AKV-300- 409837: 2721790). The sulphide stringers vary in thickness from less than 1mm to 2mm. The sulphides are **upto 2%** and are mostly chalcopyrite and pyrite. Bornite and at places malachite are also observed. Disseminations of sulphides are observed in the quartz veins. Another well dump shows grey granite gneiss with disseminations of pyrite and chalcopyrite and rare malachite stains (GPS AKV-311- 411510: 2721977). This is located NW of Menar village.

Kikawas Block: This block is located between Kikawas and Kharodan village in the western part of the RP. The area is extensively soil covered. The rock types encountered in this block are grey granite gneiss, carbonatite, pink granite, quartz vein and pegmatite. Most well dumps show medium grained, foliated granite gneiss with amphibole and chlorite. The grey granite gneiss contains disseminations of sulphides at places. Sulphides are mostly

pyrite and a few specks of chalcopyrite. Rarely malachite is also observed. Well dumps in t Kikawas, Rundera and Kharoda villages show grey granite with sulphides (GPS locations are AKV-354, 380, 391,397 and 412). Ancient pits are located in carbonatite in Kikawas with dimensions of 10m X 4m X 2m. A cave type ancient pit is exits next to the Shiva temple. This ancient pit shows carbonatite with rare malachite. At places chalcopyrite stringers also observed. Carbonatite contains magnetite and iron oxides are observed along fractures. It is traversed by quartz veins at places. The primary layering in carbonatite strikes WNW-ESE and dips angles vary from 25^0 to 40^0 towards to NE.

Tarawat Block: This block is located between Tarawat and Intali villages in the western part of the RP. In general this area is also soil covered and the dug wells have about 15m to 20m thick soil cover. The main litho units in this area are grey granite gneiss, amphibolite, pink color granite, quartz vein and pegmatite. Most well dumps show amphibolites and grey color granite gneiss. Sulphides were noticed in granite gneiss and amphibolites at locations GPS AKV- 423, 441, 451 and 476.

Nadikhera Block: This block is in the Nadikhera - Mannakhera area in the western part of the RP. Out crops are sparse in this block and dug wells have about 15-20m thick soil cover. Main rock types encountered are grey granite gneiss, meta pyroxenite and amphibolite. In Nadiakheri village grey granite gneiss shows reddish oxidations and disseminations of pyrite, chalcopyrite and encrustations of malachite (GPS AKV-493; 404176-2733674). Another well about 260m SSE of the AKV-493 shows grey color granite gneiss with disseminations of pyrite and chalcopyrite. In Bargaon village well dump shows grey color granite gneiss and amphibolites. Amphibolites show h upto 5 % of sulphides(mostly chalcopyrite, pyrite along with bornite). In Mannakhera, well dump shows grey granite and meta pyroxenite boulders. Among these the meta pyroxenite contains 10% of sulphides (GPS-AKV -552; 412730-2734143). In another well also amphibolite contains 2 to 3% of sulphides (GPS-AKV -551; 412734-2733600). This well is located 550m south of AKV-552. In both the wells sulphides are mostly chalcopyrite, bornite and pyrite. In another well pink color fractured granite with reddish, yellowish oxidations and disseminations of pyrite (GPS AKV-550; 412784-2733282) are observed. This well is located 330m south of AKV-551. In another well dump

shows amphibolites which contains 2 % of sulphides ((GPS-AKV -547; 413084-2733116), traversed by quartz veins and sulphides veins. The size of sulphides veins vary from 1mm to 2cm. Outcrops surrounding these wells show fractured granite with chlorite alteration and at places disseminations of sulphides.

Rawatpura block: This block is located in the Rawatpura - Talavan areas in the southern parts of the RP. Rock types include grey granite gneiss, talc-schist, meta pyroxenite, amphibolite, pink granite, quartzite, chert bands and quartz veins. Grey granite gneiss contains amphibole with disseminations of chalcopyrite and malachite stains (GPS AKV-625). Granite gneiss with meta pyroxenite enclaves is observed at Opa ka Khera (GPS AKV-309). Amphibolite is observed as sills between granite gneiss. Grey chert with disseminations of sulphides and malachite stains are observed at Vedbi (GPS AKV- 322). Sulphides are mostly pyrite and chalcopyrite.

Bhinder Zinc prospect: Bhinder village located in the Udaipur district in Rajasthan, in Survey of India top sheet no 45L/2 and 45 L/3. This village located SE of Udaipur about 50 kms. In this area main rock types are mostly psammopelites and , psammitic in nature. Psammopelites contain are well foliated and contain, mica, garnet and sillimanite. Psammitic rocks are grey in color, foliated and contain quartz with mica. These are traversed by white colored quartz veins at places. In the southern part of the RP, carbonaceous phyllite, graphite mica schist and psammitic rocks appear with fractured and brecciated nature. These show goethite and limonite encrustations, reddish brown, orange yellow oxidations. Patchy white r oxidation is observed on the surface. At places extensive bornite stains are also observed in these rocks. A well dump shows banded amphibole-garnet chert (BAGC) with 4% dissemination of pyrite. This shows cherry red, reddish brown, yellowish and white color patchy oxidations. In this area general foliation trends NNW-SSE and dips $60^0 - 80^0$ towards to NE. This foliation is observed in grey psammitic and psammopelite rocks. Brecciation is prominently observed in the eastern part of the belt. Samples from this zone have reported Zn values ranging upto 0.95% of Zn. This anomalous zinc bearing BAGC bands show width ranging from 25m to 30m and extends for a length of 3.75km. There are parallel goethite limonite bands along on either side of this zone.

Kanera Khera Prospect: Another area where sampling and geological mapping was carried out during this period was in the north eastern part of the RP area near Kanera Khera village. Here a well dump shows psammopelites with 4% of sulphides. The sulphides are mostly pyrite, arsenopyrite and rare chalcopyrite. At places malachite is also noticed in well dumps. Another well, about 160m south east of the above well shows psammopelite rock with reddish, yellowish oxidations and contain 5 % of sulphides. The Sulphides are mostly pyrite, arsenopyrite, rare chalcopyrite and bornite. Sulphides are located along fractures and also occur as disseminations. In yet another well dump, located 350m east of the second well, psammopelite with reddish, yellowish oxidations and 3 % of sulphides (mostly pyrite, chalcopyrite and rare bornite) is observed. Geochemical bed rock samples from the Kanera Khera area have reported Cu values from 145ppm to 2981 ppm, Pb values from 16ppm to 23 ppm and Zn values from 170 ppm to 186ppm.

Dhavadiya block: The Dhavadiya village is located in the Udaipur district in Rajasthan and falls in the Survey of India topo sheet no is 45L/3. This village located about 10 km SSW of Bhinder. There are 3 ancient pits in this village. One of the pits is located in medium grained pink color granite. At places the pink color granite is highly oxidized contains disseminations of chalcopyrite and extensive malachite. The width of oxidation zone varies from 2m to 4m and strike length extends for over 600m along NNW-SSE. At another location in this village a grey, sulphidic chert band shows reddish and yellowish oxidation and 1% of chalcopyrite (WP- KV90 – 407378 : 2708932). The width of sulphidic chert band varies from 1m to 2m and strike length is about 300m. At places the chert band is highly oxidized and appears to be a gossanous. Another ancient pit is located 1.1km SE of WP-KV85. Light grey colored granite gneiss with amphibole and extensive malachite stains are observed along with a few boulders of meta pyroxenite with malachite stains. A slag dump is also observed in this village.

Geological mapping of the block shows that the main rock types are grey granite gneiss, amphibolites, garnet-chlorite schist, pink granite and quartz veins/chert. Grey granite gneiss which contains quartz, orthoclase, amphibole, biotite and at places chlorite forms the basement rock in this block (Mewar gneiss). Amphibolites are dark green in color, medium grained, foliated and contain actinolite-tremolite with or without plagioclase. Garnet-chlorite

schist is in dark green in color rock contains big crystals of garnet with chlorite. Pink color granite is in massive form, weakly foliated at places, contains pink color orthoclase, white quartz, mica, epidote and at places magnetite. Pink color granite shows mineralogical and grain size variation. Porphyritic structure is observed in pink granite at places. Geological map of the prospect is hown in **Annexure-10.** Pink color granite with malachite and gossanous boulders and vein quartz with malachite are observed as old working dump. The pink color granite is traversed by white color quartz stringers and vein lets with ulphides and malachite. Sulphides are mostly pyrite and chalcopyrite. At places pink color granite with disseminations of fresh sulphides, magnetite and reddish oxidations are observed. Extensive chlorite alteration is observed near to mineralization. Several places pink color granite with epidote is also noticed. The rock chip samples collected from the prospect reported 1647 ppm to 1712ppm of Cu and no significant values of REE. Pink color granite shows irregular, nearly 'X' shaped contact with grey color granite gneiss as shown in this clearly indicates strong structural control during its emplacement. Pink color granite contains enclaves of granite gneiss and amphibolite rocks. The general strike of gneissic banding in the grey granite gneiss is NNW-SSE and dip is 20^0 – 50^0 and towards NE. In this area L fabric is observed in amphibolites which plunges at about S 26^0 towards to ESE. Mineralization is hosted in selected domains within the pink color granite.

There are two ancient pits near Kedariya village, located about 8.5 km NNW of Bhinder. One of these is located 600m NE of Kedariya bus stand. Here well dumps show light pink colored granite with 5% of sulphides. Sulphides are mostly pyrite, chalcopyrite and malachite. This sample is reported 1.4% of Cu (Sample No 88057 and PX Sheet no 2972). Another well in this village shows pink color granite with reddish, yellowish oxidation and extensive malachite. This well is located 450m NNW of the ancient pit.

Banded, grey color chert band is located 800m SSW of the Amli village. This chert band contains disseminations of pyrite, chalcopyrite and at places malachite. In Amli parallel mineralized chert bands are encountered. The width of mineralized chert band varies from 0.5m to 4m with strike length up to 100m to 2km length. In this village well dump shows

medium grained meta pyroxenite with up to 5% of sulphides (mostly pyrite and rare chalcopyrite).

In Jetpura village, located 2.4km north of Bhinder, a well dump shows medium grained, dark green color meta pyroxenite with disseminations of (WP KV810-417908:2712723) pyrite, chalcopyrite and rare malachite. Dump material from another well in this village, located 460m south of KV810 shows medium grained granite with pyrite and chalcopyrite.

Four ancient pits are observed around Derabad village, located about 10.5km SW of Bhinder. The pit dimensions vary from 10m x 5m to 30m x 15m. In this area 2 parallel chert bands are observed. The width of sulphidic chert bands varies from 1m to 4m and strike varies from 300m to 1.2 km. The chert bands are well within grey granite gneiss and contain disseminations of pyrite, chalcopyrite, and bornite and at places extensive malachite. Granite shows at places chlorite and sericite alterations.

Parallel sulphidic chert bands are also observed in Ambatalai village, located about 14km SW of Bhinder. The width of sulphidic chert bands varies from 1m to 4m and strike length is around 800m. Sulphides are mostly pyrite, chalcopyrite, galena and at places extensive malachite. The granite gneiss is also traversed by white colored quartz veins with extensive malachite. The width of quartz vein varies from 0.5m to1 m and over 20m along the strike.

In Dhavadiya-Kheda, located west of Dhavadiya, well dumps of granite gneiss show disseminations of 3% of sulphides, mostly chalcopyrite, pyrite and bornite. At places meta pyroxenite sills are observed within the granite gneiss. In the western side of Dhavadiya-kheda village grey color granite is traversed by network of quartz stringers and disseminations of chalcopyrite and pyrite. The width of mineralized zone varies from 6m to 8m and the strike length extends for 150m. One well dump shows medium grained meta pyroxenite with sulphides and garnet. Sulphides are mostly pyrite and chalcopyrite.

Nangliya village is located about 12 km west of Bhinder. Here granite gneiss is traversed by light grey quartz veins with pyrite, chalcopyrite and malachite. The quartz veins appear at places similar to chert. The width of quartz veins is varies from 2m to 3m and strike length is about 150m. In another location, granite is traversed by quartz veins with chalcopyrite, pyrite and at places extensive malachite. A well dump in Kuntawas village, located about 7.5km NW of Bhinder shows granite gneiss and meta pyroxenite with pyrite, chalcopyrite and malachite.

In the Dagioan ki Bhagal area, located in Udaipur district, about 35km SE of Udaipur town, well dump shows amphibolite with chalcopyrite and pyrite stringers. At places sulphides up to 2 to 3% are observed. One of the samples from here reported 0.72% Cu. This anomaly was followed up to trace the further strike extension but did not find indicate further extension of mineralization.

A number of ancient prospecting/ ancient mining sites have been reported from south western part of the RP. A well dump SW of Dharta village, located east of Bhinder (Toposheet 45 L/2) town shows nearly 2-3% of chalcopyrite in foliated granite gneiss. In another well dump west of Bortalai village, located SSE of Bhinder town, nearly 8 -10% of sulphides are observed in foliated granite gneiss traversed by quartz vein. The sulphides are mostly pyrite, chalcopyrite and malachite. A well dump in Bhardia village shows nearly 5% of sulphides in foliated granites gneiss traversed by white quartz veins. Sulphides are mostly pyrite and chalcopyrite. Another well dump near Wari village, located about 8km NE of Bhider shows granite containing 2% of pyrite and chalcopyrite. In Bejara village, located 4 km SE of Bhinder, chlorite schist samples from a well dump shows extensive malachite associated with thin quartz veins. Well dumps with disseminations of pyrite, chalcopyrite with or without malachite are also observed in Waja ka khera, Kiyakhera, Mari ka khera and Udempura villages. In Bhardia village, located 10 km SE of Bhinder town evidence of copper mineralization is observed in grey chert as disseminations of pyrite, chalcopyrite and at places extensive malachite. The mineralized chert is exposed over a strike length of 200m along the ridge axis west of Bhardia with a width of 1-2m. Another mineralised chert band was observed SSW of Gura village. In this area width of mineralized chert varies from

1m to 2m with strike length of over 125m along the small ridge axis. Both the areas further strike extension are not located due to thick soil cover.

VIII. GEOCHEMICAL SAMPLING

During the RP, geochemical sampling carried out from throughout the RP of various rock types. A total of 182 samples were collected. The map showing the locations of the anomalous samples are shown in **Annexure-11** and the details of the samples and their analytical results are presented in **Annexure-12.**

IX. SUMMARY

Geological, Geochemical and geophysical studies carried out during this work confirms the presence of copper mineralized zones both along the western and eastern margin of the Panchmata-Bhinder belt. Prospects along the western margin of the belt include Dariba (Akola), Udakhera. Along the eastern margin, known prospects include Gujaron-Ki-Bhagal, Akola and Wari (among these, Akola and Wari are out side the RP). Mineralisation in these prospects are located along shear zones broadly the contact between the supracrustal belts and Mewar gneiss; ground magnetic survey has been employed to trace the continuity of these zones in the soil covered area. Preliminary field studies indicate presence of copper mineralized zones around Bahtwar, Kikawas, Tarawat, Nadikhera, Rawatpura and Dariba-Akola, Mannakhera and Daigaon ki Bhagel. Applications for PL will be submitted covering some of these areas.

For GEOMYSORE SERVICES (INDIA) PVT. LTD

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