

**Details of Petrographic studies of borehole core samples of Thakurdih Area-1 Block,  
District: East Singhbhum, Jharkhand**

Sl. No.	Sample Number & Location	Texture	Mineral Composition			Description
			Major >5%	Minor <5%->1%	Accessory <1%	
1	MTB-01/P1 (MTB-01: 37.0m-37.18m)	It is a fine to medium grained rock showing schistosity.	Biotite  Actinolite  Quartz  Albite	Chlorite  Hornblende	Opakes  Zircon	<p>Biotite occurs as fine to medium flakes and patches, often segregating in zones and showing parallel alignment. Actinolite occurs as fine to medium subhedral prismatic grains showing parallel alignment. Quartz occurs as fine anhedral grains, often clustering in pockets. Albite is present as fine subhedral to anhedral grains. Chlorite is seen present as pseudomorphic patches developing after amphibole alterations. Hornblende is present as fine to medium subhedral and anhedral patchy relicts within biotite and chlorite patches. Opakes occur as fine anhedral grains and as very fine specks in accessories. Zircon is noted as very fine inclusions within biotite around which pleochroic haloes are observed.</p> <p>The specimen is a <b><u>biotite-actinolite-quartz-albite schist.</u></b></p>
2	MTB-03/P1 (MTB-03: 112.50m- 112.70m)	It is a greenish grey coloured medium to fine grained rock showing schistosity and porphyroblasts.	Quartz  Chlorite  Garnet	Opakes  Biotite	Apatite	Quartz occurs as medium to fine anhedral grains showing tight quartzitic contacts and undulose extinction. Chlorite is present as flaky aggregates and patches showing parallel alignment. Garnet occurs as fine to coarse subhedral to anhedral porphyroblasts, often seen segregating in zones. Opakes occur as very

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						<p>fine to fine subhedral to anhedral grains, blades and moderately coarse patches in areas. Biotite is seen present as fine to very fine flakes and flaky relicts within chlorite. Apatite is noted as fine subhedral grains in accessories.</p> <p>The specimen is a <b><u>porphyroblastic garnetiferous quartz-chlorite schist.</u></b></p>
3	MTB-04/P1 (MTB-04: 82.60m- 82.70m)	It is a medium to fine grained rock showing schistosity and porphyroblasts.	Biotite  Actinolite  Quartz  Garnet	Plagioclase  Chlorite	Opaques  Zircon	<p>Biotite occurs as medium subhedral prismatic grains/ flakes, segregating in zones and showing parallel alignment. Actinolite is present as medium to fine subhedral prismatic grains showing parallel alignment. Quartz occurs as fine anhedral grains, often clustering in pockets and showing crude alignment. Garnet is present as fine to coarse subhedral to euhedral porphyroblasts showing very fine inclusions of quartz in areas. Plagioclase is seen present as fine to medium subhedral prismatic and turbid patchy grains. Chlorite occurs as pseudomorphic patches developing after amphibole replacement. Opaques occur as fine to very fine anhedral grains in accessories. Zircon is noted as very fine inclusions within biotite around which pleochroic haloes are observed.</p> <p>The specimen is a <b><u>porphyroblastic garnetiferous biotite-actinolite-quartz schist.</u></b></p>

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4	MTB-05/P1 (MTB-05: 110m- 110.15m)	It is a fine grained rock showing granular texture.	Albite  Quartz	Opakes  Microcline  Muscovite/ Sericite  Chlorite	Calcite  Epidote	Albite is present as fine to very fine groundmass and as well as medium subhedral prismatic phenocrysts. Quartz occurs as fine to very fine anhedral grains and as patchy lenses. Silicification is also noted in areas. Opakes are present as fine to very fine disseminated grains and as well as segregated patches in pockets. Microcline is noted as subhedral traces, mostly albitised. Muscovite/sericite occur as fine to very fine flakes and flaky aggregates. Chlorite is noted as fine to very fine flakes, patches and fillings. Calcite is seen present as intrusive patches and fillings in areas. Epidote is noted as very fine granular aggregates in pockets.  The specimen is <u>anaplitic granite</u> .
5	MTB-06/P1 (MTB- 06:99.45m- 99.61m)	It is a fine to medium grained rock showing schistosity.	Biotite  Quartz  Actinolite  Albite	Chlorite	Opakes  Tourmaline  Zircon	Biotite and actinolite occur as fine to medium subhedral prismatic grains and anhedral patches showing parallel alignment. Quartz and albite are present as fine to medium anhedral to subhedral grains showing crude alignment. Chlorite is seen present as pseudomorphic patches replacing amphiboles. Opakes occur as fine to very fine subhedral to anhedral grains. Tourmaline is seen present as fine subhedral prismatic grains in accessories Zircon is noted as very fine inclusions around which pleochroic haloes are observed.  The specimen is a <u>biotite-quartz-actinolite-albite schist</u> .

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6	MTB-07/P1 (MTB-07:36.75m-37.0m)	It is a greenish grey coloured medium grained rock showing granular texture.	Actinolite-Tremolite  Chlorite	Opauques  Hornblende	Plagioclase	Actinolite-tremolite occurs as medium subhedral prismatic grains showing crude alignment. Chlorite occurs as pseudomorphic patches developing after amphibole replacement. Opauques are present as fine subhedral to anhedral grains in dissemination. Hornblende occurs as medium to fine subhedral prismatic and rhombic relicts within chlorite patches. Plagioclase is noted as fine anhedral turbid patches in accessories.  The specimen is an <b><u>amphibolite</u></b> .
7	MTB-08/P1 (MTB-08: 153.90M-154.0M)	It is a dark greenish grey coloured massive rock.	Chlorite  Antigorite  Opauques (Magnetite)  Tremolite	Olivine  Carbonates	....	Chlorite occurs as anhedral patches comprising very fine micro-crystalline aggregates and also occurs as very fine to fine flaky aggregates. Antigorite occurs as fine fibrous aggregates and fillings in association with chlorite. Opauques (magnetite) are present as fine to very fine anhedral to subhedral disseminations and as well as segregated patches in pockets. Tremolite occurs as fine acicular grains in dissemination. Olivine is noted as fine anhedral relicts within chlorite-antigorite patches. Carbonates are seen present as intrusive patches and fillings. The specimen is showing magnetism.  The specimen is an <b><u>altered mafic rock</u></b> .
8	MTB-11/P1 (MTB-	It is a fine to medium grained rock showing	Quartz	Garnet	Muscovite	Quartz is the main constituting mineral of the specimen, occurring as fine to medium anhedral grains showing

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	11:169.70m-169.90m)	granular texture.	Biotite  Chlorite	Staurolite  Opagues		tight quartzitic texture. Biotite and chlorite are present as fine disseminated flakes showing parallel alignment. Garnet occurs as fine to medium subrounded grains and anhedral patches. Staurolite occurs as fine subhedral prismatic grains in association with garnet. Opagues are seen present as fine to very fine anhedral subhedral grains. Muscovite is noted as fine flakes and flaky aggregates in pockets.  The specimen is a <b><u>garnet and staurolite bearing biotite-chlorite rich quartzite.</u></b>
9	MTB-14/P1  (MTB-14: 140.95m-141.20m)	It is a fine grained rock showing schistosity and porphyroblasts.	Chlorite  Garnet  Quartz  Opagues	....	Biotite  Apatite	Chlorite occurs as fine flaky aggregates showing parallel alignment. Garnet occurs as coarse to fine subhedral to anhedral patchy porphyroblasts showing very fine inclusions of quartz in areas. Quartz is present as fine anhedral grains. Biotite is seen present as fine flakes and flaky relicts within chloritic aggregates. Apatite is noted as fine slender prismatic grains in accessories.  The specimen is a <b><u>garnetiferous chlorite-quartz schist.</u></b>
10	MTB-17/P1  (MTB-17:108.20m-108.50m)	It is a fine grained rock showing schistosity. The specimen is showing strong magnetism.	Biotite  Quartz  Opagues	Feldspar  Tourmaline  Apatite	Chlorite  Allanite  Zircon	Biotite is present as fine flaky aggregates showing parallel alignment and mostly segregating in thin sub-parallel bands/ zones. Quartz and feldspar are present as fine anhedral grains segregating in thin sub-parallel bands/ zones Opagues (magnetite) occur as fine to medium subhedral aggregates and patches aligned along

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			(Magnetite)		Xenotime?  Monazite?	<p>the schistosity. Tourmaline occurs as fine to very fine subhedral prismatic grains in dissemination. Apatite occurs as fine subrounded and elongated grains. Chlorite is seen present as patchy fillings in areas, replacing biotite. Allanite and zircon are noted as very fine grains and as inclusions within biotite, around which pleochroic haloes are observed. Doubtful very fine xenotime and monazite specks are also observed often included within biotite.</p> <p>The specimen is a <b><u>biotite-quartz-magnetite schist.</u></b></p>