Development of Minerals in North Eastern Region

NORTH EASTERN REGION

The North-Eastern Region (NER) of India comprise a unique agglomeration, with a diversified geological set-up. The spectacular physiographic set up includes the stunning Himalayan mountain belt in the North, the Indo-Myanmar Range in the east and the mighty Brahmaputra, forming the extensive Assam plains. The diverse lithologic and tectonic ensemble calls for integrated geoscientific studies to identify and outline target areas pertaining to mineral resource evaluation, mitigation of natural hazards, environmental issues and water resources development projects.

The North Eastern Region represents varied, geomorphological and geological setup which is ranging from Precambrian to Recent age. It is manifested by spectacular Himalayan Mountain Belt in the north; Shillong Massif Plateau in the south and mighty Brahmaputra forming the extensive Assam plain in between and Indo-Myanmar Range in the east.

Work done by Geological Survey of Indian (GSI) in North Eastern Region

A total of 45 (excluding items of Regional Training Institute) investigations were carried out from the beginning of field season in NER (including Sikkim). A brief summary of the highlights pertaining to that period is given below:

MISSION-I: BASELINE GEOSCIENCE DATA GENERATION

SURVEY & MAPPING

Regional Survey

Systematic Geological Mapping (scale: 1:50,000)

• Two items of Systematic Geological Mapping are pursued in the State of Assam and Nagaland.

• An area of 230 sq. km. has been covered between April and December 2011 in parts of Zunheboto, Mon, Kiphire, Tuensang and Phek districts, Nagaland. The area covered by mapping exposes lower Tertiary sediments belonging to Disang Formation and Laisong Formation of Barail Group of rocks. The contact between the Disang and Barail is gradational. Both the units have been folded into a series of anticlines and synclines. Excepting some coal bands at places, no other indication of metallic or non metallic mineralization recorded in the area. The sandstones of Barail Formation are being quarried for building material.

• Systematic Geological Mapping in parts of Toposheets no. 83I/15 and 78J/14 in Dibrugarh, Kamrup and Goalpara districts, Assam was taken up where an area of 390 sq. km. has been covered between April and December 2011. The lower reaches of the area are occupied by Hauli Formation of Younger Alluvium Group whereas upper reaches are occupied by Sorbhog and Kukulong Formations of Older Alluvium Group. Some clay pockets have been recorded within sand-silt dominated Kukulong Formation.

Specialised Thematic Studies (scale: 1:25,000)

In North Eastern Region four items (one continuous, three new) of Specialized Thematic Mapping were taken up in the states of Arunachal Pradesh, Meghalaya and Mizoram with a total coverage of 801 sq km between April and December 2011.
• Specialized Thematic Mapping and tectono-metamorphic studies of the gneiss quartzite/schist contact and their stratigraphic relation along the eastern margin of Shillong Basin in parts of East Khasi Hills and Jaintia Hills Districts, Meghalaya has been continued. The oldest rocks of the area include of quartzites, conglomerates and schists of Shillong Group. The metasediments and granites are overlain by horizontally disposed coarse-grained to gritty Eocene arkosic to ferruginous sandstones with or without claystone/pebbly/conglomerate horizons of Shella Formation of Jaintia Group, which are well exposed around Mukhla, Nongbah, Mawpyut and Nartiang.

• The item of Specialised thematic mapping and tectono-magmatic and metamorphic studies of high grade granulite rocks and associated mineralization, if any, between Hahim and Mawdongkian (Nongdiankian); their contact and stratigraphic relation with enclosing gneiss in parts of west Khasi Hills District, Meghalaya has been taken up. The rocks exposed in the area have been classified under three main groups depending upon the mode of occurrences and their associated rock types as follows: Pre-Tectonic basic intrusives; Post-Tectonic acid intrusives and Chemogenic deposits. The granite gneiss is the most dominant rock type in the area and is occurring in Nongkrem, Ramkynshi and in and around Rambrai area.

• The item of Specialised Thematic Mapping in parts of West Siang and Upper Subansiri Districts, Arunachal Pradesh and appraisal of associated carbonate rocks has been taken up. The area exposes the rocks of Siyom, Ragidoke and Miri Formations. The Siyom Formation mainly comprises of garnet mica schist, schistose quartzite, phyllite (at places carbonaceous or graphitic, carrying sulphide minerals), mica schist and dolomite. The Ragidoke Formation comprise of grey to pale brown quartzite, magnetite-quartzite, carbonaceous/graphytic phyllite, dark grey phyllite, black to grey slate and dolomite. The
Miri Formation dominantly comprises of purple to white quartzite, feldspathic sandstone, shales and intraformational conglomerate. The rocks of Miri Formation unconformably overly the Ragidoke Formation. The contact is marked by a 50m thick conglomerate. A number of faults have also been identified in the area of which Bame Fault trending N-S has brought the rocks of Siyom Formation in juxtaposition with Miri Formation. Sulfide mineralization has been observed in carbonaceous/graphitic phyllite of Siyom Formation and magnetite quartzite and quartz veins of Ragidoke Formation. The entire sequence of Ragidoke Formation show yellowish limonitic alteration stains.

- The item of Specialized Thematic Mapping across Thinglian, Buchang and Bilkhawthlir, Kolasib District, Mizoram has been taken up. The area exposes the rocks of Bhuban formation and Bokabil formations of Surma Group, Tipam and Dupitilla Group rocks of Tertiary age. A thin pebble/conglomerate bed recorded between Tipam and Dupitila Group of rocks. Two members of Bhuban formation-the middle and upper Bhuban members are present in the area. The Bokabil Formation conformably overlies Upper Bhuban rocks which is predominantly argillaceous and is represented by shale with pockets of silt and sand. The Bokabil Formation is overlain conformably by Tipam Group rocks. The Tipam Group of rocks, in turn, is also conformably overlain by the younger Dupitila Group, which occupies the core of the syncline.

**Geochemical Mapping (GCM)**

The following eight programmes were taken up with a total coverage of 2530 sq km between April and December 2011:

- Geochemical mapping in toposheet nos. 82P/3 & 4, covering parts of East Siang District of Arunachal Pradesh.
- Regional geochemical mapping on 1:50,000 scale in parts of toposheets no. 78J/3 & 7, 78N/15 & 16 in Kamrup, Darang, Nagaon, Goalpara and Kokrajhar Districts, Assam.
- Regional geochemical mapping in parts of East Khasi Hills District, Meghalaya.
- Regional geochemical mapping in parts of Ri-Bhoi District, Meghalaya and Karbi Anglong District, Assam.
- Regional geochemical mapping in parts of Kiphire, Tuensang and Zunheboto Districts, Nagaland.
- Geochemical mapping in toposheet no. 78 A/3 & 4 covering parts of West and South Districts, Sikkim and Darjeeling District of West Bengal
- Geochemical mapping in northern part of Toposheet No. 78 A/3 covering parts of West and South Districts, Sikkim - on expedition basis.
- Regional geochemical mapping in parts of West Tripura and South Tripura Districts, Tripura [79M/6]

**Geophysical Mapping (GPM)**

Gravity-magnetic surveys in parts of East Khasi hills and Ri-Bhoi districts, Meghalaya falling in two toposheets 78O/14 & 15 has been carried out. An area of 450 sq km has been covered between April and December 2011. Gravity value varies from -38 mGal in the northwest to -12 mGals in the south. Moderate to high gravity (red) values in Northeast of Khrang area may be due to the underlying basic intrusive like meta basalts. The magnetic anomalies enabled to delineate three different geologic domains representing the exposed granitic and gneissic
basement in north, and southeast part, Tertiary formation in southern part and central and other parts of study area underlain by basic and ultra basic intrusive. The high anomaly in central part indicates the presence of un weathered basic intrusive bodies including meta basalts at shallow depth and the low intensive anomalies falling in southern part of the area is due to sedimentary rocks including sandstone, shale with alternate layers of coal beds.

Photo Geology & Remote Sensing

Work carried out in parts of Topo-sheets No. 84B/15 in parts of Kolodyne Hydroelectric Project in Mizoram. A prominent E - W striking fault, controlling a drainage, was marked 2 km south of Zero/New Maubawk on Zero - Kawlchaw Road.

Mission-II: Natural Resource Assessment (MINERAL EXPLORATION)

Basemetal

In Meghalaya, Reconnaissance stage investigation (G-4) was taken up in Archaean Gneissic Complex near Simsang Diwa village of East Garo Hills district to assess basemetal potential in the area. Lamprophyre dykes are exposed near Simsang Diwa.

In Sikkim, reconnaissance stage investigation (G-4) was continued in Lesser Himalayan zone in Chakung-Jugdum area covering parts of West district, to assess the basemetal and gold potentiality of the area. The item was taken up on the request of DMMG, Sikkim with a geoscientific partnership. Sulphide minerals are mainly pyrite and chalcopyrite which occur as fine dissemination within the quartz veins. In Buxa Formation, mineralization occurs in the form of malachite stains in the lower unit which consists of phyllite and thinly bedded quartzite.

Platinum Group of Elements (PGE)

In Manipur, reconnaissance stage investigation (G-4) was continued for Platinum Group of elements in ophiolite belt to assess the potential of PGE mineralization in the favourable host rocks in ultramafic suite comprising chromiferous dunite, peridotite and pyroxenite. Reconnoitory geological traverse mapping on 1:50,000 have been carried out in the ophiolite belt of Manipur and an area of 100 sq. km was covered in parts of Siruhi, Gamnom & Pushing areas in Ukhrul district. Ultramafic clan of rocks with chromitite layers were identified. The ultramafic suites were emplaced into the pelagic-sediments of Tertiary age. A total of eighteen chromite bands / lenses containing massive chromite with maximum dimension of 20m x 2m have been delineated within the serpentinised peridotite which are parallel to the regional trend. The chromite samples analysed Cr2O3 content varying from 44% to 59% and is akin to the Alpine Type Podiform Chromite.

Rare Earth Elements (REE)

In Meghalaya, reconnaissance stage investigation (G-4) was taken up in the peripheral part of Sung ultramafic-alkaline-carbonatite complex of East Khasi Hills district to evaluate REE potential.

Industrial Minerals

In Meghalaya, prospecting stage investigation (G-3) was taken up in Umphyrluh Block of Jaintia Hills district to explore limestone resources in the peripheral area of the Litang valley limestone deposit. The deposit is bedded type striking NNE-SSW with horizontal to sub-horizontal dip of about 3° to 5° towards ESE.

Coal
In Assam, prospecting stage (G-3) regional Exploration was taken up in Sukchar-Singrimari Block, Singrimari Coalfield in Dhubri district at the border of Assam and Meghalaya to explore the behaviour and the northward extension of the coal bands.

Mission-III: Geoinformatics (Dissemination of Information)

• Metadata of about 2177 reports of NER have been uploaded.
• District Resource Maps of South Sikkim and North Sikkim are under printing at MPD
• Miscellaneous Publication No. 30 Part IV (Geology and Mineral Resources of Manipur, Nagaland, Mizoram, & Tripura)--printed

Mission-IV: Fundamental & Multidisciplinary Geosciences and Special studies (Specialized Investigations)

Geotechnical Investigations

Following is the list of investigations taken up:

• Geotechnical evaluation of water resource development projects in Arunachal Pradesh
• Kameng Hydro-electric Project
• Pare H. E. Project
• Geotechnical evaluation of water resource development & other projects in Assam
• Lower Kopili HE Project, Dima Hasao & Karbi Anglong districts
• Geotechnical evaluation of water resource development projects in Meghalaya
• New Umtru H.E Project, Ri-Bhoi district
• Upper Khri H.E.Project, W. Khasi hills district
• Mawblei HE Project, W. Khasi hills district
• Myntdu Leshka H.E.Project, Stage-II, Jaintia hills district
• Tuipui HE Project

Geotechnical evaluation of water resource development projects in Mizoram

• Tuichang H.E. Project
• Geotechnical evaluation of water resource development projects in Sikkim
• Kalez Khola Hydroelectric Project, West Sikkim District
• Suntale khola Hydel Project, West Sikkim District

Miscellaneous Projects

Sikkim

• Geotechnical investigation for evaluation of the stability aspects of the jail complex, Omchung, West District
Landslide Hazard Studies

Arunachal Pradesh: (i) Landslide hazard zonation of a 2 km wide strip in the catchment area for Dibang multipurpose project, Lower Dibang valley district.

(ii) Landslide Hazard Zonation on macro scale of one Km wide strip along NH-52A between Bhalukpong and Bomdilla, West Kameng District, Arunachal Pradesh-- an area of 55 sq km is covered during the period along Bhalukpong to Bomdila of West Kameng district along NH-52A. The area is divided in to 615 facets. The landslide incidence map is also updated and very prominent “more than one active landslide” category landslides found to occur very close to each other at 3 places near Nag Mandir, Dedja.

Meghalaya : Meso Scale Landslide Hazard Zonation of Shillong Town, East Khasi Hills District: Meso scale landslide hazard zonation which is a semi quantitative classification scheme is taken up considering 12 geoenvironmental parameters and the area has been classified into different landslide hazard classes. It is found that LHZ (low hazard zone) covers major part of the area, which is followed by MHZ (moderate hazard zone). HHZ (High hazard zone) areas are mainly located along the Umshirpi, Wah Umkhra River in the western part of the study area and also in parts of the central part. During the period, a total of 17nos. of active landslides and 5 nos. dormant landslides have been studied in the area / along road section.

Sikkim: (i) Detailed geological mapping and evaluation of Theng landslide at 87.2 Km on North Sikkim Highway (NSH), North District was taken up. The detailed mapping (1:1000) of of 0.1 sq km area reveals that the Theng rockslide (at 87.2 Km on NSH), occurs within highly-folded,
hard, competent and jointed quartzo-feldspathic gneiss, quartzite sequence of Central Crystalline. present geological investigation at Theng rockslide confirmed the fact that diverting NSH road bench through a small road tunnel, as envisaged by road maintaining authorities would be the appropriate alternative. The detailed-scale mapping revealed that the proposed tunnel length would be around 600 m, which appears to be feasible from geological point of view. However, a modified shorter tunnel alignment has been suggested by GSI, which is expected to save about 100-150 m tunnel length

(ii) Detailed geotechnical investigation of Manvir slide, has been taken up through Geological mapping of 0.31 sq km area on 1:1000 scale of the Manvir Colony landslide situated on the Indira Bye Pass Road, East Sikkim. The area mapped is covered with overburden/slope wash materials, whereas mica schist intersected by four sets of joints is exposed at places. The area is drained by six nalas, which join together at lower elevation and ultimately meets the Rani Khola through one main nala near Jakri falls. There are a number of seepage zones identified within the slide area. Ground cracks and slide scars have been noticed mainly near the nalas. Piping out of finer particles and toe cutting by the nalas in the area appears to be the main causes of sinking of this area. Remedial measures in the form of bolting and shotcreting with chain link mesh of rock slide portion, hill side toe drain at road level, repairing of trained chute drains, construction of contour drains interlinked by chute drains, etc., have been recommended to control the slide.

(iii) Detailed geological mapping and evaluation of Lanta Khola landslide at 72.1 Km on North Sikkim Highway (NSH), North District has been taken up through detailed mapping and evaluation of the slide zone. Lanta Khola landslide is a debris flow that initiated way back in 1978 and has remained a major trouble spot on NSH in North District, Sikkim. An area of 0.3 sq km is mapped on 1:1000 scale to delineate the scars (active and dormant), nalas/streams, debris run out, accumulation zones and exposed bedrock etc.

(iv) Detailed geotechnical investigation of 9th Mile slide- Three newly developed scars are identified. A total of 112 survey pillars could be located and observations on 92 pillars are taken.

(v) Reconnoitory visit to Zeema landslide at 1.5 Km on Chungthang-Lachen road, North District- Preliminary studies of the slide mass indicate that the debris slide is a result of a cloud burst during the monsoon of 2010. A huge debris slide and flow at that location affecting about 200 m of road bench and responsible for causing significant change in the morphometry of the slope and diversion of nala course. The studies further indicated that the possible sliding surface is aligned mostly along the valley-dipping bedrock- overburden interface and due to the removal of huge amount of debris; the well foliated quartzo-feldspathic gneiss got exposed on slope from ~100m above the road bench level up to near the crown. The slope length of the present Zeema landslide may be around 1 Km. As a remedial measures based on the observation it is suggested at site that the slope of accumulated debris mass on Thangu side need to be dressed further by constructing at least three levels of wide benches to ensure better stability.

Seismic Studies (Earthquake Geology)

The continued item on Active fault studies around foothills of Mishmi block of Arunachal Himalaya has been taken up to identify the effects of the 1950 earthquakes preserved in the geologic records in the form of Erosion surfaces, Active faults, Seismic induced landslides, and Change in geomorphology etc. The study area lies to the southwest of the Mishmi Hills block and exposes the meta-sediments and sediments of Proterozoic and Quaternary age respectively. It is noted that the foot hill region is occupied by piedmont fan deposits which
has been traversed by mostly westerly flowing drainages with development of river terrace only in away from mountain front

Seismic Hazard Assessment and Risk Evaluation of Jorhat Urban Agglomeration has been taken up as a new item in FS 2010-12 and studies carried out. On the basis of available data borehole layout plan is prepared and SPT is started. Site response study by measuring ambient noise using short period Seismograph at every 1 km station spacing is already initiated. A total of 88 Seismograph stations with an average station spacing of 1 km are installed and recording of micro tremor (ambient noise) data has been conducted.

Climate Change

Glaciology

Updation of glacier inventory of Sikkim Himalaya has been undertaken. The compilation of glacier inventory of two basins, viz. East Rathong and Changme Khangpu, which contain 19 and 43 glaciers, respectively is taken up.

Fundamental Geosciences

Tectonism, Magmatism and crustal evolution of the northeastern Himalayas in parts of Tawang and West Kameng Districts, Arunachal Pradesh-- Traverses have been taken to cover Bomdila gneiss and many sites have been selected for magnetic susceptibility measurements.

Mineral Chemistry and Fluid Inclusion studies of Rongjeng and Sindhuli granites, Meghalaya-- Two types of Granitoids characterize the Rongjeng Pluton. These are porphyritic, megacrystic with abundances of melanocratic microgranular enclaves (MME) (Granite 1) and the other one is coarse, non-porphyritic types (Granite 2).

Systematics, diversity and biogeography of some major group of macro-invertebrates from the Upper Cretaceous - Tertiary sediments of Meghalaya Basin with a special emphasis on diversity dynamics-- The research project has been taken up, with the objective of taxonomic study of the invertebrates, their palaeoenvironmental interpretation and biogeographic analysis. Field investigation is carried out around Cherrapunjee and Pynursla area to study the fossiliferous units of the Mahadek and Langpar Formations.

Pertaining to the pilot project on Geospeleological studies, Syndai Cave of Meghalaya has been identified as suitable for sampling. Stalagmite samples have been collected from the cave for petrographic studies

Electrical imaging of deep crustal structure by magneto-telluric (MT) survey in Sikkim-Darjeeling Himalaya’ The objective of the study has been to decipher deep vertical succession in Silliguri- Gangtok transect and demarcate zones of mid-crustal conductors and also prepare a meaningful crustal model of the area. The study area falls in Degree Sheets 78A & 78B in West Bengal and Sikkim.

Gravity - Magnetic Evidences across Meghalaya Massif from Guwahati to Cherrapunjee has been taken up with the objective of interpreting the G-M data already acquired across Meghalaya massif from Guwahati-Cherrapunjee using the state of the art software package to delineate subsurface geology. The GM data set has been compiled, processed and validated for interpretation to know the subsurface geology along the transects from Guwahati to Cherrapunji.

Special assistance programme for NER
GSI has initiated procurement action for geoscientific equipments to be provided to all the State DGMs of NER under the Special Programme. In the Financial Year 2011-12 a total amount of `30.00 lakh has been allocated for procurement of some selected equipments. The procurement process is under progress.

State Dept. of Mines, Minerals & Geology, Govt. of Sikkim shall be provided with one each of Point load Testing Machine, Hot Air Oven and pH Meter, 5 nos. Hand held GPS, 5 nos. Geological Hammer and 4 nos. Brunton compass as soon as GSI gets in possession of all the equipments. The procurement of other sophisticated instruments required for Geotechnical Laboratory will be taken up in the next financial year.

Assistance in Capacity Building of State officials of NER

It has been decided that GSI will grant TA/DA to all the participating officials of NER States as well as Course fee will be exempted for attending training courses conducted by the GSI Training Institute at any part of India.

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Work Done by Indian Bureau of Mines in North Eastern Region

The Sub-regional office of IBM at Guwahati continued to undertake inspection of mines and studies on development of resources in North-Eastern region. During the year 2011-12 (upto December 2011) 15 mines / areas were inspected for enforcement of provisions of MCDR 1988 and for processing & disposal of mining plan / scheme of mining.

Two training programmes viz. (i) Workshop-cum-Meeting on North Eastern Special Assistance Programme at Imphal and (ii) Workshop-cum-Training on Statutory Returns & Notices under MCDR 1988 under NER Development of Mineral Industry Programme at Itanagar (Arunachal Pradesh) were conducted, in which 27 Industry personnel/ Govt. officials from North-Eastern region participated.

Work Done by MECL in North Eastern Region
MECL has been associated with mineral exploration activities and geo-technical studies for the development of mineral industry in the North Eastern Region in last 30 years. It has completed exploration for coal in 15 blocks in the states of Assam, Arunachal Pradesh, Nagaland and Meghalaya on behalf of Ministry of Coal, North Eastern Council and CMPDIL. Under its promotional programme funded by Ministry of Mines, it has completed nine schemes which include copper, sillimanite, glass sand, shell limestone and Ferro-Silicon grade quartzite in the states of Assam, Meghalaya, Mizoram, Sikkim and Arunachal Pradesh. In addition, it has carried out geo-technical studies on behalf of Brahmaputra Flood Control Board in the state of Assam and Arunachal Pradesh and consultancy work for remote sensing studies at Tripura on behalf of Ministry of Mines. Exploration services were also rendered to Atomic Mineral division involving survey, drilling & mining in Umarangaon / Domiaset block, West Kasi Hill district.

During the year 2011-12, MECL completed the field investigations for dolomite at Rupa in West Kameng district Arunachal Pradesh and analytical studies, interpretation and report writing work are in progress. The investigations and report writing work for detailed exploration for limestone carried out in Tongnub South East Sub Block, Litang River Valley in Jaintia hills dist. of Meghalaya is also under progress.

In addition to above, detailed exploration of limestone at Nimi-Pyakatsu block, district Kiphire, Nagaland at an estimated cost of `113.57 lakh has also been taken up in which field work is being carried out by DGM, Nagaland and laboratory & report writing work will be taken up by MECL.

Further to above, on behalf of Directorate General of Hydrocarbon, Govt. of India, MECL with BRGM France has completed studies for resource estimation in respect of oil shale deposit in an area of 254 sq.km. of Assam & Arunachal Pradesh. The physical work includes input of 2818 m of drilling in 8 nos. of borehole along with associated geological activities. The detailed project report has been submitted as scheduled wherein a total of 932 million tonnes of oil shale resources have been established.

The brief account of exploration by MECL in North Eastern Region is as under:-

**Tongnub South East Sub Block (Limestone), Distt. Jaintia Hills, Meghalaya:**

The exploration proposal of Tongnub block was approved in the 21st SCPP held on 4th August, 2009 with 1310m of drilling in 8 boreholes with associated geological & laboratory work. MECL commenced the physical work in January 2010 and completed in March 2011. A total of 1148.50m of drilling in 8 closed boreholes along with associated geological work has been carried out. The analytical / laboratory work & geological report preparation is in progress.

**Rupa Dolomite Block, Distt. West Kameng, Arunachal Pradesh:**

The exploration proposal of Rupa block was approved in the 19th SCPP meeting held on 10th September, 2008 with 800m of drilling in 8 boreholes and associated geological & laboratory studies.

MECL could commence the physical work in the block in July 2010 after receipt of Forest clearance from the State Government in May 2010. The drilling work was completed in October 2011.

During the period from April 2011 to October 2011, a total of 327.50m of drilling and associated geological work in 4 boreholes has been completed. Since inception a total of 594.00m of drilling in 6 boreholes and associated geological work has been completed in the block. Sampling and laboratory work is in progress.
Nimi Pyakatasu Limestone Exploration Block, District- Kiphire, Nagaland:

The detailed exploration proposal for Nimi-Pyakatasu block was approved in 12th SCPP held on 28th February, 2005 involving 1000 m of drilling in 9 boreholes with associated geological & laboratory work. Accordingly MECL mobilised its resources to project site but could not carry out the work on account of Law & Order problem.

In the joint meeting of DGM, Nagaland and MECL under chairmanship of Additional Secretary (Mines) on July 4, 2008 keeping in view thrust given by Govt of India/MoM for development of Mineral resources in NER and importance of project, it was decided that the project should be taken up jointly by DGM, Nagaland and MECL. The matter was discussed in 20th SCPP held on 18th February, 2009 and it was decided that field work like drilling, geological mapping and sampling work will be carried out by DGM, Nagaland and the laboratory studies and report preparation shall be carried out by MECL.

DGM, Nagaland could commence field work in the month of April 2011 due to hostile nature of terrain. Upto December 2011, a total of 110 m of drilling has been carried out in 1 (one) running borehole by DGM, Nagaland. Sampling work is yet to be commenced. The field investigations have been re-commenced after a gap of 4 months due to non field season.