

Scrutiny comment on Modification of Mining Plan including PMCP in respect of SIJIMALI Bauxite Ore Deposit of M/s LARSEN & TOUBRO Limited over an area of 1560.400 Hectare in Kalahandi and Raygada districts of Odisha State.

Date of Inspection: 15.09.2016

GENERAL:

- (1) It is observed that, current document has been prepared accordance to the new "IBM manual for Mining Plan appraisal-2014". However, in some chapters like Mine drainage, Use of Mineral and Mineral reject, PMCP etc. the guideline is not followed properly.
- (2) The mining plan was approved for 1551.013 Ha vide letter dated 03.04.1996; in current instance i.e. modification of Mining plan document has been submitted over an area of 1560.40 Ha. Whereas as per, DGPS survey by ORSAC the area is 1549.086 Ha difference should be clarified.
- (3) Reason of modification to be detailed in para 3.6.
- (4) CCOM circular no.2/2010 and its addendum regarding geo-referenced mining lease map and ML boundary pillars to be implemented.
- (5) The proposed category of Mines /deposit to be mentioned on cover page.

GEOLOGY & RESERVES:

- (6) Number of Exploratory BH proposed to be mentioned in table presented on page A.1-5 and same to be depicted year wise on Borehole plan (drawing PRM-0004).
- (7) It is observed that mineral resource is estimated using Geo-Mining Software. The method of resource estimation should be discussed in details along with parameter like, ellipsoid dimensions, minimum and maximum composing sample length, block size, minimum and maximum sample considered for block estimation, Maximum search distance in horizontal and vertical plan, range, nugget effect etc. Else software logic be given in detail. Further, all the parameter considered as well as all input to the software should be described in detail with software generated calculation.
- (8) The geological boundary of exploration level should be as per UNFC. Further, Specific date to be mentioned on which Reserve & resource is estimated.
- (9) Page A.1-11: Dilution of 1 meter thick zone of Bauxite at roof with lateritic OB and bottom with PLK to be justified. Block wise geological resource also should be given in table A.1-3.
- (10) Page A.1-13: Table presented on page should also needs to incorporat sectional area, tonnage factor considered etc. and tonnage factor considered should be justified with documentary evidence.
- (11) The justification of UNFC code in respect of E and F axis be given.

MINING:

- (12) Excavation proposal for pit-B should be given from Eastern end to another end in the interest of scientific and systematic mining. Further, excavation proposal should be supported by x-section and detail backup calculation.
- (13) The detail section wise backup calculation of proposed excavation of Bauxite, Mineral reject, top soil etc. to be given along with development sections.
- (14) Location of mine workings proposed has not been referred by grid lines in text part of documents.
- (15) A consolidated table to be given for Mining equipment proposed/required during plan period.

- (16) Conceptual Mine plan should be upto the end of life of mine taking into consideration of the available reserve and resources describing the total excavation, Disposal of waste, Sub-grade generation and its beneficiation/utilization, mine development, manpower and equipment requirement, conceptual exploration, land degradation, waste required and its availability for back filling the ultimate pit, reclamation and rehabilitation, Proposal of any expansion, etc. showing on a plan with few relevant sections. Hence complete chapter needs to be revised.
- (17) **Mine Drainage:** A drainage plan may be submitted showing the drainage pattern of the lease area. Accordingly, environment protective measures like retaining wall, garland drain, settling tank etc. may be proposed/revised. Further, complete chapter required to be recast in few of "IBM manual for Mining Plan appraisal-2014"

STACKING OF MINERAL REJECT/SUB GRADE AND DISPOSAL OF WASTE:

- (18) The quantity of over burden/Mineral reject mentioned on page A.4-1 does not match with the quantity mentioned in table A.2-1. Verify and rectify.
- (19) It is observed that Overburden, Mineral reject and top Soil dumps are proposed on the Mineralized Ground. These dumps should be proposed on the non-mineralized ground or purely temporary dumping for a short period to be proposed in mineralized area with technical constraints & justification.
- (20) Build-up of dumps from year to year to be mentioned in text w.r.t. designed capacity of dumps, bottom and top mRL of individual terrace, individual terrace slope with description of method & manner of disposal of waste should be mentioned.
- (21) Proposal of blending of Sub-grade/Mineral reject to be given in the interest of conservation of Mineral. Blending ratio also should be mentioned.
- (22) The disposal of sub-grade/mineral reject is not clear. This should be clarified. Further, year to year buildup of Sub-grade dumps to be mentioned in text along with some sections.
- (23) It is observed that to arrest solid waste during rainy season, only garland drain is proposed, which seems to be inadequate. Hence, retaining wall and settling tank etc. may also be proposed around waste dump, mineral reject dump & soil dump and same to depicted on the relevant plan.

USE OF MINERAL AND MINERAL REJECT:

- (24) It is observed that information furnished in this part of the text is not given para wise as the "IBM manual for Mining Plan appraisal-2014". Hence, complete recast of the chapter is required.

PROCESSING OF ROM AND MINERAL REJECT:

- (25) Indicate quantity (cum per day) of water required for mining and processing and sources of supply of water, disposal of water and extent of recycling. Water balance chart may be given.

PROGRESSIVE MINE CLOSURE PLAN

- (26) Land use pattern has been given for only 514.00 hectare area, where as present document has been submitted over an area of 1560.40 Ha. Land use to be given for entire area.
- (27) Page A.8-7: Total deposit area mentioned in referred page is 1549.086 Ha, whereas, present document has been submitted over 1560.40 Ha. Either to be corrected.
- (28) **Disaster Management and Risk Assessment:** Briefly describe about emergency plan proposed for quick evacuation or measures to be taken during high risk accidents like landslides, subsidence flood, inundation in underground mines, fire, seismic activities etc. The capability of lessee to meet such eventualities and the assistance to be required from the local authority may also be described. The name of officials along with telephone number may be given; responsible to take appropriate action during such eventualities.

- (29) The table given in the appendix A.8-4 for year wise proposal made in progressive mine closure plan and financial assurance, also need to be given in text part of the document. Further, table for progressive mine closure plan should also have details like area proposed for backfilling, length, width of retaining wall, garland drain etc.
- (30) Year wise proposed location of plantation to be mentioned in tabulated form in text part of the document and same to be depicted in reclamation plan.

FEASIBILITY STUDY REPORT:

- (31) Financial analysis is not carried out as per UNFC guidelines. It should be carried out based on real time cost. Viability of the project should be analyzed up to the ultimate depth considering following points:
Capital cost, Cashflow forecast, Investment cost, Inflation forecast, Operating cost, Sensitivity studies, RR, IRR, NPV for the project life, cost of operation, Closure cost and Rehabilitation cost etc.

PLATES:

General:

- (32) It is observed that most of the drawings are not prepared at prescribed scale (1:2000) as specified in rule 27 of MCDR, 1988. Hence, permission in this regard may be obtained from competent authority as per rule 27 of MCDR, 1988.
- (33) All plans and sections should be signed with date by certified Surveyor, Qualified Person, Mine Manager, Mining Engineer and Mining Geologist as per provisions of Rule 30 of MCDR, 1988 and Rule 66 of MMR, 1961.
- (34) Scale of each drawing also should be written numerically. The contour value to be shown in all the plans. Further, ultimate pit limit to be shown in all the plans and sections.
- (35) Safety Zone of 7.50 meter to all along the lease boundary to be shown in all plan and sections.
- (36) Forest area, Non Forest area, Surface right acquired area etc. should be marked clearly over all Map/Plan & Surface plan.
- (37) Color code given for different features in plans and sections to be same.
- (38) Surface Plan is not submitted, as per MCDR, 1988. All boundary pillars coordinates in UTM, Latitude and longitude to be shown in tabulated form on surface plan as well as in the text.
- (39) Geological Plan & Section: The color code/hatching used to display various lithology are not distinguishable, need to be reviewed. Further, Section line to be shown on the geological plan. Direction along which geological section have been drawn to be depicted on the sections. N-S grid line to be depicted on sections.
- (40) Development plans and Sections: Development sections have not been submitted in instant document. The benches in OB/SB/IB, Bauxite, Top Soil and Mineral reject to be shown on development sections.
- (41) Financial assurance area plan should be submitted showing only outline of proposed five years mining activity/working as per "IBM manual for Mining Plan".
- (42) Progressive Reclamation Plan as per para 8.3 of "IBM manual for Mining Plan appraisal-2014" to be submitted indicating all the proposed environment protective measures like retaining wall, garland drain, settling tank, plantation etc.
- (43) Key plan is not prepared as per the provision of MCDR, 1988. Same to be prepared as per the provisions.

ENCLOSURE:

- (44) Few photograph of the Boundary pillars, present land use to be attached.
- (45) Page A.2-17: Report of Seismic refraction test done by BEML to be attached.
- (46) Copy of resolution of Board of Directors dated 04/04/2012 to be submitted.
- (47) Copy of surveyor certificate to be enclosed.
- (48) Self-attested copies of qualification & experience certificates as required for qualified person to prepare mining plan under MCR'2016 should be enclosed. All the pages of the text and relevant pages of the annexure to be signed by qualified person.
- (49) Copy of prospecting report to be submitted as annexure and it should be signed by Qualified Person.
- (50) In view of above, wherever necessary correction required to be made.

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