



भारत सरकार GOVERNMENT OF INDIA
खान मंत्रालय MINISTRY OF MINES
भारतीय खान ब्यूरो INDIAN BUREAU OF MINES
क्षेत्रीय खान नियंत्रक के कार्यालय
OFFICE OF THE REGIONAL CONTROLLER OF MINES



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No. RMP/A/40-ORI/BHU/2019-20

दिनांक / Date: 16.12.2019

To

Shri Shantanu Mohapatra,
Director & Nominated Owner,
M/s Balasore Alloys Limited,
Module C/1, 01st Floor, Fortune
Tower, Chandrasekharpur,
Bhubaneswar, Odisha-751023.

Sub: Review of Mining Plan of Kaliapani Chromite Mine over an area of 64.463 ha in Jajpur district of Odisha of M/s Balasore Alloys Limited submitted under Rule-17 of MCR, 2016.

Ref:- i) Your letter no. nil dated 28.11.2019 received on 03.12.2019.
ii) This office letter of even no. dated 03.12.2019.
iii) This office letter of even no. dated 03.12.2019 addressed to the Director of Mines, Govt. of Odisha, copy endorsed to you.

Sir,

This has reference to the letters cited above on the subject. The draft Review of Mining Plan along with Progressive Mine Closure Plan has been examined in this office based on site inspection carried out on 07.12.2019 by Shri Dayanand Upadhyay, Sr. Assistant Controller of Mines and Shri Sudip Ranjan Mazumdar, Senior Mining Geologist. The deficiencies observed are enclosed herewith as Annexure-I.

You are advised to carry out the necessary modifications in the draft Review of Mining Plan in the light of the contents vide Annexure-I and submit **three (3) firm bound and two (2) soft copies of the document text in CD in a single MS Word file (the drawing/plates should be submitted in Auto CAD compatible format and JPG format in resolution of 100x100 pixels on same CD)** with financial assurance under Rule 27 of MCDR' 2017 within 15 (fifteen) days from the date of issue of this letter for further necessary action. If the total page of annexures exceeds 50 (Fifty) then it should be submitted as separate volume. But reference of these annexures must appear in the Review of Mining Plan document. The plates are also to be submitted in separate volume.

The para-wise clarifications and the manner in which the deficiencies are attended should invariably be given while forwarding the modified copies of the Review of Mining Plan. It may be noted that no extension of time in this regard will be entertained and the Review of Mining Plan will be considered for rejection if not submitted within above due date. It may also be noted that if the deficiencies are not attended completely, the submission would be liable for rejection without further correspondence.

भवदीय / yours faithfully,

(HARKESH MEENA)

क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

Copy for kind information and necessary action to:

1. Shri S. C. Nayak, Qualified Person, M/s Minesketch Consultants (P) Limited, Flat No-205, Bhagwan Tower, Cuttack Road, Bhubaneswar-751006.

(HARKESH MEENA)

क्षेत्रीय खान नियंत्रक / Regional Controller of Mines

Scrutiny comments on examination of Review of Mining Plan of Kaliapani Chromite Mine of M/s Balasore Alloys Limited over 64.463 ha in Jajpur District, Odisha state

GENERAL

1. Sequence of paragraph and its numbering as per IBM Manual Appraisal MP 2014 has not been covered in text. All the headings as mentioned in the IBM Manual Appraisal MP 2014 should be furnished in all chapters in the text.
2. All the text, tables and annexures to be properly indexed/ numbered/ paged and signed by qualified persons.
3. In the summary of “proposals at a glance”, the production and development proposal separately from opencast mining method, BPM method and underground mining have not been furnished.
4. In Para 3.3, the review of year wise proposal and achievement of ROM and Waste generation both from opencast and underground mining have not been furnished separately. Further, for FY 2019-20, the review period has not been specified and it should be done up to the latest month. Reason for any deviation has not been justified properly. Need to do necessary corrections.
5. Para 3.6 is not as per the IBM Appraisal of Mining Plan 2014. Since the present submission is not modification, therefore it should have been mentioned as “Not Applicable”.

GEOLOGY

6. In para 1 (a), the topography along with maximum and minimum RL, drainage pattern, vegetation, climate and rainfall data of the mining lease area should only be furnished. In Para 1(b), the reference of established regional stratigraphy should be furnished and the younging direction of the lithounits has not been shown in arrow mark. Need to do necessary corrections.
7. In para 1 (c), the summarized information of the chrome bands present within the lease area should be submitted in the following tabular format.

Number of Regional Chrome Ore bands present within the lease area	Name of the Regional Chrome ore Band present within the lease area	Local nomenclature of the Regional Ore band within the lease area	Summarized information of the Chrome ore bands present within the lease area													
			Location (Quarry Name /Pit) etc.	Length of the Chrome Ore band	Width of Chrome ore band	Explored depth (in mRL)	Level of Exploration as per UNFC of the Chrome Ore Bands	Strike, direction, Dip direction and dip amount	Present UPL (in mRL) for Opencast method of mining	Nature of Chrome Ore band (Physical description)	Chemical analysis of Chrome Ore band	Gangue minerals associated with Chrome ore band	Control of mineralization	Associated Lithology both in Hang wall and footwall		

8. In Para 1 e (ii), the details of drilling information furnished about production shaft & service shaft is incorrect and should corrected. In Page 24, in the table furnished, the borehole location is not in UTM but in local coordinate. Need to do necessary corrections.
9. The status of lease area explored under different UNFC norms is page 32 is incorrect. G1 and G2 boundary should be redefined as discussed during inspection and should be as per the provision of MEMC Rules, 2015. Further, the explored depth (in mRL) for G1 and G2 level of exploration is incorrect and should be corrected as per the provision of MEMC Rules, 2015. Necessary modifications to be done at all relevant places in the document like reserve resource estimation, plans and section etc.
10. In para 1 (i), along with the information submitted, the summary of exploration after complying scrutiny point no 8 may be furnished in the following tabulated format.

Ore Band	Explored Depth of G1 and G2 Exploration (in mRL)	Depth of G1/ G2 Level of exploration from Surface (m)

11. The proposal for exploration under future exploration program is inadequate. Proposal for drilling have to be submitted for converting depth wise ore body explored in G2 level to G1 level for both Band-I and Band -II. The proposal should be modified to the extent that it should clearly indicate the level (in mRL) from which G2 level is proposed to be converted to G1 level in mRL separately for both the bands. The proposed boreholes should be in grid pattern for G1 level of exploration as per exploration norms specified in MEMC Rules, 2015. The direction of drilling has not been specified. The proposed boreholes have not been shown in dotted lines in geological sections. Need to do necessary correction sin the exploration proposal.
12. As discussed during inspection, the parameters of reserve/resources estimation should be rechecked and corrected. As beneficiation process is in practice, therefore the grade up to which the ore is beneficiated should be considered as cut-off grade. The grade above which the ore is directly saleable and does not require beneficiation should be considered at cut-off grade. Further, mineral reject grade have not been defined. Bulk density test reports of different grade of ore have not been furnished from NABL accredited laboratory.
13. In page 36, the justification of the thickness of crown pillar with supporting study report have not been furnished. Need to submit the same. The mining limit by different method of mining should be rechecked and corrected. Need to do necessary corrections.
14. LVS (longitudinal vertical sections) have to be corrected complying scrutiny point 9. The blocked resources should be properly categorized as per UNFC guidelines and justification of UNFC codes should be furnished accordingly. Reserve/resources have not been estimated by level plan method when underground mining is proposed. Thus re-estimation of reserves/resources should be done as per the provision of MEMC Rules, 2015 after complying scrutiny point no 9. The recovery factor in resource/reserve assessment may be derived from time series data. All resources shall be assessed up to the threshold value and the resources between the threshold value and the cut-off grade should be reported as mineral reject separately. Parameters considered for resource/reserve estimation have to be redefined. The average grade of the reserves and resources estimated under various categories of UNFC should be furnished in table in page 38.

MINING

15. Page-49, Para-2.0, existing method of mining has not been described properly with designing parameters, ore band encountered, present capacity of mines etc. The details of existing pit to be furnished as below:

Pit size in mtrs (Length x Width x Depth)	No. of benches	Bench Height (m)	Bench Width (m)	Pit Depth (m)	Top RL (m)	Bottom RL (m)	Overall pit Slope Angle
	F/W: H/W:						F/W: H/W:

16. Justification should be submitted for selection of method by underground mining for development and stoping method (with recovery from stoping method) with study reports from competent authorities, considering the workability and technical viability for both ore bodies. Justification should also be furnished for location of entry points to the mines viz., decline and shaft etc. as per the study report. The method of mining both drift and fill and sublevel open stopes as proposed should be justified and described in detail. RL of collar of entry points in relation to higher flood level in the area should be furnished for declines, shafts etc.
17. The parameters for drilling & blasting in the proposed stope blocks of different stope size, development faces of different sizes should be furnished in detail. Need to do necessary correction.
18. The reinforcement of underground excavations like drives, cross cuts, shafts, decline, stope blocks etc. should be elaborated in detail under strata control. The SSR (systematic support rules) as per MMR 1961 should be furnished in a summarized form and the document should be enclosed as annexure. The geotechnical study reports related to the strata control should also be enclosed as annexure.
19. In Page-55, Insitu Tentative Excavation have not been furnished as per the format specified in IBM Appraisal of MP 2014 both in cubic meters and in tones in separate tables.

20. In BPM method and fill and drift method of mining the longitudinal drives as proposed do not cover the entire width of ore body. Therefore longitudinal drives should be proposed in such way that entire width of ore body covered for maximum recovery of ore. Need to necessary corrections.
21. Year wise size of drives, no. of panels, development of level /sub level, ramp, shaft, size of blocks in sub level stopes with quantity of ore and OB to be furnished with their RL.
22. Based on the scientific study conducted stope length, underground workings, sequence of stoping & backfilling and other proposed design parameters should be described. The stage wise sequence of backfilling should be furnished in text and shown in longitudinal and tranverse sections.
23. Page-50, In Proposed method of mining, opencast mining and underground method of mining in friable ore and hard ore should be described considering the geo-technical parameters and other criteria of selection. A summary of proposed method to be furnished as below:

Method	Band-I		Band-II		Remarks
	Top RL	Bottom RL	Top RL	Bottom RL	
Opencast					
BPM					
Drift & fill method					
Sub Level Stoping with filling					

24. Total cumulative generation of OB/waste year wise and further their utilisation should be furnished as below:

Year	Generation in CuM			Disposal in CuM		
	Opencast	UG Working	Total	Disposed on dump	Utilized in Backfilling	Remarks

25. Based on the scientific study conducted stope length, underground workings, sequence of stoping & backfilling and other proposed design parameters should be described as per the study report.
26. Year wise, level wise sequence of stoping and backfilling both in BPM (also panel wise), drift fill method and sub level stoping have not been furnished in text tabulated format and should be shown in longitudinal and transverse sections. Need to do necessary corrections.
27. **Decline & its purpose should be furnished in the tabulated format shown below.**

Latitude	
Longitude	
Cross Section of Opening	
Inclination	
Starting Level	
Ending Level	

28. **Vertical Shaft & its purpose should be furnished in the tabulated format shown below.**

Latitude	
Longitude	
Cross Section of Opening	
Inclination	
Starting Level	
Ending Level	
Method of Sinking	

Capacity of Handling	
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29. Underground Mine Development each year proposed to be furnished as below:

Details of Development (Decline, shaft, Cross cut, Level, stopes/ BPM)	Linear Development, in mtrs		Vertical Development, in mtrs		Total Waste in CuM	Total Ore in CuM	Total Ore in Tons
	Waste	Ore	Waste	Ore			
G.Total							
UG Infrastructures							
STOPES	Stopes under Development (mRL to mRL)						
	Stopes under Production (mRL to mRL)						

30. Abstract for each year to be furnished as below:

Total Underground Development in Mtrs	Total Waste from underground development in CuM	Total Ore from underground development in CuM	Total Ore from underground development in tonnes

31. Stope parameters to be furnished as below:

1	Number of working stopes	
2	Size of the panel	
3	Level interval	
4	Thickness of crown pillar	
5	Thickness of Sill pillar	
6	Thickness of Rib pillar	
7	Size and interval of Stope pillar	
8	Size/shape of man way	
9	Size/shape of ore pass	
10	Method of stowing / back filling	
11	Method of drainage of stowed water	

32. System of underground transportation From face to pit bottom or loading point, From pit bottom to surface and machineries proposed should furnished in view of handling of ore and OB with their specification. In Subsidence management, instrument used, monitoring points to be marked on plan, frequency subsidence monitoring, monitoring to be properly recorded have to be proposed. Need to do necessary corrections.

MINE DRAINAGE:-

33. Effluent treatment plant has not been described with its capacity and accumulation of water in pit considering water table encountered and average rain fall. The flowchart of ETP and treatment of hexavalent chromium should be furnished.

34. Provision of sump in underground is to be proposed and all the water drained to the same in such a way that less interference to the ore body, which leads to less dilution of hexavalent chromium. The pumping arrangement and management of underground water, surface runoff etc. is to be described in detail. Need to do necessary correction.

HANDLING OF MINERALS REJECT/ SUB-GRADE AND DISPOSAL OF WASTE

35. In page 118, in table only storage of overburden/waste has been furnished whereas back-filling has been proposed in stopes/drives have not been furnished and not described in text in quantified manner..
36. Blending and beneficiation of mineral reject should be furnished in respect total generation of mineral reject yearwise. Storage/Stacking of Sub-grade material/Mineral reject in earmarked area to be described with mRL and area on year to year basis with description of the manner of its disposal.
37. Details of Stocks/Dumps of Waste, Sub-grade/mineral rejects etc. is to be given. Retaining wall & garland drain all along the dump to be furnished in terms of actual and proposed.
38. Specific proposal for stabilization, reclamation & rehabilitation by plantation, coir matting etc. of existing dumps should also be given year wise in quantified terms.

PROCESSING OF ROM & MINERAL REJECT

39. Low grade ore between 10-40% Cr₂O₃ has been proposed to beneficiate, therefore capacity of COB plant, average grade of concentrate and tailings with their disposal and flow chart should discussed in details. The analysis of existing tailings from Govt. /NABL lab may be furnished. If the cut-off grade is changed then proposal should be modified accordingly. Need to do the needful.

PROGRESSIVE MINE CLOSURE PLAN

40. In summary of PMCP table, Cumulative actual achievement as on date and specific proposal should be given year-wise in absolute quantified term. Under heading 'others', protective works to be carried out year wise around waste and sub grade dumps also to be given.
41. In page 114 to 146, the air, water and noise monitoring stations and their frequency of monitoring have not been furnished in tabulated format. All water discharge points from lease area to external should be monitored. Accordingly, monitoring proposal to be submitted.
42. All the paragraphs should be addressed in detail under PMCP chapter as per IBM Manual Appraisal MP 2014. The present land use pattern should be furnished as per the format of FA table of different heads.
43. In page 149, under progressive reclamation, the mined out stope to be backfilled have not been described.
44. In page 150, under Para "Mined Out Land", the information furnished in table is incorrect. There is currently no mined out area from where ore has been completely exhausted. Need to do necessary corrections in the table and at all relevant places.
45. The tables showing year wise proposal should be corrected with respect to reclamation and rehabilitation by backfilling i.e., quantity of overburden/waste material to be backfilled has not been furnished, plantation details, cumulative plantation which is kept as blank. Further, information of protective measures (i.e., construction/maintenance of retaining wall, garland drain, settling pond etc.) to be undertaken has not been furnished in detail.

ANNEXURES

- i) All the reports related to Geotechnical investigation for optimization of stoping parameters & design of support system for underground operation justifying proposed stoping parameter should be enclosed.
- ii) The chemical analysis from NABL certified laboratory or Government Laboratory has not been enclosed.
- iii) Bulk density study reports from NABL accredited laboratory have not been submitted.
- iv) The valid copies of bank guarantee for the plan period have not been submitted. Need to submit the same.
- v) The borehole logs in Form J (erstwhile Form K) of MCDR 2017 should be submitted.

PLATES (General):

- i) Show a scale of the plan at least twenty-five centimetres long and suitably sub-divided;
- ii) The conventions provided under the Metalliferous Mines Regulations, 1961, shall be used in preparing all plans and sections
- iii) All plans and sections should comply with the provisions of Rule 32 of MCDR 2017.

- iv) The plans and sections submitted should bear the certificate that -the plans and sections are prepared based on the lease map authenticated by the state government.
- v) Date of survey should be given on plan and sections and the same should be signed by with date.
- vi) Grid lines should be shown in all plans and sections.
- vii) Magnetic declination and date of observation should be shown in all relevant plans.

Key Plan:

- i) The key plan should incorporate all features as mentioned Rule 32 (5) (a) of MCDR 2017 and all features should be shown in index as well.

Surface Plan:

- i) Latitude, longitude of all corner pillars may be indicated on the plan. Few pillars may be correlated with some permanent ground features giving distance and direction. Different land use may be shown with colour codes.
- ii) Forest & Non forest area; Surface right acquired area etc. should be marked clearly over a separate Lease Plan & Surface plan. Surface contours are not shown properly.

Geological Plan & Section:

- i) The UNFC boundaries have to be corrected as per the provision of MEMC Rules 2015. G1 and G2 boundary should be shown separately.
- ii) In Geological sections the proposed boreholes to be shown in dotted lines.
- iii) The potentially mineralized area should be rechecked and corrected considering the dip of the ore body and surface exposure. Necessary corrections to be made at all relevant places.
- iv) The index of Geological features should be same in both Geological Plan and all the Geological sections. The borehole id has not been properly shown adjacent to boreholes plotted. The blocked resources under different UNFC codes have to be properly shown in LVS and in cross sections.

Development Plan and Sections:

Year wise, level wise development plan and section separately for BPM, Drift and fill method and sub level stoping have not been furnished. Plans and sections for BPM should show the year wise level wise, panel wise, stoping and backfilling sequence. Sequence of stoping and backfilling for drift and fill method and sub level stoping should be shown properly.

Underground development plan & Section:

- i) The nomenclature "proposed stoped out blocks" should be renamed as "proposed stope blocks". Necessary changes to be done at all relevant plans and sections.
- ii) The proposal should for the plan period only (2020-21 to 2024-25). Necessary changes to be done at all relevant plans and sections.

Environment plan:

- i) The Environment Plan as prepared should be satisfy the provision as laid down rule 32 (5) (b) of MCDR'2017. Air, water and noise monitoring stations to be shown in the plan.

Financial assurance plan:

The FA table as furnished in the text should be shown in the plan.

Semaqumdar
13/12/19
(Sudip Ranjan Mazumdar)
Senior Mining Geologist

D
13.12.2019
(D Upadhyay)
Sr. Asstt. Controller of Mines