INSPECTION REPORT CUM SCRUTINY COMMENTS ON REVIEW OF MINING PLAN OF TAVASIKONDA IRON ORE MINE OF M/s SHREE ARYA LAKSHMI STEELS PVT. LTD. SPEARD OVER AN AREA OF 32.915 HA IN SURVEY NO-782 OF TAVASIKONDA VILLLAGE, BETAMCHERLA MANADAL KURNOOL DISTRICT OF ANDHRA PRADESH, DATE OF FIELD INSPECTION-16.06.2017

1. Cover Page-

a) The rule under which Progressive mine closure plan submitted should be mentioned.
b) Category of mine should be modified as per the comments pertaining to Geology & Exploration and Mining.
c) Mention the production capacity.

2. Introduction-

The date of commencement of mine should be mentioned and letter pertaining to approval Mining Plan should be furnished as annexures. Proposed production capacity should be clearly mentioned not in range.

3.Location & Accessibility

In details of the lease area the area has been shown as Govt Waste Land but in the cover page shown as Govt Revenue land. Necessary correction should be done as per lease deed.

4.Review

a) In the exploration part give the review year wise.
b) In the mine development reason should be given for short fall.
c) In the production review the year wise production furnished is not correct and the reason should be furnished year wise for short fall.
d) In the review of environmental monitoring give it year wise and the Environmental moitoring reports are not annexed but as per review the reports are annexed as annexure-XI.
e) Review of environmental protective measures has not furnished.
f) From the review of violation and compliance status, it has been observed that the violation is still pending. Justify.
g) Mention 2016-17 as lapse period.

Part-A

5. Geology & Exploration

a) In the geology of mine area the thickness of lithological succession should be furnished in range. Dip and strike should be furnished in text and in the geological plan.
b) Furnish details of exploration carried out in tabular form

Sl No	Bore hole No	Grid Interval(m)	Type	Angle	Location	Collar RL	Depth(m)

Sl No	Pit No/ Trench No	Location	Collar RL	Length(m)	Width(m)	Depth(m)

c) Furnish working pits lithological log records.
d) The dimensions of mineralized zones should be furnished.
e) Under resources estimation, the resources should be estimated as per parameters of MEMC, 2015. Prior to estimation, the resources estimation parameters like category of the deposit as per MEMC, 2015, cut off, threshold limit, sub-grade, bulk density and recovery % considered should be furnished. Detailed axes-wise justification as per field guide lines of UNFC should be furnished in tabular form.
f) Location of trial pits considered for recovery percentage test, bulk density test and location of sample collected for chemical analysis should be shown on plan.
g) In the Bulk density, Recovery test and Mineralogical Analysis report the average percentage of recovery of iron ore is 50% where as its average Fe % has not been furnished. Photographs & sample location plan not enclosed.
h) Detailed axes-wise justification as per field guide lines of UNFC should be furnished in tabular form.
i) It is a pocket type of deposit. DTH bore holes are not sufficient for exploration of this type of deposit. Only DTH bore holes falling within 50m form the working pits can be considered for minable reserves estimation. To establish the continuation of mineralization in between the working pit zones, core bore hole should be proposed and carried out. The criteria for spacing of holes should be as per MEMC Rules-2015.Accordingly the reserves/ resources should be re-estimated.

j) In view of the above the mineralised area should be modified in the geological plan and as per the category of the deposit the level of exploration should be mentioned and the area corresponding to each level of exploration should be modified and marked on geological plan and accordingly the geological sections should be drawn. The Ultimate pit limit should be demarcated in the Geological plan. Section-wise reserves/ resources estimation should be corrected and categorized based on correct depiction of zone of exploration and mineralised zone on geological plan and sections. Reserves/resources estimated should be furnished section wise, bench wise along with grade.

k) The exploration is not sufficient enough to establish reserve/resource required to cater the proposed production from 2017-18 to 2020-21 so the proposed production needs to be reduced and accordingly the method of mining should be modified.
l) In the future programme for exploration the total mineralised area within the mine should be established first then the exploration in form of core boreholes should be proposed in the potentially mineralized zone in proposed period of mining as per parameters of MEMC, 2015.Accordingly, proposals should be shown on Geological Plan. The year wise proposed BHs should be shown in different colours in the geological plan.
m) In DBH-48 the chem. analysis of 20^{th}, 21^{st}, 22^{nd} metre is of Fe content +45% but shown as Yellowish Shale & Fe. Shale. In DBH-52 the chem. analysis of 25^{th} metre is of Fe%-27.45 but shown as Fe. Shale with iron ore. The above discrepancies should be attended and necessary correction should be made after due check.
n) From the DTH bore hole logs, it is difficult to differentiate between brownish shale; Ferrugineous shale & Ferrugineous quartzite from only Fe%, as at no of places the Fe% are in the same range. In the DTH bore hole lithological logs it is observed that only one parameter i.e Fe has been analysed whereas parameters like SiO_2, Al_2O_3, P and LOI have not been analysed.
o) It is observed that chemical analysis from M/s Natural Resources Development Co-operative Society Limited, Hyderabad and other laboratories have been enclosed. Certificates from NABL accreditation board should be enclosed. Give detailed calculation to justify that 10% of the total sample has been analyzed by NABL lab.
p) Reserves / resources estimation of iron ore should be done only for ROM material having Fe% of +45%.

In light of the above comments the total mineral resource, reserves need to be assessed along with grade and categorized correctly as per MEMC rules-2015.

6. Mining

a) On the basis of the above comments pertaining to Geology and exploration the method of mining, rate of production per year, year wise production and development proposal, stacking of mineral rejects/sub grade material and waste, Processing of ROM & Mineral Rejects, progressive mine closure plan, conceptual paln and sections, Life of mine should be modified.
b) Ultimate pit limit (UPL) should be demarcated on surface plan. Bench slope and Pit slope should be as per statute.
c) Mention about the status of permission from Govt authority for deep hole drilling and blasting, source of explosives and use of ANFO.
d) In the conceptual plan the mining has been shown beyond the mineralized area and the area of mining for the period 2021-22 to 2025-26 not shown in conceptual plan.
e) In the year wise production & development plan the direction of bench development are not shown.
f) Area proposed for dumping should be proved for presence or absence of mineral and out of the Ultimate Pit Limit (UPL). Hence dump location be corrected accordingly.
g) In chapter 2(c) mention the coordinates of year wise production & development area with mRL in tabular form along with the other provided details.
h) The road lay outs are not correct and not provided for accessing the benches.
i) Quantify the existing dumps as per enclosed table:

Dump No.	Dump type ROM/Finished Product/OB/Mineral Rejects/SGM/Waste	Location	Area (Hect.)	Height (M)	Angle	Existing volume (cu.m)	Quantity (MT)	Grade	Status (Temporary, Active, rehabilitated, dead dump etc)

j) In Conceptual plan, five yearly financial year block-wise mining and ancillary activities including environmental protection measures up to end of lease period should be furnished.
k) In the reclamation and rehabilitation land use pattern, area under tailing pond is shown but not demarcated in surface plan, which should be clarified.
l) In the present land use area put to use for mining and allied activities is on lower side which has to be recalculated as per field condition.
m) In the conceptual plan the 2021-211 to 2025-26 proposed mining area has not been shown.
n) The life of mine should be recalculated based on available reserves estimated wrt ultimate pit limit, average depth of mineralization and considering the ultimate pit slope angle less than 45 degree.
o) Water requirement for environmental protection measures and other ancillary mining activities and its source not furnished.

7. Mine Drainage

a) Maximum and minimum depth of water table should be furnished in mRL.
b) Give the proposal for arresting solid wash off in tabular format.

8. Stacking of mineral rejects /sub grade material and waste disposal

a) As mentioned the +8mm fractions with Fe content -35% to +45%, below threshold value limit should be referred as waste. As it has been mentioned that +8mm fractions are

usable and tradable, permission from the state government for sale of the same from the mine should be taken as per existing statute.

b) As the mineralized zone is found below the quartzite and at places below dolomite. The quantity of OB (quartzite & dolomite) to be removed has not been estimated and quantity to be generated during the plan period has not been furnished .Proposal for disposal of OB should be finished.

c) -8 mm fraction grade is not furnished.

d) The manner of disposal of waste, configuration and sequence of year wise build up of dumps along with proposal for protective measures has not been furnished. Dumping of waste should be proposed in terraced & retreating manner. Calculation for total area requirement to accommodate the quantity of waste generated is not given. The year wise dumping section has not been furnished. The details should be furnished in tabular form

Dump No.	Dump type OB/Mineral Rejects/Sub Grade Mineral/Waste	Location	Area (Hect.)	Height (M)	Terrace height & Angle	Volume (cu.m)	Quantity (MT)	Grade	Status (Temporary, Active, rehabilitated, dead dump etc)

e) Year wise proposal for construction of retaining wall, Garland drain, Siltation pond should be furnished in tabular form.

Sl No	Year	Retaining wall /Garland drain/ Siltation pond	Location	Length(m)	Width(m)	Height(m)

9. Use of Mineral and Mineral Rejects

a) Enclose supply order for all the different types of industries. Give precise physical and chemical specification stipulated by buyers.

10. Processing of ROM & Mineral Rejects

a) Clarification regarding the location of the beneficiation plant should be furnished.

b) Furnish the details of proposed crushing and screening plant such as capacity, feed size and grade, size wise product along with grade. Process flow sheet of the plant should be furnished.

11. Other

The employment potential should be modified as per method of mining.

12. Progressive Mine Closure Plan

a) Area put to use for mining and allied activities should be modified on the basis of comments pertaining to Geology & Exploration and Mining.

b) Area put to use for mining and allied activities should be recalculated as per field condition accordingly financial assurance amount should be suitably modified.

c) Area requirement for mineral beneficiation plant, tailing pond has not been proposed. Justify
d) Area for top soil & OB dump to be proposed separately.
e) Environmental monitoring analysis reports are not enclosed.
f) Environmental monitoring should be proposed and the core, buffer zone locations of air, water, noise level monitoring should be marked on reclamation plan.
g) Environmental protection measures like plantation, retaining wall, garland drain, siltation pond, have not been proposed and should be proposed in tabular form.
h) Rate per Ha considered for calculation of financial assurance is not correct.

13. Plates

a) The grid coordinates are local which should be in UTM (WGS 84 mode). Incorporate the scale of at least 25cm length in all the plans.
b) **Plate-1**(Location cum Key Plan)-The mining lease area shown is of bigger extent compared to the original extent granted.
c) Plate-3(Surface Plan)- The name and signature of the surveyor who has carried out survey work should be there.
d) **Plate**-4 (Geological Plan)-As the deposit is of pocket type and in the absence of further exploration inputs in the form of pits/ core bore holes, the mineralised area should be demarcated as per the earlier approved mining plan and taking in to account the existence of mining pits. The area pertaining to level of exploration should be changed accordingly. The lithology shown in the geological plan should be corrected and the working pit areas should be shown as iron ore zone.

The UPL should be demarcated in the Geological plan. Ultimate Pit limit and UPL depth should be drawn on the basis of lateral extension of mineralized zone, average established depth of mineralised zone and considering pit slope less than 45 degrees. Dip and strike of the litho units should be shown. Location of trial pits considered for recovery % test, bulk density test and location of sample collected for chemical analysis should be shown on plan. The Ferrugineous shale with iron ore should be named as Iron Ore. The Ferrugineous shale with iron ore, Ferrugineous shale, Ferrugineous quartzite, shale, Quartzite should be shown with different legends/colour. Year wise proposed bore holes position should be marked in different colours. Section lines are not clearly visible. The name and signature of the Surveyor and Geologist should be there.

In view of the points mentioned in Geological & Exploration the geological plan, should be prepared again.

e) Plate-5 (Geological Sections)-
The ultimate pit limit and its ultimate pit depth should be shown in the sections. The valley portions are not projected correctly. The projected bore hole nos should be shown as BH No suffixed by (P).The boundary line & BH should be shown with different colour. At no of places the benches have not been projected. The Ferrugineous shale with iron ore having Fe% > 45% should be designate as Iron Ore. The intermediate Ferrugineous Quartzite/Ferrugineous shale zone should be clearly marked on the geological sections and should not be considered for estimation of iron ore reserves/resources. ML boundary legending is not correct. Category wise reserves /resources and blocked reserves/ resources should be shown with UNFC category in the sections. The name and signature of the Surveyor and Geologist should be there.

In view of the points of Geological & Exploration the geological sections, should be prepared again.

f) Year Wise Production and Development plan(7A to 7D) & Plate-6(Sections showing yearly workings)

In view of the points of Geological & Exploration, Mining the all the year wise production and development plan and sections, should be prepared again.

The serial no of the plans from 7A to 7D should be changed to 6A to 6D and the serial no of Plate-6 should be changed to 7.The direction of bench development should be shown in the section. Propose and show the terrace wise dumping, construction of retaining wall and garland drain, siltation pond year wise.

As the ultimate pit limit is not defined, the proposed production should be proposed such that they do not cross the ultimate pit limit. In All the sections the level should be shown in mRL. The year wise dumping section should be furnished.

g) Plate-8 & 8A(Conceptual Plan & Conceptual Sections)

The Ultimate pit limit has not been demarcated in the Conceptual plan. The area of mining proposed has crossed the mineralized zone. Ultimate Pit limit and UPL depth should be drawn on the basis of lateral extension of mineralized zone, average established depth of mineralized zone and considering pit slope less than 45 degrees. The post mining land use pattern proposed at the end of the life of mine is not matching with the plan. It is proposed that the mined out area of 15 Ha will be converted to a pond, which is not shown in the plan. As there is no proposal of stacking minerals, the mineral stock yard should be removed and proposed for stabilization by means of plantation.

The conceptual sections are feature less except mining benches and pits. In the section the RL interval should match the bench height proposed is 6m. In view of the above mentioned points the conceptual plan and section should be prepared again.

h) Plate-9 (Progressive Mine Closure Plan)

The proposed land use should be changed as per the comments in Geology & Exploration and Mining. The land use pattern should be shown in the plan in text form.

i) Plate-11 **(Environmental Plan)-** Predominant wind direction shown is not clear.

j) All the sections and their corresponding plans should be prepared in 1:1000 scale for better clarity.

14. Certificates

All the certificate should be in Mining Lessee's Letter head.

15. Annexures

a) Annexure numbering not done properly.
b) Experience certificates of qualified person to be enclosed.