F.No.J-11015/453/2008-IA.II(M)
Government of India
Ministry of Environment, Forest and Climate Change
(Impact Assessment Division)
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Date 6th November, 2020

To,

M/s Steel Authority of India Ltd.
(Shri Bipin Kumar Giri)
Chief General Manager (Mines)
Gua Ore Mines, Raw Material Division
Post Gua, Pashchimi Singhbhum
Jharkhand-833213

Sub: Amendment in Environmental Clearance under Para 7(ii) of EIA 2006 for change in excavation and dispatch pattern of Durgaiburu Iron ore mining lease 1443.756 ha, beneficiation and pelletisation plant project of M/s Steel Authority of India Limited located at Village Gua and within Ghatkuri Reserve Forest, Tehsil Noamundi, District West Singhbhum, Jharkhand- - reg.

Sir,

This has reference to the proposal No.IA/JH/MIN/139621/2020 is for amendment in EC under para 7(ii) of EIA Notification 2006 for change in excavation and dispatch pattern increasing the excavation and dispatch of iron ore fines from existing fines dump from 3.1 MTPA to 5 MTPA keeping the total production from the mines within the approved EC capacity of 12.5 MTPA. Iron ore mining lease area 1443.756 ha is located at Village Gua and within Ghatkuri Reserve Forest, Tehsil Noamundi, District West Singhbhum is a part of Survey of India toposheet bearing no.73F/8 (F45H8) and is bounded by latitudes 22°11'17.511" N-22°14'17.304" N and longitudes 85°19.58.525" E-85°23' 28.973" E. The entire mining lease area is located within the Ghatkuri Reserve Forest. The project falls under seismic zone-II.

2. As per EIA Notification dated 14th September, 2006 as amended from time to time, the project falls under Category A, project activity 1(a) as the mining lease area is greater than 100 ha.

3. The project proponent submitted that earlier the Environmental Clearance has been granted vide letter no.J-11015/453/2008-IA.II(M) dated 25th March, 2013 for expansion in production to 12.5 MTPA iron ore comprising of 10 MTPA fresh ROM and 2.5 MTPA of fines from the existing fines dump and liquidate the entire fines dump in 13 years, setting up a new 12.5 MTPA iron ore beneficiation plant (for processing of 10 MTPA, 2.5 MTPA

fines from fine dump and setting up a new 4 MTPA pelletisation plant to pelletize slimes generated at the new beneficiation plant. Subsequently MoEF&CC has amended the specific conditions letter No.J-11015/453/2008-IA.II(M) dated 02nd February, 2015 to utilize the entire dump in 9 years instead of 13 - 14 years.

4. The project proponent has applied online proposal No.IA/JH/MIN/139621/ 2020 dated 30.01.2020 under para 7(ii) of EIA Notification 2006.The proposal was placed in EAC meeting held during 26th -27th February, 2020 and 23-25th September, 2020.

5. The project proponent submitted that Durgaiburu Mining lease was first granted on 22.02.1949 for a period of 30 years. 1st renewal of mining lease was also granted for another 30 years period w.e.f 22.02.1979 to 21.02.2009. The Govt. of Jharkhand vide order dated 25.06.2019 extended the lease period from 22.02.2009 to 21.02.2029 under the provisions of Mineral (Mining by Government Company) Rules, 2015 and mining lease deed has been executed on 24.09.2019.

6. The project proponent reported that review of Mining Plan for the period from 2019-20 (01.11.2019 to 31.03.2020) to 2023-24 has been approved by IBM letter No.RAN/WSB/Fe/MP-17/2019-20 dated 20.12.2019. The estimated iron ore reserves and resources in the Durgaiburu mining lease as on 01.11.2019 is 186.41 MT. In addition to the above, there is a huge dump estimated to contain about 33 MT of iron ore fines at Gua Ore Mines, which was accumulated over the years till merger of ISP with SAIL in 2006 due non–availability of facilities to consume iron ore fines in ISP. The fines dump is spread over Durgaiburu and Topailore mining leases. Out of the 33 MT of fines, about 26.4 MT lies within Durgaiburu lease and remaining 6.6 MT lies in Topailore lease.

7. The project proponent submitted that the total lease area of 1443.756 ha, presently the mining and allied activities are confined over 274.691 ha for which Stage – II Forest Clearances have been obtained from MoEF&CC letter No.8- 251/1986–FC (Pt) dated 22.08.2014. Further, Stage-I FC over an additional area of 361.295 ha for was granted by MoEF&CC letter No.8–251/1986-FC dated 04.03.2014 and grant of Stage–II FC is under consideration by MoEF&CC. The entire mining lease area is located in Ghatkuri Reserve Forest and do not fall under the purview of protected area.

8. The project proponent submitted that Ministry of Mines, Govt. of India have noted in their Order No.16/30/2019-M.VI dated 16th September, 2019 that vast stocks of slimes and sub-grade ore are lying at mine pit heads of captive mines of SAIL and are liable to cause environmental hazards. Accordingly, Ministry of Mines, Govt. of India vide letter dated 16.09.2019 have accorded permission for selling of these low grade mineral (tailings and sub-grade ore) in the open market to maximise the availability of iron ore for the purpose of beneficiation and pelletisation and subsequent use for iron & steel making and to protect the environment such that mineral can be exhausted and environmental hazards can be mitigated. The disposal of such stockpiles would enhance the availability of iron ore for the purpose of beneficiation and pelletisation and subsequent use for iron and steel making. Further, Ministry of Mines, Govt. of India has also directed concerned State Governments to allow SAIL to sell fresh iron ore up to 25% of total previous year

production to mitigate the risk of possible shortage of iron ore on account of expiry of mining leases pertaining to merchant mining on 31.03.2020.

9. The project proponent submitted that since, installation of envisaged beneficiation and pelletisation facilities has been delayed. It is not possible to consume these fines at present. It will take about 4 years for installation and commissioning of the envisaged beneficiation and pelletisation plants after grant of Stage–II FC over 361.295 ha. SAIL has planned to accelerate the liquidation of Gua iron ore fines dump by excavating the fines from the fine dump to the tune of 5 MTPA from Durgaiburu mine lease area for selling in open market keeping total production within the approved EC sanctioned capacity of 12.5 MTPA (7.5 MTPA ROM + 5 MTPA fines) till commissioning of the envisaged beneficiation and pellet plants at Gua Ore Mines, which is expected to take about 4 years after receipt of Stage–II Forest Clearance for the earmarked area. Out of the proposed excavation of 5 MTPA fines, about 2.5 MTPA fines will be transported by dumpers / trucks to Gua public siding through SAIL's own internal road over ~3.5 km for dispatch through rail and the remaining 2.5 MTPA will be dispatched by road through SAIL's own road covering a distance of 2.2 KM and subsequently through public road up to Barajamda railway siding for dispatch through rail or directly by road as per buyers' discretion. Fines excavation from Gua fines dump shall be carried out only during non-monsoon seasons. Workings will also be suspended during periods of heavy un-seasonal rains.

10. The project proponent reported that the proposed change in scope of work does not have any significant adverse impacts on environment as revealed by the studies undertaken. Further, proposed additional pollution prevention and control measures under the current proposal will further improve environmental quality and land use of the area and also maintain and improve socio-economic aspects of the region. The project proponent also submitted that in order to assess the likely impacts, if any, on the local road infrastructure & air quality of the area, due to the proposed changes in the scope of work, specific environmental studies viz., Traffic Density Study and Air Quality Impact Prediction Study have been carried out through our environmental consultant M/s.MECON Ltd. and incorporated in the enclosed addendum to EIA/EMP Report. It has been noted that the existing roads have adequate spare capacity to handle the additional traffic load due to iron ore transportation by road. Further, the air quality impact predication also shows the quality of air is within the permissible limits. The proposed utilization of fines from the fines dumps will not only result in effective utilization of these low grade minerals, but also eliminates environmental hazards associated due to storage of fines.

11. Consent to Operate has been obtained from JSPCB, Ranchi vide letter no. JSPCB/HO/RNC/CTO1005380/2016/1066 dated 26.12.2016 which is valid from 01.01.2017 to 31.12.2020.

12. Certified Compliance report of Environmental Clearance has been obtained from the Regional Office, MoEF&CC, Ranchi letter no.103-175/08/EPE/3784 dated 29.01.2020. The project proponent submitted that 200 persons will be deployed for additional fines

handling. 50 kW power shall be required for the fines handling area. 600 m3/day of water from the mine's existing allocation will be required for the fines handling area.

13. The project proponent has reported that subsequent to the judgment of Apex Court dated 02.08.2017 in the matter of Common Cause Vs Union of India and Ors., the Government of Jharkhand vide letter dated 07.09.2017 issued a demand for payment of Rs.612,37,00,454. Against this demand, SAIL had filed a Writ Petition bearing WP(C)No.7016/2017 before Hon'ble High Court of Jharkhand at Ranchi. The matter was heard and Hon'ble High Court vide order dated 21.02.2018 referred the matter to Division bench of the Jharkhand High Court since it involves substantial questions of Law. The matter is sub-judice before Division Bench of the Hon'ble High Court of Jharkhand.

14. The project proponent vide letter dated 29.08.2020 submitted the followings:

Dump stabilization studies:

Gua Ore Mines comprises of four mining leases viz., Durgaiburu Iron Ore mine lease (covering 1443.756 ha) – the main iron ore mining lease, Topailore Iron Ore mine lease (covering 14.15 ha), Jhillingburu I Iron Ore and Manganese Ore mine lease (covering 210.526 ha) and Jhillingburu II Iron Ore and Manganese Ore mine lease (covering 30.43 ha). Presently active mining is being carried out only in Durgaiburu mine lease.

There is a huge iron ore fines dump estimated to contain about 33 MT of iron ore fines at Gua Ore Mines, which was accumulated over the years till merger of IISCO Steel Plant (ISP) with SAIL in 2006 due non–availability of technology to consume iron ore fines in ISP and thus was stocked at the mines. The fines dump is spread over Durgaiburu and Topailore leases. Out of the 33 MT of fines, about 26.4 MT lies within Durgaiburu lease and remaining 6.6 MT lies in Topailore lease. The fine deposit is not a result of a conventional geological formation; rather it is a result of deposition of iron ore fines of -10mm size produced in the Durgaiburu mine lease. The iron ore fines are carried to the Topailore leasehold by process of natural sliding aided by precipitation.

Since merger of ISP with SAIL in 2006, the iron ore fines form Gua is being regularly dispatched to the SAIL plants. Hence, there is no further dumping of fines in the fines dump since 2006 and the fines dump has been naturally stabilized over the last 15 years. Further, in order to control surface run-off from the fines dump, as suggested by the IIT Kharagpur and in consultation with Jharkhand State Pollution Control Board & State Forest Officials, series of check dams (5 nos.) have been constructed. Entire run off from the fines dump area is collected in the dams and being discharged after proper settlement of fines in the dams. As suggested by IIT KGP, further, sediment taps have been provided downstream of Dam – 5 for control solids carry over from the fines dump. The check dams and sediment traps provided to control surface runoff from the fines dump are shown. All these measures have significantly controlled surfaced runoff from the fines dump.

In order to assess stability of the fines dump and provide plan for safe excavation of fines from the fines dump including suggesting measures for further stability, a technical job titled

"Slope Stability Study and Safe Working along with associated jobs for Reclamation and Future Stability of Fines Dump at Gua Ore Mines" has been assigned to IIT Kharagpur. Team of experts from Mining Dept. of IIT KGP have visited the Gua Ore Mines and inspected the fines dump to assess the stability of the dump.

The work related to the slope stability of 33 million tonnes of Iron ore dump fines at Gua Ore Mines including measures for future safety of dump stability has been completed by the IIT KGP and report has been submitted. Copy of the Slope Stability Study Report by IIT KGP is submitted. Brief details of the studies conducted by the IIT KGP to assess the slope stability of the Fines Dump and recommendations for safe excavation of the fines from the dump as suggested by the IIT KGP are described below.

IIT KGP has conducted geotechnical study of the present dump slopes as well as a detailed numerical modeling of the proposed pit layout at different stages of mining of the dump. The geotechnical study for fines dump comprises (a) laboratory test work for determining dump material properties, and (b) slope stability study of existing fines dump as well as proposed pit layout.

Geotechnical properties of fines dump samples:

For the purpose of geotechnical analysis based on material properties, samples were collected by the IIT KGP experts from two locations viz., fines dump top and fines dump bottom. Unit weight and shear strength of material are considered as primary inputs for the slope stability analysis. The shear characteristics were determined using direct shear testing apparatus. Apart from that, in-situ moisture content, specific gravity of grains, unit weight and particle size distributions were also determined in the IIT KGP Laboratory.

Table – 01: Geotechnical Properties of iron ore fines in Fines Dump

S.No.	Soil Property	Unit	Gua Fines Dump	
			Top Fines	Bottom Fines
1	Moisture Content	%	6.83	6.64
2	Specific Gravity	-	4.04	3.98
3	Particle Size Analysis (d_{50})	microns	625	1000
4	Max. Dry unit weight of compaction	gram /CC	2.70	2.67
5	Optimum Moisture Content at max. dry unit weight.	%	11.0	14.1
6	Cohesion	kPa	135.38	68.18
7	Angle of internal friction	Degrees	16.47	32.78

Stability analysis of dump slope:

Numerical Analysis of Slope: The Simplified Bishop's Method is an extension of the Method of Slices and is generally used for calculating Factor of Safety (FoS) of slopes. It is reasonable to assume that forces on the sides of each slice are horizontal and no shear

force exists at the vertical sides of the slice. The problem becomes suitable for equilibrium studies. The Safety Factor (SF) is obtained by iterative method. An initial value of SF is assumed and then Newton-Raphson or other iterative techniques are applied to estimate the final SF until difference between SFs for two consecutive iteration is minimal.

Description of Existing Dump Slope: The plan view of the existing Fines dump has been shown. Seven typical sections 30 degrees apart on both sides of a hypothetical center line of the existing dump slope, namely; S1, S-2, S-3, S-4, S-5, S-6 and S-7 are considered for numerical analysis to evaluate the present factor of safety of the dump slope.
The geometrical profiles of the slopes along all the seven selected sections of the fines dump are considered for numerical analysis to evaluate the present factor of safety of the dump slope.

Description of Proposed Dump Slope with Mining Pits: Among all the seven sections, Section S-3 along the hypothetical centre line of the dump is considered for study. S-3 is chosen because it can show all the benches in the bottom pit. The mining pits will look similar, but not same, as in this section, as in Fig. 05. Here, four slopes namely Slope 1, Slope 2, Slope3 and Slope 4 are considered for initial phase of working. Slope 1 will commence from hill side having 10 benches (height 4m, width 12m and bench angle 38°) with a berm in the middle having a width of 25m. Similarly, Slope 2 hs been designed for 5 benches which will start from 40m behind the edge of the main existing slope. Again on the bottom side of the dump, leaving 40 m from the toe of the main slope, Slope 3 will start. Slope 4 has been proposed from the side of the retaining dam. Both Slope 3 and Slope 4 will have 2 benches with the same dimensions as mentioned above. A sample configuration of benches in top pit. The same configuration will be followed all along the configuration of the dump.

Numerical Modeling and Dump Properties: Stability analysis of slope is based on limit equilibrium method. Bishop's simplified limit equilibrium method is selected to determine the safety factor of the existing and proposed slopes with and without load for the aforementioned sections. Stability of all the slopes has been analyzed for dry conditions. The summarized factor of safety calculated for various sections are as follows:

Summarized of Factor of Safety (FoS) for existing slopes:

S.No.	Section Name	Factor of safety (without load)	Factor of safety (with load)
1	S-1	1.26	
2	S-2	1.40	
3	S-3	1.40	1.40
4	S-4	1.24	1.24
5	S-5	1.24	
6	S-6	1.71	
7	S-7	2.59	

The above results show that for sections S-4 and S-5, factor of safety was only 1.24 and that of S7 was 2.59. Another major area of interest is S-3 and S-4 that didn't show any change in factor of safety with 100t. Of course, the FoS (1.4 & 1.24) are not acceptable for engineering design. A minimum FoS of 1.50 at all times of operation is always desirable. Hence, IIT Kharagpur team opined that the dumps cannot be worked with one large pit.

Stability Analysis of the Proposed Slopes with Benches:

Stability analysis of the proposed layout comprising of all the slopes for S-3 section has been carried out. The geotechnical properties of the dump materials as determined through laboratory test were used for stability analysis. The modelling strategy in general is to use properties of the dry sample. The proposed slope profiles in dry condition for S3 section without any load and the proposed slope profiles in dry condition for S-3 section with 500t load are shown in the report.

The summarized of factor of safety (FoS) for proposed slopes of section S-3 are as follows:

Summarized Factor of Safety (FoS) for proposed slopes of Section S-3

S.No.	Slope Name	FoS without load	FoS with Load
1	Slope-1	3.00	2.75
2	Slope-2	3.74	2.46
3	Slope-3	5.25	2.19
4	Slope-4	5.25	2.17

It is clearly evident from the above results that for the benches in the proposed layout, Factors of Safety ranged from 3.00 to 5.25 without additional load. It was also observed that the Factors of Safety ranged from 2.17 to 2.75 with a very high load of 500t incorporated for testing the reliability of the slopes.

Final Recommendations: On the basis of the dump stability studies, the following recommendations have been made by IIT, Kharagpur

Recommendations for Safe Excavation of fines from the Fines Dump

1. The designated top fines dump and the bottom fines dump cannot be worked out as a single mine pit because of the low factor of safety as found in most of the sections. The combined F.O.S. was below 1.5 and hence cannot be allowed to mine as a single pit.
2. It is advised to work out two pits, one at the top and another at the bottom, with a minimum horizontal distance 200 m between the internal boundaries of the working.
3. As a matter of precaution, dam side mining should start only after reducing the effective height of the Hill-side Pit (Slope-1&2) by at least 15 m (or four benches). This will ensure further safety of the mining operations on the Dam-side pit. Reducing the height of the middle ridge left in the first phase completion of the top section mining is necessary for further reducing the load on the bottom pit, to improve FOS. Later on,

dozers towards the slope side, rolling the material to the bottom on the 40 m barrier, will safely remove ore from the top pit, of an aThe project proponent roximate height of 20 m and the same can be collected from the bottom - thereby ensuring safe removal of the ores from the leftover part. A technical study may again be required at this point to assess the situation. Now on the nearly leveled ground, similar pit benches will be established and top section mining will continue as in earlier pit. The process will be repeated until the low grade ore can safely be mined.

4. Though the pits will not be worked during the rainy season due to low overall factor of safety, occasional heavy rains in non-rainy seasons may trigger slope failure. An inspection based slope failure damage assessment and control will be in place, the details of which are given below.
5. Run-off Management: The workings, benches, roads and sumps should be so managed that run-off water is allowed as much less as possible to enter and flow on the slopes of the dump. Water from outside the top mine pit must not enter the mine area as far as practicably possible. The top dump pit water should be channeled to the outer side of the mine through sump. The water running from the long dump slope should not be allowed into the bottom pit. A properly maintained garland drain at the toe side of the dump should be constructed to course the flowing water away from the mine and without interruption in to the nearby stream. During rainy season when there will be no mining, some flood control provisions and water level monitoring should be planned to avoid flooding downstream. The water in the bottom pit will be managed by a sump connected to a suitable drainage.
6. It must be emphasized that the IIT Kharagpur team did not have any idea of the dumped material at different depths. As can be seen, the hematite material has been completely oxidized, liquefied-solidified, compacted on the surface into a nearly impermeable structure but the team did not have any idea as to how far in depth this compaction phenomena has reached. At a depth, the material can still be loose. With this idea, the calculation has been based on semi-compacted material, liable to lose strength due to inherent moisture and added moisture due to any rain event.
7. The top dumps slope will be started first and with time, the project proponent used to ease the normal load as well as horizontal load of the complete dump, ensuring better overall Factor of Safety.
8. Once the two pits are complete as per the proposal, the experience of the working can be used to plan for the excavation of the remainder of the dumps after a technical study.

Recommendations for Dump slopes Condition Assessment and Prevention of Failure and Hazards

1. Mine manager in consultation with the Safety Officer and other mine officials shall appoint a team of qualified persons including Assistant Managers and above, having at least 2nd class Mine Managers Certificate of competency, and with one or two qualified Civil / Mechanical Engineers / Foreman (certificate holder) to periodically review the conditions of the mine slopes: ultimate and operating unbroken mine and

overburden slopes and benches, broken stockpile slopes –as within the scope of the study.

2. The Slope stability team must work in close liaison with the Safety Committee.
3. The period of review on dry months of October to May , should be once in 2 weeks whereby every slope will be assessed for safety inspection and assessment that will be properly recorded and signed, and shall remain with the office of the Manager. The Manager will be reported of the details every time in writing of whether the slope conditions have changed off late or changing rapidly.
4. The period of review for predominantly rainy and wet months of June to September the inspection shall be nominally carried out once every week. The Manager will be reported of the details every time in writing of whether the slope conditions have changed off late or changing rapidly. The period between successive inspections by the team shall increase with heavy rain predictions at any time.
5. The features of impending slope failure indications are:
   - High water seepage from wide areas on the slope areas and from the toe,
   - Continuous rolling down of rock blocks from the top.
   - Excessive and increasing slurry flow from one place or from several places in the toe and face of the slope.
   - Increasing number of rill and gullies in short period of time of few hours and days,
   - Visible swelling of and separation from the layers, and
   - Visible surface cracks developed and extending in short period of times from one part to another.
6. The mine management must make a checklist of indications of slope failure or collapse that need to be looked into in situations where the slope un-stability can be out of control.
7. The history of slope failures point that most of the failures take place in the period of incessant rains or immediately after such rain episodes. Events of short period heavy rain falls and events of medium to heavy period rainfalls are to be particularly taken care of. The office of Area Safety Officer shall heed to such forecasts, now reliably available on the net and media, and direct and participate with the team to make at least one inspection every 24 hours or less, as found necessary. In such event, all operational places should be immediately cleared of workmen, property and asset. The team should document and report any such instances to the manager of the mine and if they are unanimous in voicing dangers of slope failure, the Manager should take immediate action to save the workmen and property and restrict work till all clearance reports are tabled.
8. Any alarm or alert raised by the team and the guidance by the team headed by the Safety Officer must be reported in writing to the Manager to take actions, as may be found necessary, related to the project proponent age, and evacuation of people, equipment and other assets. In no occasions, the manager should either take or

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encourage unsafe acts or daredevilry to maintain production at the cost of workmen and property.

9. A Trigger Action Response Plan (TARP) followed by disaster management response plan have to be established to respond to any major eventuality.
10. The team should also listen to the mine workers on the sites, and should engage discussions to look for features that can be considered dangerous and that need the project proponent appropriate actions.
11. All such actions must have to be reported at the project proponent appropriately to DGMS as per the law prescribed.

Transport scenario:

In the present proposal, it has been proposed that 2.5 MTPA fines will be excavated from the top of the fines dumps and dispatched for selling in open market. Another 2.5 MTPA of the excavated fines will be excavated from the bottom of the fines dumps and transported through SAIL's own roads to the nearby Gua Public Siding for final dispatch by rail.

The following roads will be used for transport of excavated fines from the Fines Dump:

- SAIL's own internal road from bottom of fines dump to Gua Public Siding
- SAIL's own internal road from top of fines dump to Intermediate Storage area.
- SAIL's own Road from intermediate storage area to Gua-Barajamda road at Gua-Kalimandir
- Public Road from Gua-Kalimandir to Barajamda railway siding on the Gua-Barajamda Road

The proposed ore transport routes from the fines dump to Gua Public Siding as well as route to Barajamda is submitted.

It has been planned to transport the excavated fines from the dump for about 200 days in a year and 24 hours per day for transportation to Gua Public Siding using internal roads and 12 hrs day for transportation through public road. The expected traffic scenario over the proposed ore transport roads for transport of the excavated fines under the present proposal are given in the following tables.

Expected Traffic over Internal Road leading to Gua Public Siding

Transportation of fines from bottom of Fines Dump to Gua Public Siding	:	2.5 million tonnes per annum
No. of working days per annum	:	200 days
No. of working hours per day	:	24 hrs
Length of transport road from Dumps to Gua Public Railway Siding	:	about 3 km
Quantity of fines transportation per day	:	About 12500 TPD
Capacity of trucks to be deployed for transportation of excavated dump fines	:	35 t

No. of truck trips per day	:	~ 360 per day (one way) ~720 per day (both ways)
Hourly traffic per hour	:	~ 30 per hour (both ways)

Expected Traffic Over Internal Road leading to intermediate storage area

Transportation of fines from top of Fines Dump to intermediate Storage Area	:	2.5 million tonnes per annum
No. of working days per annum	:	200 days
No. of working hours per day	:	24 hrs
Length of transport road from Dump to Intermediate Storage Area	:	about 3.6 km
Quantity of fines transportation per day	:	About 12500 TPD
Capacity of trucks to be deployed for transportation of excavated dump fines	:	35 t
No. of truck trips per day	:	~360 per day (one way) ~720 per day (both ways)
Hourly traffic per hour	:	~30 per hour (both ways)

Expected Traffic over Public Road leading Barajamda

Transportation of fines from Intermediate storage area uptoBarajamda Rly Siding or beyond	:	2.5 million tonnes per annum
No. of working days per annum	:	200 days
No. of working hours per day	:	12 hrs
Length of transport road from Intermediate Storage Area to Barajamda Public Railway Siding	:	about 16.3 km
Quantity of fines transportation per day	:	About 12500 TPD
Type of Road	:	Two lane block toThe project proponent ed
Capacity of trucks to be deployed for transportation of excavated dump fines	:	18 t
No. of truck trips per day	:	694 per day (one way) 1389 per day (both ways)
Hourly traffic per hour	:	~116 per hour (both ways)

Traffic density and road carrying capacity

2.5 MTPA of iron ore fines will be transported to Gua Public Siding through 3.5 km stretch of roads entirely within Gua Surface Rights area. Therefore, no impact is anticipated on public

transport due to fines transport to the Gua Public Siding.

The anticipated impact on public transport infrastructure is because of the proposed dispatch of 2.5 MTPA fines from intermediate storage area to Barajamda. The fines will be dispatched in 18 t capacity tipper trucks upto Barajamda and thereafter by rail or directly road beyond Barajamda as per the suitability of the successful bidders / buyer.

Traffic Density was studied on the proposed public road at one location on Gua- Barajamda public road, the nearest major public transportation road at junction of Gua – Barajamda Road, about 200 m from Gua-Kalimandir at 22°12'14.6" N, 85°22'50.2" E.

As per IRC:64 "Guidelines for Capacity of Roads in Rural Areas", the recommended design service volume for two lane roads on plain terrain with low curvature (<51°/km) is 15000 Passenger Car Units (PCUs) per day and the reduction factor for 3.5 m wide lane and shoulder width of 1.2 m is 0.92. The Gua-Barajamda Public Road can be classified under this category. Accordingly, the recommended design service volume comes down to 13800 PCUs/day.

Since it is proposed that transportation of iron ore fines will be carried out only during 0600 hrs to 1800 hrs., capacity of 6900 PCUs may be considered.

The present traffic on the road as measured over 0600 – 1800 hrs varied from 810 to 2580 PCUs. Transport 2.5 MTPA of fines by trucks to Barajamda is expected to increase the traffic by 1389 trucks per day i.e. 4167 PCUs (say 4170 PCUs) per day. Therefore, the possible maximum traffic on the road will be ~6750 PCUs during day-time, which is within the threshold limit.

Excavation plan

Environmental Clearance for Integrated Durgaiburu Iron Ore mining project of SAIL for production of 12.5 MTPA iron ore, utilization of 3.1 MTPA of fines from existing fine dump in the beneficiation plant, installation of new beneficiation plant of 12.5 MTPA capacity and installation of new pellet plant of 4 MTPA capacity was granted by MoEF letter no.J-11015/453/2008-IA.II(M) dated 25th March, 2013 and subsequent EC amendment dated 2nd February, 2015.

Durgaiburu Iron Ore Mine is a fully mechanized opencast mine and falls under Category-A (Fully Mechanized category) as per the IBM guidelines. Mining is being done by conventional opencast mining method with shovel dumper combination with drilling & blasting as per the calendar plan of excavation as aThe project proponent roved in the Review of Mining Plan.

In compliance to directions of Ministry of Mines, GoI for effective use of these low grade mineral, SAIL, Gua Ore Mines has planned for excavation of fines from Fines Dump maximum up to 5.0 MTPA and dispatch through rail / road or road & rail combination for selling in open market keeping total production within the approved EC limit of 12.5 MTPA. The excavation of fines from the Fines Dump will be carried out with a back hoe - dumper combination. Loading will be done by hydraulic shovel (back hoe type) with a capacity of 1.2-2.3 m^3 and hauling will be done by 35 t dumpers to the stockyards areas for quantity and quality assessment for selling in open market.

The planned and IBM approved excavation plan during 2020- 21 to 2023-24 from Durgaiburu

Mining Lease is given in the following table.

Approved IBM Excavation Plan of Durgaiburu Mining Lease of Gua Ore Mines (Unit : MTPA)

Year	ROM Excavation			Excavation of fines form Fine Dump	Total
	Saleable Ore (+57% Fe)	Mineral Rejects Fe : 45 – 57%	Total		
2020 - 21	5.74	0.29	6.03	5.0	11.03
2021 - 22	6.49	0.37	6.86	5.0	11.86
2022 - 23	6.97	0.49	7.46	5.0	12.46
2023 - 24	7.17	0.44	7.61	5.0	12.61

Impact on pollution load (increase/decrease) due to proposed excavation and dispatch plan needs to be submitted

Impact prediction has been carried out for the following two scenarios

1. As per EC i.e., Mining of 9.4 MTPA of ore from pit area and excavation of 3.1 MTPA of fines from the fines dump and transport via conveyor/rail.

2. After present proposal i.e., Mining of 7.5 MTPA of ore from pit area and excavation of 5.0 MTPA of fines from the fines dump and transport via road/rail.

After the proposed changes, in addition to mining of 7.5 MTPA of ore (existing 9.4 MTPA), fines from dumps shall be excavated and material will be transported by road/railways at the rate of 5.0 MTPA (existing 3.1 MTPA). Total iron ore production shall remain 12.5 MTPA as per EC. The estimated PM10 pollution load from all the activities Durgaiburu Mining operations before and after the proposed changes are as follows.

Project proponent submitted that, keeping in view of environmental hazards associated with the huge fines dump, while granting the environmental clearance for Durgaiburu Iron Ore Mining project, MoEF&CC stipulated a specific condition {No.A(iii)} related faster utilization of entire fines to eliminate the associated environmental impacts and stipulated a condition to utilize entire fines from fines dump in 9 years instead of 13 – 14 years after beneficiation and pellet plants are commissioned. The present proposal further will further reduce time for liquidation to the tune of 5 - 6 years subject market conditions and totally eliminate the hazards associated with the fines dump.

After entire liquidation of the fines in the Fines Dump, mining of 10 MTPA of ROM shall be resumed as per the original EC. Also, as there will be no further excavation of fines after liquidation of existing dump, the net pollution load from all the mining activities in future shall reduce to 21.06 gm/sec of PM_{10}.

15. The proposal was placed in the 21st EAC meeting held during 23rd to 25th Sept., 2020.The Committee is of the view that site visit could not be conducted due to COVID-19 pandemic and it may further take some time to become the situation to normal. In the meanwhile, it is suggested that proposal may be considered based on the information

and dump slope stability study conducted by IIT Kharagpur, so far submitted by the project proponent. Study findings of the IIT Kharagpur in respect of safe excavation of fines from fines dump based on factor of safety, Dump Slope Condition assessment, runoff management etc. were deliberated in detail.

16. Based on the discussion held and document submitted, the Committee during 23-25 September, 2020 recommended the proposal for amendment in Environmental Clearance (EC) under para 7(ii) of EIA Notification, 2006 for excavation of iron ore fines from the fines dump at the rate of 3.1 MTPA as permitted in Environmental Clearance vide letter No. J-11015/453/2008-IA.II (M) dated 25.03.2013 and subsequent amendment dated 02.02.2015 for selling in open market keeping total production within the approved EC limit of 12.5 MTPA and to transport the mineral by SAIL's internal road to Gua public siding and through SAIL's internal road & public road up to Barajamda Railway Siding by the buyers, all other conditions mentioned in Environmental Clearance vide letter No. J-11015/453/2008-IA.II (M) dated 25.03.2013 and subsequent amendment dated 02.02.2015 shall be applicable subject to the additional specific conditions.

17. The Ministry of Environment, forest and Climate Change has examined the proposal in accordance with the Environmental Impact Assessment Notification, 2006 and further amendments there to; and after accepting the recommendation of EAC meeting held during 23-25 September, 2020, hereby decided to accord the amendment in Environmental Clearance (EC) under para 7(ii) of EIA Notification, 2006 for excavation of iron ore fines from the fines dump at the rate of 3.1 MTPA as permitted in Environmental Clearance vide letter No. J-11015/453/2008-IA.II (M) dated 25.03.2013 and subsequent amendment dated 02.02.2015 for selling in open market keeping total production within the approved EC limit of 12.5 MTPA and to transport the mineral by SAIL's internal road to Gua public siding and through SAIL's internal road & public road up to Barajamda Railway Siding by the buyers, all other conditions mentioned in Environmental Clearance vide letter No. J-11015/453/2008-IA.II (M) dated 25.03.2013 and subsequent amendment dated 02.02.2015 shall be applicable subject to the following additional specific conditions:

I. Fines from the fines dump shall not be excavated during the monsoon period as well as heavy rain days.

II. Recommendations of IIT, Kharagpur for safe excavation of fines from the fines dump, slope condition assessment, run-off management, etc., shall be implemented and same to be intimated to Regional Office, MoEF&CC along with six monthly EC compliance reports. The project proponent shall also obtain other statutory permissions required for dump mining and adhered to.

III. Mitigative measures proposed for excavation and transportation of mineral shall be complied with including moist and covered.

IV. The project proponent shall monitor the dust levels along the transportation route to Barajamda and shall deploy adequate mobile road water sprinklers to control dust emissions along the ore transport routes.

18. Further, as per Ministry's O.M No 22-34/2018-IA.III dated 16.01.2020 to comply with the direction made by Hon'ble Supreme Court on 8.01.2020 in W.P. (Civil) No 114/2014 in the matter Common Cause vs Union of India, *the mining lease holder shall after ceasing mining operations, undertake re-grassing the mining area and any other area which may have been disturbed due to other mining activities and restore the land to a condition which is fit for growth of fodder, flora, fauna etc.*

19. Any appeal against this Environmental Clearance under EIA notification 2006 for expansion shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

20. This issues with the approval of Competent Authority.

Yours faithfully,

(Pankaj Verma)
Scientist E

Copy to:

1. The Secretary, Ministry of Mines, Government of India, Shastri Bhawan, New Delhi.
2. The Secretary, Department of Environment, Government of Jharkhand, Jharkhand Secretariat, Jharkhand, Ranchi.
3. The Secretary, Department of Environment, Government of Jharkhand, Secretariat, Ranchi.
4. The Secretary, Department of Forest, Government of Jharkhand, Secretariat, Ranchi.
5. The Chief Wildlife Warden of the State Govt. of Jharkhand, Ranchi.
6. The Additional Principal Chief Conservator of Forests, Regional Office (ECZ), Bunglow no. A-2, Shyamali Colony, Ranchi, Jharkhand- 834002.
7. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi-110032.
8. The Chairman, Jharkhand State Pollution Control Board, Ranchi, Jharkhand.
9. The Member Secretary, Central Ground Water Authority, A-2, W3, Curzon Road Barracks, K.G. Marg, New Delhi-110001.
10. The Controller General, Indian Bureau of Mines, Indira Bhavan, Civil Lines, Nagpur-440 001.
11. The District Collector, Singhbhum (West), Jharkhand.
12. Guard File.
13. MoEF Website.

(Pankaj Verma)
Scientist E