Compliance

to

Environmental Clearance Conditions

of

Sukinda Chromite Mine

M/s. Tata Steel Limited

For the period: April'2016 – Sept'2016

(MoEF Letter Ref No: J-11015/96/2011-IA.II (M), dated 06.09.2013)

Compliance to the Environment Clearance Letter No: J-11015/96/2011-IA.II (M), dated 06.09.2013 in respect of Sukinda Chromite Mine for Mining Lease renewal, increase in production for Chrome Ore (ROM): 2.40 MTPA, Pyroxenite Ore (ROM): 0.50 MTPA, Chrome Concentrate: 0.65 MTPA, Change in mining technology to opencast & underground mining, change in beneficiation technology and increase in project area.

A. Specific Condition:

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I	No mining activities will be allowed in forest area for which the Forest Clearance is not available	No mining is being carried out beyond any forest area other than the forest area over 73.697 ha for which the Forest Clearance/ TWP is available. The mine was granted a single window Forest-cum-Environmental clearance vide letter no. vide letter No. 8-78/96-FC dated 27.01.1998. As the lease renewal was due on 12.01.2013, renewal forest diversion proposal was applied and Stage-I FC along with one year temporary working permission was obtained from MoEF & CC vide letter no. 8-78/1996-FC (pt-I), dated 03.11.2014. Subsequent to endorsement of the MMDR Amendment Act, 2015, the Govt. of Odisha extended the mining lease from 12.01.2013 to 31.03.2020 for which the supplementary lease deed was executed on 24.08.2015 and registered on 26.08.2015. In accordance to the MoEF & CC Circular No. F.No.11-51/2015-FC, dated.01.04.2015, the forest clearance dated 27.01.1998 got extended till 31.03.2020 Further, in accordance to the MoEF & CC Circular dated F.No.8-78/1996-FC, dated.10.03.2015, the forest area as on 25.10.1980 (i.e Sabik Settlement) 404.669 ha. within the mining lease of 406 ha is now termed as forest land. Hence, fresh forest diversion proposal over an area of 330.972 ha (404.669 ha – already diverted area of 73.697 ha) has been applied on 02.11.2015 and has been recommended by Regional Chief Conservator of Forest to PCCF, Odisha. FRA had been completed.
II	The project proponent will seek and obtain approval under the FC Act, 1980 for diversion of the entire forest land located within the mining lease within a period of two years from 01.02.2013 i.e. the date of issue of guidelines by FC vide there letter F. No. 11-362/ 2012-FC, failing which the mining lease area will be reduced to the non-forest area plus the forest area for which the project proponent has been able to obtain the FC at the end of this time period. In the case of reduction in mine lease area, the project proponent will need to get a revised mining plan approved from the competent authority for reduced area and enter into a new mining lease as per reduced lease area. The EC will be construed to be available for the mining lease area as per the revised mining lease deed.	Renewal Forest Diversion Proposal for entire forest land of 73.697 ha within the Mining Lease area has been applied in time. The FDP has been duly recommended by the F&E department, Govt. of Odisha to the Ministry of Environment & Forests, Govt. of India for onward consideration for grant of Forest Clearance. MoEF, Govt. Of India has granted Stage-I Forest Clearance with one year working permission vide its letter no. 8-78/1996-FC (pt-I), dated 03.11.2014. Copy of the letter enclosed as **Annexure-I.** Subsequent to endorsement of the MMDR Amendment Act, 2015, the Govt. of Odisha extended the mining lease from 12.01.2013 to 31.03.2020 for which the supplementary lease deed was executed on 24.08.2015 and registered on 26.08.2015. In accordance to the MoEF & CC Circular No. F.No.11-51/2015-FC, dated.01.04.2015, the forest clearance dated 27.01.1998 got extended till 31.03.2020 Further, in accordance to the MoEF & CC Circular dated F.No.8-78/1996-FC, dated.10.03.2015, the forest area as on 25.10.1980 (i.e Sabik Settlement) 404.669 ha. within the mining lease of 406

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		ha is now termed as forest land. Hence, fresh forest diversion proposal over an area of 330.972 ha (404.669 ha – already diverted area of 73.697 ha) has been applied on 02.11.2015. The same proposal had been recommended by the Regional Chief Conservator of Forest, Angul to PCCF, Govt. of Odisha, Bhubaneswar and FRA also completed.
III	Till all the clearances are obtained for the proposed tailing pond/dam the project would only use existing tailing dam.	The Forest Diversion proposal for 8.370 ha of forest land involved in the proposed area for dry tailing disposal is under active consideration of State Forest Dept. For the non-forest part i.e. 65.315 ha land lease proposal is in the preview of Odisha State Land Settlement and it is now under process. Till the time the above clearances are not obtained, the tailing is being disposed within the existing tailing dam. This proposal is on hold at present in accordance to the verdict passed by Hon'ble Supreme court of India on disposal of WP(Civil) No. 435 of 2012 (Goa Foundation vs Unioin of India). Further, this proposal shall be pursued after further favourable order ascends in due course.
IV	Environmental clearance is subject to obtaining clearance under the Wildlife (Protection) Act, 1972 from the Standing Committee of National Board for Wildlife, as may be applicable to this project.	There is no Wild Life sanctuary, National Park, Biosphere reserves or other Eco sensitive zone located within 10 km from the mining lease boundary. Hence, clearance under the Wildlife (Protection) Act, 1972 from the Standing Committee of National Board for Wildlife is not applicable.
V	The project proponent shall obtain Consent to Establish and Consent to Operate from the State Pollution Control Board, Odisha and effectively implement all the conditions stipulated therein.	The Consent to Establish has been already obtained from Odisha State Pollution Control Board vide letter no. 17750/IND-II-NOC-5664 dated 30.09.2013. Consent to Operate had been renewed up to 31st March' 2020 . The condition stipulated in the Consent to Establish and Consent to Operate is being effectively implemented.
VI	Environmental Clearance is subject to final order of the Hon'ble Supreme Court of India in the matter of Goa Foundation Vs. Union of India in Writ Petition (Civil) No. 460 of 2004, as may be applicable to this project.	As per Ministry of Environment Notification and local forest notification, there are no wildlife sanctuaries, national park/ biosphere reserve or any other sensitive zones located within 10 Km radius from the mining lease boundary.
VII	As part of ambient air quality monitoring during operational phase of the project, the air samples shall also be analysed for their mineralogical composition as may be so prescribed or notified by this Ministry and records maintained.	The ambient air quality is being monitored twice a week at six locations within the Core Zone. Personal dust sampling is also being carried out. The mineralogical composition has been done and result thereof has been enclosed as **Annexure-II**. The analysis report for personal dust sampling taken in month of May'16 is enclosed as **Annexure-III.**
VIII	The ores and minerals shall be covered by tarpaulin or by such other means when transported out of the mine by road. The vehicles shall not be overloaded.	Mineral and ores which is transported out of the mine lease boundary to the various destinations using the outside trucks is being completely covered by tarpaulin and is secured in position by plastic straps. All the vehicles are weighed with help of four Weigh Bridges located within the mining lease boundary to ensure that vehicle is not overloaded. Photograph showing the same is enclosed as **Annexure-IV**.
IX	Effective safeguard measures such as conditioning of ore with water, regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of particulate matter such as around crushing and screening plant, loading and unloading point and transfer points. It should be ensured that the Ambient Air Quality parameters conform to	To limit the fugitive emissions, various control measures like water sprinkling on haul road, transfer points, Ore stack yard, etc is being done. Four graders have been deployed for grading all the haul roads to remove the accumulated muck. Ten water sprinklers (two of 28 KL, four of 25 KL, and four 8 KL) have been deployed in the mine area for dust suppression on haul road and at mineral storage yards. The main haul roads and areas in maintenance, stack yard and chrome ore beneficiation plant have

<table>
<tr><th>Sl</th><th>Condition</th><th>Compliance</th></tr>
<tr><td></td><td>the norms prescribed by the Central Pollution Control Board in this regard.</td><td>been concreted and stationary water sprinkler have also been installed to control dust dust in these permanent haulage roads. Plantation of 5-20 m width has also been raised in between colony and mines to minimize any air borne problems to the inhabitants.

Stationary water sprinklers have been installed in roads within COB Plant and Workshop also. Water spraying is done through pressure water jets at feed hopper, transfer points, discharge chute to prevent dust generation. The process at COB Plant is totally wet and eliminates the chance of any dust generation. The concentrate stacks are now being covered using tarpaulin sheets to prevent finer concrete particle from getting air borne. Successful trials have also been conducted by using Dustex chemical (a lignosulphonate product derived from the wood pulping process and developed specially for road stabilization and dust control) during water sprinkling for effective dust suppression and less consumption of water. It is nontoxic, easy to handle and satisfies all environmental requirements. Photographs showing measures taken to control dust are attached in Annexure-V.
The details of concrete road including provision of fixed water sprinkler are as follows:
Table I: Concrete and Fixed Water Sprinkler Details
<table>
<tr><th>Particulars</th><th>Location</th><th>Length(m)</th><th>Width(m)</th></tr>
<tr><td rowspan="4">Concrete road</td><td>Main Haulage road</td><td>1000</td><td>13</td></tr>
<tr><td>COB Plant</td><td>100</td><td>10</td></tr>
<tr><td>LOP Plant</td><td>200</td><td>06</td></tr>
<tr><td>Workshop</td><td>200</td><td>06</td></tr>
<tr><td rowspan="5">Fixed water sprinkling system</td><td>Main Haulage road</td><td>1000</td><td>-</td></tr>
<tr><td>COB Plant</td><td>100</td><td>-</td></tr>
<tr><td>LOP Plant</td><td>200</td><td>-</td></tr>
<tr><td>Workshop</td><td>100</td><td>-</td></tr>
<tr><td>Mining Road</td><td>1500</td><td>11</td></tr>
</table>
All these majors are being successfully implemented to maintain Ambient Air Quality. The ambient air quality monitoring report is for period of April'16 to Sept'16 is attached in Annexure VI.</td></tr>
<tr><td>X</td><td>The project authority shall implement suitable conservation measures to augment ground water resources in the area in consultation with the Regional Director, Central Ground Water Board.</td><td>Rain water harvesting proposal has already been submitted to the Regional Ground Water Board, Bhubaneswar. The final approval is awaited. However, we now have a fully functional roof top rain water harvesting project operating at the Administrative office which is working successfully. Photograph showing the same is enclosed as Annexure-VII.

Further, feasibility study was conducted through KRG Foundation to explore the possibility of water harvesting in the nearby villages located in the mine periphery. Recommendations thereof shall be implemented in phased manner.</td></tr>
<tr><td>XI</td><td>Regular monitoring of ground water level and quality shall be carried out in and around the mine lease by establishing a network of existing wells and installing new piezometers during the mining operation. The periodic monitoring [(at least four times in a year pre monsoon (April-May), monsoon (August), post-monsoon (November) and winter (January); once in each</td><td>Presently there are 10 nos. of piezometers installed in the periphery of the quarry. We are conducting regular monitoring of ground water of the open wells/ dug wells located around the nearby villages on monthly basis and all the data are being submitted to OSPCB on monthly basis along with the Form-1 of Water Cess Return. The data so collected is sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubaneswar, the Central Ground Water Authority and the</td></tr>
</table>

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	season)] shall be carried out in consultation with the State Ground Water Board/Central Ground Water Authority and the data thus collected may be sent regularly to the Ministry of Environment and Forests and its Regional Office Bhubaneswar, the Central Ground Water Authority and the Regional Director, Central Ground Water Board. If at any stage, it is observed that the groundwater table is getting depleted due to the mining activity; necessary corrective measures shall be carried out.	Regional Director, Central Ground Water Board. The ground water quality and level recorded in nearby villages is enclosed as **Annexure-VIII.**
XII	The maximum height of the overburden dumps from its toe to the top of the dump on sloping ground shall not be more than 110 m. The dump slope shall be suitably terraced by leaving berms of adequate width in between lifts such that the overall slope angle (i.e. angle between the line joining the crest to the toe of the dump and across all such lifts with the horizontal) does not exceed 28 degrees.	The maximum height of the overburden dumps from its toe to the top of the dump on sloping ground is being maintained within 110 m. Dump Stability Study was taken up in 2010-11 with IIT, Kharagpur as per advice of the Regional Office of the MoEF, Bhubaneswar, for assessing long term dump stability requirements. As per the Report of May'2011, dumps up to 110m height are stable. The topography of the present dumping area is undulated and hilly ranging from 140 mRL to 200 mRL. There is another hillock in front of the present dumping area which is an advantage to keep the slope more stable and safe. Benches have been provided and overall slope of these benched dumps are less than 28^{o}. To gain further confidence, another study was conducted in association with CIMFR, Nagpur to assess the in-situ stress of foundation and dump slope and to get a clue of various geotechnical techniques for stabilisation of dump. As per the Final report the dump is found to be stable at a height of 110m. Further, recommendations as per final report shall be implemented. Presently, backfilling of OB-II quarry is continuing in accordance to approved Mining Plan since April' 2014. Photograph showing the same is enclosed as **Annexure-XXI**.
XIII	The individual slopes and berms of each lift or bench of the overburden dump when completed shall be provided with adequate drainage arrangements or shall be suitably stabilized by such other means to prevent erosion due to surface run-offs.	Each level of dump is provided with garland drain and water from upper level flow to next level via concrete patch path (channel) provided for same purpose at areas where feasible. The concrete patch path ensures less soil erosion and flow of water from designated path. Further, coir matting has been done on the dump slopes to prevent wash off during the monsoon. Garland drains with 10 nos. of settling pits for silt collection of 1.5 m-2m width and 1m-1.5m deep have been constructed on the toe of all the OB dumps to collect the surface run-off during rainy season. The collected run-off was being treated in newly installed ETP and then discharged beyond the lease boundary. The garland drains and settling pits are being cleaned before the onset of monsoon for efficient and better management of surface run off in the lease area.
XIV	Adequate precautionary measures shall be taken for strengthening the dump foundation. Particularly while dumping over soft ground, the toe region all along the extremities of such dumps shall be suitably buttressed with hard rocky boulders after excavating the topsoil and	Dump Stability Study was taken up in 2010-11 with IIT, Kharagpur as per advice of the Regional Office of the MoEF, Bhubaneswar, for assessing long term dump stability requirements. As per the Report of May'2011, dumps upto 110m height are stable. The topography of the present dumping area is undulated and hilly ranging from 140 mRL to 200 mRL. There is

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	soft ground. Dumping operations shall commence only after such preparatory work for the dump foundation is completed in order to prevent its failure, which may trigger a slide of the entire dump.	another hillock in front of the present dumping area which is an advantage to keep the slope more stable and safe. Benches have been provided and overall slope of these benched dumps are less than 28°. To gain further confidence, as per the advice of EAC members another study was conducted in association with CIMFR, Nagpur to assess the in-situ stress of foundation and dump slope and to suggest various geotechnical techniques including buttressing etc for stabilisation of dump. As per the Final report of March'2013 the dump is found to be stable. However as a precautionary measure, present dump have been made with bench height of 10-15m with adequate berm width to maintain overall slope angle less than 28 degree. Each level of bench is provided with garland drain and water from each level flow to next level via concrete patch path provided for same purpose. The concrete patch path (channel) ensures less soil erosion and flow of water from designated path. Garland drains with 10 nos. of settling pits for silt collection of 1.5 m-2m width and 1m-1.5m deep have been constructed so that water do not get stagnant at one place which may increase chances of failure. Similarly toe wall along with garland drain is constructed all around dump photograph attached in **Annexure-IX**. Practice like coir mating and Vetiver Plantation along with dump plantation with native species is also followed to stabilise the inactive slopes of dumps. Photograph attached in **Annexure-X**.
XV	All external over burden dumps at the end of the mine life shall be reclaimed and rehabilitated by afforestation. Monitoring and management of rehabilitated areas shall continue until the vegetation becomes self-sustaining. Compliance status shall be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar on six monthly basis.	As per the approved Mining Plan & Progressive Mine Closure Plan, all the external overburden dumps at the end of life shall be reclaimed and rehabilitated through plantation in a phased manner. The compliance report of the same shall also be submitted to the Ministry of Environment & Forests and its Regional Office located at Bhubaneswar. The year wise target of plantation as per Mining Plan/ Scheme of Mining and actual achieved is enclosed as **Annexure-XXII**
XVI	Catch drains and siltation ponds of appropriate size shall be constructed around the mine working, soil, mineral and OB dump(s) to prevent run off of water and flow of sediments directly into the Damsala Nallah and other water bodies. The water so collected should be utilized for watering the mine area, roads, green belt development etc. The drains shall be regularly desilted particularly after monsoon and maintained properly. Garland drains, settling tanks and check dams of appropriate size, gradient and length shall be constructed both around the mine pit and over burden dump(s) to prevent run off of water and flow of sediments directly into the Damsala Nallah and other water bodies and sump capacity should be designed keeping 50% safety margin over and above peak sudden rainfall (based on 20 years data) and maximum discharge in the area adjoining the mine site. Sump capacity should also provide adequate retention period to allow	Garland drains with 10 nos. of settling pits for silt collection of 1.5 m-2m width and 1m-1.5m deep have been constructed on the toe of all the OB dumps to collect the surface run-off during rainy season. The collected run-off is being treated newly installed ETP and then discharged beyond the lease boundary. The garland drains and settling pits are being cleaned before the onset of monsoon for efficient and better management of surface run off in the lease area. Two collection tanks have been provided having capacity of 5332 KL and 6500 KL respectively. The garland drains have also been designed considering the waterfall data of the region. In order to assess the adequacy of the surface runoff management, discussion has been made with NIT, Rourkela to conduct the study. Upon completion of the study the recommendation shall be suitably implemented.

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	proper settling of silt material. Sedimentation pits shall be constructed at the corners of the garland drains and desilted at regular intervals.	
XVII	Retaining wall having adequate dimensions shall be constructed at the toe of the over burden dumps to check run-off and siltation.	Toe wall along with garland drain having cross section of 1.5m *1.5m have been constructed all around dump photograph of same is attached in **Annexure-IX**.
XVIII	Plantation shall be raised in an area of 384.44 ha including a 7.5m wide green belt in the safety zone around the mining lease, backfilled and reclaimed area, around the higher benches of excavated void etc. after the completion of opencast mining activity by planting the native species in consultation with the local DFO/Agriculture Department. The density of the trees should be around 2500 plants per ha.	The plantation programme is being carried out as per the approved Mining Plan & Progressive Mine Closure Plan same as that was envisaged in the EIA report. During 2015-16 total 67,473 no. of saplings were planted over 9 ha (1 ha of area within the Mining lease and 8 ha in the Additional area of 100 ha allotted for overburden dumping). The density of tree more than 2500 trees per ha is being maintained. Further to above, company had taken up plantation programme in the nearby villages through TSRDS (Tata Steel rural Development Society). Further, 15300 nos. of fruit bearing sapling were distributed to the interested villagers nearby. After the completion of opencast mining a 7.5m wide greenbelt in the safety zone around the mining lease, backfilled and reclaimed area shall be maintained.
XIX	Effective safeguard measures such as regular water sprinkling shall be carried out in critical areas prone to air pollution and having high levels of SPM and RPM such as haul road, loading and unloading point and transfer points. It shall be ensured that the Ambient Air Quality parameters conform to the norms prescribed by the Central Pollution Control Board in this regard	To limit the fugitive emissions, various control measures like water sprinkling on haul road, transfer points, Ore stack yard, etc is being done. Four graders have been deployed for grading all the haul roads to remove the accumulated muck. Ten water sprinklers (two of 28 KL, four of 20 KL, one 12 KL, two 10 KL and one 8 KL) have been deployed in the mine area for dust suppression on haul road and at mineral storage yards. The main haul road and areas in maintenance stack yard and chrome ore beneficiation plant has been concreted. Stationary water sprinkler has also been installed in these permanent haulage roads. This year we have installed fixed sprinkler, about a length of 1.5 Km, in mining road. Photograph showing the already installed stationary water sprinkling system is enclosed as **Annexure-V**. Stationary water sprinklers have been installed in roads within COB Plant and Workshop also. Water spraying is done through pressure water jets at feed hopper, transfer points, discharge chute to prevent dust generation. The process at COB Plant is totally wet and eliminates the chance of any dust generation. The concentrate stacks are now being covered using tarpaulin sheets to prevent finer concrete particle being getting air borne. Plantation of 5-20 m width has also been raised in between colony and mines to minimize any air borne problems to the inhabitants. Successful trials have also been conducted by using Dustex chemical (a lignosulphonate product derived from the wood pulping process and developed specially for road stabilization and dust control) during water sprinkling for effective dust suppression and less consumption of water. It is nontoxic, easy to handle and satisfies all environmental requirements. All parameter w.r.t ambient air quality is complying with the prescribed limit **Annexure-VI.**
XX	Mine water discharge and/or any waste water shall be properly treated in an ETP/s for the removal of hexavalent chromium and to meet the prescribed standards before reuse/discharge. The run off from OB dumps and other surface run off shall be analyzed for	The new ETP equipped with state – of the art technology and with automated dozing and online dozing had been commissioned. This is having capacity of 4500 KL/ hour and is more than sufficient enough to treat the total effluents from the mine even during the peak monsoon period. This ETP is equipped with automated dosing system,

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	hexavalent chrome and in case its concentration is found higher than the permissible limit, the waste water should be treated before discharge/reuse.	Clariflocculator, and flash mixture, dry sludge collection system, multi-bed filtration system etc to ensure more effective treatment of surface runoff and mine discharge water before it is let out of the lease boundary. Real time online monitoring system has been installed at outlet side of this new ETP. Real time online monitoring system has been installed at outlet side of this new ETP. It continuously monitor parameter like pH, TSS and Cr+6. Photographs showing the status of installation of new ETP are enclosed as **Annexure-XI.** Water samples are tested on hourly basis at old ETPs and by online monitoring system at new ETP for qualitative analysis using DPC and H_2SO_4 for immediate detection of Cr+6. Water samples are tested at our own laboratory on daily basis to monitor the presence of Cr+6. Further, water samples are drawn and tested by OPCB accredited 3rd party on weekly & monthly basis and records are being maintained. Further, company has also commissioned one Herbal Treatment Plant in the COB Plant since 2007-08 for the online hexa-chrome treatment of the chrome concentrate. Some of its related processes have been patented and Company has also won DSIR National Award for the same. Photographs showing herbal treatment plant are attached as **Annexure-XII.**
XXI	The decanted water from the beneficiation plant shall be re-circulated within the plant and there shall be zero discharge.	Tailings produced from the plant are fed to thickener. Thickener increases the settling rate of particles thus producing clarified water which is re-circulated to the plant. Thickener's discharge is fed to Tailings Dewatering Plant and Tailing pond. Clarified water from the tailing pond & clear water produced from the dewatering plant is re-circulated back to the COB plant ensuring zero discharge from the plant. Company has also installed one Tailing dewatering unit at the COB Plant to recover the water from the tailing and dispose in the form of dry cake for safe and environment friendly disposal. The clean water recovered from the system is reutilised in the plant ensuring zero discharge. Photograph showing the same is enclosed as **Annexure-XIII.**
XXII	Regular monitoring of water quality upstream and downstream of Damsala Nallah shall be carried out and record of monitoring data should be maintained and submitted to Ministry of Environment and Forests, its Regional Office, Bhubneswar, Central Groundwater Authority, Regional Director, Central Ground Water Board, State Pollution Control Board and Central Pollution Control Board.	The water quality upstream and downstream of Damsala Nallah is being carried out once in a month and record of monitoring data is maintained and submitted to State Pollution Control Board on monthly basis. Analysis report for the period April'16 to Sept'16 is enclosed as **Annexure-XIV.** In addition to the above, installation of online monitoring facility for the pH, TSS & Cr+6 parameters at our intake point of Damsala Nala has been completed on 02nd December' 2015 and monitoring data is being transmitted to SPCB, Odisha on real time basis.
XXIII	Appropriate mitigation measures shall be taken to prevent pollution of Damsala Nallah, if any, in consultation with the State Pollution Control Board.	During the compliance period, the mine discharge water and surface run off water was treated in the new ETPs before discharging it out of our lease. Further, the new ETP with higher capacity is in operation having the facilities like, settling pit, flash mixture, clarri-focculator, automatic dosing system, dry sludge collection system, multi sand filters etc as per the Direction of State Pollution Control Board. The water so treated in the above ETPs shall continue to be analysed at regular interval to confirm the CPCB standards before

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		releasing the same to outside. Real time online monitoring system has been installed at outlet side of this new ETP. It continuously monitor parameters like pH, TSS and Cr+6
XXIV	The project proponent shall obtain necessary prior permission of the competent authorities for drawl of requisite quantity of surface water for the project.	We have made necessary application for drawl of Surface water from Damsala nalla for domestic uses vide our letter no. FAMD/ L&L/56-4/2012, dated 28.07.2012. Necessary Water Management Plan has also been submitted. The Proposal is now active consideration of the Water Resources dept. In accordance to our application, Agreement for drawl of 2100cum of surface water from Damsala Nalla has been signed with Executive Engineer, Jaraka Irrigation Division in December'15 for a period of three years.
XXV	Suitable rainwater harvesting measures on long term basis shall be planned and implemented in consultation with Regional Director, Central Ground Water Board.	Rainwater harvesting study was done and submitted to Eastern Regional Office, CGWB, Bhubaneswar and final approval is awaited. As per the report, one roof top rain water harvesting structure has already started at GM office building which is fully functional. Photograph showing the same is enclosed as **Annexure-VII**. Further, feasibility study has been carried out for possible water harvesting in the periphery through KRG Foundation which shall be implemented in future in phased manner.
XXVI	Vehicular emissions shall be kept under control and regularly monitored. Measures shall be taken for maintenance of vehicles used in mining operations and in transportation of mineral from mine face to the beneficiation plant. The vehicles shall not be overloaded.	Vehicular emission is done on six monthly basis through a third party for the HEMMs used for Mining. The K factor for all the vehicle is found to be <0.33. Regular conditioning monitoring of the HEMMs is also being carried out to keep the vehicle in good condition. Transport vehicles are also allowed after they get necessary PUC from RTO office. It is ensured that the vehicles are not being overloaded.
XXVII	Blasting operation shall be carried out only during the daytime. Controlled blasting shall be practiced. The mitigation measures for control of ground vibrations and to arrest fly rocks and boulders should be implemented.	The blasting operation takes place only in day time. The timing of blasting is 1:30 PM to 2:30 PM. Practices like pre-wetting of blast area is used to control dust generation. Controlled blasting method like pre-splitting is being practiced here to reduce back break. Both, SME and NONEL blasting are being practiced to reduce huge inventory in the magazine house and control ground vibration, respectively. Further, Blast Vibration study is conducted through CIMFR, Dhanbad on quarterly basis and recommendation thereof is being strictly followed.
XXVIII	Drills shall either be operated with dust extractors or equipped with water injection system.	In-built wet drilling facility exists in all the drilling machines to reduce dust generation. Most of the drill cabins have been made air conditioned. Apart from this, the drill operators as well as workmen working in the dust prone area of the mining area have also been provided with nose mask. Pre-wetting of blasting area is also a regular practice to control fly rocks and from the dust getting airborne. Both, SME and NONEL blasting are being practiced to control ground vibration and dust generation.
XXIX	Mineral handling plant shall be provided with either adequate number of high efficiency dust extraction system or water injection system. Loading and unloading areas including all the transfer points should also have efficient dust control arrangements. These should be properly maintained and operated.	Roads in COB plant has been concreted and stationary water sprinklers have been installed in roads within COB Plant. Spraying by pressure water jets are done at feed hopper, transfer points, discharge chute to prevent dust generation. The process at COB Plant is totally wet and eliminates the chance of any dust generation.
XXX	Consent to operate shall be obtained from State Pollution Control Board prior to start of enhanced production from the mine.	Consent to operate has been obtained from State Pollution Control Board prior to start of enhanced production from the mine as advised.
XXX	Sewage treatment plant shall be installed for	Domestic effluent of the township is treated at Sewage Treatment

Sl	Condition	Compliance
I	the colony. ETP shall also be provided for workshop and wastewater generated during mining operation.	Plant constructed as per BIS standard and the treated water is being reused for garden development. An oil and grease trap system has been provided in the workshop to remove oil and grease from the workshop effluents. Similar type oil and grease separation pit has also been provided at contractor workshop also. Photograph showing the STP & Oil and Grease trap is enclosed as **Annexure-XV.** The effluents free of oil and grease is again reused for washing of HEMMs and is an effort is being made towards recycling of process water to 100%. Centralized used oil collection system is place in workshop to arrest spillage of oil on shop floor. Similarly, mine water is also being treated in the ETP and is let out beyond the lease area which finds way into a small drain. This let out water is being used by the villagers for agriculture purpose only. From the inference of the recent data for the period April'16 to Sept'16 (**Annexure-XVI**), it is evident that the let out water quality confirms to the quality of effluents discharged to the mainland. The garland drains are now so connected that now surface runoff during the monsoon is being coursed to the New ETP where it is fully treated before discharge out from our leasehold. Garland drains have been provided to collect the surface runoff from the ore stock yards within the lease. Company has installed the new ETP with higher capacity is in operation having the facilities like, settling pit, flash mixture, clarri-focculator, automatic dosing system, dry sludge collection system, multi sand filters etc as per the Direction of State Pollution Control Board. The water so treated in the above ETP shall continue to be analysed at regular interval to confirm the CPCB standards before releasing the same to outside. An Herbal Treatment Plant is also there in COB Plant since 2007-08 for the online hexa-chrome treatment of the chrome concentrate. Photographs showing herbal treatment plant are attached as **Annexure-XII**. After settlement in the tailing pond, the clear water is recycled and used in the beneficiation plant.
XXXII	Digital processing of the entire lease area using remote sensing technique shall be carried out regularly once in three years for monitoring land use pattern and report submitted to Ministry of Environment and Forests and its Regional Office, Bhubaneswar.	Digital processing of the entire lease area using remote sensing technique was carried out for baseline information of land use pattern and was report submitted to Ministry of Environment and Forests and its Regional Office, Bhubaneswar in the Chapter-3 of the EIA report in year 2013. Next map along with the findings shall be submitted to the Ministry in due course of time.
XXXIII	Regular monitoring of ambient air quality including free silica shall be carried out and records maintained.	Regular monitoring of ambient air quality including free silica shall be carried out and records maintained. The ambient air quality report is attached as **Annexure-VI.** The analysis report of free silica for the month of April'16 and Sept'16 is enclosed as **Annexure-III.** Report of mineralogical composition of particulate matter is attached as is **Annexure-II**
XXXIV	Pre-placement medical examination and periodical medical examination of the workers engaged in the project shall be carried out and records maintained. For the purpose, schedule of health examination of the workers should be drawn and followed accordingly.	All the employees do undergo periodical medical examination (PME) in hospital every five years. However as per the recent notification, PME of all the employees shall be carried out once in three years for those employees who have reached 45 years of age or more. As of now, no occupational diseases have been reported till date. 285 nos. persons were covered under PME during year 2015-16. To improve the occupational health and removing the safety hazards at industrial workplace, 3 ACT

Sl	Condition	Compliance
		(Advice, Connect & Transform) teams have been made under Wellness@ Workplace programme. The health surveillance program carried out for both permanent and contractual employees and special attention is given to critical cases of diabetics, Hypertension and obesity cases.
XXXV	The project proponent shall take all precautionary measures during mining operation for conservation and protection of endangered fauna such as elephant etc. spotted in the buffer zone of the mine and contribute towards the cost of implementation of the plan and/or Regional Wildlife Management Plan for conservation of flora and fauna so prepared by the State Forest and Wildlife Department. The amount so contributed shall be included in the project cost. A copy of action plan shall be submitted to the Ministry and its Regional Office, Bhubaneswar within 3 months	We have deposited Rs 81,20,000/- and Rs 24,36,000/- through DD No. DD no. 111682, dated 21.07.2009 and through RTGS mode on 07.03.2014 respectively in the State Specific CAMPA account towards the cost of Wildlife Management Plan @ Rs 26,000/- per ha of ML area for implementation of Regional Wildlife Management Plan. Further, Project specific Wild Life Conservation Plan has already been submitted to DFO, Cuttack vide our letter no. SCM/ ENV/091/13, dated 18.12.2013. Same was recommended by RCCF, Angul vide his letter no. 1197, dated 19.03.2015 and presentation before PCCF (WL), Odisha was made on 10.04.2015 and got approved vide letter no. 4895/1 WL-SSP-92/2015, dated 10.06.2015. All the precautionary measures stipulated by State Forest Department and laid down during the approval of Site Specific Wild Life Conservation Plan shall be adhered to.
XXXVI	A Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment & Forests 5 years in advance of final mine closure for approval.	At present Final Closure of the mine is not envisaged. However, as per Rule 23C of MCDR, 1988, Final Mine Closure Plan shall be submitted to IBM one year prior to such proposal for final closure of the mine and copy of the approved plan shall be provided to the Ministry of Environment & Forests.

B. General Conditions:

I	No change in mining technology and scope of working should be made without prior approval of the Ministry of Environment & Forests.	There is no change in mining technology and scope of working proposed be made beyond the scope of the present EC obtained. Prior approval from the Ministry would be sought in case of change in scope of working in future.
II	The calendar plan including excavation, quantum of chrome ore, beneficiated chrome concentrates, pyroxenite ore and waste shall not be exceeded.	During the year 2016-17 (April'16 to Sept'16) total excavation, quantum of chrome ore, beneficiated chrome ore and waste (OB) has not exceeded the approved quantity granted in approved mining plan. Details are given in table below. There was no production from pyroxenite quarry. Table IV: Excavation Approved Quantity Vs. Actual

Compliance for the year 2016-17123		
Particulars	Plan	Actual
Total Excavation (Lakh cum)	60.39	16.34
Chrome Ore ROM (MT)	1800000	716537
Waste Generation (Lakh cum)	54.42	13.13
Beneficiated chrome concentrate (MT)	528000	184025
Underground Mining		
Total Excavation (Lakh Cum)	0	0
Chrome ore ROM (MT)	0	0
Waste Generation (Lakh Cum)	0	0

* Target as per approved Mining Plan. The underground mining is yet to start

Sl	Condition	Compliance
III	At least four ambient air quality-monitoring stations should be established in the core zone as well as in the buffer zone for RSPM (Particulate matter with size less than 10 micron i.e., PM10) and NOX monitoring. Location of the stations should be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets and frequency of monitoring should be undertaken in consultation with the State Pollution Control Board. The data so recorded should be regularly submitted to the Ministry including its Regional office located at Bhubaneswar and the State Pollution Control Board / Central Pollution Control Board once in six months.	Six air quality monitoring stations (four in the work zone, one in residential area and one in hospital i.e. sensitive area) had been set up within the mine lease area. Monitoring of the air quality is being conducted twice in a week as per CPCB guide lines. Likewise quarterly monitoring is done in 10 buffer zone locations. PM10, PM2.5, SO2,NOx, CO, O3, Pb, NH3, Benzene, benzo(a) Pyrene, Arsenic & Nickel parameters in the air quality were being monitored. We have started ambient air quality monitoring as per recent Gazette Notification 826(E), dated 16.11.2009. The data on ambient air quality of core zone as well as buffer zone for the period April'16 to Sept'16 reveal that all the parameters are within the stipulated standards (**Annexure-VI**).
IV	Measures should be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in operations of HEMM, etc. should be provided with ear plugs / muffs.	Noise monitoring is being done once in a three months both in work zone and in ambient. The data on noise level for the period April'16 to Sept'16 indicate that the values of noise levels are within the prescribed limits. To limit exposure of noise level of 85 dBA, due precautions at source and at the receiver end are being taken adequately. Wherever possible the noise is controlled at the source by replacement of metallic screens by rubber screens & polyurethane panels etc at Chrome Ore Beneficiation and Lumpy Ore Processing plant. DG sets have also been provided with acoustic enclosures to prevent noise propagation. The operator's cabin of all the HEMM's including drills and dozers has been made air conditioned which serves as acoustic barriers. Controlled blasting technique like presplit blasting, use of Nonel and SME (Site Mixed Emulsion) is being followed as per CIMFR, Dhanbad's recommendation minimize noise pollution and fly rock generation. However, the people working in the noisy areas are provided with personal protective appliances to reduce exposure of high noise. Regular test of all the vehicles is being carried out to check whether the vehicles are meeting pollution under control (PUC) norms. The K factor for all the vehicles is <0.33. Noise monitoring for the period April'16 to Sept'16 is attached as **Annexure-XVII.**
V	There will be zero waste water discharge from the plant	Tailings produced from the plant are fed to thickener. Thickener increases the settling rate of particles thus producing clarified water which is re-circulated to the plant. Thickener's discharge is fed to Tailings Dewatering Plant and Tailing pond. Clarified water from the tailing pond & clear water produced from the dewatering plant is re-circulated to the COB plant. Photographs are attached in **Annexure-XIII**.
VI	Personnel working in dusty areas should wear protective respiratory devices and they should also be provided with adequate training and information on safety and health aspects.	Persons working in comparatively dusty and noisy areas have been provided with dust mask and ear muffs approved by the DGMS. Regular training programme is conducted among the employees to bring awareness in respect to safety and health.
VII	Occupational health surveillance program of the workers should be undertaken periodically to observe any contractions due to exposure to dust and take corrective measures, if needed.	All the employees do undergo periodical medical examination (PME) in hospital every five years. However as per the recent notification, PME of all the employees shall be carried out once in three years for those employees who have reached 45 years of age or more. As of now, no occupational diseases have been reported till date. 285 Nos. persons were covered under PME during year 2015-16. To improve the occupational health and removing the safety hazards at industrial workplace, 3 ACT

<table>
<tr><th>Sl</th><th>Condition</th><th>Compliance</th></tr>
<tr><td></td><td></td><td>(Advice, Connect & Transform) teams have been made under Wellness@ Workplace programme.

We have carried out the health surveillance program for both permanent and contractual employees for the period 2000 to 2011, in which 994 permanent and 744 contractual employees have been undergone. The chromium level in the blood samples of all the employees is found to be normal.</td></tr>
<tr><td>VIII</td><td>A separate environmental management cell with suitable qualified personnel should be set-up under the control of a Senior Executive, who will report directly to the Head of the Organization.</td><td>The Environmental Management Cell is being headed by the Head (Mine and Production Planning) and is supported by Senior Manager(Mine Planning & Environment), Manager (Environment), Environmental Supervisor and Chemists. The Head (MPP) is directly reporting to the GM, Operations of the Division. Roles, responsibility and authorities of all members of environmental cell's employees have been defined in integrated management system and proper communication has been made.</td></tr>
<tr><td>IX</td><td>The funds earmarked for environmental protection measures should be kept in separate account and should not be diverted for other purpose. Year wise expenditure should be reported to the Ministry and its Regional Office located at Bhubaneswar.</td><td>Separate budgetary provisions are made for environmental protection measures every year. Funds earmarked for this purpose for the year 2015-16. Plan expenditure vs. actual expenditure done during the year 2015-16 is also given.
<table>
<tr><th>Sl no.</th><th>Item/ Particulars</th><th>Plan 2016-17(Rupees in Lakh)</th><th>Actual till Sept'16 2016-17-(Rupees in Lakh)</th><th></th></tr>
<tr><td>1</td><td>Afforestation</td><td>83</td><td>41.17</td><td></td></tr>
<tr><td>2</td><td>Dust suppression</td><td>90</td><td>42.9</td><td></td></tr>
<tr><td>3</td><td>Treatment of mine</td><td>105</td><td>60.65</td><td></td></tr>
<tr><td>4</td><td>Environment & weather , exhaust monitoring</td><td>50</td><td>23.82</td><td></td></tr>
<tr><td>5</td><td>Horticulture</td><td>40</td><td>19.26</td><td></td></tr>
<tr><td>6</td><td>Drinking water</td><td>68.84</td><td>31.97</td><td></td></tr>
<tr><td>7</td><td>STP Operation &</td><td>8</td><td>3.93</td><td></td></tr>
<tr><td>8</td><td>Sanitation</td><td>50</td><td>23.14</td><td></td></tr>
<tr><td>9</td><td>Malaria eradication</td><td>5.7</td><td>2.65</td><td></td></tr>
<tr><td>10</td><td>Garland drain&</td><td>15</td><td>9.21</td><td></td></tr>
<tr><td>11</td><td>Family planning</td><td>2</td><td>1.24</td><td></td></tr>
<tr><td>12</td><td>Slime dam</td><td>74</td><td>44.45</td><td></td></tr>
<tr><td>13</td><td>Environment</td><td>15</td><td>11.64</td><td></td></tr>
<tr><td>14</td><td>Community</td><td>150</td><td>28.02</td><td></td></tr>
<tr><td>15</td><td>Hazardous waste</td><td>6</td><td>3.32</td><td></td></tr>
<tr><td></td><td>Total</td><td>762.54</td><td>347.37</td><td></td></tr>
</table></td></tr>
<tr><td>X</td><td>The project authorities should inform to the Regional Office located at Bhubaneswar regarding date of financial closures and final approval of the project by the concerned authorities and the date of start of land development work.</td><td>The Financial closure of the mine is not envisaged in near future. Necessary intimation to the Regional Office would be provided before commencement of land development activity.</td></tr>
<tr><td>XI</td><td>The Regional Office of this Ministry located at Bhubaneswar shall monitor compliance of the stipulated conditions. The project authorities should extend full cooperation to the officer (s) of the Regional Office by furnishing the</td><td>The mine management will always extend full cooperation to officer(s) of Regional office by furnishing the requisite data/ information/ monitoring report as and when required.</td></tr>
</table>

Sl	Condition	Compliance
	requisite data/ information/ monitoring reports.	
XII	The project proponent shall submit six monthly reports on the status of compliance of the stipulated environmental clearance conditions including results of monitored data (both in hard copies as well as by e-mail) to the Ministry of Environment and Forests, its Regional Office Bhubaneswar, the respective Zonal Office of Central Pollution Control Board and the State Pollution Control Board. The proponent shall upload the status of compliance of the environmental clearance conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the Ministry of Environment and Forests, Bhubaneswar, the respective Zonal Officer of Central Pollution Control Board and the State Pollution Control Board.	Six monthly reports on the status of compliance report of the stipulated environmental clearance conditions including results of monitored data is submitted to the Ministry of Environment and Forests, its Regional Office Bhubaneswar, the respective Zonal Office of Central Pollution Control Board and the State Pollution Control Board is submitted in both hard copy as well as soft copy Last EC compliance was submitted vide letter no. SCM/ ENV/ 012/ 031/ 16 dated : 30.05.216 . We are also uploading the same in our website on our website www.tatasteelindia.com. The snapshot of the site is attached as **Annexure-XVIII**
XIII	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad / Municipal Corporation, Urban Local Body and the Local NGO, if any, from whom suggestions/representations, if any, where received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	Environment Clearance letters were sent to concerned Panchayat, Zila Parisad / Municipal Corporation, Urban Local Body and is attached in **Annexure XIX.** No suggestion was received. We have also uploaded the same on our website www.tatasteelindia.com. The snapshot of the site is attached as **Annexure-XVIII**.
XIV	The State Pollution Control Board should display a copy of the clearance letter at the Regional office, District Industry Centre and the Collector's office/ Tehsildar's Office for 30 days	Complied by the State Pollution Control Board
XV	The environmental statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Office of the Ministry of Environment and Forests, Bhubaneswar by e-mail.	The Environment Statement in Form-V is being submitted before 30th Sept of every year and the same is also uploaded in the company website as shown in screenshot in **Annexure-XVIII**. Environment Statement for the year 2015-16 was submitted vide letter no. SCM / ENV/ 002 / 047 / 16 to the State Pollution Control Board and to the Regional Office of MoEF by e-mail
XVI	The project authorities should advertise at least in two local newspapers of the District or State in which the project is located and widely circulated, one of which shall be in the vernacular language of the locality concerned, within 7 days of the issue of the clearance letter informing that the project has been accorded environmental clearance and a copy of the clearance letter is available with the State Pollution Control Board and also at web site of the Ministry of Environment and Forests at http://envfor.nic.in and a copy of the same	The grant of Environmental Clearance was advertised in the Oriya daily **"The Samaja"** (date: 11.09.2013, page-5) and in English daily "**The New Indian Express**" (date: 11.09.2013, page-5). Copy of the above advertisement was also forwarded to the Eastern Regional Office of the MoEF vide letter no. SCM/ ENV/ 012/066/13, dated 18.06.2013. Copy of the letter is enclosed as **Annexure-XX.**

Sl	Condition	Compliance
	should be forwarded to the Regional Office of this Ministry located at Bhubaneswar.	

Date: 28th October'2016

Manager
Sukinda Chromite Mine