



HALF YEARLY COMPLIANCE REPORT

for the period
April 2017 to September 2017

Environment Clearance of 185 MW Power Plant

Letter no.: J-13012/78/2011-I-A.II (T) dated 12th February 2015



BHUSHAN ENERGY LIMITED

Ghantigadia, Nuahata, Banarpal, Angul, Odisha



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SL	STIPULATED CONDITIONS	COMPLIANCE STATUS
i	Vision document specifying prospective plan for the site shall be formulated and submitted to the RO of the Ministry within six months.	<ul style="list-style-type: none"> Vision, Mission and Environment Policy statements are enclosed as annexure - I.
ii	Harnessing solar power within the premises of the plant particularly at available roof tops shall be carried out and status of implementation including actual generation of solar power shall be submitted along with half yearly monitoring report.	<ul style="list-style-type: none"> Power is co-generated utilizing waste heat from 10 x 500 TPD sponge iron units through WHRBs. Additionally, coke oven and blast furnace gases are also used for generating green power through gas fire boilers utilizing renewal energy source.
iii	Sulphur and ash contents in the imported coal to be used in the project shall not exceed 0.3% and 6% respectively at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to environment clearance condition wherever necessary.	<ul style="list-style-type: none"> Sulphur and ash contents in the imported coal presently being used is in the range of 0.2 – 0.3 % and 6.0 – 9.0 %, respectively However, a fresh reference shall be made to the Ministry for suitable amendments in environment clearance in case of change in coal quality in future.
iv	A long term study of radioactivity and heavy metals contents in coal to be used shall be carried out through a reputed institute and results thereof analyzed every two years and reported along with monitoring reports. Thereafter mechanism for an in-built continuous monitoring for radioactivity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.	<ul style="list-style-type: none"> Heavy metal contents in coal have been analyzed at IMMT, Bhubaneswar. Radioactivity analysis in coal has been carried out at BARC, Mumbai. A copy of the report is enclosed as annexure - II.
v	A stack of 220 m height shall be provided with continuous online monitoring equipments for SO _x , NO _x , PM ₁₀ and PM _{2.5} . Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack shall also be monitored on	<ul style="list-style-type: none"> Online monitoring system installed in the stack for SO_x, NO_x, PM₁₀ and PM_{2.5}. Online data is transmitted to SPCB, Odisha and CPCB servers through RT-DAS.

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	periodic basis.	<ul style="list-style-type: none"> Summarized data of stack monitoring is enclosed as annexure - III.
vi	High efficiency ESPs shall be installed to ensure that particulate emission does not exceed 50 mg/Nm ³ . Adequate dust extraction system such as cyclones/bag filters and water spraying system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.	<ul style="list-style-type: none"> Two ESPs with 99.9% efficiency are installed and operated to ensure that particulate emission does not exceed 50 mg / Nm³. Details of ESPs are enclosed as annexure – IV. Dust extraction system (6 bag filters) have been provided at ash silos. Effective dry fog system having 102 numbers of nozzles at all the 18 junction houses have been installed in the entire coal route. Summarized data of stack monitoring is enclosed as annexure - III.
vii	Adequate dust extraction system such as cyclones / bag filters and water spraying system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.	<ul style="list-style-type: none"> Dust extraction system (6 bag filters) have been provided at ash silos. Effective dry fog system having 167 numbers of nozzles at all the 26 junction houses have been installed in the entire coal route.
viii	COC of at least 5.0 shall be adopted	<ul style="list-style-type: none"> Agreed
ix	Monitoring of surface water quantity and quality shall also be regularly conducted and records maintained. The monitoring data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of the flow of ground water and records maintained. Monitoring for heavy metals in ground water shall also be undertaken and results/findings submitted along with half yearly monitoring report.	<ul style="list-style-type: none"> Monitoring of surface and ground water is carried out every month and monthly reports are being submitted to SPCB, Odisha. The summarized data of water quality analysis is enclosed as annexure - V.
x	A well designed rainwater harvesting system shall be put in place within six months, which shall comprise of rain water collection from the built up and open area in the plant premises and detailed records kept of the quantity of water harvested every year and its use.	<ul style="list-style-type: none"> To estimate the rain water harvesting potential, a detail study has been completed covering entire plant area and township. The finding of the study is being evaluated and same will be implemented in phase manner.

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xi	No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the setting up / operation of the power plant.	<ul style="list-style-type: none"> No water body or natural drainage system will be disturbed
xii	Hydrogeology of the area shall be reviewed annually from an institute/organization of repute to assess impact of surface water and ground regime (especially around ash dyke). In case any deterioration is observed, specific mitigation measures shall be undertaken and report/data of water quality monitored regularly and maintained shall be submitted to the Regional Office of the Ministry.	<ul style="list-style-type: none"> Hydrology report has been submitted to the Regional Office of the Ministry vide letter no. BSL/MoEF &CC/BS-01/2017-02 dated 17.07.2017.
xiii	Waste water generated from the plant shall be treated before discharge to comply limits prescribed by the SPCB/CPCB.	<ul style="list-style-type: none"> Three settling tanks of capacity 138.64 m³, 128.6 m³ and 127.36 m³ have been provided to allow for settlement of suspended solids before taking the waste water to Effluent Treatment Plant (ETP#1). A Sewage treatment plant of capacity 3000 KLD has been installed for treating domestic sewage. The treated water from STP is used for ash conditioning and irrigation of green areas. The water quality parameters are well within the limit as per the prescribed standard. Summarized data is enclosed as annexure - VI.
xiv	Additional soil for leveling of the proposed site shall be generated within the site (to the extent possible) so that natural drainage system of the area is protected and improved.	<ul style="list-style-type: none"> No additional soil required for leveling the site.
xv	Prior approval of the Ministry shall be obtained for Mine Void and abandoned stone quarry filling of fly ash based on the outcome of the pilot study for which permission was accorded to the existing units by the Ministry on 05.09.2013 subject to Hon'ble NGT's Order.	<ul style="list-style-type: none"> Approval has been obtained from the MoEF&CC for ash filling in Jagannath OCP of MCL vide letter no. Z-11013/43/2011-IA.II (M) dated 19.04.2017. Copy of environment clearance is enclosed as annexure-VII.



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		<ul style="list-style-type: none"> • NEERI, Nagpur has been assigned to study the impact assessment of fly ash filling in Jagannath mine void no. 4 of MCL. • <i>In the final study report NEERI concluded that:</i> • TCLP tests for fly ash and bottom ash reveal that ash is non hazardous substance in nature. • Water extraction test indicate that leaching of trace metal from fly ash and bottom ash is very less (less than 1%). • Water elution test indicate that trace metal leaching decreases with time. • Radio nuclides indicate that activity is below the limits set by the AERB guidelines. • Flow and solute transport model reveal that plumes (for conservative elements) will travel considerably less, about 700 meters in 30 years time. • The movement will be considerably less for trace elements which undergo retardation. • Trace element concentration in various plant species found to be within limits. • Bioassay tests indicate no mortality in test samples. • Backfilling of mine void through fly ash has no adverse impact on environment. • The Radioactive tracer study has been carried out by the Board of Radiation and Isotope Technology, BARC, Mumbai. • Report concludes very low permeability of the soil underground in the mine void region of the quarry and hence no leachate is reaching the groundwater aquifer.
xvi	<p>Fly ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury and other heavy metals (As, Cr, Pb etc) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall</p>	<ul style="list-style-type: none"> • Ash is being collected and disposed off in dry form. • Four silos of 1000 MT capacity each and two intermediate silos of 250 MT capacity each have been installed. • 100 % fly ash utilization is ensured as per fly ash notification of MoEF&CC, Govt. of India.

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	be disposed off in low lying areas.	<ul style="list-style-type: none"> The details of fly ash management are attached as annexure - VIII. Leachate characteristics of fly ash and bottom ash have been carried out at IMMT; Bhubaneswar which shows leachate characteristics data is well within the USEPA standards. The Leachate characteristics report is enclosed as annexure - IX.
xvii	Fugitive emission of fly ash (dry or wet) shall be controlled such that no agricultural or non-agricultural land is affected. Damage to any land shall be mitigated and suitable compensation provided in consultation with the local panchayat.	<ul style="list-style-type: none"> Fly ash is transported to Jagannath mine of MCL through closed bulkers and through covered trucks to abandoned stone quarry to avoid any fugitive emission due to transportation.
xviii	Ash pond shall be lined up with HDPE/LDPE lining or any other suitable material impermeable media such that no leachate takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached.	<ul style="list-style-type: none"> Not applicable as ash is being collected and disposed in dry form.
xix	Green belt consisting of three tire of plantation of native species around plant and at least 50 m width shall be raised. Wherever 50 m width is not feasible a 20 m width shall be raised and adequate justification shall be submitted to the Ministry. Tree density shall not be less than 2500 trees per ha with survival rate not less than 80%. Only native species shall be planted and the green belt development shall be expedited.	<ul style="list-style-type: none"> Wherever feasible, green areas are being developed in and around the plant premises. Mainly native plant species are planted to ensure survival rate of about 90%. Total green area in and around the entire complex of BSL and BEL is about 26 % of the total area. This shall be increased gradually every year and 33% will be achieved in next 3-4 years. Plantation photographs are enclosed as annexure - X.
xx	CSR schemes identified based on Public Hearing issues and need based assessment shall be implemented in consultation with the village panchayat and the District administration starting from the development of the project itself. As part of CSR, prior identification of local employable youth and eventual	<ul style="list-style-type: none"> The peripheral development is being carried out based on socio economic survey of the area on need based assessment. Based on this we have provided the facilities of sanitation, drinking water, education, health care, road and communication facilities etc to the surrounding villages.

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	employment in the project after imparting relevant training shall be also undertaken. Company shall provide separate budget for community development activities and income generating program.	<ul style="list-style-type: none"> • Till now, an amount of Rs. 68.18 crore has been spent on the above activities. • The details are enclosed as annexure - XI.
xxi	As committed, a minimum amount of Rs. 40.00 crore shall be earmarked for CSR activities for next five years. For proper and periodic monitoring of CSR activities, a CSR committee or a social audit committee or a suitable credible external agency shall be appointed. CSR activities shall also be evaluated by an independent external agency. This evaluation shall be both concurrent and final.	<ul style="list-style-type: none"> • The peripheral development is being carried out based on socio economic survey of the area on need based assessment. • Based on this, we have provided the facilities of sanitation, drinking water, education, health care, road and communication facilities etc to the surrounding villages. • Till now, an amount of Rs. 68.18 crore has been spent on the above activities.
xxii	For proper and periodic monitoring of CSR activities, a CSR committee or a social audit committee or a suitable credible external agency shall be appointed. CSR activities shall also be evaluated by an independent external agency. This evaluation shall be both concurrent and final.	<ul style="list-style-type: none"> • The peripheral development is being carried out based on socio economic survey of the area on need based assessment. • Based on this we have provided the facilities of sanitation, drinking water, education, health care, road and communication facilities etc to the surrounding villages. • Till now, an amount of Rs.68.18 crore has been spent on the above activities.
xxiii	An Environmental Cell comprising of at least one expert in environment science/engineering, ecology, occupational health and social science, shall be created preferably at the project site itself and shall be headed by an officer of appropriate superiority and qualification. It shall be ensured that the Head of the Cell shall directly report to the Head of the Plant who would be accountable for implementation of environmental regulations and social impact improvement / mitigation measures.	<ul style="list-style-type: none"> • Environment Management Department has been established for implementation of stipulated environmental safeguards and control of pollution. • Details of department structure, monitoring and analysis facilities are enclosed as annexure - XII.
A	General Conditions:	
i	Space for FGD shall be provided for future installation as may be required.	<ul style="list-style-type: none"> • Space is available near ESP for installation of FGD.

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		<ul style="list-style-type: none"> Necessary modification shall be carried out in compliance with the recent notification.
ii	<p>The treated effluents conforming to the prescribed standards only shall be re-circulated and re-used within the plant. Arrangements shall be made that effluents and storm water do not get mixed</p>	<ul style="list-style-type: none"> Waste water is treated in 350 m³/hr capacity ETP supported by two settling tanks of 183.64 m³ and 127.36 m³ holding volume, respectively. The treated effluents, conforming to the prescribed standards, are recycled and reused for cooling tower make up, coal washery, dust suppression, ash handling and green area irrigation. Summarized analysis report is enclosed as annexure - XIII. Three water lagoons of approximate holding volume of 80,000 m³ have been constructed to treat, store & reuse surface run off during excess rain. Zero discharge of effluent is maintained.
iii	<p>A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt / plantation.</p>	<ul style="list-style-type: none"> A Sewage treatment plant of capacity 3000 m³ per day has been provided for treating domestic sewage and treated water is being reused for green area irrigation & ash conditioning. Detail of STP is enclosed as annexure - XIV. STP in township of 1000 KLD capacity, which is common for BSL & BEL, has been established to treat and reuse domestic waste water.
iv	<p>Adequate safety measures shall be provided in the plant area to check/minimize spontaneous fire in coal yard especially during summer season. Copy of these measures with full details along with location on plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.</p>	<ul style="list-style-type: none"> 19 numbers of fire hydrants have been provided in the coal yard-1, 2 and coal shed to check / minimize spontaneous fire. 09 numbers of gun sprinklers have also been installed in the yards to keep the surface moist. The coal piles are leveled by scraping and compacted by rolling In coal silos / bins, First in First out (FIFO) principle is applied to avoid spontaneous burning. Fire tenders will be put into service in case of emergency.

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v	<p>Storage facility for auxiliary liquid fuel such as LDO/HFO/LSHS shall be made in the plant area in consultation with the Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.</p>	<ul style="list-style-type: none"> • LDO is stored in the plant area where the risk is minimum. There is a dyke around the storage tanks to contain LDO in case of any leakage. Detail is enclosed as annexure- XV. • Onsite emergency plan has been prepared to meet any eventuality in case of an accident taking place. • Regular mock drills are being conducted to respond to emergency situations. Last emergency mock drill was conducted on 13.09.2017. • Report of the last mock drill is attached as annexure - XVI. • As per specification of the supplier, the sulfur content in the fuel varies between 0.25 to 0.5 % by mass. • Details are enclosed as annexure – XVII.
vi	<p>First aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.</p>	<ul style="list-style-type: none"> • Adequate First aid and sanitation arrangements were made during construction phase of the plant. • Similar facilities are being maintained during operational phase also for the workers and employees.
vii	<p>Noise level emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 85 dB(A) from the source. For people working in the high noised areas, requisite PPEs like ear plugs/ear muffs etc shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric records and for treatment for any hearing loss including shifting to non-noisy/less noisy areas.</p>	<ul style="list-style-type: none"> • Acoustic enclosures have been provided for turbines and air compressors to meet the work zone noise standards. • 16 nos. of silencers have been provided at primary air and secondary air fans of all four boilers. • Necessary PPEs are being provided to all the workers working in noisy areas and periodic examination is being conducted for the workers engaged in noisy areas. • Noise monitoring is carried out regularly at six locations in the work zone areas. • The summary of noise monitoring report is enclosed as annexure – XVIII.
viii	<p>Regular monitoring of ambient air ground level concentration of SO₂, NO_x, PM_{2.5}, PM₁₀ and Hg shall be carried out in the impact zone and records maintained. If at</p>	<ul style="list-style-type: none"> • Five ambient air quality monitoring stations have been set up in nearby villages for measuring the monthly ground level concentrations of PM₁₀, SO₂ and NO_x in

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	any stage levels are found to exceed the prescribe limits, necessary control measures shall be provided immediately. The locations of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the regional office of the Ministry. The data shall also be put on the website of the Company.	consultation with SPCB. Odisha. • Analysis report is enclosed as annexure - XIX.
ix	Utilization of 100 % fly ash generated shall be made from 4 th year of operation. Status of implementation shall be reported to the Regional Office of the Ministry from time to time.	• Presently 100 % utilization of fly ash is achieved by filling ash in the Jagannath OCP no. 4 of MCL and abandoned stone quarries and low lying areas. • Annual report on fly ash generation and utilization is submitted to the Regional Office of the Ministry.
x	Provision shall be made for the housing of contractor workers (as applicable) within the site with all necessary infrastructure facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc.	• Adequate arrangements for housing of construction workers were made during construction phase of the plant. • Same facilities are being maintained during operational phase also for employees and workers.
xi	The project proponent shall advertise in at least two local news papers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environment clearance and copies of the clearance letters are available with the SPCB/Committee and may also be seen at website of the Ministry of Environment and Forests at http://envfor.nic.in	• Advertisements were circulated in The Telegraph (English daily) dated 15.02.2015 and the Samaya (Oriya daily) dated 15.02.2015. • A copy of the same has been submitted to MoEF&CC vide letter no. BSL/MoEF/BS-02/2015-09 dated 21.02.2015.
xii	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parishad / Municipal Corporation, Urban Local Body and the local NGO, if any, from whom suggestions/representations, if any, were received while processing the proposal.	• Copy of the environment clearance was submitted to the concerned village panchayat, Zila Parishad, District Industry Centre etc.

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	The clearance letter shall also be put on the web site of the Company by the Proponent.	
xiii	The proponent shall upload the status of compliance of the stipulated environment clearance conditions, including results of measured data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of the MoEF, the respective zonal office of CPCB and the SPCB. The criteria pollutant levels namely SPM, RSPM (PM ₁₀ and PM _{2.5}) SO ₂ , NO _x (ambient as well as stack emission) shall be displayed at a convenient location near the main gate of the Company in the public domain.	<ul style="list-style-type: none"> • Status of compliance of the stipulated environment clearance conditions are uploaded and sent to the Ministry, CPCB and SPCB. • Results of online air quality monitoring are displayed near the main gate.
xiv	The environment statement for each financial year ending 31 st March in Firm-V as is mandated to be submitted by the project proponent to the concerned SPCB 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 environment clearance conditions and shall also be sent to the respective Regional Office of the Ministry by e-mail.	<ul style="list-style-type: none"> • The environment statement for each financial year ending 31st March in Form-V is being submitted to the Regional Office of MoEF&CC, CPCB and SPCB, Odisha.
xv	The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of environment and Forests, its Regional Office, CPCB and SPCB. The project proponent shall upload the status of compliance of the environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e-mail to the Regional office of MoEF.	<ul style="list-style-type: none"> • Six monthly reports on the status of the implementation of the stipulated environmental safeguards are being submitted to the MoEF&CC, Regional Office, CPCB and SPCB, Odisha.
xvi	Regional office of the MoEF will monitor the implementation of the stipulated	<ul style="list-style-type: none"> • Will be complied.

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	<p>conditions. A complete set of documents including Environment Impact Assessment report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring. Project proponent will upload the compliance status in their website and update the same from time to time at least six monthly basis. Criteria pollutants levels including NO_x (from stack and ambient air) shall be displayed at the main gate of the power plant.</p>	
xvii	<p>Separate funds shall be allocated for implementation of environmental protection measures along with item-wise break-up. These shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.</p>	<ul style="list-style-type: none"> • Funds earmarked for pollution control measures are not diverted for any other activity. • Year wise expenditure are submitted along with the annual environment statement to the Ministry.
xviii	<p>The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the project authorities and the dates of land development work and commissioning of plant.</p>	<ul style="list-style-type: none"> • 165 MW TG was commissioned on 23rd September 2015.
xix	<p>Full cooperation shall be extended to the Scientists / Officers from the Ministry / Regional Office / CPCB / SPCB who would be monitoring the compliance on environmental status.</p>	<ul style="list-style-type: none"> • Agreed