**Z-11013/43/2011-IA.II (M)**
**Government of India**
**Ministry of Environment, Forests and Climate Change**

3rd Floor, Vayu Block
Indira Paryavaran Bhawan, Jor Bagh Road
Aliganj, New Delhi-110003

To

Date: 19.04.2017

M/s Bhushan Steel Ltd.
Bhushan Centre, Ground Floor,
Hyatt Regency Complex,
Bhikaji Cama Place,
New Delhi- 110066.

***Sub: Permission on trial basis for disposal of flyash generated from 410 MW TPP (110 MW of M/s Bhushan Steel Ltd. and 300 MW of M/s Bhushan Energy Ltd.) into mine void of Quarry-IV of Jagannath Opencast Mine of M/s MCL in Talcher, Distt. Angul, Odisha. – extension of permission reg.***

Sir,

This has reference to your online application dated 17.10.2016 and documents submitted vide your letter dated 13.2.2017 on the above subject. It is noted that temporary permission of one year for pilot project proposal for disposal of flyash (3,234 T/month, annual generation is 38,808 T) generated from 410 MW TPP of M/s Bhushan Steel Ltd (110 MW of M/s Bhushan Steel LTd. and 300 MW of M.s Bhushan Energy Ltd.) at Angul, Dhenkanal Dist., Odisha into abandoned Opencast Mine/quarry Jagannath OCP of M/s Mahanadi Coalfields Ltd. has been granted vide Ministry's vide letter dated 05.09.2013. The said temporary permission has been extended for 11 months i.e till 14.02.2016 vide Ministry's letter dated 08.04.2015. Further, the temporary permission for disposal of 1.65 MTPA generated from 883 MW Captive Thermal Power Plant of M/s Bhushan Steel Ltd (398 MW) and M/s Bhushan Energy Ltd. (485 MW) into mine void of Jagannath Opencast Mine of M/s MCL has been extended for one year i.e till 18.04.2017 vide Ministry's letter dated 19.04.2017.

2. Total capacity of the mine void is 17 million tons. Only 0.446 million tons of ash has been filled into the mine. The total generation of ash from the 883 MW (142 MW+300 MW+256 MW+185 MW) power plants of M/s Bhushan Steel Ltd. and Bhushan Energy Ltd. is 1.65 MTPA. Total water consumption till February, 2016 in slurry making is 5,35,841.7 $m^3$/annum which has been taken from the Jaggannath mine.

3. Radio tracer study of flyash disposal into mine void has been carried by Isotope Application Services, Board of Radiation & Isotope Technology, Department of Atomic Energy. Double well tracer study has shown that radio tracer did not reach to the monitoring well indicating very low permeability of the underground soil matrix in the mine void region of Quarry No. 4 of Jagannath OCP.

4. Scandium-46 leached out from labelled flyash could not be detected in the bore wells surrounding the Quarry No.4 of Jagannath OCP indicating no leachates are reaching the groundwater aquifers from the time of injection.

5. Further dumping of flyash could be continued into the mine void to push particulate matter towards the boundaries of the void forcing the labelled fly ash

toward the bore wells and to ascertain the impact of leachates in future. Sampling of the water in the designated bore wells should be continued for about five half-lives of the radiotracer. While regular dumping, subsequent radiotracer study can be repeated after every two years.

6. NEERI has conducted impact assessment studies of flyash disposal into mine voids of Jagannath OCP of M/s MCL, Talcher. An integrated approach has been adopted in this study by utilizing various tools like hydrogeology, groundwater chemistry, flyash characterization, soil, groundwater flow and solute transport modelling studies. A network of observation wells has been set up and monitoring of the wells has been carried out in the post-monsoon and pre-monsoon seasons for the major cations, anions and trace elements. The analysis has also been carried out for mine pit water and groundwater samples at various depths in the study area. Soil sampling has been carried out at representative locations around the mine area and analysis for major physical and chemical properties. Bio-assay test, bio-magnification and bio-accumulation tests have also been carried out for the study area. Leachability studies of flyash have been carried out using the TCLP, SPLP and Water Elution test. Petrographic study has been carried out for rock samples collected in the study area.

7. The presence of high fluoride concentration gives the reasons whether it is due to geogenic nature or anthropogenic stresses. Petrographic study indicated the presence of fluoride bearing minerals in the study area. Petrographic study also indicated the presence of minerals having aluminium. Fluoride content in the ground water within 2.5 km of the ash dumping area is <1.0 mg/l which is well within norms.

8. Concentration of TDS in all samples is within BIS limits. Higher concentrations of iron are observed in some of the groundwater samples which may be due to the presence of laterite geological nature. Other physic-chemical parameters were within the permissible limits of BIS standards. The TCLP test for flyash and bottom ash samples reveal that the ash is non-hazardous in nature as per RCRA guidelines. The water extraction test indicated that the leaching of trace elements from the flyash and bottom ash is very less. It is less than 1% for the different trace elements. The water elution test also indicates that the leaching of trace elements from the ash matrix decreases with time. As the pH in the Jagannath Mine pit is approximately 7, leaching at concentration likely to affect the ground water is not expected.

9. The possible impact of the mine pit on the groundwater sources was also studied by attempting the solute transport simulation using the Mass Transport Modelling (MT3D). The modelling of the solute transport for the Jagannath mine pit indicate that the plumes will move to a maximum distance of 700 m over a 30 year period starting from March, 2014. The radio activity analysis of the radio nuclides indicates that the activity is below the limits set by the AERB guidelines. The trace element concentration in the plant species has been found to be within limits. The Bio-assay tests also indicated that mortalities were not observed in the test samples.

10. Based on the comprehensive study starting from May, 2014 and sampling spread over the last 2 years, it is concluded that the trace element in the mine pit has not increased with time and the concentrations in the wells close to the mine pit is also not increasing.

11. The matter was placed before the Re-constituted Expert Appraisal Committee (Thermal Power) in its 4th Meeting held on 16.3.2017. In acceptance of the recommendations of the Re-constituted Expert Appraisal Committee (Thermal Power) and in view of the information/clarification furnished by you, with respect to the above project, the **Ministry hereby accords the permission to continue**

**the disposal of fly ash for the maximum quantity of 1.65 MTPA into mine voids of Quarry-IV of Jagannath Opencast Mine on temporary basis for a further period of five years *w.e.f* from 18.4.2017** subject to following conditions.

i. A pilot project shall be explored for implementation for Cenosphere extraction from flyash and manufacturing of by-products in consultation with organizations like CSIR, ISM (IIT) Dhanbad.

ii. As recommended by NEERI, Ash characterisation, hydro-geological studies, leachability of trace metals, monitoring of trace elements in the supernatant, pH of the water and the piezometers on a quarterly basis and reports shall be submitted to the Ministry and it's regional office annually.

iii. Radio tracer studies shall be continued once in six months and the findings of the study shall be submitted to the Ministry and its Regional office annually.

iv. Bioaccumulation and bio-magnification tests shall be conducted on surrounding flora and fauna (tree leaves, vegetation, crop yields and cattle population etc) during pre-monsoon and post monsoon to find out any trace metals escaped through groundwater or runoff.

v. Surface runoff and supernatant water, in any case shall not be let into surroundings. It shall be collected by providing adequate drains around the mine. As proposed the supernatant water along with surface runoff shall be treated and re-used for ash mixing and plant operations. Surface and groundwater quality along with existing piezometric wells shall be monitored quarterly and the reports shall be submitted to the Ministry annually.

vi. After the mine void reaches its full capacity, 30 cm sweet soil lining and proper compacting be provided on the top to avoid any wash off during reason. Reclamation activities along with greenbelt development shall be carried out in consultation with M/s MCL in accordance with approved Mine Closure Plan. An action plan in this regard shall be submitted to the Ministry and its Regional Office.

vii. Only decanted water from mine, make up water from treated effluents such as cooling tower blow down and treated sewage water shall be used for making ash slurry.

viii. Mercury in flyash shall be periodically monitored by Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

ix. Details of month-wise quantity of flyash disposed and water consumption along with nature of water shall be submitted to Ministry.

x. Half-yearly Compliance report for all the stipulated conditions in this permission shall be submitted to the Ministry and its Regional Office.

xi. The flyash utilization shall be in compliance with Flyash Notification and its amendments issued from time to time by the Ministry.

xii. Third party evaluation/Environment Audit shall be conducted annually for reviewing the compliance conditions stipulated in the clearances along with the baseline data/studies to be carried out during the period of temporary permission.

xiii. Compliance of EC/amendment conditions, Environment (Protection) Act, 1986, Rules and MoEF&CC Notifications issued time to time shall be done by an Environment Officer to be nominated by the Project Head of the Company who shall be responsible for implementation and necessary compliance.

12. All other studies & conditions prescribed in the earlier permissions dated 05.09.2013, 08.04.2015 and 19.04.2016 shall also be complied with by M/s Bhushan Steel Ltd. and other concerned, as applicable.

13. Any appeal against this permission shall lie with the National Green Tribunal, of preferred, within 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

This issues with the approval of the Competent Authority.

Yours faithfully,

(Dr. S. Kerketta)
Director

Copy to:

1. The Secretary, Ministry of Power, Shram Shakti Bhawan, Rafi Marg, New Delhi 110001.
2. The Chairman, Central Electricity Authority, Sewa Bhawan, R.K. Puram, New Delhi-110066.
3. The Chairman, Central Pollution Control Board, Parivesh Bhawan, CBD-cum-Office Complex, East Arjun Nagar, Delhi- 110032.
4. The Director General of Mines Safety, Head Office Dhanbad-826016, Jharkhand.
5. The Additional Principal Conservator of Forests (APCCF), Regional Office (EZ), Ministry of Environment, Forests and Climate Change, A/3, Chandesekharpur, Bhubaneswar – 751023.
6. The Principal Secretary, Department of Forest and Environment, Government of Odisha, Bhubaneshwar.
7. The CMD, Mahanadi Coalfields Limited, Jagriti Vihar, Burla, Sambalpur-768020, Odisha.
8. The Chairman, Orissa State Pollution Control Board, A-118, Nilkanta Nagar, Unit – VIII, Bhubaneshwar- 751 012.
9. The District Collector, Angul District, Odisha.
10. Guard/Monitoring file.
11. Website of MoEF&CC.

(Dr. S. Kerketta)
Director