BEFORE THE NATIONAL GREEN TRIBUNAL

(PRINCIPAL BENCH), NEW DELHI

ORIGINAL APPLICATION NO. 164 OF 2018

BETWEEN

ASHWANI KUMAR DUBEY …APPLICANT

VERSUS

UNION OF INDIA & ORS. …RESPONDENTS

INDEX
VOLUME -II

FILED BY

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PLACE: NEW DELHI
DATED: 12.09.2025

	the fall out of fly-ash is also in huge quantities. It is the general consensus that though the MoEF&CC, Government of India issued notification as early as in the year 1999, subsequently modified in 2003 and 2009, for utilisation of fly-ash in building materials such as the preparation of fly-ash bricks and their utilisation in all government constructions and contracts, public sector undertaking, road construction by NHAI, CPWD, PWD and other such bodies and the State Road Construction Corporations and such alike bodies including the disposal by way of stowing and back filling of the mines. It is generally the contention on the part of the Applicant that all these measures which have been suggested in the notification have not been seriously carried out though it is submitted on behalf of the Respondents that measures are being taken for the utilisation of the fly-ash bricks in the Government construction and the modification has been made in the standard form works-contract being issued by the government and government agencies. Likewise, in the road construction also fly-ash is being utilised at the foundation level. Further, so far as back filling of mines and stowing of abandoned mines is concerned, it is submitted before us that this particular issue is raised before the Principal Bench of NGT at New Delhi in Original Application No. 117/2014 and other similar matters wherein interim order of injunction was issued restraining such back filling as in the said petition doubts have been raised as to whether it is conducive without proper study to undertake the exercise of back filling of the abandoned mines, etc. The said order of injunction passed in September, 2014 has since been vacated by the Principal Bench during its hearing on 20.8.2015 after noticing the provision contained in the notification issued by the MoEF relating to expert bodies being constituted for the said purpose and in accordance with the

recommendations and guidelines framed by such expert bodies. Learned Counsel for the Respondent pointed out that the Company has approached the Central Institute of Mining and Fuel Research, Dhanbad to undertake a study and to suggest methods by which back filling of such abandoned mines can be undertaken with all possible safety measures which are highlighted in the Terms of Reference to the said agency. It is submitted that the said report is likely to be submitted on or before 31.12.2015. We would expect that back filling operations to be undertaken by them would be commenced thereafter in the light of the methodology suggested by the said institute.

Counsel for the Applicant also suggested that Ministry of Railway may also be directed to utilise the fly-ash to the new railway corridors that they are constructing i.e. East-West Railway Corridor of about 120 kms. from Korba Pendra Road and the Western Corridor from Korba to Dharamjaigarh. In this behalf, we would direct that the Ministry of Railway undertake the exercise and explore the feasibility of utilising the fly-ash for the said purpose and if such possibility without compromising on safety can be undertaken, the same should be incorporated in the terms of the tender document that may be issued by the concerned Railway for the said purpose. The State Government of Chhattisgarh is accordingly directed to convey the aforesaid order to the South Eastern Railway within whose jurisdiction these two projects are likely to fall. The response of the Railway should be intimated to this Tribunal either through the State Government or directly. A closer look at the notification, 2009 of the MoEF regarding utilisation of fly-ash also brings to fore the requirement stressed therein to the Central Government to constitute a Monitoring Committee for the purpose of utilisation and its

ancillary issues. We would accordingly direct that the MoEF submit before us as to whether the said monitoring committee has been constituted and what role it has played so far after analysing the issues similar to the ones which are discussed hereinabove.

O.A.No. 122/2015 & 95/2015

Issue notice in these Original Applications.

We would direct that these matter be listed on **29th January, 2016.**

.....JM
(DALIP SINGH)

.....EM
(PROF. A.R.YOUSUF)

Annexure – III

NGT Matter
MOST URGENT

No.11-4/2013-HSMD
Government of India
Ministry of Environment & Forests
HSM Division

2nd Level, Jal Block Indira Paryavaran
Bhawan Jor Bagh Road, New Delhi-
110003
Date: 23rd December, 2015

To
Shri Peeyush Kumar
Director (Tech), Ministry of Coal
A-Wing, Shastri Bhawan
Dr. Rajendra Prasad Road
New Delhi-110001

Subject:- Order of NGT, Bhopal in OA 95 of 2015 regarding use of fly ash as stowing material.

Dear Sir,

This is with reference to the order of Hon'ble NGT, Bhopal dated 5th November, 2015 in OA 95 of 2015(copy enclosed) regarding disposal of fly ash especially mine backfilling.

Hon'ble NGT has directed that the Ministry to submit as to whether the Monitoring Committee has been constituted and what role it has played so far as regards the backfilling of mines with fly ash.

It may be recalled that during the meeting of the Central Monitoring Committee on implementation of Fly Ash utilisation held of 18.06.2014, it was decided that
Ministry of Coal through its expert Committee or by involving any other agency such as CMPDI will examine the issues of use of fly ash as stowing material in operating mines and will suggest the way forward for consideration of the Ministry of Environment and Forests within a period of six months. Copy of the minutes is enclosed for reference.

You are requested to kindly provide the action taken on this issue at the earliest so as enable this Ministry file reply before NGT in time.

Yours Faithfully

Encl: as above

(Sanchita Jindal)
Director

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Annexure-IV

BEFORE THE NATIONAL GREEN TRIBUNAL, CENTRAL ZONAL BENCH, BHOPAL

Original Application No. 124/2014 (CZ)
Ajay Dubey Vs. State of Chhattisgarh & Ors.
and
Original Application No. 122/2015 (CZ)
Anhad Mishra Vs. Union of India & Ors.
and
Original Application No. 95/2015
Laxmi Chouhan Vs. Union of India & 7 Ors.
and
Original Application No. 36/2015 (CZ)
Laxmi Chouhan vs. Union of India & 5 Ors.
and
Appeal No. 42/2015 (CZ)
Chhattisgarh State Power Generation Co. Ltd. Vs. CG Environment Conservation Board & Ors.
and
Original Application No. 29/2015 (CZ)
Titksha Social Organisation Vs. Union of India & 5 Ors.

CORAM : HON'BLE MR. JUSTICE DALIP SINGH, JUDICIAL MEMBER
HON'BLE DR. SATYAWAN SINGH GARBYAL, EXPERT MEMBER

PRESENT :

Applicant in O.A. No. 95/2015 :	**Shri Dharmvir Sharma, Adv. for Shri Sanjay Agrawal, Adv.**
Applicant in O.A. No. 42/2015 :	**Shri Apoorva Kurup, Adv. Shri Shantanoo Saxena, Adv.**
Respondent CECB :	**Ms. Shikha Gupta, Advocate for Shri Purushaindra Kaurav, Advocate**
NTPC:	**Shri Sachin K.Verma, Advocate**
Respondent SECL:	**Shri Yogesh Bhatnagar, Advocate**
CSPGCL / State of Chattisgarh :	**Shri Apoorv Kurup, Advocate**
Respondent No. 2 :	**Shri Deepesh Joshi, Adv.**

Date and Remarks	Orders of the Tribunal
Item No. 07 to 12 **4th April, 2016**	Learned Counsel for the CECB submitted that the CMPDI has requested for some more time to submit the complete report as they have carried out the ground work and are in the process of compilation of their report. For the aforesaid purpose two months time may has been sought by CMPDI. We would also expect that the persons who have compiled the report be present on the next date of hearing to explain any issue that may arise during the course of hearing. The reply filed be taken on record. In that view of the above as prayed by the Learned Counsel for the parties let the matte be listed on **4th July, 2016.** .....JM **(DALIP SINGH)** .....EM **(DR. S.S.GARBYAL)**

Annexure -V

भारत सरकार/Govt. of India
श्रम एवं रोज़गार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
हैदराबाद क्षेत्र सं.1/Hyderabad Region No. 1

Tel. + 91 40 24602507; Fax. +91 40 24602504; Telegrams: "MINSAFETY"
Gruhakalpa, Block-II, A.P.H.B. Complex, Nampally, Hyderabad-500 001

संख्या.एच.1/अनुज्ञा Modi /2013/ 845 – 849 हैदराबाद, दिनांक 28/3/13

प्रेषित
खान सुरक्षा निदेशक
हैदराबाद क्षेत्र सं.1

सेवा में
अभिकर्ता,
गोदवरिखनि सं.1 व 3 इनक्लाइन खदान,
M/s सिंगारेनी कालरीज कं.लि.,
डाक गोदवरिखनि : 505209,
करीमनगर जिल्ला ।

Subject:- Permission under Reg.100(1) & 127(3) of the Coal Mines Regulations, 1957 to extract pillars in Panel No.3S/16 in No.3 seam by Bord and Pillar method in conjunction with hydraulic sand stowing using SDLs at Godavarikhani No.1 & 3 Incline mine - Modification for usage of "Bottom Ash" instead of sand as stowing material – Extension thereof.

महोदय,

Please refer to your letter no. RG.I/Agt.Gdk.1Gr/D-003/076 dated 16-2-2013 and plans & sections enclosed therewith on the above subject.

The matter has since been examined in the light of what has been stated in your application. In exercise of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Regulations 100(1) and 127(3) of the Coal Mines Regulations, 1957 and by virtue of the authorization granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Section 6(1) of the Mines Act, 1952, I, hereby extend the permission granted vide this Directorate's letter No.H1/010042/Perm/2011/1544 dated 12/7/2011, for further 3 months period i.e. **upto 31.05.2013** for using Bottom Ash instead of sand as stowing material on further experimental basis as suggested by the scientific agency, subject to the following conditions being strictly complied with.

1.0 The Bottom Ash proposed to be used for stowing shall not have particle size less than 53 microns. Suitable monitoring shall be done to ensure this.

2.0 A suitable percentage of Bottom Ash along with sand for hydraulic stowing shall be established such that the normal stowing operations are not affected.

3.0 A suitable scientific agency shall be associated for ascertaining and establishing the shrinkage of stowed Bottom Ash.

4.0 The barricade used during the depillaring operation shall be erected strongly under the supervision of at least overman certificate holder.

5.0 Effective steps shall be taken to prevent accumulation of water behind the stowing barricade.

6.0 All other conditions of the permission letter no. H1/010042/Perm/2011/1544 dated 12/7/2011 and letter no. H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 shall remain unchanged and shall be strictly complied with.

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True Copy

7.0 This permission is subject to the following additional conditions:

7.1 In the event of any change in the circumstances connected with this permission, which is likely to endanger the life of workmen employed in the mine or endanger the mine, the mining operations for which this permission has been granted shall be stopped forthwith and intimation thereof shall be sent to this Directorate. The said mining operations shall not be resumed without an express and fresh permission in writing.

7.2 This permission is being issued specifically under the regulations mentioned above, and without prejudice to any other provisions of law, which may be or may become applicable at any time.

7.3 If at any time any of the conditions subject to which this permission is granted is violated or not complied with, this permission shall be deemed to have been revoked with immediate effect. The above permission may be amended or withdrawn at any time, if considered necessary in the interest of safety.

7.4 This Directorate shall be informed as soon as the mining operations are commenced in accordance with the above permission and intimation about completion of the mining operations should also be sent promptly and in any case not later than one month thereof.

भवदीय,
Sd/-
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–I

ज्ञापन संख्या एच.1/अनुज्ञा Modi /2013/ हैदराबाद, दिनांक

आवश्यक कार्यवाही एवं सूचनार्थ प्रेषित

1 नामांकित मालिक व निदेशक (P & P) M/s सिंगरेनी कालरीज़ कं. लि., पी.ओ.कोत्तगुडेम कालरीज़ –507 101 (
2 महाप्रबंधक, रामगुण्डेम क्षेत्र सं. 1, पी.ओ.गोदावरिखनि–505 209, करीमनगर जिला।
3 प्रबंधक, गोदावरिखनि सं. 1 व 3 खदान, M/s SCCL., पी.ओ.गोदावरिखनि–505209, करीमनगर जिला।

Sd/-
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र–I

ज्ञापन संख्या.एच.1/अनुज्ञा Modi /2013/ हैदराबाद, दिनांक 30/7/13

प्रतिलिपि आवश्यक कार्यवाई एवं सूचनार्थ खान सुरक्षा उपमहानिदेशक, दक्षिणी मध्य अंचल, हैदराबाद, के माध्यम से खान सुरक्षा महानिदेशक, धनबाद को प्रेषित

30/7/2013
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र I

खान सुरक्षा उपमहानिदेशक,
दक्षिण मध्य अंचल, हैदराबाद ।

Note

Name of the Mine : Godavarikhani No.1&3 Incline Mine.
Name of the Owner : M/s. S.C.C.Ltd.,

Subject: Permission under Reg.100(1) & 127(3) of the Coal Mines Regulations, 1957 to extract pillars in Panel No.3S/16 in No.3 Seam by bord and pillar method in conjunction with hydraulic sand stowing method using SDLs at Godavarikhani No.1 & 3 Incline mine – Modification thereof.

Reference: Agent's letter No.RGI/Agt.Gdk.1Gr./D-003/76 dated 16-2-2013
(R.O. Diary No. 682 dated 16-2-2013)

1.0 INTRODUCTION:

a) Management was granted permission under regulation 100(1) and 127(3) of CMR, 1957 to extract pillars in panel No.3S/16 in 3 seam by conventional Bord and Pillar in conjunction with Hydraulic Sand Stowing using SDLs at Godavarikhani no,1 & 3 incline was obtained vide letter no. H1/Perm/010042/2011/1547 dt.12/07/2011,valid up to 11/07/2014.

b) Then, management had applied for modification using Bottom Ash as stowing material instead of sand along with vide letter no. RG.I/AgtGDK.1.Gr/D-003/389 dated 25-10-2012.

c) Thereafter,vide this Directorate's letter No.H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 permission was granted to use Bottom Ash in place of sand as stowing material in the panel on experimental basis.

d) As per the condition No.3 of the above modified permission letter, the modification of this permission shall be valid for 3 months from the date of issue of this letter or completion of stowing of bottom ash of about 25000m^3 whichever is earlier.

e) The bottom ash as stowing material was started in the said panel on 8.12.2012 and 14900m^3 of bottom ash was used as a stowing material as on 13.2.2013.

f) Management informed that to comply with the conditions of the modified permission granted, the following actions were taken by them:

a) Suitable monitoring at regular interval was done to ensure particle size of Bottom Ash shall not be less than 53 microns (copy of analysis results enclosed).
b) CIMFR, Dhanbad was involved for ascertaining and establishing the shrinkage of stowed Bottom Ash and a report to this affect had submitted a report.

2.0 Proposal:

2.1 Now, management is requesting to extend the permission for usage of Bottom Ash instead of sand as stowing material for another 3 months i.e. upto 13-05-2013 in Panel No.3S/16 of No.3 Seam of Gdk-1 Section of GDK No.1 & 3 Incline mine.

2.2 The management has enclosed the sieve analysis report of bottom ash of samples taken from surface bunker and at 44 ½ LS/19 dip in underground from 14.12.12 to 06.02.(Flag-C)

2.3 The management has said that CIMFR, Dhanbad was involved for study and establishing the shrinkage of stowed Bottom ash in the above stowing panel, i.e., 3S-16 in 3 seam at GDK 1 & 3 Incline Mine and submitted a report on the above subject (enclosed in Flag D).

2.4 A copy of plan showing the present position of workings in abovesaid panel is enclosed vide plan no SCC/GDK 1 & 3/SUR/3S-16/84/13/1, dated 16.02.1013(Flag-E)

3.0 Comments:

3.1 The sieve analysis report of bottom ash of samples taken from surface bunker and at 44 ½ LS/19 dip in underground from 14.12.12 to 06.02.12 shows that 53 micron particles size of bottom ash was more than 99%.

3.2 RECOMMENDTIONS OF CIMFR STUDY REPORT SUBMITTED ON 19.2.2013 as per above study report are as:

a) Being light and fine it will offer saving in energy cost per unit volume in transportation by mechanical or hydraulic means, as it will require less tonnage of material for filling the same underground void and will cause less frictional head loss during transportation through pipelines.

b) Pumping cost will also be reduced because hydraulic backfilling with bottom ash will need less amount of water.

c) It will cause less wear of pipeline thereby increasing the life of the pipe.

d) The cementing effect developed in ash filled mass, due to the pozzolanic activity, will help in consolidation and thereby increasing the stability of the working.

f) The percolation rate was found to be as high as 22.83cm/hr and ash in the slurry at 50% concentration by weight settled within 30 min, this may be attributed to the fact that there is very little chance that bottom-ash will remain in the slurry form for a longer period of time and may cause barricade bursting.

g)The ultra fines (less than 53 micron size)is only 0.82% which indicates that percolation of water through the pack is not going to create any problem and the consolidation of the pack will take place within a short period.

h)Bottom ash of RSTPS was found to be least susceptible to spontaneous heating as CPT and IPT are not attained even up to 200°C bath temperature.

i)Results of shrinkage study carried out in the field indicates that the bottom ash stowed mass undergoes an initial shrinkage of 1% during first 3 days of readings and no shrinkage was observed beyond that. This initial shrinkage may be attributed to the dissipation of entrapped water in interstitial voids of ash fill mass.

j)The visual inspection of the site shows that the stowing is done properly upto the roof and the packed mass stand erect when the adjacent stooks were punctured. The pack was found to be uniformly distributed without making any heap and touching almost all the portion of the roof.

3.3 Observations with regard to performance of bottom ash stowing during my inspection of this panel on 26.02.13:

3.3.1 The depillaring in the panel was started on 24.08.2012 with hydraulic sand stowing. After obtaining permission to use bottom ash on experimental basis, stowing was stared with bottom ash from 06.12.12. Till now, 75% of the extractable coal was extracted in this panel.

3.3.2. During the stowing operation, it was found that ,sometimes, water got accumulated behind the barricade built outbye of stowed goaf at 37 no slice at 44½L/18D. To prevent the water stagnation, stowing operations were to be stopped intermittently to clear away the water.

3.3.2 Through the barricade at 46L/17D, stowed bottom ash was found outbye of goaf edge indicating side puncture of the bamboo matting

3.3.3 However, during the inspection it was found that overall genera' conditions of the stowing by the bottom ash appears to be satisfactory.

3.4 Inspection of the above panel by Shri G. Vijaya Kumar, DMS, Hyderabad, on dated 10.01.2013 also revealed satisfactory remarks with respect to stowing by the bottom ash.

4.0 RECOMMENDATIONS: Management's proposal for modification of Condition No.3.1 of the modified permission letter No. H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 appears to be in order.

We may have no objection for modification of Condition No.3.1 of the modified permission letter No.H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 by extending the permission to use Bottom Ash instead of sand as stowing material upto **13-05-2013** subject to following additional conditions specified in the DPL:

a) The barricade used during the depillaring operation shall be erected strongly under the supervision of at least overman certificate holder.

b) Effective steps shall be taken to prevent accumulation of water behind the stowing barricade.

DPL is enclosed pl..

(Mukesh Kumar Sinha)
Dy.Director of Mines Safety,
Hyderabad Region No.1.

Encl: As above.

Annexure - VI

Details of the Leachate Analysis Study

The Leachate analysis results of fly ash with mine water are given in the table below:

Trace/ Minor elements	With MN1	With MN2	With MN3	With MN4	With MN5	With MN6	With MN7	With MN8	With MN9	With MN10	With MN11	With MN12	With MN13	With MN14	Std. IS10500/ MoEF Sch VI
pH of Mine Water	8.11	7.11	7.90	7.93	7.72	8.03	7.89	3.99	7.35	7.60	8.66	6.34	3.00	4.12	
Mn	<0 0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.191	4.81	<0.0015	<0.0015	<0.0015	0.14	8.80	2.97	0.1
V	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2
Cr	0.76	0.26	0.40	0.65	0.41	0.32	0.32	0.84	0.90	0.56	0.97	<0.003	<0.003	<0.003	0.2
Ni	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	3.0
Cu	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.321	<0.01	<0.01	<0.01	<0.01	1.605	0.239	0.05
Zn	0.109	0.22	0.088	0.103	0.115	0.142	0.089	1.142	0.133	0.12	0.141	0.344	3.72	0.78	5
As	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
Se	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.01
Pb	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
B	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.0
[illegible]	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.01
	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.001

MN1- Maduban OC Mine Water
MN2- Bokaro OC Mine Water
MN3- Sayal D OC Mine Water
MN4- Swang OC Mine Water
MN5- Manikpur OC Mine Water
MN6- Dhanpuri OC Mine Water
MN7- Sharda OC Mine Water
MN8- Amlai OC Mine Water
MN9- Jhingurdha OC Mine Water
MN10- Bina OC Mine Water
MN11- Lilari OC Mine Water
MN12- Belpahar OC Mine Water
MN13- Jagannath OC Mine Water
MN14- Ananta OC Mine Wate

From the above table it can be seen that the values of Mn and Cu are high in some of the samples than the permissible limit. The concentration of Mn, Cu have found to be in excess of Drinking water standard and as such the backfilling of fly ash of Amarkantak TPS should be avoided to be placed in Mine Void of Amlai OC and similarly fly ash of Ib TPS should be avoided to be placed in Belpahar OC and that of Talcher TPS should be avoided to be placed in Jagannath OC and in Ananta OC.

Metal Composition of Fly Ash

Elemental chemical composition of fly ash is highly variable. The variability is directly related to the source of the coal, its pretreatment, and the operation of the plant burning the coal. The major elements in the order of decreasing abundance are; Si, Al, Ca, C, Mg, K, Na, S, Ti, P and Mn. Most of these major elements exist in the core of the fly ash which is relatively stable. This is probably because they are not volatilized in the combustion process (*Mogazi etal, 1988)*. Fly ash contains large quantities of major impurities such as oxides, hydroxides and sulfates of iron and calcium, as well as significant quantities of hazardous leachable trace elements such as arsenic, boron, cadmium, chromium, manganese, selenium and vanadium (*Querol etal, 1999)*. During coal combustion, the organic matter in coal is utilized to produce heat and as a result, the concentrations of trace elements are increased relative to those in the source coal. Several trace elements such as As, Se, Cd, Cr, Ni, Sb, Pb, Sn, Zn and B is enriched by factors of 4–10 in coal combustion by-products (*Fernandez etal, 1994)*. These impurities have a negative impact on fly ash utilization due to environmental restrictions.

Leaching Characteristics of Fly Ash

The leaching characteristics of fly ash are controlled by its chemical, mineralogical and morphological composition. Fly ash from thermal power plants vary in chemical composition not only from plant to plant but also within the same plant. The quantity of trace elements that shall be available for leaching

in an aqueous media depends on the fixation of these elements on the fly ash particles and pH of fly ash – aqueous medium itself. The trace metals release from fly ash at various pH is given below:

Trace Metal Release at Various pH

Elements	Elements in Fly Ash (ppm)		Concentration Leached in ppm				Concentration Leached in %			
	Total Conc.	Surface Conc.	pH 3	pH 6	pH 9	pH 12	pH 3	pH 6	pH 9	pH 12
As	157	146	51.9	1	0.8	72.9	35.6	0.7	0.5	50
Cd	8.1	2.1	1.1	0.5	0.15	0.18	52.4	23.8	7.1	8.6
Cr	109	48	9.0	1.9	2.0	2.4	19.6	4.0	9.2	5.1
Cu	97	46.6	15.6	0.82	0.36	0.6	33.5	1.8	0.8	1.3
Pb	157	12.6	9.1	1.4	0.73	0.91	72.2	11.1	2.1	7.2
Ni	290	24.2	11.7	3.6	0.5	0.61	48.3	14.9	0.2	2.5
Zn	575	154.5	25.7	8.3	0.26	1.7	16.6	5.9	0.2	1.1

Source: Theis & Wirth (1977)

From the above table it can be observed that all fly ash cannot be used as a dumping material due to their leaching characteristics. The trace elements leach in the presence of acidic environment and may contaminate ground water. Thus mine site specific studies are required to be carried out before disposal of fly ash.

The predominant factors, which control the release of elements from ash impoundment area, are water contact, pH solubility relation and chemical composition. Fly ash with high lime content may tend to raise the pH which in turn will enhance the precipitation of the insoluble metal while fly ash with low lime and high iron content obviously shall depress the pH below neutral. The effect of pH on the leachability of the trace metals indicate that the most favorable condition for maximum release of metal ion is below the neutral region of pH scale. This pattern is followed with all the elements studied excepting Zn, which shows slightly different pattern.

The Toxic Characteristics Leaching Procedure (TCLP) or the Synthetic Precipitation Leaching Procedure (SPLP) generally evaluates the environmental risk of land filling fly ash. However, there is doubt regarding the applicability of these tests to long-term fly ash leaching behavior in groundwater associated with coalmines. Thus the Mine Water Leaching Procedure (MWLP) was developed to provide a site-specific risk assessment tool.

Annexure - VII

MINUTES OF 39th EXPERT APPRAISAL COMMITTEE (EAC) (THERMAL & COAL MINING) MEETING HELD ON 3rd-4th JANUARY 2012 IN PARYAVARAN BHAWAN, CGO COMPLEX, LODI ROAD, NEW DELHI.

COAL MINING PROJECTS

The **39th meeting** of the reconstituted EAC (T &C) was held on **3rd-4th January 2012** in Paryavaran Bhawan, C.G.O Complex, New Delhi to consider the projects of coal mining sector. The list of participants of EAC and the proponents are given at Annexure-1 and 2 respectively.

Confirmation of minutes

The minutes of the 37th meeting of EAC (T&C) held on **28th-29th November 2011** and was confirmed.

The agenda items were taken up as given below:

8. Dumping of flyash of M/s NTPC into the decoaled voids of South Balanda Coalmine of M/s M/s Mahanadi Coalfields Ltd., located in dist. Angul, Orissa

Both M/s NTPC and M/s MCL made a joint presentation. It was informed that the proposal is for utilisation of flyash generated from M/s NTPC's Talcher Thermal Power Station 460 MW (14x60+2x10) and its proposed expansion to 2x660 MW, located in Talcher Dist Angul in Western part of Talcher Coalfields in Brahmi valley to the North of Mahanadi River. Wet slurry of Talcher TPS into abandoned coal mine void of South Balanda Coal mine (10.1 MTPA) of M/s Mahanadi Coalfields Ltd. Talcher Coalfields, Dist. Angul, Orissa.

It was informed that there are 10 Reserve Forest in the area. The river Brahmani is at the distance of 2.1 km towards west side. River Nandir Jhor is adjacent to the southern side of the existing plant boundary. Brahmani River on the eastern side of the coalfields and controls the drainage of the area. There is one seasonal nala namely Bangaru jhor flowing in north –western side of the block and draining into Brahmani river north of Talcher town. Depth of water table ranges from <2m to 15m.The average depth to water in pre-monsoon period is from 4m -6m bgl in western part and 8m to 12m bgl in eastern part. Ground water table ranges from 75-13msl (pre-monsoon) and 85-135m above msl (post monsoon).

Flyash from the TTPS is being presently filled into Quarry Nos 2,3A & 3B of South Balonda Open Cast mine of MCL. M/s NTPC informed that it has carried out hydrogeological studies

in 2003, which also includes ash characterisation, baseline data generation and feasibility study for disposal of Ash in South Balanda in 2004. After the start of dumping of flyash, environmental monitoring for soil, surface water quality and ground water quality was carried out by NTPC.

M/s MCL informed that the South Balanda Coal mine was started in 1959 in an area of 315 ha with 1 MTPA capacity. The production started in 1961 and closed in 2005. The void is 90.4 Mm3. M/s NTPC had obtained the permission from OSPCB and MCL entered into an MOU with NTPC for filling of the mine void with ash from Talcher TPS. It was informed that there are three quarries, Quarry-1 with 6.99Mm3 void, Quarry -2 with 7.74 Mm3 void and Quarry-3 with 3.97 Mm3 void (total mine void is 18.70 Mm3), of which the mine void available for ash filling is 14.73 Mm3. Life of void for ash filling would be 15 years. The dumping would be by use of slurry discharge pipes and the flyash would settle into the bottom. It was noted that the tests carried out indicate that heavy metals such as mercury, chromium, lead, Arsenic, Iron are within prescribed limits.

The Committee observed that the fine particles of ash may block confined aquifers and affect its permeability characteristics and desired that a detailed Hydrogeology studies with flyash characterisation such as its reactivity, movement should be carried out. The Committee desired that tracer study is required to understand the pathway of movement of flyash/leachates in the aquifers. The Committee desired that decanted water/excess water utilised for irrigation should conform to standards. In case, data extrapolated from the studies indicate no long-term effects, the voids should be lined with suitable material before dumping of flyash. The Committee also desired that third party evaluation should be carried out for monitoring the adverse effects of fly ash dumping on ground water, surface water, flora and fauna etc.

The Committee decided to further consider the project upon receipt of the aforesaid details. The Committee also decided that the Central Pollution Control Board may bring out a Technical Guidance Document/Manual for various uses of flyash and disposal by dumping in coalmine voids. The Manual may address the environmental issues, the environmental issues that would require to be addressed and a environmental management plan which includes the technologies and methodologies for the environmental assessment – short-term and long-term use off flyash for dumping in decoaled voids and for other uses and for other uses vis-à-vis MOEF Notification on Flyash.

Annexure –VIII

MINUTES OF 34th MEETING OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE ON ENIVORNMENTAL IMPACT ASSESSMENT OF THERMAL POWER & COAL MINING PROJECTS

The 34th Meeting of the reconstituted Expert Appraisal Committee (Thermal Power) was held on **29th-30th April, 2015** at Teesta Meeting Hall, First Floor, Vayu Wing, Indira Paryavaran Bhawan (new building), Jorbagh, New Delhi.
The members present were:

1. Prof. C.R. Babu - Vice Chairman (Acting Chair)
2. Shri T.K.Dhar - Member
3. Shri J.L Mehta - Member
4. Shri G.S. Dang - Member
5. Shri N.K. Verma - Member
6. Dr. C.B.S Dutt - Member (Representative of NRSC)
7. Dr. S.D. Attri - Member (Representative of IMD)
8. Shri P.D Siwal and Shri N.S. Mondal - Member (Representative of CEA)
9. Dr. S.S. Bala - Member (Representative of CPCB)
10. Ms. Sanchita Jindal - Member Secretary

In attendance: Dr. M. Ramesh, Scientist 'D', MoEF&CC.
Shri A.K. Bansal, Dr. Ratnavel, and Dr. Asha Rajvanshi did not attend the meeting.

2.5 Permission for Backfilling of Ash from Talcher Super Thermal Power Station at Talcher, Odisha of M/s. NTPC Ltd. in abandoned voids of Quarry No. 8 of Jagannath Mines of M/s MCL – For Amendment of EC.

The Committee perused the presentation made by NTPC. It was noted earlier NTPC, Bhushan Steel and NALCO in Odisha were given permission for mine void filling on pilot basis and the results/outcome of the pilot study are not yet concluded. It was also noted that the existing ash pond has capacity to last for about four more years. However, the PP submitted that there are no cement plants in the vicinity and there is not much demand of fly ash bricks in the State and there are not many infrastructure projects coming up in the State where the fly ash can be utilized therefore there is no other option than to use for mine void filling. The present fly ash notification also permits mine void filling and filling of low lying areas. Recently, the Committee constituted by the NGT has also visited various sites and recommended mine void filling for TTPs in

Talcher area. The Committee was of the view that shear volume of the fly ash makes it hazardous and there is all possibility of heavy metals
leaching into the ground water. Therefore, till the results of the pilot study are made available, the proposal may be kept in abeyance. Meanwhile, NTPC may submit scientific and engineering plan for backfilling of the mines after consulting the National and International Experts for exploring the various geo-technical & engineering solutions.

Simultaneously, alternate avenues for fly ash utilization shall be explored and detailed action plan shall be submitted. It was also decided that Ministry may take a policy decision for allowing Mine void filling.

In view of above, the proposal was **deferred.**

Annexure- IX

No. J-11015/78/2011-IA-II.(M)
Government of India
Ministry of Environment, Forests & Climate Change
IA-II (Coal Mining) Division

Indira Paryavaran Bhawan,
Jorbagh Road,
New Delhi-110003
Dated: 16th January, 2015

To,

The General Manager (E&F)
M/s Eastern Coalfields Ltd.,
Asansol, Dist. Burdwan,
West Benga..
E-mail: envecl@yahoo.com

Sub.: Cluster no. 1 group of 11 mines project of expansion (from 2.70 MTPA (Normative) to 3.30 MTPA (Peak) in an ML area of 3692 ha; Latitude 23°, 44' N & 23°, 49' N and Longitude 86°, 39' E & 86°, 46', 30" E) M/s Eastern Coalfields Limited, located at dist. Dhanbad, Jharkhand - Environmental Clearance - reg.

Sir:

This is with reference to letter no. 430/17/2011-CPAM dated 08.03.2011 with the application for Terms of Reference (TOR) and this Ministry's letter dated 02.12.2011 & revised letter dated 10.02.2012 granting TOR. Reference is also invited to the letter no CIL/DL/EMP/2014/01 dated 12.02.2014 and subsequent letter nos. dated 05.05.2014; 22.07.2014; 23.07.2014; 24.11.2014 and 18.12.2014 for environmental clearance on the above-mentioned subject.

2. The Ministry of Environment, Forests & Climate Change has considered the application. It is noted that the proposal is for grant of Environmental Clearance for **Cluster no. 1 group of 11 mines project of expansion (from 2.70 MTPA (Normative) to 3.30 MTPA (Peak) in an ML area of 3692 ha; Latitude 23°, 44' N & 23°, 49' N and Longitude 86°, 39' E & 86°, 46', 30" E) M/s Eastern Coalfields Limited, located at dist. Dhanbad, Jharkhand.** The TOR was granted to the project, vide letter no. J-11015/287/2010-IA II(M) dated 15.06.2011. TOR modification was issued on 02.12.2011. Additional TOR issued on 10.02.2012. The Proponent submitted the EIA/EMP report on 12.02.2014. The TOR expired as per the earlier OM dated 22.03.2010 and accordingly letter was issued on 19.05.2014 delisting the project from pending list. The proposal has been considered for EC in accordance to the OM no. J-11013/41/2006-IA-II(I) (Part) dated 22.08.2014. The proposal was considered in the 23rd EAC meeting held on 16th -17th October, 2014. The proponent has informed that

i. The TOR was granted to the project, vide letter no. J-11015/287/2010-IA.II(M) dated 15.06.2011. TOR modification was issued on 02.12.2011. Additional TOR issued on 10.02.2012. The Proponent submitted the EIA/EMP report on 12.02.2014. The TOR expired as per the earlier OM dated 22.03.2010 and accordingly the project was delisted from the pending list. However, in accordance to the OM no. J-11013/41/2006-IA-II(I) (Part) dated 22.08.2014, the proposal has been submitted for considered of EC.

ii Objectives behind operating the OC patches / mines: The mines are Vulnerable to illegal mining proposed to undertake extraction of the upper seams by opencast method, wherever possible. Reduce possibilities of fire and inundation and ensuring safety of underground workings. Reduce future problems of unstable locations getting created due to population growth. Patches planned mainly in small, uninhabited areas, free from surface features and do not involve shifting of any

village. Only, land has to be acquired, compensation will be made as per the CIL's R & R Policy or that of the state, whichever is acceptable. Environmental impact for a short period. Quarries will be completely backfilled and biologically reclaimed with the help of experts and there will be no residual external OB dump. Beneficial from the financial viewpoint as this coal is available at shallow depth and the operation of the OC patches will enhance production and help in the turn-around of the company.

iii. There are wt Total 11 mines (All existing mines): 8 Underground, 1 Opencast & 2 Mixed mines Beside this, 5 new opencast patches have been proposed over existing underground workings within mine leaseholds.

iv. Present production from the cluster is 0.65 MTY. It is planned to achieve a peak capacity of 3.3 MTY from the existing as well as proposed mines in the cluster

Sl No.	Name of the Mine	Lease Area (Ha)	Normative Production Capacity (MTY)	Peak Production Capacity (MTY)	Life (Years)
1	Hariajam UG	316	0.11	0.14	> 25
2	Badjna UG	676	0.05	0 10	> 25
3	Chapapur-II UG	480	0.15	0.20	> 25
	Chapapur OC Patch (14 Ha)*		0.86	0.86	1
4	Khoodia UG	186	0.05	0.10	> 25
	Khoodia OC Patch (18 Ha)*		0.10	0.10	1
5	Lakhimata UG	217	0.08	0.10	> 25
	Lakhimata OC Patch (19 Ha)*		0.30	0.40	8
6	Shampur-B UG	368	0.09	0.10	> 25
	Shampur-B (Sangamahal) OC Patch (33 Ha)*		0.15	0.20	3
7	Mandman UG	345	0.07	0.10	> 25
8	Nirsha OC Patch	147	0.09	0.10	11
9	Shampur-A UG	491	0.05	0.10	> 25
	Shampur-A OC Patch		0.12	0.12	2
10	Gopinathpur UG	157	0.05	0.07	> 25
	Gopinathpur OC Patch		0.10	0.13	5
11	Kapasara UG	309	0.10	0.15	> 25
	Kapasara OC Patch (24 Ha)*		0.16	0.23	5
	Total	**3692**	**2.70**	**3.30**	

* New proposed OC patches (Area of the patch given in brackets)

v. The latitude and longitude of the project are 23^0, 44' N & 23^0, 49' N and 86^0, 39' E & 86^0, 46',30" E respectively.

vi. Joint Venture: No Joint Venture

vii. Coal Linkage :

The coal linkages are with The West Bengal Power Development Corporation Limited (WBPCDCL),
Mejia Thermal Power Station-Bankura,West Bengal.
Sipat Super Thermal Power Station or Rajiv Gandhi Super Thermal Power Station at SipatBilaspurdistrict Chhattisgarh.
GMR Energy Limited Kamalanga thermal power plant ,Odisha.
Aravali Power Company Private Limited,Haryana.
Kahalgaon Super Thermal Power Station (KhSTPP), Kahalgaon, Bhagalpur , Bihar.

viii. The land usage of the project will be as follows:

Pre-Mining& Post- Mining:

S.No	Type Land Use	Present Mining Land Use (ha)	Land Use during Mining (ha)	Post- mining Land Use (ha)
1.	Running quarry	92.00	200.00	
	Backfilled	-		200.00 & brought under Plantation
	Not Backfilled	-		
2.	Abandoned / exhausted quarry	171.00		
	Backfilled	121.00	121.00	121.00&brought under Plantation
	Not Backfilled	50.00	50.00	50.00 (water body)
3	External OB dump	48.00	48.00	48.00 To be brought under Plantation
4	Service building/ mine infrastructure	382.00	382.00	300.00 (undisturbed) + 82.00 ha under plantation
5.	Rail & Road	108.00	108.00 (20 Ha for green belt)	108.00 (20 Ha under plantation)
6.	Habitation (total)	592.00	592.00	592.00
7	Other built-up areas	654.00	654.00	654.00
8	Agriculture land	860.00	860.00	860.00
9.	Forest land	-	-	-
10	Plantation / Natural Vegetation	60.00 62.00	60.00 62.00	593.00
11	River/nallah/pond	204.00	204.00	204.00
12.	Barren land	459.00	351.00	351.00
	Total	3692.00	3692.00	3692.00

ix. The total estimated water requirement is 4667 m3/day. The level of ground water ranges in Pre - monsoon: 0.6 to 14.7 m BGL & Post - monsoon: 0.4 to 7.47 m BGL.

x. The Method of mining would be by Bord & Pillar for UG and Shovel - Dumper Combination for OC.

xi. There are 8 external OB dumps with Quantity of 200 Mbcm with height of 60 m from ground level and 8 internal dump with Quantity of 35.7 Mbcm.

xii. No final mine voids. Patches will be completely backfilled, and the Total quarry area is 200 Ha Backfilled quarry area of 200 Ha shall be reclaimed with plantation

xiii. The seasonal data for ambient air quality has been documented and all results at all stations are within prescribed limits

xiv. **Transportation:** Coal transportation in pit by Underground mine coal tubs at the faces are being hauled by series of rope haulages to surface. Opencast mine-coal is loaded by shovels at face and transported to the surface coal depot by colliery dumpers, Surface to Siding by Road transportation by 15 te dumpers and loading at siding by Pay loaders are used for loading of coal onto wagons

xv. There is no **R & R** involved. There are no PAFs.

xvi. **Cost.** Total capital cost of the project is Rs 186.42 Crore. CSR Cost @ Rs. 5.00 per tonne of coal

produced. Environmental Management Cost (capital cost Rs 2713.00 Lakhs, annual recurring cost Rs 1886.95 Lakhs).

xvii **Water body**: The cluster is drained by a seasonal river Khoodia, a tributary of the Barakarriver, flowing about 4 kms from the cluster boundary on the east. Another seasonal river, Pusai, which is a tributary of Khoodia also drains the northern portion of the cluster.

xviii **Approvals**: All the existing mines within the cluster are taken over mines after nationalization. The mines of ECL has been grouped into 13 Clusters which has been approved by Competent authority of ECL on 10.09.2009 and subsequently accorded approval of Board of Directors of ECL in its Board Meeting held on 28.03.2011 for preparation of EIA/EMP of the cluster. Mine Closure Plan approval in December, 2013.

xix. **Wildlife issues**: There are no national Parks, wildlife sanctuary, biosphere reserves found in the 10 km buffer zone.

xx. **Forestry issues**: No forest area involved in the cluster.

xxi. Total **afforestation** plan shall be implemented covering an area of 471 ha at the end of mining. Reclaimed external OB dump (48 ha), internal dump (121 ha); Green Belt over an area (20 ha) Density of tree plantation 2500 trees/ ha of plants.

xxii There are no **court cases/violation** pending with the project proponent.

xxiii. **Public Hearing** was held on 12.06.2013. The issues raised in the PH includes information regarding closed mines ; water scarcity ; dust pollution due to road traffic; CSR works; Demand for employment; transportation etc. All the commitments made during the Public Hearing shall be implemented.

3. The proposal was considered in the Expert Appraisal Committee (EAC) (Thermal & Coal Mining) and recommended in its 25th EAC meeting held on 16th -17th October, 2014 for granting Environmental Clearance. The Ministry of Environment, Forests & Climate Change hereby accords environmental clearance for the above-mentioned **Cluster no. 1 group of 11 mines project of expansion (from 2.70 MTPA (Normative) to 3.30 MTPA (Peak) in an ML area of 3692 ha; Latitude 23°, 44' N & 23°, 49' N and Longitude 86°, 39' E & 86°, 46', 30" E) M/s Eastern Coalfields Limited, located at dist. Dhanbad, Jharkhand** under the provisions of the Environment Impact Assessment Notification, 2006 and subsequent amendments/circulars thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions:

i. The maximum production from the mine at any given time shall not exceed the limit as prescribed in the EC.

ii. The validity of the EC is for the life of the Mine or as specified in the EIA Notification, 2006, whichever is earlier.

iii. No underground mining shall be carried out below and within 45 m of the NH-2 and rivers flowing through the cluster.

iv. The EC be only for peak value only. PP should ensure the mine water discharge shall comply to the prescribed standards.

v. All commitments made in the Public Hearing shall be fully implemented.

vi. There shall be no voids and OB dumps after the end of mining. New voids shall be completely filled up to near ground position. 50% of old voids shall be filled up and other 50% of old voids shall be filled upto 15 meter for the purpose of pisciculture.

vii. There shall be no fly ash utilization in the mine voids. Fire in the OBDs shall be quenched by blanketing and should be re-vegetated.

viii. The surface drainages shall be preserved.

ix. The quality of water should be conformed to the prescribed standards before discharged into nallahs.

x. All safety measures shall be taken as per CMR, 1957 & related Circulars.

xi. The production shall be within the same Mining Lease area.

xii. Coal shall be transported by rail only. Coal transportation from mine to siding should be by conveyor belt. The loading to siding by pay loaders into railway wagons.

xiii. Independent network of railway sidings inside cluster be developed. Railway sidings should be constructed at the earliest and till then proponent may use mechanically covered trucks for transportation of coal.

xiv. Three tier green belts shall be raised around the railway sidings and along the road sides to prevent dust and noise pollution.

xv. Stowing and depillaring shall be as per the recommendations of the DGMS

xvi. The proponent must comply with the Raniganj Action Plan. The unstable areas within the cluster will be brought under plantation after the population residing over these areas is rehabilitated under the Master plan for Raniganj Coalfield to be implemented by ADDA.

xvii. Trees with deep rooted system should be planted so as to prevent soil erosion.

xviii Proponent should plant additional 10 Ha/ year over the next 10 years at various locations in this Cluster.

xix. River/nallahs shall be desilted and restored back to functional state

xx. Wild life conservation plan be prepared and submitted to the MOEFCC with the approval of the State Govt.

xxi. Proponent shall use high resolution image of all clusters for evaluating land use, plantation etc

xxii. Separate drainage pattern be provided.

xxiii Sand stowing must be used as recommended by CMPDI.

xxiv. Action plan for prevention and mitigation of subsidence be prepared and implemented.

xxv. The OC patches to be operated will be completely filled-up after exhaustion of reserves and reclaimed with plantation.

xxvi. The OB shall be completely re-handled at the end of the mining

xxvii. There shall be no residual OB dump after the mining

xxviii. After completion of mining activities, the subsided areas shall be graded and planted upon

xxix. Coal Extraction shall also be optimised in areas where agricultural production is continuing. Some pillars shall be left below the agricultural land. No depillaring & coal extraction should be carried out below habitation, H.T. Lines & beneath road, water bodies

xxx The land excavated after mining must be brought back to original condition for agricultural/plantation purpose

xxxi. Water discharged from the mine should be as good as surface drinking water.

xxxii. Regular monitoring of subsidence movement on the surface over and around the working area and impact on natural drainage pattern, water bodies, vegetation, structure, roads, and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence movement, appropriate effective corrective measures shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil/suitable material.

xxxiii If subsidence is found exceeding the permitted limits, then the landowners shall be adequately compensated with mutual agreement of the landowners.

xxxiv. Water sprinkling system shall be provided to check fugitive emissions from loading operations, conveyor system, haulage roads, transfer points, etc. Major approach roads shall be black topped and properly maintained.

xxxv. The CSR cost should be Rs 5 per Tonnes of Coal produced which should be adjusted as per the annual inflation.

xxxvi. The mining in the existing mines should be phased out after expiry of the current mining lease and after reclamation of mined over area. The operating mines may be analysed and monitored for compliance of conditions, bearing with movement of wildlife and until such time they are closed/phased out.

xxxvii Everybody in the core area should be provided with mask for protection against fugitive dust emissions

xxxviii. Dust mask to be provided to everyone working in the mining area.

xxxix. The supervisory staff should be held personally responsible for ensuring compulsory regarding wearing of dust mask in the core area.

xl People working in the core area should be periodically tested for the lung diseases and the burden of cost on account of working in the coal mine area

xli. The mining area should be surrounded by green belt having thick closed thick canopy of the tree cover.

xlii Besides carrying out regular periodic health check-up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, through an specialised agency /institution within the District/State and the results reported to this Ministry and to DGMS

xliii. The embankment constructed along the river boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side and stabilised with plantation so as to withstand the peak water flow and prevent mine inundation.

xliv. There shall be no overflow of OB into the river and into the agricultural fields and massive plantation of native species shall be taken up in the area between the river and the project.

xlv. Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilised for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.

xlvi. Garland drains (size, gradient and length) around the safety areas such as mine shaft and low lying areas and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine sites. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.

xlvii. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.

xlviii. Crushers at the CHP of adequate capacity for the expansion project shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc.

xlix Mine discharge water outside the ML shall be monitored, particularly for TDS and treated to confirm to prescribed levels before discharge into the natural environment.

l Drills shall be wet operated

li. The project authorities shall undertake regular repairing and tarring of roads used for mineral transportation. A 3-tier green belt comprising of a mix of native species shall be developed all along the major approach roads.

lii. Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.

liii A Progressive afforestation plan shall be implemented covering an area of 593 ha at the end of mining, which includes waste dump area (169 Ha) Excavation area (200 ha), Mine Infrastructure/ Built-up area (82 ha); Green Belt (20 Ha) by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha. Massive plantation shall be carried out in open spaces in and around the mine and a 3-tier avenue plantation along the main approach roads to the mine.

liv The proponent should prepare restoration and reclamation plan for the degraded area. The land be used in a productive and sustainable manner.

lv. Compensatory Ecological & Restoration of waste land, other degraded land and OB dumps in lieu of breaking open the land be carried out.

lvi. No groundwater shall be used for mining operations

lvii An estimated total 235.7 Mm^3 of OB will be generated during the entire life of the mine. Out of which 200 Mm^3 of OB will be dumped in eight external dump and 35.7 Mm3 in eight internal OB Dumps. The OB dump height is upto 60 m. The maximum slope of the dump shall not exceed 28 degrees. Monitoring and management of reclaimed dump sites shall continue till the vegetation becomes self-

sustaining and compliance status shall be submitted to MOEF&CC and its Regional Office on yearly basis.

lviii. Of the total quarry area 200 ha. the backfilled quarry area of (200 Ha) shall be reclaimed with plantation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha

lix. Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the Ministry of Environment, Forests & Climate Change and to the Central Pollution Control Board quarterly within one month of monitoring.

lx. The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring indicates a decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine

lxi. Sewage treatment plant shall be installed in the existing colony. ETP shall also be provided for workshop and CHP wastewater.

lxii. Land oustees shall be compensated as per the norms laid out R&R Policy of CIL or the National R&R Policy or R&R Policy of the State Government whichever is higher

lxiii. For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF&CC and its concerned Regional office

lxiv. A detailed Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest & Climate Change within 6 months of grant of Environmental Clearance.

lxv. The project authorities shall in consultation with the Panchayats of the local villages and administration identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine.

lxvi. Corporate Environment Responsibility:

a) The Company shall have a well laid down Environment Policy approved by the Board of Directors.

b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions.

c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.

d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large

B. General Conditions

i. No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment, Forests & Climate Change.

ii. No change in the calendar plan of production for quantum of mineral coal shall be made.

iii. Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.

iv. Data on ambient air quality (PM_{10}, $PM_{2.5}$, SO_2 and NO_x) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its concerned Regional Office and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EPA rules, 1986 shall be furnished as part of compliance report.

v Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.

vi Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.

vii. Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.

viii. Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EPA Rules, 1986.

ix. Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.

x Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.

xi A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company.

xii The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.

xiii. The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days 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 may also be seen at the website of the Ministry of Environment, Forests & Climate Change at http://envfor.nic.in

xiv A copy of the environmental clearance letter shall be marked to concern Panchayat/Zila Parishad, Municipal Corporation or Urban local body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website.

xv. A copy of the environmental clearance letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days.

xvi. The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM_{10}, $PM_{2.5}$, SO_2 and NO_x (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.

xvii The project proponent shall submit six monthly compliance reports on status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the Ministry, respective Zonal Offices of CPCB and the SPCB.

xviii. The Regional Office of this Ministry located in the Region shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports

xix. The Environmental statement for each financial year ending 31 March in For –V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEFCC by e-mail

4. The proponent shall abide by all the commitments and recommendations made in the EIA/EMP report so also during their presentation to the EAC.

5 The commitment made by the Proponent to the issue raised during Public Hearing shall be implemented by the Proponent

6. The proponent is required to obtain all necessary clearances/approvals that may be required before the start of the project. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

7. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

8 The Proponent shall setup an Environment Audit cell with responsibility and accountability to ensure implementation of all the EC Conditions

9. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

10. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India/ High Courts and any other Court of Law relating to the subject matter. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

11. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

(Dr. Manoranjan Hota)
Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi.

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3 Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, A/3 Chandrashekarpur, Bhubaneswar 751023
4 Member-Secretary, Jharkhand State Pollution Control Board, 1A Building, HEC Complex, PO Dhurwa, Ranchi.
5. Member-Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi 110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7 Dr. R.K Garg, Advisor, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxmi Nagar, New Delhi
8. District Collector, Dhanbad, Government of Jharkhand.
9 IG (Wild life), Ministry of Environment and Forests, New Delhi
10 Monitoring File 11. Guard File 12. Record File 13. Notice Board

(Dr. Manoranjan Hota)
Director

एनटीपीसी
NTPC
A Maharatna Company

एन टी पी सी लिमिटेड
NTPC Limited

Date:- 26.10.2020

OFFICE MEMORANDUM

Sub: Record Notes of Discussions of 7th meeting of Task Force held on 09.10.2020 through VC on Microsoft Teams Platform – reg

Kindly refer to the meeting held through VC, chaired by ED (SSEA), NTPC Ltd. to review status of Mine Void allocation for backfilling with Ash.

In this regard, record notes of discussion are enclosed for information and necessary action

Sahoo

(Laxmidhar Sahoo)
General Manager,
Ash Management, NTPC Ltd.
Mob-7328816804

Distribution:

- As per list at **Annexure – I**

Record Notes of Discussions of 7th meeting of Task Force held on 9.10.2020 through VC on Microsoft Teams Platform

7th meeting of the Task Force (constituted by Ministry of Power to identify, review and recommend the list of Mines for ash back filling) was organized on 9thOctober, 2020 through VC on Microsoft Teams platform. List of participants is attached as **Annexure- I.**

At the outset, ED (SSEA), NTPC Limited, Convener of the Task Force, welcomed all the members. He briefed about the draft Gazette Notification issued by MoEF & CC and its impact on TPPs and Mining Organizations. Thereafter, discussions were held on actionable points of the last (6th) meeting and allocation of new mine voids. Following are the major points of discussions / recommendations of the Task Force, which emerged during this meeting:-

1. **Identification of more mines for allocation**: List of 21 mines was shared in the last meeting by CIL with a comment that it will be reviewed quarterly. CIL informed the list of mines for ash filling has been reviewed by CIL and that there is no addition in the list of 21 mines shared earlier.

   2. NTPC and DVC expressed apprehension that these 21 mine voids are grossly insufficient in view of the tough Ash Utilization targets, specifically for Pithead TPPs. List needs to be reviewed and more mines need to be added. Convener of Task Force requested that CIL may revisit / review the first list of mines wherein 285 mines were identified for ash filling and that some more mines may be added. CIL agreed to revisit / review the first list of 285 mines and share the updates on the same in a period of one month. He also shared that with new technology, some underground mines are proposed to be converted into Open Cast mines and that stripping ratio too has increased resulting in issue of handling OB. In view of above two factors, a substantial increase in list of Mine voids will not be there. MOEF & CC member informed that they have received a letter dated 08.10.2020 from M/s DB Power to instruct SECL to allocate Chhal Mines of SECL for back filling of ash in mines. CIL member replied that Chhal Mine is planned for expansion and cannot be allocated for ash filling .Suitable reply may please sent to M/s DB Power in this regard by CIL. (Action: CIL)

3. NTPC shared that as per Gazette Notification dated 03.11.2009, issued by MoEF & CC, at least 25% ash is to be used with OB for dumping / mine back filling. It will help in achieving tough target of 100% Ash Utilization by Pit Head TPPs. NTPC vide letter dated 05.08.2020 had requested NCL / ECL / MCL / SECL / WCL / SCCL for use of ash in backfilling with OB. On this issue, CMPDIL informed that they have already highlighted the environmental and safety issues (stability of dumps, air & water pollution etc.) associated in back filling of ash with OB dumps. CIL also added that coal companies are also facing scarcity of land for OB dump. CIL also informed that mixing of ash with OB is having many issues including operational and safety issues and this clause of Gazette Notification needs to be reviewed. In view of all these concerns, in the present scenario, fly ash dumping can only be allowed in abandoned mines. It was informed that the matter will be deliberated in MoEF& CC upon receipt of comments/inputs from MOC/CIL as part of the inter-ministerial consultations.

   (Action: MOC / MOEF& CC)

4. On non-availability of more abandoned coal mine for ash filling as well as constraints of ash filling in operational mines as shared by CIL / CMPDIL, convener of Task Force pointed out that both these aspects limits the utilization of fly ash in mines. For ensuring 100 % utilization of fly ash by power industry ,he stressed upon identification and allocation of more mines for ash filling. (for information to all)

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5. CPCB shared that as far as safety aspects are concerned during ash filling with OB in operating mines, DGMS may examine mine safety on case-to-case basis. It was added that if M/s Jindal can use ash with OB for back filling, why other companies can not? It was further added that apart from considering economic viability by coal companies, compliance of ash utilization norms in view of national interest should also be given due importance. On this issue, CIL shared that M/s Jindal's mines are new & small in size, whereas safety and operational issues becomes many fold in big mines. In addition, slope failure may have huge impact where stripping ratio is high. In view of this, in operational mines, ash filling with OB dumps is not possible.

(Action: DGMS)

6. NTPC shared that the draft Gazette Notification on fly ash utilization issued by MoEF & CC and its penalty provisions may put the power plants and mining companies in a big problem. It will be critical especially for pithead stations where there are no users / takers of fly ash and mining companies are unable to allocate mine for ash filling because of their technical / commercial constraints. In such conditions, how the power plants will achieve 100% ash utilization. Members from CIL, CMPDIL and Ministry of Coal opined that draft Gazette Notification on fly ash utilization should not be finalized by MoEF & CC unilaterally. A committee may be constituted for finalization of Gazette Notification with technically supported decision on all provisions. MoEF & CC shared that inter-ministerial consultations will be held for finalization of draft notification after receipt of comments from concerned Ministries/Organizations.

(Action : MoEF & CC)

7. CIL shared that putting conditions of use of ash in mines is affecting viability of coal companies, especially for big mines. It was added that nearly Rs. 100 Crore has been deposited by CIL / its subsidiaries to State PCBs in the form of BGs towards CTE / CTO on use of ash in mine filling conditions. On this issue, MoEF & CC shared that Ministry may consider the issue on receipt of representation from CIL regarding constraints on obtaining CTE/CTO (Action: MoEF&CC)

8. Ministry of Mines (MoM) had earlier submitted a list of 84 abandoned mines of minerals other than coal. In the last meeting of the Task Force, it was agreed that Ministry of Mines will review the list of mines, other than Coal mines and come out with revised list along with mine location / co-ordinates, void capacity and feasibility of ash filling these mines. Now, it has been shared that all the 84 mines are shallow mines and ownership of these mines is with respective State Govt. Status about co-ordinates, void capacity and feasibility of ash filling etc. is not known to Ministry of Mines. However, Ministry of Mines can arrange more details about mines which may be useful for TPPs for ash filling among earlier circulated list. (Action- MOM)

9. DVC shared that its BTPS plant has been allocated Govindpur mine by CCL which has only 85000 Cu.m capacity. Being an UG mine & such a small volume, it is very difficult to be filled up. It was further stated that its CTPS plant has been allocated Murlidih mine by BCCL which has capacity of 1.5 lakh Cum, however, major constraint with this is that water body (River Damodar) is within 500 meter. On this CIL commented that most of the mines are in proximity of water bodies. It was thus requested by DVC that this condition of proximity of water body may be redefined by MoEF & CC. It was then shared that its DSTPS and MTPS also have been allocated only small capacity mine voids and that alternate mines available near these plants has been identified by DVC. CIL / its subsidiaries may allocate the identified alternate mines to DVC. On this point, CIL shared that available mine have already been allocated and that the alternate mines suggested by DVC are not available for ash filling. DVC/CIL was asked to share a map showing mine

boundary and river to understand the issue and arrive at possible solution.
(Action- CIL / MOEF)

The Meeting ended with vote of thanks by Convener of Task Force to all participants.

****

Annexure- I

List of Task Force members and others present during the meeting:-

Sl. No.	Name (S/Sh.)	Designation	Organization
1.	S M Chowdhury	ED (SSEA)	NTPC - Convener
2.	Ajitesh Kumar	Dy. Secretary	MoC
3.	A K Diwakar	Chief Manager	MoC/ CIL
4.	Md. Aftab Ahmad	Director (M)	DGMS
5.	N. Subramanyam	Joint. Director	MoEF&CC
6.	S K Paliwal	Addl. Director	CPCB
7.	Pushpender Gaur	Dy. Controller of Mines	Indian Bureau of Mines, MoM
8.	Shankar	GM (Env.)	CIL
9.	Baleshwar Thakur	Director	CEA (TCD)
10.	Ashish Srivastawa,	Dy. Director	CEA (TCD)
11.	Dr C N Ghosh	Chief Scientist	CIMFR
12.	V K Pandey	Chief Manager (Env)	CMPDIL
13.	Dr. Vinita Arora	Chief Manager (Env)	CMPDIL
14.	Md. Eyasin	CE (EM&PC)	DVC
15.	B B Chugh	GM	NTPC
16.	L. D. Sahoo	GM	NTPC
17.	S. K. Pathak	AGM	NTPC
18.	Ashwani Tyagi	DGM	NTPC
19.	Subhash C Kalia	Sr. Manager	NTPC

UTILISATION OF FLY ASH IN COAL MINES (UG/OC)

JUNE 2016

1. Introduction

Coal is likely to remain the main fuel source for the domestic energy market in India over the next few decades. Indian coal is of low calorific value and high ash content. The thermal power plants in India using domestic coal supply consumes about 0.7 kg of coal to generate one kWh of energy, whereas United States thermal power plants consume about 0.45 kg of coal per kWh. Low grade Indian coal is having ash content up to 40%.

Fly ash is one of the byproduct generated in combustion of coal. Fly ash along with bottom ash is known as 'coal ash' and is generally captured from the chimneys of coal-fired power plants and from the bottom of the boiler. Depending upon the source and geological formation of the coal being burned, components of fly ash vary considerably. The progressive ash generation at coal/lignite based thermal power stations and its utilization for the period from 1994 to 2014-15 as per data collected from Fly Ash Unit (FAU), Department of Science & Technology (DST) and other sources is given in Table-1 below:

Table-1: Fly ash generation and utilization in India

Sl. No.	Year	Fly Ash Generation (mtpa)	Fly Ash Utilization (mtpa)	Percentage Utilization
1	1994-95	40	1	2.5
2	2008-09	160	80	50
3	2011-12	220	110	50
4	2014-15	230	130	57

As per the developed countries scenario the fly ash is being used as a basic raw material for construction of road and building and to some extent void filling work. The worldwide production of coal combustion products (consisting of fly ash, bottom ash, FGD gypsum) for the year 2010 is given below in Table 2. The largest coal combustion products generating country was China (395 MT). The percentage of utilization is almost 90-100% in countries like Japan, Europe.

Table-2: Coal Ash Utilization–International Scenario

Country	Total Ash Production (MTY*)	Ash Utilization (MTY)	Utilization in % of production
Australia	13.1	6	45.80
Canada	6.8	2.3	33.82
China	395	265	67.09
Europe	52.6	47.8	90.87
Japan	11.1	10.7	96.40
Middle East & Africa	32.2	3.4	10.56
United States of America	118	49.7	42.12
Other Asia	16.7	11.1	66.47
Russian Federation	26.6	5	18.80

Source: Published in 2013 World of Coal Ash Conference. "Coal Combustion Production. A global Perspective", Craig Hedrich, Hans Jaochim Feuerborn, Anne Wier.

The fly ash generation in India is second highest in the world. Despite fly ash being used a raw material for cement industry as well as a building material the problem of unutilized fly ash is a serious environment problem.

2. Background

In the meeting of the Central Monitoring Committee on Implementation of Fly Ash utilization held on 18.06.2014, it was decided that "**Ministry of Coal through its expert Committee or by involving any other agency such as CMPDI, will examine the issues of use of fly ash as stowing material in operating mines and will suggest the way forward for consideration of Ministry of Environment and Forest" (Annexure I).**

Further to the above, Ministry of Environment & Forest (MoEF) in reference to the order of Hon'ble National Green Tribunal (NGT), Bhopal dated 5th November, 2015 in OA 95 of 2015 **(Annexure II)** regarding disposal of fly ash especially through mine backfilling, directed Ministry of Coal (MoC) to provide the action taken on this issue at the earliest so that they could file a reply before Hon'ble NGT in time.

The draft report on the subject matter was submitted by CMPDI to MoC on 28th December, 2015. This draft report was further supplemented on 4th April, 2016 and 8th April, 2016 and MoC was requested for their comments so that it could be incorporated in the final report.

3. Scope of work

The above matter was considered in the hearing of Hon'ble NGT Bhopal on 4th April 2016 and CMPDI requested for some more time to submit the final report. The request was agreed by the Hon'ble NGT.

Accordingly, a four member committee was constituted in CMPDI and the committee examined the following:-

- Statutory requirements for backfilling of fly ash in coal mine voids
- Studies carried out for fly ash utilization in coal mines by different agencies including CMPDI
- Operational, safety & environmental issues of stowing / backfilling of fly ash in coal mines
- Operating as well as abandoned mines were considered for further study

Based on the above, the committee has formulated this report for submission to MoC.

4. Chronology of events

a. Meeting of the Central Monitoring Committee on implementation of Fly Ash utilization held on 18.06.2014. Minutes of meeting is enclosed as Annexure-I.

b. Point No. 11 of the Minutes of the meeting (as above) states " "The representatives of the Ministry of Coal submitted that as per the provisions of the notification, they have constituted the Expert Committee to guide and advise the backfilling or stowing of mine by utilizing fly ash. The issues had been discussed by the Expert Committee of the Ministry of Coal. It has been agreed that fly ash disposal as stowing material in underground mines, abandoned opencast mines and final voids at the end of mining operation can be considered. The Ministry of Coal has written to MoEF that in view of practical difficulties from safety point of

view, specifically in operational mines, it is not practically possible for mixing fly ash with external OB dumps and then back filling of operating mines. Thus, provisions in the notification need a complete review. Till such time, incorporation of these provisions in mining plans may be kept in abeyance. It was decided that the Ministry of Coal will get the issue examined through appropriate agencies such as Central Mine Planning and Design Institute and the Expert Committee. The MoC will forward the outcome for consideration of the MoEF. The proposed exercise may be completed by MOC within a period six months".

c. The minutes were forwarded by MoEF to MoC vide letter no. 9-8/2005-HSMD dated 31st July 2014. The following decision was taken with respect to fly ash utilization in coal mining industry –

"**Ministry of Coal through its expert Committee or by involving any other agency such as CMPDI will examine the issues of use of fly ash as stowing material in operating mines and will suggest the way forward for consideration of the Ministry of Environment and Forests within a period of six months**".

d. Vide letter no. 43011/102/2007-CPAM dated 16th September 2014 CMPDI was requested by MoC to examine the issue of use of fly ash as stowing material in operating mines and to suggest the way forward for consideration of MoEF within a period of six months.

e. MoEF, vide letter no. No.11-4/2013-HSMD dt. 23rd December 2015, in reference to the order of Hon'ble NGT, Bhopal dated 5th November, 2015 in OA 95 of 2015 requested MoC to submit the said report **(Annexure – III).**

f. CMPDI submitted a draft report to Director (Tech.), MoC in this regard and further revised the same and sent it by mail on 28thDecember 2015 to MoC. The draft report was further supplemented on 4th April, 2016 and 8th April, 2016. Further, MoC was requested for their comments so that it could be incorporated in the final report.

h. NGT (CZ), Bhopal order dated 4th April 2016, wherein CMPDI has been given two months' time to complete the said report and be present on 4th July 2016. **(Annexure–IV).**

5. Conventional Approach in Backfilling of voids in mines

a. Underground mines

In underground mines, extraction of coal is carried out by mining methods involving either

- Caving, wherein overlying strata is allowed to cave and fill-in voids created due to extraction ; or
- Stowing or backfilling the voids so created.

Primarily, mining methods with caving is adopted for extraction of coal in underground mines while mining methods with stowing or backfilling is adopted only in certain specific conditions, such as -

- Constraints on surface; in such cases damages to surface features are to be protected by minimizing subsidence;

- Problems in extraction of coal due to complex geo-mining conditions, like multiple seams/working in contiguity or proximity, thick seams with multi-section workings, disturbances due to overlying mine workings, steep seams etc.

Stowing or backfilling is generally carried out keeping in view conservation of coal. Stowing or backfilling operation in underground mines is non-productive and is an additional operation in the coal extraction process. Difficulties in stowing or backfilling may create hindrances in the normal mining operations as it falls in the process cycle of underground mining operation, thereby affecting profitability & viability of the underground mines.

Hence, very limited number of underground mines exists (or may be available) where extraction of coal is planned or carried out by adopting stowing or backfilling. This is also reflected in total sand stowing which has been carried in underground mines (as approved by CCDA) of different subsidiaries of CIL during the three financial years 2013-14, 2014-15 and 2015-16 as under:

Company	Quantity of sand approved by CCDA (in million m^3)		
	2013-14	2014-15	2015-16
CIL	3.015	3.059	2.848

(*Data provided by Coal Controller office, Kolkata*)

Characteristic of stowing or backfilling material has direct bearing on coal production process by underground mining methods, thereby affects production, productivity and overall economics of the mine. Hence, it is necessary that material selected for stowing or backfilling in underground coal mines has requisite properties. DGMS has imposed restriction on use of fly ash with particle size less than 53 µm (Copy of the permission for use of 'bottom ash' is enclosed as **Annexure-V**).

Generally, river sand is used for stowing in underground mines. Its suitability has been established in stowing/backfilling in underground coal mines. Processes for stowing with sand has been standardized and adopted in underground coal mines. Stowing operation involves additional cost. A part of the cost incurred on the stowing or backfilling with sand is reimbursed by CCDA.

Abandoned underground mines:

In abandoned underground mines where final extraction has been completed with caving, the voids generally gets filled-up with broken overlying rocks due to increase in its volume. The internal spaces within the broken rock, generally gets filled up water.

In case of abandoned or discontinued mines where final extraction (depillaring or pillar extraction) has not been completed, backfilling may not feasible as coal reserve locked in pillars may be lost forever. Further, if such underground workings are left abandoned or discontinued for the longer periods, it may also get filled-up with water.

In the limited voids that may be available in abandoned mines, generally filled with water, blind backfilling, i.e. filling up the stowing material in the inaccessible UG mine from surface, or stowing would be very difficult.

Nowadays, water locked-up in abandoned underground mines act as reservoirs, which are being used for water supply to surrounding residential colonies and other nearby villages. This is done under the instruction of the MoC in view of water crisis in the nearby areas.

b. Opencast mines

In opencast mining, handling of overburden (OB) is considered the most important activity requiring very careful and elaborate planning. The purpose is to reduce land requirement for external dumping of overburden and accommodate maximum overburden in internal dumps. There are also restrictions on maximum dump height, i.e. up to 90 m or three decks of 30 m each above surface level. The overall working slope is kept at approximately 24-26 degrees, that is further flattened while reclamation at the end of the mine life. In many steeper seams (steeper than 1 in 6 to 1 in 7 gradient) simultaneous internal dumping is not recommended at all. Additionally, many other geo-technical parameters are considered for handling of overburden.

During mining operations, as the active coal face advances beyond a distance of 100-150m, the internal overburden dump benches are also advanced, maintaining recommended bench dimensions.

For external dumping, OB decks of recommended height are made on top of each other. Ramps are provided on the decks for transporting OB from mine faces to dumps.

6. Statutory requirements for using fly ash in mine voids

The notification S.O.2804 (E), dated 3rd November, 2009, issued by MoEF, is particularly related to the utilization of fly ash in various sectors. The relevant extracts related to mining sector are as under:

8(i) ***No person or agency shall within fifty kilometers (by road) from coal or lignite based thermal power plants, undertake or approve stowing of mine without using at least 25% of fly ash on weight to weight basis, of the total stowing materials used and this shall be done under the guidance of the Director General of Mines Safety (DGMS).***

Provided that such thermal power stations shall facilitate the availability of required quality and quantity of fly ash as may be decided by the expert committee referred in sub-paragraph (10) for this purpose.

8(ii) ***No person or agency shall within fifty kilometers (by road) from coal or lignite based thermal power plants, undertake or approve without using at least 25% of fly ash on volume to volume basis of the total materials used for external dump of overburden and same percentage in upper benches of back filling of opencast mines and this shall be done under the guidance of the Director General of Mines Safety (DGMS).***

The notification also spells out that –

(10) ***The Ministry of Coal for this purpose shall constitute and expert committee comprising of representatives from Fly Ash Unit, Department of Science and Technology, Ministry of Science and Technology, Director***

General of Mines Safety (DGMS), Central Mine Planning and Design Institute Limited (CMPDIL), Ministry of Environment and Forests, Ministry of Power, Ministry of Mines and the central Institute of Mining and Fuel Research (CIMFR), Dhanbad; the committee shall also guide and advise the backfilling or stowing in accordance with the provisions contained in sub-paragraphs (8) (i), 8(ii) and (9), and specifications and guidelines laid down by the concerned authorities as mentioned in sub-paragraph (1) of paragraph 3.

7. Studies carried out on backfilling of mine voids

Several studies have been carried out on issues related to fly ash utilization. Some of the relevant studies related to coal mining sector were examined. The conclusions/ recommendations/ constraints mentioned in these reports are given as under:

a. Coal S&T project funded by MoC "Characterization and Leaching Studies of Indian Fly Ashes for Evaluation of their Stability as Mine Fill Material" carried out by CIMFR, Dhanbad (2001-2004).

The **conclusions / recommendation** of the above report is as under (page - 93 & 94 of the said S&T report)

- The percentage determination of the major components present in Ramagundam and Chandrapura ash revealed that both the ashes belong to class-F category because calcium oxide content present in these ashes is less than 10%.
- From the batching leaching experiment, it has been seen that leachates produced from Ramagundam fly ash contained maximum concentration of dissolved solids. Chandrapura fly ash showed high concentration of fluoride and manganese in it, more than the drinking water standard. Chromium, in fly ash leachate of Ramagundam, has been found more than in drinking water standard. The leachates of bottom ash, pond ash and weathered ash of Ramagundam and Chandrapura have not shown any pollutant at high concentration level.
- Effect of pH on leaching behaviour of pond ash of Ramagundam and Chandrapura revealed that dissolution of heavy metals from coal ash surfaces, in aqueous solution follows a predictable pattern of decreasing release with increasing pH, except chromium. At lower pH of 2, high concentrations of all the heavy metals are released from the ash surface.
- The total metal content determination in fly ash, bottom ash, pond ash and weathered ash of Ramagundam and Chandrapura showed that iron is the major component in each type of ash, whereas cadmium is present in least concentration.
- The three major size fractions of pond ash of Ramagundam and Chandrapura indicated that almost all the fractions have similar type of leaching behaviour and amount of pollutants released shown similar concentrations.
- Open column percolation leaching experiment carried out on fly ash, bottom ash, pond ash and weathered ash of Ramagundam and bottom ash, pond ash and weathered ash of Chandrapura showed that in all the experiments, in the beginning higher concentrations of total dissolved solids, total hardness, calcium, magnesium, chloride, sulphate, fluoride and potassium were released but gradually after passing few pore volume of water through the column substantial decrease in the concentrations of all parameters have been observed.

- Release of heavy metals through open column percolation experiment showed irregular pattern of concentration. At a few occasions, a few of the heavy metals showed higher level of their release in the leachates, otherwise in overall experiment very less concentrations of heavy metals were released.
- ASTM column leaching experiment conducted on pond ash of Chandrapura and Ramagundam also showed the similar pattern of leaching behavior as it has been seen in open column percolation experiment.
- Physical properties determination of fly ash, bottom ash, pond ash and weathered ash of Ramagundam and Chanrdapura revealed that the bottom ash of Ramagundam showed good settling characteristics and also its specific gravity is also quite less as compare to sand. Physically bottom ash of Ramagundam is better than the fly ash and pond ash, if it is used for underground mine fill. All the ashes of Chandrapura are not very favourable for underground mine stowing as they have poor settling rate and very less compressive strength. For filling of abandoned opencast mine, the physical properties of all ashes are not very important, hence all the ashes of Ramagundam and Chandrapura are physically suitable for abandoned opencast mine filling.
- Field investigation of ground water quality evaluation at ash filled Damoda abandoned open cast mine revealed that fluoride and manganese concentration resemble with the leachates characteristics of batch leaching. Monthly evaluation of ground water quality also revealed that in the initial month's fluoride concentration has been found very high as compare to its prescribed limits but gradually its concentration has been found to decrease in later months. Concentration of manganese has also been found to a very high level than its prescribed limits, throughout the investigation period.
- It has been predicted that like concentrations of all parameters in long term leaching experiment carried out in columns of different ashes of Chandrapura, the concentrations of all parameters including fluoride and manganese will also decrease to the acceptable level as the time pass.
- Effect of ground water quality beneath the ash filled zone has a little effect on ground water quality at the periphery of the ash filled zone but no effect on ground water quality ½ km away from the ash filled zone. The villagers of that area, for drinking purpose, are using this ground water. This ground water has not shown any parameters including heavy metals at alarming concentrations.

Recommendations

- Fresh fly ash of Ramagundam should not be used as underground mine filling material as it contributes to high concentration of chromium in its leachates.
- Pond ash, bottom ash and weathered ash of Ramagundam are suitable for underground mine filling as they do not show any pollutant at alarming level in their leachates.
- Physically bottom ash of Ramagundam is better than pond ash and weathered ash, if it is used for underground mine filling.
- Fly ash, bottom ash, pond ash and weathered ash of Chandrapura should be avoided as underground mine filling material because of their poor physical properties.
- All the ashes of Chandrapura can be used for opencast mine filling. The filling should be done in those abandoned open cast mines, which are away from the human habitat area and sources of drinking water.

b. Coal S&T project funded by MoC "Fly Ash Characterization for Mine Void Reclamation" carried out by CMPDI, Ranchi (2003-2011).

The **conclusion / recommendation** of the above report is as under (page - 123 of the said S&T report)

- Elemental concentrations obtained through Mine Water Leaching Procedure (MWLP) are unlikely to reflect actual field concentrations as it will also be influenced by the method of Coal Combustion Byproduct (CCB) placement, its hydraulic conductivity, the ability of the surrounding mine spoil / ground strata to sequester toxic elements, adjacent ground water quality, and gradients.
- In view of the above mine specific studies are to be carried out before fly ash from a particular Thermal Power Station is backfilled into a particular mine because of the likely change in the characteristics of fly ash and mine water due to the passage of time.
- MWLP is expected to provide an important component of the overall risk assessment picture.
- The concentration of Mn, Cu have found to be in excess of Drinking water standard and as such the backfilling of fly ash of Amarkantak TPS should be avoided to be placed in Mine Void of Amlai OC and similarly fly ash of Ib TPS should be avoided to be placed in Belpahar OC and that of Talchar TPS should be avoided to be placed in Jagannath OC and in Ananta OC.
- Since Cr is also found to be higher in leachate samples on carrying out Mine Water Leaching Procedure (MWLP) when compared to the effluent standard (0.2 ppm), fly ash from Chandrapura TPS should be avoided to be placed in Madhuban OC, Bokaro TPS in Bokaro OC, Patratu TPS in Sayal 'D' OC, Tenughat TPS in SwangOC, Korba TPS in Manikpur OC, Amarkantak TPS in Dhanpuri OC & Sharda OC, Singrauli STPS in Jhingurdha OC & Bina OC and Ib TPS in Lilari OC.
- Further investigations can be carried out with mine water from other nearby mines so that if suitable fly ash backfilling can be carried out in those mines.
- Placement of fly ash in acidic mines should be avoided as far as possible.
- Ground water quality monitoring in terms of Drinking Water Standard is also to be carried out to observe the building up of the metal concentration in long run.

c. DST project funded by MoC "Fly Ash Characterization for Mine Void Reclamation" carried out by CMPDI, Ranchi (2003-2011).

The constraints as described in the above report is as under (page - 64 & 65 of the said DST report)

Constraints

The DST report details the constraints and bottleneck for utilization of fly ash in Mining Sector. In spite of R&D work already carried out by Ministry of Coal and other Government Agencies, there is no mass scale application of fly ash in mining sector. There are many technical, economic, environmental, and regulatory barriers to increased use of Fly Ash in mining sector, which have been summarized below:

Technical Barriers

1. Quality of fly ash: Quality of fly ash in terms of its size (whether larger than 53 micron or smaller) is important for its greater utilization in mining sector. Delivering fly ash with desired fineness needs extra care and investment to which TPS owners are generally reluctant as there is no incentive for them in doing so.
2. Technological Limitations: Medium Concentration Slurry Disposal (MCSD) and High Concentration Slurry Disposal (HCSD) of fly ash and the methodology of backfilling of mine with fly ash mixing with OB in opencast mines are not known. The methodology of stowing of fly ash in underground mines is also not yet established.

Economic Barriers

1. Transportation Cost: One of the most important financial barrier is the associated transportation cost of fly ash, these costs have restricted the use of fly ash inspite of policy mandating its free dispatch by power plants. Cost of fly Ash for mine backfilling is a direct function of cost of transportation increasing with the distance between power plants and abandoned mines limiting the shipment of fly ash.
2. Cost of handling Fly ash: Investment involved in handling of fly ash often pose a hindrance in its utilization in mining sector.

Environmental Barriers

1. Leachate Pollution: Chemically fly ash consists of Si, Al, Mg, Ca, K, Ti and Fe in greater proportion with many trace elements as V, Mn, Cr, Cu, Ni, As, Pb, Cd and smaller quantity of various potential toxic elements, that can migrate to soil and subsequently to ground water over a period of time, thus deteoriating the quality of ground water.

Regulatory Barriers

1. Lack of monitoring institutions/ mechanism for implementation of policy: There is a need for government agencies or committees to act as monitoring institutions for implementation of policy for increasing fly ash utilization.
2. Lack of directions, guidelines by regulatory bodies for safer utilization of fly ash in mining sector.

Other barriers

1. Unwillingness of mine owner due to operational difficulties: There are adequate numbers of abandoned coal mines but owners are not willing to dump the fly ash as the OC operation will be further carried out in the near future. The present scenario should be considered for Technological Assessment and Forecasting the viable and feasible option for enhancing the fly ash utilization in mining sector.
2. Mismatch between life of TPS and life of mines: There is a mismatch between life of a power plant and life of a mine which often pose as a barrier for mine backfilling on a continuous basis.
3. Problem in concurrent fly ash backfilling: Concurrent Fly-ash dumping during mining operation is not possible due to following reasons:-

    - Fly-ash will make the dump floor slippery in contact with water. It will hamper the stability of internal dump.

- In case of dragline dumping, fly-ash will put extra surcharge load on newly formed dragline dump.
- Fly-ash carrying trucks will cause hindrance to movement of dumper carrying both O.B and Coal.
- Thorough mixing of fly-ash and O.B dump material is not all possible in the opencast coal mining.
- There is scarcity of land for O.B dumping in almost all the opencast coal mines of CIL, as most of the opencast mines are having stripping ratio of more than 1 and as high as 7 and further dumping of fly-ash is not possible during mining operation in opencast coal mines of CIL.
- Fly-ash dumping can be possible only on top of shovel-dumper dumps when there will be no further dumping on these dumps.

However these operational and safety issues can be overcome in case of captive mines (barring dragline dumping) as being done in M/s JSPL, Raigarh, where administrative control is one for mining activity as well power production so that the backfilling is done under strict supervision.

8. Operational, Safety & Environmental issues of backfilling fly ash in mine voids

I. Operational and Safety Issues

A. In Underground Mines

Stowing of fly ash is a potential safety hazard in underground coal mines as the water - fly ash slurry exerts hydrostatic pressure on the barricades and failure of these barricades due to this pressure is a big safety threat. Stowing of fly ash on experimental basis has been tried in PK-1 (Prakasham Khani) colliery and GDK 6A of SCCL and at least two instances of failure of barricades were reported there in. Subsequently, 'Directorate General of Mine Safety' (DGMS), which is a regulatory authority for monitoring the safety of mines, has imposed restrictions on using fly ash as stowing material. In a permission granted by DGMS for depillaring (i.e. final extraction of coal) in conjunction with stowing with fly ash, a condition has been imposed for using fly ash having particle size more than 53 µm (Annexure-V).

In the total fly ash generated, percentage of fly ash particles having size more than 53µm is only 20% (approximately). So, even if expensive hydro-cyclone is used for concentrating the fly ash, a very small percentage of fly ash will be available for stowing in underground coal mines.

Other than safety issues discussed above, there are operational problems which are a big deterrents in using fly ash as a stowing material.

Two major coal producer in public sector, namely, Coal India Limited as well as Singareni Colliery Company Limited have tried to use fly ash as stowing material for underground coal mines. Their experience are as under:

(i) **Coal India Limited (CIL)**

- High concentration of fly ash stowing was tried at Madhuban Colliery, BCCL. The project was started in January, 2002 by BCCL and as it could not be completed despite their efforts by M/s BCCL

as well as M/s CIMFR and the project was terminated by CIL, R & D Board in 2010 due to operational problems.

- As per the case study for using fly ash in Durgapur-Rayatwari Colliery of WCL, it was found that "After working in various phases it can be concluded that pond ash/ fly ash with high percentage of fines may be used without any problem if it is mixed with some granular material like sand in such a proportion that ultimate percentage of fines in the ash-sand mixture comes down to maximum 2 to 3 percent only.

(ii) Singareni Collieries Companies Limited (SCCL)

- In SCCL it was tried in GDK No. 2, 3 and No. 5 between 1998 and 1999. The experience of SCCL, as par the report "Fly ash stowing in underground mine in India and abroad – SCCL (April, 2002), are as under:
- Damage of barricades due to hydrostatic pressure.
- Generation of dust and more settling time.
- Accumulation of fly ash in underground sump.
- Contamination of mine water which is being used as a source of water supply for colonies as well as near-by areas, and
- Degradation of coal quality due to leakage of fly ash through barricades into working panels and choking of surface filters beds.
- Due to above reason, it cannot be recommended to use fly ash without some major technical break-through into underground coal mines.

B. In Open-Cast Mines

In case of opencast mines, overburden material swells upto 20% due to blasting or fracturing. Hence in most of the opencast mines, despite provision of internal dumping, substantial volume of overburden is required to be dumped externally. Dumping of overburden outside the mine is not at all environment friendly as it sterilizes precious land resource that can be gainfully utilized for other purposes. To accommodate 25% fly ash in external OB dumps, outside land requirement will further increase.

Secondly, for internal dumps, additional 25% ash on upper benches of overburden dump will raise total planned height of the dump beyond allowable limit. That will again necessitate acquiring additional land for external dumping.

In case of abandoned mines with lower stripping ratios, the remaining voids are used to accommodate the external dump of adjacent mines or as a water reservoir or for other purposes. In many cases opencast coal mines are being planned for expansion and it is not advisable to dump fly ash and close the void.

In operating opencast mines, fly ash will be required to be dumped in dry form in separate layers or by mixing with OB while dumping. Both these processes would require elaborate and complex scheduling of various activities/ equipment, hampering mine production and creating unsafe conditions owing to high equipment density in limited space of mine operations.

Concurrent fly-ash dumping during mining operation is also not recommended due to following additional reasons:

- Fly-ash will make the dump floor slippery in contact with water resulting in unstable internal dump.
- Mixing of overburden and fly ash is difficult while in operations due to huge volumes involved and non-availability of any technology to carry out such operations. Further it will adversely affect mine functioning.

Coal India Limited has already given abandoned South Balanda OC mine of MCL for fly ash backfilling.

II. Environmental issues due to Leaching on aquifer

Leaching Analysis of Fly ash from the following power plants was carried out in the Env. Lab of CMPDI(HQ) under a S&T project "Fly Ash Characterization for Mine Void Reclamation" with the mine water of coal mines having potential for fly ash backfilling.

Sl. No.	Related Identified TPS	Mine Void for dumping fly ash
1	Chandrapura TPS, DVC	Madhuban, BCCL
2	Bokaro TPS , DVC	Bokaro OC, CCL
3	Patratu TPS, JSEB	Sayal 'D' OC, CCL
4	Tenughat TPS, TenughatVidhyut Nigam	Swang OC, CCL
5	Korba STPS, NTPC	Manikpur OC, SECL
6	Amarkantak TPS, MPEB	Dhanpuri OC, SECL
		Sharda OC, SECL
		Amlai OC, SECL
7	Singrauli Super TPS, NTPC	Jhingurda OC, NCL
		Bina OC, NCL
8	Ib TPS, OPGC	Lilari OC
		Belpahar OC
9	Talcher TPS, NTPC	Jagannath OC
		Ananta OC

Based on the leaching study the following may be inferred

- Mine specific studies are to be carried out before fly ash from a particular Thermal Power Station is backfilled into a particular mine because of the likely change in the characteristics of fly ash and mine water due to the passage of time.
- Mine Water Leaching Procedure is expected to provide an important component of the overall risk assessment picture.
- Placement of fly ash in acidic mines will have detrimental effect of leaching out of trace elements.
- Long term leaching studies are to be carried out to get a true picture

Details of the study along with the literature on metal composition of fly ash and leaching characteristics is also attached as **Annexure VI**.

9. Views of Expert Appraisal Committee (EAC) on stowing / backfilling of fly ash in coal mines

A. Minutes of 39th Expert Appraisal Committee (EAC) (Thermal & Coal Mining Meeting held on 3rd & 4th January 2012 in Paryavaran Bhawan, CGO Complex, Lodi Road, New Delhi on the issue of use of fly ash in coal mines "The committee decided to further consider the project upon receipt of the aforesaid details. The Committee also decided that the Central Pollution Control Board may bring out a Technical Guidance Document/ Manual for various uses of fly ash and disposal by dumping in coal mine voids. The Manual may address the environmental issues, the environmental issues that would require to be addressed and an environmental management plan which includes the technologies and methodologies for the environmental assessment "short-term and long-term" use of fly ash for dumping in decoaled voids and for other uses vis-à-vis MOEF Notification on Flyash"**(Annexure VII)**.

B. Minutes of 34th meeting of the Re-constituted Expert Appraisal Committee on environmental impact assessment of thermal power and coal Mining Porjects held on 29th & 30th April 2015 in Paryavaran Bhavan, Jor Bagh, New Delhi on the issue of use of fly ash in coal mines **(Annexure VIII)** also specifies that the sheer volume of fly ash make it hazardous and there is all possibility of heavy metals leaching into ground water.

C. In the recent environmental clearance of Cluster 1, 9 and 10 of ECL, EAC has prohibited use of fly ash in coal mine filling. The environment clearance of Cluster 1, ECL is attached as **Annexure IX**.

10. Conclusions

Underground mines

- The volume of void is difficult to estimate in the depillared (de-coaled) area. Moreover, these are generally filled with water. Such water filled underground voids are being used as a water resource for irrigation and domestic use.

- Stowing is adopted in only limited number of mines where there is surface and other constraints as it severely affects production and productivity of the mine.

- The Operational/ safety issues have been highlighted in this report for running/operating mines. DGMS has imposed restriction on using fly ash having size less than 53 micron, which is only about 20% (bottom ash) of the total ash generated.

Opencast coal mines

- In most of the cases, dump space is insufficient to accommodate additional quantities owing to swelling of overburden material while mining. Due to swelling, external dump is needed which consumes extra land resource. If fly ash is added additional land will be required for external dumping as total volume of dumping material will substantially increase. This is also true if fly ash is accommodated in internal dumping. That is undesirable.

- In operating mines, it is very difficult to mix fly ash with external overburden dumps and also in internal dump while back filling the de-coaled area. Fly ash mixing processes would require elaborate and complex scheduling of various activities, adversely affecting mine production. The practice will also create unsafe conditions owing to high equipment density in limited space.

- Operational difficulties will be encountered with safety issues during heavy rains with slippery roads and sliding of dump benches owing to fly ash.

- In case of abandoned opencast mines with low strip ratio, the remaining voids are generally used to accommodate the external dump of adjacent mines or as a water reservoir.

- In many cases opencast coal mines are being planned for expansion in the dip side and it is not advisable to dump fly ash and close the void completely.

- Dumping of fly ash may be planned on case by case study basis in an abandoned opencast mine.

Environmental Issues

- EAC has desired that leaching studies of fly ash dumped over a long period is to be carried out thus long term leaching studies need to be done to establish the absence / presence of trace elements which can leach out in the ground water when fly ash is backfilled / stowed in a coal mine. Moreover, mine specific leachate studies are to be carried out before fly ash from a particular Thermal Power Station is backfilled into a particular mine because of the likely changes in the characteristics of fly ash and mine water due to the passage of time.

LIST OF ANNEXURES

Annexure I : Minutes of meeting of the Central Monitoring Committee on Implementation of Fly Ash utilization held on 18.06.2014.

Annexure II : O.A no. 95 dated 5th November 2015, order issued by NGT (CZ) regarding suggestion of methods by which backfilling of fly ash can be done in abandoned mines.

Annexure III : Letter no. 43011-102-2007-CPAM-Vol-II of MoC to CMPDI and Letter no.11-4/2013-HSMD dated 23rd December 2015 of MoEF to MoC to submit the said report.

Annexure IV : Order of NGT (CZ), Bhopal order dated 4th April 2016, wherein CMPDI has been given two months' time to complete the said report and be present on 4th July 2016

Annexure V : Copy of permission of given by DGMS for depillaring in conjunction within hydraulic sand stowing for a coal mine of SCCL – modification for usage of "Bottom Ash" instead of sand as stowing material – extension thereof.

Annexure VI : Details of the study along with the Literature on metal composition of fly ash and leaching characteristics

Annexure VII : Minutes of 39th Expert Appraisal Committee (EAC) (Thermal & Coal Mining Meeting held on 3rd & 4th January 2012

Annexure VIII : Minutes of 34th meeting of the Re-constituted Expert Appraisal Committee on EIA of thermal power and coal Mining Projects held on 29th & 30th April 2015

Annexure IX : Environment Clearance Letter No. J-11015/78/2011-IA-II.(M) dated 16th January 2015 of Cluster 1 group of 11 mines

Annexure – I

Minutes of Meeting of the Monitoring Committee to monitor the implementation of the provisions of the notification on Fly Ash Utilization-regarding

A meeting of the Monitoring Committee to discuss various issues relating to the implementation of notification on utilization of fly ash, namely; generation of fly ash, gainful utilization of fly ash and environmentally sound disposal of fly ash was held on 18.06.2014 under the Chairmanship of Shri Shashi Shekhar, Additional Secretary, Ministry of Environment and Forests. The list of participants of the meeting is Annexed.

2. The Chairman welcomed all participants and mentioned that the Ministry of Environment and Forests (MoEF) has issued notification dated 14th September, 1999, as amended, on utilization fly ash generated from coal or lignite based power plants. The notification, inter-alia, provides for utilization of fly ash based products in construction of buildings within a radius of hundred kilometers from a coal or lignite based thermal power plant by every construction agency. The agencies undertaking construction of roads or fly over bridges, reclamation and compaction of low lying areas are also required to use fly ash. The fly ash is required to be used in backfilling or stowing of the mines also. The thermal power plants in operation before 03.11.2009 are required to utilize 100% of the fly ash generated within a period of four years from the date of the second amendment notification. The plants commissioned after 03.11.2009 are required to achieve the target of 100% utilization within a period of five years from the date of their commissioning. However, based on the information from Central Electricity Authority (CEA) for the year 2012-13 for 138 power plants, the overall utilization of Fly Ash was only about 61.37% of the total fly ash generated in the country. The Chairman has stressed that all stakeholders need to emphasis to maximum the utilization of fly ash. He further stressed that fly ash could be gainfully utilized on road construction. He requested the representatives of National Highways Authority of India (NHAI) to present the updated status of action taken by them to comply with provisions of the notification.

3. The representative of NHAI informed that they are prescribing the use of fly ash and fly ash based products in their tender documents, schedules of specifications and construction applications. Shri V. Upadhaya, Director (IA), MoEF informed that there were instances of non-compliance by the contractors of NHAI involved in construction of roads in the State of Orissa. NHAI was requested to ensure strict compliance to the notification of the fly ash by their contractors. The NHAI must include the relevant provisions of the notification as one the conditions, while granting contracts for road construction projects.

4. The Chairman informed that one of the objectives of the notification is to protect top soil layer so as to maintain and enhance the agriculture yield in the country and asked NHAI to furnish its views on proposal to modify conditions for using fly ash/ fly ash based products in road construction projects by increasing the prescribed distance of 100 kilometer to 300 kilometer. The paradigm to evaluate the aforesaid proposal should be economic analysis instead of financial analysis since the later is related to the benefits and costs for individual road laying projects. He requested NHAI to conduct a study to evaluate the proposal of increasing the distance by considering the benefits and costs for the whole economy of the country. In response NHAI was of the opinion that this will increase the cost of road construction projects. The NHAI further suggested that Central Road Research Institute (CRRI) may carry out a study to evaluate the techno-economic viability of such proposal. Representative from Indian Road Congress submitted that the evaluation study should include life cycle assessment of the road construction projects. It was decided that MoEF will request NHAI and CRRI to conduct a study for evaluating the proposal of modifying end point distance prescribed for utilization of fly ash in road construction projects by increasing the prescribed distance from 100 to 300 kilometers.

5. The representative of NHAI further submitted that information regarding availability of fly ash in the country is not available with them. He requested MoEF for the information; State-/UT-wise, regarding availability of fly ash in various parts of the country. The representative of Central Electricity Authority (CEA) informed that such information is available in their report titled 'Fly Ash Generation at Coal or Lignite based Thermal Power Station and its Utilization in the Country' for the year 2011-12 and 2012-13. The report, inter-alia, provides summary of fly ash generation and utilization, plant wise and state wise data related to fly ash generation and utilization in the country, etc. The report is available on the website of CEA. The information regarding fly ash generation and utilization for the year 2013-14 is being compiled by CEA. The NHAI and Central Public Works Department (CPWD) were requested to procure the information regarding the locations of power plants, generation and utilization of fly ash from CEA and to ensure strict compliance to provisions of the notification in projects being undertaken by them.

6. The representatives from CPWD informed that they are prescribing the use of fly ash and fly ash based products in tender documents issued by them. However, the fly ash bricks available in the market do not conform to the prescribed standards. Fly ash bricks absorb more moisture than that of the limits prescribed by the Bureau of India standards (BIS). The use of sub-standard fly ash bricks can substantially increase the risk of development of cracks in buildings. CPWD was requested to inform the Ministry of Environment and Forests about technical difficulties being faced by them in implementations of the notification.

7. The representative of BIS informed that it has published Standards on fly ash, namely IS 3812 (Fly ash for use of pozzolana and admixture), IS 6491 (Method of sampling fly ash), IS 10153 (Guidelines for Utilization and Disposal of Fly Ash) and IS 13757 (Burnt clay fly ash building bricks). Indian Road Congress (IRC) has published the codes, namely IRC: 60-1976 Tentative Guidelines for the Use of Lime-Fly Ash Concrete as Pavement Base or Sub-Base, IRC: 68-1976 Tentative Guidelines on Cement-Fly Ash Concrete for Rigid Pavement Construction IRC: 74-1979 Tentative Guidelines for Lean-Cement Concrete and Lean-Cement Fly Ash Concrete as a Pavement Base or Sub-Base IRC: SP-89-2010 Guidelines for Soil and Granular Material Stabilization Using Cement Lime and Fly Ash. The Standards and Guideline for use of fly ash in construction of buildings and roads are available. However, the construction agencies are required to ensure utilization of fly ash in their projects so as to ensure implementation of the notification. It was decided that MoEF will also write to the Environment Department of every State and UT requesting them to ensure compliance to the provisions of the notification by the construction agencies in their jurisdictions.

8. Most of the State Pollution Control Boards (SPCBs) and Pollution Control Committees (PCCs) in Union Territories (UTs) did not attend the meeting. The Central Pollution Control Board (CPCB) was requested to coordinate with all SPCBs/PCCs for getting status of constitution of State Level Monitoring Committee, which is mandatory as per the notification on fly ash utilization. The CPCB should submit this status to the Ministry. The representative of CPCB informed that the flow of information vis-à-vis submission of annual report/ action plan from the State agencies/ power plants is very poor. The CPCB was requested to write to all SPCBs/ PCCs directing them to issue directions under section 5 of the Environment (Protection) Act, 1986 to the agencies/ authorities those are not complying with the provisions of the fly ash notification.

9. The representatives from NTPC informed that while according environmental clearance to Thermal Power Projects, Ministry has been recently stipulating conditions that fly ash, shall not be used in filling of low lying areas, in agriculture and in backfilling/stowing of mines, etc. These conditions are contrary to provisions of Ministry's notification on Fly ash utilisation. These conditions may have to be suitably reviewed so that the target of 100% utilization of fly ash, as mandated in the Notification of 3rd November,

2009, could be achieved. The Forest departments in certain States/ UTs are not allowing development of forest wasteland by utilizing fly ash.

10. NTPC also informed that use of fly ash in backfilling/stowing of closed/abandoned/running open cast and underground mines has large potential for utilization of fly ash, especially for pit head thermal power stations which otherwise have limited avenues for fly ash utilization. However, it's potential is yet to be fully utilized. The use of fly ash in back filling/stowing of open cast and underground mines within a radius of 50km of any thermal power station as mandated in Ministry's Notification of 3rd November, 2009 has to be ensured right from initial stage of preparation of mine development plan. Inclusion of fly ash and bottom ash as backfill materials in the guidelines for preparation of mine closure plan is required, for which Ministry of Coal and other concerned Ministries/Authorities have to take necessary action. However, there are environmental and safety concerns for use of fly ash along with other materials for back filling of operating open cast mines. These concerns need to be addressed.

11. The representatives of the Ministry of Coal submitted that as per the provisions of the notification, they have constituted the Expert Committee to guide and advise the backfilling or stowing of mine by utilizing fly ash. The issues had been discussed by the Expert Committee of the Ministry of Coal. It has been agreed that fly ash disposal as stowing material in underground mines, abandoned opencast mines and final voids at the end of mining operation can be considered. The Ministry of Coal has written to MoEF that in view of practical difficulties from safety point of view, specifically in operational mines, it is not practically possible for mixing fly ash with external OB dumps and then back filling of operating mines. Thus, provisions in the notification need a complete review. Till such time, incorporation of these provisions in mining plans may be kept in abeyance. It was decided that the Ministry of Coal will get the issue examined through appropriate agencies such as Central Mine Planning and Design Institute and the Expert Committee. The MoC will forward the outcome for consideration of the MoEF. The proposed exercise may be completed by MOC within a period six months.

12. The representative of DST informed that it has now been established, through their research projects, that use of fly ash in agriculture sector is safe. However, there is no specific report available with them to demonstrate that there is no negative environmental impact of use of fly ash in reclaiming the low lying area, back filing and stowing of the open mines, etc. DST was requested to provide copies of such study reports to MoEF along with its recommendations with regard to safe use of fly ash in agriculture.

13. The Chairman informed that there is perception among people that presence of heavy metals and other hazardous elements may affect the ground water due leaching of heavy metals and may complicate land disposal. Therefore, it is necessary that the distribution of heavy metals in the coal in different Georegions of the country and so also the fly ash from coal of such regions need to be analysed. Also, leaching characteristics of coal and ash samples should be investigated with various laboratory extraction procedures. CPCB should undertake this study. Based on the study report, MoEF would review the conditions regarding fly ash utilization, which are being specified in Environmental Clearances granted to the thermal power plants and coal mines. NTPC was requested to compile the information regarding international practices for gainful utilization of fly ash.

14. The following decisions were taken:

1) The MoEF will write to all Departments of Environment of States/ Union Territories (UTs) requesting them to ensure strict implementation of the provisions of notification on fly ash by all the agencies concerned and in particular by the agencies responsible for construction activities in States/ UTs. **(Action: MoEF and States/ UTs)**

2) MoEF will write to the Ministry of Urban Development (MoUD) and the Ministry of Road Transport and HighWays (MoRTH) in order to ensure implementation of the provisions of fly ash notification by the construction agencies coming under their respective jurisdiction. **(Action: MoEF, MoUD, MoRTH)**

3) Ministry of Coal through its expert Committee or by involving any other agency such as CMPDI will examine the issues of use of fly ash as stowing material in operating mines and will suggest the way forward for consideration of the Ministry of Environment and Forests within a period of six months. **(Action: MoC)**

4) The Central Pollution Control Board will coordinate with all SPCBs/ PCCs for getting the status of constitution of the State level monitoring Committees and will submit the status to the Ministry of Environment and Forests within three months. CPCB will also direct to SPCBs/ PCCs to issue directions under section 5 of the Environment (Protection) Act, 1986 to the agencies/ authorities those are not complying with the provisions of the fly ash notification. **(Action: CPCB, SPCBs and PCCs)**

5) CPCB will conduct a study to anlayse distribution of heavy metals in the coal available in different Georegions of the country and so also the fly ash from coal of such regions. CPCB will also analyse leaching characteristics of coal and ash samples with various laboratory extraction procedures during the study. The CPCB will submit the aforesaid report to MoEF within period of three months. Based on the findings of the study, MoEF would review the conditions regarding fly ash utilization, which are being specified in Environmental Clearances for power plants and coal mines. **(Action: CPCB, MoEF)**

6) DST will provide study reports regarding establishment of the fact that use of fly ash in agriculture is safe to MoEF. **(Action: DST).**

7) CPWD will inform MoEF about the difficulties, which are being faced by them in implementation of various provisions of the fly ash utilization notification. **(Action: CPWD)**

8) NTPC will compile the information regarding international practices for gainful utilization of fly ash and will share this information with the MoEF. **(Action: NTPC)**

15. The meeting ended with a vote of thanks to the Chair.

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LIST OF PARTICIPANTS

1. Shri Shashi Shekhar, Additional Secretary, MoEF-In Chair
2. Shri Chander Mohan Scientist- `G', & Head- Fly Ash Unit, Department of Science and Technology (DST) New Delhi (Mobile:-09312888632, E-mail:- chander.m@nic.in)
3. Shri Peeyush Kumar, Director, Ministry of Coal, New Delhi (Mobile-9560048183, Email:- dirtech.moc@nic.in)
4. Shri B. B. Dhar, C. E. CSQ Central Public Works Department (CPWD), New Delhi (Mobile:- 9910025528, E-mail:- cecsq.cpwd@nic.in)
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6. Shri S. P. Singh, Assistant Director, CEA, New Delhi (E-mail:- satyenps@gmail.com)

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7. Shri S. K. Adhikari, Superintending Mining Geologist, Indian Bureau of Mines, Nagpur (Mob. 07588690545, E-mail:- skadhikari@ibm.gov.in)
8. Shri Sanjay Pant, Director (Civil Engineering), Bureau of Indian Standard, New Delhi (Mobile-9818251925, E-mail:- sanjaypant@bis.org.in)
9. Shri D. Basu, GM (Environment), Central Mine Planning and Design Institute (CMPDI), Ranchi (Mobile:- 09431573977, E-mail-basudebashis@yahoo.com)
10. Shri S. P. Sharma, General Manager (Environment), National Highways Authority of India (NHAI), New Delhi (Mobile: 9013095010)
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25. Shri A. S. Ahluwalia, CM (MKH) & RM (NR), National Aluminium Company Limited (NALCO), New Delhi (Mob. 9818362550 E-mail-asahluwalia@nalco.co.in)
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28. Dr. Saroj, Director, MoEF, New Delhi (E-mail;- saroj-mef@nic.in)
29. Dr. M. Hota, Director, MoEF, New Delhi (E-mail;- hota@nic.in)
30. Shri Shard, Joint Director MoEF, New Delhi (Mobile: 9968683100, E-mail:-shard.sapra@nic.in)

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Annexure- II

BEFORE THE NATIONAL GREEN TRIBUNAL, CENTRAL ZONAL BENCH, BHOPAL

Original Application No. 124/2014 (CZ)
Ajay Dubey Vs. State of Chhattisgarh & Ors.

CORAM : HON'BLE MR. JUSTICE DALIP SINGH, JUDICIAL MEMBER
HON'BLE PROF. A.R.YOUSUF, EXPERT MEMBER

PRESENT :

Applicant :	**Shri Sanjay Kumar, Advocate**
	Shri Vineet Singh, Advocate
CSPGCL :	**Shri Apoorv Kurup, Advocate**
	Shri Shantanoo Saxena, Advocate
	Shri Deepesh Joshi, Advocate
Respondent CECB :	**Shri Parul Bhadoria, Advocate**
	Shri Purushaindra Kaurav, Advocate
Respondent SECL:	**Shri Yogesh Bhatnagar, Advocate**
MoEF&CC / UoI:	**Shri Om S.Shrivastav, Advocate**
State of Chhattisgarh:	**Shri Apoorv Kurup, Advocate**
NTPC:	**Shri Sachin K.Verma, Advocate**

Date and Remarks	Orders of the Tribunal
Item No. 7 **5th November, 2015**	Appeal No. 42/2015 primarily is against the notice dated 03.07.2015 issued by the CECB / Respondent for closure of their 4x50 MW Thermal Power Plant at Korba (Korba East). The other Original Applications pertain to critical pollution as a result of number of power plants which have been allowed to be set up and run at Korba and major issue of pollution being caused from fly-ash generated at these plants and water utilisation therefore and discharge into the river Hasdeo from these power plants. As regards the Appeal No. 42/2015 filed by Chhattisgarh State Power Corporation in the Appeal in paragraph 6.20 the Appellant has submitted that they intend to close down the said plant in a phased manner between June 2016 to June 2018 as it is a very old plant having been commissioned in the 1960's. As per the information provided in para 6.20 in the memo of Appeal, in the first phase, unit to be shut down is unit no. 3 by June, 2016. Similarly unit no. 1 by March 2017, unit no. 2 in December, 2017 and unit no. 4 by June, 2018. It has also been submitted that all the employees who are

going to be affected as a result of the de-commissioning would have to be suitably re-deployed except those who shall be superannuating.

While the aforesaid proposals were submitted by the Appellant to mitigate the issue the CECB contended that the plant did not have consent right from 1994 and despite several letters, correspondence and notices the plant did not take steps to achieve the required stake emissions. And therefore, 3rd July, 2015 a notice for closure was given by the CECB. We find that from the data that have been supplied by the CECB in their reply that stake emissions have varied at various units of the Appellant power plant in various months during the last three year for which the data has been provided by the CECB from 2012 to 2015. It is not therefore a situation where the Appellant is in no position to curb the stake emissions at the time of operations of these units. There is a great deal of variance between the stake emissions and this is of course disputed by the Appellant. We however at this stage do not wish to go into the controversy as to which of the data is corrected but, however, we would direct that for the month of November and December a joint study in respect of the stake emissions levels would be carried out for the remaining 45 days of this calendar year and submitted before this Tribunal. If we find that the stake emission level are not being reduced to level which have been achieved by the Appellant in the past we will have to take a view as to whether or not the plant of the Appellant corporation can be given the approval for the closure plan which they have submitted.

As regards the major issue which have been raised in most of these Original Application arising out of the problem of pollution as a result of accumulation of the fly-ash at Korba since Korba has got a large number of thermal power station which are all coal based and

	the fall out of fly-ash is also in huge quantities. It is the general consensus that though the MoEF&CC, Government of India issued notification as early as in the year 1999, subsequently modified in 2003 and 2009, for utilisation of fly-ash in building materials such as the preparation of fly-ash bricks and their utilisation in all government constructions and contracts, public sector undertaking, road construction by NHAI, CPWD, PWD and other such bodies and the State Road Construction Corporations and such alike bodies including the disposal by way of stowing and back filling of the mines. It is generally the contention on the part of the Applicant that all these measures which have been suggested in the notification have not been seriously carried out though it is submitted on behalf of the Respondents that measures are being taken for the utilisation of the fly-ash bricks in the Government construction and the modification has been made in the standard form works-contract being issued by the government and government agencies. Likewise, in the road construction also fly-ash is being utilised at the foundation level. Further, so far as back filling of mines and stowing of abandoned mines is concerned, it is submitted before us that this particular issue is raised before the Principal Bench of NGT at New Delhi in Original Application No. 117/2014 and other similar matters wherein interim order of injunction was issued restraining such back filling as in the said petition doubts have been raised as to whether it is conducive without proper study to undertake the exercise of back filling of the abandoned mines, etc. The said order of injunction passed in September, 2014 has since been vacated by the Principal Bench during its hearing on 20.8.2015 after noticing the provision contained in the notification issued by the MoEF relating to expert bodies being constituted for the said purpose and in accordance with the

recommendations and guidelines framed by such expert bodies. Learned Counsel for the Respondent pointed out that the Company has approached the Central Institute of Mining and Fuel Research, Dhanbad to undertake a study and to suggest methods by which back filing of such abandoned mines can be undertaken with all possible safety measures which are highlighted in the Terms of Reference to the said agency. It is submitted that the said report is likely to be submitted on or before 31.12.2015. We would expect that back filling operations to be undertaken by them would be commenced thereafter in the light of the methodology suggested by the said institute.

Counsel for the Applicant also suggested that Ministry of Railway may also be directed to utilise the fly-ash to the new railway corridors that they are constructing i.e. East-West Railway Corridor of about 120 kms. from Korba Pendra Road and the Western Corridor from Korba to Dharamjaigarh. In this behalf, we would direct that the Ministry of Railway undertake the exercise and explore the feasibility of utilising the fly-ash for the said purpose and if such possibility without compromising on safety can be undertaken, the same should be incorporated in the terms of the tender document that may be issued by the concerned Railway for the said purpose. The State Government of Chhattisgarh is accordingly directed to convey the aforesaid order to the South Eastern Railway within whose jurisdiction these two projects are likely to fall. The response of the Railway should be intimated to this Tribunal either through the State Government or directly. A closer look at the notification, 2009 of the MoEF regarding utilisation of fly-ash also brings to fore the requirement stressed therein to the Central Government to constitute a Monitoring Committee for the purpose of utilisation and its

ancillary issues. We would accordingly direct that the MoEF submit before us as to whether the said monitoring committee has been constituted and what role it has played so far after analysing the issues similar to the ones which are discussed hereinabove.

O.A.No. 122/2015 & 95/2015

Issue notice in these Original Applications.

We would direct that these matter be listed on **29th January, 2016**.

.....JM
(DALIP SINGH)

.....EM
(PROF. A.R.YOUSUF)

Annexure – III

NGT Matter
MOST URGENT

No.11-4/2013-HSMD
Government of India
Ministry of Environment & Forests
HSM Division

2nd Level, Jal Block Indira Paryavaran
Bhawan Jor Bagh Road, New Delhi-
110003
Date: 23rd December, 2015

To
Shri Peeyush Kumar
Director (Tech), Ministry of Coal
A-Wing, Shastri Bhawan
Dr. Rajendra Prasad Road
New Delhi-110001

Subject:- Order of NGT, Bhopal in OA 95 of 2015 regarding use of fly ash as stowing material.

Dear Sir,

This is with reference to the order of Hon'ble NGT, Bhopal dated 5th November, 2015 in OA 95 of 2015(copy enclosed) regarding disposal of fly ash especially mine backfilling.

Hon'ble NGT has directed that the Ministry to submit as to whether the Monitoring Committee has been constituted and what role it has played so far as regards the backfilling of mines with fly ash.

It may be recalled that during the meeting of the Central Monitoring Committee on implementation of Fly Ash utilisation held of 18.06.2014, it was decided that
Ministry of Coal through its expert Committee or by involving any other agency such as CMPDI will examine the issues of use of fly ash as stowing material in operating mines and will suggest the way forward for consideration of the Ministry of Environment and Forests within a period of six months. Copy of the minutes is enclosed for reference.

You are requested to kindly provide the action taken on this issue at the earliest so as enable this Ministry file reply before NGT in time.

Yours Faithfully

Encl: as above

(Sanchita Jindal)
Director

Annexure-IV

BEFORE THE NATIONAL GREEN TRIBUNAL, CENTRAL ZONAL BENCH, BHOPAL

Original Application No. 124/2014 (CZ)
Ajay Dubey Vs. State of Chhattisgarh & Ors.
and
Original Application No. 122/2015 (CZ)
Anhad Mishra Vs. Union of India & Ors.
and
Original Application No. 95/2015
Laxmi Chouhan Vs. Union of India & 7 Ors.
and
Original Application No. 36/2015 (CZ)
Laxmi Chouhan vs. Union of India & 5 Ors.
and
Appeal No. 42/2015 (CZ)
Chhattisgarh State Power Generation Co. Ltd. Vs. CG Environment Conservation Board & Ors.
and
Original Application No. 29/2015 (CZ)
Titksha Social Organisation Vs. Union of India & 5 Ors.

CORAM : HON'BLE MR. JUSTICE DALIP SINGH, JUDICIAL MEMBER
HON'BLE DR. SATYAWAN SINGH GARBYAL, EXPERT MEMBER

PRESENT :

Applicant in O.A. No. 95/2015 :	**Shri Dharmvir Sharma, Adv. for Shri Sanjay Agrawal, Adv.**
Applicant in O.A. No. 42/2015 :	**Shri Apoorva Kurup, Adv. Shri Shantanoo Saxena, Adv.**
Respondent CECB :	**Ms. Shikha Gupta, Advocate for Shri Purushaindra Kaurav, Advocate**
NTPC:	**Shri Sachin K.Verma, Advocate**
Respondent SECL:	**Shri Yogesh Bhatnagar, Advocate**
CSPGCL / State of Chattisgarh :	**Shri Apoorv Kurup, Advocate**
Respondent No. 2 :	**Shri Deepesh Joshi, Adv.**

Date and Remarks	Orders of the Tribunal
Item No. 07 to 12 **4th April, 2016**	Learned Counsel for the CECB submitted that the CMPDI has requested for some more time to submit the complete report as they have carried out the ground work and are in the process of compilation of their report. For the aforesaid purpose two months time may has been sought by CMPDI. We would also expect that the persons who have compiled the report be present on the next date of hearing to explain any issue that may arise during the course of hearing. The reply filed be taken on record. In that view of the above as prayed by the Learned Counsel for the parties let the matte be listed on **4th July, 2016**. .....JM **(DALIP SINGH)** .....EM **(DR. S.S.GARBYAL)**

Annexure -V

भारत सरकार/Govt. of India
श्रम एव रोज़गार मंत्रालय
Ministry of Labour & Employment
खान सुरक्षा महानिदेशालय
Directorate General of Mines Safety
हैदराबाद क्षेत्र स.1/Hyderabad Region No 1

Tel. + 91 40 24602507; Fax. +91 40 24602504; Telegrams: "MINSAFETY"
Gruhakalpa, Block-II, A.P.H.B. Complex, Nampally, Hyderabad-500 001

संख्या.एच.1/अनुज्ञा Modi /2013/ ८२४५ - ८२४७ हैदराबाद, दिनाक 25-3-13 |17

प्रेषित
खान सुरक्षा निदेशक
हैदराबाद क्षेत्र स :

सेवा में
अभिकर्ता,
गोदवरिखनि सं.1 व 3 इनक्लाइन खदान,
M/s सिंगारेनी कालरीज कं.लि.,
डाक गोदवरिखनि : 505209,
करीमनगर जिल्ला ।

Subject:- Permission under Reg.100(1) & 127(3) of the Coal Mines Regulations, 1957 to extract pillars in Panel No.35/16 in No.3 seam by Bord and Pillar method in conjunction with hydraulic sand stowing using SDLs at Godavarikhani No.1 & 3 Incline mine - Modification for usage of "Bottom Ash" instead of sand as stowing material – Extension thereof.

महोदय,

Please refer to your letter no. RG.I/Agt.Gdk.1Gr/D-003/076 dated 16-2-2013 and plans & sections enclosed therewith on the above subject.

The matter has since been examined in the light of what has been stated in your application. In exercise of the powers conferred on the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Regulations 100(1) and 127(3) of the Coal Mines Regulations, 1957 and by virtue of the authorization granted to me by the Chief Inspector of Mines (also designated as Director-General of Mines Safety) under Section 6(1) of the Mines Act, 1952, I, hereby extend the permission granted vide this Directorate's letter No.H1/010042/Perm/2011/1544 dated 12/7/2011, for further 3 months period i.e. **upto 31.05.2013** for using Bottom Ash instead of sand as stowing material on further experimental basis as suggested by the scientific agency, subject to the following conditions being strictly complied with.

1.0 The Bottom Ash proposed to be used for stowing shall not have particle size less than 53 microns. Suitable monitoring shall be done to ensure this.

2.0 A suitable percentage of Bottom Ash along with sand for hydraulic stowing shall be established such that the normal stowing operations are not affected.

3.0 A suitable scientific agency shall be associated for ascertaining and establishing the shrinkage of stowed Bottom Ash.

4.0 The barricade used during the depillaring operation shall be erected strongly under the supervision of at least overman certificate holder.

5.0 Effective steps shall be taken to prevent accumulation of water behind the stowing barricade.

6.0 All other conditions of the permission letter no. H1/010042/Perm/2011/1544 dated 12/7/2011 and letter no. H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 shall remain unchanged and shall be strictly complied with.

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7.0 This permission is subject to the following additional conditions:

7.1 In the event of any change in the circumstances connected with this permission, which is likely to endanger the life of workmen employed in the mine or endanger the mine, the mining operations for which this permission has been granted shall be stopped forthwith and intimation thereof shall be sent to this Directorate. The said mining operations shall not be resumed without an express and fresh permission in writing.

7.2 This permission is being issued specifically under the regulations mentioned above, and without prejudice to any other provisions of law, which may be or may become applicable at any time.

7.3 If at any time any of the conditions subject to which this permission is granted is violated or not complied with, this permission shall be deemed to have been revoked with immediate effect. The above permission may be amended or withdrawn at any time, if considered necessary in the interest of safety.

7.4 This Directorate shall be informed as soon as the mining operations are commenced in accordance with the above permission and intimation about completion of the mining operations should also be sent promptly and in any case not later than one month thereof.

भवदीय,
Sd/-
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र-1

ज्ञापन संख्या.एच.1/अनुज्ञा Modi /2013/ हैदराबाद, दिनांक

आवश्यक कार्यवाही एवं सूचनार्थ प्रेषित:

1 नामांकित मालिक व निदेशक (P & P) M/s सिंगरेनी कालरीज का लि. पी.ओ.कोथागुडेम कालरीज - 507 101 ।
2 महाप्रबंधक, रामगुन्डम क्षेत्र स. 1, पी.ओ.गोदावरिखनि-505 209, करीमनगर जिला।
3 प्रबंधक, गोदवरिखनि स. 1 व 3 खदान, M/s SCCL, पी.ओ.गोदावरिखनि - 505209, करीमनगर जिला।

Sd/-
खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र-1

ज्ञापन संख्या.एच.1/अनुज्ञा Modi /2013/ हैदराबाद, दिनांक 24/10/13

प्रतिलिपि आवश्यक कार्यवाई एवं सूचनार्थ खान सुरक्षा उपमहानिदेशक, दक्षिणी मध्य अंचल हैदराबाद, के माध्यम से खान सुरक्षा महानिदेशक, धनबाद को प्रेषित

खान सुरक्षा निदेशक,
हैदराबाद क्षेत्र 1

खान सुरक्षा उपमहानिदेशक,
दक्षिण मध्य अंचल, हैदराबाद ।

Note

Name of the Mine : Godavarikhani No.1&3 Incline Mine.
Name of the Owner : M/s. S.C.C.Ltd.,

Subject: Permission under Reg.100(1) & 127(3) of the Coal Mines Regulations, 1957 to extract pillars in Panel No.3S/16 in No.3 Seam by bord and pillar method in conjunction with hydraulic sand stowing method using SDLs at Godavarikhani No.1 & 3 Incline mine – Modification thereof.

Reference: Agent's letter No.RGI/Agt.Gdk.1Gr./D-003/76 dated 16-2-2013
(R.O. Diary No. 682 dated 16-2-2013)

1.0 INTRODUCTION:

a) Management was granted permission under regulation 100(1) and 127(3) of CMR, 1957 to extract pillars in panel No.3S/16 in 3 seam by conventional Bord and Pillar in conjunction with Hydraulic Sand Stowing using SDLs at Godavarikhani no,1 & 3 incline was obtained vide letter no. H1/Perm/010042/2011/1547 dt.12/07/2011,valid up to 11/07/2014.

b) Then, management had applied for modification using Bottom Ash as stowing material instead of sand along with vide letter no. RG.I/AgtGDK.1.Gr/D-003/389 dated 25-10-2012.

c) Thereafter,vide this Directorate's letter No.H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 permission was granted to use Bottom Ash in place of sand as stowing material in the panel on experimental basis.

d) As per the condition No.3 of the above modified permission letter, the modification of this permission shall be valid for 3 months from the date of issue of this letter or completion of stowing of bottom ash of about 25000m^3 whichever is earlier.

e) The bottom ash as stowing material was started in the said panel on 8.12.2012 and 14900m^3 of bottom ash was used as a stowing material as on 13.2.2013.

f) Management informed that to comply with the conditions of the modified permission granted, the following actions were taken by them:

a) Suitable monitoring at regular interval was done to ensure particle size of Bottom Ash shall not be less than 53 microns (copy of analysis results enclosed).
b) CIMFR, Dhanbad was involved for ascertaining and establishing the shrinkage of stowed Bottom Ash and a report to this affect had submitted a report.

2.0 Proposal:

2.1 Now, management is requesting to extend the permission for usage of Bottom Ash instead of sand as stowing material for another 3 months i.e. upto 13-05-2013 in Panel No.3S/16 of No.3 Seam of Gdk-1 Section of GDK No.1 & 3 Incline mine.

2.2 The management has enclosed the sieve analysis report of bottom ash of samples taken from surface bunker and at 44 ½ LS/19 dip in underground from 14.12.12 to 06.02.(Flag-C)

2.3 The management has said that CIMFR, Dhanbad was involved for study and establishing the shrinkage of stowed Bottom ash in the above stowing panel, i.e., 3S-16 in 3 seam at GDK 1 & 3 Incline Mine and submitted a report on the above subject (enclosed in Flag D).

2.4 A copy of plan showing the present position of workings in abovesaid panel is enclosed vide plan no SCC/GDK 1 & 3/SUR/3S-16/84/13/1, dated 16.02.1013(Flag-E)

3.0 Comments:

3.1 The sieve analysis report of bottom ash of samples taken from surface bunker and at 44 ½ LS/19 dip in underground from 14.12.12 to 06.02.12 shows that 53 micron particles size of bottom ash was more than 99%.

3.2 RECOMMENDTIONS OF CIMFR STUDY REPORT SUBMITTED ON 19.2.2013 as per above study report are as:

a) Being light and fine it will offer saving in energy cost per unit volume in transportation by mechanical or hydraulic means, as it will require less tonnage of material for filling the same underground void and will cause less frictional head loss during transportation through pipelines.

b) Pumping cost will also be reduced because hydraulic backfilling with bottom ash will need less amount of water.

c) It will cause less wear of pipeline thereby increasing the life of the pipe.

d) The cementing effect developed in ash filled mass, due to the pozzolanic activity, will help in consolidation and thereby increasing the stability of the working.

f) The percolation rate was found to be as high as 22.83cm/hr and ash in the slurry at 50% concentration by weight settled within 30 min, this may be attributed to the fact that there is very little chance that bottom-ash will remain in the slurry form for a longer period of time and may cause barricade bursting.

g)The ultra fines (less than 53 micron size)is only 0.82% which indicates that percolation of water through the pack is not going to create any problem and the consolidation of the pack will take place within a short period.

h)Bottom ash of RSTPS was found to be least susceptible to spontaneous heating as CPT and IPT are not attained even up to 200°C bath temperature.

i)Results of shrinkage study carried out in the field indicates that the bottom ash stowed mass undergoes an initial shrinkage of 1% during first 3 days of readings and no shrinkage was observed beyond that. This initial shrinkage may be attributed to the dissipation of entrapped water in interstitial voids of ash fill mass.

j)The visual inspection of the site shows that the stowing is done properly upto the roof and the packed mass stand erect when the adjacent stooks were punctured. The pack was found to be uniformly distributed without making any heap and touching almost all the portion of the roof.

3.3 Observations with regard to performance of bottom ash stowing during my inspection of this panel on 26.02.13:

3.3.1 The depillaring in the panel was started on 24.08.2012 with hydraulic sand stowing. After obtaining permission to use bottom ash on experimental basis, stowing was stared with bottom ash from 08.12.12. Till now, 75% of the extractable coal was extracted in this panel.

3.3.2. During the stowing operation, it was found that ,sometimes, water got accumulated behind the barricade built outbye of stowed goaf at 37 no slice at 44½L/18D. To prevent the water stagnation, stowing operations were to be stopped intermittently to clear away the water.

3.3.2 Through the barricade at 46L/17D, stowed bottom ash was found outbye of goaf edge indicating side puncture of the bamboo matting.

3.3.3 However, during the inspection it was found that overall general conditions of the stowing by the bottom ash appears to be satisfactory.

3.4 Inspection of the above panel by Shri G. Vijaya Kumar, DMS, Hyderabad, on dated 10.01.2013 also revealed satisfactory remarks with respect to stowing by the bottom ash.

4.0 RECOMMENDATIONS: Management's proposal for modification of Condition No.3.1 of the modified permission letter No. H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 appears to be in order.

We may have no objecton for modification of Condition No.3.1 of the modified permission letter No.H1/010042/Perm-modfn/2011-12/2669 dated 14-11-2012 by extending the permission to use Bottom Ash instead of sand as stowing material upto **13-05-2013** subject to following additional conditions specified in the DPL:

a) The barricade used during the depillaring operation shall be erected strongly under the supervision of at least overman certificate holder.

b) Effective steps shall be taken to prevent accumulation of water behind the stowing barricade.

DPL is enclosed pl..

(Mukesh Kumar Sinha)
Dy.Director of Mines Safety,
Hyderabad Region No.1.

Encl: As above.

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Annexure - VI

Details of the Leachate Analysis Study

The Leachate analysis results of fly ash with mine water are given in the table below:

Trace/ Minor elements	With MN1	With MN2	With MN3	With MN4	With MN5	With MN6	With MN7	With MN8	With MN9	With MN10	With MN11	With MN12	With MN13	With MN14	Std. IS10500/ MoEF Sch VI
pH of Mine Water	8.11	7.11	7.90	7.93	7.72	8.03	7.89	3.99	7.35	7.60	8.66	6.34	3.00	4.12	
Mn	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	<0.0015	0.191	4.81	<0.0015	<0.0015	<0.0015	0.14	8.80	2.97	0.1
V	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.2
Cr	0.76	0.26	0.40	0.65	0.41	0.32	0.32	0.84	0.90	0.56	0.97	<0.003	<0.003	<0.003	0.2
Ni	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	<0.009	3.0
Cu	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.321	<0.01	<0.01	<0.01	<0.01	1.605	0.239	0.05
Zn	0.109	0.22	0.088	0.103	0.115	0.142	0.089	1.142	0.133	0.12	0.141	0.344	3.72	0.78	5
As	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.05
Se	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.01
Pb	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.05
B	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.0
Cd	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	<0.0004	0.01
Hg	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	

MN1- Maduban OC Mine Water
MN2- Bokaro OC Mine Water
MN3- Sayal D OC Mine Water
MN4- Swang OC Mine Water
MN5- Manikpur OC Mine Water
MN6- Dhanpuri OC Mine Water
MN7- Sharda OC Mine Water
MN8- Amlai OC Mine Water
MN9- Jhingurdha OC Mine Water
MN10- Bina OC Mine Water
MN11- Lilari OC Mine Water
MN12- Belpahar OC Mine Water
MN13- Jagannath OC Mine Water
MN14- Ananta OC Mine Wate

From the above table it can be seen that the values of Mn and Cu are high in some of the samples than the permissible limit. The concentration of Mn, Cu have found to be in excess of Drinking water standard and as such the backfilling of fly ash of Amarkantak TPS should be avoided to be placed in Mine Void of Amlai OC and similarly fly ash of Ib TPS should be avoided to be placed in Belpahar OC and that of Talcher TPS should be avoided to be placed in Jagannath OC and in Ananta OC.

Metal Composition of Fly Ash

Elemental chemical composition of fly ash is highly variable. The variability is directly related to the source of the coal, its pretreatment, and the operation of the plant burning the coal. The major elements in the order of decreasing abundance are; Si, Al, Ca, C, Mg, K, Na, S, Ti, P and Mn. Most of these major elements exist in the core of the fly ash which is relatively stable. This is probably because they are not volatilized in the combustion process (*Mogazi etal, 1988)*. Fly ash contains large quantities of major impurities such as oxides, hydroxides and sulfates of iron and calcium, as well as significant quantities of hazardous leachable trace elements such as arsenic, boron, cadmium, chromium, manganese, selenium and vanadium (*Querol etal, 1999).* During coal combustion, the organic matter in coal is utilized to produce heat and as a result, the concentrations of trace elements are increased relative to those in the source coal. Several trace elements such as As, Se, Cd, Cr, Ni, Sb, Pb, Sn, Zn and B is enriched by factors of 4–10 in coal combustion by-products (*Fernandez etal, 1994)*. These impurities have a negative impact on fly ash utilization due to environmental restrictions.

Leaching Characteristics of Fly Ash

The leaching characteristics of fly ash are controlled by its chemical, mineralogical and morphological composition. Fly ash from thermal power plants vary in chemical composition not only from plant to plant but also within the same plant. The quantity of trace elements that shall be available for leaching

in an aqueous media depends on the fixation of these elements on the fly ash particles and pH of fly ash – aqueous medium itself. The trace metals release from fly ash at various pH is given below:

Trace Metal Release at Various pH

Elements	Elements in Fly Ash (ppm)		Concentration Leached in ppm				Concentration Leached in %			
	Total Conc.	Surface Conc.	pH 3	pH 6	pH 9	pH 12	pH 3	pH 6	pH 9	pH 12
As	157	146	51.9	1	0.8	72.9	35.6	0.7	0.5	50
Cd	8.1	2.1	1.1	0.5	0.15	0.18	52.4	23.8	7.1	8.6
Cr	109	48	9.0	1.9	2.0	2.4	19.6	4.0	9.2	5.1
Cu	97	46.6	15.6	0.82	0.36	0.6	33.5	1.8	0.8	1.3
Pb	157	12.6	9.1	1.4	0.73	0.91	72.2	11.1	2.1	7.2
Ni	290	24.2	11.7	3.6	0.5	0.61	48.3	14.9	0.2	2.5
Zn	575	154.5	25.7	8.3	0.26	1.7	16.6	5.9	0.2	1.1

Source: Theis & Wirth (1977)

From the above table it can be observed that all fly ash cannot be used as a dumping material due to their leaching characteristics. The trace elements leach in the presence of acidic environment and may contaminate ground water. Thus mine site specific studies are required to be carried out before disposal of fly ash.

The predominant factors, which control the release of elements from ash impoundment area, are water contact, pH solubility relation and chemical composition. Fly ash with high lime content may tend to raise the pH which in turn will enhance the precipitation of the insoluble metal while fly ash with low lime and high iron content obviously shall depress the pH below neutral. The effect of pH on the leachability of the trace metals indicate that the most favorable condition for maximum release of metal ion is below the neutral region of pH scale. This pattern is followed with all the elements studied excepting Zn, which shows slightly different pattern.

The Toxic Characteristics Leaching Procedure (TCLP) or the Synthetic Precipitation Leaching Procedure (SPLP) generally evaluates the environmental risk of land filling fly ash. However, there is doubt regarding the applicability of these tests to long-term fly ash leaching behavior in groundwater associated with coalmines. Thus the Mine Water Leaching Procedure (MWLP) was developed to provide a site-specific risk assessment tool.

Annexure - VII

MINUTES OF 39th EXPERT APPRAISAL COMMITTEE (EAC) (THERMAL & COAL MINING) MEETING HELD ON 3rd-4th JANUARY 2012 IN PARYAVARAN BHAWAN, CGO COMPLEX, LODI ROAD, NEW DELHI.

COAL MINING PROJECTS

The **39th meeting** of the reconstituted EAC (T &C) was held on **3rd-4th January 2012** in Paryavaran Bhawan, C.G.O Complex, New Delhi to consider the projects of coal mining sector. The list of participants of EAC and the proponents are given at Annexure-1 and 2 respectively.

Confirmation of minutes

The minutes of the 37th meeting of EAC (T&C) held on **28th-29th November 2011** and was confirmed.

The agenda items were taken up as given below:

8. Dumping of flyash of M/s NTPC into the decoaled voids of South Balanda Coalmine of M/s M/s Mahanadi Coalfields Ltd., located in dist. Angul, Orissa

Both M/s NTPC and M/s MCL made a joint presentation. It was informed that the proposal is for utilisation of flyash generated from M/s NTPC's Talcher Thermal Power Station 460 MW (14x60+2x10) and its proposed expansion to 2x660 MW, located in Talcher Dist Angul in Western part of Talcher Coalfields in Brahmi valley to the North of Mahanadi River. Wet slurry of Talcher TPS into abandoned coal mine void of South Balanda Coal mine (10.1 MTPA) of M/s Mahanadi Coalfields Ltd. Talcher Coalfields, Dist. Angul, Orissa.

It was informed that there are 10 Reserve Forest in the area. The river Brahmani is at the distance of 2.1 km towards west side. River Nandir Jhor is adjacent to the southern side of the existing plant boundary. Brahmani River on the eastern side of the coalfields and controls the drainage of the area. There is one seasonal nala namely Bangaru jhor flowing in north –western side of the block and draining into Brahmani river north of Talcher town. Depth of water table ranges from <2m to 15m.The average depth to water in pre-monsoon period is from 4m -6m bgl in western part and 8m to 12m bgl in eastern part. Ground water table ranges from 75-13msl (pre-monsoon) and 85-135m above msl (post monsoon).

Flyash from the TTPS is being presently filled into Quarry Nos 2,3A & 3B of South Balonda Open Cast mine of MCL. M/s NTPC informed that it has carried out hydrogeological studies

in 2003, which also includes ash characterisation, baseline data generation and feasibility study for disposal of Ash in South Balanda in 2004. After the start of dumping of flyash, environmental monitoring for soil, surface water quality and ground water quality was carried out by NTPC.

M/s MCL informed that the South Balanda Coal mine was started in 1959 in an area of 315 ha with 1 MTPA capacity. The production started in 1961 and closed in 2005. The void is 90.4 Mm3. M/s NTPC had obtained the permission from OSPCB and MCL entered into an MOU with NTPC for filling of the mine void with ash from Talcher TPS. It was informed that there are three quarries, Quarry-1 with 6.99Mm3 void, Quarry -2 with 7.74 Mm3 void and Quarry-3 with 3.97 Mm3 void (total mine void is 18.70 Mm3), of which the mine void available for ash filling is 14.73 Mm3. Life of void for ash filling would be 15 years. The dumping would be by use of slurry discharge pipes and the flyash would settle into the bottom. It was noted that the tests carried out indicate that heavy metals such as mercury, chromium, lead, Arsenic, Iron are within prescribed limits.

The Committee observed that the fine particles of ash may block confined aquifers and affect its permeability characteristics and desired that a detailed Hydrogeology studies with flyash characterisation such as its reactivity, movement should be carried out. The Committee desired that tracer study is required to understand the pathway of movement of flyash/leachates in the aquifers. The Committee desired that decanted water/excess water utilised for irrigation should conform to standards. In case, data extrapolated from the studies indicate no long-term effects, the voids should be lined with suitable material before dumping of flyash. The Committee also desired that third party evaluation should be carried out for monitoring the adverse effects of fly ash dumping on ground water, surface water, flora and fauna etc.

The Committee decided to further consider the project upon receipt of the aforesaid details. The Committee also decided that the Central Pollution Control Board may bring out a Technical Guidance Document/Manual for various uses of flyash and disposal by dumping in coalmine voids. The Manual may address the environmental issues, the environmental issues that would require to be addressed and a environmental management plan which includes the technologies and methodologies for the environmental assessment – short-term and long-term use off flyash for dumping in decoaled voids and for other uses and for other uses vis-à-vis MOEF Notification on Flyash.

Annexure –VIII

MINUTES OF 34th MEETING OF THE RE-CONSTITUTED EXPERT APPRAISAL COMMITTEE ON ENIVORNMENTAL IMPACT ASSESSMENT OF THERMAL POWER & COAL MINING PROJECTS

The 34th Meeting of the reconstituted Expert Appraisal Committee (Thermal Power) was held on **29th-30th April, 2015** at Teesta Meeting Hall, First Floor, Vayu Wing, Indira Paryavaran Bhawan (new building), Jorbagh, New Delhi.
The members present were:

1. Prof. C.R. Babu - Vice Chairman (Acting Chair)
2. Shri T.K.Dhar - Member
3. Shri J.L Mehta - Member
4. Shri G.S. Dang - Member
5. Shri N.K. Verma - Member
6. Dr. C.B.S Dutt - Member (Representative of NRSC)
7. Dr. S.D. Attri - Member (Representative of IMD)
8. Shri P.D Siwal and Shri N.S. Mondal - Member (Representative of CEA)
9. Dr. S.S. Bala - Member (Representative of CPCB)
10. Ms. Sanchita Jindal - Member Secretary

In attendance: Dr. M. Ramesh, Scientist 'D', MoEF&CC.
Shri A.K. Bansal, Dr. Ratnavel, and Dr. Asha Rajvanshi did not attend the meeting.

2.5 Permission for Backfilling of Ash from Talcher Super Thermal Power Station at Talcher, Odisha of M/s. NTPC Ltd. in abandoned voids of Quarry No. 8 of Jagannath Mines of M/s MCL – For Amendment of EC.

The Committee perused the presentation made by NTPC. It was noted earlier NTPC, Bhushan Steel and NALCO in Odisha were given permission for mine void filling on pilot basis and the results/outcome of the pilot study are not yet concluded. It was also noted that the existing ash pond has capacity to last for about four more years. However, the PP submitted that there are no cement plants in the vicinity and there is not much demand of fly ash bricks in the State and there are not many infrastructure projects coming up in the State where the fly ash can be utilized therefore there is no other option than to use for mine void filling. The present fly ash notification also permits mine void filling and filling of low lying areas. Recently, the Committee constituted by the NGT has also visited various sites and recommended mine void filling for TTPs in

Talcher area. The Committee was of the view that shear volume of the fly ash makes it hazardous and there is all possibility of heavy metals
leaching into the ground water. Therefore, till the results of the pilot study are made available, the proposal may be kept in abeyance. Meanwhile, NTPC may submit scientific and engineering plan for backfilling of the mines after consulting the National and International Experts for exploring the various geo-technical & engineering solutions.

Simultaneously, alternate avenues for fly ash utilization shall be explored and detailed action plan shall be submitted. It was also decided that Ministry may take a policy decision for allowing Mine void filling.

In view of above, the proposal was **deferred.**

Annexure- IX

No. J-11015/78/2011-IA-II.(M)
Government of India
Ministry of Environment, Forests & Climate Change
IA-II (Coal Mining) Division

Indira Paryavaran Bhawan,
Jorbagh Road,
New Delhi-110003
Dated. 16th January, 2015

To,

The General Manager (E&F)
M/s Eastern Coalfields Ltd.,
Asansol, Dist. Burdwan,
West Bengal
E-mail: envecl@yahoo.com

Sub.: Cluster no. 1 group of 11 mines project of expansion (from 2.70 MTPA (Normative) to 3.30 MTPA (Peak) in an ML area of 3692 ha; Latitude 23^0, 44' N & 23^0, 49' N and Longitude 86^0, 39' E & 86^0, 46', 30" E) M/s Eastern Coalfields Limited, located at dist. Dhanbad, Jharkhand - Environmental Clearance - reg.

Sir:

This is with reference to letter no. 4301/7/2011-CPAM dated 08.03.2011 with the application for Terms of Reference (TOR) and this Ministry's letter dated 02.12.2011 & revised letter dated 10.02.2012 granting TOR. Reference is also invited to the letter no CIL/DIL/EMP/2014/01 dated 12.02.2014 and subsequent letter nos. dated 05.05.2014; 22.07.2014, 23.07.2014; 24.11.2014 and 18.12.2014 for environmental clearance on the above-mentioned subject.

2 The Ministry of Environment, Forests & Climate Change has considered the application. It is noted that the proposal is for grant of Environmental Clearance for **Cluster no. 1 group of 11 mines project of expansion (from 2.70 MTPA (Normative) to 3.30 MTPA (Peak) in an ML area of 3692 ha; Latitude 23^0, 44' N & 23^0, 49' N and Longitude 86^0, 39' E & 86^0, 46', 30" E) M/s Eastern Coalfields Limited, located at dist. Dhanbad, Jharkhand.** The TOR was granted to the project, vide letter no. J-11015/287/2010-IA.II(M) dated 15.06.2011. TOR modification was issued on 02.12.2011. Additional TOR issued on 10.02.2012. The Proponent submitted the EIA/EMP report on 12.02.2014. The TOR expired as per the earlier OM dated 22.03.2010 and accordingly letter was issued on 19.05.2014 delisting the project from pending list. The proposal has been considered for EC in accordance to the OM no. J-11013/41/2006-IA-II(I) (Part) dated 22.08.2014. The proposal was considered in the 22nd EAC meeting held on 16th -17th October, 2014. The proponent has informed that:

i. The TOR was granted to the project, vide letter no J-11015/287/2010-IA.II(M) dated 15.06.2011. TOR modification was issued on 02.12.2011. Additional TOR issued on 10.02.2012. . The Proponent submitted the EIA/EMP report on 12.02.2014. The TOR expired as per the earlier OM dated 22.03.2310 and accordingly the project was delisted from the pending list. However, in accordance to the OM no. J-11013/41/2006-IA-II(I) (Part) dated 22.08.2014, the proposal has been submitted for considered of EC.

ii. Objectives behind operating the OC patches / mines: The mines are Vulnerable to illegal mining, proposed to undertake extraction of the upper seams by opencast method, wherever possible. Reduce possibilities of fire and inundation and ensuring safety of underground workings. Reduce future problems of unstable locations getting created due to population growth. Patches planned mainly in small, uninhabited areas, free from surface features and do not involve shifting of any

village. Only, land has to be acquired, compensation will be made as per the CIL's R & R Policy or that of the state, whichever is acceptable. Environmental impact for a short period. Quarries will be completely backfilled and biologically reclaimed with the help of experts and there will be no residual external OB dump. Beneficial from the financial viewpoint as this coal is available at shallow depth and the operation of the OC patches will enhance production and help in the turn-around of the company.

iii. There are wi Total 17 mines (All existing mines)' 8 Underground, 1 Opencast & 2 Mixed mines Beside this, 5 new opencast patches have been proposed over existing underground workings within mine leaseholds.

iv. Present production from the cluster is 0.65 MTY. It is planned to achieve a peak capacity of 3.3 MTY from the existing as well as proposed mines in the cluster

Sl No.	Name of the Mine	Lease Area (Ha)	Normative Production Capacity (MTY)	Peak Production Capacity (MTY)	Life (Years)
1	Hariajam UG	316	0.11	0.14	> 25
2	Badjna UG	676	0.05	0.10	> 25
3	Chapapur-li UG	480	0.15	0.20	> 25
	Chapapur OC Patch (14 Ha)*		0.86	0.85	1
4	Khoodia UG	186	0.05	0.10	> 25
	Khoodia OC Patch (18 Ha)*		0.10	0.10	1
5	Lakhmata UG	217	0.08	0.10	> 25
	Lakhimata OC Patch (19 Ha)*		0.30	0.40	8
6	Shampur-B UG	368	0.09	0.10	> 25
	Shampur-B (Sangamahal) OC Patch (33 Ha)*		0.15	0.20	3
7	Mandman UG	345	0.07	0.10	> 25
8	Nirsha OC Patch	147	0.09	0.10	11
9	Shampur-A UG	491	0.05	0.10	> 25
	Shampur-A OC Patch		0.12	0.12	2
10	Gopinathpur UG	157	0.05	0.07	> 25
	Gopinathpur OC Patch		0.10	0.13	5
11	Kapasara UG	309	0.10	0.15	> 25
	Kapasara OC Patch (24 Ha)*		0.16	0.23	5
	Total	**3692**	**2.70**	**3.30**	

* New proposed OC patches (Area of the patch given in brackets)

v. The latitude and longitude of the project are 23°, 44' N & 23°, 49' N and 86°, 39' E & 86°, 46',30" E respectively.

vi. Joint Venture: No Joint Venture

vii. Coal Linkage :

The coal linkages are with The West Bengal Power Development Corporation Limited (WBPCDCL),
Mejia Thermal Power Station-Bankura.West Bengal.
Sipat Super Thermal Power Station or Rajiv Gandhi Super Thermal Power Station at Sipat;Bilaspurdistrict Chhattisgarh.
GMR Energy Limited Kamalanga thermal power plant ,Odisha
Aravali Power Company Private Limited,Haryana.
Kahalgaon Super Thermal Power Station (KhSTPP), Kahalgaon, Bhagalpur , Bihar.

viii. The land usage of the project will be as follows:

Pre-Mining& Post- Mining:

S.No	Type Land Use	Present Mining Land Use (ha)	Land Use during Mining (ha)	Post- mining Land Use (ha)
1.	Running quarry	92.00	200.00	
	Backfilled	-		200.00 & brought under Plantation
	Not Backfilled	-		
2.	Abandoned / exhausted quarry	171.00		
	Backfilled	121.00	121.00	121.00&brought under Plantation
	Not Backfilled	50.00	50.00	50.00 (water body)
3	External OB dump	48.00	48.00	48.00 To be brought under Plantation
4	Service building/ mine infrastructure	382.00	382.00	300.00 (undisturbed) + 82.00 ha under plantation
5	Rail & Road	108.00	108.00 (20 Ha for green belt)	108.00 (20 Ha under plantation)
6.	Habitation (total)	592.00	592.00	592.00
7.	Other built-up areas	654.00	654.00	654.00
8	Agriculture land	860.00	860.00	860.00
9	Forest land	-	-	-
10	Plantation / Natural Vegetation	60.00	60.00	593.00
		62.00	62.00	
11.	River/nallah/pond	204.00	204.00	204.00
12.	Barren land	459.00	351.00	351.00
	Total	3692.00	3692.00	3692.00

ix. The total estimated water requirement is 4667 m3/day. The level of ground water ranges in Pre - monsoon: 0.6 to 14.7 m BGL & Post – monsoon: 0.4 to 7.47 m BGL

x. The Method of mining would be by Bord & Pillar for UG and Shovel – Dumper Combination for OC

xi. There are 8 external OB dumps with Quantity of 200 Mbcm with height of 60 m from ground level and 8 internal dump with Quantity of 35.7 Mbcm.

xii. No final mine voids. Patches will be completely backfilled. and the Total quarry area is 200 Ha Backfilled quarry area of 200 Ha shall be reclaimed with plantation.

xiii. The seasonal data for ambient air quality has been documented and all results at all stations are within prescribed limits

xiv. **Transportation:** Coal transportation in pit by Underground mine coal tubs at the faces are being hauled by series of rope haulages to surface. Opencast mine-coal is loaded by shovels at face and transported to the surface coal depot by colliery dumpers. Surface to Siding by Road transportation by 15 te dumpers and loading at siding by Pay loaders are used for loading of coal onto wagons

xv. There is no R & R involved. There are no PAFs

xvi. **Cost:** Total capital cost of the project is Rs 186.42 Crore. CSR Cost @ Rs 5.00 per tonne of coal

produced. Environmental Management Cost (capital cost Rs 2713.00 Lakhs, annual recurring cost Rs 1886.95 Lakhs).

xvii. **Water body**: The cluster is drained by a seasonal river Khoodia, a tributary of the Barakarriver, flowing about 4 kms from the cluster boundary on the east. Another seasonal river, Pusat, which is a tributary of Khoodia also drains the northern portion of the cluster.

xviii. **Approvals**: All the existing mines within the cluster are taken over mines after nationalization. The mines of ECL has been grouped into 13 Clusters which has been approved by Competent authority of ECL on 10.09.2009 and subsequently accorded approval of Board of Directors of ECL in its Board Meeting held on 28.03.2011 for preparation of EIA/EMP of the cluster. Mine Closure Plan approval in December, 2013.

xix. **Wildlife issues**: There are no national Parks, wildlife sanctuary, biosphere reserves found in the 10 km buffer zone.

xx. **Forestry issues**: No forest area involved in the cluster.

xxi. Total **afforestation** plan shall be implemented covering an area of 471 ha at the end of mining. Reclaimed external OB dump (48 ha); internal dump (121 ha); Green Belt over an area (20 ha) Density of tree plantation 2500 trees/ ha of plants.

xxii. There are no **court cases/violation** pending with the project proponent.

xxiii. **Public Hearing** was held on 12.06.2013. The issues raised in the PH includes information regarding closed mines ; water scarcity ; dust pollution due to road traffic; CSR works; Demand for employment; transportation etc. All the commitments made during the Public Hearing shall be implemented.

3. The proposal was considered in the Expert Appraisal Committee (EAC) (Thermal & Coal Mining) and recommended in its 23rd EAC meeting held on 16th -17th October, 2014 for granting Environmental Clearance. The Ministry of Environment, Forests & Climate Change hereby accords environmental clearance for the above-mentioned **Cluster no. I group of 11 mines project of expansion (from 2.70 MTPA (Normative) to 3.30 MTPA (Peak) in an ML area of 3692 ha; Latitude 23°, 44' N & 23°, 49' N and Longitude 86°, 39' E & 86°, 46', 30" E) M/s Eastern Coalfields Limited, located at dist. Dhanbad, Jharkhand** under the provisions of the Environment Impact Assessment Notification, 2006 and subsequent amendments/circulars thereto subject to the compliance of the terms and conditions mentioned below:

A. Specific Conditions:

i. The maximum production from the mine at any given time shall not exceed the limit as prescribed in the EC.

ii. The validity of the EC is for the life of the Mine or as specified in the EIA Notification, 2006, whichever is earlier.

iii. No underground mining shall be carried out below and within 45 m of the NH-2 and rivers flowing through the cluster.

iv. The EC be only for peak value only. PP should ensure the mine water discharge shall comply to the prescribed standards.

v. All commitments made in the Public Hearing shall be fully implemented.

vi. There shall be no voids and OB dumps after the end of mining. New voids shall be completely filled up to near ground position. 50% of old voids shall be filled up and other 50% of old voids shall be filled upto 15 meter for the purpose of pisciculture

vii. There shall be no fly ash utilization in the mine voids. Fire in the OBDs shall be quenched by blanketing and should be re-vegetated.

viii. The surface drainages shall be preserved.

ix. The quality of water should be conformed to the prescribed standards before discharged into nallahs.

x. All safety measures shall be taken as per CMR, 1957 & related Circulars

xi. The production shall be within the same Mining Lease area.

xii. Coal shall be transported by rail only. Coal transportation from mine to siding should be by conveyor belt. The loading to siding by pay loaders into railway wagons.

xiii. Independent network of railway sidings inside cluster be developed. Railway sidings should be constructed at the earliest and till then proponent may use mechanically covered trucks for transportation of coal.

xiv Three tier green belts shall be raised around the railway sidings and along the road sides to prevent dust and noise pollution.

xv. Stowing and depillaring shall be as per the recommendations of the DGMS.

xvi. The proponent must comply with the Raniganj Action Plan. The unstable areas within the cluster will be brought under plantation after the population residing over these areas is rehabilitated under the Master plan for Raniganj Coalfield to be implemented by ADDA.

xvii. Trees with deep rooted system should be planted so as to prevent soil erosion.

xviii Proponent should plant additional 10 Ha/ year over the next 10 years at various locations in this Cluster.

xix River/nallahs shall be desilted and restored back to functional state

xx. Wild life conservation plan be prepared and submitted to the MOEFCC with the approval of the State Govt.

xxi Proponent shall use high resolution image of all clusters for evaluating land use, plantation etc

xxii. Separate drainage pattern be provided

xxiii. Sand stowing must be used as recommended by CMPDI.

xxiv. Action plan for prevention and mitigation of subsidence be prepared and implemented.

xxv The OC patches to be operated will be completely filled-up after exhaustion of reserves and reclaimed with plantation.

xxvi The OB shall be completely re-handled at the end of the mining.

xxvii. There shall be no residual OB dump after the mining.

xxviii. After completion of mining activities, the subsided areas shall be graded and planted upon

xxix. Coal Extraction shall also be optimised in areas where agricultural production is continuing. Some pillars shall be left below the agricultural land. No depillaring & coal extraction should be carried out below habitation, H.T. Lines & beneath road, water bodies

xxx The land excavated after mining must be brought back to original condition for agricultural/plantation purpose.

xxxi. Water discharged from the mine should be as good as surface drinking water.

xxxii Regular monitoring of subsidence movement on the surface over and around the working area and impact on natural drainage pattern, water bodies, vegetation, structure, roads, and surroundings shall be continued till movement ceases completely. In case of observation of any high rate of subsidence movement, appropriate effective corrective measures shall be taken to avoid loss of life and material. Cracks shall be effectively plugged with ballast and clayey soil/suitable material.

xxxiii. If subsidence is found exceeding the permitted limits, then the landowners shall be adequately compensated with mutual agreement of the landowners.

xxxiv. Water sprinkling system shall be provided to check fugitive emissions from loading operations, conveyor system, haulage roads, transfer points, etc. Major approach roads shall be black topped and properly maintained.

xxxv The CSR cost shou'd be Rs 5 per Tonnes of Coal produced which should be adjusted as per the annual inflation.

xxxvi. The mining in the existing mines should be phased out after expiry of the current mining lease and after reclamation of mined over area. The operating mines may be analysed and monitored for compliance of conditions, bearing with movement of wildlife and until such time they are closed/phased out

xxxvii Everybody in the core area should be provided with mask for protection against fugitive dust emissions.

xxxviii. Dust mask to be provided to everyone working in the mining area.

xxxix. The supervisory staff should be held personally responsible for ensuring compulsory regarding wearing of dust mask in the core area.

xl. People working in the core area should be periodically tested for the lung diseases and the burden of cost on account of working in the coal mine area.

xli. The mining area should be surrounded by green belt having thick closed thick canopy of the tree cover.

xlii. Besides carrying out regular periodic health check-up of their workers, 10% of the workers identified from workforce engaged in active mining operations shall be subjected to health check-up for occupational diseases and hearing impairment, if any, through an specialised agency /institution within the District/State and the results reported to this Ministry and to DGMS.

xliii. The embankment constructed along the river boundary shall be of suitable dimensions and critical patches shall be strengthened by stone pitching on the river front side and stabilised with plantation so as to withstand the peak water flow and prevent mine inundation.

xliv. There shall be no overflow of OB into the river and into the agricultural fields and massive plantation of native species shall be taken up in the area between the river and the project.

xlv. Catch drains and siltation ponds of appropriate size shall be constructed to arrest silt and sediment flows from soil, OB and mineral dumps. The water so collected shall be utilised for watering the mine area, roads, green belt development, etc. The drains shall be regularly desilted and maintained properly. Garland drains (size, gradient and length) and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine site. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.

xlvi. Garland drains (size, gradient and length) around the safety areas such as mine shaft and low lying areas and sump capacity shall be designed keeping 50% safety margin over and above the peak sudden rainfall and maximum discharge in the area adjoining the mine sites. Sump capacity shall also provide adequate retention period to allow proper settling of silt material.

xlvii. Dimension of the retaining wall at the toe of the dumps and OB benches within the mine to check run-off and siltation shall be based on the rainfall data.

xlviii. Crushers at the CHP of adequate capacity for the expansion project shall be operated with high efficiency bag filters, water sprinkling system shall be provided to check fugitive emissions from crushing operations, conveyor system, haulage roads, transfer points, etc.

xlix. Mine discharge water outside the ML shall be monitored, particularly for TDS and treated to conform to prescribed levels before discharge into the natural environment.

l. Drills shall be wet operated.

li. The project authorities shall undertake regular repairing and tarring of roads used for mineral transportation. A 3-tier green belt comprising of a mix of native species shall be developed all along the major approach roads,

lii. Controlled blasting shall be practiced with use of delay detonators and only during daytime. The mitigative measures for control of ground vibrations and to arrest the fly rocks and boulders shall be implemented.

liii A Progressive afforestation plan shall be implemented covering an area of 593 ha at the end of mining, which includes waste dump area (169 Ha) Excavation area (200 ha), Mine Infrastructure/ Built-up area (82 ha); Green Belt (20 Ha) by planting native species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha. Massive plantation shall be carried out in open spaces in and around the mine and a 3-tier avenue plantation along the main approach roads to the mine.

liv. The proponent should prepare restoration and reclamation plan for the degraded area. The land be used in a productive and sustainable manner.

lv. Compensatory Ecological & Restoration of waste land, other degraded land and OB dumps in lieu of breaking open the land be carried out.

lvi. No groundwater shall be used for mining operations.

lvii. An estimated total 235.7 Mm^3 of OB will be generated during the entire life of the mine. Out of which 200 Mm^3 of OB will be dumped in eight external dump and 35.7 Mm3 in eight internal OB Dumps. The OB dump height is upto 60 m. The maximum slope of the dump shall not exceed 28 degrees. Monitoring and management of reclaimed dump sites shall continue till the vegetation becomes self-

sustaining and compliance status shall be submitted to MOEF&CC and its Regional Office on yearly basis.

lviii. Of the total quarry area 200 ha, the backfilled quarry area of (200 Ha) shall be reclaimed with plantation by planting native plant species in consultation with the local DFO/Agriculture Department. The density of the trees shall be around 2500 plants per ha.

lix. Regular monitoring of groundwater level and quality shall be carried out by establishing a network of existing wells and construction of new peizometers. The monitoring for quantity shall be done four times a year in pre-monsoon (May), monsoon (August), post-monsoon (November) and winter (January) seasons and for quality in May. Data thus collected shall be submitted to the Ministry of Environment, Forests & Climate Change and to the Central Pollution Control Board quarterly within one month of monitoring.

lx. The Company shall put up artificial groundwater recharge measures for augmentation of groundwater resource in case monitoring indicates a decline in water table. The project authorities shall meet water requirement of nearby village(s) in case the village wells go dry due to dewatering of mine.

lxi. Sewage treatment plant shall be installed in the existing colony. ETP shall also be provided for workshop and CHP wastewater.

lxii. Land oustees shall be compensated as per the norms laid out R&R Policy of CIL or the National R&R Policy or R&R Policy of the State Government whichever is higher.

lxiii. For monitoring land use pattern and for post mining land use, a time series of land use maps, based on satellite imagery (on a scale of 1: 5000) of the core zone and buffer zone, from the start of the project until end of mine life shall be prepared once in 3 years (for any one particular season which is consistent in the time series), and the report submitted to MOEF&CC and its concerned Regional office

lxiv. A detailed Final Mine Closure Plan along with details of Corpus Fund shall be submitted to the Ministry of Environment, Forest & Climate Change within 6 months of grant of Environmental Clearance

lxv. The project authorities shall in consultation with the Panchayats of the local villages and administration identify socio-economic and welfare measures under CSR to be carried out over the balance life of the mine.

lxvi. Corporate Environment Responsibility:

a) The Company shall have a well laid down Environment Policy approved by the Board of Directors

b) The Environment Policy shall prescribe for standard operating process/procedures to bring into focus any infringements/deviation/violation of the environmental or forest norms/conditions

c) The hierarchical system or Administrative Order of the company to deal with environmental issues and for ensuring compliance with the environmental clearance conditions shall be furnished.

d) To have proper checks and balances, the company shall have a well laid down system of reporting of non-compliances/violations of environmental norms to the Board of Directors of the company and/or shareholders or stakeholders at large

B. General Conditions

i. No change in mining technology and scope of working shall be made without prior approval of the Ministry of Environment, Forests & Climate Change

ii. No change in the calendar plan of production for quantum of mineral coal shall be made.

iii. Four ambient air quality monitoring stations shall be established in the core zone as well as in the buffer zone for PM_{10}, $PM_{2.5}$, SO_2 and NOx monitoring. Location of the stations shall be decided based on the meteorological data, topographical features and environmentally and ecologically sensitive targets in consultation with the State Pollution Control Board. Monitoring of heavy metals such as Hg, As, Ni, Cd, Cr, etc carried out at least once in six months.

iv. Data on ambient air quality (PM_{10}, $PM_{2.5}$, SO_2 and NO_x) and heavy metals such as Hg, As, Ni, Cd, Cr and other monitoring data shall be regularly submitted to the Ministry including its concerned Regional Office and to the State Pollution Control Board and the Central Pollution Control Board once in six months. Random verification of samples through analysis from independent laboratories recognised under the EPA rules, 1986 shall be furnished as part of compliance report.

v. Adequate measures shall be taken for control of noise levels below 85 dBA in the work environment. Workers engaged in blasting and drilling operations, operation of HEMM, etc shall be provided with ear plugs/muffs.

vi. Industrial wastewater (workshop and wastewater from the mine) shall be properly collected, treated so as to conform to the standards prescribed under GSR 422 (E) dated 19th May 1993 and 31st December 1993 or as amended from time to time before discharge. Oil and grease trap shall be installed before discharge of workshop effluents.

vii. Vehicular emissions shall be kept under control and regularly monitored. Vehicles used for transporting the mineral shall be covered with tarpaulins and optimally loaded.

viii. Monitoring of environmental quality parameters shall be carried out through establishment of adequate number and type of pollution monitoring and analysis equipment in consultation with the State Pollution Control Board and data got analysed through a laboratory recognised under EPA Rules, 1986.

ix. Personnel working in dusty areas shall wear protective respiratory devices and they shall also be provided with adequate training and information on safety and health aspects.

x Occupational health surveillance programme of the workers shall be undertaken periodically to observe any contractions due to exposure to dust and to take corrective measures, if needed and records maintained thereof. The quality of environment due to outsourcing and the health and safety issues of the outsourced manpower should be addressed by the company while outsourcing.

xi. A separate environmental management cell with suitable qualified personnel shall be set up under the control of a Senior Executive, who will report directly to the Head of the company

xii. The funds earmarked for environmental protection measures shall be kept in separate account and shall not be diverted for other purpose. Year-wise expenditure shall be reported to this Ministry and its concerned Regional Office.

xiii. The Project authorities shall advertise at least in two local newspapers widely circulated around the project, one of which shall be in the vernacular language of the locality concerned within seven days 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 may also be seen at the website of the Ministry of Environment, Forests & Climate Change at http://envfor.nic.in

xiv. A copy of the environmental clearance letter shall be marked to concern Panchayat/Zila Parishad, Municipal Corporation or Urban local body and local NGO, if any, from whom any suggestion/representation has been received while processing the proposal. A copy of the clearance letter shall also be displayed on company's website.

xv. A copy of the environmental clearance letter shall be shall also be displayed on the website of the concerned State Pollution Control Board. The EC letter shall also be displayed at the Regional Office, District Industry Sector and Collector's Office/Tehsildar's Office for 30 days

xvi. The clearance letter shall be uploaded on the company's website. The compliance status of the stipulated environmental clearance conditions shall also be uploaded by the project authorities on their website and updated at least once every six months so as to bring the same in public domain. The monitoring data of environmental quality parameter (air, water, noise and soil) and critical pollutant such as PM_{10}, $PM_{2.5}$, SO_2 and NO_x (ambient) and critical sectoral parameters shall also be displayed at the entrance of the project premises and mine office and in corporate office and on company's website.

xvii. The project proponent shall submit six monthly compliance reports on status of compliance of the stipulated environmental clearance conditions (both in hard copy and in e-mail) to the respective Regional Office of the Ministry, respective Zonal Office s of CPCB and the SPCB.

xviii. The Regional Office of this Ministry located in the Region shall monitor compliance of the stipulated conditions. The Project authorities shall extend full cooperation to the office(s) of the Regional Office by furnishing the requisite data/ information/monitoring reports.

xix. The Environmental statement for each financial year ending 31 March in Form -V is mandated to be submitted by the project proponent for the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be uploaded on the company's website along with the status of compliance of EC conditions and shall be sent to the respective Regional Offices of the MoEFCC by e-mail.

4. The proponent shall abide by all the commitments and recommendations made in the EIA/EMP report so also during their presentation to the EAC.

5. The commitment made by the Proponent to the issue raised during Public Hearing shall be implemented by the Proponent

6. The proponent is required to obtain all necessary clearances/approvals that may be required before the start of the project. The Ministry or any other competent authority may stipulate any further condition for environmental protection

7. The Ministry or any other competent authority may stipulate any further condition for environmental protection.

8. The Proponent shall setup an Environment Audit cell with responsibility and accountability to ensure implementation of all the EC Conditions.

9. Concealing factual data or submission of false/fabricated data and failure to comply with any of the conditions mentioned above may result in withdrawal of this clearance and attract action under the provisions of Environment (Protection) Act, 1986.

10. The above conditions will be enforced inter-alia, under the provisions of the Water (Prevention & Control of Pollution) Act, 1974, the Air (Prevention & Control of Pollution) Act, 1981, the Environment (Protection) Act, 1986 and the Public Liability Insurance Act, 1991 along with their amendments and Rules and any other orders passed by the Hon'ble Supreme Court of India/ High Courts and any other Court of Law relating to the subject matter. The proponent shall ensure to undertake and provide for the costs incurred for taking up remedial measures in case of soil contamination, contamination of groundwater and surface water, and occupational and other diseases due to the mining operations.

11. Any appeal against this environmental clearance shall lie with the National Green Tribunal, if preferred, within a period of 30 days as prescribed under Section 16 of the National Green Tribunal Act, 2010.

(Dr Manoranjan Hota)
Director

Copy to:

1. Secretary, Ministry of Coal, Shastri Bhawan, New Delhi.
2. Secretary, Department of Environment & Forests, Government of Jharkhand, Secretariat, Ranchi

3. Chief Conservator of Forests, Regional office (EZ), Ministry of Environment & Forests, A/3 Chandrashekarpur, Bhubaneswar 751023
4. Member-Secretary, Jharkhand State Pollution Control Board, TA Building, HEC Complex, PO Dhurwa, Ranchi.
5. Member-Secretary, Central Pollution Control Board, CBD-cum-Office Complex, East Arjun Nagar, New Delhi 110032.
6. Member-Secretary, Central Ground Water Authority, Ministry of Water Resources, Curzon Road Barracks, A-2, W-3 Kasturba Gandhi Marg, New Delhi.
7. Dr. R.K. Garg, Advisor, Coal India Limited, SCOPE Minar, Core-I, 4t Floor, Vikas Marg, Laxmi Nagar, New Delhi.
8. District Collector, Dhanbad, Government of Jharkhand.
9. IG (Wild life), Ministry of Environment and Forests, New Delhi
10. Monitoring File 11. Guard File 12. Record File. 13. Notice Board

(Dr. Manoranjan Hota)
Director

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

ocation of CAAQMS :NCL NIGAHI

Date:06.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.34	10.25	1.00	1.00	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	200.70	200.32	1.74	1.70	OK
3	NO_2 Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.72	200.31	1.18	1.18	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	1.34	1.85	0.00	0.00	OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.49	200.16	1.18	1.18	OK
4	PM10 Analyzer	OK					775ug/cm2	787.31ug/cm2		0.87	0.87	OK
5	PM 2.5 Analyzer	OK					838 ug/cm2	836.17ug/cm2		0.69	0.71	OK
6	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
7	Computers											OK
8	UPS/ AC / Others											OK
9	Data Display Board											Faulty

Maintenance Details / Requirement:Please provide ladder for the cleaning of PM10 & PM.5 Sample hood.

Specific Observation(s): All analyzer are calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically,Please provide ladder for the cleaning of PM10 & PM.5 Sample hood.

Signature of Engineer:

Station Supervisor

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

cation of CAAQMS :NCL CET1 Date:07.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	8.37	9.15	1.13	1.13	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	200.34	200.35	1.74	1.74	OK
3	Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.47	199.64	0.86	0.86	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.11	0.10			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	201.52	201.24	0.81	0.81	OK
5	PM10 Analyzer	OK					792 ug/cm2	784.06 ug/cm2		0.83	0.75	OK
7	PM 2.5 Analyzer	OK					802ug/cm2	786.68ug/cm2		0.89	0.86	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement:

Specific Observation(s): All analyzer calibrated satisfactory. NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer:

Station Supervised By:

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS: NCL JHINGURDA

Date: 08.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.72	10.50	1.01	1.01	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	201.92	202.00	1.84	1.84	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	200.83	201.15	0.89	0.89	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.54	0.22			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.95	201.06	0.88	0.88	OK
4	PM10 Analyzer	OK					847ug/cm2	835.88ug/cm2		0.89	0.89	OK
5	PM 2.5 Analyzer	OK					825 ug/cm2	816.00 ug/cm2		0.83	0.88	OK
6	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
7	Computers											OK
8	UPS/ AC / Others											OK
9	Data Display Board											[illegible]

Maintenance Details / Requirement:

Specific Observation(s): All analyzer are calibrated satisfactory , NO2 has no factor, it has defined by NO & NOx. , PM10 & PM2.5 Analyzer has [illegible] automatically

Signature of Engineer:

Person Supervised By

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STATION PROTOCOL

FOR

CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT

CALIBRATION REPORT

Location of CAAQMS :NCL BLOCK-B

Date:09.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	NOT OK										NOT OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	198.35	199.92	1.67	1.67	OK
	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.10	200.13	1.10	1.10	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	1.09	0.83	0.00	0.00	OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	198.98	201.43	0.99	1.09	OK
4	PM10 Analyzer	OK					817ug/cm2	815ug/cm2		0.91	0.90	OK
5	PM 2.5 Analyzer	OK					839 ug/cm2	835.44ug/cm2		0.88	0.88	OK
6	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
7	Computers											OK
8	UPS/ AC / Others											OK
9	Data Display Board											OK

Maintenance Details / Requirement:

Specific Observation(s). All analyzer are calibrated satisfactory. Except CO analyzer having issue of interconnection board. NO2 has [illegible]
PM10 & PM2.5 Analyzer has calibrated & set factor automatically.

Signature of Engineer: Asingh

[illegible] Singh Vatwal

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL AMLOHRI

Date:11.01.2021 Calibration

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.16	10.34	0.97	0.97	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	199.57	199.67	0.99	1.15	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	200.34	200.46	0.90	0.85	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.20	0.19			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	199.28	200.34	0.90	0.84	OK
6	PM10 Analyzer	OK					867 ug/cm2	853.05 ug/cm2		0.88	0.89	OK
7	PM 2.5 Analyzer	OK					809 ug/cm2	805.58 ug/cm2		0.89	0.85	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement: please always maintain AC temperature on 25 deg C otherwise due to condensation of moisture will damage all analyzers.

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically. Bottom side LED blocks are faulty otherwise display is ok

Signature of Engineer:

Station Supervised By:

11.01.21

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :RCL JAYANT

Date:20.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.75	9.73	0.54	0.55	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	200.66	200.74	0.98	1.07	OK
3	NO_x Analyzer											
	NO	NOT OK	0.00	0.00	0.00	0.00	Under maintenance					NOT OK
	NO_2		0.00	0.00	0.00	0.00						
	NO_x		0.00	0.00	0.00	0.00						
6	PM10 Analyzer	OK					936 ug/cm2	830.95 ug/cm2		0.90	0.88	OK
7	PM 2.5 Analyzer	OK					819 ug/cm2	816.55 ug/cm2		0.87	0.89	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement

Specific Observation(s), If any: analyzer calibrated satisfactory .NO2 has no factor .it has defined by NO & NOx .PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL KHADIA

Date: 25.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Span
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.98	9.92	1.001	1.00	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	199.09	200.31	1.452	1.45	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.08	198.27	0.93	0.94	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.18	0.15	0.00		OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	202.00	201.46	0.87	0.88	OK
6	PM10 Analyzer	OK					838 ug/cm2	813.99 ug/cm2		0.96	0.89	OK
7	PM 2.5 Analyzer	Not Ok					847 ug/cm2					Not Ok
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement:Pm 2.5 Arm20 board got faulty today material has been dispatched from mumbai

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 Analyzer has calibrated & set factor automatically.

Signature of Engineer:
Engineer CSD

Station Supervised By:
AM (Env.)
Khadia

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

ocation of CAAQMS :NCL bina

Date:29.01.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.02	9.16	1.00	1.00	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	199.76	199.26	2.90	2.80	OK
3	NO_x Analyzer											
	NO	Under maintenance										Under maintenance
	NO_2											
	NOx											
6	PM10 Analyzer	OK					815 ug/cm2	823.69 ug/cm2		0.91	0.83	OK
7	PM 2.5 Analyzer	OK					844 ug/cm2	857.25 ug/cm2		0.89	0.87	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement:

Specific Observation(s): All analyzer calibrated satisfactory, Except Nox analyzer running under maintenance . PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Engineer:

Station Supervised By:

27/02/2021

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT
Date: 05.02.2021

…on of CAAQMS : NCL KHADIA

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pet	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.09	9.26	1.00	1.01	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	198.08	199.07	1.45	1.46	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.45	201.03	0.94	0.95	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.20	0.19			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	199.06	199.06	0.88	0.89	OK
	PM10 Analyzer	OK					836 ug/cm2	821.05 ug/cm2		0.89	0.905	OK
	PM 2.5 Analyzer	Not Ok					847 ug/cm2					Not Ok
6	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement: Pm 2.5 Arm20 board got faulty today material has been dispatched from mumbai

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 Analyzer has calibrated & set factor automatically.

Signature of Engineer:
Engineer CSD
A Singh

Station supervised by:
05/02/2021
A. Sharma (Asst Mgr - E&M)
NCL Khadia

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL CETI **Date: 06.02.2021**

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	*Post*	Per	*Post*	Span Source	*Pre*	*Post*	*Pre*	*Post*	
1	**CO Analyzer**	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.85	10.01	1.130	1.148	OK
2	**SO_2 Analyzer**	OK	0.00	0.00	0 00	0.02	200 PPB	205.30	200.03	1.740	1.695	OK
3	**NO_x Analyzer**											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	205.30	201.01	0.86	0.838	OK
	NO_2	OK										
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	206.30	200.61	0.83	0.805	OK
6	**PM10 Analyzer**	OK					792 ug/cm2	789.51 ug/cm2		0.88	0.87	OK
7	**PM 2.5 Analyzer**	OK					800 ug/cm2	810.6 ug/cm2		0.89	0.91	OK
8	**Meteorological Parameter**											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	**Computers**											OK
10	**UPS/ AC / Others**											OK
11	**Data Display Board**											OK

Maintenance Details / Requirement:

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically.

Signature of Engineer:
Engineer CSD

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL AMLOHRI — Date:08.02.2021 Calibration

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.97	9.98	0.97	0.98	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	201.35	201.85	1.15	1.14	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.75	199.06	0.85	0.84	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.21	0.20			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.16	200.42	0.84	0.85	OK
6	PM10 Analyzer	OK					867 ug/cm2	871.58 ug/cm2		0.89	0.90	OK
7	PM 2.5 Analyzer	OK					809 ug/cm2	813.58 ug/cm2		0.85	0.86	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement: please always maintain AC temperature on 25 deg C otherwise due to condensation of moisture will damage all analyzers.

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor auto [illegible]

Signature of Engineer:

Abhay Kr. Singh

Abhay Kr. Singh

Station Supervised By:

8/02/21

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL JHHINGURDA — Date:08.02.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	12.40	10.05	1.01	0.615	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	189.52	201.35	1.84	1.941	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.20	200.56	0.89	0.904	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.72	0.78	0.00	0.000	OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	198.20	201.18	0.69	0.693	OK
5	PM10 Analyzer	OK					847 ug/cm2	837.93 ug/cm2		0.88	0.91	OK
7	PM 2.5 Analyzer	OK					825 ug/cm2	811 ug/cm2		0.89	0.92	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fal											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement

Specific Observation(s): All analyzer calibrated satisfactory. NO2 has no factor it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically.

Signature of Engineer:
Engineer CSD

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL NIGAHI Date: 09.02.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	8.92	11.07	1.00	1.121	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	201.10	198.29	1.70	1.697	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.20	201.43	1.16	1.185	OK
	NO_2	OK										
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	199.52	201.51	1.16	1.183	OK
6	PM10 Analyzer						775ug/cm2	769.23 ug/cm2		0.87	0.89	OK
7	PM 2.5 Analyzer						538 ug/cm2	845.63 ug/cm2		0.71	0.67	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											Faulty

Maintenance Details / Requirement:

Specific Observation(s) All analyzer except PM 10 & PM 2.5 are calibrated satisfactory NO2 has no factor it has defined by NO & NOx PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer:

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL KAKRI — Date 15.02.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.87	10.03	1.05	0.918	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	201.82	200.41	1.83	1.813	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.39	201.21	0.89	0.897	OK
	NO_2	OK										
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	199.01	201.82	0.82	0.824	OK
6	PM10 Analyzer	OK					832 µg/m3	829.2 µg/m3		0.86	0.83	OK
7	PM 2.5 Analyzer	OK					806 ug/m3	799.26 ug/m3		0.89	0.91	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Replacement:

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no function, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL JAYANT

Date:23.02.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.73	10.68	0.55	0.54	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	198.97	199.87	1.07	1.10	OK
3	NO_2 Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	200.16	200.00	0.83	0.74	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.19	0.16			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	198.23	198.38	0.84	0.75	OK
6	PM10 Analyzer	OK					836 ug/cm2	821.64 ug/cm2		0.88	0.86	OK
7	PM 2.5 Analyzer	OK					819 ug/cm2	811.90 ug/cm2		0.89	0.87	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement

Specific Observation(s): All analyzer calibrated satisfactory, NO2 has no factor it has defined by NO & NOx PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty fAMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL BLOCK B

Date:24.02.2021 Calibration

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.24	11.23	0.25	0.244	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	198.49	199.52	1.67	1.683	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.30	201.84	1.10	1.109	OK
	NO_2	OK										OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	202.00	199.05	0.99	0.980	OK
6	PM10 Analyzer	OK					817 ug/cm2	839.27 ug/cm2		0.91	0.89	OK
7	PM 2.5 Analyzer	OK					839 ug/cm2	846.32 ug/cm2		0.88	0.83	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement

Specific Observation(s) All analyzer calibrated satisfactory. NO2 has no factor. It has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically.

Signature of Engineer:
Engineer CSD

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL Singrauli

Date:27.02.2021

S.No	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.73	9.74	1.00	1.00	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	200.10	200.03	2.80	2.70	OK
3	NO_x Analyzer											
	NO	Under observation										Under observation
	NO_2											
	NOx											
6	PM10 Analyzer	OK					815 ug/cm2	818.90 ug/cm2		0.83	0.88	OK
7	PM 2.5 Analyzer	OK					844 ug/cm2	844.12 ug/cm2		0.87	0.87	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Tolerance Details / Requirement

Specific Observation(s): All analyzer calibrated satisfactory. Except Nox analyzer under observation PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

Station Supervisor

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL AMLOHRI

Date:02.03.2021 Calibration

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.98	9.87	0.98	0.97	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	201.85	201.35	1.14	1.13	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.06	199.75	0.84	0.95	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.20	0.21			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.42	200.16	0.85	0.94	OK
6	PM10 Analyzer	OK					867 ug/cm2	859.66 ug/cm2		0.90	0.87	OK
7	PM 2.5 Analyzer	OK					809 ug/cm2	831.76 ug/cm2		0.86	0.82	OK
8	Meteoroloogical Parsmeter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details : Requirement: please always maintain AC temperature on 25 deg C otherwise due to condensation of moisture will damage all analyzers.

Other Observation(s): All analyzer calibrated satisfactory. NO2 has no factor it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Name of Engineer: Abhay Kr. Singh

Station Supervised By:

राष्ट्रीय हरित अधिकरण
National Green Tribunal
सत्यमेव जयते

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL NIGAHI

Date :08.03.2021

S No	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.92	10.60	1.12	1.057	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	201.10	200.10	1.59	1.582	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.20	200.30	1.19	1.190	OK
	NO_2	OK										
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	199.52	2005.00	1.18	1.186	OK
6	PM10 Analyzer	OK					77ug/cm3	769.71 ug/cm3		0.89	0.83	OK
7	PM 2.5 Analyzer	OK					535 ug/cm3	535.63 ug/cm3		0.67	0.63	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar RadiaSon											OK
	Barometric Pressure											OK
	Rain Fa.											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement:

Specific Observation(s): All analyzer except PM 10 & PM 2.5 are calibrated satisfactory. NO2 has no factor. It has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically.

Signature of Engineer

STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL BLOCK B — Date:10.03.2021 Calibration

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	11.23	11.32	0.24	0.217	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	196.30	200.10	1.68	1.715	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	194.22	199.89	1.11	1.147	OK
	NO_2	OK										OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	202.00	199.35	0.98	0.970	OK
6	PM10 Analyzer	OK					817 ug/cm2	821.7 ug/cm2		0.89	0.86	OK
7	PM 2.5 Analyzer	OK					839 ug/cm2	843.3 ug/cm2		0.83	0.81	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement

Specific Observation(s): All analyzer calibrated satisfactory. NO2 has no factor. It has defined by NO & NOx. PM10 & PM2.5 Analyser has calibrated & set factor automatically

Signature of Engineer:
Engineer (SI)

STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL CETI

Date: 12.03.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.50	10.01	1.145	1.093	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	203.20	200.03	1.655	1.658	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	198.30	201.01	0.84	0.854	OK
	NO_2	OK										
	NO_x	OK	0.00	0.00	0.00	0.00	200 PPB	198.30	200.51	0.81	0.812	OK
6	PM10 Analyzer	OK					792 ug/cm2	789.51	ug/cm2	0.87	0.88	OK
7	PM 2.5 Analyzer	OK					800 ug/cm2	813.6	ug/cm2	0.91	0.89	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement

Specific Observation(s): All analyzer calibrated satisfactory. NO2 has no factor it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer
Engineer CSD

STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL JHIKINGURDA Date:12.03.2021

S No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			X Factor (Span)		Rem
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.60	10.78	0.97	0.703	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	194.20	201.25	1.94	1.999	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	197.30	200.95	0.99	0.974	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.72	0.78	0.00	0.000	OK
	NO_x	OK	0.00	0.00	0.00	0.00	200 PPB	198.40	201.38	0.99	0.995	OK
5	PM10 Analyzer	OK					847 ug/cm2	879.93 ug/cm2		0.91	0.94	OK
7	PM 2.5 Analyzer	OK					825 ug/cm2	815 ug/cm2		0.92	0.93	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details : Requirement

Specific Observation(s) All analyzer calibrated satisfactory NO2 has no factor it has defined by NO & NOx PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer.
Engineer CSD

STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :N.C.L. JAYANT — Date:13.03.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.06	9.11	0.54	0.55	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	200.87	200.75	1.00	1.04	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.02	199.03	0.74	0.65	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.19	0.18			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.93	200.76	0.75	0.65	OK
6	PM10 Analyzer	OK					836 ug/cm2	832.09 ug/cm2		0.86	0.90	OK
7	PM 2.5 Analyzer	OK					839 ug/cm2	817.09 ug/cm2		0.87	0.89	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement:

Specific Observation(s): All analyzer calibration satisfactory, NO2 has no factor 1 has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL KAKRI — Date 16.03.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.40	10.40	0.92	0.863	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.02	200 PPB	200.36	200.33	1.81	1.910	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	201.60	201.60	0.89	0.883	OK
	NO_2	OK										
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	201.96	201.98	0.82	0.813	OK
6	PM10 Analyzer	OK					833ug/cm2	837.2 ug/cm2		0.83	0.82	OK
7	PM 2.5 Analyzer	OK					835 ug/cm2	829.25 ug/cm2		0.91	0.93	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rainfall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirment

Specific Observation(s): All analyzer calibrated satisfactory. NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL bina

Date: 19.03.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.98	10.02	1.00	1.09	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	199.35	200.03	2.70	2.60	OK
3	NO_x Analyzer											
	NO	OK					200 PPB	201.00	200.01	0.96	0.89	OK
	NO_2	OK					0.0	0.26	0.21			OK
	NOx	OK					200 PPB	199.28	200.06	0.95	0.89	OK
6	PM10 Analyzer	OK					815 ug/cm2	829.91 ug/cm2		0.88	0.86	OK
7	PM 2.5 Analyzer	OK					844 ug/cm2	820 ug/cm2		0.87	0.90	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirement:

Specific Observation(s): All analyzer calibrated satisfactory. NO2 has no factor it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer:

Ashay Kr. Singh

Station Supervised By:

19/3/21

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS : NCL KHADIA

Date 22.03.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.81	10.34	1.01	1.00	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	199.08	200.34	1.46	[illegible]	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.28	200.35	0.95	0.86	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.20	0.19			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.35	200.46	0.89	0.81	OK
6	PM10 Analyzer	OK					836 ug/cm2	846.15 ug/cm2		0.91	0.89	OK
7	PM 2.5 Analyzer	Not Ok					847 ug/cm2	854.26 ug/cm2		0.91	0.90	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rainfall											OK
9	Computers											OK
10	UPS/AC [illegible]											OK
11	Data Display [illegible]											OK

[illegible] ... NO2 has no factor, it has defined by NO & NOx. PM10 Analyzer has calibrated & set factor automatically.

[illegible]

Abhay Kr. Singh (signature)

JS 8/4/2021 (signature)
Station Supervised By:

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty /AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL AMLOHRI

Date:03.04.2021 Calibration

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			X Factor (Span)		Rem.
			Pre	Post	Pre	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.65	10.26	0.97	0.97	OK
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	200.64	200.56	1.23	1.23	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	199.25	200.64	0.95	1.02	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.18	0.17			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.35	200.15	0.94	1.00	OK
4	PM10 Analyzer	OK					867 ug/cm2	882.27 ug/cm2		0.87	0.85	OK
	PM 2.5 Analyzer	OK					909 ug/cm2	909.42 ug/cm2		0.82	0.83	OK
5	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Requirements: please always maintain AC temperature on 25 deg C otherwise due to condensation of moisture will damage all analyzers.

Remarks/Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 & PM2.5 Analyzer has calibrated & set factor automatically.

Signature of Engineer:

Vinay Kr. Singh

Reviewed By:

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty IAMC/CMC/O&M CONTRACT
CALIBRATION REPORT

of CAAQMS : NCL KHADIA

Date: 08.04.2021

Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
		Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	9.06	10.35	1.00	1.00	OK
SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	200.46	200.56	1.39	1.35	OK
NO_x Analyzer											
NO	OK	0.00	0.00	0.00	0.00	200 PPB	200.38	200.19	0.86	0.79	OK
NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.19	0.18			OK
NOx	OK	0.00	0.00	0.00	0.00	200 PPB	200.83	200.16	0.81	0.78	OK
PM10 Analyzer	OK					836 ug/cm2	842.97ug/cm2		0.89	0.85	OK
PM 2.5 Analyzer	OK					847 ug/cm2	845.43ug/cm2		0.900	0.92	OK
Meteorological Parameter											OK
Temperature											OK
Humidity											OK
Wind Speed											OK
Wind Direction											OK
Solar Radiation											OK
Barometric Pressure											OK
Rain Fall											OK
Computers											OK
UPS/ AC / Others											OK
Data Display Board											OK

Details / Requirement:

Observation(s): All analyzer calibrated satisfactory, NO2 has no factor, it has defined by NO & NOx. PM10 Analyzer has calibrated & set factor automatically.

of Engineer:

Asingh
Akshay Kr Singh

8/4/2021
Station Supervised By:

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STATION PROTOCOL
FOR
CAAQM STATION UNDER Warranty/AMC/CMC/O&M CONTRACT
CALIBRATION REPORT

Location of CAAQMS :NCL JAYANT

Date:09.04.2021

S.No.	Parameter	Status	Zero Value		Zero Offset		Span Calibration			K Factor (Span)		Rem.
			Pre	Post	Per	Post	Span Source	Pre	Post	Pre	Post	
1	CO Analyzer	OK	0.00	0.00	0.00	0.00	10.00 PPM	10.83	10.82	0.55	0.54	Ok
2	SO_2 Analyzer	OK	0.00	0.00	0.00	0.00	200 PPB	199.05	199.08	1.14	1.16	OK
3	NO_x Analyzer											
	NO	OK	0.00	0.00	0.00	0.00	200 PPB	200.83	200.90	0.65	0.64	OK
	NO_2	OK	0.00	0.00	0.00	0.00	0.0	0.23	0.20			OK
	NOx	OK	0.00	0.00	0.00	0.00	200 PPB	199.38	199.35	0.66	0.67	OK
5	PM10 Analyzer	OK					836 ug/cm2	834.85 ug/cm2		0.90	0.87	OK
7	PM 2.5 Analyzer	OK					819 ug/cm2	810.91 ug/cm2		0.89	0.82	OK
8	Meteorological Parameter											OK
	Temperature											OK
	Humidity											OK
	Wind Speed											OK
	Wind Direction											OK
	Solar Radiation											OK
	Barometric Pressure											OK
	Rain Fall											OK
9	Computers											OK
10	UPS/ AC / Others											OK
11	Data Display Board											OK

Maintenance Details / Rectification :

Specific Observation(s) All analyzer calibrated satisfactory, NO2 has no factor it has defined by NO & NOx PM10 & PM2.5 Analyzer has calibrated & set factor automatically

Signature of Engineer

ANNEXURE 7A /III

Gmail

hemant Sharma <hsharma1091@gmail.com>

Reply on Action taken and expected actions by Jabalpur division.

1 message

Deepak Kumar Gupta <dkguptairps@gmail.com> Wed, May 5, 2021 at 3:05 PM
To hsharma1091@gmail.com

Dear Sir,

Reply on your mail dated 18.04.2021 is attached herewith.Submitted for kind information please.

With Regards,

Deepak Kumar Gupta
Additional Divisional Railway Manager/Gen
West Central Railway, Jabalpur MP
Mobile - 7489928099
Whatsapp- 7000054220

MPPCB Reply.pdf
7652K

West Central Railway

DRM (C)'s Office
Jabalpur

No. JBP/C/452/GA/Pollution Control/Siding-Goods Shed/20-21

Date: - 27.04.2021

Director/MPPCB
Paryavaran Parisar, E-5, Arera Colony
Bhopal, Madhya Pradesh
PIN - 462016

Sub: - Establishing and Running of loading and unloading sidings at Bargawan, Gajarabahara & Gondawali (Distt Singrauli) without proper dust control arrangement: Compliance of the recommendations of the Over Committee reg.

Ref: - 1. Director, Environment MPPCB, Bhopal letter No. 1268/MPPCB/CE-II/2021 dated 12.04.2021

2. This Office letter of even number dated 04.06.2020, 21.08.2020, 11.11.2020 & 22.04.2021.

.....

In reference to above, it is submitted Jabalpur division has already taken notes of NGT guidelines and conducted inventorization of Railway sidings as per guidelines. Accordingly action plan has been prepared and communicated to MPPCB vide letter under reference (2). Jabalpur division has given all the information and replies as desired by MPPCB time to time (Copy enclosed). Division has applied for CTE, necessary fees of Rs. 30000/- and fees for Inspections have already been deposited, for which inspections have also been carried out 2-3 times and compliance have been submitted on portal, still the CTE for Bargawan is awaited.

Most of the coal is delivered to power plants by rail mode of transport. The reliable supply of coal by rail to powerhouses is therefore important for the electric power supply system. In this context, Jabalpur Division has developed a goods sheds near Singrauli region where most of the Coal mines are located near this region to provide facility of Coal transportation for various Power Plants /Super Thermal Plants. These goods sheds are situated far away from residential area and where ever there is requirement, necessary arrangements have already been done by Railway to protect environment balance. Jabalpur division is also insisting Cement and other industries for transportation of Fly Ash by railways, so far 21 rakes fly ash have been loaded from HINDALCO siding on initiatives taken by railways.

West Central Railway has taken steps to streamline its initiatives in regards to environmental management. Some important policy initiatives taken by Railway administration in recent years are noted below:

1. Provision of water recycling plants at major Railway stations for Jabalpur division.
2. Provision of Rain water harvesting system.
3. Provision of Wind braking wall and sprinkling systems at Major goods sheds of Jabalpur division where loose commodities are loaded/unloaded.

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4. Use of plastics of less than 20 micron thickness in packaging is banned.

5. For dust protection wall at BRGW & Gandawali, a tender of about Rs 1.82 Cr. has been invited to be opened on 18.05. It is targeted to complete the work upto 31.12.21.

Further, compliance of issues raised by HQrs Office MPPCB, Bhopal is prepared and enclosed as Annexure -A for your kind information. Jabalpur division is committed to comply all the norms of Pollution control and carry out all environmental related work in due course as per availability of funds provided by Central Government.

DA: As enclosed.

Deepak Kumar Gupta

Digitally signed by Deepak Kumar Gupta
Date: 2021.05.05 13:30:27 +05'30'

(Deepak Kumar Gupta)
ADRM/JBP

C/- PCCM/WCR for kind information please.
C/- CME/WCR for kind information please.

ADRM/JBP

Annexure A

Item wise compliance of issues raised by MPPCB:

Sr.No	Issues raised by MPPCB	Reply of Jabalpur division West Central Railway
01	No compliance /reply have been submitted by WCR Jabalpur which is very unsatisfactory.	The necessary information in this regard was already communicated with Regional & Head quarters Office of MPPCB vide this Office letters of even number dated 04.06.2020, 21.08.2020, 11.11.2020 & 22.04.2021 on E-mail (Due to covid-19 pandemic). Also same information is provided in XGN portal of MPPCB. It may kindly be noted that, we have already applied for Consent to Establish at Bargawan goods shed & Consent To Operate at Gajarabahara & Gondawali location of Jabalpur division through XGN portal and necessary fees required for Consent for Establish/Operate has already been deposited by this Office. It is further informed that we have already made necessary provisions for prevention of air and water pollution at these goods shed. • Dust protection/ Wind screen wall is provided at these sidings as per requirement • Green belt is developed all around the siding by plantation • At these sidings 100 plants have been planted in last rainy season Sprinkler is provided at Gajarabahara & Bargawan Goodsheds • Dust suppression machine is provided at Gondwali location. • Approach road and platform surface is also repaired and developed to restrict dust. **(Images are attached.)**
	No time lines have been provided for complying with the CPCB guidelines nor any time targeted action plan has been chalked out.	Time lines have been prepared as under:- Plantation :- 50% completed **Short Term Plan:** 1. Dust protection wall 2. Paved approach road. 3. Plantation in rest area. The said work is likely to be completed by the end of December 2021. **Long Term Plan:** Water sprinkling system all along the siding area will be established in the next financial year to protect the coal particles from erosion due to wind. TDC: 31.03.2023

	No administrative control is exercised at the Railway sidings, which are being run at the mercy and will of the loading contractors. Coal crushers are installed without any prior statutory permission, which further add to the already poor condition at the sidings and cause of public complaints.	It is also submitted that no manufacturing/ mining/crushing of materials like activities are carried out at Railway siding/goods shed. Only loading/unloading operations of commodities are being dealt at goods shed /Railway siding. Stacking of material is being only allowed after registration of indent for transportation of consignment and before commencement of loading from wharf area into the wagons/rakes. Loading parties are also advised to follow the guidelines issued by CPCB regarding stock pile and drop height while loading and unloading.
2.	No dedicated staff has been appointed for pollution control by the WCR and no responsible officer remains available to check the activities of the contractors/ coal loaders and to ensure compliance with the environmental issues.	Field staffs (Supervisor, Inspectors, and Engineers) are appointed by Railway at these locations. Goods supervisors and staffs deputed by Railway Protection Force takes a closer look on loading /unloading activities and other related activities for smooth transportation. Field staffs have also been instructed to supervise and ensure that loading/unloading parties follows the CPCB guidelines
3.	Verifiable details of the dust control arrangements / devices installed at sidings for the compliance as per CPCB guidelines for Bargawan, Gajarabahara & Gondawali sidings as on 30.04.2021 along with photographs and drone camera video graphy shall be submitted and also replies to the issues as mentioned at point No. 1 & 2.	Power Point for photos is attached. **Short Term Plan:** Dust protection wall has already proposed at Bargawan & Gondawali Railway siding breaking for enclosing stock piles to reduce wind blowing. Apart from that provision of paved approach road for the sidings is also proposed. For dust protection wall at BRGW & Gandawali, a tender of about Rs.1.82 Cr. has been invited to be opened on 18.05. This work will complete upto 31.12.21. The said work is likely to be completed by the end of December 2021. **Long Term Plan:** Water sprinkling system all along the siding area will be established in the next financial year to protect the coal particles from erosion due to wind. TDC: 31.03.2023.
4.	Action taken by WCR to ensure the compliance of the Fly Ash Notification, 1999 and use of fly ash in the track doubling, embankment making etc. Compliance to be submitted accordingly.	Presently, using fly ash in the track doubling, embankment making is not technically feasible. Construction and civil works are done as per RDSO specifications. However, the matter is conveyed to RDSO for utilization of fly ash in construction related works of Railways.

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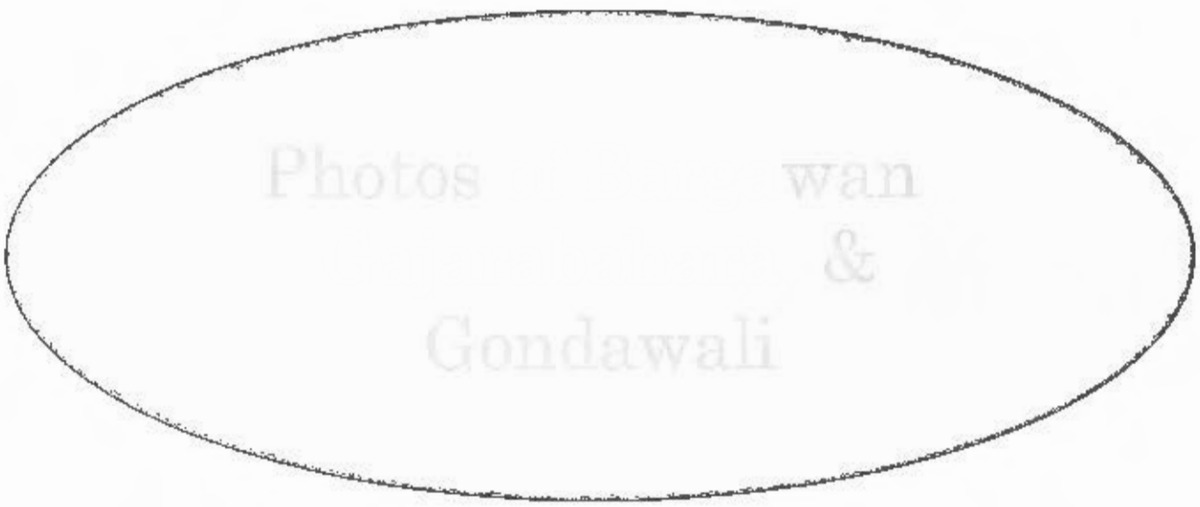
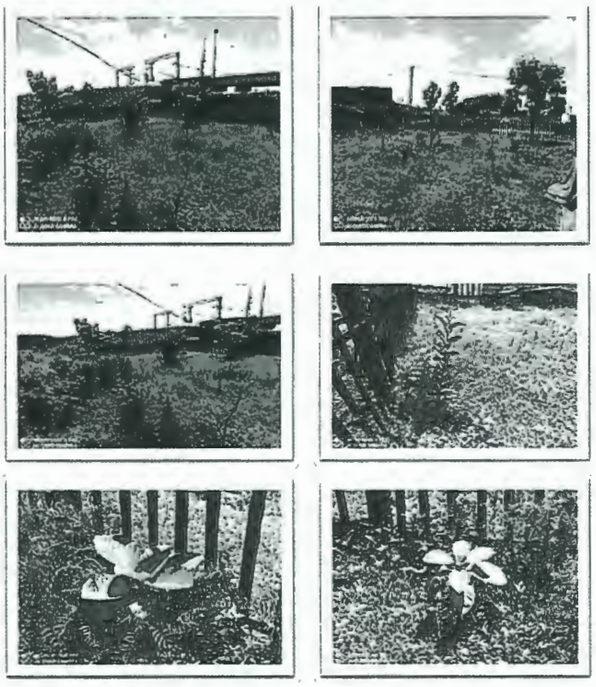


JABALPUR DIVISION
(WEST CENTRAL RAILWAY)

Photographs of Bargawan siding

Water Sprinkling System at Bargawan

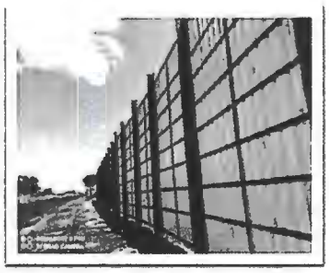
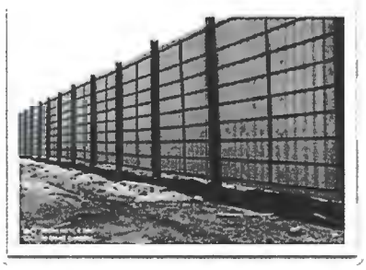
Green Belt Plantation at Bargawan

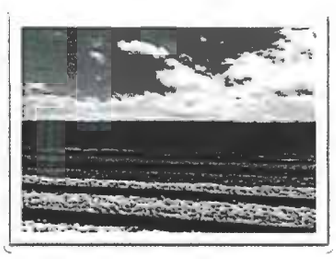


Photographs of Bargawan siding

Dust Screen/Wind Breaking Wall



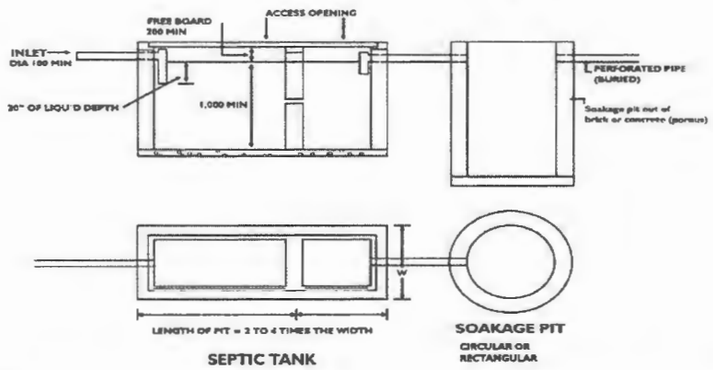





Photographs of Gajarabahara siding

Wind breaking wall & profile sheeting around siding

GAJARABAHARA



Septic tank Size:2 X2 X 2.2 m
Cap:8.8 M^3
Soak pit : 1.2 Dia X2.2 depth
Cap. 2.5 M^3

Photographs of Gajarabahara siding

Platform surface & Wind breaking wall

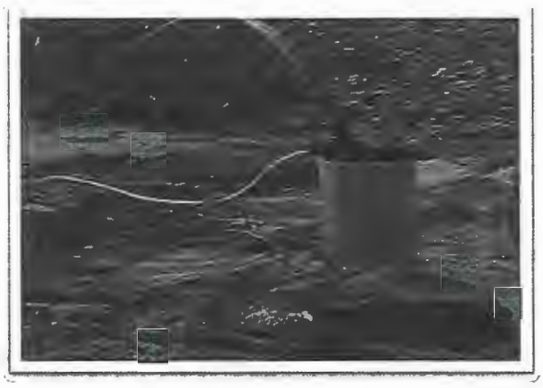
6

Photographs of Gondwali siding

Wind breaking wall & profile sheeting around siding

Photographs of Gondawali siding

Plantation & Other Air Pollution measures



Photographs of Gondwali siding

Plantation & Platform surfacing

THANK YOU

Technical Presentation

❀❀❀❀❀

Bargawan Railway Siding Of Jabalpur Division West Central Railway

Introduction and ba[illegible] of projects

Bargawan is a village situated near Singrauli district of Madhya Pradesh. The Coal has been collected from various mines near Singrauli region through trucks which is approximately 30 to 35 Kms away from loading point (Bargawan Siding).

Bargawan is located on KTE-SGRL line of the Indian Railways, under West Central Railway Zone. At Bargawan siding, the consignor load coal rakes with pay loader and dispatched to various destination mainly powerhouses . The wagon loading contractors have also been advised for cleaning of the siding tracks/between the line and on both sides of the tracks , leveling of coal loaded into the wagons and lime washing on the top.

Near by Mines : There are various coal mines are situated near by Bargawan siding likewise

Sr. No	Name of Mines	Approx. Distance from Siding
01.	Jayant Mines	30 KM
02.	Dudhichua	37 KM
03.	Bina	28 KM
04.	Block "B"	10 KM

Location of Bargawan Siding

Description as per CPCB guideline	Compliance
Sidings should be kept away from the residential area, school/colleges, Historical Monuments, Religious Places, Ecological sensitive area as well as forests area.	As Bargawan Railway Siding is constructed on Railway Land, which is situated about 1 km away from school/colleges and residential places. The guidelines of MPPCB & CPCB are followed during loading/unloading Operations.

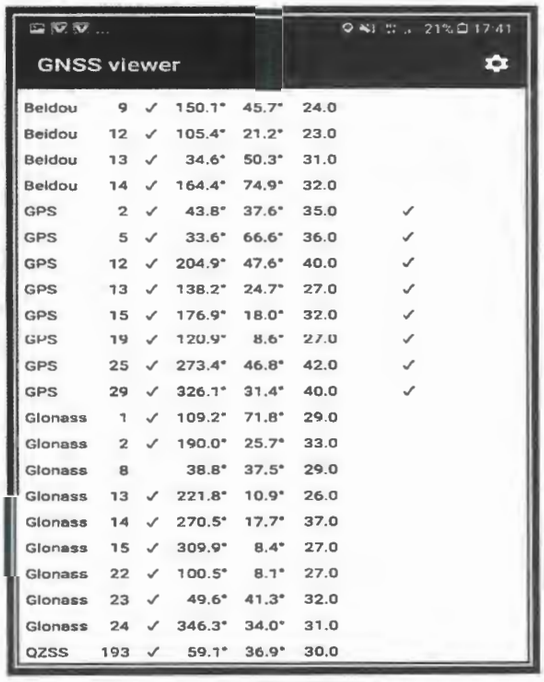
Location of Bargawan on Google map

Near By Places	Dist. (in KM)
Central Bank :-	1.07
Govt hospital :-	1.16
Residential area	0.25
School/Collage	1.10
National/State Highway:-	0.30
River /pond :-	1.57

Location of Bargawan on Google map

Location of Bargawan on Google map

Latitude and Longitude of Siding



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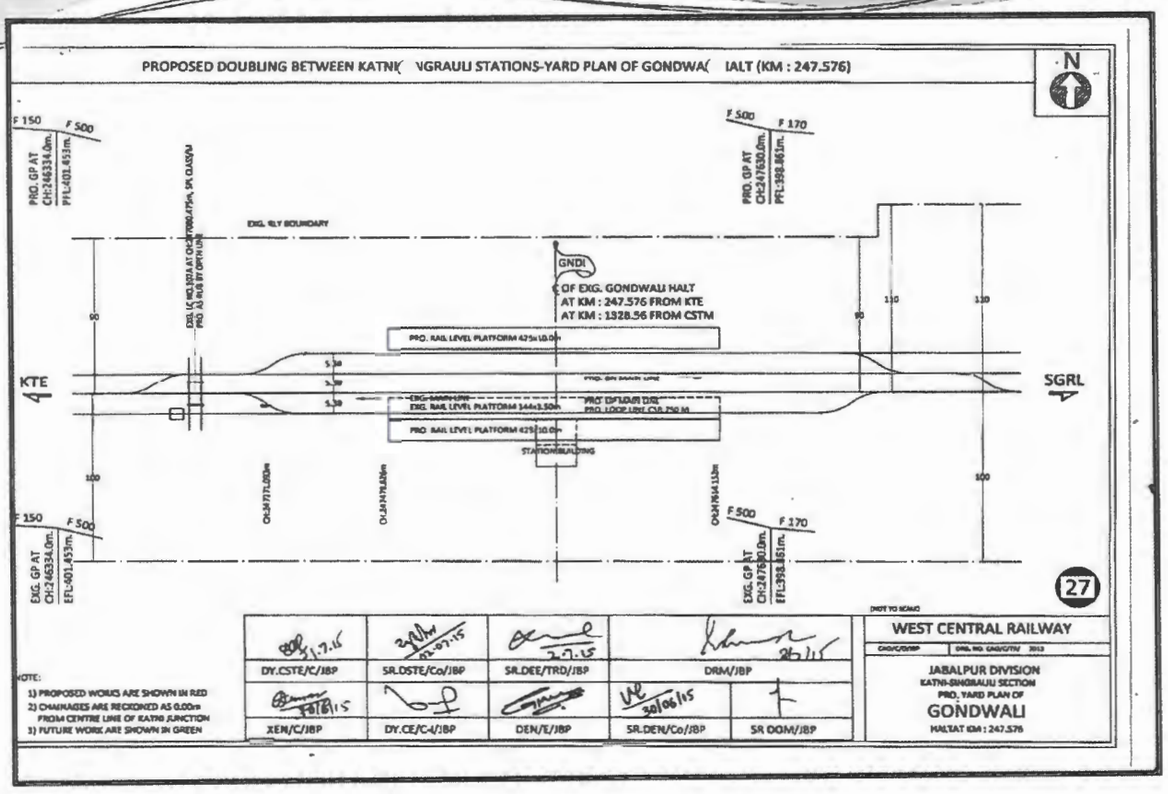
Existing Site specification details such as River, lake, Forest, Human settlement etc.

Presently the proposed area is just a open area, not being utilised for any purpose. The distances of various resources from this ground are as under:-

Sr.No	Places	Distance	Remark
01.	Residential Area	01 Km	Bargawan
02.	School/colleges	02 Km	-
03.	National /State Highways	0.8 Km	NH-75
04.	Rivers/Stream/Ponds	04 Km	Pareva Nala
05.	Other sensitive area	500 meter	Bhagwati Mandir

Approved Layout Plan



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RAW Material and Product

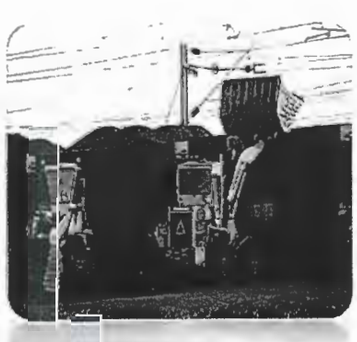
At present Bargawan siding is opened for loading and unloading of Coal, Bagged Consignment & Container traffic. In view of demand for loading /unloading of other commodities , the same will also be carried out from Bargawan siding.

Quantity of material expected to be dealt

Sr. No	Type of material	Quantity per Annum	Max. Storage quantity .
01.	Coal	12.00 Lakh (Metric Tonne) per Year Approx.	Presently Bargawan railway-siding deals with loading of coal which are stacked temporarily on proposed ground for dispatching through Railway rakes.

Manufacturing Process

- As no manufacturing process involved at proposed site, the process of dealing with material for loading is described below:
- The commodity Coal is being brought from various mines near Singrauli region through trucks which is approximately 30 Kms away from loading point (Bargawan Siding). At Railway, coal rakes are loaded by Consignor with the help of pay loaders and dispatched to various destinations.
- After loading, the wagon loading contractors cleans the extra material from Railway tracks i.e. between the line and on both sides of the Siding.



Coal Handling System

- By both mechanical and manual means.
- Coal from trucks are unloaded at the siding through hydraulic system.
- The truck is emptied manually by machines.
- The coal is then lifted from the siding through pay loaders and JCBs and loaded into the wagons.

Source of water and water consumption in different usages.

Water balance

Water Consumption	Sources
Industrial consumption for fog machine and water suppression machines:- 10 kilo litre/day/rake	Mobile tankers
Fresh water consumption (Domestic):- 2 kilo litre/day for human consumption	Borewell (underground water)

Sources of pollution

- Air pollution :-
  - Unloading
  - Loading
  - Movement of trucks/ dumpers on macademised road & areas
  - Wind erosion
- Water Pollution:-
  - There is no water body near or around Bargawan siding.
- Solid wastes:
  - There is no solid waste and hazardous substances being natural raw material to be dealt.

Preventive measures for air pollution

- Plantation of trees has been done at about 15 sq. meter area along roadsides, to seize auto exhaust and noise pollution.
- Loading/unloading by using mechanized system.
- Provision of wind screen and profile sheet at all around the coal siding area for dust protection.
- Dust dislodgement from vehicular movement are minimized by implementing speed limits.
- Provision of wind dust wall which has been made to act as noise barrier to some extent.
- Row plantation pattern of trees to prevent horizontal dispersion of pollutants
- Loading party have been advised to follow the guidelines issued by Central Pollution Control Board regarding stock pile and drop height while unloading from trucks.

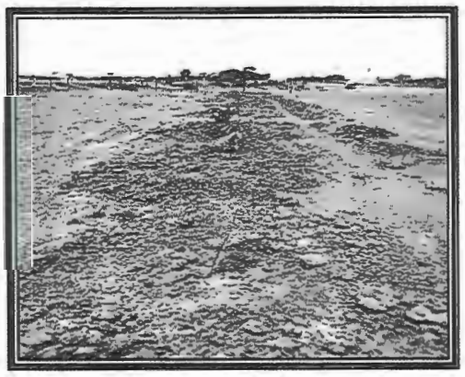
DROP & STOCKPILE HEIGHT

Description	As per CPCB guideline	Compliance
DROP HEIGHT	The drop heights should be minimized to reduce dust during loading and unloading operations.	Drop height is maintained at 3 ft. - 4 ft only from ground initially. Unloading process is slowed down at this height .
Stack Pile Height	The stockpile should have adequate dimensions so that wind erosion from the stockpile will be minimum.	The height of material stack within storage areas is kept below the height of the boundary wall at all times to prevent the material from being air borne.
	The loading /unloading at stockpile should be done by mechanized means.	Loading /unloading can be done by using mechanized system.

Approach Road for siding

As per CPCB guideline	Ongoing works	Proposed work
Approach road for siding	Coal dust is used for approach road	Planned to strengthening the black topping of permanent and semi-permanent roads to avoid dust when the trucks moves over them. Proper approach road will be constructed within six to eight month period for smooth movement of trucks.

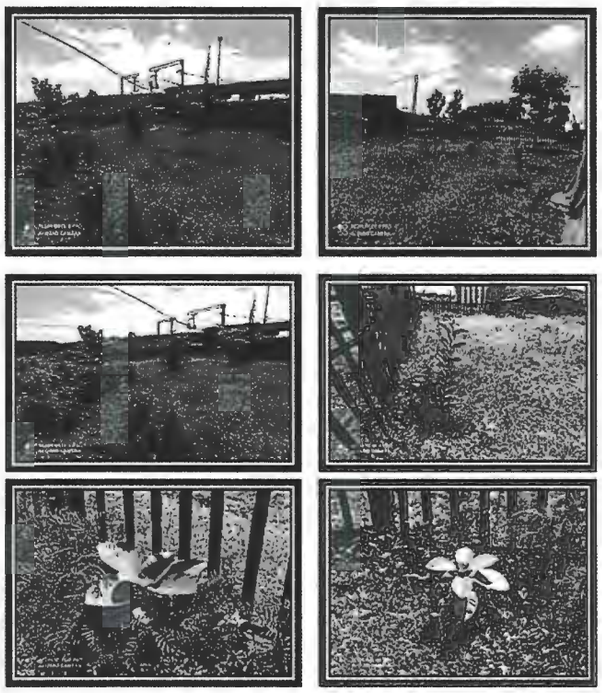
Photographs of Bargawan siding



Photographs of Bargawan siding

Water Sprinkling System at Bargawan

Green Belt Plantation at Bargawan



Photographs of Bargawan siding

Dust Screen/Wind Breaking Wall






Preventive measures for WATER pollution

- Water Sprinkling System: APC arrangement has been done as Water Sprinkler system has been installed throughout the yard area. Whenever necessary Water tanker are also used as per need.
- Proper waste water/drainage system shall also be provided if so required during rainy season.
- Construction of Septic Tank and Soak pit is going on with the construction of Railway Station building at Bargawan.
- Coal yard is protected by Boundary wall of CGI (Corrugated Galvanized Iron) sheet supported by MS Angle for dust separation.
- Presently no water waste is being generated as no manufacturing process is involved hence there is no requirement of ETP , however if in future requirement is felt ETP will be proposed.
- Water sprinkling system with one deep tube well had been commissioned at Bargawan goods sheds.
- Drain is being dug along the periphery of the siding. A settling pond is proposed within the siding land to store rain water prior to its release into natural drain.

Estimated cost of project.

The land on which Railway station/Goodshed /Siding constructed are owned by Ministry of Railways, Government of India. It is informed by the Engineering department that the cost for investment incurred in the construction of Bargawan siding is Rs. 10 crores (ten crores).

Other miscellaneous provisions

- **Basic Facilities for staff/ Workers at both sidings:**
  - i) Drinking Water
  - ii) Toilets with septic tanks.
  - iii) Rest rooms, also temporary sheds to act as rest shelters shall also be provided.

DRM (C)'s Office
Jabalpur
Date: - 11.02.2020

West Central Railway

No. JBP C-45/2 CA Pollution Control Siding Goods Shed/19-20

Director/MPPCB
Paryavaran parisar,E-5, Arera colony
Bhopal
Madhya Pradesh
462016

Sub - Regarding obtaining of Consent to Operate at Gajra Bahra Railway Siding.
Ref - Your's Office letter No. 362/Tech/PCB/2020 dated 06.02.2020.

.....

In reference to your letter dated 06.02.2020, it is inform that, West Central Railway, Jabalpur Division has developed new goods shed near Gajra Bahra Railway station located in Katni Singrauli line for public use to cater the growing demand of the region. The Goods shed will have all basic infrastructure amenities like water sprinkler, lighting, wind breaking wall, overhead water tank, cabin & restroom, etc.

In this context , we have already applied for Consent to Establish for Gondawali goods shed and same has been granted from your Office subject to the condition below mentioned. It is further informed that we have already made provisions as desired by your goodself.

The itemwise reply of your queries is as under:

Sr. No	Items	Compliance
01.	Dust vacuum cleaner machine to be installed at siding/goods shed.	Dust vaccum cleaner has been installed at goods shed.
02.	Approach road from PWD road to siding (Approx. 150 mts X 12 Feet) should be made concrete	Concrete paved approach for more than 2 km length is already constructed & Road widening is done from 3 mtr to 7 mtr wide. It is also keeping in view that,dustdisledgement from vehicular movement must be minimized by implementing speed limits.
03.	Wind breaking wall installed to be raised to 15 feet.	At present, the height of wind breaking wall is 10 feet. However, it is far sufficient in view of locality. Still we are in process to increase the height of the same.
04.	Mist fogging machine to be provided at siding.	We are in process to install it shortly.
05.	Chimney height need to be increased of DG set up to above of building height at Gajara Bahara.	Done as per CPCB guidelines.
06.	Water spraying system on entire yard need to be fixed at Gajara Bahara.	Water spraying system are installed. Water Sprinkling system and tankers are used at siding/goods shed to prevent water pollution
07.	Water meter should be installed in Boring machine to monitor water consumption at Gajara Bahara goods shed	Water meter has been installed, also process for obtaining NOC from CGWA is intiated and requisite fees has been submitted in portal.
08.	Plantation to be done beside wind braking wall and appropriate areas at and	Trees are planted along roadsides, to arrest auto exhaust and noise pollution.

O/C office of
1) CCM/FM/WCR

13/2/20

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around siding.

Row planting of trees are done near goods shed area to prevent horizontal dispersion of pollutants. We are also growing more plants, more trees to stop air pollution.

In view of above compliance of queries, it is requested that Consent to Operate may kindly be issue for Gajarabahara goods shed for loading/unloading operations.

(Basant Kumar Sharma)
Sr.DCM/JBP

C/- **Regional Officer/MPPCB,Singrauli** for kind information.
C/- **CCM(FM)/WCR** for kind information please.

(Basant Kumar Sharma)
Sr.DCM/JBP

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West Central Railway

DRM (C)'s Office
Jabalpur
Date: - 04.06.2020

No. JBP/C/452/GA/Pollution Control/Siding-Goods Shed/19-20

Director/MPPCB
Paryavaran Parisar,E-5, Arera Colony
Bhopal
Madhya Pradesh
PIN - 462016

Sub: - Regarding obtaining of **Consent to Operate** at Bargawan.
Ref : - Your's Office letter No. 362/Tech/PCB/2020 dated 06.02.2020.

.....

In reference to your letter dated 06.02.2020, it is to inform you that, West Central Railway, Jabalpur Division has developed new goods shed near Bargawan station located in Katni – Singrauli line for public use to cater the growing demand of the region. The Goods shed has all basic infrastructure amenities like water sprinkler, lighting, wind breaking wall, overhead water tank, cabin & restroom, etc.

In this context , we have already applied for Consent to Establish for Bargawan goods shed through XGN portal. It is further informed that we have already made necessary provisions for prevention of air and water pollution.

It is also submitted that proposal regarding necessary APC arrangement was already processed by Engineering department of Jabalpur division of West Central Railway, but due to Covid-19 lockdown since March 23, 2020. No civil work could be proceeded regarding the proposed work. As such the work order has been given in first week of June and the work of providing other necessary APC arrangements likewise wind breaking wall, approach road to siding, water sparying system on entire yard likely to be completed by August 2020.

In view of above, it is requested that "Consent to Establish/Operate may kindly be issue for Bargawan goods shed for loading/unloading operations.

(Basant Kumar Sharma)
Sr.DCM/JBP

C/- Regional Officer/MPPCB,Singrauli for kind information.
C/- CCM(FM)/WCR for kind information please.
C/- ADRM(Gen.)/WCR for kind information please.

(Basant Kumar Sharma)
Sr.DCM/JBP

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West Central Railway

Office
Divisional Commercial Manager
(Commercial)/Jabalpur

No JBP/C/G/452/Pollution Control Board/20

Date. 11 11 2020

Regional Manager,
Madhya Pradesh Pollution Control Board
Bhaguwar, Naugad, Singrauli
Pin:

Sub. **Information for the Oversight Committee constituted by Hon'ble NGT vide its order dated 14-07-2020 on OA 164 of 2018 Ashwani Kumar Dubey vs. Union of India.**

Ref. Letter No लो.से प्रा. /सी.एस.आर /943/2020/सिंगरौली dated 09 11 2020

In reference to the NGT order regarding the Oversight Committee constituted by Hon'ble NGT vide its order dated 14-07-2020 on OA 164 of 2018 Ashwani Kumar Dubey vs Union of India. The desired information is enclosed as annexure for kind perusal and further necessary action please. It is also submitted that Railway has also applied for Consent To Establish at Bargawan siding and goods shed through XGN portal of MPPCB The copy of technical presentation in the form of power point presentation is also enclosed for your kind information and to grant Consent To Establish/Operate at Bargawan siding and goods sheds

Encl: As above

DEVESH SONI
Digitally signed by DEVESH SONI
Date: 2020.11.11 18:00:46 +05'30'

(Devesh Soni)
Divisional Commercial Manager
West Central Railway, Jabalpur

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Before The National Green Tribunal, Principal Bench, New Delhi in the matter of cases O.A. No. 164/2018

Information for the Oversight Committee constituted by Hon'ble NGT vide its order dated 14-07-2020 on OA 164 of 2018 Ashwani Kumar Dubey vs. Union of India

SNo	Final Recommendations in the report of February 2018 of Core Committee submitted before Hon'ble NGT on 03-04-2018 and cited by Hon'ble NGT in its order dated 14-07-2020	Action to be taken Through Concerning Agency	Current Status of action as on 31-10-2020 for Singrauli MP
1	2	3	4
	a) Transportation of coal in open trucks is continued unabated thereby defying the very purpose of installation of the Pipe Conveyor System. Further, the residents in the concerned area complained about severe noise pollution caused by the prevailing coal transportation system. Necessary compliance should be carried out to reduce the noise pollution to the level required by the concerned SPCB with immediate effect. In case of dire necessity of transportation of fly ash and bottom ash, CPCB Guidelines for Loading/Unloading and Transportation of Fly ash (December 2013), made for this purpose should be strictly followed. CCTV cameras are to be installed at strategic locations to monitor such transports by the concerned SPCBs. NCL, Gorbi Block B mine shall complete its railway track at the earliest and stop road transportation of coal up to Morba Railway siding. Similarly, Jayant mine shall either transport coal up to Morba railway siding by conveyor system or make arrangements to load the entire coal in railway wagons from the mine itself and stop road transportation of coal.	NCL	HINDALCO and NTPC are being persuaded to transport fly ash by Railways Hindalco Industries Limited, HIMB has started loading in BOXN wagons. Two such rakes have been loaded so far Railway has also grant 40% Freight incentive to promote loading of Fly ash. In addition to normal free time for loading one hour additional free time also granted to cover the wagons with tarpaulin to prevent air pollution during transportation
	c) Also, the coal mines shall ensure that transportation of coal shall only be either by railway wagons or by the dedicated conveyor system. No transportation of coal shall be permitted by road to any of the industries in the Singrauli area, as	NCL/ Railways (WCR &	• For facilitating transportation of coal WCR have developed Bargawan and Gondwali sidings

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	recommended earlier also. The railway wagon loading area requires better material management as severe dust pollution is fuund in the area.	ECR)	• Dust protection/ Wind screen wall is provided at these sidings as per requirement • Green belt is developed all around the siding by plantation. At both sidings 100 plants have been planted in last rainy season • Sprinkler is provided at Bargawan Goodshed • Dust suppression machine is provided at Gondwali • Approach road and platform surface is also repaired and developed to restrict dust **Images are attached.** • Loading parties are also advised to follow the guidelines issued by CPCB regarding stock pile and drop height while loading and unloading. However at present there is no loading of coal at Gondwali and Bargwan
14	Installation of dust control arrangements at the railway sidings of Singrauli (01-03-2019).	East Central Railways / West Central Railways / NCL	On WCR Bargawan, Gondawali and Gajrabahara sidings are dealing with Coal traffic **Dust Control System :** **Bargawan:** Sprinkling system provided. Dust protection

			wall of 200 m as required has been provided to accommodate full rake in rest of the area the resident area is above required height (hilly area) for which dust wall not required **Gondwali:** Dust protection wall was provided, which shall be repaired when loading will be started Dust suppression machine provided while loading **Gajarabahara:** Dust wall to the length of whole siding provided with sprinkler

Place: Jabalpur
Date: 11.11.2020

DEVESH SONI
Digitally signed by DEVESH SONI
Date: 2020.11.11 17:56:10 +05'30'

(Devesh Soni)
Divisional Commercial Manager
West Central Railway, Jabalpur

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East Central Railway

ANNEXURE 7 B/III

Office of the
Divisional Rly manager (C)
Dhanabd: 826001
Dhanbad, dt.30.04.21

No.C.710/MPPCB/DHN/21

H K Sharma
Director-Environment,
MP Pollution Control Board
Bhopal

Sub: Establishing and Running of loading and unloading sidings at Mahdeiya (MHDA) and Singrauli (SGRL) without proper dust control arrangements: Compliance of the Oversight Committee reg.

Ref: Your D.No.1210/MPPCB/CE II/2021 dt.12.04.2021.

As informed vide your letter above reference, compliance status of Singrauli and Mahdeiya Railway sidings as on 30.04.2021 along with time lines or time targeted action plan is to be submitted before Hon'ble NGT in the IIIrd report of the Oversight Committee.

In this connection it is to inform you that Railway has always tried to comply with the direction of the statutory body and has taken all possible measures to control dust and other pollutants during loading and unloading as per CPCB guidelines. Point wise compliance for the above referred matter is as below:-

I. Construction of 06 feet height of concrete Boundary wall along with 20 feet height of fencing/protection screen for pollution control at Singrauli Railway siding has been started. It is expected to be completed within **06 months** i.e. up to Oct'21. **(Photograph enclosed)**

II. Currently, construction of Boundary wall at Mahdeiya Railway siding has not been started due to proposed yard remodeling work. Boundary wall at mahdeiya Railway siding will be constructed with yard remodeling work. For this tender has already been awarded. It will take almost **10 months** for completion of boundary wall work at Mahdeiya.

III. Regular water sprinkling through water tanker is being done which covers various points like loading/unloading /stacking areas at Railway sidings to control air pollution. More rigorous compliance will be ensured. **(Photograph enclosed)**

सही प्रति
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IV. Regular cleaning of Railway goods shed wharf is being done.

V. Small and big trees surrounding the Railway Sidings exists. New plantations will be made in vacant area before monsoon and some after construction of boundary wall so that saplings are not destroyed. The expected results will be reflected in a couple of months.

VI. It will be ensured to cover the trucks from Tarpaulin which runs for transportation of coal.

It is also informed that at present there is no any Coal Crushers are installed at Railway premises. Moreover, supervisors from Engineering, Commercial and Operating department of Railway have been appointed to supervise all above works. Time to time, the activities of the goods shed are communicated by them to the higher authority for smooth functioning of goods shed.

(B) Track doubling work in Singrauli area is being done for heavy axle load. As per BIS-1498, Fly Ash is categorised as silty and sand mixture which is a non cohesive and loose soil. As guided by RDSO, a non cohesive and loose soil is not required for formation of heavy axle load. Further, using of Fly ash with soil improvement, RDSO guideline and specification is not available as of now. Hence Fly Ash cannot be directly used for railway embankment as per our technical department.

Therefore, it is certified that we are taking our all effort to comply required measures for control of dust and other air pollutants. The desired result is expected to be visible in coming days.

Sr.Div.Commercial Manager
East Central Railway
Dhanbad

ANNEXURE 8 /III

Gmail

hemant Sharma <hsharma1091@gmail.com>

Compliance of the recommendations of Over sight Committee

3 messages

hemant Sharma <hsharma1091@gmail.com> Mon, Apr 12, 2021 at 1.09 PM
To: r_kumar@neeri.res.in, h.bherwani@neeri.res.in
Cc: "romppcb.sgrl@gmail.com" <romppcb.sgrl@gmail.com>, Sunil Kumar Meena <biosunil2006@gmail.com>, dmsingrauli@mp.gov.in

PFA letter no 1266 dated 21-04-21 from MPPCB
With Best Regards,
H. K Sharma,
Director Environment,
MP Pollution Control Board,
Bhopal

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86K

Hemant Bherwani <h.bherwani@neeri.res.in> Thu, Apr 15, 2021 at 3:18 PM
To: hsharma1091@gmail.com
Cc: Rakesh Kumar <r_kumar@neeri.res.in>, romppcb sgrl <romppcb.sgrl@gmail.com>, biosunil2006@gmail.com, Mr Rajeev meena <dmsingrauli@mp.gov.in>, Paras Pujari <pr_pujari@neeri.res.in>, Atya Kapley <a_kapley@neeri.res.in>, Padma Rao <ps_rao@neeri.res.in>, DIRECTOR NEERI <director@neeri.res.in>

Dear Sir,
Greetings from CSIR-NEERI.
With reference to your letter number 1266 dated 12-04-21, please find below the updates related to Fly Ash Dyke breach in Sasan Power Limited. NTPC Vindhyanchal project is being handled by Dr. Paras Pujari, Senior Principal Scientist. CSIR-NEERI (M: 9423684077) who is also copied in this email for providing details.

Following points may be taken into consideration for Sasan Power:

- The contaminated sites were visited from 23.12.2020 to 27.12.2020 in SASAN Mega Power Plant, Singrauli, in which the accident due to ash breaching was monitored by the team of scientists and research associates of CSIR-NEERI.
- Total 89 samples were taken during the visit, out of which 49 of water, 32 of soil, 05 of ash and 03 were of crops/plants.
- Onsite measurement of certain parameters like pH, conductivity, DO were taken. Also, the infiltration rate in affected site and background sites was measured.
- Remote sensing analysis was completed to finalise the sampling location along the path of fly ash deposition in the contaminated area.
- Out of 49 Water samples, some samples were collected from affected site, nearest village and 1 composite sample was taken from different positions near the reservoir, based on remote sensing.
- Out of 32 soil samples some samples were taken from actual site and some samples were taken from the nearest village. Samples were taken at different depth to understand the penetration of pollutants.
- Out of 05 Ash samples some samples were taken from actual site and one from ESP of plant.
- Out of 03 crop samples two samples were taken from nearest village and one from actual site. Further sampling of plants/crops is pending.
- Physicochemical analysis of the above samples is complete. Heavy metal analysis is ongoing. Based on the results of above samples, next round of sampling, if required, may be conducted.

- It is worthwhile to mention here that it has been a difficult phase of sample collection and analysis for CSIR-NEERI given the pandemic situation. The movements were restricted which caused delay in sampling. Further, the analysis also is taking time because of shortage of chemicals, irregular supply, and hindered maintenance of equipment such as ICP-MS. As on today's date as well, the entry in CSIR-NEERI laboratory is restricted to bare essential employees only given the rise in COVID-19 cases in Nagpur and within NEERI campus.

Hope above points will suffice. Will update you about any progress by 7th May as well. Please feel free to get back to us in case you have any queries. Head of Legal and Environmental Policy Division of CSIR-NEERI, Dr. Padma Rao, is also copied in this email for her reference.
Kind regards
Hemant
--
Hemant Bherwani
Scientist
CSIR-NEERI
M:+919096049515

From: hsharma1091@gmail.com
To: "Rakesh Kumar" <r_kumar@neeri.res.in>, "Hemant Bherwani" <h.bherwani@neeri.res.in>
Cc: "romppcb sgrl" <romppcb.sgrl@gmail.com>, biosunil2006@gmail.com, "Mr Rajeev meena" <dmsingrauli@mp.gov.in>
Sent: Monday, April 12, 2021 1:09:43 PM
Subject: Compliance of the recommendations of Over sight Committee
[Quoted text hidden]

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Paras Pujari <pr_pujari@neeri.res.in> Thu, Apr 15, 2021 at 10:06 PM
To: hsharma1091@gmail.com
Cc: Padma Rao <ps_rao@neeri.res.in>, Hemant Bherwani <h.bherwani@neeri.res.in>, Atya Kapley <a_kapley@neeri.res.in>, DIRECTOR NEERI <director@neeri.res.in>, Chandrasekhar Srivari <srivaric@iict.res.in>, Pawan Labhasetwar <pk_labhasetwar@neeri.res.in>, Sadhana Rayalu <s_rayalu@neeri.res.in>

Dear Mr.Sharma,

This has reference to the Damage cost assessment for the ash dyke breach at the NTPC Vindhyanchal.

NEERI team has completed the sampling and analysed all the data. We are finalising the report now. At present, some of our staff members are under treatment for Covid and we intend to compete it in 2-3 weeks and submit to the Project proponent.

Dr.Paras R Pujari
Senior Principal Scientist
Critical Zone Research
Water Technology and Management Division
CSIR-NEERI, Nehru Marg, Nagpur-20, India

Mobile No: +91-7774014201
Skype ID:paras.pujari

From: "Hemant Bherwani" <h.bherwani@neeri.res.in>
To: hsharma1091@gmail.com
Cc: "Rakesh Kumar" <r_kumar@neeri.res.in>, "romppcb sgrl" <romppcb.sgrl@gmail.com>, biosunil2006@gmail.com, "Mr Rajeev meena" <dmsingrauli@mp.gov.in>, "Paras Pujari" <pr_pujari@neeri.res.in>, "Atya Kapley" <a_kapley@neeri.res.in>, "Padma Rao" <ps_rao@neeri.res.in>, "DIRECTOR NEERI" <director@neeri.res.in>

Sent: Thursday, April 15, 2021 3:18:18 PM
Subject: Re: Compliance of the recommendations of Over sight Committee
[Quoted text hidden]

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ANNEXURE -4

Item Nos. 05 to 12 (Court No. 1)

BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI

(By Video Conferencing)

Original Application No. 164/2018
(Earlier O.A.No.276/2013)

Ashwani Kumar Dubey — Applicant

Versus

Union of India & Ors. — Respondent(s)

WITH

Original Application No. 194/2020
(Earlier O.A.No.47/2020(CZ)
(I.A. No. 90/2020)

Suresh Kumar Pandey & Anr. — Applicant(s)

Versus

Union of India & Ors. — Respondent(s)

WITH

Original Application No. 94/2020
(I.A. No. 188/2020 I.A. No. 189/2020
& I.A. No. 205/2020)

Ashwani Kumar Dubey — Applicant

Versus

Sasan Ultra Mega Power Plant & Ors. — Respondent(s)

WITH

Original Application No. 148/2020
(Earlier O.A. No. 31/2020 (CZ))

Hiralal Bais — Applicant

Versus

Reliance Sasan Power P. Ltd. & Ors. — Respondent(s)

WITH

Original Application No. 107/2020 (CZ)

Jagnarayan Shah & Ors. Applicant(s)

Versus

Sasan Power Ltd. & Ors. Respondent(s)

WITH

Original Application No. 117/2014

Shantanu Sharma Applicant

Versus

Union of India & Ors. Respondent(s)

WITH

Original Application No. 499/2014

Anupam Raghav & Anr. Applicant(s)

Versus

U.O.I. & Ors. Respondent(s)

WITH

Original Application No. 102/2014

Sandplast (India) Ltd. & Ors. Applicant(s)

Versus

MoEF & Ors. Respondent(s)

Date of hearing: 18.01.2022

CORAM: HON'BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON'BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON'BLE MR. JUSTICE BRIJESH SETHI, JUDICIAL MEMBER
HON'BLE PROF. A. SENTHIL VEL, EXPERT MEMBER
HON'BLE DR. AFROZ AHMAD, EXPERT MEMBER

Applicant(s): Mr. Ashwani Kumar Dubey, Advocate for Applicant in OA Nos. 164/2018 & OA 94/2020
Mr. Dharamvir Sharma, Advocate for Applicant in OA 148/2020
Ms. Srishti Agnihotri, Advocate for Applicant in OA 107/2020 (CZ)

Respondent(s): Mr. K.M Nataraj, ASG with Mr. Sailesh Madiyal, Advocate for R-10
Mr. Sanjay Jain, ASG with Mr. Adarsh Tripathi, Advocate for R - 19 & 20
Mr. Nalin Kohli, Advocate for Sasan Power Ltd.
Mr. Ashish Prasad, Advocate for Hindalco Ltd.
Mr. Rajat Jariwal, Advocate for R-17

Mr. A.K. Prasad, Adv. for R - 4 in OA 194/2020
Dr. Sapna Aggarwal, Adv. for MoEF & CC in OA 148/2020
Mr. Raj Kumar, Advocate for CPCB
Mr. Pradeep Misra & Mr. Daleep Dhyani, Advocates for UPPCB
Mr. Rahul Khurana, Adv. for HSPCB
Mr. Soumyajit Pani Adv. for the State of Odisha

ORDER

The Issue

1. The common issue in all the above eight matters is the remedial action against violation of environmental norms by the Thermal Power Plants (TPPs) in the light of facts found and recommendations of the fact-finding committees, set out inter alia in para 15 of this order. There is resultant air water and land pollution due to not installing requisite air pollution control and monitoring devices (FGDs and CAAQMS) to mitigate air pollution during operation of TPPs, unscientific handling and storage of fly ash beyond capacity of flyash dykes/ponds resulting in devastating accidents due to their breach. Such breaches have resulted in contamination of water sources, damage to crops, loss of human lives and flora and fauna. Accumulated fly ash has been found to be **1670.602 Million Tonnes as on 31.12.2021.** The same is source of continuing damage to public health and environment. Several Industrial areas (about 100), particularly Singrauli and Sonebhadra in Madhya Pradesh and Uttar Pradesh about which factual reports are on record of present case are categorized as polluted industrial clusters on the basis of Comprehensive Environment Pollution Index (CEPI) prepared by CPCB. Associated issue of Pollution by stone crushers, coal mining and transportation in the area is also for consideration.

Procedural History and scope of today's proceedings

2. Main orders passed by the Tribunal are in OA 117/2014, OA No. 164/2018 and OA No. 148/2020. Other matters are covered by the said orders. Though the said three matters have been dealt with separately, principal issue in all three matters is common and overlapping. In OA No. 117/2014, the issue dealt with relates to compliance of mandate for scientific management and utilization of fly ash by the TPPs in Sonebhadra and Singhrauli. In OA 164/2018, apart from the said issue, additional issue in the context of **breach of Rihand Reservoir on 07.08.2019 and 06.10.2019** has been raised**.** Further, breach of fly ash pond in Sasan Ultra Mega Power Plant on 15.04.2020 resulting in death of six persons and injuries to others, apart from damage to crops has been raised.

3. On appointing Expert Committees and considering reports submitted based on study on the spot, the Tribunal found serious gaps in storing of fly ash in ponds and dykes and failure to prevent fugitive emissions, failure to install FGDs, failure to install OCEMS at appropriate locations. Such failures have been found to have resulted in serious damage to the environment and the public health which need to be remedied in a Mission Mode as per mandate of Constitution of India and the NGT Act. Accordingly, directions have been earlier given and further compliance reports sought. **Scope of today's proceedings is ascertainment of updated status and need for further directions in the interest of environment and public health**.

Last orders

OA No. 117/2014 – order dated 4.11.2020

4. OA No. 117/2014, *Shantanu Sharma vs. Union of India & Ors.*, OA No. 499/2014, *Anupam Raghav & Anr. vs. U.O.I. & Ors.* and OA No. 102/2014, *Sandplast (India) Ltd. & Ors. vs. MoEF & Ors.* were last dealt

with vide order dated 04.11.2020. The Tribunal noted earlier proceedings of the Tribunal, the notification of the MoEF&CC on the subject and impact of non-utilization and improper disposal of fly ash on the health and recipient environment, including surface and ground water, horticulture and agriculture crops in violation of provisions of the Air (Prevention and Control of Pollution) Act, 1981; Water (Prevention and Control of Pollution) Act, 1974 and Environment (Protection) Act, 1986 (EP Act) and Notifications issued thereunder. The Tribunal noted that the report of the Working Group constituted by the Department of Industrial Policy and Promotion, Ministry of Commerce and Industry, Govt. of India submitted in the year 2011, recommending requirement of 100% fly ash disposal and enforcement strategies, including condition for grant of loan and incentives. It was further noted that the MoEF&CC directed 100% utilization of fly ash by 31.12.2017. The Tribunal also referred to Judicial and Executive orders for utilization of the fly ash in construction activities, brick making, road construction and constitution of Monitoring Committees in every State and also at the level of Central Government. The Tribunal also referred to statistics of generation and utilization of the fly ash and need for invoking 'Polluter Pays' principles as a component of 'Sustainable Development' principle, also incorporated under Section 20 of the NGT Act, 2010. In terms of orders of this Tribunal dated 20.11.2018, a Joint Committee was constituted to determine the amount of compensation required to be paid by individual TPPs and also interim compensation fixed by this Tribunal. In the light of report of the Joint Committee dated 20.12.2019, the Tribunal issued further directions about the mode of disposal/utilization of fly ash for reclamation of low-lying areas and in using of abandoned mines/Quarries. It was noted that several TPPs had preferred appeals to the Hon'ble Supreme Court against

the order of interim compensation passed by this Tribunal. The Tribunal directed further steps for scientific disposal of the fly ash and coercive measures by the statutory regulators against the violators, subject to orders of the Hon'ble Supreme Court in matters pending therein. Relevant extracts from the order are:

"xxx ……xxx……xxx

15. On the last date i.e. 12.02.2020, the Tribunal reviewed the matter further in the light of the report of the joint Committee filed on 20.12.2019. It was observed:-

> *"21. Pursuant to order dated 20.11.2018, the joint Committee has filed its report on 20.12.2019 on the subject of action plan to achieve 100% fly ash utilization by the TPPs and liability of the TPPs to pay compensation. The report mentions the meetings held for the purpose and consideration of the enhanced utilization of fly ash by way of Ash based building construction material such bricks/blocks/tiles; road, flyover embankment construction, Development of low- laying areas, Reclamation of abandoned mine voids, Ash utilization as soil conditioners of agriculture. As per CPCB, about 77% of total fly ash generated per annum is utilized. This indicates a gap in terms of 23% which needs immediate action. In terms of legacy waste, the total quantum is 1647 million tonnes as on 31.03.2019.*
>
> *22. The Committee recommended one year time to achieve 100% utilization of fly ash where the utilization currently was more than 85% and two years for the remaining. The action plans of 118 individual units have been annexed. The compliance status is to be reviewed quarterly and on annual basis. On the subject of environmental compensation, it is recommended that compensation should be imposed only on non-pit head TPPs."*

16. It was further observed that this Tribunal has noticed repeated and continuous defaults by the TPPs resulting in damage to the environment and public health for which compensation has been assessed by the experts under orders of the Tribunal.

In O.A. No. 453/2019, Anjani Jaiswal vs. Union of India & Ors., vide order dated 11.10.2019, this Tribunal considered reports of the MPPCB and UPPCB in respect of pollution by the TPPs in districts Singrauli and Sonebhadra respectively. It was found that damage was being caused to the water bodies including Rihand reservoir, surface and ground water and rivers like Son, Renu, Bijul, Kanhar, Gopad, Pankagan, Kathauta Kachan, etc. and streams/nalas like Ballia Nala, Chatka Nala, Kahuwa Nala, Tippa Jharia, Dongia Nala,

etc. water was contaminated by toxic effluents discharged and was not fit for consumption.

MPPCB furnished its report dated 21.08.2019 recording a finding that pollution was taking place and recommending compensation as follows:

"Details of imposed Environmental compensation

As per the Environmental Compensation guidelines framed by CPCB in compliance of order 31.08.2018 in O.A. 593/2017 the maximum environmental compensation is Rs. 30,000/- per day of non-compliance. The total amount of ***56,08,50,000/- (Fifty Six Crore Eight Lac Fifty thousand rupees)*** *may be imposed upon the 03 TPP & 08 NCL mining project against the non-compliance of the major notification, direction & recommendations issued since 2014.*

Summary of the days of non-compliance & Environmental compensation therefore is as tabulated below:

S. No.	***Thermal power plant & Northern Coalfield Mine***	***Days of Non-compliance***	***Environmental Compensation in Rupees @ 30000/day***
1.	*M/s Essar Power MP Limited, Singrauli, MP*	*01*	*30,000/-*
2.	*M/s Sasan Power Limited, Singrauli, MP*	*1247*	*3,74,10,000/-*
3.	*M/s NTPC, Vindhyachal, Singrauli, MP*	*1389*	*4,16,70,000/-*
4.	*NCL, Nigahi, Singrauli*	*1825*	*5,47,50,000/-*
5.	*NCL, Gorbi Block-B, Singraulli*	*1843*	*5,52,90,000/-*
6.	*NCL, Khadia Project,*	*1825*	*5,47,50,000/-*
7.	*NCL, Amlohri area, Singraulli*	*2185*	*6,55,50,000/-*
8.	*NCL, Bina project*	*1825*	*5,47,50,000/-*
9.	*NCL, Dudhichua area*	*1825*	*5,47,50,000/-*
10.	*NCL, Jayant Project*	*2455*	*7,36,50,000/-*
11.	*NCL, Jhingurda area*	*2275*	*6,82,50,000/-*

"

Likewise, UPPCB also found pollution by the TPPs in its report dated 28.08.2019 and compensation was recommended as follows:

"Abridged Status of Environmental Compensation (EC)

S.No.	***Name of industry (M/s)***	***EC in Rs.***

1.	*NTPC Thermal Power Plant, at Shaktinagar, Sonebhadra (U.P)*	*27,00,000*
2.	*Northern Coal Fields Limited (NCL) Project Dudhichua, Sonebhadra (U.P.)*	*1,30,20,000*
3.	*Northern Coal Fields Limited (NCL) Project Khadia, Sonebhadra (U.P.)*	*1,24,80,000*
4.	*Northern Coal Fields Limited (NCL) Project Krishnashila, Sonebhadra (U.P.)*	*6,11,40,000*
5.	*Northern Coal Fields Limited (NCL) Project Bina, Sonebhadra (U.P.)*	*64,50,000*
6.	*Northern Coal Fields Limited (NCL) Project Kakri, Sonebhadra (U.P.)*	*64,50,000*
	NTPC Thermal Power Plant at Rihandnagar, Sonebhadra (U.P.)	*45,90,000*
7.	*U.P. Power Corporation Ltd, Thermal Power Plant, Obra, Sonebhadra (U.P.)*	*6,11,40,000*
8.	*U.P. Power Corporation Ltd, Thermal Power Plant, Anpara, Sonebhadra (U.P.)*	*6,11,40,000*
10.	*LANCO Anpara Power Ltd, Thermal Power Plant, Anpara, Sonebhadra (U.P.)*	*23,70,000*

”

Apart from recommendation for compensation, the UPPCB also recommended remediation measures and study of carrying capacity as follows:-

“11. Recommendations

In order to suitably address the critical issues of potential concerns to environment in the Singrauli Area, the Committee proposes following Recommendations subject to approval of Hon'ble NGT:

a. *In keeping with the strict compliance of this referenced Order of Hon'ble NGT, the Statutory Authorities may take note of the findings of this report and ensure appropriate action for recovery of Environmental Compensation due to damage caused to environment.*

b. *Considering complexity of study components and required expertise in related field / discipline, estimation of environmental damage and cost of remediation be worked out by a consortium of reputed institutions namely National Institute of Hydrology (NIH), Roorkee, National Geophysical Research Institute (NGRI),Hyderabad; National Institute of Occupational Health (NIOH), Ahmedabad; National Botanical Research Institute (NBRI), Lucknow and Indian Institute of Toxicology Research (IITR), Lucknow or such other institutions*

of repute. U.P. Pollution Control Board and M.P. Pollution Control Board may be nodal agencies for execution of the above activities in their respective jurisdiction.

c. *Irrigation Department in U.P. State is required to come out with status of silting in the reservoir impacting adversely on the water holding capacity of the reservoir and possible threat (if any) on the structure of the Rihand dam as the latter was designed to hold water column and is expected to practically holding a significant column of silt due to discharge of industrial effluents.*

d. *Environmental carrying capacity in Singrauli area must be worked out to take a decision on new / expansion projects and also to devise an environment friendly strategy on pollution control by the industries in the area."*

17. The Tribunal also considered the subject of parameters for determining environmental compensation. Apart from the said issues, there was specific consideration with regard to the breach of fly ash dyke of ESSAR Thermal Power Plant and NTPC, Vindhya Nagar at Singruali, M.P. In O.A. No. 164/2019, with reference to breach of fly ash dyke of ESSAR Thermal Power Plant and NTPC, Vindhya Nagar at Singruali, M.P., the Committee appointed by this Tribunal headed by Justice Rajes Kumar, former Judge of Allahabad High Court, in its report dated 03.11.2019 observed:-

> ***"****(2) By persuasion and monitoring, the Fly Ash disposal by the Thermal Power Plants has been increased but 100% disposal could not be achieved. Disposal of stocked Fly Ash has not yet been started. An exclusive meeting of the Thermal Power Plants has been held on 22nd October, 2019. The meeting was very successful. Some positive suggestions have come out to deal with the Fly Ash. Copy of the Minutes has already been sent by email. It is stated that the Fly Ash is the main cause of the air pollution in the Singrauli-Sonbhadra area. Since the installation of the Thermal Power Plant(s) from the year 1981 onwards, no sincere effort was made by the Thermal Power Plants for the disposal of Fly Ash. It is only because of the sincere effort made by the Committee and regular monitoring, the Thermal Power Plants have started taking steps for disposal of Fly Ash.*
>
> *(3)* ***Construction of the Fly Ash Dyke and its maintenance was not found technically sound and proper. Recently, two Fly Ash Dykes – one of ESSAR Thermal Power Plant and another of NTPC, Vindhyanagar were breached, causing heavy environmental damages. The Committee has taken serious note about this happening and has given direction to all Thermal Power Plants to get the certificate of the third party expert about the construction and stability of the Fly Ash Dyeke. The Committee is seriously monitoring.***

(4) Since long, the industrial effluents have been drained in the Rihand Reservoir. The Fly the Fly Ash has also been drained by some of the Thermal Power Plants, Ash travelled to the Rihand Reservoir, polluting the water of the Rihand Reservoir, which is only source of water. The committee has taken a very serious note of this issue and directed the U.P. Pollution Control Board to prepare a DPR for de-silting of sludge in order to purify the water and to increase the capacity of the Rihand Reservoir which has been substantially reduced due to drainage of affluents and fly ash.

*(8) Shri Ashwani Kumar Dubey has filed one Application seeking the various reliefs on account of the environmental damages being cause by the breach of Fly Ash Dyke of ESSAR Thermal Power Plant. The enquiry in pursuance thereof is going on. Shri Ashwani Kumar Dubey has also filed a second Application seeking various reliefs on account of the breach of the Fly Ash Dyke of NTPC Vindhyanagar causing environmental damages. The enquiry in this regard is going on and is pending.***"**

18. *Finally, the Tribunal passed following operative order:-*

"30. We have considered the written submissions filed by the individual TPPs. In view of earlier orders dealing with the contentions of the TPPs, there is no merit in the stand that the said plants are not liable for 100% fly ash disposal. Difficulties pointed out are of no relevance as the same are to be resolved by the administration and not by the victims of pollution whose rights are being affected. Environment cannot be violated against statutory norms. Violation of statutory notifications needs to be visited sternly in terms of enforcing the same, recovering compensation and prosecuting the violators. Whatever be the individual circumstances, it cannot be a ground to disobey law and to commit criminal offence under the Water Act, Air Act and EP Act. There is no discretion available with this Tribunal to dispense with the mandate of law. Statutory provisions are binding on every TPP without any exception. It is, thus, not necessary to go into the justification or otherwise of such impermissible defence of the TPPs.

31. In view of above, all TPPs must take prompt measures for disposal of both current and accumulated fly ash. In respect of non-compliant TPPs, Polluter Pays principle has to be applied from the cut-off date of 31.12.2017, apart from other statutory consequences for continued violations.

32. Thus, our directions are as follows:-

a. The TPPs may take prompt steps for scientific disposal of fly ash in accordance with the statutory notification issued by the MoEF&CC under the provisions of EP Act requiring 100% utilization and disposal of fly ash.

b. *For the non-compliant TPPs, environmental compensation needs to be determined w.e.f. the cut-off date of 31.12.2017 as stipulated in the Notification dated 27.01.2016.*

c. *CPCB may accordingly compute and levy Environmental Compensation in accordance with the formula referred to above w.r.t. individual TPPs in accordance with law and submit compliance report to this Tribunal before the next date.*

d. *CPCB Guidelines of May 2019 for Utilization/Disposal of Fly ash for Reclamation of Low Lying Areas and in Stowing/Back filling of Abandoned Mines/Quarries may be complied.*

e. *Task Force of Ministry of Power and Ministry of Coal may recommend list of abandoned mines/quarries for mine back filling purposes to the CPCB. CPCB may notify the same accordingly for use by the TPPs as per applicable guidelines and permission from State PCBs/PCCs.*

f. *A Committee comprising of CPCB and IIT Roorkee may assess the environmental damage with regard to the breach sites at Vidhyanchal TPP an Essar TPP in Singrauli area and submit its recommendation within three months. CPCB shall be at liberty to engage any other technical expert for this purpose.*

g. *The Committee comprising of Collector, CPCB and Member Secretary of MP State Pollution Control Board may assess the damage with regard to the breach sites at Vidhyanchal TPP and Essar TPP in Singrauli area to the crop and agricultural productivity and ensure effective restoration/remediation of affective sites within three months.*

h. *CPCB may ensure implementation of action plans approved by it in accordance with timeline as provided in the statute.*

i. *A joint Committee comprising of MoEF&CC, CPCB, IIT Roorkee and any other member considered necessary may submit quarterly progress report on recommendations of Expert Committee of Niti Aayog for enhanced utilization of fly ash in various sectors: mines, roads, cement, industries and bricks etc., along with its implementation status.*

j. *The present order is subject to proceedings pending before the Hon'ble Supreme Court and where stay is operative, this order will not operate till stay*

continues and thereafter abide by orders of Hon'ble Supreme Court."

19. Accordingly, compliance reports have been filed by the MoEF&CC, the CPCB and the joint Committees.

20. The report filed by the MoEF&CC on 03.11.2020 with regard to enhanced utilisation of fly ash is that guidelines for disposal/utilization of the fly ash for reclamation of low lying areas and in using of abandoned mines/Quarries, in consultation with Central Pollution Control Board and Central Institute of Mining and Fuel Research, Dhanbad has been published in March, 2019. As per policy decision dated 28.08.2019, restriction on backfilling of fly ash in abandoned mines and low lying areas has been removed. National Highways Authority has given an action plan on 30.09.2019 for enhanced utilization of fly ash. Direction has been issued on 02.03.2020 to Ministry of Power, Ministry of Road Transport & Highways, Ministry of Coal, Ministry of Housing and Urban affairs, Central Pollution Control Board, National Thermal Power Corporation and National Highways Authority of India requesting them to furnish the progress report/action taken report. Ministry of Coal has submitted ATR via email dated 06.11.2019, 08.04.2020, 03.09.2020 respectively on the recommendations of Expert Committee i.e. "mining companies should share their experience of mines backfilling to enhance fly ash utilisation in this sector". MoEF & CC has shared the report on fly ash filling experience in CIL mines and also the list of mines identified by Ministry of Coal for fly ash filing with CPCB and Ministry of Power with request to furnish progress report in this regard vide letter dated 27.04.2020. Ministry has issued a reminder letter vide email dated 07.07.2020 to Ministry of Power, Ministry of Road Transport and Highways, Ministry of Housing and Urban affairs, Central Pollution Control Board, National Thermal Power Corporation, National Highways Authority of India requesting to furnish the progress report/action taken report at the earliest.

21. Report of CPCB filed on 04.09.2020 is to the effect that environmental compensation has been computed. Out of 112 plants, two have paid while 102 plants have sought exemption. List of 21 abandoned mines has been finalized for utilization of the fly ash. Action with regard to the directions (f) and (g) is pending finalization. Utilization status for 2018-2019 and 2019-20 has been monitored.

22. A report has been filed by the joint Committee constituted in terms of direction (f) of order dated 12.02.2020 on 06.09.2020 regarding Environmental Compensation for Vidhyanchal TPP and Essar TPP. The assessment of compensation is as follows :-

"3. Damage assessment fir M/s Essar Power MP Ltd & M/s NTPC Vindhnagar

The Committee has assessed the environmental damage based on the available monitoring reports, field reports and literature. The brief on damage cost is as tabulated below:-

Industrial Unit	*GHG emission damage cost in Crore Rs.,*	*Water pollution/environmental property/other damage cost in Crore Rs.*	*Total In Crore Rs.*
M/s Essar Power MP Ltd	*0.0711*	*7.28*	*7.3511*
M/s NTPC Vindhnagar	*0.0384*	*104.13*	*104.1684*

"

23. The recommendations in the report are as follows:-

"i. Industrial units have engaged professional institute NEERI, Nagpur to assess the damage; the institute needs to assess the site specific long term direct or indirect impact on the flora fauna, human health and consumptive cost.

ii. Industrial units need to comply for 100 % fly ash utilization to avoid such incidence in future.

iii. To install monitoring stations on the affected sites, to continuously monitor the movement of plume underground or the leaching of toxic heavy metals from the sediment

iv. Industrial units need to take care for the health of worker s employed for spill clean-up working."

24. Second report is by the Committee constituted in terms of direction (g) for assessment of compensation to the crop and agricultural productivity by Vidhyanchal TPP and Essar TPP. The Compensation has been assessed, for which recommendation is as follows:-

*"**3. Restoration/remediation of the site***

a. Restoration of site by M/s Essar Power MP Ltd.

The team of district administration and Madhya Pradesh Pollution Control Board has visited the ash dyke breached data area on 02.02.2020 to physically verify the status of restoration work of the site. The report submitted vide letter no. 1125/RO/PCB2020 dated 17.02.2020 by MPPCB, Singraulli states that the ash spread over the field and water bodies was collected and dumped at ash dyke no. 3. The photographs attached with the report show that ash spread over the fields was removed and site is restored. Copy of the report is enclosed as Annexure-IX. Further after the site collection of ash from the fields by M/s Essar Power MP Ltd., farmers have sown the Kharif crop during this monsoon.

b. Restoration of site by M/s NTPC Vindhnagar

As there was no agricultural activity is in practice inside the NTPC ash dumping area; no crop damage was reported and same was recorded by district administration. As per the status report submitted by M/s NTPC Vindhnagar on 27.07.2020; the ash spread over the land and in drains and near pond were collected that was about 1 Lac ton. The collection of ash deposited near the Rihand reservoir is delayed due to swampy land and problems of machinery movement, which is likely to be completed by 15-09.2020. The dredging of the affected portion of the Rihand Reservoir is also being started. Copy of the status report submitted by NTPC is enclosed as Annexure-X."

Recommendation:

a. *The Essar Power M.P. Ltd. Village Bandhaura, Distt. Singrauli (M.P) shall be directed to compensate for indirect loss of Rabi Crop of Rs. 2014200/-*
b. *The Essar Power M.P. Ltd. Village Bandhaura, Distt. Singrauli (M.P) may depute an agricultural institute for the assessment of damage to the crop productivity w.r.t. the Kharif and Rabi crop cultivated in 41 Ha of Village Karsualal and Karsuaraja for 2020-21 & 2021-22."*

25. ***Let further steps be taken in terms of the above reports subject to the orders of the Hon'ble Supreme Court in matters pending therein. Further progress report may be compiled by the MoEF in terms of direction (i) in the order dated 12.2.2020.*** *CPCB may finalise the issue of compensation determination. We approve the reports of the joint Committees. Recovery of compensation will be as per directions of the Hon'ble Supreme Court wherever there is stay.*

Xx xx xx

The CPCB, the MoEF&CC and the joint Committees may file their further status reports with regard to the status as on 30.4.2021 before the next date *by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF. The joint Committee is at liberty to take assistance of such other experts as they find necessary."*

OA No. 164/2018 – order dated 14.07.2020

5. In OA No. 164/2018, *Ashwani Kumar Dubey vs. Union of India & Ors.*, the matter was last considered vide order dated 14.07.2020. The Tribunal inter alia considered the **issue of breach of fly ash dykes due to storage beyond capacity or otherwise and adverse impact on public**

health and water bodies in the area of Singrauli and Sonebhadra Districts of Madhya Pradesh and Uttar Pradesh respectively. **There was damage to Rihand Reservoir which was major source of water supply in the area**. The Tribunal had constituted an Oversight Committee headed by Justice Rajesh Kumar, former Judge of the Allahabad High Court to furnish a factual report in the matter with recommendations for remedial action. In the light of recommendations of the said Committee and the response of the concerned TPPs, the Tribunal issued directions for scientific management and disposal of fly ash as well as payment of compensation and also directed further monitoring by Joint Committee of CPCB, State PCB and District Magistrate and filing of quarterly status reports before the Tribunal. Relevant extracts from the said order are reproduced below:

> *"1. The order is being passed in continuation of order dated 05.11.2019. The issue for consideration is remedial action against pollution and violation of environmental norms by Thermal Power Stations operating in Singrauli and Sonebhadra Districts of Madhya Pradesh and Uttar Pradesh respectively, resulting inter-alia in air pollution, water contamination and large scale of damage to public health. The areas figure in the list of polluted industrial clusters based on comprehensive environment pollution index, prepared by the CPCB as per available data of pollution.*
>
> *2. After considering the report of the joint Committee, constituted by the Tribunal, to the effect that damage to environment was being caused by the thermal power stations in Singrauli and Sonebhadra in M.P/U.P and that water bodies, including the Rihand Reservoir (main source of supply of drinking water in the area) were adversely affected, the Tribunal directed remedial action and also constituted an oversight committee (OC) headed by Justice, Rajesh Kumar, former Judge of the Allahabad High Court.*
>
> *3. The Committee gave its reports about the status of compliance upon which the Tribunal passed further orders. The reports considered by this Tribunal include reports dated 14.12.2018 (Ist report), 28.06.2019 (IInd report), 21.08.2019 & 23.08.2019 (IIIrd report) and 29.10.2019 (IVth Report). The IVth report pointed out **damage to the Rihand Reservoir on account of breach of fly ash dykes of Essar Power and NTPC on 07.08.2019 and 06.10.2019 respectively**. Slurry travelled upto the reservoir giving rise to emergent situation. The concerned plants were required to take suitable remedial measures by the Committee.*

4. In the earlier orders, the Tribunal directed consideration of recommendations of the Committee and appropriate further action, adopting appropriate safeguards. The Tribunal also directed the CPCB to have an action plan prepared by the power plants for de-silting of the reservoir and improvement of the dykes. The issue of recovery of compensation was deferred to the extent that there was stay by the Hon'ble Supreme Court. The term of Committee headed by Justice Rajesh Kumar was initially for six months but was extended till 31.12.2019. The NTPC and Essar power were directed to initiate steps for restoration of their respective ash dykes by 31.12.2019.

5. In pursuance of the above, we have considered the matter further in the light of following:-

I) Report of Justice Rajesh Kumar dated 20.12.2019
II) Report of the CPCB dated 28.02.2020
III) Objections to the report by the Vindhyachal Super Thermal Power Station, R-10
IV) Comments to the observations of the OC report dated 20.12.2019 by the UPVUN.

6. Report dated 20.12.2019 by the OC is based on the minutes of meeting held on 17.12.2019 which record the status report furnished by the concerned power plants. With regard to the NTPC, the Committee observed that on account of the breach of its ash dyke, the fly ash travelled up to the reservoir for which interim compensation of Rs. 10 Crore was liable to be deposited. NTPC was also required to take remedial measures. UPUVN was also found to be liable as follows:

> *"**On the spot inspection, the Committee found that a large portion of Ash Dyke had been breached with the result huge quantity of fly ash had spread all over the land. It has travelled up to the Rihand reservoir. Prima facie, the interim environmental compensation demanded by the MPPCB at Rs. 10.00 Crore cannot be said to be excessive. The said amount ought to be deposited. We are of the view that the furnishing of bank guarantee of Rs. 1.00 Crore is not sufficient. MPPCB may issue the notice asking the Plant to deposit the entire Rs. 10.00 Crore. Bank guarantee cannot be said to be deposit, it can only be treated as the security.***
>
> ***The committee is of the view that to strengthen the ash dyke the plant should consider to develop RCC wall around the fly ash dyke. The structure should be of RCC having a layer of PVC, tiles to ensure the stability of the dyke. At present the dyke is being made out of the fly ash putting boulder pitching outside wall and brick lining inside the dyke. The storage of fly ash is very important aspect in the context of Environment. Improper storage of fly ash results in air pollution and water pollution affecting the Environment In the last meeting we have asked***

the thermal power plants to explore the possibility of developing the fly ash mount as has been developed by NTPC Dadri. Neither any interest has been shown in this regard nor any step has been taken to develop the fly ash mount. In the face of status stated above, we direct NTPC-Vindhyachal to be very sincere and implement the directions given by the committee and by the Hon'ble NGT in a shorter time.

Committee directs the MPPCB to assess the Environment Compensation finally within one month. Plant is also directed to give the status report time to time, preferably within 15 days each time.

UPVUN, Anpara:

On the information being received from the various sector that there is a continuous flow of the water carrying fly ash from two sides towards Rihand Reservoir since last more than one year. On 15.12.2019 night at about 6:30 PM committee visited the spot and found that the information given is true. There is continuous flow of water coming from plant along with the fly ash filling in Rihand Reservoir. On a query being made that why this is happening, Shri Pradhul Gupta, Senior Engineer states that this flow is not continuous, it is mainly during the rainy season and this happened because of fulfilment of the ash dyke therefore the water is overflowing. It also carries catchment water. It is stated that they are raising the height of the dyke which may likely to take one year at least. He further submitted that they are also developing another compartment which may likely to take six months and they are also making effort to divert the nala which carries natural water to reduce the quantity of water.

We do not find explanation satisfactory. The fact is that the water carrying fly ash are continuously flowing towards the Rihand Reservoir, the volume of the flowing water is very high and it carries fly ash, it is continuous since last more than one year. Discharge of fly ash to the Rihand Reservoir pollutes the water of reservoir which is the only source of water of the area. We find that the information about the flow of huge water along with fly ash had not been conveyed to SPCB authorities and they have deliberately concealed the facts. It is mentioned here that these two areas are in a very interior and we have to reach these places after travelling about 18 KM kaccha road through forest. Act of pollution amounts to violation of various laws and polluter is liable to be punished. The committee is of the

view that since the flow of water along with fly ash is continuous, and there is no possibility for its immediate stoppage. The only way to stop the flow is to close operation of the unit and their unit is liable to be closed until they make arrangements and ensure that no water with ashes may go to the Rihand Reservoir. The committee is also of the view that they are liable for the environment compensation as well as cost of desilting of the ashes from the reservoir on the principle of polluter pay. The UPPCB is directed to assess environmental compensation and take all stringent actions under the provision provided in the various Acts."

7. Report of the CPCB is on the issue of de-silting and restoration of Rihand Reservoir. It refers to pre-existing guidelines of CPCB on ***ash disposal in mounds and backfilling of ash in abandoned mines.*** *With regard to the cost apportionment for de-silting/restoration of Rihand Reservoir, The CPCB has concluded as follows:*

"In absence of verified records in these respects, an assessment of contribution of each plant by this approach is difficult. Therefore, ***the contribution of each power plant might also be revealed by the proposed study to assess sediment volume at various places in the reservoir.***

To begin with, the total ash slurry volume generated by each plant on the periphery of Rihand reservoir can be considered as the basis of sharing of the cost of the study to assess sediment volume at various places in the reservoir. For this purpose, the information on annual power generation and coal consumption, average ash content, and annual ash generation as well as annual ash slurry generation based on ash to water ration power plants and collated (Annexure-III). ***Total ash quantity and ash slurry volume generated over the years by individual thermal power plants located on the periphery of Rihand reservoir on the basis of information collected is presented below****:*

Table 1

Thermal Power Plant	*Capacity (MW)*	*Total ash disposed in* ***Ash*** *Pond till 31.03.2019 (MMT)*	*Total ash slurry disposed in* ***Ash*** *Pond till 31.03.2019 (MMT)*	*Relative share in total* ***Ash*** *of plants (multiple of least)*	*Relative share in total* ***Ash Slurry*** *of plants (multiple of least)*	*Share in total Ash of plants (% of total)*	*Share in total Ash Slurry of plants (% of total)*
Anpara TPS UPRVUNL	*2630*	*81.313*	*569.225*	*31.7*	*66.3*	*22.9%*	*19.6%*
Lanco Anpara	*1200*	*10.870*	*46.395*	*4.2*	*5.4*	*3.0%*	*1.6%*
Renusagar, Hindalco	*820*	*2.564*	*8.584*	*1*	*1*	*0.7%*	*0.3%*
Singrauli NTPC	*2000*	*89.295*	*803.654*	*34.8*	*93.6*	*25.1%*	*27.6%*

Vindhyachal NTPC	*4760*	*104.937*	*953.855*	*40.9*	*111.1*	*29.6%*	*32.8%*
Rihand NTPC	*3000*	*66.136*	*529.008*	*25.8*	*61.6*	*18.6%*	*18.2%*
Total / combined	*12610*	*355.115*	*2910.801*	*138.4*	*339*	*100%*	*100%*

It is submitted that *U.P. Irrigation Department may be directed to coordinate the study to assess sediment volume at various places in the reservoir.*
It is further submitted that *Anpara TPS and Lanco-Anpara power plants may be directed to stop ash pond overflow discharge into Rihand reservoir."*

8. According to the Vidhyachal Super Thermal Power Station, R-10, the observation of the oversight Committee are completely erroneous and unsubstantiated. Breach was plugged within 30 hours. PFL wall was repaired and it is also incorrect that fly ash transfer to the Reservoir and that the raising of the height was without expert opinion. It is further submitted that compensation of Rs. 10 Crores was not justified. Cash payment of Rs. 1 Crore has been made towards interim compensation. With regard to developing fly ash mound, it is stated that it is not necessary. Comments of the UPVUN are that necessary action has been taken which may be verified. There is zero discharge from the ash dyke. Reference has also been made to the inspection report by the joint Committee of the CPCB and the State PCB recommending as follows:

"Recommendations

1. *M/s NTPC Shaktinagar to repair the AWRS desloged pipeline within 07 days & to stop discharge of decant water of S1 & S2 dyke immediately by pumping in M/s NTPC Vindhnagar AWRS 03 system immediately.*

2. *M/s NTPC Vidhnagar shall* ***collect back the spread over ash from 53 Ha area with minimal fugitive emission & dispose it in operating dyke. Unit shall submit the time bound action plan in this regard.***

3. ***M/s NTPC Vindnagar to stop the probable mixing of slurry in Rihand reservoir & Surya drain near decanting pond with no further delay.***

4. *M/s NTPC Vindhnagar may be asked to deposit 01 Crore to CPCB or MPPCB towards an interim environmental compensation w.r.t Aryavart Foundation v. M/s Vapi Green Enviro Ltd & Ors. Hon'ble NGT O.A 95/2018 order dated 11.1.2019"*

9. We have duly considered the stand of the NTPC- Vidhyachal Super Thermal Power Station as well as the UPUVN. Mere self-serving denial in the face of report based on site visit by a Committee appointed by this Court headed by a former judge of the High Court has no legs to stand. Responsible organisations should

refrain from adopting such attitude. We uphold the report of the OC. We also note that the Tribunal has been considering the issue of compliance of Notification dated 31.12.2018 issued by the MoEF&CC requiring 100% utilization of fly ash vide order dated 12.02.2020 in Original Application No.117/2014, Shantanu Sharma v. Union of India & Ors. In the said order, following directions were issued:-

"32. Thus, our directions are as follows:-

a. The TPPs may take prompt steps for scientific disposal of fly ash in accordance with the statutory notification issued by the MoEF&CC under the provisions of EP Act requiring 100% utilization and disposal of fly ash.

b. For the non-compliant TPPs, environmental compensation needs to be determined w.e.f. the cut-off date of 31.12.2017 as stipulated in the Notification dated 27.01.2016.

c. CPCB may accordingly compute and levy Environmental Compensation in accordance with the formula referred to above w.r.t. individual TPPs in accordance with law and submit compliance report to this Tribunal before the next date.

d. CPCB Guidelines of May 2019 for Utilization/Disposal of Fly ash for Reclamation of Low Lying Areas and in Stowing/Back filling of Abandoned Mines/Quarries may be complied.

e. Task Force of Ministry of Power and Ministry of Coal may recommend list of abandoned mines/quarries for mine back filling purposes to the CPCB. CPCB may notify the same accordingly for use by the TPPs as per applicable guidelines and permission from State PCBs/PCCs.

f. A Committee comprising of CPCB and IIT Roorkee may assess the environmental damage with regard to the breach sites at Vidhyanchal TPP an Essar TPP in Singrauli area and submit its recommendation within three months. CPCB shall be at liberty to engage any other technical expert for this purpose.

g. The Committee comprising of Collector, CPCB and Member Secretary of MP State Pollution Control Board may assess the damage with regard to the breach sites at Vidhyanchal TPP and Essar TPP in Singrauli area to the crop and agricultural productivity and ensure effective restoration/remediation of affective sites within three months.

h. *CPCB may ensure implementation of action plans approved by it in accordance with timeline as provided in the statute.*

i. *A joint Committee comprising of MoEF&CC, CPCB, IIT Roorkee and any other member considered necessary may submit quarterly progress report on recommendations of Expert Committee of Niti Aayog for enhanced utilization of fly ash in various sectors: mines, roads, cement, industries and bricks etc., along with its implementation status.*

j. *The present order is subject to proceedings pending before the Hon'ble Supreme Court and where stay is operative, this order will not operate till stay continues and thereafter abide by orders of Hon'ble Supreme Court.*

Copy of this order may be conveyed to MoEF&CC, Ministry of Power, Ministry of Coal, CPCB, IIT Roorkee and MP State Pollution Control Board. CPCB may put the order on its website and communicate the same to all concerned TPPs."

10. *In view of the above, we direct:*

i. *Fly ash disposal may be undertaken as per the directions in the order of this Tribunal dated 12.02.2020 referred to above.*

ii. *Fly ash disposal in mounds and backfilling of ash in abandoned mines may be undertaken as per the CPCB guidelines If necessary, Indian Bureau of Mines, Dhanbad may also be consulted so that latest technology is utilized and all necessary safeguards are adopted.*

iii. *Report of the CPCB regarding Cost apportionment for de-silting/restoration of Rihand Reservoir is accepted and further steps, including further study be undertaken as recommended by the CPCB. The U.P Irrigation Department may coordinate such study.*

iv. *Anpara TPS and Lanco-Anpara power plants may stop ash pond overflow discharge into Rihand Reservoir to the extent the work remains unexecuted.*

v. *The NTPC, Vidhyachal may deposit amount of Rs. 10 Crores as recommended by the Oversight Committee with the State PCB towards interim compensation, deducting the mount already deposited. The plant may also develop RCC wall around the plant in the matter recommended.*

vi. *The liability for environmental compensation in respect of UPVUN, Anpara and NTPC Vidhyachal may be assessed by joint Committee of CPCB and the State PCB within two months. The nodal agency will be the State PCB for coordination and compliance.*

vii. *The transportation measures may be adopted as per suggestions of the Committee and directions of the Hon'ble Supreme Court.*

11. Since the term of the Committee has expired, ***further oversight work may be undertaken by a joint Committee of the CPCB with respective State PCB and the District Magistrates****. The State PCBs will be the nodal agency for the respective States.*

12. ***The newly constituted OC may furnish its reports quarterly*** *by e-mail at judicial-ngt@gov.in preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF. First such report may be furnished giving status as on 31.10.2020 by 15.11.2020 with copies to concerned stake holders for their response if any by 30.11.2020."*

OA No. 148/2020 – order dated 29.06.2020

6. In OA No. 148/2020 (earlier OA No. 31/2020(CZ), *Hiralal Bais vs. Reliance Sasan Power P. Ltd. & Ors.*, CZ Bench of this Tribunal dealt with the incident dated 15.04.2020 of death of six persons, washed away in fly ash slurry and contamination of mercury in air, water and soil on account of negligence by the TPP - Sasan Ultra Mega Power Plant vide order dated 29.6.2020 and constituted a joint Committee to furnish a factual and action taken report. OA No. 94/2020, *Ashwani Kumar Dubey vs. Sasan Ultra Mega Power Plant & Ors.* also relates to the same incident which was filed before PB. Vide order dated 14.7.2020, the Tribunal noted the order of the Central Zone Bench dated 29.06.2020 in OA No. 148/2020 (earlier OA No. 31/2020(CZ)) constituting a Joint Committee to ascertain facts and give report and directed hearing of both matters together. The operative part of the order dated 29.6.2020 in OA 148/2020 (earlier OA No. 31/2020(CZ) is reproduced below:

"By way of filing this application, the applicant has raised the issue of the incident of collapsing of Fly ash pond constructed by Reliance Power's Ultra Mega Power Project's (UMPP) Singrouli (MP) on 10.04.2020 around 3 PM during COVID 19 pandemic, leading to flood of the toxic ash slurry located in adjoining Harrhava village, washed away six persons, including three kids, a woman and two men living

in the adjoining villages. All the Respondents are severely and jointly responsible for the loss of human and animal's lives as well as severe damages to the nearby rivulets Goiwahai, vegetations, biodiversity, fertile agricultural lands, due to their negligence. A substantial issue of environment has been raised.

We deem it just and proper to call a report from a Joint Committee consisting of:-

1. *Representative of MoEF & CC*
2. *Representative of CPCB*
3. *District Collector, Singrouli*
4. *Madhya Pradesh Pollution Control Board through its Regional Officer, Singrouli."*

Status reports for consideration in today's proceedings

OA 117/2014 and connected matters

7. A report dated 23.08.2021 in pursuance of order of this Tribunal dated 04.11.2020 which also includes compliance status of earlier orders of the Tribunal dated 27.01.2020/12.02.2020 has been filed in the form of two annexures (Annexure -1 and Annexure-2). Annexure-1 deals with status of utilization of fly ash by Power Plants in 2020-2021 as follows: