JOINT COMMITTEE REPORT

ON

Hon'ble NGT order dated 09.05.2022 in OA No.35/2022(CZ) in the matter of Budhsen Rathore Vs Union Of India & Ors

Date of Inspection :05th & 06th June 2022

By

Joint Committee members

1. **Sh Sanjeev Kumar Mehra, RO, MPPCB, Regional Office, Shadol, MP**
2. **Sh Kamlesh Puri, SDM, Anuppur, MP**
3. **Sh P. Jagan, Regional Director, CPCB, Bhopal, MP**

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M.P. Pollution Control Board
Shahdol

Factual and Action taken Report of the joint Committee constituted by Hon'ble NGT order dated 09.05.2022 in OA No.35/2022 (CZ) in the matter of Budhsen Rathore Vs Union Of India & Ors

Hon'ble National Green Tribunal, Central Zone Bench, Bhopal was pleased to pass an order on 09.05.2022 in the original application no. 35/2022 in the matter of Budhsen Rathore Vs Union Of India & Ors. The directions of the order is as follows:

"We deem it just and proper to call a report on the matter in issue of the present Original Application, from a Joint Committee consisting of:-

i. Collector or representative, Anuppur.

ii. Central Pollution Control Board or representative.

iii. Madhya Pradesh Pollution Control Board or representative.

The Committee is directed to visit the place and submit the factual and action taken report within six weeks. The State PCB will be the nodal agency for coordination and logistic support."

Copy of the Hon'ble NGT order is enclosed as **Annexure-I.**

In compliance of the Hon'ble NGT order the following committee members are nominated for conducting the field visit and submitting the factual report by the concerned departments.

1. Sh Sanjeev Kumar Mehra,RO, MPPCB, Shadol, MP
2. Sh Kamlesh Puri, SDM, Anuppur, Dist. Anuppur, MP
3. Sh P. Jagan, Regional Director, CPCB, Bhopal, MP

Copies of the nomination letters are enclosed at **Annexure-II.**

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The committee has inspected the site during 5th &6th June 2022 and visited the ash dyke pond 1 where breach took place, tanki nalla from origin to confluence point with sone river, affected agricultural fields, sone river, ash water recycling system (AWRS), plant dry collection system etc. during visit the following observations are made:

A. Air & Water Consents and HW Authorisation Validity:

The consents under water and air acts issued by MPPCB are valid up to 28.02.2023. copy enclosed at **Annexure-III** and HW authorisation issued by MPPCB is also valid up to 31.05.2025. Copy of the same is enclosed at **Annexure-IV.**

B. Power Plant Details :-

Madhya Pradesh Power Generating Company Limited (MPPGCL), a wholly owned company of MP Government engaged in generation of electricity in the state of Madhya Pradesh (MP). It is a successor entity of erstwhile Madhya Pradesh State Electricity Board (MPSEB). MPPGCL is operating 4 Thermal Power Stations (TPS) with installed capacity of 5400 MW & 10 Hydro Power Stations (HPS) with installed capacity of 915 MW within the state.

M/s Amarkantak Thermal Power Stations is one of the four TPPs which is in operation from year 2009 with a capacity of 1x210 MW. The Plant is located near Chachai village, Anuppur district, Madhya Pradesh. The plant is located between latitude 23°9'22.1"N to 23°10'08.5"N & longitude 81°37'53.7"E to 81°38'45.8"E. Distance of the plant by road to Amlai town - 7 km NW (aerial distance 5.5 km), Amlai Railway Station - 8 km NW (aerial distance 3.6 km), NH43 – 10 km N (aerial distance 4.3 km), Jabalpur

Airport - 250 km W (aerial distance 160 km), Chachai lake (Suthna reservoir) – adjacent (E) and Sone River- 1.8 km (N).

The Plant comprised of 5 units. Unit No.I of 1x30MW & Unit No.II of 1x20MW were commissioned in 1965 and decommissioned on 01.04.2009. Unit No.III of 1x120 MW was commissioned in 1978 and decommissioned on 13.01.2015. Unit No. IV of 1x120 MW was commissioned in 1978 and decommissioned on 01.05.2014. Unit No.V of 1x 210 MW was commissioned on 09.09.2009 and presently in operational. M/s Amarkantak Thermal Power Station (ATPS) is located near Chachai village, Anuppur district of Madhya Pradesh, India. The installed capacity and current status of the power plants are presented below:

Phase	Units	Size (MW)	Commissioning Date	Current status
PH-I	Unit I	30	1965	Decommissioned on 01/04/2009
	Unit II	20	1965	Decommissioned on 01/04/2009
PH-II	Unit III	120	1977-78	Decommissioned on 13/01/2015
	Unit IV	120	1977-78	Decommissioned on 01/05/2014
PH-III	Unit V	210	09/09/2009	Operation

C. Fly Ash Generation Details

As per the fly ash compliance report for the year 2021-22 the industry has consumed an average of 2715MT coal per 210 MW power generation and produced 981MT fly ash per day. The generated fly ash from the ESP hoppers has been collected pneumatically in 2x200MT buffer hoppers and 2x600MT silos for giving to the cement industries, road construction agencies, brick manufacturing units etc. The bottom ash has been sent to

ash dyke in the form of slurry. The decanted water from ash dyke has been recirculated in the plant through ash water recirculation system(AWRS) having 3x540m^3/hr capacity slurry pumps and 3x600 m^3/hr ash dyke decanted water pumps.

Presently the overall utilisation of fly ash is only 39% against 100% as per the MoEF&CC fly ash notification dated 31.03.2021. The legacy waste utilisation is only 9.42%. the details of ash generation and utilisation submitted by the industry is enclosed at **Annexure-V.** The industry has submitted the action plan to MPPCB for 100% utilisation of fly ash and legacy ash stored in ash dyke 1&2 are enclosed at **Annexure-VI.**

D. Ash Dyke/ Pond Details:-

M/s Amarkantak Thermal Power Station at Chachai is operating a coal-based thermal power plant of 1X 210 MW having 02 nos of Ash Dyke No. 01 & No. 02. Area of ash pond 01 is 13.16 ha. And area of ash pond 02 is 14.235 ha. The volume capacity of ash dykes are 1533932.14 Cubic meter & 1732807.86 Cubic meter respectively. Available volume in ash dyke 01 is approx. 794576 MT. In ash dyke 02 there are stationary water sprinklers in row manner are installed to control fugitive dust emission.

Presently, both bottom ash and fly ash are being disposed into lagoon 1. The ash pond no. 1 is approximately 50% filled up with ash and capacity for next 02 years is available. One decantation well & one spillway is constructed on each pond. Spillway is mainly for dissipating excess rain water and normal ash water is recycled through decantation well.

E. About the Incident and observations made by the comittee:-

1. In Ash Pond No.01 breach(sinking of spillway occurred) took place around 4.00 AM on 11.02.2022. From the damage portion of ash dyke, Approx. 4000.00 M^3 ash slurry was flowed in to the storm water nalla(Tanki Nalla) which is passing near the ash pond recirculation system holding tank and into nearby agricultural land. During this incident there was no crop available in the agricultural land. The plant officials informed that the spillway failure was sudden without any warning prior to the failure and the failure occurred at the spillway location and the first stage rising has failed. The ash pond 1 was in use when the spillway sinking occurred. Immediately after the failure was spotted, the usage of pond 1 was stopped. The failure was localized and at the location of the spillway only. As informed by the industry, no casualties were reported. Immediately after getting the information, the plant officials took the following action stoppage of leakage water and the work was completed up to 2.00 PM.

    - Ash water was totally stopped flowing towards Tanki Nalla immediately after sinking of spillway no. 01.
    - Ash slurry was diverted in alternative pond No. 02 which is adjacent to pond no. 01.
    - Immediate restoration work of fields was under taken,

2. Agricultural field restoration work has been begin on same day. Affected agricultural field and Tanki Nalla is now made almost cleaned. But the cleaned ash sludge was dumped on the banks of the drain. During visit it

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was informed that the same will be shifted in to the ash pond and rest of the drain will also be cleaned within 3 days.

3. It is pertinent to mention that there was no loss of crop happened as there was no standing crop in the effected field, also no loss of life of animal & human was occurred, further there was no major change in water quality was observed during visit in Sone River at the confluence point of tanki Nalla with river.

4. As per the plant officials request for compensation to be paid to the farmers was made by M/s ATPS to the district collector and further information is awaited for revenue department.

5. As per Sh. Rai, SEE Civil from ATPS, Anuppur that the officials from Indian Institute of Technology Indore have visited the ash pond site on 20th February 2022 for investigating the reasons for ash dyke spillway sink and conducted the structural safety and root cause analysis study and found animal burrows were the reason for sinking of spillway. Copy of the report is enclosed as **Annexure-VII.**

6. During the visit it was informed that the industry is doing Strict monitoring as suggested in the report by IIT Indore on daily basis and copy of maintenance log book is enclosed as **Annexure-VIII.** The tendering process for construction of permanent spillway in place of damaged spillway is under progress. The list of works carried out and amount spent for restoration of agricultural fields and cleaning of Tanki Nalla is enclosed at **Annexure-IX**. As directed periodical checking and structural safety of ash bund is also proposed and its frequency shall be at least quarterly and especially before and after monsoon and report will be submitted to MPPCB. Further the following works are being taken for captioned work.

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- Construction of permanent check bund, across Tanki Nalla to arrest ash in case of future unwanted situation.
- Construction of Pucca Nalla (Tanki Nalla) towards Sone river.
- Transportation of collected dumped ash to ash pond no. 01.

7. As per the RO MPPCB that immediately after getting information reached with his scientific and technical team to the site on morning 11.00 AM at the incident site and visited the affected area with ATPS officials. Around 2.00 PM the ash slurry was arrested completely by plugging of damaged portion of ash dyke spillway sink with soil and sand bags. MPPCB team from RO shadol has visited confluence point of Tanki Nalla & Son River, And found that water quality of sone has not affected. The Tanki nalla is originated from near the Ash Dyke. And it meets to Son River after approx. 03 KM from the origin point. Ash found deposited in some portion of agricultural field having total rakwa about 2.287 ha located on right side of tanki nalla. The ash flown in these areas majorly due to available openings in drain that were created by formers to receive water from nalla.
8. The Tanki nalla is originated from near the Ash Dyke of ATPS, Chachai and it meets to Son River after approx. 03 KM from the origin point. It is a seasonal nalla and during visit the joint team has observed lean flow prevailing in this nalla.
9. The team visited the incident site of the Ash Dyke-01 and found the damaged portion of the ash dyke is arrested with the help of soil/ sand bags and constructed coffer dam on that breach area.
10. The cleaning of the affected area of the Tanki Nalla and surrounding agricultural private lands have done by the ATPS, Chachai management however a small quantity of ash was still found laying on the side of nalla.

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11. During visit team has also found 3 temporary bunds with the help of sand bag across Tanki Nalla at appropriate places to arrest ash in case of accidental breach if any in future.

12. The team has inspected Tanki nalla at downstream of the breach point as well as along the 3.0 KM length periphery of the nalla up to sone river. During inspection joint committee has not observed any discharge of water and ash from ash dyke to tanki nalla. There was no visual evidence found in sone river. During inspection the nalla water physically appear clear. Water sample also collected by the inspecting team from RO MPPCB on 11.2.2022 and the analysis report is enclosed at **Annexure-X.**

Tanki nalla also known as khilori nalla because it passes through Khilori village. Analysis report submitted by state board analyst shows there is no adverse impact on water quality of Sone River. All relevant parameter including such as suspended particles, colour appearance and BOD found normal.

13. The photographs taken on the day of ash dyke incident occurred on 11.02.2022 and during the inspection of joint team on 5th & 6th June 2022 are enclosed at **Annexure-XI.**

F. Action Taken By MPPCB

1. Notice issued by Head Office, MPPCB, Bhopal to the Amarkantak Thermal Power Station, Chachai, Anuppur under section 33 "A" of Water (Preventation & Control of Pollution) act 1974 with Letter No.1489, Dated. 22/02/2022.

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2. Regularly inspection was done by the RO, MPPCB, Shahdol officials to the affected area and submitted the progress of remediation and restoration work to HO, MPPCB, Bhopal from time to time.
3. Court case is submitted in Local Judicial Court, Anuppur by the Regional Officer, MPPCB, Shahdol against the concerned Amarkantak Thermal Power Station, Chachai, Anuppur officials regarding violation of condition of Water (Preventation & Control of Pollution) act 1974 and violation of conditions of the consent issued by the MPPCB against following officer and registration process is under progress.

S.No.	Name	Post
1.	Shri A.H. Rizvi	Chief Engineer (Production)
2.	Shri R.K. Pahurkar	Chief Chemist
3.	Shri M.K. Namdev	Executive Engineer (Civil)
4.	Shri Akhtar Hausen Ansari	Assistant Engineer (Civil)
5.	Smt Shakuntala Dhurvey	Chemist

G. Environmental compensation

1. Compensation announced To Farmers:-

According to record of revenue Department, During breach in ash dyke, no agricultural crop was existing in affected agricultural field at the time of incident. Details of affected agricultural field along with Rakwa, Khasra, damage details, compensation amount announced by district collector is as below:-

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S. No.	Land Owner Name	Village- Deori		Village- Bargawan		Damage Details	Type Of Farmer	Sanctioned Compensation amount
		Khasra	Affected Rakwa in Ha.	Khasra	Affected Rakwa in Ha.			
1	Shri Yaman Prasad, S/O- Jodhiram Sahu	34/4	0.081	254/2/6	0.109	Too much ash accumulated	Small/ Marginal	5000.00
2	Shri Premdas, S/O- Dadnu Sahu	34/2	0.081	254/2/5 , 256/4	0.101 0.081	Too much ash accumulated	Small/ Marginal	5000.00
3	Shri Dhanai, S/O- Dadnu Sahu	34/3	0.101	254/2/4	0.028	Too much ash accumulated	Small/ Marginal	5000.00
4	Shri Dhanuva, S/O- Shivram Sahu	34/1 96/4/3	0.105 0.053	254/2/1 256/1	0.178 0.081	Too much ash accumulated	Small/ Marginal	5000.00
5	Shri Shambhu Prasad, S/O- Ramsevak Sahu	36/4 /1	0.336	254/2/3	0.401	Too much ash accumulated	Small/ Marginal	5000.00
6	Shri Ramgopal, S/O- Jogeswar Sahu	58/1/1/1 /2	0.096	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00
7	Shri Ramdayal, S/O- Jogeswar Sahu	58/1/1 /1/1	0.048	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00
8	Smt Bimla urf Munni bebo, Lallaram, Surendra, heeralal, Janaklali D/O- Reva prasad Sahu	58/1/1 /1/3	0.028	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00
9	Shri Ramgopal Ramdayal Gendlal S/O Jogeswar Sahu			256/2	0.031	Due to Water/ Ash filled	Small/ Marginal	5000.00
10	Smt Siyabati Bebo Paltu Baiga	97/1 98/1	0.175 0.127	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00
11	Semkali Baiba Maniraj, Nanda, Chotelal,Sohan, Kamla,Rani, Dhania S/O Maniram Baiga	97/2/2/2	0.051	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00
12	Belsiya Baiba subhe, bhulayiya sankhu, Lalita:	97/2/2/1	0.050	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00

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	Father- Subhe Baiga							
13	Khhaju S/O Rambishal Pansari	97/2/1	0.242	--	--	Due to Water/ Ash filled	Large/ Marginal	Not Eligible Due to large Farmer
14	Tirath S/O Rambishal Pansari	95/2/1	0.113	--	--	Due to Water/ Ash filled	Small/ Marginal	5000.00
15	Ramakant S/O Nanbabu Pansari	95/1	0.049	--	--	Due to Water/ Ash filled	Large/Marginal	Not Eligible Due to large Farmer
16	Ramswarath S/O Sakhu Baiga	299	0.081	--	--	Too much ash accumulated	Large/Marginal	5000.00
	Total Affected Land Area		**2.287 Ha.**			**Total Compensation**		**70000.00**

2. Calculation of Environmental Compensation

A. Estimation of GHG Emission and Related Cost: Green House Gases (GHG) emission is expected from the clean-up operation for the ash using JCB, dumper, tractor, and other mechanical. The ash can be taken as loose soil. For collecting the ash spread in the drain and nearby fields, the vehicle used emitted GHG that can be avoided if this incident doesn't took place. Considering this the damage due to gas emission was assessed:

- Amount of ash flown after the incident dt. 11.2.2022 = 4000 M^3
- Total kilometres travelled by ash collecting vehicle = 500 KMs(Considering average 2.5Kms travel from ash spread point to dyke in each trip)
- Average mileage of collecting vehicle of capacity 20m3 = 2.5km/litres
- Total fuel (Diesel) consumed = 200 Litres
- Density of Diesel = 0.85 kg/L
- Total weight of diesel used = 170 kg
- Specific CO2 emission for diesel = 3.15 kg CO2/ kg of diesel (Based on Framework for Environmental Damage Cost Assessment, NEERI document, 2019, Table 3)

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- Total CO2 emission = 535.5 kg CO2 = 0.536T of CO2 (approximately)
- Considering the social cost of carbon emission at a moderate impact scenario in 2020 = $42 with exchange rate (year 2020 i.e. 74.1322) = Rs. 3113.55 Say Rs 3114/- ((Based on Framework for Environmental Damage Cost Assessment, NEERI document, 2019 – Page 13)
- So, The total cost for GHG emission = 0.536T X Rs 3114/ T = Rs. 1669/-

B. <u>Damage to crop & water quality:</u>

- As reported, on the day of incidence i.e. 11.2.2022, no crop was on cultivation and the ash spread in fields were collected and compensation was provided to agri-field owners as per the revenue records.
- As the water quality was also not found polluted. The assessment for water pollution was also not assessed.

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H. Conclusion and Recommendations :-

During the visit the committee has not found any ash in the agricultural fields and Tanki Nalla because the industry has cleaned the affected areas by spending Rs 14,46,267/- but in few places the cleaned ash from the drain was dumped on both sides of drain. It was informed that even though there was no loss of crop, no loss of life of animals & humans and no major contamination of water in Sone River but the formers were announced Rs 5000/- each by the district collector. The following recommendations may be implemented:

1. The industry should take permission from MPPCB for further rising of ash dyke height and comply the conditions mentioned there in.
2. The industry should not discharge wastewater & seepage water from the ash pond in to the Tanki nalla.
3. The industry should construct permanent concreted check dam of large size capacity on the Tanki Nalla to prevent meeting of the seepage water from ash pond in to the river sone.
4. The industry should submit the action plan for ash utilization for 03 years cycles and comply as per the approved plan.
5. The industry should use vehicles having automatic covering system for fly ash transportation.
6. The industry should deposit the Green House Gas Emission and Related Cost with the district collector along with the other compensation assessed and announced by revenue department.

Sanjeev Kumar Mehra RO,MPPCB, Shahdol(M.P)	Kamla Sahu Puri SDM,Anuppur (M.P)	P. Jagan Regional Director, CPCB, Bhopal(M.P)

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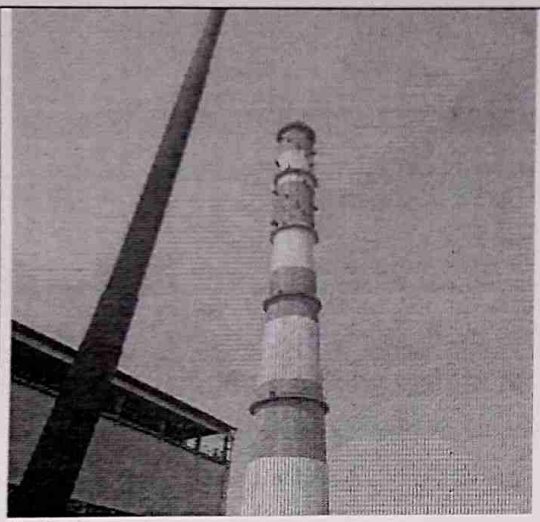
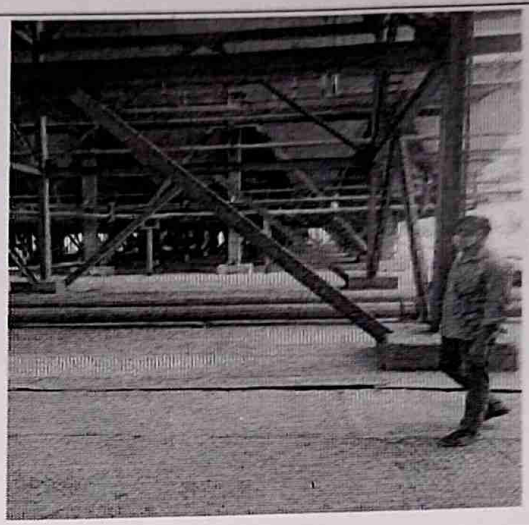
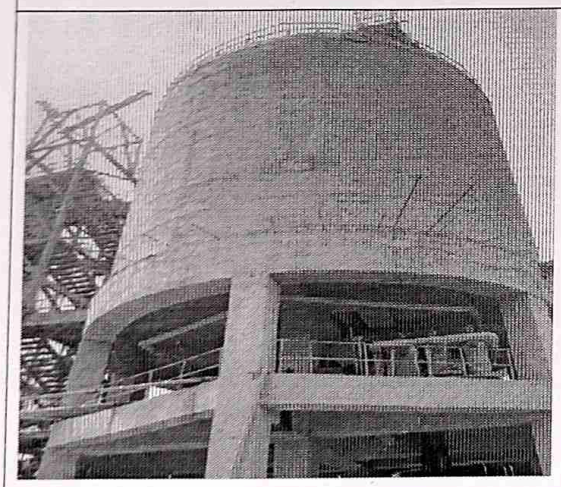
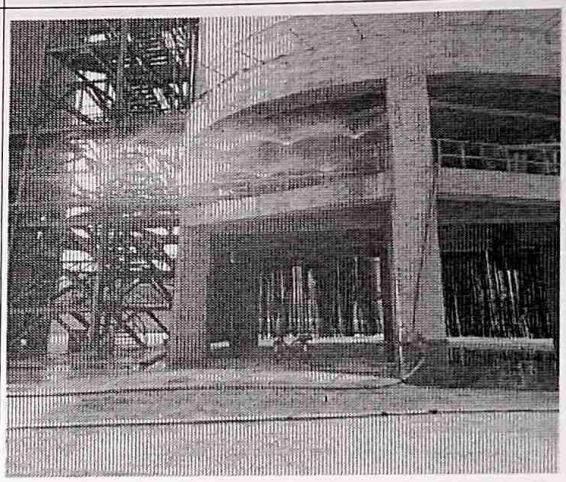
Photographs taken during the field visit of the Hon'ble NGT constituted joint committee during 5th & 6th June 2022

	
View of the 210 MW power plant stack	Fly ash collection ESP hoppers
	
1000- MT capacity Fly ash storage silo	Water sprinklers provided to control fugitive emission at fly ash storage silos

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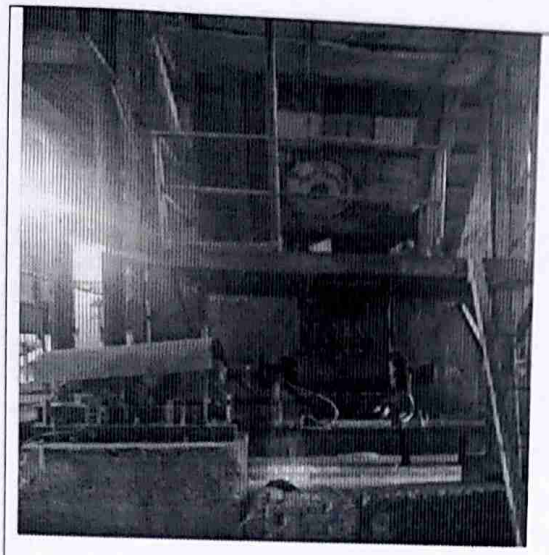
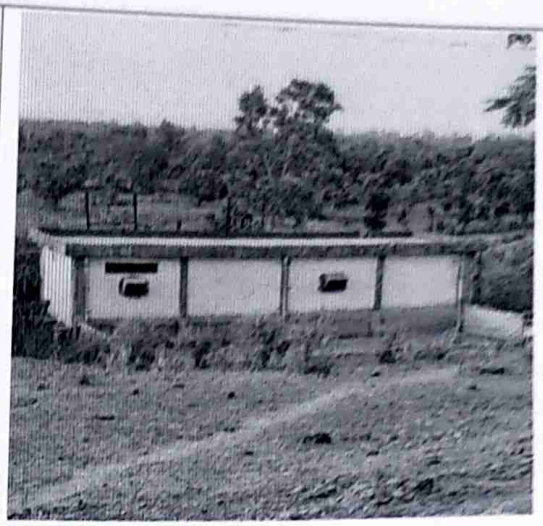
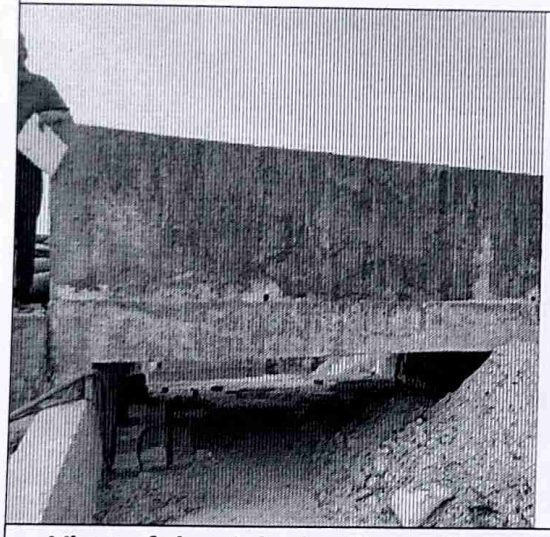
	
Bottom ash slurry making system for pumping through AWRS system to ash ponds	**Ash water recirculation system(AWRS) at ash dyke**
	
View of the sinked spillway through which ash has overflowed in to tanki nalla	**Ash dyke bund view where ash has gone down in to the drain**

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View of the bund through which ash water entered in drain in the down stream

View of the path through which ash entered in to drain from ash dyke on the day of breach

View of the cleaned ash has been dumped on the sides of Tanki Nalla

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View of the Stop dams constructed with sand bags on the Tanki Nalla to stop the ash flowing in to river sone

View of the cleaned ash has been dumped on the sides of Tanki Nalla

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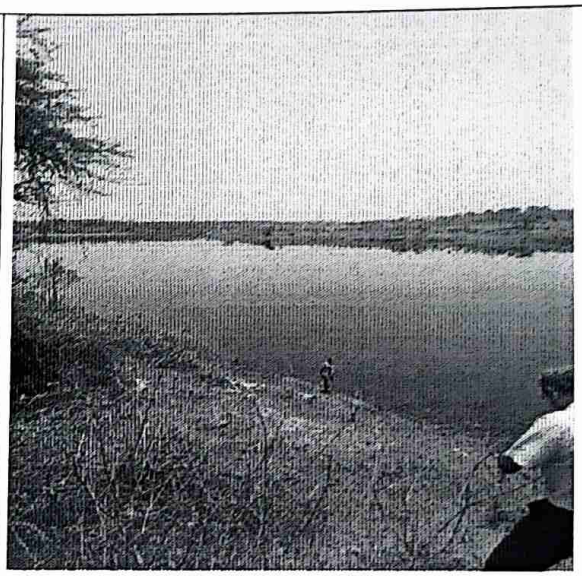
Cleaning work was under progress at the time of visit on 6.6.2022 at few stretches of Tanki Nalla

Cleaned ash dumped on the sides of tanki nalla and covered with soil



View of the sone river which is not affected due to ash dyke breach

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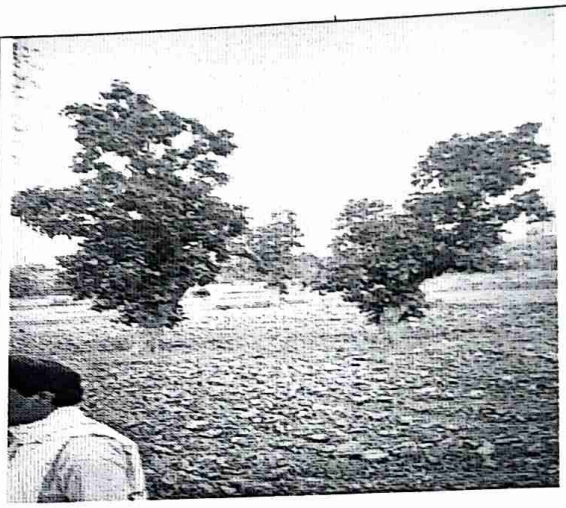
Provision made by formers for Drain water tapping for agricultural field through which ash entered in to the fields



View of the cleaned and restored agricultural fields which were affected due to ash dyke breach

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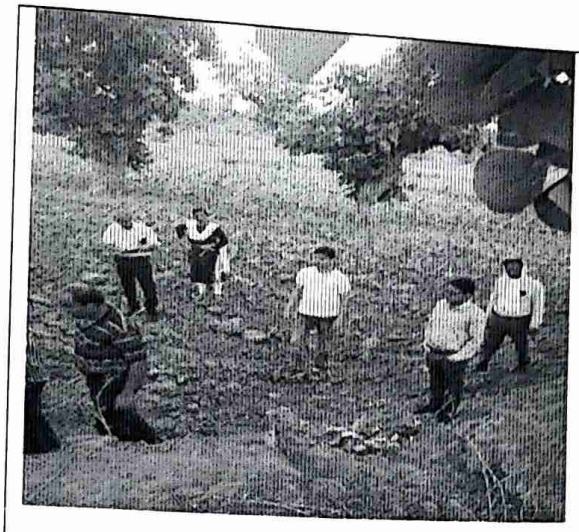

View of the cleaned and restored agricultural field which were affected due to ash dyke breach

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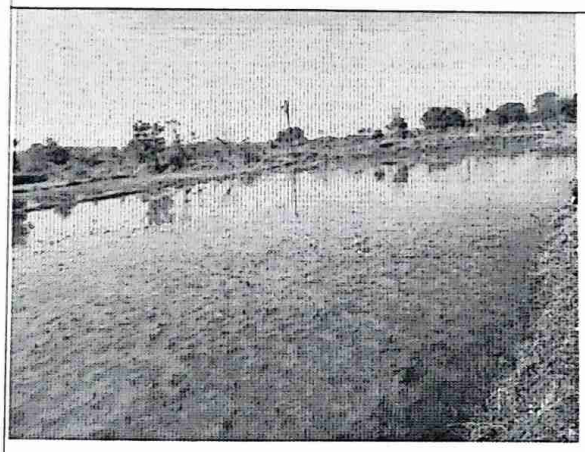
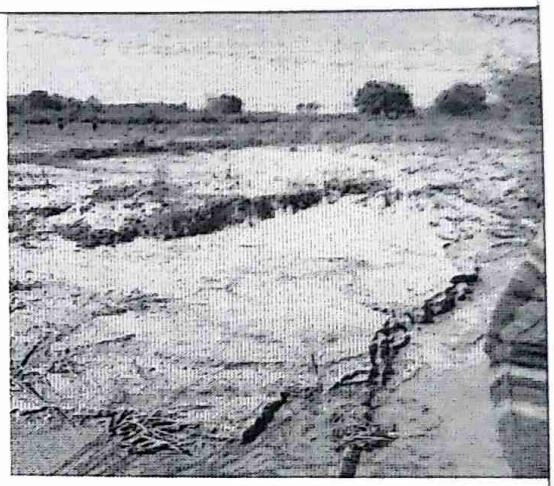
Photographs taken on the day of ash dyke breach on 11.02.2022

View of the agricultural field and tanki nalla which are affected due to ash dyke breach(photographs taken on the day of incident)





View of the agricultural field and tanki nalla which are affected due to ash dyke breach(photographs taken on the day of incident)

Regional Officer
M.P. Pollution Control Board
Shahdol

ANNEXURE-I

Item No. 1

BEFORE THE NATIONAL GREEN TRIBUNAL
CENTRAL ZONE BENCH, BHOPAL
(Through Video Conferencing)

Original Application No. 35/2022 (CZ)

Budhsen Rathore — Applicant(s)

Versus

Union of India & Ors — Respondent(s)

Date of Hearing: 09.05.2022

CORAM: HON'BLE MR. JUSTICE SHEO KUMAR SINGH, JUDICIAL MEMBER
HON'BLE DR. ARUN KUMAR VERMA, EXPERT MEMBER

For Applicant(s): Mr. Saurabh Sharma, Adv

For Respondent(s):

ORDER

1. Disposal of fly ash is of grave concern to the environment as well as public health. There are numerous scientific publications that have highlighted the serious concern. In Physciochemical Study of Kanhan River Water Receiving Fly Ash Disposal Waste Water of Khaperkheda Thermal Power Station, India, published in International Research Journal of Environment Sciences, Vol. 2(9), 10-15, September (2013), it has been stated with respect of the ill effects when fly ash gets disposed off into river water. Fly ash resulting from coal based thermal power plants is one of the alarming and continuously increasing sources of pollution leading to degradation of soil, water and air. Fly ash generated from thermal power plant and industrial waste discharged into the streams or dumped into surrounding land causes serious water and soil pollution problems. As per Kanhan Study, values of conductivity, total dissolved solids, turbidity, chemical oxygen

demand, alkalinity, hardness, and chlorides were very high in side stream water than the desirable values for drinking water Concentration of copper, cadmium, zinc, lead, mercury and arsenic metals were observed within normal range posing no threats of pollution of heavy metals in water due to ash bund.

2. The present Original Application relates to an Ash Dyke breach of the Chachai Ash Pond of Amarkantak Thermal Power Station in District Anuppur, Madhya Pradesh which is operated by MPPGCL. The Ash Dyke breach took place on the early morning of 11th February 2022, which impacted and contaminated about 10 acres of fertile agricultural land with fly ash. This spillage has led to spoiling of the fertile agricultural fields of farmers who are living in the vicinity of the said Ash Dyke. The Ash Dyke breach also contaminated the Son river as the fly ash and water which has spilled from the Ash pond has reached the Son river which is about 1.5 km away from the Ash Dyke.

3. The Additional Condition No.7 for Water Pollution Control of the Consent to Operate specifically and categorically provided :

   "7. The industry shall operate & maintain Ash Water Recirculation System (AWRS) to ensure 100% recirculation of overflow of the ash dyke. Industry shall make arrangement for transportation of fly ash to ash pond in the form of medium slurry mode system having 38% ash and 62% water as per MoEF directives"

4. Significant environmental issues are raised in this application.

5. Issue notice to the respondents, returnable within six weeks. Respondents are directed to submit their reply within four weeks through E-filing portal, preferably in the form of searchable PDF/ OCR Support PDF and not in the form of Image PDF.

6. Applicant is directed to take necessary steps for service to the respondents by both ways and also on available email.

M.P. Pollution Control Board

7. We deem it just and proper to call a report on the matter in issue of the present Original Application, from a Joint Committee consisting of:-

   i. Collector or representative, Anuppur.

   ii. Central Pollution Control Board or representative.

   iii. Madhya Pradesh Pollution Control Board or representative.

8. The Committee is directed to visit the place and submit the factual and action taken report within six weeks. The State PCB will be the nodal agency for coordination and logistic support.

9. Applicant is directed to supply the copy of the application and relevant documents to the Committee and Respondent(s) within a week and after compliance of service, the applicant has to submit an affidavit that the notice and copy of the application have been served upon the Committee and respondent(s).

10. The report in the matter be filed by the Committee through email at ngtczbbho-mp@gov.in preferably in the form of searchable PDF/OCR Support PDF and not in the form of Image PDF.

List it on 12th July, 2022

Sheo Kumar Singh, JM

Dr. Arun Kumar Verma, EM

09th May, 2022
O.A. No. 35/2022(CZ)
PU

Annexure - II

क्षेत्रीय निदेशालय (मध्य), भोपाल

केन्द्रीय प्रदूषण नियंत्रण बोर्ड

(पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय, भारत सरकार)

क्षे.नि.भो./एन.जी.टी. ओ.ए.–35/2022(CZ)/ 224-226

दिनांक : 30 मई, 2022
31

प्रति,

क्षेत्रीय अधिकारी
मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड
पुराना बस स्टैंड, जेड. एस. विशनदासानी
पेट्रोल पम्प के पीछे
शहडोल 484001 (म.प्र.)

Most urgent
NGT Case

विषयः NGT OA No. 35/2022(CZ) "Budhsen Rathore vs. Union Of India & Ors." में अधिकारी के नामांकन बाबत्।

संदर्भः माननीय एन.जी.टी. द्वारा पारित आदेश दिनांक 09.05.2022

महोदय,

कृपया माननीय एन.जी.टी. द्वारा दिनांक 09.05.2022 को विषयांकित प्रकरण में पारित आदेश का अवलोकन करने का कष्ट करें। विषयांकित प्रकरण में माननीय एन.जी.टी. द्वारा पारित आदेश दिनांक 09.05.2022 के संदर्भ में संयुक्त समिति का गठन किया गया है, जिसमें जिला कलेक्टर, अनूपपुर, केन्द्रीय प्रदूषण नियंत्रण बोर्ड एवं मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड के प्रतिनिधि शामिल है।

उपरोक्त समिति द्वारा कार्य पूर्ण करने के पश्चात प्रतिवेदन छः सप्ताह के भीतर माननीय एन.जी.टी. के समक्ष प्रस्तुत करना होगा। मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड नोडल एजेंसी होगी। प्रकरण में आगामी सुनवाई दिनांक 12.07.2022 नियत है।

उपरोक्त कार्य हेतु इस कार्यालय से अधोहस्ताक्षरकर्ता (मोबाइल नं. 9755559745, ईमेल– cpcb.bhopal@gov.in) को नामित किया जाता है। अनुरोध है कि उपरोक्त कार्य हेतु तिथि निर्धारित कर इस कार्यालय को सूचित करने का कष्ट करें जिससे माननीय एन.जी.टी. द्वारा नियत तिथि के पूर्व की गई कार्यवाही संबंधी प्रतिवेदन माननीय एन. जी.टी. के समक्ष संबंधित नोडल एजेंसी द्वारा प्रस्तुत किया जा सके।

भवदीय,

(पी.जेगन)
क्षेत्रीय निदेशक

संलग्नकः उपरोक्तानुसार।

प्रतिलिपिः

(1) डिविजनल हेड, विधि अनुभाग, के.प्र.नि.बोर्ड, दिल्ली
(2) सदस्य सचिव, म.प्र.प्र.नि.बो. भोपाल

} की ओर कृपया सूचनार्थ ।

क्षेत्रीय निदेशक

Regional Officer
M.P. Pollution Control Board
Shahdol

गगत है"

ANNEXURE II

कार्यालय कलेक्टर,जिला अनूपपुर (म0प्र0)

Email:-dmanuppur@gmail.com

क्रमांक– 2767 / राजस्व / NGT/2022–23 अनूपपुर,दिनांक–04/06/2022

प्रति,

(1) अनुविभागीय अधिकारी (रा.)
अनुभाग–अनूपपुर

(2) जिला खनिज अधिकारी
जिला–अनूपपुर

विषयः– NGT के मान्नीय सदस्यों का भ्रमण एवं निरीक्षण कार्यक्रम के संबंध में।

––000––

विषयान्तर्गत लेख है कि अनूपपुर जिले के चचाई स्थित अमरकंटक थर्मल पावर प्लाण्ट से उत्पादित प्लाई ऐश का डिस्पोजल, ऐश पोन्ड में किया जाता है। फैक्ट्री से उत्पादित प्लाई ऐश को सड़क मार्ग से वाहनों के द्वारा विभिन्न सीमेन्ट फैक्ट्रीज में परिवहन की जाती है। पावर प्लाण्ट एरिया में स्थित ऐश पोण्ड से कृषि भूमि एवं आसपास के क्षेत्रों में पड़ने वाले विपरीत प्रभाव का निरीक्षण करने के लिए राष्ट्रीय हरित अधिकरण के मान्नीय सदस्यगण दिनांक–05 जून एवं 06 जून 2022 को निरीक्षण करेंगे।

मान्नीय सदस्यों के निरीक्षण के समय आप उपस्थित रहना सुनिश्चित करें।

अपर कलेक्टर
जिला–अनूपपुर (म0प्र0)
अनूपपुर,दिनांक–04/06/2022

पृ.क्रमांक–2767 / राजस्व / NGT/2022–23
प्रतिलिपिः–

1. पुलिस अधीक्षक, जिला अनूपपुर (म0प्र0)।
2. मुख्य अभियंता, अमरकंटक थर्मल पावर प्लाण्ट चचाई, जिला अनूपपुर।
3. क्षेत्रीय अधिकारी, प्रदूषण नियंत्रण बोर्ड, शहडोल की ओर सूचनार्थ।

अपर कलेक्टर
जिला–अनूपपुर (म0प्र0)

Regional Officer
M.P. Pollution Control Board
Shahdol

मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड,

पर्यावरण परिसर,ई-5,अरेरा कॉलोनी,भोपाल-462016
Fax No :+91-755-2463742 E-mail : it_mppcb@rediffmail.com

आजादी का अमृत महोत्सव

क्रमांक 1730 /विधि/ NGT(CZ)/प्रनिबो/22 भोपाल, दिनांक 17 MAY 2022

प्रति

1 कलेक्टर,
कलेक्टर कार्यालय,
अनूपपुर

2. क्षेत्रीय निर्देशक,
केन्द्रीय प्रदूषण नियंत्रण बोर्ड,
क्षेत्रीय निर्देशालय (मध्य)
पर्यावरण परिसर, ई-5,
अरेरा कॉलोनी, भोपाल

M.P. Pollution Control Board, Shahdol Regional Office Recd. No. 630 Date 24/05/22

विषय :- माननीय एनजीटी प्रिंसिपल बैंच द्वारा प्र.क्र. 35/2022 (बुद्धसेन राठौर विरूद्ध भारत संघ व अन्य) में दिनांक 09.05.2022 के पालन बाबत।

उपरोक्त विषयान्तर्गत माननीय एनजीटी द्वारा प्रकरण क्रमांक 35/2022 में दिनांक 09.05.2022 को पारित आदेश के मुख्य अंश निम्नानुसार है :-

"The present Original Application relates to an **Ash Dyke breach of the Chachai Ash Pond of Amarkantak Thermal Power Station in District Anuppur, Madhya Pradesh which is operated by MPPGCL.** The Ash Dyke breach took place on the early morning of 11th February 2022, which impacted and contaminated about 10 acres of fertile agricultural land with fly ash. This spillage has led to spoiling of the fertile agricultural fields of farmers who are living in the vicinity of the said Ash Dyke. The Ash Dyke breach also contaminated the Son river as the fly ash and water which has spilled from the Ash pond has reached the Son river which is about 1.5 km away from the Ash Dyke.

We deem it just and proper to call a report on the matter in issue of the present Original Application, from a Joint Committee consisting of:-

i. Collector or representative, Anuppur.
ii. Central Pollution Control Board or representative.
iii. Madhya Pradesh Pollution Control Board or representative.

The Committee is directed to visit the place and submit the factual and action taken report within six weeks. The State PCB will be the nodal agency for coordination and logistic support."

कृपया माननीय अधिकरण द्वारा पारित आदेश के अनुपालन में आपके कार्यालय से कमेटी हेतु अधिकारी को नामांकित कर निर्देशित किये जाने का अनुरोध है ।

संलग्न :- उपरोक्तानुसार

W.A

M.Sahu (SE) 17/24/5/2022

(ए0ए0मिश्रा)
सदस्य सचिव

प्रतिलिपि :-

1 क्षेत्रीय अधिकारी, क्षेत्रीय कार्यालय, मध्यप्रदेश प्रदूषण नियंत्रण बोर्ड, शहडोल की ओर सूचनार्थ एवं आवश्यक कार्यवाही हेतु, कृपया संबंधितों से सम्पर्क कर 04 सप्ताह रिपोर्ट प्रस्तुत करें ।

Regional Officer M.P. Pollution Control Board Shahdol

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

RED-LARGE	CCA-Renewal	CONSENT NO: ***	PCB ID: 14362

Outward No: 114502 11/01/2022
NO: /MPPCB/SDL

Consent No:AW-55025

To,

The Occupier,
M/s. Amarkantak Thermal Power Station
(MPEB), 1x210 Mw Unit,
M. P. Power Generation Co. Ltd, Kelhori,
Chachai Abad,
Tehsil & Dist Anuppur, PIN 484 220 (M.P.)

Subject: **Grant of renewal of Consent under section 25 of the Water (Prevention & Control of Pollution) Act,1974 and under section 21 of the Air (Prevention & Control of Pollution) Act,1981**

Ref: Your renewal of Consent Application Receipt No. 1087020 Dt. 07/12/2021 and last communication received on Dt. 11/01/2022

With reference to your above application for renewal of Consent has been considered under the aforesaid Acts and existing rules therein. The M. P. Pollution Control Board has agreed to grant consent up to **28/02/2023**, subject to the fulfillment of the terms & conditions, enclosed with this letter and-

SUBJECT TO THE FOLLOWING CONDITIONS :-

a. Location: M. P. Power Generation Co. Ltd, Kelhori, Chachai Abad, Tehsil & Dist : Anuppur, PIN 484 220 (M.P.)

b. The capital investment : Rs. 1204.00 Crs

c. Product & Production Capacity:

Product	Qty / year
GENERATION OF ELECTRICITY (Coal Based Power Generation Plant)	**210.0 MWh**

Note:-

1. **For any change in above industry shall obtain fresh consent from the board.**
2. **This renewal of consent to operate is being considered with condition that the TPP shall have to abide by the timelines for the achievement of new emission norms as per the MoEF&CC notification G.S.R. 243(E) dated 31-03-21 according to the categorization of the TPP to be done by the task force, as provided in the said notification.**

The Validity of the consent is up to 28/02/2023 and has to be renewed before expiry of consent validity. Online application through XGN with annual license fees in this regard shall be submitted to this office 6 months before expiry of the consent/Authorization. Board reserves the right to amend/cancel / revoke the above condition in part or whole as and when required.

Enclosures:-

* Conditions under Water Act
* Conditions under Air Act
* General conditions

eSign Signing from UIDAI Server
Digitally Sign with Aadhaar

(Organic Authentication on AADHAR from UIDAI Server)
TPAV # P574BWYPJ4

Achyut mishra

ACHYUT ANAND MISHRA
Member Secretary

Regional Officer
M.P. Pollution Control Board
Shahdol

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

CONDITIONS PERTAINING TO WATER (PREVENTION & CONTROL OF POLLUTION) ACT 1974 :-

1. The daily quantity of trade effluent at out fall of the unit shall not exceed **1829.000 KL/day**, and the daily quantity of sewage at out fall of the unit shall not exceed **198.000 KL/day**

2. **Trade Effluent Treatment:-**
The applicant shall provide comprehensive effluent treatment system as per the proposal submitted to the Board and maintain the same properly to achieve following standards-

pH	Between	5.5 – 9.0
Suspended Solids	Not exceed	100 mg/l.
BOD $_3$ Days 27°C	Not exceed	30 mg/l.
COD	Not exceed	250 mg/l.
Oil and grease	Not exceed	10 mg/l.

TDS	Not exceed	2100 mg/l.
Chlorides	Not exceed	1000 mg/l.

For other parameters general standards of discharge as notified under EP Act 1986 shall be applicable.

3. **Sewage Treatment** :- The applicant shall provide comprehensive sewage treatment system as per the proposal submitted to the Board and maintain the same properly to achieve following standards-

Parameter	Standard limit*	
pH	Between	6.5 – 9.0
Suspended Solids	Not exceed	100 mg/l.
BOD $_3$ Days 27°C	Not exceed	30 mg/l.
COD	Not exceed	250 mg/l.
Oil and grease	Not exceed	10 mg/l.
Fecal Coliform	Not exceed	1000 (MPN/100 ml)
pH	Between	6.5 – 9.0

***The operator of the STP shall comply with the standards notified vide G.S.R. 1265(E) under sections 6 and 25 of the Environment (Protection) Act, 1986 by the Ministry of Environment, Forest and Climate Change New Delhi dated 13th October, 2017.**

4. The effluent shall be treated up to prescribed Standards and reuse in the process, for cooling and for green belt devolvement/gardening within premises. Hence zero discharge condition shall be practiced. In no case treated effluent shall be discharged outside of industry/unit premises.

5. Water meter preferably electromagnetic/ultrasonic type with digital flow recording facilities shall be installed separately for category wise consumption of water for Industrial cooling/boiler feed, mine spray, process & domestic purposes and data shall be submitted online through XGN monthly patrak/statements. The industry/unit shall also monitor the treated wastewater flow and report the same online through monthly patrak/statements.

Sr	Water Code (Qty in klpd - Kilo Ltr per Day)	WC : 20064.370	WWG : 2027.000	Water Source	Remark
1	Boiler Feed	127.000	19.000	Pond	FOR ELECTRICITY GENERATION
2	Cooling Water	10257.000	1467.000	Pond	
3	D.M Water Plant	192.000	14.000	Pond	
4	Domestic Purpose	1488.000	507.000	River	TREATED EFFLUENT WATER IS USED FOR GARDENING PURPOSE ETC.
5	Floor / Utensils / Other Washing	0.000	6.000	Pond	FOR FLOOR WASHING
6	Plantation / Horticulture	407.000	0.000	River	FOR PLANTATION

6. Any change in production capacity, process, raw material used etc. and for any enhancement of the above prior permission of the Board shall be obtained. All authorized discharges shall be consistent with terms and conditions of this consent. Facility expansions, production increases or process modifications which result new or increased discharges of pollutants must be reported by submission of a fresh consent application for prior permission of the Board

7. All treatment/control facilities/systems installed or used by the applicant shall be regularly maintained in good working order and operate effectively/efficiently to achieve compliance of the terms and conditions of this consent

8. The Consent does not authorize or approve the Construction of any physical structures or facilities or the undertaking of any work in any water course or within its high flood level (HFL) area

Regional Officer
M.P. Pollution Control Board
Shahdol

9. The specific effluent limitations and pollution control systems applicable to the discharge permitted herein are set forth as above conditions.

10. **Compilation of Monitoring data-**
i. Samples and measurements taken to meet the monitoring requirements specified above shall be representative of the volume and nature of monitored discharge.
ii. Following promulgation of guidelines establishing test procedures for the analysis of pollutants, all sampling and analytical methods used to meet the monitoring requirements specified above shall conform to such guidelines unless otherwise specified sampling and analytical methods shall conform to the latest edition of the Indian Standard specifications and where it is not specified the guidelines as per standard methods for the examination of Water and Waste latest edition of the American Public Health Association, New York U.S.A. shall be used.
iii. The applicant shall take samples and measurement to meet the monthly requirements specified above and report online through XGN the same to the Board.

11. **Recording of Monitoring Activities & Results-**
i. The applicant shall make and maintain online records of all information resulting from monitoring activities by this Consent.
ii. The applicant shall record for each measurement of samples taken pursuant to the requirements of this Consent as follows:

(i) The date, exact place and time of sampling
(ii) The dates on which analysis were performed
(iii)Who performed the analysis?
(iv)The analytical techniques or methods used and
(v)The result of all required analysis

iii. If the applicant monitors any Pollutant more frequently as is by this Consent he shell include the results of such monitoring in the calculation and reporting of values required in the discharge monitoring reports which may be prescribed by the Board. Such increased frequency shall be indicated on the Discharge Monitoring Report Form.
iv. The applicant shall retain for a minimum of 3 years all records of monitoring activities including all records of Calibration and maintenance of instrumentation and original strip chart regarding continuous monitoring instrumentation. The period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the applicant or when requested by Central or State Board or the court.

12. **Reporting of Monitoring Results:-**
Monitoring Information required by this Consent shall be summarized and reported by submitting a Discharge Monitoring report on line to the Board.

13. **Limitation of discharge of oil Hazardous Substance in harmful quantities**:-
The applicant shall not discharge oil or other hazardous substances in quantities defined as harmful in relevant regulations into natural water course. Nothing in this Consent shall be deemed to preclude the institution of any legal action nor relive the applicant from any responsibilities, liabilities, or penalties to which the applicant is or may be subject to clauses.

14. **Limitation of visible floating solids and foam**:
During the period beginning date of issuance the applicant shall not discharge floating solids or visible foam.

15. **Disposal of Collected Solid waste/sludge-**
All hazardous waste/sludge shall be disposed of as per the Authorization issued under Hazardous & other waste (M&TM) Rules 2016. And/other Solids Sludges, dirt, silt or other pollutant separated from or resulting from treatment shall be disposed of in such a manner as to prevent any pollutant from such materials from entering any such water Any live fish, Shall fish or other animal collected or trapped as a result of intake water screening or treatment may be returned to eaters body habitat.

16. **Provision for Electric Power Failure-**
The applicant shall assure to the consent issuing authority that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities utilized by the applicant to maintain compliance with the terms and conditions of the Consent.

17. **Prohibition of By pass system of treatment facilities-**
The diversion or by-pass of any discharge from facilities utilized by the applicant to maintain compliance with the terms and conditions of this Consent in prohibited except :
i. where unavoidable to prevent loss of life or severe property damage, or
ii. Where excessive storm drainage or run off would damage any facilities necessary for compliance with the terms and conditions of this Consent. The applicant shall immediately notify the consent issuing authorities in writing of each such

Regional Officer
M.P. Pollution Control Board
Shahdol

diversion or by-pass in accordance with the procedure specified above for reporting non-compliance.

18. Industry/Institute/mine management shall submit the information online through XGN in reference to compliance of consent conditions.

Additional Water condition:-

1. All the recommendations made in the Charter on Corporate Responsibilities for Environment Protection(CREP) for thermal power sector shall be strictly implemented.
2. Industry shall comply with the parameters notified in the Environment (Protection) Rules, 1986 notified by G.S.R. 3305(E) 7/12/15 as amended, for Thermal Power Plants.
3. The effluent will be treated in ETP and be used in ash slurry preparation, dust suppression and plantation. The domestic effluent of plant and colony will be treated through sewage treatment plant and will be used within factory premises. Zero discharge condition shall be maintained.
4. Industry shall provide adequate facility for the treatment of industrial (including the bleed from boiler house) and domestic waste water to ensure that the treated effluent quality meets the standards prescribed by M. P. Pollution Control Board published in notification of Govt. of M. P. Gazette dated: 25/03/88 as amended upto date.
5. Industry shall maintain closed cycle system with cooling tower. Once through cooling if any shall not be used. All the cooling tower blow down shall be reused in fire fighting, service water, coal handling plant and ash handling after proper treatment.
6. The industry shall operate & maintain Ash Water Recirculation System (AWRS) to ensure 100% recirculation of overflow of the ash dyke. Industry shall make arrangement for transportation of fly ash to ash pond in the form of medium slurry mode system having 38% ash and 62% water as per MoEF directives.
7. Water table depletion study in and around the project area shall be carried out by the project. All possible efforts including rain water harvesting to recharge ground water shall be taken up for the ground water enrichment in consultation with the Central Ground Water Authority.
8. Fly ash shall be collected in dry form and shall explore the possibility that storage facility (silo) of fly ash should be at least for one day. Un-utilized fly ash shall be disposed off in the ash pond in the form of high concentration slurry disposal. Industry shall also monitor mercury and other heavy metals (As, Hg, Cr, Pb etc.) in the bottom ash as also in the effluents from the ash pond. For disposal of ash in low lying area/mine for void filling prior permission from the Board be obtained, and conditions stipulated therein shall be followed.
9. As per the MoEF & CC notification dated 2015, the unit shall have to convert the Once Through Cooling (OTC) if any, to Cooling Tower (CT) by 6th of December 2017, and shall have to achieve specific water consumption upto maximum of 3.5 m3/MWh.
10. Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachette takes place at any point of time. Ash pond water shall be re-circulated and utilized in the process or other beneficial purposes in the plant.
11. Industry shall regenerate the village ponds/surface water bodies located within 5 km radius of the project site as a part of its social welfare activities. 14. Industry shall make arrangement for transportation of fly ash to ash pond in the form of medium slurry mode system having 38% ash and 62% water as per MoEF amendment.

Regional Officer
M.P. Pollution Control Board
Shahdol

M.P. Pollution Control Board
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Paryavaran Parisar, Bhopal - 16 MP
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CONDITIONS PERTAINING TO AIR (PREVENTION & CONTROL OF POLLUTION) ACT 1981 :-

1. The applicant shall provide comprehensive air pollution control system consisting of control equipments as per the proposal submitted to the Board with reference to generation of emission and same shall be operated & maintained continuously so as to achieve the level of pollutants to the following standards:-

Name of section	Capacity	Stack height(mtrs)	Fuel	Control equipment installed	P.M, SO_x, NO_x, Hg (mg/Nm^3)
Boiler	210 MWH	220	Coal-115 Ton/hr	E.S.P , Gravity Settling Chamber, Cyclone separator	50, 600, 300, 0.03 (to be achieved as per the notification G.S.R. 243(E) dated 31-03-2021)

2. Ambient air quality at the boundary of the industry/unit premises shall be monitored and reported to the Board regularly on quarterly basis: The Ambient air quality norms are prescribed in MoEF gazette notification no. GSR/826(E), dated: 16/11/09. Some of the parameters are as follows:
   a. Particulate Matter (less than 10 micron) - 100 $\mu g/m^3$ (PM10 $\mu g/m^3$ 24 hrs. basis)
   b. Particulate Matter (less than 2.5 micron) - 60 $\mu g/m^3$ (PM2.5 $\mu g/m^3$ 24 hrs. basis)
   c. Sulphur Dioxide [SO_2] (24 hrs. Basis) - 80 $\mu g/m^3$
   d. Nitrogen Oxides [NOx] (24 hrs. Basis) - 80 $\mu g/m^3$
   e. Carbon Monoxide [CO] (8 hrs. Basis) - 2000 $\mu g/m^3$

3. The industry shall take adequate measures for control of noise level generated from industrial activities within the premises less than 75 dB(A) during day time and 70 dB(A) during night time.

4. Industry/Unit shall provide with each stack port hole with safe platform of 1 meter width with support & spiral ladder/ Stepped ladder with hand rail up to monitoring platform as per specifications given in part-III emission regulation of CPCB. In no case monkey ladder shall be allowed as stack monitoring facility.

5. The industry/unit shall make the necessary arrangements for control of the fugitive emission from any source of emission/section/activities.

6. All other fugitive emission sources such as leakages, seepages, spillages etc shall be ensured to be plugged or sealed or made airtight to avoid the public nuisance.

7. The industry/ unit shall ensure all necessary arrangements for control of odour nuisance from the industrial activities or process within premises

8. All the internal roads shall be made pucca to control the fugitive emissions of particulate matter generated due to transportation and internal movements. Good housekeeping practices shall be adopted to avoid leakages, seepages, spillages etc.

9. Industry shall take effective steps for extensive tree plantation preferably in 03 rows of the local tree species with minimum spacing of 2X2 meters within or around the industry/unit premises for general improvement of environmental conditions and as stated in below..

(Minimum number of plants to be planted by the unit:-213850)

Additional Air condition:-

1. The TPP shall have to abide by the timelines for the achievement of new emission norms as per the MoEF&CC notification G.S.R. 243(E) dated 31-03-21 according to the categorization of the TPP to be done by the task force, as provided in the said notification.
2. Industry shall regularly operate CAAQMS stations at suitable locations to monitor ambient air quality and stack emission. The management shall provide and ensure uninterrupted connectivity of CAAQMS with Environment Surveillance Centre at the HQ of M.P. Pollution Control Board for monitoring and data transmission purpose. Similarly CEMS shall be provided to monitor the emissions at each stack and CEQMS shall be provided for the monitoring of treated effluent quality and uninterrupted connectivity with Environment Surveillance Centre at the HQ of M.P shall be provided.
3. Industry shall have to provide & operate adequate pollution control arrangement at all points and non point sources. Suitable air pollution control equipments shall be installed for the control of fugitive emission during the handling/transportation of raw material and fly ash etc. Industry should improve house keeping near fly ash loading system/silo.
4. In case of coal being imported, or as per the statutory applicable norms being in force, the industry shall install sulphur recovery system for control of sulphur dioxide emission.

Regional Officer
M.P. Pollution Control Board
Shahdol

5. Industry shall install adequate dust extraction and dust suppression system to control fugitive emissions from the crushing house, dumper, conveyor belt, moving vehicles, pneumatic compressors, raw material handling and other vulnerable dusty areas.
6. Coal transportation to the plant site shall be undertaken by rail and no road transportation shall be undertaken as far as possible. The entire internal roads should be made pucca and good housekeeping practices shall be adopted.
7. Dry fly ash collection system shall be installed for regular disposal of generated fly ash in dry form. Fly ash and bottom ash generated during the process shall be utilized as per the provisions of Fly Ash Notification for beneficial uses such as brick making, road construction, cement making etc.
8. The Industry shall regularly operate Outdoor HD Industrial grade IP(Internet Protocol) Cameras with pan-TiltZoom(PTZ) feature, minimum focal length 5X with night vision facility and temper proof mechanism at suitable location to display all emission sources / stacks, coal yards coal conveyors / crushers and effluent discharge point and connect the same with Environment Surveillance Centre, MP Pollution control board Bhopal, and ensure its uninterrupted connectivity for remote Surveillance.
9. Regular monitoring of ground level concentration of SO2, NOx, PM2.5 and PM10 and Hg shall be carried out in the impact zone and records shall be maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be taken immediately.
10. Industry should make appropriate arrangement for protection of the green belt. Massive plantation shall be under taken under the guidance of forest Department/Horticulture expert. Local Species shall be planted all around the periphery of the industry as well as the ash dyke.
11. The entire internal roads should be made pucca and good housekeeping practices shall be adopted.
12. Industry management shall regulate the generation of electricity according to its fly ash handling and availability of ash holding capacity of the ash dyke(s).
13. Following improvements shall be achieved within the stipulated time limits as committed by the industry during VC dated 15-07-2021 and uploaded on 23-07-2021 and as recommended by Regional Officer, Shahdol:
14. Installation of stationery water sprinkler in Ash Pond area.
15. Installation of fogger system in Silo Area.
16. Improvement of on-site temporary Hazardous waste storage site such as raising floor level, inside and outside drainage arrangement, catch pit, necessary repairing/replacement of roof sheets etc.
17. Improvement of drainage of silo area such as construction of guard pond, drain extension and other necessary arrangement for collection & disposal of ash slurry, so that ash slurry does not go outside industry premises. The bank guarantee submitted in RO Shahdol shall be forfeited in case of non-compliance of Time Bound Action Plan submitted with BG.
18. Industry shall incorporate more pressurized mist gun in coal track line and one more mist gun in fly ash silo area for further improvement in exiting fugitive dust control system.
19. Industry shall be done extensive plantation at remaining one side of external road from silo gate to erector hostel as well as around fly ash silo area and coal track line.

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GENERAL CONDITIONS:

1. The non hazardous solid waste arresting in the industry/unit/unit premises sweeping, etc. be disposed off scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permission from civic authorities for disposal to dumping site. If required.

Non Hazardous Solid wastes:-

Type of waste	Quantity	Disposal
Scrap/ Plastic packing material wood, card board, gunny begs etc	To be disposed to actual users	Sale to authorized party/As Per CPCB. MoEF Guidelines
FLY ASH	28326.000 MT/Month	

2. The applicant shall allow the staff of Madhya Pradesh Pollution Control Board and/or their authorized representative, upon the representation of credentials:
   a. To inspect raw material stock, manufacturing processes, reactors, premises etc to perform the functions of the Board.
   b. To enter upon the applicant's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this Consent.
   c. To have access at reasonable times to any records required to be kept under the terms and conditions of this Consent.
   d. To inspect at reasonable times any monitoring equipment or monitoring method required in this Consent: or,
   e. To sample at reasonable times any discharge or pollutants.

3. This consent / authorisation is transferable in nature, in case of any change in ownership / management, the new owner / partner / directors / proprietor shall immediately apply for the consent with new requisite information.

4. The issuance of this Consent does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorise any invasion of personal rights, nor any infringement of Central, State or local laws or regulations.

5. Industry shall install separate electric metering arrangement for running of pollution control devices and this arrangement shall be made in such fashion that any non functioning of pollution control devices shall immediately stop electric supply to the production and shall remain tripped till such time unless the pollution control device/devices are made functional. The record of electricity consumption for running of pollution control equipment shall be maintained and submitted to the Board every month

6. This consent is granted in respect of Water pollution control Act 1974 or Air Pollution Control act, 1981 or Authorization under the provisions of Hazardous and other Waste (Management & Transboundary movement) Rules 2016 only and does not relate to any other Department/Agencies. License required from other Department/Agencies have to be obtained by the unit separately and have to comply separately as per there Act / Rules.

7. Balance consent/authorisation fee, if any shall be recoverable by the Board even at a later date.

8. The applicant shall submit such information, forms and fees as required by the board not letter than 180 day prior to the date of expiration of this consent/authorisation

9. The industry/unit shall establish a separate environmental cell, headed by senior officer of the unit for reporting the environmental compliances. The industry/ Unit shall submit environmental statement for the previous year ending 31st March on or before 30th September every year to the Board.

10. Industry shall obtain membership of Emergency Response Center of the Board if needed.

11. Knowingly making any false statement for obtaining consent or compliance of consent conditions shall result in the imposition of criminal penalties as provided under the section 42(g) of the Water Act or section 38 (g) of the Air Act.

12. After notice and opportunity for the hearing, this consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to, the following :
   (a) Violation of any terms and conditions of this Consent.
   (b) Obtaining this Consent by misrepresentation of failure to disclose fully all relevant facts.
   (c) A change in any condition that requires temporary or permanent reduction or elimination of the authorized discharge.

13. On violation of any of the above-mentioned conditions the consent granted will automatically be taken as canceled and necessary action will be initiated against the industry.

Consent No:AW-55025

Regional Officer
M.P. Pollution Control Board
Shahdol

Additional condition:-

MANAGEMENT & DISPOSAL OF FLY ASH

1. The industry management shall ensure all the compliances regarding disposal and utilization of fly ash from its TPP as stipulated in MOEF&CC notifications no. S.O. 763€ dated 14/9/99 and its amendments vide notification no. S.O. 979(E) dated 27/8/03, S.O. 2804(E) dated 03/03/09 and S.O. 254(E) dated 25/1/16.
2. For ensuring free delivery of fly ash within the radius of 100 km and up to 300 km radius to the prospective users as per respective clauses 2(10) & 2(14) of the Fly ash Notification, the industry management shall procure / make provision of the Bulkers / closed transport vehicles under its control to ensure fast and quick delivery of fly ash.
3. The industry management shall keep / maintain and update the record of all the prospective users of fly ash within the radius of 100 km, keep constant liaison with them, provide fly ash to them in a timely manner and will submit 3 monthly compliance report to the Board.
4. A Industry shall ensure 100% utilization of fly ash in compliance of fly ash notification as amended up to date. Other alternatives like setting up of clinker grinding unit, encouragement of ancillary units for ensuring use of fly ash for other building products. . Dry fly ash collection system shall be installed for regular disposal of generated fly ash in dry form. The filling of low lying area inside the premises shall be undertaken strictly in accordance with the prior permission granted by the MPPCB.
5. The TPP management shall adhere to the office memorandum (OM)of MoEF&CC dated 28-08-19 and the conditions stipulated therein pertaining to the use of fly ash as mentioned in the para 7 of the OM. TPP shall have to follow the same and the guidelines of the CPCB entitled "Guidelines for disposal/utilization of Fly ash for reclamation of Low Lying Areas and in stowing of abandoned mines /Quarries" for the disposal of fly ash.
6. The non hazardous solid waste arresting in the industry/unit/unit premises sweeping, etc. be disposed off scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permission from civic authorities for disposal to dumping site. If required.

Consent/authorization as required under the Water (Prevention & Control of Pollution) Act,1974 & The Air (Prevention & Control of Pollution) Act,1981is granted to your industry subject to fulfillment of all the conditions mentioned above. For renewal purpose you shall have to make an application to this Board through XGN at least Six months before the date of expiry of this consent/authorisation. The applicant without valid consent (for operation) of the Board shall not bring in to use any outlet for the discharge of effluent and gaseous emission.

Regional Officer
M.P. Pollution Control Board
Shahdol

For and on behalf of
M.P. Pollution Control Board

eSign Signing from UIDAI
Digitally Sign with Aadhaar

(Organic Authentication on AADHAR from UIDAI Server)
TPAV # P574BWYPJ4

Achyut mishra

ACHYUT ANAND MISHRA
Member Secretary

Annexure - IV

Consent Order

M.P. Pollution Control Board
E-5, Areru Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

RED-LARGE	CCA-Renewal	CONSENT NO: ***	PCB ID: 14362

To,

The Occupier,

M/s. Amarkantak Thermal Power Station,

M. P. Power Generation Co. Ltd, Kelhori,

Chachai, Teh & Distt: Dist : Anuppur(MP)

Subject: Grant of renewal of Consent to Operate under section 25 of the Water (Prevention & Control of Pollution) Act,1974 & under section 21 of the Air (Prevention & Control of Pollution) Act,1981 and Authorization under Hazardous and other Waste (Management & Transboundary movement) Rules, 2016

Ref: Your Consent to Operate Application Receipt No. 871615 Dt. 26/04/2020 and last communication received on Dt.07/01/2020

With reference to your above application for renewal of consent to operate has been considered under the aforesaid Acts and existing rules therein. The M. P. Pollution Control Board has agreed to grant consent up to **28/02/2021** & authorisation up to **31/05/2025**, subject to the fulfillment of the terms & conditions, enclosed with this letter and-

SUBJECT TO THE FOLLOWING CONDITIONS :-

a. Location: Kelhori , Chachai, Distt. Anuppur.

b. The capital investment: Rs. 1204 crore

c. Product & Production Capacity:

Product	CCA-Qty / year
GENERATION OF ELECTRICITY **(Coal Based Power Generation Plant)**	**210.0 MWh**

The validity of the consent is up to **28/02/2021** and has to be renewed before expiry of consent validity. Online application through XGN with annual license fees in this regard shall be submitted to this office **6 months before expiry of the consent/Authorization**. Board reserves the right to amend/cancel / revoke the above condition in part or whole as and when required.

Enclosures:-

- *Conditions under Water Act*
- *Conditions under Air Act*
- *Conditions under Hazardous Rules*
- *General conditions*

e-Signed On 24/07/2020 17:17:25
(Organic Authentication on AADHAR from UIDAI Server)
TPAV # NP9FF5UMHO

ACHYUT ANAND MISHRA
Member Secretary

This Consent ... are valid and does not require physical signatures, the certificate can be validated online from ... using "TPAV" Number

Regional Officer
M.P. Pollution Control Board
Shahdol

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

CONDITIONS PERTAINING TO WATER (PREVENTION & CONTROL OF POLLUTION) ACT 1974 :-

1. The daily quantity of trade effluent of the unit shall not exceed **1680.0 KL/day**. and the daily quantity of sewage of the unit shall not exceed **198.0 KL/day**

2. Trade Effluent Treatment:- The applicant shall provide treatment system and maintain the same properly to achieve following standards-

pH	Between	5.5 – 9.0	TDS	Not exceed	2100 mg/l.
Suspended Solids	Not exceed	100 mg/l.	Chlorides	Not exceed	1000 mg/l.
BOD_3 Days 27 °C	Not exceed	30 mg/l.			
COD	Not exceed	250 mg/l.			
Oil and grease	Not exceed	10 mg/l.			

For other parameters general standards of discharge as notified under EP Act 1986 and notified by MPPCB from time to time shall be applicable.

3. Sewage Treatment :- The applicant shall provide treatment system and maintain the same properly to achieve following standards-

pH	Between	6.5 – 9.0
Suspended Solids	Not exceed	100 mg/l.
BOD_3 Days 27 °C	Not exceed	30 mg/l.
COD	Not exceed	250 mg/l.
Oil and grease	Not exceed	10 mg/l.
Fecal Coliform	Not exceed	1000 (MPN / 100ml)

4. The effluent shall be treated up to prescribed Standards and reuse in the process, for cooling and for green belt devolvement/gardening within premises. **Hence zero discharge condition** shall be practiced. In no case treated effluent shall be discharged outside of industry/unit premises. Industry should improve treated sewage utilization system for its use in garden and parks.

5. Water meter preferably electromagnetic/ultrasonic type with digital flow recording facilities shall be installed separately for category wise consumption of water for Industrial cooling/boiler feed, mine spray, process & domestic purposes and data shall be submitted online through XGN monthly patrak/statements. The industry/unit shall also monitor the treated wastewater flow and report the same online through monthly patrak/statements.

6. Any change in production capacity, process, raw material used etc. and for any enhancement of the above prior permission of the Board shall be obtained. All authorized discharges shall be consistent with terms and conditions of this consent. Facility expansions, production increases or process modifications which result new or increased discharges of pollutants must be reported by submission of a fresh consent application for prior permission of the Board

7. All treatment/control facilities/systems installed or used by the applicant shall be regularly maintained in good working order and operate effectively/efficiently to achieve compliance of the terms and conditions of this consent

8. The specific effluent limitations and pollution control systems applicable to the discharge permitted herein are set forth as above conditions.

9. Compilation of Monitoring data-

i. Samples and measurements taken to meet the monitoring requirements specified above shall be representative of the volume and nature of monitored discharge.

ii. Following promulgation of guidelines establishing test procedures for the analysis of pollutants, all sampling and analytical methods used to meet the monitoring requirements specified above shall conform to such guidelines unless otherwise specified sampling and analytical methods shall conform to the latest edition of the Indian Standard specifications and where it is not specified the guidelines as per standard methods for the examination of Water and Waste latest edition of the American Public Health Association, New York U.S.A. shall be used.

iii. The applicant shall take samples and measurement to meet the monthly requirements specified above and report online through XGN the same to the Board.

10. Recording of Monitoring Activities & Results-

i. The applicant shall make and maintain online records of all information resulting from monitoring activities by this

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M.P. Pollution Control Board
Sidhi

M.P. Pollution Control Board
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Paryavaran Parisar, Bhopal - 16 MP
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Consent.

ii. The applicant shall record for each measurement of samples taken pursuant to the requirements of this Consent as follows:

(i) The date, exact place and time of sampling
(ii) The dates on which analysis were performed
(iii)Who performed the analysis?
(iv)The analytical techniques or methods used and
(v)The result of all required analysis

iii. If the applicant monitors any Pollutant more frequently as is by this Consent he shell include the results of such monitoring in the calculation and reporting of values required in the discharge monitoring reports which may be prescribed by the Board. Such increased frequency shall be indicated on the Discharge Monitoring Report Form.

iv. The applicant shall retain for a minimum of 3 years all records of monitoring activities including all records of Calibration and maintenance of instrumentation and original strip chart regarding continuous monitoring instrumentation. The period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the applicant or when requested by Central or State Board or the court.

11. Reporting of Monitoring Results:-

Monitoring Information required by this Consent shall be summarized and reported by submitting a Discharge Monitoring report on line to the Board.

12. Limitation of discharge of oil Hazardous Substance in harmful quantities:-

The applicant shall not discharge oil or other hazardous substances in quantities defined as harmful in relevant regulations into natural water course. Nothing in this Consent shall be deemed to preclude the institution of any legal action nor relive the applicant from any responsibilities, liabilities, or penalties to which the applicant is or may be subject to clauses.

13. Limitation of visible floating solids and foam:

During the period beginning date of issuance the applicant shall not discharge floating solids or visible foam.

14. Disposal of Collected Solid waste/sludge-

All hazardous waste/sludge shall be disposed of as per the Authorization issued under Hazardous & other waste (M&TM) Rules 2016. And/other Solids Sludges, dirt, silt or other pollutant separated from or resulting from treatment shall be disposed of in such a manner as to prevent any pollutant from such materials from entering any such water Any live fish. Shall fish or other animal collected or trapped as a result of intake water screening or treatment may be returned to eaters body habitat.

15. Provision for Electric Power Failure-

The applicant shall assure to the consent issuing authority that the applicant has installed or provided for an alternative electric power source sufficient to operate all facilities utilized by the applicant to maintain compliance with the terms and conditions of the Consent.

16. Prohibition of By pass system of treatment facilities-

The diversion or by-pass of any discharge from facilities utilized by the applicant to maintain compliance with the terms and conditions of this Consent in prohibited except :

i. where unavoidable to prevent loss of life or severe property damage, or

ii. Where excessive storm drainage or run off would damage any facilities necessary for compliance with the terms and conditions of this Consent. The applicant shall immediately notify the consent issuing authorities in writing of each such diversion or by-pass in accordance with the procedure specified above for reporting non-compliance.

17. Industry/Institute/mine management shall submit the information online through XGN in reference to compliance of consent conditions.

18. All the recommendations made in the Charter on Corporate Responsibilities for Environment Protection(CREP) for thermal power sector shall be strictly implemented.

19. Industry shall comply with the parameters notified in the Environment (Protection) Rules, 1986 notified by G.S.R. 3305(E) 7/12/15 as amended, for Thermal Power Plants.

20. The effluent will be treated in ETP and be used in ash slurry preparation, dust suppression and plantation. The domestic effluent of plant and colony will be treated through sewage treatment plant and will be used within factory premises. Zero discharge condition shall be maintained.

21. Industry shall provide adequate facility for the treatment of industrial (including the bleed from boiler house) and domestic waste water to ensure that the treated effluent quality meets the standards prescribed by M. P. Pollution Control Board published in notification of Govt. of M. P. Gazette dated: 25/03/88.

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22. Industry shall maintain closed cycle system with cooling tower. Once through cooling if any shall not be used. All the cooling tower blow down shall be reused in fire fighting, service water, coal handling plant and ash handling after proper treatment.

23. The industry shall operate & maintain Ash Water Recirculation System (AWRS) to ensure 100% recirculation of overflow of the ash dyke. Industry shall make arrangement for transportation of fly ash to ash pond in the form of medium slurry mode system having 38% ash and 62% water as per MoEF directives.

24. Water table depletion study in and around the project area shall be carried out by the project. All possible efforts including rain water harvesting to recharge ground water shall be taken up for the ground water enrichment in consultation with the Central Ground Water Authority.

25. Fly ash shall be collected in dry form and shall explore the possibility that storage facility (silo) of fly ash should be at least for one day. Un-utilized fly ash shall be disposed off in the ash pond in the form of high concentration slurry disposal. Industry shall also monitor mercury and other heavy metals (As, Hg, Cr, Pb etc.) in the bottom ash as also in the effluents from the ash pond. For disposal of ash in low lying area/mine for void filling prior permission from the Board be obtained, and conditions stipulated therein shall be followed.

26. As per the MoEF & CC notification dated 2015, the unit shall have to convert the Once Through Cooling (OTC) if any, to Cooling Tower (CT) by 6th of December 2017, and shall have to achieve specific water consumption upto maximum of 3.5 m3/MWh.

27. Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachette takes place at any point of time. Ash pond water shall be re-circulated and utilized in the process or other beneficial purposes in the plant.

28. Industry shall regenerate the village ponds/surface water bodies located within 5 km radius of the project site as a part of its social welfare activities. 14. Industry shall make arrangement for transportation of fly ash to ash pond in the form of medium slurry mode system having 38% ash and 62% water as per MoEF amendment.

29. Industry shall make arrangement for transportation of fly ash to ash pond in the form of medium slurry mode system having 38% ash and 62% water as per MoEF directives. The industry shall operate & maintain Ash Water Recirculation System (AWRS) to ensure 100% recirculation of overflow of the ash dyke..

<u>CONDITIONS PERTAINING TO AIR (PREVENTION & CONTROL OF POLLUTION) ACT 1981 :-</u>

1. The applicant shall provide comprehensive air pollution control system consisting of control equipments as per the proposal submitted to the Board with reference to generation of emission and same shall be operated & maintained continuously so as to achieve the level of pollutants to the following standards:-

Name of section	Stack height (meters)	Fuel	Control equipment to be installed	P.M, SOX, NOX, Hg (mg/NM3)
Boiler	210	COAL	E.S.P, Gravity Settling Chamber, Green Belt, Natural Draft, Water Sprinkler	50, 600, 300, 0.03 (Time lines to be maintained as per directions given by CPCB)

2. Ambient air quality at the boundary of the industry/unit premises shall be monitored and reported to the Board regularly on quarterly basis: The Ambient air quality norms are prescribed in MoEF gazette notification no. **GSR/826(E), dated: 16/11/09.** Some of the parameters are as follows:

a. Particulate Matter (less than 10 micron) - 100 µg/m³ (PM10 µg/m³ 24 hrs. basis)
b. Particulate Matter (less than 2.5 micron) - 60 µg/m³ (PM2.5 µg/m³ 24 hrs. basis)
c. Sulphur Dioxide [SO2] (24 hrs. Basis) - 80 µg/m³
d. Nitrogen Oxides [NOx] (24 hrs. Basis) - 80 µg/m³
e. Carbon Monoxide [CO] (8 hrs. Basis) - 2000 µg/m³

3. The industry shall take adequate measures for control of noise level generated from industrial activities within the premises less than 75 dB(A) during day time and 70 dB(A) during night time.

4. The industry/unit shall make the necessary arrangements for control of the fugitive emission from any source of emission/section/activities.

5. All other fugitive emission sources such as leakages, seepages, spillages etc shall be ensured to be plugged or sealed or made airtight to avoid the public nuisance.

6. The industry/ unit shall ensure all necessary arrangements for control of odour nuisance from the industrial activities or process within premises

7. All the internal roads shall be made pucca to control the fugitive emissions of particulate matter generated due to

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transportation and internal movements. Good housekeeping practices shall be adopted to avoid leakages, seepages, spillages etc.

8. Industry shall take effective steps for extensive tree plantation of the local tree species within or around the industry/unit premises for general improvement of environmental conditions and as stated in additional condition

9. The industry shall have to ensure compliance of the directions issued by CPCB under section 5 of the EP Act, 1986 vide letter no. B-33014/07/2017-18/IPC-II/TPP/15896 dated 11/12/17 regarding compliance of emission standards pertaining to PM, SOx & NOx. FGD shall have to be installed within the time limits specified for the boiler. Immediate measures shall be taken by installation of low NOx burners, providing Over Fire Air (OFA) etc. for progressive reduction of NOx emission up to the specified limits by the year 2022. The PM emission has to be complied by 31/3/2021.

10. Industry shall regularly operate CAAQMS stations at suitable locations to monitor ambient air quality and stack emission. The management shall provide and ensure uninterrupted connectivity of CAAQMS with Environment Surveillance Centre at the HQ of M.P. Pollution Control Board for monitoring and data transmission purpose. Similarly CEMS shall be provided to monitor the emissions at each stack and CEQMS shall be provided for the monitoring of treated effluent quality and uninterrupted connectivity with Environment Surveillance Centre at the HQ of M.P shall be provided.

11. Industry shall have to provide & operate adequate pollution control arrangement at all points and non point sources. Suitable air pollution control equipments shall be installed for the control of fugitive emission during the handling/transportation of raw material and fly ash etc. Industry should improve house keeping near fly ash loading system/silo.

12. In case of coal being imported, or as per the statutory applicable norms being in force, the industry shall install sulphur recovery system for control of sulphur dioxide emission.

13. Industry shall install adequate dust extraction and dust suppression system to control fugitive emissions from the crushing house, dumper, conveyor belt, moving vehicles, pneumatic compressors, raw material handling and other vulnerable dusty areas.

14. Coal transportation to the plant site shall be undertaken by rail and no road transportation shall be undertaken as far as possible. The entire internal roads should be made pucca and good housekeeping practices shall be adopted.

15. Dry fly ash collection system shall be installed for regular disposal of generated fly ash in dry form. Fly ash and bottom ash generated during the process shall be utilized as per the provisions of Fly Ash Notification for beneficial uses such as brick making, road construction, cement making etc.

16. The Industry shall regularly operate Outdoor HD Industrial grade IP(Internet Protocol) Cameras with pan-Tilt-Zoom(PTZ) feature, minimum focal length 5X with night vision facility and temper proof mechanism at suitable location to display all emission sources / stacks, coal yards coal conveyors / crushers and effluent discharge point and connect the same with Environment Surveillance Centre, MP Pollution control board Bhopal, and ensure its uninterrupted connectivity for remote Surveillance.

17. Regular monitoring of ground level concentration of SO_2, NOx, $PM_{2.5}$ and PM_{10} and Hg shall be carried out in the impact zone and records shall be maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be taken immediately.

18. Industry should make appropriate arrangement for protection of the green belt. Massive plantation shall be under taken under the guidance of forest Department/Horticulture expert. Local Species shall be planted all around the periphery of the industry as well as the ash dyke.

19. The entire internal roads should be made pucca and good housekeeping practices shall be adopted.

20. Industry management shall regulate the generation of electricity according to its fly ash handling and availability of ash holding capacity of the ash dyke(s).

Regional Officer
M.P. Pollution Control Board
Shahdol

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

CONDITIONS PERTAINING TO THE HAZARDOUS AND OTHER WASTES (MANAGEMENT AND TRANSBOUNDARY MOVEMENT) RULES, 2016:-

FORM-2
[See rule 6 (2)]

FORM FOR GRANT OR RENEWAL OF AUTHORISATION BY STATE POLLUTION CONTROL BOARD TO THE OCCUPIERS, RECYCLERS, REPROCESSORS, REUSERS, USER AND OPERATORS OF DISPOSAL FACILITIES

1. Number of authorisation and date of issue : ,

2. Reference of application (No. and date) : **COW-871615, dt: 26/04/2020**

3. **The Occupier** of **M/s Amarkantak Thermal Power Station,** is hereby granted an authorisation based on the enclosed signed inspection report for generation, collection, reception, storage, transport, reuse, recycling, recovery, pre-processing, co-processing, utilisation, treatment, disposal or any other use of hazardous or other wastes or both on the premises situated at **Kelhori , Chachai, Distt. Anuppur.**

Details of Authorisation

S.No.	Category of Hazardous Waste as per the Schedules I, II and III of these rules	Authorised mode of disposal or recycling or utilisation or co-processing, etc.	Quantity (ton/annum)
1.	Chemical sludge from waste water treatment I -35.3	M.P. Waste Management Project, Pithampur, Dist Dhar	2.0-M.T
2.	Spent ion exchange resin containing toxic metals I -35.2	To be disposed off for incineration /co-processing/ M.P.Waste Management Project, Pithampur, Dist Dhar.	3.0-M.T
3.	Used or Spent Oil I -5.1	Sale to authorized re-processor registered with CPCB.	32.0-M.T

(1) The authorisation shall be valid for a period of *five years* i.e from dated *01/06/2020* to *31/05/2025*

(2) The authorisation is subject to the following general and specific conditions:

A. General conditions of authorisation:

1. The authorised person shall comply with the provisions of the Environment (Protection) Act, 1986, and the rules made there under.

2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board.

3. The person authorised shall not rent, lend, sell, transfer or otherwise transport the hazardous and other wastes except what is permitted through this authorisation.

4. Any unauthorised change in personnel, equipment or working conditions as mentioned in the application by the person authorised shall constitute a breach of his authorisation.

5. The person authorised shall implement Emergency Response Procedure (ERP) for which this authorisation is being granted considering all site specific possible scenarios such as spillages, leakages, fire etc. and their possible impacts and also carry out mock drill in this regard at regular interval of time;

6. The person authorised shall comply with the provisions outlined in the Central Pollution Control Board guidelines on Implementing Liabilities for Environmental Damages due to Handling and Disposal of Hazardous Waste and Penalty

7. It is the duty of the authorised person to take prior permission of the State Pollution Control Board to close down the facility.

8. The imported hazardous and other wastes shall be fully insured for transit as well as for any accidental occurrence and its clean-up operation.

9. The record of consumption and fate of the imported hazardous and other wastes shall be maintained.

Regional Officer
M.P. Pollution Control Board
Shahdol

10. The hazardous and other waste which gets generated during recycling or reuse or recovery or pre-processing or utilisation of imported hazardous or other wastes shall be treated and disposed of as per specific conditions of authorisation.

11. The importer or exporter shall bear the cost of import or export and mitigation of damages if any.

12. An application for the renewal of an authorisation shall be made as laid down under these Rules.

13. Any other conditions for compliance as per the Guidelines issued by the Ministry of Environment, Forest and Climate Change or Central Pollution Control Board from time to time.

14. Annual return shall be filed by June 30th for the period ensuring 31st March of the year.

15. The non hazardous solid waste arresting in the industry/unit/unit premises sweeping, etc. be disposed off scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permission from civic authorities for disposal to dumping site. If required.

B. Specific conditions:

1. The industry shall display the information on hazardous waste generated on notice board of size 6' x 4' (in Hindi & English) outside the unit main gate along with quantity and nature of hazardous chemicals being handled in the plant, including wastewater, air emission and hazardous wastes.

2. The authorisation or its renewal shall be produced for inspection at the request of an officer authorised by the State Pollution Control Board.

3. The Industry shall maintain the records of hazardous wastes as per the Form-3 of rule 6(5) and should online submit the annual return in Form No.4 as per the rule 6(5) to this office on or before 30th day of June of every year for the preceding period April to March.

4. In the event of any accident due to handling of hazardous wastes, the authorized person must inform immediately to the Regional Office & Head office of the board on Fax/telephone/email-it_mppcb@rediffmail.com about the incident and detail report should be sent in Form No.10 as per rule –22 of Hazardous and Other Wastes (Management and Transboundary Movement) Rules, 2016.

5. The Industry shall install industrial grade HD IP (Internet Protocol) Pan-Tilt-Zoom (PTZ) Camera with minimum 5X zoom and night vision facility for remote surveillance and constant vigil of emission source and effluent discharge points.

6. Industry management shall upgrade and improve the temporary on-site storage area of hazardous waste.

7. Industry management shall provide the catch-pit and drainage system to avoid the spillage of hazardous waste for accidental cases.

Regional Officer
M.P. Pollution Control Board
Shahdol

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

GENERAL CONDITIONS:

MANAGEMENT & DISPOSAL OF FLY ASH

1. THE INDUSTRY MANAGEMENT SHALL ENSURE ALL THE COMPLIANCES REGARDING DISPOSAL AND UTILIZATION OF FLY ASH FROM ITS TPP AS STIPULATED IN MoEF&CC NOTIFICATIONS NO. S.O. 763(E) DATED 14/9/99 AND ITS AMENDMENTS VIDE NOTIFICATION NO. S.O. 979(E) DATED 27/8/03, S.O. 2804(E) DATED 03/03/09 AND S.O. 254(E) DATED 25/1/16.

2. For ensuring free delivery of fly ash within the radius of 100 km and up to 300 km radius to the prospective users as per respective clauses 2(10) & 2(14) of the Fly ash Notification, the industry management shall procure / make provision of the Bulkers / closed transport vehicles under its control to ensure fast and quick delivery of fly ash.

3. The industry management shall keep / maintain and update the record of all the prospective users of fly ash within the radius of 100 km, keep constant liaison with them, provide fly ash to them in a timely manner and will submit 3 monthly compliance report to the Board.

4. A Industry shall ensure 100% utilization of fly ash in compliance of fly ash notification as amended up to date. Other alternatives like setting up of clinker grinding unit, encouragement of ancillary units for ensuring use of fly ash for other building products. . Dry fly ash collection system shall be installed for regular disposal of generated fly ash in dry form. The filling of low lying area inside the premises shall be undertaken strictly in accordance with the prior permission granted by the MPPCB.

4.B.The TPP management shall adhere to the office memorandum (OM)of MoEF&CC dated 28-08-19 and the conditions stipulated therein pertaining to the use of fly ash as mentioned in the para 7 of the OM. TPP shall have to follow the same and the guidelines of the CPCB entitled *"Guidelines for disposal/utilization of Fly ash for reclamation of Low Lying Areas and in stowing of abandoned mines /Quarries"* for the disposal of fly ash.

5. The non hazardous solid waste arresting in the industry/unit/unit premises sweeping, etc. be disposed off scientifically so as not to cause any nuisance/pollution. The applicant shall take necessary permission from civic authorities for disposal to dumping site. If required.

Non Hazardous Solid wastes:-

Type of waste	Disposal
Scrap/ Plastic packing material wood, card board, gunny begs etc	Sale to authorized party/As Per CPCB. MoEF Guide lines / Others.

6. The applicant shall allow the staff of Madhya Pradesh Pollution Control Board and/or their authorized representative, upon the representation of credentials:

a. To inspect raw material stock, manufacturing processes, reactors, premises etc to perform the functions of the Board.

b. To enter upon the applicant's premises where an effluent source is located or in which any records are required to be kept under the terms and conditions of this Consent.

c. To have access at reasonable times to any records required to be kept under the terms and conditions of this Consent.

d. To inspect at reasonable times any monitoring equipment or monitoring method required in this Consent: or,

e. To sample at reasonable times any discharge or pollutants.

7. This consent/authorisation is transferable, in case of change of ownership/management and addresses of new Owner/partner/Directors/proprietor should immediately apply for the same.

8. The issuance of this Consent does not convey any property rights in either real or personal property or any exclusive privileges, nor does it authorise any invasion of personal rights, nor any infringement of Central, State or local laws or regulations.

9. Industry shall install separate electric metering arrangement for running of pollution control devices and this arrangement shall be made in such fashion that any non functioning of pollution control devices shall immediately stop electric supply to the production and shall remain tripped till such time unless the pollution control device/devices are made functional. The record of electricity consumption for running of pollution control equipment shall be maintained and submitted to the Board every month

10. This consent is granted in respect of Water pollution control Act 1974 or Air Pollution Control act, 1981 or Authorization under the provisions of Hazardous and other Waste (Management & Transboundary movement) Rules 2016

Consent No:AWH-51845

Regional Officer
M.P. Pollution Control Board
Shahdol

Consent Order

M.P. Pollution Control Board
E-5, Arera Colony
Paryavaran Parisar, Bhopal - 16 MP
Tele : 0755-2466191, Fax-0755-2463742

only and does not relate to any other Department/Agencies. License required from other Department/Agencies have to be obtained by the unit separately and have to comply separately as per there Act / Rules.

11. Balance consent/authorisation fee, if any shall be recoverable by the Board even at a later date.

12. The applicant shall submit such information, forms and fees as required by the board not letter than 180 day prior to the date of expiration of this consent/authorisation

13. The industry/unit shall establish a separate environmental cell, headed by senior officer of the unit for reporting the environmental compliances. The industry/ Unit shall submit environmental statement for the previous year ending 31st March on or before 30th September every year to the Board.

14. Industry shall obtain membership of Emergency Response Center of the Board if needed.

15. Knowingly making any false statement for obtaining consent or compliance of consent conditions shall result in the imposition of criminal penalties as provided under the section 42(g) of the Water Act or section 38 (g) of the Air Act.

16. After notice and opportunity for the hearing, this consent may be modified, suspended or revoked by the Board in whole or in part during its term for cause including, but not limited to, the following :
(a) Violation of any terms and conditions of this Consent.
(b) Obtaining this Consent by misrepresentation of failure to disclose fully all relevant facts.
(c) A change in any condition that requires temporary or permanent reduction or elimination of the authorized discharge.

17. On violation of any of the above-mentioned conditions the consent granted will automatically be taken as canceled and necessary action will be initiated against the industry.

Consent/ Authorisation as required under the Water (Prevention & Control of Pollution) Act, 1974, The Air (Prevention & Control of Pollution) Act, 1981 and the Authorization under Hazardous Waste (Management handling & Transboundary movement) Amended Rule, 2016 is granted to your industry subject to fulfillment of all the conditions mentioned above. For renewal purpose you shall have to make an application to this Board through XGN at least Six months before the date of expiry of this consent/ Authorisation/. The applicant without valid consent (for operation) of the Board shall not bring in to use any outlet for the discharge of effluent and gaseous emission.

For and on behalf of
M.P. Pollution Control Board

Regional Officer
M.P. Pollution Control Board
Shahdol

(Member Secretary)

eSign Signing from UIDAI Server
Digitally Sign with Aadhaar

e-Signed On 24/07/2020 17:17:25
(Organic Authentication on AADHAR from UIDAI Server)
TPAV # NP9FF5UMHO

Achyut mishra

ACHYUT ANAND MISHRA
Member Secretary

Annexure - I

Annex-B-S.N.7(4)

Detail Of Fly Ash Utilization In Previous Year Of Existing Plant 210 MW ATPS, Chachai :-

S.N.	FY	Coal consumption	Ash %	Fly Ash Gen.	Fly Ash Utilization	Utilization (%)	Remarks
1)	2017-18	958312.10	32.25	309086.46	175952.0	56.93	
2)	2018-19	880215.00	28.14	247702.24	164533.3	66.42	
3)	2019-20	988791.04	31.82	314659.95	316396.0	100.55	
4)	2020-21	998828.00	33.69	336514.588	218111.2	64.81	For FY 20-21, Short lifting due to Covid-19 (Lockdown)
5)	2021-22	991265.00	36.13	358164.543	140001.6	39.09	Due to non existing sale of fly ash tender & no dedicated agreements with cement manufacturers since Sep-2021

A.E. (Office)
O/o SE (OPN) PH-III
ATPS MPPGCL Chachai

S.E.(OPN) PH-III
ATPS, MPPGCL, CHACHAI

Regional Officer
M.P. Pollution Control Board
Shahdol

Action Plan For Fly Ash Utilization In Next Ten Years(Estimated) As Per Notification Dtd-31/12/2021 :-

S.N.	FY	Fly Ash Generation (LMT)	Legacy Ash as on end of March in every year (Previous + Current FY) (LMT)	Dry Fly Ash utilization (LMT)	Expected Legacy Ash utilization in FY (LMT)	Total Fly ash utilization (Dry Ash + Legacy Ash) (LMT)	Fly ash utilization (%) w.r.t. total ash Generation
1	2022-23	3.5	35.81	2.5	1.7	4.2	120.00
2	2023-24	3.5	35.11	2.5	2.23	4.73	135.14
3	2024-25	3.5	33.88	2.5	5.11	7.61	217.43
4	2025-26	3.5	29.77	2.5	5.11	7.61	217.43
5	2026-27	3.5	25.66	2.5	5.11	7.61	217.43
6	2027-28	3.5	21.55	2.5	5.11	7.61	217.43
7	2028-29	3.5	17.44	2.5	5.11	7.61	217.43
8	2029-30	3.5	13.33	2.5	5.11	7.61	217.43
9	2030-31	3.5	9.22	2.5	5.11	7.61	217.43
10	2031-32	3.5	5.11	2.5	5.11	7.61	217.43
Totai utilization				25.0	44.81	62.2	177.71
11	2032-33	3.5	1.0	2.5	1.0	3.5	100.00

Modes Of Average Annual Dry Fly Ash & Legacy Ash Utilization (Estimated):-

S.N.	Particulars	Modes	utilization QTY (LMT)/YEAR	Utilization (%) / YEAR
1	Avg. Fly Ash Generation = 3.5 LMT/year	Cement Manufacturers	1.9	30.55
2		Mine Filling*	3.32	53.38
3		Bricks & Tiles Manufacturers	0.6	9.65
4		Ash Dyke Raising	0.35	5.63
5		Roads & Flyovers	0.04	0.64
6	Accumulated Legacy Ash as on dtd-31/12/2021 = 34.81 LMT	Concrete	----	----
7		Agriculture	0.01	0.16
8		Hydropower sector	----	----
9		Others/Miscellaneous	----	----
10		Unutilized Ash	0	0
		Total (Avg. of next 10 Yrs.)	6.22	177.71

***List Of Proposed Abandoned Mine For Back Filling Of Fly Ash, With Capacity And Distance From ATPS :-**

S.N.	Name of Mines	Capacity	Distance from ATPS by Road
1)	Open Cast Sharda Mine (OPQR Patch)	12 L.Cu.M.	14 kms.
2)	Open Cast Sharda Mine (Bakehi Patch)	25 L.Cu.M.	14 kms.
3)	Open Cast Sharda Mine (Trench-T1)	65 L.Cu.M.	14 kms.
4)	Open Cast Amlai Mine	5 L.Cu.M.	13 kms.

Note : - The MOU between SECL & ATPS for back filling of 2.25 LMT fly ash in Open Cast Sharda Mine (OPQR Patch) has been completed .

S.E.(OPN) PH-III
ATPS, MPPGCL, CHACHAI

A.E. (Office)
O/o SE (OPN) PH-III
ATPS MPPGCL Chachai

Regional Officer
M.P. Pollution Control Board
Shahdol

Annexure-VI

Details of ash dyke capacity as on dtd. 05.06.2022 for 1x210 MW at ATPS, Chachai

Sl. No.	No. of Ash dyke	Capacity of ash dyke	Area of ash dyke	Filled ash of Pond no.1	Filled ash of Pond no.2	Balance Capacity of Ash dyke	Remark
1	2	3	4	5	6	7	8
1	Ash dyke phase-III ash pond no.1	987000.00 M3	13.16 Hec.	987000.00 M3	----	----	Completed filled upto on dtd. 07.06.2016
2	Ash dyke phase-III ash pond no.2	1175000.00 M3	14.235 Hec.	----	1175000.00 M3	----	Completed filled upto on dtd. 30.04.2013
3	Capacity created by 1st stage Raising of pond no. 2 form RL-479 to 484 mt.	557808.00 M3	Within the area of ash pond no.2	----	507808.00 M3	50000.00 M3	Balance for alternate arrangement.
4	Capacity created by 1st stage Raising of pond no. 1 form RL-479 to 484 mt.	546932.00 M3	Within the area of ash pond no.1	261227.00 M3	----	285705.00 M3	Being disposed

E.E. (Civil) Constn. Dn-II
ATPS, MPPGCL, Chachai

Annexure-VII

M.P. POWER GENERATING COMPANY CO. LTD.
(Govt. of M.P. Undertaking)
OFFICE OF THE SUPERINTENDING ENGINEER (CIVIL)
ATPS; Chachai, Distt.-Anuppur (M.P.) 484226
(CIN–U40109MP2001SGC014882) Email ID-secivilatps@gmail.com

No. 501-2100/89 Chachai,dtd. 8/04/2022

To,

The Chief Engineer (Generation),
ATPS, MPPGCL, Chachai

Sub:- Report from IIT Indore regarding damaged spillway of ash pond no .1 at ATPS, Chachai.

-------000------

The report has been received for Dr. Neelima Satyam Professor HOD Civil IIT Indore and is being sent to your good office for kind information please.

Encl:- Copy of report through mail.

(Atul Rai)
S.E.(Civil)
ATPS, Chachai

Copy to :-

1. The Chief Engineering (Civil Engg.), MPPGCL, Jabalpur

Encl:- Copy of report through mail.

(Atul Rai)
S.E.(Civil)
ATPS, Chachai

D1/SE(Civil)/letter

Regional Officer
M.P. Pollution Control Board
Shahdol

Date: April 07, 2022

To

Superintending Engineer (Civil)
MPPGCL, ATPS, Chachai

Subject: ***Report for expert service for ash dyke Phase-III at ATPS, Chachai***

Reference: ***Letter No. 501-2100/AMK/Tech./740 dated. 11/03/2022***

Dear Sir,

In connection to your letter cited under reference, the work asked has been completed. The report for the same in 3 copies is enclosed with this letter. The tax invoice of the deposited consultancy fee is also enclosed.

Thanks!

Faithfully,

Neelima Satyam

Dr. Neelima Satyam D.
Professor
Department of Civil Engineering
Indian Institute of Technology Indore
Simrol, Indore 453 552, India

Prof. Neelima Satyam
Professor

&

Dr. Priyansh Singh
Assistant Professor
Department of Civil Engineering, Indian Institute of Technology Indore

Regional Officer
M.P. Pollution Control Board
Shahdol

A Report on Site Visit and Cofferdam & Spillway Design of Ash Pond 1 of Amarkantak Thermal Power Station (ATPS)

Reference # 501-2100/AMK/Tech./740 dated. 11/03/2022 and 501-2100/AMK/Tech./712 dated. 21/02/2022

Neelima Satyam

Dr. Neelima Satyam D.
Professor
Department of Civil Engineering
Indian Institute of Technology Indore
Simrol, Indore 453 552, India

.....

Dr. Priyansh Singh

Assistant Professor

.....

Prof. Neelima Satyam

Professor

DEPARTMENT OF CIVIL ENGINEERING

Indian Institute of Technology Indore
Khandwa Road Simrol

Indore 452020

April 7, 2022

Regional Officer
M.P. Pollution Control Board
Shahdol

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Part 1

Report on Site Visit

A visit to site of ash pond of Amarkantak Thermal Power Station (ATPS), Anuppur (MP) was made as detailed below:

Date of visit: 20th February 2022
Time: 9:00 AM to 12:30 PM

1.1 Introduction

Madhya Pradesh Power Generation Company Ltd. (MPPGCL) is operating a coal-based thermal power plant (Amarkantak Thermal Power Station (ATPS)) at Chachai, district Anuppur of Madhya Pradesh.. The bottom ash is being disposed in a dyke having two compartments or lagoons. The lagoon 2 after first raising has been filled with ash. Presently, both bottom ash and fly ash are being disposed into lagoon 1. The general layout of the site is shown in figure 1.1.

As per the information received from ATPS, Anuppur regarding the failure of the ash pond 1, Dr. Neelima Satyam (Professor and Head) and Dr. Priyansh Singh (Assistant Professor) from the Department of Civil Engineering, Indian Institute of Technology Indore, have visited the ash pond on 20th February 2022. The plant officials reported that the failure happened on 11th February 2022, at 04:00 hours. No casualties were incured as the authorities took immediate response actions. The failure has occurred at the spillway location, and the first stage rising has failed. The failure was sudden without any warning or significant distress prior to the failure.

Regional Officer
M.P. Pollution Control Board
Shahdol

Figure 1.1: General layout of the site (Source: https://earth.google.com).

1.2 Scope

Study on the cause of failure in the spillway area of ash pond 1.

1.3 Major Observations

1. The stability analysis of the dyke under question was already conducted in November 2019, using the properties provided by the client. The dyke was found to be marginally stable in al the conditions mentioned as per IS: 7894-1975 (2002).

2. The pond 1 was in use when the failure occurred. Immediately after the failure was spotted, the usage of pond 1 was stopped.

3. The depth of the ash near the site of failure was about 1.5 meters.

4. Suddenly, the ash slurry spilled out from below the spillway area during the failure. Due to this, the spillway settled by nearly 1.8 meters.

5. The failure was localised, at the location of the spillway only. No further distress is observed along the ash dyke. The failed spillway is shown in figure 1.2.

Figure 1.2: View of the downstream slope.

6. There is no evidence of overtopping, the level of ash was below the maximum slurry level during the failure.

7. The concrete structure was intact during the failure, and the minor damages that happened to the spillway resulted from a sudden fall.

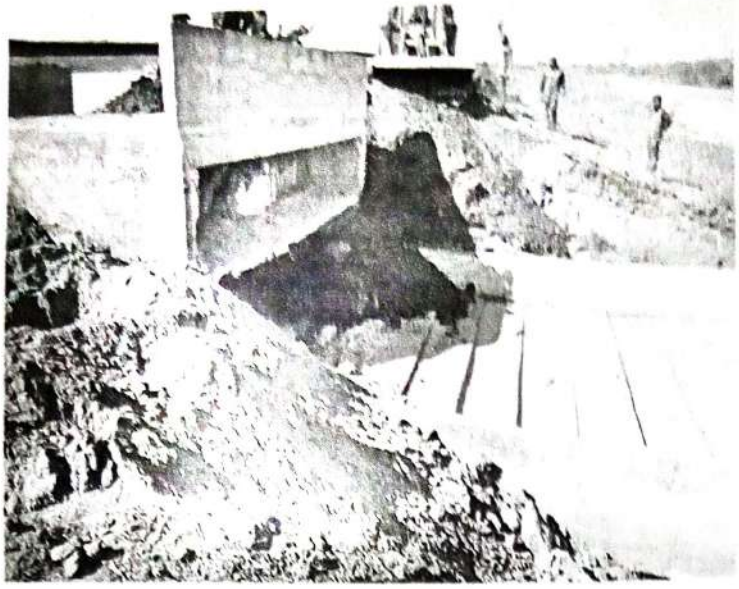
8. The sliding has only happened through the embankment body, not the foundation. The view of downstream slope during the field visit is shown in figure 1.3.

9. Many animal burrows are observed on the dam body, which indicates that the possible reason for failure is the internal seepage through these burrows. The images of few animal burrows observed during the visit is presented as figure 1.4.

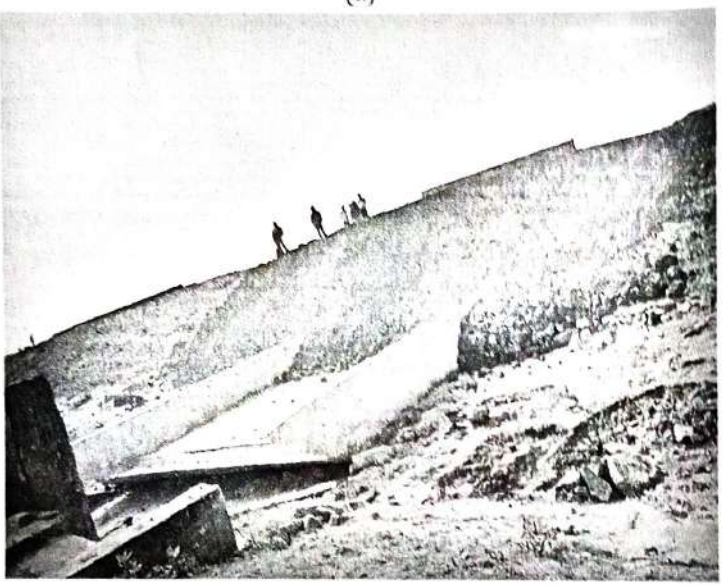
1.4 Reasons for failure

- The small animal burrows observed in the dam body can have a significant effect on altering the hydraulic control of the dam and might have resulted in raising the phreatic line.

- The failure has happened due to piping through the dam body.



(a)



(b)

Figure 1.3: View of the downstream slope during the field visit.

- Shortened seepage paths and increased seepage volume through the burrow pits have resulted in internal piping.

(a)

(b)

(c)

Figure 1.4: Animal burrows observed on dam body

1.5 Recommendations for constructing the spillway

- Earthen dams rely on a thick placement of compacted soils to withstand the water pressure of the pool contained behind5the embankment. The degree of compaction

and its maintenance should be ensured.

- A detailed investigation should be conducted to locate all the burrows, and these should be immediately covered to avoid further seepage.
- A temporary cofferdam should be constructed as an immediate measure, and the spillway should be reconstructed to ensure the safe functioning of the dyke.
- In general, it is recommended that the dyke should be monitored regularly to check the following:
  - Cracks
  - Leakages
  - Animal burrows
  - Saturated areas
  - Sinkholes
  - Evidence fo piping
  - Erosion
  - Excessive vegetation growth
  - Bulging or depression of slopes or berms
  - Deterioration of slope protection works
- Implementing a wildlife con trol strategy is necessary to maintain safe dam operation

Part 2

Safety Analysis of Proposed Cofferdam and Ash Dykes

2.1 Introduction

As the details received from ATPS Chachai, The construction of cofferdam with top bund width of 1.2 m and side slope of 2(H):1(V) has already been commenced. The top level of the bund is proposed to keep equal to the spillway' s ingress level, i.e., RL 481.925. The maximum depth of the cofferdam is found to be of the order to about 3.5 m. The proposed cofferdam section is shown in figure 2.1.

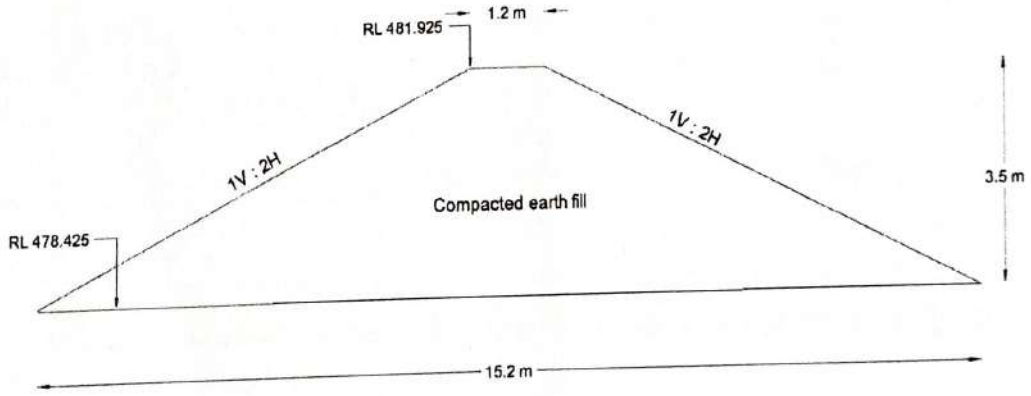


Figure 2.1: Cross-section of cofferdam

2.2 Safety Analysis

The safety analysis is conducted to check the safety of the proposed cofferdam section. The soil sample obtained from the local site is characterised, and These material properties are used for this analysis. Figure 2.2 shows the ash pond cross-section with cofferdam.

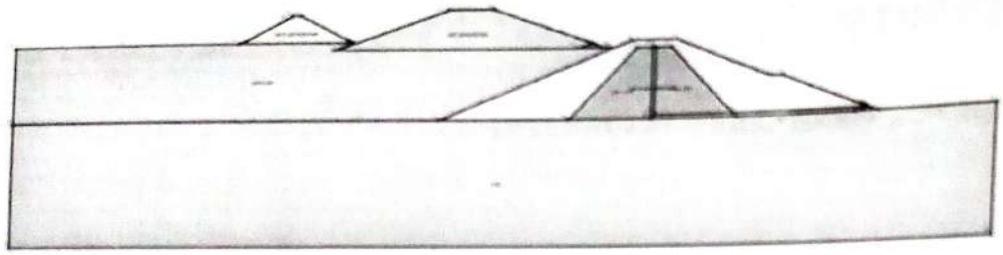


Figure 2.2: Cross-section of ash pond with a cofferdam

The safety analysis is conducted for the steady-state seepage and sudden drawdown conditions. The factor of safety (FS) obtained for steady-state seepage and sudden drawdown conditions are 1.617 and 2.061. Table 2.1 presents the FS values for the proposed cofferdam. Figure 2.3 and figure 2.4 shows the critical slip surface for steady-state seepage and sudden draw-down conditions, respectively.

Table 2.1: The factor of safety values for the proposed cofferdam

S. No.	Condition	Critical for	Obtained FS	Minimum FS required
1	Steady-state seepage	Downstream slope	1.617	1.5
2	Sudden drawdown	Upstream slope	2.061	1.3

2.3 Conclusions

The factor of safety (FS) obtained for the proposed cofferdam steady-state seepage and sudden drawdown conditions are 1.617 and 2.061. Hence the adopted cross-section is

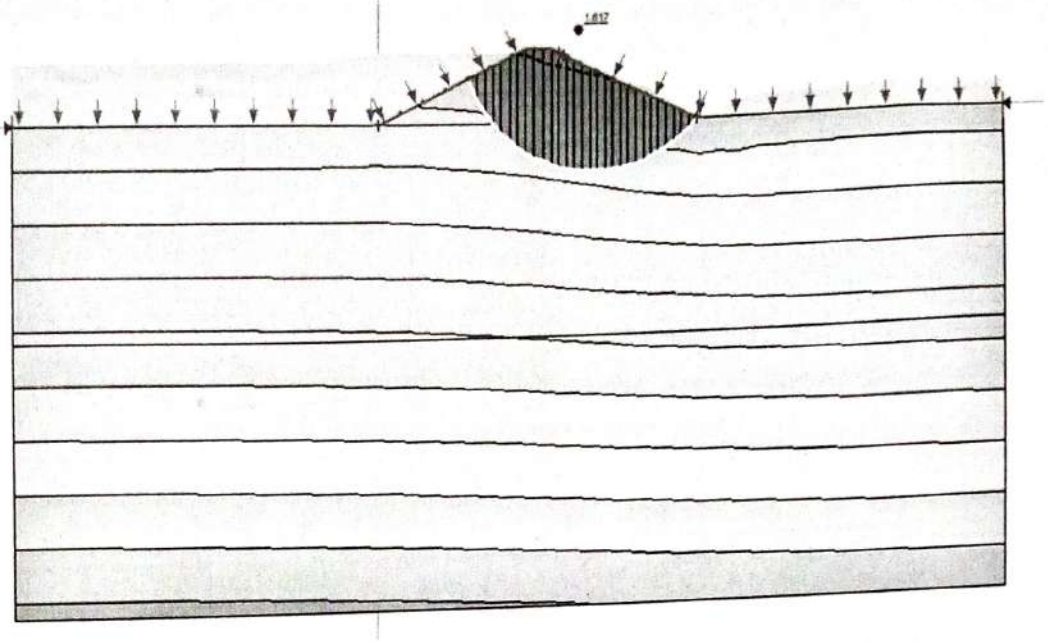


Figure 2.3: Critical slip surface for steady seepage condition

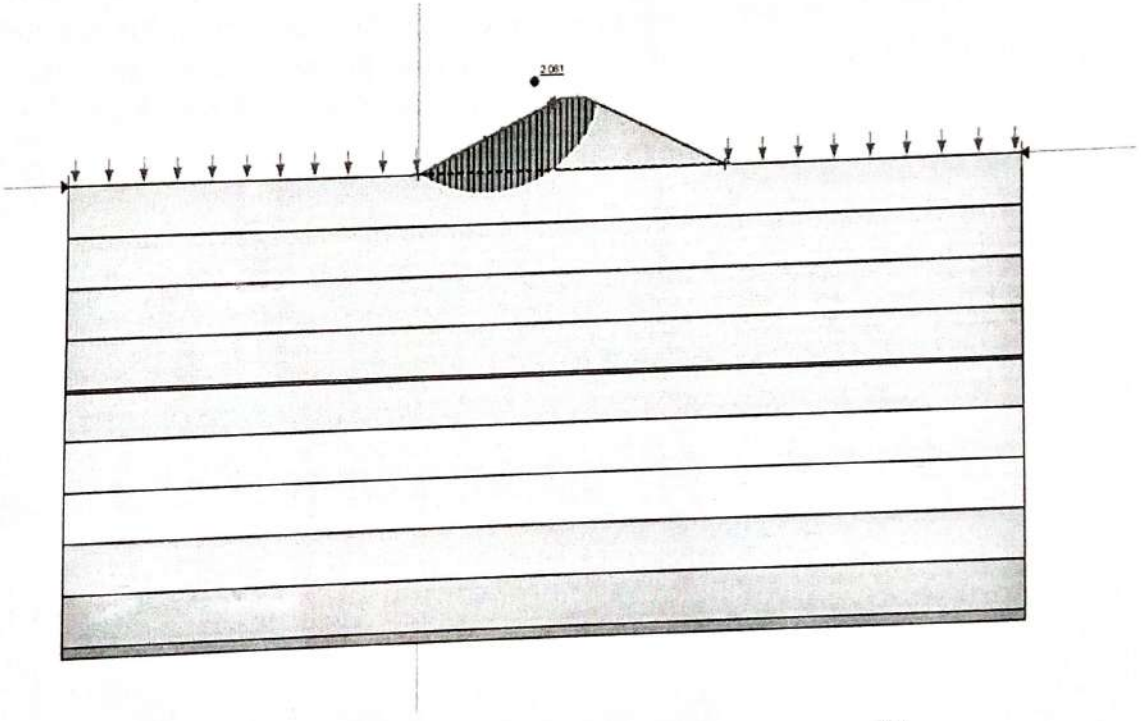


Figure 2.4: Critical slip surface for sudden drawdown condition

marginally safe against steady-state seepage and sudden drawdown, in the case of coffer-dam.

Part 3

Spillway Design

3.1 Introduction

During the site visit, no significant damage to the spillway structure was reported. The existing spillway (as per drawing no. D-3032-AD-C-001-R4 sheet no. 4 of 4) is constructed as a stepped-type spillway having a slurry ingress level at EL. 479.000 m. The spillway section has a clear dimension of 6.6 m (width) × 2.075 m (depth). The spillway slope conforms to the embankment slope (i.e., 2.25(H):1(V)).

The client has sought the revised spillway design to meet the following

1. The top-level of spillway slab shall correspond to the top bund level of 1 stage raised dyke, i.e., RL 484.00.
2. The ingress level for the spillway shall be 2.075 m below the top of the spillway arrangement, i.e., RL 481.925 m, in line with the scheme adopted before the breach.

3.2 Revised Spillway Design

3.2.1 Discharge Computation

- Area, A = 11.0358 ha = 0.110358 km^2.
- Maximum rainfall magnitude of 92 mm in 24 hours
- Runoff coefficient, C = 0.6 (assumed)

- Average rainfall intensity, I_{avg}=(92 mm)/(24 hr) = 3.833 mm/hr
- Maximum rainfall intensity is computed using CWC (Central Water Commission) flood estimation report for Sone sub-zone 1(d) adopting conversion factor to convert 24-hour point rainfall to short duration rainfall (Refer Fig. 10 of the flood estimation report). The study area falls within the sub-zone 1(d) of CWC.
- Thus, maximum rainfall intensity is worked out to be I_{max} = 34.04 mm/hr. The hyetograph is shown in figure 3.1.

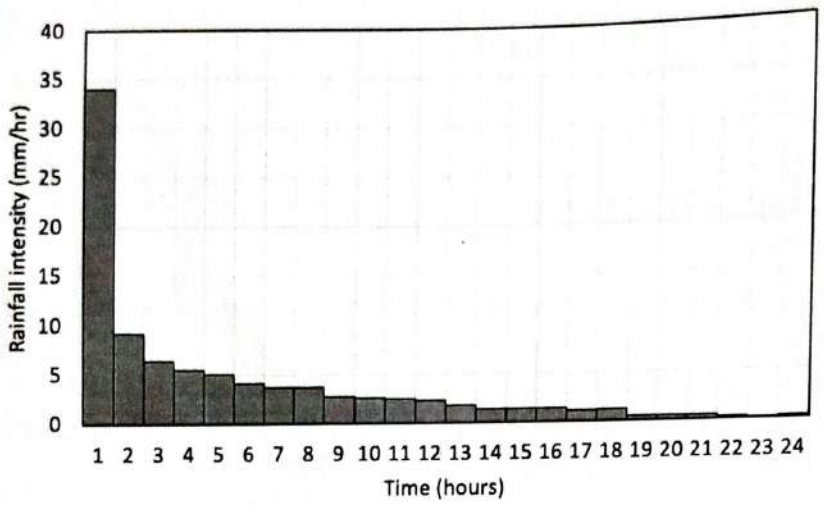


Figure 3.1: Derivation of hyetograph from 24-hour point rainfall using conversion factor

3.2.2 Spillway Elevation and Section

- Revised top level of spillway = EL. 484.000 m *(top level of spillway slab shall correspond to top bund level of 1st stage raised dyke)*
- Revised ingress level of spillway = EL. 484.000 - 2.075 = EL. 481.925 m *(the ingress level for spillway shall be 2.075 m below the top of spillway arrangement in line with the scheme adopted before breach)*
- The bottom level of the embankment on upstream and downstream side (i.e., slurry filled side) = EL. 467.000 m for starter dyke and EL. 479.000 m for raised portion *(as per the drawing, however, the actual level might differ according to the site conditions)*

- The bottom level of the embankment on downstream side (i.e., spillway side) = EL. 465.000 m *(as per the drawing, however, the actual level might differ according to the site conditions)*

- During the site visit, no significant damage to the existing spillway structure was reported. Hence, the revised spillway design incorporates the changes due to the raising of the slurry ingress level (see figure 3.2), whereas the structural and reinforcement details remain unaltered. The drawing no. D-3032-AD-C-001-R4 sheet no. 4 of 4 shall be referred for other details. However, an assessment of hydraulic efficiency of energy dissipation in the revised arrangement is carried out.

- The suggestion for adopting the circular barrel or box-type arrangement for spillway inlet is not recommended. Since this modification would lead to constriction of the flow section and may also influence the energy dissipation mechanism if the flow is not distributed evenly through all the barrels. Thus, the existing spillway inlet section with dimensions of 6.6 m (width) × 2.075 m (depth) can be continued with (see figure 3.3).

3.2.3 Energy Dissipation in Stepped Spillway

- The flow regimes in a stepped spillway typically exhibit nappe flow, transition flow and skimming flow. Assuming that the skimming flow regime (most dominant streamflow regime in a stepped spillway) is achieved in the existing spillway, the energy dissipation is estimated for the revised arrangement considering discharge due to both average and maximum rainfall intensities.

- The discharge is estimated using rational formula

$$Q = \frac{1}{3.6} CIA \tag{3.1}$$

Where, Q is the peak discharge in m^3/s, C is the runoff coefficient, A is the catchment area in km^2, and I is the rainfall intensity in mm/hr.

The computations for energy dissipation is shown in table 3.1. For details of formulae in the computation of these quantities, refer Khatsuria (2004) pp. 95-124. The energy dissipation in the stepped spillway is found to be within limits. However, it is recommended that a physical-scaled model study may be conducted for the revised spillway arrangement to evaluate its performance efficiency for various discharge scenarios.

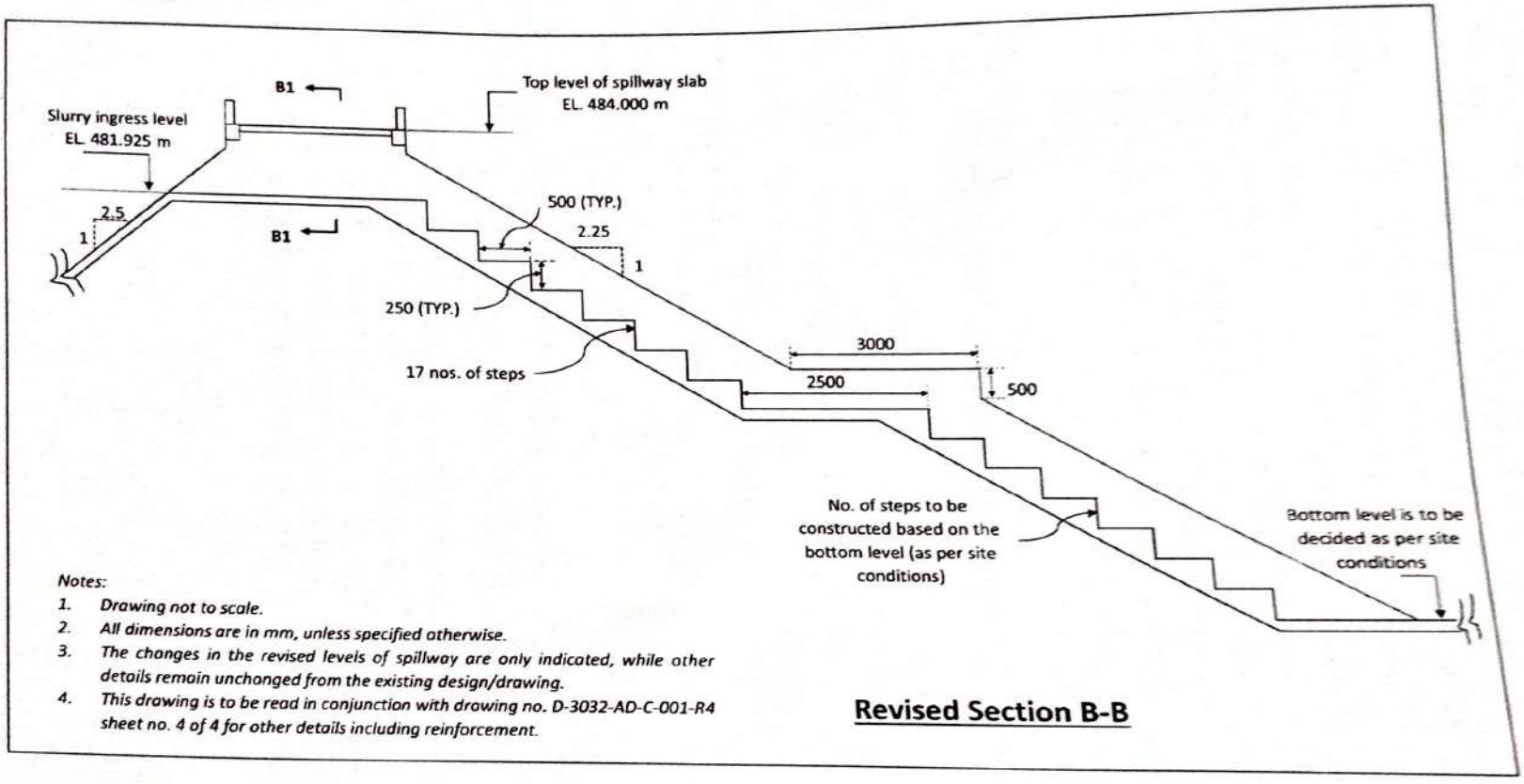


Figure 3.2: Details of revised section B-B of the spillway

Regional Officer
M.P. Pollution Control Board
Shahdol

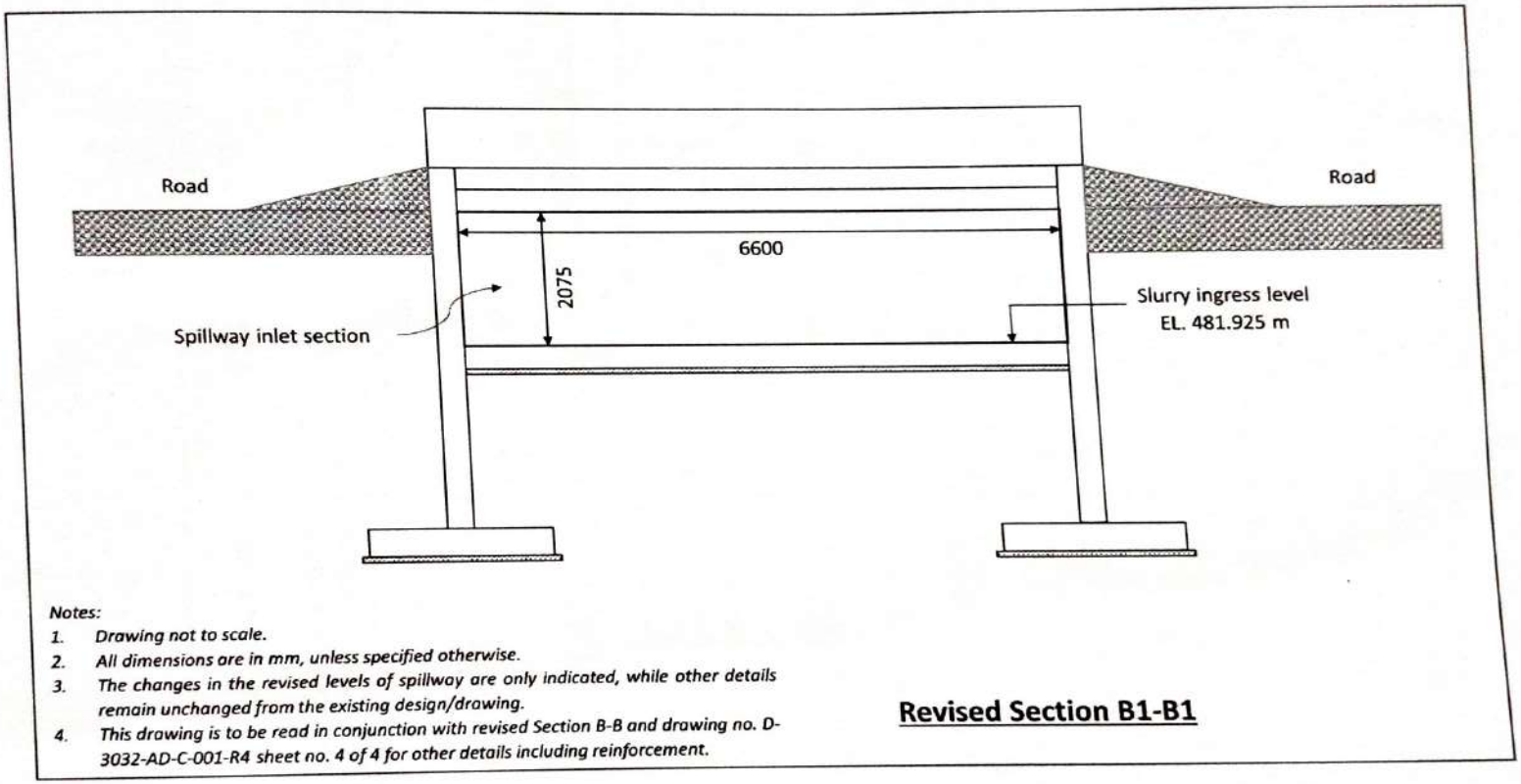


Figure 3.3: Details of revised section B1-B1 of the spillway

Table 3.1: Computation for energy dissipation in stepped spillway

Description	Notation	For average rainfall intensity	For maximum rainfall intensity	Unit
Rainfall intensity	I	3.833	34.04	mm/hr
Discharge over the spillway using rational formula	Q	0.07	0.683	m3/s
Side slope	H	2.25	2.25	
Side slope	V	1	1	
Angle	θ	24	24	degrees
cos angle	$\cos\theta$	0.914	0.914	
sin angle	$\sin\theta$	0.407	0.407	
tan agnle	$\tan\theta$	0.445	0.445	
Width of spillway	B	6.6	6.6	m
Discharge per unit width	q	0.0106	0.1035	$m^3/s/m$
Critical depth	y_c	0.023	0.103	m
Dam height from toe	H_d	16.925	16.925	m
	H_{max}	16.959	17.079	m
Height of step	h	0.25	0.25	m
$k = h\cos\theta$	k	0.23	0.23	m
Distance from start of boundary layer	L_i	0.301	1.863	m
Depth of flow at point of inception	y_i	0.015	0.059	m
Average velocity at point of inception	V	4.658	11.585	m/s
Froude no.	F	9.904	11.528	
Energy at point of inception	E	1.12	6.894	m
Energy level with datum as base of spillway	E_{dat}	17.922	23.062	m
For non-uniform flow				
Clear water depth of flow	DW_h	0.015	0.059	m
Depth of water	H_d	0.123	0.758	m
	H_{max}	0.156	0.912	m
Residual energy head	H_r	0.081	0.419	m
Energy level	$E1$	16.883	16.586	m
At 5 m below the crest				
Normalized vertical distance required for uniform flow to be attained	H_{du}	0.297	1.356	m
Uniform flow clear water depth	y_{wu}	0.007	0.03	m
		uniform flow not been reached at this elevation		

Table 3.1: Computation for energy dissipation in stepped spillway (continued)

Description	Notation	For average rainfall intensity	For maximum rainfall intensity	Unit
At location of uniform flow				
Clear water depth for uniform flow condition	DH_{wu}	0.026	0.119	m
Friction factor	$\frac{1}{\sqrt{f}}$	1.764	2.145	
	f	0.321	0.217	
Depth of water	H_d	0.297	1.356	m
	H_{max}	0.331	1.511	m
Residual energy head	H_r	0.151	0.452	m
Aerated flow depths				
Froude No. based on step height	F_h^*	0.17	1.659	
Uniform flow depth corresponding to 90% air concentration	$y_{90,u}$	0.048	0.165	m

Part 4

Ash Pond Safety Analysis

4.1 Introduction

The stability analysis of the ash dyke was conducted in 2019, for starter dyke and two stage raisings, using the properties provided by the client. After the failure, soil and ash samples were collected from the site and the material properties were determined using detailed laboratory investigations. The material properties obtained after testing is used for the analysis mentioned in this report. The analysis was conducted for the proposed cofferdam and the ash dyke (stage I raising and stage II raising), as per the drawings provided by the client.

4.2 Safety Analysis

At present, the starter dyke and stage I raising are existing at the site, and failure has happened in stage I raising. The stability analysis was conducted for both the existing condition and the proposed stage II raising. The cross-section of ash dyke with stage II raising is given in Figure 4.1. The analysis was conducted for the existing and proposed cases, for both steady state seepage and sudden drawdown cases, and the results are mentioned in table 4.1. Figure 4.2 to 4.5 presents the critical slip surface for different conditions.

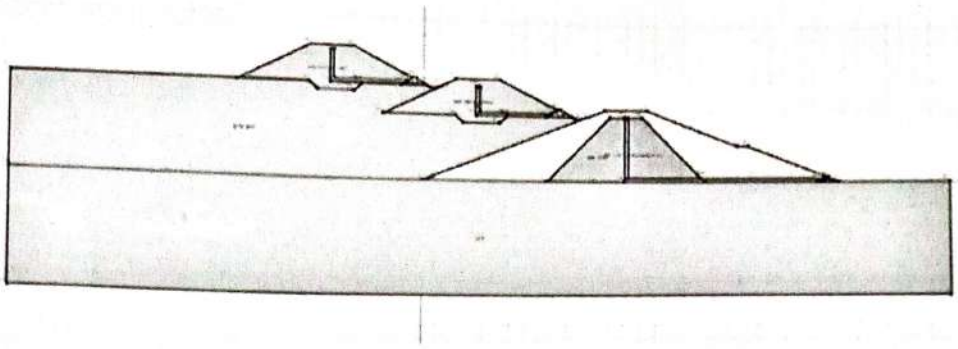


Figure 4.1: Cross section of ash dyke with stage II raising (proposed)

Table 4.1: The factor of safety values for ash dyke, stage I and stage II raising

S. No.	Raising	Condition	Critical for	Obtained FS	Minimum FS required
1	Stage I	Steady-stage seepage	Downstream	1.625	1.5
2	Stage I	Sudden drawdown	Upstream	1.812	1.3
3	Stage II	Steady-stage seepage	Downstream	1.608	1.5
4	Stage II	Sudden drawdown	Upstream	1.630	1.3

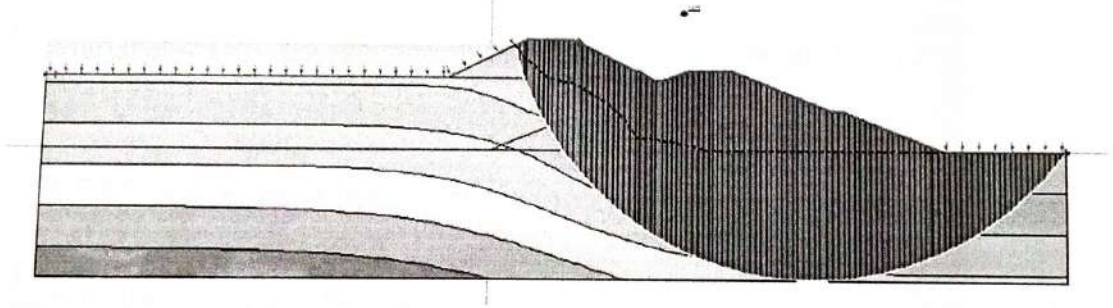


Figure 4.2: Critical slip surface for stage I raising, with ash, in steady seepage condition

4.3 Alternate Design with Earth Embankment for Failed Zone

It is suggested to use earth for the reconstruction of failed areas, instead of ash. Hence the stability analysis has been conducted for this case as well, to evaluate the FS values, and the same are listed in table 4.2. Figure 4.6 and 4.7 presents the critical slip surface

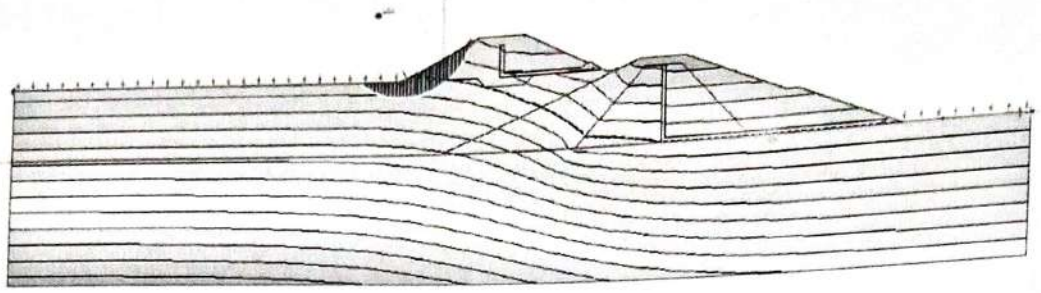


Figure 4.3: Critical slip surface for stage I raising, with ash, in sudden drawdown condition

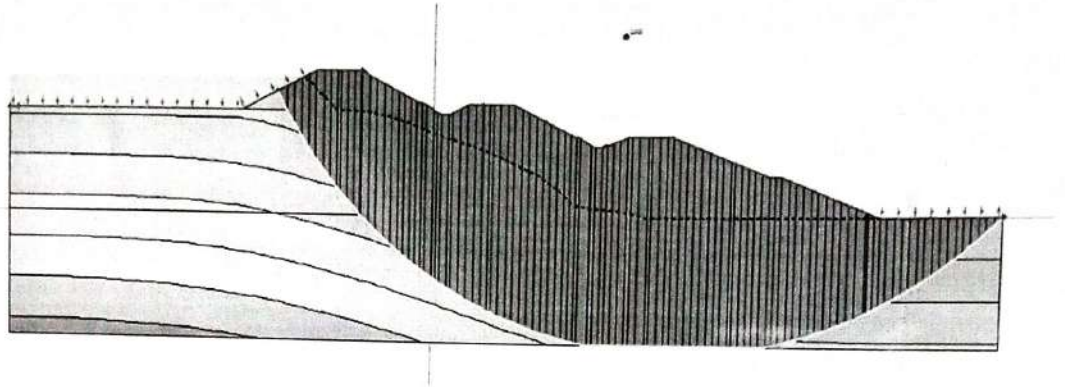


Figure 4.4: Critical slip surface for stage II raising, with ash, in steady seepage condition

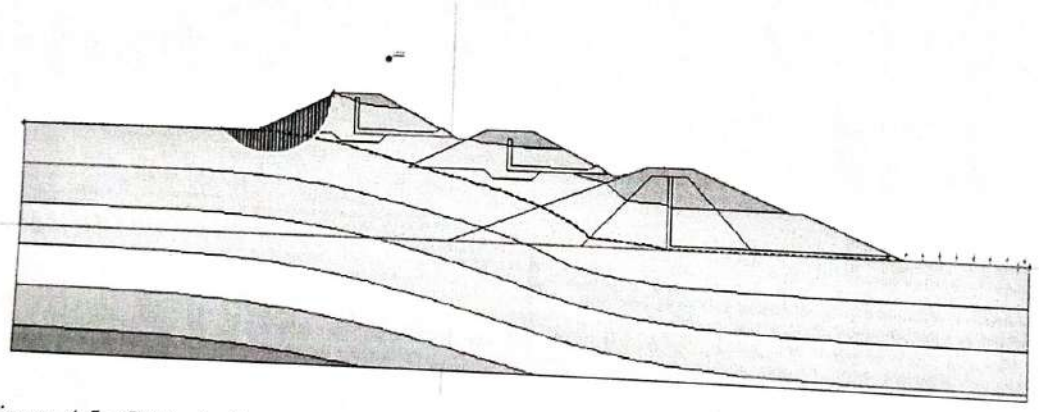


Figure 4.5: Critical slip surface for stage II raising, with ash, in sudden drawdown condition

for different conditions.

Table 4.2: The factor of safety values for ash dyke, stage I raising with earth, instead of fly ash

S. No.	Raising	Condition	Critical for	Obtained FS	Minimum FS required
1	Stage I	Steady-stage seepage	Downstream	1.627	1.5
2	Stage I	Sudden drawdown	Upstream	1.814	1.3

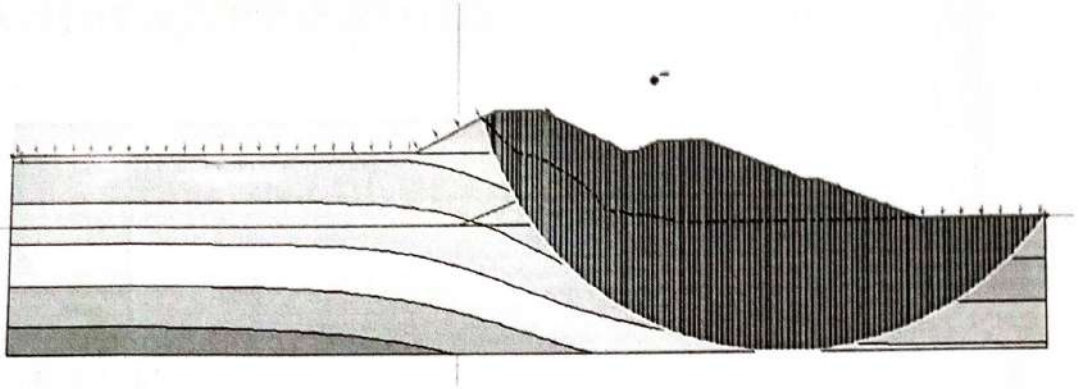


Figure 4.6: Critical slip surface for stage I raising, with earth, in steady seepage condition

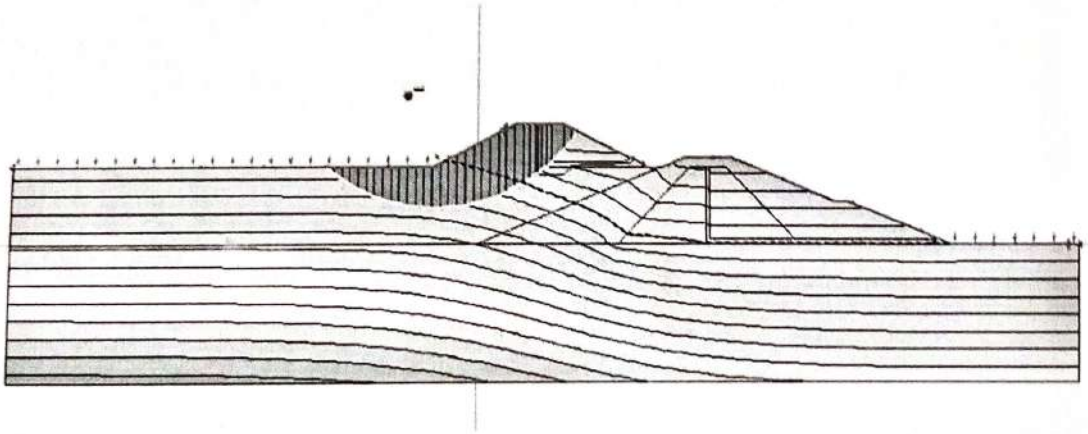


Figure 4.7: Critical slip surface for stage I raising, with earth, in sudden drawdown condition

4.4 Conclusions

For stage I raising and Stage II raising, the FS values obtained were found to be higher than the minimum requirement. In the case of downstream slope, the FS values are marginally higher than the required value of 1.5. Reconstructing the failed portion with earth is found to improve the FS values slightly and hence it is suggested over ash. Considering the marginal variation in FS values when compared to the minimum requirements, utmost care should be taken while constructing stage II raising. Any variation in the material properties or piping through the body will adversely affect the stability of the embankment.

Appendix A

Results of Soil and Fly Ash Physical Characterisation

A.1 Grain Size Distribution

The sieve analysis and hydrometer analysis were conducted as per IS IS : 2720 (Part 4) - 1985 (2006). The results of grain size analysis of soil and fly ash is presented as figure A.1 and A.2.

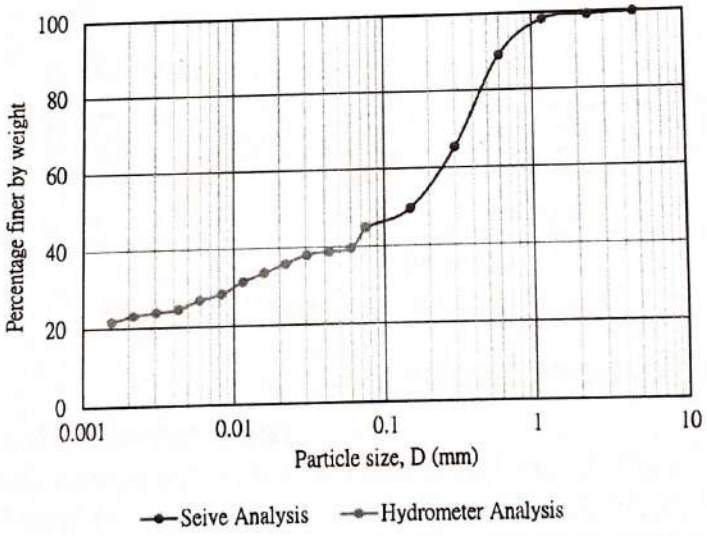


Figure A.1: Grain size distribution of the soil

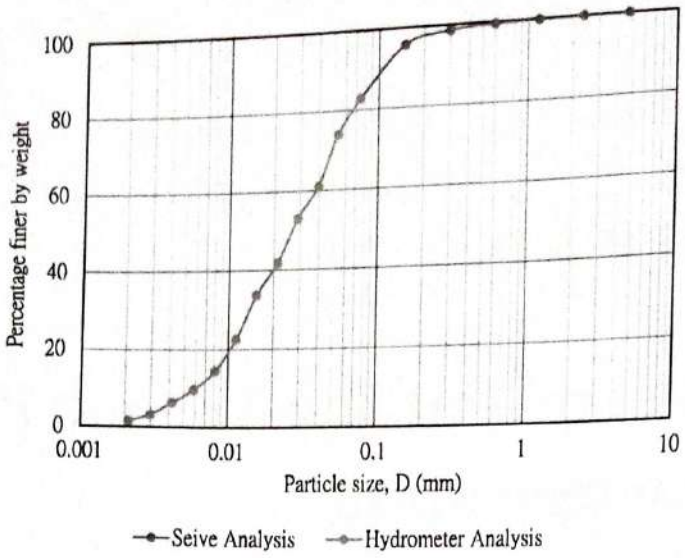


Figure A.2: Grain size distribution of the fly ash

A.2 Optimum Moisture Content and Maximum Dry Density

The Optimum Moisture Content (OMC) and Maximum Dry Density (MDD) of the soil and fly ash were determined as per IS : 2720 (Part 7) - 1980 (2011). The results are presented in table A.1.

Table A.1: Results of OMC and MDD

S. No.	Material	MDD (g/ml)	OMC (percentage)
1	Soil	1.866	12.858
2	Fly ash	1.217	12.797

A.3 Atterberg limits

The Liquid Limit (LL) and Plastic Limit (PL) of soil was determined as per IS : 2720 (Part 5) - 1985 (1985). Figure A.3 shows the flow curve for liquid limit test and A.4 presents the soil' s plasticity parameters (LL and PI) on Casagrande' s plasticity chart (Casagrande, 1948). The LL and PL for the soil is obtained as 30.381 and 13.532 percent.

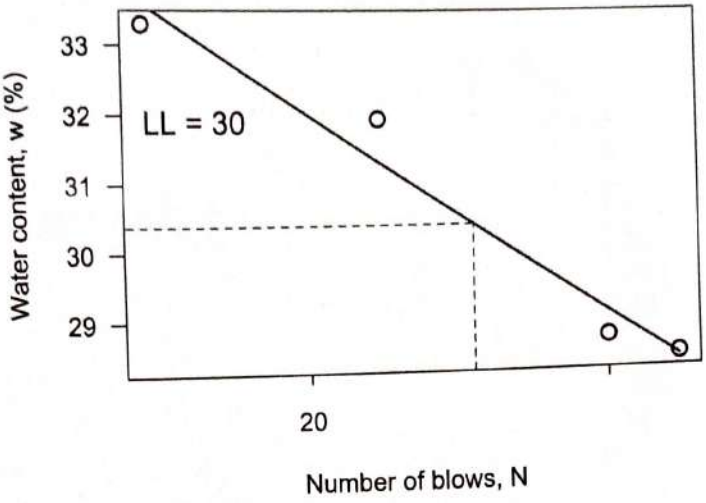


Figure A.3: Flow curve for liquid limit test

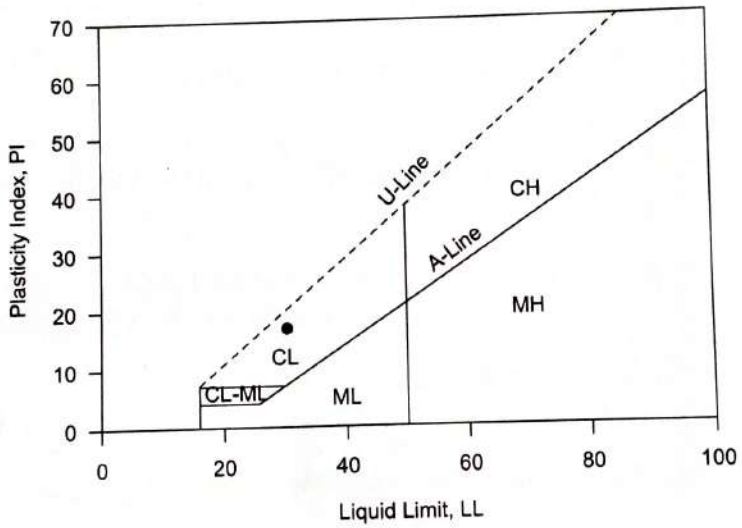


Figure A.4: Casagrande' s plasticity chart

A.4 Direct Shear Test

Direct shear test was conducted on soil and fly ash specimens as per IS : 2720 (Part 13) - 1986 (2002). Figure A.5 and A.6 presents the results of direct shear test of soil and fly ash.

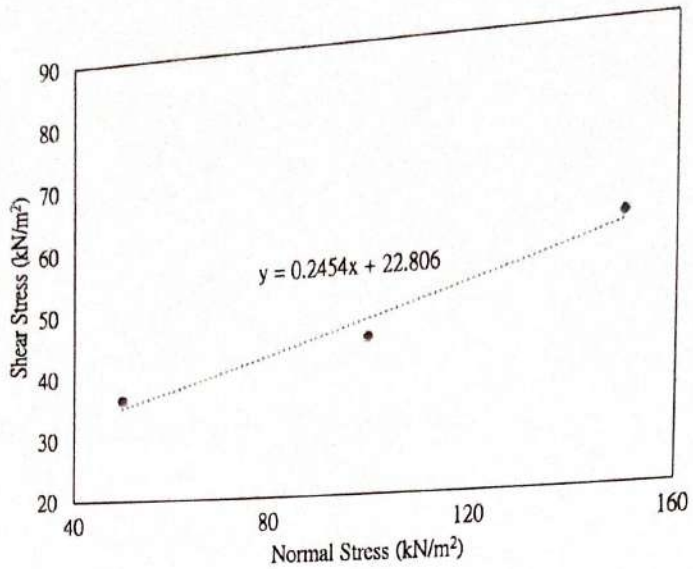


Figure A.5: Grain size distribution of the soil

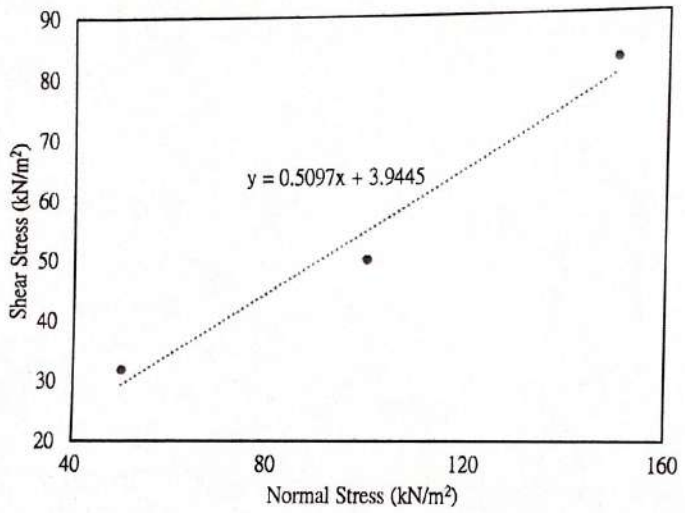


Figure A.6: Grain size distribution of the soil

A.5 Permeability

The soil and fly ash permeability were determined as per IS : 2720 (Part 17) - 1986 (1986) using falling head method. The permeably of soil and fly as are found as 0.002598. and 0.002710012382 cm/sec.

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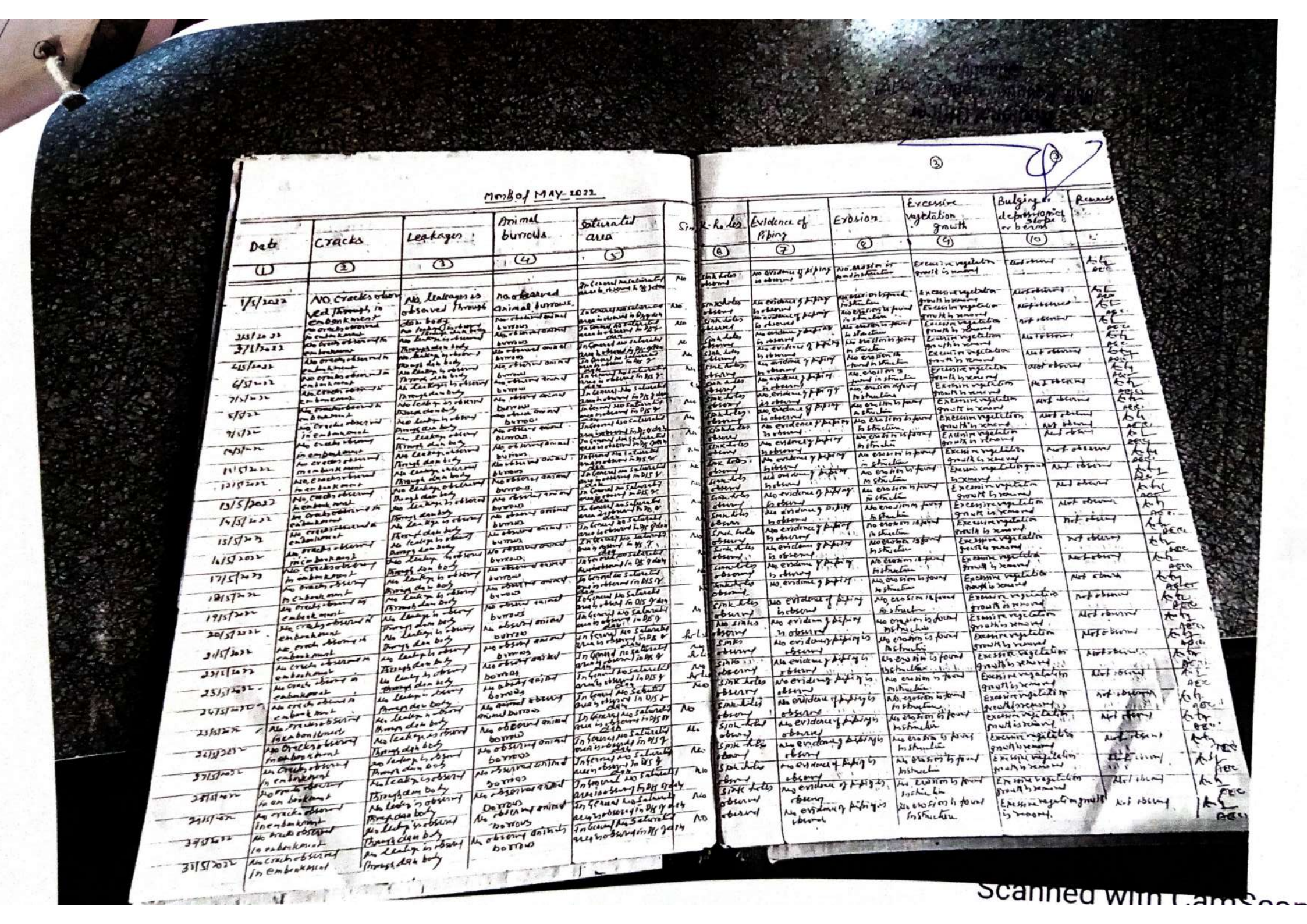
Month of April - 2022

Date	Cracks	Leakage	Animal burrows	Saturated Areas	Sink holes	Evidence of Piping	Erosion	Excessive vegetation growth	Bulging or depressions of slopes or berms
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩
12/4/2022	No Cracks observed in embankments	No leakages is observed through dam body	observed animal burrows are plugged with compacted earth	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
13/4/2022	No cracks	No leakages is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping observed	No erosion is found in structure	—	not observed
14/4/2022	No Cracks	No leakages is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
15/4/2022	No Cracks	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping observed	No erosion is found in structure	Excessive vegetation is removed	not observed
16/4/2022	No Cracks	No leakages is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
17/4/2022	No Cracks	No leakages is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
18/4/2022	No Cracks	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	[illegible] excessive vegetation growth [illegible]	not observed
19/4/2022	No Cracks	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
20/4/2022	No Cracks	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
21/4/2022	No Cracks	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
22/4/2022	No Cracks	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
23/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
24/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
25/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
26/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping	No erosion is found in structure	Excessive vegetation growth is removed	not observed
27/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
28/4/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
29/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink hole observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed
30/4/2022	No cracks observed in embankment	No leakage is observed throughout dam body	No observed animal burrows	In general no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed



Month of MAY-2022

Date (1)	Cracks (2)	Leakages (3)	Animal burrows (4)	Saturated area (5)	Sink holes observed (6)	Evidence of Piping (7)	Erosion (8)	Excessive vegetation growth (9)	Bulging or depressions/ Slope or berms (10)	Remarks
1/5/2022	NO cracks observed Through in embankment	No leakages is observed through embankment	no observed animal burrows.	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
2/5/2022	no cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
3/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
4/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
5/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
6/5/22	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
7/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
8/5/22	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
9/5/22	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
10/5/22	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
11/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
12/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
13/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
14/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
15/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
16/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
17/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
18/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
19/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
20/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
21/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
22/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
23/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
24/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
25/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
26/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
27/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
28/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
29/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
30/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done
31/5/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturation area is observed in Dyke	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	Activity done

Date	Cracks	Leakage	Animal burrows	Saturated area	Sink holes	Evidence of piping	Erosion	Excessive vegetation Growth	Bulging or depressions of Slope or berms	Remarks
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
14/6/2022	No Cracks observed in embankment	No leakage is observed through dam body	No, observed animal burrows	In General No Saturated area is observed in down stream of dam	No Sink holes observed	No evidence of piping is observed	No erosion is found structure	Excessive vegetation growth is removed	Not observed	Ref by MGR
15/6/2022	No Cracks observed in embankment	No leakage is observed through dam body	No, observed animal burrows	In General No Saturated area is observed in down stream of dam	No Sink holes observed	No evidence of piping is observed	No erosion is found structure	excessive vegetation growth is removed	Not observed	Ref by MGR
16/6/2022	No Cracks observed in embankment	No leakage is observed through dam body	No, observed animal burrow	In General No Saturated area is observed in down stream of dam	No, Sink holes observed	No evidence of piping is observed	No erosion is found structure	excessive vegetation growth is removed	Not observed	Ref by MGR
17/6/2022	No Cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	Inferred No Saturated area is observed in down stream of dam	No Sink holes observed	No evidence of piping	No erosion is found structure	Excessive vegetation growth is removed	Not observed	Ref by MGR
18/6/2022	No Cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General No, saturated area is observed in down stream of dam	No. Sink holes observed	No evidence of piping	No erosion is found structure	Excessive vegetation growth is removed	Not observed	Ref by MGR
19/6/2022	No Cracks observed in embankment	No leakage is observed through dam body	No. observed animal burrow	In General no saturated area is observed in down stream of dam	No Sink holes observed	No evidence of piping	No erosion is found structure	Excessive vegetation growth is removed	Not observed	Ref by AGR

Regional Officer
M.P. Pollution Control Board
Shahdol

Month of June - 2022

Date (1)	Cracks (2)	Leakage (3)	Animal Burrows (4)	Saturated Areas (5)	Sink Holes (6)	Evidence of Piping (7)	Erosion (8)	Excessive vegetation Growth (9)	Bulging or depressions of slopes/berms (10)	Remarks (11)
1/6/2022	No cracks observed in embankment	No leakage is observed through dam body	Observed animal burrows are filled with compacted earth	In General no saturated area is observed downstream of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
2/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in downstream of dam	No sink holes observed	No evidence of piping is observed	No erosion is found structure	Excessive vegetation growth is removed	not observed	[signature]
3/6/22	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in down stream of dam	No sink holes observed	No evidence of piping is observed	No erosion is found structure	Excessive vegetation growth is removed	not observed	[signature]
4/6/22	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrows	In General no saturated area is observed in down stream of dam	No sink holes observed	No evidence of piping is observed	No erosion is found structure	Excessive vegetation growth is removed	Not observed	[signature]
5/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	not observed	[signature]
6/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General No saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
7/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General No saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
8/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
9/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
10/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
11/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
12/6/2022	No cracks observed in embankment	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]
13/6/2022	No cracks observed in dam (embankment)	No leakage is observed through dam body	No observed animal burrow	In General no saturated area is observed in D/S of dam	No sink holes observed	No evidence of piping is observed	No erosion is found in structure	Excessive vegetation growth is removed	Not observed	[signature]

Annexure-IX

Work executed by MPPGCL for restoration of ash pond no.1

Sl.	Name of work	Amount	Qty	Remark
1	Work for dumpping of earth for plugging of damaged spillway.	47355.00	910 Cum	Completed
2	Transporation of marshy soil / ash from near by agriculture land other area of ash bund.	199146.00	2910 Cum	Completed
3	Transporation of marshy soil / ash from near by agriculture land and tanki nallah in ash bund area.	194737.00	2475 Cum	Completed
4	Excavation of marshy soil/ ash from near by agriculture and another area.	171192.00	2910 Cum	Completed
5	Hiring of JCB for collection of ash from tanki nallah and agriculture land	177000.00	125 Hours	Completed
6	Hiring of tractor for earth topping in damaged agriculture land and ploughing for making of field as original.	94282.00	100 Trips	Completed
7	Construction of coffer bund to up-stream side of damaged spillway.	199083.00	1339 Cum	Completed
8	Providing of brick pitching on up-stream side of coffer bund and grass turfing.	188094.00	sqm	Completed
9	Construction of check bund by earth filled bags for prevention of ash slurry in the Sone River.	175378.00	7600 bags	Completed
Total		**1446267.00**		

EE(C)

EE(C)

Regional Officer
M.P. Pollution Control Board
Shahdol

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ANNEXURE - A

Report by the State Board Analyst

(See Rule 27)

(114)

Report no 2555-2559 . **Date 14.02.2022**

I hereby certify that I (1) Dr. A.K. Dubey Scientist & State Board Analyst duly appointed under sub section (3) of section 53 of the water (Prevention & Control of Pollution) Act. 1974 (6 of 1974) received on the (II) day of Fridaydate 11.02.2022 from (III) Laboratory in charge M.P.P.C.B. Shahdol. The sample was in condition fit for analysis as reported below.

I further certify that I have analyzed the aforementioned sample on (IV) 11.02.2022 to 14.02.2022 and declare the result of the analysis to be as follows:-

Sample from: - Collapsed ashdyke outflow of M/s Amarkantak Thermal Power Station Chachai Distt.-Anuppur (M.P.)

Description:- (I) Sone river water sample U/S near pumping station
(II) Water sample from Kelhori Nala before mixing to Sone river dis.100M
(III) Water sample from Kelhori Nala mixing into Sone river
(IV) Sample from Kelhori Nala near Bargawan Nala (road bridge)
(V) Sample from Sone river D/S near OPM pumping station

S.No.	CHARACTERISTICS	UNIT	SAMPLE (I)	SAMPLE (II)	SAMPLE (III)	SAMPLE (IV)	SAMPLE (V)
1.	(Lab) Temperature	0c	26.5	26.4	26.4	26.5	26.5
2.	Appearance	-	Clear	Clear	Clear	Clear	Clear
3.	Colour	-	Colourless	Colourless	Colourless	Sl.muddy	Colourless
4.	Odour	-	Odorless	Odorless	Odorless	Sl.unpleasent	Odorless
5.	pH	pH Unit	8.05	8.25	8.51	3.39	8.55
6.	Total Solids	Mg/lit.	260	5590	269	61548	229
7.	Total Dissolve Solids	Mg/lit.	227	2924	198	54183	199
8.	Suspended Solids	Mg/lit.	33	2666	71	7365	30
9.	T. Hardness	Mg/lit.	132	--	--	--	148
10.	Cal. Hardness	Mg/lit.	76	--	--	--	88
11.	Mag. Hardness	Mg/lit.	56	--	--	--	60
12.	Chloride	Mg/lit.	15.99	54.98	16.99	48.98	15.99
13.	B.O.D.	Mg/lit.	1.0	1.6	1.2	2.2	0.5
11.	C.O.D.	Mg/lit.	20	40	30	60	20

1. ☐ Indicate that the values exceed permissible limit of sample (II),(IV) as M.P Gadget Notification dated 25 March 1988 for industrial treated waste water Standards.
2. ☐ Indicate that the values exceed permissible limit, sample for (I),(III) and (v) compared with Indian Standard 2296 class B (water for outdoor bathing). The condition of the seal, Fastening & container on receipt are intact and in good condition and samples was received in sealed condition.
3. The analysis was done by prescribed standard methods for the Examination of water & waste water (American Public Health Association, 23rd Edition:2017) method no 2110, 2550B, 4500, 4500Cl-B, 5220, 2540B,C,D, 2340C & Indian Standards for BOD 3025(Part 44)-1993(RA-2019).

Pollution Control Board, Shahdol (M.P.) Regional Office Recd. No. 4193 Date 14/02/22

Signed On date 14.02.2022 **Day of February (Monday)**

Dr. A.K. Dubey Scientist
M.P.P.C.B. Shahdol(M.P.)
Signature Board Analyst

S.P.(Env. Engg.) 14/02

To,
Laboratory In charge,
M.P. Pollution Control Board,
Shahdol (M.P)

To, Regional officer, M.P.P.C.B Shahdol (M.P.) For further action Pl.

Regional Office M.P. Pollution Control Board Shahdol 14.02.22