



LEST WE FORGET

**A status report of neglect
of coal ash accidents in India**

August 2019–May 2021

**FLYASH WATCH
GROUP**

ACKNOWLEDGEMENTS

Lest we forget: A status report of neglect of coal ash accidents in India, August 2019–May 2021, is a collaborative effort of ASAR Social Impact Advisors, Centre for Research on Energy and Clean Air (CREA), and Manthan Adhyayan Kendra. It has been compiled and written on behalf of the Fly Ash Watch* group, in an effort to highlight the current status of past incidents of fly ash breaches and illegal discharges, to ensure that such accidents are not forgotten soon after they happen. We propose to release updated status reports periodically.

We would also like to acknowledge earlier work on coal ash and its negative impacts in India. “Coal Ash in India: A compendium of Disasters, Environmental and Health Risks” by Healthy Energy Initiative India & Community Environmental Monitoring, and “An Ashen Legacy: India’s Thermal Power Ash Mismanagement” by the Centre for Science and Environment are two such reports that have paved the way for us to work on the current status update. We would also like to acknowledge the inputs provided by Pooja Kumar and the ongoing work on flyash pollution in the Ennore region by The Coastal Resource Centre.

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1.0 EXECUTIVE SUMMARY

Of all the material legacies of coal-fired electricity generation, the immensity of coal ash is significant. In the last decade alone, 76 ash-related disasters have been documented across India. Typically, coal ash mixed with water is stored in ash ponds and dykes near power plant premises prior to its transportation for 'use'. The collapse of dyke walls, bursting of ash pipelines, and consequent overflow of ash slurry into people's fields, homes, lands, and water is one of the biggest challenges of this highly polluting source of energy.

This report presents the current status of eight fly ash related accidents that have occurred over the last two years at Essar Thermal Power Station (Madhya Pradesh), Vindhyachal Thermal Power Plant (Madhya Pradesh), Reliance Sasan Ultra Mega Power Project (Madhya Pradesh), Anpara Thermal Power Station (Uttar Pradesh), Talcher Thermal Power Station (Odisha), Bokaro Thermal Power Station (Jharkhand), North Chennai Thermal Power Station (Tamil Nadu), and Kahalgaon Super Thermal Power Station (Bihar). Present status of prevailing pollution, non-compliance with law, monetary compensation levied, environmental damage assessed, legal proceedings conducted in the National Green Tribunal (NGT), and ash disposal infrastructure revaluation have been highlighted here. The compilation brings to light several gaps in the management of ash related accidents and structural issues.

The wall of Reliance Sasan Ultra Mega Power Project's illegally constructed ash dyke collapsed on 10 April 2020, claiming six lives and flooding hundreds of acres of land with as much as 10 lakh tonnes of toxic ash slurry. Merely six months prior to this disaster, the ash pond of Vindhyachal Thermal Power Plant (TPP) had breached, causing around 2.5 lakh tonnes of ash slurry to overflow beyond plant premises. Two months prior to this, the ash pond of Essar Thermal Power Station (TPS) breached, trapping six children in their homes, covering more than 100 acres of land in ash water and leaving 500 farmers with destroyed kharif crops. All three accidents occurred over just eight months. One year later, progress on social and environmental impact response to the accidents remains slow.

The case of Anpara TPS is a unique one, owing to the deliberate discharge of ash slurry into Rihand reservoir by the power plant over many years. Documentation of this dates back to 2014, with 21% of the total ash discharge in the reservoir being attributed to the plant. While information obtained under the RTI act states that such discharge has been curtailed, the impacts of pollution on water in Rihand over time are noteworthy.

The ash pond of Bokaro TPS—allegedly constructed without taking local rainfall patterns into account—burst in September 2019 affecting over twenty families. Plant authorities attributed the breach to excessive rainfall. The NGT disposed of the petition filed by the affected persons with no stringent action against plant authorities and incomplete monetary compensation.

The embankment of Kahalgaon Super TPP's ash dyke breached in November 2020, flooding over 150 acres of agricultural land with ash. Just two months later, its main ash slurry pipeline burst as well. Compensation for affected families living near the plant premises is incomplete, and NTPC has declined to share a technical review report of the ash pond.

Despite evident large-scale damage to people and the environment, only one out of the eight instances (Sasan Ultra Mega Power Project) have seen any criminal action initiated against the project authorities so far. Homes, agricultural land, standing crops, and surface water bodies have all been damaged by ash slurry spillage. District administrations and State Pollution Control Boards (SPCBs) are supposed to ensure monetary compensation for affected people, but the distribution of this compensation has been staggeringly inconsistent.

To add to the burden of affected communities, not all instances of ash pond collapse or pipeline breach are covered by mainstream media. Coverage depends on the scale of the accident, or what is deemed 'disastrous enough'.

The standard procedure following a breach in ash bund walls or pipelines is the assessment of environmental damage

A pipeline carrying fly ash slurry from Talcher TPS to the South Balanda coal mine burst in March 2020. 12 families were severely affected by the ash slurry spillage, but statements by NTPC officials claimed the accident was 'minor'. In August 2020, a similar incident occurred in North Chennai TPS, leaving over 60 households flooded with coal ash. Neither burst was the first of its kind, and neither plant has faced proportionate punitive action from environmental authorities till date.

Fly ash generation and utilisation data for the last three years of the power plants in question shows that some plants have a reported utilisation of less than 10% of ash generated by them. Others document higher percentages but attribute the majority of their use to “reclamation of low-lying areas”, which is often a euphemism for ash dumping, or to construction activities. Only three out of the eight plants achieved 100% or more utilisation for the year 2019–2020, in line with the legally binding requirements of the Ministry of Environment, Forest & Climate Change’s (MoEFCC) Fly Ash Utilisation Notification.

compensation, usually assigned by respective project proponents to ‘reputed’ institutes, with SPCBs as nodal agencies. These reports have been difficult to obtain or are absent from the public domain, with a majority of them only being submitted to ensure compliance with orders from the NGT. The amounts of interim environmental damage compensation levied on power plants by authorities vary from ₹1 crore to ₹10 crores, depending on the scale of damage. The authors of this report believe that compensation is essential for affected communities, but assigning monetary values to environmental damage and impacts on human health is inherently problematic. That such accidents continue to occur despite penalties and fines also raise doubts about their effectiveness as deterrents.

Causes cited for the accidents in official reports range from substandard construction of ash dykes, hydraulic pressure induced by excessive rainfall, to ‘overflow’ in storage units. It is apparent, however, that subpar technical design and a lack of consistent monitoring and revaluation of ash storage methods and structures are the larger issues at hand. At present, the status of reviews of the technical design of ash ponds is known only for two plants. The lack of information on all aspects of the issue in the public domain is a problem in and of itself. Much of the latest information has been obtained through RTI applications and reports related to various NGT cases.

In all these cases, compensation and clean-up are delayed. Affected persons have had to seek relief via legal routes in all but two instances. The NGT has passed many orders pertaining to fly ash pollution throughout the country over the years, demonstrating the scale of the problem. Reports written in compliance with NGT orders make damning revelations on the pollution and environmental damage caused by these accidents.

Despite limited documentation of coal ash related accidents over the years, not a single case study documented in this report is a first. The government has tried to push for newer modes of ash ‘utilisation’ since as early as 1999, and yet ash spill accidents continue to occur frequently, demonstrating the magnitude of

India's coal ash management problem. Use of coal ash as stipulated by law is necessary, but the continuous deliberate discharge of ash into water bodies, broken slurry pipelines, damaged ash dyke walls, and indiscriminate dumping of ash in the name of land 'reclamation' all show that utilisation targets are difficult to achieve. The problem's persistence reiterates the unsustainability of coal as a source of electricity.

This report recommends a way forward, including but not limited to the need for criminal action in response to coal ash accidents; mandatory routine technical assessments for ash ponds; increasing transparency and public access to information; and continuous collective effort by civil society to hold relevant authorities accountable.

With the country suffering the consequences of pollution from coal, and mounting global pressure to phase out fossil fuels and transition to cleaner modes of electricity generation, it is imperative for India to act on coal ash pollution and accidents at the earliest. Without urgent action, the management of this solid waste will remain a problem even after the retirement of thermal power plants and the emergence of renewable energy. The authors hope that this report can serve as a status update to deepen collective understanding of the causes of such accidents in an attempt to prevent more in the future.

This report has substantiated information from secondary sources with on-ground status as far as possible in view of COVID 19 restricting ground visits.

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Image on right: Immediate aftermath of Reliance Sasan TPP ash pond breach, Singrauli, 10 April 2020



TABLE 1 SUMMARY OF THE EIGHT FLY ASH BREACHES/ACCIDENTS DETAILED IN THE REPORT**#1 ESSAR THERMAL POWER STATION**

Date of incident 7 August 2019	Cause of breach Substandard construction of dyke; heavy rainfall	Total area affected 50 ha
Agricultural land damaged (ha) —	Casualties/lives lost 0	Affected persons (direct/indirect) 500 farmers
Volume of fly ash discharged 1,00,000 tonnes	Compensation levied/deposited/paid —	Environmental damage compensation ₹10 crore interim compensation levied; ₹1 crore deposited
Criminal action initiated —	Status of required environmental damage assessment report Prepared by NEERI, under 'assessment' by Essar authorities	Status of technical assessment report for the ash pond —

Fly ash utilisation 2018, 2019, 2020 (%)
N.A., 85%, 78.79%

#2 VINDHYACHAL THERMAL POWER PLANT

Date of incident 6 October 2019	Cause of breach Heavy rainfall; more details under investigation	Total area affected 53 ha
Agricultural land damaged (ha) —	Casualties/lives lost 0	Affected persons (direct/indirect) —
Volume of fly ash discharged 2,25,000 tonnes	Compensation levied/deposited/paid —	Environmental damage compensation ₹10 crore interim compensation levied; ₹1 crore deposited
Criminal action initiated —	Status of required environmental damage assessment report Report being prepared by NEERI	Status of technical assessment report for the ash pond —

Fly ash utilisation 2018, 2019, 2020 (%)
24%, 32%, 32%

#3 RELIANCE SASAN ULTRA MEGA POWER PROJECT

Date of incident 10 April 2020	Cause of breach Collapse of wall of illegal ash pond	Total area affected 80 ha
Agricultural land damaged (ha) —	Casualties/lives lost 6	Affected persons (direct/indirect) —
Volume of fly ash discharged —	Compensation levied/deposited/paid ₹2.45 crore deposited	Environmental damage compensation ₹10 crore interim compensation levied; ₹2 crore deposited
Criminal action initiated Magisterial inquiry of the accident under Section 176 of Criminal Procedure Code 1973 ordered by District Collector	Status of required environmental damage assessment report Report being prepared by NEERI	Status of technical assessment report for the ash pond —
Fly ash utilisation 2018, 2019, 2020 (%) N.A., 37%, 52%		

#4 ANPARA THERMAL POWER STATION

Date of incident Continuous deliberate discharge of fly ash slurry from ash pond into Rihand reservoir over many years	Cause of breach Plant authorities state 'overflow' of ash into reservoir is seasonal as ash ponds get filled with rainwater	Total area affected —
Agricultural land damaged (ha) —	Casualties/lives lost 0	Affected persons (direct/indirect) —
Volume of fly ash discharged 21% of total fly ash discharge into Rihand reservoir attributed to Anpara TPS	Compensation levied/deposited/paid —	Environmental damage compensation Joint committee of CPCB and UPPCB directed to ascertain amount
Criminal action initiated —	Status of required environmental damage assessment report —	Status of technical assessment report for the ash pond —
Fly ash utilisation 2018, 2019, 2020 (%) Anpara Stations A,B,D: 1.7%, 5.3%, 3.9% Anpara Station C: N.A., 29%, 22%		

Image on right: Ash slurry deposition near Bokaro TPS ash pond, Jharkhand, 10 March 2021
Photo credit: Gulab Chandra



#5 TALCHER THERMAL POWER STATION

Date of incident 6 March 2020	Cause of breach Pipeline carrying slurry from Talcher TPS ash pond to South Balanda coal mine void burst	Total area affected —
Agricultural land damaged (ha) —	Casualties/lives lost 0	Affected persons (direct/indirect) 12 families
Volume of fly ash discharged —	Compensation levied/deposited/paid —	Environmental damage compensation —
Criminal action initiated —	Status of required environmental damage assessment report —	Status of technical assessment report for the ash pond —

Fly ash utilisation 2018, 2019, 2020 (%)
100%, 100%, 100%

#6 BOKARO THERMAL POWER STATION

Date of incident 12 September 2019	Cause of breach Authorities claim heavy rainfall caused hydraulic pressure build-up resulting in ash pond breach	Total area affected 18 ha
Agricultural land damaged 18 ha	Casualties/lives lost 0	Affected persons (direct/indirect) 20+
Volume of fly ash discharged —	Compensation levied/deposited/paid ₹8,000 given to people who lost temporary housing structures bordering the nala near ash pond boundary	Environmental damage compensation Interim compensation of ₹1 crore deposited with JSPCB; remainder amount assessed as ₹1,89,39,769
Criminal action initiated —	Status of required environmental damage assessment report Submitted to JSPCB	Status of technical assessment report for the ash pond Ash pond design to be reviewed by 'reputed institutes'; copy not yet obtained

Fly ash utilisation 2018, 2019, 2020 (%)
84%, 36%, 156%

Image on right: Ash laden soil at a village near Essar TPS, Singrauli, 1 March 2021
Photo credit: Kripanath Yadav



#7 NORTH CHENNAI THERMAL POWER STATION

Date of incident 24 August 2020	Cause of breach Pipeline carrying slurry from NCTPS to ash pond burst	Total area affected (ha) —
Agricultural land damaged (ha) —	Casualties/lives lost 0	Affected persons (direct/indirect) 60–100+ households
Volume of fly ash discharged —	Compensation levied/deposited/paid —	Environmental damage compensation To be determined
Criminal action initiated —	Status of required environmental damage assessment report To be submitted to NGT by joint committee comprising members from TNPCB, IIT Madras, and CPCB	Status of technical assessment report for the ash pond —

Fly ash utilisation 2018, 2019, 2020 (%)
39%, 66%, 121%

#8 KAHALGAON SUPER THERMAL POWER STATION

Date of incident 7 November 2020 21 January 2021	Cause of breach Embankment of ash dyke breached in Nov 2020 allegedly due to overflow of accumulated residual water or 'some problem in spillway' according to NTPC, main fly ash slurry pipeline burst in Jan 2021	Total area affected 80.8 ha
Agricultural land damaged 80.8 ha	Casualties/lives lost 0	Affected persons (direct/indirect) —
Volume of fly ash discharged —	Compensation levied/deposited/paid NTPC reply to RTI in March '21 states that process of compensation is under progress in coordination with District Administration	Environmental damage compensation —
Criminal action initiated —	Status of required environmental damage assessment report —	Status of technical assessment report for the ash pond NTPC RTI reply in March '21 states that report prepared by technical committee is 'internal documents of the company' and copy of same denied

Fly ash utilisation 2018, 2019, 2020 (%)
45%, 48%, 76%

Sources Right to Information Act 2005, Central Electricity Authority annual flyash status reports, news reports, conversations with affected communities.

Note Gaps in this table are due to non-availability of information in the public domain.

2.0 CONTEXT

2.1 FLY ASH: AN INTRODUCTION

India's mainstay of electricity generation has been coal. Although the share of coal in total installed capacity has come down to 53% as of February 2021¹, the share of coal in overall electricity generation is still more than 70%². More than 88% of the total coal dispatched from coal mines in 2019–20 was dispatched to the power sector (utility 76% and captive 12%)³. In the last decade India has steadily ramped up its coal-fired power producing capacity, which has also led to a surge in coal consumption. Between 2008–09 and 2018–19, annual coal offtake and imports rose from 549 million tonnes to about 911 million tonnes, an increase of almost 66%⁴.

One of the byproducts of the combustion of coal in power plants is ash. There are two kinds of ash: fly ash and bottom ash. Fly ash, which is 80% of total ash generated, is released along with other flue gases and is supposed to be captured by electrostatic precipitators or other pollution control technology. Bottom ash constitutes roughly 20% of the total ash generated and is found at the bottom of the boilers. Bottom ash is later collected, and along with unused fly ash, is deposited in designated ash ponds of the power plant in a slurry form for later utilisation and disposal.

Most Indian coal has high ash content (35–50%) and low calorific value. It is primarily of sub-bituminous grade, followed by bituminous and lignite. Bituminous coal is most commonly used for electricity generation in India. Of the different methods used to mine coal, the most widespread in India is the open cast mining process, which further increases the ash content of the coal. During the process, extra mineral matter (dust, clay, sand) gets mixed with coal. Even though it is not technically ash, this mineral matter is called extraneous ash due to its non-combustibility.

Annual fly ash generated from Indian coal power plants rose from 123 million tonnes in 2009–10 to 217 million tonnes in 2018–19, an increase of almost 76%⁴. Combustion of coal with high ash content not only increases emissions per KiloWattHour (Kwh) but also the quantity of ash being deposited in ashponds, which in drier form can become airborne and contribute significantly to air pollution in the surrounding areas. Chronic exposure to airborne fly ash can lead to severe cardio-pulmonary diseases such as silicosis and lung manifestations. Fly ash can also leach into groundwater or leak into surface water causing heavy metal contamination, leading to severe conditions like fluorosis, lead toxicity, and mercury poisoning.

The 1999 notification required all TPPs to ensure the use of fly ash in brick making, road construction, and cement manufacturing within a 50-kilometre radius of the plant with a vision of 100% utilisation of fly ash by 2009. This notification was amended in 2003 to increase the radius of fly ash utilisation from 50–100 kilometres in the interest of achieving the target. The notification was amended again in 2009 as 100% utilisation of fly ash was nowhere near realisation. In this amendment, plants commissioned before 3 November 2009 were given five years to achieve the target of 100% utilisation and plants commissioned after 3 November 2009 were given four years. Yet another failure to achieve the target led to another amendment in 2016, which increased the radius for utilisation from 100 kilometres to 300 kilometres and mandated 100% utilisation of fly ash for all TPPs by 31 December 2017. However, many power plants still remain far below utilising 100% of the ash they produce. As of March 2019, the quantity of unused ash from the coal power sector was 1,647 million tonnes. This was almost eight times the current annual ash generation⁵. In another attempt to enhance utilisation, in February 2019 the draft amendment banned new red brick kilns installations within the 300-kilometre radius and mandated all existing ones to convert to fly ash-based bricks, blocks, or tiles within a year from the date of publication of the final notification⁶.

In another draft amendment dated September 2020, a penalty was introduced based on the polluters pay principle. It levies fines on TPPs if they are unable to utilise 80% of the fly ash they generate annually or 100% fly ash in a three-year period. There is also a fine on the user industry within the 300-kilometre radius if it is unable to use the legacy ash. Apart from the fly ash notification and its amendments, fly ash management has been taken up in the NGT several times over the years. In 2018, the NGT had imposed a penalty for environmental damages on TPPs that had been unable to utilise 100% of their fly ash by 31 December 2017. This was stayed by an order of the Supreme Court after many power producers cited challenges in utilisation, lack of case by case analysis, and user agency issues⁷. In February 2020, the NGT again held TPPs accountable and directed the Central Pollution Control Board (CPCB) to compute environmental compensation for each defaulting TPP.

Due to the toxicity of fly ash, its generation, disposal, and utilisation has been under the regulatory scanner. As the amount of fly ash generated has increased over the decades, the Fly Ash Utilisation Notification, which first came into being in 1999, has gone through several amendments to move towards 100% utilisation of fly ash.

However, the implementation of this order is on hold and is subject to the proceedings of the Supreme Court, which has placed a stay on the collection of environmental damage compensation⁸.

To limit the ash content of coal, in 2014, it was made mandatory for all TPPs located more than 500 kilometres away from the pit head or those near critically polluted and urban areas to use raw, blended, or beneficiated coal with ash content not exceeding 34%⁹ (power plants located more than 500 kilometres away from the pit head were to be supplied coal with ash content not exceeding 34% on a quarterly average basis, w.e.f January 01, 2016). In 2020, the MoEFCC did away with the mandatory 34% ash content cap and allowed the use of coal with higher ash content¹⁰.

2016

Radius of mandatory use increased from 100 kilometres to 300 kilometres and uniform timeline for achieving 100% utilisation set as 31.12.17.

2014

As part of its climate change commitments, the government made coal washing mandatory for supply to all thermal units beyond 500 kilometres from the coal mine.

2019

Draft amendment banned red brick kilns within 300 kilometres of coal-fired plants, and mandated all existing ones to be converted to fly ash based bricks, blocks or tiles manufacturers. Draft shelved after vocal opposition by red brick lobby.

2020

Draft amendment introduced monetary fines in the notification for the first time; definition and provisions for utilisation of legacy ash along with annual ash generated. Timelines and caveats for achievement of targets by plants also provided. Comments from public and other stakeholders are yet to be incorporated.

TIMELINE FOR FLY ASH UTILISATION NOTIFICATION & AMENDMENTS IN INDIA

2009

Plants commissioned before 03.11.2009 to achieve 100% utilization target in 5 years; plants commissioned after to do so in 4 years.

1999

All coal-fired TPPs to ensure use of flyash in brick-making, road construction, and cement manufacturing within a 50-kilometre radius. Plants were to achieve 100% utilisation of fly ash by 2009.

2003

Amended to increase radius of mandatory fly ash use in construction, cement, and brick making from 50 kilometres to 100 kilometres.

2020

MoEFCC does away with 34% ash content cap.

High-generation and low-utilisation have led to accumulation of ash in ash ponds or even ash dumps over the years. In many cases, the amount of ash being deposited has surpassed the carrying capacity of the ash dykes⁵. Filling beyond capacity and poor management of ash dykes continuously over the years have significantly increased the occurrence of fly ash related accidents such as fly ash pond breaches. This has resulted in large-scale damage and contamination of water bodies, drinking water sources, soil, and agricultural land; loss of life of humans and animals; loss of property; and long-lasting impacts on people's health.

2.2 FLY ASH BREACHES

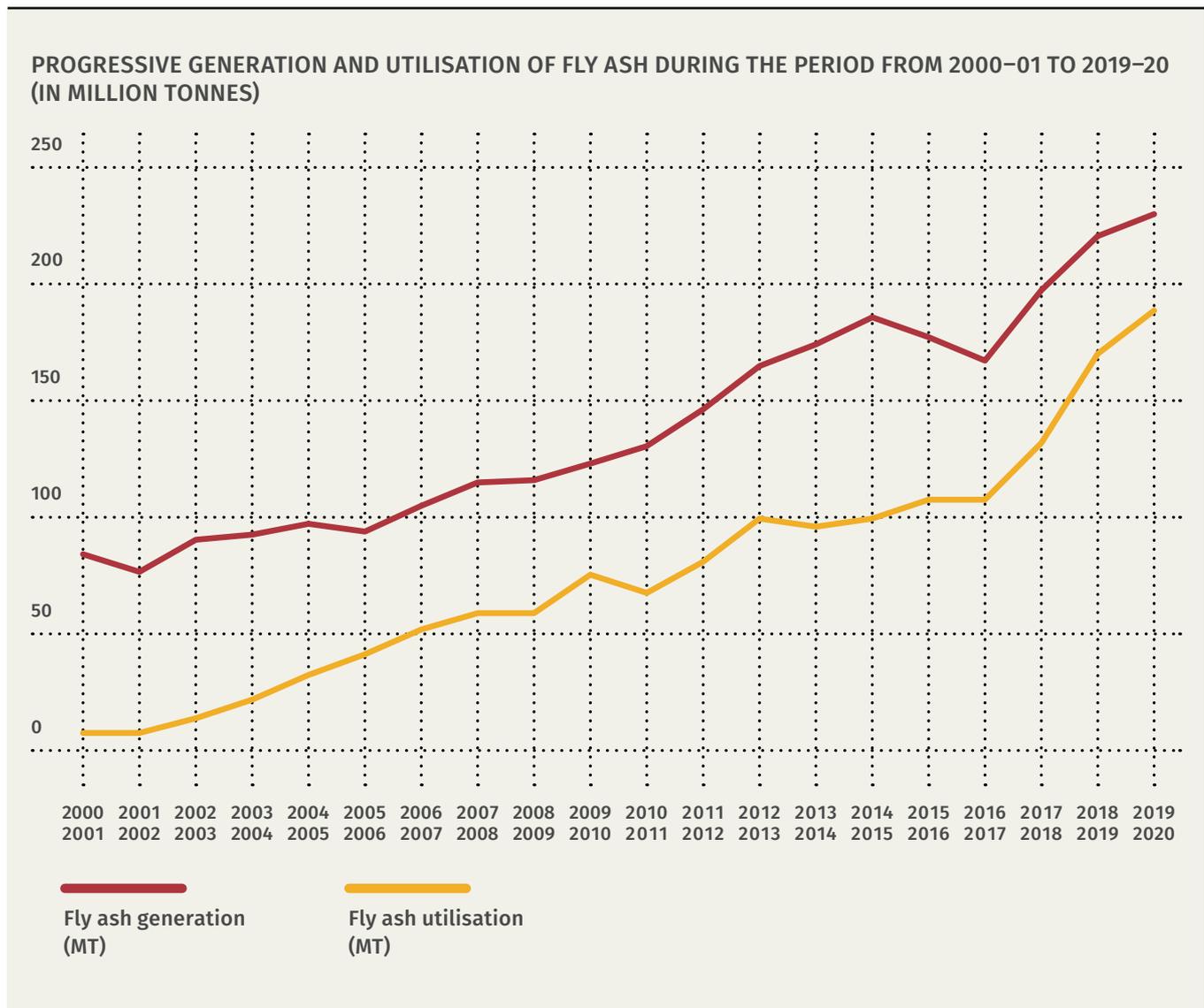
In August 2019, in Singrauli, Madhya Pradesh, Essar Mahan Power Plant's ash dyke breached, spilling ash over several acres of land, leading to contamination of water bodies and destruction of agricultural land and residential property. This breach was widely covered by vernacular and English media alike. Mismanagement of fly ash does not get a lot of media reportage, so this massive coverage created some momentum towards ensuring compliance and management. The Essar fly ash breach was followed by a series of breaches in Singrauli and other parts of the country, which were brought to the forefront by the media.

TABLE 2 FLY ASH BREACHES/INCIDENTS AFTER ESSAR FLY ASH BREACH IN AUGUST 2019

THERMAL POWER PLANTS/ BREACHES	DATE OF BREACH	LOCATION	START OF OPERATION (YEAR)
Essar Thermal Power Station	7 August 2019	Singrauli	Unit 1: 2012 Unit 2: 2017
Bokaro Thermal Power Station	12 September 2019	Bokaro	Unit B: 1993 Unity A: 2016
NTPC Vindhychal Thermal Station	6 October 2019	Singrauli	Unit 1: 1987 Unit 2: 1988 Units 3 & 4: 1989 Unit 5: 1990 Unit 6: 1991 Unit 7: 1999 Unit 8: 2000 Unit 9: 2006 Unit 10: 2007 Unit 11: 2012 Unit 12: 2013 Unit 13: 2015
Talcher Thermal Power Station	6 March 2020	Talcher	Unit 1: 1967 Units 2 & 3: 1968 Unit 4: 1969 Unit 5: 1982 Unit 6: 1983
NTPC Kahalgaon Thermal Power Station	7 November 2020	Kahalgaon	Unit 1: 1992 Unit 2: 1994 Unit 3: 1995 Unit 4: 1996 Unit 5: 2007 Unit 6: 2008 Unit 7: 2009
Reliance Sasan Ultra Mega Power Project	10 April 2020	Singrauli	Units 1 & 2: 2013 Units 3, 4 & 5: 2014 Unit 6: 2015
North Chennai Thermal Power Station	24 August 2020	Chennai	Unit 1: 1994 Unit 2: 1995 Unit 6: 1996
Anpara Thermal Power Stations A, B, and D	Continuous ash flow	Singrauli	Unit 1: 1986 Unit 2: 1987 Unit 3: 1988 Unit 4: 1993 Unit 5: 1994 Unit 6: 2015 Unit 7: 2016
Anpara Thermal Power Station C	Continuous ash flow	Singrauli	Unit 1: 2011 Unit 2: 2012

The fly ash utilisation rate increased from 15.7% in 2000–01 to 83% in 2019–20¹¹. However, utilisation levels vary significantly from plant to plant. In many cases, a significant part of ‘ash utilisation’ is simply using ash to reclaim low-lying areas or fill mines, which is not a practical utilisation but merely disposal/dumping of ash.

FIGURE 1 FACTUAL GENERATION/UTILISATION



Sources CEA

TABLE 3 FLY ASH UTILISATION FOR PAST THREE YEARS AT POWER PLANTS WHICH HAD FLY ASH RELATED ACCIDENTS SINCE AUGUST 2019¹¹

THERMAL POWER PLANTS	% OF FLY ASH UTILISATION [2017-18]	% OF FLY ASH UTILISATION [2018-19]	% OF FLY ASH UTILISATION [2019-20]	SITE OF BREACH	PRIMARY MODE OF ASH UTILISATION AND OTHER
Essar Thermal Power Station	—	85%	78.79%	Ash dyke	Ash dyke raising
Bokaro Thermal Power Station	84%	36%	156%	Pipeline	Reclamation of low-lying areas
NTPC Vindhyachal Thermal Station	24%	32%	32%	Ash dyke	Ash dyke raising (breached ash dyke is >40 years old)
Talcher Thermal Power Station	100%	100%	100%	Pipeline	>90% of fly ash used for mine filling since 2017
NTPC Kahalgaon Thermal Power Station	45%	48%	76%	Ash dyke	Manufacture of Portland pozzolana cement; reclamation of low-lying areas
Reliance Sasan Ultra Mega Power Project	—	37%	52%	Ash dyke	Reclamation of low-lying areas
North Chennai Thermal Power Station	39%	66%	121%	Pipeline	Construction of highways and roads including flyovers
Anpara Thermal Power Stations A, B and D	1.7%	5.3%	3.9%	Ash dyke (continuous)	Manufacture of Portland pozzolana cement
Anpara Thermal Power Station C	—	29%	22%	Ash dyke (continuous)	Manufacture of Portland pozzolana cement

2.3 PURPOSE OF REPORT

Widespread neglect of fly ash management and non-compliance with the laws, norms, notifications, and court orders on the problem show that this aspect of pollution from power generation hasn't been treated seriously by regulators or power generators themselves. This report presents the status of follow up actions on fly ash accidents over the last two years.

- This document aims to act as a status update reference for any remedial actions proposed or taken on these accidents
- Explain the underlying reasons behind these accidents and the inherent limitations of the system in effectively arresting such incidents in the future.

3.0 CASE STUDIES

3.1 ESSAR THERMAL POWER PLANT

Date 7 August 2019	Cause of breach Heavy rainfall; sub-standard construction of dyke boundary, lack of repair and maintenance of dyke, waste in the dyke not cleared	Total area affected 50 hectares
Agricultural area damaged N.A.	Lives lost 0	Affected persons (direct/indirect) 500 farmers
Quantum of ash discharged 1,00,000 tonnes	Compensation levied/deposited/paid ₹50 lakhs deposited; ₹37 lakhs distributed amongst 247 farmers	Environment damage compensation ₹10 crore interim compensation levied by MPPCB; ₹1 crore deposited
Criminal action initiated N.A.	Status of required environmental damage assessment report Prepared by NEERI, under assessment by Essar	Status of technical assessment report for the ash pond N.A.

TIMELINE OF EVENTS

7 August 2019 »	In Singrauli, Essar Mahan Power Plant's ash dyke breached after two days of heavy rainfall. The ash dyke, 3.34 hectares in area and 13.3 metres in height, spilled ash across Karsualal and Khairahi villages depositing nearly 1 lakh tonnes of fly ash across 50 hectares of land. The ash spill flooded several homes, trapping six children who were rescued later. Standing kharif crops of around 500 farmers were destroyed. The lateral spread of ash was about 1.8kilometre before it met Jaria nallah, flowed into Garia river, and ultimately into the Mayer river confluence causing large scale contamination of water ¹² .
August 2019 »	Essar released an official statement denying any mistake on their part and characterising the breach as an act of sabotage by villagers ¹³ . The district administration directed the plant to carry out repairs and deposit a sum of ₹50 lakh for distribution to affected villagers ¹³ . Information received indicates that the amount was deposited at the Collector's office. <i>Cont. »</i>

	<p>A three-member committee comprising the sub-divisional officer of police (SDoP), the sub-divisional magistrate (SDM), and the executive engineer was formed to look into the reasons behind the spillage. The committee attributed the spillage to “sub-standard construction of the dyke boundary, lack of repairing and maintenance of the dyke and waste in the dyke not cleared as a result of extreme carelessness of company management”¹³, negating the company’s claims of sabotage.</p>
11 August 2019 »	<p>A joint team of CPCB and the Madhya Pradesh Pollution Control Board (MPPCB) conducted a site visit to assess how the breach had damaged the environment¹⁴.</p>
14 August 2019 »	<p>Based on the committee’s findings, MPPCB asked the plant to give an interim compensation of ₹10 crore for the damage caused to the environment¹⁴. The final compensation was to be known after completion of the assessment process. MPPCB set a 15-day deadline for the company to repair the damaged wall of the dam and clear the slurry, with failure to comply leading to a closure of the plant.</p> <p>A plea was filed in the National Green Tribunal seeking action against Essar Power M.P. Ltd. for crop and environmental damage. In the plea, the petitioner Ashwani Kumar Dubey asked for the company to be required to remove fly ash, bottom ash, toxic water, and other solid wastes from the houses, wells, water bodies, existing crops, and agricultural lands of the farmers; and to pay damages to affected persons. It also sought direction to Essar Power to stop operation and generation of fly ash, bottom ash, and industrial/solid waste with immediate effect¹⁵.</p>
20 August 2019 »	<p>An NGT bench headed by chairperson Adarsh Kumar Goel asked the petitioner Ashwani Kumar Dubey to approach the oversight committee (OS committee) with his plea against Essar¹⁵.</p> <p><i>The Oversight Committee, headed by Justice Rajesh Kumar, was formed on 28.08.2018 to prepare action plans to ensure compliance with orders regarding air and water pollution in the Singrauli region of Madhya Pradesh and Uttar Pradesh.</i></p>
27 September 2019 »	<p>MPPCB assessed the plant’s compliance with its directions and noted that:</p> <ul style="list-style-type: none"> • The broken ash dyke had been repaired • There was no trace of ash in the Jaria nallah till the Mayar river confluence • Around 40% of the ash had been cleared from the fields with work on this ongoing at the time • Out of ₹50 lakhs given by the company to the district administration, ₹37 lakhs had been used to compensate 247 farmers of both affected villages • Out of ₹10 crore fine imposed by MPPCB, a bank guarantee of ₹1 crore had been submitted by the plant • The plant had sought relief from the interim compensation of ₹10 crore citing financial constraints¹²

<p>5 November 2019 »</p>	<p>The NGT discussed a report submitted on 29.10.2019 by Justice Rajesh Kumar of the Oversight Committee on the management of fly ash by thermal power stations and the damage caused to Rihand reservoir¹⁶. The committee noted the reduced capacity of the Rihand reservoir due to effluent deposits, exacerbated by the Essar fly ash breach of 7.08.2019, and the Vindhyachal fly ash breach of 6.10.2019. The committee discussed the handling and disposal of fly ash with various power plants in Singrauli and asked them to submit:</p> <ul style="list-style-type: none"> • Details about the structural design of their ash dykes • Whether the dykes are scientifically designed or not • A third party assessment of ash dykes by expert institutions • Adequacy of plants in handling fly ash • A roadmap for fly ash disposal <p>In response, Essar submitted that:</p> <ul style="list-style-type: none"> • 80% of the fly ash spilled by the breach had been removed and the remaining would be removed within a month • National Environmental Engineering Research Institute (NEERI) had been engaged to carry out the environmental damage assessment and would complete this in six months • The plant was consulting with experts from the Indian Institute of Technology Roorkee (IIT Roorkee) for technically sound reconstruction of the ash dyke¹⁶
<p>27 January 2020 »</p>	<p>In hearing another case on 100% utilisation of fly ash as per the Fly Ash Notification, the NGT referred to its hearing on 05.11.2019 (Ashwani Kumar Dubey vs Union of India) and directed the formulation of two committees:</p> <ul style="list-style-type: none"> • A committee comprising CPCB and IIT Roorkee to assess the environmental damage caused by Essar and Vindhyachal ash dyke breaches and submit recommendations in three months • A committee comprising the district collector, CPCB, and MPPCB to assess the damage due to these two breaches with a view to improve crop and agricultural productivity and ensure effective restoration/remediation of affected sites within three months
<p>8 September 2020 »</p>	<p>CPCB and IIT Roorkee's assessment of the environmental damage from the Essar breach¹² made the following key observations:</p> <ul style="list-style-type: none"> • Cost of greenhouse Gas emission (GHG): Clean up operations use JCBs, excavators, vibro-rollers, tractors, and other mechanical and diesel generator devices (for work at night). This involves GHG emissions from fuel combustion as well as the cost of the fuel. Based on the amount of ash to be cleaned and the area covered, fuel costs amount to ₹7,11,200. • Cost of water pollution: Field surveys and aerial videography by MPPCB revealed that the ash slurry had flowed through Jaria nallah, to Garra river, and reached the Mayer river confluence—a distance of around 11kilometre. Tests showed excess copper in the fly ash slurry. It took 51 days to remove this high copper slurry from the rivers. Counting these 51 days as a period of non-compliance, the cost of environmental damage with respect to polluted water was calculated to be ₹7.28 crore. • The final compensation was to be decided based on NEERI's environmental damage assessment report.

LATEST STATUS

<p>22 January 2021 »</p>	<p>Through an RTI response, NEERI stated that the environmental damage assessment report was currently being scrutinised by the ‘sponsor’, that is, Essar. They declined to share a copy of the report claiming that it had not been finalised and that even after completion, they would consult Essar on whether it could be shared or not.</p> <p><i>The report was to be completed in six months, but remained incomplete a year later.</i></p>
<p>28 January 2021 »</p>	<p>An RTI response from MPPCB revealed that Essar’s damaged ash dyke has been repaired and all the slurry has been cleaned up. Only ₹1 crore interim compensation has been deposited by the plant. In August 2019, Essar had been directed to deposit ₹10 crore in damages: it had not complied with the directions over a year later.</p>

ANECDOTES FROM AFFECTED COMMUNITIES

<p>Essar TPP’s ash pond stands in close proximity to villagers’ homes and farms—as close as 50 metres in Kharsualal village. The ash pond breach damaged residents’ homes, fields, and wells.</p>	<p>Many farmers from Kharsualal lost their entire standing crop of rice to the ash slurry, pushing them into financial instability. Due to lack of other options, they are now trying to grow wheat and mustard on the same land. They say that growth is slower and yields significantly lower. Not all farmers whose crops were damaged or land contaminated have received the promised monetary compensation. Among those who have, the maximum amount is ₹12,000: a pitiful amount compared to the ₹50,000 they made from farming a single acre of land. Plot boundaries became hard to differentiate on the submerged farmland, and even those farmers who have been able to farm on the reclaimed land can’t tell if they’re working on their own plot or someone else’s.</p> <p>Some locals were forced to temporarily flee as their homes were flooded with ash. Not all of them have received compensation yet. In addition to farmland and homes, even wells in Kharsualal were severely damaged by the breach. The power plant authorities sent drinking water tankers to Kharsualal in the immediate aftermath of the accident, but locals said these tankers stopped after a few months. Not all damaged wells have been repaired completely. Even as compensation and remedial actions remain patchy, communities in Kharsualal and Khairahi have other worries too about fly ash: they fear a summer of airborne fly ash covering their homes, crops, and water in grey.</p>
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FIGURE 2 FLY ASH DEPOSITION ON FARMLAND IN VILLAGE KHARSUALAL, SINGRAULI AS ON MARCH 2021

Image on right: Flyash deposition on farmland in village Kharsualal, Singrauli as on 1 March 2021
Photo credit: Kripanath Yadav



Image on right: Dry flyash continues to cover fields in the proximity of Essar TPP as of 1 March 2021
Photo credit: Kripanath Yadav



3.2 VINDHYACHAL THERMAL POWER PLANT

Date 6 October 2019	Cause of breach Heavy rainfall; further details under investigation	Total area affected 53 hectares
Agricultural area damaged —	Lives lost 0	Affected persons (direct/indirect) N.A.
Quantum of ash discharged 2,25,000 lakh tonnes	Compensation levied/deposited/paid Information not available	Environment damage compensation ₹10 crore interim compensation levied by MPPCB; ₹1 crore deposited
Criminal action initiated N.A.	Status of required environmental damage assessment report Report being prepared by NEERI	Status of technical assessment report for the ash pond N.A.

TIMELINE OF EVENTS

6 October 2019 »	<p>Within two months of the Essar ash dyke breach, Singrauli saw another ash pond accident: this time the ash dyke of NTPC Vindhyachal thermal power plant located in Vindhyanagar, Madhya Pradesh collapsed. Vindhyachal TPP has six ash dykes: V1, V2, V3A, V3B, V4A, and V4B at Shahpur and Baliyari. Buttressing work had been in progress at the 1981 constructed V1, when several days of heavy rainfall culminated in a breach. The force of the ash spill rendered the plant's ash water recycling systems 1 and 2 non-functional. The spill also dislodged the ash slurry carrying pipeline of the NTPC Shaktinagar plant¹².</p>
9 October 2019 »	<p>A team from CPCB and MPPCB inspected the site to assess the spread of ash and contamination. A joint committee report of IIT Roorkee and CPCB¹² said that the breach deposited 2,25,000 tonnes of ash over an area greater than 53 hectares, including an 8 hectare spread towards Rihand reservoir and Surya drain. CPCB and MPPCB team noted that:</p> <ul style="list-style-type: none"> • Very little ash had reached the Rihand reservoir and the right bank of the Surya drain • No villages or agricultural land had been affected • No human or animal lives had been lost • The spill was restricted to the plant premises • The ash discharge had been stopped immediately • The breached area had been plugged within a few hours and restoration and cleaning work was in progress <p>It also asked the plant to deposit ₹1 crore as interim compensation for environmental damage to CPCB or MPPCB.</p> <p>NTPC released a statement asserting that “no loss of life or property of any villager has been reported” and that the spill was contained within the plant's premises, which was endorsed by the district collector and the state government . However, villagers claimed that their cropland had been severely affected and their cattle had been swept away .</p>

<p>18 October 2019 »</p>	<p>A plea was filed with the Supreme Court (Writ Petition (Civil) No.1303/2019) to get Singrauli's TPPs to stop discharging ash and waste in agricultural lands and water bodies immediately²¹. The plea, filed by Ashwani Kumar Dubey, highlighted the damage caused to water bodies, agricultural land, and cattle due to the breach of the Vindhyachal TPP ash dyke.</p>
<p>25 October 2019 »</p>	<p>The Supreme Court heard the plea and permitted its withdrawal, with liberty to file a plea raising the issue before the NGT for hearing on 18 December 2019²².</p>
<p>16 December 2019 »</p>	<p>The OS committee submitted its site visit findings to the NGT:</p> <ul style="list-style-type: none"> • A lot of ash had reached the Rihand reservoir and was continuing to flow into it • MPPCB officer who inspected the site said that huge quantities of ash had reached the Rihand reservoir, in contradiction to MPPCB's earlier stance that no ash had reached the reservoir • MPPCB has sought ₹10 crore for environmental damage, out of which ₹1 crore as bank guarantee had been submitted • The plant was increasing the dyke's height without MPPCB's approval of designs and permission to construct, which could affect its long-term sustainability • MPPCB had not taken any action against the plant for this unauthorised work despite being aware of it¹⁸ <p>NTPC submitted that the restoration of the breached ash dyke would take at least eight months and may be completed by August 2020¹⁸.</p> <p>Ashwani Kumar Dubey added in his plea that the region's power plants continue to operate and dispose of hazardous waste in the reservoir, and sought directions to the Madhya Pradesh and Uttar Pradesh governments to take immediate steps for the safety of the people of those areas.</p>
<p>5 November 2019 »</p>	<p>In the same NGT order (Ashwani Kumar Dubey vs. Union of India O.A No. 164/2018)¹⁶ that referred to Justice Rajesh Kumar's report on management of fly ash by thermal power stations and the damage caused to Rihand reservoir, the committee took note of the Essar fly ash breach of 07.08.2019 and the Vindhyachal fly ash breach of 06.10.2019.</p> <p>Vindhyachal TPP was asked for details about the plant's handling and disposal of ash. The TPP said that their fly ash dyke was constructed as per norms and technical advice was sought from experts when raising the height of the dyke from time-to-time. However, no evidence of these claims was produced. The plant admitted that no third party had assessed its ash dyke.</p> <p>The committee observed that:</p> <ul style="list-style-type: none"> • NTPC had not treated the matter seriously • The dyke wouldn't have breached if NTPC had complied with norms • NTPC had failed to submit documents the committee had asked for <p>The committee concluded that the plant was liable to pay compensation¹⁶.</p>

<p>27 January 2020 »</p>	<p>CPCB and IIT Roorkee’s assessment of the environmental damage from the Vindhyachal breach¹² made the following key observations:</p> <ul style="list-style-type: none"> • Cost of greenhouse Gas emission (GHG): Based on the amount of ash to be cleaned and the area covered, fuel costs for machines amount to ₹3,84,408. • Cost of water pollution: 1 lakh cubic metres of ash water had flown towards Rihand reservoir. Tests showed excess suspended solids in the fly ash slurry. It took 57 days to stop the discharge of slurry towards the reservoir. The cost of environmental damage with respect to polluted water was calculated to be ₹104.13 crore. • The final compensation was to be decided based on NEERI’s environmental damage assessment report.
<p>14 July 2020 »</p>	<p>In a subsequent hearing of Ashwini Kumar Dubey vs. Union of India (O.A No. 164/2018), Vindhyachal TPP opposed the OS committee’s observations on the grounds that they were “completely erroneous and unsubstantiated”. Vindhyachal said that:</p> <ul style="list-style-type: none"> • The breach had been plugged within thirty hours • Fly ash did not flow into the Rihand reservoir • The plant was not raising the height of the dyke without expert opinion • The compensation of ₹10 crore was not justified <p>The NGT:</p> <ul style="list-style-type: none"> • Deemed Vindhyachal’s stance baseless • Upheld the OS committee’s report • Directed the Vindhyachal TPP to deposit ₹10 crore with MPPCB towards interim compensation • Directed a joint committee of CPCB and MPPCB to assess the environmental damage, with MPPCB acting as the nodal agency for compliance and coordination

LATEST STATUS

<p>28 January 2021 »</p>	<p>As per information received in response to an RTI application, Vindhyachal TPP has failed to deposit the stipulated ₹10 crore as interim compensation. A whole year after the breach and six months after NGT’s order, the plant’s initial submission of ₹1 crore to MPPCB was the only compensation it had deposited.</p> <p>Vindhyachal TPP says the breached ash dyke has been repaired. However, 1.5 years after the breach, clearing of ash slurry from Rihand reservoir is still ongoing.</p> <p><i>Due to restrictions on movements related to the ongoing COVID 19 pandemic, recent testimony from communities living near the power plant could not be obtained.</i></p>
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3.3 SASAN ULTRA MEGA POWER PROJECT

Date 10 April 2020	Cause of breach Collapse of wall of illegal ash pond	Total area affected 200 acres
Agricultural area damaged N.A.	Lives lost 6	Affected persons (direct/indirect) 566
Quantum of ash discharged 10,00,000 lakh tonnes	Compensation levied/deposited/paid ₹2.45 crore deposited	Environment damage compensation ₹10 crore interim compensation levied by MPPCB; ₹2 crore deposited
Criminal action initiated Magisterial inquiry of the accident under Section 176 of Criminal Procedure Code 1973 ordered by District Collector	Status of required environmental damage assessment report Report being prepared by NEERI	Status of technical assessment report for the ash pond Report being prepared by IIT-BHU

FIGURE 3 IMMEDIATE AFTERMATH OF SASAN ASH POND BREACH IN SINGRAULI



Immediate aftermath of Reliance Sasan ash pond breach in village Sidhikala, Singrauli 10 April 2020



Ash slurry flooded in fields after Reliance Sasan ash pond breach, Singrauli 10 April 2020

TIMELINE OF EVENTS

10 April 2020 »

Six months after the Vindhychal breach, the walls of Sasan TPP's ash pond collapsed, hitting four villages: Harrhawa, Sidhikhurd, Sidhikala, and Jhanjitol. The breach flooded 200 acres of land, killing six people, destroying property and standing crops, and washing away cattle. The spilled ash mixed with a water stream (Gohbaiya nallah) and flowed towards Rihand reservoir²⁴. The district administration ordered a "tatkal" survey and promised appropriate compensation for affected villagers. Reliance Power, who own Sasan TPP, tried to play down the accident by claiming minor damage to some thatched houses and small land parcels²⁵.

The District Collector ordered a magisterial inquiry of the accident under Section 176 of Criminal Procedure Code 1973 and called for a point-wise examination, within 45 days, of:

- The reasons for the collapse of the dyke and the person/s responsible
- Whether the dyke had been constructed as per prescribed standards and quality; and if not, the person responsible for poor construction
- Suggestions to ensure that such incidents do not occur in the future²⁶

Sasan Power promised a compensation of ₹10 lakh to the families of adults who had died in the incident and ₹5 lakh to the families of minor victims. They also promised a job to the heirs of the deceased, and a maintenance allowance of ₹7,950 as per norms to dependents of the deceased²⁷.

A press note released by the district administration revealed that the collector's office had issued show cause notices to Sasan Power regarding its ash dyke four times—on 04.10.2019, 22.10.2019, 30.11.2019, and 17.12.2019 — but the plant took no action²⁷.

In October 2019, Visthapit Parivar Sangh, a union of people displaced by Sasan TPP had staged a three week-long protest²⁴ with a 12-point agenda detailing their demands and concerns. The very first of these was the structural integrity of the ash dam²⁸. According to a press release by Visthapit Parivar Sangh, the District Collector had responded to their protest with a statement that the likelihood of a breach of the ash dam was nil²⁹ as the ash slurry was highly concentrated with very little water mixed in. This statement was made without any investigation. However, the District Magistrate (DM) constituted a three-member inquiry committee composed of the Sub-Divisional Magistrate (SDM), the Tehsildar, and Public Works Department (PWD) engineers to conduct a quality check of the ash dam and submit a report. According to the Visthapit Parivar Sangh, this report had concluded that the ash dam was built as per prescribed quality standards and the possibility of a breach nil. Just three months later, the dam breached.

12 April 2020 »

The collector issued a show cause notice to Sasan after local residents reported cracks in other ash dykes of the plant³⁰. The notice:

- Directed the plant to start improving the structural stability of other ash dykes immediately and report the actions taken to the collectorate

Cont. »

	<ul style="list-style-type: none"> • Stated that the plant would take full responsibility if there was another breach resulting in loss of life and property damage • Ordered the plant to explain, within three days, its non-compliance with instructions in previous letters
<p>13 April 2020 »</p>	<p>MPPCB issued a notice³¹ stating that in February 2018 they had permitted the plant to dispose of ash in a small (6.09 ha), low-lying area within the plant premises. As per this permission, the plant could only dispose dry, compacted ash with a soil covering. However, the plant ignored this condition and deposited ash slurry in the area, for which it was served a show cause notice dated 30.03.2019. Not only this, it also went far beyond the low-lying area it originally had permission for. Due to this huge expansion, the plant had to build a wall around the ash deposits, and it was this wall which had collapsed, leading to the massive spillage.</p> <p>Like previous breaches, MPPCB imposed an interim fine of ₹10 crore on the power plant. It directed the plant to take several actions within 15 days failing which the plant would be closed until further notice; and its electricity, water, and other utilities would be discontinued. MPPCB asked the plant to:</p> <ul style="list-style-type: none"> • Repair the damaged wall of the dam • Remove fly ash slurry from its own premises, adjoining areas, and water bodies • Depute an institute of national repute to assess the environmental damage caused by the breach • Submit a time-bound action plan for remediation and restoration of all affected areas including water bodies
<p>16 April 2020 »</p>	<p>The district administration said³² that it was surveying the four affected villages (Harrhawa, Sidhikhurd, Sidhikala, and Jhanjitol) to assess environmental damage, crop damage, property damage, and loss of cattle. It estimated that a 52 hectare area with standing crops had been damaged, 610 farmers impacted, and the crop damage would amount to ₹32,98,000 which would be disbursed after completing the survey.</p> <p>On the same day, Ashwani Kumar Dubey filed a representation with the district administration requesting it to take quick action against the industry and responsible officers of Sasan TPP. On 29.04.2020, Ashwani Kumar Dubey filed a complaint in the National Human Rights Commission as well.</p>
<p>19 June 2020 »</p>	<p>Ashwani Kumar Dubey filed an application with the NGT highlighting the loss of lives, further contamination of Rihand reservoir, contamination of drinking water and groundwater, destruction of agricultural fields and standing crops, death of cattle, damage to flora and fauna, destruction of property, and the worsening of Singrauli's pollution due to the Sasan breach³³.</p> <p><i>Cont. »</i></p>

	<p>He sought:</p> <ul style="list-style-type: none"> • Removal of ash and waste from Rihand reservoir and other water bodies • Direction to TPP to restore the environment, to compensate affected persons, and pay adequate environmental damages for causing pollution in Singrauli • Cancellation of environmental/statutory clearances and the closure of Sasan TPP among few others
29 June 2020 »	<p>The Central Zone bench of the NGT heard another case (Hira Lal Bais vs. Reliance Sasan Power Pvt. Ltd. & Ors.³⁴) where it considered an application against Sasan regarding the collapse of its fly ash pond; flooding of nearby villages with toxic slurry; the death of six people; death of animals; damage to agricultural land, vegetation, rivulets, and biodiversity due to negligence. In its order, the NGT constituted a committee of representatives of the MoEFCC, CPCB, MPPCB, and the District Collector to visit the site and submit an action taken within four weeks. MPPCB was made the nodal agency for coordination and logistic support.</p>
14 July 2020 »	<p>In a hearing (O.A No. 94/2020) of Ashwani Kumar Dubey vs. Sasan Ultra Mega Power Plant & Ors., the NGT took cognisance of Ashwini Kumar Dubey's application (19.06.2020) and noted that the Central Zone bench of the NGT had already passed an order dated 29.06.2020 constituting a committee to look into the matter. The NGT transferred the matter from the Central Zone to the Principal bench³⁵.</p>
28 July 2020 »	<p>The committee constituted by the NGT in its order of 29.06.2020 visited the plant on 14 and 15 July 2020 and met plant officials. It noted that:</p> <ul style="list-style-type: none"> • 10 lakh tonnes of fly ash had spilled • The damaged dyke wall had been repaired • Slurry was being cleared • Sasan had issued a letter of intent and work order to IIT-BHU to study the ash dyke's stability • Sasan had issued a letter of intent and work order to NEERI to conduct an assessment of the environmental damage • Significant fly ash had spread on the banks of Goiwahai drain over a stretch of 6.5 kilometres, till its confluence with the Rihand river • There was a continuous flow of water contaminated with ash • Clean up was slow due to a lack of resources in the Covid-19-induced lockdown <p>On compensation to affected people, the committee noted that:</p> <ul style="list-style-type: none"> • A one-time payment of ₹10 lakh had been made to families of the five deceased adults and ₹5 lakh to the family of the deceased minor • A lifelong sustenance of ₹8,275 per month had been extended to six dependents of deceased people • Employment had been provided to three members of deceased persons's families • compensation of ₹80.4 lakh had been provided to affected villagers of four villages of Tehsil Singrauli and Mada for loss of/damage to cattle/livestock/poultry, pumps, wells, etc. • Compensation of ₹85.07 lakh had been provided to 566 affected villagers of the four villages for damage to houses, household materials, and crops • The power plant had made provisions to supply drinking water to the affected areas <p><i>Cont. »</i></p>

	<ul style="list-style-type: none"> • Compensation for several other losses/damages/needs had been provided: <ul style="list-style-type: none"> » ₹1.78 lakh for ration/household damages to 11 families » ₹2.3 lakh in medical support » ₹1.5 lakh for flooding to affected families » ₹1.5 lakh for civil and electrical maintenance and ration to the main family » ₹1.4 lakh for water for cattle » ₹6.4 lakh to install hand pumps for affected families » ₹0.45 lakh for drinking water supply • Grievances of some of the affected people were still to be addressed by the company <p>The committee asked the power plant to:</p> <ul style="list-style-type: none"> • Get reputable expert agencies to check the strength of the bunds created around the dykes/low-lying areas quarterly, especially before the onset of the monsoon • Submit reports of action taken on above to regional offices of MPPCB, CPCB, and MoEFCC periodically • Clear fly ash from Gowahai drain within one month • Submit reports of action taken on above to regional offices of MPPCB, CPCB, and MoEFCC every week • Set up grievance redressal camps in each affected village to address unresolved grievances • Expedite the assessment reports being prepared by IIT-BHU and NEERI
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<p>21 August 2020 »</p>	<p>MPPCB's representative to the committee added more recommendations for the power plant³⁶:</p> <ul style="list-style-type: none"> • Sasan, which had submitted only ₹2 crore of the ₹10 crore interim compensation, had to submit the full amount • Criminal proceedings would be initiated against Sasan management • The company had to ensure 100% utilisation of fly ash, failing which a penalty would be imposed on it
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LATEST STATUS

<p>30 January 2021 »</p>	<p>As per MPPCB's response to an RTI application, Sasan had not submitted the rest of the interim compensation of ₹8 crore as of January. NEERI was still preparing the environmental damage report.</p>
<p>16 March 2021 »</p>	<p>The NGT heard a new case (O.A No. 107/2020 (CZ) Jagnarayan Shah & Ors.) which sought direction for disposal of fly ash by thermal power plants in Singrauli, Madhya Pradesh, and assessment of damages and guidelines for siting and operation of fly ash ponds. The NGT clubbed this matter with O.A. No. 164/2018, Ashwani Kumar Dubey vs. Union of India & Ors. and O.A. No. 117/2014, Shantanu Sharma vs. Union Of India & Ors because this matter was already being dealt with in those two cases³⁷.</p>

ANECDOTES FROM AFFECTED COMMUNITIES

People of Sidhikala village live as near as 500 metres from the ash pond that collapsed. According to them, most ash has been removed from the village and fields, but some still remains. In some fields, authorities have not removed the ash at all: they have covered it with a layer of soil, compacted it, and directed farmers to cultivate on this. The slurry caused extensive damage to the rice crop, and the next monsoon for growing it has passed as well. Farmers are compelled to grow wheat in the fields where ash was deposited, and the yields are far lower than previous years. Some wells were also submerged in ash at the time of the accident, and one is still covered with ash.

Farmers of Sidhikala who lost standing crops got ₹5000 per household. One resident lost nine goats, three oxen, a buffalo and a cow to the accident, but those who lost farm animals have not been compensated. Another resident has received ₹10,000 for destroyed crops, but no amount for affected soil has been discussed.

FIGURE 4 FLY ASH DEPOSITION ON FARMLAND AND WELLS NEAR SASAN TPP, SINGRAULI



Flyash deposits on fields remain after Sasan TPP ash pond breach, as on 7 March 2021 | Photo: Kripanath Yadav



Cavity in-ground is what can be seen of well that was filled with ash slurry, 7 March 2021 | Photo: Kripanath Yadav



Wheat cultivation on fields previously covered with ash slurry. A layer of soil has been added on top and flattened, while ash deposits around fields remain, 7 March 2021 | Photo credits: Kripanath Yadav

3.4 ANPARA THERMAL POWER STATION

Date Continuous flow of ash water into Rihand reservoir	Cause of breach Overflow of ash dyke	Total area affected 21% of total fly ash discharge into Rihand reservoir attributed to Anpara TPP
Agricultural area damaged N.A.	Lives lost N.A.	Affected persons (direct/indirect) N.A.
Quantum of ash discharged N.A.	Compensation levied/deposited/paid N.A.	Environment damage compensation N.A.
Criminal action initiated N.A.	Status of required environmental damage assessment report N.A.	Status of technical assessment report for the ash pond N.A.

The case of Anpara TPP located in Sonbhadra is different from one-time breaches at other power plants: a continuous overflow of ash slurry from the plant's ash pond directly into Rihand reservoir has been reported over many years. Anpara A, B, and D, owned by Uttar Pradesh Rajya Vidyut (UPRV), and Anpara C, owned by Lanco, share a fly ash pond built on the banks of the Rihand reservoir.

TIMELINE OF EVENTS

25 August 2014 »	The documentation of constant ash leakage goes back to 2014, when the NGT had constituted a core committee to monitor the potential hazards of industrial development in Singrauli (O.A 164/2018, earlier 276/2013 Ashwani Kumar Dubey vs. Union of India & Ors., and Jagat Narayan Viswakarma and Ors. vs. Union of India & Ors) ³⁸ .
2015 »	The core committee's report noted that Anpara TPP was discharging its fly and bottom ash into Rihand reservoir. The plant said the discharge would stop once their Ash Water Recirculation System (AWRS) were set up. The Uttar Pradesh Pollution Control Board (UPPCB) was made responsible for monitoring the commissioning of the AWRS and stoppage of discharge ³⁹ .
6 December 2017 »	The core committee conducted a fresh inspection ⁴⁰ .
3 April 2018 »	The core committee's report, dated February 2018, said that Anpara TPS had installed an AWRS ⁴¹ .
28 August– December 2018 »	The NGT constituted an Oversight Committee headed by Justice Rajesh Kumar ⁴² . In its report in December 2018, the Oversight Committee said that fly ash from Anpara TPP was continuing to overflow into Rihand reservoir, and that the discharge was reducing the level of the reservoir and polluting the water ⁴³ .

3 January 2019 »	In response to the report, the NGT directed the state Pollution Control Boards and CPCB to take remedial measures and submit a status report on ambient air quality and water quality of the reservoir and other water bodies to the Oversight Committee ⁴⁴ .
5 November 2019 »	<p>The NGT (O.A 164/2018 Ashwani Kumar Dubey vs. Union of India)¹⁶ discussed a report submitted on 29.10.2019 by Justice Rajesh Kumar on management of fly ash by TPPs and the damage caused to Rihand reservoir. The report noted the reduced capacity of the reservoir due to draining of effluents and fly ash, which created the need for desilting. The same order which dealt with the Essar and Vindhyachal breaches also took cognisance of the Anpara fly ash discharge situation. It noted that the plant management:</p> <ul style="list-style-type: none"> • Said that ash overflow into the reservoir occurred only occasionally in the rainy season, when the dyke got full due to rainwater • Was serious about the issue and had asked the district administration to divert the nallah of the catchment area “somewhere” (details of location not provided) to avoid any flow of fly ash into the Rihand reservoir
14 July 2020 »	<p>Further to its order of 05.11.2019 (O.A 164/2018 Ashwani Kumar Dubey vs. Union of India)²³, the NGT passed another order on remedial action against pollution and violation of environmental norms by TPPs in Singrauli (M.P.) and Sonbhadra (U.P.). The order refers to a report dated 20.12.2019 by the OS committee, which visited the Anpara site on 15.12.2019 and the Vindhyachal site on 16.12.2019, and verified the continuous discharge of ash from Anpara’s ash pond into Rihand reservoir. According to the OS committee’s report, plant representatives said that:</p> <ul style="list-style-type: none"> • The overflow was seasonal and occurring due to the dyke being full of rainwater • The height of the dyke was being raised • The nallah was being diverted • Another compartment was being created for the disposal of ash <p>The OS committee:</p> <ul style="list-style-type: none"> • Deemed the plant’s explanation unsatisfactory • Condemned the continuous ash discharge into the reservoir for causing siltation and depleting the quality of water of the only water source in the area • Noted that UPPCB had not been informed of the situation and true facts had been concealed • Recommended closure of Anpara TPP until it was ensured that no ash water would go to Rihand reservoir • Held the plant liable to pay environmental compensation as well as the cost of desilting the reservoir on the “polluters’ pay” principle • Directed UPPCB to compute environmental compensation and take stringent action under relevant Acts <p>The NGT also discussed a report by CPCB dated 28.02.2020 on desilting and restoration of Rihand reservoir. This report determined each TPP’s contribution of ash depending on the sediment volume in the reservoir at different peripheral locations.</p> <p><i>Cont. »</i></p>

Anpara A,B,D, and C's total contribution was calculated to be 21.2% of the total ash slurry in the reservoir. The NGT:

- Ordered Anpara TPP to stop the discharge of fly ash
- Directed a joint committee of CPCB and UPPCB to compute environmental compensation
- Made UPPCB the nodal agency for coordination and compliance

LATEST STATUS

15 February 2021 »

In response to an RTI application seeking the status of ash overflow after NGT's order (O.A No. 164/2018), the plant said the overflow had been stopped. In response to another RTI application on the location and status of the diverted nallah, the plant said it had not been built yet and technical and financial discussions with the Central Water Commission on the nallah were going on.

Due to restrictions on movements related to the ongoing Covid-19 pandemic, recent testimony from communities living near the power plant could not be obtained.

3.5 TALCHER THERMAL POWER STATION

Date 6 March 2020	Cause of breach Crack in pipeline	Total area affected N.A.
Agricultural area damaged N.A.	Lives lost N.A.	Affected persons (direct/indirect) 10–12 families
Quantum of ash discharged N.A.	Compensation levied/deposited/paid N.A.	Environment damage compensation N.A.
Criminal action initiated N.A.	Status of required environmental damage assessment report N.A.	Status of technical assessment report for the ash pond N.A.

NTPC's 460 MW Talcher TPP disposes of its fly ash in Mahanadi Coalfields Limited's (MCL) abandoned South Balanda open cast coal mine (void) via an 8–10 kilometre long pipeline.

TIMELINE OF EVENTS

6 March 2020 »

The disposal pipeline cracked, flooding Jagannathpur village with ash slurry. The slurry entered at least a dozen homes, affecting 10–12 families. It also inundated farmland, local water bodies, and roads⁴⁵.

The residents of Jagannathpur demanded compensation for their losses and threatened to start an agitation if the authorities did not compensate them. They also demanded that NTPC clean ash slurry from their homes⁴⁶.

The Group General Manager of NTPC Talcher:

- Deemed the damages to be minimal
- Said that compensation would be paid if necessary
- Promised restoration⁴⁶

Villagers asserted ash slurry leakages occurred regularly and plant authorities took to no preventive action⁴⁷. In fact, other breaches are on record:

- **10 July 2016:** A similar breach inundated vast areas near Talcher central colony. The slurry submerged the Talcher South Balanda road and entered some shops. Locals staged a protest and demanded action against those responsible⁴⁸.
- **29 March 2017:** The NGT Eastern Zone (EZ) heard the matter of the pipeline breach and other complaints on Talcher's fly ash management (O.A 119/2016/EZ Gadhadhar vs. Odisha Pollution Control Board and Ors)⁴⁹. The applicant pointed to the regularity of breaches and held NTPC responsible for failing to improve the situation.

Cont.»

NTPC responded that:

- The leakage had been immediately plugged/repared
- Slurry spread had been addressed
- It had submitted a number of compliance reports after the incident
- A large area could not have been inundated because the crack was only 10–12mm long
- Media reports that claimed a large area had been flooded were unreliable
- A new and modernised action plan on the upkeep of pipelines had been submitted to the Odisha Pollution Control Board (OPCB)

The NGT (EZ) disposed of the matter citing the NTPC's new action plan to prevent future breaches.

Locals have reported regular leaks and spills at different locations which interrupt their lives and livelihoods, in addition to posing a significant health risk. Incidents such as these, which are not characterised as full scale breaches or accidents, get very little media attention and a lukewarm response from the authorities and the public. Many smaller incidents go completely unreported, with no penal action against those responsible and no measures to prevent future incidents. Communities are left to deal with the repercussions of the mismanagement of fly ash on their own.

LATEST STATUS

23 March 2021 »

NTPC Talcher Thermal Power Station was shut down⁵⁰ to pave the way for a new, modernised plant.

3.6 BOKARO THERMAL POWER STATION

Date 12 September 2019	Cause of breach Hydraulic pressure build up due to heavy rainfall (as reported by TPP, contested by residents)	Total area affected Approximately 45 acres
Agricultural area damaged Approximately 45 acres	Lives lost 0	Affected persons (direct/indirect) 20+
Quantum of ash discharged N.A.	Compensation levied/deposited/paid ₹8,000 given to people who lost temporary housing structures bordering the nallah near ash pond boundary	Environment damage compensation ₹2,89,39,769 environmental damage compensation levied by JPCB; ₹1 crore deposited
Criminal action initiated N.A.	Status of required environmental damage assessment report Submitted to JPCB; RTI application for copy filed	Status of technical assessment report for the ash pond Ash pond design to be reviewed by 'reputed institutes', RTI application filed for copies of same

Owned by Damodar Valley Corporation (DVC), Bokaro TPP has two operational units of 210 MW (Bokaro 'B') and 500 MW (Bokaro 'A') capacity. The plant and its two ash ponds are on the banks of the Konar river, which is a tributary of the Damodar.

TIMELINE OF EVENTS

12 September 2019 »	Ash pond 1 breached around 2:50 a.m. ⁵¹ , allegedly following heavy rainfall, flooding 20 DVC quarters and nearby areas. Bokaro has been storing ash slurry in this pond since 2017, the design of which does not factor the potential impact of heavy rainfall. A committee constituted to enquire into the breach found that: <ul style="list-style-type: none"> The width of the bund of the collapsed ash pond was about 50 ft. at the bottom and the breached length was about 40 feet The plant had not been complying with several Environment Clearance (EC) and Consent to Operate (CTO) conditions⁵²
18 September 2019 »	A five-member high-level committee was constituted to calculate environmental damage compensation. The plant was directed to deposit ₹1 crore in the interim. A show cause notice was issued to Bokaro TPP for non-compliance with various CTO conditions.
14 & 15 November 2019 »	The Ranchi office of the MoEFCC visited the site to monitor the plant's compliance with conditions stipulated in its EC ⁵³ .
2 December 2019 »	In its report, the MoEFCC's Ranchi office submitted that: <ul style="list-style-type: none"> Even two months after the breach, DVC had not submitted details such as total ash spillage, length of wall breach, reason of breach, status of ash removal from contaminated area, or any other action taken <p><i>Cont. »</i></p>

	<ul style="list-style-type: none"> • A DVC official said that the slurry spill extended from from ash pond 1 to stilling pond 1 and 2, draining into the Konar river via a nallah • There were fly ash deposits in nearby ghats and along the nallah • A fly ash-sand mixture was found in nearby areas • Fly ash-laden water had spread over a larger area beyond the plant's premises • The plant was flouting many EC conditions: <ul style="list-style-type: none"> » Ash was being dumped near Konar dam, in additional land over and above the permitted area » DVC had not furnished effluent monitoring details from ash dumping areas and coal analysis data (including ash and sulphur content of coal) » Far from achieving 100% ash utilisation, both ash ponds of the plant were overflowing with ash » The plant's disaster management plan had no action plan in case of breach of ash ponds <p>The report noted that <i>“fly ash is being dumped near Konar dam, without any protection measure. The ash was found to be spreading with rain. The effluents are not in control and the water from the ash dump was flowing with ash. No details furnished on effluent monitoring and impervious lining”</i>.</p>
<p>19 February 2020 »</p>	<p>A plea regarding the breach was filed with the NGT (O.A no. 25/2020/EZ Praveen Kumar Singh vs. Damodar Valley Corporation). The plea pointed to meteorological data from the week prior to the ash pond collapse, which showed no heavy rainfall.</p>
<p>8 May 2020 »</p>	<p>To inspect the area and verify facts, a committee comprising representatives of the Kolkata office of the CPCB, the Jharkhand Pollution Control Board (JPCB), and the District Magistrate was constituted, with the JPCB as the nodal agency⁵⁴.</p>
<p>26 June 2020 »</p>	<p>The committee inspected the site and collected soil and water samples for analysis.</p>
<p>10 August 2020 »</p>	<p>The committee submitted a report to the NGT⁵⁵, which was taken on record on 18 September 2020. The committee observed that:</p> <ul style="list-style-type: none"> • Repair work on the bund had been going on at the time of the site visit • Breached ash pond 1 was not in operation • Excessive rain in a short period built up hydraulic pressure, which led to the collapse of the bund • The bund had not been designed to account for excessive rainfall • Without proper repairs keeping natural calamities in mind, the bund could breach again • Bokaro TPP had not complied with the 100% ash utilisation requirement • The plant had not submitted any action plan to remove ash accumulated in its ash ponds <p>The committee recommended that:</p> <ul style="list-style-type: none"> • TPPs have their ash pond design reviewed by reputed institutes such as the IITs, the National Institute(s) of Technology (NITs), etc. • No ash slurry be deposited in the pond until the bund is redesigned and repaired • TPPs submit a time bound action plan to remove both accumulated and currently generated ash slurry <p><i>Cont. »</i></p>

	<ul style="list-style-type: none"> The power generation capacity of plants be regulated based on their capacity to utilise fly ash <p>On compensation, the committee noted that:</p> <ul style="list-style-type: none"> Bokaro TPP had deposited an interim environmental compensation of ₹1 crore with the JPCB The high-level committee constituted in September 2019 computed the total environmental compensation to be ₹2,89,39,769, subject to change depending on lab results JPCB had directed the plant to submit the cost of evaluation of the breach and to deposit the remaining environmental compensation of ₹1,89,39,769 <p>The report acknowledged the improper construction and maintenance of the ash dyke which was “not in line with the approved plan”.</p>
<p>14 December 2020 »</p>	<p>The NGT disposed of the plea OA 25/2020/EZ. The grievance expressed in the plea was that the JPCB had not taken stringent action against DVC or Bokaro TPP authorities. While dismissing the plea, the NGT said that despite all the environmental damage and health impacts caused by the breach, the August 2020 report’s recommendations were satisfactory⁵⁶. In its order, the NGT directed the plant to comply with the report’s recommendations by 14 February 2021.</p> <p>The NGT dismissed the case even though this was not the first ash pond breach at Bokaro⁵⁷ and the plant had continuously violated multiple EC and CTO conditions.</p>

LATEST STATUS

	<p>An RTI application requesting the status of compliance with NGT orders was filed, and received an inadequate response. Another appeal has been filed and the response is awaited at the time of publishing this report.</p>
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ANECDOTES FROM AFFECTED COMMUNITIES

<p>The three villages surrounding Bokaro TPP’s ash pond area—Nurinagar, Bazar Tand, and Jarwabasti—were affected differently by the ash pond breach.</p>	<p>As of publishing this report, residents whose farmland was affected have not received monetary compensation in any of the villages.</p> <p>In Nurinagar, the breach flooded 25 acres of farmland, the premises of a temple, and a nallah which joins the Damodar. The only monetary compensation so far has been around ₹8,000 given to people whose ‘temporary’ housing structures were closest to the spill area and were destroyed.</p> <p>In Bazar Tand, the breach ruined over 20 acres of farming land. Even when there are no breaches, airborne fly ash regularly settles on Kanjipani nallah (which joins the Damodar) and on people’s fields.</p> <p><i>Cont. »</i></p>
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A resident of Jarwabasti, among the first to see the site after the breach, said that on the day of the breach, the ash dam looked 'overloaded' with slurry, and breached at around 3 a.m., following light rainfall. Even though the damaged portion of the ash pond wall has been repaired, locals fear such an accident could appear again, because indiscriminate dumping inside and outside the ash pond continues. The villagers also mentioned the dumping of ash near and in the Konar river.

Residents of all three villages mentioned ongoing fly ash problems. Water from the ash pond makes its way into fields, affecting soil quality and crop yields. When airborne, especially in the summer, ash settles on crops, nallahs, homes, and wells. Tuberculosis and other respiratory diseases are commonplace here; residents believe ash pollution has a role to play.

A resident of over thirty years said that a fly ash pipeline breached on 8 March 2021, leaving the area outside his kirana store covered in slurry. Temporary repairs to such pipelines are commonplace. Resistance from locals has been met with strong counter resistance from local authorities in the past.

FIGURE 5 ASH DUMPING AT BOKARO TPP



Image on top: Ash slurry deposition near Bokaro TPS ash pond, Jharkhand, 10 March 2021
Photo credits: Gulab Chandra



Image below: Ash slurry pipelines run parallel to village shops, homes, 10 March 2021
Photo credits: Gulab Chandra

3.7 NORTH CHENNAI THERMAL POWER STATION

Date 24 August 2020	Cause of breach Old, inefficient pipelines	Total area affected N.A.
Agricultural area damaged N.A.	Lives lost 0	Affected persons (direct/indirect) 60–100+ households
Quantum of ash discharged Varying quantities due to continuous pipeline bursts over the years	Compensation levied/deposited/paid N.A.	Environment damage compensation To be determined
Criminal action initiated N.A.	Status of required environmental damage assessment report Report being prepared by joint committee of TNPCB, CPCB, IIT Madras	Status of technical assessment report for the ash pond N.A.

North Chennai Thermal Power Station (NCTPS) has five operational units with a combined capacity of 1830 MW. It is one of several industries in close proximity to the ecologically sensitive Ennore Creek. Fly ash from NCTPS, NTPC Tamil Nadu Energy Company Limited's (NTECL) Vallur power plant, and the now closed Ennore Thermal Power Station is disposed of in or near Ennore Creek. Tamil Nadu Generation and Distribution Corporation Limited (TANGEDCO) operates two ash ponds that fall wholly or within the Creek. NCTPS's ash pond is located in the vicinity of Athipattu, Sepakkam, and Puzhuthivakkam villages. Pipelines are used to transport fly ash slurry discharged from the plant to the ash dyke over a distance of 5 kilometres. The pipeline leak caused slurry to flow into the river as well, likely affecting several more people. Such pipeline leaks are continuous. It should be noted that this incident needs to be seen as a part of the larger fly ash pollution issues in the Ennore region, where there is discharge of fly ash on an ongoing basis into the creek and rivers, leakages from ash ponds, breaches, and leaks from pipelines.

TIMELINE OF EVENTS

24 August 2020 »

A pipeline carrying fly ash slurry from NCTPS burst⁵⁸, flooding Sepakkam village, home to over 60 households. News reports said that the Tamil Nadu Pollution Control Board (TNPCB) directed NCTPS to replace damaged pipelines at the earliest, and carry out regular maintenance to prevent further bursts.

However, this was not an isolated incident⁵⁹. Reports document how the houses in Sepakkam have been invaded by ash slurry from leaking pipelines and seepage from unlined dykes for over two decades now, with residents facing extremely high levels of ash in the air as well⁶⁰. This affects people's health; contaminates stored water and food; and damages clothes, utensils, and household goods. Over time, leaking ash has also choked parts of the river and leached harmful toxins into the riverbed⁶¹.

Legal proceedings related to fly ash pollution in and around Ennore Creek caused by NCTPS have been ongoing for the last five years. The NGT has constituted multiple committees to submit reports on the matter.

Cont. »

While some are yet to be considered, others submitted by committees as well as independent advocacy groups have highlighted the adverse impacts of fly ash pollution on the health of the people and ecosystem of Ennore Creek, and a significant portion of this has been traced to fly ash leakages and unlined ash ponds of NCTPS.

HIGHLIGHTS FROM LEGAL PROCEEDINGS

18 January 2016 »

A plea, OA 08/2016 (R.Ravimaran vs. Union of India & Ors) was filed in the NGT Southern Zone (SZ) seeking action against illegal dumping of fly ash in Buckingham Canal by NCTPS.

With the addition of related petitions to be considered together, the plea has come to include various instances of leaking fly ash slurry pipelines, fly ash dumping in water bodies and areas around the power plant, and dumping of dredged material by Kamarajar Port Ltd. (KPL).

4 August 2017 »

The NGT directed an expert committee to assess the extent and impacts of fly ash pollution in the Kosasthalaiyar river, Ennore Creek, and associated regions. *An interim report submitted to the tribunal in compliance with this order covered fly ash contamination caused by NCTPS.*

The committee comprised three subject experts: Dr. Balaji Narasimhan (Water Resources and Hydrology), Dr. Sultan Ismail (Soil Biology), and Dr. D Narasimhan (Botany). They visited Ennore Creek on 13 August 2017 and submitted a preliminary report to NGT on 6 September 2017. The committee observed that:

- Industrial activity, coupled with prolonged fly ash pollution from ash conveyance and storage/impoundment structures, had drastically altered the hydrology, ecology, and topography of the area
- Ennore Creek, an estuarine ecosystem, consists of various habitats and acts as a buffer zone between inland freshwater areas and coastal saline areas
- The Creek's water, flora, and fauna were severely contaminated with toxic chemicals, some of which could be linked to fly ash with reasonable certainty
- NCTPS's completely unlined ash pond violated its EC, which mandated proper lining of ash ponds, and that its impoundments were of unsound structural integrity
- Despite repeated leaks in slurry pipelines, NCTPS did not have a response protocol for the resulting spills

20 May 2019 »

A committee comprising representatives of the CPCB, TNPCC, and IIT Madras was constituted to ascertain the status of fly ash disposal, damage caused to the environment, and cost of restitution by NCTPS. It visited the site and submitted a report.

18 November 2019 »

NGT Principal Bench directed the committee to:

- Check if soil damage had been caused by violations by KPL
- Assess if ongoing remediation for mangrove restoration was sufficient
- Evolve an action plan in consultation with NCTPS

The committee inspected areas where KPL had dumped dredged material (in a Coastal Regulation Zone), evaluated NCTPS's action plan, and submitted its report to the NGT.

30 November 2019 »	<p>The committee visited NCTPS and submitted a report with point-wise evaluation and update of the action plan and a time for completion, including:</p> <ul style="list-style-type: none"> • Removal of fly ash accumulated in the creek • Replacement of faulty ash slurry pipelines • Making the existing ash pond impervious in line with technical consultation with IIT Madras
20 January 2020 »	<p>The NGT directed the committee to:</p> <ul style="list-style-type: none"> • Assess real damage caused by dumping of ash in water bodies by NCTPS and of dredged material by KPL • Submit an action plan with the method of remediation required and measures needed to remove fly ash with a stipulated timeline • Submit a cumulative report about damage to the environment <p>The committee conducted meetings with various experts and floated financial and technical bids to carry out various parts of the study on 12 March 2020.</p>
15 June 2020 »	<p>The NGT granted the committee's request for an additional three months to carry out the first part of the study due to delays caused by the Covid-19 pandemic. The NGT also asked NCTPS for a report on the steps the plant had taken to prevent future pipeline leaks, the current status of NCTPS's fly ash dumping in water bodies (through leakages and non-repair of pipelines), and possible remedial actions on this.</p>
19 September 2020 »	<p>A joint committee member visited NCTPS as directed by the NGT. According to a letter of the same date signed by the Chief Engineer, NCTPS on 'action plan for slurry pipelines renewal and avoiding pipeline leaks':</p> <ul style="list-style-type: none"> • The plant's five ash slurry pipelines had been in continuous service for the preceding two decades • Exposure to saline atmospheric conditions made erosion and corrosion of pipelines inevitable • In attempts to avoid leakages, the plant had welded the punctures, repaired damaged portions, and replaced some pipes with second-hand pipes from the defunct ETPS • The pipes were found to be "beyond repairable" and required replacement • By December 2021, remaining pipelines would be renewed, and ash would be removed from all areas where leaks and dumping had occurred <p>Annexure I of this letter tabulated details of all fly ash pipeline leaks from 20 June 2020 to 20 September 2020: location, line number, nature of break, average duration, leak discharge quantity, rectification work and length.</p> <p>NCTPS listed 22 major and minor leaks over this three month period, but only one was covered by mass media.</p>

<p>23 September 2020 »</p>	<p>In compliance with the NGT's 20.01.2020 and 15.06.2020 orders, the committee submitted another report on action taken⁶². Based on the 19.09.20 site visit, the committee made observations similar to the Chief Engineer's letter:</p> <ul style="list-style-type: none"> • NCTPS was using five disposal lines along a length of about 25,000 metres to transport ash slurry from the handling pump house to the dyke • The pipelines had been in continuous service for the preceding two decades, had been corroded and eroded in the saline atmosphere, and needed replacement <p>The report included detailed status of all five pipelines:</p> <ul style="list-style-type: none"> • Erection of line 3 had commenced in the worst hit Sepakkam area • Shipment of some portions of line 2 had been delayed due to Covid-19 • Replacement of lines 2 and 3 would be completed by June 2021 • Entire lengths of lines 1, 4, and 5 had been replaced using second-hand pipes from ETPS • 22 leaks had occurred in the preceding 4 months, with a total leakage time of 2 hours 36 minutes and 2,418 cubic metres of ash had leaked • No leakage had been observed during inspection <p>The committee decided to include suggestions for further remedial measures in the final report, after completion of the first part of the study by an expert agency. It also requested time till 31 December 2020 to submit a proper action plan after evolving required methods of remediation and cumulative impact report, which the NGT granted while listing the case for hearing in 2021.</p>
<p>14 December 2020 »</p>	<p>The NGT heard the case earlier than planned after the appearance of some newspaper reports about the 24.08.20 NCTPS fly ash pipeline breach . The NGT took cognisance of large scale fly ash deposition due the pipeline breach, which forced the people of Sepakkam out. It directed the same committee to submit a report covering:</p> <ul style="list-style-type: none"> • The facts of the matter • Action taken against NCTPS • Assessment of environmental compensation due for the damage caused • Analysis of water and air quality in the area during the period of the pipeline leak • suggested methods of rectifying this and restoring the environment <p>The NGT also directed the TNPCB to submit an independent report before the next hearing date (06.01.21) on action they had taken following the breach.</p>
<p>6 January 2021 »</p>	<p>The NGT acknowledged the receipt of the joint committee's report on 05.06.21, cited a stay order by the Supreme Court on directions issued in an earlier order related to the case, and scheduled the consideration of the report for 05.02.21.</p>
<p>5 February 2021 »</p>	<p>The NGT adjourned the hearing to 02.03.21.</p>

<p>2 March 2021 »</p>	<p>The NGT referred to the Supreme Court’s stay order in a civil appeal filed by KPL against an environmental compensation of ₹8 crore which the NGT had asked it to pay. While ongoing fly ash pollution had been noted in various orders in OA 08/16 and related petitions over the years, representatives of KPL had argued that greater responsibility for this lay with TANGEDCO. While ₹8 crore was to be levied on KPL, they opposed the same in the Supreme Court, pleading the amount for environmental damage compensation to be levied on TANGEDCO. As of the release of this report, the final amount has not been determined or deposited by either party.</p> <p>The NGT called the TNPCB’s independent report “nothing but a reproduction of the Joint Committee report”.</p> <p>Representatives of TANGEDCO requested more time to submit the report recommended by the joint committee. KPL was directed to produce a copy of the appeal memorandum filed previously. The NGT set the next hearing for 07.04.21 April 2021.</p>
<p>7 April 2021 »</p>	<p>The NGT adjourned the hearing to 29.04.21⁶⁴.</p>
<p>29 April 2021 »</p>	<p>The NGT adjourned the hearing to 10.06.21.</p>
<p>10 June 2021 »</p>	<p>The NGT adjourned the hearing to 23 July 2021.</p>

LATEST STATUS

	<p>Despite ongoing litigation, the third stage of NCTPS is set to be commissioned for commercial operation soon. Newspaper reports from February 2021 featured the ‘boiler light up’ inauguration of the new 800MW stage III by the Chief Minister of Tamil Nadu⁶⁵. The existing unlined ash ponds and pipelines that have caused leaks and breaches are to be used for “emergency disposal” of (bottom) ash from the new units. Existing green belts have been removed for the construction of Stage III. The people of Ennore Creek continue to struggle against fly ash pollution.</p> <p><i>Due to restrictions on movements related to the ongoing COVID 19 pandemic, recent testimony from communities living near the power plant could not be obtained.</i></p>
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3.8 KAHALGAON SUPER THERMAL POWER STATION

Date 27 November 2020, 21 January 2021	Cause of breach Overflow of accumulated residual water	Total area affected 200 acres, 20 acres
Agricultural area damaged 200 acres, 20 acres	Lives lost 0	Affected persons (direct/indirect) N.A.
Quantum of ash discharged N.A.	Compensation levied/deposited/paid N.A.	Environment damage compensation N.A.
Criminal action initiated N.A.	Status of required environmental damage assessment report Ongoing process, as per NTPC reply to RTI application	Status of technical assessment report for the ash pond Access to report denied by NTPC in reply to RTI application

TIMELINE OF EVENTS

	<p>Owned by NTPC, Kahalgaon Super Thermal Power Station is located in Bhagalpur district of Bihar. The plant has a total installed capacity of 2340 MW (four units of 210 MW each and three units of 500 MW each). According to the Central Electricity Authority's Daily Generation Report, unit 4 210MW was non-operational from 7 November 2020 to February 2021 due to 'ash-handling system problem'⁶⁶. The ash disposal area of Kahalgaon Super stage I (4 x 210 MW) is located about 3.5 kilometres from the plant, near village Chandpur, which is home to 150 families.</p>
7 November 2020 »	<p>An embankment around Kahalgaon Super's ash dyke breached in the early hours. News reports suggest that around 200 acres of farmland were covered in ash slurry, destroying standing rabi crops⁶⁷, and that a possible cause was the overflow of residual water 'under' the ash dyke embankment. The breach gathered media attention, mainly because four units of the plant were shut down, affecting power generation⁶⁸.</p> <p>The breach occurred on the company's 46th 'Raising Day' and local villagers blocked a road to demand compensation for damaged crops. NTPC officials claimed compensation would be given at the earliest, but Kahalgaon Super's Vishwanath Chandan denied the breach and claimed that the overflow might have occurred due to 'some problem in the spillway'.</p> <p>In a statement to the press, he said that a high-level technical committee of NTPC representatives from New Delhi was to arrive the next day to investigate the incident. Kahalgaon Super officials also claimed to have initiated repair of the embankment soon after the breach⁶⁹.</p>

<p>20 January 2021 »</p>	<p>One of Kahalgaon Super's main main fly ash pipelines burst, flooding 20 acres of farmland with ash-laden water and destroying standing rabi crops again. According to a news report (Annexure I), the pipeline breach occurred around 12 noon and repair work started immediately, continuing till 2 p.m. Affected farmers, left financially insecure by the destruction of their crops, demanded compensation. Government and NTPC officials have promised to compensate them.</p>
<p>26 March 2021 »</p>	<p>In response to an RTI application asking for the latest status on the November 2020 embankment breach, NTPC said that:</p> <ul style="list-style-type: none"> • The damaged embankment was being repaired based on a 'revised drawing' • Payment of compensation was being processed in coordination with the district administration • "Technical committee visited the site. As the committee report is the internal documents of the Company, the same cannot be shared as per provisions of RTI Act, 2005." • We believe that information shared about the technical report is grossly inadequate and have filed an appeal. As of the date of publishing, no response to the appeal has been received <p><i>Due to restrictions on movements related to the ongoing Covid-19 pandemic, recent testimony from communities living near the power plant could not be obtained.</i></p>

4.0 OBSERVATIONS

The fly ash breaches and illegal dumping documented in this report occurred at different places and times, but they demonstrate the same patterns of violations, negligence, lack of accountability, and unsatisfactory action by keepers of the law.

4.1 DELAYED ASSESSMENT REPORTS & INACCESSIBLE INFORMATION

Singaruli saw three consecutive fly ash dam breaches in eight months starting August 2019, but the environmental damage assessment reports are still awaited. Worse, in the case of the Essar breach, NEERI claims that the report's disclosure on finalisation depends on Essar's approval. The need for Essar's approval for disclosure of a public document is unnecessary. Moreover, Essar as the violator cannot be given the right to withhold information related to the environmental damage caused by its violation. Doing so suggests that these assessment reports serve industry interests rather than the public good. Even in cases where assessment reports are completed on time, they are not made available in the public domain.

Once media coverage of a breach dies down, access to relevant information about the breach is lost as well. Unavailability of this information in the public domain exempts the industry from public scrutiny and public pressure, worsening the problem of unaccountability of both the industry and state PCBs.

4.2 DELAYED CLEAN-UPS

A general trend of delayed clean-ups can be observed in all the case studies above. Even where official documents claim that clean up is complete, residents of the area often report incomplete or botched clean up operations that leave them with ashy fields and contaminated water.

Fly ash breaches render the whole surrounding ecosystem dysfunctional for the communities and animals whose lives depend on it. Communities lose lives, livelihoods, and health because of lack of industrial will and timely efforts to remediate and rehabilitate, especially clean up and restoration of affected areas. Their troubles are aggravated because local administration and state pollution control boards do not implement strict penalisation and constant monitoring to ensure that violators fulfil their duties.

4.3 NON-PAYMENT OF ENVIRONMENTAL DAMAGE COMPENSATION

As documented in these case studies, violators routinely fail to deposit the full amount of even the interim compensation for environmental damage within stipulated deadlines.

Despite this, state PCBs take no action against these defaulters and let them continue operations unabated. This sets an immoral precedent for the industry, sending the message that they can keep violating the Fly Ash Notification, flouting multiple environmental laws, and inflicting lasting damage on people's lives and livelihoods, all without any consequences.

Unavailability of information in the public domain on post-breach actions (status of environmental and individual compensation, damage reports, remediation, clean ups, inquiry reports, action taken by authorities etc.) exacerbates the problem of unaccountability and reinforces the cycle of violations.

Another point is that ascribing a monetary value to environmental damage is very limiting: apart from the iniquity of putting a price tag on lost resources, it absolves authorities of their responsibility to adequately remediate and prevent such accidents.

4.4 NON-PAYMENT OF INDIVIDUAL COMPENSATION

Individual compensation to those who have suffered loss of life, homesteads, land, crops, cattle, etc. is often not paid at all. In other cases, what people receive is different from what they were promised. Compensation decided/ paid tends to be meagre and not commensurate with the losses people have suffered. The basis on which this compensation is calculated is unclear.

Again, putting a monetary value to people's losses is problematic: when people lose their homes or land or crops, they lose far more than physical possessions and property. The time and labour invested in building lives and livelihoods cannot be equated with money.

4.5 PERSISTENT VIOLATIONS, NEGLIGENCE, MISMANAGEMENT

Remedial action has not been able to prevent fly ash accidents because it doesn't address the core of the problem.

These accidents are the outcome of long-term negligence; improper construction and management of dykes; violations of legal provisions such as the Fly Ash Notification (and its amendments), conditions of environmental clearances, provisions of the Water Act etc.; non compliance with orders and directives; illegal dumping; low ash utilisation; and a failure to follow best practices over years. When an NGT report on fly ash management was discussed on 05.11.2019, TPPs could not even produce satisfactory status updates on third party assessments of their ash dykes or submit affidavits regarding adequacy of their fly ash dykes.

Vindhyachal, Sasan, and Anpara TPPs could not prove that their ash dykes had been constructed according to stipulated norms, and admitted to not getting third party assessments done for their dykes. The Bokaro breach exposed the faulty design of the dyke, which had neglected to factor the effects of rainfall. The plant's disaster management plan had nothing on ash dyke breaches. At the NCTPS, despite scathing reports submitted to the NGT, pipelines leaked and ash ponds continued to be unlined well into 2021. NGT Eastern Zone had disposed of a case against Talcher TPP for a pipeline leak in 2017, but neither the NTPC's compliance reports nor its new action plan for upkeep of pipelines could prevent another breach in March 2020.

4.6 POOR UTILISATION OF FLY ASH

Low levels of fly ash utilisation lead to accumulation, building pressure on dykes. Vindhychal's breached fly ash dyke is 40 years old, and ash utilisation levels have ranged from 28 to 32% in the past three years. Even this ash has mainly been used for raising the height of the dyke (without the MPPCB's permission). Anpara's ash utilisation over the last three years has been an abysmal 1.7 to 3.9%, resulting in periodic overflow of ash into the Rihand reservoir. The relatively new Sasan utilised 50% ash in 2019–20, and over the past two years it has used more than 90% of its ash for "reclamation of low-lying area". As demonstrated by the collapsed wall of this low-lying area, reclamation was just a euphemism for dumping.

High utilisation levels of ash do not necessarily mean effective utilisation and do not guarantee that breaches won't occur. Talcher has boasted of 100% ash utilisation since 2017, but almost all of this ash has been used to fill mines and none for a practical purpose. Bokaro reportedly utilised 156% of its ash in 2019–20, but 81% of this was used for "reclamation of low-lying area". In Bokaro, as in other TPPs claiming high fly ash utilisation, breaches have exposed faulty pipelines, unlined ash ponds, sub standard construction and poor repair and maintenance of dykes/ boundaries, and misleading data.

4.7 LACK OF REPORTING AND ACTION ON SMALLER BREACHES

Breaches that cause loss of life and damage to vast tracts of land and water bodies get wider coverage by mainstream media. Smaller spills and leaks are often covered by vernacular media only and never reach the public eye beyond the region where they occur. The media doesn't regularly report on the long histories of recurrent breaches or ongoing leaks, legal proceedings, and struggling communities behind many major breaches.

In some cases, the smaller scale of damage and lower media coverage allows TPPs to evade the compensation demanded by the affected communities.



Immediate aftermath of Reliance Sasan TPP ash pond breach, Singrauli, 10 April 2020

4.8 INEFFECTIVE DETERRENCE MECHANISMS

Warnings, show cause notices, fines, litigation—none seem to work as effective deterrents for TPPs.

There are two reasons for this:

- State PCBs don't enforce environmental laws strongly
- State PCBs don't penalise the industry and hold it accountable for after-breach repairs, clean ups, submission of compensation, etc. by robust monitoring and follow-ups, and closing defaulting plants

Inadequate legal and criminal action against violators and weak law enforcement on the system's part has given rise to weak deterrence. The consequences can be seen in the increasing frequency of breaches.

5.0 RECOMMENDATIONS

All these incidents have in common a lack of industrial will towards transparency, accountability, compliance; and a governance system with law enforcement, penalization, and monitoring that routinely fall short. We believe the following recommendations can help remedy this.

01

CRIMINAL ACTION AGAINST VIOLATORS

Criminal action must be initiated against individuals or parties who are found to be directly or indirectly responsible for a breach or fly ash accident. These include people/representatives who have been negligent, have violated/ignored orders/conditions/directions/notices related to technicalities and safety upkeep of fly ash dykes, and/or have misrepresented facts about the construction and management of ash dykes to pollution boards/district collectorates/inquiry panels/oversight or expert committees/the NGT/or other authorities.

02

MANDATORY TECHNICAL ASSESSMENTS OF ASH PONDS

TPPs have shown themselves unable to construct and maintain technically sound ash dykes. Periodic technical assessments of fly ash dykes by third-parties is the most effective way to keep a check on the structural and technical integrity of dykes and identify susceptibilities in time. These should be made a mandatory part of six-monthly compliance reports submitted to the CPCB and state PCB. Third-party technical assessments should be made a non-negotiable criteria for granting/renewal of Consent to Operate.

03

PUBLIC ACCESS TO INFORMATION

Reports and information on all aspects of a breach—inquiries, details of damage to individuals and the environment, compensation, directives, orders, action taken, progress reports, etc.—should be uploaded on the websites of the respective agencies. This will keep the matter under media and public scrutiny, which can help build public pressure when a TPP fails to comply with orders or to fulfil its own premises on remediation. It will also improve the accountability of government bodies such as state PCCBs.

04

DATABASE OF ASH PONDS IN INDIA

A database of all ash ponds in the country, along with key details about them, can help promote compliance with existing laws by augmenting media and public scrutiny. In addition, developing a national fly ash watch within the CPCB or MoEFCC website is a good way to collect and disseminate information and action taken reports on all fly ash accidents across the country.

6.0 ANNEXURE I

NEWS REPORT ON KAHALGAON SUPER THERMAL POWER STATION FLY ASH PIPELINE BREACH ON 20 JANUARY 2021

एनटीपीसी ऐश का पाइप फटा, राखयुक्त पानी से 20 एकड़ में लगी फसल बर्बाद

पीड़ित किसानों ने एनटीपीसी प्रबंधन से मुआवजे की लगाई गुहार लोगों ने कहा-ठेकेदार और अधिकारियों की लापरवाही से बार-बार हो रही है इस तरह की घटना

भास्कर न्यूज़ | कहलगाँव

एनटीपीसी ऐश डाइक का मेन पाइप मंगलवार की देर रात चायंटोला के पास फट गया। इससे 20 एकड़ में लगी रबी फसल में राख मिश्रित पानी फैल गया और फसल बर्बाद हो गया। सूचना पर बुधवार सुबह एनटीपीसी प्रबंधन ने पाइप लाइन बंद करा दिया।

दोपहर 12 बजे डीजीएम एचआर अजय कुमार, सीनियर मैनेजर ओ एंड एम सिविल एवं मैनेजर पीएंड एस रतन कुमार ने स्थल का मुआयना किया। इसके बाद दो बजे तक पाइप की मरम्मत कराई गई। प्रभावित किसान शंकर दयाल मिश्रा, प्रीति कुमारी, संजय मिश्रा, परिमल चौधरी, दामोदर मंडल, रवि



पाइप फटने के बाद खेतों में फैला राखयुक्त पानी।

मंडल, शिवपूजन मंडल, अशोक मंडल, राकेश मंडल, पूजन मंडल आदि ने प्रबंधन से मुआवजे की मांग की है। किसानों ने कहा कि हमारी जमा पूंजी लूट गई। अब कर्ज कैसे चुकायेंगे। किसानों द्वारा विधायक पवन कुमार यादव को भी इसकी सूचना दी। विधायक ने डीएम और एसडीओ से किसानों को अतिलंब

मुआवजा दिलाने का आग्रह किया है। इधर, एनटीपीसी के अफसरों ने कहा कि बिहार सरकार द्वारा मुआवजा निर्धारण कराकर किसानों को भुगतान किया जायेगा। बता दें कि दो माह पूर्व भी ऐश डाइक लगून श्री डी का तटबंध टूटने से सैकड़ों एकड़ फसल बर्बाद हो गई थी। इसके बाद किसानों ने दोबारा फसल लगाया था।

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