

**BEFORE THE NATIONAL GREEN TRIBUNAL
PRINCIPAL BENCH, NEW DELHI**

(BY HYBRID MODE)

Original Application No. 919/2022

In re : News item published in The Hindu dated 23.12.2022 titled “**One killed, four injured in fire at NLC Thermal Plant**”

Date of hearing: 18.01.2023

**CORAM: HON’BLE MR. JUSTICE ADARSH KUMAR GOEL, CHAIRPERSON
HON’BLE MR. JUSTICE SUDHIR AGARWAL, JUDICIAL MEMBER
HON’BLE PROF. A. SENTHIL VEL, EXPERT MEMBER**

Respondent: Mr. ShobhitDwivedi, Advocate for TNPCB
Mr. K. Balasubramaniam, District Collector, Cuddalore with Mr. D. Kumanan, Advocate for the State of Tamil Nadu
Mr. PinakiMisra, Senior Advocate with Mr.Chitranshul A. Sinha & Ms. Tammana Malik, Advocates for NLC India Ltd. (PP)

ORDER

1. The matter has been taken up *suo-motu* in light of captioned media report about death of one person and injuries to four at NLC Thermal Power, Cuddalore Tamil Nadu on 23.12.2022.

2. At the outset, we may note that the Tribunal dealt with an earlier incident in the same unit on 30.06.2020 in which six persons died and 17 were injured on account of failure to follow environmental safety norms, resulting in explosion in the boiler and the fire incident. While we will refer to the said order later, it is disheartening to note that such incident has been repeated due to negligence on the part of the management, which calls for serious soul-searching at local level of management as well as stringent remedial action at higher level in the establishment.

3. Coming back to the present matter, in pursuance of advance notice issued by the Registry on 23.12.2022, the Project Proponent (PP), M/s NLC India Ltd. has filed its affidavit dated 16.01.2023 giving sequence of events and the remedial action taken. According to the said version, flash fire took place on 22.12.2022, at about 11:32 Hrs, in lignite Bunker No. 10 of Unit I of the Neyveli New Thermal Power Station ("NNTPS") of NLC India Ltd. ("NLC"). One employee succumbed to his injuries and four more were injured. The unit is NNTPS is a lignite-based pit head thermal power station, having 2 units, being Unit I and Unit II, of 500 MW capacity each. Lignite is being used as the primary fuel for the boilers in both the units. Unit-I was running at a load of 480 MW. There were five workmen (one permanent employee and four contract workers) present for the purpose of filling the Bunkers. Their functions involved bunker filling, movement of shuttle feeder, positioning the shuttle feeder over the respective bunkers and cleaning the area. During the process of filling, after positioning the shuttle feeder above Bunker No. 10, a sudden flash fire surfaced in the vicinity of the said Bunker, which lasted for five seconds. All five Workmen were standing near lignite Bunker No. 10 and the walkway area, and they moved to the interconnecting platform walkway that leads to the Bunker Bay from the Boiler. The Bunker Bay is the place where the shuttle feeder is positioned for filling the bunker at 56ML The Feeder Bay is the place where the lignite stored in the bunker is extracted through feeder in to milling system at 29 ML. Width of this interconnecting platform walkway is about 2 Meters, with a substantial length leading to the elevator and M the stairs. Five workmen were waiting the interconnecting platform, one person, Mr. S. Thirunavukkarasu, a contract based worker, panicked and jumped from 56 ML to 29 ML of the interconnecting platform and succumbed to his injuries on the way to Apollo Hospital, Chennai. The remaining four

persons who remained on the platform sustained minor injuries and immediate first aid was provided at the NLC General Hospital and thereafter they were sent to Apollo Hospital, Chennai for further treatment and as a precaution. All four injured workers were discharged on 07.01.2023.

4. Tamil Nadu Pollution Control Board ("TNPCB") inspected the site on 22.12.2022. The District Collector, Cuddalore, and Deputy Director from Directorate of Industrial Safety and Health ("DISH"), Government of Tamil Nadu ("GoT") also visited the site on 30.12.2022. Further, the Additional Director (AD) from DISH inspected the Unit-1 site and investigated the fire incident on 23.12.2022. The AD of DISH issued stoppage order since 13.00 Hrs on 23.12.2022 on account of a few non-compliances observed during the site inspection. Subsequently, NNTPS appealed on 26.12.2022 by submitting a report on the compliances to the Director of DISH and sought revocation of the stoppage order. Stoppage Order was revoked by Director of DISH on 29.12.2022. The PP issued an Office Order dated 22.12.2022, to form a committee to study the sequence of events that led to the fire incident, and to give recommendations to avoid such incidents. Mr. Thirunavakurasu was a contractual workman deployed by Indcoserve Society at the NNTPS plant, who by unfortunately succumbed to injuries and died on 22.12.2022 as a result of the incident. Following steps were taken by the PP:

- a. Rs.50,000/- has been given to the wife of Mr. Thirunavakurasu under the Death Relief Fund Scheme and Rs.5,000/- was given towards funeral expenses on 24.12.2022.
- b. As per the policy of NLCIL, about Rs. 30 lakhs as compensation has been recommended. The same is pending disbursement, subject to receipt of documents of his legal heirs.

- c. Recommendation for permanent employment under Deceased Employees Dependant Employment (DEDE) Scheme has been issued to the deceased family.
 - d. NLC is processing his statutory compensation under Provident Fund and Gratuity through NLC Indcoserve Society.
 - e. NLC has submitted the Form-18 Accident report to NLC Indcoserve to follow up for the compensation due to him under the Employee Compensation Act 1923
 - f. A Special Committee has been formed on 23.12.2022 to provide provide necessary support and assistance to the family members of the deceased and to quicken the settlement process of Statutory and Non-Statutory benefits. The role of the Committee is also to provide the family of the deceased the required psychological support.
 - g. The NLC Committee has been visiting his family continuously and providing moral support.
5. Remaining four persons, who were injured, were provided medical treatment at the expense of the PP, details of which are provided below:

S. No	Name	Status of injury	Employment status	Status of patient
1.	Suresh KK	35% burn injuries	Employed with NLC Indcoserve Society	Patient discharged on 07.01.2023 (Annexure 19)
2.	Selvaraj N	22% burn injuries	Employed with NLC Indcoserve Society	
3.	Senthil Kumar D	20% burn injuries	Employed with NLC Indcoserve Society	
4.	Dakshanamoorthy N	35% burn injuries	Employed with NLC	

6. Furthermore, three workmen employed with NLC Indcoserve, who are insured under the Employee Compensation Insurance, are awaiting compensation payable to them under the Employee Compensation Act

1923. The fourth injured workman is eligible for Special Disability Leave as per special disability leave scheme as well as full wages for the period of disablement. Additionally, the said workman will be eligible for compensation payable under the Employees Compensation Act, 1923, for the disablement sustained, if any, and certified by a qualified medical practitioner as per the Employees Compensation Act, 1923/Group Personal Accident Insurance of the Respondent.

7. PP has also annexed copy of the report of enquiry conducted by the Director Industrial Safety, Tamil Nadu finding as follows:-

“.....On 23.12:2022 in connection with the burn injury, the fatality inquiry conducted by the Joint Director, Occupational Safety and Health, Cuddalore found the following unsafe conditions as per the above provisions.

Unsafe situations:

8 Hunters 8-10, B-40 at Banker bay area in plant 2x500 MW Neyveli Pudu Thermal Power Station (Registration No. CDR 12009). B-30, 13-20, B-8). There is the B-70, B-60 and 950. Each Bimkar measures 12.5m wide, 6.Bm long and 23m high. Its capacity is 800 tanas. All Bunkers are filled with Brown Coal twice for every Shift.

On 22.12.2022 at about 11.30 hrs the Shuttle Curveyor was engaged and the smilie Conveyor Drive moved straight to B-10 to fill Bunker B+10 and stopped and the Shuttle Curveyor was started. Belt Conveycn above for Brown Coal to Shuttle Conveyor: Operated. A B-10 Bunkat suddenly flashed fire 5 minutes after the conveyors were turned on. 1lunker-caused fire is extinguished by calling immediate fire: Service. As a result of the fire accident, 5 workers who were working in the Bunker filling area were injured. In which Mr. N. Thirunavukarasu Age 47) Mr. Narayanasamy fell from a height of 55 m on a feeder walkway at a height of 29 m; 4 laborers who were rescued with burn injuries in Bunker area and one laborer who fell at a height of 29 m were rescued and taken to Neyveli NLC General Hospital and given first aid treatment and admitted to Chennai Apollo Hospital for further treatment. In which Mr. without treatment. N. Thirunavukarasu was reported dead on 22.12.2022 at 03.50 PM.

Details of the person

Sr. No.	Name	age	Father's Name	Nature of work
1.	Mr. N. Thirunavukarasu	47	Sisubramanianan	Indcoserve Contract

				Employee
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Details of burn victims

<i>Sr. No.</i>	<i>Name</i>	<i>age</i>	<i>Father's Name</i>	<i>Nature of work</i>	<i>Extent of burn</i>
1.	Mr. K. Suresh	44	Indcoserve Contract Employee	20%
2.	Mr. N. Selvaraj	46	Neivasikamani	Indcoserve Contract Employee	22%
3.	Mr. D. Senthil Kumar	43	Narayanasamy	Indcoserve Contract Employee	35%
4.	Mr. N. Thakarnamurthy	54	NLCIL employee	22%

The following are unsafe Occurred by contradictions as found during the study.

Defect Noticed during Inspection

1. Zero-meter level- Lignite dust spreaded around all the 8 mills:
2. 29-meter level -Lignite dust spreaded in the apron feeder chute door.
3. Mill discharged ducts dust accumulated.
4. Bunker area lignite dust fully accumulated.
5. Lignite accumulated in beams, cables, etc.,
6. Lignite dust accumulated over the insulated air duct.
7. Seventh floor-64-meter level, the lignite dust stared in the bags.
8. Damaged insulation debris store at 64-meter level.
9. 75-meter level, damaged insulation debris spreaded all over the floor area.

Thus, the death and termination of the worker is covered by clauses 1 to 9. Failure to follow procedures, failure to take safety precautions, and allowing work in unsafe conditions.

This is order prohibits the use of the buildings and machinery in the factory until the approval of the Director of Industrial Safety and Health has been obtained by informing the Directorate of Industrial Safety and Health with appropriate photographic evidence of the rectification and rectification of the unsafe conditions listed above under 1 to 9. Section 40 (provided under 21.

And this order shall come into effect from 23.12.2022 at 1.00 PM.

Associate Director, Industrial Safety and Health amm Cuddalore.”

8. In view of affidavit of the PP and the Enquiry report annexed thereto, it is clear that the PP failed to follow all safety protocols and apart from its accountable in terms of compensation, it must take action against those responsible for such failure. Further, strict compliance of environmental safety norms must be ensured in future to avoid deaths and injuries. It is more so when such incident has happened second time which is a matter of concern.

9. We may reproduce extracts from the earlier order of this Tribunal dated 22.12.2020 in O.A. No. 108/2020, News item published in the “Indian Express” dated 01.07.2020 titled “Tamil Nadu Neyveli boiler blast: 6 dead, 17 injured”as under:-

“

5. Accordingly, the Committee has given its report dated 23.10.2020. The Committee held its meeting on 02.09.2020, visited the site on 09.09.2020 and 10.09.2020. It gave opportunity to the industry to present its view point. Victims were also given opportunity to place their view point. The Committee examined the relevant documents on record and interacted with the officials at the site. The Committee also looked into the background of the industry, statutory status, process details, status of compliance of pollution control norms and other significant facts.

6. The conclusion of the Committee are as under:-

CONCLUSION AS PER SCOPE OF WORK BASED ON NGT DIRECTION

a. The sequence of events;

The following was the sequence of events revealed by the industry.

- *On 30.06.2020 at 9.31 hrs.: Unit-5, stage - II of Thermal Power StationII (TS-II) was shut downed due to heavy slag discharge for maintenance work and boiler left for forced cooling by deploying ID & FD fans.*
- *On 01.07.20, fateful day and at the time of accident, forty-seven (47) persons belong to Boiler housekeeping group were working.*

- On 01.07.2020, at 7.00 AM, under the supervision of Deputy Chief Engineer, E5 level executive in-charge of housekeeping, a team of 10 workmen reached the floor at 15 ML with an intention to remove the lignite dust from the girder. Found that the work spot was so hot and found the red hot lignite dust (smoldering) inside the girder at front & right side opening. So dropped the plan of cleaning at 15 ML and decided to clean at 32 ML.
- On 01.07.2020, at 7.30 AM, started removing the accumulated lignite dust from the box type girders at 32ML front and rear side of boiler, by engaging 5 workmen on each side using scrappers made of mild steel and Iron pans
- Around 08:00 hours, four workmen entered inside the rear side girders through right opening and started removing the lignite dust at 32ML. About 100 steel Pans of lignite dust (about 200 kg total) were removed and after completing the work, four workmen came out around 09.30 hours and started taking rest at 28 ML floor. No water washing was carried out.
- Around 08:00 hours, five workmen were engaged at the front side of boiler for the job of removing the lignite dust from the girders at both the ends. About 30 Iron Pans of lignite dust (about 35 kg total) was removed and the work was going on.
- Around 09:45 hours, after completion of cleaning work at rear right side of girder at 32ML, housekeeping in-charge, who was overseeing the cleaning works on the same floor had sent one of the workmen, who was engaged in the cleaning work of the girder, inside the rear side girder at 32ML to check and ensure that the lignite dust was fully removed, so that follow-up action of closing of manhole door work can be given to Boiler Maintenance group. When he entered into the girder to carry out the inspection. DCE was near the opening
- Around 09:53 hours, all of sudden, an explosion took place resulting in fatal injuries to the individual along with 5 other workmen, who all were carrying out cleaning of front side girder at 32ML. Six workmen killed on the spot. The fireball that has leaped out of the girder caused severe burn injuries to those standing nearby box girders at 28ML floor. (Four workmen and Deputy Chief Engineer). 12 employees were also injured at different levels of 0, 15 & 32 ML.
- Around 09:55 hours, on hearing the blasting sound, fire wing of TS-II unit, Central Industrial Security Force (CISF), NLCIL comprising of 8 fire personnel along with fire tender reached the accident site. Found that fire was at different levels of boiler structures up to 32 ML. Ambulance was called for.
- By the time, Firefighting personnel from TS-II expansion unit also reached the accident site
- Immediately the fire personnel swing into action to put off the fire and searched for causalities
- The Assistant Commandant and three inspectors of Fire reached the accident site and assessed the situation. Requested the additional force from all the seven fire stations and pressed into the operation
- On receipt of request, fire crews from nearby station namely TS-I, TS-I Expansion, Mine-I, Mine-IA and Mine-II reached the accident site and started their operation

- *DIG, Sr. Commandant, Deputy Commandant and Sector commanders of the industry reached the accident spot and started executing the fire fighting and rescue operation*
- *Security personnel of different unit also called and pressed into the operation particularly to control the crowd*
- *At around 10:08 hours, the accident was informed to the local administration*
- *At around 10:30 hours, CISF Fire personnel put off the fire completely. Eleven fire personnel from New Neyveli Thermal Power Plant (NNTPP) along with the fire tender reached the accident spot and joined the rescue operation*
- *Seventeen persons got injured and were sent to the Hospital of M/s. NLCIL for medical treatment*
- *After providing initial medical treatment at NLCIL hospital, sixteen persons were sent to Apollo Hospital, Chennai for further and better treatment. One injured person was admitted in NLCIL hospital for treatment of injury on left hand joint.*
- *Fire personnel continues the search operation of accident area and found six bodies as detailed below:*

At the front side of boiler at 28ML:

All the five persons working inside and outside of the girder, killed on the spot. Two bodies were removed from inside of the girders one each at left and right side. Three bodies were removed from outside of the girders two at left and one from right side.

At the rear side of boiler at 28ML floor:

One person who gone inside the girder to check, died on the spot. The Executive, DCE approaching the openings got injured and expired at the Apollo hospital, Chennai on 03.07.20. Four workmen standing at a distance of twenty to twenty-five feet distance on 28 ML floor gratings got severe burn injury.

- *At around 13:30 hours, the entire operation was completed and fire crews except TS-II and TS-II Expansion, returned to their respective station after a briefing by the Senior Commandant.*
- *At around 14:55 hours, after getting final clearance, Fire crews of TS-II and TS-II Expansion returned to their respective fire station.*
- *At around 12.30 hours a meeting was convened and discussed about the accident and related issues including the treatment, relief measures, compensation and employment on compassionate ground etc. and address the same. The meeting was attended by CMD, Functional Directors, District Collector, Sub Collector, Superintendent of Police, and Revenue Officials. The meeting was continued till evening and could not solve the issue. The meeting was continued on 02.07.20 too and with some local representatives. Finally decided a compensation of Rs. 30 (Rupees thirty lacs) and 5 (Rupees five lacs) lacs to the deceased and injured respectively and a regular job to one of the family member of each deceased.*

- *Out of sixteen person undergone treatment in Chennai, nine persons died during treatment on various date. Seven injured discharged after the treatment*
- *On 02.07.20 a closure notice was served by Directorate of Industrial Safety and Health to the Unit-V for the lapse of safety, which caused the death and injuries to the employees.*

b. Causes of failure and persons and authorities responsible therefore;

Causes of failure

- ***The openings provided in the Girders were not closed after the completion of structure erection work.***
- ***Due to lack of knowledge on SOP in carrying out cleaning activities in a confined area as well as technical knowledge about smoldering of accumulated fine lignite dust and probable formation of water gas.***
- ***Due to lack of knowledge on application of water to the red hot lignite, water gas will be generated. Water gas consists of Carbon monoxide and Hydrogen. When Hydrogen reaches the level of 4% in ambient air, gets exploded with the release of enormous energy spontaneously***
- ***SOPs for confined space are not followed.***
- ***Necessary training for the working in confined area was not imparted; awareness program was not conducted for the persons involved in the accident and also in the hazardous areas.***
- ***No work permit was issued before the girder cleaning***

Persons and authorities responsible:

The following officers are mainly responsible for the accident

- ***The Occupier of the unit no.: 5, TS-II, M/s. NLCIL***
- ***Divisional Head of Operation and maintenance of the unit***
- ***Safety Officer***

c. The compliance of norms laid down in Technical Guidance Manual for Thermal Power Plants.

I. Environmental Legislations:

i. Under the Water Act

The industry has obtained consent of TNPCB under the Water (P&CP) Act, 1974 with validity up to 31.03.2020 vide Board's Proceeding dt. 01.08.2019 and subsequently extended up to 30.09.2020 vide TNPCB office orders dated 01.04.2020 and 01.07.2020 in view of the lockdown due to the pandemic Covid19.

The industry has been consented to discharge 100 KLD of sewage and 6225 KLD of trade effluent. The industry has provided septic tank/dispersion trench arrangements for the treatment and disposal of sewage.

The industry has also provided treatment plant for the waste water generated from the canteen and the treated waste water is disposed on land within the premises for gardening.

The trade effluent generated from Demineralization plant is neutralized in neutralization tank and then treated in a settling tank along with effluent from other sources such as boiler blow down, cooling tower bleed off, floor washings, etc. The settling tank overflow is discharged into an adjacent canal

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The one sample of treated sewage (canteen waste water) and trade effluent were collected by Committee on 10.09.2020 and analyzed in TNPCB Lab. The details of analytical report are furnished below:

Test results of Treated Sewage (canteen waste water)

S No	Parameter	Test Results	Standards	Remarks
1	pH	7.21	5.5 to 9.0	All the parameters of the treated sewage adhere to the standards prescribed by the Board.
2	TSS	12	30	
3	BOD	16	20	

Test results of Treated Trade Effluent

S. No.	Parameter	Test Results	Standards	Remarks
1.	pH	7.20	5.5 to 9.0	All the parameters are within the Standards except TSS which is marginally above the standards.
2.	TSS	104	100	
3.	TDS	932	2100	
4.	Chlorides	185	1000	

5.	<i>Sulphate</i>	<i>187</i>	<i>1000</i>
6.	<i>Oil & Grease</i>	<i>< 2</i>	<i>10</i>
7.	<i>BOD</i>	<i>21</i>	<i>30</i>
8.	<i>COD</i>	<i>176</i>	<i>250</i>
9.	<i>Total chromium</i>	<i>< 0.05</i>	<i>2</i>
10.	<i>Lead</i>	<i>< 0.05</i>	<i>0.1</i>
11.	<i>Mercury</i>	<i>< 0.003</i>	<i>0.01</i>
12.	<i>Arsenic</i>	<i>< 0.01</i>	<i>0.2</i>

The industry has provided online monitoring system at the outlet of the settling tank for the parameters such as Temperature, pH and TSS and the same has been connected to the Water Quality Watch, TNPCB, Chennai and CPCB server.

The status of compliance of the conditions of the latest consent order is detailed below:

Sl. No.	Condition	Compliance status
1	<i>The unit shall ensure that the treated trade effluent shall satisfy the standards prescribed by the Board before disposal.</i>	<i>The test report of the sample collected on 10.09.2020 reveals that all the parameters are within the limits prescribed by the Board except the TSS (104 mg/litre) which is</i>
2	<i>The unit shall maintain the online sensor for pH, Temperature, TSS in the treated effluent disposal line in good condition and upload the data to Water Quality Watch, TNPC Board, Chennai.</i>	<i>The online monitoring system is maintained and the data are transferred to the Water Quality Watch, TNPC Board, Chennai</i>

ii. Under the Air Act

The industry has been issued with consent of the Board under the Air (P&CP) Act, 1981 up to 31.03.2020 vide Board's Proceeding dated 01.08.2019 and extended up to 30.09.2020 vide Board office orders dated 01.04.2020 and 01.07.2020.

The industry has been consented to let out emission as follows.

Stack No.	Point of emission sources	Air Pollution Control measures	Height of stack (in m)
1	Boiler furnace of unit - I	Electrostatic Precipitator with stack	170
2	Boiler furnace of unit - II	Electrostatic Precipitator with stack	170
3	Boiler furnace of unit - III	Electrostatic Precipitator with stack	170
4	Boiler furnace of unit - IV	Electrostatic Precipitator with stack	220
5	Boiler furnace of unit - V	Electrostatic Precipitator with stack	220
6	Boiler furnace of unit - VI	Electrostatic Precipitator with stack	220
7	Boiler furnace of unit - VII	Electrostatic Precipitator with stack	220

The industry has provided Electro Static Precipitators (ESP) with stacks of suitable height as air pollution control measures to the boilers. The industry has also provided water sprinkler system/ dust suppression system/ fogging system to suppress fugitive emission

The industry has provided online stack monitoring system for parameters PM, SO₂ and NO_x and connected the same to the Care Air Centre (CAC), TNPCB, Chennai and CPCB.

The NLC has installed Continuous Ambient Air Quality Monitoring Stations at the following 5 locations near Thermal Power Station-II and the ambient air quality is monitored by the IIT-M, Chennai/NLC Lab (NABL accredited) for PM₁₀, PM_{2.5}, SO₂, and NO_x. Samples are being collected from each location on alternate days and analyzed.

- i. Block No 29*
- ii. Umangalam*
- iii. Mudanai village*
- iv. ChinnaKappankulam*
- v. Vadakkuvellur*

The report of analysis of Ambient Air Quality for the period of June 2020 to August 2020 is furnished below.

The AAQM data for the month of June, 2020

Sl.No.	Station	PM₁₀ ($\mu\text{g}/\text{m}^3$)	PM_{2.5} ($\mu\text{g}/\text{m}^3$)	SO₂ ($\mu\text{g}/\text{m}^3$)	NO_x ($\mu\text{g}/\text{m}^3$)
1.	Block 29	50.6 to 57.9	18.2 to 26.7	2.8 to 5.0	14.0 to 28.2
2.	Umangalam	45.6 to 67.4	21.9 to 32.5	1.87 to 3.18	16.1 to 22.4
3.	Mudanai	44.6 to 55.7	19.6 to 29.3	2.56 to 4.04	15.3 to 21.4
4.	Chinna	41.1 to 69.6	21.4 to 36.2	2.14 to 3.26	16.6 to 26.6
5.	Vadakkuvellur	65.1 to 76.5	27.3 to 38.4	3.98 to 5.68	24.9 to 36.7

Standards

100

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The AAQM data for the month of July, 2020

S. No	Station	PM₁₀ ($\mu\text{g}/\text{m}^3$)	PM_{2.5} ($\mu\text{g}/\text{m}^3$)	SO₂ ($\mu\text{g}/\text{m}^3$)	NO_x ($\mu\text{g}/\text{m}^3$)
1.	Block 29	41.5 to 54.4	19.1 to 29.9	4.1 to 6.0	18.3 to 25
2.	Umangalam	49.8 to 69.6	20.2 to 33.7	1.98 to 3.25	15.0 to 31.5
3.	Mudanai	48.8 to 69.1	20.2 to 28.6	2.46 to 3.72	16.2 to 23.6
4.	Chinna	45.7 to 57.2	20.5 to 29.4	2.16 to 3.7	16.3 to 26.5
5.	Vadakkuvellur	60.9 to 74.3	28.7 to 36.8	3.78 to 4.95	23.2 to 33.9

Standards

100

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80

The AAQM data for the month of August, 2020

S. No	Station	PM₁₀ ($\mu\text{g}/\text{m}^3$)	PM_{2.5} ($\mu\text{g}/\text{m}^3$)	SO₂ ($\mu\text{g}/\text{m}^3$)	NO_x ($\mu\text{g}/\text{m}^3$)
1.	Block 29	42.5 -52.2	19.7 to 29.9	2.1 7.5	14.3 - 24.2
2.	Umangalam	58.1 -68.6	21.3 -33.7	2.19 -3.12	16.1 -30.1
3.	Mudanai	43.2 -58.2	20.2 -29.8	2.15 -3.19	15 -22.6
4.	Chinna Kappankulam	42.6 -56.5	21.1 -29.1	2.13 -3.1	17.3 -26.6
5.	Vadakkuvellur	59.6 -69.1	21.1 -35.1	3.69 -4.76	21 -30.6

Standards

100

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The above data shows that PM₁₀, PM_{2.5}, SO₂ and NO_x in the ambient air are within the standards prescribed by the Board

The CPCB vide its Letter dated 11.12.2017 has given time limit from March 2021 to Dec 2022 for the implementation of Flue Gas Desulphurization (FGD) to control the emission of SO₂ (in the units 1 to 7 of TPS II) and for the unit 5, the time limit is up to June 2022.

The status of compliance of the conditions of the latest consent order is detailed below:

Sl. No.	Condition	Compliance status
1	The unit shall operate and maintain the Air Pollution Control measures efficiently and continuously so as to satisfy the Emission / Ambient Air Quality standards prescribed by the Board.	The unit has provided air pollution control measures for the point and fugitive sources of emission.
2	The unit shall comply with the emission Standards for Thermal Power Plants as per Ministry's Notification S.O. 3305(E) dated: 07.12.2015, G.S.R. 593(E) dated: 28.06.2018 and as amended from time to time.	The online stack emission data from January to April 2020 shows that PM (67 to 70 mg/m ³), NO _x (197 to 253 mg/m ³) were within the standards (100 & 600 mg/m ³ respectively). The SO ₂ (1336 to 1945 mg/m ³) was above the standards (600 mg/m ³). For the control of SO ₂ emission, the CPCB has given time limit up to June 2022 for providing Flue Gas Desulphurization (FGD). [The full month details for May and June 2020 are not available due to server problem.]
3	The unit shall comply with the MoEF& CC Notifications on Fly Ash Utilization S.O, 763(E) dated 14.09.1999, S.O. 979(E) dated 27.08.2003, S.O. 2804(E) dated 3.11.2009, S.O. 254(E) dated 25.01.2016 as amended from time to	The industry has provided dry fly ash collection system. The fly ash is disposed to cement industries and brick manufacturers. The bottom ash is sent to Mine-II of NLC India Ltd for back filling in the mined area.
4	The unit shall install Flue Gas Desulphurization (FGD) System based on Lime/Ammonia dosing to capture Sulphur in the flue gases to meet the SO ₂ emissions standard of 100 mg/Nm ³ by December 2021, September 2021, June 2021, March 2022, June 2022, September 2022, & December 2022 in unit 1, 2, 3, 4, 5, 6 & 7 respectively so as to comply SO ₂ emission limit as reported.	The industry has initiated action to install FGD system and has informed that tendering process is in progress.

iii. Solid Waste Management:

The industry has provided dry fly ash collection system. The industry generates 3150 Tonnes per day of fly ash. The fly ash is disposed to cement industries and brick manufacturers. The bottom ash/slag is sent to Mine-II of NLC India Ltd for back filling in the mined area

The industry is generating 175 Tonnes per Annum of used/spent oil (Hazardous Waste). The industry has obtained authorization under the Hazardous Waste (Management, Handling and Transboundary Movement) Rules 2008 vide Board's proceeding dated 09.02.2017 with validity up to 08.02.2022.

iv) Environmental Clearance:

NLC Thermal Power Station II was commissioned in two stages from 1986 to 1993. The industry has obtained Environmental Clearance in two stages. The Environmental Clearance for the stage II of the TPS-II (units 4,5,6& 7 – 4 x 210 MW) was obtained on 05.01.1983 from the Ministry of Environment, GoI., New Delhi. The status of the compliance of the conditions of the environmental clearance is detailed below:

Sl.No.	Conditions	Compliance
1.	Adequate control equipment would be installed to contain the emissions of pollutants from the stacks in such a way that the ambient concentration of SO ₂ and particulate matters remain within the desirable limits of 60µg/m ³ and 150µg/m ³ respectively.	The industry has provided Electrostatic Precipitator with stack of suitable height for the boiler. As per the latest CPCB Notification, the AAQ standards prescribed is PM ₁₀ - 100 µg / m ³ PM _{2.5} – 60 µg / m ³ SO ₂ - 80 µg / m ³ NO _x - 80 µg / m ³
2.	Appropriate monitoring system should be set up to have regular sampling and analysis of the pollutants in the ambient air. This will help in ascertaining the efficient of the equipment and useful in taking suitable measures to maintain the desired ambient standard.	The industry has installed 5 numbers of Continuous Ambient Air Quality monitoring stations near the TPS II And the ambient air quality is monitored by IIT-M, Chennai/NLC Lab (NABL accredited).

d. Compliance with statutory safety norms including hazard risk management.

M/s NLCIL is a public sector enterprise conferred with status of Navratna Company by Government of India. The following statutes are applicable to this organization:

- 1. The Factory Act, 1948*
- 2. The Tamil Nadu Factory Rules, 1950 and*
- 3. Manufacture, Storage, Import of Hazardous Chemicals Rules, 1989.*

The general safety awareness among the workforce and managerial staff found to be satisfactory during the field visits. In addition to that some of the sections of the factories act needs to be looked into, which were one of the contributory factors for the cause of this accident and they are listed as -

Sec 7A General Duties of Occupier *(1) Every occupier shall ensure, so far as is reasonably practicable, the health, safety and welfare of all workers while they are at work in the factory.*

Sec 11 Cleanliness *(1) Every factory shall be kept clean and free from effluvia arising from any drain, privy or other nuisance, and (a) in particular- accumulations of dirt and refuse shall be removed daily by sweeping or by any other effective method from the floors and benches of workrooms and from staircases and passages, and disposed of in a suitable manner.*

Sec 14 Dust and Fumes *(1) In every factory in which, by reason of the manufacturing process carried on, there is given off any dust or fume or other impurity of such a nature and to such an extent as is likely to be injurious or offensive to the workers employed therein, or any dust in substantial quantities, effective measures shall be taken to prevent its inhalation and accumulation in any workroom, and if any exhaust appliance is necessary for this purpose, it shall be applied as near as possible to the point of origin of the dust, fume or other impurity, and such point shall be enclosed as far as possible.*

Sec 33 Pits, sumps, openings in floors, etc.- *(1) In every factory fixed vessel, sump, tank, pit or opening in the ground or in a floor which, by reasons of its depth, situation, construction or contents, is or may be a source of danger, shall be either securely covered or securely fenced.*

Sec 36. Precautions against dangerous fumes, gases, etc.- *(1) No person shall be required or allowed to enter any chamber, tank, vat, pit, pipe, flue or other confined space in any factory in which any gas, fume, vapour or dust is likely to be present to such an extent as to involve risk to persons being overcome thereby, unless it is provided with a manhole of adequate size or other effective means of egress. (2) No person shall be required or allowed to enter any*

confined space as is referred to in sub-section (1), until all practicable measures have been taken to remove any gas, fume, vapour or dust, which may be present so as to bring its level within the permissible limits and to prevent any ingress of such gas, fume, vapour or dust and unless- (a) a certificate in writing has been given by a competent person, based on a test carried out by himself that the space is reasonably free from dangerous gas, fume, vapour or dust; or (b) such person is wearing suitable breathing apparatus and a belt securely attached to a rope the free end of which is held by a person outside the confined space.

Sec.37. Explosive or inflammable dust, gas, etc.- *(1) Where in any factory any manufacturing process produces dust, gas, fume or vapour of such character and to such extent as to be likely to explode on ignition, all practicable measures shall be taken to prevent any such explosion by-*

(b) Removal or prevention of the accumulation of such dust, gas, fume or vapour.

(c) Exclusion or effective enclosure of all possible sources of ignition.

(2) Where in any factory the plant or machinery used in a process such as is referred to in sub-section (1) is not so constructed as to withstand the probable pressure which such an explosion as aforesaid would produce, all practicable measures shall be taken to restrict the spread and effect of the explosion by the provisions in the plant or machinery of chokes, baffles, vents or other effective appliances.

Sec.38. Precautions in case of fire. *- (2) Effective measures shall be taken to ensure that in every factory all the workers are familiar with the means of escape in case of fire and have been adequately trained in the routine to be followed in such cases.*

Site observations:

- 1. SOPs for confined space are not followed.*
- 2. Necessary training for the working in confined area was not imparted; awareness program is not conducted for the persons involved in the accident and also in the hazardous areas.*
- 3. No work permit was issued before the girder cleaning.*
- 4. Proper maintenance schedules are to be prepared.*
- 5. Boiler startup and shutdown procedures shall be developed and followed strictly.*
- 6. Hazard Identification and Risk Assessment shall be renewed.*
- 7. Periodicity of the Mock Drills and frequency shall be enhanced.*
- 8. Safety audit was carried out by National Safety Council in the year 2018. The same may be carried out at the earliest.*
- 9. NLC has prepared onsite emergency plans in 2020 as per Rule 13 of MSIHC Rules 1989. Whereas no evidence was found with regard to full fledged rehearsals on onsite emergency plan. Also, up-dating of telephone numbers in case of*

superannuation of employees, transfers, promotions shall be carried out as and when required.

10. Off-site Emergency Plan and rehearsals shall be carried out in coordination with the District Collector to mitigate offsite emergency situations arises, if any.

Extent of damage of life, human and non-human; public health; and environment including water, soil, air;

The Committee studied the various short and long-term effects of the fire accident on the surrounding areas. The Committee also examined the immediate impacts of the blast and release of high energy on humans, other non-living beings, environment and their likely impact in the short and longterm.

Extent of damage to life and human:

- i. Data obtained from the NLC officials and survived witness reveals that, during this incident, 17 personnel were injured and all were sent to NLC GH for medical treatment, after providing initial medical treatment at NLC GH, 16 injured personnel were further sent to Apollo Hospital Chennai for further treatment and one person with minor injury remained admitted at NLC GH for treatment.
- ii. CISF Fire Wing personnel searched the entire affected area of the Boiler and recovered six dead bodies which were trapped at inaccessible/congested and dark areas inside the girders with rigorous efforts.
- iii. The accident took place within the industry premises, no loss or damage to other life except the following.

Extent of damage to life and human

S. No.	Stages	Dead	Injured
1.	At the time of accident	6	17
2.	First aid given at NLC Hospital	--	17
3.	Treated at Apollo Hospital for further treatment	--	16
4.	Treated at NLC hospital itself and discharged	--	01
5.	Number of persons dead at later stages during treatment	09	--
6.	Number of persons treated at Apollo hospital and discharged	--	07
	Total	15	08

Extent of damage to the property;

Material damages due to the accident and its estimated cost

S. No.	Material damages	Estimated Cost, lacs
1.	Girder material	151
2.	Girder works	153
3.	Refractory material	21
4.	LT cables and Automatics	10
5.	Control & Instrumentation	21
6.	Boiler Lift	128
7.	Civil work including removal of debris	170
	Total	654
<i>(Rupees six and half crore)</i>		

Nonoccurrence of damage to non-humans has been ascertained.

As far as environmental issue is concerned there was no visible damage to the environment including air, water and soil. Observations is based on the following facts:

- 1. As the incident occurred almost in a confined enclosure type i.e., girder.*
- 2. Within 30-40 minutes fire was engulfed, contained within the work area and did not spread to open environment*
- 3. Incident occurred at 32 M height (within 20-meter radius), flooring of all levels is steel gratings and entire plant area is covered with concrete flooring.*
- 4. From the Online data of five Ambient Air Quality stations located surrounding the unit for the month of June and July, 2020 it is observed that the amount of emission discharged due to the accident is not quantifiable and below the detection limit.*
- 5. Occurrence of healthy vegetation around the plant justifying no damage to vegetation due to this fire accident.*
- 6. No smoke strain is observed on any of the surfaces*

f. Steps to be taken for compensation of victims and restitution of the damaged property and environment and the cost involved;

In accordance with the Employee Compensation Act, 1974, the mechanism of calculating the Compensation is

$$\text{Compensation} = 50\% \text{ of Monthly wages} * \text{Relative factor}$$

Ministry of Labour and Employment, GoI has notified Rs.15000/- (Rupees fifteen thousand only) as monthly wages with effect from 3rd January, 2020 vide Notification S.O.71(E) dt.: 3rd January, 2020. The amount of compensation to be paid to the deceased and injured as per the Employee Compensation Act, 1974 is detailed below:

Sl. No.	Name	Nature of Employment	Date of Birth	Age As On 01-07-2020	Wages	Employee Compensation
1	2	3	4	5	6	7
Deceased						
1	Sivakumar.G	NLCIL Employee	04-10-1967	53	140363	10,70,100
2	Ravichandran C	NLCIL Employee	15-5-1970	50	65380	11,48,175
3	Vaithyanathan A M	NLCIL Employee	01-04-1972	48	92249	11,98,500
4	Jothiramalingam V	NLCIL Employee	07-10-1972	47	100641	12,23,025
5	Suresh R	NLCIL Employee	26/12/1970	49	89274	11,73,525
6	Ravichandran K*	NLCIL Employee	05-02-1964	56	73107	9,89,625
7	Selvaraj G	Indcoserve Society	05-04-1969	51	15501	NE
8	Elangovan T	Howsicos Society	04-05-1971	49	15501	NE
9	Anandapadmanabhan T	Indcoserve Society	01-01-1976	44	15501	NE
10	Ramanathan D	Private Contract	04-07-1974	46	15501	NE
11	Nagaraj P	Private Contract	05-07-1978	42	15501	NE
12	Silambarasan S	Private Contract	09-07-1995	24	15501	NE
13	Arunkumar S	Private Contract	06-09-1994	26	15501	NE
14	Venkatesaperumal K	Private Contract	04-05-1992	28	15501	NE
15	Padmanaban K	Private Contract	11-04-1991	29	15501	NE
Total						68,02,950

**It is reported that Shri. K. Ravichandran, a regular employee also eligible for the Employee Compensation and all other benefits as other deceased. Payment is kept pending since there is a dispute in*

identifying the legal heir due to dispute within the family. Once it is resolved, the payment will be released to the legal heir/s.

Whereas Co-operative Society and Private Contract workers are covered under Employee State Insurance (ESI). Under ESI Act, monthly pension at the rate of 90% of last drawn wages, are admissible to them. The industry extended their service in filing the return for the monthly pension and the same is under process. Whereas Statutory, Non statutory and Total compensation paid by the industry is placed at A8, A9 and A10.

The Hon'ble Minister of Coal, GoI has ordered the payment of compensation of Rs.15 lacs to the deceased and regular employment to one of the family members of the deceased.

The Government of Tamilnadu also announced a compensation of Rs.3.0 lacs to fourteen deceased under Chief Minister's Relief Fund and released. Copy of the Order issued to this effect is placed at A11. Thus a sum of Rs.42 lacs has been distributed as a compensation to the fourteen deceased under Chief Minister's Relief Fund by Government of Tamilnadu. A proposal has been sent for sanction of compensation for fifteenth deceased one (Shri. K. Ravichandran) and injured too.

A sum of Rs. 5,17,73,013/- (Rupees five crores seventeen lacs seventy three thousand thirteen only) and Rs. 40 lacs (Rupees forty lacs only) have been distributed to the deceased and injured by M/s. NLCIL towards the compensation respectively. Thus a total of Rs. 5,57,73,013/- (Rupees five crore fifty seven lacs seventy three thousand thirteen only) have been distributed towards the compensation.

In addition, M/s. NLCIL has deposited an amount of Rs.5 crores (Rupees five crore only) in the SB account of District Collector, Cuddalore on 21st July, 2020 in compliance with the Order dt.8th July, 2020 issued by Hon'ble NGT, Principal Bench, New Delhi.

In light of above, the Committee is of the opinion that the amount of Compensation paid by the industry is satisfactory. The process of providing regular employment to one of family members of the victims shall be completed within a period of one year.

Relief measures extended to the victims by the industry:

Restitution of the damaged property and the cost involved;

S. No.	Material damages	Estimated Cost, lacs
1.	Girder material	151
2.	Girder works	153
3.	Refractory material	21
4.	LT cables and Automatics	10

5.	Control & Instrumentation	21
6.	Boiler Lift	128
7.	Civil work including removal of debris	170
	Total	654
<i>(Rupees six and half crore)</i>		

Restitution of Environment and the cost involved;

From the Online data of five Ambient Air Quality stations located in the vicinity of the unit for the month of June and July, 2020, it is observed that there is no abnormal data during this period may be due to the discharge of meagre quantity (Below Detection Level) of emission due to the accident. Thus the impact on the Ambient Air quality is not quantifiable may be due to the combustion rather than a fire accident.

Occurrence of healthy vegetation around the plant justifying no damage to vegetation due to this accident. No smoke strain is observed on any of the surfaces of the plant, within as well as outside of the industry premises. Further it is observed that no chance of impact on the soil and water, since the accident occurred within the girder structure from 15 to 32 m elevation, flooring of all levels is steel gratings and entire plant area is covered with concrete flooring.

Relief measures taken by the industry to the victims of the accident:

- Rs.10 lacs through cheque and Rs.50,000/- in cash paid to the dependents of six deceased regular employees
- Rs.5 lacs through cheque and Rs. 50,000/- in cash paid to the dependents of nine deceased Contract workmen/Supervisor.
- Hon'ble Minister of Coal, Government of India announced Compensation of Rs.15 lacs to the deceased and regular employment to one of the family member of the deceased
- Counseling session and motivation programs are organized for the family of the deceased to lead the normal life, in association with "Art of Living"
- Special cell comprising members from the deceased earlier in M/s. NLCIL is formed to extend moral, psychological support, speed up the settlement process of Statutory and non-Statutory benefits and lead a normal life.
- **Medical treatment** was given at Super Specialty Apollo Hospital, Chennai to the injured. Free Accommodation, food and transportation were extended to all the family members/attendees during the treatment period
- NLC doctors and HR executives were deputed to Apollo Hospital, Chennai to supervise, co-ordinate and extend all possible support to the family members/attendees during the treatment period. Spared one number of ambulance for the use of injured persons.

- *Visit to the house of bereaved and injured persons on weekly basis to provide relief measures, assistance in getting certificates from respective agencies and created awareness about various benefits and compensation applicable to them.*
- *One Nodal officer was identified to meet the needs of the family members of deceased.*
- *Fruit baskets and Health Supplement were provided*
- *A special cell has been constituted to support, meet the requirements, coordinate Art of Living program, console, and provide solace*
- *As a policy, M/s. NLCIL extend the following facilities to the family of deceased*
- *Allotment of quarter as per their choice*
- *Posting in the desired units of M/s. NLCIL., Neyveli*
- *Arranging well being program*
- *Creating avenues for improving their livelihood*
- *In claiming compensation from the Authorities*

g. Remedial measures to prevent recurrence;

1. *Safety study, safety audit, HAZOP study and risk assessment shall be carried out by competent agencies.*
2. *Girders structural stability study shall be conducted by reputed authorities, like IIT, Structural Engineering Research Institutes, etc.,*
3. *All the unwanted openings to be closed completely to prevent lignite dust entering into the box girder, except for maintenance or specific work. It is also essential that before closing the openings, complete removal of lignite deposits by proper cleaning inside the girders (following all the safety norms) is advised.*
4. *To avoid spreading lignite dust from furnace, mill house, re-suction duct, suitable dust control, dust extraction and dust suppression system shall be provided to check the fugitive emission.*
5. *Suitable and appropriate explosion vent shall be provided in vertical column in consultation with the designers.*
6. *Endoscopic camera shall be used to measure the dust level inside the girder to ensure the safety of the unit.*
7. *For repair of box girder inside and outside by welding, adequate safety measures to be taken before allowing persons into the girders.*
8. *Thermal scanner shall be used to check the hotness and temperature of the girders both inside and outside before carrying out any work inside the girders to remove the lignite dust only with the supervision of NLCIL staff with the safety clearance.*
9. *Only trained persons and contract labours shall be allowed.*
10. *No person shall be allowed inside the box girder without taking adequate safety procedures like confined space work permit.*

11. *The points of origin of lignite dust leakage shall be identified and suitable engineering measures shall be taken to arrest the spillages and the discharge of emission.*
12. *SOP shall be modified for the periodic inspection of girder and other structures for the deposition of lignite dust and periodical removal of the same. Without work permit, no work in any nature shall be carried out.*
13. *Periodic rigorous housekeeping shall be carried out.*

h. Any other incidental or allied issues found relevant

Earlier Incidence of fire in boiler of Unit 6 on 07.05.2020 and conclusion of the committees:

A fire incident in Unit-6 Boiler of TS-2 was occurred on 07-5-2020 at 16.41 hrs. In order to analyze the root cause of the incidence and suggest remedial measures to prevent reoccurrence of such incident in future, a committee was constituted which has suggested

The committee thoroughly enquired with respective responsible officials and inspected Boilers in Units 5, 6 & 7 and assessed the damages and observed all evidences. All DCS historical data of Critical Measurements, Trends and SOE print outs of Units 5, 6 & 7 during the incident on 07-05-2020 were collected and analyzed in depth. Reports of six similar incidents occurred earlier in the Units 5 & 6, since 2001 were collected and reviewed critically.

After complete analysis of data and evidences, the committee held detailed deliberations on the 2 possibilities for the Fire Incident (i) either due to localized pressurization inside the Boiler Furnace (ii) Explosion inside the horizontal box type girder at 42ML right side. As all the evidences were supporting the theory of Explosion inside the horizontal box type girder, the committee concluded that explosion inside the girder Box, outside the Boiler Furnace as root cause for the fire incident.

Accordingly, recommendations were given to various working areas viz. Boiler Structural Maintenance, House Keeping, Boiler Maintenance, Lignite Handling System, Operation, Technological Up gradation (Control and Instrumentation) to avoid both possibilities of Boiler Furnace Inside Explosions as well as Boiler Outside Girders Explosion in order to operate the Units safely, without any untoward similar incidents in future.

In addition, the committee strongly recommended the complete Healthiness Survey of all 07 Units with respect to Boiler Main Structures by Structural Specialist agencies like "Structural Engineering Research Centre"(SERC, CSIR-Chennai). The committee also suggested that extra care should be taken during cleaning by following strict house-keeping measures at all locations especially in the areas of Boiler and Lignite Handling System so that Lignite Dust accumulation is avoided.

14. CONCLUSION OF THE REPORT:

The Accident;

On 1st July 2020, a fire incident referred to as “TamilnaduNeyveli Boiler Blast: 6 dead and 17 injured”, occurred at the 15 ML girder of the Boiler supporting structure of unit – V of Thermal Power Station – II (TS-II), M/s. NLC India Limited, Village Ammeri, Neyveli, Viruthachalam Taluk, Cuddalore District.

The accident took the life of six persons on the spot and subsequently nine persons while undergoing treatment at Super Specialty Hospital i.e., Apollo Hospital, Chennai. Sixteen persons were hospitalized at Apollo Hospital, Chennai and one person treated at NLC hospital itself. Besides causing damage to the industry’s properties viz., boiler supporting structure, lift and cable.

Fire fighting, Rescue and evacuation operations during the accident were carried out by the Fire wing of Central Industrial Security Force (CISF) unit, NLC, Neyveli. On hearing the blast sound, fire wing of TS-II reached the spot immediately without waiting for an emergency call and swing into action.

The Hon’ble Minister of Coal, GoI has ordered payment of compensation of Rs.15 lacs to the deceased and regular employment to one of the family members of the deceased.

The Government of Tamilnadu also announced a compensation of Rs.3.0 lacs to fourteen deceased under Chief Minister’s Relief Fund and released. Thus a sum of Rs.42 lacs has been distributed as compensation to the fourteen deceased under Chief Minister’s Relief Fund by Government of Tamilnadu. A proposal has been sent for sanction of compensation for fifteenth deceased one and injured too.

A sum of Rs. 5,17,73,013/- (Rupees five crores seventeen lacs seventy three thousand thirteen only) and Rs. 40 lacs (Rupees forty lacs only) have been distributed to the deceased and injured by M/s. NLCIL towards the compensation respectively. Thus a total of Rs.5,57,73,013/- (Rupees five crore fifty seven lacs seventy three thousand thirteen only) have been distributed towards the compensation.

In addition, M/s. NLCIL has deposited an amount of Rs.5 crores (Rupees five crore only) in the SB account of District Collector, Cuddalore on 21st July, 2020 in compliance with the Order dt.8th July, 2020 issued by Hon’ble NGT, Principal Bench, New Delhi.

Hon’ble NGT, Principal Bench, New Delhi constituted an Independent Committee to submit a report with a detailed term of reference.

The Committee visited the accident site with and without witnesses, heard the version of the industry, examined the records and had extensive discussions with all the stakeholders.

Reasons for the Fire Accident/Blast

The Committee has identified the following as the main causes behind the blast followed by the fire accident:

- ***No separate SOP was created for the periodic housekeeping including cleaning of girders.***
- ***No work permit was issued***
- ***The safety protocols were not followed. The Process Safety Management (PSM) systems were not implemented.***
- ***Trained manpower was not deployed***
- ***Safety awareness program was not conducted***
- ***Failure to submit HAZOP & Risk Assessment Reports***
- ***The Onsite Emergency plan did not take into account any likely scenario of hydrogen gas generation on applying water to smoldering (lignite dust in hot condition) and such a case was never considered for emergency mock drill.***

Root Cause: In the light of the above, the Committee is of the view that the root causes of the accident in the girder of boiler supporting structure can be attributed to insufficient knowledge amongst staff, insufficient knowledge of the chemical properties of lignite, especially formation of water gas when water is applied on the lignite in hot conditions, poor safety protocol, poor safety awareness, inadequate risk assessment and response, poor process safety management systems and failure in conducting awareness programs among all the employees and workers about handling the smoldering.

Possible root cause of Analysis has been represented through Fish Bone Diagram. The diagram is placed at A12.

Onsite Emergency Plan:

Lack of awareness for water gas generation: The Onsite emergency plan prepared by NLC lacked any measures to combat smoldering but only provided for fire occurrences and other accident scenarios. The NLC had no Emergency Plan to tackle the smoldering and water gas generation.

To avoid recurrence of such incidences in future, M/s NLCIL is advised to take the following preventive measures.

1. Carry out HIRA study of processes to assess the inherent risk associated with the different activities in process.
2. HAZOP study shall be conducted.
3. Strict Safety precautions to be taken before resuming operation of the units in accordance with the advisory issued by the Chairman, CPCB vide L.No.: B-29014/IPC-I/MSIHC/2020 dt 8th May, 2020 (A13)
4. SOPs and SMPs of all the processes may be prepared or revised and strict adherence to the standing procedures must be ensured.
5. SOP for handling of lignite and lignite dust in hot condition, is silent. The procedures of handling lignite and lignite dust in the hot condition may be incorporated in the SOP.
6. Training to workforce should be further strengthened on need-based requirements.
7. Safety Audit should be done strictly at prescribed intervals.
8. Approved emergency plan should be regularly updated and followed
9. Awareness program shall be conducted to the workforce before commencing the activity
10. Rigorous Housekeeping protocol shall be followed.”

7 to 8.....xxx.....xxx.....xxx

9. The report shows that the cause of the incident is failure of the staff handling the situation which did not have the knowledge of the SOPs and of the process. The staff was not given due training and requisite work permits. Thus, the Occupier, the Head of the Operation and Maintenance and the Safety Officer are mainly responsible for the accident. There is violation of safety norms under Section 38 of the Factories Act, 1948. There is also violation of the Manufacture, Storage, Import of Hazardous Chemicals Rules, 1989. In the process, the hazardous gases are generated, attracting the said Rules. It is mandatory to prepare on-sight and off-sight emergency plan and holding of mock drills once in six months. Standard operating procedure has not been followed nor appropriate training given to the staff handling the process. Safety protocols have not been followed. It would have been desirable that the standards operating procedures were duly explained to the handling staff in vernacular language as a part of process of awareness.

10 to 11.....xxx.....xxx.....xxx

12. We direct further action in terms of the Report, including the remedial measures to be adopted for future. If there is any excess amount available in deposit, after due compliances on the subject, the same may be refunded to the company. We place on record our appreciation for the task executed by the Committee. This observation may be conveyed to the members of the Committee by the CPCB. The report of the Committee may be placed on the websites of the CPCB and the State PCB for the purposes of reference for atleast six months.

13. We also direct the Secretaries, Ministries of Power and Coal, Government of India, in coordination with such other Departments/Institutions as may be necessary, to undertake safety audit of similarly placed thermal power stations, throughout the country expeditiously, preferably within six months, to avoid recurrence of such incidents in future.”

10. We may also reproduce extracts from order in connected matter being O.A. No. 130/2020, *MeenavaThanthai K.R. Selvaraj Kumar MeenavarNalaSangam vs Union of India &Ors.* dealing with the issue of replacement of obsolete technology in operations of the PP :-

“2. The Applicant has stated that the Environmental Clearance (EC) did not have a provision for carrying out Human Health/Occupational assessment Risk and safety management, as has been subsequently mandated in the Technical Guidance document of MoEF, 2010 and the Standard EC conditions for Thermal Power Plants dated 19.11.2018. There is negligence, as similar incidents had earlier also happened. The National Electricity Plan, 2018 shows that Units 1 to 7 of the Thermal Power Plant-II are nearing retirement by 2022. The Old and obsolete technology used in these Units, which are more than 25 years old now, has aggravated safety and environmental issues more so when in last few years there have been numerous accidents. If the Unit 1 to 7 of Thermal Power Plant -II are not shut down, there is likelihood of many more incidents which could jeopardise the safety and human/occupational health of the Community members be it those who are working in the Plant or those who are residing nearby. The purpose of hazard identification and risk assessment in thermal power plant is to identify physical, chemical, biological and environmental hazards in the plant, analyse the event sequences leading to those hazards and calculate the frequency and consequences of hazardous events. Therefore, no Thermal Power Plant should be allowed to run without its risk, hazard as well as safety auditing. The overall regulatory framework is under the Ministry of Environment, Forest and Climate Change which has to ensure that Thermal Power Plants, which have outlived their respective lives, need to be shut down. Frequent blasting incidents show that there are serious lacunae in the monitoring of Environmental Parameters of Respondent No. 1’s units specially those related to emergency preparedness, occupational health, risk management, safety norms and Human Health Environment issues.

3. Reply has been filed to the application by the NLCIL. It is stated that FGD has been installed. The recommendation of the Central Electricity Authority about retirement of the units is recommendatory. The technology is not obsolete. The internal and external teams have ensured that the entire Risk assessment processes are foolproof. Hence, there is enhanced risk management at the plant. The unit is operating consistent with occupational health, risk management assessment and safety or workmen parameters. It carries out audits and to ensure compliance of all the aforementioned parameters, it is certified ISO: 45001-2018, superseding the earlier certification of OHSAS 18001-

2007. Our attention has also been drawn to the letter of the PWD, Director of Boilers as follows:-

*“With reference to the above and based on the final report of RLA study carried out by M/s. IRC Engineering Services India Pvt. Ltd., New Delhi and the report submitted by M/s. NLC Ltd., Neyveli on the Remnant Life Assessment of Boiler Ry. No. T-4977, **your boiler is considered fit for further continued operation for a period of six years, provided all the operating parameters and chemical regime are kept within standard/design condition.***

You are requested to make necessary arrangement to carry out next RLA Study on or before the completion of the validity period (i.e. Oct, 2024) as per the latest proviso of Regulation 391 A of Indian Boiler Regulations, 1950.”

*4. In view of above, while we refrain from directing retirement of the unit, **all safety measures may be duly adopted which may be regularly monitored and audited by teams of Experts on the subject and also by the Regulators.**”*

11. In view of above, the PP may take stringent remedial measures to prevent such failures in future which may be overseen by the statutory regulators who may give their report to the Chief Secretary, Tamilnadu within one month to enable review in respect of compliance of safety norms in such establishments. Such report may also be sent to Ministries of Environment, Coal and Power in the Central Government for necessary policy review. PP may follow the conditions laid down by DISH in its order dated 29.12.2022 while revoking the closure order. MoEF&CC may consider measures to prevent such failures in similar establishments and incorporate appropriate conditions while granting EC to such plants, apart from requisite supplementary condition in the already granted ECs for the Power Plants. The Ministry of Coal and Ministry of Power may also take necessary measures to prevent such incidents in future including modernization of Power Plants as earlier directed. The PP may disburse the proposed compensation within one month.

The application is disposed of. If any grievance survives, it will be open to the aggrieved parties to take remedies as per law.

A copy of this order be forwarded to Chief Secretary, Tamilnadu, TNPCB, CPCB, DISH, Tamilnadu, District Magistrate, Cuddalore, Secretary, Ministry of Coal, GoI, Secretary, Ministry of Power, GoI, Secretary, MoEF&CC, GoI and M/s NLC India Ltd. Cuddalore by e-mail for compliance.

Adarsh Kumar Goel, CP

Sudhir Agarwal, JM

Prof. A. SenthilVel, EM

January 18, 2023
Original Application No. 919/2022
SN