



भारत सरकार  
GOVERNMENT OF INDIA  
पर्यावरण, वन और जलवायु परिवर्तन मंत्रालय  
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE  
एकीकृत क्षेत्रीय कार्यालय/Integrated Regional Office  
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F.No.EP/12.1/6/2010-11/TN/524

Dated: 28<sup>th</sup> April, 2023

To

Surianarayanan B,  
Chief General Manager,  
Neyveli New Thermal Power Station (2x 500 MW),  
M/s. NLC India Ltd., Neyveli- 607 807.

Sub: (i) Proposed expansion by addition of 1000 MW (2x500 MW) lignite based thermal power plant at Neyveli, Kurinjipadi Tehsil, Cuddalore District, Tamil Nadu by M/s Neyvelli Lignite Corporation Ltd – Environmental Clearance - - Issue of Certified compliance Report - Reg.

(ii) Proposed expansion by addition of 1,000 MW (2x500 MW) Lignite based TPP at Neyveli, Tehsil Kurinjipadi, District Cuddalore, Tamil Nadu by M/s. Neyveli Lignite Corporation Ltd., - Reg. Extension of validity of EC. - Certified compliance Report

Ref: (i) MoEF – F.No. - J-13012/250/2007-IA-II (T) dated 21st October 2010.

(ii) MoEF – F.No. - J-13012/250/2007 – IA.II (T) dated 09.03.2016.

Sir,

This has reference to your letter dated 08.03.2023 requesting this office for the certified copy of the compliance report for the above-mentioned EC. In this regard, the project was monitored on 13.04.2023 and a copy of the certified compliance report (monitoring report) is attached herewith for your necessary action.

This has been approved by the Competent Authority vide Diary No. 399  
Dated .. 27/4/23

Yours faithfully,

(Dr. R. Sridhar)  
Scientist 'D'

Dr. R. Sridhar,  
Scientist 'D'

Government of India

Min. of Environment Forest and Climate Change

Integrated Regional Office

1st Floor, Additional Office Block for GPOA,

Shastri Bhawan, Haddows Road

Nungambakkam, Chennai - 600 006.

Encl: As above

DESPATCHED BY SN  
Date 28/04/23

**GOVERNMENT OF INDIA**  
**Ministry of Environment, Forests & Climate Change**  
**(Regional Office, Chennai)**  
**MONITORING REPORT**  
**PART I**  
**DATASHEET**

1	Project Type : River valley / Mining/ Industry / Thermal/Nuclear/Other Specify	Thermal	
2	Name of Project	1000 MW (2x500 MW) Lignite Based TPP at Neyveli, in Kurinjipadi Tehsil, in Cuddalore Distt., in Tamil Nadu	
3	Clearance letter(s)/OM No. and dated	F. No. J-13012/250/2007-IA.II (T), dt 21.10.2010	
4	Locations		
	a	District (s)	Cuddalore
	b	State (s)	Tamil Nadu
	c	Latitudes	11° 35' 1.25" N to 11° 35' 44" N
d	Longitudes	79° 26' 48" N to 79° 27' 28" N	
5	Address of Correspondence		
a	Address of concerned project Head (with Pin Code & telephone/telex/fax numbers)	Name: Surianarayanan B Designation: Chief General Manager Email id: cgm.nntpp@nlcindia.in Telephone No.: 04142-212345  Address: Office of the Chief General Manager, Neyveli New Thermal Power Station (2x 500 MW), Neyveli	
6	Salient features		
	a	of the project	1000 MW (2X500 MW)
b	of the environmental management plans	<ul style="list-style-type: none"> <li>✓ Air emissions Management</li> <li>✓ Effluent Treatment and disposal</li> <li>✓ Solid waste generation, storage and disposal</li> <li>✓ Greenbelt development plan</li> <li>✓ Rain water harvesting</li> <li>✓ Post project environmental monitoring</li> </ul>	
7	Breakup of the project area		
	a	Submergence area (forest & non-forests)	Not applicable
b	Others	160 Ha (Industrial Land)	
8	Break up of project affected population with enumeration of those losing houses/dwelling units only, agricultural land only, both dwelling units and agricultural land and landless labourers/artisans		Not applicable
	a	SC, ST/Adivasis	Not applicable
	b	Others	Not applicable



	Financial Details		
9	a	Project cost as originally planned and subsequent revised estimates and the years of price reference	5907.11 (GoI Sanctioned Oct-2010) 7080.41 (RCE-1 base Feb-2018) 7980.79 (RCE-2 base Feb-2020) 8990.00 (RCE-3 base Feb-2022)
	b	Allocations made for environmental management plans, with item wise and year wise breakup	An amount of Rs. 1501.1 Crores was allocated for implementation of environmental protection measures. Details Enclosed as Annexure-I
	c	Benefit cost ratio/internal rate of return and the years of assessment	Internal rate of return – 9.49 % Years of Assessment – 25 Years
	d	Whether (c) includes the cost of environmental management as shown in (b) above	Yes
	e	Total expenditure on the Project so far	Rs. 7340 Crores upto Feb 2022
	f	Actual expenditure incurred on the environmental management plans so far	Rs. 586.3 Crores already incurred. FGD project of Rs. 914.89 Crores is under construction.
10	Forest land requirement		There is no forest land involved in the project.
	a	The status of approval for a diversion of forest land for non-forestry use	Not applicable
	b	The Status of compensatory afforestation, if any	Not applicable
	c	The status of clear felling	Not applicable
	d	Comments on the viability and sustainability of compensatory afforestation programme in the light of actual field experience so far	Not applicable
11	The status of clear felling in non-forest area (such as submergence area of reservoir, approach road), if any, with quantitative information		Not applicable
12	Status of construction		
	A	Date of commencement	12.01.2012
	b	Date of completion (actual and/or planned)	COD dates for Unit-I:28.12.2019 Unit-II:10.02.2021
13	Reasons for the delay if the project is yet to start		Not applicable
14	Date of site visit		
	a	The dates on which the project was monitored by the Regional Office on previous occasions, if any	--
	b	Date of site visit for this monitoring report	13.04.2023.

## CERTIFIED COMPLIANCE REPORT

**Subject:** Proposed expansion by addition of 1000 MW (2x500 MW) lignite based thermal power plant at Neyveli, Kurinjipadi Tehsil, Cuddalore District, Tamil Nadu by M/s Neyveli Lignite Corporation Ltd – Environmental Clearance - Reg.

**Reference No.** J-13012/250/2007-IA-II (T) dated 21st October 2010.

**Date of Monitoring:** 13.04.2023.

### **Present Status of the Project:**

The Neyveli New Thermal Power Project (2x500 MW) is a lignite based power project located at Kolliruppu, Alandarkollai, Vilangulam villages, Vridhachalam Taluk, Cuddalore District, Tamil Nadu.

The project has obtained Environmental Clearances (EC) from Ministry of Environment Forest & Climate Change (MoEF&CC) vide letter, J-13012/250/2007-IA-II (T) dated 21<sup>st</sup> October 2010.

The project has obtained Consent for Establishment (CTE) vide Proc. No. T8/TNPCB/F22610/UL/CUD/W&A/2011 dated 21.01.2012. The CTE was extended on 16.11.2018.

Consent to Operate (CTO) under Air (Prevention and control of Pollution) Act, 1981 and Water (Prevention and control of Pollution) Act, 1974 was obtained from Tamil Nadu State Pollution Control Board vide consent order dated 26<sup>th</sup> April 2019 with validity up to 31.03.2021 which was further extended up to 30.11.2021 due to the outbreak of Covid'19 vide TNPCB order dated 13.05.2021.

The project proponent has informed that the application for renewal of CTO was submitted on 6<sup>th</sup> Feb 2021. However, the TNPCB vide communication dated 31.05.2022 has instructed to comply with the following conditions:

- i. Concrete proposal for the recycling of treated effluent with action plan along with monthly target statement and time schedule for completion
- ii. Consolidated statement of the RoA of the treated trade effluent for the past 2 years
- iii. Action plan for the achieving the stack emission standards within the prescribed limits with respect to NO<sub>x</sub>
- iv. Explore the possibility of getting Environmental Clearance amendment from the competent Authority.

Currently, CTO is yet to be renewed from TNPCB.



As per the directions from TNPCB, application for EC amendment is uploaded on Ministry of Environment PARIVESH portal. The 1<sup>st</sup> EAC meeting was held on 25.01.2023, the committee had sought certified EC compliance report from the Integrated Regional Office, Chennai.

The Unit-I is in operation since 28<sup>th</sup> December'2019 and Unit-II was commissioned in 10<sup>th</sup> February' 2021.

S. No	Condition	Compliance Status
<b>A</b>	<b>Specific Conditions</b>	
(i)	Environmental clearance is subject to submission within six months of a firm commitment for time bound action plan for phasing out existing old units confirmed by the project proponent.	<b>Refer below</b>  The project proponent informed that the phasing out program of existing Thermal Power Station (TPS-I – 6 Units of 50 MW each and 3 units of 100MW each) has been completed in line with directives of Central Pollution Control Board and Energy Department of Government, Tamil Nadu.
(ii)	Prospective plan for the site showing future expansion shall be formulated and submitted to the Ministry within six months.	<b>Refer below</b>  The project proponent informed that there is no such plan for expansion of the project under consideration.
(iii)	Hydro geological study of the area shall be reviewed annually and report submitted to the Ministry.	<b>Complied.</b>  Well inventory of 14 wells was conducted in and around NNTPS. Out of 14, eight (8) are dug wells and six (6) are tube wells. The depth to water levels was studied on monthly basis and it ranges from 0.3 m to 5.9 m with average water level of 2.5 m. the report is submitted as part of six-monthly compliance report. Based on the report, there is no adverse impact observed. Map showing the location of tube wells and bore wells and water level data is enclosed as <b>Annexure-I</b> .
(iv)	No ground water shall be extracted for use in operation of the power	<b>Complied.</b>

S. No	Condition	Compliance Status
	plant even in lean season.	No ground water is extracted for plant operation of NNTPS. The water from Mines is stored in a Lake behind the Thermal Station – I Expansion and is being used for the plant operation.
(v)	No water bodies including natural drainage system in the area shall be disturbed due to activities associated with the setting up/operation of the power plant. The project proponent shall regenerate any degraded water body located nearby within 5.0 Km atleast.	<b>Complied.</b> As informed by the PP, no water bodies including natural drainage system in the area was disturbed during the setting up/ operation of the plant. Further, as part of the CSR activities, NLC is carrying out desilting of lakes in the nearby villages thereby promoting water resource augmentation.
(vi)	Minimum required environmental flow suggested by the competent authority of the State Govt. shall be maintained in the Channel/Rivers (as applicable) even in lean season	<b>Complied.</b> No perennial water bodies like channel or river had prevailed in the site with flow of water.
(vii)	COC of 5.0 shall be adopted.	<b>Complied.</b> Closed cycle cooling water re-circulation system has been designed and adopted with COC of 5.0 for conservation/optimization of water requirement for the project.
(viii)	Additional soil for levelling of the proposed site shall be generated within the sites (to the extent possible) so that natural drainage system of the area is protected and improved	<b>Complied.</b> As informed by the PP, no soil from outside the plant area was used for levelling. Cut and fill method was adopted for leveling of site. Hence there is no change in the natural drainage system.
(ix)	There should not be any contamination of soil, ground and surface waters (canals & village pond) with sea water in and around the project sites. In other words necessary preventive measures for spillage from pipelines, such as lining of guard pond used for the treatment	<b>Complied.</b> There is no sea nearer to the site and hence there is no possibility for the contamination of soil and water sources due to sea water. The use of sea water is not envisaged in the project.



S. No	Condition	Compliance Status
	of outfall before discharging in to the sea and surface RCC channels along the pipelines of outfall and intake should be adopted.	
(x)	A Bi-Flue stack of 275 m height shall be provided with continuous online monitoring equipments for SO <sub>x</sub> , NO <sub>x</sub> and particulate matter (PM <sub>2.5</sub> & PM <sub>10</sub> ). Exit velocity of flue gases shall not be less than 22 m/sec. Mercury emissions from stack may also monitored on periodic basis.	<p><b>Complied.</b></p> <p>Chimney shell of 275 m height had been constructed. The shell is housing two flues of 7 m dia one for each boiler. The Bi-flue chimney has exit velocity of more than 24 m/sec. CEMS (Continuous Emission Monitoring System) is installed which transmits the data to TNPCB server. Mercury emissions from stack also monitored periodically by MoEF&amp;CC recognized – NABL accredited laboratory (M/s Chennai testing Laboratory). Report enclosed as <b>Annexure-II.</b></p>
(xi)	Provision for installation of FGD shall be provided for future use.	<p><b>Complied.</b></p> <p>Provision for installation of FGD has been provided and the civil works are under progress. It was informed that, the anticipated date of commissioning for Unit-I and Unit-II are by Apr'2024 and Oct'2024 respectively.</p>
(xii)	High Efficiency Electrostatic Precipitators (ESPs) shall be installed to ensure that particulate emission does not exceed 50 mg/Nm <sup>3</sup> .	<p><b>Complied.</b></p> <p>The flue gas generated in the boiler passes through the Electro Static Precipitator (ESP). The ESP is of 99.74% efficiency and is designed to have a particulate emission level less than 50 mg/Nm<sup>3</sup>. The ESP is consisting of 4 passes for each boiler and each pass is consisting of 6 fields. Each field is containing 56 anode collecting plates (electrode) and 56 springs acting as cathode. The anodes and cathodes are charged by 95 kv DC voltage energising them.</p> <p>Few ferric atoms in the ash particles</p>

S. No	Condition	Compliance Status
		are ionized to Fe <sup>+</sup> ions and are attracted towards the anode/collecting electrodes. The ash is removed from the plates by the striking of rapping mechanism.
(xiii)	Adequate dust extraction system such as cyclones/bag filters and water spray system in dusty areas such as in coal handling and ash handling points, transfer areas and other vulnerable dusty areas shall be provided.	<p><b>Complied.</b></p> <p>The storage yard is provided with water sprinkler system comprising of 42 nozzles provided at height 2.5-3 m spraying water at an angle of 43 degrees to a radius of 45 m covering the entire storage outside the closed shed. These nozzles are connected to a common dust suppression water header from water tanks and pumps. The water sprayed from the nozzles keeps the stored lignite wet and the dust generation is prevented.</p> <p>Dry fog water spray system is provided in all the discharge points and receiving points of all the conveyors. A total of 55 dry fog stations are provided from slewing feeder which receives the lignite from Mines to the 11 A/B and 12 A/B conveyors which discharges the lignite to the eight hoppers storing the lignite for each boiler.</p> <p>The crusher house is containing two crushers, two screens and six shuttle feeders. The crusher house is provided with one bag filter of capacity 80,000 Am<sup>3</sup>/hr connected to all dust producing areas through ducts and Blowers. The bag filter collects the lignite dust in the air and keeps the area clean from lignite dust. Bunkers, where the Lignite from the conveyors is fed are also provided with bag filters of capacity 20,000 Am<sup>3</sup>/hr to extract the dust.</p>



S. No	Condition	Compliance Status
(xiv)	The project proponent shall ensure that no fugitive fly ash generation takes place at any point of time. Dust and fugitive emissions from mines shall be also controlled and adequate permanent air quality monitoring stations shall be installed and records maintained.	<p><b>Complied.</b></p> <p>The ash separated from the flue gas in ESP is collected in the ESP hopper situated under the bottom of ESP. The ash from ESP hoppers, RAPH and Flue gas duct are pneumatically sucked into the 10 nos Intermediate surge hoppers (ISH) (5 nos for each boiler – one for each pass of the ESP and one spare) through vacuum suction. As the large mass of Ash cannot be moved to a larger distance by vacuum suction from ESP to Ash silos, dense phase pneumatic/ Pressure conveying process is adopted from ISH to Silos. Four number of silos each having a capacity of 1000 M<sup>3</sup> is constructed in a location away from the plant and convenient for truck movement.</p> <p>5 nos of permanent air quality monitoring locations are in place to monitor the ambient air quality around NNTPS.</p>
(xv)	Utilisation of 100% Fly Ash generated shall be made from 4 <sup>th</sup> year of operation of the plant. Status of implementation shall be reported to the Regional Office of the Ministry from time to time.	<p><b>Complied.</b></p> <p>The fly ash is being supplied to Cement Plants and Brick Manufacturers in dry form from the commissioning of the plant. 100 % fly ash utilization is being achieved. The Annual Fly Ash utilization report for FY 22-23 is enclosed in <b>Annexure-III</b>.</p>
(xvi)	Fly Ash shall be collected in dry form and storage facility (silos) shall be provided. Unutilized fly ash shall be disposed off in the ash pond in the form of slurry. Mercury and other heavy metals (As, Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating	<p><b>Complied.</b></p> <p>The ash from ESP and other sources is extracted and is being stored in 4 numbers of 1000 Cu.M each capacity silos in dry form. The fly ash is being supplied to Cement Plants and Brick Manufacturers in dry form. Mercury</p>



S. No	Condition	Compliance Status
	from the existing ash pond. No ash shall be disposed off in low lying area.	and other heavy metals in the bottom ash were monitored periodically in the facilities already available with NLCIL. Report is enclosed as <b>Annexure-IV</b> . No ash is stored in low lying areas.
(xvii)	Ash pond shall be lined with HDPE/LDPE lining or any other suitable impermeable media such that no leachate takes place at any point of time. Adequate safety measures shall also be implemented to protect the ash dyke from getting breached.	<b>Complied.</b>  As informed by the PP, there is no ash pond designed as part of NNTPS. The Fly ash being generated from NNTPS is supplied to the cement & fly ash brick manufacturers. Further, the PP informed that only in emergency conditions, the fly ash will be sent to the Existing Ash Pond being used by TPS-II in slurry form.
(xviii)	For disposal of Bottom Ash in abandoned mines (if proposed to be undertaken) it shall be ensured that the bottom and sides of the mined out areas are adequately lined with clay before bottom ash is filled up. The project proponent shall inform the State Pollution Control Board well in advance before undertaking the activity.	<b>Complied.</b>  Bottom ash was utilized for leveling within the plant premises and now it is being sent to adjacent mines of NLCIL, as informed by PP.
(xix)	Green belt consisting of 3 tiers of plantations of native species around plant and at least 100 m width shall be raised. Wherever 100 m width is not feasible a 50 m width shall be raised and adequate justification shall be submitted to the Ministry. Tree density shall not less than 2500 per ha with survival rate not less than 75%.	<b>Partially Complied:</b>  It was observed that no adequate greenbelt has been developed as stipulated in the condition. Green belt is being developed in and around the plant where vacant space is available. The total plant area is 160 Ha. 33% of the total area is 52.8 Ha. The greenbelt was developed in only 16.5 Ha. The PP informed that, another 23.5 Ha has been identified for greenbelt development and it is being carried out in phased manner.
(xx)	Local employable youth shall be trained in skills relevant to the project	<b>Refer below:</b>



S. No	Condition	Compliance Status
	for eventual employment in the project itself. The action taken report and details thereof to this effect shall be submitted to the Regional Office of the Ministry and the State Govt. Dept. Concerned from time to time.	As informed by the PP, during operation phase, for the new contracts, 50 % of the project affected people were engaged through contractor employer to carry out the contract works.
(xxi)	Two nearest village shall be adopted and basic amenities like development of roads, drinking water supply, primary health centre, primary school etc. shall be developed in co-ordination with the district administration.	<p><b>Complied.</b></p> <p>As informed by the PP, under CSR activities, Kolliruppu village, about 4 kms from NNTPP has been transformed into a model village with required facilities viz., constructed Toilets to 158 needy families in order to achieve mission ODF (Open Defecation Free) village, strengthened community infrastructure by constructing Overhead Tank and installed motors for supply of drinking water to entire village and constructed culverts, and also laid in internal roads for its sustainable growth.</p>
(xxii)	The project proponent shall also adequately contribute in the development of the neighbouring villages. Special package with implementation schedule for free potable drinking water supply in the nearby villages and schools shall be undertaken in a time bound manner.	<p><b>Complied.</b></p> <p>As informed by the PP, under CSR activities, the following activities have been undertaken:</p> <ul style="list-style-type: none"> <li>• Road connectivity with nearby towns had been established.</li> <li>• Schools are provided with good class rooms and toilets.</li> <li>• Bore wells, Water tanks and water distribution networks had been established in the nearby villages.</li> <li>• Sanitation had been improved by providing toilets.</li> </ul> <p>The CSR report for FY 2021-22 is enclosed in <b>Annexure-V</b>.</p>
(xxiii)	A good action plan for R&R (as applicable) with package for the project affected persons be submitted and implemented as per prevalent R&R policy within three	<p><b>Complied.</b></p> <p>A R&amp;R policy is already in place for all the existing plants of NLCIL. The same was extended to the projected affected</p>



S. No	Condition	Compliance Status
	months from the date of issue of this letter.	persons of this project.
(xxiv)	An amount of Rs. 22.40 crores shall be earmarked as one time capital cost for CSR programme. Subsequently a recurring expenditure of Rs.4.5 crores per annum shall be earmarked as recurring expenditure for CSR activities. Details of the activities to be undertaken shall be submitted within one month along with road map for implementation.	<b>Complied.</b> As informed by the PP, NLCIL has spent Rs.21.00 Crores as one time capital cost from NNTPP CSR Fund towards implementation of various community development and social welfare initiatives in the project vicinity of NNTPP, which is enclosed in <b>Annexure-VI</b> . Subsequently, NLCIL has been undertaking several CSR projects/activities in the vicinity area of NNTPS from the company CSR fund.
(xxv)	While identifying CSR programme the company shall conduct need based assessment for the nearby villages to study economic measures with action plan which can help in upliftment of poor section of society. Income generating projects consistent with the traditional skills of the people besides development of fodder farm, fruit bearing orchards, vocational training etc. can form a part of such programme. Company shall provide separate budget for community development activities and income generating programmes. This will be in addition to vocational training for individuals imparted to take up self employment and jobs.	<b>Complied.</b> Need based assessment on CSR programmes have been done and action is being taken on the lines of the study. The CSR and other developmental activities are decided based on the recommendations of the Cuddalore District Administration/ local villages. The CSR baseline survey report is enclosed in <b>Annexure-VII</b> .
(xxvi)	It shall be ensured that in-built monitoring mechanism for the schemes identified is in place and annual social audit shall be got done from the nearest government institute of repute in the region. The project proponent shall also submit the status of implementation of the scheme from time to time.	<b>Complied.</b> The CSR and other developmental activities are designed and implemented as per the directions of District administration. After the implementation of the developmental activities Impact assessment study is conducted and the feedback is used to design further requirements.



S. No	Condition	Compliance Status
<b>B</b>	<b>General Condition</b>	
(i)	The treated effluents conforming to the prescribed standards only shall be re-circulated and reused within the plant. There shall be no discharge outside the plant boundary except during monsoon. Arrangements shall be made that effluents and storm water do not get mixed.	<p><b>Refer below.</b></p> <p>The treated effluent conforming to standards is being used for dust suppression and green belt development. Treated effluent is being discharged out of plant premises for agricultural activities as per the request by farmers. NNTPS is in the process to obtain EC amendment in this regard.</p> <p>Separate drains are available to collect storm water.</p>
(ii)	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising green belt/plantation.	<p><b>Complied.</b></p> <p>A 50 KLD Sewage Treatment Plant is constructed inside the plant area to treat sewage emanating from plant. The water from the STP is being used for raising the green belt.</p>
(iii)	A well designed rainwater harvesting shall be put in place within six months. Central Groundwater Authority/ Board shall be consulted for finalization of appropriate rainwater harvesting technology and the status of implementation shall be furnished periodically.	<p><b>Complied.</b></p> <p>Total of seven Rain Water Harvesting pits were constructed within the plant premises to conserve the rain water. However, it is not consulted with CGWA / Board.</p>
(iv)	Adequate safety measures shall be provided in the plant area to check/minimize spontaneous fires in fuel stock yard, especially during summer season. Copy of these measures with full details along with location plant layout shall be submitted to the Ministry as well as to the Regional Office of the Ministry.	<p><b>Complied.</b></p> <p>The storage yard consists of two stock piles of 620 m and 450 m length and 40 m width. To meet the eventuality to handle the fires in stock yard, Hydrant system and Spray system with Automatic Fire Detection system are provided. Water sprinkler system in lignite stock yard with 42 sprinklers is provided in the two stock piles at a height of 2.5-3 m with an angle of 43 deg covering a distance of 45 m. The Nozzles spray the water and keep the</p>



S. No	Condition	Compliance Status
		Lignite in the Stock Yard always wet. This will minimise the occurrence of spontaneous fires.
(v)	Storage facilities for auxiliary liquid fuel such as LDO and/ HFO/LSHS shall be made in the plant area in consultation with Department of Explosives, Nagpur. Sulphur content in the liquid fuel will not exceed 0.5%. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.	<b>Complied.</b>  The HFO and LDO are being purchased from Oil companies of India only. License was obtained for storing HFO and LDO and operating facility from PESO, Nagpur. Disaster management plan is in place to meet any eventuality in case of an accident taking place due to storage of oil. The copy of Disaster management plan is enclosed in <b>Annexure-VIII</b> .
(vi)	Regular monitoring of ground water level shall be carried out by establishing a network of existing wells and constructing new piezometers. Monitoring around the ash pond area shall be carried out particularly for heavy metals (Hg,Cr,As,Pb) and records maintained and submitted to the Regional Office of this Ministry. The data so obtained should be compared with the baseline data so as to ensure that the ground water quality is not adversely affected due to the project.	<b>Complied.</b>  Networks of wells are established and the ground water level is being monitored through piezometers by the project proponent (Ground Water Cell of NLCIL) and the reports are submitted to PWD and MoEF&CC office.  There is no separate ash pond area for the NNTPS. Ground water quality monitoring is being carried out by PP (Centre for Applied Research & Development of NLCIL – NABL Accredited laboratory) and the report is enclosed as <b>Annexure-IX</b> . As per the report, no adverse impact was observed.
(vii)	Monitoring surface water quantity and quality shall also be regularly conducted and records maintained. The monitored data shall be submitted to the Ministry regularly. Further, monitoring points shall be located between the plant and drainage in the direction of flow of ground water and records maintained. Monitoring for heavy	<b>Refer below:</b>  There are no major surface water bodies. Google image showing the plant area during year 2011 is enclosed as <b>Annexure-X</b> .



S. No	Condition	Compliance Status
	metals in ground water shall be undertaken.	
(viii)	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	<p><b>Complied.</b></p> <p>An exclusive First Aid Center had been established in the plant area. Ambulance is stationed inside the project. Sanitation facilities like toilets are provided at required locations.</p>
(ix)	Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 75 dBA. For people working in the high noise area, requisite personal protective equipment like earplugs/ear muffs etc. shall be provided. Workers engaged in noisy areas such as turbine area, air compressors etc shall be periodically examined to maintain audiometric record and for treatment for any hearing loss including shifting to non noisy/less noisy areas.	<p><b>Complied.</b></p> <p>Noise enclosures are provided for Turbine, Compressors and Generators to keep the noise level below 75 dBA.</p> <p>The workmen engaged near such machineries are provided with earplugs and are shifted from the area after the permissible time of exposure. They are also on rotation basis to reduce the continuous exposure to noise. The workers are subjected to audiometric medical examination which is done once a year by NLCIL.</p>
(x)	Regular monitoring of ground level concentration of SO <sub>2</sub> , NO <sub>x</sub> , PM <sub>2.5</sub> & PM <sub>10</sub> and Hg shall be carried out in the impact zone and records maintained. If at any stage these levels are found to exceed the prescribed limits, necessary control measures shall be provided immediately. The location of the monitoring stations and frequency of monitoring shall be decided in consultation with SPCB. Periodic reports shall be submitted to the Regional Office of this Ministry. The data shall also be put on the website of the company.	<p><b>Complied.</b></p> <p>The ground level concentration of SO<sub>2</sub>, NO<sub>x</sub>, PM<sub>2.5</sub> &amp; PM<sub>10</sub> and Hg are being monitored in the impact zone by TNPCB and PP (Centre for Applied Research &amp; Development – NABL accredited laboratory). Report is submitted to the Regional Office of MoEFF&amp;CC. The PP informed that, necessary control measures will be taken in the event of exceeding the prescribed limits.</p>
(xi)	Provision shall be made for the	<b>Complied.</b>



S. No	Condition	Compliance Status
	housing of construction labour (as applicable) within the site with all necessary infrastructure and facilities such as fuel for cooking, mobile toilets, mobile STP, safe drinking water, medical health care, crèche etc. The housing may be in the form of temporary structures to be removed after the completion of the project.	As informed by the PP, the migrant construction labours from outside places are provided with housing in the labour colony adjacent to the site. Basic requirements and amenities are provided.
(xii)	The project proponent shall advertise in at least two local newspapers widely circulated in the region around the project, one of which shall be in the vernacular language of the locality concerned within seven days from the date of this clearance letter, informing that the project has been accorded environmental clearance and copies of clearance letter are available with the State Pollution Control Board/Committee and may also be seen at Website of the Ministry of Environment and Forests at <a href="http://envfor.nic.in">http://envfor.nic.in</a> .	<b>Complied.</b>  As informed by the PP, wide publicity had been given by publicizing in two Tamil Newspapers in 2010 to publicize the public about the issue of EC to the project. However, the copy of the advertisement is not made available.
(xiii)	A copy of the clearance letter shall be sent by the proponent to concerned Panchayat, Zila Parisad / Municipal Corporation, urban local Body and the Local NGO, if any, from whom suggestions/representations, if any, received while processing the proposal. The clearance letter shall also be put on the website of the Company by the proponent.	<b>Complied.</b>  As informed by the PP, the copy of the Clearance letter was given to Kammapuram Panchayat, Virudhachalam Taluk and other local bodies for suggestions/representations. However, the copy of the letter is not made available.
(xiv)	An Environmental Cell shall be created at the project site itself and shall be headed by an officer of appropriate seniority and qualification. It shall be ensured that the head of the Cell shall directly report to the head of the organization.	<b>Complied.</b>  An Environment Cell has been established to look after the implementation of environmental management plan and ensuring compliance to all the conditions stipulated in the EC and CTO issued




S. No	Condition	Compliance Status
		<p>under Air and Water Acts.</p> <p>An officer at the level of Executive Engineer is heading the Environment Cell.</p>
(xv)	<p>The proponent shall upload the status of compliance of the stipulated EC conditions, including results of monitored data on their website and shall update the same periodically. It shall simultaneously be sent to the Regional Office of MOEF, the respective Zonal Office of CPCB and the SPCB. The criteria pollutant levels namely; SPM, RSPM (PM2.5 &amp; PM10), SO<sub>2</sub>, NO<sub>x</sub> (ambient levels as well as stack emissions) shall be displayed at a convenient location near the main gate of the company in the public domain.</p>	<p><b>Complied.</b></p> <p>The PP has uploaded the status of compliance of EC Conditions and the results of monitored data on the website <a href="http://www.nlcindia.com">www.nlcindia.com</a>. The levels of SO<sub>2</sub>, NO<sub>x</sub>, SPM and RSPM is being displayed in a convenient location near the Gate.</p>
(xvi)	<p>The environment statement for each financial year ending 31st March in Form-V as is mandated to be submitted by the project proponent to the concerned State Pollution Control Board as prescribed under the Environment (Protection) Rules, 1986, as amended subsequently, shall also be put on the website of the company along with the status of compliance of environmental clearance conditions and shall also be sent to the respective Regional Offices of the Ministry by e-mail.</p>	<p><b>Complied.</b></p> <p>The Environment Statement in Form V for every financial year is being submitted to TNPCB and will also be hosted on the website. Copy is enclosed in <b>Annexure-XI</b>.</p>
(xvii)	<p>The project proponent shall submit six monthly reports on the status of the implementation of the stipulated environmental safeguards to the Ministry of Environment and Forests, its Regional Office, Central Pollution Control Board and State Pollution Control Board. The project proponent shall upload the status of compliance of the environment of the</p>	<p><b>Complied.</b></p> <p>The compliance report on the conditions stipulated in the EC is being submitted to the MoEFCC, Regional Office MoEF and TNPCB once in six months.</p>

S. No	Condition	Compliance Status
	environmental clearance conditions on their website and update the same periodically and simultaneously send the same by e- mail to the Regional Office, Ministry of Environment and Forests.	
(xviii)	Regional Office of the Ministry of Environment & Forests will monitor the implementation of the stipulated conditions. A complete set of documents including Environmental Impact Assessment Report and Environment Management Plan along with the additional information submitted from time to time shall be forwarded to the Regional Office for their use during monitoring. Project proponent will up-load the compliance status in their website and up-date the same from time to time at least six monthly basis. Criteria pollutants levels including NOx (from stack & ambient air) shall be displayed at the main gate of the power plant.	<b>Complied.</b>  The levels of SOx, NOx, and SPM are being displayed in a convenient location near the Gate. Six monthly reports are being submitted to TNPCB, Regional office of MoEFCC.
(xix)	Separate funds shall be allocated for implementation of environmental protection measures along with item-wise break-up. These cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for other purposes and year-wise expenditure should be reported to the Ministry.	<b>Complied.</b>  An amount of Rs. 1142.80 Crores was allocated for implementation of environmental protection measures. The PP has assured that the fund is not diverted for any other purposes. However, the year wise expenditure is not submitted.
(xx)	The project authorities shall inform the Regional Office as well as the Ministry regarding the date of financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and	<b>Complied.</b>



S. No	Condition	Compliance Status
	commissioning of plant.	
(xxi)	Full cooperation shall be extended to the Scientists/Officers from the Ministry / Regional Office of the Ministry at Bangalore / CPCB/ SPCB who would be monitoring the compliance of environmental status.	Complied.

This has the approval of the competent authority vide diary no...329....dated 27/4/23

  
(Dr.R.Sridhar)  
Scientist 'D'

Dr. R. Sridhar,  
Scientist 'D'  
Government of India  
Min. of Environment Forest and Climate Change  
Integrated Regional Office  
1st Floor, Additional Office Block for GPOA,  
Shastri Bhawan, Haddows Road  
Nungambakkam, Chennai - 600 006.



**CERTIFIED COMPLIANCE REPORT**

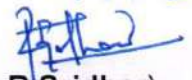
**Subject: Proposed expansion by addition of 1,000 MW (2x500 MW) Lignite based TPP at Neyveli, Tehsil Kurinjipadi, District Cuddalore, Tamil Nadu by M/s. Neyveli Lignite Corporation Ltd., - Reg. Extension of validity of EC.**

EC vide letter No. J-13012/250/2007 – IA.II (T) dated 09.03.2016.

Date of Monitoring: 13.04.2023.

S. No	Condition	Compliance Status
1	The monitoring data of AAQ, Water quality shall be compared with the oldest baseline data available to assess the impact of the TPP and also the cumulative impact on a continuous basis.	<b>Complied.</b>  Monitoring data of AAQ and Water quality is compared with the EIA data available to assess the impact of the TPP. The comparison is enclosed as <b>Annexure-XII.</b>
2	Considering the location of TPP in Cuddalore district and the directions of the Hon'ble NGT pertaining to the cumulative impact carrying capacity of the area, the PP shall comply with all the conditions stipulated/Action plan if any, by SPCB for the area.	<b>Complied.</b>  All the conditions stipulated in Environmental Clearance are being complied with.

This has the approval of the competent authority vide diary no...329...dated 27/4/23

  
**(Dr.R.Sridhar)**  
Scientist 'D'

Dr. R. Sridhar,  
Scientist 'D'  
Government of India  
Min. of Environment Forest and Climate Change  
Integrated Regional Office  
1st Floor, Additional Office Block for GPOA,  
Shastri Bhawan, Haddows Road  
Nungambakkam, Chennai - 600 006.



**ANNEXURE-I**  
**COST TOWARDS ENVIRONMENT PROTECTION MEASURES**

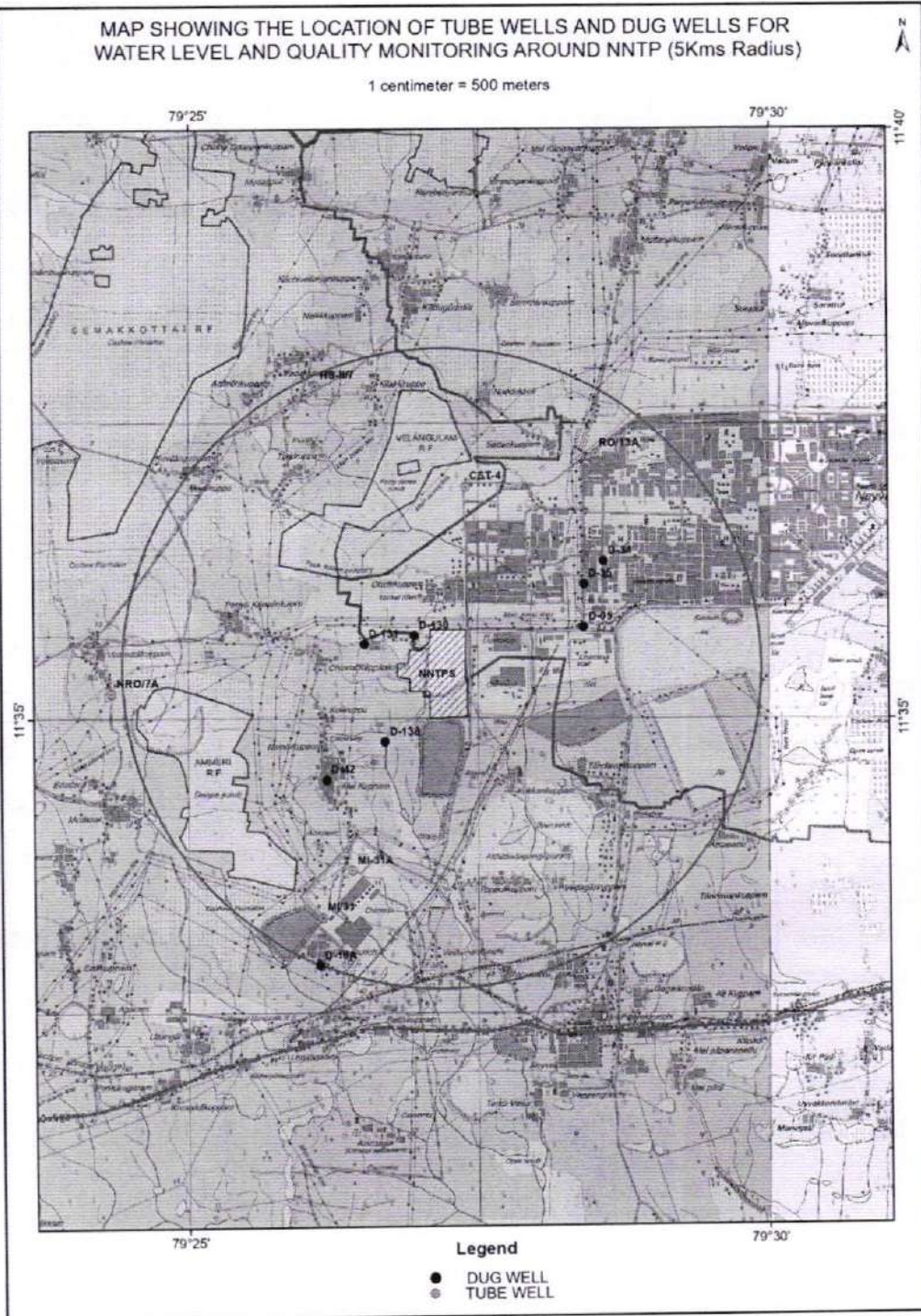
<b>Sr. No</b>	<b>Description</b>	<b>Cost (Rs. In Crores)</b>
1	Electrostatic Precipitator	100.00
2	ETP, Oil Separator	12.00
3	Ash Handling System	104.00
4	Cooling Towers	199.00
5	Chimney	38.50
6	Roads & Drains	22.60
7	Diversion of Nalla, Grading of Pond & Lake	6.20
8	FGD	914.89
9	Circulating water system	104.00
	<b>Total</b>	<b>1501.19</b>



# ANNEXURE-I GROUND WATER LEVELS AROUND NNTPS

MAP SHOWING THE LOCATION OF TUBE WELLS AND DUG WELLS FOR  
WATER LEVEL AND QUALITY MONITORING AROUND NNTP (5Kms Radius)

1 centimeter = 500 meters



**Ground Water and Quality Monitoring in the area around NNTP- Neyveli**

<b>LIST OF DUG WELLS</b>										
S. No	Longitude	Latitude	Well ID	Location	Oct-21 DTW in mts	Nov-21 DTW in mts	Dec-21 DTW in mts	Jan-22 DTW in mts	Feb-22 DTW in mts	Mar-22 DTW in mts
1	79.4761	11.6055	D-34	Block-27 Perumalkoil	5.90	3.90	0.50	1.70	2.10	3.10
2	79.4735	11.5961	D-05	Opp. To TPS-I	3.50	1.60	0.50	2.90	2.90	3.30
3	79.4365	11.5745	D-42	Melakuppam-west	3.50	0.60	0.30	2.50	4.10	4.00
4	79.4354	11.5484	D-18A	Kunamkurichi	1.90	1.50	1.25	2.50	1.10	2.75
5	79.4448	11.5800	D-138	Nainarkuppam (South west of NNTPS)	4.10	1.00	1.60	2.70	4.00	4.30
6	79.4417	11.5939	D-131	Kappankulam (west of NNTPS)	-	-	3.50	-	-	4.20
7	79.4489	11.5950	D-130	Kaikalaikuppam	1.80	1.00	1.00	1.60	1.50	1.70
8	79.4735	11.6022	D-35	Block-28 Subramaniyarkoil	5.30	3.30	0.40	2.60	2.90	3.50
<b>LIST OF TUBE WELLS</b>										
1	79.4384	11.5547	MI/31	South of TPS-II	Dry	Dry	Dry	Dry	Dry	Dry
2	79.4458	11.5625	MI/31 A	Inside of TPS-II	98.30	98.00	97.60	97.50	97.70	98.20
3	79.4565	11.6161	CST-4	Block-15(north of NNTPS)	111.50	111.45	111.60	111.70	111.70	117.50
4	79.4750	11.6206	RO/13 A	Block-7(north east of NNTPS)	108.30	108.25	108.10	108.50	108.20	108.60
5	79.4348	11.6301	HS-II/7	Irrupu (north west of NNTPS)	117.45	-	117.60	-	-	117.70
6	79.405704	11.5867	NRO/7A	Veeredikuppam (west of NNTPS)	106.75	-	106.80	-	-	106.80



**ANNEXURE-II**  
**MERCURY EMISSIONS ANALYSIS FROM STACK**



CIN: U93000TN2000PTC043869

www.ctllabs.in  
www.foodenvironmenttesting.com

**TEST REPORT**

<b>Report Number and date</b>	CTL/CH/1991/2022-23 & 07.10.2022
<b>Sample Number</b>	1991/22-23

SL.NO	PARAMETER	METHOD	UNIT	RESULT
1	MERCURY(Hg)	EPA Method - 29	mg/Nm <sup>3</sup>	BDL(DL:0.01)

BDL - Below Detection Limit , DL - Detection Limit.

\*\*\*END OF REPORT\*\*\*

For Chennai Testing Laboratory Pvt Ltd

  
Authorised Signatory

G. MANIKANDAN  
Head - Environment Division  
(CHEMICAL)

Page 2 of 2

The Report shall not be used in evidence, or taken into account for any legal or regulatory purpose.  
The Report is meant only for the use of the addressee and is not to be used for any other purpose.

A - Super 19 | T.V.K. Industrial Estate | Guindy | E-mail : chennaiestinglab@gmail.com  
Chennai - 600 032 | Tamil Nadu | India | Telefax : +91-44-2250 1757



## ANNEXURE-Q

**Fly Ash Notification S.O. 2804(E), 3<sup>rd</sup> November, 2009 -  
Statutory Compliance Report for the period 01.04.2022 to 31.03.2023**

S. No.	Item	Reply
1	Name of Thermal Power Station	Neyveli New Thermal Power Station (2x500 MW)
2	Full address including District & Pin code	Office of the Chief General Manager, Neyveli New Thermal Power Station (2x500 MW) NLC INDIA Ltd., Neyveli-607807, Cuddalore District, Tamilnadu.
3	E-mail address	<a href="mailto:planning.nntpp@nclindia.in">planning.nntpp@nclindia.in</a>
4	Name of the Nodal Officer (not below the rank of DGM / Dy.CE / or equivalent ) dealing with ash/environment management and designation	<b>Shri. S. Sathyamurthi</b> ADGM/Civil
5	Contact No.	04142-212345
6	Email:	<a href="mailto:planning.nntpp@nclindia.in">planning.nntpp@nclindia.in</a>
7	Total capacity of the Thermal Power Station (MW) along with unit-wise capacity break-up	Total Capacity - 1000 MW Unit-1 - 500MW Unit - II -500 MW

**A. Coal Consumption and Ash Generation in year 2022-2023(in tonnes)**

8	Coal /Lignite Consumption	71,28,209
9	Average ash content in coal (annual)	6.37 %
10	Bottom Ash Generation	46,696
11	Fly Ash Generation	4,07,197
12	Total Ash Generation (10 + 11)	4,53,890

**B. Ash utilization in year 2022-2023(in tonnes)**

S. No.	Purpose for which ash is utilized	From ESP Dry Ash (1)	From Pond Ash (2)	From Bottom Ash (3)	Total (1+2+3)
13	Cement industry	2,93,834	-	-	2,93,834
14	Bricks/blocks/tiles and other ash based products	1,13,322	-	-	1,13,322
15	Road and flyover embankments	-	-	-	-
16	Reclamation of low lying area	-	-	-	-
17	Back filling of mines		-	41,760	41,760



S. No.	Purpose for which ash is utilized	From ESP Dry Ash (1)	From Pond Ash (2)	From Bottom Ash (3)	Total (1+2+3)
18	Concrete/ mortar/ plaster	-	-	-	-
19	Agriculture	-	-	-	-
20	Exports	-	-	-	-
21	Others (please specify all avenues)	41 (Replacement to Cement concrete)	-	4,935 (Ash dyke raising)	4,976
	<b>Total B (13 to 21)</b>	<b>4,07,197</b>	<b>-</b>	<b>46,696</b>	<b>4,53,893</b>

**C. Unutilised ash of year 2022-23 and previous years**

22	Unutilised ash of year 2022-23 (in tonnes)	Nil
23	Unutilised ash pertaining to previous years i.e. up to 31.03.2023 (in Million tonnes)	Nil
24	Total unutilised ash up to 31.03.2023 (22 + 23)(in Million tonnes)	Nil
	a. Quantity of Ash stored in Silos	Not Applicable
	b. Quantity of Ash stored in Ash Ponds	Not Applicable
	c. Quantity of Ash stored in any other manner (please specify type of storage and dry/wet phase)	Not Applicable

**D. Reasons for not achieving 100% ash utilisation -**

Not applicable as 100 % ash was utilized.

B - S

Signature and Seal of the Plant Head

Name: SURIANARAYANAN. B  
Designation: CHIEF GENERAL MANAGER  
Date: 08.04.2023

**B.SURIANARAYANAN**  
Chief General Manager  
NNTPS (2x500 MW)  
NLC India Ltd., Neyveli- 607807

**ANNEXURE-IV**  
**BOTTOM ASH ANALYSIS**

No.	Test Parameters	UOM	Uni-1	Unit-II	LOQ	Test Method
1	Arsenic	mg/kg	BLQ	BLQ(LOQ:1.0)	1	USEPA 6010 B Rev.2: 1996
2	Nickel	mg/kg	10.4	23.1	1	USEPA 6010 B Rev.2: 1996
3	Lead	mg/kg	BLQ	BLQ(LOQ:1.0)	1	USEPA 6010 B Rev.2: 1996
4	Total Chromium	mg/kg	BLQ	4.9	1	USEPA 6010 B Rev.2: 1996

Analysis was carried out by M/s Bureau Veritas, NABL accredited laboratory





## CSR REPORT

FOR THE YEAR 2021-22

ANNEXURE - 1

### 1. Brief outline on CSR policy of the Company.

- NLCIL has been carrying out peripheral developmental activities for betterment of communities in the surrounding villages since inception.
- The vision of NLCIL is to emerge as a leading Mining and Power Company, with social responsiveness accelerating Nation's growth.
- NLCIL'S Values
  - N - National Orientation
  - L - Learning and Development
  - C - Commitment for Excellence
  - I - Innovation and Speed
- NLCIL has adopted a CSR Policy, under which new / ongoing CSR projects/ programme / activities are undertaken.
- The CSR activities of NLCIL focus on sustainable development and inclusive growth, addressing the basic needs of the surrounding communities.
- Aiding in the Socio economic development of the local State(s) in which NLCIL operates and also the country at large.
- The CSR of NLCIL contributes to various sectors of development, as enumerated in the Schedule VII of the Companies Act. The major thrust areas are:

S. No	CSR Focus Area
1	Promoting Healthcare
2	COVID-19 Preventive/ Relief Measures
3	Promoting Sanitation
4	Promoting Education
5	Promoting Employment Enhancing Skills
6	Protection of national heritage, art and culture
7	Measures for the benefit of armed forces veterans
8	Promoting Rural Sports
9	Rural development projects.
10	Disaster Management, including relief, rehabilitation and reconstruction activities

- The CSR Committee of the Board of Directors of NLCIL monitors the CSR Activities.
- The Board of Directors of NLCIL reviews the same from time to time and ensures that at least two percent of the average net profit of NLCIL for the last three years is spent by NLCIL on CSR.

### 2. Composition of CSR Committee:

S. No	Name of Director	Designation / Nature of Directorship	Number of meetings of CSR Committee held during the year	Number of meetings of CSR Committee attended during the year
1	Prakash Mishra	Chairman/Independent Director w.e.f. 15 <sup>th</sup> Dec. 2021	0	0
2	N.K. Narayanan Namboothiri	Member/Independent Director (Chairman upto 15 <sup>th</sup> Dec. 2021)	2	2
3	P. VishnuDev	Member/Independent Director (Relinquished w.e.f. 13.12.2021)	2	2
4	V. Muralidhar Goud	Member/Independent Director	2	2
5	R. Vikraman	Member/Director (Relinquished w.e.f. 01.03.2022)	2	2



3. Provide the web-link where composition of CSR committee, CSR Policy and CSR projects approved by the board are disclosed on the website of the Company:  
Web-link: [https://www.nlcindia.in/new\\_website/index.htm](https://www.nlcindia.in/new_website/index.htm)
4. Provide the details of Impact Assessment of CSR projects carried out in pursuance of sub-rule (3) of rule 8 of the Companies (Corporate Social Responsibility Policy) Rules, 2014, if applicable (attach the report).  
Impact assessment of projects of FY 2020-21 has been planned to be undertaken during FY 2022-23 in accordance with sub-rule(3) of rule 8 of the Companies (Corporate Social Responsibility Policy) Rules 2014, which came to effect from 22.01.2021.
5. Details of the amount available for set off in pursuance of sub-rule (3) of rule 7 of the Companies (Corporate Social Responsibility Policy) Rules, 2014 and amount required for set off for the financial year, if any.

Financial Year	Amount available for set-off from preceding financial years (in ₹)	Amount required to be set-off for the financial year, if any (in ₹)
2020-21	Nil	Nil

6. Average Net Profit of the company as per Section 135 (5): ₹ 2040.23 Crore.
7. (a) Two percent of average net profit of the company as per section 135 (5): ₹ 40.80 Crore.  
(b) Surplus arising out of the CSR projects or programmes or activities of the previous Financial years: Nil  
(c) Amount required to be set off for the financial year, if any: Nil  
(d) Total CSR obligation for the financial year (7a+7b-7c): ₹ 40.80 Crore.
8. (a) CSR amount spent or unspent for the financial year:

Total Amount Spent for the Financial Year.	Amount Unspent (in ₹)				
	Total Amount transferred to Unspent CSR Account as per section 135(6).		Amount transferred to any fund specified under Schedule VII as per second proviso to section 135(5).		
	Amount	Date of transfer	Name of the Fund	Amount	Date of transfer
₹40.80 Crore.	Nil	NA	NA	Nil	NA





8(b) Details of CSR amount spent against ongoing projects for the financial year:

(1) Sl. No	(2) Name of the Project.	(3) Item from the list of activities in Schedule VII to the Act	(4) Local area (Yes /No).	(5) Location of the project.		(7) Project duration	(8) Amount allocated for the project (in ₹)	(9) Amount spent in the current financial Year (in ₹)	(10) Amount transferred to Unspent CSR Account for the project as per Section 135(6) (in ₹)	(11) Mode of Implementation- Direct (Yes /No).	(12) Mode of Implementation - Through Implementing Agency		(13)
				State	District						Name	CSR Registration number	
Nil													

8(c) Details of CSR amount spent against other than ongoing projects for the financial year:

(1) Sl. No	(2) Name of the Project	(3) Item from the list of activities in schedule VII to the Act.	(4) Local area (Yes/No)	(5) Location of the project.		(7) Amount spent for the project (₹ In lakh)	(8) Mode of implementation Direct (Yes/No)	(9) Mode of implementation - Through implementing agency.		(10)
				State	District			Name	CSR registration number	
A	Promoting Healthcare	Item No. I								
1	Conducting Medical camps		Yes	Tamil Nadu	Cuddalore	24.25	Yes			
2	Swachhta Pakwada, Yearlong swachhta, Swachh Bharat related activities		Yes	Tamil Nadu	Cuddalore	9.42	Yes	-	-	
3	Nutritional support - to the students of NLCIL Schools		Yes	Tamil Nadu	Cuddalore	25.20	Yes			
4	Poshak - Supply of Health Mix Powder, dates, Chenna to HIV +ve Society, Cuddalore - Monthly supply		Yes	Tamil Nadu	Cuddalore	13.90	Yes	-	-	
5	Supply of Food Supplements and soaps to Oasis, home - Monthly supply		Yes	Tamil Nadu	Cuddalore	8.33	Yes	-	-	
6	Supply of Diapers, Food Supplement and cleaning materials to Annai Theresa Home, Vadalur - Monthly Supply		Yes	Tamil Nadu	Cuddalore	1.63	Yes	-	-	
7	Construction of Trauma Care centre at Govt. General Hospital, Kurinjipadi		Yes	Tamil Nadu	Cuddalore	14.04	Yes	-	-	
8	Distribution of baby kits to new born babies under Beti Bachao scheme		Yes	Rajasthan	Bikaner	2.00	Yes	-	-	

## 8(c) Details of CSR amount spent against other than ongoing projects for the financial year:

(1) Sl. No	(2) Name of the Project	(3) Item from the list of activities in schedule VII to the Act.	(4) Local area (Yes/No)	(5) Location of the project.		(7) Amount spent for the project (₹ In lakh)	(8) Mode of implementation Direct (Yes/No)	(9) Mode of implementation - Through implementing agency.	
				State	District			Name	CSR registration number
9	Periodical health check up of villagers by organizing Free Medical camps at surrounding villages of Barsingsar Unit		Yes	Rajasthan	Bikaner	2.91	Yes	-	-
10	Emergency / life saving treatment to common residents in Neyveli Township and patients from surrounding villages of Neyveli on OP Basis		Yes	Tamil Nadu	Cuddalore	130.94	Yes	-	-
11	Construction of two nos. of RCC OHT of 30000 liters capacity for KANNADI Village (Anna Nagar West & East) in Kurinjipadi TK		Yes	Tamil Nadu	Cuddalore	4.56	Yes	-	-
<b>B</b>	<b>COVID-19 Preventive/ Relief Measures</b>	<b>Item No. I</b>							
12	Setting up of 5 Nos. Oxygen Plants of 30 Nm <sup>3</sup> /Hr capacity in Tamil Nadu at the following locations 1. Chidambaram 2. Villupuram 3. Panruti 4. Thittakudi 5. Vridhachalam		Yes	Tamil Nadu	Cuddalore Villupuram	13.90	Yes	-	-
13	Setting up of 6 Nos. Oxygen Plants of 30 Nm <sup>3</sup> /Hr capacity in Karnataka at the following locations 1. Bilgi 2. Gadag 3. Badami 4. Byadagi 5. Challakere 6. Holakere		No	Karnataka	Bagalkot Gadag Bagalkot Haveri Chitradurga	448.07	Yes	-	-
14	Setting up of 6 Nos. Oxygen Plants of 30 Nm <sup>3</sup> /Hr capacity in Rajasthan at the following locations 1. Bikaner 2. Ajmer 3. Jaipur 4. Jodhpur 5. Nagaur 6. Udaipur		Yes	Rajasthan	Bikaner Ajmer Jaipur Jodhpur Nagaur Udaipur	385.77	Yes	-	-







OVERVIEW

VALUE CREATION

STATUTORY REPORTS

FINANCIAL STATEMENTS

66<sup>th</sup> ANNUAL REPORT 2021-2022

(1)	(2)	(3)	(4)	(5)		(6)	(7)	(8)	(9)		(10)
Sl. No	Name of the Project	Item from the list of activities in schedule VII to the Act.	Local area (Yes/No)	Location of the project.		Amount spent for the project (₹ In lakh)	Mode of implementation Direct (Yes/No)	Mode of implementation - Through implementing agency.		CSR registration number	
				State	District			Name			
15	Supply of 184 Nos of Oxygen Concentrators of capacity 10 lit/Min in Tamil Nadu		Yes	Tamil Nadu	Cuddalore Villupuram	218.02	Yes	-	-	-	
16	Supply of 86 Nos of Oxygen Concentrators of capacity 10 lit/Min in Rajasthan		Yes	Rajasthan	Bikaner	108.13	Yes	-	-	-	
17	Sparing of 10 Nos of Hired Basic Life Support Ambulances to Cuddalore District Administration for 3 Months		Yes	Tamil Nadu	Cuddalore	58.34	Yes	-	-	-	
18	Purchase of masks, sanitizer and soap for distribution to surrounding villages of Mine-II for containing the spread of COVID-19		Yes	Tamil Nadu	Cuddalore	2.20	Yes	-	-	-	
19	Purchase of materials for sanitizer for preparation of Soap Solution/ Sanitizer		Yes	Tamil Nadu	Cuddalore	7.70	Yes	-	-	-	
20	Procurement of Cold Chain Equipment for COVID 19 Vaccination for Andaman and Nicobar Is.		Yes	Andaman & Nicobar Islands	Andaman & Nicobar Islands	1.10	Yes	-	-	-	
21	Financial Assistance to M/s Socio Economic Research Institute (SERI) towards distribution of PPE Garments, Surgical Masks, Hand Sanitizers, Infrared forehead Thermometer, Oxygen concentrators and Probass UV-C disinfection systems for Cuddalore District		Yes	Tamil Nadu	Cuddalore	32.20	No	M/s. Socio Economic Research Institute		CSR00006843	
22	Financial Assistance to M/s SANTHIGIRI ASHRAM towards distributing Ration & cleaning and personal hygiene kits to 300 families - COVID Prevention		No	New Delhi	New Delhi	10.00	No	M/s. Santhigiri Ashram		CSR00007322	
23	Distribution of medical equipments to combat COVID -19 for Govt. Hospitals at Kattumannarkoil & Kurinjipadi		Yes	Tamil Nadu	Cuddalore	10.41	Yes	-	-	-	
24	Financial Assistance to M/s Sri Aurobindo Society, Puducherry		No	Puducherry	Puducherry	10.00	No	M/s. Sri Aurobindo Society		CSR00000200	
25	Providing food pockets to the needy people through SOS		Yes	Tamil Nadu	Cuddalore	24.78	Yes	-	-	-	

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Sl. No	Name of the Project	Item from the list of activities in schedule VII to the Act.	Local area (Yes/No)	Location of the project.		Amount spent for the project (₹ In lakh)	Mode of implementation Direct (Yes/No)	Mode of implementation - Through implementing agency.	
				State	District			Name	CSR registration number
26	Financial Assistance to District admin Cuddalore for electrical connection for four PSA Oxygen Plants		Yes	Tamil Nadu	Cuddalore	6.40	Yes	-	-
27	Remdesivir Injection given to Government Hospital		No	Tamil Nadu	Trichy Chidambaram Sambalpur	108.13	Yes	-	-
<b>C</b>	<b>Promoting Sanitation</b>	<b>Item No. I</b>							
28	Contribution to M/s RITES, towards the Construction of Toilets in the Circulating Areas of Railway Stations in Tamil Nadu		No	Tamil Nadu	Various Districts in Tamilnadu	436.25	No	M/s. RITES Limited	-
29	Hygiene and Health Care works of NLC Schools, Kendriya vidyalaya and education department		Yes	Tamil Nadu	Cuddalore	70.75	Yes	-	-
<b>D</b>	<b>Promoting Education</b>	<b>Item No. II</b>							
30	Awareness, motivation Guidance Programmes/ Functions for students, parents and teachers. Programmes as per directives of the State and Central Govt like swachh related activities, celebration of important days, Scouts and Guides Camp & Thinking day, School Sports & Literary Activities, Competitions, Issue of school Uniforms, Issue of text books/ educational aids and lease charges for photo copier etc.		Yes	Tamil Nadu	Cuddalore	24.34	Yes	-	-
31	Distribution of school kits to 1 <sup>st</sup> standard girl student under "Beti Padhao" scheme		Yes	Rajasthan	Bikaner	2.00	Yes	-	-
32	Distribution of Scholarship to girl students		Yes	Rajasthan	Bikaner	7.24	Yes	-	-
33	Tution fees for the students of SC, ST & OBC towards promoting Education (JSC)		Yes	Tamil Nadu	Cuddalore	458.99	Yes	-	-
34	Educational Assistance to Contract Workmen Children (CLC)		Yes	Tamil Nadu	Cuddalore	44.54	Yes	-	-
35	Educational promotional activity/ Skill Development programme/ smart class maintenance and other Items related to Promotion of Education		Yes	Tamil Nadu	Cuddalore	4.68	Yes	-	-







OVERVIEW

VALUE  
CREATIONSTATUTORY  
REPORTSFINANCIAL  
STATEMENTS66<sup>TH</sup> ANNUAL  
REPORT  
2021-2022

(1) Sl. No	(2) Name of the Project	(3) Item from the list of activities in schedule VII to the Act.	(4) Local area (Yes/No)	(5) Location of the project.		(7) Amount spent for the project (₹ In lakh)	(8) Mode of implementation Direct (Yes/No)	(9) Mode of implementation - Through implementing agency.		(10) CSR registration number
				State	District			Name		
36	Educational Assistance towards promoting education of the students of Kendiriya Vidyalaya School		Yes	Tamil Nadu	Cuddalore	148.86	Yes	-	-	
37	Financial assistance to Jawahar Education Society (JES) patronized by NLCIL towards promoting Education of the students in the operating region of NLCIL, Neyveli.		Yes	Tamil Nadu	Cuddalore	500.00	Yes	-	-	
38	Financial Assistance towards construction of 9 Smart Class Rooms to Sri Sarada Niketan College of Science for Women, Kodangipatti, Karur		No	Tamil Nadu	Karur	92.50	Yes	-	CSR00006324	
39	Distribution of books related to Indian Freedom to village students		Yes	Tamil Nadu	Cuddalore	0.13	Yes	-	-	
40	Certain Facilities to Sneha Opportunity Services		Yes	Tamil Nadu	Cuddalore	8.72	Yes	-	-	
<b>E</b>	<b>Promoting Employment Enhancing Skills</b>	<b>Item No. II</b>								
41	Skill Development Training Programmes in various Skill sectors for project affected persons (PAPs)		Yes	Tamil Nadu	Cuddalore	1.57	Yes	-	-	
42	Skill Development Training Programmes for students and teachers		Yes	Tamil Nadu	Cuddalore		Yes	-	-	
43	Financial Assistance to Gram Vikas Society, Dharwad, Karnataka towards Skill Development (Fashion Design) Training		No	Karnataka	Dharwad	79.69	No	M/s. Gram Vikas Society	CSR00000084	
<b>F</b>	<b>Protection of national heritage, art and culture</b>	<b>Item No. V</b>								
44	Financial Assistance for Uttarakhand's Virasat Arts & Heritage Festival		No	Uttarakhand	Dehradun	5.00	No	M/s. REACH	CSR00009576	
<b>G</b>	<b>Measures for the benefit of armed forces veterans, war widows and their dependents.</b>	<b>Item No. VI</b>								
45	Contribution to Armed Forces Flag Day Fund (AFFDF) for 2021-22		No	Delhi	-	5.00	Yes	-	-	

(1) Sl. No	(2) Name of the Project	(3) Item from the list of activities in schedule VII to the Act.	(4) Local area (Yes/No)	(5) Location of the project.		(7) Amount spent for the project (₹ In lakh)	(8) Mode of implementation Direct (Yes/No)	(9) Mode of implementation - Through implementing agency.		(10)
				State	District			Name	CSR registration number	
46	Conducting of Sports Events, Providing Sports items etc.		Yes	Tamil Nadu	Cuddalore	10.68	Yes	-	-	
47	Financial Assistance of ₹ 5.00 lakh each to the Sports Persons 1. Shri Sajan Prakash 2. Ms. Revathi Veeramani and 3. Ms. C.A. Bhavani Devi who had represented India in TOKYO Olympics		Yes	Tamil Nadu	Cuddalore	15.00	Yes	-	-	
<b>I</b>	<b>Rural development projects.</b>	<b>Item No. X</b>								
49	Janpravesh - Providing affordable access of social facilities of Neyveli T.S to the peripheral villages and connecting services by NLC Bus Service		Yes	Tamil Nadu	Cuddalore	68.90	Yes	-	-	
<b>J</b>	<b>Disaster Management, including relief, rehabilitation and reconstruction activities</b>	<b>Item No. XII</b>								
50	Financial Assistance to M/s. Deseeya Sevabharathi Keralam towards providing relief material to the affected families of flash floods and landslides in kottayam districts in Kerala state		No	Kerala	Kottayam	35.00	No	M/s. Deseeya Sevabharathi Keralam	CSR00006235	
	<b>Total</b>					<b>3876.14</b>				

- 8 (d) Amount spent in Administrative Overheads: ₹204.00 lakh.  
(e) Amount Spent on Impact Assessment, if applicable: 0.00  
(f) Total Amount spent for the Financial Year (8b+8c+8d+8e): ₹40.80 Crore.  
g) Excess amount for set off, if any

(₹ crore)

Sl. No	Particular	Amount
(i)	Two percent of average net profit of the company as per section 135(5)	40.80
(ii)	Total amount spent for the Financial Year	40.80
(iii)	Excess amount spent for the financial year [(ii)-(i)]	0.00
(iv)	Surplus arising out of the CSR projects or programmes or activities of the previous financial years, if any	0.00
(v)	Amount available for set off in succeeding financial years [(iii)-(iv)]	0.00







## 9(a) Details of Unspent CSR amount for the preceding three financial years:

Sl. No.	Preceding Financial Year	Amount transferred to Unspent CSR Account under section 135 (6) (in ₹)	Amount spent in the reporting Financial Year (in ₹).	Amount transferred to any fund specified under Schedule VII as per section 135(6), if any.			Amount remaining to be spent in succeeding financial years. (in ₹)
				Name of the Fund	Amount	Date of transfer	
1.	2018-19	0.00	0.00	-	0.00	-	0.00
2.	2019-20	0.00	0.00	-	0.00	-	0.00
3.	2020-21	0.00	0.00	-	0.00	-	0.00

## 9(b) Details of CSR amount spent in the financial year for on-going projects of the preceding financial year(s):

(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Sl. No.	Project ID.	Name of the Project.	Financial Year in which the project was commenced.	Project duration.	Total amount allocated for the project	Amount spent on the project in the reporting Financial Year (in Rs)	Cumulative amount spent at the end of reporting Financial Year (in ₹)	Status of the project -Completed / Ongoing
Nil								

## 10. In case of creation or acquisition of Capital asset, furnish the details relating to the asset so created or acquired through CSR spent in the financial year

S. No	Description	Details
(a)	Date of creation or acquisition of the capital asset(s)	Not Applicable
(b)	Amount of CSR spent for creation or acquisition of the capital asset(s)	
(c)	Details of the entity or public authority or beneficiary under whose name such capital asset is registered.	
(d)	Provide details of the capital asset(s) created or acquired (including complete address and location of the capital asset)	

11. Specify the reason(s), if the company has failed to spend two percent of the average net profit as per section 135 (5): **Not Applicable**

(Chairman cum Managing Director)

(Chairperson CSR Committee)

**ANNEXURE-VI**  
**CSR EXPENDITURE FROM CAPEX**

Details of CSR Activities by NNTPP		Rs. in Lakhs
1	Construction of 2 Class rooms, compound wall and toilets for both boys and girls in panchayat Union Middle school, Kollirippu	36.00
2	Construction of Toilet Blocks for Govt Boys Hr Sec School, Vridhachalam	20.00
3	Toilets and incinerator and Science labs for Govt High School, Vadalur, Pudhu Nagar	20.00
4	Construction of Toilets in the operating region of NNTPP	100.00
5	Providing 1000 LPH RO water filters in Mandharakuppam	20.00
6	Face lifting of Union Middle School, A block, Neyveli	9.50
7	Construction Auditorium and Class rooms in Jawahar Science College, Neyveli	326.50
8	Construction of Auditorium, Kolanjiappar College, Vridhachalam	75.00
9	Skill development for Men	25.00
10	Improvement & Repair works of Roads near by villages	30.00
11	Desilting and formation and improvement of Drainages,	5.00
12	Infrastructure facilities in Govt land for displaced persons	15.00
13	Desilting of ponds in 8 villages around NNTPP	268.00
14	Sinking of borewells in the desilted lakes and providing solar powered pumps	130.00
15	Fuel Cost for desilting and deepening of community ponds thro Mines	20.00
18	Anandam House for orphaned elders in and around Neyveli	1000.00
	Total	2100.00



# GBHSS, Kurinjipadi







# NLCIL & ANNAMALAI UNIVERSITY

## CSR-Base Line Survey – 2019



NLCIL List No: 29

Date of Visit: 07-Nov-2019

1. Name of the School: Government High School

2. Address: Kattugudalur

3. Block: Panruti

4. Type of School: Government

5. Students Natives (Beneficiary Villages):

Kattukudalore, Mudapalli

Beneficiary Students	
OC	0
BC	25
MBC	173
SC/ST	132

Male	184
Female	146
<b>Total</b>	<b>330</b>

6. Previous benefits received from NLCIL (if any): Toilet for girls

7. Status of those benefits: Helps to maintain personal hygiene

8. Name of the Headmaster: K Gunaselvi

Contact No.: 9443813960

9. Actual Request 1: Toilet for boys

9.a. Need of the Demand: Highly Needed

9.b. Nature of the Demand: Most Urgent

Priority: P1

10. Actual Request 2: Sports Equipments

10.a. Need of the Demand: Needed

10.b. Nature of the Demand: Not Urgent

Priority: P4

11. Actual Request 3:

11.a. Need of the Demand:

11.b. Nature of the Demand:

Priority:

12. Any other additional requirement: Compound wall, Laboratory class room Cycle shed.

12.a. Need of the Demand: Highly Needed

12.b. Nature of the Demand: Most Urgent

Priority: P1

\* P1 – Priority One (Highly Needed & Most Urgent); P2 – Priority Two (Highly Needed & Urgent);  
P3 – Priority Three (Needed & Urgent); P4 – Priority Four (Needed & Not Urgent); NR – Not Recommended.

### Validating Points

Toilet for boys: They don't have toilet for boys and using open space for the same. Hence, it is vital to maintain the personal hygiene.

Compound wall: It is necessary because all the sides are open. School buildings are safe place for animals and trees passers after school hours.

Cycle shed: Many students are coming by bicycle and are parked under the sun and rain. The bicycle shed will delay corrosion and life to the same.

Science Laboratory: Experiments are conducted in the class rooms they don't have separate class room for the same. Further laboratory experiments ensures the students to grasp each and every concept thoroughly.

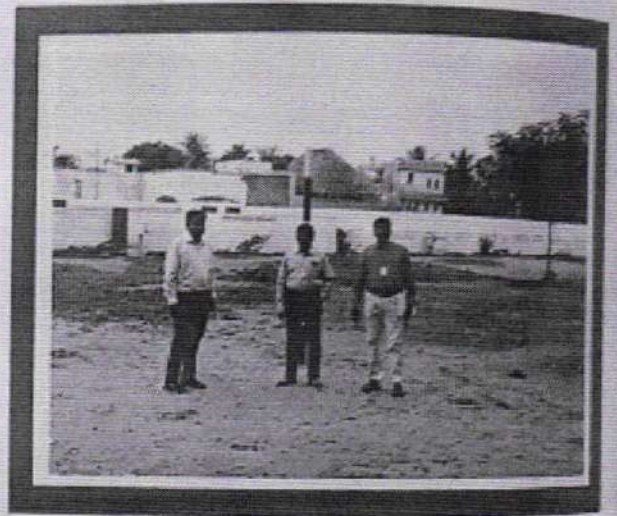
### Team members:

Dr. R. Anand

Dr. C. Kathiravan



# Kattumannarkoil







# NLCIL & ANNAMALAI UNIVERSITY

## CSR-Base Line Survey – 2019



NLCIL List No: 030

Date of Visit: 24-Oct-2019

1. Name of the School: Parvadaraja Gurukulam Higher Secondary School

2. Address: New north Street, Udalyarkudi, Kattumannarkoil.

3. Block: Kattumannarkoil

4. Type of School: Government aided

5. Students Natives (Beneficiary Villages):

Movur, Keelakadambur, Kandhakumaran, Reddiyur, Kudikadu, Værananallur, Lalpet, Kumaratchi, Therkiruppu.

Beneficiary Students	
OC	3
BC	229
MBC	482
SC/ST	483

Male	1,167
Female	
Total	1,167

6. Previous benefits received from NLCIL (if any):

7. Status of those benefits:

8. Name of the Headmaster: Dr.K.Mathivanan

Contact No.: 9486918478

9. Actual Request 1: New building with new classrooms

9.a. Need of the Demand: Needed

9.b. Nature of the Demand: Not Urgent

Priority: P4

10. Actual Request 2:

10.a. Need of the Demand:

10.b. Nature of the Demand:

Priority:

11. Actual Request 3:

11.a. Need of the Demand:

11.b. Nature of the Demand:

Priority:

12. Any other additional requirement: Smart classroom

12.a. Need of the Demand: Needed

12.b. Nature of the Demand: Urgent

Priority: P3

\* P1 – Priority One (Highly Needed & Most Urgent); P2 – Priority Two (Highly Needed & Urgent);

P3 – Priority Three (Needed & Urgent); P4 – Priority Four (Needed & Not Urgent); NR – Not Recommended.

### Validating Points

New building is needed but not urgent. However, smart classrooms are needed as the students syllabus is with QR code (new syllabus)

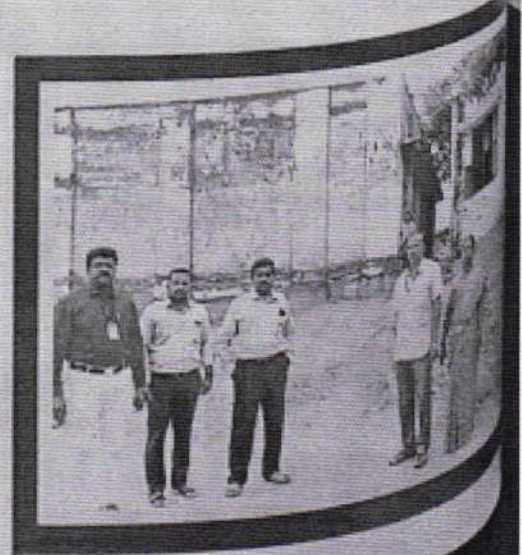
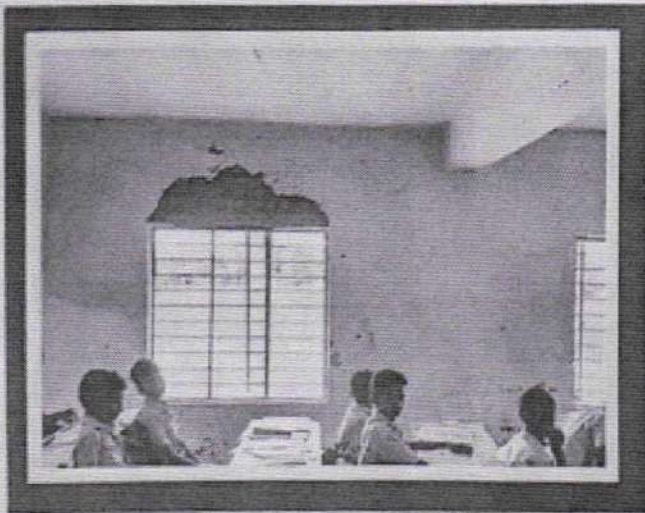
### Team members:

Dr. C. Samudhra Rajakumar

Dr. K. Tamizhyothi



# GHSS, KANJANKOLLAI







# NLCIL & ANNAMALAI UNIVERSITY

## CSR-Base Line Survey – 2019



NLCIL List No: 031

Date of Visit: 24-Oct-2019

1. Name of the School: Government Higher Secondary School

2. Address: Kanjankollai 608 304

3. Block: Kattumannarkoil

4. Type of School: Government

Beneficiary Students	
OC	
BC	6
MBC	162
SC/ST	188

5. Students Natives (Beneficiary Villages):

Srukattur, Kondaimappu, Achalpuram, Vanavanailur, Koozhavooracholapuram

Male	174
Female	181
Total	355

6. Previous benefits received from NLCIL (if any):

7. Status of those benefits:

8. Name of the Headmaster: K. Rajendiran

Contact No.: 7598779155

9. Actual Request 1: Construction of Classrooms and Toilets

9.a. Need of the Demand: Highly Needed

9.b. Nature of the Demand: Most Urgent

Priority: P1

10. Actual Request 2:

10.a. Need of the Demand:

10.b. Nature of the Demand:

Priority:

11. Actual Request 3:

11.a. Need of the Demand:

11.b. Nature of the Demand:

Priority:

12. Any other additional requirement:

12.a. Need of the Demand:

12.b. Nature of the Demand:

Priority:

\* P1 – Priority One (Highly Needed & Most Urgent); P2 – Priority Two (Highly Needed & Urgent);

P3 – Priority Three (Needed & Urgent); P4 – Priority Four (Needed & Not Urgent); NR – Not Recommended.

### Validating Points

- At present 11 sections are there from 6th to 12th, but only 6 classrooms are available. 5 classrooms are needed. They conduct classes in the Varandah and also under the tree.
- Mostly two sections are conducted in the one classroom facing opposite direction (lot of difficulty)
- Space for constructing new building is available. In addition to that 2 existing buildings will be demolished which are more than 40 years old. Government has given order to demolish those two buildings.
- Toilet for boys is in open place. Toilet for girls is without room. There is a need for constructing a toilet especially for girl students.

### Team members:

Dr. C. Samudhra Rajakumar

Dr. K. Tamizhjothi



# GHS, KEELAKUPPAM







# NLCIL & ANNAMALAI UNIVERSITY CSR-Base Line Survey – 2019



NLCIL List No: 32

Date of Visit: 24-Oct-2019

1. Name of the School: Government High School, Keelakuppam

2. Address: Keelakuppam, Nadakuppam Post

3. Block: Pannur

4. Type of School: Government

5. Students Natives (Beneficiary Villages):

Keelakuppam, Naudkuppam, vallam, Srandharkuzhi

Beneficiary Students	
OC	
BC	
MBC	140
SC/ST	60

Male	80
Female	120
<b>Total</b>	<b>200</b>

6. Previous benefits received from NLCIL (if any): Toilets

7. Status of those benefits: Functioning well

8. Name of the Headmaster: Mrs. Priyadarshini

Contact No.: 94862 25783

9. Actual Request 1: Toilet Facilities

9.a. Need of the Demand: Not at all Needed

9.b. Nature of the Demand: Not Urgent

Priority: NR

10. Actual Request 2: Compound Wall 20 Feet

10.a. Need of the Demand: Needed

10.b. Nature of the Demand: Urgent

Priority: P3

11. Actual Request 3:

11.a. Need of the Demand:

11.b. Nature of the Demand:

Priority:

12. Any other additional requirement:

12.a. Need of the Demand:

12.b. Nature of the Demand:

Priority:

\* P1 – Priority One (Highly Needed & Most Urgent); P2 – Priority Two (Highly Needed & Urgent);  
P3 – Priority Three (Needed & Urgent); P4 – Priority Four (Needed & Not Urgent); NR – Not Recommended.

## Validating Points

- Toilet facility offered by NLCIL recently, it has maintained well.
- Compound wall was damaged by village people during the rainy season, it should be reconstructed is need for safety of the students and school's properties.

## Team members:

- Dr. B. Karthikeyan
- Dr. P. Balathandayutham



Annexure - VIII



**NLC INDIA LIMITED**

(Formerly Neyveli Lignite Corporation Limited)

('Navratna'-Govt. of India Enterprise)

OFFICE OF THE CHIEF GENERAL MANAGER

NEYVELI NEW THERMAL POWER PROJECT (2x500MW)

NEYVELI - 607807, Cuddalore Dist. Tamil Nadu, India

Phone: 04142 - 268868, FAX: 04142-268453, e-mail:hrntpp@nlcindia.com

Ltr No: CGM/NNTPP/OSEP/2017

DT: 19.04.2017

To

**The Director of Industrial Safety and Health**  
O/o the Director of Industrial Safety and Health  
Indian Officer's Assn. Building,  
Old No.69, New No.35,  
Thiru Vi Ka Nagar Road,  
Royapettah,  
Chennai - 600 014.

Sub: NLC INDIA LIMITED, NNTPS (2X500 MW) - Submission of proposed onsite emergency plan and risk assessment report and seeking approval - Reg.

With reference to the above subject, we are submitting our proposed plant onsite emergency plan and risk assessment report prepared as per TNFR 1950, along with relevant documents for our your kind perusal.

We request your good office to kindly pursue the same and issue the approval as early as possible for the above.

Thanking you,

Yours faithfully,  
For Neyveli New Thermal Power Station

*[Handwritten Signature]*  
Occupier (NNTPS) 19/4/17

Encl : 1. Onsite emergency plan and risk assessment report - 4 copies.

சென்னை செயலகத்தில் பராமரிப்பு மற்றும்  
சுற்றுச்சூழல் பாதுகாப்புப் பிரிவுக்கு  
தயார் செய்து கொடுக்கப்பட்டுள்ளது.  
திகதி 24.4.17. சம்ப *[Signature]*  
பராமரிப்பு அதிகாரி





# M/s. NEYVELI NEW THERMAL POWER STATION

## 2 X 500 MW POWER PLANT

### NEYVELI

## On-Site Emergency Plan & Risk Assessment Report

### 1.0 GENERAL

#### 1.1 Introduction

Emergency is a general term implying the onset of hazardous situation both inside and outside the installation. Thus, Emergencies are termed "On-Site" when it is confined within the plant even though it may require external help and "Off-Site" when emergency extends beyond the plant boundaries to public area. It is to be understood here, that if an emergency occurs inside the plant and could not be controlled, it may lead to an Off-Site Emergency.

Emergency planning is an important part of loss prevention strategy. The type of emergency primarily considered here is the major emergency which may be defined as one which has the potential to cause serious danger to persons and or damage to property and which tends to cause disruption inside and or outside the site and may require the use of outside resources.

#### 1.2 Objectives of the plan

Emergency Planning and Preparedness is a Comprehensive Response Plan to react to a number of predictable emergencies anticipated in the works and to contain the loss of human life, property and provide speedy and effective remedial measures. Important prerequisite for emergency planning is to forecast an accident scenario which leads to a major fire, explosion, toxic gas release, their spread or extent and their damage potential. This information is used in conjunction with layout of the units in the works, and adjacent communities in the preparation of the contingency plan.

Identification of scenarios and their consequences form important elements in the emergency planning. The type of scenarios and their consequences determine the emergency response. Identification of scenarios and mitigation include the detection of abnormal conditions, assessing the potential consequences and immediate measures to





**M/s. NEYVELI NEW THERMAL POWER STATION**  
**2 X 500 MW POWER PLANT**  
**NEYVELI**

**On-Site Emergency Plan & Risk Assessment Report**

mitigate the situations. This includes emergency response action which must be taken to protect the health and the safety of the plant personnel and the public.

Assuming all reasonable plant safety design and their improvements have been considered like design codes & practices, alarms, shutdown interlocks etc., the accidents may still occur as the plant operating parameters and their values may exceed or lie outside the normal parameters.

These uncontrollable parameters give the plant operators an indication of consequences in advance of actual occurrence. The important elements of Emergency Planning can be broadly classified as follows:

- i. Identifying the disaster potential scenarios and advance planning to combat and minimize the damage.
- ii. Disaster phase i.e. warning, protective action like evacuation of personnel etc.
- iii. Containment of disaster by isolating, Fire Fighting etc.
- iv. Rescue, relief assistance to the people affected in the works / community effectively and efficiently based on the actual needs and on the information collected locally both in advance of the disaster and as soon as possible after the disaster occurred.
- v. Finally when the situation is contained, efforts are to be taken to return back to near- normal conditions.

of the above points, the first four are most relevant to the immediate attention to works management. The areas affected by each accident scenario can be identified by their consequences like Pool Fire, Flash Fire, Jet Fire and Toxic gas release. It would be appropriate to classify the hazards around the plant and to provide Emergency Measures in the area both on-site and off-site, if the zone extends.



# M/s. NEYVELI NEW THERMAL POWER STATION

## 2 X 500 MW POWER PLANT

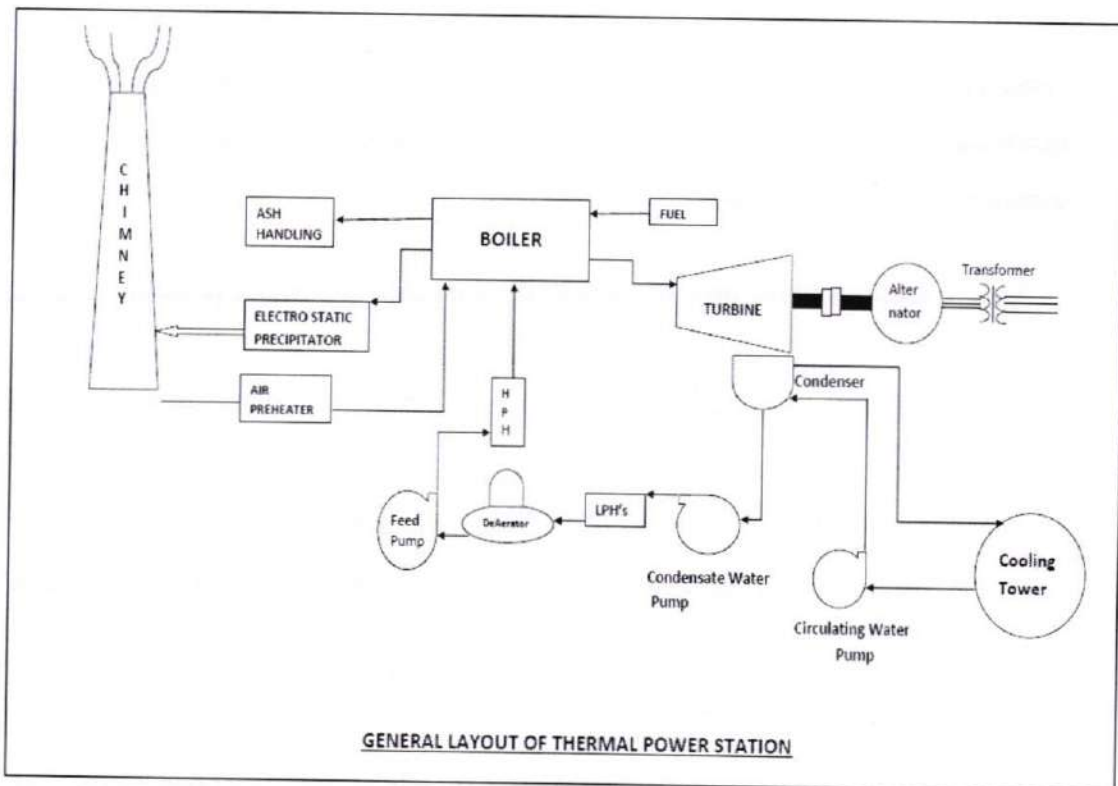
### NEYVELI

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### 1.3 Organization chart

### 1.4 Health & safety policy

### 1.5 Process Flow & Description



Neyveli New Thermal Power Project (NNTPP) is a replacement plant for the existing 50 years old Thermal Power Plant-I by adopting latest technology and relatively high efficient machineries in the process. It has 2 Units, each Unit consists of Boiler, Turbine, Generator & Transformer of 500 MW capacity, the main input to the System is Lignite, which is mined from existing mine-I & mine-IA and transported to lignite stock yard.





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Lignite from stock yard/direct load from mines is flow through various components like screen, crusher and filled in Boiler Bunkers (8 nos. per Boiler) through belt conveyors after removing the foreign materials. This lignite is extracted individually from each Boiler Bunker and feeding to Lignite Pulveriser (Beater Wheel Mill), where the lignite get pulverised in to microns and fed into the Boiler Furnace through Pulverised fuel Burners (PFB).

The atmospheric air is forced through FD fans and is passing through the air pre heaters where it is getting heated. The Hot Air is used for various purposes as primary air, Secondary air, over fire air, oil burner air, etc.

The hot air and the pulverised lignite are fed into the Boiler Furnace through PFB tangentially to form fire cylinder at the centre of furnace. In the furnace the lignite is subjected to complete combustion using the hot air and the furnace outlet temperature is maintained around 10000C. The heat liberated in the furnace is extracted at various heat exchangers viz evaporator, Super Heater, Re-Heater and Economiser, where the temperature of the working fluid (Steam) is increased and thus produced live steam is fed into High Pressure Turbine (HPT). After expansion in HPT, the cold steam is again fed into Re-Heater to again reheat the steam and the same is fed in to Intermediate Pressure Turbine (IPT) and then to Low Pressure Turbine (LPT), finally the exhausted steam is fed in to Turbine Condenser to condense the steam into water. This feed water is pumped by Condensate Extraction Pump and flows through Low Pressure Heaters and Deaerator, where the internal chemical treatment is being carried out to maintain the ultra-pure quality of working medium. Again the Feed water is pressurised to sub-critical stage and passed through High Pressure Heaters then through Feed manifolds it is fed into Boiler side Heat Exchangers (Via Economiser, Water Wall, Separator, Super Heaters and Re-Heaters). Thus the working fluid under goes cyclic process where energy addition taking place at Feed Pump (pressure) and Boiler(heat) and useful work output is taking place at Turbines in the form of shaft power (Mechanical energy).



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The flue gas which is coming out of the Boiler is used to heat the incoming air and induced through the Electro Static Precipitator (ESP) to separate the ash particles from the ash laden gas to meet out the environmental norms by ID fans. Finally the clean gas is let out at a height of 275 metres (for better dispersion in atmosphere) through the chimney at the required velocity. The fly ash collected in the ESP is taken to the silos by the ash handling system consisting of Vacuum extraction and dense phase pressure conveying to silos, where from the dry ash is disposed off through trucks to nearby cement plants. The bottom ash from the Boiler furnace is disposed as wet ash for land filling.

The water from Mines is stored in the lake behind Thermal-I is taken to the plant through raw water intake system and is used after required treatment for Circulating water system make-up, service water, drinking water and Demineralised water and other water requirements. The sludge and other effluents are treated in Effluent Treatment Plant.

The Turbine condenser is cooled by circulating water system maintained as closed cooling system. It consists of circulating water pumps, inlet cold circulating water pipe lines to Turbine condenser for cooling the turbine exhaust steam, the outlet hot circulating water pipes from condenser to Natural Draught Cooling Towers where it gets cool and flows to the Forebay of Circulating Water Pumps sump via channels. The drift & evaporation losses of circulating water is make-up from the soft water tank of clarified water from Raw water, which is drawn from existing nearby lake.

The Turbine in turn is connected to the 500 MW Generators which converts the mechanical energy in the form of shaft power into electrical energy. This electrical energy is stepped up through Unit Transformers into 400 KV and is transported to the grid.

**2.0 DETAILS TO BE FURNISHED IN THE ONSITE EMERGENCY PLAN**

**2.1 Name and address of the person furnishing the Information**

**Mr. -----**





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**OCCUPIER - NNTPP**

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Neyveli,  
Cuddalore District - 607 807.

**2.2 Key personnel of the organization and responsibilities assigned to them in case of an emergency**

<b>Sl. No.</b>	<b>ROLES AND RESPONSIBILITIES</b>	<b>NAME</b>	<b>TEL. NUMBER</b>
1	Site Main Controller		
2	Incident Controller		
3	Technical Officer		
4	Communication Officer		
5	Fire Fighting Officer		
6	Rescue Officer		
7	Rehabilitation Officer		

**2.3 Outside Organizations, if involved, in assisting during Emergency**

1. M/s NLC TS-I, Neyveli.
2. M/s NLC TS-I Expansion, Neyveli.
3. Hospital - GH, Neyveli.
4. Fire Station - Neyveli.
5. Police station - Neyveli.

**2.4 Details of liaison Arrangement between the Organizations**

Oral Mutual Aid Agreement has been raised with the above two organizations.

**2.5 Information on the Preliminary Hazard Analysis**

2.5.1 Type of accidents

2.5.2 System elements/events that can lead to a major accident



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2.5.3 Hazardous

2.5.4 Safety- relevant components





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Area	Hazards	Prevention Measures
Boiler	<ul style="list-style-type: none"> <li>➤ Failure of pressure control causing non-uniform combustion and potential boiler damage, release of not fully combusted and exposure of workers.</li> </ul>	<ul style="list-style-type: none"> <li>➤ Maintenance of equipment and operating procedures to control /optimize operation of boilers. Training of operators</li> <li>➤ Maintenance and operating procedures to optimize operations of boilers.</li> <li>➤ Monitoring of dust emissions..</li> <li>➤ Appropriate PPE for operators</li> </ul>
Raw material Storage	<ul style="list-style-type: none"> <li>➤ Airborne dust</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use of the stacker and reclaimer system to collect dust</li> <li>➤ Routine cleaning of the area</li> <li>➤ Good housekeeping</li> </ul>
Cooling system	<ul style="list-style-type: none"> <li>➤ Dusty environment</li> <li>➤ Accidental hurling of hot material</li> <li>➤ Use of a high pressure pump to clean the area</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use of a dust suction system (Disab)</li> <li>➤ Use of a safe system of work – no accidental operation (tag in/ tag out procedures)</li> </ul>
Piping System	<ul style="list-style-type: none"> <li>➤ Release of high pressure steam due to rupture of pipe/flange</li> <li>➤ Failure of boiler feed pumps</li> </ul>	<ul style="list-style-type: none"> <li>➤ Design Inspection</li> <li>➤ Safety interlocks</li> </ul>
Steam Turbine	<ul style="list-style-type: none"> <li>➤ Cooling tower left unused for a period of time causing potential for cooling tower fire as it dries out.</li> <li>➤ Oil used for lubrication and transformers – potential for oil fire / explosion (eg. transformer failure).</li> <li>➤ High voltage power connection from turbine to grid – potential electrocution of personnel</li> <li>➤ Noise due to leak of high pressure steam</li> <li>➤ Noise emitted from turbine due to plant design and/or to excessive vibration</li> <li>➤ Release of steam due to rupture of pipe/flange</li> </ul>	<ul style="list-style-type: none"> <li>➤ Firefighting equipment available to control /extinguish fires.</li> <li>➤ Appropriate fire detection and suppression systems will be provided on site</li> <li>➤ Appropriate clearances, procedures, standards will be</li> <li>➤ Adhered to in site layout and design.</li> <li>➤ Turbine in acoustic enclosure and silencers</li> <li>➤ Vibration monitoring equipment</li> </ul>



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Demineralized water plant	<ul style="list-style-type: none"> <li>➤ Poor quality feed water affecting the operation of the Demineralization plant resulting in increased regeneration</li> <li>➤ Leakage of acid or caustic storage tank(s)</li> <li>➤ Release of acid or caustic during truck unloading</li> </ul>	<ul style="list-style-type: none"> <li>➤ Water supply quality control</li> <li>➤ Demin plant control</li> <li>➤ Guidelines for disposal of hazardous wastes</li> <li>➤ Wastewater pond</li> <li>➤ Site drainage /barriers</li> <li>➤ Bunding</li> <li>➤ Regular inspections</li> <li>➤ Separate containment for acid and caustic</li> </ul>
Maintenance Department	<ul style="list-style-type: none"> <li>➤ Toxic fumes from welding operations</li> <li>➤ Insufficient tag in/tag out procedures during maintenance</li> <li>➤ Manual handling causing Musculoskeletal problems</li> <li>➤ High temperatures Electricity</li> <li>➤ Use of hand tools</li> <li>➤ Bad housekeeping</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use of a fumes suction system</li> <li>➤ Trained personnel</li> <li>➤ Use of hoists</li> <li>➤ Use of approved and maintained Protective devices RCD 's 30 mA</li> <li>➤ Routine cleaning – good housekeeping practices</li> <li>➤ Use of approved and well maintained hand tools</li> </ul>
Loading and Unloading	<ul style="list-style-type: none"> <li>➤ Overhead loads</li> <li>➤ Use of lifting equipment</li> <li>➤ Falling of loads</li> <li>➤ Dusty environment</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use of authorized personnel</li> <li>➤ Provision of appropriate maintenance to the lifting equipment.</li> <li>➤ Use of load limiting devices</li> <li>➤ Routine cleaning of the area</li> </ul>
Work Environment, Work areas and Passageways	<ul style="list-style-type: none"> <li>➤ Absence of safety signage</li> <li>➤ obstructions in the passageways</li> <li>➤ Inadequate environmental conditions</li> <li>➤ Insufficient protection from physiochemical factors</li> </ul>	<ul style="list-style-type: none"> <li>➤ Use of appropriate safety signage indicating the passageways and emergency exits</li> <li>➤ Good housekeeping of the area</li> <li>➤ Assessment of the environmental conditions and provision of adequate protection</li> </ul>





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Use of work Vehicles (for lifts, Loaders Unloaders)	<ul style="list-style-type: none"> <li>➤ Insufficient training</li> <li>➤ Insufficient maintenance</li> <li>➤ Inappropriate securing of the load</li> <li>➤ Speeding</li> <li>➤ Insufficient visibility</li> </ul>	<ul style="list-style-type: none"> <li>➤ Authorization and training of personnel</li> <li>➤ Routine maintenance of the work vehicles</li> <li>➤ Provision of work instructions</li> <li>➤ Labeling of the vehicle movement area</li> </ul>
Fuel Storage	<ul style="list-style-type: none"> <li>➤ Use of naked flames near fuel storage</li> <li>➤ The creation of hot spots during maintenance activities</li> <li>➤ The hurling of hot material in the fuel area</li> <li>➤ Electrical discharges (Thunderbolt, electrostatic charges during refueling , short circuits)</li> </ul>	<ul style="list-style-type: none"> <li>➤ Existence of a work permit system for working near the fuel storage</li> <li>➤ Maintenance and control of the anti-discharge system.</li> </ul>
Lignite Handling	<ul style="list-style-type: none"> <li>➤ Lignite Fire, lignite dust Explosion</li> </ul>	<ul style="list-style-type: none"> <li>➤ Control Measures as per the Recommendation given in Risk analysis Report.</li> </ul>
Sewage Treatment Plant	<ul style="list-style-type: none"> <li>➤ Short Circuit</li> <li>➤ Exposure to chemical and other lubricants while handling</li> <li>➤ Cleaning of tank</li> </ul>	<ul style="list-style-type: none"> <li>➤ Appropriate SOP &amp; Maintenance system followed.</li> <li>➤ Appropriate PPE's Used</li> <li>➤ Trained persons are utilized.</li> </ul>
Power plant (DG) Operation & Maintenance	<ul style="list-style-type: none"> <li>➤ Noise</li> <li>➤ Fire</li> <li>➤ Exposure to chemical</li> <li>➤ Insufficient maintenance</li> </ul>	<ul style="list-style-type: none"> <li>➤ Isolation is done</li> <li>➤ Appropriate PPEs used</li> <li>➤ Fire hydrant line &amp; Extinguishers provided</li> <li>➤ Appropriate PPEs used</li> <li>➤ Preventive maintenance of the equipments carried as per the schedule</li> </ul>

**2.6 Details about the site:**

**SITE PLAN is enclosed in the Annexure**

**2.6.1 Locations of the dangerous substances**

Sl.No.	Name of the Raw Material/Chemicals	Purpose of usage	Storage Details	Max. Stored Qty
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1	Lignite	Power Plant	Closed Yard	2,30,000 MT
2	HFO	Power plant start up	MS Tank-Above Ground level	2000 KL x 2 Nos
3	LDO/HSD	DG Set Fuel	MS Tank-Above Ground level	200 KL x 2 Nos
4	Caustic Soda	RO/ETP	MS Tank	11KL x 3 Nos
5	HCL	RO/ETP	FRP Tank	66KL
6	Hydrogen	Boiler	Can	40L x 2 Nos

**2.6.2 Seat of key personal**

**Mr. CGM/NNTPS** who is the Site Main Controller is normally seated in Admin Building. In case of an emergency, this office will function as the Emergency Control Centre.

**2.6.3 Emergency Control Centre**

The Emergency Control Centre in IBMS Room located in the Admin Building. The following Emergency facilities are available in the Emergency Control Centre:

- P & T Telephones
- Fax
- Intercoms
- Local Area Plan (Topographical Plan)
- Site Plan of the factory
- Predominant Wind Direction and Speed charts
- Fire Extinguishers as given in Annexure
- List of Key Personnel and their Telephone No
- List of neighboring factories with the contact personnel and the telephone no.
- List of Government Agencies and their contact telephone no
- Fire Suit
- Breathing Apparatus Set
- Face Masks
- Emergency Lights





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- First Aid Items
- White Board with Marker Pens
- Sufficient numbers of Emergency Plan copies and
- Public Address System

**2.7 Description of Hazardous chemicals at the site:**

**2.7.1 Chemical (Quantities and toxicological data)**

- Refer 2.6.1 and MSDS enclosed in the Annexure

**2.7.2 Purity of hazardous substances**

The purity of hazardous substances is as per the enclosed MSDS.

**2.8 Likely Hazards in the Plant**

The thermal radiation and shock waves in case of fire due to lignite/coal and explosion due to lignite dust would be highest at the center and starts falling down as one move away from the seat of fire. Effects of this on the human and environment should be known to understand the damage.

Information available in the literature is given below

Heat Flux- KW/ SQ.M	Damage to equipment	Damage to human
37.5	Damage the process Equipments	100% Lethality in one minute; 0.1% in 10 seconds.
25.0	Minimum energy to ignite wood upon indefinitely long exposure without a flame	100% lethality in 1 minute, Significant injury in 10 seconds
12.5	Minimum energy to ignite the combustible materials	1% lethality in 1 minute: First degree burns in 10 seconds.
9.5	-----	Pain threshold reached after 10 seconds; Second degree burns after 20 seconds.
4.00	-----	Causes pain if duration is longer than 20 seconds;
1.6	-----	Causes no discomfort



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Over-pressure wave, due to explosion, may result in broken windows, structural deformation including fatalities of the operating personnel in the Factor

**SOCIETAL RISKS THAT POSES DANGERS TO THE FACTORY:**

**NATURAL CALAMITY THAT POSES LIKELY DANGERS TO THE PLANT:**

- Cyclone;
- Floods and
- Earth-quake.

**SOCIETAL RISKS THAT POSES THE DANGERS TO THE FACTORY:**

- Bomb threats;
- Sabotage and
- Arson / Terrorism, etc.

**2.9 Details regarding**

**2.9.1 Warning, alarm and safety and Security systems**

An Emergency siren is provided in the admin Office; this will be sounded on the instruction of the Site Main Controller or Site Incident Controller in the absence of Site Main Controller when any fire is noticed in any fire hazard area.

The factory is surrounded by a compound wall and the security personnel sufficient in number shall be deployed for surveillance of the factory premises round the clock.

Suitable procedures have been devised for those personnel who remain behind for the critical plant operations; this critical plant shut-down will be shut down only in events where immediate emergency evacuation is required. To minimize damage from Emergency, the Rescue Officer is assigned with the additional responsibility of shutting them down.





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Emergency, the Rescue Officer is assigned with the additional responsibility of shutting them down.

**2.9.2 Alarm and Hazard control plans in line with disaster control and hazard control planning, ensuring the necessary technical and organizational precautions**

The Electrical siren that is installed in the Admin building will be used for the emergency warning.

- \* **EMERGENCY** : Wailing sound for 2 minutes.
- \* **ALL CLEAR** : Continuous blast for 2 minutes.

All department heads and designated personnel have inter-com phone connection for communication to aid in the accountability of the employees. Therefore, all the department heads must know the attendance of their employees on any given day to account accurately for their personnel.

**2.9.3 Reliable measuring instruments, control units and servicing of such equipment**

- Safe instruments will be used
- Required instrument inter-locks are provided
- Redundant trips will also be provided
- Emergency push-button trips will be provided locally and in the control room
- All critical instruments are provided with battery back-up

**2.9.4 Precautions in designing of the foundations and load-bearing parts of the building**

Adequate factor of safety has been provided in designing the foundations of all the buildings as well as the Equipment's. The buildings and the structures are periodically maintained in tidy condition as per the Building Code of practice and relevant acts.



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**2.9.5 Continuous surveillance of operations**

Round the clock surveillance is established in the factory premises

**2.9.6 Maintenance and repair work according to the generally recognized rules**

**Of Good Engineering Practices**

Electrical maintenance system is streamlined through check- lists covering preventive maintenance, half-yearly, yearly, turn-around and daily maintenance; this includes maintenance of equipment like motors, switch-gears, batteries, etc. The details of work to be done in each area are listed and codified. The records are computerized; all shut-down works are pre-planned and requirements of spares, etc. provisioned through the systemic coordination with the other service and operation departments. Predictive maintenance in the plant is highly evolved and job specific. The job history is computerized and the same is used in case of trouble- shooting also. The details about the Equipment's are maintained in the areas responsible for the maintenance activities. A Maintenance Engineer performs daily- LLF (Look, Listen and Feel) inspection to identify any abnormality. Process parameters are monitored by operating staff and logged in.

**2.10 Details of communication facilities available during emergency and those required for an Off-site Emergency**

- Mobile and Intercom phones within the factory premises
- P & T Telephone Lines and
- Public Addressing System

**2.11 Details of fire- Fighting and other facilities available**

- Fire Fighting Equipment's are provided throughout the Factory (List is enclosed in the Annexure).
- Exclusive Fire Water Storage with the capacity of 2700KL within the Factory Premises and also hydrants are installed
- Electrical Pump, Diesel with Jockey Pump with the pressure capacity of 10kg/cm<sup>2</sup>





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- Fire Hydrant Layout enclosed in the annexure.

**2.12 Details of First Aid and Hospital Services available and their adequacy**

- First - Aid Boxes with medicines are proposed to provide in various sections of the Factory.-List of First Aid Boxes/Location are enclosed in the Annexures
- Required Number of persons are proposed to train in the First - Aid by St. John Ambulance
- Round the Clock Ambulance service is available
- In case of serious emergency for further treatments the management has a tie-up with nearest hospital

**3.0 MAIN STAGES OF EMERGENCY**

Major Emergency goes through the following main stages:

1. Communication during Emergency
2. Declaration of Emergency by raising the Alarm
3. Implementation of the Emergency Combat Procedures and
4. Rescue.

**1. Communication during Emergency**

The person first noting the emergency has to inform to shift-in-charge of the respective section. On assessing the situation, shift-in-charge will inform to all the concerned as per the guidelines given in the communication net-work.

**2. Determination of Emergency**

On receipt of information, Incident Controller rushes to the site, assess the situation and advises them to tackle the situation/emergency. Then he informs



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the Site Main Controller and on the instruction of the Site Main Controller he instructs the central control room to raise the siren.

In case of emergency, the siren will be raised in short wailing tone. On hearing the siren, all personnel will assemble at assembly points. The personnel assigned with the emergency duty will report to the respective key personnel at the emergency control Centre and take orders.

**3. Implementation of Emergency Combat Procedures**

On hearing the siren / information over phone, all key personnel would assemble at emergency control centre and take orders from the site Main controller and play their roles as defined. In connection with the Emergency Operations to be carried out in an orderly and sequential manner, the following teams have been formed to assist the coordinators so as to restore the normalcy at the earliest:

- I. Technical Officer
- II. Fire-Fighting Officer
- III. Communication Officer
- IV. Rescue Officer and
- V. Rehabilitation Officer.

All others will remain in the Assembly Points until the Emergency is over which is indicated by the long ALL CLEAR SIGNAL. Depending on the wind direction and incident spot, all employees (including company employees as well as contract employees) and visitors should choose the escape route to reach the Assembly Points. Head count would be taken at the Assembly Point to ascertain that no one is trapped/ missing in the plant area.





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**4. Rescue and Rehabilitation**

In order to ensure that all the persons are safe, Head Count will be taken. In case of any difference in the count, rescue team will be pressed into service to rescue the victims.

**Head Count System**

Number of persons assembled in the Emergency Assembly Point should be informed to the Site Main Controller by Communication Coordinator. The number of company employees, contract employees and visitors inside the plant at that point of time will be informed to the Site Main Controller within 15 minutes by the Human Resources Development Manager and the Security Officer respectively. Site Main Controller will match the figures and if needed advice the Rescue Officer to search for the trapped employees.

**Emergency call off**

Site Emergency Controller will check-up the area along with Incident Controller and Technical & Fire-Fighting Officers so as to declare Emergency Call Off by raising continuous long siren.

Communication Officer will arrange to make announcements with public address system.

**Training**

The company believes that any job or task can be performed efficiently through good training. Human Resources Department takes care of the training needs of the factory. The Emergency Control is also a task connected with the industrial activity, which requires training of connected persons for

Effective management of the task. Training and re-training are imparted in two stages.



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Induction training is given to the facilitators and other members of the Emergency team. The role of each and every facilitator and the team would be perfected by Mock-Drills on a given emergency situation.

**Responsibilities and duties**

**Duties of the person noticing the emergency**

The primary responsibility of informing any Emergency situation to the Incident Controller shall be religiously followed by the person, who notices the Fire/emergency situations in the factory premises. In turn, the Incident Controller would consult with the Site Main Controller after having assessed the Emergency Situation and declare Emergency without any further loss of time. The siren will be blown for a longer duration of 2 minutes, at intermission of 15 seconds "ON" and 5 seconds "OFF" for 5 times.

The first responder shall be the vocal alerting system through voice audibility, pitch, volume and contents of the message. The person who notices the Emergency shall be determined to react and rise up to the occasion through periodical rehearsals and training. Since the response time to the Emergency Scenario is the most critical component of combating the emergencies, his reliable and specific communication about the nature, magnitude and severity of the incident shall be clearly shown by his action of carrying the Red Flag hoisted nearby.

**Duties of site main controller / incident controller:**

The Site Main Controller shall have the control options ( in his absence) the Incident Controller shall have the Scenario Analysis to initiate the Level I or Level II Emergencies:

**LEVEL I - Emergency:**

Minor Emergency managed by Department Level

**Level II - Emergency:**

Possible Emergencies like Fire or toxic release that can be controlled by factory level,





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The Site Main Controller / Incident Controller shall be able to demonstrate:

- How to implement the On-Site Emergency Plan
- How to implement the incident command system
- How to identify, to the extent possible, all credible Accident Scenarios or the conditions present
- How to address the site analysis, use of Engineering Controls, hazardous material handling procedures and use of new techniques
- How to determine- through monitoring, when personal protective equipments or respiratory protection is required
- How to provide training to the First Responders based on their duties and functions within the factory premises; the skill and training required for all new Responders shall be conveyed to them through training , before they are permitted to take part in the actual Emergency Situation
- A First Responder Awareness Level employee is an individual who is likely to witness or discover a hazard and who, through training, is expected to initiate a response system by notifying the appropriate authorities of the Fire / hazardous chemical splashing. They are not expected to take further action
- A First Responder Operation Level is an individual who is expected to respond to the fire scenario as part of initial action to protect nearby personnel, property or the environment from the effects of the fire. They are trained to respond defensively to the fire scenario without necessarily being expected to extinguish the fire
- They shall have the knowledge of Hazards and the Risks associated with employees wearing in personal protective clothing
- When to decide for termination procedures

**Duties of the technical officer**



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- The technical officer shall be able to demonstrate the implementation of the Emergency Response Plan
- The knowledge of the classification, identification and verification of known and unknown materials by using field survey instruments Equipment's shall be acquired
- Ability to function within the assigned role in the incident command system shall be exercised
- The knowledge of the selecting and using the specialized personal protective Equipment's shall be acquired
- The knowledge of the in-depth Hazard and Risk Assessment shall be possessed
- Performance of advance control, containment and confinement operations within the capabilities of the resources available shall be secured
- Understanding of the termination procedures shall also be propagated.

**Duties of the fire-fighting officer**

Identification of the standard fire-fighting functions or evaluations expected of them based on the credible accident scenario to be assigned, including fire scenario assessment shall be performed simultaneously. The specific Fire-Safety Rules, Procedures and First-aid / Medical Attention services shall be performed according to the type of each credible accident scenario.

Whenever hot work operations are essential in the course of any industrial activities, the following Six Steps Rules shall be adhered in the interest of safety:

1. Conduct safety meeting with other officers
2. Put up warning signs at the site
3. Move combustibles away from the hot work site
4. Shield combustibles with fire blankets or welder's blankets
5. Provide fire watch
6. Have nearby appropriate fire extinguisher and telephone





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7. Evacuate the area, if fire can't be extinguished immediately and
8. Protect stored materials with a thermal barrier such as half-an-inch gypsum sheet board as soon as possible

Effective communication ensures that the fire-fighting crew understands their responsibilities during an assigned work. Effective coordination prevents conflicting activities and ensures that a proper sequence is followed, while conducting an assigned task. This becomes increasingly important as more agencies such as Tamilnadu Fire & Rescue Service and Mutual Aid Member would be involved in fire-fighting operations. Written code of practice shall be observed during fire-fighting by each and every-one of the crew.

It is not necessary to develop standard operating procedures regarding every possible exposure to carbon-monoxide and carbon-di-oxide atmosphere in the course of fire-fighting activities. What is expected is that procedures would be followed by way of wearing personal protective Equipment's, which is mandatory for their own protection.

Apart from the active fire-fighting crew, the Incident Controller and Fire-Fighting Officer shall wear personal protective Equipment's invariably. Fit testing shall be conducted for one and all fire-fighting crew and equipment shall be made available in the correct size.

**Duties of the communication officer**

- Emergency communication and warning protocols, processes and procedures shall be developed, periodically tested and used to alert people potentially impacted by an actual or impending emergency;
- The communication officer shall develop procedures to disseminate and respond to request for pre-disaster, disaster and post-disaster information including procedures to provide information to the media and other external audience and deal with their enquiries



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- Effective communication shall be ensured in the interest of safety
- The channel shall be monitored before transmitting
- The message shall be planned suitably before pushing the transmitter switch
- The push-to talk button in the Radio shall be pressed first and then wait for one second before starting the message; otherwise the first part of the message would be cut off due to the transmitter to work at its full power
- The micro-phone shall be held two inches from the mouth
- The unit or person shall be first identified
- The message transmitted shall be acknowledged by saying "GO AHEAD". If long message could not be taken for some reasons, simply "STANDBY" shall be recorded until the problem is solved
- While transmitting a number with two or more digits, ; first the entire number shall be given and then each digit separately; for example, the number "sixty three" shall be recorded as "63" first and then "six" and "three" shall be followed
- Exclusive frequency shall be ensured for Emergency Management Services and the back-ground noise shall be reduced as much as possible
- There shall be adequate proper communication from each stage of a plan to the next, so that the Hazard Management Decisions could be understood, recorded and audible. One way of achieving this by summarizing the key information of fire events in the factory premises
- The summary of the Key Information shall be a living document, which in its simplest form may be a compilation of entire details. It should convey information to all those who are responsible for operations in full, which is concise and easily read

#### Duties of the rescue officer

- Because air-way maintenance is one of the very important skills that has to be learnt by the Rescue Team Members and also the respiratory system shall be the first of the body systems to be reviewed in the course of an emergency





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- Unconscious persons who have not suffered trauma shall be placed in a side-laying or RECOVERY POSITION to help keeping air-way open
- Improperly lifting or moving a person can result in injury to either the responder or to the injured person. By exercising good body mechanics, the possibility of injuring self as well as the injured will be reduced. Good Body Mechanics means using the strength in the large muscles from the legs to lift a person instead of applying back muscles
- To lift safely, the Rescue Crew shall keep certain guide-lines in mind
- Before attempting to move a person, check the weight of the patient; if required, another person may be called for the help. The rescue work shall be carried out in an effective and helpful manner If the patient is on the floor or on the ground during an emergency situation, the rescue team member may have to drag the person away from the site
- Instead of trying to lift them and carry. Every effort shall be made to pull the person in the direction of long axis of the body in order to provide as much spinal protection for the person as possible. This sort of CLOTHES DRAG is the simplest way to move a person in an emergency
- If the person is dressed in cloths that could tear away easily during clothes drag (for example, burnt partially) the person injured shall be moved by using a blanket or large bed sheet, which is termed as BLANKET DRAG
- If any large sheet is not readily available, the injured person shall be carried by ARMS-TO-ARMS DRAG by placing the hands under the lying person's arm-pits from the back of the person and grasping the person's fore-arm
- There shall be close coordination and effective communication between the Rescue Team and the Rehabilitation Team
- plants in the course of their emergency rescue operations in the factory premises

**Duties of the rehabilitation officer**



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The Rehabilitation Officer shall establish logical capability and the Procedures to locate, Store, distribute, maintain, test and account for Services, personnel, resource materials and facilities procured for the Purpose of supporting the plan;

- Procedures shall include, but not limited to, the following:
  1. Control of access to the area affected by the emergency
  2. Identification of personnel engaged in emergency activities at the scene of incident
  3. Accounting for the personnel engaged in various activities
  4. Accounting for the personnel affected, displaced or injured by the incident
  5. Mobilization and Demobilization of resources
  6. Provision of temporary, short-term or long-term shelters, feeding and care of people displaced by the emergency
  7. Recovery, identification and safe-guarding of human remains
  8. Provision of mental health and physical well-being of the individuals affected by the emergency
  9. Provision for managing the critical incident stress for responders The Rehabilitation Officer shall develop functional and administrative procedures to support the entire sequence of operations like pre-disaster, disaster and post-disaster scenarios.

**Duties of the employees**

Employees in the factory including contractors and their contract workers shall, to the extent to which they are expected, that is, within their competency and skills, shall comply with all procedures and protection relating to the prevention and control of major accidents within the factory premises

They shall comply with all emergency procedures should a major accident or near miss occur They shall report promptly to the Incident Controller / shift-in-charge any matter of which they are aware that they may affect the facility compliance





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They shall take, within the scope of their job, and without being placed at any disadvantage, corrective action and, if necessary, interrupt the operations / processes of the factory, where, on the basis of their training and skills, they have responsible jurisdiction to believe that there is an imminent danger of a major accident and notify to the Incident Controller / Shift-in-charge or raise an alarm, as appropriate, before or as far as possible, after taking such action

They shall discuss with the Emergency Coordinating Officers any potential hazards that they consider are capable of generating a major accident and they also have the right to notify the relevant District Administration Authorities of those hazards

They shall also be consulted through appropriate consultative Mechanism in order to provide the safe system of work in and around the factory premise. In particular, they shall invariably be consulted about the Hazard Identification, the maintenance and Implementation of the Safety Management Systems and also on the revision as well as updating periodically of the On- Site Emergency Plan.

**Special Features of Emergency Plan for this Plant**

The major accidents possible in the plant are fire and explosion. These may be initiated by the physical explosion of the boiler and fires due to lignite and firewood and agro waste used as fuel. The fire effects can cause damage to the neighboring areas or persons working in the location. These scenarios are considered based on some literature data and practical experiences. Boiler explosions are possible only in case of negligence, mishandling and instrumentation failures. These needs to be viewed seriously in the standard operating procedure and special care is to be taken during the emergency situations for each event and act accordingly the emergency lists the duties and responsibilities of the personnel.



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**4.0 Emergency Response Plan: EARTHQUAKE**

In India following earth quake zones are classified such as Zone 2,3,4,5. As per current classification of Tamilnadu earthquake falls under zone III - moderate possibilities of occurrence. Initially, which falls under zone II, less occurrence.

In case of earthquake the following emergency procedures may be followed,

**If Indoors during an Earthquake**

- DROP to the ground
- TAKE COVER by moving under a table or other piece of furniture
- HOLD ON until shaking stops
- If you cannot take cover under a piece of furniture, tuck your head into your knees and cover your head with your arms
- Evacuate only after shaking has stopped and it is safe to do so
- DO NOT USE ELEVATORS

**If Outdoors during an Earthquake**

- Remain outdoors; DO NOT enter a building
- Move away from buildings, trees, streetlights, and utility wires
- Drop to your knees and into fetal position, close your eyes, and cross your arms over the back of your neck for protection
- Remain in this position until shaking stops
- Stay in an open area; the greatest danger exists directly outside buildings, at building exits, and alongside exterior walls

**If in a Vehicle during an Earthquake**

- Stop as quickly as safety permits and stay in the vehicle
- Avoid stopping near or under buildings, trees, overpasses, and utility wires
- Proceed cautiously once shaking has stopped





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- Avoid roads, bridges, or ramps that might have been damaged by the earthquake

**After Shaking Stops**

- DO NOT USE MATCHES/LIGHTERS OR OTHER SOURCES OF IGNITION
- Power outages may occur; fire alarms and sprinkler systems may be activated
- If possible, provide assistance to persons with disabilities who may need it or alert emergency responders to their location
- Do not enter any building that has been deemed or appears to be unsafe
- Leave the area if you smell gas or chemical fumes or dust.
- Be prepared for aftershocks
- If you are properly trained and able, provide first aid to victims
- DO NOT move the seriously injured unless they are in immediate danger of further injury
- Open doors carefully
- Watch for falling objects
- Avoid using telephones unless reporting an emergency

**Call Police and tell the Occurrence:**

- Your location
- Status of the victim (conscious, breathing, bleeding)
- Any visible injuries
- Stay on the phone until released by the dispatcher

**If Trapped Inside Building**

- DO NOT USE MATCHES/LIGHTERS OR OTHER SOURCES OF IGNITION
- Cover your nose and mouth with cloth to protect against dust
- If you are properly trained, provide first aid to victims



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- Do not move about or kick up dust
- Signal for help by whistling or tapping on the building
- Shout only as a last resort

**Call Police and tell the Occurrence:**

- Your location
- Status of the victim (conscious, breathing, bleeding)
- Any visible injuries
- Stay on the phone until released by the dispatcher

**Prepare for an Earthquake:**

- Fasten shelves securely to walls
- Place large or heavy objects on lower shelves
- Store breakable items such as bottled foods and glass in low, closed cabinets with latches
- Hang heavy items such as pictures or mirrors away from beds, couches, and any other seating areas

## **5.0 Emergency Action Plan - BOMB THREATS**

The following emergency action procedure may be adopted in case of receiving bomb threat in any form by the management.

1. If you observe a suspicious object or potential bomb on campus, **DO NOT HANDLE THE OBJECT!** Clear the area and immediately call Emergency control centre in the campus.
2. Any person receiving a phone call bomb threat should ask the caller:
  - When is the bomb going to explode?





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- Where is the bomb located?
  - What kind of bomb is it?
  - What does it look like?
  - Why did you place the bomb?
3. Keep talking to the caller as long as possible and record the following:
- Time of call.
  - Approximate age and sex of caller.
  - Speech pattern, accent, possible nationality, etc.
  - Emotional state of the caller.
  - Background noise.
4. If possible, have someone contact Campus Safety while you are on the phone with the caller. Otherwise, immediately notify emergency control center to report the incident.
5. Campus Safety will contact the authorized personnel to conduct a detailed bomb search. Employees are requested to make a cursory inspection of their area for suspicious objects and to report the location to Campus Safety. Again, **DO NOT TOUCH ANY SUSPICIOUS OBJECTS!** Do not open drawers, cabinets, or turn lights off.
6. If the bomb threat threatens you and other building occupants, or if you are instructed to do so, evacuate the space by walking quickly to the nearest marked exit, proceed to the building's initial assembling point, and await further instructions. Generally speaking, building alarm systems **SHOULD NOT BE MANUALLY ACTIVATED** during bomb threat situations, unless done so by someone in authority.
7. During building evacuations, assist the handicapped in exiting the building. Remember that elevators are reserved for handicapped persons during evacuations.



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8. Following emergency evacuations, your designated place is the primary assembly point or alternate assembly point if the emergency is impacting your primary location. Proceed to your assembly once instructed to do so by your Building Coordinator, RA, faculty member or supervisor. Keep streets, fire lanes, hydrants and walkways clear for emergency vehicles and crews.

9. If requested, assist Emergency crews as necessary.

10. A Command Post may be set up near the emergency site. Keep clear of the Command Post unless you have official business.

**IMPORTANT—DO NOT RETURN TO AN EVACUATED BUILDING** until and unless told to do so by College officials. And remember—during an actual emergency resulting in a building evacuation, **HEADCOUNTS** are to be performed at the assembly point(s), not the initial gathering point. Stay there until an accurate **HEADCOUNT** has been taken.

### **6.0 Emergency Response Plan - Storm, Cyclone and Flood:**

Despite our best efforts, it is still impossible to entirely prevent storm, cyclone and floods.

- To meet out cyclone and storm, adequate lightening arrestors shall be installed in the highest places of an Industry such as silos, building roofs and towers etc.
- Number of Lightening arrestors shall be calculated based on the last 10 year meteorological information from meteorological department.





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- Establishing public communication system and gathering information and communicate the same to all employees and top management through public addressing system in the facility.
- Periodical check up with insulations of all electrical systems particularly in the rainy seasons.
- All chemical storages are always kept free from rainy water.
- Shelters shall be provided according to the employee's strength with adequate food items, first aid materials, blankets etc.
- In case of flood, the responsible person should take care of all employees and keep them safe in shelters.
- Communicate to local agencies and nearest industry to get necessary help such as variety of vital services like,  
Supplying of drinking water
  - Emergency power
  - Helping in search and rescue operations.
  - Clearing debris and blockages of critical water intakes, sewer outflows and drainage channels.
  - Providing engineering services
  - Emergency flood lighting.
  - Making emergency repairs to draining and other flood control projects.
  - Restoring public services and facilities, like electrical power and water Supply systems;
  - Offering technical assistance, including structural evaluations of buildings and damage assessments;
  - Building temporary shelters and assisting long term recovery and Reconstruction.



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## **7.0 RISK ASSESSMENT REPORT**

### **7.1 INTRODUCTION**

#### **7.1.1 Objectives**

The Process Hazard Analysis or Risk Assessment objectives are:

- To identify the hazards in the process area and to determine they are acceptable
- To find any residual risk that could be appropriately managed and





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- To advise risk reduction strategies where unacceptable risks are identified.

### **7.1.2 Scope**

This analysis includes a description of the process, screening of hazardous goods, a qualitative assessment and where required, subsequent quantitative assessment that reviews the input/output materials in storage, processing and handling.

### **7.2 Statutory Requirements**

Tamilnadu factories rules 1950 and factories act 1948 and MSIHC rules 1989 insists on risk assessment should done to quantify the risks involved in the process. This analysis considers risks associated with the development in terms of accidental loss scenarios and their potential for hazardous incidents.

The primary objectives are to:

- ❖ Identify potential hazards associated with the proposal
- ❖ Analyze the consequences of significant hazards on people and the environment, and the likelihood or frequency of these hazards occurring
- ❖ Estimate the resultant risk to the surrounding land uses and environment and
- ❖ Analyze the safeguards to ensure they are adequate, and therefore demonstrate that the plant can operate within acceptable risk levels to its surroundings.

### **7.3 METHODOLOGY**

#### **7.3.1 General**

Risk Analysis is to provide sufficient information and assessment of risks to show that a project satisfies the risk management requirements of the proponent company and the relevant public authorities. Within this brief, the main objective of the RA is to show that the residual risk levels are acceptable in relation to the surrounding land use, and that risk will be appropriately managed. This is done by systematically:



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- Identifying intrinsic hazards and abnormal operating conditions that could give rise to hazards
- Identifying the range of safeguards
- Assessing the risks by determining the probability (likelihood) and consequence (effects) of hazardous events for people, the surrounding land uses and environment and
- Identifying approaches to reduce the risks by elimination, minimization and/or incorporation of additional protective measures.

With proper application, this method should demonstrate that the plant can operate within acceptable risk levels in relation to its surroundings. The analysis needs to be carefully and clearly documented with the assumptions and uncertainties of final design and operation defined.

### **7.3.2 Preliminary Risk Screening**

The need for a RA is determined by a preliminary risk screening of the proposed development. The preliminary screening methodology concentrates on the storage of specific dangerous goods classes that have the potential for significant offsite effects. Specifically the assessment involves the identification of classes and quantities of all dangerous goods to be used, stored or produced on site with an indication of storage depot locations.

### **7.3.3 Risk Classification and Prioritization**

Multilevel Risk Assessment (1997)[3] suggests the use of preliminary analysis of the risks related to a proposed development, to enable the selection of the most appropriate level of risk analysis. The preliminary analysis, detailed in Section 6, includes risk classification and prioritization using a technique adapted from the Manual for Classification of Risk due to Major Accidents in Process and Related Industries (IAEA, 1993)[5].





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### 7.3.4 Analysis and Assessment Levels

The hazard analysis and quantified risk assessment regime relies on a systematic and analytical approach to the identification and analysis of hazards and the quantification of offsite risks to assess risk tolerability and land use safety implications. Two key objectives are emphasized in the implementation of this process:

- The systematic and analytical nature of the assessment process enables the nature of the hazards, risks, leading risk contributors and events to be identified and understood from design, operational and organizational viewpoints.
- The quantification of offsite risks, where applicable, enables judgments to be made on location safety implications with regard to people, the biophysical environment and other land uses.

Multilevel Risk Assessment (1997) [3] prescribes three levels of risk assessment that can be undertaken. The choice of an appropriate technique is based on the results of preliminary screening, risk classification and prioritization and the potential for significant offsite consequences arising from hazards identified for the proposed development.

**Level 1** This is a qualitative assessment using word descriptions to approximately assess and rank risks. This is used when risk screening, classification and prioritization indicate no major offsite consequences, adequate controls exist, and surrounding land uses are not sensitive to the hazards posed.

**Level 2** Is a semi-quantitative assessment that utilizes the hazards identified in Level 1 and provides a focused quantification of key potential offsite risk contributors to demonstrate that risk criteria will be met.

**Level 3** This involves a full quantitative risk assessment and is undertaken whenever the scale and nature of an activity creates a significant risk of a major accident. A full scale analysis should also be carried out if partial quantification cannot sufficiently



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demonstrate that relevant criteria will be met. The rationale for the multilevel risk assessment approach is that:

- Preliminary analyses that indicate minor land use safety outcomes may only require qualitative assessment (Level 1). The emphasis in such instances should be on the identification of key risk elements and optimising safety management controls, therefore fulfilling objectives of Level 1 above.
- Preliminary hazard analyses that indicate significant potential risk impacts to surrounding land uses should be subjected to a more detailed level of analysis including partial or total quantification (Levels 2 and 3). For such cases there should be increased emphasis on objectives of level 2 above, relating to land use safety and risk tolerability.

#### **7.3.5 Qualitative Analysis**

Qualitative analysis uses words and descriptive scales to determine the likelihood of each identified hazard and its consequences. This provides an estimate of the likely rate of occurrence of hazardous events and their severity, from which a measure of the risk may be obtained through a simple matrix format of the equation:





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Risk = Likelihood x Consequence

**Table 3.1 - Consequence and Likelihood[6]**

Consequence Scale					Likelihood				
					E - Rare	D - Unlikely	C - Possible	B - Likely	A - Almost Certain
	Assets	Production	Environment	People	May occur only in exceptional circumstances (million to 1)	Could occur at some time (10,000 to 1)	Might occur at some time (100 to 1)	Will probably occur in most circumstances (even money)	Is expected to occur in most circumstances (odds-on)
1 - Insignificant	Slight Damage < \$5,000	Slight Loss < 1 hour	Environmental Nuisance	Slightly Injured (FAC)	L	L	L	M	M
2 - Minor	Minor Damage < \$50,000	Minor Loss < 12 hours	Material Environmental Harm	Minor Injury/Occ. Illness (MTC)	L	L	M	H	H
3 - Moderate	Localised Damage < \$500,000	Localised Loss < 1 day	Serious Environmental Harm	Significant Injury/Occ. Illness (LTI-PPD)	M	M	H	H	E
4 - Major	Major Damage < \$5,000,000	Major Loss < 1 week	Major Environmental Harm	Single Fatality Permanent/Total Disability	M	H	E	E	E
5 - Catastrophic	Extensive Damage > \$5,000,000	Extensive Loss > 1 week	Extreme Environmental Harm	Catastrophic Multiple Fatality	H	E	E	E	E

**Legend**

E: extreme risk; immediate action/ control measure required  
H: high risk; senior management attention required  
M: moderate risk; management responsibility must be specified  
L: low risk; manage by routine procedures

The risk associated with a proposed development is determined by combining the likelihood of the potentially hazardous events and the magnitude of their consequences. The process of combining consequences and frequencies gives appropriate weight to the range between small consequence events (which are relatively frequent) and events of major consequence (which are very infrequent).

### 7.3.6 Quantitative Analysis

Quantitative analysis is conducted using numerical data values for both likelihood and consequences. This data has been gathered from a variety of sources including mathematical risk modeling, extrapolation from experimental studies or past data.

A quantitative analysis can be used to estimate:

- Thermal radiation distances;
- Explosion overpressure;
- Toxic exposure levels; and
- Fatality risk levels.



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### 7.3.7 Risk Assessment

Risk assessment involves comparing the level of risk found during the qualitative and quantitative analyses to previously established risk criteria, thereby ascertaining if that level of risk can be accepted or not. Such decisions take into account the wider context of the risk and include consideration of the tolerability of the risks borne by external parties.

Low and acceptable moderate risks can be allowed with minimal further treatment; however, they should be monitored and periodically reviewed to ensure they remain at this level. Higher level risks should be treated using safeguards (see Section 3.8).

### 7.3.8 Risk Treatment

A complete range of safeguards should be incorporated into the design and operation of the proposed development as prevention or protection measures for higher level risks. These measures may include plant design features, organizational safety controls, emergency and counter disaster principles and approval processes. Options should be evaluated on the basis of the extent of risk reduction and the extent of benefits or opportunities they create. In general, the cost of managing risks should be commensurate with the benefits obtained.

### 7.3.9 Monitoring and Review

Risks and the effectiveness of control measures need to be continually monitored to ensure changing circumstances do not alter risk priorities. Factors that may affect the likelihood and consequences of an outcome may change, as may the factors that affect suitability or cost of various treatment options. Ongoing review is, therefore, essential to ensure that risk management activities remain relevant.

## 7.4 FACILITY DESCRIPTION

### 7.4.1 Site Location

Please Refer Annexure.-Site Plan

## 7.5 HAZARD IDENTIFICATION





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**7.5.1 HAZARDOUS MATERIALS**

A summary of the materials associated with the plants is given below

Sl.No.	Name of the Raw Material/Chemicals	Purpose of usage	Storage Details	Max. Stored Qty
1	Lignite	Power Plant	Closed Yard	2,30,000 MT
2	HFO	Power plant start up	MS Tank-Above Ground level	2000 KL x 2 Nos
3	LDO	DG Set Fuel	MS Tank-Above Ground level	200 KL x 2 Nos
4	Caustic Soda	RO/ETP	MS Tank	11KL x 3 Nos
5	HCL	RO/ETP	FRP Tank	66KL
6	Hydrogen	Boiler	Can	40L x 2 Nos

**7.5.2 Hazardous Event Identification Word Diagram**

In accordance with the requirements of *Guidelines for Hazard Analysis*, (Ref 1), it is necessary to identify hazardous events which could be caused by the proposed operations. As recommended in HIPAP 6, this study focuses on “a typical and abnormal events and conditions. It is not intended to apply to continuous or normal operating emissions to air or water”. The latter are discussed elsewhere in the environmental assessment.

In keeping with the principles of preliminary hazard analyses or similar, credible, hazardous events with the potential for *off-site effects* have been identified. That is, “slips, trips and falls” type events or events that can be readily contained on-site are not included. Similarly, non-credible situations such as an aircraft crash occurring at the same time as an earthquake are not included.

The credible, significant incidents identified are summarized in the Hazard Identification Word Diagram following (The diagram presents the causes and consequences of the events, together with major preventative and protective features that are included as part of the design). The identified events apply to the modified facility, i.e. they include



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existing potential hazardous events with off-site impact as well as new potential hazardous events as a result of the proposed changes.

### **7.6 SAFETY MANAGEMENT SYSTEMS**

Safety management systems are intended to minimize the risk from potentially hazardous installations by a combination of hardware (i.e. design) and software factors (managements systems such as procedures, policies, plans, training etc). To ensure safe operation of the processing plants, storage and transfer systems, both the hardware and the software systems must be of high standard.

The personnel, being employed by a company specializing in the storage and distribution of Dangerous Goods, are well aware of the hazardous nature of materials associated with the project scope.

#### **7.6.1 Hazards Connected With Flammable Material**

Lignite is stored in the storage yard under completely covered roof. This one is imported from Indonesia. In general the following hazards are identified with the lignite.

1. Lignite Fire.
2. Lignite dust Explosion.
3. HFO – Pool Fire
4. LDO – Pool Fire

The detailed risk analysis report and recommendations will be briefed in the following section.

#### **7.6.2 MAXIMUM CREDIBLE ACCIDENT AND CONSEQUENCE ANALYSIS**

Maximum Credible Accident and Consequence Analysis (MCACA) is one of the methodologies evolved to quantify releases of hazardous chemicals. A Maximum Credible Accident can be described as the worst “credible” accident or as an accident with a maximum damage distance, which is still believed to be probable. The selection of Maximum Credible Accidents is somewhat arbitrary. In practice the selection of accident





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scenarios is done on the basis of engineering judgment and expertise in the field of risk analysis especially in accident analysis.

The MCACA aims at identifying undesirable and hazardous events causing the maximum damage to human beings and environment in and around the industries under consideration. This exercise is not only important to reduce the risks of existing units in industrial area, but also to provide valuable information for the location of future units for which there is little or only limited operating experience available.

The following steps are followed in the **MCACA**

- I. Preparation of an inventory of major chemical storages and rank them on the basis of their hazardous properties and storage quantities.
- II. Identification of potential hazardous areas and representative failure
- III. Cases from the vessels and pipes.
- IV. Visualization of the chemical release scenarios.
- V. Short-listing of maximum credible accident scenarios.
- VI. Effect and damage calculations from the release cases through mathematical modeling.



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**1. POOL FIRE**

The Consequences taken into consideration is pool fires only as these are the possible accident scenario in the plant with respect to the chemicals stored.

When a pool of a liquid hydrocarbon gets ignited it can result in a "Pool Fire". It can result in the generation of long smoky flames that can reach several pool diameters downwind. The flame also can bend as per the wind direction. The radiation from the flames is very intense near the fire but falls off rapidly beyond 3-5 pool diameters. Such fires can cause high destruction around its vicinity. But they normally do not pose serious damage beyond the plant boundary

Damage contour of all the scenarios are enclosed as Annexure.

Cases considered above for two different types of scenarios; namely, two different wind velocities and atmospheric conditions; 1.5m/sec of wind velocity with Stable (F) condition and 5.0m/s wind velocity for Neutral (D) conditions.

No	SCENARIO – POOL FIRE	5D	1.5 F			5D		
		Pool Radius	37.5	12.5	4.0	37.5	12.5	4.0
			Kw/M <sup>2</sup>			Kw/M <sup>2</sup>		
Meters								
1	LDO– Tank 200 KL –Catastrophic Rupture	2	-	3	4	-	3	4
2	HFO – 2000 KL Catastrophic Rupture	6	-	8	10	-	8	10

The results have been calculated for two different pool diameters; one the tank itself is burning with its diameter as its pool diameter and the other scenario where the pipeline rupture leading to a unconfined pool of a maximum of 10m diameter on the pipe route. However, both scenarios show results which will fall within the plant premises only. The maximum heat radiation effect of 37.5kW/m<sup>2</sup> falls within the pool itself which means the damage even in case of fire should be manageable with proper safety measures in place.

**2. Lignite FIRE**





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**Risk Analysis and Recommendations**

Bulk storage of any combustible materials leads to fire risk in many large storage areas such as waste bunkers, wood or paper stockpiles and lignite storage yards. Self-ignition usually starts within the bottom layers of a stockpile as a result of temperature increases in the material. Continuous monitoring of the surface layers enables a fast location of hot spots rapid response to lignite fires at initial stage.

It is obvious and well proven that lignite fire-fighting at the initial stage increases the probability to control and extinguish the fire it with low effort.

The fires usually start as 'hot spots' in the lignite accumulation. These are places where the generated heat cannot be dissipated efficiently while there is still enough oxygen to promote the oxidation reaction of the lignite.

**Why and When Self-Ignition May Occur?**

First the lignite's temperature begins to climb above ambient. At about 65°C-250°C measurable quantities of gas- aerosols, hydrogen and CO gases announce the danger of possible combustion. As about 65°C -150°C measurable quantities of gas- aerosols, hydrogen and CO gases announce the danger of possible combustion. As the temperature increase further, at about 315°C-370°C relatively large, visible particulates are emitted. Soon, as the hot spot heating rate increases in intensity, reaching about 400C -425°C, incipient combustion, can ultimately lead to self-ignition and flame.

The risk from fire exists anywhere significant amounts of lignite are in use or storages. After all, lignite is flammable and susceptible to a variety of ignition scenarios. One of the most frequent and serious causes of lignite fires is spontaneous combustion. In fact, spontaneous combustion is one of the most prevalent and serious causes of lignite fires. It has been a well-known and long-feared, danger at lignite storage sites all over the world.



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Lignite reacts with atmospheric oxygen even at ambient temperatures and this reaction is exothermic. If the heat liberated during the process is allowed to accumulate, the rate of the above reaction increases exponentially and there is a further rise in temperature. When this temperature reaches the ignition temperature of lignite, the lignite starts to burn and the phenomena is described as spontaneous combustion.

Preventing spontaneous combustion lignite fires involves attention to many different factors. Among the most critical are the type, age, and composition of lignite, how it is stored, and how it is used. Given the right kind of lignite, oxygen, and a certain temperature and moisture content, lignite will burn by itself.

Spontaneous combustion has long been recognized as a fire hazard in stored lignite. Spontaneous combustion fires usually begin as "hot spots" deep within the reserve of lignite. The hot spots appear when lignite absorbs oxygen from the air. Heat generated by the oxidation then initiated the fire.

Such fires can be very stubborn to extinguish because of the amount of lignite involved and the difficulty of getting to the seat of the problem. Moreover, lignite in either the smoldering or flaming stage may produce copious amounts of CH<sub>4</sub> and CO gases. In addition to their toxicity, these gases are highly explosive in certain concentrations, and can further complicate efforts to fight this type of lignite fire.

Even the most universal firefighting substance, water, cannot be used indiscriminately. Because of the remote possibility of a steam explosion, it is advisable that water be applied carefully and from a safe distance.

**What May Cause Spontaneous Lignite Combustion?**

The following general factors contribute to spontaneous lignite fires.

- Long lignite handling procedures which allow long-time retention of lignite, which increases the possibility of overheating.





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- New lignite added on top of old lignite created segregation of particle sizes, which is a major cause of overheating.
- Insufficient, temperature probes installed in the lignite bunker resulted in an excessive period of time before the fire is detected.
- Failure of equipment needed to fight the fire.
- Ineffective capability and use of CO<sub>2</sub> suppression system.
- Delay in the application of water.
- Inadequate policies, procedures, and training of personal prevented proper decision making, including the required knowledge to immediately attack the fire.

Thermal Radiation due to lignite fire calculation results are as follows.

Thermal Radiation Calculation For Lignite Fire 2,30,000 MT Capacity Storages		
Radiation Levels(kW/m <sup>2</sup> )	Distance (meters)	Effect of IHR at height
4	150	Damage to process equipment. 100 % Fatal in 1 Min. 1 % fatal in 10 sec.
12.5	92	Min. to ignite wood (with flame contact). 1 % fatal in 1 min. 1 st deg. burn in 10 sec.
37.5	30	Damage to process equipment. 100 % Fatal in 1 Min. 1 % fatal in 10 sec.

If not attended immediately based on the quantity of the lignite the fire may last longer and later it would be difficult to put off the fire once the intensity becomes too high.



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### 7.7 RECOMMENDATIONS & CONCLUSIONS

#### Lignite Storage and Handling:

- Know the lignite that is going to be used. E.g. anthracite has high carbon content and is much less combustible than low oxygen content bituminous lignite. Freshly mined lignite absorbs oxygen more quickly than lignite mined at an earlier time, and is more likely to overheat spontaneously.
- Air circulating within a lignite pile should be restricted as it contributes to heating; compacting helps seal air out.
- Moisture in lignite contributes to spontaneous heating because it assists the oxidation process and should be limited to 3%.
- Lignite having high moisture content should be segregated and used as quickly as possible. Efforts should be made to keep stored lignite from being exposed to moisture.
- Dry lignite shall be kept dry and shall be not exposed to any rain during storage period. This concerns what is known as the heat-wetting; Drying lignite is an endothermic process [heat is absorbed] and lowers the temperature of the lignite. Wetting (or gaining moisture) is an exothermic process and the liberated heat can accelerate the spontaneous heating of the lignite.
- Following the "first in, first out" rule of using stock reduces the chance for hot spots by helping preclude heat buildup for portions of stock which remain undisturbed for a long term. The design of lignite storage bins is important in this regard.
- A high ambient temperature aids the spontaneous heating process.
- Use lignite as quickly as practicable. The longer large lignite piles are allowed to sit, the more time the spontaneous process has to work.
- The shape and composition of open stockpiles can help prevent fires. Dumping lignite into a big pile with a trestle or grab bucket can lead to problems. Rather, lignite should be packed in horizontal layers, which are then leveled by scraping and compacted by rolling. This method helps distribute the lignite evenly and thus





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avoids breakage and segregation of fine lignite. Segregation of lignite particles by size should be strenuously avoided, as it may allow more air to enter the pile and subsequent heating of finer sizes.

- The height of the lignite pile is also important. Limit un-layered, un-compacted high grade lignite to a height of 5m; maximum height is 8m for layered and packed lignite.
- Properly inspect, test and maintain installed fire protection equipment.
- Maintain an update pre-fire plan and encourage regular visits to lignite facilities by the site or local emergency.
- Do not keep PPE within the thermal radiation Zone.

#### Summary

Lignite presents hazards between the time it is mined and its eventual consumption in boilers. Below are listed some of the characteristics of spontaneous fires in lignite. These characteristics, together with above recommendation can be used to evaluate the potential for lignite fires and as guidelines for minimizing the probability of a fire.

- (1) The higher the inherent (equilibrium) moisture, the higher the heating tendency.
- (2) The lower the ash free calorific value (Btu), the higher the heating tendency.
- (3) The higher the oxygen contents in the lignite, the higher the heating tendency.
- (4) Sulfur, once considered a major factor, is now thought to be a minor factor in the spontaneous heating of lignite. There are many very low-sulfur western sub-bituminous and lignite lignites that have very high oxidizing characteristics and there are high sulfur lignites that exhibit relatively low oxidizing characteristics.
- (5) The oxidation of lignite is a solid /gas reaction, which happens initially when air (a gas) passes over a lignite surface (a solid). Oxygen from the air combines with the lignite, raising the temperature of the lignite. As the reaction proceeds, the moisture in the lignite is liberated as a vapor and then some of



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the volatile matter that normally has a distinct odor is released. The amount of surface area of the lignite that is exposed is a direct factor in its heating tendency. The finer the size of the lignite, the more surface is exposed per unit of weight (specific area) and the greater the oxidizing potential, all other factors being equal.

- (6) Many times segregation of the lignite particle sizes is the major cause of heating. The coarse sizes allow the air to enter the pile at one location and react with the high surface area fines at another location. Lignites with a large top size (e.g.100mm), will segregate more in handling than those of smaller size [50mm]
- (7) It is generally believed that the rate of reaction doubles for every 8 to 11° C increase in temperature.
- (8) Freshly mined lignite has the greatest oxidizing characteristic, but a hot spot in a pile may not appear before one or two months. As the initial oxidization takes place, the temperature gradually increases and the rate of oxidization accelerates.
- (9) There is a critical amount of airflow through a portion of a lignite pile that maximizes the oxidation or heating tendencies of lignite. If there is no airflow through a pile, there is no oxygen from the air to stimulate oxidation. If there is a plentiful supply of air, any heat generated from oxidation will be carried off and the pile temperature will reach equilibrium with the air temperature: this is considered a ventilated pile.
- (10) When there is just sufficient airflow for the lignite to absorb most of the oxygen from the air and an insufficient airflow to dissipate the heat generated, the reaction rate increases and the temperatures may eventually exceed desirable limits.





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#### LIGNITE DUST EXPLOSION

#### RISK ANALYSIS AND RECOMMENDATIONS

There are a large number of facilities throughout the world which handle lignite, such as preparation plants. Many other facilities use lignite as fuel, such as cement and lime factories. Although lignite can be handled safely and can be an efficient fuel, there are explosion hazards which are accentuated as the particle size is reduced. Particle sizes of lignite which can fuel a propagating explosion occur within thermal dryers, cyclones, bag houses, pulverized-fuel systems, grinding mills, and other process or conveyance equipment. This paper discusses how explosions can occur within these facilities.

#### Fire Triangle and Explosion Pentagon

There are three necessary elements which must occur simultaneously to cause a fire: fuel, heat, and oxygen. These elements form the three legs of the triangle. By removing any one of these elements, a fire becomes impossible. For example, if there were very little or no oxygen present, a fire could not occur regardless of the quantities of fuel and heat that were present. Likewise, if insufficient heat were available, no concentrations of fuel and oxygen could result in fire.

On the other hand, for an explosion to occur, there are five necessary elements which must occur simultaneously: fuel, heat, oxygen, suspension, and confinement. These form the five sides of the explosion pentagon. Like the fire triangle, removing any one of these requirements would prevent an explosion from propagating. For example, if fuel, heat, oxygen, and confinement occurred together in proper quantities, an explosion would still not be possible without the suspension of the fuel, however, in this case, a fire could occur. If the burning fuel were then placed in suspension by a sudden blast of air, all five sides of the explosion pentagon would be satisfied and an explosion would be imminent.

Remembering the three side of the fire triangle (fuel, heat, oxygen) and the five sides of the explosion pentagon (fuel, heat, oxygen, suspension, confinement) is important in



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preventing fires and explosions at any facility. By eliminating the possibility of either suspension or confinement, an explosion cannot occur, but a fire may occur. By eliminating the fuel, the heat, or the oxygen requirement, neither a fire nor an explosion can occur.

**Fuel**

Lignite, as a primary fuel, must meet several requirements in order to be explosive. These requirements are volatile ratio, particle size, and quantity. The volatile ratio is a value established by the former United States Bureau of Mines to evaluate the explosibility of lignites based on large – scale tests in the Experimental Lignite Mine. To calculate the volatile ratio, a proximate analysis must be performed in the laboratory on a sample of the lignite. This analysis determines the volatile matter and fixed carbon quantities of the lignite along with moisture and ash. The volatile ratio is defined as the volatile matter divided by the summation of volatile matter and fixed carbon of the lignite.

This method for calculating the volatile ratio produces a value independent of the natural or added incombustible in the lignite. It has been determined that lignites with a volatile ratio exceeding 0.12 present a dust explosion hazard. All bituminous lignites fall into this category. Since anthracite lignites, by definition, have a volatile ratio of 0.12 or less, they do not present an explosion hazard. It is important to note that both bituminous lignites can be involved in explosions.

Another important requirement of the fuel is related to particle size. Experiments have shown that bituminous lignite particles passing through a 20 – mesh sieve can participate in a lignite dust explosion. A 20-mesh sieve can participate up to 841microns or about 0.903 inch to pass and these are the largest particles that contribute to a lignite dust explosion. As the particle size is reduced even further, a more severe explosion hazard is realized. Typically, in pulverized-fuel systems, the lignite is reduced to a particle size where more than 85% will pass a 200-mesh sieve with openings of 74 microns or about





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0.003 inch. These lignite dust particles require less energy or temperature to ignite and, since heat transfers more quickly between smaller particles, the pressure and rate of pressure rise during an explosion are accentuated. Fact is that thicker dust layers capture and hold heat more readily.

Electrical or frictional sparks can also provide the heat source for initiating a fire or explosion. Experiments have shown that a lignite dust cloud can be ignited directly by frictional sparks in the absence of methane. Dust clouds of lignite and sub-bituminous lignites can ignite with as little as 30milli-joules of energy. Beyond 8% moisture, the minimum amount of energy required for an explosion increases dramatically and, at 15% moisture, about ten times more energy is required.

Also, the minimum ignition energy of lignite dust varies with oxygen content of the atmosphere, volatile content, and the amount of fine dust that will pass a .200-mean sieve (74 microns). Lignites are easier to ignite with increases in the oxygen content, or the volatile content, or in the amount of fine lignite. However, there is a limiting value of minimum ignition energy which varies for each lignite.

All lignite dusts should be regarded as prone to ignition when exposed to the frictional sparks of badly maintained machinery or when they become contaminated with tramp metal. For mixtures of lignite dust and flammable gas, the critical minimum ignition energy is that which affects the gas. When ignited, the gas releases sufficient energy to suspend and ignite a lignite dust cloud.

#### **Oxygen**

As the volatile content of a lignite increases, less oxygen is required to complete the fire triangle or the explosion pentagon. Less oxygen is also required as the rank of the lignite decreases. Semi-anthracite has a very low volatile content and lignite is at least as volatile as high-volatile bituminous lignites. However, at ambient temperatures, the oxygen



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content must be reduced to below 138 to prevent ignition of bituminous lignite dusts with a strong ignition source.

**Suspension**

For fires to occur suspension is not a necessary step but completion of the explosion pentagon does require that the fuel be placed in suspension. There is certainly danger present whenever lignite dust is placed in suspension because, in most explosions, if a lignite dust layer on the floor is smoldering, an explosion is imminent if the layer is somehow placed into suspension. In this case, heat to satisfy the fire triangle and the explosion pentagon is already present..

The speed and duration of the moving air in an explosion is capable of dispersing additional lignite dust from the floor, walls, overhead beams, and equipment. In most lignite dust explosions, the air speed exceeds 200 miles per hour. In fact, a lignite dust explosion will generally die out if the air speed is less than 100 miles per hour (150 feet per second).

The Maximum explosion pressure developed is about 90 psig for lignite. The maximum rate of pressure rise for Pittsburgh Seam lignite is 2000 psi per second. These parameters are important in predicting the vigilance or destructive powers capable of being generated when a particular dust is suspended and ignited. Since the maximum pressure 90 psi for lignite and the rate of pressure rise is 2000 psi per second, it is easily seen that only about 0.045 seconds elapse before the maximum pressure is realized. In a pulverized-fuel system using lignite and designed to withstand 50 psi, vents a must excessive and equipment in the system is destroyed.

Good housekeeping practices are extremely important inside a plant because process equipment is not always able to withstand the internal pressures generated by an explosion. Once the explosion flame and pressures burst from the confinement into the





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plant, a secondary explosion may be fueled by any additional dust suspended by the blast. When good housekeeping practices have eliminated lignite dust in the plant, there would not be any fuel to allow a continuation of the explosion flame. This secondary explosion is responsible for the most damage to the plant itself. Also, the secondary explosion is usually responsible for the loss of lives or the serious injuries to personnel that occur.

### **Confinement**

Confinement is not a leg of the fire triangle, but to complete the explosion pentagon, it is essential. Basically, confinement keeps the fine lignite particles in close proximity after they are placed in suspension. Without the closeness, heat transfer could not occur rapidly enough to allow continued propagation. Without confinement, a propagating explosion is not possible; but rather, only a large fireball with no appreciable forces associated with it. If an explosion is vented to the atmosphere outside the plant, confinement is eliminated and part of the lignite forced out of the vent will be burned, with the remaining unburned lignite falling to the ground. As with the suspension leg of the explosion pentagon, if confinement is lost, the air speed will drop, additional lignite dust will not be placed in suspension, and explosion will extinguish.

### **Equipment Considerations**

There are many explosion hazards associated with facilities utilizing pulverized-fuel systems. However, with an understanding of the explosion phenomena, these types of accidents can be avoided. The same knowledge applies to preparation plants where large tonnages of lignite are processed. Each area where lignite is handled and each piece of equipment in the process poses individual hazards. Some of these areas and equipment are discussed in subsequent sections of this report.

### **Raw Lignite Stockpile**

The raw lignite for a pulverized fuel system is usually received from a variety of sources and the size is generally limited to approximately 2 inches or smaller. This raw lignite is



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typically stored on an outside stockpile where it is moved around by front end loaders. The fire and explosion hazards associated with this stockpile are usually limited to spontaneous combustion. Hot materials must never be loaded into the pulverized-fuel system. There is a definite possibility of an explosion pentagon could occur simultaneously. It is recommended that these hot spots be removed from the lignite stockpile and spread until cooled.

### **Raw Lignite Storage Bin**

If there are no hot spots in the lignite, the front-end loader will load the lignite onto a conveyor belt, which feeds a lignite storage bin. These bins are usually equipped with mechanical sensors to detect high-level or low-level lignite storage. There is also an emergency chute for unloading the bin in the event of a problem inside the bin. Lignite in the bin may be susceptible to spontaneous combustion: however, some airflow is required to provide the oxygen necessary for heating. However, thermocouples are sometimes located inside the bin to give warning of a fire, but carbon monoxide sensors would be more reliable for detecting an incipient fire. The raw lignite empties from this bin onto a weigh scale. The weigh scale is short conveyor belt that monitors the weight and the feed rate of the raw lignite to the pulverizer. When any problems are detected in the system, the lignite feed to the pulverizer is stopped completely.

### **Lignite Pulverizer (Impact Crusher)**

Under normal operating conditions, lignite and Dolochar is mixed in the ratio of 30% and 70% is dropped from the weigh scale into the pulverizer. The rotary airlock allows the lignite and its inherent moisture to enter the pulverizer, but prevents any outside air from entering the system. Generally, the outside air has higher oxygen content than the air circulating in the system and this additional oxygen could lead to completion of the explosion pentagon and potential disaster.





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##### 7.7.1 Recommendations

- The fire-fighting equipments should not be within the 100% fatality zone of thermal radiation. The distances for such zone may be informed to the fire-fighting crew and it may be ensured that they enter such zone with full protection such as fire proximity suit.
- Operating personnel should be through with all aspects of operation, safety systems; firefighting etc. their reaction time should be monitored.
- Mentioned control measures in the hazard identification word diagram should be implemented.
- Competent person will periodically test conveyor structures and necessary maintenance work will be done.
- Sensors will be connected to alarm system and interlocking system.
- Chemicals will be stored as per the classification said in MSIHC rules 1989. Chemicals will be stored in the specified area and shall be fenced.
- Sign boards shall be posted throughout the factory.
- Safe operating procedures shall be posted in each and every area with local languages.
- Chemicals will be stored in dyke area, even in small quantity.
- MSDS displayed for all chemical storages in both the languages.
- Periodical training given to applicable persons and all shall be documented.
- Lightening arrestors will be installed based on the last ten year meteorological information's.
- Since the area falls under Zone III, special care will be taken for foundations of all the construction activities.
- Buildings are constructed based on IS 1893:2002 standards.



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**HFO & LDO storage tank fire**

- Located in restricted area with proper guarding with barbed wire fencing & static electricity earthing is provided.
- Entry to restricted to others and allowed only to trained personnel.
- Fire buckets and extinguishers provided in accessibility and checked frequently.
- MSDS and Petroleum Rules Extract Displayed.
- Periodic inspection for corrosion control.
- Fire extinguishers provided and checked frequently.
- Designated storage earmarked for different consumables.

**ANNEXURE**

**DETAILS OF FOLLOWING SYSTEM IMPLEMENTED IN THE FACTORY:**

**A. CERTAIN STATUTORY REQUIREMENTS FOR OSEP**

**A1. SAFETY COMMITTEE (TNFR 1950- RULE 61M)**

Safety committee Reconstituted and attached.

**A2. OCCUPATIONAL HEALTH CENTER (RULE 62-0)**

**I. Medical Staff:**





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1. Factory Medical Officer – 1 No (General Shift – 9.00am to 5.00pm)
2. Duty Doctor - 1 Nos
3. Male Nurse - 1 No
4. Female Nurse - 1 No
5. Ambulance Driver - 2 Nos
6. House Keeping Staff - 1 Nos

**II. Infrastructure:**

1. 24 hours ambulance service available with driver.
2. Consulting room – 1No
3. Examination & observation room – 1No
4. Oxygen cylinder – 2 Cylinders
5. Oxygen concentrator – 1 No
6. BP apparatus – 3 Nos
7. Glucometer – 1 Nos
8. Refrigerator – 1 Nos
9. All lifesaving drugs available
10. First aid boxes – 4 No
11. Wheel chair – 2 Nos
12. Bed – 3 Nos
13. Spirometer - 1 No
14. Audiometer - 1 No
15. ECG Machine – 1 No
16. Portable Multi Parameter – 1 No
17. Suction Apparatus - 1 No each
18. Magnifier glass stand -1
19. Physio ultrasound therapy machine- 1
20. Wax therapy machine- 1
21. AED – 2 Nos

**III. First Aid**

1. First Aid trained persons - 25 nos

**A3. AMBULANCE VAN FACILITY (RULE 62 P)**

1. Oxygen cylinder – 1 No



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2. Fire extinguisher - 1 No
3. Bio medical waste collecting box -2 Nos
4. Flow meter – 1 No
5. Medicine Box – 1 No
6. Wheel chair- 1No
7. Portable Stretcher- 1No

Sl.No	LIST OF AMBULANCE MEDICINE BOX	Quantity
1	Inj.Avil	1
2	Inj.Buscopan	1
3	Inj.Diclo	1
4	Inj.Drotin	1
5	Inj.Fevastin	1
6	Inj.Deriphylin	1
7	Inj.Rantac	5
8	Roller Bandage Small	2
9	Roller Bandage Long	2
10	Sterile Glove Size 7	1
11	Betadine	1
12	Venflon	1
13	Scalp Vein	1
14	Syringe 2ML	5
15	IV Set	2
16	Disposal Glove	2
17	NS	2
18	RL	2
19	D5	1
20	DNS	1
21	Blade 22	4
22	Syringe 5ML	2
23	Syringe 10 ML	2
24	Sterile Pad Small	2
25	Sterile Pad Large	1
26	Cotton Roll	2





**M/s. NEYVELI NEW THERMAL POWER STATION**  
**2 X 500 MW POWER PLANT**  
**NEYVELI**

**On-Site Emergency Plan & Risk Assessment Report**

**A4. WORKS SHIFT DETAILS WITH TRAINED PERSONS IN SHIFT**

Regular	Contract	Total
It may vary due to Transfers and promotions.		900 Nos

Shift Details	Regular	Contract	First Aid Persons	Fire Fighting Persons
G Shift (09.00 AM to 05.00 PM)	It may vary due to Transfers and promotions.			
A Shift (06.00 AM to 02.00 PM)				
B Shift (02.00 PM to 10.00 PM)				
C Shift (10.00 PM to 06.00 AM)				

**B. FIRE FIGHTING MEASURES**

**B1. LIST OF FIRE EXTINGUISHERS AND ITS TYPE.**

Sl.No	Extinguishers Type & Capacity	Nos
1	4.5 KG CO2	574
2	6 KG DCP	287
3	9 Liters Foam	10
4	22.5 KG Co2	2
5	50 Liters Foam Trolley	2
6	50 KG DCP	1
7	Fire Bucket	1
<b>TOTAL</b>		<b>877</b>



**M/s. NEYVELI NEW THERMAL POWER STATION**  
**2 X 500 MW POWER PLANT**  
**NEYVELI**

**On-Site Emergency Plan & Risk Assessment Report**

**B2. LIST OF FIRE HYDRANT POINTS LOCATION & PUMPING DETAILS.**

Sr. No.	Item Description	UoM	Qty
<b>A</b>	<b>FIRE WATER PUMP HOUSE EQUIPMENTS INCLUDING CONTROL AND INSTRUMENTATION</b>		
A1	<b>Electric Motor</b> Driven, Centrifugal Horizontal type <b>Hydrant Pump sets</b> with Motor & accessories	SET	3
A2	<b>Diesel</b> Engine Driven, Centrifugal Horizontal type Standby <b>Hydrant Pump sets</b> with diesel engine, battery & battery charger and other accessories	SET	2
A3	<b>Electric Motor</b> Driven, Centrifugal Horizontal type <b>Spray Pump sets</b> , complete with Motor	SET	2
A4	<b>Diesel</b> Engine Driven, Centrifugal Horizontal type Standby <b>Spray Pump sets</b> with diesel engine, battery & battery charger and other accessories	SET	1
A5	<b>Electric Motor</b> Driven, Centrifugal Horizontal type <b>Jockey Pump sets</b> with motor & accessories	SET	2
A6	PLC Panel for Fire Water System	SET	1
A7	<b>Electric Motor</b> Driven, Centrifugal Horizontal type <b>Booster Pump sets</b> with Motor & accessories (Hydrant System, Boiler Area)	SET	2
A8	<b>Diesel</b> Engine Driven, Centrifugal Horizontal type <b>Booster Pump sets</b> with diesel engine, battery & battery charger and other accessories (Hydrant System, Boiler Area)	SET	2
A9	<b>Electric Motor</b> Driven, Centrifugal Horizontal type <b>Booster Pump sets</b> with motor & accessories (Hydrant System, LHS area)	SET	1
A10	<b>Diesel</b> Engine Driven, Centrifugal Horizontal type <b>Booster Pump sets</b> with diesel engine with motor, battery & battery charger and other accessories (Hydrant System, LHS area)	SET	1
A18	<b>Electric Motor</b> Driven, Centrifugal Horizontal type <b>Booster Pump sets</b> of cap. 410 M <sup>3</sup> /Hr. x 70 MWC, complete with Motor	SET	2
A19	<b>Diesel</b> Engine Driven, Centrifugal Horizontal type <b>Booster Pump sets</b> with diesel engine, battery & battery charger of cap. 410 M <sup>3</sup> /Hr. x 70 MWC	SET	1
<b>B</b>	<b>HYDRANT SYSTEM</b>		
B1	Single Headed, (External) <b>Hydrant Valves</b>	NOS	167





**M/s. NEYVELI NEW THERMAL POWER STATION**  
**2 X 500 MW POWER PLANT**  
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B2	Single Headed, (Internal) <b>Landing Valves</b>	NOS	161
B3	<b>Fire Hoses</b> Size - 63 mm Dia x 15 M long	NOS	350
B4	<b>Fire Hoses</b> Size - 63 mm Dia x 7.5 M long	NOS	178
B5	<b>Branch Pipe &amp; Nozzles</b>	NOS	648
B6	<b>First aid Hose reel</b>	NOS	161
B7	<b>Hose Box</b> For Hydrant Valve & Landing Valve	NOS	324
B8	<b>Water monitor</b>	NOS	46
B9	<b>Air Release Valves</b> - Size 25 mm NB	NOS	43

**B3. LIST OF FIRST AID BOXES LOCATION WITH MEDICINE LIST**

**B4. LIST AND LOCATION OF EYE WASH SHOWERS**

S.No	Department	Eye Wash Fountain / Shower
1	RO/DM Plant	1
2	PT Plant	1
3	Service Building	1
4	OHC	1
<b>Total</b>		<b>4</b>

**B5. EMERGENCY CONTACT NUMBERS (IN-SIDE & OUT-SIDE)**

**Telephone Numbers of Important Internal**

**Telephone Numbers of Important External Authorities**

Authorities	Office
<b>DIRECETORATE OF SAFETY &amp; HEALTH</b>	
Director of Safety & health, Chennai	044 - 28583617 044 – 28544091 984461041
Joint Director of Safety & health, Trichy	0431– 28295619 9444187610
Joint Director of Safety & health, Cuddalore.	04142-222826 9943660433



**M/s. NEYVELI NEW THERMAL POWER STATION**  
**2 X 500 MW POWER PLANT**  
**NEYVELI**

**On-Site Emergency Plan & Risk Assessment Report**

Dy Director of Safety & health, Cuddalore	04142-231864 9444418508
<b>POLLUTION CONTROL BOARD</b>	
Tamilnadu Pollution Control Board, Chennai. Chairperson, Chennai	044 -22353134 / 044-22353140
Additional Chief Environmental Engineer, Chennai	044-22353076 044 -22355146
District Environment Engineer, Cuddalore.	04142- 223867 9443140253
<b>COLLECTORATE</b>	
District Collector, Cuddalore	04142-230666 04142-230777 FAX -04142 230555
<b>POLICE</b>	
District Police Office, Cuddalore Superintendent of Police, Cuddalore	04142-230222 04142-295161 9445008800
Deputy Superintendent of Police, Block -26, Neyveli Township	04142-228050 9443519541 NLC-73737
Inspector of Police, Township Police Station, Block - 8, Neyveli Township	04142 - 252051 NLC-70358
Inspector of Police, Township Police Station, Block -27, Neyveli Township	04142-257262 NLC-73272
Inspector of Police, All women Police Station, Block - 19, Neyveli Township	04142-228100 NLC-73914
<b>FIRE CONTROL</b>	
Divisional Fire Officer, Cuddalore	04142-294603
Fire Station, Kuringipadi	04142-258370
Fire Station, Virudhachalam	04143-238701
Fire Station, TPS-I, Neyveli	NLC 50200, 50300
Fire Station, TPS-II, Neyveli	NLC-52600,52800
Main Fire Station, Block -17, Neyveli Township	04142- 252309 NLC 70800 & 70900 NLC-70451
CM / Main Fire Station, Block -17, Neyveli Township	NLC-73892
DGM/ Main Fire Station, Block -17, Neyveli	
Fire Station -Mines- I sub-stores, Neyveli Township.	NLC 40400, 42500
<b>HOSPITAL</b>	
Joint Director of Health Services, Cuddalore	04142- 230052
Causality, Government General Hospital,Cuddalore	04142- 231590





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Causality, NLC General Hospital, Neyveli Township	NLC-75628
Chief General Superintendent (Medical ), Neyveli	NLC-75666
<b>ELECTRICITY</b>	
Central Electricity Authority	
Superintendent Engineer, CEA, Chennai	044-28257051
Deputy Director,CEA, Chennai	044-28276579
TamilNadu Electricity Board, Main Load Dispatch Centre, Chennai	
Supdt. Engineer, Chennai	044-28521059
Executive Engineer, Chennai	044-28521056
Assistant Divisional Engineer, Chennai	044-28545294
<b>Southern Region Electricity Board, Bangalore</b>	
Southern Region Load Dispatch Centre, Bangalore	080-22254525
	080-22255962
<b>EXPLOSIVES</b>	
Joint Chief Controller of Explosives, Chennai	044 – 28419529

**B6. LIST OF PPE AND STORAGE DETAILS**

**Respiratory Protective Equipments**

1. Air Purifying type – Dust Respirator

**Non Respiratory Protective Equipments**

1. Safety Helmets - 50 Nos
2. Safety Goggles - 100 Nos
3. Face Shield - 10 Nos
4. PVC Apron - 20 Nos
5. Hand Gloves - 250 Nos (as per works)
6. Gum Boots - 50 Nos
7. Fire Aluminized Suit - 4 Nos
8. SCBA - 2 Nos
9. Emergency Lamp - 10 Nos

**B7. LIST OF FIRE FIGHTING PERRSONS**

Proposed to train 200 persons during factory operation.

**B8. LIST OF FIRST AID PERSONS & SAMPLE FIRST AID TRAINING CERTIFICATE.**

Proposed to train 100 persons during factory operational stage



**M/s. NEYVELI NEW THERMAL POWER STATION**  
**2 X 500 MW POWER PLANT**  
**NEYVELI**

**On-Site Emergency Plan & Risk Assessment Report**

**B9. WORK PERMIT DETAILS TYPES AND MODELS**

**HOT WORK PERMIT**

Ref: \_\_\_\_\_

(Hot work would mainly comprise - Welding, Gas-cutting, use of Open Flames or other sources of fire in a fire-prone place containing inflammable substances, explosives & / or other such highly combustible materials susceptible to spontaneous ignition & / or explosion.)

**A. The person taking permit to fill up:**

1. Exact location where hot work is being planned. \_\_\_\_\_
2. Description of work: \_\_\_\_\_
3. Date: \_\_\_\_\_ Time \_\_\_\_\_

Points to be checked

Sl No	Details	Yes	No	Remarks Not Required
1.	Has the area immediately below the work spot, been cleared / removed of oil, grease & waste cotton etc.?			
2.	Has Gas concentration been tested in case there is gas valve/gas line nearby?			
3.	Have fire extinguishers been kept handy at site?			
4.	Has tin sheet/ wet gunny bag/ fire retardant cloth / sheet been placed to prevent sparks from causing fire?			
5.	Has water hose connection been made for continuous water spray?			
6.	Have all the drain inlets (if any) been closed?			
7.	Any other precautions taken (specify): _____			

The above points have been complied with and conditions rendered safe / hazards innocuous to undertake the hot work.

Name of Permittee \_\_\_\_\_ Signature \_\_\_\_\_ Designation \_\_\_\_\_

**B) The person giving permit (issuing authority) to fill up:**

After checking all the above precautions the hot work can be carried out in the area.

Time: \_\_\_\_\_ Responsible officer Signature : \_\_\_\_\_  
 Safety Officer Signature : \_\_\_\_\_  
 Elect In charge Signature : \_\_\_\_\_  
 Shift In charge Signature : \_\_\_\_\_

**C) The work has been completed safely and all persons under my supervision, materials and equipment have been withdrawn.**

Time \_\_\_\_\_ Responsible officer Signature : \_\_\_\_\_  
 Safety Officer Signature : \_\_\_\_\_  
 Elect In charge Signature : \_\_\_\_\_  
 Shift In charge Signature : \_\_\_\_\_





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Doc. Code	<b>Cold Work Permit</b>
-----------	-------------------------

**Reference number :** .....

**DEPT:** .....

This permit to work relates to any work at normal working conditions

**SECTION 1**

This permit is valid from .....Hrs to .....Hrs on [date].....

Location of work .....

Has an enclosed space entry permit been issued? (Reference No. ....) Yes / No

Reason If 'No' .....

Description of work: .....

Responsible officer Mr.....

- |     |   |      |    |
|-----|---|------|----|
| 1.1 | Has the surrounding area been made safe?      | YES; | NO |
| 1.2 | Has the equipment or pipeline been gas freed? | YES; | NO |
| 1.3 | Has the equipment or pipeline been blanked?   | YES; | NO |
| 1.4 | Is the equipment or pipeline free of liquid?  | YES; | NO |
| 1.5 | Is the equipment isolated electrically?       | YES; | NO |
| 1.6 | Is additional fire protection available?      | YES; | NO |
| 1.7 | Special condition \ precaution .....          |      |    |

Time \_\_\_\_\_ Responsible Officer Signature: \_\_\_\_\_

Safety Officer Signature: \_\_\_\_\_

Elect In charge Signature: \_\_\_\_\_

Shift In charge Signature: \_\_\_\_\_

**SECTION 2**

The work has been completed and all persons under my supervision, materials and equipment have been withdrawn.

Time \_\_\_\_\_ Responsible Officer Signature : \_\_\_\_\_

Safety Officer Signature : \_\_\_\_\_

Elect In charge Signature : \_\_\_\_\_

Shift In charge Signature: \_\_\_\_\_

[Type text]



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**B10. LIST OF MSDS**

1. HFO
2. LDO
3. Lignite
4. HCL
5. Hydrogen





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**2 X 500 MW POWER PLANT**  
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**C. LIST OF DRAWINGS**

- C1 Emergency Evacuation Plan Containing Details of Hazardous Chemicals Storage, Hazardous Production Zone, Wind Sox, Occupational Health Centre, Emergency Exit, Escape Route, Assembling Point Area, Fire Hydrant Layout, Fire Water Storage and Pump House Emergency Control Centre.
- C2 Fire Hydrant Layout
- C3 Site Plan
- C4 Topo Plan
- C5 Consequence Analysis – Worst Case Scenarios.



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**2 X 500 MW POWER PLANT**  
**NEYVELI**

**On-Site Emergency Plan & Risk Assessment Report**



**ANNEXURE-IX**  
**GROUND WATER QUALITY IN THE AREA AROUND NNTPP**

Sl. No.	Parameters	Analytical Results of Water Samples (Tube Well) around NNTP - Neyveli					BIS-Permissible limit
		Inside of TPS-II	Block-15	Block-7	Irrupu	Veerareddi kuppam	
	WELL ID	MI/31A	CST-4	RO/13A	HS-II/7	NRO-7A	
	<b>Date of Collection</b>	15.05.2021	18.09.2021	15.05.2021	08.03.2022	08.03.2022	
1	Calcium as Ca	31.0	18.6	9.30	6.4	28.8	200
2	Magnesium as Mg	8.9	1.4	7.50	1.5	7.78	50
3	Sodium as Na	19.5	6.9	2.30	4.6	17.8	-
4	Iron & Aluminium oxide as R <sub>2</sub> O <sub>3</sub>	4.8	7.2	7.20	5.2	4.4	-
5	Iron as Fe	0.40	0.4	0.20	0.2	0.3	1.0
6	Silica as SiO <sub>2</sub>	48.0	38	47.20	48	50	-
7	Chloride as Cl <sup>-</sup>	16	12	8.1	11	15	1000
8	Sulphate as SO <sub>4</sub> <sup>-</sup>	31.0	2	1.70	2.3	7.56	400
9	Free CO <sub>2</sub>	40.0	14	14.0	12	0	-
10	Total Solids	148	87	53	61	170	2000
11	Dissolved Solids	139	71	46	47	156	-
12	Suspended Solids	9	16	7	14	14	-
13	Total Alkalinity	69	52	36	24	124	-
14	Bicarbonate Alkalinity as CaCO <sub>3</sub>	69	52	36	24	39	600
15	Carbonate Alkalinity as CaCO <sub>3</sub>	0	0	0	0	85.6	-
16	Hydroxide Alkalinity as CaCO <sub>3</sub>	0	0	0	0	0	-
17	Total Hardness as CaCO <sub>3</sub>	114	52	54	22	104	600

Sl. No.	Parameters	Analytical Results of Water Samples (Tube Well) around NNTP - Neyveli					BIS-Permissible limit
		Inside of TPS-II	Block-15	Block-7	Irrupu	Veerareddi kuppam	
		WELL ID	MI/31A	CST-4	RO/13A	HS-II/7	
18	Temp.Hardness as CaCO <sub>3</sub>	69	52	36	22	104	-
19	Permanent Hardness as CaCO <sub>3</sub>	45	0	18	0	0	-
20	Conductivity in micromhos @ 25 <sup>o</sup> C	232	118	76	79	260	-
21	pH @ room temperature	6.06	7.48	6.79	8	8.45	6.5-8.5
22	Temperature	29	31	29	30	30	-
23	Dissolved Oxygen	6.42	7.85	7.07	6.2	6.31	-
24	Flouride as F	0.28	0.34	0.18	0.21	0.18	1.5
25	Nitrate as NO <sub>3</sub>	2.80	17.66	3.5	2.12	2.61	100
26	Copper as Cu	-	0.011	-	BDL	BDL	1.5
27	Manganese as Mn	-	0.008	-	0.07	0.082	0.3
28	Zinc as Zn	-	0.22	-	0.051	0.058	15
29	Potassium as K	1.14	0.21	0.22	0.12	0.02	



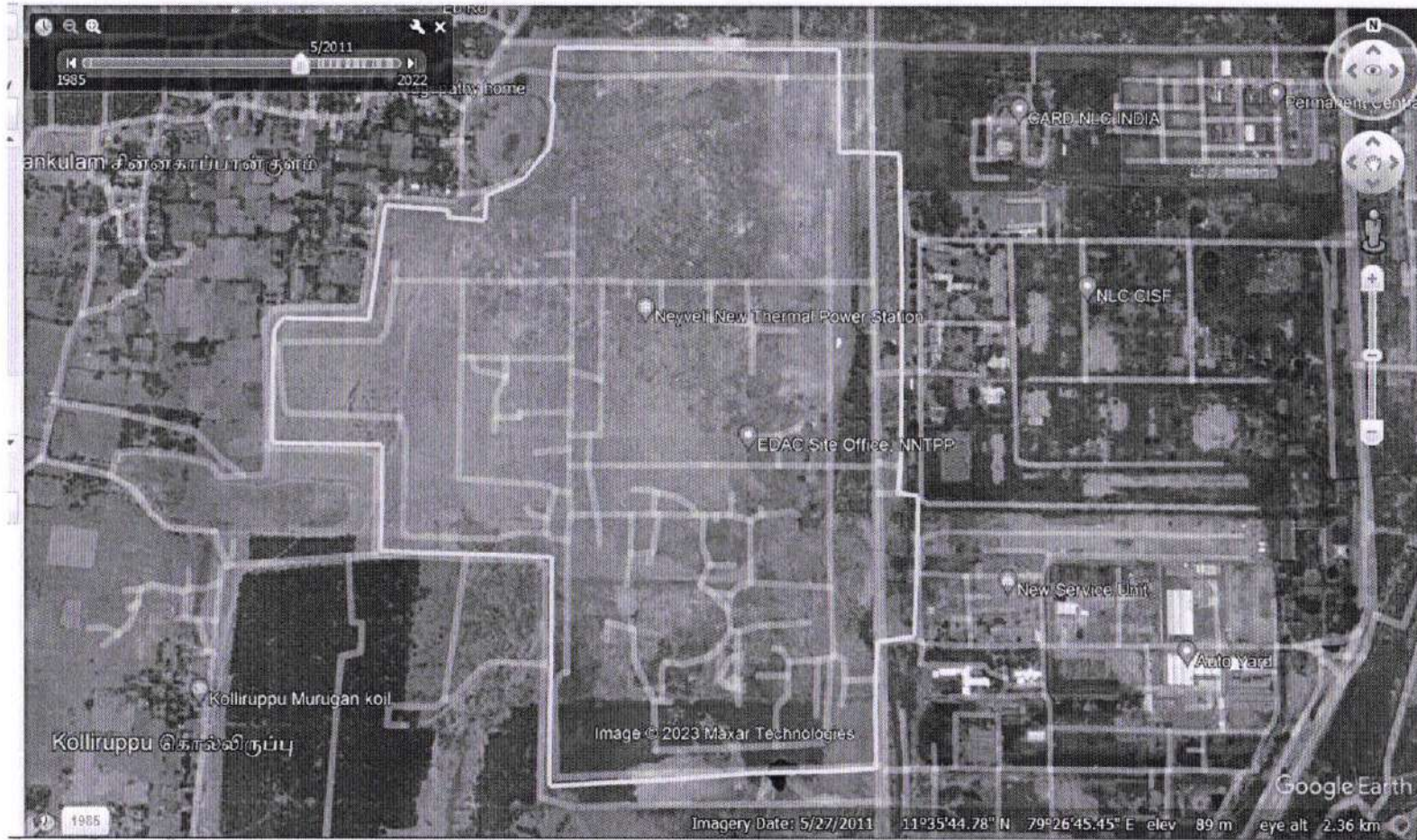
Sl. No.	Parameters	Analytical Results of Water Samples (Tube Well) around NNTP - Neyveli								BIS-Permissible limit
		Block-27	Opp To TPS-I	Mela kuppam-West	Kunam kurichi	Nainar kuppam	Block-28 Murugan Koil	Kaikalai kuppam	Kappan kulam	
	<b>Date of Collection</b>	17.06.2021	08.02.2022	17.06.2021	17.06.2021	17.06.2021	17.06.2021	08.03.2022	08.03.2022	
	WELL ID	<b>D-34</b>	<b>D-05</b>	<b>D-42</b>	<b>D-18A</b>	<b>D-138</b>	<b>D-35</b>	<b>D-130</b>	<b>D-131</b>	
1	Calcium as Ca	140	68.8	80	208	92	65.6	16	14.4	200
2	Magnesium as Mg	12.2	18.5	17.01	75.3	21.9	8.7	3.9	3.9	50
3	Sodium as Na	58	34	32	215	64	35	6.3	5	-
4	Iron & Aluminium oxide as R <sub>2</sub> O <sub>3</sub>	9.2	8.8	9.6	10.8	10.4	8.8	4.4	5.2	-
5	Iron as Fe	0.6	0.5	0.6	0.8	0.6	0.5	0.2	0.4	1.0
6	Silica as SiO <sub>2</sub>	50.4	50.4	50.4	52.4	51	49.6	48	50.4	-
7	Chloride as Cl <sup>-</sup>	83.2	39	24	186	69	23	11.3	13	1000
8	Sulphate as SO <sub>4</sub> <sup>--</sup>	176.7	192	121.92	290	80	64	3.1	5.8	400
9	Free CO <sub>2</sub>	71.2	14	112	60	100	29.2	8	8	-
10	Total Solids	536	398	351	1169	385	276	71	67	2000
11	Dissolved Solids	524	384	337	1152	371	262	56	53	-
12	Suspended Solids	12	14	14	17	14	14	15	14	-
13	Total Alkanity	76	65	109	326	109	113	51	47	-
14	Bicarbonate Alkalinity as CaCO <sub>3</sub>	76	65	109	326	109	113	51	26	600
15	Carbonate Alkalinity as CaCO <sub>3</sub>	0	0	0	0	0	0	0	21.4	-
16	Hydroxide Alkalinity as CaCO <sub>3</sub>	0	0	0	0	0	0	0	0	-
17	Total Hardness as CaCO <sub>3</sub>	400	248	270	830	320	200	56	52	600
18	Temp.Hardness as CaCO <sub>3</sub>	76	65	109	326	109	113	51	47	-
19	Permanent Hardness as CaCO <sub>3</sub>	324	183	161	504	211	87	5	5	-

Sl. No.	Parameters	Analytical Results of Water Samples (Tube Well) around NNTP - Neyveli								BIS-Permissible limit
		Block-27	Opp To TPS-I	Mela kuppam-West	Kunam kurichi	Nainar kuppam	Block-28 Murugan Koil	Kaikalai kuppam	Kappan kulam	
	<b>Date of Collection</b>	17.06.2021	08.02.2022	17.06.2021	17.06.2021	17.06.2021	17.06.2021	08.03.2022	08.03.2022	
20	Conductivity in micromhos @ 25°C	873	640	562	1920	618	436	94	88	-
21	pH @ 25 C	6.65	6.8	6.81	7.28	6.92	6.54	8.02	7.96	6.5-8.5
22	Temp°C	29	29	29	29	29	29	30	30	-
23	Dissolved Oxygen	6.52	4.92	6.42	7.16	6.56	6.74	6.12	6.12	-
24	Fluoride as F	0.24	0.18	0.28	0.22	0.32	0.18	0.22	0.2	1.5
25	Nitrate as NO <sub>3</sub>	0.18		2.12	3.56	2.64	1.96	2	1.65	100
26	Copper as Cu	-	-	-	-	-	-	BDL	BDL	1.5
27	Manganese as Mn	-	-	-	-	-	-	0.071	0.092	0.3
28	Zinc as Zn	-	-	-	-	-	-	0.061	0.06	15
29	Potassium as K	1.24	0.42	5.53	3.69	9.1	7.6	0.11	0.09	-



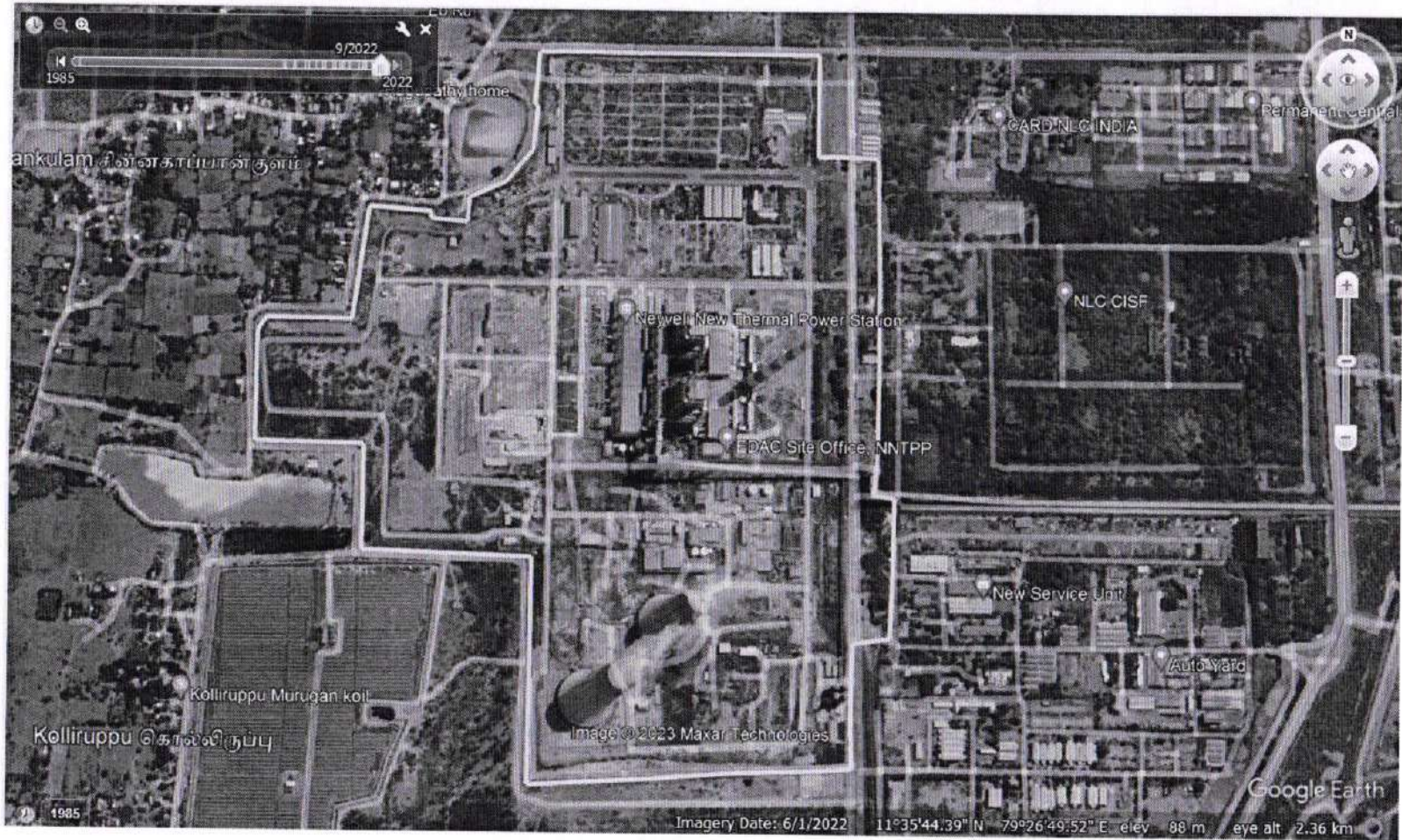
**ANNEXURE-X**

**GOOGLE IMAGERY OF YEAR 2011**





GOOGLE IMAGERY OF YEAR 2022







# एनएलसी इंडिया लिमिटेड NLC India Limited

Anneure-21



(भारत सरकार का नवरत्न उद्यम) / ('Navratna' A Government of India Enterprise)  
महा प्रबंधक/कार्ड एवं सीईसी का कार्यालय / Office of the General Manager / CEC

सी.टी.ओ. भवन, एनएलसी इंडिया लिमिटेड, नेयवेली - 607801  
C.T.O Building, NLC INDIA Ltd., Neyveli - 607801  
कडलूर जिला, तमिलनाडु  
Cuddalore District, Tamil Nadu  
दूरभाष/Phone: 04142-255760  
फैक्स/Fax: 04142-253422/252496  
ई-मेल/E-mail: gm.env@nlicindia.com  
सीएन.आई./CIN - L93090TN1956GOI003507

पंजीकृत कार्यालय: प्रथम तल, नं.8, मेयर सत्यमूर्ती रोड, एफएमसी, एग्मोर  
कॉम्प्लेक्स, भारतीय खाद्य निगम, चेतपेट, चेन्नई - 600031  
Registered Office: First Floor, No.8 Mayor Satyamoothy Road,  
FSD, Egmore Complex, Food Corporation of India, Chetpet,  
Chennai- 600031  
वेबसाइट/Website: www.nlicindia.com

Lr.No. GM/CEC/E.S. 21-22/ 43 /2022.

Date: 28/09/2022

To  
The Director,  
Ministry of Environment, Forests & Climate Change,  
34, H.E.P.C. Building,  
Cathedral Garden Road,  
MOEF&CC Office,  
Nungampakkam,  
CHENNAI – 600 0034.

Sir,

Sub: NLC India Ltd. – Environmental Statement for the financial year  
Ending 31<sup>st</sup> March 2022 – Reg.  
Ref: Government Notification dt.28<sup>th</sup> April, 1993, Ministry of  
Environment, Forests & Climate Change, Government of India.

\*\*\*\*\*

With reference to the notification cited, the Environmental Statement for the financial year ending 31<sup>st</sup> March, 2022 for all the NLC India Limited industrial units viz. Mines and Thermal Power Stations in Neyveli, is hereby submitted.

Kindly acknowledge the receipt of the same.

Thanking you,



Encl: As above.

Copy to

The Member Secretary/TNPCB/Chennai.

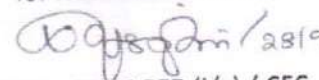
The District Environmental Engineer/TNPCB/Cuddalore.

The Joint Chief Environmental Engineer/Trichy.

Copy submitted to: Dir./P&P, Dir./Mines, Dir./Power, Dir./HR, Dir./Finance,

Copy submitted to: CGM/RE, IE Wing & CEC, CGM/M-IA, CGM/M-II, CGM/M-I, CGM/TPS-I Exp.,  
CGM/TPS-II, GM/TPS-II Expn, CGM/NNTPP

Yours faithfully,  
for NLC India Limited.,

  
GENERAL MANAGER (i/c) / CEC.  
GENERAL MANAGER,  
Corporate Environment Cell,  
NLC India Ltd., Neyveli-607 801.



# एनएलसी इंडिया लिमिटेड NLC India Limited



(भारत सरकार का नवरत्न उद्यम)/(‘Navratna’ A Government of India Enterprise)  
महा प्रबंधक/कार्ड एवं सीईसी का कार्यालय / Office of the General Manager / CEC

सी.टी.ओ. भवन, एनएलसी इंडिया लिमिटेड, नेयवेली - 607801  
C.T.O Building, NLC INDIA Ltd., Neyveli - 607801  
कडलूर जिला, तमिलनाडु  
Cuddalore District, Tamil Nadu  
दूरभाष/Phone: 04142-255760  
फैक्स/Fax: 04142-253422/252496  
ई-मेल/E-mail: gm.env@nlicindia.com  
सीएन.आई./CIN : L93090TN1956G0I003507

पंजीकृत कार्यालय: प्रथम तल, नं.8, मेयर सत्यमूर्ती रोड, एफएसडी, एगमोर  
कॉम्प्लेक्स, भारतीय खाद्य निगम, चेतपेट, चेन्नई - 600031  
Registered Office: First Floor, No.8 Mayor Satyamoothy Road,  
FSD, Egmore Complex, Food Corporation of India, Chetpet,  
Chennai- 600031  
वेबसाइट/Website: www.nlicindia.com

पत्रांक.उ.म.प्र./सीईसी/ई.एफ 21-22/ 43 /2022

दिनांक: 28/09/2022

सेवा में  
निदेशक  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय  
34.एच.ई.पी.सी भवन  
कैथड्रैल गार्डन रोड  
प.व.ज.प.म कार्यालय  
नुंगमवाक्कम, चेन्नई - 600034

महोदय,

विषय: एनएलसी इंडिया लिमिटेड - 31 मार्च 2021 को समाप्त हो रहे वित्तीय वर्ष के पर्यावरणीय  
विवरण के संबंध में।

संदर्भ: सरकारी अधिसूचना दिनांकित 28 अप्रैल 1993, पर्यावरण, वन एवं जलवायु परिवर्तन  
मंत्रालय, भारत सरकार।

\*\*\*\*\*

उपर्युक्त अधिसूचना के संदर्भ में, एनएलसी इंडिया लिमिटेड की सभी औद्योगिक इकाइयों (नेयवेली) जैसे कि खान तथा ताप विद्युत गृह का 31  
मार्च 2022 को समाप्त हो रहे वित्तीय वर्ष के पर्यावरणीय विवरण एतद्वारा प्रस्तुत किया जाता है।

कृपया उपर्युक्त पत्र की पावती दें।

धन्यवाद।



संलग्न: उपर्युक्त  
सेवा में  
पतितिपि प्रेषित

सदस्य सचिव/त.न.पी.सी.बी/चेन्नई  
जिला पर्यावरणीय अभियंता/त.न.पी.सी.बी/कडलूर  
संयुक्त मुख्य पर्यावरणीय अभियंता/कडलूर

भवदीय  
कृते एनएलसी इंडिया लिमिटेड  
  
म.प्र / सीईसी  
GENERAL MANAGER,  
Corporate Environment Cell,  
NLC India Ltd., Neyveli-607 801.



**ENVIRONMENTAL STATEMENT FOR NEW NEYVELI THERMAL POWER STATION.**  
(for the financial year ending 31<sup>st</sup> March, 2022)

**PART-A**

- (i) **Name and Address of the owner/ occupier of the Industry operation or process** : Shri NEDUNGKEERAN R  
CHIEF GENERAL MANAGER / NNTPS  
NLC India Ltd., Neyveli-607 807.
- (ii) **Industry Category** : Primary  
Primary : (STC Codes)  
Secondary : (SIC Code)
- (iii) **Production Capacity -Units** : 1000 MW (2 x 500MW)
- (iv) **Year of Establishment (COD)** : Unit-I 28.12.2019  
Unit- II 10.02.2021
- (v) **Date of the Last environmental Statement submitted** : 31.07.2021  
(for the financial year ending 31<sup>st</sup> March 2021)

**PART-B**

**Water and Raw Material consumption**

- I. **Water Consumption (M<sup>3</sup> / day)**
- a) **Process** : 32,712.46 M<sup>3</sup>/day
- b) **Cooling** : 1,165.15 M<sup>3</sup>/day
- c) **Domestic** : 5,597.12 M<sup>3</sup> /day

Name of the products	Process water consumption per Unit of product output	
	During the previous Financial year (2020-21)	During the current Financial year (2021-22)
Electrical Power	0.111 Lts/Kwhr	0.069 Lts/Kwhr

\* Specific water consumption is well within the norms of 3.0 Lts./KW hr

## II. Raw material consumption:

Name of raw materials	Name of Products	Raw material Consumption per unit of output	
		During the previous Financial year (2020-21)	During the current Financial year (2021-22)
Lignite	Electric Power	1.005 Kg/KW hr	0.992 Kg/KW hr
Oil (HFP + LDO)	Electric Power	2.25 ml/KW hr	1.36 ml/KW hr

### PART-C

#### Pollution discharged to environment / Unit of output (Parameter as specified in the consent Issued)

Pollutants	Quantity of Pollutants Discharge (mass/day)	Concentration of Pollutants in discharges (mass/volume)	Percentage of variation from prescribed standards with reasons
a) WATER	Effluents- 7984 M <sup>3</sup> /day	Effluents parameter meets TNPCC norms	Nil
b) AIR: AAQ/SM survey conducted by TNPCC on 28.01.2022 and 21.03.2022		Stack Analysis Report SPM : 45.5 mg/m <sup>3</sup> SO <sub>2</sub> : 1512 mg/m <sup>3</sup> NO <sub>x</sub> : 236 mg/m <sup>3</sup>	

\* In order to reduce the SO<sub>2</sub> emissions from stack, LoA for FGD is issued to L&T & work is under progress.

### PART-D

#### Hazardous wastes

(as specified under Hazardous Wastes/Management & Handling rules, 1989)

Hazardous wastes	Total quantity in Kg	
	During the previous Financial year (2020-21)	During the current Financial year (2021-22)
a) From Process (Spent lubricating & transformer oil)	8970 Kg	14553 Kg
b) From pollution control facilities	---	---



**PART - E****Solid Waste**

Ash and slag	Total Quantity (in Tonnes)	
	During the previous Financial year (2020-21)	During the current Financial year (2021-22)
a) From Process ( Slag & Fly ash)	2,08,854.00 MT	3,12,684.00 MT
b) From pollution control facilities (fly ash) from ESP	1,87,246.00 MT	2,65,681.00 MT
c) 1. Quantity re-cycled or reutilized within the Units	Nil	Nil
3. Fly ash off-take by Cement factories and brick industries	1,75,125.00 MT	2,65,415.00 MT
3. Disposed		
(i) Fly ash disposed to ash pond	Nil	Nil
(ii) Bottom ash for backfilling	21,608.00 MT	47,003.00 MT
(iii) Conditional ash backfilled in abandoned Mines.	12,121.00 MT	266.00 MT

**PART-F**

Please specify the characteristics (in terms of Composition and Quantum) of hazardous wastes as well as solid wastes and indicate disposal practice for both categories:

**HAZARDOUS WASTES (Spent Lubricating & Transformer Oil):**

Composition	Quantity	Mode of disposal
Lubricate oil	14.5 Tonnes	Spent oil is collected and stored in oil storage yard. After accumulation of considerable quantity it will be disposed through NLCIL Disposal Wing for further disposal to PCB authorized agencies.

**SOLID WASTES: (Fly ash & Slag)**

Composition	Qty.	Mode of disposal
	2,65,415.00 Tonnes (Fly Ash)	Fly ash: To the nearest Brick Industries & Cement Factories through Closed trucks and bunkers.
<b>Fly Ash</b>		
	266.00 Tonnes (Fly ash)	The fly ash is conditioned in the plant and used for filling low lying areas in mines of NLCIL.
<b>Chemical Composition</b>		
1) Silica (SiO <sub>2</sub> ) : 39.22 %		
2) Alumina (Al <sub>2</sub> O <sub>3</sub> ) : 18.45 %		
3) Iron (Fe <sub>2</sub> SO <sub>3</sub> ) : 19.19 %		
4) Calcium (CaO) : 13.22 %		
5) Magnesium (MnO) : 3.54 %	47,003.00 Tonnes (Bottom Ash)	Bottom ash used for filling low lying areas in Mines of NLCIL.
6) Sulphur as (SO <sub>3</sub> ) : 4.76 %		
7) Loss on ignition : 1.62 %		
	<b>Total Ash Utilized:</b> 3,12,684.00 Tonnes <b>100% Utilized</b>	

**PART- G****Impact of Pollution abatement measures taken on conservation of natural resources and on cost of production:**

1. Green Belt Development was taken on a large-scale basis. About 2000 No's of sapling were planted to control the impact of air pollution and optimize the ambient temperature of surrounding area.
2. Treated effluent was utilized for dust suppression, thus minimizing the fresh water consumption

**PART-H****Additional Measures / Investment proposal for Environment Protection including abatement of Pollution, Prevention of Pollution:**

1. To minimize SO<sub>2</sub>, LoA Order for supply, Erection and Commissioning of FGD was issued to M/s L&T on 31.01.2022.
2. All internal roads have been made pucca in order to reduce dust
3. Adoption of Good House Keeping practices in which proper & systematic movement of materials, loading of flyash and bottom ash has been implemented
4. Large scale plantation was undertaken as part of Vriksharopan Abhiyan



**PART-I****Any other particulars for improving the quality of environment:**

1. Display of environmental awareness boards
2. 100% utilization of fly ash is ensured by distributing to cement industries and Brick Industries
3. The World environment day and other Environment events like World forest day, World water day, World Earth day, and World soil day were observed enthusiastically and environment awareness initiatives were conducted during those days
4. Swatch Bharat, Swatchata Hi Sewa and Swatchchta pakwada activities were conducted
5. Ban on "one time use and throwaway plastics" is implemented

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**ANNEXURE-XII**  
**COMPARISON WITH EIA DATA**

**I. Air Quality Data**

**a. EIA Data**

Parameters	Location	Min.	Max.	Avg.
RPM	Periakappanakulam	41.0	59.0	49.0
	Block-23	27.0	38.0	33.0
SO <sub>2</sub>	Periakappanakulam	6.7	11.6	9.2
	Block-23	5.5	9.7	7.6
NO <sub>x</sub>	Periakappanakulam	9.1	13.9	11.6
	Block-23	6.5	11.1	9.0

**b. Monitoring Data in Upwind and Downwind Directions**

Parameters	Location	Min.	Max.	Avg.
PM <sub>10</sub>	Block-29	46.0	72.9	57.0
	Umangalam	51.1	64.4	59.3
PM <sub>2.5</sub>	Block-29	13.6	21.8	17.5
	Umangalam	18.9	32.3	26.1
SO <sub>2</sub>	Block-29	2.0	3.6	2.8
	Umangalam	3.7	5.1	4.2
NO <sub>x</sub>	Block-29	13.1	21.6	16.2
	Umangalam	14.6	23.2	19.2

On comparison of present data with oldest baseline data which was monitored during EIA study, no significant impact on change in ambient air quality is noticed.

**II. Water Quality data**

Parameters	Nainarkuppam (as per EIA)	Nainarkuppam
pH value	6.67	6.92
Electrical Conductivity $\mu$ mhos/cm	71	618
Total Dissolved solids, mg/l	45	371
Total hardness as (CaCO <sub>3</sub> ), mg/l	36	320
Alkalinity, mg/l	22	109
Chlorides, (as Cl) mg/l	12	69
Iron (as Fe), mg/l	0.19	0.6
Fluoride (as F), mg/l	0.1	0.32
Sulphate (as SO <sub>4</sub> ), mg/l	0.8	80
Nitrate (as NO <sub>3</sub> ), mg/l	5.0	2.64
Calcium (as Ca), mg/l	13	92
Magnesium (as Mg), mg/l	0.97	21.9

On comparison of present data with oldest baseline data which was monitored during EIA study, no significant impact on change in water quality is noticed.