एनटीपीसी
NTPC
A Maharatna Company

एनटीपीसी लिमिटेड
(भारत सरकार का उद्यम)
NTPC Limited
(A Govt. of India Enterprise)

नॉर्थ करणपुरा/NORTH KARANPURA

Ref: NKSTPP/EMG/MoEF&CC/EC/02

Dated: - 25.11.2021

To
The Regional Officer,
Ministry of Environment and Forests,
Regional office (ECZ),
Bungalow No - A2, Shyamali Colony,
Ranchi-834002

Ref. No: J-13011/26/89-IA-II(T) dated 29.11.2004 & J-13011/26/89-IA-II(T) dated 19.02.2014

Sub: Half Yearly compliance Report of conditions stipulated in Environmental Clearance of North Karanpura Super Thermal Power Project (3x660MW) for the period April, 2021 to September, 2021.

In reference to your letter under reference No.J-13011/26/89-IA-II (T) dated 19.02.2014, the half yearly compliance report regarding compliance of conditions stipulated in Environmental Clearance for the period **April 2021 to September 2021** of North Karanpura Super Thermal Power Project (3 x 660 MW) is attached herewith.

This is for your kind information please.

Thanking you,

Yours Sincerely,

25/11/2021

Diptendu Mandal
दीप्रेन्दु मंडल / DIPTENDU MANDAL
महाप्रबंधक (प्रचालन एवं रखरखाव)/GM (O&M)
एन.टी.पी.सी. लिमिटेड / NTPC Limited
एन.के.एस.टी.पी.पी. / NKSTPP
टण्डवा, चतरा / Tandwa, Chatra

Enc: As Above:
Copy to:
(i) Member Secretary,Jharkhand Pollution Control Board, T.A Division Building, HEC Campus, P.O. Dhurwa, Ranchi-834004, Jharkhand.
(ii) R.O. Hazaribagh.

एनटीपीसी NTPC North Karanpura

A Maharatna Company

HALF-YEARLY COMPLIANCE REPORT FOR ENVIRONMENTAL CLEARANCE (EC) FOR NORTH KARANPURA STPP (3X660 MW)

Date-25-11-2021

A. Compliance Report for Conditions Stipulated vide MOEF Letter No. J- 13011/26/89-IA-II(T) dated 29.11.2004

Sl. No.	Stipulations of conditions	Status (As on 30.09.2021)
i.	The conditions stipulated by Bihar State Pollution Control Board (BSPCB) vide their letter no. BS/60 dated 31.12.2001 shall be strictly implemented	Shall be strictly implemented. Details are attached as Annexure-I
ii.	Environmental clearance for construction of dam and Forest clearance if Forest land is involved for MGR, shall be obtained separately from the Ministry of Environment and Forests (MoEF)	Environmental Clearance for Garhi Dam has been accorded by MOEF vide letter dated 09.09.2005. Forest Clearance-NKSTPP Project Area Stage-I Forest Clearance has been accorded by MOEF&CC vide their letter no F.No.8-76/2007-FC dated 08.06.2009. Stage-II Forest Clearance has been accorded by MOEF&CC vide their letter no F.No.8-76/2007-FC dated 03.11.2015 for the forest land involved in project *(Copy already submitted with Half Yearly EC compliance report vide our letter no NKSTPP/EMG/MoEF&CC/EC/04/271 dated 25.04.2016).* NTPC reviewed the proposal for construction of dam on Garhi River for withdrawal of water. Due to huge submergence of forest land after construction of dam, NTPC has change the technology to reduce its water requirement. Government of Jharkhand granted NOC for construction of weir across the Garhi River vide letter no 468 dated 22/06/2015. Agreement between M/s DVC and NKSTPP has already been done.

Kumar 25/11/2021

Sanjoy Kumar

DGM(EMG)

Sl. No.	Stipulations of conditions	Status (As on 30.09.2021)
iii.	R&R Plan shall be prepared in consultation with Govt. of Jharkhand and the same shall be submitted to MoEF within a period of **6 months** from the date of clearance letter.	R&R Plan was formulated earlier but with the revival of project, affected persons approached Govt. for enhanced package. The enhanced package has been finalized in the VDAC meeting held on 04.12.2013 in consultation with District Administration/ Govt. of Jharkhand. The enhanced compensation is being disbursed to beneficiaries. A total amount of Rs. 312.63 Cr has been disbursed till September' 2021. The Community Development activities are being implemented in consultation with stakeholders. A provision of Rs 48 Cr has been kept for Community Development activities broadly related to Health Activities, Education Activities, Sports, Arts, Culture Activities, Infrastructure Activities, Training & Implementation Activities, Drinking water facilities, Solar Power facilities etc. Rs 1.54 Cr spent during this period and total cumulative amount of Rs 32.28 Cr has been spent till September 2021.
iv.	It shall be ensured that there is no leaching of heavy metals from the Ash Ponds and necessary corrective measures including clay blanketing shall be taken, A copy of the detailed design of the ash pond along with a note on necessary corrective measures to be taken shall be furnished to MoEF within **3 months.**	North Karanpura STPP envisages High Concentration Slurry Disposal System (HCSD) for Ash Disposal. In HCSD system, the disposed layers of ash is solidified and there is no free water for overflow and no leachate or no risk of ash dyke getting breached.
v.	No earth shall be taken out from the ash pond area for any purpose.	Being complied
vi.	A minimum distance of 500 m from plant boundary to the riverine system including the submergence level shall be maintained	Complied. In the design of layout, a minimum distance of 500 m from plant boundary to riverine system has been maintained.
vii.	Copy of the permission for re-alignment of the road passing through the ash pond area shall be submitted to MoEF within **3 months** from the grant of clearance.	Consent letter from RCD, GoJ has been submitted in our earlier compliance report vide our letter no 043/GM/NK/ dated 23.04.2014.
viii.	List of flora / fauna duly authenticated by the PCCF / CWLW or Academic	Already submitted.

25/11/2021

Sl. No.	Stipulations of conditions	Status (As on 30.09.2021)
	Institution / University shall be submitted within **3 months** from the grant of clearance.	
ix.	Copy of the necessary coal linkage shall be submitted to MoEF within **6 months** from the grant of clearance.	Already submitted.
x.	Two stacks (one bi-flue and one single flue) of 275 m each shall be provided with continuous online monitoring system. Exit velocity of 22 m/sec shall be maintained.	Three stacks (single flue) of 275 m each shall be provided with ***Online Continuous Stack Emission Monitoring System*** (CSEMS). The exit velocity of 22 m/sec shall be maintained during operation. Construction of stacks is in under progress and details are as bellow. Stack of Unit-I,II & III - Shell casting of all the three Chimneys completed. Structural work of Unit I completed. Work of Unit II and III are under progress.
xi.	Electrostatic Precipitators (ESP) having efficiency of 99.9 % shall be installed to limit SPM emission up to 100 mg/Nm3.	This Condition no (xi) is deleted now vide the MoEF letter no J-13011/26/89-IA.II(T) dated 31.10.2014 regarding amendment of EC.
xii.	Ash generation will be 13,394 TPD. Ash will be utilised in cement and brick manufacturing, roads / embankments, agriculture / wasteland development and for backfilling of abandoned mines. This shall be used in a phased manner as per provisions of the notification on Fly ash Utilisation issued by the Ministry in September 1999 and its subsequent amendments. Full fly ash utilisation shall be ensured by the end of 9th year from the date of commissioning of the plant.	The quantity of ash generation has been revised as 11000 Tons/day dated 19.02.2014. NTPC will make best efforts to utilise ash in manufacturing of cement, ready mix concrete and bricks, construction of roads and embankments. Efforts will be made to achieve 100% ash utilisation by the end of 4th year from the date of commissioning of the plant.
xiii.	Water requirement shall not exceed 10,100 m^3/hr. Waste water shall be recycled and reused in the plant.	The water requirement has been revised as per EC dated 19.02.2014. This is likely to reduce further after adoption of dry cooling system, for which an amendment in EC is already received from MOEF vide their letter no J-13011/26/89-IA.II(T) dated 31.10.2014. The requirement shall be maintained within the final stipulated quantity 2,180 m3/hr instead of 10,100 m3/hr.

Kumar 25/11/2021

Sl. No.	Stipulations of conditions	Status (As on 30.09.2021)
		Waste water shall be treated and recycled & reused in the plant during operation stage. Effluent treatment plant is completed.
xiv.	Appropriate rainwater harvesting technology shall be finalised in consultation with the Central Groundwater Authority / Board within a period of **2 months** from the date of clearance.	CGWB, Patna has approved the rainwater harvesting scheme for following areas. (i) Enabling Township: Vide their letter no CGWB/MER/CGWA/2014/227 dated 26.02.2015 (ii) Main Plant area: Vide their letter no CGWB/MER/CGWA/2017/1014 dated 11.08.2017 Status of Construction of Rain Water Harvesting (i) Enabling Township: Completed. (ii) Main Plant Area: Recharge pit completed. Civil work for Recharge pond is under progress.
xv.	Regular monitoring of water quality including heavy metals shall be undertaken around the ash dyke and the project area to ascertain that there is no leaching of contaminants from ash disposal area.	Shall be complied during operation stage. However monitoring of water quality including heavy metals around ash dyke and project area is going on under hydrogeological survey study work.
xvi.	Noise level shall be limited to 75 Leq. Necessary personal protection equipment like ear plug etc. shall be provided to the persons working in the area of generator and other high noise area.	Regular maintenance of equipment shall be undertaken to maintain the designed noise level of 75 Leq. Personal protective equipment shall be provided to all persons working in the area of generator and other high noise areas during the operation stage. However monitoring of noise level inside project area is going on.
xvii.	Greenbelt of 100 m width shall be developed around the plant boundary covering an area of 87 Ha.	Greenbelt shall be developed around the plant boundary as mentioned in General Layout Plan. 1. NKSTPP has already planted 22500 no. of trees and donated 2500 no. fruit bearing trees among project affected villages. It will be developed in phased manner. This year target of tree plantation is 2500 in which 600 no. are already planted near township and surrounding area.
xviii.	Regular monitoring of the air quality shall be carried out in and around the power plant and records shall be maintained. **6 monthly** monitoring report shall be submitted to the ministry.	Regular monitoring of air quality is started from January,2021 and reports are attached as **Annexure-1**

Kumar 25/11/2021

Sl. No.	Stipulations of conditions	Status (As on 30.09.2021)
xix	For controlling fugitive dust, regular sprinkling of water in vulnerable areas of the plant shall be ensured.	For controlling fugitive dust, regular sprinkling of water is being done in project areas.
xx.	All other mitigate measures shall be taken as enumerated in chapter V of the EIA report.	Being complied.
xxi.	The project proponent shall advertise at least in two local newspapers widely circulated in the region around the project, one of which should be in the vernacular language of the locality concerned, informing that the project has been accorded environmental clearance and copy of clearance letter is available with the State Pollution Control Board / Committee and may also be seen at website of the Ministry of Environment and Forests at http://envfor.nic.in	Complied.
xxii.	A separate environment-monitoring cell with qualified staff shall be set up for implementation of the stipulated environmental safeguards.	A separate environment monitoring cell known as Environmental Management Group, (EMG) is already setup and functional at NKSTPP sites for implementation of the stipulated environmental safeguards.
xxiii	Half yearly report on the status of implementation of the stipulated conditions and environmental safeguards shall be submitted to the Ministry / Regional Office / CPCB / SPCB.	Being complied. Half yearly report on the status of implementation of the stipulated conditions and environmental safeguards is being submitted regularly to the following. (i) MOEF&CC - Regional officer, of MOEF&CC, Ranchi, (ii) CPCB- Regional Director, CPCB, Kolkata and (iii) JSPCB - Member Secretary, Jharkhand State Pollution Control Board Ranchi. (Last half yearly report already submitted to the above vide through letter no NKSTPP/EMG/MoEF&CC/EC/02 dated 19.04.2021

Kumar 25/11/2021

Sl. No.	Stipulations of conditions	Status (As on 30.09.2021)
xxiv.	Regional office of the Ministry of Environment & Forest located at Bhubaneswar will monitor the implementation of the stipulated conditions. Complete set of Environmental Impact Assessment report and management plan shall be forwarded to the regional office.	Complied. Details already submitted to Regional office of MoEF, Bhubaneswar vide our letter no CC:ESE:4100:2005:GEN:02B, dated 7th Feb, 2005.
xxv.	Separate funds shall be allocated for implementation of environmental protection measures. Break-up of the funds for various activities shall be submitted to MoEF. This cost shall be included as part of the project cost. The funds earmarked for the environment protection measures shall not be diverted for any other purposes and year-wise expenditure shall be reported to the MoEF.	Being complied. An amount of Rs. 1125.34 Crores have been earmarked in the Feasibility Report for North Karanpura STPP towards environmental protection measures. (*Break-up of the funds for various activities is already submitted with Half Yearly EC compliance report vide our letter no NKSTPP/EMG/MoEF&CC/ EC/04/ 271 dated 25.04.2016).* *Total expenditure up to September 2021 is Rs. 7524.50 Millions.* In addition to above, An amount of Rs 11.11 Crores (Rs.2.93 Crores towards Compensatory Afforestation and Rs. 8.18 Crores towards Cost of Net Present Value) have been paid by NKSTPP to Jharkhand State Forest Department for diversion of forest land to NKSTPP, as on 31st March 2016.
xxvi.	Full cooperation shall be extended to the scientists / officers from the Ministry / Regional offices of the ministry at Bhubaneswar / CPCB / SPCB for monitoring the compliance of environmental norms and safeguards.	Full cooperation shall be extended to the scientists / officers from the Ministry / Regional offices of the ministry at Ranchi / the CPCB / the SPCB during monitoring of the project.

25/11/2021

B. Compliance Report for Additional Conditions Stipulated vide MOEF Letter No. J-13011/26/89-IA-II(T) dated 19.02.2014 **Date: 25th November, 2021**

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
xxvii.	Vision document specifying prospective plan for the site shall be formulated and submitted to Regional Office of the Ministry within **six months**.	Vision document has been submitted with the compliance report submitted on 23.04.2014.
xxviii.	Harnessing solar power within the premises of the plant particularly at available roof tops shall be undertaken and status of implementation shall be submitted periodically to the Regional Office of the ministry.	Rooftop solar PV (1500 KWp) of estimated capacity: 1. 1100KWp (approx.) has been envisaged inside NKSTPP premises on rooftop of following buildings: 1.Main service building. 2.O&M workshop. 3.Ash water pump house. 4.Permanent store building. 5.Compressor house building. 6.Fire station building. 7.Switchyard control building. One proposal PR: 400036778 has been initiated. (B) Balance 400 KWp rooftop solar PV will be initiated in the matching time schedule of balance building's readiness.
xxix.	Sulphur and ash contents in the coal to be used in the project shall not exceed 0.5% and 48% at any given time. In case of variation of coal quality at any point of time, fresh reference shall be made to the Ministry for suitable amendments to environmental clearance condition wherever necessary.	Shall be complied during operation stage.
xxx.	A long term study on radio activity and heavy metals contents on coal to be used shall be carried out through a reputed institute. Thereafter, mechanism for an in-built continuous monitoring for radio activity and heavy metals in coal and fly ash (including bottom ash) shall be put in place.	Shall be complied during operation stage.

Kumar 25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
xxxi.	Mercury emissions from stack shall also be monitored on periodic basis.	Shall be complied during operation stage.
xxxii.	High Efficiency Electrostatic Precipitation (ESPs) shall be installed to ensure that particulate emission from the proposed plant does not exceed 50mg/Nm3.	Shall be complied. Installation of High Efficiency Electrostatic Precipitation (ESPs) is in under progress and details are as below. (i). Unit-I – Completed. (ii) Unit-II – 10151 MT/11283 MT (% progress: 89.97 %) (iii). Unit III - 6026 MT/11283 MT (% progress: 53.4%) All ESPs are designed to meet prevailing emission standard.
xxxiii.	Provision for installation of FGD shall be provided for future use.	Space has been kept in the lay out for installation of FGD plant. FGD package awarded to M/s BHEL. Work is under progress.
Xxxiv	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.	Adequate dust extraction system has been provided in coal handling and ash handling points, transfer areas and other vulnerable dusty areas.
xxxv.	COC of at least 5.0 shall be adopted. the water requirement shall not exceed 5,835 m3/h.	NTPC proposes to adopt of Air Cooled Condenser System for the project instead of wet cooling system. This will reduce the overall water requirement from 10,100 m3/hr to 2,180 m3/hr. An amendment in Environmental Clearance is received from MOEF in this regard vide their letter no J-13011/26/89-IA.II(T) dated 31.10.2014 (*Copy already submitted with Half Yearly EC compliance report dated 08.04.2015).* Hence this condition no (xxxv) is deleted now.
xxxvi.	No water bodies including natural drainage system in the area shall be disturbed due to	No water bodies shall be disturbed due to activities associated with the

25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
	activities associated with the setting up/operation of the power plant.	setting up/operation of the power plant.
xxxvii	Hydrogeology of the area shall be reviewed annually from an institute/organization of repute to assess impact of surface water and ground regime (especially around ash dyke). In case any deterioration is observed specific mitigation measures shall be undertaken and reports/data of water quality monitored regularly and maintained shall be submitted to the Regional Office of the Ministry.	Study of Hydrogeology of the area has been awarded to M/s IIT Roorkee and its 1st report is attached as **Annexure-2.**
xxxviii.	Monitoring of 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 metals in ground water shall be undertaken.	Monitoring of Surface water quantity and quality is also included with Hydrogeological study to M/s IIT Roorkee and its 1st report is attached as **Annexure-2.**
xxxix	Waste water generated from the plant shall be treated before discharge to comply limits prescribed by the SPCB/CPCB.	Shall be complied during operation stage. All waste water generated from the plants shall be treated before discharge to comply limits prescribed by the CPCB/ SPCB. Waste water will be treated and recycled / reused within the plant. Construction work of ETP completed. STP at enabling township is completed and under observation. Work of Plant STP under progress.
xl.	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 improve.	Being complied.
xli.	Utilization of 100% fly ash generated shall be made from 4th year of operation. Status of implementation of the Fly Ash Utilization Notification and its amendments shall be reported in the Regional Office of the Ministry from time to time.	Shall be complied during operation stage.
xIii.	Fly Ash shall not be used for agricultural purpose. No mine void filling will be	Shall be complied during operation stage.

25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
	undertaken as an option for ash utilization without adequate lining of mine with suitable media such that no Leachate shall take place at any point of time. In case, the option of mine void filling is to be adopted, prior detailed study of soil characteristics of the mine area shall be undertaken from an institute of repute and adequate clay lining shall be ascertained by the State Pollution Control Board and implementation done in close co-ordination with the State Pollution Control Board.	
xliii.	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 form. Mercury and other heavy metals (As Hg, Cr, Pb etc.) will be monitored in the bottom ash as also in the effluents emanating from the existing ash pond. No ash shall be disposed off in low lying area.	Shall be complied during operation stage.
xliv.	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.	Shall be complied. North Karanpura STPP envisages High Concentration Slurry Disposal System (HCSD) for Ash Disposal. In HCSD system, the disposed layers of ash is solidified and there is no free water for overflow and leachate or no risk of ash dyke getting breached.
xlv.	Fugitive emission of fly ash (dry or wet) shall be controlled such that no agricultural or non-agricultural land is affected. Damage to any land shall be mitigated and suitable compensation provided in consultation with the local Panchayat.	Shall be complied during operation stage.
xlvi.	Green Belt consisting of three tiers of plantations of native species around plant and at least 50 m width shall be raised. Wherever 50 m width is not feasible a 20 m width shall be raised and adequate justification shall be submitted to the Ministry. Tree density shall not be less than 2500 per ha with survival rate not less than 80%.	Space for Green Belt has been earmarked in General Layout Plan. Native / Local plants species will be planted and density of 2500/ha shall be maintained with survival rate of not less than 80%. 1. NKSTPP has already planted 22500 no. of trees and also donated 2500 no. fruit bearing trees among project affected villages. It will be developed in phased manner. This year target of tree plantation is 2500

Kumar
25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
		in which 600 no. are already planted near township and surrounding area.
xlvii.	A common **green endowment fund** shall be created and the interest earned out of it shall be used for the development and management of green cover of the area.	Shall be complied.
xlviii.	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.	Being complied. Project proponent adequately contributing in the development of the neighbouring villages through Community Development activities like Infrastructure development in Village, Schools, Health check-up to villagers, Education and Training to student, Solar lighting in village, Provision of drinking water to villagers etc. 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. Existing water supply system has been strengthen. Supply of potable drinking water by water tanker in each Project Affected Villages. Water bottle have been provided to school students. Provision of Solar water system at Project Affected Villages is being done.
xlix.	A minimum amount of 0.4 % of the project cost shall be earmarked as one time capital cost for activities to be taken up under CSR during construction phase of the project. Subsequently, a recurring expenditure of $1/5^{th}$ of the capital cost of the CSR budget shall be earmarked for CSR activities per annum till	Being complied. Provision of Rs 48 Crs (0.4 % of project cost) has been kept for Community Development activities broadly related to Health, Education, Drinking water, Welfare,

Kumar 25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
	life of the plant. Social audit by a reputed University or an Institute shall be carried out periodically as per CSR guidelines of Govt. of India and details to be submitted to MOEF besides putting it on Company's website	Infrastructure, etc. Rs 1.54 Cr spent during this period and total cumulative amount of Rs 32.28 Cr has been spent till September 2021. **Social audit:** Socail Audit work has been awarded to M/s KPMG. Draft report submitted.
I.	CSR schemes identified based on need based assessment shall be implemented in consultation with the village Panchayat and District Administration starting from the development of project itself. As part of CSR prior identification of local employable youth and eventual employment in the project after imparting relevant training shall be also undertaken. Company shall provide separate budget for community development activities and income generating programmes.	Being complied. The community development activities are being implemented in consultation with stakeholders. A provision of Rs 48 Cr has been kept for Community Development activities broadly related to Health-Medical Camp, Education-Merit award, sponsorship of student, furtinure, lab items, books to Vananchal collage, Welfare-Blanket, stationeries, Financial assistance for cultural program, cleaning & renovation of chhath Talab, sports & culture, Infrastructure development-Restoration of Drinking water facilities, construction of road, drain, provision of electric transformer, DG set and training-physically handicapped to PAP women on domestic solar electrification etc. The said activities would also include provisions to provide training to local employable youth and income generating programmes.
Ii.	An Environmental Cell comprising of at least one expert in environmental science/engineering, occupational health and social scientist, shall be created preferably at the project site itself and shall be headed by an officer of appropriate superiority and qualification. It shall be ensured that the head of the cell shall directly report to the head of the organization who would be accountable for implementation of environmental regulations	An Environmental cell [known as Environmental Management Group(EMG)] is already created at project site and functional.

Kumar 25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
	and social impact improvement/mitigation measures.	
liii.	The treated effluents conforming to the prescribed standards only shall be re-circulated and re-used within the plant. Arrangements shall be made that effluents and storm water do not get mixed.	❖ Shall be complied during operation stage. ❖ Arrangements has been made that effluents and storm water do not get mixed.
liii.	A sewage treatment plant shall be provided (as applicable) and the treated sewage shall be used for raising greenbelt/plantation.	(i) Construction of a Sewage Treatment Plant having capacity of 300 KLD is in operation at enabling township area. (ii) Construction of a Sewage Treatment Plant having capacity of 100 KLD is under progress at plant site.
liv.	Adequate safety measures shall be provided in the plant area to check / minimise spontaneous fires in coal 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.	Shall be complied during operation stage.
lv.	Storage Facilities for auxiliary liquid fuel such as LDO/HFO/LSHS shall be made in the plant area in consultation with Department of explosives, Nagpur. Disaster Management Plan shall be prepared to meet any eventuality in case of an accident taking place due to storage of oil.	Complied. Disaster Management Plan is prepared and available at site. Copy of DMP is enclosed as **Annexure-3**.
lvi.	First Aid and sanitation arrangements shall be made for the drivers and other contract workers during construction phase.	Complied. First Aid and sanitation arrangements has been made available to the drivers and contract workers at project site.
lvii	Noise levels emanating from turbines shall be so controlled such that the noise in the work zone shall be limited to 85 dB(A) from source. For people working in 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.	Shall be complied during operation stage.

25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
lviii.	Regular monitoring of ambient air ground level concentration of SO_2, NO_x, $PM_{2.5}$ and PM_{10} 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.	Regular monitoring of air quality is started from January,2021 and reports are attached as **Annexure-1**
lix.	Provision shall be made for the 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.	Complied Provision has been made available for the housing of construction labour within the site with all necessary infrastructure i.e. Toilet, safe drinking water with RO Plant, Medical check-up facilities.
lx.	The proponent shall upload the status of compliance of the stipulated environmental clearance 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. The criteria pollutant levels namely; SPM, RSPM ($PM_{2.5}$ and PM_{10}), SO_2, NO_x(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.	It Shall be complied during Operation Stage.
lxi.	**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.	Shall be complied during Operation Stage.

Kumar
25/11/2021

Sl. No.	Stipulations vide EC letter dated 19.02.2014	Status on 30.09.2021
lxii.	The project authorities shall inform the Regional Office as well as the Ministry regarding date of Financial closure and final approval of the project by the concerned authorities and the dates of start of land development work and commissioning of the plant.	Investment approval for the project has been accorded by the Board of Directors of NTPC on 28.01.2014. The award for main plant has been placed on 28.02.2014. Construction work is under progress at project site and date of Commissioning of Units are as bellow. Unit-I – March,2022 Unit-II – March'2023 Unit-III – September'2023

25/11/2021

Annexure-I

Compliance report for condition stipulated vide through Jharkhand State Pollution Control Board letter no PC/NOC/HBG/176/14/D-12318 dated 11.01.2014 and old NOC of BSPCB vide letter NO B- 8160 dated 31.12.2001. **Date: 25th November, 2021**

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 30.09.2021)
i.	The unit Shall obtained consent to operate under sections 25 of the Water Act,1974 and section 21 of the Air Act, 1981, prior to commissioning of the plant from pollution control board.	Application for CTO vide application no. 9389769 has been submitted to Jharkhand Pollution Control Board.
ii.	The effluent (Domestic & Trade) and emission, if any shall confirm to the standard prescribed by the board.	It shall be complied during operation of plant. Effluent treatment plant is completed. Civil work of STP at Plant site is completed. Mechanical work is under progress. STP at ETS Township is in operation.
iii.	Minimum height of the proposed stacks (one single flue steel lined RCC stacks & one twin flue steel lined RCC stack) shall be 275 meters each with port hole and platform as per norms of the central pollution control board.	Minimum height of the stacks (Three stacks single flue) shall be 275 meters. Online Continuous Stack Emission Monitoring System (CSEMS) shall be provided in stacks. Construction of stacks is in under progress and details are as bellow. Stack of Unit-I, II & III - Shell casting of all the three Chimneys completed.
iv.	High efficiency ESP shall be provided to achieve standard prescribed by the board.	Installation of High Efficiency Electrostatic Precipitation (ESPs) is in under progress and details are as below. (i). Unit-I – Completed. (ii) Unit-II – 10151 MT/11283 MT (% progress: 89.97 %) (iii). Unit III - 6026 MT/11283 MT (% progress: 53.4%)

Kumar 25/11/2021

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 30.09.2021)
		Standard prescribed by the board shall be achieved during the operation of the plant.
v	Effective measures shall be taken to control Fugitive dust pollution within plant premises and around Ash disposal area.	All effective measures has been taken to control fugitive dust pollution within plant premises and around ash disposal area. Water spraying through tanker is being carried out on regular basis.
vi	Trade effluent from plant and domestic effluent from the captive colony shall be suitable stored and treated to the standards: treated effluent shall be recycled and reused to the maximum extent.	Trade effluent from plant and domestic effluent from the captive colony shall be suitable stored and treated in ETP and STP respectively to achieve the prescribed standards. Treated effluent shall be recycled and reused to the maximum extent. (i) **Enabling Township: -** Construction of Sewage treatment (STP) having capacity of 300 KLD is in operation. (ii) **Main Plant Area: -** Construction work of ETP is completed and STP are under progress.
vii.	Analysis report of the raw and treated effluent shall be submitted to the board immediately after commissioning of the plant and thereafter monthly.	It shall be complied immediately after commissioning of the plant and thereafter on monthly basis during operation stage.
viii.	Ambient air quality report of the area (station as in EIA) shall be submitted to the board before and after commissioning of the plant along with the stack monitoring report monthly.	It shall be complied before and after commissioning of the plant and thereafter on monthly basis along with the stack monitoring report during the operation stage. However ambient air monitoring is being carried out. Report is attached as **Annexure-1.**
ix.	Unit shall submit detailed scheme for management of the ash. The scheme shall include measures taken for manufacturing	Detailed scheme for management of ash shall be submitted to the board during operation stage.

Kumar
25/11/2021

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 30.09.2021)
	ash bricks and utilization of ash within one year.	
x.	Detailed EIA shall be submitted to the board within one year which should also include detailed hydrological scenario of surface and subsurface water level, besides litho-section at plant and ash disposal area. In such hydrological study, correlation of the available water table at plant and ash disposal area shall be made and incorporated.	Complied Detail's already submitted to Regional office of MoEF, Bhubaneswar vide our letter no CC:ESE:4100:2005:GEN:02B dated 7th Feb ,2005.
xi.	The unit shall set up a modern laboratory for regular monitoring of the impact on land, air, underground and surface water. For this purpose, an area having 10 km radius from the plant zone of influence, shall be considered.	It shall be complied during operation stage.
xii.	The unit shall explore the feasibility of using washed coal and in this context CCL should be especially requested.	The unit shall explore the feasibility of using washed coal.
xiii.	The unit shall not commence its operation without the environmental clearance of MOEF, GOI.	Complied North Karanpura Super Thermal Power Project received its Enviromental Clearance from MoEF & CC, GOI vide through MoEF Letter No. J-13011/26/89-IA-II(T) dated 29.11.2004 and it is revalidated by MoEF & C vide through Letter No. J-13011/26/89-IA-II(T) dated 19.02.2014.
xiv.	Three tier plantations with a minimum 100 meters width shall be done all around the plant site and around the captive colony and maintained plantation shall also be done on the slope and abandoned ash disposal area.	Plantation shall be done in green belt development areas as per General Layout Plan in all around the plant and around the captive colony. Tree plantation shall be done in all technically feasible areas at project site.

Kumar 25/11/2021

Sl. No.	Stipulation of Conditions of BSPCB, Letter No. B-1860 dated 31.12.2001	Status (As on 30.09.2021)
	In order to neutralise the adverse impact on the captive colony physical barrier between the captive colony and the plant site shall be made.	Greenbelt shall be developed around the plant boundary as mentioned in General Layout Plan. 1. NKSTPP has already planted 22500 no. of trees and also donated 2500 no. fruit bearing trees among project affected villages. 2. It will be developed in phased manner. This year target of tree plantation is 2500 in which 600 no. are already planted near township and surrounding area.
xv.	Suitable space will be provided for retrofitting the FGD system. The design and layout of steam generator and its auxiliaries would be such that a wet/dry FGD system can be installed.	Suitable space is already provided in General layout Plan for retrofitting the FGD system. A provision has been incorporated in General layout plan for installation of FGD in North Karanpura STPP. FGD package awarded to M/s BHEL. Work is under progress.
xvi.	The unit shall fix permanent sampling stations up and down stream of effluent disposal points on Garhi River	It shall be complied during operation stage.

Kumar
25/11/2021
Sanjoy Kumar
Dum(Emn)

OFFICE OF THE CHIEF CONSERVATOR OF FORESTS-CUM-CHIEF WILDLIFE WARDEN, JHARKHAND RANCHI

Letter no.- 1083 **Dated-** 3/7/04.

To,

Sri S.L. Kapur,
Director (Technical)
National Thermal Power Corporation Ltd.
(A Govt. of India Enterprise),
NTPC Bhawan, SCOPE Complex,
7, Institutional Area, Lodhi road,
New Delhi-110003

GM(ES)/AGM(Env. Engg.)

Sub: **Authenticated list of Flora & Fauna for North Karanpura STPP.**

Ref: **Your letter no.- CC D(T)-71, dated- 05-04-2004.**

Sir,

With reference to the letter quoted above, please find enclosed a xerox copy of authenticated list of flora & fauna found in north Karanpura Region, Tandwa, Hazaribagh, received from Divisional Forest Officer, Hazaribagh West Division. Comment of Chief Wild Life Warden on the possible impact of the plant on flora and fauna of the area has been sent to Principal Chief Conservator of Forests/Executive Director, West Bengal by this office letter no-217 dated-10.02.2004.

Enclosure: As above

Yours faithfully,

ED(Engg.)

Chief Conservator of Forests-cum-
Chief Wild Life Warden,
Jharkhand, Ranchi

Dr. I M Rao

02.07-12.13

Annexure - II

List of Flora found in North Karanpura Region, Tandwa, Hazaribagh

Sl.No.	Local Name	Botanical Name	Habit
1	Akawan	Calortopis giganta	Shrub
2	Amaltas	Cassia fistula	Tree
3	Amarbel	Cascuta reflexa	Climber
4	Aonla	Emblica officinalis	Tree
5	Am	Mangifera indica	Tree
6	Arjun (Kauha)	Terminalias arjuna	Tree
7	Asan	Terminalia temontosa	Tree
8	Amra	Spondias pinnata	Climber
9	Babul	Acacia arabica	Tree
10	Bel	Aegle mermelos	Tree
11	Bakain	Melia azadiracta	Tree
12	Bans	Dendrocalamus strictus	Bamboo
13	Bar	Ficus bengalensis	Tree
14	Bantulsi	Hyptis suaveolens	Shrub
15	Bijasal (Paisar)	Petrocrpus marsupitum	Tree
16	Bahera	Terminalia belerica	Tree
17	Ber	Zizyphus maurationa	Shrub
18	Chakundi	Cassia siamea	Tree
19	Dhaunta	Anogeissua latifolia	Tree
20	Dumar	Ficus glomerata	Tree
21	Ghorneem	Ailanthus excelsa	Tree
22	Harre (Hadsa)	Terminalia chebula	Tree
23	Harsinger	Nyctanthes arbortristis	Shrub
24	Imali	Tammarindus Indica	Tree
25	Jamun	Syzygium cumini	Tree
26	Kathal	Artocarpus integrifolia	Tree
27	Khair	Acacia catechu	Tree
28	Kala Siris	Albizzia lebbek	Tree
29	Kachnar	Bauhinia variegate	Tree
30	Kend (Tend)	Diospyros melanoxylon	Tree
31	Kusum	Schelichera oleosa	Tree
32	Kadam	Anthosphalus cadamba	Tree
33	Karam	Adina cordifolia	Tree
34	Murabba	Agave americana	Shrub
35	Mahulan	Bauhinia vahlii	Climber
36	Munj	Sacchrum munja	Grass
37	Mahua	Madhuca indica	Tree
38	Neem	Azadirachta indica	Tree
39	Palas	Butea monosperma	Tree
40	Pipal	Ficus religiosa	Tree
41	Putus	Lantana camara	Shurba

42	Rori (Sinduri)	Malltus philippinensis	Large Shrub
43	Safed Siris	Albizzia procera	Tree
44	Satsar (Rose wood)	Dalbergia lartiolia	Tree
45	Satawar	Asparagus recemosus	Shrub
46	Semal	Bambex malabaricum	Tree
47	Salai	Boswellia serrata	Tree
48	Sissoo	Dalbergia sissoo	Tree
49	Sanajhuri	Acacia auriculeaformis	Tree
50	Sal	Shorea robusta	Tree
51	Sagwan (Teak)	Tectona grandis	Tree
52	Sinduar	Vitex negundo	Shrub
53	Sisal	Agave sisalana	Shrub
54	Sabai		Tree Grass
55	Sidha	Lagerstroemia parviflora	Tree

Divisional Forest Officer
Hazaribag West Division

Annexure -III

List of Fauna found in North Karanpura Region Tandwa, Hazaribag

Sl.No.	Hindi or Local Name	English Name	Zoological Name	Schedule according to Wild life protection act 1972
1	2	3	4	5
1.	Hathi	Elephant	Elephas maximus	Schedule –I
2.	Tendua	Leopard	Panthera Pardus	Sch - II
3.	Kotra	Deer	Muntiacus muntjac	Sch -III
4.	Hiran	Chital	Axis axis	Sch-III
5.	Lakarbagha	Hyena	Hyaena hyaena	Sch- III
6.	Bhalu	Bear	Molursus ursinus	Sch-II Part II
7.	Bandar	Monkey	Macaca Mulatta	Sch-II
8.	Hanuman	Common Langer	Presbytis entelus	Sch-II
9.	Siyar	Jackal	Canis aurus	Sch-II part-II
10.	Khargos	Hare	Lepus reficuadatus	Sch-IV
11.	Janglee Suar	Wild Pig	Sus Serofa	Sch-III
12.	Newla	Mongoose	Herpestes Spp.	Sch- IV
13.	Sahil	Porcupine	Hystrix indica	Sch-IV
14.	Nag Sanp	Indian Cobra	Naja Naja	Sch-II
15.	Karait Sanp	Karait	Elapidae	Sch-IV
16.	Ajgar	Python	Genus python	Sch-1 Part II
17.	Bajrakit	Pangolin	Manits Crassicaudata	Sch -I
18.	More	Peacock	Pavo Cristatus	Sch-I part III
19.	Van battakh	Wild Duck	Anatidae	Sch-IV
20.	Koel	Indian Cuckoo	Caculus micropterus	Sch-IV
21.	Gilhari	Squirrels	Ratufa indica	Sch-II part-II
22.	Dhamin	Rat snake	Ptyas mucosus	Sch-II part-II
23.	Bheria	Indian Wolf	Canis lupus pallipes	Sch -I
24.	Lomri	Common fox	Vulpes bengalensis	Sch-II Part -II
25.	Chamgadar	Fruit bats		Sch - V
26.	Gidh	Vulture	Accipitridae	Sch- IV
27.	Goh	Monitor lizard	Varanus flavescens	Sch -I Part II
28.	Bahurangi	Chameleon	Chameleo calcaratus	Sch-II

Note :- Fauna of Sl. No. 1 (Elephant) is not found permanently but crosses the area sometimes

Divisional Forest Officer
Hazaribag West Division

कार्यालय वन संरक्षक हजारीबाग अंचल, हजारीबाग

पत्रांक 1156 दिनांक 5/4/04

सेवा में ,

उपमहाप्रबंधक, (इन्चार्ज)
एन.के.एस.टी.पी.पी., रॉची
पूर्वी क्षेत्रीय कार्यालय,
पटना।

विषयः— नॉर्थ कर्णपुरा नेशन थर्मल पावर योजना के प्रस्तावित क्षेत्र में फलोरा एवं फाउना के अध्ययन के संबंध में।

प्रसंगः— आपका पत्रांक— — 2003/05/01 दिनांक 9/10.6.03

महाशय,

उपरोक्त प्रासंगिक विषय के संबंध में सूचित करना है कि संबंधित परियोजना का प्रस्तावित क्षेत्र वन प्राणी आश्रयणी या राष्ट्रीय उद्यान क्षेत्र के अन्तर्गत अवस्थित नहीं है।

आपके प्रासंगिक पत्र के आलोक में वन प्रमंडल पदाधिकारी, हजारीबाग पश्चिमी वन प्रमंडल से उक्त क्षेत्र के फलोरा एवं फाउना से संबंधित विवरणी की मांग की गई थी। वन प्रमंडल पदाधिकारी, हजारीबाग पश्चिमी ने अपने पत्रांक 2865 दिनांक 1.9.03 द्वारा प्रस्तावित क्षेत्र के 10 कि.मी. परिधी में पाए जाने वाले जानवर एवं जीवजंतु की सूची समर्पित की है, जिसकी छाया प्रति इस पत्र के साथ संलग्न है।

ज्ञातव्य है कि प्रस्तावित परियोजना क्षेत्र के 10 कि.मी. परिधी के निकट कोई भी वन्य प्राणी आश्रयणी स्थित नहीं है। संबंधित क्षेत्र में वन्य पशुओं की नियमित गणना नहीं की गई है अतः इस क्षेत्र में वन्य जीव (संरक्षण) अधिनियम 1972 की अनुसूची I में पाये जाने की वाली वन्य जीव, पाए जाने की निश्चित सूचना नहीं है।

अनुः— यथोक्त।

आपका विश्वासी

वन संरक्षक,
हजारीबाग अंचल, हजारीबाग।

Dr DM Rao

NTPC-N-Karnpura-c1

Fax to Dr M.H. Rao DGM(Env Eqn) cc
0120-2410201

कार्यालय, वन प्रमंडल पदाधिकारी, हजारीबाग पश्चिमी वन प्रमंडल

पत्रांक 2865 दिनांक 01-9-2003.

सेवा में,

वन संरक्षक,
हजारीबाग अंचल,
हजारीबाग।

विषय:— नेशनल पावर कारपोरेशन लि० को वन भूमि निकासी से संबंधित व्योरा के र में।

प्रसंग:— आपका पत्रांक 2503 दिनांक 24.07.2003 ।

महाशय,

उपर्युक्त विषयक प्रसंग में सूचित करना है कि एन0टी0पी0सी0 के पदाधिकारियं एवं सहायक वन संरक्षक द्वारा दिनांक 05.08.2003 को टण्डवा के प्रस्तावित क्षेत्र के 10 कि0मी0 दूरी वाले क्षेत्रों का सर्वेक्षण कर प्रतिवेदन समर्पित किया गया है।(छाया प्रति संलग्न)

प्रतिवेदन के अनुसार प्रस्तावित क्षेत्र के 10 कि0मी0 दूरी वाले स्थानो निम्नलिखित जानवर एवं जीव जन्तु पाए जाते है :—

क्र0सं0	नाम
1.	तेन्दुआ
2	हिरण या कोटरा
3.	चीतल
4.	लकडबघ्घा
5	भालू
6.	बन्दर
7.	हनुमान
8.	सियार
9	खरगोश
10	जंगली सुअर
11.	नेवला
12.	साहिल
13.	नाग सांप
14	करैत सांप
15	अजगर सांप
16.	बजकिट
17.	मोर
18.	जंगली मुर्गा
19.	वन बत्तख

आपके सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित ।

अनुलग्नक:— यथोक्त।

आपका विश्वासी,

वन प्रमंडल पदाधिकारी
हजारीबाग पश्चिमी वन प्रमंडल

सेवा में,

वन प्रमंडल पदाधिकारी,
हजारीबाग पश्चिमी वन प्रमंडल।

विषय :- एन0टी0पी0सी0 के नार्थ कर्णपुरा सुपर थर्मल पावर प्लांट, चतरा द्वारा अधिग्रहित की जाने वाली भूमि के आस-पास के जंगलों में जानवर एवं अन्य जीव जंतु के संबंध में निरीक्षण प्रतिवेदन ।

प्रसंग :- वन संरक्षक, हजारीबाग अंचल का पत्रांक 2503 दिनांक 24-7-2003 ।

महाशय,

सादर सूचित करना है कि आपके निदेशानुसार अधोहस्ताक्षरी द्वारा दिनांक 5-8-2003 को प्रमंडल के अधीन निरीक्षक श्री सुधीर कुमार सिन्हा एवं टण्डवा प्रक्षेत्र में पदस्थापित वनरक्षी श्री केदार नाथ तिवारी की उपस्थिति में एन0टी0पी0सी0 के [illegible] एवं [illegible] के साथ टण्डवा प्रक्षेत्र के प्रभावित क्षेत्र (10 कि0मी0 की दूरी वाले क्षेत्र) का दौरा किया एवं संबंधित ग्रामीणों का बयान वहाँ पर पाए जाने वाले जानवरों एवं अन्य जीव जन्तुओं के बारे में लिया गया ।

एन0टी0पी0सी0 का प्लान्ट टण्डवा के राहम ग्राम में प्रस्तावित है इसके चारों ओर 10 कि0मी0 की दूरी में निम्नलिखित प्रमुख गाँव है:-

उत्तर में – कुम्हारंग खुर्द, कुम्हारंग कला, सैंदाग, कशियाडीह
दक्षिण में – राहम, लरंगा, बानाडीह, उत्तरौली, डुड़वा, करमाटांड़
पूर्व में – खुखरू, केंवा, पेटो, सलगा, स्याल, केरेडारी
पश्चिम में – सराढू, होन्हे, नावाडीह, कुरलौंगा, मशियांग इत्यादि ।

निरीक्षण के क्रम में रास्ते में पड़ने वाले संबंधित गाँव के कई ग्रामीणों के बयान लिये गए जिनमें कुछ प्रमुख ग्रामीणों के नाम निम्नवत हैं :-

क्र0सं0	नाम	पता
1.	श्री कामेश्वर पाण्डेय	राहम
2.	,, रामनाथ तिवारी	राहम
3.	श्रीमती मरियम तिर्की, शिक्षिका	राहम प्राथमिक विद्यालय
4.	श्री अखिलेश पाण्डे	अध्यक्ष, राहम वन सुरक्षा समिति ।
5.	,, सुरेश सिंह	अध्यक्ष, उत्तरौली, -वही-
6.	,, गौतम कुमार	विद्यार्थी, कक्षा-9, सराढू उच्च विद्यालय।
7.	,, आलोक रंजन,	-वही-
8.	,, संदीप कुमार	-वही-
9.	,, सरयू साव	चटटी , पेटो
10.	,, [illegible]	-वही-

(2)

11. श्री नागेश्वर महतो — कुटंग
12. ,, राजकिशोर यादव — पेटो
13. ,, रविन्द्र कुमार सोनी — केरेडारी

निष्कर्ष : उपर्युक्त निरीक्षण एवं बयान से स्पष्ट होता है कि प्रस्तावित क्षेत्र के आस-पास (10 कि॰मी॰ की दूरी में) निम्नलिखित जानवर एवं जीव जन्तु पाये जाते हैं :-

क्र॰सं॰	नाम	अभियुक्ति
1.	हाथी	नजदीक के किसी वन में नहीं है और न ही इसका आम रास्ता (कोरिडोर) है परन्तु पिछले वर्षों हाथी रातहा, गोन्दा, सामोडीह, सराघु होते हुए गुजरा था जिसमें कुछ जान-माल का नुकसान हुआ था एवं ग्रामीणों को वन विभाग द्वारा मुआवजा भी दिया गया था।
2.	तेंदुआ	तेंदुआ आस-पास के स्थल एवं सलगा के जंगल में पाया जाता है। पिछले वर्ष ग्राम करमटांड़ में श्री सरयु साहि का बैल तेंदुआ द्वारा मारा भी गया था।
3.	हिरण या कोटरा—	ये अकसर फसल को खाने आते हैं फिर भाग जाते हैं। स्थल एवं सलगा के जंगल की ओर ही ज्यादा पाए जाते हैं।
4.	चीतल	ग्राम होन्हें में कभी-कभी दिखता है।
5.	लकड़बग्घा—	कई जगह है। बहुत से लोगों द्वारा देखा गया है।
6.	[illegible]	[illegible]
7.	बन्दर—	केरो, सिकरी, बड़कागांव के जंगलों में देखा गया है।
8.	हनुमान—	सलगा एवं बड़कागांव के जंगलों में देखा गया है।
9.	सियार—	सभी जगह बहुतायत में है।
10.	खरगोश—	सभी जगह बहुतायत में है।
11.	जंगली सुअर—	सलगा एवं बड़कागांव के जंगल में कभी-कभी दिखा है।
12.	गिलहरी—	प्रायः सभी जगह बहुतायत में है।
13.	साहिल—	सलगा एवं बड़कागांव के जंगल में कभी-कभी दिखाई देती।
14.	नाग सांप	प्रायः सभी जगह देखे गए हैं।
15.	करैत सांप	—वही—
16.	अजगर सांप	बड़कागांव के जंगल में कभी-कभी देखे गए हैं।
17.	बज्रकीट—	—वही—
18.	मोर—	—वही—
19.	जंगली मुर्गी—	—वही—
20.	बन बतख—	—वही—

आपके सूचनार्थ एवं आवश्यक कार्रवाई हेतु प्रेषित।

आपका विश्वासी,

सहायक वन संरक्षक,
हजारीबाग पश्चिमी प्रमंडल।

अनुला॰ 7/8

CENTRAL COALFIELDS LIMITED
(Govt. of India Undertaking)
SALES & MARKETING DIVISION
DARBHANGA HOUSE, RANCHI 834 001
Phone: (0651)236 0606 (10 Lines), 236 0123

CCL
A Miniratna Company

By Registered Post

No. CCL/HQ/C-4/LOA/Power/North Karanpura/ 3641-49
Dated: 23/03/2015
24

To,

M/s North Karanpura Super Thermal Power Plant,
(A unit of NTPC ltd.)
Tandwa Town, Distt: Chatra,
Jharkhand 825321

General Manager (Fuel Management)
NTPC Limited, Engineering Office Complex,
A-8A, R&D Building, Room No. 124,
Sector -24, Noida 201301 (U.P.)

Dear Sir,

Subject: Letter of Assurance

Preamble

In consideration of the request by **M/s North Karanpura Super Thermal Power Plant (A unit of NTPC Ltd.) , Tandwa Town, Distt: Chatra , Jharkhand** (hereinafter referred to as "**the Assured**") for issuance of Letter of Assurance (hereinafter referred to as "**LOA**") requiring **7.039 million tonnes per annum** (MTPA) of **erstwhile E Grade (equivalent GCV range G7-G11)** coal for its **3X660 MW** Power Plant [to be] located at **Tandwa Town, Distt: Chatra , Jharkhand** (hereinafter referred to as "**The Plant**"), from about [insert the date of commencement of coal supplies], **date not specified by the Assured, Central Coalfields Limited** (hereinafter referred to as "**the Assurer**") hereby provisionally assures that it would endeavour to supply coal to the Assured subject to the following terms and conditions:

1. Scope of Assurance

1.1 Quantity, Grade and Source of coal

Subject to the Assured fulfilling its obligations in accordance with Clause 2 to the satisfaction of the Assurer within the period of validity of this LOA and the signing of the Fuel Supply Agreement (FSA) within three (3) months thereafter, the Assurer shall endeavour to supply, as per the normative requirement of the Plant, **7.039 million tonnes per annum** (MTPA) of **erstwhile E Grade (equivalent GCV range G7-G11)** (s) coal to the Assured, which shall be subject to review and assessment by the Assurer of the actual coal requirement of the Assured as well as the availability of coal from the mines of the Assurer and of imported coal. It is expressly clarified that in the event that the coal supplies available with the Assurer is less than the coal demand, such availability shall be distributed on pro-rata basis and the balance quantity of coal requirement shall be met through imports of coal. Notwithstanding , the ongoing coal supplies by the seller to the existing power plants would be provided due preference over the new power plants to whom such letters of assurance have been issued by the Seller; and the remaining coal including imported coal available with the Seller shall be distributed to such new power plants on pro-rata basis.

Price of coal

The price of coal assured herein shall be as per the notified price of CIL from time to time. Notwithstanding, in case the quantity of normative requirement, as stated in Clause 1.1 above, necessitates opening of a dedicated mine, then coal shall be priced at the higher of the cost plus reasonable return or such notified price. The quantity of imported coal that may be supplied to the Assured, as mentioned in Clause 1.1, shall be charged at the landed cost plus service charge. Such service charge shall be notified by the Assurer from time to time. The Assured shall be liable to pay all applicable taxes and statutory levies.

Change in law

In the event of an enactment, promulgation, amendment or repeal of any statute, policy, decree, notice, rule or direction by any government instrumentality that would have an impact on the coal supply terms assured hereof; the Assurer shall be free to amend or repeal this LOA without any liabilities or damages, whatsoever, payable to the Assured.

Force-Majeure affecting the Assurer

In the event that development on the coal block identified by the Assurer for the purpose of meeting the normative requirement stated in Clause 1.1 is delayed or terminated for reasons including de-allocation of such block by the Government and inordinate delays faced in acquiring land or receiving environmental/forest clearances; Or that imports of coal required for the purpose of meeting the portion of normative requirement stated in Clause 1.1 is reasonably withheld owing to such factors as global shortage or a Force-Majeure event affecting the source(s) of imported coal or logistical bottlenecks faced in transportation and unloading; which are not within the control of and not caused by the negligence or fault of the Assurer; the Assurer shall be free to amend or repeal this LOA without incurring any liability whatsoever, including the liability for payment of damages to the Assured.

2. Fulfillment of Assured's obligations

2.1 Time-bound achievement of milestones

The Assured shall undertake to complete all the activities, as mentioned in Annexure-1 to this LOA, within twenty four (24) months from the date of issue of LOA and each activity within the time-period mentioned against it unless such completion is affected due to any Force Majeure event provided that such Force Majeure event shall not include inability or failure to obtain financing for the Plant or failure to comply with the existing rules and regulations with respect to statutory clearances applicable to the Plant or any such event resulting from the negligence, omission or default by the Assured; and the Assured notifies in writing within seven (7) of occurrence of any such Force Majeure event along with documentary evidence of the same.

2.2 Reporting Requirement

The assured shall submit the status of each activity/milestone including the documentary evidence in relation to such status within the time period as mentioned in Annexure-1.

2.3 Verification by the Assurer

The Assurer reserves the right to independently verify the status of each milestone as mentioned in Annexure 1, and in the event of any significant or reasonable discrepancy found by the Assured in respect of the status reported/documentary evidence submitted by the Assured, the Assurer shall notify the Assured forthwith upon which the Assured shall correct the discrepancy so noted by the Assurer within seven (7) days. Further, in the event that the Assured fails to correct the discrepancy as provided herein the Assured shall be liable to submit additional Commitment Guarantee, as per Clause 3.3.

3. Commitment Guarantee by the Assured

3.1 Amount of Commitment Guarantee

Prior to the date of issue of this LOA, the Assured have provided to the Assurer, a Commitment Guarantee (CG), in cash / bank guarantee, for a sum **of Rs/- 98,54,60,000 (Ninety eight crore fifty four lakh sixty thousand only)** , equivalent to ten percent **(10%) of base price of erstwhile E Grade (G7)** Run-of-Mine (ROM) coal of the Assurer prevalent on the date of application for issue of LOA, multiplied by the quantity of coal mentioned in the Preamble. {Note: In no case shall the CG be less than Rs.2,50,00,000/- (Indian Rupees Two hundred and Fifty Million only. Such CG shall be non-interest bearing, and in case of it being deposited in the form of bank guarantee it should comply with the format specified by the Assurer and issued by a scheduled bank acceptable to the Assurer.

3.2 Validity of Commitment Guarantee

The Commitment Guarantee (CG) shall remain valid until four (4) months after the expiry of the LOA period of twenty-four (24) months. Thereafter, the CG shall stand converted into the Contract Performance Guarantee (CPG) that would be the condition precedent to signing of the FSA, in which case, validity of the CG shall be extended in accordance with the terms of the FSA. For the avoidance of any doubt, the Assured shall be liable to submit the guarantee for such further amount that may result from the difference between the CPG under FSA and the CG under this LOA.

3.3 Additional Commitment Guarantee

If any activity/milestone is not duly performed or completed by the Assured within the time stipulated against each such activity/milestone, as specified in Annexure 1, then the Assured shall be liable to furnish to the Assurer one tenth ($1/10^{th}$) of the amount of CG for each such non-performed or incomplete milestone, as additional CG, within fifteen (15) days from the date such activity/milestone is falling due for completion. For the avoidance of any doubt, such additional CG may need to be deposited multiple times subject to partial/non-fulfillment of each activity/milestone at the end of each half-yearly interval, as mentioned in Annexure 1. The aggregate of additional CG(s), however, in no case shall exceed the amount of CG, as specified in Clause 3.1 above. Further, such additional CG(s) shall at all times be deemed to be a part of the CG and all related provisions of this LOA shall be equally applicable for additional CG.

3.4 Encashment of Commitment Guarantee

3.4.1 Cancellation or withdrawal of LOA

In the event that any of the activities/milestones is delayed beyond the period specified against each such activity/milestone in Annexure 1 and the Assured fails to furnish the additional CG to the Assurer in accordance with Clause 3.3 hereof, or the Assured furnishes additional CG to the Assurer in accordance with Clause 3.3 hereof but fails to fulfill all the activities/milestones within the total period of twenty-four (24) months, as specified in Annexure 1, the Assurer shall have the right to cancel or withdraw this LOA after duly notifying the Assured in writing at least seven (7) days in advance. For the avoidance of doubt, all the milestones, as specified in Annexure 1, shall need to be fully completed and any partial completion with regard to any activity/milestone at the end of validity of the LOA shall entitle the Assurer to cancel or withdraw this LOA. Upon such cancellation/withdrawal of this LOA, the Assurer shall encash the CG including any additional CG submitted by the Assured. It is clarified for removal of doubt that this Clause shall survive the cancellation/withdrawal of this LOA.

3.4.2 Failure to sign the FSA

The Assurer shall have the right to encash the CG in the event of failure by the Assured to sign the FSA within three (3) months from the expiry of validity of the LOA or the satisfactory achievement of all the milestones, as shown in Annexure 1, whichever is earlier. It is also clarified to the Assured that the percentage of annual contracted quantity Fixed with respect to Take or Pay obligations in the FSA may be reviewed by the Seller in light of its coal availability and coal commitments, and amended on year to year basis during the term of the FSA.

3.5 Return of Commitment Guarantee

In case of inability of the Assured to fulfill any activity/milestone, as specified in Annexure 1, due to the occurrence of any Force Majeure event, the time period for fulfillment of such activity/milestone, shall be extended for the period of such Force Majeure event, subject to a maximum extension period of three (3) months continuous or non-continuous in aggregate. In no case including a Force Majeure event affecting multiple activities/milestones shall the validity of LOA be extended by more than three (3) months. Thereafter, this LOA may be cancelled/withdrawn by the Assurer after duly notifying the Assured in writing at least seven (7) days in advance without any liabilities or damages, whatsoever, payable by the Assured to the Assurer; and the Assurer shall return the CG submitted by the Assured.

4. Validity of the LOA

The LOA shall remain valid for a period of twenty-four (24) months from the date of issue of this LOA unless extended for three (3) months in accordance with Clause 3.5 hereof, and shall stand annulled upon expiry of such period.

5. Assignment of the LOA

The Assured shall not, without the express prior written consent of the Assurer, assign to any third person the LOA, or any right, benefit, obligation or interest therein or thereunder.

6. End-use of coal

The total quantity of coal assured pursuant to this LOA is for use at the Plant, and the Assured shall not re-sell or trade the coal assured or supplied hereunder to any third party. If at any time in the reasonable opinion of the Assurer, the Assured has entered into an arrangement for such resale or trade of such coal supplies, the Assurer shall cancel/withdraw this LOA without incurring any liability whatsoever, including the liability for payment of damages to the Assured.

Thanking You,

Yours faithfully

23/12/13

General Manager (S&M-HOD)

Copy for Kind information to:

1. CMD, CCL, Ranchi
2. D(F)/ DT(O) CCL, Ranchi
3. CGM(P&P), CCL, Ranchi
4. CGM(S&M), CIL, Kolkata

} This LOA is being issued in accordance with the letter no. 47011/24/99-CPD dated 9th May'13 issued by GOI, MOC, New Delhi.

5. All members of LOA committee of CCL : For further needful

Cc to:

1. GM (Fuel Management), A-11, C- wing, NFL Premises, Sec-24, Noida-U.P. : LOA is being issued in accordance with the letter no. 47011/24/99-CPD dated 9th May'13 issued by GOI, MOC, New Delhi and acceptance vide letter dated 29.09.2014 of conditions as mentioned in MOC letter dated 9th May'13

EMTRC CONSULTANTS PRIVATE LIMITED

EMTRC Lab: Recognized by Ministry of Environment, Forests & Climate Change, Govt. of India
Gazette Notification SO: 3744 (E), 17-10-2019 Accredited by NABL - ISO/IEC 17025:2005 (TC-7376)
Registered Office Tower 5 / 102 (FF), CWG village, NH24, Near Akshardham Temple, Delhi 110092
Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 23/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/04/2021	65	32	6.2	10.8	22	7.2
2	02/04/2021	58	28	5.6	9.5	24	<5.0
3	09/04/2021	62	30	5.8	10.2	20	6.8
4	10/04/2021	56	26	5.2	9.2	24	<5.0
5	11/04/2021	60	28	5.6	9.8	22	<5.0
6	12/04/2021	52	25	4.8	9.2	18	<5.0
7	23/04/2021	58	28	5.6	9.5	20	<5.0
8	24/04/2021	62	30	5.8	10.5	22	6.5
9	26/04/2021	60	28	5.4	10.2	24	<5.0
10	27/04/2021	56	26	5.2	9.5	20	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

MUKESH KUMAR
Authorized Signatory

Emtrc Consultants Private Limited DELHI

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WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	09/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	10/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	11/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	12/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	23/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	24/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	26/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	27/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

MUKESH KUMAR
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Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/04/2021	54	26	5.2	<9.0	20	<5.0
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6	12/04/2021	50	24	4.5	<9.0	20	<5.0
7	23/04/2021	56	26	5.2	9.2	21	<5.0
8	24/04/2021	62	30	5.8	10.5	20	6.8
9	26/04/2021	54	26	5.2	9.8	22	<5.0
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MUKESH KUMAR
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1	01/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	09/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	10/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	11/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	12/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	23/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	24/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	26/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	27/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

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CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

MUKESH KUMAR
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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 25/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/04/2021	54	26	5.2	<9.0	21	<5.0
2	02/04/2021	52	25	4.8	<9.0	24	<5.0
3	09/04/2021	46	22	<4.0	<9.0	23	<5.0
4	10/04/2021	54	26	5.2	9.2	22	<5.0
5	11/04/2021	50	24	<4.0	<9.0	19	<5.0
6	12/04/2021	54	26	5.4	<9.0	22	<5.0
7	23/04/2021	60	28	5.6	10.2	22	<5.0
8	24/04/2021	56	26	5.2	9.5	19	<5.0
9	26/04/2021	60	28	5.8	9.8	20	<5.0
10	27/04/2021	56	26	5.4	9.2	20	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 25/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	09/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	10/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	11/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	12/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	23/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	24/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	26/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	27/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 26/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/04/2021	52	25	4.5	<9.0	22	<5.0
2	02/04/2021	48	23	4.2	<9.0	23	<5.0
3	09/04/2021	44	21	<4.0	<9.0	22	<5.0
4	10/04/2021	46	22	<4.0	<9.0	20	<5.0
5	11/04/2021	50	24	4.5	<9.0	22	<5.0
6	12/04/2021	48	23	4.2	<9.0	20	<5.0
7	23/04/2021	54	26	4.8	<9.0	24	<5.0
8	24/04/2021	48	23	4.2	<9.0	22	<5.0
9	26/04/2021	52	25	4.5	<9.0	18	<5.0
10	27/04/2021	48	23	4.2	<9.0	22	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 26/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	09/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	10/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	11/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	12/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	23/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	24/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
9	26/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
10	27/04/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 27/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	09-04-2021	dB(A)	53.6	49.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	09-04-2021	dB(A)	57.8	50.6	
3	DM Plant	09-04-2021	dB(A)	56.4	50.2	
4	Near Township Area	09-04-2021	dB(A)	51.8	43.6	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	12-04-2021	dB(A)	54.2	50.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	12-04-2021	dB(A)	57.4	50.2	
3	DM Plant	12-04-2021	dB(A)	56.8	50.6	
4	Near Township Area	12-04-2021	dB(A)	52.2	43.8	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	23-04-2021	dB(A)	55.2	51.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	23-04-2021	dB(A)	59.6	52.2	
3	DM Plant	23-04-2021	dB(A)	58.4	52.4	
4	Near Township Area	23-04-2021	dB(A)	51.4	43.2	

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 28/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	24-04-2021	dB(A)	56.4	51.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	24-04-2021	dB(A)	59.4	52.6	
3	DM Plant	24-04-2021	dB(A)	56.8	50.6	
4	Near Township Area	24-04-2021	dB(A)	53.2	44.4	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	26-04-2021	dB(A)	54.6	50.2	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	26-04-2021	dB(A)	58.6	51.8	
3	DM Plant	26-04-2021	dB(A)	58.4	52.2	
4	Near Township Area	26-04-2021	dB(A)	52.6	43.8	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	27-04-2021	dB(A)	54.8	49.6	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	27-04-2021	dB(A)	56.4	50.8	
3	DM Plant	27-04-2021	dB(A)	57.8	51.4	
4	Near Township Area	27-04-2021	dB(A)	51.6	43.2	
5	Near CHP Plant	27-04-2021	dB(A)	56.4	50.6	
6	Near Labor Colony	27-04-2021	dB(A)	53.8	44.8	

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 29/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ground Water
Date of Sampling : 26-04-2021
Location of Sampling : Vishvesheria Bhawan
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

TEST RESULTS

	Parameters	Unit	Test Methods	RESULT	Acceptable Limit IS:10500:2012	Permissible Limit IS:10500:2012
1	pH	-	APHA, 23rd Ed.2017-4500B	7.32	6.5 to 8.5	No relaxation
2	Turbidity	NTU	APHA, 23rd Ed.2017-2030B	<0.5	1	5
3	Colour	Hazen Unit	APHA, 23rd Ed.2017-2120B	<5	5	15
4	Total Dissolved Solids	mg/l	APHA, 23rd Ed.2017-2540B	510	500	2000
5	Total Hardness as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2340C	170	200	600
6	Calcium as Ca	mg/l	APHA, 23rd Ed.2017-4500B	56	75	200
7	Magnesium as Mg	mg/l	APHA, 23rd Ed.2017-4500B	7.3	30	100
8	Total Alkalinity as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2320B	224	200	600
9	Free Ammonia as NH_3	mg/l	APHA, 23rd Ed.2017-4500	BDL	0.5	No relaxation
10	Total Residual Chlorine	mg/l	APHA, 23rd Ed.2017-4500B	BDL	0.2	1.0
11	Phenolic compound	mg/l	APHA, 23rd Ed.2017-5230D	<0.001	0.001	0.002
12	Chromium as Cr^{+6}	mg/l	APHA, 23rd Ed.2017-3500B	<0.05	0.05	No relaxation
13	Total Chromium as Cr	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.05	No relaxation
14	Iron as Fe	mg/l	APHA, 23rd Ed.2017-3111B	0.15	0.3	No relaxation
15	Copper as Cu	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.05	1.5
16	Zinc as Zn	mg/l	APHA, 23rd Ed.2017-3111B	0.30	5	15
17	Nickel as Ni	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.02	No relaxation
18	Manganese as Mn	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.1	0.3
19	Lead as Pb	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.01	No relaxation
20	Cadmium as Cd	mg/l	APHA, 23rd Ed.2017-3111B	<0.001	0.003	No relaxation
21	Aluminum as Al	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.03	0.2
22	Selenium as Se	mg/l	IS3025(Part 56)	<0.01	0.01	No relaxation
23	Arsenic as As	mg/l	APHA, 23rd Ed.2017-3114	<0.001	0.01	0.05
24	Mercury as Hg	mg/l	APHA, 23rd Ed.2017-3112	<0.001	0.001	No relaxation
25	Total coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil
26	Fecal coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil

BDL= Below Detection Limits

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----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 30/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ground Water
Date of Sampling : 26-04-2021
Location of Sampling : Labor Colony
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

TEST RESULTS

	Parameters	Unit	Test Methods	RESULT	Acceptable Limit IS:10500:2012	Permissible Limit IS:10500:2012
1	pH	-	APHA, 23rd Ed.2017-4500B	7.35	6.5 to 8.5	No relaxation
2	Turbidity	NTU	APHA, 23rd Ed.2017-2030B	<0.5	1	5
3	Colour	Hazen Unit	APHA, 23rd Ed.2017-2120B	<5	5	15
4	Total Dissolved Solids	mg/l	APHA, 23rd Ed.2017-2540B	460	500	2000
5	Total Hardness as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2340C	150	200	600
6	Calcium as Ca	mg/l	APHA, 23rd Ed.2017-4500B	48	75	200
7	Magnesium as Mg	mg/l	APHA, 23rd Ed.2017-4500B	7.3	30	100
8	Total Alkalinity as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2320B	212	200	600
9	Free Ammonia as NH_3	mg/l	APHA, 23rd Ed.2017-4500	BDL	0.5	No relaxation
10	Total Residual Chlorine	mg/l	APHA, 23rd Ed.2017-4500B	BDL	0.2	1.0
11	Phenolic compound	mg/l	APHA, 23rd Ed.2017-5230D	<0.001	0.001	0.002
12	Chromium as Cr^{+6}	mg/l	APHA, 23rd Ed.2017-3500B	<0.05	0.05	No relaxation
13	Total Chromium as Cr	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.05	No relaxation
14	Iron as Fe	mg/l	APHA, 23rd Ed.2017-3111B	0.26	0.3	No relaxation
15	Copper as Cu	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.05	1.5
16	Zinc as Zn	mg/l	APHA, 23rd Ed.2017-3111B	0.35	5	15
17	Nickel as Ni	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.02	No relaxation
18	Manganese as Mn	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.1	0.3
19	Lead as Pb	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.01	No relaxation
20	Cadmium as Cd	mg/l	APHA, 23rd Ed.2017-3111B	<0.001	0.003	No relaxation
21	Aluminum as Al	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.03	0.2
22	Selenium as Se	mg/l	IS3025(Part 56)	<0.01	0.01	No relaxation
23	Arsenic as As	mg/l	APHA, 23rd Ed.2017-3114	<0.001	0.01	0.05
24	Mercury as Hg	mg/l	APHA, 23rd Ed.2017-3112	<0.001	0.001	No relaxation
25	Total coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil
26	Fecal coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil

BDL= Below Detection Limits

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Gazette Notification SO: 3744 (E), 17-10-2019 Accredited by NABL - ISO/IEC 17025:2005 (TC-7376)

Registered Office Tower 5 / 102 (FF), CWG village, NH24, Near Akshardham Temple, Delhi 110092

Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 05-05-2021

Report No. : EMTRC/NKSTPP- 31/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ground Water
Date of Sampling : 26-04-2021
Location of Sampling : Township (ETS)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

TEST RESULTS

	Parameters	Unit	Test Methods	RESULT	Acceptable Limit IS:10500:2012	Permissible Limit IS:10500:2012
1	pH	-	APHA, 23rd Ed.2017-4500B	7.47	6.5 to 8.5	No relaxation
2	Turbidity	NTU	APHA, 23rd Ed.2017-2030B	<0.5	1	5
3	Colour	Hazen Unit	APHA, 23rd Ed.2017-2120B	<5	5	15
4	Total Dissolved Solids	mg/l	APHA, 23rd Ed.2017-2540B	410	500	2000
5	Total Hardness as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2340C	90	200	600
6	Calcium as Ca	mg/l	APHA, 23rd Ed.2017-4500B	24	75	200
7	Magnesium as Mg	mg/l	APHA, 23rd Ed.2017-4500B	7.3	30	100
8	Total Alkalinity as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2320B	150	200	600
9	Free Ammonia as NH_3	mg/l	APHA, 23rd Ed.2017-4500	BDL	0.5	No relaxation
10	Total Residual Chlorine	mg/l	APHA, 23rd Ed.2017-4500B	BDL	0.2	1.0
11	Phenolic compound	mg/l	APHA, 23rd Ed.2017-5230D	<0.001	0.001	0.002
12	Chromium as Cr^{+6}	mg/l	APHA, 23rd Ed.2017-3500B	<0.05	0.05	No relaxation
13	Total Chromium as Cr	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.05	No relaxation
14	Iron as Fe	mg/l	APHA, 23rd Ed.2017-3111B	0.24	0.3	No relaxation
15	Copper as Cu	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.05	1.5
16	Zinc as Zn	mg/l	APHA, 23rd Ed.2017-3111B	0.38	5	15
17	Nickel as Ni	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.02	No relaxation
18	Manganese as Mn	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.1	0.3
19	Lead as Pb	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.01	No relaxation
20	Cadmium as Cd	mg/l	APHA, 23rd Ed.2017-3111B	<0.001	0.003	No relaxation
21	Aluminum as Al	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.03	0.2
22	Selenium as Se	mg/l	IS3025(Part 56)	<0.01	0.01	No relaxation
23	Arsenic as As	mg/l	APHA, 23rd Ed.2017-3114	<0.001	0.01	0.05
24	Mercury as Hg	mg/l	APHA, 23rd Ed.2017-3112	<0.001	0.001	No relaxation
25	Total coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil
26	Fecal coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil

BDL= Below Detection Limits

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----------TEST REPORT----------

Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 32/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	09/06/2021	60	28	5.8	9.5	26	6.8
2	10/06/2021	68	32	6.5	10.5	28	7.2
3	17/06/2021	44	21	<4.0	<9.0	18	<5.0
4	18/06/2021	48	23	<4.0	<9.0	20	<5.0
5	24/06/2021	58	28	5.2	9.2	24	6.5
6	25/06/2021	62	30	5.8	9.5	28	6.8
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	**Parameters**						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	09/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	10/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	17/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	18/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	24/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	25/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 33/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	09/06/2021	58	28	5.2	9.2	24	6.2
2	10/06/2021	52	25	4.8	9.8	26	5.8
3	17/06/2021	40	18	<4.0	<9.0	16	<5.0
4	18/06/2021	42	18	<4.0	<9.0	18	<5.0
5	24/06/2021	56	26	4.8	9.2	25	6.5
6	25/06/2021	60	28	5.5	9.5	30	7.2
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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Report No. : EMTRC/NKSTPP- 33/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	09/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	10/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	17/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	18/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	24/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	25/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 34/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	09/06/2021	55	26	4.8	<9.0	26	5.2
2	10/06/2021	58	28	5.5	9.5	28	6.5
3	17/06/2021	38	16	<4.0	<9.0	18	<5.0
4	18/06/2021	40	18	<4.0	<9.0	20	<5.0
5	24/06/2021	52	25	4.5	<9.0	24	<5.0
6	25/06/2021	56	27	5.2	9.8	26	6.2
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	09/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	10/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	17/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	18/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	24/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	25/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 35/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	09/06/2021	54	26	4.2	<9.0	24	<5.0
2	10/06/2021	50	24	<4.0	<9.0	25	<5.0
3	17/06/2021	35	16	<4.0	<9.0	18	<5.0
4	18/06/2021	38	18	<4.0	<9.0	18	<5.0
5	24/06/2021	46	22	<4.0	<9.0	22	<5.0
6	25/06/2021	52	25	4.5	<9.0	25	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 35/2021-2022
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: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	09/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	10/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	17/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	18/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	24/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	25/06/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 36/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	09-06-2021	dB(A)	55.2	50.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	09-06-2021	dB(A)	58.4	51.2	
3	DM Plant	09-06-2021	dB(A)	55.6	50.8	
4	Near Township Area	09-06-2021	dB(A)	52.8	44.2	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	10-06-2021	dB(A)	56.4	51.2	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	10-06-2021	dB(A)	58.2	51.8	
3	DM Plant	10-06-2021	dB(A)	57.4	51.6	
4	Near Township Area	10-06-2021	dB(A)	51.8	43.6	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	17-06-2021	dB(A)	57.6	52.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	17-06-2021	dB(A)	56.8	50.6	
3	DM Plant	17-06-2021	dB(A)	56.6	51.2	
4	Near Township Area	17-06-2021	dB(A)	52.4	43.8	

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EMTRC Lab: Recognized by Ministry of Environment, Forests & Climate Change, Govt. of India
Gazette Notification SO: 3744 (E), 17-10-2019 Accredited by NABL - ISO/IEC 17025:2005 (TC-7376)
Registered Office Tower 5 / 102 (FF), CWG village, NH24, Near Akshardham Temple, Delhi 110092
Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 05-07-2021

Report No. : EMTRC/NKSTPP- 37/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	18-06-2021	dB(A)	58.4	52.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	18-06-2021	dB(A)	57.6	51.4	
3	DM Plant	18-06-2021	dB(A)	55.4	50.6	
4	Near Township Area	18-06-2021	dB(A)	51.8	43.2	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	24-06-2021	dB(A)	57.6	51.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	24-06-2021	dB(A)	59.4	52.8	
3	DM Plant	24-06-2021	dB(A)	57.4	51.2	
4	Near Township Area	24-06-2021	dB(A)	53.6	44.4	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	25-06-2021	dB(A)	56.6	50.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	25-06-2021	dB(A)	58.2	51.2	
3	DM Plant	25-06-2021	dB(A)	56.8	50.6	
4	Near Township Area	25-06-2021	dB(A)	54.2	44.6	
5	Near CHP Plant	25-06-2021	dB(A)	59.4	52.8	
6	Near Labor Colony	25-06-2021	dB(A)	54.6	44.8	

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 38/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/07/2021	62	30	5.2	10.2	22	<5.0
2	02/07/2021	60	28	4.8	9.8	26	<5.0
3	08/07/2021	56	26	4.5	9.2	18	<5.0
4	09/07/2021	62	30	5.5	9.5	22	<5.0
5	16/07/2021	65	32	5.8	10.8	26	7.2
6	17/07/2021	58	28	5.2	9.5	22	<5.0
7	22/07/2021	54	25	4.5	9.2	20	<5.0
8	23/07/2021	60	28	5.0	9.8	24	6.5
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 38/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	**Parameters**						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	08/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	09/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	16/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	17/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	22/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	23/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 39/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/07/2021	58	28	4.8	9.5	20	<5.0
2	02/07/2021	54	25	4.5	<9.0	25	<5.0
3	08/07/2021	60	28	5.2	9.8	20	<5.0
4	09/07/2021	56	25	4.8	9.2	24	<5.0
5	16/07/2021	62	30	5.5	10.5	24	<5.0
6	17/07/2021	58	28	4.8	9.2	20	<5.0
7	22/07/2021	52	24	<4.0	<9.0	22	<5.0
8	23/07/2021	60	28	5.5	9.5	22	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 39/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	08/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	09/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	16/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	17/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	22/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	23/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 40/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/07/2021	52	24	4.2	<9.0	22	<5.0
2	02/07/2021	56	26	4.5	<9.0	24	<5.0
3	08/07/2021	48	22	<4.0	<9.0	20	<5.0
4	09/07/2021	54	25	4.5	<9.0	22	<5.0
5	16/07/2021	58	28	4.8	9.5	20	<5.0
6	17/07/2021	52	24	4.5	<9.0	24	<5.0
7	22/07/2021	56	26	4.8	9.5	22	<5.0
8	23/07/2021	54	25	4.5	9.2	20	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 40/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	08/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	09/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	16/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	17/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	22/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	23/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 41/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	01/07/2021	48	22	<4.0	<9.0	20	<5.0
2	02/07/2021	52	24	<4.0	<9.0	18	<5.0
3	08/07/2021	46	22	<4.0	<9.0	20	<5.0
4	09/07/2021	50	24	<4.0	<9.0	22	<5.0
5	16/07/2021	54	25	<4.0	<9.0	20	<5.0
6	17/07/2021	48	22	<4.0	<9.0	22	<5.0
7	22/07/2021	52	24	<4.0	<9.0	24	<5.0
8	23/07/2021	54	26	<4.0	<9.0	22	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 41/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	01/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	02/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	08/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	09/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	16/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	17/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	22/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	23/07/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 42/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	01-07-2021	dB(A)	54.6	49.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	01-07-2021	dB(A)	59.2	52.4	
3	DM Plant	02-07-2021	dB(A)	56.8	51.6	
4	Near Township Area	02-07-2021	dB(A)	51.6	43.8	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	08-07-2021	dB(A)	55.6	50.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	08-07-2021	dB(A)	57.8	51.2	
3	DM Plant	09-07-2021	dB(A)	55.4	50.6	
4	Near Township Area	09-07-2021	dB(A)	52.6	44.4	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	16-07-2021	dB(A)	56.2	51.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	16-07-2021	dB(A)	58.4	52.2	
3	DM Plant	16-07-2021	dB(A)	57.2	51.8	
4	Near Township Area	16-07-2021	dB(A)	51.8	44.2	

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Gazette Notification SO: 3744 (E), 17-10-2019 Accredited by NABL - ISO/IEC 17025:2005 (TC-7376)
Registered Office Tower 5 / 102 (FF), CWG village, NH24, Near Akshardham Temple, Delhi 110092
Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 06-08-2021

Report No. : EMTRC/NKSTPP- 43/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	17-07-2021	dB(A)	55.8	50.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	17-07-2021	dB(A)	59.2	52.8	
3	DM Plant	17-07-2021	dB(A)	58.2	51.8	
4	Near Township Area	17-07-2021	dB(A)	52.4	44.6	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	22-07-2021	dB(A)	54.8	50.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	22-07-2021	dB(A)	57.6	51.8	
3	DM Plant	22-07-2021	dB(A)	56.2	50.6	
4	Near Township Area	22-07-2021	dB(A)	51.8	43.6	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	23-07-2021	dB(A)	57.4	51.6	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	23-07-2021	dB(A)	59.6	52.8	
3	DM Plant	23-07-2021	dB(A)	55.8	50.2	
4	Near Township Area	23-07-2021	dB(A)	53.2	44.4	
5	Near CHP Plant	23-07-2021	dB(A)	58.6	52.4	
6	Near Labor Colony	23-07-2021	dB(A)	53.8	44.6	

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 44/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	05/08/2021	68	32	6.0	11.2	24	6.8
2	06/08/2021	65	30	5.8	10.8	22	6.5
3	12/08/2021	60	28	5.2	9.8	20	<5.0
4	13/08/2021	62	30	5.5	10.2	18	<5.0
5	18/08/2021	58	28	4.8	9.5	20	<5.0
6	19/08/2021	56	26	4.5	9.2	18	<5.0
7	25/08/2021	62	30	5.5	9.8	22	<5.0
8	26/08/2021	65	30	5.8	10.0	20	6.5
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 44/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Material Gate (R & R Building)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	**Parameters**						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	05/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	06/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	12/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	13/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	18/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	19/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	25/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	26/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 45/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	05/08/2021	65	30	5.8	10.8	22	6.5
2	06/08/2021	60	28	5.5	10.5	20	5.8
3	12/08/2021	62	28	5.8	9.8	22	5.5
4	13/08/2021	56	26	4.5	9.2	20	<5.0
5	18/08/2021	62	30	5.2	9.8	18	5.2
6	19/08/2021	60	28	4.8	9.5	20	<5.0
7	25/08/2021	58	28	4.5	9.5	22	<5.0
8	26/08/2021	56	26	4.5	9.2	22	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 45/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : DM Plant
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	05/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	06/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	12/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	13/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	18/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	19/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	25/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	26/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 46/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	05/08/2021	58	28	4.8	<9.0	20	<5.0
2	06/08/2021	60	28	5.2	9.5	22	<5.0
3	12/08/2021	54	26	4.5	<9.0	24	<5.0
4	13/08/2021	56	26	4.8	<9.0	20	<5.0
5	18/08/2021	60	28	5.2	9.8	18	<5.0
6	19/08/2021	58	28	4.8	9.5	20	<5.0
7	25/08/2021	52	25	<4.0	9.5	24	<5.0
8	26/08/2021	56	26	4.8	9.2	22	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 46/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Near Switch Yard
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	05/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	06/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	12/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	13/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	18/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	19/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	25/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	26/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 47/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters					
		PM_{10} $\mu g/m^3$	$PM_{2.5}$ $\mu g/m^3$	SO_2 $\mu g/m^3$	NO_2 $\mu g/m^3$	O_3 $\mu g/m^3$	NH_3 $\mu g/m^3$
1	05/08/2021	54	26	<4.0	<9.0	22	<5.0
2	06/08/2021	48	23	<4.0	<9.0	20	<5.0
3	12/08/2021	52	25	<4.0	<9.0	18	<5.0
4	13/08/2021	46	22	<4.0	<9.0	20	<5.0
5	18/08/2021	48	23	<4.0	<9.0	22	<5.0
6	19/08/2021	52	25	<4.0	<9.0	20	<5.0
7	25/08/2021	54	26	<4.0	<9.0	22	<5.0
8	26/08/2021	48	24	<4.0	<9.0	20	<5.0
National Standard		**100 (24-hours average)**	**60 (24-hours average)**	**80 (24-hours average)**	**80 (24-hour average)**	**100 (8-hours average)**	**400 (24-hours average)**

Note: BDL = Below Detection Limit.
$PM_{2.5}$ <5, SO_2 <4.0 $\mu g/m^3$, NO_2 <9.0 $\mu g/m^3$, O_3 <5.0 $\mu g/m^3$, NH_3 <5.0$\mu g/m^3$

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 47/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 2 of 2
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ambient Air Quality
Location of Sampling : Township
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

Sr. No	Date	Parameters						
		CO mg/m^3	B(a)P ng/m^3	Benzene $\mu g/m^3$	As ng/m^3	Ni ng/m^3	Pb $\mu g/m^3$	Hg $\mu g/m^3$
1	05/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
2	06/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
3	12/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
4	13/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
5	18/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
6	19/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
7	25/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
8	26/08/2021	BDL	BDL	BDL	BDL	BDL	BDL	BDL
National Standard		**04 (1-hours average)**	**01 (Annual average)**	**05 (Annual average)**	**06 (Annual average)**	**20 (Annual average)**	**01 (24-hours average)**	**-**

Note: BDL = Below Detection Limit.
CO <0.1 mg/m^3, B(a)P <0.1 ng/m^3, Benzene <0.1 $\mu g/m^3$, As <1.0 ng/m^3 , Ni <1.0 ng/m^3, Pb <0.1 $\mu g/m^3$

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Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 48/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	05-08-2021	dB(A)	53.8	48.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	05-08-2021	dB(A)	58.6	51.8	
3	DM Plant	05-08-2021	dB(A)	57.2	52.4	
4	Near Township Area	05-08-2021	dB(A)	50.8	43.4	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	06-08-2021	dB(A)	54.6	49.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	06-08-2021	dB(A)	59.4	52.6	
3	DM Plant	06-08-2021	dB(A)	58.6	52.8	
4	Near Township Area	06-08-2021	dB(A)	51.6	43.8	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	12-08-2021	dB(A)	55.2	50.6	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	12-08-2021	dB(A)	57.6	51.8	
3	DM Plant	12-08-2021	dB(A)	56.4	50.6	
4	Near Township Area	12-08-2021	dB(A)	52.2	44.4	

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Authorized Signatory

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Gazette Notification SO: 3744 (E), 17-10-2019 Accredited by NABL - ISO/IEC 17025:2005 (TC-7376)
Registered Office Tower 5 / 102 (FF), CWG village, NH24, Near Akshardham Temple, Delhi 110092
Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 49/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Noise Quality
Sampling Procedure : SOP
Sample Collected & Brought to Lab by : EMTRC Staff

NOISE QUALITY TEST RESULTS

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	13-08-2021	dB(A)	55.4	50.2	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	13-08-2021	dB(A)	59.6	52.4	
3	DM Plant	13-08-2021	dB(A)	56.8	51.4	
4	Near Township Area	13-08-2021	dB(A)	52.2	44.8	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	18-08-2021	dB(A)	58.6	51.8	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	18-08-2021	dB(A)	60.4	52.8	
3	DM Plant	19-08-2021	dB(A)	57.2	51.6	
4	Near Township Area	19-08-2021	dB(A)	52.6	44.6	

	Location	Date	Unit	Result (Day Time)	Result (Night Time)	Prescribed Standards
1	Near Switch Yard	25-08-2021	dB(A)	55.8	50.4	**Permissible Exposure Limit** Factories Act (1-1-1997) 85 dBA – 8 hours 88 dBA – 4 hours 91 dBA – 2 hours 94 dBA – 1 hours 97 dBA – 30 minutes 100 dBA – 15 minutes
2	Plant Material Gate	25-08-2021	dB(A)	58.6	51.8	
3	DM Plant	25-08-2021	dB(A)	57.4	51.4	
4	Near Township Area	26-08-2021	dB(A)	54.2	44.8	
5	Near CHP Plant	26-08-2021	dB(A)	60.4	52.8	
6	Near Labor Colony	26-08-2021	dB(A)	54.4	44.2	

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Phone: 9810032481, 011 21211228, email: emtrcjkm@gmail.com , website: www.emtrc.in

----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 50/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ground Water
Date of Sampling : 20-08-2021
Location of Sampling : Vishvesheria Bhawan
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

TEST RESULTS

	Parameters	Unit	Test Methods	RESULT	Acceptable Limit IS:10500:2012	Permissible Limit IS:10500:2012
1	pH	-	APHA, 23rd Ed.2017-4500B	8.1	6.5 to 8.5	No relaxation
2	Turbidity	NTU	APHA, 23rd Ed.2017-2030B	<0.5	1	5
3	Colour	Hazen Unit	APHA, 23rd Ed.2017-2120B	<5	5	15
4	Total Dissolved Solids	mg/l	APHA, 23rd Ed.2017-2540B	480	500	2000
5	Total Hardness as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2340C	160	200	600
6	Calcium as Ca	mg/l	APHA, 23rd Ed.2017-4500B	52	75	200
7	Magnesium as Mg	mg/l	APHA, 23rd Ed.2017-4500B	7.3	30	100
8	Total Alkalinity as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2320B	210	200	600
9	Free Ammonia as NH_3	mg/l	APHA, 23rd Ed.2017-4500	BDL	0.5	No relaxation
10	Total Residual Chlorine	mg/l	APHA, 23rd Ed.2017-4500B	BDL	0.2	1.0
11	Phenolic compound	mg/l	APHA, 23rd Ed.2017-5230D	<0.001	0.001	0.002
12	Chromium as Cr^{+6}	mg/l	APHA, 23rd Ed.2017-3500B	<0.05	0.05	No relaxation
13	Total Chromium as Cr	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.05	No relaxation
14	Iron as Fe	mg/l	APHA, 23rd Ed.2017-3111B	0.12	0.3	No relaxation
15	Copper as Cu	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.05	1.5
16	Zinc as Zn	mg/l	APHA, 23rd Ed.2017-3111B	0.26	5	15
17	Nickel as Ni	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.02	No relaxation
18	Manganese as Mn	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.1	0.3
19	Lead as Pb	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.01	No relaxation
20	Cadmium as Cd	mg/l	APHA, 23rd Ed.2017-3111B	<0.001	0.003	No relaxation
21	Aluminum as Al	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.03	0.2
22	Selenium as Se	mg/l	IS3025(Part 56)	<0.01	0.01	No relaxation
23	Arsenic as As	mg/l	APHA, 23rd Ed.2017-3114	<0.001	0.01	0.05
24	Mercury as Hg	mg/l	APHA, 23rd Ed.2017-3112	<0.001	0.001	No relaxation
25	Total coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil
26	Fecal coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil

BDL= Below Detection Limits

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 51/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ground Water
Date of Sampling : 20-08-2021
Location of Sampling : Labor Colony
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

TEST RESULTS

	Parameters	Unit	Test Methods	RESULT	Acceptable Limit IS:10500:2012	Permissible Limit IS:10500:2012
1	pH	-	APHA, 23rd Ed.2017-4500B	7.35	6.5 to 8.5	No relaxation
2	Turbidity	NTU	APHA, 23rd Ed.2017-2030B	<0.5	1	5
3	Colour	Hazen Unit	APHA, 23rd Ed.2017-2120B	<5	5	15
4	Total Dissolved Solids	mg/l	APHA, 23rd Ed.2017-2540B	530	500	2000
5	Total Hardness as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2340C	180	200	600
6	Calcium as Ca	mg/l	APHA, 23rd Ed.2017-4500B	56	75	200
7	Magnesium as Mg	mg/l	APHA, 23rd Ed.2017-4500B	9.7	30	100
8	Total Alkalinity as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2320B	230	200	600
9	Free Ammonia as NH_3	mg/l	APHA, 23rd Ed.2017-4500	BDL	0.5	No relaxation
10	Total Residual Chlorine	mg/l	APHA, 23rd Ed.2017-4500B	BDL	0.2	1.0
11	Phenolic compound	mg/l	APHA, 23rd Ed.2017-5230D	<0.001	0.001	0.002
12	Chromium as Cr^{+6}	mg/l	APHA, 23rd Ed.2017-3500B	<0.05	0.05	No relaxation
13	Total Chromium as Cr	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.05	No relaxation
14	Iron as Fe	mg/l	APHA, 23rd Ed.2017-3111B	0.22	0.3	No relaxation
15	Copper as Cu	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.05	1.5
16	Zinc as Zn	mg/l	APHA, 23rd Ed.2017-3111B	0.45	5	15
17	Nickel as Ni	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.02	No relaxation
18	Manganese as Mn	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.1	0.3
19	Lead as Pb	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.01	No relaxation
20	Cadmium as Cd	mg/l	APHA, 23rd Ed.2017-3111B	<0.001	0.003	No relaxation
21	Aluminum as Al	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.03	0.2
22	Selenium as Se	mg/l	IS3025(Part 56)	<0.01	0.01	No relaxation
23	Arsenic as As	mg/l	APHA, 23rd Ed.2017-3114	<0.001	0.01	0.05
24	Mercury as Hg	mg/l	APHA, 23rd Ed.2017-3112	<0.001	0.001	No relaxation
25	Total coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil
26	Fecal coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil

BDL= Below Detection Limits

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----------TEST REPORT----------

Date: 06-09-2021

Report No. : EMTRC/NKSTPP- 52/2021-2022
Issued To : 1029, North Karanpura Super Thermal Power Project
: Post-Tandwa, District-Chatra, Jharkhand -825321
Name of Project : North Karanpura Super Thermal Power Project
No. of Pages : 1 of 1
WO / PO No : 5500037315-037-1028 Date: 10.12.2020
Type of Sample : Ground Water
Date of Sampling : 20-08-2021
Location of Sampling : Township (ETS)
Sampling Procedure : Grab Sampling
Sample Collected & Brought to Lab by : EMTRC Staff

TEST RESULTS

	Parameters	Unit	Test Methods	RESULT	Acceptable Limit IS:10500:2012	Permissible Limit IS:10500:2012
1	pH	-	APHA, 23rd Ed.2017-4500B	7.98	6.5 to 8.5	No relaxation
2	Turbidity	NTU	APHA, 23rd Ed.2017-2030B	<0.5	1	5
3	Colour	Hazen Unit	APHA, 23rd Ed.2017-2120B	<5	5	15
4	Total Dissolved Solids	mg/l	APHA, 23rd Ed.2017-2540B	390	500	2000
5	Total Hardness as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2340C	80	200	600
6	Calcium as Ca	mg/l	APHA, 23rd Ed.2017-4500B	20	75	200
7	Magnesium as Mg	mg/l	APHA, 23rd Ed.2017-4500B	7.3	30	100
8	Total Alkalinity as $CaCO_3$	mg/l	APHA, 23rd Ed.2017-2320B	140	200	600
9	Free Ammonia as NH_3	mg/l	APHA, 23rd Ed.2017-4500	BDL	0.5	No relaxation
10	Total Residual Chlorine	mg/l	APHA, 23rd Ed.2017-4500B	BDL	0.2	1.0
11	Phenolic compound	mg/l	APHA, 23rd Ed.2017-5230D	<0.001	0.001	0.002
12	Chromium as Cr^{+6}	mg/l	APHA, 23rd Ed.2017-3500B	<0.05	0.05	No relaxation
13	Total Chromium as Cr	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.05	No relaxation
14	Iron as Fe	mg/l	APHA, 23rd Ed.2017-3111B	0.20	0.3	No relaxation
15	Copper as Cu	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.05	1.5
16	Zinc as Zn	mg/l	APHA, 23rd Ed.2017-3111B	0.32	5	15
17	Nickel as Ni	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.02	No relaxation
18	Manganese as Mn	mg/l	APHA, 23rd Ed.2017-3111B	<0.05	0.1	0.3
19	Lead as Pb	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.01	No relaxation
20	Cadmium as Cd	mg/l	APHA, 23rd Ed.2017-3111B	<0.001	0.003	No relaxation
21	Aluminum as Al	mg/l	APHA, 23rd Ed.2017-3111B	<0.01	0.03	0.2
22	Selenium as Se	mg/l	IS3025(Part 56)	<0.01	0.01	No relaxation
23	Arsenic as As	mg/l	APHA, 23rd Ed.2017-3114	<0.001	0.01	0.05
24	Mercury as Hg	mg/l	APHA, 23rd Ed.2017-3112	<0.001	0.001	No relaxation
25	Total coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil
26	Fecal coliform	MPN/100ml	APHA, 23rd Ed.2017-9230B	Nil	Nil	Nil

BDL= Below Detection Limits

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Progress Report on

Hydrogeological study around ash dyke, plant site and monitoring of surface and ground water for NKSTPS (3 X 660 MW)

Submitted to

NTPC North Karanpura Super Thermal Power Project

Post: Tandwa, District: Chatra, Jharkhand

Submitted by the

Indian Institute of Technology Roorkee

ROORKEE – 247667

March 2021

Title	Hydrogeological study of area around ash dyke, plant site and monitoring of surface and ground water for North Karanpura Super Thermal Power Station (3 x 660 MW) of NTPC Study conducted by Department of Hydrology, Indian Institute of Technology Roorkee, Roorkee – 247667 (Uttarakhand)
Client	NTPC Limited
Disclaimer	While every opportunity has been taken to ensure the accuracy of the material presented in this document, IIT-R cannot be held responsible for errors or omissions but reserve the right to provide further clarification or consultation.
Document reference	HYD-6007/2020-21 (PO: 5500036701-037-1028)
Consultants	Prof. Manoj Kumar Jain, Department of Hydrology Prof. Brijesh K. Yadav, Department of Hydrology Indian Institute of Technology, Roorkee, Uttarakhand 247667, India
Quality Assurance	Prof. Manoj Kumar Jain, Department of Hydrology Prof. Brijesh K. Yadav, Department of Hydrology Department of Hydrology, Indian Institute of Technology Roorkee, Roorkee – 247667, Uttarakhand, India
Date	30 March 2021

EXECUTIVE SUMMARY

A survey team comprised of Dr. Manoj Kumar Jain (Professor and Head, Department of Hydrology), Dr. Brijesh Kumar Yadav (Professor, Department of Hydrology), Mr. Shubham Tiwari (Research Scholar), Mr. Abhishek Kumar (Junior Research Fellow), from IIT Roorkee visited the NTPC North Karanpura Super Thermal Power Station, Chatra district, and its nearby areas along with the required instruments during January 24-26, 2021 to undertake a reconnaissance survey of the plant area, ash dyke and surrounding area of the plant, including the pumping station at Garhi Nadi. The team identified relevant observation points in all directions for data collection of surface and groundwater. Water samples were collected from the identified existing hand-pumps, open wells, upstream and downstream of Garhi Nadi (Badki river) river, and other surface water bodies present in the plant premise. Mr. Sanjoy Kumar, DGM NTPC North Karanpura, and his team joined the IIT Roorkee team throughout the field visit. The depth of groundwater table was also measured using the existing open wells and piezometers available in and around the plant boundary. Some water quality parameters were measured in-situ during the field visit and remaining were analysed in the laboratories of the Department of Hydrology and Institute instrumentation centre of IIT Roorkee. These results are assessed and presented in this progress report to find the present status of surface and groundwater quality status of the area.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 SALIENT DETAILS OF THE PROJECT

North Karanpura Super Thermal Power Project (NKSTPP) of NTPC Limited is an upcoming coal-based thermal power plant located between Magadh coal block and Garhi river near village Kamta / Tandwa in the Simaria subdivision of the Chatra district, Jharkhand. North Karanpura Super Thermal Power Project is located at 23°51′02″N 85°00′44″E. The area surrounding to the power plant is fairly levelled and sparsely populated. The surrounding area is mostly monsoon fed agricultural area with single crop. The planned capacity of the power plant is 1980 MW (3x660 MW). The present status of the power station is given in Table 1.

Table 1. Status of the power station as on March 2021

Stage	Unit Number	Capacity (MW)	Status
1st	1	660	Under construction/testing
1st	2	660	Under construction
1st	3	660	Under construction

The NKSTPP is well connected by air, train and road. The nearest airport Ranchi is 100 km from the plant. The nearest railway station Ray on Sone Nagar – Daltonganj section of Eastern Railways is located approximately 20 km away from the power plant. The power plant and township are accessible from NH-33 connecting Hazaribagh and Ranchi. The water requirements of the power plant are met from the dam/reservoir constructed across the Garhi river, a tributary of Damodar river. The coal requirement for NKSTPP shall be met from Magadh block of North Karanpura coal fields of CCL. The coal would be transported from the coal block to the plant through captive Merry-Go-Round (MGR) system.

2 SCOPE OF THE STUDY

The Scope of Services shall be "Hydrogeological study of area around ash dyke and around plant site and monitoring of surface water and ground water for North Karanpura Super Thermal Power Station (3 x 660 MW)" which consists of the following:

1. Identification and delineation of Aquifer geometry and Drainage pattern, Watershed of the study area
2. Establishment of ground water level monitoring stations (at a distance of 500 m, 2.0 Km and 5 km from plant site area) and their monitoring on half-yearly basis.
3. Surface water level monitoring using already existed Scale/gauge at Check Dam site of Garhi Nadi monitoring on half-yearly basis.
4. Total 30 Nos of Sampling including surface water and groundwater regime for monitoring of heavy metals on half yearly basis.
   a) Local stream (natural drain)- flowing close to eastern part of proposed ash pond- Upstream and Downstream
   b) Garhi Nadi- Upstream and Downstream
   c) Confluence of Local drainage and Garhi Nadi
   d) Groundwater-Dug-wells, tube-wells/Bore-well/Hand pumps (existed in and around Plant site area).

5. If piezometers are required, location and design and installation of 2 nos. of shallow Piezometers in the dip direction of the ash Dyke will be provided.
6. Hydrogeological Report preparation including Quality monitoring data (frequency- Half yearly).
7. Suggest specific remedial measure based upon the monitoring report of water samples for any deterioration observed during sampling period.

3 WORK PROGRESS

The study team visited NTPC North Karanpura (Tandwa, Jharkhand) on January 24-26, 2021, to undertake a reconnaissance survey of the plant area, ash dyke and surrounding area of the plant, including the pumping station at Garhi Nadi. The team identified several observation points for data collection of surface and groundwater. Accordingly, water samples from surface ponds, river, open wells, hand-pumps, ash dyke area were collected from the identified data collection points in and around the plant boundary. While collecting water samples, several parameters were measured in the field using in-situ instruments and water samples were collected for detailed analysis in the laboratories of IIT Roorkee.

3.1 Identification and delineation of Aquifer geometry and Drainage pattern, Watershed of the study area

The North Karanpura Super Thermal Power Project (3 x 660 MW) (NKSTPP) of National Thermal Corporation Ltd. New Delhi is located near Tandwa village in Chatra district of Jharkhand state. The NKSTPP is located at 23 51' N; 85 01' E at a distance of about 100 km from Ranchi. The project area and buffer zone of a 10 km radius are covered in Survey of India toposheets 73E/1 & 73A/1. The boundary of the NKSTPP, along with buffers zones of 2 km and 5 km radius around the NKSTPP boundary, is shown in Fig. 1. The plant area is drained by the Garhi Nadi, which is a tributary of Damodar River. The Garhi Nadi meets Damodar river at about 5 km south of the project area. The drainage pattern of Garhi Nadi and watershed drawn at the confluence of Garhi Nadi with Damodar river is shown in Fig. 2.

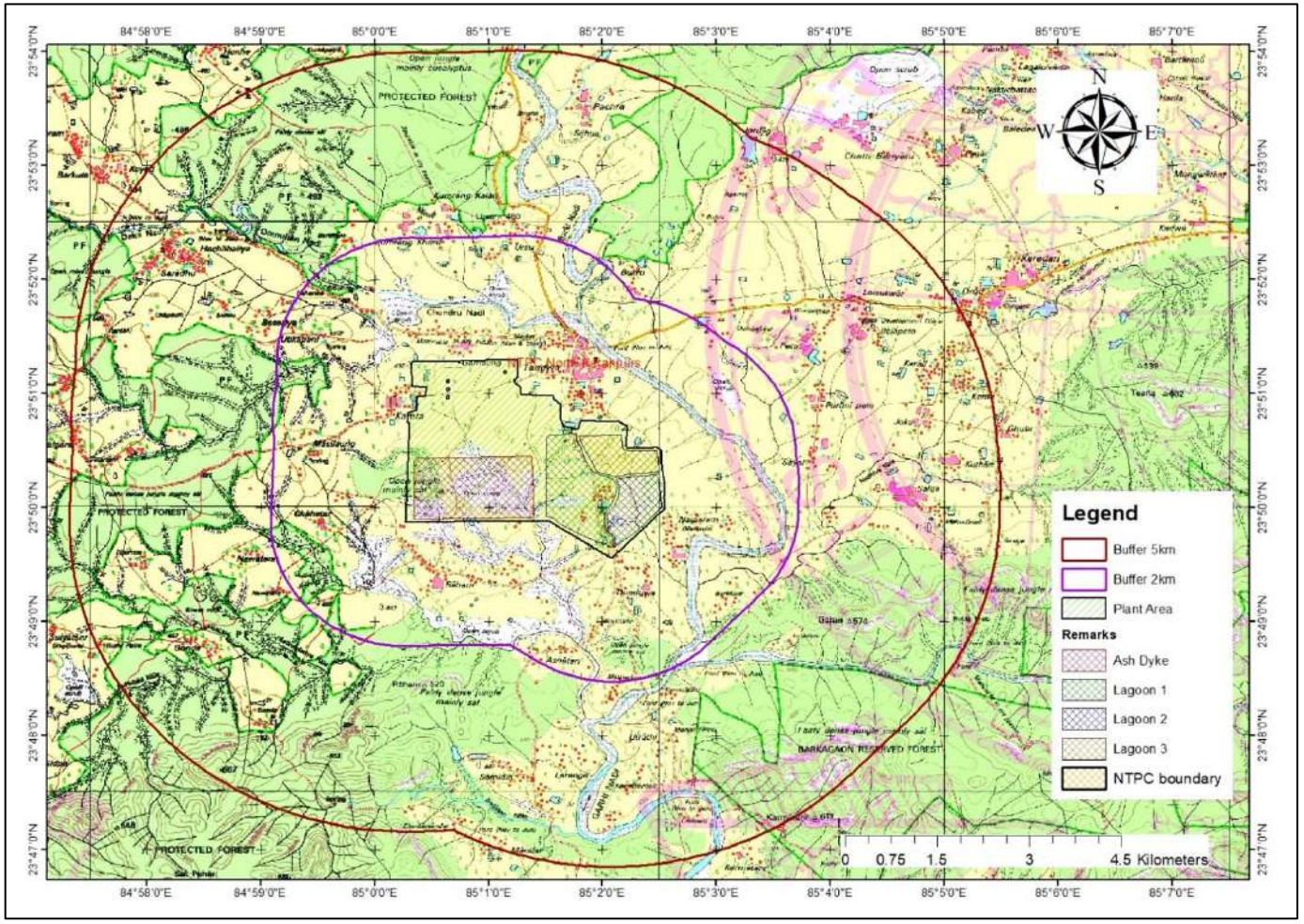

Fig.1. The boundary of North Karanpura Super Thermal Power Project with 2 km and 5 km buffer on SoI toposheets

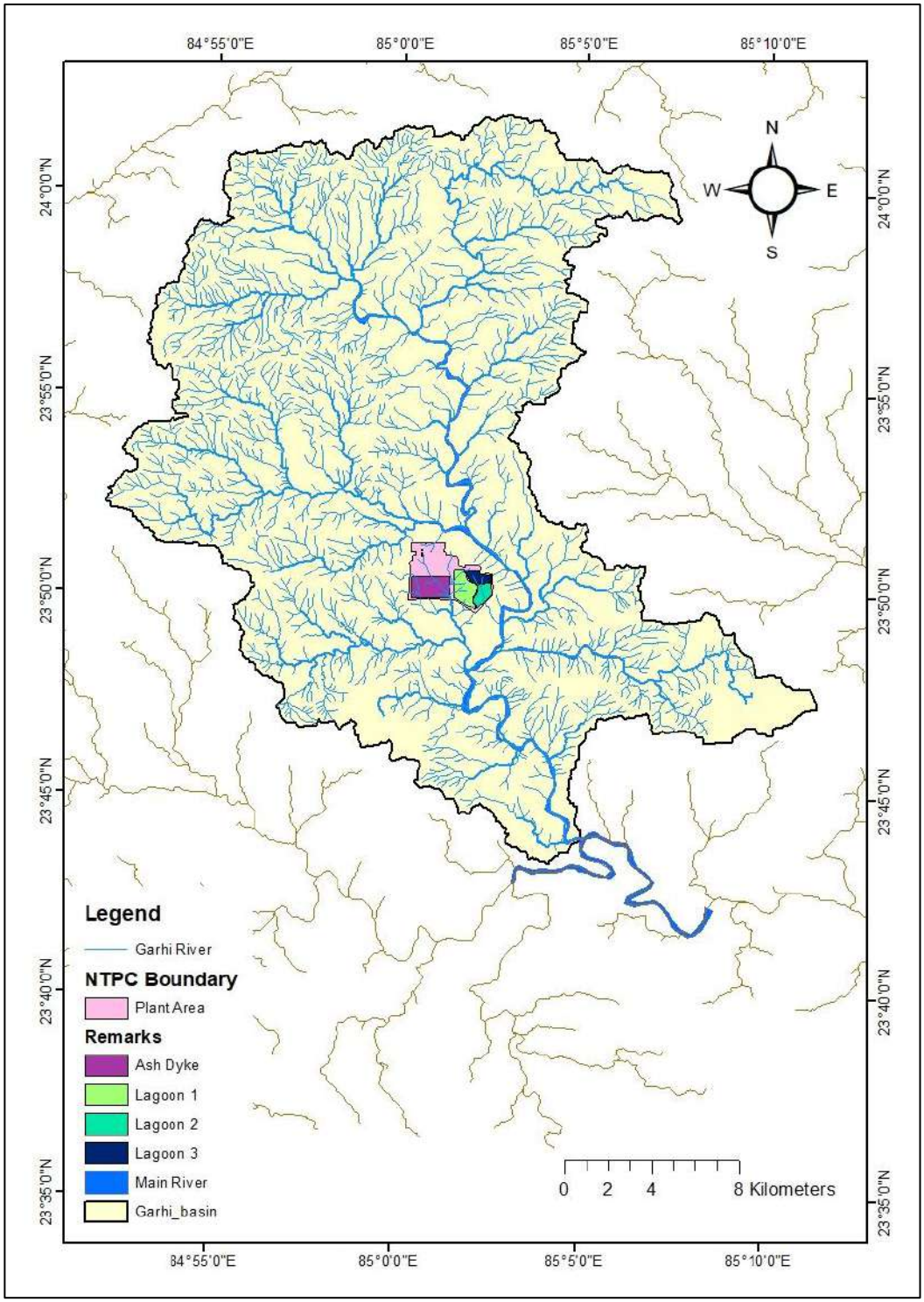

Fig. 2. Watershed boundary and drainage pattern of the study area

3.2 *Establishment of groundwater level monitoring stations (at a distance of 500 m, 2.0 Km and 5 km from plant site area) and their monitoring on a half-yearly basis*

The boundary of the plant site area was established on the base map drawn using Survey of India toposheets, and buffer zones at a distance of 2 km and 5 km were established. *Dip direction and from the ash dyke area was established*, and the location of water level monitoring stations was identified. The identified locations are marked with code OW-2, OW-24, and OW-26 located at a distance of 500 m, 2 km and 5 km, respectively, from the power station. The location of identified monitoring stations is shown in Fig. 3. During the site visits, groundwater table from various locations was captured using a dip meter and the same is listed in Table 2.

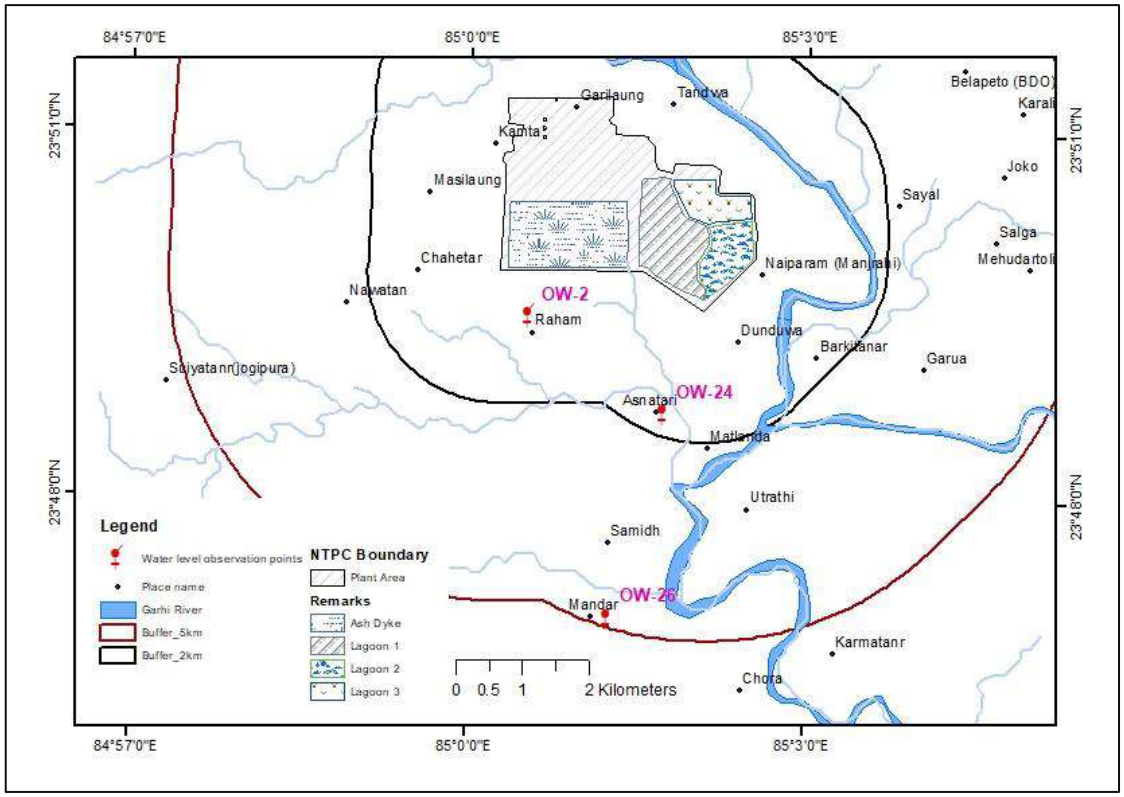

Fig 3. Groundwater level monitoring stations at a distance of 0.5, 2 and 5 km.

Table 2: Groundwater level of locations in and around the plant area measured below ground level (BGL) in meters during the field visit.

Sr. No.	Name of Site (Location)	Latitude	Longitude	Type of site	Depth in BGL (m)
1	OW-2 (Rahamat)	23°49'29.46"	85°0'31.86"	Open Well	4.60
2	OW-5 (Rahamat)	23°49'30"	85°0'12.96"	Open Well	5.12
3	OW-6 (Rahamat)	23°49'30.9"	85°0'14.52"	Open Well	5.52
4	OW-7 (Kamta)	23°51'2.22"	85°0'13.98"	Open Well	9.52
5	OW-11 (Garilaung)	23°51'29.7"	85°0'40.98"	Open Well	5.61
6	OW-16 (Tandwa)	23°51'10.08"	85°1'56.52"	Open Well	0.64
7	OW-19 (Tandwa)	23°50'49.92"	85°1'46.74"	Open Well	0.87
8	OW-20 (Tandwa)	23°50'51.54"	85°1'41.82"	Open Well	3.05
9	OW-21 (Tandwa)	23°50'45.78"	85°1'46.86"	Open Well	4.53
10	OW-22 (Tandwa)	23°50'54.42"	85°1'33.3"	Open Well	1.20
11	OW-23 (Tandwa)	23°50'54.42"	85°1'33.3"	Bore Well	21.59

3.3 *Surface water level monitoring using already existed Scale/gauge at Check Dam site of Garhi Nadi monitoring on a half-yearly basis*

The team visited the check dam site on February 25, 2021, and found gates of the check dam open, allowing minor baseflow to pass to the downstream side, and the water level was found below the lowest marking level of the staff gauge installed in the check dam as shown in Fig. 4.

Fig. 4. Site photograph of water level gauge and check dam on January 25, 2021.

3.4 *Analysis of water samples including surface water and groundwater regime for monitoring of heavy metals on a half-yearly basis*

Base on the reconnaissance site survey of the plant area and the prevailing groundwater flow direction, surface and groundwater sampling locations were identified, as shown in Fig. 5. Out of 25 sampling sites visited around the NTPC plant site area, In-situ analysis of 13 samples (Table 3) was done, and 11 samples (Table 2) were selected to perform the detailed ex-situ analysis in the laboratory.

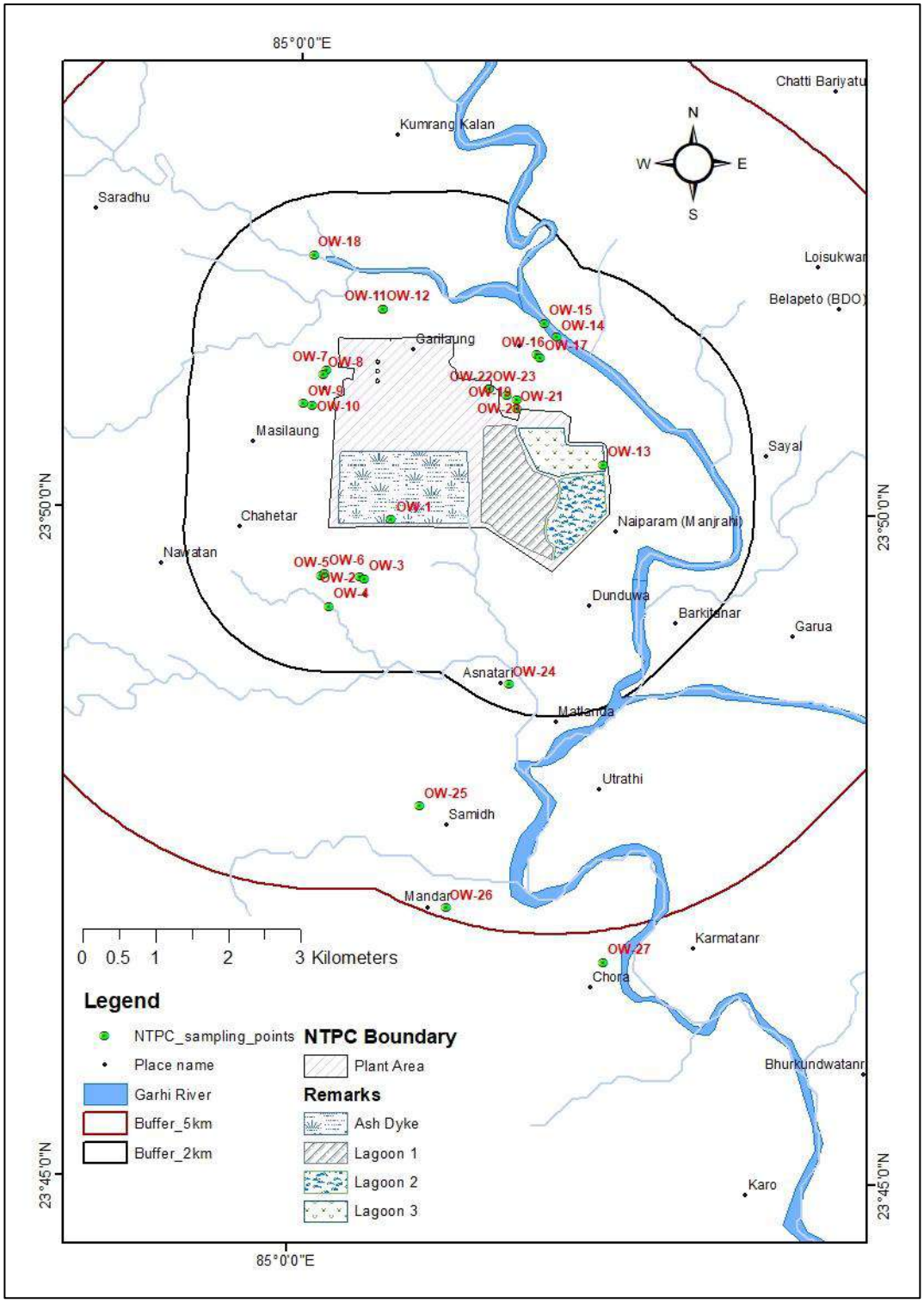

Fig 5. Map depicting locations of surface and groundwater sampling points.

Table 3. Location of sampling sites for In-situ/Ex-situ or both analyses

S. No.	Site code	Type of site/location	Latitude	Longitude	Type of Analysis
1	**OW-1**	Ash dyke/Lagoon-1	23°49'55.39"	85°0'46.53"	In-situ and Ex-situ
2	**OW-2**	Open Well/Rahamat	23°49'29.46"	85°0'31.86"	In-situ
3	**OW-3**	Hand pump/Rahamat	23°49'28.68"	85°0'33.66"	In-situ and Ex-situ
4	**OW-4**	Hot spring/Rahamat	23°49'16.14"	85°0'16.92"	In-situ and Ex-situ
5	**OW-7**	Open Well/Kamta	23°51'2.22"	85°0'13.98"	In-situ
6	**OW-8**	NTPC solar pump/Kamta	23°51’0.00"	85°0'12.48"	In-situ and Ex-situ
7	**OW-9**	Hand pump/Kamta	23°50'46.86"	85°0'2.88"	In-situ and Ex-situ
8	**OW-11**	Open Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ
9	**OW-12**	Tube Well/Garilaung	23°51'29.7"	85°0'40.98"	In-situ and Ex-situ
10	**OW-15**	Garhi River/Tandwa	23°51'24.28"	85° 2'0.10"	Ex-situ
11	**OW-17**	Submersible/Tandwa	23°51'8.7"	85°1'58.26"	Ex-situ
12	**OW-18**	Garhi River/Kasaha DPS	23°51'53.64"	85° 0'7.17"	In-situ and Ex-situ
13	**OW-19**	Open Well/Tandwa	23°50'49.92"	85°1'46.74"	In-situ and Ex-situ
14	**OW-20**	Open Well/Tandwa	23°50'51.54"	85°1'41.82"	In-situ
15	**OW-21**	Open Well/Tandwa	23°50'45.78"	85°1'46.86"	In-situ
17	**OW-24**	Handpump/Asnatari	23°48'42.31"	85°1'44.71"	Ex-situ

(Note: observation points OW-5, OW-6, OW-10, OW-13, OW-14, OW-16, OW-22 and OW-23 were used only for ground water table monitoring)

During the In-situ analysis of the samples, pH, TDS (Total dissolved solids), EC (Electrical Conductivity), DO (Dissolved Oxygen), and temperature were measured at the water collection site using the multimeter electrode. The result of In-situ analysis is shown in Table 4.

Samples collected for ex-situ analysis were examined using inductively coupled plasma mass spectrometry (ICP-MS) and Ion Chromatography (IC) for finding the concentration of heavy metals and other elements in the water samples. All the samples were first acid digested, diluted to a suitable degree, filtered through a 0.45-micron filter, and then proceed for ICP-MS analysis. The purpose of acid digestion was to destroy the matrix, which otherwise interferes during atomisation. Also, digestion converts all form of metal into a single oxidation state. Samples are analysed using ICP-MS for Li, B, Na, Mg, Al, K, Ca, Cr, Cd, Mn, Fe, Co, Ni, Cu, Zn, As, Sr, Ag, Ba, Hg, Pb, Rh and results after correction are tabulated in Tables 5(a) and 5(b). Apart from the ICP-MS, samples were analysed using ion chromatography (IC) for Cl, SO_4^{2-}, F, NO^{3-}, and PO_4^{2-} and results are listed in Table 6. The eluent used in the IC analysis for digestion purpose was 3.2 mM Na_2CO_3 mixed with 1mM $NaHCO_3$. All the water quality analysis results are compared with bureau of Indian Standards (BIS) code IS 10500:2012 to check the groundwater utlility for drinking purposes.

Generally, all the water samples are showing a slight increase in pH from normal drinking water, i.e., 6.8. Water analysis shows that the sample number OW-17 is having the maximum overall concentration of heavy metals. Comperatively high peaks for chromium, iron, and zinc are observed at OW-17. At the same time, lithium is found maximum in a water sample collected from OW-24. Magnesium is varying in the samples having a range of 5-50 ppm with a maximum value observed at OW-9. All the water samples are generally free from arsenic pollution expect OW-1 having its arsenic concentration of 138.50 ppb.

Table 4: Mean values of pH, EC, TDS, DO, and temperature obtained in the water samples from In-situ analysis.

Name of Site	Type of site	pH	EC(mS)	TDS(ppm)	DO(mg/l)	Saturation%	Temperature(°C)
OW-1	Ash dyke	8.40	1.26	_	6.43	82.6	26.3
OW-2	Open Well	6.98	0.78	_	5.11	_	23.9
OW-3	Hand pump	6.60	1.10	_	6.30	87.8	_
OW-4	Hot spring	6.74	0.83	_	5.85	103.5	40.9
OW-7	Open Well	7.26	1.20	623	_	_	_
OW-8	NTPC solar pump	7.23	0.70	340	_	_	29.1
OW-9	Hand pump	6.63	1.04	510	5.63	89.4	_
OW-11	Open Well	6.94	0.98	390	5.26	76.0	22.1
OW-12	Tube Well	6.40	0.58	290	6.78	90.8	25.8
OW-18	Garhi River	7.57	0.37	170	7.18	80.1	_
OW-19	Open Well	7.12	1.17	580	6.73	86.6	_
OW-20	Open Well	7.49	0.61	310	5.76	77.2	_
OW-21	Open Well	7.40	0.40	190	5.33	74.2	19

Table 5(a). Mean concentration of elements obtained in the water samples from ICP-MS analysis for Li, B, Na, Mg, Al, K, Ca, Cr, Cd, Mn compared with BIS limits of IS 10500:2012.

Site code	Li (ppb)	B (ppb)	Na (ppm)	Mg (ppm)	Al (ppm)	K (ppm)	Ca (ppm)	Cr (ppb)	Mn (ppb)	Fe (ppb)
OW-1	47.11	123.65	8.65	5.00	0.60	1.37	8.57	39.42	18.91	1769.46
OW-3	26.92	72.56	57.60	36.31	0.08	12.46	54.42	6.93	13.64	80.54
OW-4	352.26	66.91	42.82	24.66	0.19	24.52	29.33	15.77	33.70	259.35
OW-8	252.52	112.62	32.25	36.83	4.04	26.75	111.36	30.86	178.63	3123.08
OW-9	34.41	42.69	46.66	48.99	0.15	4.32	53.73	14.50	21.67	202.36
OW-12	128.51	55.43	33.01	21.47	1.32	7.74	33.01	27.29	566.81	767.75
OW-15	35.88	60.23	19.49	11.05	0.51	2.47	11.19	17.12	11.74	741.85
OW-17	331.54	326.73	155.13	10.02	3.86	6.28	11.48	48.33	773.54	5269.34
OW-18	48.93	63.05	19.11	12.23	0.41	2.08	11.76	16.09	11.54	700.40
OW-20	40.15	104.86	68.85	47.54	1.94	2.09	150.24	17.78	88.81	1108.44
OW-24	409.88	111.30	56.48	22.36	0.28	24.92	23.07	14.58	53.29	198.00
BIS Limits	No limits	**≤ 500**	No limits	**≤ 30**	**≤ 0.2**	**No limits**	**≤ 200**	**≤ 50**	**≤ 300**	**≤ 300**

Table 5(b). Mean concentration of elements obtained in the water samples from ICP-MS analysis for Fe, Co, Ni, Cu, Zn, As, Sr, Ag, Ba, Hg, Pb, Rh compared with BIS limits of IS 10500:2012.

Site code	Co (ppb)	Ni (ppb)	Cu (ppb)	Zn (ppb)	As (ppb)	Sr (ppb)	Ag (ppb)	Cd (ppb)	Ba (ppb)	Hg (ppb)	Pb (ppb)	Rh (ppm)
OW-1	2.67	13.43	22.14	123.96	138.50	58.71	4.11	3.28	46.42	0.14	25.75	3250.87
OW-3	0.28	4.09	4.10	88.49	1.01	267.35	0.00	0.13	79.96	0.02	1.94	1553.95
OW-4	0.27	6.65	3.53	85.20	0.12	485.01	6.75	0.37	692.94	0.02	5.82	1595.72
OW-8	2.39	15.32	19.16	909.13	2.56	1950.81	1.23	141.57	262.29	0.01	71.59	1633.35
OW-9	0.38	7.78	3.94	73.34	0.00	253.79	0.09	0.29	170.78	0.01	5.06	1586.47
OW-12	1.98	15.91	13.25	123.73	0.85	249.64	0.12	1.24	144.00	0.01	18.00	1653.42
OW-15	0.27	10.97	9.33	62.92	12.92	74.36	0.86	1.99	39.02	0.02	14.67	3214.46
OW-17	6.00	20.51	27.15	999.47	5.93	340.33	2.59	43.76	453.68	0.01	63.74	1560.40
OW-18	0.35	8.65	10.69	65.52	37.24	73.73	0.95	2.91	30.60	0.01	11.20	2969.88
OW-20	4.93	11.96	13.25	540.04	2.54	6558.91	0.61	162.44	102.32	0.01	22.98	1649.99
OW-24	0.33	7.34	4.10	788.76	0.00	984.80	0.79	0.38	598.13	0.01	6.07	1528.51
BIS limits	No limits	No limits	**≤ 50**	**≤ 5000**	**≤ 10**	**No Limits**	**≤ 100**	**≤ 3**	**≤ 700**	**≤ 1**	**≤ 10**	**No Limits**

Table 6: Mean concentration of elements (Chloride, Nitrate, Phosphate, and Fluoride) obtained in the water samples from IC analysis compared with BIS limits of IS 10500:2012.

Sample	Chloride (ppm)	Nitrate (ppm)	Phosphate(ppm)	Fluoride (ppm)
OW-1	3.68	32.26	60.49	1.23
OW-3	39.68	Traces	1006.66	Traces
OW-4	43.60	43.34	265.10	3.38
OW-8	27.47	142.67	439.01	3.80
OW-9	74.52	349.11	527.13	Traces
OW-12	43.72	168.30	198.57	Traces
OW-15	13.33	22.72	121.92	1.58
OW-17	37.88	24.81	49.62	14.14
OW-18	16.68	100.46	96.34	1.24
OW-20	41.39	139.94	107.57	1.28
OW-24	33.65	25.49	243.56	4.40
BIS limits	**≤ 250**	**≤ 45**	**No limits**	**≤ 1.5**

Water analysis shows that the samples marked as OW-1, OW-17, and OW-18 are the most polluted ones amongst all water smaples. Magnesium is exceeding its BIS limits in OW-3, OW-8, OW-9, and OW-20. Alumniun is exceeding in most of the water samples. Mangeses is found to be in order in all smaples except OW-12 and OW-17. Iron and lead is exceeding its prescribed BIS limit in most of the water smaples. Arseic is in limits in the area except at OW-1. Flouride and Nitrate are also exceeding their BIS limits for drinking water in most of the samples.

3.5 *Geological data of the study area*

Jharkhand is a blessed land with the natural gift of immense mineral potential and other natural resources. The state stretches over 79,714 square kilo meter geographical areas with 29.61% forest area and owns about 40% of total mineral resources of India (Figure 6). The State occupies 1st position in coal reserve, 2nd position in Iron ore reserve, 3rd position in Copper ore reserve, 7th position in Bauxite reserve and is the sole producer of prime coking coal. Limestone, Dolomite, Manganese, Mica, China Clay, Graphite, Soap stone, Fire Clay, Coal Bed Methane, Uranium, Phosphorite, Apatite, Quartz, Feldspar, Gold and Pyroxenite are other important minerals available in huge quantity in the state.

As per the EIA report ONGC tandwa, in the north Karanpura district, the texture of the soil is generally clay, and sandy clay loam, sandy loam. The clay contain in the soil of the study area varies from 7.2 to 51.2 percent. The bulk density of soil in the region is found to be 1.24-1.40 g/cm^3 and considered as moderately good. The porosity and water holding capacity of soil is in the range of 18.80-48.80 % and 15.6-56.8 % respectively. pH of soil is generally slightly acidic and neutral in reaction as there pH is in the range of 6.3-7.8 and the electrical conductivity of the soil are found in the range of 0.42-2.83 dS/m. Calcium and magnesium concentrations are in the range of 7.03-19.17 meq/l and 2.89-15.13 meq/l respectively whereas sodium and potassium are in the range of 0.88-1.66 meq/l and 0.07-0.38 meq/l respectively. Amongst the exchangeable cations, Ca^{+2} and Mg^{+2} are found in the range of 3.40-21.46 cmol(p^+) kg^{-1} and 1.40-11.79 cmol(p^+) kg^{-1} of soil while Na^+ and K^+ are in the range of 0.20-1.26 cmol(p^+) kg^{-1} and 0.17-0.83 cmol(p^+) kg^{-1} of soil respectively. Exchangeable sodium percentage range from 0.91-6.12. Organic carbon, available nitrogen and available phosphorous are found to be in the range of 0.30-0.75 %, 205.72-331.16 and 13.68-22.62 kg/ha respectively. Available potassium is found in the range of 134.68-197.27 kg/ha. Total viable microbial population per gram of soil varied from 37 - 82 x 10^6 CFU. Different micro flora observed per gram of soil was

fungi (1 - 6 x 10^4 CFU), actinomycetes (1 - 4 x 10^4 CFU), rhizobium (2 – 17 x 10^4 CFU) and azotobacter (2 - 9 x 10^4 CFU). Geological map of North Karanpurs coalfield is shown in Fig. 7.

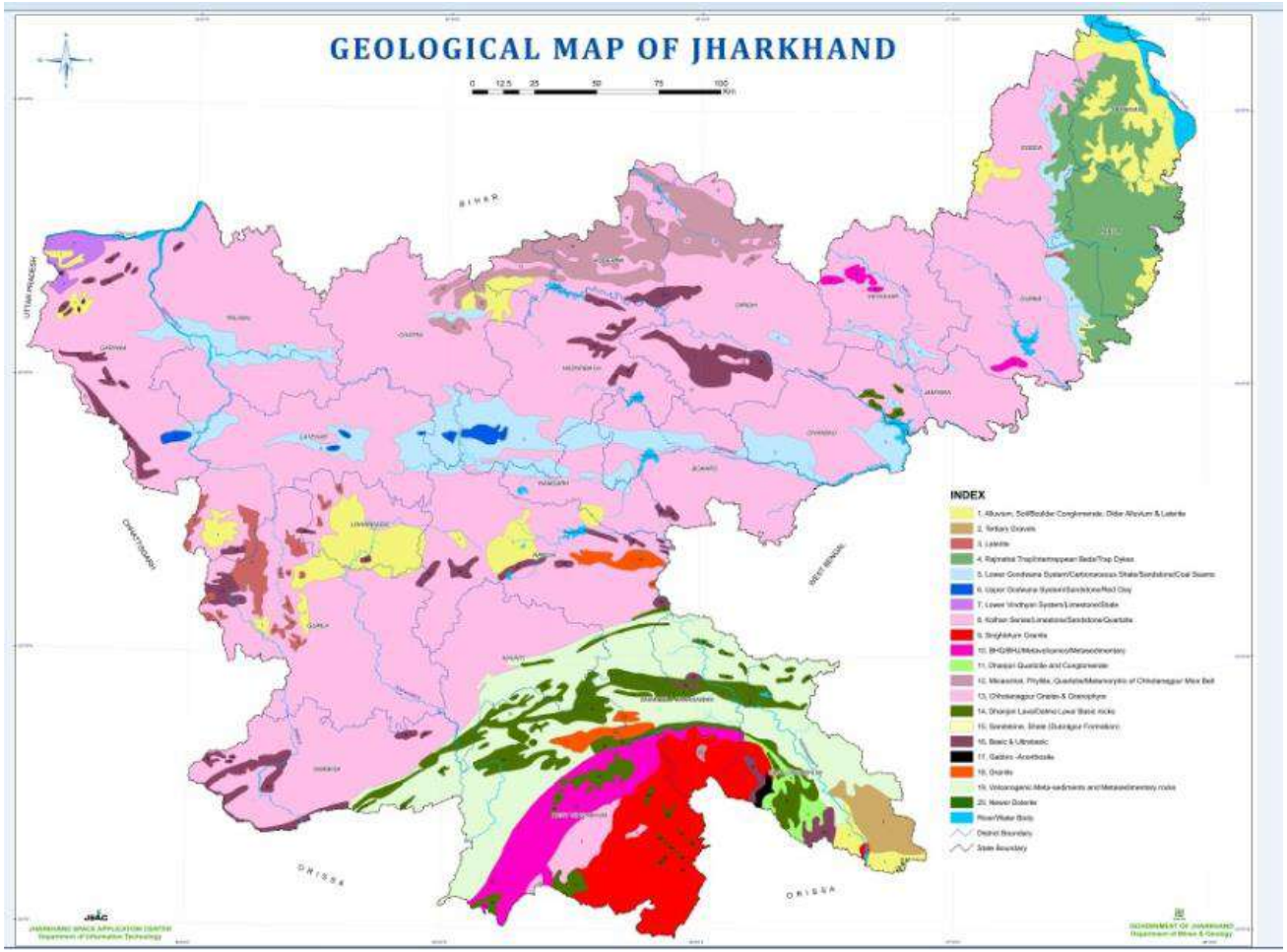

Figure 6: Geological map of Jharkhand (adopted from ismenvis.nic.in)

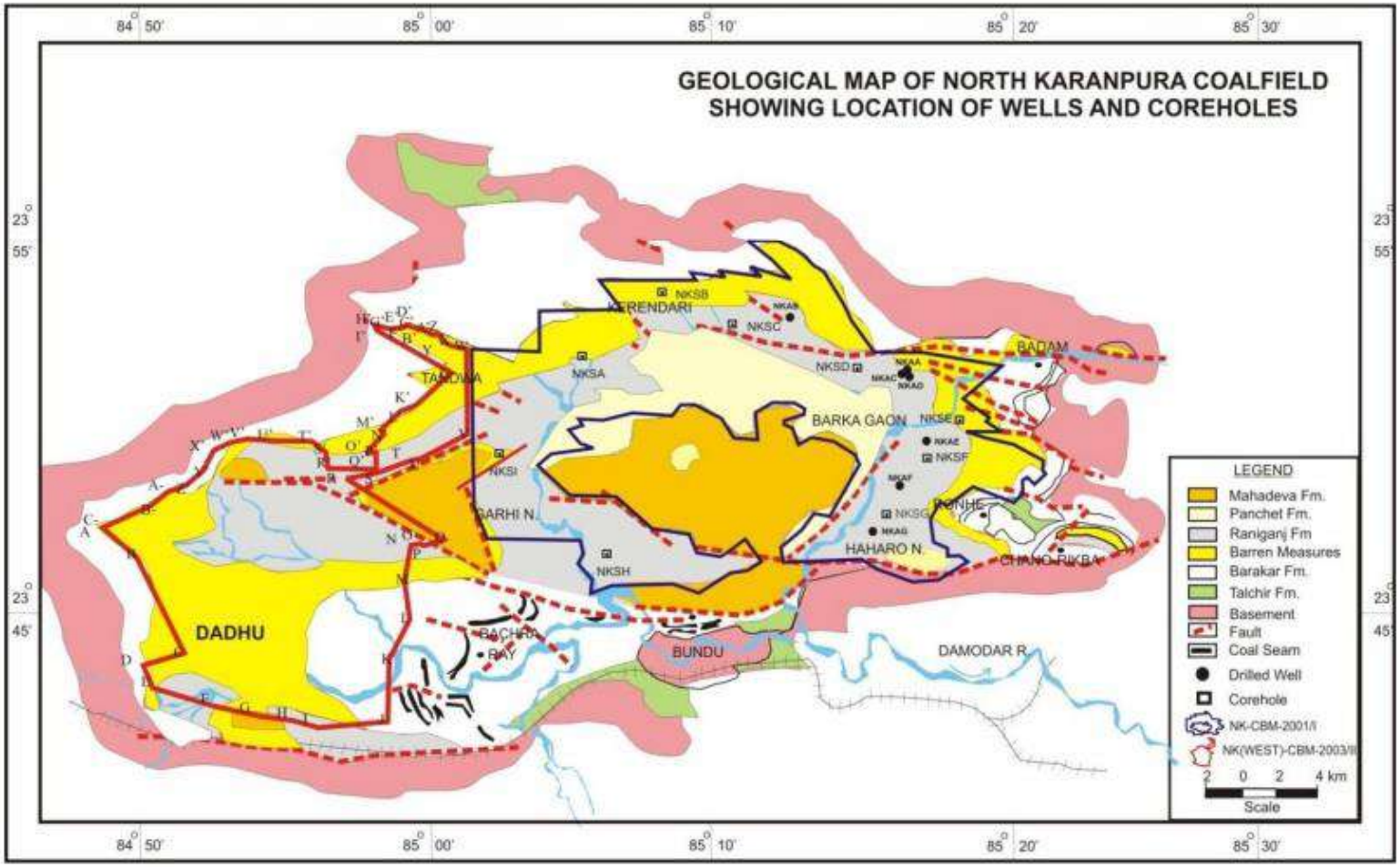

Fig. 7. Geological map of North Karanpurs coalfield

Study Group

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A Maharatna Company

DISASTER MANAGEMENT PLAN
OF
NKSTPP (3X660 MW)-UNDER CONSTRUCTION

REV-01, Dated:15.09.2020

NORTH KARANPURA SUPER THERMAL POWER PROJECT (3X660 MW)

Post – North Karanpura, District- Chatra

Jharkhand- 825415

P R E A M B L E

The aim of NTPC is safe Project execution / Station operation / generation. All efforts right from the design stage itself emphasize safety and elimination of accidents in the industry. However, due to human errors or system malfunctioning accidents could happen. The suffering and damage as a result of an accident is determined by the potential for loss surrounding the event. By taking effective action at the time of occurrence of the incident, full potential loss can be largely avoided. Effective actions will be possible for handling major emergencies if preplanned procedures utilizing the combined resources of the factory and outside emergency services are practiced.

As per the provisions in the section 41-B (4) of the Factories Act 1987 (as amended) requires that every occupier is to draw up an On-site Emergency Plan with detailed disaster control measures for the factory and to educate the workers employed in the factory premises.

This is the statutory provision laid down in the act for preparation of On-site Emergency Plan to control disaster in the factories. Any accidents may cause emergency and it may lead to disaster, which may cause heavy damage to plant, property & harm to persons and create adverse effects on production.

This On-site Disaster Management Plan has been prepared in accordance with the above.

FOREWORD

In NTPC Limited, protections and protective measures ensuring safety are taken care of during design, erection, commissioning stages and requisite care is also taken during erection, operation and maintenance. Despite all precautions, possibilities of emergencies/accidents involving man and material, release of hazardous chemicals like chlorine, hydrogen and fire etc. cannot be totally ruled out. Even though such an occurrence(s) may be rare and of remote possibility, accident(s) do have adverse effects on project, property and the human beings. In order to be in a state of readiness to face such adverse effects of accident(s) leading to emergencies which may affect a section of the plant or area within it as a result of deviation from normal operating conditions, malfunction of a system, human errors etc., a Disaster Management Plan is essential for any industry.

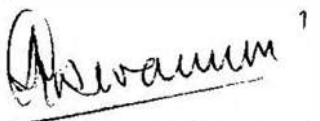
This document has been prepared with the objective in mind to contain / minimize the hazard and ultimately bring the incident under control so as to prevent damage to property, human beings and environment. This manual details the possible hazards, causes of emergencies, emergency preparedness, protective/preventive measures, response plans to identify emergencies, testing of emergency preparedness & response plans and periodicity of conducting mock drills etc.

The manual further elaborately discusses all aspects of disaster and plans keeping in view the statutory requirements, site conditions and local operational procedures.

It identifies clearly the vulnerable hazards, precautions to be taken, procedures to be followed in case of such disaster, with specific responsibilities, action to be taken by the individuals, mutual aid scheme and mock drills. Ensuring awareness and familiarization of the procedures and methods of implementation as and when necessary is mandatory.

It is expected that plan shall be followed in its true letter and spirit by all key personnel, team members and all concerned and adhere to the responsibilities assigned to them to tackle disaster effectively and mitigate the losses and sufferings.

I solicit co-operation and involvement of all employees & associates of NTPC North Karanpura and derive the envisaged benefits by effective implementation of this action plan.



Ashim Kumar Goswami

Executive Director (North Karanpura STPP)

INTRODUCTION

Power plants deal with materials, which are generally hazardous in nature by virtue of their intrinsic chemical properties or their operating temperatures or pressures or a combination of these. Fire, explosion, toxic release or combinations of these are the hazards associated with industrial plants using hazardous chemicals. More comprehensive, systematic and sophisticated methods of Safety Engineering, such as, Hazard Analysis and Quantitative Risk Assessment have now been developed to improve upon the integrity, reliability and safety of industrial plants. The primary emphasis in safety engineering is to reduce risk to human life, property and environment. Some of the more important methods used to achieve this are:

- **Quantitative Risk Analysis:** Provides a relative measure of the likelihood and severity of various possible hazardous events by critically examining the plant process and design.
- **Work Safety Analysis:** The technique discerns whether the plant layout and operating procedures in practice have any inherent infirmities.
- **Safety Audit:** Takes a careful look at plant operating conditions, work practices and work environments to detect unsafe conditions.

Together, these three broad tools attempt to minimize the chances of accidents occurring. Yet, there always exists, no matter how remote, probability of occurrence of a major accident. If the accident involves highly hazardous chemicals in sufficiently large quantities, the consequences may be serious to the plant, to surrounding areas and the populations residing therein.

Chemicals which are hazardous like Acids, Liquid Ammonia, HCL, H_2SO_4 & Alum, materials which are inflammable like Lubricating Oil, Light Diesel Oil, Transformer oil are being more widely used in power plants. Improper handling of these materials may lead to uncontrollable hazards, costly accidents and in rare cases may lead to disasters.

In the wake of such disasters an emergency plan, each part / section of the plant of the complete plant as a whole need to be studied and analyzed critically from safety point of view. To control effectively the rise of such situations, it is imperative to have “Disaster Management Plan”.

OBJECTIVES OF DISASTER MANAGEMENT PLAN

The objectives of the Disaster Management Plan is to develop, implement and maintain an integrated emergency management system for protection of people, property and the environment in the event of an on-site emergency caused by hazardous material or a major accident.

The ultimate goal is to reduce the vulnerability of the plant due to any emergency, to save lives and protect property by developing capabilities that mitigate the effects of, prepare for, respond to and recover from any emergency that could affect the area.

a) It would help to accomplish the aforesaid objectives by assigning actions at plant at times & places in an emergency that exceeds the capability or routine responsibility of any one agency.

b) It sets forth lines of authority and inter-group relationships, and shows how all actions will be coordinated. It describes how people and property will be protected in emergencies.

c) The plan identifies resources viz. personnel, equipment, facilities, supplies available within or by agreement with others for use during response.

d) This is a positive effort towards Emergency Management making use of the combined resources of the plant and the outside services to achieve the following:

- Effective Rescue and Medical treatment of casualties.
- Safe guard other people in the premises.
- Minimize damage to property and the environment.
- Initially contain and ultimately bring the incident under control.
- Identify the dead and injured, if any.
- Provide for the needs of relatives, who come for any inquiry.
- Provide authoritative information to the news media.
- Secure the safe rehabilitation of affected area.
- Preserve relevant records and equipment for the subsequent enquiry, (If conducted), into the cause and circumstances of the Emergency.

PROFILE OF THE COMPANY

NTPC is India's largest energy conglomerate with roots planted way back in 1975 to accelerate power development in India. Since then it has established itself as the dominant power major with presence in the entire value chain of the power generation business.

The total installed capacity of the company is 57,106 MW (including JVs) with 23 coal based, 7 gas based stations, 2 Hydro based stations and 1 Wind based station. 9 Joint Venture stations are coal based and 11 Solar PV projects.

North Karanpura Super Thermal Power Project (3x660 MW) is owned by NTPC Ltd. and is under construction. Brief description of the project:

Name of the Factory	North Karanpura Super Thermal Power Project (3X660 MW) Post- NTPC, North Karanpura, Distt. : Chatra Jharkhand - 825415
Location	Plant is located near Tandwa village in Chatra district in the state of Jharkhand on Hazaribag-Chatra state highway (SH-7). Plant is spread over 2245 acres of land. **Distances:** i)150 KMs.(approx) from Ranchi city via Hazaribagh & 110 KM via Khalari / Patratu ii) 50 Kms. from Hazaribag and iii) 40 KMs. from Khalari iv) 50 KM from Chatra, District HQ
Nature of Industry	v) Coal based 'Thermal Power Plant' having generation capacity of 1980 MW (3 units of 660 MW)

Principal Raw Material	vi) **Raw Coal – 10.6 Million MT per annum** Transported from Magadh Coal Block of CCL to the project site through cross country conveyor belt system. One external coal handling plant and one internal coal handling plant are envisaged. **Water** – Make up water requirement for this project would be approx. 22 cusec (2200 m3/hr) and will be arranged through barrage /weir across river Garhi.
Name & Address of Occupier & Chief Incident Controller (CIC)	Sh. Ashim Kumar Goswami, Executive Director Mobile No : 9416212442
Name & Address of Factory Manager & Works Incident Controller (WIC)	Sh. Tajinder Gupta, General Manager (Projects), Mobile No : 9650994662
Employment Details (As on 31.08.2020)	NTPC Employees 175 Contractors' employees 4000 (approx.)
Access to the Plant and Escape Route	There is one gate for access & escape to the Power Project, which is manned by CISF Security wing. All the plant locations are connected through well laid plant roads for

SALIENT FEATURES OF THE PROJECT

1. The project is situated on the coal bearing area.
2. The NKSTPP is the first power project in the country near a coal mine with environment friendly supercritical technology.
3. No permanent structures other than those required for operationalizing and running the power plant will be allowed to come up in the vicinity of the mining areas.
4. The project is equipped with Air Cooled Condenser (ACC) to reduce the water requirement by 80% as compared to conventional method to protect the environment by least use of land & water. Water consumption reduced from 90 Cusec to 22 Cusec.
5. Coal is to be transported from mine directly through a cross-country piped conveyor of length 8 km (Approx.) to the plant.

IMPORTANT TERMS AND GLOSSARY RELATED TO DMP

1. Accident: Unplanned event giving rise to death, ill health, injury, damage or other losses to personnel or property (IS-18001).
2. Assembly point: A notified common place in the plant where all the workers shall assemble in case of any emergency.
3. Chief Incident Controller (CIC): The person who has the overall responsibility of directing operations from the Emergency Control Centre.
4. Disaster: Disaster means a catastrophe, mishap, calamity or grave occurrence in any area, arising from natural or man made causes or by accident or negligence which results in substantial loss of life or human suffering or damage to, and destruction of property, or damage to, or degradation of, environment, and is of such a nature or magnitude as to be beyond the coping capacity of the community of the affected area.
5. Disaster Management: Disaster Management means a continuous and integrated process of planning, organizing, coordinating and implementing measures which are necessary or expedient for –
    i. Preventing of danger or threat of any disaster;
    ii. Mitigation or reduction of risk of any disaster or its severity or consequences;
    iii. Capacity-building;
    iv. Preparedness to deal with any disaster;
    v. Prompt response to any threatening disaster situation or disaster;
    vi. Assessing the severity or magnitude of effects of any disaster;
    vii. Evacuation, rescue and relief; and
    viii. Rehabilitation and reconstruction.
6. Emergency: It is one which has the potential to cause serious injury or loss life and/or property and which tends to cause disruption inside and /or outside the works.
7. Emergency Control Centre: It is a place from which the operations to handle the emergency are directed and coordinated.

8. Emergency Plan: A formal written documented plan which, on the basis of identified potential accidents together with their consequences, describes how such accidents and their consequences should be handled, either on-site or off-site.

9. Emergency preparedness: Preparedness means the state of readiness to deal with a threatening disaster situation or disaster and the effects thereof.

10. Emergency Response: The efforts to minimize the severity of an accident by protecting the people, the environment or the property and bring back the scene to normal pre- emergency conditions.

11. Evacuation: Removal of persons from the accident site / neighboring place and diverting them to assembly point.

12. Hazard: A source or a situation with a potential to cause harm in terms of human injury or ill health, damage to property, damage to the environment or a combination of these.

13. Hazard Analysis: Identification of undesired events that may lead to the materialization of the hazard. The analysis of the mechanism by which those undesired events could occur and usually the estimation of the nature, characteristics and magnitude of the possible loss/damage to life and property. The loss/damage, severity would be analyzed and assessed for each hazard identified.

14. Hazardous Chemical: Hazardous chemicals means any chemical which satisfies any of the criteria laid down in Part I of Schedule I or listed in Column 2 of Part 2, any chemical listed in Column 2 of Schedules 2 and 3 of the Manufacture, Storage and Import of Hazardous Chemicals Rules, 1989.

15. IDLH Value: Immediately Dangerous to Life or Health (IDLH) is a condition "that possesses a threat of exposure to airborne contaminants when that exposure is likely to cause immediate death or delayed permanent adverse health effects or prevent escape from such an environment".

16. Mock-drill: Simulated accident setup to test emergency response methods and for use as a training tool.
17. On-Site Emergency: An accident, which takes place within the boundaries and its effects are felt within the premises involving the people working within the specified boundaries of the plant.
18. Off-site Emergency: An accident, which takes place within the boundaries but its effects are also felt outside the premises involving the general public in the vicinity.
19. Works Incident Controller (WIC): The person who will take control of handling the emergency at the incident site.
20. Vulnerable Zone: It is an area, which may be affected or exposed by the release of hazardous chemicals.

INCIDENT INFORMATION SUMMARY FORMAT

The first information about an incident becomes a very vital input for effective handling of any emergency situation. It is important to gather as much as information as possible very quickly so as to facilitate various decisions and to initiate appropriate actions. In order to obtain maximum information from the person giving the first information about the incident, the suggested format for "Incident Information Summary" is given below. The questions given in the format are to be asked to the caller who is giving the first information. Answers for some of the questions may be unknown to the caller but it is important to gather more information as possible.

INCIDENT INFORMATION SUMMARY	
Date & Time ……	Name of the caller : ……..
Location of the incident……	Caller's contact No. ……..
Near by location:……	Nearby population……..…
Nature of incident (ex. Leak, explosion, spill, fire, accident)……	Time of release……..….
Possible effects ……	No. of dead or injured……..…..
Where dead or injured are taken? ……	Rescue accomplished. ..... or Rescue needed? .....
Name of the material released ……	If unknown, container type ……..……..……

Placard/label information……..	Characteristics of material (ex. Color, smell etc)……..
Present physical state of material……	Total amount of material that may be released……
Other hazardous material in area…….....	Amount of material released so far/ duration of release……...
Whether significant amount of material appear to be entering the atmosphere, water, storm drains, or soil? ……	Whether the release was in a confined space? …….
Direction, height, color & odor of any vapor clouds or plumes ……	Weather conditions (wind direction, speed, inversion)…… ……
Local terrain conditions significant to Dispersion of personnel at the scene……	Any other relevant information? …….

PROCESSES INVOLVED IN POWER GENERATION AT NKSTPP

a. Production of Steam:

Coal shall be transported to the plant by cross country pipe conveyor from Magadh Coal Block of CCL which is part of external CHP. Then coal is crushed in Crusher House of internal CHP and transported to the coal bunkers with the help of conveyor belts and fed to Coal mills where it is pulverized in to powder form. The pulverized coal is fed to the furnace through coal pipes with the help of hot and cold air mixture from Primary Air Fan (PA Fan). Atmospheric air from Forced Daft Fan (FD Fan) is heated in the air heaters and sent to the furnace as combustion air. Water is partly converted in to steam as it rises up in the furnace and get separated in the separator tank and passes through super heaters(SH) which are located inside the furnace where it becomes super saturated steam that finally goes to HP Turbine. The exhaust steam from HP Turbine (CRH line) comes back to the boiler where it is reheated and goes back (HRH line) to IP Turbine.

Flue gases from the furnace are extracted by Induced Draft Fan (ID Fan) which maintains balance draft in the furnace with FD Fan. These flue gases emit their heat energy to various super heaters and finally pass through air pre-heaters (PAH/ SAH) and goes to Electro Static Precipitator (ESP) where the ash particles are extracted, so that they do not pass through the Chimney to pollute the atmosphere. The dry ash is collected through vacuum system and is supplied to ash brick plant and cement plants.

Water requirement for boilers and other plant equipment as well as drinking water is being met by constructing a Barrage/Weir at Garhi River which is about 03 km from the main plant.

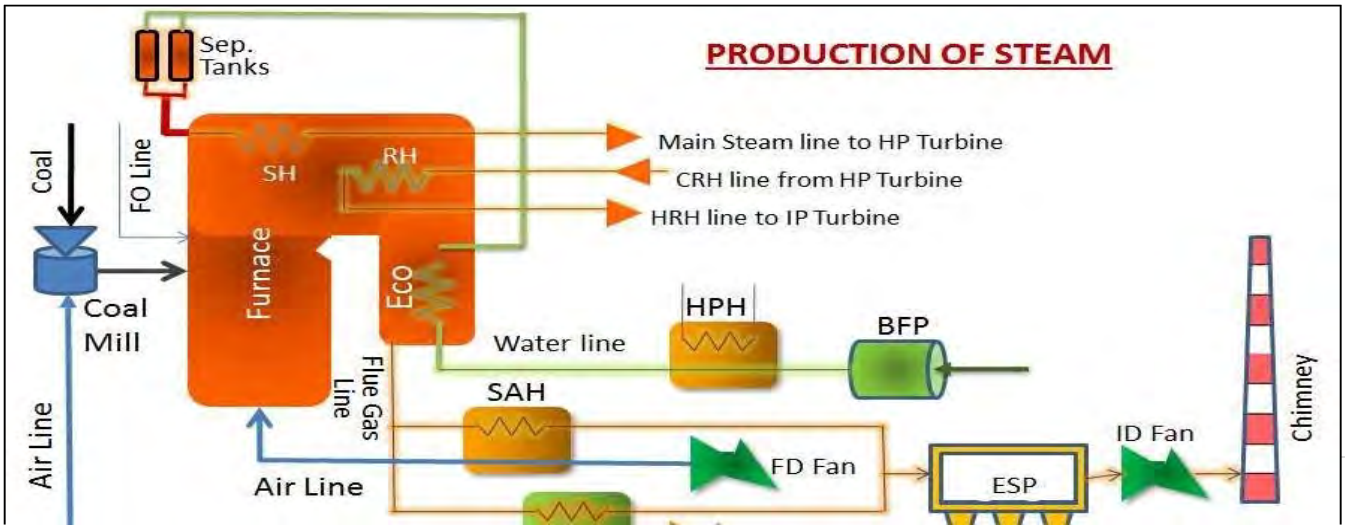
Intake Water Pump House near Tandwa village pumps raw water to the Reservoir at the plant having 1,60,000 M^3 storage capacity. The approximate fresh water requirement is 2200 cubic metre per hour. Water used in the boiler is demineralized at DM Plant with anion / cation exchange process.

b. Steam to Power:

The Main Steam line conveys steam to HP Turbine through a stop valve and through control valves that automatically regulate the supply of steam to the turbine. The steam passes through each stage in turn until it reaches the end of the high pressure cylinder and in its passage some of its heat energy is changed into mechanical energy.

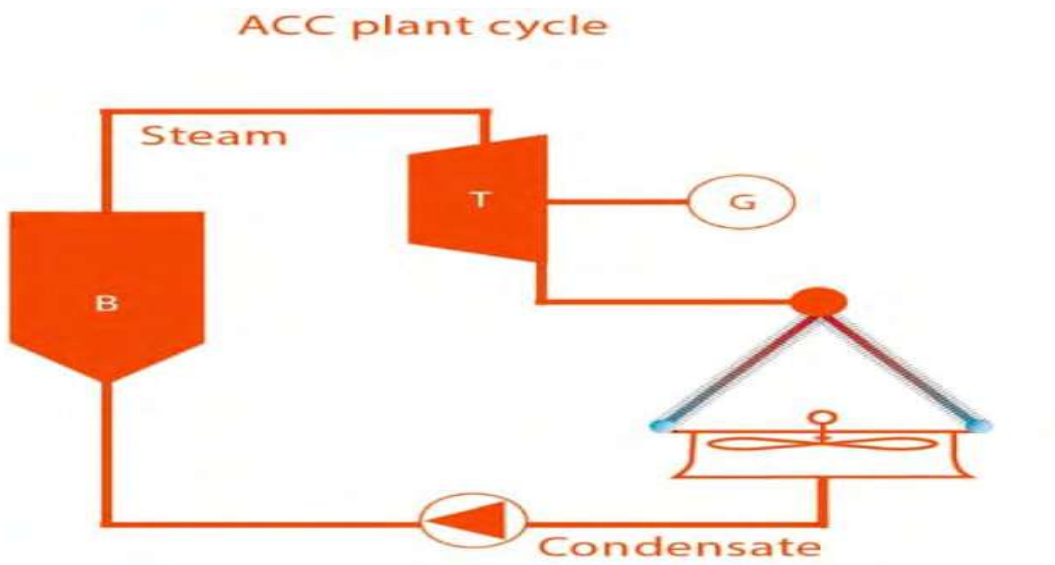
The steam leaving the high pressure cylinder (i.e. CRH) goes back to the boiler for reheating and returns (i.e. HRH) by a further pipe to the intermediate pressure cylinder. Here it passes through another series of stationary and moving blades.

Finally, the steam is taken to the low pressure cylinders, each of which it enters at the centre flowing outwards in opposite directions through the rows of turbine blades (an arrangement known as double flow) to the extremities of the cylinder. As the steam gives up its heat energy to drive the turbine, its temperature and pressure fall and it expands. Because of this expansion, the blades are much large and longer towards the low pressure ends of the turbine.



AIR COOLED CONDENSER

An air cooled condenser (ACC) is a direct dry cooling system where steam is condensed inside air-cooled finned tubes. The cool ambient air flow outside the finned tubes is what removes heat and defines the functionality of an ACC. In thermal power plants (T), the steam from the turbine exhaust flows into the ACC where condensation occurs. Then the condensate returns to the boiler (B) in a closed loop. Since the steam coming from the turbine is at a low pressure, the ACC works at a pressure close to a vacuum, and non-condensable gases (G) are removed continuously by an air evacuation unit.



ACCs work well in water-scarce areas

Air cooled condensers are used for thermal power plants like combined cycle, concentrated solar, coal, biomass, and waste to energy. Since these kinds of power plants, which are equipped with ACCs, do not require a large volume of cooling water, the power plants can easily be built in a region where water may not be available, or where its use is restricted or expensive.

The Building blocks of an air cooled condenser

An air cooled condenser is made up of modules that are arranged in parallel rows. Each module contains a number of fin tube bundles. An axial flow forces the cooling air across the heat exchange area of the fin tubes.

The typical set-up for an ACC installation includes:

i. the supporting structure

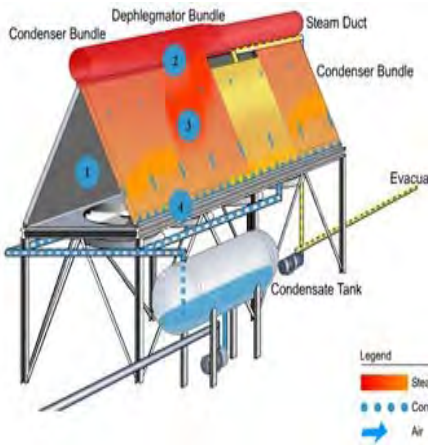
ii. the steam ducting from the steam turbine interface

iii. heat exchangers, finned tubes, fans, motors, gearboxes, and auxiliaries such as the condensate and drain pumps

iv. condensate and duct drain tanks,

v. the air evacuation units

vi. related piping works and instrumentation



From the condensers, the condensate is pumped through low pressure heaters and De-aerator by the extraction pump (CEP), after which its pressure is raised to boiler pressure by the Boiler Feed Pump (BFP). It is further passed through feed heaters (HPH) to the economizer and the boiler for re-conversion in to steam.

c. Switching and Transmission of Power:

The electricity produced in the stator winding of generator at about 21 kV and is fed through terminal connections to one side of a generator transformer that step up the voltage to 400 kV.

Power evacuation system of NKSTPP is detailed as under:

1. NK-Chandwa, 400KV Double Circuit Transmission Line
2. NK-Gaya, 400KV Double Circuit Transmission Line

Construction of above lines is being executed by M/s NKTL.

HAZARDOUS SUBSTANCES ON SITE

FLAMABLE AND SPILLAGE MATERIALS

Sl. No.	Material	Type of container	Location/nos. of container	Max. Storage capacity	Normal inventory
1	Hydrogen	----------	----------	----------	----------
2	LDO	MS Tank	LDO Storage Area/2	3KL x 2	
3	Coal	----------	----------	----------	----------
4	Ash	----------	----------	----------	----------

TOXIC & CORROSIVE CHEMICALS / MATERIALS

(Material Safety Data Sheets of each Material are at Annexure-I)

Sl. No.	Material	Type of container	Location & nos. of container	Max. Storage capacity	Normal inventory
1	Chlorine	Chlorine Tonners	Shall not be used		
2	Hydrochloric Acid (HCl 33%)	Horizontal dish ends rubber lined tank	DM Plant 8 Nos tank	800 M^3	500 M^3
3	Sodium Hydroxide (NaOH 48%)	Horizontal dish ends rubber lined tank	DM Plant 3 Nos tank	310 M^3	200 M^3
4	Ammonia Solution 25% (25 Ltr)	HDPE Jaricans	DM Plant & Central Stores 200 Cans	15000 Ltrs	10000 Ltrs

SUMMARY OF RISK ANALYSIS

Risk analysis of the following major hazard potential areas of NTPC North Karanpura Super Thermal Power Project.

i. Hydrogen gas storage

ii. Fuel Oil Pump House.

iii. Ash Dyke breach.

iv. Reservoir Bund breach

I. Effects of Hydrogen gas leakage at Hydrogen storage godown.

a. Bursting of a Hydrogen cylinder (Inventory = 0.5 Kg, ambient temperature and 150kgf/cm2).

b. Bursting of 10 Hydrogen cylinders at each unit makeup filling station (Inventory = 5 Kg, ambient temperature and 150 kgf/cm2).

c. Bursting of 420 Hydrogen cylinders at storage godown (where minimum inventory required for two units (Inventory = 210 Kg, ambient temperature ad 150 kgf/cm2).

II. Risk analysis summary in Fuel Oil Pump House:

a. In case of LDO leakage in the 6 mm hole from the outlet pipeline of LDO Tank, the liquid fuel comes out and can for oil pool within the bund area. In case there is pool fire, the effect would be within acceptable level.

b. In case of rupture of the LDO tank, can result liquid to come out and fill the pool area of the bund. In case there is pool fire, likely risk of damage to the objects from thermal radiations.

c. In case of Tank fire of LDO, there is likely risk of injury/damage to people & objects from thermal radiations.

III. Risk analysis summary in Ash Dyke Breach

A large quantity of Ash and water from station is getting stored inside the Ash dyke. During heavy rains and floods Ash pond dyke is vulnerable for breach and the breach of dyke can lead to major disaster and can affect the permanent township of NKSTPP and villages nearby to large extent.

IV. Risk analysis summary in Reservoir Breach of Bund

Three big water reservoirs are being made to meet the water requirement of the Plant. In case of breach of Bund there may be massive damage to township and nearby villages.

EVENTS THAT CAN LEAD TO A MAJOR ACCIDENT

Considering the process and the material being used at North Karanpura Super Thermal Power Project, the major hazard potential has been assessed and enumerated below.

Major Plant Sections	Major Hazard Potential						
	Slow Isolated Fire	Fast Spreading Fire	Explosion	Bursting of pipes / vessels	Release of Hazardous liquid	Release of Hazardous gases	Floods
CHP	Coal Yard	Conveyor	Coal dust				
Boiler House	Mills & Burner		Furnace	Steam lines, air receivers		Flue gas from ducts	
Turbine House		Oil tanks control room	H2 Generator	Steam lines	Control fluid		
DM Plant					HCl, NaOH		
H2 Plant	H2 pipes		H2 holder / Cylinders				
GT & 400 KV SW	Transformer		CT / PT / CBs				
Fuel Oil P/H		HFO / LDO tanks		FO lines	HFO/LDO		
Cable Galleries		Cables in trays					

Chemical Godown					Chemicals		
Reservoir							Breach of Dam
Ash Dyke							Breach of bund

EMERGENCY SCENARIOS

From the major hazard potential assessment and summary of Risk Analysis probable emergency scenarios have been identified in the order of their seriousness. Except in the case in all other cases, the emergency scenario would be confined to On-site Emergency nature only. Significant On-site / Off-site emergency scenarios are as given below.

Major On-site Emergency Scenario-1:

Release of Liquid Chemicals:

There are chances of spill-over/leakage of HCl & NaOH from storage tanks and also due to bursting of acid/alkali lines in DM Plant. There are chances of chemical burns due to contact with acid/alkali.

Major On-site Emergency Scenario-2:

Hydrogen gas is used in the Generator for stator cooling. Fire and explosion in H_2 gas cylinder storage room is possible in case of total failure of entire protection systems or due an illicit act/sabotage.

Major On-site Emergency Scenario-3:

Major fire and explosion in LDO tanks or major pool fire may take place at FOPH due to total system failure or an illicit act/sabotage.

Other Emergency Scenarios:

a) Major Fire in Coal handling plant :

There have been occasions of major fire in conveyor galleries in various power plants. Fires may occur due to over friction in the belt conveyors,

spontaneous fire in the coal lumps/oil soaked waste in the surroundings of conveyor belt, hot works without precautions, poor housekeeping practices in the conveyor galleries, crusher house, track hopper and TPs. Initially the fire may be a slow and isolated but over a period of time, if a running conveyor catches this fire it spreads rapidly and engulf the whole conveyor gallery.

b) Major Fire in Cable Galleries/ Plant Control Room.

Major fire in Cable Galleries/Plant Control Room at TG Building can be turned in an emergency situation in case the protection systems fail. The fire may originate from over heating of cables, short circuits, etc.

c) Major Fire in Oil Tanks in TG Building and Transformers.

Major Fire in MOTs / COTs in TG building may occur due to hot works without precautions, poor housekeeping practices and intentional acts.
Similarly the fire and explosion in Transformers may occur due to;

Failure of terminal bushings and flash-over.

Sudden gas pressure formation due to transformer internal faults and subsequent failure of explosion vents and pressure release devices may cause explosion of transformer and fires.
Accumulated leakage of oil from different parts of transformers and spurious sparking nearby.

a. Release of Liquid Chemicals:

There are chances of spill-over/leakage of HCl & NaOH from storage tanks and also due to bursting of acid/alkali lines in DM Plant. There are chances of chemical burns due to contact with acid/alkali.

b. Boiler Explosion:

Whenever Boiler gets pressurised due to non-evacuation of steam, there are chances of Boiler explosion. However, various interlocks and protections are available for Boiler to taken care off to avoid Boiler explosion.

c. Turbo-Generator Explosion:

H2 gas explosion is a possible hazard in Generator. Various interlocks and protections are available to taken care off to avoid generator explosion.

Off-site Emergency Scenario:

In the case of water release / ash slurry release due to bund failure from the reservoir / ash pond, which are located away from the plant boundaries, would lead to emergency situations in the villages and fields in the vicinity of the reservoir / ash pond.

NEARBY RESIDENCE AND POPULATION CENTRES

EAST:

SL.NO.	NAME OF VILLAGE	DISTANCE IN KM	POPULATION
01	NAIPARAM	2	1833

WEST:

SL.NO.	NAME OF VILLAGE	DISTANCE IN KM	POPULATION
01.	RAHAM	1.5	5046
02.	KAMTA	1	2455

NORTH:

SL.NO.	NAME OF VILLAGE	DISTANCE IN KM	POPULATION
01.	KAMTA	1	2455
02.	GARILONG	1	4322
03.	TANDWA	1.5	6475

SOUTH:

SL.NO.	NAME OF VILLAGE	DISTANCE IN KM	POPULATION
01.	DUNDWA	2	747
02.	RAHAM	1.5	5046

EMERGENCY CONTROL CENTRE (ECC)

The Emergency Control Centre is the place from where the operations to handle the emergency are directed and coordinated. It will be attended by the CIC, his support team and the senior officers of District Administration.

Location of ECC:

Safety Control Room in 'Kawach' has been identified as Emergency Control Centre (ECC) with adequate means of communication to areas inside and outside the plant together with relevant data, personnel protective equipment and equipment to assist those manning the centre and to enable them to plan accordingly.

Alternate Emergency Control Centre would be the Fire Station Control Room. Depends upon the anticipated risk during an emergency, one of the above two ECCs shall be decided by CIC for use.

Facilities and Items in each ECC :-

a. Safety data pertaining to all hazardous materials, which are likely to cause emergency.
b. Procedure of major and special fire fighting, rescue operations, First Aid etc.
c. Emergency call out list.
d. Nominal Roll of Employees

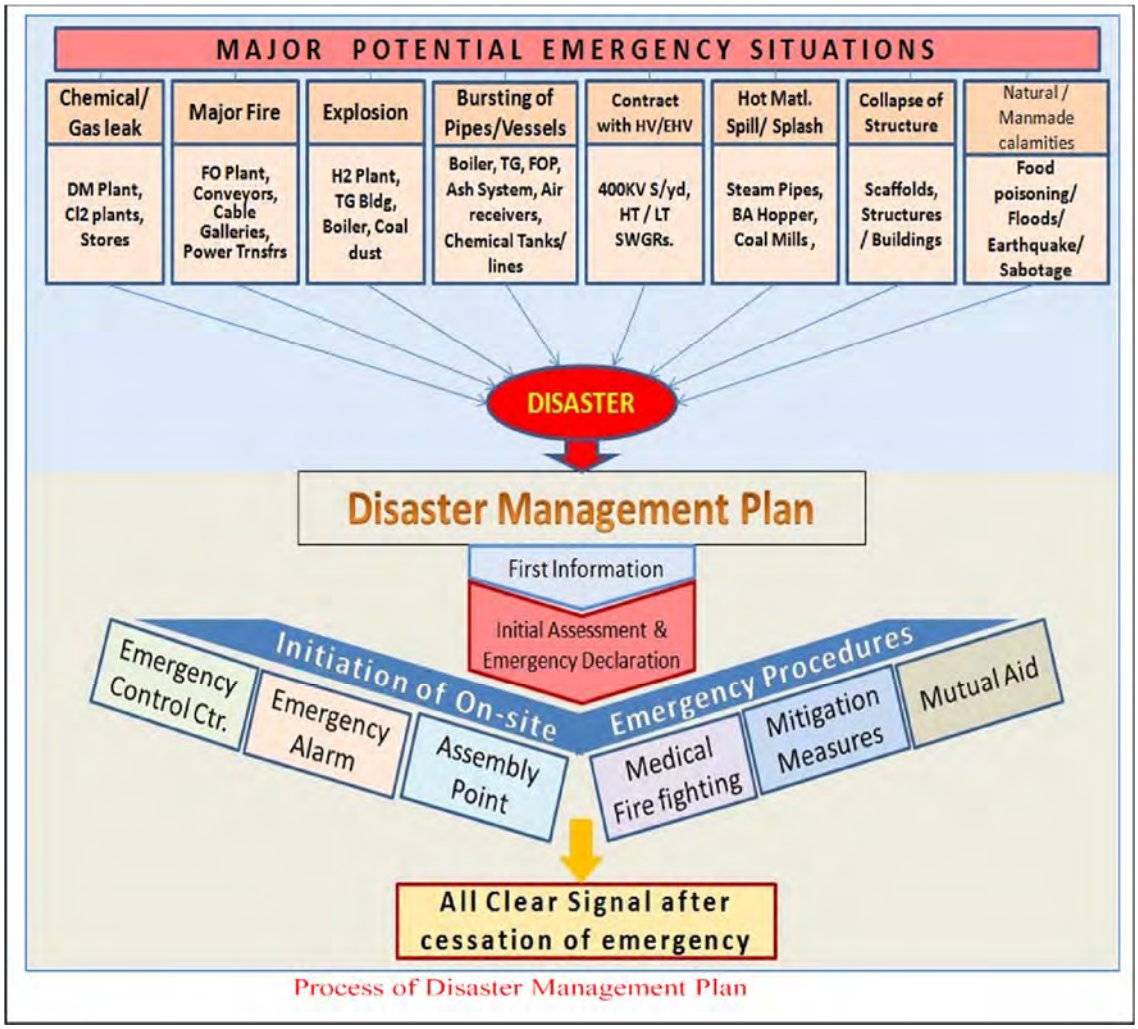
Manning of Emergency Control Centre:-

During normal working days, ECC will be under the control of Manager(Safety) in the day time. During an emergency, the ECC will be manned by the following personnel. However no other personnel shall have access to the Control Centre.

1. Chief Incident Controller (CIC), i.e., ED(NK) or his Alternate
2. Members of Support team to CIC
3. Sr. Officers of outside services called in for assistance.

ACTION PLAN

The primary purpose of the Disaster Management Plan is to control and contain the incident so as to prevent it from spreading to nearby plants / population centers. It is not possible to cover every eventuality in the plan. However, the successful handling of emergency will depend on appropriate action and decisions being taken on the spot. For effective control and management of On-site emergency arising out of potential emergency situations, an action process flow is drawn out, as illustrated below.



Process of Disaster Management Plan

Plant Emergency Organization: Various teams have been identified and their roles & responsibilities are explained in the action plan. The organization chart illustrates the reporting system in case of emergency.

CORE TEAM & RESPONSIBILITIES

The Core Team consisting of Chief Incident Controller, Works Incident Controller and the Support Team to CIC

RESPONSIBILITIES OF CORE TEAM:

(i) Responsibilities of Chief Incident Controller (CIC):

The Chief Incident Controller (CIC) has an overall responsibility for directing operations and calling outside help. The BUH assumes the role of CIC.
Specific responsibilities/duties and requirements to be ensured by CIC are as under:

a. After assuming the position as CIC, he would get the information from the Works Incident Controller (WIC) and take overall control of the emergency.
b. Decide and declare emergency.
c. Decide and declare the location of ECC and Assembly point after consulting with WIC.
d. Continually review and assess existing and possible developments to determine the most probable course of events and effective methods to deal with them.
e. Direct a safe shut down and evacuation of plants, if required, in consultation with the WIC, his Support Team.
f. Ensure that casualties are receiving adequate attention.
g. Arrange for hospitalisation of victims and additional help if required.
h. Ensure that families / relatives of affected persons are informed.
i. If necessary, direct for information and liaison with Fire Services, Police Services, District Emergency Authorities and Officials of Directorate of Factories, Govt. of Jharkhand
j. Ensure accounting of personnel and collate the actual attendance with the master list of persons including contractors and visitors.
k. Arrange for the rescue of missing ones.
l. Arrange control of traffic movement within the Plant.

m. Arrange for the safe removal of vehicles loaded with flammable or dangerous substances from the incident site.

n. Arrange to maintain chronological record of the events.

o. Decide whether off-site emergency exists or is likely to take place. If off site emergency exists-

i. Arrange to alert / evacuate the public living in the vicinity of the Plant.

ii. Call out outside emergency services.

iii. Inform district emergency authorities.

iv. Coordinate with district emergency authorities to mitigate the consequences outside the factory.

v. Coordinate with district emergency authorities for evacuation, shelter, rescue and rehabilitation of general public in the vicinity of affected area.

p. Issue authorised statements to the press or the media in consultation with media contact person.

q. Inform company senior officials.

r. Declare cessation / termination of emergency after having full control on emergency event.

s. Control rehabilitation of affected area after the emergency is over.

(ii) Responsibilities of Support Team to CIC:

On knowing the major emergency, they will proceed to Emergency control centre to assist Chief Incident Controller.

They will:-

a. Report to Chief Incident Controller and follow the instructions of CIC.

b. Maintain a log of incidents.

c. Arrange for urgently required materials through cash purchase or whatever means.

d. Arrange funds for various relief measures as well as emergency purchase of materials and sending his representative for emergency purchase.

e. Identify suitable staff to act as runners or messengers, between CIC and WIC, if the telephone and other system of communication fail due to any reason.

(iii) Responsibilities of Works Incident Controller (WIC):

The WIC operates from the nearest accident site. As per the response level matrix as indicated above assumes the role of WIC. The responsibilities of the WIC are as under:

a. Take charge of the scene of emergency as WIC and assess the scale of emergency.
b. In consultation with CIC, activate the on-site emergency plan.
c. Provide advice to the heads of DMP Teams reporting to him.
d. Search for trapped persons or casualties, if any.
e. Initiate rescue operations until the rescue team arrives through available staff and evacuate the non-essential persons and direct them to report at the Assembly Point.
f. Set up communication network with the Emergency Control Centre using Intercom / walkie-talkie / Mobile phones.
g. Ensure that the outside emergency services have been called in, if required.
h. Direct all operations within the affected area with following priorities
   i. Secure safety of personnel, giving priority to saving life and preventing further injury.
   ii. Advice and inform as required by the emergency responders, i.e. Fire and Security personnel or emergency services.
i. Keep CIC informed of the developments.
j. Preserve evidences, which would be necessary for subsequent investigation to find out the immediate and underlying causes of the emergency and for concluding preventive measures.

ESSENTIAL STAFF:

In case the plant is immediately affected or likely to be affected as decided by the Chief Incident Controller/Works Incident Controller, efforts will be needed to make shut down and make process units safe. They can do it without exposing themselves to undue risk. Essential staff also includes personnel for emergency works as identified by Head, such as for providing extra lighting or replacement of lighting, providing temporary bypass of the works.

RESPONSIBILITIES OF RESPONSE TEAMS AND SUPPORT TEAMS:

(i) Technical Advisory Team:

The team will immediately report to WIC at incident spot. Their responsibilities are:

a. To identify source of hazard and try to neutralize/contain it with the co-ordination of Maintenance Team.

b. To isolate remaining plant and keep that in safe condition

c. To organize safe shutdown of plant, if necessary.

d. To organize all support service like operation of fire pumps, sprinkler system etc.

e. To measure gas concentrations in case of gas leakage at various places.

(ii) Fire and Rescue Team

This is the most important function and hence all care is taken to ensure that the team members have sufficient knowledge and skill in fire fighting and also to ensure that they have been trained and tested periodically.

Head (Fire/CISF) is the in-charge for the operation and handles this function in consultation with the WIC.

The fire and rescue team would typically consist of personnel from NTPC and CISF-Fire wing. This team would be assisted by security personnel for handling the injured one and also for rescue operation.

Functions of Team Leader

1. Rush to the spot of emergency on receipt of message.
2. Assess the situation and co-ordinate rescue operation such as evacuation of affected personnel, and isolation of affected area.

3. Decide beforehand proper use of fire fighting equipment.
4. Ensure availability of PPE and their safe use by the team members
5. Check the wind direction and advise the fire fighting operation accordingly.
6. Ensure that sufficient numbers of trained fire fighting persons are always available on site.
7. If required arrange to contact and call other trained fire persons from nearby industries with an information to CIC & WIC.
8. Keep / arrange liaison with members of Mutual Aid and establishments such as Industries as well as with Jharkhand Fire services for additional help.
9. Take part in the fire fighting, if situation so demands.

Functions of Team members

1. Be available at their work stations.
2. Note down the fire call details in the prescribed format.
3. Quickly respond and rush to the scene of emergency.
4. Report their team leader / senior person at site.
5. Know, understand and follow safe use of fire fighting equipment.
6. Use fire-fighting equipment properly.
7. Use appropriate PPE.
8. First priority would be given to save lives by rescuing people.

(iii) Medical Team

Leader of the team is Chief Medical Officer. The following medical arrangements should be made by the CMO and his team. The assistance of trained first-aiders would be taken in handling the victims.

Functions of Team members

1. Rush to the site with stretchers, Ambulance, first aid equipment's and trained first aid persons.
2. Depute the trained first aid persons in dispensary.

3. Keep the required medicines in readiness and ensure that they would be available at any time dispensary.
4. Tie-up with nearby hospitals and maintain a list containing 24-hour telephone numbers.
5. Arrange ambulance for victims / injured/ affected person to the hospitals.
6. Administer first-aid and if required send the victims to the nearby hospital for further treatment.
7. Get in touch with WIC/ CIC for any type of medical aid required.
8. Ensure proper medical help is given to the victim.
9. Make necessary arrangement with nearby hospital(s) to treat victims if their number is large.
10. Maintain records of affected persons, treatment given to them, etc.

(iv) Maintenance Team

This team will assist WIC in management of the incident. The team would include personnel from Mechanical, Electrical, Control & Instrumentation and Civil.

Functions of Team Leader

1. Assess the emergency situation and guide the team members accordingly.
2. Keep liaison with other tem leaders and coordinators for requirement of their services if any.
3. Consult WIC and inform him the latest development and information of the situation.
4. Direct action to restore facilities, repairs, demolition as required under the circumstances
5. Ensure shutting off supply of electricity to the affected areas if so required.
6. Get necessary equipment's like cranes, dozers, trucks, welding and cutting set etc as needed for tackling the emergency and make available required personnel to operate above facilities.
7. Make sufficient number of contractor workers available to do civil jobs, like filling sand bags, making bunds, closing drains,

excavation & required for the emergency.

8. Keep workshops / facilities open with necessary personnel throughout emergency to cater any need for repairs of additional equipment.
9. Make arrangements of temporary lighting / emergency lighting for affected areas, shelters and other places of assembly.
10. Know and understand Operating Procedures for controlling or shutting down various operations through regular training programs.
11. Ensure that the team members also know and understand the Operating Procedures.
12. Guide the team in efficiently controlling/shutting down the operations in consultation with WIC.
13. Keep the contact details of all the team members handy, especially for any specific operation vis-a-vis persons, so that they can be contacted when not on duty.
14. Ensure that sufficient number of different categories of skilled personnel is available and used for the purpose.
15. Ensure own safety and the safety of team members.

Functions of Team Members.

1. Know, understand and follow the direction of the leader.
2. Contact the other team members for any assistance/ help.
3. Arrange to restore facilities, repairs, demolition as required under the circumstances
4. Arrange shutting off supply of electricity to the affected areas if so required.
5. Use necessary equipment's like cranes, dozers, trucks, welding and cutting set etc. as needed for tackling the emergency and make available required personnel to operate above facilities
6. Arrange civil jobs, like filling sand bags, making bunds, closing drains, excavation & required for the emergency.
7. Keep workshops / facilities open with necessary personnel throughout emergency to cater any need for repairs of additional equipment.

8. Make arrangements of temporary lighting / emergency lighting for affected areas, shelters and other places of assembly.

9. Preserve record and other evidence, which may be required for inquiry.

(v) Security & Traffic Control Team

It is very important that during the emergency, the movement of persons within the factory is controlled effectively, non-essential persons and vehicles are guided to pre-determined locations and only essential persons and vehicles are allowed to tackle the emergency. To prevent access by the public into an area used by the fire service and other services for support activities is another responsibility of this team. Security personnel would be the members of this team. The Leader of the team is AC/CISF.

Functions of the Leader

1. After getting information, arrange for cordoning of affected area and deploy manpower for this purpose.
2. Consult WIC / CIC and decide the locations for assembly of persons.
3. Guide the team members in adopting a particular procedure-like cordon, traffic control, entry of key and other required persons.
4. Consult WIC/CIC and decide the traffic movement in the plant.
5. Arrange Police help in consultation with WIC/CIC for control of traffic and public outside.
6. Allocate the team members to particular locations and brief them how to control the traffic.
7. Ensure availability of PPE for the Team members and self.

Functions of Team Members

1. The security person stationed near the affected area will reach at site and take charge for security.
2. Stop unauthorised entry at site and inside the plant.
3. Allow entry of only emergency vehicles- fire brigades, ambulance etc.

4. Receive the help under mutual aid members and direct such persons to the affected site.
5. Barricade the incident site and control the traffic movement
6. Know and understand traffic signs and rules to be followed during an emergency.
7. Understand and follow procedure for wearing PPE.
8. Guide the traffic as instructed by the team leader, using proper signs.
9. Curb the panic among people.

(vi) Administration Team

The role of Administration team is to provide the necessary common facilities during any disaster / emergency in the plant.

Functions of Team Members

1. Organise the transportation of personnel & equipment and relief materials.
2. Arrange for canteen services for personnel on duty as well as affected one's like Food & refreshments etc.
3. Assess and maintain law and order situation inside the plant.
4. Arrange for temporary shelters for rehabilitation of those evacuated.
5. Arrange for help of security personnel for cordoning off the affected area, for fire fighting / rescue help and evacuation of casualties.
6. Arrange for head counts of employees, contractors, transporters and visitors.
7. Inform and assist the relatives of persons affected in emergency.
8. Keep the employees informed in township and seek their help if necessary.

(vii) Safety Team:

This team will assist WIC in management of the incident. The team would include personnel from Safety Department and Participative Safety Forums. AGM(Safety) will head the team.

Functions of Team Leader

1. Rush to the site of incident and assess the emergency situation and guide the team members accordingly.
2. Keep liaison with other tem leaders for requirement of services if any.

3. Ensure all facilities & requirements at ECC available.
4. In consultation with Chemistry and EMG departments, co-ordinate for monitoring of gas concentration at affected / likely affected areas.
5. Arrange required safety equipment and ensure safety of all members of emergency teams at incident site.
6. Guide authorities (Factories Deptt, Mutual aid organization etc.) on all safety related issues.
7. Collect and preserve evidences for subsequent inquires.

Functions of Team Members.

1. Keep ready all the apparatus required for monitoring of gas concentrations.
2. Mobilise the additional PPEs and other Safety Equipment (like Gas monitors, fall arrestors, safety nets etc.) required for Emergency Operations.

(viii) Communication System Team:

The role of Communication team is to provide and ensure working of all types of communication systems and facilities in ECC and at the site of emergency. The Head of the team will be the head of IT Department & will be assisted by the department personnel.

On knowing the emergency the head of the communication team will immediately report to WIC at incident spot and take the guidance.

Functions of Team Members

1. Maintaining the communication network in working condition during the period of emergency.
2. Attending urgent repairs in the communication system, if required.
3. Keeping ready the additional communication facilities like Walkie Talkies / Radios, etc for use in case of other communication systems fail.

(ix) Transportation Team:

The role of Transportation team is to pool up the resources for transportation of emergency equipment and shifting of people from affected areas.

On knowing the emergency the head of the Transportation team will immediately report to WIC at incident spot and take the guidance.

Functions of Team Members.

1. Taking in to possession all the plant vehicles, earth moving equipment under their control.
2. Arranging vehicles for evacuation of people from affected areas to assembly points.
3. Arranging vehicles for the officials comes to take part in emergency management activities.
4. Arranging mobile lifting equipment, earth moving equipment for emergency operations.
5. Keeping contact with travel agencies for additional vehicle requirement, if any.

DESIGNATED PERSON FOR MEDIA CONTACTS:

Any incident will attract the interest of the media, and a major accident is likely to involve wide spread in radio and television coverage. Unless appropriate arrangements are made, this can divert personnel from the task of handling emergency. It is essential to make arrangements for the authoritative release of information during any emergency of significant length, and a senior management member should be appointed as the sole source of information. Inquiries made to other employees should be directed to this appointed person. AGM(HR) has been designated as the authorized person for media contacts during On-site Emergency situations. However, he shall take complete information about the emergency and rescue operations from Chief Incident Controller before issuing the press releases/ media contacts.

RESPONSIBILITY OF CORPORATE CENTRE

Responsibilities of Chairman & Managing Director (CMD):

Upon receipt of information regarding occurrence, CMD shall constitute the Corporate Crisis Management Group with Director (Operations) as the Coordinator and Director (HR) and Executive Director (CP) as permanent members another two members can be co-opted by Director (Operations) depending on the type of emergency. The Crisis

Management Group will immediately initiate action on request of services required by the CIC.

As per terms of "Constitution of a Committee and Conduct of inquiry", Chairman & Managing Director(CMD) shall constitute inquiry committee.

A Task Force consisting of the following shall immediately proceed to the Disaster site to study the circumstances relating to the mishap.

1. General Manager (OS) or AGM (OS) in case GM (OS) is not available - Coordinator.
2. General Manager (PE) or AGM (PE) in case GM (PE) is not available.
3. Sr. Medical Specialist.
4. Head of Safety.

If the Task Force coordinator feels necessary, it may co-opt any other official to help the Task Force.

CIC shall provide the OS Control Room with the first information of the occurrence when CMD is informed, Shift-in-Charge OS Control Room will in turn inform Directors and Delhi based Executive Directors regarding the occurrence. Information from site shall be collected at regular intervals by OS Control Room till the crisis Control Room under Addl. General Manager (IR) starts functioning.

A Crisis Control Room shall be set up at Corporate Centre, which shall be controlled by Addl. General Manager (IR). Information shall be collected regularly and given to the Chairman & Managing Director(CMD), Directors, Executive Director (HR) and other concerned officials to deal with the situation.

Group General Manager may requisites the services of the Helicopter for shifting of critically injured personnel to hospitals with advanced medical facilities. Request for same can be made along with the requirement of essential external services. Executive Director (CP) shall organize the deployment of the helicopter to the Plant. Thereafter helicopter movement shall be directed by Group General Manager till the crisis is over.

OUTSIDE ORGANISATIONS TO ASSIST DURING EMERGENCY AND PROTOCOLS FOR LIAISONING

To further strengthen the external resources, NKSTPP may take mutual aid from CCL which operated its coal mining operations nearby.

For Medical assistance, the company may take the services of Hospitals at Ranchi

a. Medanta Hospital, Ranchi
b. Medica Hospital, Ranchi
c. Centavita Hospital, Ranchi
d. Orchid Hospital, Ranchi

COMMUNICATION AND SEQUENCE OF ACTIONS DURING AN EMERGENCY

The Action Plan for effective communication and sequence of actions during and after an emergency consists of:

a. First Information & Assessment ofemergency.
b. Responsibilities for Declaration of Emergency.
c. Responsibility for All Clear Signal.

First Information:

The first person who observes/identifies the hazardous incident shall inform by telephone or by any other means, communicates to the EIC about the incident. In case, the information is received by Fire Station, In-charge of Fire Station Control room shall inform to ED(NK) about the incident before the fire team proceeds to the site of emergency.

Responsibility for Declaration of Major Emergency:

The Works Incident Controller or the EIC (incase WIC is not in the plant premises) on hearing the hazardous incident shall go to the scene of the incident, make an informal assessment of the situation and decide whether a major emergency exists or is likely to develop and inform the same to CIC. Based on the advice of WIC or EIC, the Chief Incident Controller (CIC) declares a Major Emergency and instructs to blow the emergency siren.

Once the Emergency siren is sounded, Emergency procedures will be activated.

Responsibility for 'All Clear Signal':

After cessation of emergency, Works Incident Controller will communicate to Chief Incident Controller about it. After verification of status, CIC will communicate to announce the "All clear" by instruction to sound the "ALL CLEAR SIGNAL".

In case the receiver of the incident information is Fire Station Control Room, the person in-charge should take the information in the Incident Summary Form and report the summary to the EIC immediately. In turn the EIC should conduct an initial assessment and proceed further as per the above chart.

ALARM SYSTEMS

The emergency siren will be sounded by the CISF from Fire Control Room which is manned round the clock.

The emergency siren audible to a distance of 3 Kms range is installed at the roof top of Fire Station Building in the Main Plant area.

The emergency alarm shall consist of repeated long and short blast for continuous period of 2 minutes. The purpose is to communicate all persons inside the plant about major emergency occurred in the plant.

The siren is sounded such that the nature of emergency can be distinguished as a major fire or other . The Siren is tested once in every three months for its effective functioning during emergencies.

EMERGENCY SIREN

Sl. NO.	T Y P E	DURATION
1.	FIRE	15 SECONDS ON, 5 SECONDS OFF (3 TIMES)
2.	CHEMICAL LEAK	20 SECONDS ON, 10 SECONDS OFF (5 TIMES)

3.	ALL CLEAR SIGNAL	CONTINUOUS SIREN FOR THREE MINUTES (ONLY ONCE)

COMMUNICATION PROCEDURES

Procedure of Communication about Emergency to CIC, WIC, Heads and members of DMP Teams:

Communication to	Responsibility	Message of Communication / what is to be communicated	Communication channel
CIC, WIC	EIC	Details as per Incident Information Summary Form & findings of initial assessment of the emergency by him.	Mobile Phone
Heads of DMP Teams	WIC	As mentioned above.	Mobile Phone
Members of DMP Teams	Head of DMP Team concern	Briefing the emergency and asking to rush to the site with requisite PPEs and facilities to accomplish defined tasks in the action plan.	Mobile Phone / SMS

Procedure of Communication to All employees in the Plant:

Communication to	Responsibility	Communication channel
All employees inside the Plant	GM(Project)	PA system
Essential Staff	EIC	Mobile / Intercom Phone Or PA System

Procedure of Communication to Corp. Centre, External Services, District Administration and likely affected Villages:

Communication to	Responsibility	Message	Communication channel
CC, mutual aid organizations, external / local authorities, etc.	Head of HR	The message should be as advised by CIC.	Mobile Phone / landline /mail etc
Empaneled Hospitals	CMO	The message depends upon the type & nature of injuries.	Mobile / Landline phone
People in the likely affected villages in the vicinity of Plant	Head of HR	The message should be as advised by CIC.	Mobile PA System

Procedure for notifying families of injured employees:

Responsibility	Wording	Communication channel
AGM(HR) and his identified team after identifying the injured employees and the severity of injuries.	Wording should be decided according to the situation.	1. Responsible officer of HR in case of Serious/fatality. 2. By phone in case of minor injuries.

COMMUNICATION SYSTEMS AVAILABLE:

Public address system is being provided in the plants. Intercom telephones are being provided at all required locations. The facility is also be used to contact district authorities for information and help.

MAJOR FIRES:

Response Procedure:

a. Evacuate all non-essential workers from the area and keep all passages, doors etc., clear for firefighting operations.

b. Start rescue and firefighting operation immediately as deemed fit for the extent of fire.

c. Ensure manning of Fire Water Pump house to start the hydrant pumps / maintaining the water pressure and to start additional pumps, if needed.

d. Ensure isolation of all electrical power supplies in the affected area.

e. Depending upon the extent of fire, additional fire crew / accessories turnouts to be called in.

f. Arrange to call all 'Off-duty' fire staff to report for firefighting operations.

g. Establish co-ordination with external fire brigades called in.

h. The instructions given in the Fire Orders of NTPC North Karanpura Unit shall be followed.

General precautions:

i. Evacuate and cordon off the affected area. Entry to the authorized personnel only should be permitted.

ii. Suitable breathing apparatus must be used wherever necessary.

iii. Fire proximity suits, water gel blankets must be used whereverrequired.

iv. While carrying out firefighting operations, safety of the persons / plant buildings/ equipments should be borne in mind.

Fire in Hydrogen generation plant:

There is a possibility of fire in the storage room due to hydrogen leakage from filled cylinders. Since the hydrogen fire is invisible, severe heat radiation and subsequent fire in the storage room may take place if the leak is not noticed and arrested in time.

System Safety: The storage room is well ventilated and vents provided on the top of the roof to easy dispersion of hydrogen gas. However to prevent any untoward incidents, the following precautions are taken.

i. All electrical equipment and lighting fixtures are explosion poof in the entire plant.

ii. Hydrogen gas sensors/leak detectors are provided in the cylinder storage area.

iii. A detailed LMI is in practice.

iv. Strict use of non sparking tools.

v. Availability of Fire Hydrant water system & portable fire extinguishers in the plant.

vi. Prohibition of use of mobiles, radios, etc. in side the plant.

vii. Prohibition of entry of unauthorized persons in the storage location and posting of security guard.

Response Procedure:

a. Evacuate all non-essential workers from the area and keep all passages, doors etc., clear for firefighting operations.
b. Start rescue and firefighting operation immediately as deemed fit for the extent of fire.
c. Ensure manning of Fire Water Pump house to start the hydrant pumps / maintaining the water pressure and to start additional pumps, if needed.
d. Ensure isolation of all electrical power supplies in the affected area.
e. Seek for additional fire crew / 'Off-duty' fire staff turnouts, if found necessary.
f. Establish co-ordination with external fire brigades, if called in.
g. The instructions given in the Fire Orders of NTPC North Karanpura Unit shall be followed.

General precautions:

i. Evacuate and cordon off the affected area. Entry to the authorized personnel only should be permitted.
ii. Fire proximity suits, water gel blankets must be used wherever required.
iii. While carrying out fire fighting operations, safety of the persons / plant buildings/ equipment should be borne in mind.

Fire in Fuel Oil Pump House:

There is chance of major fire in the FOPH and LDO tanks due to system malfunction or illicit acts.

System Safety: To prevent and control the fire, following fire safety arrangements have been made here.

i. Foam Flooding system on all oil storage tanks.
ii. Fire Detection system.
iii. Fire Hydrants, Landing valves.
iv. Foam Hydrant system.
v. Round the clock security.

Response Procedure:

a. Evacuate all non-essential workers from the area and keep all passages, doors

etc., clear for fire fighting operations.

b. Start rescue and fire fighting operation immediately as deemed fit for the extent of fire.

c. Start all fixed fire fighting systems manually if they are not operated automatically.

d. Ensure manning of Fire Water Pump house to start the hydrant pumps / maintaining the water pressure and to start additional pumps, if needed.

e. Depending upon the extent of fire, decide whether to shutdown the plant or part of the plant.

f. Ensure isolation of all electrical power supplies in the affected area.

g. Seek for additional fire crew / 'Off-duty' fire staff turnouts, if found necessary.

h. Establish co-ordination with external fire brigades, if called in.

i. The instructions given in the Fire Orders of NTPC North Karanpura Unit shall be followed.

General precautions:

i. Evacuate and cordon off the affected area. Entry to the authorized personnel only should be permitted.

ii. Fire proximity suits, water gel blankets must be used whereverrequired.

iii. While carrying out fire fighting operations, safety of the persons / plant buildings/ equipment should be borne in mind.

Fire in Cable Galleries

The main hazard in cable galleries is fire due to over heating of cables, short circuits, etc. To prevent chance of fire origination in the cables, all the cables used in the North Karanpura are of Fire Retardant & Low Smoke (FRLS) type.

System Safety: To prevent further chances of fire in the cable galleries the following systems have been adopted in North Karanpura.

i. Zoning of cable gallery and fireproof sealing between zones, cable entries/intersections and intermittent places on cable trays, cable raisers and cable entry points.

ii. Providing Smoke detectors, flame sensors (linear heat sensing cables, quartzite bulbs).

iii. Automatic MV Water spray system.

Response Procedure:

a. Close ventilation system, if any in the cable gallery room.
b. Exhaust the smoke using Smoke exhausters.
c. Identify the affected portion of the gallery/tray and isolate electrically.
d. In case identification is difficult, then isolate all possible connected supplies.
e. Check if the water spray system is not operated automatically, operate manually if required.
f. Extinguish fire preferably with CO_2 or DCP extinguishers.(Water can be used externally, if the cables are fully dead).
g. In case of major fire, use breathing apparatus and fire suit.

Storage godowns:

Chances of major fire are only possible in gas cylinder storage / chemical storage areas in the stores.

System Safety: such chances are reduced by proper layout and by providing adequate fire safety measures.

Response Procedure in case of Fire on DA/LPG Cylinder:

a) Try to shutoff the valve of the cylinder immediately.
b) Separate the hot cylinder from other cylinders and cool it with copious flow of water.

Flashover & Fire in Switchgears:

Following reasons convert in to Fires or Flashovers in indoor / Outdoor Switch gears:-

i. Short circuit either at bus-bars, breaker high voltage parts or cable termination chambers may occur due to reptiles or falling of internal accessories on to live parts.
ii. Failure of supporting insulators of bus-bars, breakers, termination and subsequent earthing of supply may cause flash-over.
iii. Failure of measurement equipment like CTs & PTs may cause flashover in the concerned chambers.

System Safety: All switchgears are well designed to prevent chances of flash-over or fire. In addition, to take care of the above problems, the following precautions are taken.

i. Plugging of cable gland plates and breaker inspection plates against reptile entry.
ii. Periodical inspection/testing of switch gear equipment.
iii. Providing proper nomenclature of switchgear equipment with regards to voltage level, feeder description and panel numbering to avoid wrong identification.
iv. Standard Operating procedures are prepared and followed in Operation and Maintenance of the switchgears.

Response Procedure:

a. Evacuate all non-essential workers from the area and keep all passages, doors etc., clear for fire fighting operations.
b. Start rescue and fire fighting operation immediately as deemed fit for the extent of fire.

EXPLOSION:

(a) Explosion in Hydrogen Generation Plant:

Explosion in H2 Plant and Cylinder storage room is only possible in case of total failure of entire protection system or due an illicit act/sabotage.

System Safety: The plant is well designed to prevent any chance of explosion. However to prevent any untoward incidents, the following measures have been adopted.

i. The protection system of H2 Plant is designed such that at 20% of lower explosive limit it gives alarm and at 40% of lower explosive limit the plant trips automatically.
ii. Gas purity will be monitored continuously and if the purity is less than 99%, the gas will be vented out to the atmosphere and the plant will be shut down automatically. However the purity of H2 gas is maintained 99.8%.
iii. Hydrogen gas sensors are provided in the plant and cylinder storage area which are interlocked to the plant tripping system.
iv. A detailed LMI is in practice.
v. All electrical equipment including lighting fixtures are explosion poof in the entire plant.

vi. Hydrogen holder / lines are purged with N_2 first before start-up and shutdown.

vii. Prohibition of unauthorized persons in the plant and posting of security guard.

Response Procedure:

a. Evacuate all non-essential workers from the affected area and keep all passages, doors etc., clear for rescue operations.

b. Start rescue operation immediately after ensuring that there would be no consequent explosion chances.

c. Any Fire in the exploded area shall be fought from safe distance and with utmost care.

(b) Explosion in Fuel Oil Pump House:

There is a remote chance of explosion in the Fuel Oil tanks at FOPH due to total failure of entire protection system or an illicit act/sabotage.

(c) Coal Dust Explosion:

Coal dust can explode when they are suspended in air in Conveyor galleries, crusher house, bunker area, track hopper and transfer points. A coal dust explosion may occur if the coal

dust is present in the concentration between UEL & LEL limits i.e., 30-2000 grams/M3 of air and also a source of ignition like sparks caused by friction or static electricity.

System Safety: However measures are adopted to prevent the chances of explosion in the design stage itself. To prevent the accumulation of dust, dust suppression systems are available at strategic locations.

(d) Boiler Explosion:

Whenever Boiler gets pressurized due to non-evacuation of steam, there are chances of Boiler explosion.

System Safety: Various interlocks and protections are available for Boiler to taken care off to avoid Boiler explosion.

(e) Turbo-Generator Explosion:

H_2 gas explosion is a possible hazard in Generator.

System Safety: the generator is designed to withstand explosion. Seal oil system is also provided for the generator to prevent the leakage of H_2 gas. And also the H_2 gas purity is continuously monitored and maintained always above 99%. All the H_2 cylinders are checked for high purity.

(f) Transformer Fire & Explosion:

The possibility of Fire & Explosion hazards in transformers are due to;

- Failure of terminal bushings and flash-over.
- Sudden gas pressure formation due to transformer internal faults and subsequent failure of explosion vents and pressure release devices may cause explosion of transformer and fires.
- Accumulated leakage of oil from different parts of transformers and spurious sparking nearby.

System Safety: All the transformers are provided with adequate inbuilt and external protection systems and monitoring devices. However to control the fire, the following measures have been adopted.

- Emulsifier system with deluge valve and fire detection devices on all transformers having capacity more than 16 MVA.
- Oil soaking pits with gravel fill beneath all the transformers.
- Fire Separation walls between transformers.
- Adequate number of Fire extinguishers.

Response Procedure:

a) Isolate transformer from both sides, if it is not automatically de-energized.
b) Stop forced oil circulating pump and forced air-cooling fans in service, wherever provided.
c) Use water spray to cool the hot part, wherever provided.
d) If oil has splashed out of transformer and also has caught fire, use only foam to extinguish fire. Do not use water.

LIQUID CHEMICAL RELEASE (Spill Containment & Cleanup):

There are chances of spill-over/leakage of HCl & NaOH from storage tanks and also due to bursting of acid/alkali lines in DM Plant. There are chances of chemical burns due to contact with acid/alkali.

System Safety: Dyke walls are provided to contain any overflow/leakage of acid/alkali from tanks which can be transferred in to the standby tank. The spill over, if any beyond the dyke, will be collected in neutralization pit.

Response Procedure in case of leakage of Hydrochloric Acid / Sodium Hydroxide

a) If leakage is from a Storage Tanks:

Any leakage from the storage tanks will be collected in the dyke provided, from where it will be recovered, if possible, and water flushed subsequently.

Non-key personnel should be kept away.

Material Safety data-sheet of respective chemical should be referred.

If recovery of acid/alkali is not possible, then the same shall be neutralized properly, before discharging to the drains. In case of contamination of land, the soil shall be neutralized properly with alkali/acid as the case may be.

b) If leakage is from a Pipeline:

Leakage of acid/alkali from a pipeline may either be from flange or from pipe itself:

a. The pump should be switched off first.
b. Isolate the pipeline.
c. The pipeline should be drained.
d. The defect should be attended either by repairing the defective part or replacing it, preferably by blanking wearing Face - shield, Acid / Alkali - proof suit & hand - gloves.
e. Chemicals spill on the body, if any should be immediately washed using drench showers/ eye wash fountains.
f. Area should be flushed with water.
g. Minor spillage can be neutralized by spreading lime powder.
h. Water should be sprayed on leakage point to suppress toxic / corrosive fuming.
i. Non-key personnel should be kept away.

Note : Water should not be sprayed on the leaking tank / pipeline.

Response Procedure in case of release of Ammonia Solution from the carboys / if leakage is from a Storage Tank:

Any leakage from the storage tanks will be collected in the dyke provided, from where it will be recovered, if possible, and water flushed subsequently.Non-key personnel should be kept away.

Medical (Handling of multiple injuries):

In the event of major emergency like Hydrogen Gas explosion (either at H2 Plant or at TG building) or major fire in FOPH, there would be multiple injuries / multiple casualties. In such cases, the entire Medical Team arrives immediately at the site of emergency and put up Medical camp at a safer location with beds, stretchers and all necessary medical aids. External medical help shall be called for including the voluntary organization like Red Cross, medical staff from mutual aid organizations and near by hospitals.

On receipt of victims, the medical team shall prioritize according the seriousness, hopes of survival, type of injury etc., and start treatment or first aid and if necessary refer the cases to empaneled hospitals with a prior intimation/ briefing of case history along with a medical attendant.

Company Ambulances and ambulances of mutual aid organizations or of near by hospitals & other organizations shall be utilized for shifting of casualties.

All the first aiders (employees of the company) who got First aid training shall assist the medical team in such eventual situations.

Utility failure procedures:

In case of any Emergency, if the power fails, it would affect the emergency operations at large. Diesel Generator are available in the plant to cater for power needs in the event of any emergency.

CYCLONE POSING SERVERE THREAT – MEASURES TO BE TAKEN:

a) Suspending all works at height.
b) Possibility of suspending operations /processes which are water/moisture sensitive shall be seriously considered.
c) Protection from flying of roof sheets due to gales.
d) Storm water drains shall be attended immediately to avoid clogging of drains.

e) The possibility of reverse flow of water from the factory premises outlets shall be examined and effective steps like provision of isolation etc shall be ensured.

f) The possibility of rain water flooding in the plant and possible consequences of marooning of plant roads, entry of water into main plant, offsites, stores, tank farms etc., shall be examined and steps shall be taken to handle such situations effectively.

g) Storages of hazardous materials especially drums, carboys etc., in open areas shall be rechecked and shall be properly secured under shade with elevated floor level.

h) Review of probabilities for collapse of tall structures, street lights, old constructions and temporary constructions etc, more so in the construction activity if any under progress. The probability of falling structures, and street lights and other flying objects on the equipment, pipelines containing the hazardous chemicals shall be specially reviewed.

i) Unnecessary movements of persons in the open areas within the premises shall be discouraged during the heavy gales. Even essential movements of persons shall be predefined in such a way that open area movements are limited to bare minimum during gales.

j) Care towards the possible shortcomings in electrical wiring, equipment when subjected to rain and gales shall be exercised.

k) Emergency power back up shall be rechecked.

l) Adequate quantity of diesel shall be stored for continuous running of generators if necessary.

m) Adequate quantity of dry food shall be stored for consumption of persons remained in the plant.

n) All battery backups for communications, UPS etc shall be kept fully charged. Spare batteries shall be kept handy.

o) Arrangements shall be made for releasing the periodical internal bulletins on the status of weather conditions through Public addressing system or other suitable means based on the updates from media etc for the benefit of the persons inside the plant & threat prone pump houses in order to release their anxieties if any.

p) Special communication channel shall be arranged in the plant control room for the exclusive purpose of contacting the family members of the workers remained in the plant/pump houses or vice versa to avoid building up of anxieties among them.

If possible, a periodical SMS about the safety of the workers in the factory to their family members may be arranged to keep them at ease and it shall go a long way in keeping the workers with peace and to make them concentrate on their job.

q) Special care shall be taken in preventing workers who come drenched & Workers may be advised to come with spare cloths fully packed and protected from becoming wet. Extra towels shall also be kept available.

r) Medical officer shall be remained in the plant if possible or at least a trained first aider shall remain in the plant till the normalcy is restored.

s) All essential employees shall be alerted in this regard and going on leave shall be discouraged during this cyclone period.

t) Emergency preparedness shall cross checked and necessary protective gear like adequate rain coats, torch lights of suitable type etc shall be made available

u) All important telephone numbers shall be kept handy and they shall be cross checked about their correctness as well as continuity. They shall be updated if changes are found.

v) Fire fighting systems shall be checked and adequate quantity of foam shall be kept ready.

w) Special care shall be taken while continuing/restarting the work after the cyclone with reference to condition of plant roads (other than black top), outdoor equipment especially the electrically connected, movement of heavy loads/vehicles, work at heights etc. Works of this nature shall be taken up only after satisfying suitability by the safety department or the by responsible concerned person as the case may be.

EVACUATION, ASSEMBLY POINTS AND HEAD COUNT

Evacuation & Assembly Points:

In case of emergency, the non essential personnel should be evacuated from the incident area and also from adjacent areas. Evacuation should be to a predetermined assembly point in a safe part of the works.

The persons, those are not part of immediate response teams, would evacuate their work area and report at the designated Assembly Point. The decision to evacuate the work area will be taken by CIC after getting feedback from the WIC/Shift In-charge. Evacuating visitors would be the responsibility of the concerned officer. Department Head should take care to evacuate any handicapped person in his area.

Assembly Points:

There are ten assembly points identified in the plant.

FIRE FIGHTING SYSTEM

Foam Hydrant System:

Foam Hydrants are provided in Fuel Oil Pump House area. Purpose of providing this system is to combat the fire of fuel oil tanks dyked area occurs due to spill over of oil. Water for Foam Hydrants is tapped from hydrant system.

Fire Extinguishers:

Fire Extinguishers are deployed in all the buildings of entire plant as per the requirements and in accordance with the guide lines of IS: 2190-1992.

FIRE STATION:

A full pledged Fire Station is available in the Plant which is managed by CISF-Fire Wing. The Fire Station has been equipped with all the required equipments for efficient operation of fire squad. The equipments include the following items mainly.

1. One Water Tender
2. One Foam Tender
3. One DCP Tender
4. One no. Fire Jeep
5. 10 Nos. Breathing Apparatus Sets.
6. 04 Fire Proximity Suits.
7. 02 First Aid Kits.
8. 02 Nos. Blower cum Exhausters, etc.

MATERIAL SAFETY DATA SHEET FOR TOXIC & CORROSIVE CHEMICALS

1. PRODUCT IDENTIFICATION

Product Name: Hydrochloric Acid (HCl) /Muriatic acid/Hydrogen chloride, aqueous; Chlorohydric acid CAS#: 7647-01-0
Physical State: Liquid, Transparent, Colorless/ Pale yellow
Odor: Pungent, irritating

2. HAZARDS IDENTIFICATION

Emergency Overview: DANGER! Corrosive. Causes severe skin, eye, and digestive tract burns. Harmful if swallowed. Mist or vapor extremely irritating to eyes and respiratory tract.

Safety Ratings: Health: 3, Severe; Reactivity: 1, Slight; Flammability: 0, None; Contact: 4, Extreme

OSHA Regulatory Status: This product is considered a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Acute Health Effects: **Routes of Exposure** **Inhalation, ingestion, skin contact, eye contact**

Exposure Limits: ACGIH: Ceiling: 2 ppm OSHA: Ceiling: 5 ppm

Personal Protective Equipment:
Eye/Face Protection: Wear safety glasses with side shields or goggles and a face shield.
Skin Protection: Wear appropriate chemical resistant clothing (with long sleeves) and appropriate chemical resistant gloves.
Respiratory Protection: Chemical respirator with acid gas cartridge.

3. FIRST AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Get medical attention immediately.

Ingestion: Do not induce vomiting. If vomiting occurs, keep head low so that vomit does not enter lungs. Never give anything by mouth to an unconscious person. GET MEDICAL ATTENTION IMMEDIATELY.

Skin Contact: Flush affected area with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Ventilate area of leak or spill. Isolate hazard area and keep unnecessary and unprotected personnel away. Keep upwind. Keep out of low areas. Wear appropriate personal protective equipment. Avoid contact with eyes, skin, and clothing.

Methods for Containment: Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Dike the spilled material, where this is possible.

Methods for Cleaning Up: Absorb spill with an inert material (e.g. vermiculite, dry sand, earth, cloth, fleece), and place in a suitable non-combustible container for reclamation or disposal. Neutralize spill area and washings with soda ash or lime. Never return spills in original containers for re-use.
Clean up in accordance with all applicable regulations.

5. HANDLING AND STORAGE

Handling: Wear personal protective equipment. Do not breathe vapors or spray mist. Do not ingest. When using, do not eat, smoke, or drink. DO NOT add water to acid. ALWAYS add acid to water while stirring to prevent release of heat, steam, and fumes.

Storage: Store in a cool, dry, ventilated area away from incompatible materials. Store in original container. Keep containers tightly closed and upright. Keep away from food, drink and animal feeding stuffs. Keep out of the reach of children.

1. PRODUCT IDENTIFICATION

Product Name: Sodium hydroxide (NaOH) / Caustic Soda CAS#: 1310-73-2
Physical State: **Thick** Liquid, Colorless
Odor: Odorless

2. HAZARDS IDENTIFICATION

Emergency Overview: DANGER! Very hazardous in case of skin contact (corrosive, irritant, permeator) of eye contact (irritant, corrosive), of ingestion, of inhalation.

Safety Ratings: Health: 3, Severe Reactivity: 2, Slight
Flammability: 0, None Contact: 4, Extreme

OSHA Regulatory Status: This product is considered a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Acute Health Effects: **Routes of Exposure Inhalation, Ingestion, skin contact, eye contact**

Exposure Limits: ACGIH: Ceiling: 2
ppm OSHA: Ceiling: 2
ppm

Personal Protective Equipment:
Eye/Face Protection: Wear safety glasses with side shields or goggles and a face shield.
Skin Protection: Wear appropriate chemical resistant clothing (with long sleeves) and appropriate chemical resistant gloves.
Respiratory Protection: Chemical respirator.

3. FIRST AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Get medical attention immediately.

Ingestion: Do not induce vomiting. If vomiting occurs, keep head low so that vomit does not enter lungs. Never give anything by mouth to an unconscious person. GET MEDICAL ATTENTION IMMEDIATELY.

Skin Contact: Flush affected area with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Ventilate area of leak or spill. Isolate hazard area and keep unnecessary and unprotected personnel away. Keep upwind. Keep out of low areas. Wear appropriate personal protective equipment. Avoid contact with eyes, skin, and clothing.

Methods for Containment: Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, Basements or confined areas. Dike the spilled material, where this is possible.

Methods for Cleaning Up: Absorb spill with an inert material (e.g. vermiculite, dry sand, earth, cloth, fleece), and place in a suitable non-combustible container for reclamation or disposal. Neutralize spill area and washings with acetic acid. Never return spills in original containers for re-use.
Clean up in accordance with all applicable regulations.

5. HANDLING AND STORAGE

Handling: Wear personal protective equipment. Do not breathe vapors or spray mist. Do not ingest. When using, do not eat, smoke, or drink.

Storage: Store in a cool, dry, ventilated area away from incompatible materials. Store in original container. Keep containers tightly closed and upright. Keep away from food, drink and animal feeding stuffs. Keep out of the reach of children.

1. PRODUCT IDENTIFICATION

Product Name: Ammonium Hydroxide / Aqueous ammonia; Ammonia aqueous CAS#: 1336-21-6
Physical State: Liquid, Color less
Odor: Irritable odor

2. HAZARDS IDENTIFICATION

Emergency Overview: DANGER! Corrosive. Causes severe skin, eye, and digestive tract burns. Harmful if swallowed. Mist or vapor extremely irritating to eyes and respiratory tract.

Safety Ratings: Health: 2 , Moderate Reactivity: 1, Slight
Flammability: 1 , Slight Contact: 4, Extreme

OSHA Regulatory Status: This product is considered a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.

Potential Acute Health Effects: **Routes of Exposure: Inhalation, Ingestion, skin contact, eye contact**

Exposure Limits: ACGIH: Ceiling: 25 ppm

OSHA: Ceiling: 50 ppm

Personal Protective Equipment:

Eye/Face Protection: Wear chemical safety goggles and a face shield.
Skin Protection: Wear appropriate chemical resistant clothing (with long sleeves) and appropriate chemical resistant gloves
Respiratory Protection: Chemical respirator

3. FIRST AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Get medical attention immediately.

Ingestion: Do not induce vomiting. If vomiting occurs, keep head low so that vomit does not enter lungs. Never give anything by mouth to an unconscious person. GET MEDICAL ATTENTION IMMEDIATELY.

Skin Contact: Flush affected area with plenty of water for at least 15 minutes. Remove contaminated clothing and shoes. Wash clothing before reuse. Get medical attention immediately.

Eye Contact: Check for and remove contact lenses. Immediately flush eyes with gentle but large stream of water for at least 15 minutes, lifting lower and upper eyelids occasionally. Get medical attention immediately.

4. ACCIDENTAL RELEASE MEASURES

Personal Precautions: Ventilate area of leak or spill. Isolate hazard area and keep unnecessary and unprotected personnel away. Keep upwind. Keep out of low areas. Wear appropriate personal protective equipment. Avoid contact with eyes, skin, and clothing.

Methods for Containment: Stop the flow of material, if this is without risk. Prevent entry into waterways, sewer, basements or confined areas. Dike the spilled material, where this is possible.

Methods for Cleaning Up: Absorb spill with an inert material (e.g. vermiculite, dry sand, earth, cloth, fleece), and place in a suitable non-combustible container for reclamation or disposal. Neutralize spill area and washings with acetic acid. Never return spills in original containers for re-use.
Clean up in accordance with all applicable regulations.

5. HANDLING AND STORAGE

Handling: Wear personal protective equipment. Do not breathe vapors or spray mist. Do not ingest. When using, do not eat, smoke, or drink.

Storage: Store in a cool, dry, ventilated area away from incompatible materials. Store in original container. Keep containers tightly closed and upright. Keep away from food, drink and animal feeding stuffs. Keep out of the reach of children.

ANNEXURE-II

DISASTER MANAGEMENT TEAMS

SUPPORT TEAM TO CIC

Tajinder	Gupta	GM(PROJ CONST)	PROJ CONST	9650994662
Kaushik	Bhowmik	AGM(TS)	TS	9650990180
Bijay	Manjul	GM(COMMS & TEST.)	COMMS & TEST.	9431215293
Murari	Prasad	AGM(CHEMISTRY)	CHEMISTRY	9650990755
Ajay Kumar	Agarwal	AGM(ELECT ERECT)	ELECT ERECT	7054757778
Sumanta Kumar	Garnaik	AGM(Safety)	SAFETY	9471701249

TECHNICAL RESPONSE TEAM

Anil Kumar	Singh	GM(O&M)	O&M	9650998516
Rajeev	Tripathi	AGM(ELECT ERECT)	ELECT ERECT	9450925384
Pradeep Kumar	Singh	AGM(FQA)	FQA	9431215346
Dipak Kumar	Dalei	AGM(C & I ERECT)	C & I ERECT	9437964101
Maqusood Ahmed	Ansari	AGM(CIVIL CONST)	CIVIL CONST	9425222236

FIRE FIGHTING TEAM

		AC (CISF)		
		FIRE INSPECTOR, CISF		
Pramod Chandra	Nath	AGM(MAINT. PLNG.)	MAINT. PLNG.	9650992374
Uday	Kumar	AGM(MECH ERECT)	MECH ERECT	9471001324
Aditya Vardhan	Verma	SR.MANAGER(P & S)	P & S	9416212327

MEDICAL TEAM

Shankar Sheo	Prasad	CHIEF MEDICAL OFFICER	MEDICAL	9434084523
Satyabrata	Nayak	G D M O (MEDICAL)	MEDICAL	9668367477
Amit Singh	Gill	GDMO(MEDICAL)	MEDICAL	9914406939
Hema Naik	Vadethe	GDMO(MEDICAL)	MEDICAL	9693549255

MAINTENANCE TEAM

Ladu Kishor	Behera	GM(MECH ERECT)	MECH ERECT	7588691221
Nanduri Surya Prakash	Rao	AGM(EM & IT)	EM & IT	9440918641
Tapan Kumar	Patra	AGM(R & R)	R & R	7260818069
Sachin	Kumar	DGM(ELECT ERECT)	ELECT ERECT	9471003376
George	Mathew	SR.MANAGER(ELECT ERECT)	ELECT ERECT	9425222258

ADMINISTRATIVE TEAM

Nanduri Surya Prakash	Rao	AGM(EM & IT)	EM & IT	9440918641
Shahid	Akhtar	AGM(MECH ERECT)	MECH ERECT	9431800188
Neeraj Kumar	Roy	AGM(HR)	HR	9650990808
Dharmendra	Singh	AGM(COMMS & TEST.)	COMMS & TEST.	9650998599
Maqusood Ahmed	Ansari	AGM(CIVIL CONST)	CIVIL CONST	9425222236

SAFETY TEAM

Sumanta Kumar	Garnaik	AGM(SAFETY)	SAFETY	9471701249
Prabhat Kumar	Ranjan	MANAGER(SAFETY)	SAFETY	9431600126
Prince	Kumar	ASSISTANT MANAGER(SAFETY)	SAFETY	9065519283
Nilmani	Ojha	SR.MANAGER(P & S)	P & S	9430489858

COMMUNICATION TEAM

Nanduri Surya Prakash	Rao	AGM(EM & IT)	IT	9440918641
Abdul	Quadir	SR.MANAGER(IT)	IT	9437565331
Ashishan Snehlata	Tudu	MANAGER(IT)	IT	9470197250
Kundan	Kishore	SR.MANAGER(HR)	HR	9472744079

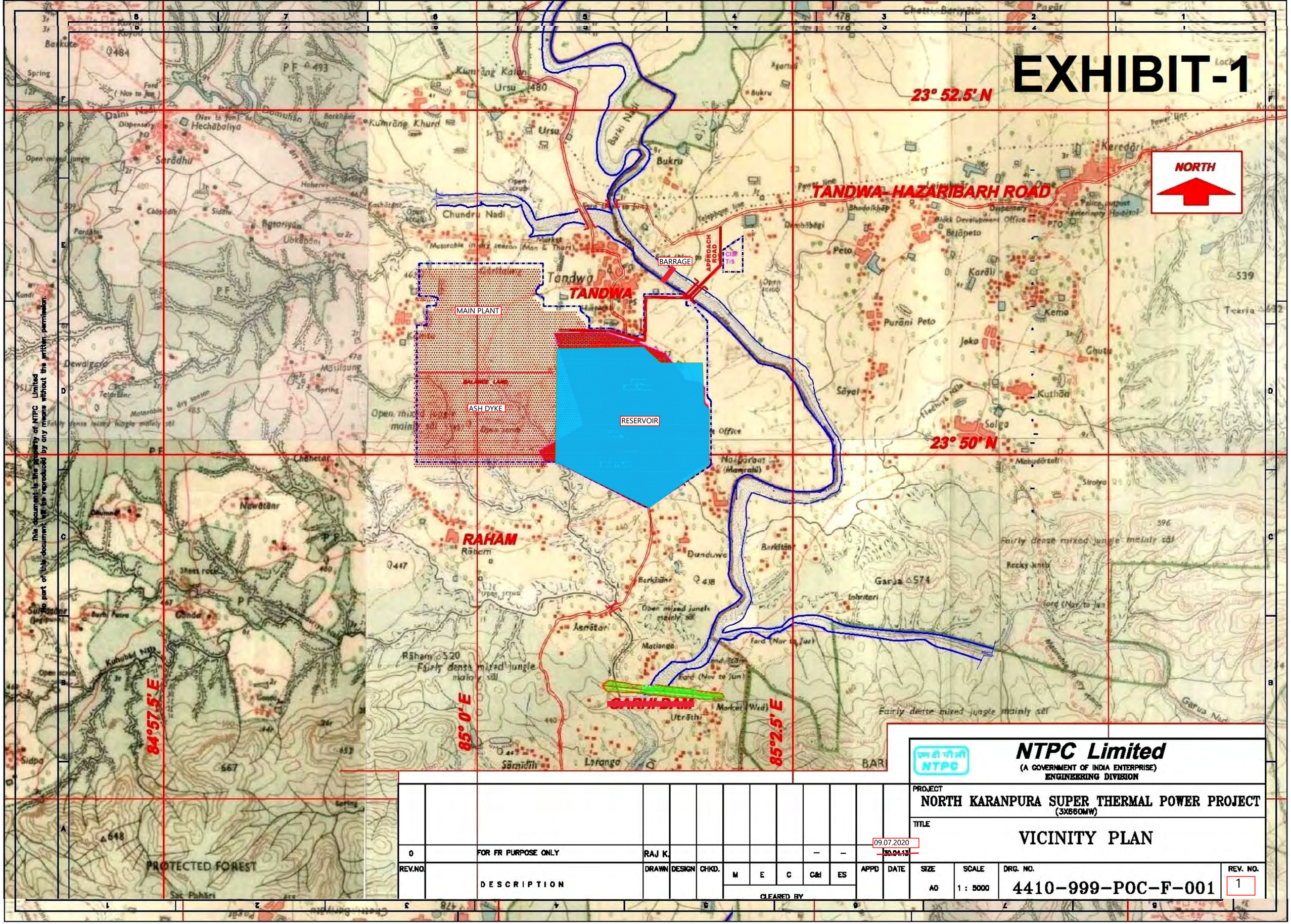
TRANSPORTATION TEAM

Gopal Shankar	Saxena	DGM(MECH ERECT)	MECH ERECT	9404951536
Anil Binit	Lakra	DGM(MECH ERECT)	MECH ERECT	9425178269
Bhabani Sankar	Mohapatra	SR. MANAGER(LAW)	LAW	9437142445
S N	Pandey	MANAGER(HR)	HR	9415003210

SECURITY & TRAFFIC CONTROL TEAM

		AC, CISF		
		INSPECTOR,CISF		
		CISF		
Prahalad	Prasad	SR.MANAGER(HR)	HR	9931394889
Sita Ram	Munda	ENGINEER(SAFETY)	Safety	9473196353

EXHIBIT-1



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REV.NO	DESCRIPTION	DRAWN	DESIGN	CHKD.	M	E	C	C&I	ES	APPD	DATE
0	FOR FR PURPOSE ONLY	RAJ K.						—	—		09.07.2020

CLEARED BY

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

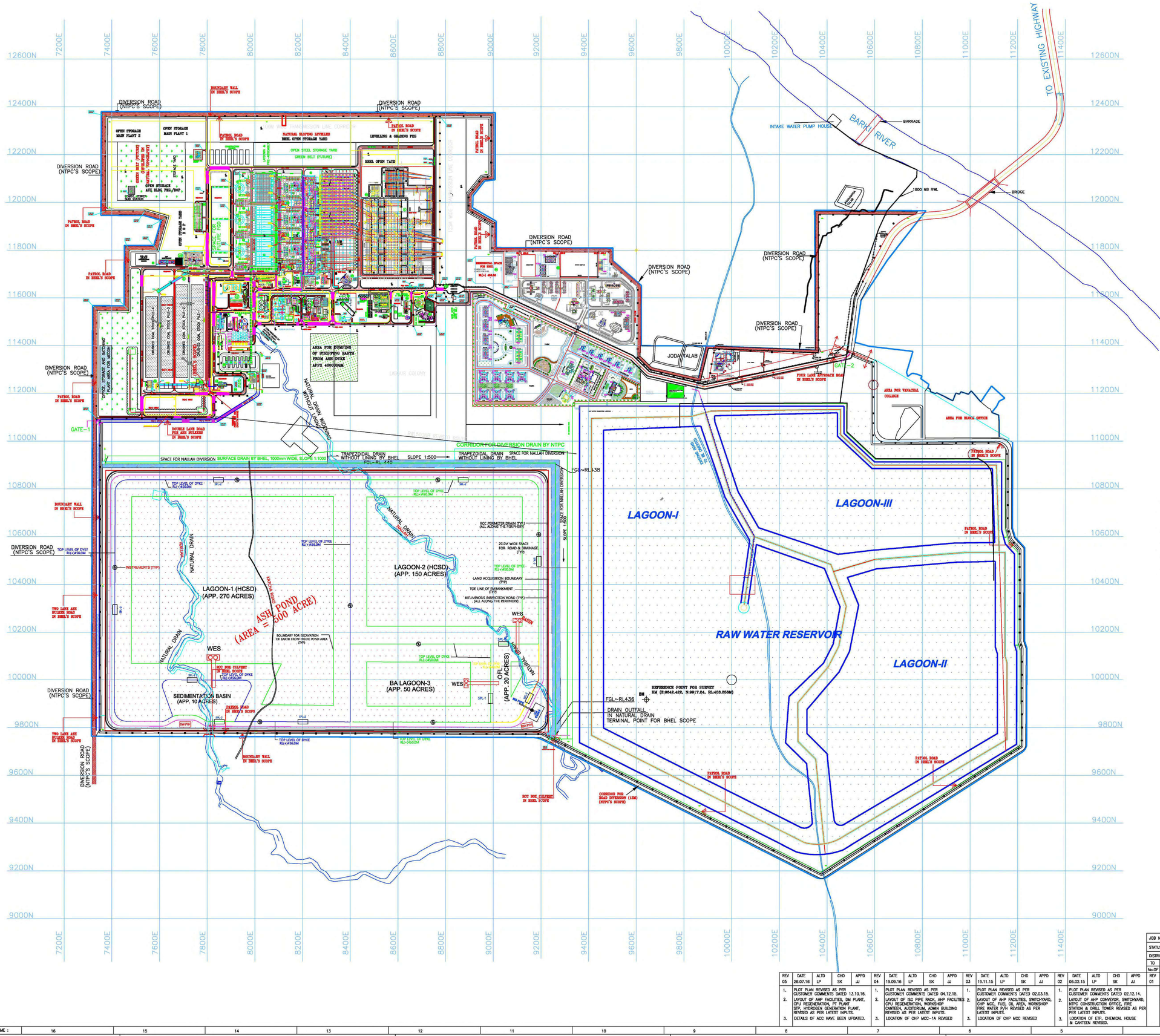
PROJECT
NORTH KARANPURA SUPER THERMAL POWER PROJECT
(3X660MW)

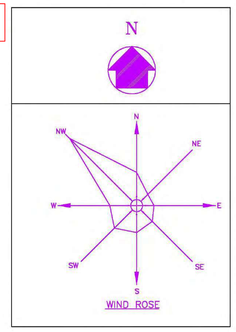
TITLE
VICINITY PLAN

SIZE	SCALE	DRG. NO.	REV. NO.
A0	1 : 5000	4410-999-POC-F-001	1

DRAWING NO. PE-DG-405-100-M001

EXHIBIT-2





LIST OF BUILDING/EQUIPMENT SHOWN

NO	DESCRIPTION
1	SWITCHYARD
2	TRANSFORMER YARD
3	POWER HOUSE BUILDING
4	BOILER
5	MILL BAY
6	ELECTROSTATIC PRECIPITATOR
7	STACK
8	COAL STOCK YARD
9	ASH HANDLING PLANT
10	MCC CUM CONTROL ROOM FOR CHP
11	PT PLANT
12	D.M PLANT(DG/CONVENTIONAL)
13	D.M. WATER TANKS & PUMP HOUSE
14	SEWAGE TREATMENT PLANT
15	EFFLUENT TREATMENT PLANT
16	CW TREATMENT & CHLORINATION PLANT
17	F.O. UNLOADING, STORAGE & PUMP HOUSE
18	CANTEEN
19	O&M STORES
20	WORKSHOP
21	COOLING TOWER
22	A.C.W. PUMP HOUSE
23	COMPRESSOR HOUSE
24	ADMINISTRATIVE BUILDING COMPLEX
25	FLY ASH SILO / ASH DESPATCH AREA
26	CONSTRUCTION YARD (SGO)
27	DG SET
28	ESP CONTROL ROOM
29	CONDENSATE STORAGE TANK
30	ASH COMPRESSOR HOUSE
31	CHEMICAL HOUSE-PT PLANT
33	FIRE STATION & DRILL TOWER
33	AUDITORIUM
34	SWITCHYARD CONTROL ROOM
35	MAIN GATE
36	SERVICE BUILDING
37	ASH WATER TANK/ PUMP HOUSE
38	HYDROGEN GENERATION PLANT
39	AUXILIARY BOILER, MCC & CONTROL ROOM
40	NTPC'S CONSTRUCTION OFFICE SPACES
41	CLARIFIED WATER TANK & PUMP HOUSE
42	FILTERED WATER TANK & PUMP HOUSE
43	CHEMICAL LAB-PCRI
44	FIRE WATER TANKS & PUMP HOUSE
45	FIRE WATER BOOSTER PUMP HOUSE
46	CPU REGENERATION AREA
47	BA SLURRY PUMP HOUSE
48	NTPC COLONY
49	BHEL SITE OFFICE
50	COAL SLURRY SETTLING POND
51	WATER SYSTEM CONTROL ROOM & ANNEX.
52	CHP PUMP HOUSE-2
53	AHP MCC
54	CHP PUMP HOUSE-1
55	CHP MCC-1B
56	VFD MCC ROOM
57	SILO UTILITY BUILDING
58	CHP MAINTENANCE BUILDING
59	BHEL-ISG CLOSED STORE
60	DOZER SHED
61	RESIDENTIAL SPACE FOR BHEL
62	CRUSHER HOUSE (ISG)
63	WATCH TOWER-25 NOS.
64	AIR COOLED CONDENSER

LEGEND:

1. ROADS (DOUBLE LANE) . . . . . SHOULDER LINE / PAVEMENT LINE
   ROADS (SINGLE LANE) . . . . .
2. BOUNDARY WALL (IN BHEL'S SCOPE) . . . . .
3. LAND ACQUISITION LINE . . . . . TOP OF SLOPE / BOTTOM OF SLOPE
4. SLOPE LINE . . . . .
5. PROPOSED BORE WELL HEADER (LENGTH: 2220M APPX) . . .

NOTES:-

1. ALL DIMENSIONS ARE IN MM & ELEVATIONS IN METERS UNLESS STATED OTHERWISE.
2. FINISH FLOOR LEVEL = RL (+)457.50 M,CORRESPONDS TO PLANT EL O.0M(GROUND FLOOR OF STG BUILDING) FINISHED GROUND LEVEL OF BOP AREAS AS MARKED.
3. LOCATION/SIZE OF BOP FACILITIES IS TENTATIVE ONLY
4. APPROACH ROAD TO TOWNSHIP IS IN OWNER'S SCOPE.
5. SEPARATE STORM WATER DRAINAGE SHALL BE PROVIDED FROM TOWNSHIP TO DRAIN OUTFALL BY OWNER.
   - ROADS,DRAINS,BOUNDARY WALL,BUILDINGS,VARIOUS FACILITIES ETC. FOR TOWNSHIP ARE IN OWNER'S SCOPE OF WORK.
   - ASH POND IS IN OWNER'S SCOPE OF WORK.

REV	DATE	ALTD	CHD	APPD
05	26.07.16	LP	SK	JJ
	1. PLOT PLAN REVISED AS PER CUSTOMER COMMENTS DATED 13.10.16.			
	2. LAYOUT OF AHP FACILITIES, DM PLANT, CPU REGENERATION, PT PLANT STP, HYDROGEN GENERATION PLANT, REVISED AS PER LATEST INPUTS.			
	3. DETAILS OF ACC HAVE BEEN UPDATED.			
04	19.09.16	LP	SK	JJ
	1. PLOT PLAN REVISED AS PER CUSTOMER COMMENTS DATED 04.12.15.			
	2. LAYOUT OF ISG PIPE RACK, AHP FACILITIES CPU REGENERATION, WORKSHOP CANTEEN, AUDITORIUM, ADMIN BUILDING REVISED AS PER LATEST INPUTS.			
	3. LOCATION OF CHP MCC-1A REVISED			
03	19.11.15	LP	SK	JJ
	1. PLOT PLAN REVISED AS PER CUSTOMER COMMENTS DATED 02.03.15.			
	2. LAYOUT OF AHP FACILITIES, SWITCHYARD, CHP MCC, FUEL OIL AREA, WORKSHOP FIRE WATER P/H REVISED AS PER LATEST INPUTS.			
	3. LOCATION OF CHP MCC REVISED			
02	06.02.15	LP	SK	JJ
	1. PLOT PLAN REVISED AS PER CUSTOMER COMMENTS DATED 02.12.14.			
	2. LAYOUT OF AHP CONVEYOR, SWITCHYARD, NTPC CONSTRUCTION OFFICE, FIRE STATION & DRILL TOWER REVISED AS PER PER LATEST INPUTS.			
	3. LOCATION OF ETP, CHEMICAL HOUSE & CANTEEN REVISED.			
01	28.10.14	APS	SK	JJ
	LOCATION OF PLANT SHIFTED WITHIN PLANT BOUNDARY AS PER MOM DATED 07.10.14.			

NTPC DWG.NO: 4410-001-999-POC-F-001

CUSTOMER: एनटीपीसी NTPC

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

JOB NO. : 405
STATUS : CONTRACT
DISTRIBUTION :
TO
No.OF

PROJECT: NORTH KARANPURA SUPER THERMAL POWER PROJECT (3X660MW)

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	APS	–SD–	04.06.14
	DESN	KK	–SD–	04.06.14
	CHD	SK	–SD–	04.06.14
	APPD	AJ	–SD–	04.06.14

TITLE: PLOT PLAN

MAX	ELEC.	MSE	CIVIL	C&I	–	DEPT.
						SIGN
						DATE

SCALE 1:5500

DRAWING NO. PE-DG-405-100-M001

SHEET 1 OF 2 REV. 5A (SiteR6)

FORMAT SIZE A0

ELECTRONIC FILE NAME :